San Clemente Island

Wildland Fire Management Plan

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San Clemente Island

Wildland Fire Management Plan

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San Clemente Island

Wildland Fire Management Plan

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Executive Summary

Purpose

This San Clemente Island (SCI or Island) Wildland Fire Management Plan (Fire Plan) will shape fire-related policy, management, and decisions on the Island for the next five years. It sets the course for sound integration of the U.S. Navy's mission, fire protection, and natural resource protection on SCI. Its primary purpose is to provide for a full and complete range of training opportunities for military users, while complying with environmental laws and achieving sustainable ecosystem management.

This Plan addresses all aspects of wildland fire management consistent with federal wildland fire management policy (January 2001 [Interagency Federal Wildland Fire Policy Review Working Group]) and environmental laws. Federal wildland fire policy mandates that all federal lands with burnable vegetation have a fire plan and resources to safely mitigate losses. This Fire Plan is to be consistent with this policy as it was adopted by the Department of Defense (DoD) Wildland Fire Policy Working Group in 1996 and made DoD fire policy through DoD Instruction (INST) 6055.06 (DoD Fire and Emergency Services Program December 21, 2006).

Planning Process

The office of the Commander Navy Region Southwest (CNRSW) initiated this planning process. In a collaborative setting, the users, managers and agencies with responsibility for, or interest in SCI resources, partnered together in the form of a Fire Plan Working Group that set the Plan goal, identified key issues, and defined successful outcomes for these issues. This Working Group consisted of the Commanding Officer (CO) Naval Base Coronado (NBC) and representatives from CNRSW Natural Resources Office (NRO), CNRSW Federal Fire Department, San Clemente Island Range Operations, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), Southern California Offshore Range (SCORE), Naval Facilities Engineering Command Southwest Division (SWDIV), and tenant users of Island resources including Naval Special Warfare Group One (NSWG-1), US Marine Corps Expeditionary Warfare Training Group Pacific (EWTGPAC), 1st Marine Expeditionary Force (I MEF), Space and Naval Warfare Systems Center (SPAWARSYSCEN), Commander THIRD Fleet, and HC-85 Commander Helicopter Wing Reserve.

The following goal was agreed to by the Working Group:

Protect life, property, and maximize training opportunities, while protecting natural ecosystem functions and diversity, and minimizing total cost.

Core Strategy and Elements of Fire Plan

Consistent with federal fire policy, this Plan's approach is to minimize the cost of fire suppression, considering firefighter and human safety, other values at risk, and consistent with natural resource objectives. Three primary components of this approach are: prevention; fuels management; and rapid-attack suppression.

Prevention. Preventing unplanned ignitions by managing fire ignition risk as hazardous weather and fuel conditions increase is the first line of defense. Prevention strategies are based primarily on implementing a Fire Danger Rating System which will align fire ignition risk with fuel hazard conditions (fuels, topography and weather) in the wildland environment. On SCI weather conditions require constant monitoring during the fire season. This helps prepare appropriate suppression response in high danger conditions.

Fuels Management. Managing fuel loads by establishing safety corridors or buffers where fuels are reduced, defensible space around structures, and low-intensity landscape modification that also meets ecological objectives are the initial lines of defense to reducing adverse ecological effects of wildland fire, and the associated cost of fire suppression.

Suppression. Due to the high cost of providing the manning and equipment necessary for the suppression of wildland fire, using timely and appropriate suppression response through tactical and strategic planning, it is extremely necessary. Staging manpower and assets when fire risk is high will reduce the overall cost of suppression. Using both civilian and military resources, operational costs can be reduced. Annual risk analysis along with recorded statistics will help in determining future funding and needs of the suppression protection of wildland fire on SCI.

The following elements of the Plan build on the above core strategy:

1. The Plan describes the values at risk from fire: human life, military training, structures, and natural resource sustainability.
2. Recommendations are designed around these assumptions:
   - a worse-than average fire scenario but not a worst case
   - 3-minute notification of first fire observation
   - 5-minute getaway for ground assets from first notification
   - 15-minute getaway for helicopter suppression asset
   - 30-minute on-site response for ignitions that leave Impact Area fuelbreaks, or a 10-minute response to the scene with a quick-attack fire suppression apparatus for a NSWG-1 Training Area Range (TAR).
   - SHOBA is unsafe for any ground suppression. No aerial firefighting is assumed within the designated SHOBA Impact Areas I and II fuelbreaks.
   - There is a commitment to habitat condition objectives that are consulted on and agreed to by USFWS under Section 7 of the Endangered Species Act. (A Biological Opinion (BO) was issued on the San Clemente Island Military Operations and Fire Management Plan, addressing this Fire Plan in concert with military training activities, on November 17, 2008 [FWS-LA-09B0027-09F0040]). These objectives are based on a desired

community condition including its distribution, structure, and function compared to a baseline or reference condition. This approach seeks to control risk to natural communities of extreme fire scenarios, rather than try to mimic an evolutionary Island fire pattern. They place management controls on fire return interval, severity, and size.

- There is a commitment to protect federally listed and other management focus species that are at risk from fire, to ensure their self-sustainability with fire as part of their environment.

3. The Plan establishes land management units that are overlaid with the Island crash grid that is currently in routine use.
4. The start and end of fire season will be declared when live fuel moisture reaches ~ 200% by OIC, through recommendations from the Wildland Fire Coordinator. At the start of fire season, fuelbreaks and drivable roads should be in place, and water storage containers should be filled at VC-3, Mt. Thirst, and TAR 10. This is also when the FDRS will be announced on a daily basis to manage fire risk and guide the staging and availability of necessary suppression assets.
5. The Plan implements three types of fuels management:
   - high-intensity fuels management safety corridors or buffer zones;
   - defensible space around structures; and
   - low-intensity landscape modification with prescribed fire that meets fuels management, resource protection and habitat restoration objectives.
6. The Plan builds up human resource capacity for improved suppression response by assigning responsibilities to a Wildland Fire Coordinator, providing training to Fire Department and military operators and civilians, improving access to a Rapid Fire Response Team. The WFC will organize a training program for FFD San Diego personnel assigned to SCI. WFC will appoint along with the Wildland Fire Coordination Group, military and civilian personnel, to assist in support of suppression efforts during a wildland fire incident on SCI. FFD San Diego will provide training in line of that support when needed, including the training of personnel to man the standby quick-attack suppression apparatus.
7. Rapid-attack suppression capability by air is through staging of a private or military helicopter at various levels of alert according to the Fire Danger Rating if training is being conducted. Enhanced ground suppression is achieved with acquisition of a quick-attack fire suppression apparatus (a wildland engine compliant with the interagency National Wildfire Coordinating Group standards, but with some adjustments--see Section 4.4.1).
8. Improved firefighting infrastructure is necessary to improve access and response to fire emergencies:
   - Develop improved electronic communications capable of rapid notification of any fire or any life and safety incident on SCI. Any system should guarantee ground (Federal Fire) to air (helicopter) radio communication.
   - Improve the road network. Road design, construction, and maintenance should be to a standard that functions as a fuelbreak, is secure from ero-

sion, and that will support a Type 3 equivalent fire engine for emergency response. For TAR 10 in LMU 7, the road immediately south of the dunes should remain passable for two-wheel drive vehicle. A staging area for a portable water tank and emergency vehicle should be located in the immediate vicinity of TAR 10. For TAR 17 in LMU 10, the existing unpaved road to Seal Cove along the LMU boundary should remain passable by two-wheel drive emergency vehicles to the canyon directly east of Eel Point.

- Future use of an airfield at VC-3 will benefit fire suppression as well as aerial application of retardant for fuelbreaks.
- Staging of water for refilling during suppression will benefit suppression response.

9. Habitat Success Thresholds are established based on the assumptions above. These thresholds are not mandatory, but intended to guide both fire response and land management. They relate to objectives for ecological communities and protected species in the SCI Integrated Natural Resources Management Plan.
10. Sufficient reporting and monitoring is necessary to evaluate, adapt and improve the program. A monitoring program would consist of mapping the perimeter at each fire, documenting ignition source, mapping fire severity, assessing effects on listed species, an annual review, biennial natural resources update, and a Fire Plan review/update in five years.
11. Collaborative partnerships are proposed for improved planning, management, implementation, and cost efficiency.
    - Establish a Department of Navy Wildland Fire Coordinating Group to improve availability of suppression assets and cost-effectiveness of their use, as well as human resources available to implement the Plan.
    - Establish an SCI Wildland Fire Coordination Group led by the OIC that involves user command representatives including SCORE, as well as representatives from Federal Fire, Public Works, EOD, and natural and cultural resources.
12. Develop implementation instruments such as range rules, instructions, or cooperative agreements to assure Plan implementation. An Island-wide Fire Management Instruction to augment the SCORE Range Users Manual that includes the FDRS and reaches the entire spectrum of those who need to know is recommended, applicable to all tenants and users of the Island as well as personnel stationed there as part of shore facilities support.

Implementation Responsibilities and Costs

The following preliminary assignments are made (funding may not necessarily come from the entity assigned responsibility):

- *CNRSW Assistant Chief of Staff for Public Safety.* Communication system upgrade. Improve radio and telephone communication system so that reporting of a fire incident reaches Federal Fire in three minutes or less from time of first knowledge. Improve access to high-speed Internet service for managing real-time fire information and weather data.

- *Naval Base Coronado Public Works Center.* Road design, construction, and maintenance to a standard that functions as a fuelbreak, and that will support a Type 3 equivalent fire engine for emergency response. Priority roads are along Land Management Unit boundaries that are expected to serve as part of an Island fuelbreak system.
- *Federal Fire Department.*
  - Quick attack, all-wheel drive fire apparatus on Island to specifications (see Section 4.4.1 IV) for use of incendiaries north of SHOBA during certain fire danger conditions.
  - Wildland Fire Support Crew based on 3-4 weeks of overtime pay for existing off-duty federal firefighters or contracted. Alternatively, the current DoD Instruction allows for the use of "call when needed" reserve units to fill this need.
  - Set up seasonal Rapid Fire Response Team agreement.
  - GS 10-11 Wildland Fire Coordinator.
  - Training of 2-3 support staff assigned to Wildland Fire Coordinator, each should have 40 hours each of wildland fire training. Alternatively, the current DoD Instruction allows for the use of "call when needed" reserve units to fill this need.
  - Wildland Fire Coordinating Group.
  - Advise the OIC when live fuel moisture in the wildland environment reaches ~ 200%, to announce the start and end of fire season.
  - Computer system upgrade for Fire Chief on Island to achieve high-speed Internet access.
  - Update Fire Instructions for consistency with DoD fire policy.
  - For prescribed fire monitoring and post-fire reporting, access to a camera, global positioning system, and Arc/View software for a geographic information system will be necessary.
- *Environmental Program.*
  - Aerial suppression support: private helicopter.
  - Prescribed Fire Program, including coordinating priorities among operators, natural resources managers, and EOD. Estimated newly burned additions are up to one mile per year of fuelbreaks and 300 acres per year of additional strip or patch burns. Work with WFC to monitor prescribed burns that have more of an experimental component to burn objectives.
  - Monitoring to include fire perimeter mapping, fire severity mapping, weather confirmation at time of fire, fire effects analysis on listed species.
  - Environmental Program/NRO will convene and confer regarding an update to the Fire Plan in five years if it has not been done earlier. If found beneficial, this update will be done in tandem with the INRMP update.
  - Adaptive management annual review and update to include annual review, major update in five years.
- *Naval Base Coronado/SCI Officer In Charge.*
  - Establish an SCI Wildland Fire Coordination Group.
  - Announce the start and end of fire season.

- The continued need for staffing of two to three seasonal firefighters will be determined after a three-year annual review of the effectiveness of other recommendations in this Plan by the OIC and Environmental Program/NRO.
- Sign prescribed burn plans and coordinate annual implementation of prescribed burns.
- Conduct an annual review jointly with the Environmental Program/NRO among parties with a stake in wildland fire management to reassess priorities and success criteria, and build on the past year's experience.

■ *SCORE:* Monitoring and documentation of ignition source, impacts of fire management on training. SHOBA Fuelbreak Installation. (Other fuelbreaks are considered above under Prescribed Fire Program, estimated newly burned additions at about one mile per year of fuelbreaks and 300 acres per year of additional strip or patch burns.)

■ *Environmental Program, Federal Fire Department, and/or SCORE:*

- RAWS weather station upgrade, maintenance and monitoring
- Education
- Develop Island-wide Instruction on compliance with FDRS and other Fire Management Plan requirements.

■ *Individual Military Units, As Appropriate.* Quick attack, all-wheel drive fire apparatus on Island to specifications (see Section 4.4.1 IV) for use of incendiaries north of SHOBA during certain fire danger conditions.

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1.0 Purpose and Background

1.1 Introduction

This San Clemente Island (SCI or Island) Wildland Fire Management Plan (Fire Plan) is intended to shape fire policy, management, and decisions on the Island for the next five years. It sets the course for sound integration of the U.S. Navy's mission, fire protection, and natural resources protection on SCI. Its primary purpose is to provide for a full and complete range of training opportunities for military users, while complying with environmental laws and achieving sustainable ecosystem management.

This Plan addresses all aspects of wildland fire management consistent with federal wildland fire management policy January 2001 [Interagency Federal Wildland Fire Policy Review Working Group]) and environmental laws. Federal wildland fire policy mandates that all federal lands with burnable vegetation have a fire plan and resources to safely mitigate losses. This Fire Plan is to be consistent with this policy as it was adopted by the Department of Defense (DoD) Wildland Fire Policy Working Group in 1996 and made the DoD fire policy through DoD Instruction (INST) 6055.06 (DoD Fire and Emergency Services Program December 21, 2006). DoDINST 6055.06 provides policy and criteria for the allocation, assignment, operations, and administration of the DoD Fire and Emergency Services (F&ES) and Emergency Medical Service programs. It states:

> Plan for and respond to wildland fires on installations using 2001 Federal Wildland Fire Management Policy (Reference (w)), established standards, local conditions' risk considerations, and the following:
>
> E3.8.1. For installations with burnable acreage or bordered by burnable acreage, prepare an Installation Wildland Fire Management Plan that identifies:
>
> E3.8.1.1. All wildland fire management strategies including military training availability, ecosystem sustainability, and protection of F&ES personnel and the public.
>
> E3.8.1.2. Wildland fire preparedness, preplanned dispatch for both initial and extended attack, and prescribed fire and prevention per NFPA Standard 1710 (Reference (x)). If required, the minimum level of service for wildfire suppression shall consist of a direct wildland attack capability within 10 minutes of arrival of the initial wildland fire company at the fire scene.

E3.8.2. Train all personnel involved in wildland fire management activities to the appropriate Publication Management System (PMS) 310-1 (Reference (y)) or NFPA Standard 1051 (Reference (z)), and all personnel shall be outfitted with protective clothing and equipment per NFPA 1977.

1.1.1 Consistency With Other Plans

This Plan is consistent with the SCI Integrated Natural Resources Management Plan (INRMP). An INRMP is the principal natural resources planning document for DoD Lands as required under the Sikes Act Improvement Act (SAIA) of 1997 (16 USC Section 670a). It is an ecosystem-based plan intended to guide installation commanders in managing their natural resources in a manner that is consistent with sustainability of those resources while ensuring continued support of the military mission. For the Island, this mission is:

To support tactical training and research and development efforts in the SCI Range Complex by maintaining and operating facilities and providing services, arms and material support to the U.S Pacific Fleet and other operating forces.

While this Fire Plan has its own goal and objectives (Chapter 4), it also meets the goal set forth in the INRMP, which is:

SCI INRMP Goal: *Support the military requirements of the Pacific Fleet while maintaining long-term ecosystem health. The INRMP will:*

- Facilitate sustainable military readiness and foreclose no options for future requirements of the Pacific Fleet.
- Protect, maintain, and restore priority native species to reach self-sustaining levels.
- Ensure ecosystem resilience to testing and training impacts.
- Maintain the full suite of native species, emphasizing the endemics.

This Fire Plan is also consistent with the Southern California Range Complex Management Plan (SOCAL RCMP), which centers around the use of SCI for training and testing. The SOCAL RCMP is an integrated operational and environmental planning document designed to ensure range sustainability in order to maximize operational forces' unimpeded access to the training complex. The SOCAL RCMP develops a strategic vision for range operations and investment with a 10-year planning horizon, using principles of sustainable management, based on a set of range complex-required capabilities derived from Fleet training and testing needs.

Finally, this Fire Plan was consulted on under Section 7 of the Endangered Species Act. A Biological Opinion (BO) was issued on the San Clemente Island Military Operations and Fire Management Plan, addressing this Fire Plan in concert with military training activities, on November 17, 2008 (FWS-LA-09B0027-09F0040). The terms and conditions of this BO are included in Chapter 4 of this Fire Plan.

1.2 Planning Process

The office of the Commander Navy Region Southwest (CNRSW) initiated this planning process. In a collaborative setting, the users, managers and agencies with responsibility for, or interest in SCI resources, partnered together in the form of a Fire Plan Working Group. Stakeholders came together regularly at meetings and in the field over the course of the year 2001 to identify and discuss issues, clarify what currently occurs, jointly develop a sense of the desired fire management direction, and arrive at fire management and implementation strategies. The Fire Plan was then put on hold as discussions ensued about how to apportion the costs of implementing the Plan, as well as complete consultation on the Plan's approach with the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA). The planning process was reinitiated in 2003 with the addition of some new training ranges proposed by Naval Special Warfare Group One (NSWG-1).

This Working Group consisted of the Commanding Officer (CO) Naval Base Coronado (NBC) and representatives from CNRSW Natural Resources Office (NRO), CNRSW Federal Fire Department, San Clemente Island Range Operations, USFWS, California Department of Fish and Game (CDFG), Southern California Offshore Range (SCORE), Southwest Division Naval Facilities Engineering Command (SWDIV), and tenant users of Island resources including NSWG-1, US Marine Corps Expeditionary Warfare Training Group Pacific (EWTGPAC), 1st Marine Expeditionary Force (I MEF), Space and Naval Warfare Systems Center (SPAWARSYSCEN), Commander THIRD Fleet (COMTHIRDFLT), and HC-85 Commander Helicopter Wing Reserve. The USFWS regularly attended these meetings and commented on document drafts.

1.3 Key Issues

A "key issue" is a focus of effort for the Working Group because it is important, not easily solved, and it may have more than one solution in which trade-offs need to be evaluated. The Working Group identified the following key issues to be addressed using the framework described later in this chapter; they are listed in no particular order:

- Uncontrolled wildland fires threaten personnel, facilities and natural resources. Wildland fire hazards are highest during extended dry periods. Fire danger may increase as SCI continues to recover from damage caused by feral goat grazing, which existed perhaps for centuries but became out of control when domestic sheep grazing was terminated by the Navy after taking control of the Island in 1934.
- Recovery requirements for the endangered San Clemente loggerhead shrike have dictated the current fire management strategy. This has curtailed training by restricting units' time on the range, target size, and the use of incendiary munitions including tracers and illumination rounds.
- Complete access and flexibility in use of ordnance for training operations in SHOBA and other ranges is necessary to properly train military personnel to deployment standard. The Navy needs to use the entire area within firebreaks of designated Impact Areas (I and II) for training during fire season and breeding season for federally listed species.
- Suppression response times can be too long, depending on where a fire occurs, because of inadequate communication systems and poor road conditions. When response time increases, fires may become larger than suppression resources can contain in a timely manner, and result in more expensive containment measures and additional ecological damage.

- Fire suppression even from the air by helicopter over SHOBA Impact Areas is not safe from any altitude effective for water drops due to the presence of unexploded ordnance. There is a risk of explosion due to fire or suppression activity during a wildfire incident.
- Control of invasive plant species must be improved to protect habitat values for endemic species. Both uncontrolled and prescribed fires can have both positive and negative roles in exotic species management and must be evaluated on a situational basis.
- The removal of grazing feral animals has resulted in an increase in fuel loads in shrub and woodland areas. In the event of a fire, higher fuel loads may preclude achieving ecological objectives if the fires cannot be contained and controlled.
- The current level of fire protection afforded natural habitats is not deemed adequate to remove any use restrictions on SCI ranges imposed by the USFWS Biological Opinions (BOs) (see Table 1-2), although the suppression response time has been improved significantly by use of HC-85 and a private helicopter, instead of the U.S. Forest Service helicopter required under BO 1-6-97-F-21. Improved practices should result in greater flexibility for operations as a positive consequence of proactive management undertaken. Costs, including annual budgeting for helicopter standby and fire fighting costs, continue to rise with little appreciable return in operational flexibility.
- The funding source of fire management should be clearly defined and funding secured. Conflicts arise because operational commands and the shore support facilities responsible for overall management and maintenance of SCI have different funding sources. This may result in a scarcity of funding resources, as well as friction over who is required to fund various aspects of numerous programs required to maintain the SCI range complex.
- Fire management responsibilities must be clarified and funded to facilitate use of the Island for training by operational forces in higher fire danger conditions. The level of partnership among Island managers that may be necessary to implement this fire plan is not currently operational.
- It is paramount to have a balanced approach that does not over-emphasize suppression, which is the most expensive approach to fire management. Preventing fires is much more cost-effective than suppression and should receive more emphasis than it has in the past. A cost-effective balance of prevention, fuels management, and suppression strategies needs to be identified.
- Uncontrolled fires can be detrimental to San Clemente loggerhead shrike recovery. However, fire management for shrike protection may conflict with objectives for other species. It also conflicts with operational requirements for using ordnance. There has been no assessment of whether operational restrictions actually benefit San Clemente loggerhead shrike recovery.
- Fire suppression activities can cause more harm than the fire itself because of ground disturbance caused by the suppression vehicles and equipment. Fire control lines are necessary to fight fires at logical locations. Fire department personnel must be notified of habitat that is sensitive to off-road vehicles. This includes increased information in the form of up-to-date maps and charts clearly delineating natural resources values that require protection.
- DoD guidance currently identifies a collateral mandate or mission for wildland fire suppression consistent with what is identified in recent Federal Fire Policy, but this mission is not currently adequately staffed, equipped, or funded. There is little institutional reward for fighting wildland fire within

the Federal Fire Department (FFD), and the organization is geared almost completely to structural fire protection and crash or other emergency response.

- When training activity covers a large area with large quantities of potential fuel sources, the firefighting assets must be commensurate with the vegetation fuel hazard and risk of ignition.
- There is an emerging fuel hazard on the central part of the Island with the spread of the native colonizing shrub, coyote brush *(Baccharis pilularis)*, into grassland areas.
- Use of illumination rounds and other incendiary devices is a required and critical training activity for Navy and Marine Corps personnel for deployment overseas. Because of the risk of fire ignition during breeding seasons, use of incendiary devices has been severely curtailed resulting in reduced and suboptimal training. A recent Biological Opinion has alleviated some but not all of the restrictions (FWS-CA-2808 23 July 2002, reinitiation of BO 1-6-97-21).
- Under appropriate conditions, controlled burns could be used to support Explosive Ordnance Disposal (EOD) personnel so they have a clear view of the ground during ordnance sweeps, but currently there is no mechanism to conduct them.
- Communication systems, including internet computer systems, require improvement in terms of connectivity, range, reliability and dependability. Communication systems are critical for safety and to minimize the dangers of fires spreading quickly. The Fire Chief requires immediate access to the internet as well as communication with his firefighters on the scene and aircrews providing support. All personnel in the field require reliable communication in the event of emergencies and to report fires. Spectrum management is becoming critical and requires even greater coordination among the 11 commands on SCI.
- Fire planning cannot be segregated for different management organizations or types of resources on the Island. A plan encompassing all administrative areas and users on the Island is needed.
- Fire season restrictions have not been consistently implemented and should be predictable. Military operators must know constraints well in advance to ensure adequate training and exercise planning occurs.
- Areas of high military value and the need to conduct training with incendiary munitions warrant acceptance of a higher level of fire damage to the environment. The best way to minimize damage should be considered.
- The use of all terrain vehicles (ATVs) for resource protection has resulted in increased fire risk due to potential ignitions from sparks in dry grass.
- Mechanically-established fire and fuel breaks have environmental impacts, especially with regard to accelerated soil erosion and sedimentation due to improper drainage design. Alternatives need to be researched. Use of salt water for suppression on sensitive areas, such as water sources, may affect these resources.
- Documentation of fire patterns including numbers of fires, locations, and ignition sources has not been consistent and so has been ineffective at guiding management effort. Documentation of fire management success has similarly been inconsistent.

1.4 Current Fire Protection and Management Framework

1.4.1 Legal Framework

Wildland fire planning at SCI comes under the umbrella of a broader, national fire planning framework. Most of this framework is based on firefighting in which human life and values such as structures are threatened. The current DoD Wildland Fire Policy (DoDINST 6055.06) mandates compliance with federal fire policy. Key points of this policy are summarized in Table 1-1. Implementation of federal fire policy requires a valuation of the resources to be protected so that they may be ranked (Chapter 2). Facilities, infrastructure, wildland areas, wetlands, and sensitive species habitat must all be assigned a value by unit or area so that the required planning may take place and be formalized in fire management plans.

Table 1-1. Brief summary of federal wildland fire policies (USDI/USDA 1995).

PRIORITIES
Firefighter and public safety is the first priority. All fire management plans and activities must reflect this commitment. Protection priorities are (1) human life and (2) property and natural / cultural resources. If it becomes necessary to prioritize between property and natural / cultural resources, this is done based on relative values to be protected, commensurate with fire management costs. Once people have been committed to the incident, these resources become the highest value to be protected.
COST AND ECONOMIC EFFICIENCY
Fires are suppressed at minimum cost, considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives. Fire management programs and activities will be based on economic analyses that incorporate commodity, non-commodity and social values.
ECOLOGICAL ROLE OF FIRE
Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role.
PLANNING
Every area with burnable vegetation must have an approved FMP. FMPs must be consistent with firefighter and public safety, values to be protected, and land and resource management plans and must address public health issues. FMPs must also address all potential wildland fire occurrences and include the full range of fire management actions. Agencies will use compatible planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management activities.
GUIDING PRINCIPLES
■ Safety is top priority. ■ Plan for fire as an essential ecological process. ■ Support land and resource management plans. ■ Fire policy is established on a foundation of sound risk management. ■ Fire management must be economically viable. ■ Fire management is based on the best available science. ■ Public health and environmental quality are considered. ■ Coordination and cooperation are essential. ■ Fire management involves ongoing standardization of policy and procedures.

Several federal laws strongly influence the potential scope and tempo of military activities on the Island. These may be considered "drivers" of environmental compliance in that non-compliance could lead to disruption to the mission, a claim against the U.S. Navy or possible range closure. The National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA) influence how fire management activities are implemented. NEPA requires documentation of how environmental choices are made.

Prescribed burns must be coordinated with the Air Pollution Control Board to ensure that smoke-generating fires occur on days when other sources of air pollution do not exceed certain levels and conditions do not aggravate public health problems. This is not expected to be an issue on San Clemente Island.

Besides DoDINST 6055.06 (DoD Fire and Emergency Services Program 2006), the following guides fire management on SCI (Appendix C):

- Naval Operations Instruction (OPNAVINST) 11320.23F ("Fire Bill") specifically establishes policies, standards, guidance, and responsibilities for administering the Navy-wide Shore Activities Fire Protection and Emergency Services Program, focusing on structural fire protection and other emergency response.
- Intraservice Support Agreement between Naval Air Station North Island (NASNI) and Naval Auxiliary Landing Field (NALF) SCI and Commander, Naval Base San Diego to provide a Federal Fire Department at SCI, NASNI, Outlying Landing Field Imperial Beach, and Survival, Evasion, Resistance, and Escape (SERE) School, Warner Springs.
- Letter of Agreement Between the CO, NASNI, and Commander, Helicopter Wing Reserve (COMHELWINGRES) regarding scheduling and procedures to support airborne firefighting requirements of SCI, outlining the role of HC 85 helicopter assets in support of SCI training requirements during those periods when HC 85 has assets deployed during SCORE Operations.
- Interagency Fire Agreement (IA-5-92-02-005) and Operating Plan between Commander, Naval Base San Diego for the Federal Fire Department and the U.S. Forest Service Cleveland National Forest for mutual aid.
- NALF SCI INST3502.1A (November 19, 1991) "Brush/Grass Firefighter Training for SCI Personnel." This Instruction established a program for training personnel to be placed on a roster to augment Fire Department capability to fight grass and brush fires on SCI. "…All SCI personnel, E-6 and below except Crash/Fire and Security personnel, shall receive brush firefighting training unless specifically exempted for medical reasons or by the Officer In Charge." This training is to be provided annually.
- Draft of Commander, NSWG-1 INST 3550.5 (January 5, 2001) for Littoral Warfare Training Facility (MAROPS) "Fire Management Plan."

In addition, as part of the range certification process, fire-safe clearing on small arms and other ranges is conducted separately from other fire planning.

Table 1-2 summarizes existing parameters of two BOs that have changed fire management on SCI for protection of the San Clemente loggerhead shrike and the Island night lizard. The CNRSW NRO is currently seeking formal consultation and a new BO on this SCI Wildland Fire Management Plan. In addition to consulting on this Fire Plan, CNRSW will be consulting on military operations with the completion of the SCI Environmental Impact Statement (EIS), which is in support of the Range Complex Management Plan (RCMP).

In addition to Biological Opinions, a Conservation Agreement between the Navy and USFWS concerning the San Clemente Island fox *(Urocyon littoralis clementae)* dated 10 January 2003 contained some requirements related to fire management. Among other conservation measures, the Navy committed to take responsibility for the following:

- Promote recovery of native grassland and shrub communities and reduce the coverage of non-native annual grasses. The Navy has established the ability to propagate native plants through the operation of a viable native plant nursery and to enhance habitats by outplanting nursery grown plants in the field. This method of habitat augmentation will continue. Further, with implementation of the San Clemente Island Integrated Natural Resources Management Plan, and with the adoption and implementation of the San Clemente Island Fire Management Plan, prescribed fire can be used to foster a mosaic of grassland and shrubs with consequential restoration of native vegetation to improve grassland habitats.
- In order to minimize collisions between SCI foxes and vehicles, vegetation along certain roadside edges will be cut in focal areas where foxes are hit by vehicles and maintained to increase visual contact with foxes.

1.4.2 Fire Response Organization and Capability

The SCI FFD is responsible for fire suppression and management on the Island. The FFD falls under the Assistant Chief of Staff for Public Safety for CNRSW, based in San Diego. Organizational charts for CNRSW and for FFD on the Island are depicted in Figures1-1 and 1-2. The Officer In Charge (OIC) of SCI supervises non-range day-to-day operations and activities on and around the Island for the primary host command, NBC. The OIC has authority to sign prescribed fire plans, to summon aerial support assets from off-Island, and to garner necessary logistical support for fire-related operations. SCORE receives initial fire reports and summons an on-Island helicopter as necessary.

Wildland firefighting is assigned to Federal Fire Department but inadequately funded. The DoD guidance (see Appendix C DODINST 6055.5) currently identifies a mandate or mission for wildland fire suppression, but without forcing mechanisms for funding. Current Department of Navy Instructions have not been modified based on Federal Wildland Fire Policy, but this is expected in the future. Organizationally, the FFD is staffed and equipped almost completely to provide structural fire protection and crash or other emergency response, and does not meet National Fire Plan or Federal Fire Policy standards. By national direction there must always be a fire truck in reserve, but currently, SCI Fire Department is operating under a waiver to structural requirements alone.

A minimum of ten firefighters are on duty on SCI at any one time, with all personnel on 24-hour standby. Two fire stations, one at the airfield and one at Wilson Cove, are manned 24 hours a day, seven days a week. Currently, the available wildland fire resource on SCI at any time responds from Station #10 out of Wilson Cove. This station is manned by a four-man crew and responds with one Type-1 structural apparatus and one Type-3 two-wheel drive wildland fire apparatus. Engine types are defined according to National Wildfire Coordinating Group (NWCG) standards (see www.nwcg.gov/teams/fewt/typ-std.pdf *or* NWCG Interagency Incident Business Management Handbook 2). There are four firefighters and a Battalion Chief in residence at Wilson Cove Station #10, and a KMA 750-gallon engine, a GMC 500-gallon brush truck and a 750-gallon ward engine. There are 16 water hydrants located in the vicinity of Wilson Cove, supplied by the 1,000,000-gallon Island tank.

With the airfield closed, additional response comes from Station #11 and consists of two Crash, Fire & Rescue (CFR) all-terrain apparatus, each with a three-man crew. A similar reserve engine is available, only if the airfield is shut down, since it only can be manned by staff exclusively assigned to airfield crash response. There are six firefighters assigned to the Station #11 airfield crash team with three crash engines. The crash trucks contain 1,000 gallons of water and are restricted to road use. Four hydrants at the airfield are supplied by a 100,000-gallon tank. There are also 10,000-gallon drinking water tanks located at OP1, Mt. Thirst, Vista, Peak, the Photo Lab complex and other buildings.

Table 1-2. The following summarizes three USFWS Biological Opinions pursuant to Endangered Species Act Consultations on training activities. These BOs are related to fire management (BO 1-6-97-F-21), activities related to the establishment of an Island Night Lizard Management Area (BO 1-6-97-F-58), and FWS-CA-2808 (23 July 2002), which reinitiated BO 1-6-97021

Measures Offered By the Navy

- Adopt Fire Instruction.
- Develop fire training and education pamphlets for range users, and yearly briefings by NRO for regarding fire prevention.
- Conduct yearly NRO briefings to the Federal Fire Department concerning the Endangered Species Act and wildland fire issues.
- Restrict ordnance use during fire season.
- Reduce size of target areas and reduced number of targets.
- Restrict activities involving ordnance and artillery to fixed operating areas surrounded by firebreaks.
- No training activities in Shore Bombardment Area (SHOBA) involving incendiary and other pyrotechnic devices during the overlap breeding/fire seasons unless on-site suppression resources sufficient to extinguish all incidental fires are present. Onset of fire season to be determined by the NRO botanist and on-island Fire Chief.
- Fire Suppression Measures to include existing Memorandum of Understanding (MOU) between the USFS and the FFD to address the suppression of fires on the southern portion of the island and the steep areas of the eastern escarpment (aerial suppression zone).
- Prescribed Fire is identified as a component of the management strategy for SCI.
- Install firebreak to contain fires in Impact Area 2.
- All Standard Operating Areas to be surrounded by firebreaks, and coordinate annually with FFD and USFS in advance of fire season to develop and implement a firebreak addendum to the Wildland Fire Management Plan.
- Implement the fire management practices of the Fire Management Plan, once completed.

Conservation Recommendations

- Apply fire retardants surrounding the remaining population of Santa Cruz Island winged rock cress (Sibara filifolia).
- Survey for sensitive species prior to installation of any firebreak, or any controlled burn. Informally consult with the USFWS prior to firebreak installation.
- Mark individual SCI bushmallow plants prior to EOD removal, fuelbreak establishment, and training range backburning to enable personnel to avoid individual plants.
- Conduct research on fire effects on the recovery of listed plant and animal populations.
- Research the distribution of Island night lizard in postburn areas as part of scheduled Island night lizard surveys.
- Apply aerial herbicide within firebreak corridors when wind speeds are below 13 knots.
- Survey to assess the status of federally listed plant species within the fuelbreak boundaries and in and adjacent to Horse Beach Canyon.
- Collect seed from listed plants within impact areas. Propagate plants for future planting within and adjacent to the impact areas, prioritizing San Clemente Island bushmallow seed or cuttings from within Impact Area 2.
- Include detailed location information and impact avoidance recommendations for each listed plant species in the Fire Management Plan.
- Notify USFWS when conservation recommendations are implemented.

Reasonable and Prudent Measures

- Improve maintenance of the electrical system on SCI.
- Maintain "trim line" of 25 feet around buildings and generators.
- Conduct annual ignition source review.
- Limit incendiary ordnance to non-windy conditions during fire season.
- Reduce size of the impact area during fire season (this requirement later adjusted to an expanded zone by FWS-CA-2808). Maintain firebreaks at each target area.
- Train and educate personnel.
- Close SHOBA for ordnance training during the entire fire season whenever USFS aerial suppression units are unavailable because of fires on the mainland.
- No training in SHOBA involving incendiary devices during overlap of fire season and shrike breeding period. This requirement was later adjusted by FWS-CA-2808. The Navy now can use incendiary illumination rounds, white phosphorus, and tracer rounds in Impact Areas 1 and 2 within maintained firebreaks for two hours prior to sunrise, year-round, except when wind speed exceeds 13 knots, using a real-time weather recording system. Continue training activities as described unless the percentage of the shrike population inhabiting the Impact Area exceeds 10 percent of the island-wide population.
- All Standard Operating Areas surrounded by firebreaks.
- FFD and USFS develop and implement a firebreak addendum to the Wildland Fire Management Plan annually.
- Prescribed fires meeting natural resources objectives shall be allowed.
- Minimize adverse effects to shrikes and island night lizards during fuelbreak installation and maintenance, and reduce the potential for spread of wildfire outside of existing firebreaks.
- Implement the loggerhead shrike recovery program (captive breeding, reintroduction, predator management, genetics research, population monitoring, and habitat restoration), monitoring/mapping of listed species (western snowy plover, island night lizard, sage sparrow, listed plant species), propagation and out-planting of Santa Cruz Island rockcress, propagation and out-planting of other listed plant species, and genetics research on listed plant species.
- Continue to monitor the level of take that may occur within fuelbreaks in impact areas, including loss of island night lizard habitat, and shrike habitat, individuals, and nests.

Terms and Conditions

- Maximize use of roads to position firefighters between sage sparrow habitat and approaching fires.
- Minimize use of backburning in sage sparrow habitat. Water will be the primary suppression agent in sage sparrow habitat.
- FFD shall relay aerial suppression availability to the Range Safety Officer (RSO) on a daily basis. RSO shall use an anemometer to determine wind speed when analyzing ignition potential.
- Personnel trained in the use of the on-site fire suppression equipment shall be present at each fixed range (except SHOBA) when exercises may cause fires.
- Fire history databank to include ignition source, fire size, weather conditions at time of ignition, time of initial report, time of response, method of suppression, duration, intensity, and proximity to sensitive resources.
- Site visit by NRO biologist within one week of fire.
- Aerial surveillance on any fires over 100 acres in size.
- Gas combustion engines to have spark arrestors.
- Prohibit incendiary use for entire fire season if wildfire due to incendiary use occurs outside of firebreaks. Informally consult. If take of an individual shrike, then cease activity and formally consult. (This later modified by FWS-CA-2808.)
- Quantify number, cause of fires in no-suppression zones.
- On-site fire suppression unit during control burns near shrike breeding areas.
- Prohibit use of incendiary devices unless on-site aerial resources are present.
- Notify USFWS of ignition source and maps of all fires.
- Share criteria defining the "fire season" with USFWS.
- Notify the USFWS in advance of any prescribed burn.
- Provide USFWS review and comment on draft and final SCI Fire Management Plan.
- Coordinate between shrike monitors and firebreak installation contractors prior to firebreak installation.
- Assure aerial fire suppression units are not staged in the vicinity of the Santa Cruz Island winged rock cress population, or on beaches within SHOBA.
- Establish preset flight pattern that avoids shrike breeding areas for helicopters involved in range maintenance and clean-up. Brief pilots.
- Qualified biological monitor observes shrikes during all phases of firebreak installation. Provide to USFWS a written annual report within three months of installation.
- Maintain effective and logistically practical fuelbreaks around Target Areas 1 and 2 prior to use of incendiary devices, illumination rounds, and tracers during each fire season. Fuelbreak alignment and installation shall protect the maximum possible number of shrikes, including crossing below the China 4 historical territory adjacent to Impact Area 2.
- Assess, in coordination with the Service and the Navy's Fire Management Plan team, the utility of firebreaks around Horse Beach Canyon in the vicinity of the SEAL Team training area.
- Continue to monitor the loggerhead shrike population within Impact Areas 1 and 2. Impact areas shall be monitored a minimum of three times each during the breeding and nonbreeding seasons. Coordinate with the Service prior to the onset of fire season and at the end of shrike breeding season to discuss the number of loggerhead shrikes detected within the impact areas and how this relates to the island-wide status of the shrike.
- Continue habitat restoration, predator management and monitoring, captive breeding, and re-introduction to benefit the San Clemente loggerhead shrike, in accordance with approved recovery plans.
- The Navy shall assure that operators using San Clemente Island comply with weather restrictions.

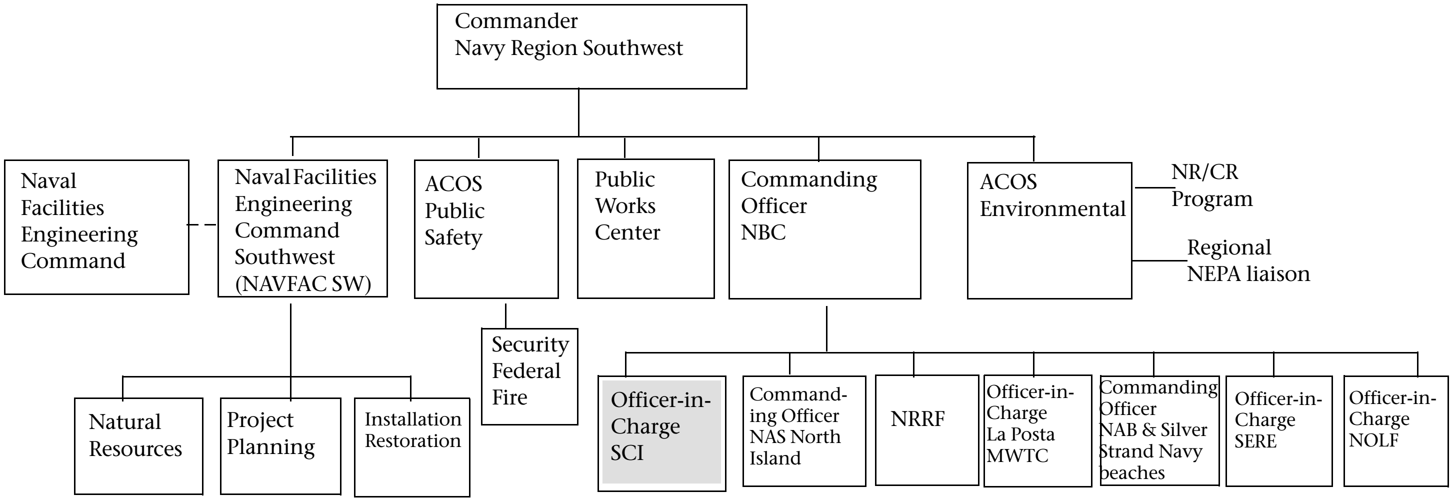


Figure 1-1. Administrative organizational chart for CNRSW as related to San Clemente Island and this Fire Plan.

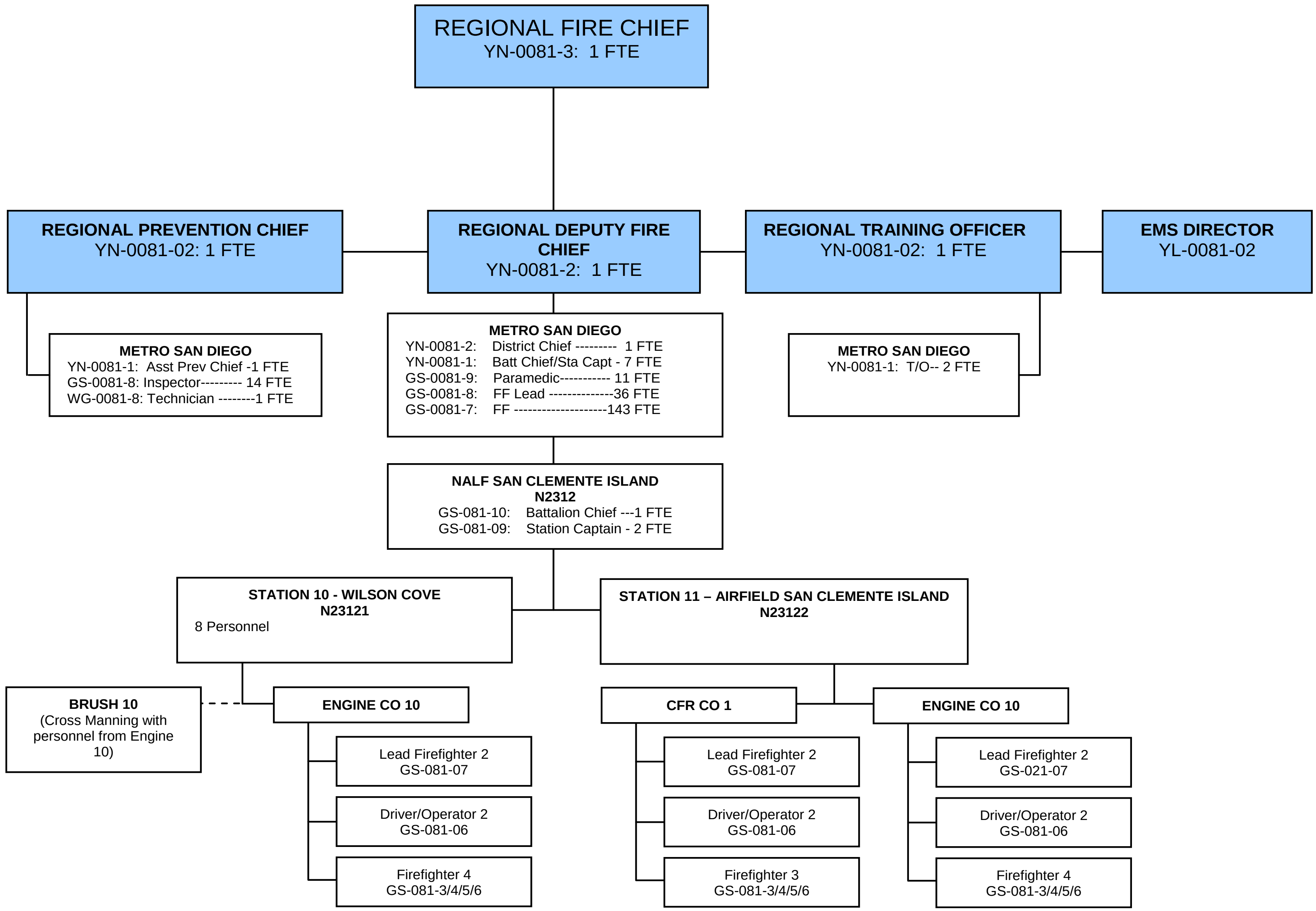


Figure 1-2. Current organizational chart for SCI Federal Fire Department Fire Suppression Division, Battalion 3. Number of personnel identified provide Fire Protection 24 hours a day, 365 days per year.

Cooperative resources agreements have supported the Island's ability to respond to fire incidents. SCI maintains an interagency Memorandum of Understanding (MOU) with Cleveland National Forest. While the U.S. Forest Service does not maintain helicopter aircraft that can fly over water, they can access interagency resources through the interagency command and support system. Follow-up resources from the mainland USFS or other federal wildland firefighting units are, at a minimum, four to six hours away under the best of conditions. Fixed winged aircraft were summoned in June 1999 by the OIC for fire suppression support.

The direct cost of fire fighting on SCI is expensive due to the relative inaccessibility of many parts of the Island. Under the current level of fire protection, the most appropriate method of initial ground attack would be to back-burn and hold the wildland fire along a road, fuelbreak, or other fuel treated area. This method of fire containment by allowing a fire to continue to burn until it reaches a road or other fuel treated area will prevent a larger fire from occurring. In the Shore Bombardment Area (SHOBA), the Fire Department will currently suppress only structural fires accessible by the SCI Ridge Road. Elsewhere, fires cannot be suppressed on the ground due to danger from unexploded ordnance. There is a no-fly-over zone in place over SHOBA impact areas due to the potential to detonate unexploded ordnance with rotor wash. Air attack is conducted in SHOBA outside the boundaries of the two Impact Areas.

1.4.3 Current Firefighting Practice

A significant practice instituted in 1999 is the presence of a firefighting helicopter during periods of live-fire operations in SHOBA. This practice was instituted after a major fire in SHOBA that the U.S. Forest Service could not respond to. CH-53 helicopters from Reserve Unit HC-85 now serve as the primary fire fighting asset when present on the Island for other duties. When military assets are not available a private contractor provides these services on ground alert from the main airfield, normally using a Bell Jet Ranger 206. This contracted helicopter provides aerial wildfire suppression when reserve helicopter squadron HC-85 is unavailable. Outside the Impact Areas, the HC-85 helicopter flies 60-100 ft above ground level (agl), which is necessary to drop water effectively (i.e attain the wetting footprint needed). The HC-85 helicopter maximum capacity for water buckets is 410 gal. External load capacity is 6,000 lb, and 2-1/2 hours of fuel are standard. HC-85 has less frequent refueling requirements than the private helicopter and can carry a bigger bucket.

While at the Island, one U.S. Navy helicopter is assigned to mission support while the other is assigned to "training." The latter is available for a fire call from SCORE, with the exception of a medical emergency. The decision process of whether to send a helicopter to fight fire in SHOBA involves the following steps:

1. High priority versus low priority area (e.g. does fire threaten shrike nests?);
2. The number of helicopters at the station. If two, then one can go to the fire. If there is only one, can that helicopter complete its task, drop off what it needs to, and re-fuel all within 60 minutes to get to fire?; and
3. Weather conditions.

A private helicopter is still needed for times the HC-85 is unavailable. HC-85 is typically available from 12:00 Monday through 12:00 Friday to support SCORE operations. HC-85 provides aerial wildfire suppression support when on SCI SCORE operations and will not typically remain on SCI to provide fire suppression only. The decision as to HC-85 availability is made quarterly when SCORE schedules operations.

Limitations on the use of incendiary ordnance during wildfire season as per BO 1-6-F-97-21, used during Naval Surface Fire Support and other training exercises, has reduced the chances of fires caused by ordnance. Fire season usually extends from May through November or December, depending upon weather conditions. However, in 1999–2001, the end of the fire season was not declared until January/February due to the persistent drought conditions. Additionally, weather recording systems which are hooked up via satellite to provide hourly weather data in SHOBA were installed in the target areas. Eventually, these weather recording systems will allow operators to monitor real time weather conditions to avoid high fire danger conditions when weapons are more likely to cause fires. These weather stations were installed by NRO under contract with California State University at Northridge (CSUN). Data from the OP3 station are available from: J.B. Wall, Weather Observer/Technologies Manager, College of Social & Behavioral Sciences, Department of Geography, CSUN, john.b.wall@csun.edu, 818-677-5632, 818-677-2723(fax).

Fuelbreaks were installed in Impact Areas 1 and 2 in accordance with BO 1-6-F-97-21 and the boundaries were revised in discussion with the USFWS prior to the start of the 2000 and 2001 fire seasons. Currently a fuelbreak exists in Impact Area 2 to prevent fires from spreading into shrike territories primarily in China Canyon. In 2001, fire retardant (rather than herbicide) was the primary means of maintaining the fuelbreak after NRO successfully tested its use as a fuelbreak on the Island. Fire retardant is especially helpful in areas with ordnance concerns. Compared with disking it is a benefit to natural resources because biomass is not removed, helping to prevent erosion, and the remaining vegetation can still function as habitat.

Current fire management includes declaring the start and end of San Clemente loggerhead shrike breeding season when increasing ordnance restrictions are placed in effect. Defensible space management measures are practiced around structures in developed areas. In addition, as a fire prevention measure, in 2001 new copper transmission lines were installed in SHOBA, which reduced the chances of fires starting from downed power lines. The old lines were aluminum and more likely to break. In 1999 and 2000, prior to the installation of the new power lines, three fires due to downed aluminum power lines burned a total of 1,811 acres. In 2001, after the installation of copper lines there were no fires due to downed transmission lines. Additionally, electrical system improvements included changing the fusing on transformers to reduce the chance of starting a fire, and use of blank-load and plug-in power lines in SHOBA during fire season such that when a power line goes down it reduces the chance of a fire starting. A restart charge will not be automatically sent to restart the power; the system will have to be manually reset. The restart charge is what is believed to ignite fires.

Recent improvements to the communications systems benefit fire management as well as other activities. Installation of repeaters was provided by SCORE, and SCORE also purchased for the Fire Department a VHF radio to facilitate communication with HC-85 on a tactical channel.

Also benefitting fire management and many other Island activities is a five-year road enhancement plan underway, implemented through military construction (MILCON) project P-493 by the Construction Battalion (Seabees).

1.4.3.1 Record Keeping

SCORE or the range user reports fires started during training activities that occur on SCI, but only training-related fires are reported to SCORE. NRO has been responsible for mapping fire perimeters. Fire incident reports are only filled out by FFD if an asset was used to respond to the fire.

1.4.3.2 Fiscal Framework

The NRO has been budgeting the private helicopter to be on call during fire season. The private helicopter now costs $3,000-$4,000/day and is paid from environmental funds from Commander, Pacific Fleet (COMPACFLT). The cost of presuppression measures, such as installing fuelbreaks and implementing prescribed burns, has also come from the NRO budget. Mitigation costs for the effects of wildfires on listed species can be high and remain the responsibility of NRO. The financial costs of extended use of attack assets comes from general funds outside NRO's operating budget. There has been no financial obligation for the use of HC-85, since it is assigned to an operational mission on-Island.

The cost of maintaining access roads are borne by NASNI Public Works through the use of road equipment and labor. Public Works on SCI also has a water tender and nurse truck that can be used for fire management-related needs.

1.4.4 Designation of Land Management Units

Whole-island management (including offshore to 300 yards) is appropriate for many natural resource decisions, but a finer scale focus for some issues will aid in supporting use, management, and restoration objectives, and deconflicting possible incompatibilities. A third scale incorporated into the INRMP in its ecosystem approach is the species level, with the identification and use of focus management species.

Resource management units proposed for this Plan and the INRMP were based on the following criteria:

- Existing operational controls on use.
- Natural locations for wildfire defense such as topographic breaks and existing roads.
- Uniform military use or access.
- Maximum environmental variability within unit boundaries to support the goal of "preserving all the parts" throughout the Island.
- Simple and easily recognizable boundary.
- Consideration of positive or negative consequences to either military activity or sensitive resource.

The 19 management units are shown in Map 1-1. One of these management units, Land Management Unit (LMU) 10, was subdivided from a larger unit with this Fire Plan due to a proposed change in operational use there, and was not part of the INRMP LMU system. Within each management unit, different strategies for fire suppression and natural resources management were developed based on military and natural resource values. These strategies are outlined by unit in Chapter 5.

Map 1-1. Land Management Units developed for managing natural resources and fire at San Clemente Island.

1.5 Plan Organization and Development

1.5.1 Ecosystem Management

The DoD Ecosystem Initiative (1996) and DoDINST 4715.3 require that Navy installations incorporate ecosystem management as the basis for land use planning and management. This approach takes a long-term view of human activities, including military uses, and biological resources as part of the same environment. The goal is to preserve and enhance ecosystem integrity, and to sustain both biological diversity and continued availability of those resources for military and other human use. The INRMP should benefit the species of San Clemente Island, and be implementable and achievable.

Ecosystem-based management shall include (OPNAVINST 5090.1C October 2007):

- A shift from single species to multiple species conservation.
- Formation of partnerships necessary to consider and manage ecosystems that cross boundaries.
- Use of the best available scientific information in decision-making and adaptive management techniques in natural resources management.

1.5.2 Plan Organization and Definitions

This Fire Plan is intended to serve as a planning tool, management guide, reference document, policy strategy, and daily resource management decision guide.

Chapter One provides an overview of the purpose of the Fire Plan and sets up key issues and drivers. Chapter 2 describes the resources at risk that require protection from the negative impacts of fire. Historic and current fire patterns are described in Chapter 3 along with fire weather and fuel patterns. The strategy statements in Chapters 4 are in a logical, hierarchical, cascading format. They begin with broad, long-term statements and end with specific, short-term methods (Table 1-3). Each land management unit is viewed individually in Chapter 5, with strategies listed that pertain to that unit.

Table 1-3. Planning definitions.

Hierarchy	Definition
Goal	Broad statement of intent, direction, and purpose. An enduring, visionary description of where you want to go. A goal is not necessarily completely attainable. It does, however, describe a desired outcome related to the mission, rather than an activity or a process.
Objective	Specific statement that describes a desired target condition, behavior, or attitude. Should be quantitative at least to the extent that a yes/no answer can be attributed to the outcome. Should be good for at least five years.
Strategy	Explicit description of ways and means chosen to achieve goals and objectives. These are activities and processes to achieve gaols and objectives.
Policy	Formally-adopted strategy or decision to carry out a course of action.
Task/Tactic	Specific step, practice, or method to get the job done, usually organized sequentially with time lines and duty assignments. These go out of date quickly and should be updated annually.

1.5.2.1 Implementation

Some of this Fire Plan's guidelines involve specific actions that may need cooperative funding. However, other strategies suggest changes in policy and do not necessarily require direct funding to implement (e.g. adoption of an MOU or Instruction). Whatever the case, cooperative partnerships and leadership are essential to ensure implementation of this Plan. Formal approval by the U.S. Navy as well as by other agencies and organizations provides an authority for implementation, subject to funding.

Any requirement for the obligation of funds for projects in this Plan shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable federal law, including the Anti-Deficiency Act, 31 U.S.C. § 1341, et seq.

1.5.2.2 Updating

Intended to be a starting point for adaptive management, this Fire Plan will require revision to remain current and relevant. Its loose-leaf format provides for updates as frequently as needed. Updating is appropriate, for example, when results of monitoring efforts reveal new insights and indicate a change in strategy.

The philosophy behind the Federal Fire Policy is to more effectively recognize the importance of fire in defining landscapes and the need to consistently manage wildland fire. Through shared resources, improvement can be made to the efficiency and effectiveness of wildland fire management, especially as it relates to improving human safety within wildland management boundaries, and in ecosystem management. The goal is to move beyond traditional fire suppression to integrating wildland fire into land management and environmental health planning.

2.0 Values at Risk

Wildland fire hazard is often high due to the extended dry periods which occur on SCI and the ongoing use of munitions, or other activities, which can serve as ignition sources for the abundant fuel available. Fires can spread during any part of the year; however, fire season usually extends from May through at least November or December, or even into January or February of the following calender year, depending upon fuel moisture levels. Fire danger has increased and will continue to increase with more fuel build-up and continuity in coming years as the Island recovers from the damage previously caused by feral goats, which kept fuel loads discontinuous and low.

Federal Fire Policy directs that resources at risk from fire be valued in order to call for the appropriate pre-suppression and suppression response. The goal is to minimize the total cost of fire management, "considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives." Fire management plans, programs, and activities "will be based on economic analyses that incorporate commodity, non-commodity and social values."

Proper planning will help avoid excessive spending on suppression when resources are not threatened. It will also provide for additional pre-suppression work, such as fuel treatment, in order to avoid high suppression costs. An appropriate suppression response will match potential resource damage. Most experienced wildland firefighters can speak of instances when hundreds of thousands of dollars have been spent on suppression decisions that in retrospect would not have been made had there been a wildland fire plan in place and sufficient knowledge of the values at risk. For example, a single fire on Santa Catalina Island cost about $500,000 to suppress, when no life or property were threatened, and there was a resulting significant benefit to natural resources due to the fire itself (a native fire poppy emerged as the first record for that island, and many native plants seen rarely or not for years emerged from the intact seed bank that had been unburned for decades) (P. Schuyler, pers. comm.). A different, less expensive suppression response might have been called for with fire planning under the new Federal Fire Policy. In contrast, on Marine Corps Base (MCB) Camp Pendleton, suppression assets were *not* called when natural resources damage resulted in over $300,000 worth of mitigation requirement in riparian habitat (D. Cross, pers. comm.). This led to renewed impetus to improve fire planning with respect to natural resources on Camp Pendleton, and an update to their Wildland Fire Management Plan (MCB Camp Pendleton 1998).

This chapter describes values at risk from wildland fire, including structures, facilities, cultural and natural resources.

2.1 Military Mission

Hazardous fire conditions which necessitate restrictions on training activity can seriously impact the military mission if not managed. If left unchecked, overly-frequent, large or intense fires can alter natural habitats in ways that may affect training as well as irretrievably damage natural resources. Such a fire regime can result in soil erosion and subsequent sedimentation of facilities, waters, and eventual persistent loss of plant cover and camouflage for training. Some training areas are surrounded by sensitive or protected natural resources and large or frequent uncontrolled fires have led, and can in the future lead, to significant constraints on effective military training.

The Island itself is the center of the San Clemente Island Range Complex (SCIRC). SCIRC supports the training requirements of the largest concentration of Naval forces in the world. It is a cornerstone of tactical training in the Southern California (SOCAL) Range Complex. Land, air, and sea ranges provide the U.S. Navy, U.S. Marine Corps (USMC), and other military services space and facilities which they use to conduct readiness training and test and evaluation activities. Over 20 U.S. Navy and USMC commands conduct training and testing activities on and around SCI. Activities range across the entire spectrum of warfare mission areas including aviation training, air warfare, surface warfare, under-sea warfare, strike warfare, submarine warfare, amphibious warfare, special warfare, Research, Development Training and Education (RDT&E), and Joint Task Force Exercises that include other military services. Allied forces and non-DoD agencies like the Immigration and Naturalization Service (INS) also train at SCI.

There are three main types of users at SCI: tenants, frequent users and intermittent users. Tenants are users that maintain a permanent presence on the Island and occupy permanent facilities or operational areas. Tenants primarily consist of military training and research groups but also include a medical clinic and the NRO. Frequent users conduct operations on and around the Island throughout the year, but do not have permanent assigned structures or a daily presence. Frequent users consist mainly of large Navy commands such as THIRD Fleet (COMTHIRDFLT) and Commander Strike Force Training Pacific (COMSTKFORTRAPAC). Infrequent users include a variety of military and civilian groups including U.S. Air Force Units, National Guard Units, and Boy Scout groups. In the INRMP, users are listed in Table 1-1 and an organizational chart of Navy users is shown in Figure 1-5.

2.1.1 Training Requirements and Values

Being discontiguous from, yet proximate to, the mainland is key to SCI's importance to the Navy. Proximity to the mainland means lower cost for transit to training sites. Geographic isolation and restricted airspace facilitate testing and training programs with minimal restrictions and maximum flexibility. Safety and security can be maintained since the Island is wholly Navy-owned. This reduces the potential for physical danger and disturbance to civilians due to noise hazard, electromagnetic interference, ordnance use, and airspace congestion that exists on the mainland. The use of live fire and the ability to combine exercises as would occur under actual battle conditions also make SCI a strategic and unique asset.

The military defines an operation as a live training exercise, Research and Development test, field maneuver, or a combination of activities conducted for a specific strategic, operational, or tactical military mission or task. A military action is the basic metric of range activity. Operations may occur singly, or multiple operations may be accomplished as part of a larger event. Operations consist of a combination of activities accomplished together. Operations can be characterized by their number (ops tempo) and type, participants, footprint and ordnance expended. The type of operation can include air, land, sea and undersea warfare training or testing and can be identified by Naval Tactical Task. Participants can include a specific number and type of aircraft, ships, submarines, amphibious or other vehicles and personnel. Ordnance broadly encompasses all weapons, missiles, shells and expendables (chaff and flares). An individual operation occurs over a given geographic footprint for a scheduled period of time, usually less than one day. An example is a Mining operation. Each Mining operation is discrete, relatively short-term, but it may be combined with other operations in a single, larger training event, like a joint training fire exercise (JTFEX), which lasts for several days or weeks. (SCI Range Complex EIS, as derived from Joint Publication 1-02, DoD and Dictionary of Military and Associated Terms).

The SCI Range Complex EIS details operations that take place on SCI as well as their tempo. Some of these operations combine into major range events that take place over days. A Major Range Event is defined as a significant operational employment of live, virtual and/or constructive forces during which live training is accomplished. A training event is a major field exercise with multiple training objectives, usually occurring over an extended period of days or weeks. An event can have multiple training operations (sub-events), each with its own mission, objective and time period. Examples include C2X, JTFEX, Expeditionary Fires Exercise (EFEX) and Combined Arms Exercise (CAX). Events (JTFEX) are composed of specific operations (e.g. Air-to-Air Missile), which consist of individual activities (e.g. missile launch). (Source: FFC, Navy Warfare Training System, undated)

Aboard SCI, major range events, operations, and the activities that make up the operations occur in onshore, nearshore and offshore environments. The types of operations and activities that are conducted at SCI can be further broken down into seven broad types which are described in more detail in the SCI Range Complex EIS. They are:

- SHOBA Operations
- Amphibious Training
- Naval Special Warfare Training
- Airfield Operations
- RDT & E Tests
- Other Island Operations
- Offshore Operations.

The first six of these occur in the onshore/ nearshore environment. Map 2-1 shows Island facilities. Table 2-1 and Map 2-2 give the extent and locations of areas used for operations. Total acreage of the Island is 37,200 plus 54 acres in offshore islands and rocks.

In Fiscal Year 1997, which is the last year operations were tallied, offshore and onshore operations (excluding the airfield) totalled 2,685. Airfield operations totaled 41,949. Table 4-2 in the INRMP shows the primary training elements (PTE), or training exercises, supported by each management unit on SCI.

Table 2-1. Summary of developed land-use areas, designated zones, roads, impact areas, and other on- and off-shore training areas.

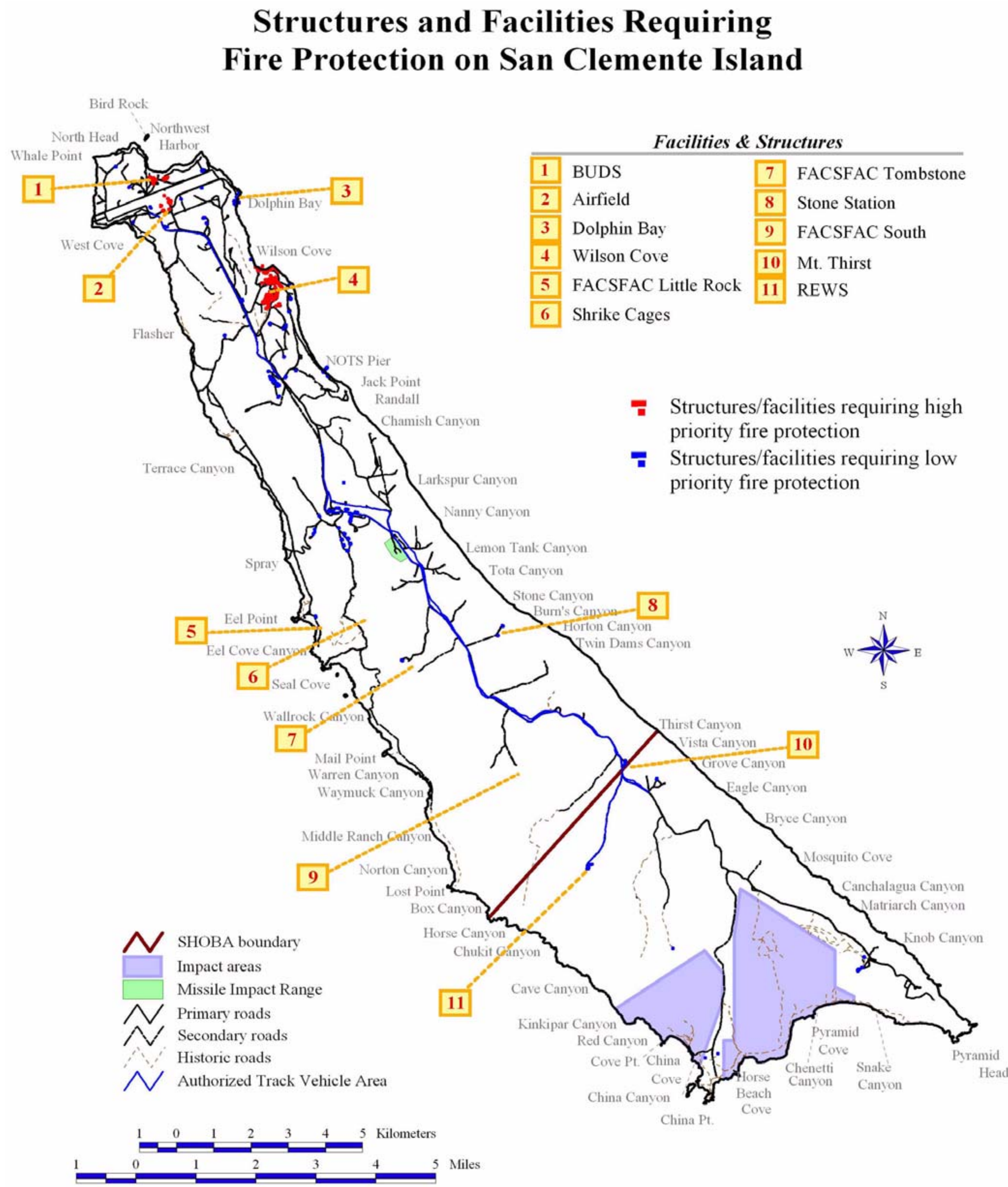
Land Use Type	
Land Use Categories (as defined in SCI EIS)	**Acres**
Air Operations	1,238
Logistics	211
Ordnance/Live Range	12,423
Personnel Support	416
Extent/Acreage of Selected Features	
Roads	**Length**
Primary	59 mi
Secondary	94 mi
On-Shore Features	**Acres**
Developed areas	360
Island Night Lizard Management Area	11,010
Shore Bombardment Area (SHOBA, including Impact Areas)	10,061
SHOBA Impact Areas	3,103
Missile Impact Range	54
Off-Shore Features	**Acres**
Mining Training Ranges	28,458
Kingfisher	1,629
Underwater Range	21,022

2.1.1.1 Scheduling

The CO, Naval Base Coronado (NBC) is responsible for Island infrastructure and provides resources including personnel and facilities. The OIC of SCI supervises nonrange day-to-day operations and activities on and around the Island. NALF SCI is responsible for airfield operations. The SCORE SCI Range Manager manages and coordinates between range operations and SCI support activities. This includes facilitating operational events, logistics support and coordination with the NRO in reviewing operations for compliance with all applicable statutes, laws, and environmental regulations.

SCORE schedules access to ranges and OP AREAS on SCI. Scheduling takes place quarterly at the COMTHIRDFLT scheduling conference. Essentially, for natural resources personnel, a range can “go hot,” or be declared off-limits due to live ordnance activity, with very short notice and activities need to be curtailed. Current regulations are listed in NASNI INST 11015.2 (13 May 1981).

A Range User’s Manual is available from SCORE, but currently does not reflect the requirements for ground ranges on SCI. An environmental “Users Guide to SCI” pamphlet is produced by the NRO. The brochure contains a condensed version of the range rules, as well as a map of sensitive resources to be used by the operators. NRO distributes an orientation package “Operations Package for Natural Resources San Clemente Island, February 2000” to NRO contractors or representatives who are new to the Island, before granting them access to flights. An ordnance familiarization brief is also required once per year if a trip to SHOBA is planned.



Map 2-1. Structures and facilities requiring fire protection on San Clemente Island.

2.1.1.2 Military Value Analysis

In conjunction with the draft SCI Range Complex EIS under development, SRS Technologies provided an evaluation of military values of the resource management units identified in the INRMP. Ten scoring factors and a weighting factor for each were developed to calculate an estimated military value for each management unit. The scoring and weighting factors are shown in Table 2-2.

Table 2-2. Scoring and weighting factors contributing to military value (SRS Technologies).

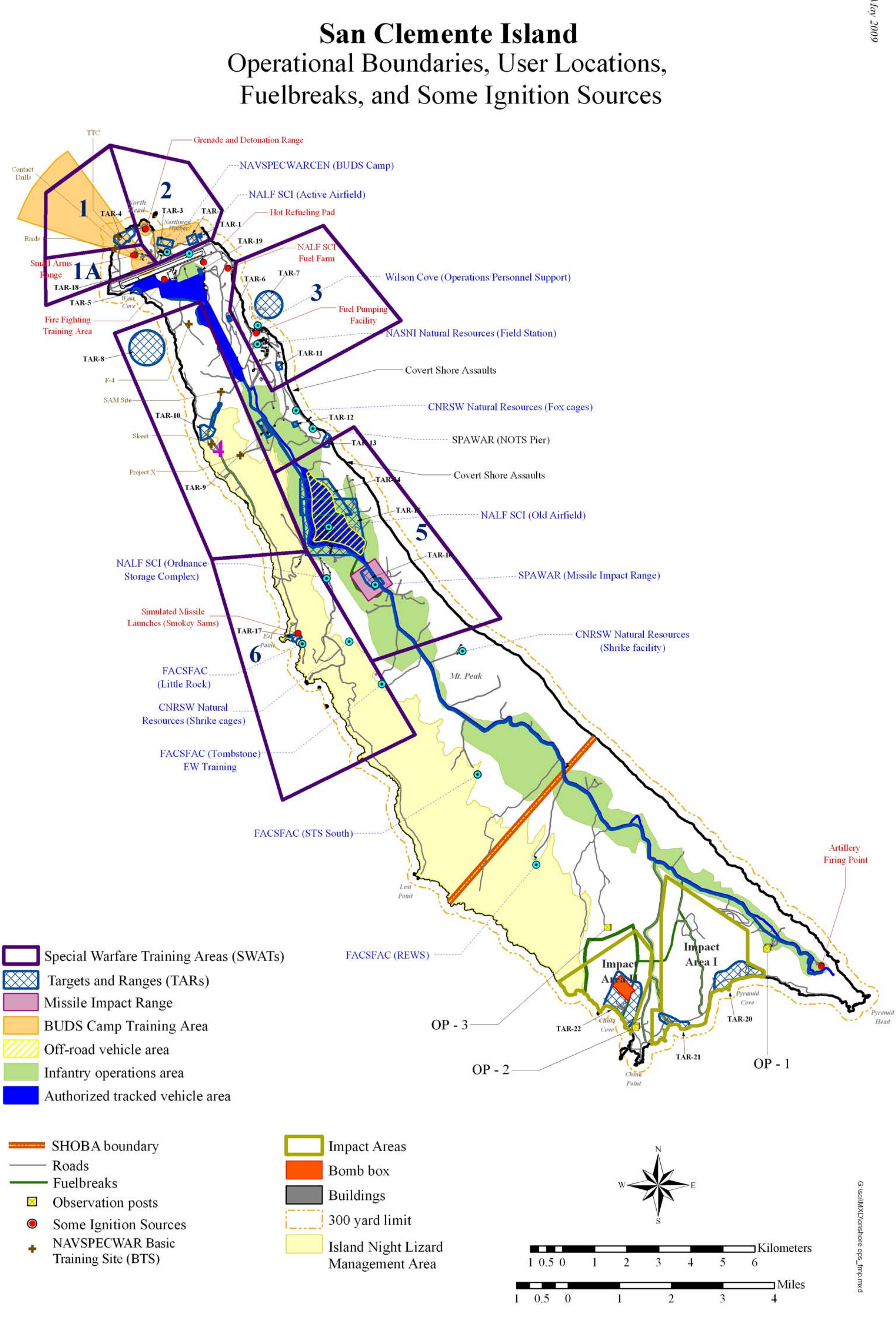
Scoring Factor	Weighting Factor Percent (%)
Ability to support primary training elements	20.1%
Instrumentation	14.8%
Uniqueness	12.7%
Ordnance	10.6%
Target quality and quantity	9.5%
Ease of access	9.5%
Number of warfare areas supported	9.0%
Number of training levels supported	5.3%
Utilization	4.8%
Training Media	3.7%

The scores that each management unit received by military activity were ranked for military value into five categories: Highest; High; Medium; Low; and Lowest (Table 2-3). Five units received the "Highest" designation. Lost Point, Mosquito Cove, Eagle Canyon, and Upper China Canyon received the "Lowest" scores. In addition, an estimated cost value was developed based upon a per acre lease value of SCI. The Eel Point LMU was added as part of this Fire Plan, so does not appear in this table.

Table 2-3. Military value scores ranked by land management unit, and their estimated annual and daily cost of operation (estimates made in 2001).

Management Unit	Total Score		Annual Cost	Daily Cost
China Cove	412	Highest	$10,207,717	$27,966
VC3	405		$10,037,370	$27,500
Pyramid Cove	403		$9,971,851	$27,320
Northwest Harbor	362		$8,975,977	$24,592
Airfield	348		$8,622,179	$23,622
NOTS Pier	308	High	$7,626,304	$20,894
Seal Cove	287		$7,102,160	$19,458
Wilson Cove	254		$6,289,736	$17,232
Terrace Canyon	250	Medium	$6,184,907	$16,945
West Cove	246		$6,080,078	$16,658
Cave Canyon	244		$6,053,870	$16,586
Mt. Thirst	225		$5,582,140	$15,294
Dolphin Bay	176	Low	$4,350,400	$11,919
Lemon Tank	158		$3,904,877	$10,698
Lost Point	98	Lowest	$2,424,169	$6,642
Mosquito Cove	69		$1,716,574	$4,703
Eagle Canyon	60		$1,480,709	$4,057
Upper China Canyon	56		$1,388,983	$3,805

Assumptions for cost estimates:
Cost of Military Use for Training for San Clemente Island = $3,000 per acre per year
Number of Acres on San Clemente Island = 36,000
Annual Cost of Using San Clemente Island $108,000,000
Total Value units provided by San Clemente Island range areas =4,361
Cost to achieve one unit of value = $108,000,000 / 3988 = $24,766per year



Map 2-2. On-shore operational boundaries and user locations on San Clemente Island.

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2.2 Environmental Setting: Values at Risk

2.2.1 Fire's Ecological Roleand the Role of Management

Fire is a natural part of the southern California landscape. It is a periodic source of disturbance to which certain local habitat types have adapted during their evolution. There is little direct evidence to indicate the frequency or extent of fire that occurred naturally in the past on the Island. Only three documented fires on the Channel Islands over the past 140 years are confirmed to have been caused by lightning (Carroll *et al.* 1993). However, there is evidence to suggest that fire was more frequent than has been documented, including two recent lightning fires on Santa Catalina Island (P. Schuyler, Catalina Island Conservancy, pers. comm.). In any case, we can safely assume that fire was at least a part of the Channel Island ecosystem, and that it was occasionally catastrophic (P. Zedler, pers. comm.). It is likely that the historic fire regime in the Channel Islands was somewhat different from that on the mainland because climatic controls are different, and because Native Americans, while possessing the knowledge to conduct prescribed burns, did not have the need on SCI. The influence of the maritime climate would have limited, but not eliminated, the occurrence of lightning-ignited fires and of fire spread potential, leading to longer fire intervals than those that prevailed on the mainland. Native Americans on the mainland burned primarily to support their hunting needs such as for rabbit and deer, but these do not occur on SCI, and the available evidence leads to the conclusion that they depended on coastal resources for survival.

Fire can impact natural resources at many levels including soil, water, air, plant communities, and wildlife populations. Soils are affected directly by the burning of organic material in the top layers of the soil horizon, and indirectly by removing vegetation that stabilizes soils on slopes. Extreme fire conditions can impact water quality by resulting in erosion that sediments in ponds and drainages, or sending sediment plumes into sensitive marine habitats. The smoke and ash created from fires can impact air quality within a region, especially if burning is frequent or intense.

The INRMP is the umbrella document for natural resources management for the Island. It adopts an ecosystem approach to Island management, and wildland fire is considered to be the primary disturbance agent to manage, along with exotic introductions. Both on a species and community level, fire return interval, seasonality, size, and intensity all matter to ecosystem resilience. Each plant, by its life history, has fire or disturbance response capability. Most resprout, and many seed prolifically after fire. Some are short-lived and thrive on canopy openings created by disturbance, while others are long-lived and have fire-resistance built into their bark, leaves, or other anatomical features. On a community level, return intervals that are too short prevent a community from proceeding through its seral stages to maturity. Fires that are too hot burn reproductive structures and so, slow recovery. (However, this same high fire intensity can lead to favoring native perennial bunchgrasses over exotic annuals, because while the seeds of both will burn, the bunchgrasses can resprout (Keeley 2001)). Large fires delay community recovery. They slow recolonization by wildlife, and tend to result in a homogeneous vegetation pattern of a uniform age class, which generally results in a decline in wildlife diversity. In the worst case scenario for rare species, fire can cause a local extinction that damages species sustainability, or delays recovery of a threatened or endangered species.

We cannot know the natural fire regime; it will remain a largely anecdotal assumption, and we cannot manage for a natural fire regime that is vague. Even in the very data-rich fire literature of the Southern California mainland, which has been studied for decades, natural fire regimes continue to be widely debated (Zedler 1995; Keeley and Fotheringham 2001; Minnich 2001). It is recognized that a full range of mainland fire regimes from a few years to several hundred occurred, with individual events ranging from slight to very severe in intensity. It is beginning to be recognized that the fire regime in general was dominated not by fuel condition but by Santa Ana weather condition, which fostered a pattern of very large fires that burned themselves out after weeks, and had variable impacts on the landscape depending upon the intensity at which they burned (Moritz 1997; Weise *et al.* 1997; Keeley 2001).

Such a regime today poses unacceptable risks. This is particularly so since the current system is permanently changed by the prevalence of European exotic grasses and forbs, and the lack of fire may pose as much a risk to overall ecosystem health as its uncontrolled extreme (Keeley 2001). A further risk would be the eventual loss of certain seed banks of fire-dependent species that can wait in a dormant state for decades before a passing fire allows their expression (P. Zedler, pers. comm.). The most serious ecosystem management error would be to introduce fire into a system that had never known it. We discuss what is known about Island fire history in the following chapter (Section 3.1), and are confident that this is not the case. Its absence on San Clemente Island would be unique in southern California for any land base this size. In addition, it is hard to explain the presence and persistence, even in low numbers, of such recognized obligate fire-dependent seeders as *Ceanothus, Adenostoma,* and *Emmenanthe* (Keeley *et al.* 1987; Keeley 1991), without fire as a natural presence on the Island.

Since fire has to be managed in a context of insufficient knowledge about natural fire regime and a changed Island ecological and fuel condition, we believe our Fire Plan goal is best served by focusing our attention on the specifics of fire effects on various communities and species, and the range of options we have for addressing them, rather than trying to achieve a "natural" fire regime (see, for example, Klinger and Messer 2001). For each plant community we define, in Chapter 3, the condition that is sought as it relates to the INRMP goal, and define an approach to managing the risks of extremes we need to avoid, and propose preliminary targets for control of fire interval, fire severity, and fire size that are necessary to ensure that desired condition. We seek to prevent large-scale, stand-replacing losses which may be catastrophic to individual species. A program is proposed to monitor the outcome of our management approach so that course corrections can be made along the way.

In order to achieve the above-described outcome conditions and manage the effects of fire, we need to understand the resource values at risk. In the following sections these values are described, and finally, ranked in Section 2.2.8.

2.2.2 Soils and Physiography

San Clemente Island's area is about 56 square miles. Within that area are a large variety of soil and topographic features. Marine terraces dominate the western side of the Island. A higher elevation plateau lies across much of the center which drops off into steep slopes on the eastern side. Canyons, some of which are relatively deep and wide, cut down through the slopes from the plateau on all sides of the Island. Dunes and sandy beaches are also present in some parts of SCI. The highest point of elevation, located slightly east of the center of the Island, is Mt. Thirst at 1,964 ft.

The Island consists mainly of volcanic rocks extruded during the Middle Miocene. Andesite flows dominate its bedrock structure, with younger dacites and rhylolites occurring in the central part and on the west and south shores. Dacite is extremely resistant to weathering and the marine terraces cut in dacite are much less defined than those cut in andesite (Olmstead 1958). The youngest of the volcanic flows is rhyolite which is found in the form of loose boulders or stacks on the terraces or more commonly at the base of eastern escarpments. Sedimentary limestones, siltstones, diatomites, and shales of Middle to Upper Miocene partly overlay, and in some places are interrelated with, the upper part of volcanic rocks (Olmstead 1958).

Natural Resource Conservation Service (NRCS) completed a draft soil survey for SCI in 1982 (USDA 1982). The survey identified eight series, three soil variants (soils distinctive from existing series but not widespread enough to warrant the creation of a new series), and 43 mapping units. Areas that were difficult to access were mapped only to the soil suborder level as Ustalf. This included the Pyramid Cove area, eastern escarpment, and westshore canyons.

Most soils on the Island are less than 3,000 years old and contain well developed profiles and high clay content. Soils on the western slopes have a distinctive silt loam surface cap or horizon. This horizon is a thin (five to 21 centimeters [cm]), light colored layer with a silt loam texture and judging from its unique mineralogy, is unrelated to the profile beneath. It is found on all geomorphic surfaces on the Island from andesitic and dacitic marine terraces and alluvial fans to calcareous dune sand (Muhs 1980). This soil may have arrived on the Island via wind transport.

In some parts of the Island the upper soil layers, and sometimes down to subsoil, have eroded away due to the actions of feral animals. Steep slopes denuded by historic grazing have quickly become sites of mass wasting. Grazers suppressed the fire fuel loads of most habitats, which are now increasing after their removal. In addition, there may be a general lack of burrowing animals and soil arthropods to turn the soil and facilitate nutrient cycling on SCI compared to the mainland (D. Estrada, pers. comm.), so mulch in the grassland continues to build up rather than turn over with decomposition. Soil arthropods are fundamental to the breakdown of organic materials (leaves, vegetation, carcasses) and the release of nutrients for new plant growth in mainland systems.

Large, intense fires often have a negative effect on site productivity and water quality because of associated soil erosion, and the resulting sedimentation into watercourses. The magnitude of post fire erosion and sedimentation depends upon soil type and its moisture content at the time of a fire, type and condition of vegetation cover on watershed slopes, steepness, aspect, fire intensity, proximity to the nearest drainage, and timing and intensity of storms that follow the fire. In most shrub communities, erosion rates are highest post-fire, then return to pre-fire levels within a few years.

Certain of the Island's soils are more prone to erosion than others. Past or current erosion caused by overgrazing or unimproved road conditions is a concern on the high plateau loamy soils, along drainage margins where established tree roots have been undercut, and on upper canyon wall soils supporting oak groves. Even fairly level areas on the west side have been eroded by wind, especially on the siltier westshore soils and in sandy locations.

2.2.3 Water Resources And Jurisdictional Waters

When wildfire consumes vegetation that anchors and protects the soil surface, erosion by water commonly follows the following winter. If soil actually erodes off the slope into a water body, it is called sedimentation. Erosion alone causes a reduction in site productivity over both the short and long term. Sedimentation compounds the loss of productivity by potentially affecting water quality, suffocating living organisms in the downslope drainage, and affecting the hydrologic balance of both waterways and uplands. Whether soil erosion results in drainage sedimentation depends upon a number of factors: inherent soil erodibility, slope position, distance to the drainage, steepness, rainfall intensity and duration, saturation condition of the soil, and the amount of protective vegetation on the soil surface.

Proper watershed functioning supports riparian habitats, which can contain some of the most concentrated biological values. During normal or above average rainfall years, runoff collects in drainages or vernal pools on SCI. A three-parameter wetland delineation (U.S. Army Corps of Engineers [USACOE] 1987) has been completed that identified which pools meet soil, water, and vegetation criteria to be called waters of the U.S. under Clean Water Act definitions. However, since they are non navigable, isolated, intrastate waters, their jurisdictional status is complicated and it is likely that *most* pools are not jurisdictional, but *some* are.

Increased sedimentation from onshore areas of SCI could have considerable impact not only to water bodies on SCI, but to the ocean waters directly surrounding the Island, which are designated an Area of Special Biological Significance (ASBS) by the State Water Resources Control Board. This designation is intended to protect species or biological communities, because of their value or fragility, from an undesirable alteration in natural water quality. Natural water quality conditions must be preserved and maintained to the extent practicable (Water Resources Control Board and California Regional Water Quality Control Board [RWQCB] Administrative Procedures, Sept. 24, 1970, Sec. XI and Miscellaneous Rev. 7-9/1/72). CDFG is responsible for management of marine resources in these areas. No site-specific regulations have been established for this ASBS, but the following general regulations apply:

- Discharge of elevated temperature wastes in a manner that would alter water quality conditions from those occurring naturally is prohibited.
- Discharge of discrete, point-source sewage or industrial process wastes in a manner that would alter water quality conditions from those occurring naturally is prohibited.
- Discharge of waste from nonpoint sources, including but not limited to storm water runoff, silt, and urban runoff, will be controlled to the extent practical. In control programs for waste from nonpoint sources, Regional Boards will give high priority to areas tributary to ASBSs.
- The Ocean Plan, and hence the designation of ASBSs, is not applicable to vessel wastes, the control of dredging, or the disposal of dredging spoil.

2.2.4 Air Quality

Air quality is defined by ambient air concentrations of specific pollutants determined by the Environmental Protection Agency (EPA) to be of concern to the health and welfare of the general public. The State of California Air Resources Board (CARB) also sets its own, more stringent air quality standards. The specific pollutants monitored are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), suspended, respirable particulate matter (PM-10), sulfates, lead, hydrogen sulfide, vinyl chloride, and visibility reducing particles. Areas in California that exceed a state standard for a particular pollutant are considered to be in "non-attainment" status for that pollutant. An area is designated in "attainment" if the state standard for a particular pollutant was not violated at any site in the area during the past three years.

SCI is in the South Coast Air Basin regulated by the South Coast Air Quality Management District (SCAQMD), with the nearest monitoring station in North Long Beach. According to the more stringent state standards, the South Coast Air Basin is currently in extreme non-attainment for ozone and non-attainment for CO and PM10. The federal and state air quality standards for specific pollutants are shown in Table 2-4.

Table 2-4. State and Federal Air Quality standards for air pollutants that require monitoring (CARB 1999). Standards are not to be exceeded more than once per year with two exceptions: ozone and PM10 must not exceed 1.0 days on average over three years.

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Federal Secondary Standard
Carbon Monoxide (CO)	1-hour 8-hour	20 ppm 9 ppm	35 ppm 9 ppm	35 ppm 9 ppm
Nitrogen dioxide (NO_2)	Annual	0.25 ppm	0.05 ppm	0.05 ppm
Ozone (O_3)	1-hour 8-hour	0.9 ppm ---	0.12 ppm 0.08 ppm	0.12 ppm 0.08 ppm
Respirable Particulate Matter (PM_{10})	24-hour Annual	50 ug/m^3 30 ug/m^3	150 ug/m^3 50 ug/m^3	150 ug/m^3 50 ug/m^3
Sulfur Dioxide (SO_2)	3-hour 24-hour Annual	 0.04 ppm 	-- 0.14 ppm 0.03 ppm	0.5 ppm -- --

Given its location and the differences in climate, human density, and use between the Island and the rest of the SCAQMD, the "attainment" and "non-attainment" designations above do not accurately reflect conditions on the Island. From 1994–1995, the San Diego Air Pollution Control District operated an ambient air monitoring station on SCI (Table 2-5) and during this period there was only one exceedance of measured pollutants. High ozone measurements were detected in April of 1995 associated with an extremely unusual wind pattern.

Generally speaking, the air quality on the Island is considered better than on the mainland. The primary sources of NO_X emissions on SCI are the Main and Range Electronic Warfare System (REWS) power plants that produce 95% of the NO_X emissions on the Island. Additional sources include boilers, water heaters, internal combustion engines, and gas turbine engines.

Table 2-5. Ambient air quality measurements at San Clemente Island, April 1994–September 1995 .

Month	Ozone Federal standard = 0.12 ppm State standard = 0.09 ppm		Nitrogen Dioxide Federal standard = 0.05 ppm State standard = 0.25 ppm	
	Average Reading (ppm)	Maximum Reading (ppm)	Average Reading (ppm)	Maximum Reading (ppm)
September 1995	0.04	0.08	0.002	0.011
August 1995	0.04	0.06	0.002	0.006
July 1995	0.04	0.06	0.002	0.010
June 1995	0.04	0.06	0.002	0.013
May 1995	0.04	0.06	0.002	0.010
April 1995	0.05	0.10	0.003	0.019
March 1995	0.04	0.08	0.002	0.008
February 1995	0.04	0.07	0.004	0.041
January 1995	0.04	0.06	0.004	0.051
December 1994	0.04	0.07	0.007	0.062
November 1994	0.04	0.09	0.006	0.052
October 1994	0.04	0.09	0.003	0.019
September 1994	0.04	0.07	0.002	0.008
August 1994	0.03	0.07	0.002	0.020
July 1994	0.04	0.06	0.000	0.010
June 1994	0.04	0.06	0.000	0.020
May 1994	0.04	0.07	0.000	0.010
April 1994	0.04	0.08	0.000	0.020

Prescribed fires and the resulting smoke emissions are considered to be man-made sources of PM-10. These are considered to be under the “control” of man, and so are regulated. The EPA requires smoke management planning to control this pollution source, and includes burning permits, emissions reduction techniques, and measures to mitigate the impact of smoke emissions by identifying the most favorable wind and weather conditions under which to conduct fires.

2.2.5 Vegetation and Wildlife Habitat

The flora of San Clemente Island is similar to that of the mainland with some important exceptions. The Island is rich in endemics, most of which are relictual but some a result of divergent island evolution (Axelrod 1967). The ironwood tree (*Lyonothamnus floribundus* ssp. *asplenifolius*), for example, is found only in fossilized forms today on the mainland. A counterpart for the white-flowered paintbrush (*Castilleja grisea*) has never been found on the mainland or any other Channel Island.

Raven (1963) noted also that certain components of the flora are related to areas in northern California rather than the nearest mainland sites, while other components are more closely related to drier, more southern locales such as Baja California. A partial explanation is that a much more mesic climate predominated in California during the last glacial epoch. When a warming trend followed, a more arid flora became dominant on the mainland while the Channel Islands acted as a refuge for the northern elements because of more moist, moderate conditions.

Westman (1983), on the other hand, concluded that SCI contains more floristic affinities with coastal succulent scrub of Baja California than any of the mainland coastal scrub communities in Alta California, as indicated by the prominence of fleshy stem succulents (families *Cactaceae, Crassulaceae,* and *Euphorbiaceae*).

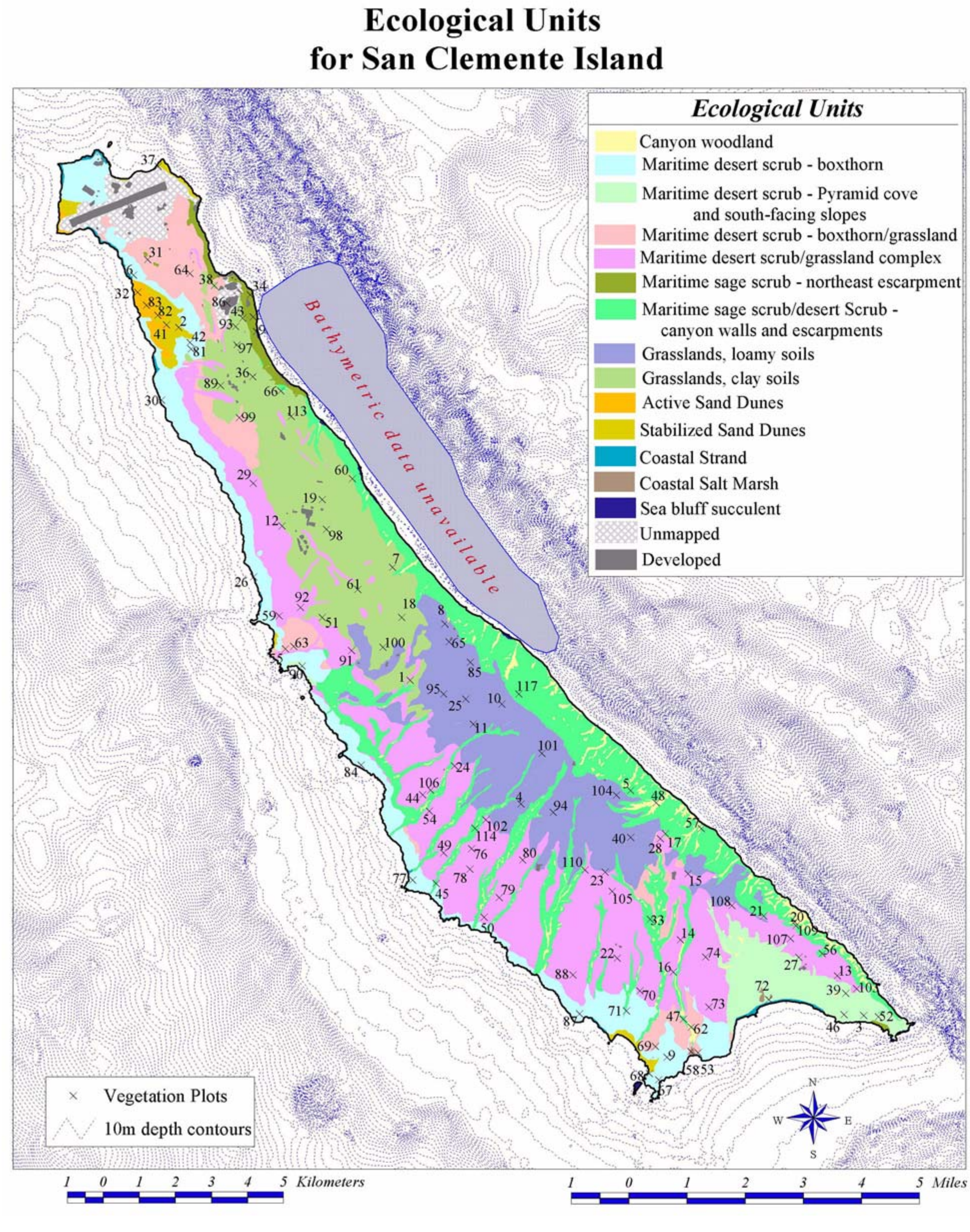
Since an important goal for managing SCI's natural resources is preservation of the full range of ecological variety that occurs, mapped vegetation units were combined with landform and soils maps to define new ecosystem units that could better address management goals. In all, fourteen unique ecological units were identified (Table 2-6 and Map 2-3). The acreage of an ecological unit does not necessarily correspond with its importance to the Island ecosystem. While the canyon woodlands occupy only about two percent of the Island area, most vegetation structure and floral and wildlife diversity is contained within them. The ecological units are described in more detail in Section 3.5 of the INRMP.

As an island ecosystem, SCI is particularly vulnerable to the introduction of non-native, invasive species. Plants and animals that evolved in other locations may have ecological advantages over native species that evolved without the levels of competition and predation present elsewhere. Non-native plant species, especially exotic grasses, have become well established on SCI. In terms of fire, exotic annual grasses create a more continuous and ‘flashier’ fuel matrix than previously existed on the island by filling in interstitial areas with fuel that ignites and carries a fire more quickly. Exotic grasses also extend the fire season by a month or more, creating a hazard earlier in the spring by drying out sooner than the native herbaceous flora (J. Keeley, pers. comm.). These factors are noticeable in the grasslands and in the boxthorn community, as well as in the flats, which are now largely dominated by exotic annuals.

Table 2-6. Ecological units, acreages and percentages of island area for SCI. Plant community nomenclature is that of Thorne (1976).*

Ecological Units	Acres	% of Island Area
Canyon woodland	696.2	1.9
Maritime Desert Scrub (MDS) - Boxthorn	3621.0	9.7
MDS- Boxthorn/Grassland	2188.8	5.9
MDS/Grassland complex (terrace faces and flats)	8921.4	23.9
MDS - Pyramid Cove and south-facing slopes	1611.5	4.3
Maritime Sage Scrub (MSS)- northeast escarpment	369.9	1.0
MSS/Desert scrub- canyon walls and escarpments	5858.3	15.7
Grasslands, loamy soils	5275.9	14.2
Grasslands, clay soils	5383.7	14.5
Active sand dunes	223.8	0.6
Stabilized sand dunes	412.9	1.1
Coastal strand	166.8	0.4
Coastal salt marsh	19.3	0.1
Sea bluff succulent	36.0	0.1
Developed	359.1	1.0
Unmapped	916.1	2.5

*See INRMP for complete descriptions of ecological units.



Map 2-3. Ecological units for San Clemente Island, showing long-term monitoring locations for collecting vegetation condition and trend data (Section 3.8.1.1 of INRMP).

2.2.6 Plant and Wildlife Populations and Sensitive Species

San Clemente Island's isolation has resulted in the presence of numerous endemic species, many of which have declined because of past disturbances. In total, there are 42 plant species and 61 wildlife species endemic to SCI or the Channel Islands found on SCI (Table 2-7). However, some groups, especially invertebrates, have been inadequately studied on SCI. In total, 17 species are federally or state listed as endangered or threatened, and many others are considered species of concern because of their vulnerability to disturbance. Approximately three million dollars is spent annually on SCI for natural resources management, most of which is directed toward federally listed species.

Table 2-7. Number of endemic species within taxonomic groups identified on San Clemente Island. Species counts include subspecies, but does not include species extirpated from SCI.

Group	Total No. Species on SCI[a]	SCI Endemics	Channel Islands Endemics[b]	No. Federally or State Listed
Terrestrial Invertebrates	83	30	19	0
Reptiles, Amphibians	2	0	1	1
Native Resident Breeding Birds	23	2	5	2
Terrestrial Mammals	6	2[c]	1	1
Marine Invertebrates	92	0	0	1
Marine Vertebrates	55	0	0	5
Plants and Lichens	272	14	29	8
Total	533	48	55	17

[a] Total number of species currently identified. Some taxonomic groups may not have been adequately surveyed.
[b] No overlap of SCI endemics and Channel Island endemics unless stated.
[c] Subspecies of Island fox and deer mouse are endemic to SCI. Fox species is endemic to Channel Islands, counted in both columns.

2.2.6.1 Plants

SCI's isolation combined with recent degradation from introduced herbivores have resulted in the presence of numerous endemic plant species that have undergone severe declines. However, recent transect data suggest that much of the native vegetation has begun to recover from past damage (Kellogg and Kellogg 2004, see Section 2.2.6.2 "Vegetation Condition and Trend"). The cumulative effect of the historic disturbance to the SCI ecosystem has been altered species composition, especially in the grasslands, and a general loss of trees and shrubs due most directly to feral goat overgrazing. The excessive removal of the vegetation as well as trampling effects by goats and pigs have likely contributed to contemporary erosion problems in some areas of the Island.

In total, SCI is home to approximately 262 native terrestrial plants, 107 exotic terrestrial plants, 10 cryptograms, 179 lichens, and 89 algae. Of these, 42 terrestrial plant species are endemic to SCI or the Channel Islands (Table 2-7). Three plant species formerly located on the Island are now presumed extinct on SCI. Six species are listed as endangered by USFWS, all but one of which are also considered endangered by CDFG (Map 2-4, Table 2-8). Another 22 species were formerly on the USFWS Category 2 list as species of concern, but this list is no longer maintained. A rare plant survey on SCI was completed in 1997 (Junak and Wilken 1998), during which more than 1,700 individual populations of sensitive plants were located. Surveys took place again in 2003 and 2004, and an additional 700 individual populations of sensitive plants have so far been located, mostly in addition to those previously documented (S. Junak, pers. comm.

2005). The plants depicted on Map 2-4 show results from early surveys by NRO staff, by Pacific Southwest Biological Services, and the surveys referenced above and conducted in 1997, 1998, 2003, and 2004.

A number of woody perennials that do not neatly fit into community categories, also occur on SCI. Their occurrence is isolated and relictual, or in such diverse habitats that their role in a particular community is unclear. Some of these merit special monitoring or restoration planning because of their low population numbers and lack of understanding about their community role. Some may be remnants of a hardier chaparral component to island flora that existed before the introduction of feral herbivores, similar to such plant communities on neighboring islands. Alternatively, they may simply be isolated specimens seeded by visiting birds. Examples are *Malosma laurina*, *Rhamnus pirifolia*, *Ceanothus megacarpus* ssp. *insularis*, *Ceanothus megacarpus* ssp. *megacarpus*, *Adenostoma fasciculatum* var. *fasciculatum*, and *Quercus chrysolepis*. All of these are fire adapted and require animals for dispersal of seed.

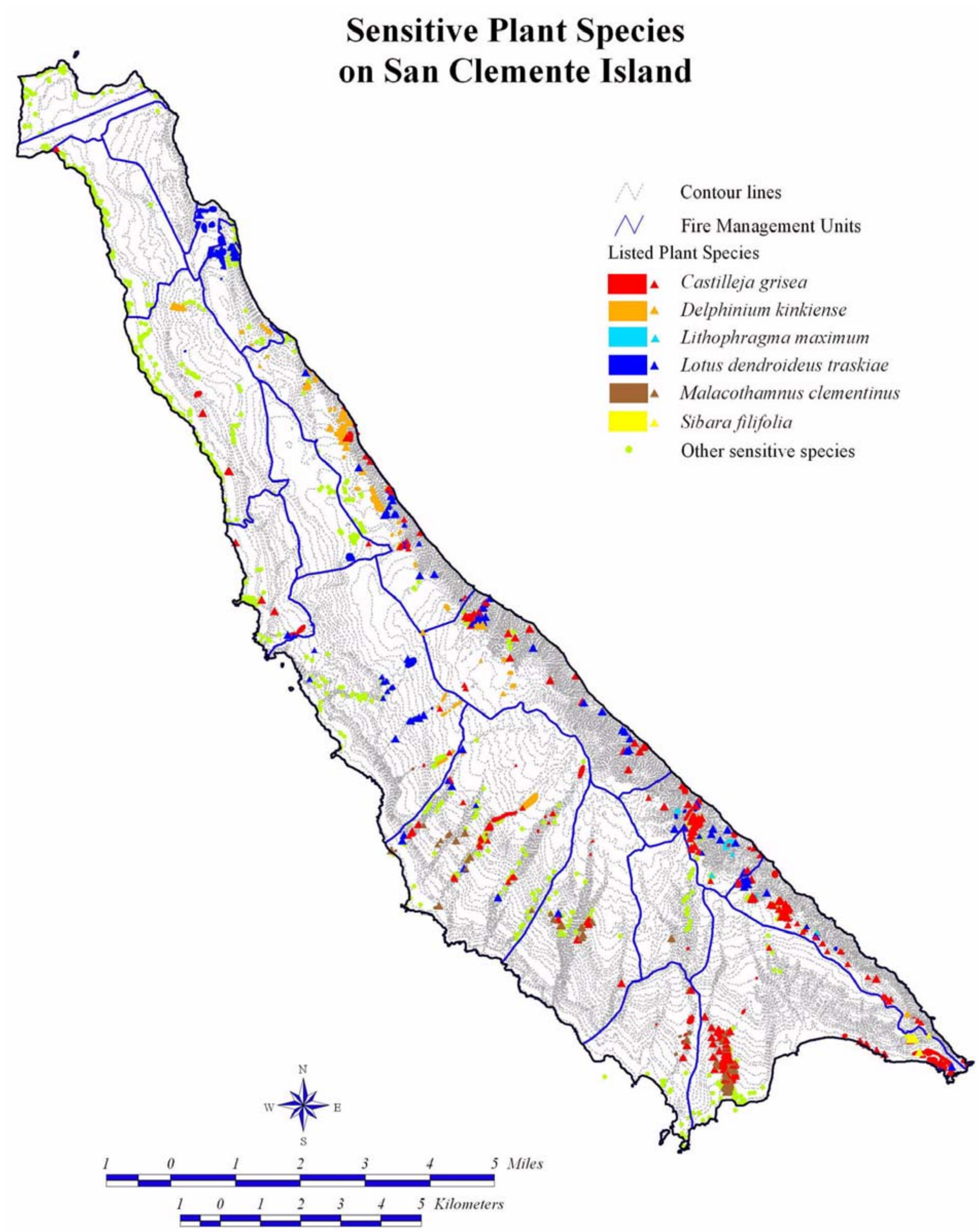
2.2.6.2 Vegetation Condition and Trend

The Vegetation Condition and Trend program (Tierra Data 2004) provides long-term monitoring data to support assessment of the Island's ecological health, with data starting in 1992. It continues to document changes in the Island's vegetation, and the general trend of recovery since removal of feral goats.

These plots show an increase in shrub cover over the past decade. For example, California sagebrush *(Artemisia californica)* is increasing on the southern half of the Island, but remains steady elsewhere. Boxthorn *(Lycium californicum)* has decreased on several plots in the northern part of the island, while tending to increase elsewhere. San Clemente tarweed *(Hemizonia clementina)* is increasing quite noticeably and adding a structural component to the northeast grasslands. California sunflower *(Encelia californica)* is stable or increasing except where plots have burned. Plots located in areas mapped as grasslands can have a significant composition of shrubs such as boxthorn, up to 35%. In general, bulbous perennials have increased dramatically since the base sampling years, with very few detected in 1992-1993. Percent cover of perennial grasses has remained steady at between 8% and 13% cover. Following a year of extremely low diversity in 2002, the highest species richness yet was recorded in 2003, with almost 40 species per plot sampled.

Overall ground cover is an important aspect of evaluating ecological health or "condition." Percent cover of non-persistent litter has increased steadily over the study period from about 24% cover to over 60% cover. Over the same period, the percent of bare ground recorded each year has fallen slightly from about 24% in 1992 to 15% in 2003. Other ground cover types have fluctuated from year-to-year but have not changed appreciably.

There has been a significant reduction in cholla *(Opuntia prolifera)* in some areas that may be related to fire patterns. Overall, there is no clear north-south trend in any of the three cactus species present except that many of the plots where cacti have increased are located in the Pyramid Cove area. The vine *Calystegia macrostegia* ssp. *amplissima,* which is an early successional species that shades out cactus, has increased in cover across the entire Island.



Map 2-4. Rare plant locations on San Clemente Island. Data shown represents both point locations (triangles) and larger patches (polygons).

Table 2-8. Endemic plant species and species of concern on San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG Status	CNPS Status
SCI ENDEMICS			
Astragalus nevinii	San Clemente Island milkvetch	FC2	1B
Camissonia guadalupensis clementina	San Clemente Island evening primrose	FC2	1B
Castilleja grisea	San Clemente Island Indian paintbrush	FE, SE	1B
Delphinium variegatum ssp. *kinkiense*	San Clemente Island larkspur	FE, SE	1B
Delphinium variegatum ssp. *thornei*	Thorne's royal larkspur	FC2	1B
Eriogonum giganteum formosum	San Clemente Island buckwheat	FC2	1B
Galium catalinense acrispum	San Clemente Island bedstraw	FC2, SE	1B
Lithophragma maximum	San Clemente Island woodland star	FE, SE	1B
Lotus argophyllus adsurgens	San Clemente Island silver hosackia	FC2, SE	1B
Lotus dendroideus traskiae	San Clemente Island broom	FE, SE	1B
Malacothamnus clementinus	San Clemente Island bush mallow	FE, SE	1B
Munzothamnus blairii	Blair's Munzothamnus	FC2	1B
Brodiaea kinkiense	San Clemente Island brodiaea	FC2	1B
Triteleia clementina	San Clemente Island triteleia	FC2	1B
CHANNEL ISLAND ENDEMICS			
Amsinckia spectabilis nicolai	seaside fiddleneck	No official status but of local concern.	
Artemisia nesiotica	island sagebrush		4
Astragalus miguelensis	San Miguel milkvetch		4
Calystegia macrostegia amplissima	island morning-glory	FC2	4
Ceanothus megacarpus insularis	island big-pod ceanothus		4
Cryptantha traskiae	Trask's cryptantha	FC2	1B
Deinandra clementina	island tarplant		4
Dendromecon harfordii ssp. *rhamnoides*	Channel Island tree poppy	FC2, Presumed extinct on SCI	1B
Dissanthelium californicum	California dissanthelium	Presumed Extinct	1A
Dudleya virens virens	island green dudleya	FC2	1B
Eriogonum grande grande	island buckwheat		4
Eriophyllum nevinii	Nevin's eriophyllum	FC2	1B
Eschscholzia ramosa	island poppy		4
Galvezia speciosa	island snapdragon	FC2	1B
Gilia nevinii	Nevin's gilia		4
Hazardia cana	San Clemente Island hazardia	FC2	1B
Heteromeles arbutifolia macrocarpa	Christmas berry or toyon	No official status but of local concern.	
Jepsonia malvifolia	island jepsonia	FC2	4
Lavatera assurgentiflora glabra	southern island tree mallow (malva rose)	FC2	1B
Linanthus pygmaeus pygmaeus	pygmy linanthus		1B
Lomatium insulare	San Nicolas Island lomatium	FC2	1B
Lupinus guadalupensis	Guadalupe Island lupine	FC2	1B
Lyonothamnus floribundus asplenifolius	Santa Cruz ironwood	FC2	1B
Malacothrix foliosa foliosa	leafy malacothrix		4
Phacelia floribunda	San Clemente Island phacelia	FC2	1B
Quercus tomentella	island oak		4
Rhamnus pirifolia	island redberry		4
Scrophularia villosa	Santa Catalina figwort	FC2	1B
Sibara filifolia	Santa Cruz Island rock cress	FE	1B
Trifolium gracilentum palmeri	Palmer's clover		4
OTHER NATIVES			
Aphanisma blitoides	Aphanisma		1B
Crossosoma californicum	island apple-blossom		1B
Lepidium virginicum robinsonii	Robinson's pepper-grass		1B
Lycium brevipes var. *hassei*	Santa Catalina Island desert thorn	Presumed extirpated on SCI	1B
Microseris douglasii platycarpha	small-flowered microseris		4

USFWS and CDFG Codes: FC2 = Former Category 2, FE = Federally Endangered, SE = State Endangered;
California Native Plant Society (CNPS) Codes: 1A = Presumed extinct in California, 1B = Rare or Endangered in California and elsewhere, 2 = Rare or Endangered in California, more common elsewhere, 4 = Plants of limited distribution;

Coyote brush *(Baccharis pilularis),* recognized as a native colonizing shrub in wet years and one of the few that tolerates wet conditions, is significantly increasing only on the clay grasslands. Coyote brush invasion of grasslands is of structural importance because it facilitates the establishment of other shrub species. Shrub cover subsequently is expected to increase use by wildlife.

San Clemente Island bush mallow *(Malacothamnus clementinus)* has experienced marked population increases. The Horse Beach Canyon population is becoming overwhelmed by the canopy dominants California sunflower and lemonade berry *(Rhus integrifolia),* although younger offshoots appear to be expanding along the margins and up the canyon slope.

2.2.6.3 Fire Effects on Plants

In order to consider effects of fire on plants, they may be grouped by similar life history characteristics. Response to variation in the fire regime varies with regeneration strategies.The following breakdown of plants and their fire adaptation was conceived to function as a resource for future adaptive management of this fire plan. Information for dominant shrubs was derived from the USFS Fire Effects Information System (USFS FEIS at http://www.fs.fed.us/database/feis/plants/). The breakdown of life histories used for shrubs and trees is based on Zedler (1977, 1995). Classification of herbaceous species is based on Zedler (1995), Keeley and Keeley (1984), and Keeley (1986). Lichens are also considered in the herbaceous species table. The life history breakdown is as follows:

- Shrubs and trees
  - Obligate seeders (reproduce almost exclusively by seed)
  - Obligate sprouters (reproduce almost exclusively by sprouting)
  - Facultative seeders/sprouters (commonly reproduce by both seed and sprouts)
  - Suffrutescents (plants which are woody at the base only, do not die each year)
  - Intermediate- to long-lived canopy dominants of coastal sage scrub
  - Insufficient information to classify with confidence
- Stem succulents and cacti
- Herbaceous Species
  - Herbaceous perennials with underground storage structures
  - Herbaceous perennials dependent on seed for propagation
  - Opportunistic native annuals (plants that die each year and do not need fire for germination, but instead germinate under many conditions)
  - Pyrophyte annuals (plants that die each year and only appear after fire because seeds are stimulated to germinate by heat, smoke, or charate)
  - Lichens

The following paragraphs break down life histories of plants in relation to fire, and a number of the sensitive or dominant species from SCI are listed if they are expected to fall under each category. The grouping into categories are based on best judgment and should be treated with some caution until specific observations are made on the Island. This is because some plants that may have close counterparts on the mainland may behave differently in this insular setting.

Obligate Seeders. Primary period of population expansion is post fire. Mature plants killed by fire, recruitment mostly from soil seed bank. Fire-dependent, shallower roots, higher tolerance of water stress, and greater post-fire seedling survivorship than obligate sprouters. Obligate seeders can be lost with a single premature burn. For non-sprouting species 7-15 years are needed for seedlings to mature enough to replenish the population, depending on weather and other factors. These shrubs have only limited dispersal ability and once lost from an area, recolonization from other established populations can be extremely slow (Zedler and Zammit 1989). Obligate seeders can disappear after a long fire-free period, but still remain in the soil seed bank.

- *Ceanothus megacarpus insularis* (island big-pod ceanothus)

Obligate Sprouters. Seeds killed by fire, regeneration by vegetative resprouting. Sprouts between fires but may need fire to create gaps for saplings to recruit to the canopy and for population expansion; more resilient to short return intervals for fires (Zedler et al. 1993, Fabritius and Davis 2000), but nevertheless may be severely impacted by sustained high-frequency fire regimes. Successful germination and recruitment of new individuals is correlated with the cooler, moister, low light conditions and increased litter depth associated with mature closed-canopy chaparral that develops over fire-free intervals of 40 years or more (Lloret and Zedler 1991, Keeley 1992a and b, DeSimone 1995). S. Keeley et al. (1981) investigated seedlings of obligate sprouters: Seedlings are established primarily in mature chaparral in gaps resulting from the death of senescing, shorter-lived species. Seedling establishment is often episodic and coincides with periods of above-normal rainfall. Although initial establishment may occur in burned or unburned stands during very wet years, continued survival is favored beneath mature stands on sites that are relatively mesic (north slopes) and which possess a well-developed litter layer. Long-term survival beneath mature chaparral is rare; seedlings are subjected to herbivory by small mammals. Seedlings are most common in very old stands (60 to 100+ years) where long fire free intervals allow for the build-up of seedling populations.

- *Malacothamnus clementinus* (San Clemente Island bush mallow). No known natural regeneration by seed on SCI.
- *Lyonothamnus floribundus asplenifolius* (Santa Cruz ironwood). No known regeneration by seed on SCI.
- *Rhus integrifolia* (lemonade berry). Tall canopy dominant, moderately vigorous resprouter. Expanding on SCI. Seedling recruitment occurs under fire-free conditions (Lloret and Zedler 1991) and after fire but survivorship after fire has not been determined (Keeley 1998). Species is expected to continue to increase with extended fire-free period due to height and ability to dominate the canopy, as well as ability to recruit seedlings.

Facultative Seeders/Sprouters (mixed seedling recruitment and vegetative resprouting). Mortality of the lignotuber (a woody swelling below or just above the ground, containing buds from which new shoots develop if the top of the plant is cut or burnt) can be very high if fire returns prematurely (Zedler et al. 1983, Haidinger and Keeley 1993). Since a premature fire also kills seedlings that germinated in response to the previous fire, facultative seeders show only limited ability to persist under repeated disturbance.

- *Eriogonum giganteum formosum* (San Clemente Island buckwheat)

- *Galvezia speciosa* (island snapdragon)
- *Quercus tomentella* (island oak)
- *Rhamnus pirifolia* (island redberry)
- *Crossosoma californicum* (island apple-blossom)
- *Lycium californicum* (California desert thorn). Leaves succulent, stress tolerator, root sprouter. Probably a weak resprouter that experiences variable mortality depending on fire intensity. May take 10-20 years for it to reach preburn densities on a burned site (E. Kellogg and D. Pivorunas, pers. obs. on San Clemente Island). Probably regenerates from root suckering and layering, as do other species in this genus. On San Clemente Island, has been observed to recover from fire through both resprouting and seed, but short fire intervals cause long-term loss (E. Kellogg, pers. obs.). Severe fires may kill desert thorn, but moderate-severity fires probably only consume its aerial portions. It may resist burning in low-intensity fires. Emery (1988) reports no treatment required for seed germination.A conservative approach that minimizes fire impacts is recommended. Protection from short-interval fires.

Subshrubs (Maritime Desert Scrub). Intermediate- to long-lived dominant and canopy species which tolerate fire, but do not require it for establishment; they are sensitive to fire intensity because it affects sprouting ability (Zedler in Kalen *et al*. 1995). The ability of surviving shrubs to seed in the first year after fire appears to allow coastal sage scrub to persist under fire frequencies that eliminate chaparral (O'Leary 1995).

- *Artemisia californica* (California sagebrush)
- *Artemisia nesiotica* (island sagebrush)
- *Galium catalinense acrispum* (San Clemente Island bedstraw)
- *Deinandra clementina* (island tarplant)
- *Hazardia cana* (San Clemente Island hazardia)

Suffrutescents. Smaller, short-lived shrubs with slightly woody above ground stem that is killed by fire with no ability to resprout. Fire-stimulated seedling establishment. Obligate seeders following fire but will respond to other disturbances. Mostly absent in older communities or persist in gaps. No special dispersal mechanism. Germination is heat or charate stimulated, with a portion germinating without treatment (Keeley et al. 1985).

- *Lotus dendroideus traskiae* (San Clemente Island broom)
- *Castilleja grisea* (San Clemente Island Indian paintbrush)
- *Eriophyllum confertiflorum* (golden yarrow)
- *Eriophyllum nevinii* (Nevin’s eriophyllum)
- *Coreopsis gigantea* (giant coreopsis)

Insufficient Information to Classify With Confidence. Basic fire effects information is lacking: percent mortality and percent resprouting in mature plants, presence or absence of postfire seedling recruitment, postfire seedling survival, and presence or absence in the seed bank.

- *Lavatera assurgentiflora glabra* (southern island tree mallow (malva rose)). Known regeneration is from seed.

Herbaceous Perennials. Underground storage structures such as a bulb, tuber, rhizome, or large tap root; these plants are normally dormant when a fire passes through, so are not directly affected, but benefit from nutrient flush, canopy opening, and other aspects of altered competitive status. Obligate resprouters.

- *Brodiaea kinkiense* (San Clemente Island brodiaea), *Triteleia clementina* (San Clemente Island triteleia), *Delphinium variegatum* ssp. *kinkiense* (San Clemente Island larkspur), *Delphinium variegatum* ssp. *thornei* (Thorne's royal larkspur), *Jepsonia malvifolia* (island jepsonia), *Lithophragma maximum* (San Clemente Island woodland star), *Calystegia macrostegia amplissima* (island morning-glory), *Scrophularia villosam* (Santa Catalina figwort)

Herbaceous Perennials Dependent on Seed for Propagation. Generally germinate well without treatment, but high temperatures are lethal (Keeley *et al.* 1985)

- *Lotus argophyllus adsurgens* (San Clemente Island silver hosackia)

Stem Succulents and Cacti. Somewhat fire resistant due to succulence and low fuel loads associated with typically open habitats. No soil seed bank, so population recovery is slow if plants are killed by fire. Variability in different species ability to survive or resprout following fire. Most have some ability to resprout, but most also suffer some degree of mortality if fire is moderate or severe.

- *Dudleya virens virens* (island green dudleya)

Opportunistic Native Annuals (Zedler 1995). Usually found in canopy gaps.

- *Sibara filifolia* (Santa Cruz Island rock cress). Annual habit make this plant resilient to fire. Also there is no record of a fire in its current location and fuel hazard is very low.
- *Camissonia guadalupensis clementina* (San Clemente Island evening primrose)
- *Aphanisma blitoides* (Aphanisma)
- *Trifolium gracilentum palmeri* (Palmer's clover)
- *Lupinus guadalupensis* (Guadalupe Island lupine)
- *Lepidium virginicum robinsonii* (Robinson's pepper-grass)
- *Microseris douglasii platycarpha* (small-flowered microseris)

Pyrophyte Annuals (Keeley and Keeley 1984). Considered fire followers because seeds stored in the soil seed bank are stimulated to germinate following fire by heat, smoke, or charate (ashy burned material). Fire eliminates canopy cover of competing species. No special dispersal mechanisms, largely disappear by third year after fire. Seed is long-lived.

- *Emmenanthe penduliflora* (whispering bells)
- *Papaver californicum* (fire poppy)
- *Phacelia floribunda* (San Clemente Island phacelia). Species in these genera are generally considered pyrophytic. Population expansion likely following either prescribed fire or wildfire, but these are fairly common species that appear able to maintain themselves at low levels without fire.

Lichens. Foliose lichens on rocks and shrubs on the southern California coast and Channel Islands (Brodo *et al.* 2001) are highly flammable because they desiccate when relative humidity drops. Should survey in advance of experimental burns, and should be part of fire recovery evaluation. At least some stands should be protected so they can get as old as possible, to act as refugia and sites of inocula to perpetuate lichens (Bowler and Riefner 2003).

2.2.6.4 Wildlife

In total, approximately 233 birds, two reptiles, 12 mammals (six native), 24 marine mammals, 31 fish, and at least 75 species of invertebrates have been observed on SCI. The Island contains numerous endemic and sensitive animal species. Because of the Island's isolation and relatively small area, populations of many animals are smaller than they would be on the mainland and consequently are extremely vulnerable to disturbance.

Seven federally endangered and four federally threatened animal species are located on the Island (Table 2-9). An additional three species are recognized by CDFG as endangered or threatened including the Island fox (*Urocyon littoralis clementae*) which is endemic to the Channel Islands. Counting unique subspecies, there are at least 30 species endemic to SCI and an additional 22 species endemic to the Channel Islands found on the Island. Management programs for the San Clemente sage sparrow (*Amphispiza belli clementae*) (Map 2-5), San Clemente loggerhead shrike (*Lanius ludovicianus mearnsi*) (Map 2-6), Island night lizard (*Xantusia riversiana*), and Island fox are in place and numerous other species are regularly monitored. Some groups such as invertebrates have been inadequately studied on SCI and may reveal additional unique species when they are surveyed more thoroughly.

Table 2-9. Sensitive wildlife species of San Clemente Island.

Scientific Name	Common Name	USFWS, CDFG, PIF Status
TERRESTRIAL INVERTEBRATES		
Coenonycha clementina	SCI Coenonycha beetle	FSC
Micrarionta gabbi	Gabb's snail	FSC
Coelus pacificus	Channel Islands dune beetle	FSC
AMPHIBIANS AND REPTILES		
Xantusia riversiana	Island night lizard	FT
BIRDS		
Amphispiza belli clementae	San Clemente sage sparrow	FT, PIF
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike	FE
Accipiter cooperii	Cooper's hawk	CSC
Accipiter striatus	sharp-shinned hawk	CSC
Asio flammeus	short-eared owl	CSC
Asio otus	long-eared owl	CSC
Carduelis lawrencei	Lawrence's goldfinch	PIF
Chaetura vauxi	Vaux's swift	CSC
Circus cyaneus	northern harrier	CSC
Dendroica occidentalis	hermit warbler	PIF
Empidonax trailii	willow flycatcher	SE
Falco peregrinus anatum	peregrine falcon	SE
Falco columbarius	merlin	CSC
Icteria virens	yellow-breasted chat	CSC
Piranga rubra	summer tanager	CSC
Riparia riparia	bank swallow	ST
Selasphorus rufus	Rufous hummingbird	PIF
Spizella atrogularis	black-chinned sparrow	PIF
Spizella breweri	Brewer's sparrow	PIF
Toxostoma bendirei	Bendire's thrasher	CSC, PIF

Table 2-9. Sensitive wildlife species of San Clemente Island. (Continued)

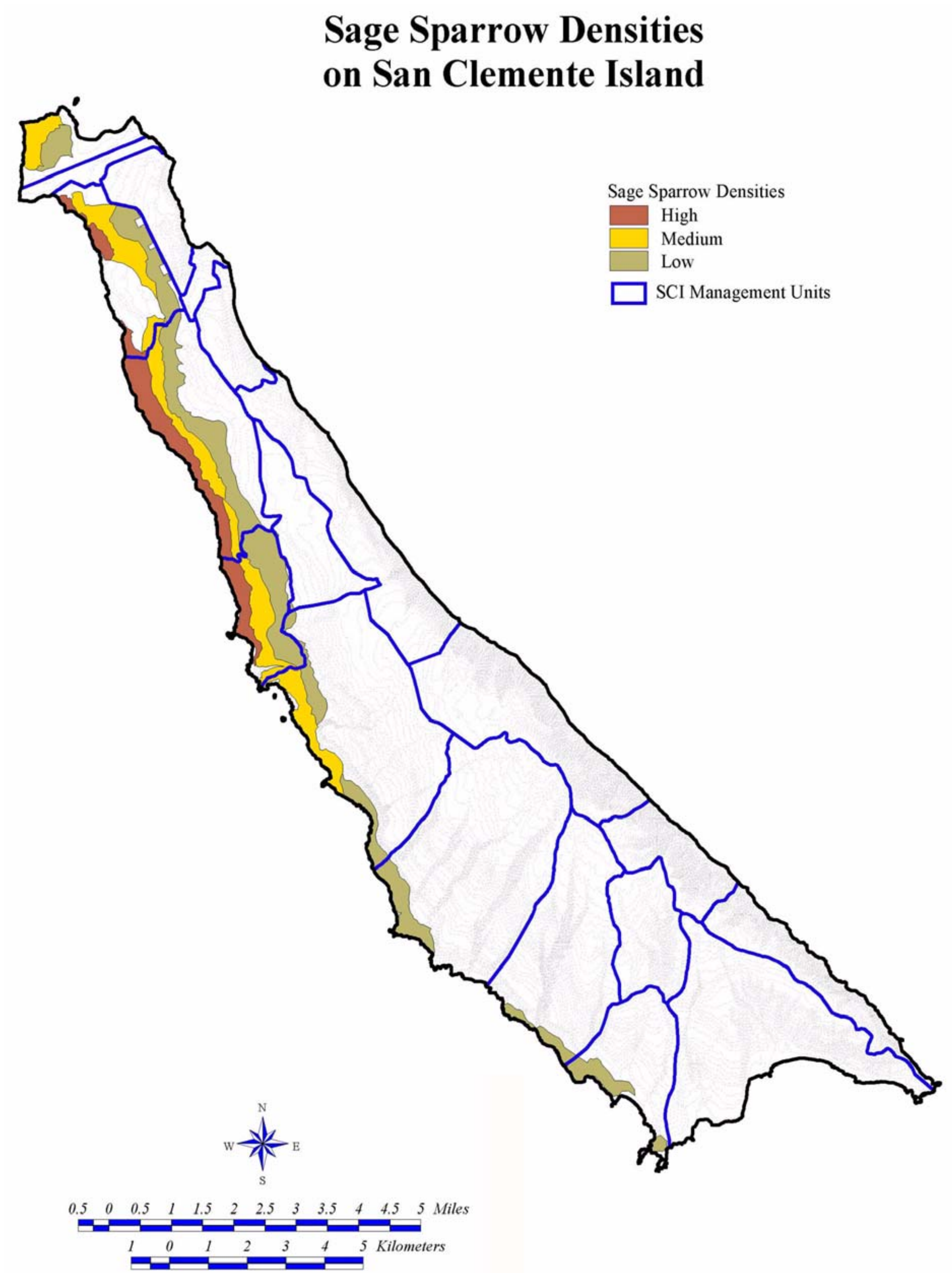
Scientific Name	Common Name	USFWS, CDFG, PIF Status
Haematopus bachmani	black oystercatcher	PIF
Charadrius alexandrinus nivosus	western snowy plover	FT, CSC, PIF
Charadrius montanus	mountain plover	FPT, CSC
Nemaenius americanus	long-billed curlew	CSC, PIF
Gavia immer	common loon	CSC
Pelecanus occidentalis	brown pelican	FE, SE, FP
Phalacrocorax auritus	double-crested cormorant	CSC
Oceanodroma homochroa	ashy storm-petrel	FSC, CSC, PIF
Oceanodroma melania	black storm-petrel	CSC, PIF
Larus californicus	California gull	CSC
Sterna elegans	elegant tern	FSC, CSC
Cerorhinca monocerata	rhinoceros auklet	CSC
Synthliboramphus hypoleucus	Xantus' murrelet	FSC, CSC, PIF
TERRESTRIAL MAMMALS		
Urocyon littoralis clementae	San Clemente Island fox	ST, FPE
MARINE INVERTEBRATES		
Haliotis sorensi	white abalone	FE
MARINE REPTILES		
Dermochelys coriacea	leatherback sea turtle	FE
Caretta caretta	Loggerhead sea turtle	FT
Chelonia mydas	Eastern Pacific green sea turtle	FT
Lepidochelys olivaceaf	Olive Ridley sea turtle	FT
MARINE MAMMALS		
Balaenoptera musculus	blue whale	FE
Balaenoptera borealis	sei whale	FE
Balaenoptera physalus	fin whale	FE
Megaptera novaengiliae	humpback whale	FE
Physeter macrocephalus	sperm whale	

USFWS Codes: FE = Federal Endangered, FT = Federal Threatened, FSC = Federal Species of Concern, FPE = Federal Proposed Endangered. CDFG Codes: SE = State Endangered, ST = State Threatened, CSC = California Species of Special Concern. PIF = Partners in Flight Watch List.

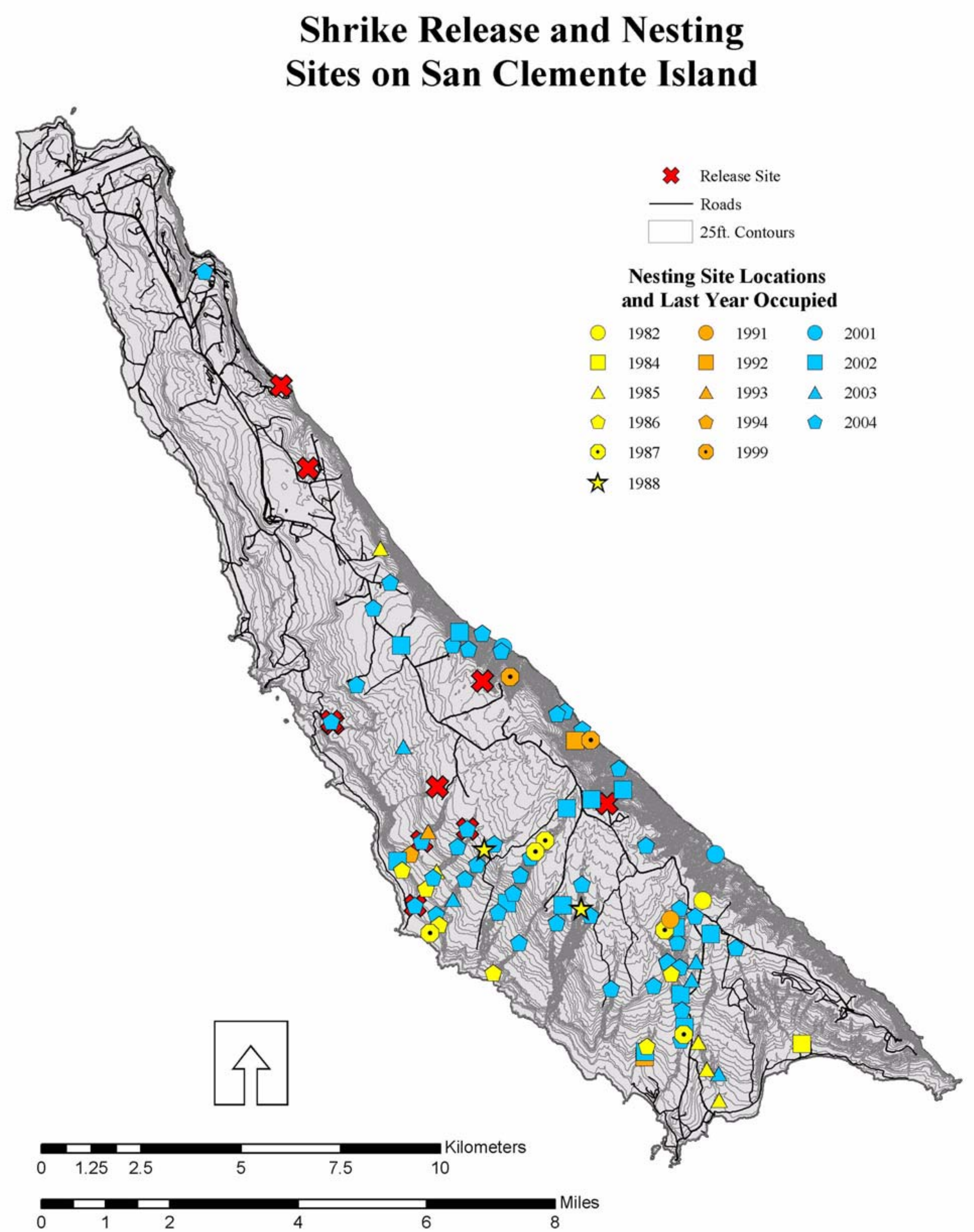
On SCI food chains have been disrupted by the introduction of feral mammals, exotic species and other effects of human disturbance. Competition from non-native annual grasses and the presence of short fire intervals that Island species are not adapted to have altered or disrupted present vegetation communities. This in turn affects the ability of primary and secondary consumers to locate food and cover.

Most wildlife populations on SCI, including listed species, are probably resilient to fire, unless fires become exceptionally frequent. Fires and firebreaks can temporarily create new foraging habitat for shrikes and foxes. However, frequent or hot fires that kill shrubs and trees are detrimental to shrike nesting (USFWS 2001) and reduce woody species preferred by foxes. Island night lizards are not greatly affected by fire unless fire size or frequency is so high as to remove the necessary thermal cover over excessively large areas or long periods of time (e.g. type conversion). Since fire negatively affects boxthorn cover (Kellogg and Kellogg 1994), frequent fires that consume shrubs in this habitat are expected to be detrimental to San Clemente sage sparrow populations.

Species-specific profiles of plants and wildlife that are a focus of management on SCI may be found in Appendix D of the INRMP, and Map 2-6 of this Fire Plan shows the distribution of shrike territories.



Map 2-5. Densities of San Clemente sage sparrows (provided by N. Munkwitz).



Map 2-6. Recent and historical nest locations of the San Clemente loggerhead shrike. (Do not reproduce or distribute without Navy permission [see Document Disclaimer].)

2.2.7 Cultural Resources

San Clemente Island's rich history provides numerous sites where scientists have the opportunity to study California's past. These cultural resources are scattered throughout the Island and include fossils of the early Island fauna, historical records of Native American habitation, turn-of-the-century ranching structures, and early military use. In a recent evaluation in consultation with the State Historic Preservation Office (SHPO), the older administrative buildings of the Wilson Cove area were found to be not eligible for the National Register. The only elements built by humans on the Island with a recommended National Register eligibility are a complex of 1950s-era structures associated with (and including) NOTS Pier, which are important under Cold War criteria for their associations with weapons research and development (A. Yatsko, pers. comm.). The Navy's Cultural Resources Management Program (CRMP) is responsible for the identification, preservation and protection of these resources. The CRMP is guided by compliance with pertinent federal historic preservation laws.

2.2.8 Defining Resource Values At Risk

Federal wildland fire policy (USDI/USDA 1995) dictates that fires will be suppressed at minimum cost based on natural resources objectives and values to be protected. Fire management programs are to be based on an economic assessment that includes commodity, non-commodity and social values. Good fire management planning will ensure that the following equation holds true:

Pre-Suppression Costs + Actual Suppression Costs <= Resource Value Lost.

SCI adopts for its fire management planning a ranking of values from similar resource valuations (Table 2-10). These valuations assume losses due to a medium- or high-severity fire and the use of heavy equipment, such as a bulldozer, to suppress wildfires. Values at risk for mechanical disturbance are considered separately from the more temporary (usually) impacts of the fire itself.

Table 2-10. Priority Valuations.

Cost Estimate	Ranking
> $80,000 per acre	Highest
$10,000 - $80,000 per acre	High
$1,000 - $10,000 per acre	Medium
< $1,000 per acre	Low

Actual dollar costs to the Navy were used when available, such as mitigation ratios and costs for restoration that have been observed on other property in the region. Sometimes, regional values were applied if actual dollar costs were unavailable, or if no values were available locally, then statewide averages from the California State Fire Plan were used. However, most natural resources have broad social and ecological values and cannot be assessed directly. Social cost was not rigorously assessed in this analysis, except that human life and safety always receives the highest priority. For endemic species thought to be declining on the Island and identified in the INRMP as high priority even though they are not federally listed, costs per acre were estimated based on growing them in the Island native plant nursery and social value related to possible future listing under the ESA.

Developed areas are not valued in this analysis because they are valued separately based on human occupancy as well as monetary value of the structures and their contents. It is assumed these resources will receive first consideration in a wildland fire, as the values described below suggest for where buildings interface with the wildland environment. An exception is ordnance storage facilities or bunkers. While these facilities can have multi-million dollar value, they are designed to be undamaged by fire and defensible space management is required to keep fires cool. Fires should be allowed to burn over them and no damage is expected. (Safety requirements for ordnance facilities are described in the manual Naval Sea Systems Command Operational Procedures 5, Volume 1 “Ammunition and Explosives Ashore – Safety Regulations for Handling, Production, Renovation and Shipping”.) The valuations for different types of developed areas are as follows:

- Housing area (assume first two rows of homes threatened): $65/ft^2 or about $400,000/acre.
- Ordnance maintenance or handling facilities in the wildland environment: can be multi-million dollar value, but there is little risk to contents.
- Other buildings in the wildland environment: $40/ft^2.
- Buildings at edge of cantonment area: $50/ft^2 or about $300,000/acre.

All of the above values would be rated *Very High* in the rating system applied to natural resources, except for smaller, isolated structures in the wildland environment, such as an abandoned trailer or building, or bunkers. The highest natural resources values in Table 2-10 are estimated at about $80,000/acre. There may be instances during fire suppression when high-value habitat may be protected in preference to structures.

In wildland natural resources valuation there is a sharp break in value between resources that have legal status under the Endangered Species Act and others. Losses of these protected resources to wildfire might require compensatory action. Costs are always site- and project-specific, and should be periodically reviewed for adjustment. Many values are notoriously variable. **These relative values are not to be used for any other purpose than fire suppression strategy development.**

Re-appraisal of natural resources valuations should be conducted at least biennially with the following objectives:

- to incorporate new understanding about resource values;
- to adjust/provide for significant species recoveries, declines, or delistings which occur in the region or on SCI; and
- to protect the value of recently-restored or impacted areas that need time for recovery.

2.2.9 Environmental Setting: Values at Risk

In the valuation below, reference is made to fire severity classes used by the National Park Service and adapted for use in this Plan. These may be seen in Table 2-11.

Table 2-11. Natural resources values at risk from fire and mechanical disturbance related to fire. All values relate to areas outside Impact Areas I and II.

Vegetation Type, Habitat Area, or Resource Type	Values at Risk for Wildland Fire or Prescribed Fire	Values at Risk for Mechanical Disturbance	Comment/Basis for Valuation
Canyon Shrub/Woodland			
Active area for nesting SCLS	Highest	Highest	Nests valued at more than $50,000 apiece. Value per SCI Biological Opinions.
Historic area for nesting SCLS	High	High	Treated similarly to active nests in Recovery Plan.
Ironwood woodland	High	High	Value reflects high priority in INRMP due to high risk of decline. Value is non-commodity, social, many years to replace habitat and other values.
Oak woodland	High	High	Value reflects high priority in INRMP due to high risk of decline. Value is non-commodity, social, many years to replace habitat and other values.
Recovering from fire with tree or shrub top kill in last 5 years. (Fire severity 3 or hotter)	High	High	Shrub community recovery value reflects high priority in INRMP and is non-commodity.
Recovering from fire with tree or shrub top kill in last 40 years. (Fire severity 3 or hotter)	Medium	Medium	Shrub community recovery value reflects high priority in INRMP and is non-commodity.
Maritime Desert Scrub-Boxthorn Phase			
High density sage sparrow area	Highest	Highest	Value per SCI Biological Opinions.
Medium density sage sparrow area	High	High	Value per SCI Biological Opinions.
Low density sage sparrow area	Medium	Medium	Includes areas mapped as boxthorn phase and other areas mapped as grassland but that have a prominent boxthorn component. Value based on occupation by sage sparrows.
Maritime Desert Scrub-Grassland Complex (including all prickly pear and cholla phases)			
Terrace Faces	Medium	Medium	Shrub community recovery emanates from these areas. Value reflects high priority in INRMP and is non-commodity, social.
Terrace Flats	Low	Low	These areas are mostly grassland but have a component of shrub recovery from historic grazing. Value based on qualitative discussion of trade-offs. No special fire protection is recommended until top kill of shrubs within previous 15 years.
Slopes of Pyramid Cove and similar south-facing types	Low	Medium	No special protection measures are recommended until fire starts to appear in this community, then enhanced protection is needed.
Recovering from fire with shrub top kill in last 15 years. (Fire severity 3 or hotter)	Medium	Medium	Shrub community recovery emanates from these areas. Value reflects high priority in INRMP. Value is non-commodity, social.
Maritime Sage Scrub			
Maritime Sage Scrub (canyon walls and slopes)	Medium	Medium	Value based on Island recovery needs and are non-commodity.
Maritime Sage Scrub (northeast escarpment)	Low	Medium	Value reflects low identified risk from ignition. No special protection measures are recommended until fire starts to appear in this community, then enhanced protection is needed.
Grassland Types			

Table 2-11. Natural resources values at risk from fire and mechanical disturbance related to fire. All values relate to areas outside Impact Areas I and II. (Continued)

Vegetation Type, Habitat Area, or Resource Type	**Values at Risk for Wildland Fire or Prescribed Fire**	**Values at Risk for Mechanical Disturbance**	**Comment/Basis for Valuation**
Clay grassland with boxthorn, little or sparse Baccharis	Low	Low	Keep the boxthorn component while managing for excessive exotics. Not known to be occupied by nesting sage sparrows.
Loamy Grassland	Low	Medium	Fire would generally benefit by controlling exotics and keeping the perennial grass canopy open enough to support annual and perennial forbs, as well as foraging by the loggerhead shrike, the fox, and a variety of raptors. Control and contain fires to LMU or other logical road/topographic boundary.
Baccharis Scrub/Grassland	Low	Low	With the new addition of Baccharis to this system, the grassland is higher in structural diversity but potentially lower in diversity of native grasses and forbs. However, the potential for improved mesic conditions due to the ability of these shrubs to capture additional moisture from fog than was previously available may ameliorate this. At this time we are not sure where the system will end up. Fires are more likely to become hot enough to kill underground storage structures of native forbs or growing points of needlegrass. More frequent burning than is currently experienced in this community is recommended to avoid hot fires, foster a mix of grassland and shrubs. Control and contain fires to LMU or other logical road/topographic boundary.
Other Plant Communities			
Stabilized Sand Dunes	Low	Low	No special protection measures are recommended until fire starts to appear in this community, then enhanced protection is needed.
Active Sand Dunes	Low	Low	No special protection measures are recommended.
Sea Bluff Succulent	Low	Low	No special protection measures are recommended.
Disturbed	Low	Low	No special protection measures are recommended.
Coastal Strand	Low	Low	No special protection measures are recommended.
Coastal Salt Marsh	Low	Low	No special protection measures are recommended due to low fuel hazard.
Jurisdictional Wetlands or Waters of the U.S.	Low	High	Mitigation not required for burning. Mitigation required under Clean Water Act for dredge or fill.
Sensitive Species Other Than Those Already Addressed Above			
Island night lizard (*Xantusia riversiana*)	Low	High	Expected to be resilient to fires if severity 3 or cooler which are not expected to affect thermal cover, due to high numbers and wide distribution.
San Clemente Island fox (*Urocyon littoralis clementae*)	Low	Low	Expected to be resilient to fires if severity 3 or cooler due to wide distribution and improved foraging and travel conditions with grassland fire.

Table 2-11. Natural resources values at risk from fire and mechanical disturbance related to fire. All values relate to areas outside Impact Areas I and II. (Continued)

Vegetation Type, Habitat Area, or Resource Type	Values at Risk for Wildland Fire or Prescribed Fire	Values at Risk for Mechanical Disturbance	Comment/Basis for Valuation
San Clemente Island larkspur (*Delphinium variegatum* ssp. *kinkiense*)	Low	Medium	Expected to be fire-resilient at frequent fire levels due to underground storage structure and dormancy.
Thorne's royal larkspur (*Delphinium variegatum* ssp. *thornei*)	Low	Medium	Expected to be fire-resilient.
San Clemente Island buckwheat (*Eriogonum giganteum formosum)*	Medium	Medium	Valued as member of recovering Maritime Sage Scrub community. Value based on qualitative discussion of trade-offs. No special fire protection is recommended until top kill of shrubs within previous 15 years.
San Clemente Island bush mallow (*Malacothamnus clementinus*)	Low	Medium	Expected to be fire-resilient if fires spaced more than 10 years.
San Clemente Island woodland star (*Lithophragma maximum*)	Medium	High	An herbaceous perennial of shaded woodlands, low numbers. No special protection measures are recommended until any individual burns, then enhanced protection is needed.
San Clemente Island broom (*Lotus dendroideus traskiae*)	Low	Medium	Expected to be fire-resilient if fires spaced more than 10 years.
San Clemente Island silver hosackia (*Lotus argophyllus adsurgens)*	Low	Medium	Expected to be fire-resilient if fires spaced more than 10 years.
San Clemente Island evening primrose (*Camissonia guadalupensis clementina*)	Low	Low	Expected to be protected due to location on dunes where fire is not a threat.
San Clemente Island Indian paintbrush (*Castilleja grisea*)	Low	Medium	Expected to be fire-resilient if fires spaced more than 10 years.
San Clemente Island bedstraw (*Galium catalinense acrispum*)	Low	Medium	Expected to be fire-resilient if fires spaced more than 10 years. Also protected as member of canyon woodland community.
Blair's munzothamnus (*Munzothamnus blairii*)	Medium	Medium	Protected as member of canyon woodland community. No special protection measures beyond this identified.
San Clemente Island brodiaea (*Brodiaea kinkiense*)	Low	Medium	Expected to be fire-resilient at frequent fire levels due to underground storage structure and dormancy.
San Clemente Island triteleia (*Triteleia clementina*)	Low	Medium	Expected to be fire-resilient at frequent fire levels due to underground storage structure and dormancy.
Southern island tree mallow (malva rose) (*Lavatera assurgentiflora glabra*)	Medium	High	Value reflects high priority in INRMP due to high risk of decline. Value non-commodity, social.
Santa Cruz Island rock cress (*Sibara filifolia*)	Low	High	Annual habit make this plant resilient to fire. Also there is no record of a fire in its current location and fuel hazard is very low.
Recreation			
Fishing	Low	Low	Based on fishing fees. Statewide, fishing = $85/user-day; non-consumptive recreation = $100/user-day.
Watershed Values			
Water quality, sediment filter function of buffer	Not identified	Not identified	Increased values within buffer strip of drainage.

Table 2-11. Natural resources values at risk from fire and mechanical disturbance related to fire. All values relate to areas outside Impact Areas I and II. (Continued)

Vegetation Type, Habitat Area, or Resource Type	Values at Risk for Wildland Fire or Prescribed Fire	Values at Risk for Mechanical Disturbance	Comment/Basis for Valuation
Water quality of nearshore areas	Low	Medium	East shore and areas draining into Area of Special Biological Significance (one nm from shore around entire Island). Cost of excess total dissolved solids (not quantifiable), excavation and removal of sediment from reservoirs ($4-40 cu.yd. depending on hauling distance), watershed rehabilitation costs ($25-$30/acre assuming 10-25% of burn seeded), streambank and slope erosion control, road repairs, increased peak flows (2- to 2.5-fold (up to 45-fold) increases seen in southern Calif.), increased flood control facilities, flood damage. Most of impact costs incurred in first two years following fire, but much longer for mechanical damage.
Watershed cover on steep slopes that have been affected by fire	Medium	Medium	Watershed rehabilitation, sediment removal costs, loss of woodland values upstream. Value reflects high priority in INRMP, long recovery time, and is mostly non-commodity.
High soil erodibility due to surface texture or grade	Low	Medium	Cost of road repairs, watershed rehabilitation, and sediment removal. Main impact from poor road standards or maintenance, possibly exacerbated by fire.
Air Quality	Low	Not identified	Risk of PM10's exceeding legal limits, by air quality basin or fuel type.
Aesthetic / Public Relations	Low	Low	Large fires or those that cost public goodwill and Navy personnel time in repairing public relations.
Cumulative Effects (Vegetation Type X Watershed)	Not identified	Not identified	

2.2.10 Natural Resources Value Analysis By Land Management Unit

The valuation of natural resources by land management unit was undertaken during the preparation of the INRMP to try to determine which parts of the Island have the potential for the most conflict between military use and natural resources management. It is appropriate for inclusion in this Fire Plan to show how natural resources managers might determine if resources will require specific fire management prescriptions. The analysis was performed with the understanding that much of the information about the Island's natural resources is incomplete. Consequently, this analysis should be viewed with caution and only in conjunction with the objectives and strategies outlined throughout the INRMP and this Fire Plan. For a complete discussion of how the analysis was completed see Section 4.2.3 of the INRMP.

The most limiting factor in determining which natural resources would be used in the analysis was the amount and quality of information available about the resource. Only those resources tied to specific locations could be analyzed by management unit. Other factors considered to determine a resource's use included:

- Its federal or state protective status, or potential status;
- The distribution of the resource;
- The threats to the resource;
- Its commercial value; and
- Its distribution on the Island.

The resources that were eventually selected for the analysis were assigned a weighting factor determined by a panel of biologists. The following resources were selected for use in the analysis:

- San Clemente loggerhead shrike nest locations;
- San Clemente loggerhead shrike potential release sites;
- Sage sparrow density;
- Island night lizard density;
- Ecological units;
- Federally listed plants;
- Endemic plants;
- Seabird colonies;
- Pinniped rookeries;
- Western snowy plover observations; and
- Existing natural resources management operations (NRO facilities in Wilson Cove, Stone Station and Burns cage complex, and Arizone cage complex).

Results of the valuation of natural resources on SCI, by resource, are shown in Table 4-7 of the INRMP. Figure 2-1 below shows the relative value of each management unit for natural resources. Seal Cove, Pyramid Cove, and Lost Point received the highest scores while Wilson Cove and VC3 received the lowest.

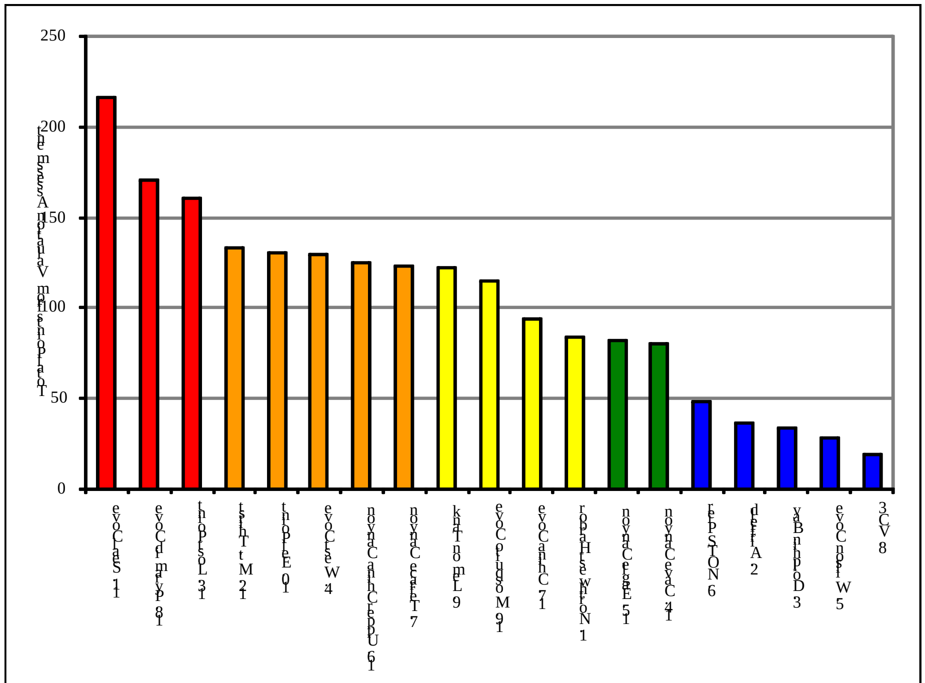


Figure 2-1. Relative value of land management units to selected natural resources at SCI, as developed by the INRMP Working Group.

Table 2-12 was developed to determine which units may have the greatest potential for conflict between military activities and natural resources management. The conflict could include the threat of fire to natural resources from military exercises, but not necessarily. Pyramid Cove and Seal Cove appear to have the greatest potential for conflict, however, actual activities and locations of activities should be looked at more closely to determine if there truly is a conflict. The Eel Point LMU was added as part of this Fire Plan, so does not appear in this table.

Table 2-12. Comparison of Military Value and Natural Resources Value of each management unit.

Management Unit	Military Value	Natural Resources Value
1. Northwest Harbor	Highest	Medium
2. Airfield	Highest	Lowest
3. Dolphin Bay	Low	Lowest
4. West Cove	Medium	High
5. Wilson Cove	High	Lowest
6. NOTS Pier	High	Low
7. Terrace Canyon	Medium	High
8. VC3	Highest	Lowest
9. Lemon Tank	Low	High
10. Eel Point	High	High
11. Seal Cove	High	Highest
12. Mt. Thirst	Medium	High
13. Lost Point	Lowest	Highest
14. Cave Canyon	Medium	Medium
15. Eagle Canyon	Lowest	Medium
16. Upper China Canyon	Lowest	High
17. China Cove	Highest	Medium
18. Pyramid Cove	Highest	Highest
19. Mosquito Cove	Lowest	High

3.0 Fire History and Fuels

3.1 Fire History

Prior to about 1979, there is little direct information on fire history for San Clemente Island. Lightning-caused fire appears to be rare in recorded history for the Channel Islands (three documented fires over the past 140 years, on Catalina in 1967, on Santa Cruz Island in 1987, and Santa Rosa in 1988) (Carroll *et al.* 1993). However, two recent lightning fires have occurred since these records on Santa Catalina Island (P. Schuyler, pers. comm.). Additional lightning strikes are documented on other islands that did not result in fires (Carroll *et al.* 1993). Charcoal deposits from the Pleistocene and Holocene on San Miguel Island (Johnson 1972) and Holocene on Santa Cruz (Brumbaugh 1980) may have resulted from natural prehistoric fires. It is appropriate to assume that fire has played at least some ecological role in shaping the Island's natural resources and will continue to do so in the future.

During habitation by the Gabrieliño people, it can be assumed that residential fires occasionally escaped, and that these aboriginal occupants probably also set fires systematically. Prehistoric manipulation of the botanical environment has been clearly demonstrated in the results of archaeological, ethnographic, ethnohistoric and paleobotanical research in the American Southwest. Evidence of these activities by California tribes was compiled by Blackburn and Anderson (1993). Although none of their assembled data derive specifically from SCI, the Island's late prehistoric Island Gabrieliño occupants were socially, economically, and linguistically integrated with their mainland counterparts, who did use fire as a tool to draw out seed yields from plants important to them (A. Yatsko, pers. comm.).

No direct archaeological evidence of intentionally-set aboriginal fires has been examined for the island, although sedimentary deposits containing charcoal could be investigated with this in mind. However, because prehistoric Island dwellers would have had immediate knowledge for this use of fire, it can be inferred that they most likely followed the mainland pattern and frequently burned selected vegetation communities. Although these aboriginal residents depended to a large degree on the sea for subsistence, archaeological evidence from their groundstone seed processing tools suggests a certain reliance on terrestrial plant resources as well. Some species commonly used by Native Americans including *Nassella, Calandrinia, Dichelostemma,* and *Datura* are known to be favored by fire over other species (Menke 1992; Keeley 1991).

Fires continued to be set at least intermittently after sheep ranching commenced, from about 1862 to 1934. There is written documentation of three instances when sheep ranchers set fire to increase forage for their herds (Andrew 1996). The intention would have been to favor forbs and grasses over shrubs, which are less palatable to sheep. This may have had a detrimental impact particularly because the fires were set during periods of drought or overgrazing when the vegetation was stressed to begin with; however, such fires probably would not have carried far due to discontinuous and low-volume fuels.

Sheep grazing leases were immediately cancelled when the Navy took control of the Island in 1934. The goat population expanded without controls at this point, and fuel loads probably became progressively lower and less continous as the goats browsed it down. Military use of SCI began to take on the pattern it has today, with the airfield and other localized developments for human occupation, and areas of live ordnance use. A change in fire pattern developed coincidentally with the use of incendiary ordnance.

3.2 Current Fire Pattern

All the Channel Islands except San Nicolas and Anacapa now experience human-ignited fires relatively commonly compared to natural fires, especially those with high levels of human activity (Carroll *et al*. 1993) (Table 3-1).

Table 3-1. Number of historical fires on the Channel Islands (1830-1986) based on literature and dozens of interviews, compiled by Carroll et al. *(1993). Fires greater than one ha are recorded by size range. Fires less than one ha are not recorded.*

	Number of Historical Fires By Range In Size of Fires (hectares)			
Island	**1-9**	**10-99**	**100-999**	**1000+**
Anacapa	0	0	0	0
San Clemente	9*	2	1	2
San Miguel	12*	0	2	1
San Nicolas	0	0	0	0
Santa Barbara	0*	4*	1	0
Santa Catalina	21*	3	3	1
Santa Cruz	5	2	0	1
Santa Rosa	0	3	0	0

* Estimate due to lack of accurate records

It is unclear in what manner the use of live ordnance as the primary ignition source has changed the frequency, footprint, or severity of Island fires. Approximately half of the fires occurring on the Island in recent years have occurred within SHOBA (Table 3-2). Within SHOBA, unless a fire threatens human life or facilities, it is usually allowed to burn itself out. Fires in the northern portion of the island are usually suppressed before they spread very far. This disparity in fire suppression practices within SHOBA and outside of SHOBA at least partially accounts for the fact that the SHOBA fires total approximately 85% of the total acreage burned from 1996–2004 (Table 3-3).

Table 3-2. Recorded wildfires comparing SHOBA to north of SHOBA for 1996-2004.

	Number of Fires	Percent of Total	Acres Burned	Percent of Total
In SHOBA	54	59.3%	6242.4	88.1%
North of SHOBA	37	40.7%	842.3	11.9%
Totals	91	-	7084.7	-

Early records are meager, but many fires apparently covered only a small area and burned themselves out without serious impact on wildlife or plants. However, certain fires such as the 1980 fire from Stone Gate south, spread over much of the Island. Canyons and most coastal areas probably escaped in this instance, but the grasslands likely burned freely (Resnick 1988). Until helicopter resources became available for firefighting, most fires were allowed to burn themselves out because of the danger of fighting fires near unexploded ordnance. Map 3-1 and Map 3-2 show the fire history on SCI based on fire records from 1979 through 2004.

3.3 Ignitions and Ignition Sources

Most fires on the Island today are ignited by live ordnance training of various types (Table 3-3 and Table 3-4).

Table 3-3. Known number of ignitions and acres burned each year between 1990 and 2001 by ignition source (Sources: 1900-2001 Wildland Fire Inventories; GIS Data 1993, 1994, 1996, and 1999, NRO; USFWS TAR BO January 2001). Plus signs (+) following acreage numbers indicate that the acreage for at least one fire of the indicated source was missing from the database. Although Maps 3-1 and 3-1 reflect the known fire history up through 2004, no information regarding ignition sources is available after 2001.

Ignition Source		1990	1993	1994	1995	1996	1997	1998	1999	2000	2001	Totals
Unknown Source	(#)	1	4	16	4	5	1	4	1	4		40
	(acres)	1,000	8,446	6,271	2,430	1,287	5	800	2.5	162		20,443
Controlled Burn	(#)		1	1								2
	(acres)		?	73								73+
Electrical Wiring/Transformer	(#)							2	2	1		4
	(acres)							120	1,483	328		1,931
Vehicle Exhaust Pipes	(#)							1		2		3
	(acres)							350		108		458
Helitorch During Firebreak	(#)					1				1		2
Instruction	(acres)					300				346		646
Naval Shell	(#)						7		4	1		12
	(acres)						176+		481	23		692+
Artillery Shell	(#)								1			1
	(acres)								2.5			2.5
Air to Ground Ordnance	(#)									1	1	2
	(acres)									235	3	238
Spark off of target	(#)							1				1
	(acres)							55				55
Illumination Round - Naval	(#)						1	4				5
	(acres)						4.6	230+				235+
Illumination Round - Mortar	(#)								2			2
	(acres)								5			5
Flare*	(#)		1	1		1	3				1	7
	(acres)		?	845		4	43				1	893+
Missile	(#)					2	4					6
	(acres)					2.5	2					4.5
UAV Crash	(#)							1		1		2
	(acres)							1		7		8

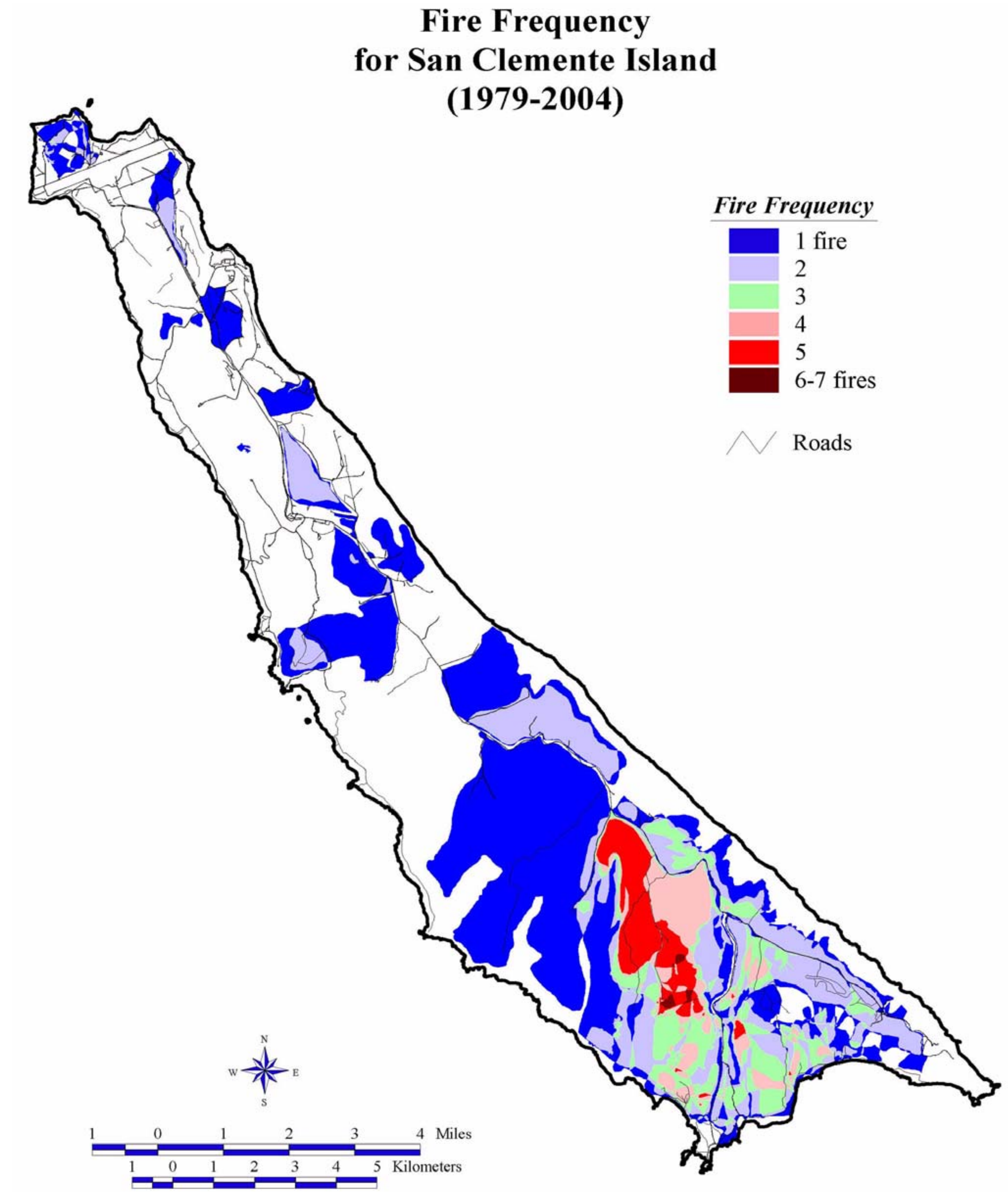
Table 3-3. Known number of ignitions and acres burned each year between 1990 and 2001 by ignition source (Sources: 1900-2001 Wildland Fire Inventories; GIS Data 1993, 1994, 1996, and 1999, NRO; USFWS TAR BO January 2001). Plus signs (+) following acreage numbers indicate that the acreage for at least one fire of the indicated source was missing from the database. Although Maps 3-1 and 3-1 reflect the known fire history up through 2004, no information regarding ignition sources is available after 2001. (Continued)

Ignition Source		1990	1993	1994	1995	1996	1997	1998	1999	2000	2001	Totals
Grenade	(#) (acres)						3 216	1 2		1 10		5 228
Demolition Charge	(#) (acres)					1 18		2 10	3 12	2 18	1 1	9 59
Small Arms	(#) (acres)								2 2	3 114	1 1	6 117
Tracer round	(#) (acres)				1 162			2 3		2 23	2 25+	8 214+
Totals	**(#) (acres)**	**1 1,000**	**6 8,446+**	**18 7,188**	**5 2,592**	**10 1,612**	**19 445**	**17 1,571**	**15 1,988**	**19 1,374**	**6 31+**	**117 26,304**

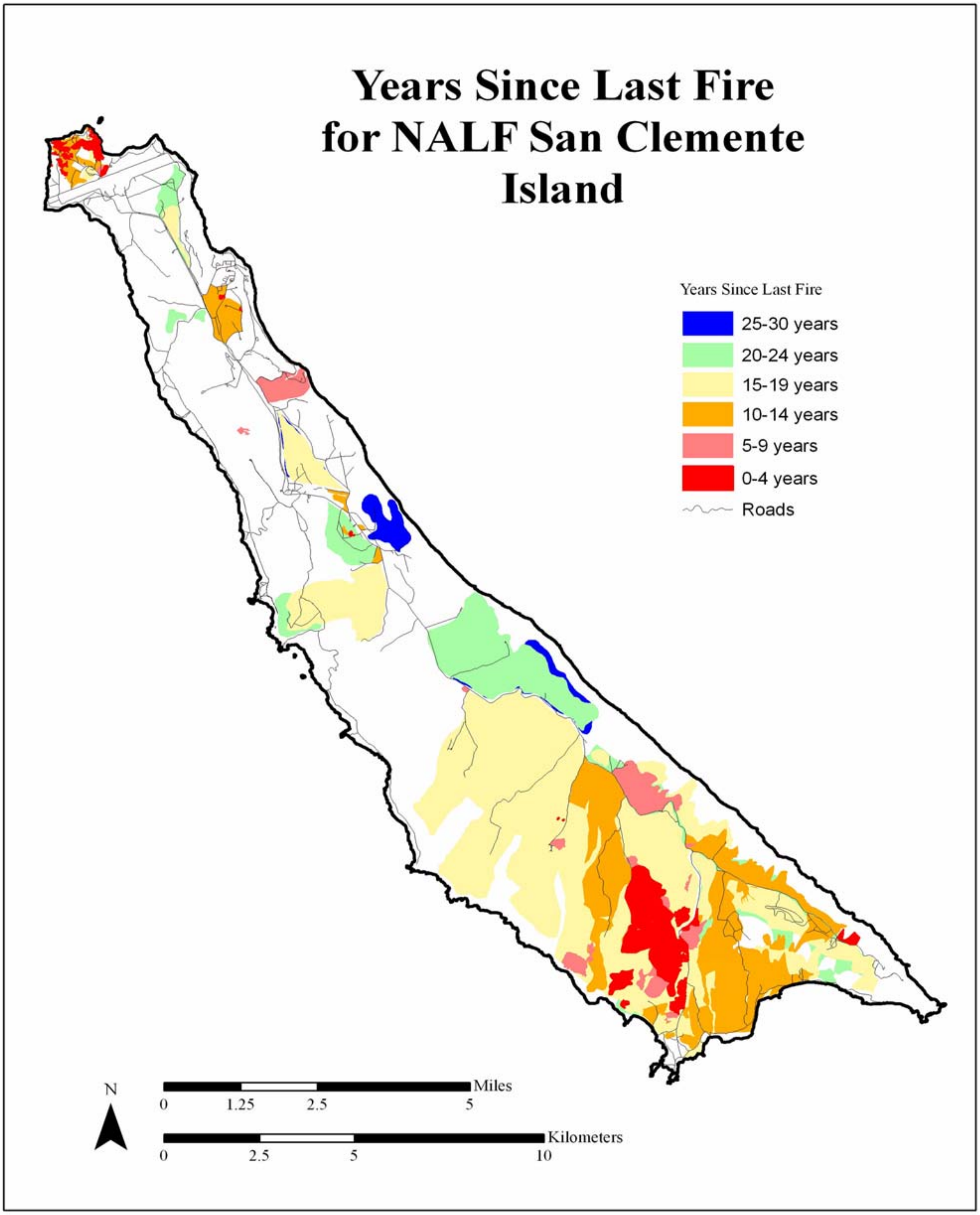
Table 3-4. Known ignition sources, total ignitions, and total acreage burned from 1990-2001. (Sources: 1900-2001 Wildland Fire Inventories; GIS Data 1993, 1994, 1996, and 1999, NRO; USFWS TAR BO January 2001. Although Maps 3-1 and 3-1 reflect the known fire history up through 2004, no information regarding ignition sources is available after 2001.)

Ignition Source	Total Known Ignitions 1990-2001	Percent of Total Ignitions	Acres Burned	Percent of Total Acreage
Unknown Source	40	34.2%	20,443	77.7%
Naval Shell	12	10.3%	692	2.6%
Demolition Charge	9	7.7%	59	0.2%
Electrical Wiring/Transformer	4	3.4%	1931	7.3%
Flare*	7	6.0%	893	3.4%
Missile	6	5.1%	4.5	<1%
Illumination Round - Naval *	5	4.3%	235	0.9%
Grenade	5	4.3%	228	0.9%
Small Arms	6	5.1%	118	0.4%
Tracer round*	8	6.8%	214	0.8%
Vehicle Exhaust Pipes	3	2.6%	458	1.7%
Controlled Burn	2	1.7%	73	0.3%
Helitorch During Firebreak Instruction	2	1.7%	646	2.5%
UAV Crash	2	1.7%	8	<1%
Artillery Shell	1	0.9%	2.5	<1%
Air to Ground Ordnance	2	1.7%	238	0.9%
Spark off of target	1	0.9%	55	0.2%
Illumination Round - Mortar*	2	1.7%	5	<1%
Totals	117	-	26,304	-

*indicates incendiary device



Map 3-1. Fire frequency map for San Clemente Island 1979-2004. This represents all documented fires for the island, but many fires less than five acres are undocumented. Map is probably accurate in terms of relative pattern and frequency.



Map 3-2. Years-since-last-fire map for San Clemente Island 1979–2004. This represents all documented fires for the island, but many fires less than five acres are undocumented. Map is probably accurate in terms of relative pattern.

3.4 Fuel Types

3.4.1 Fuel Types

Fuel load (biomass), fuel structure (the arrangement and density of fuels), and fuel type (grasses, shrubs, trees, etc.) interact to influence the spread, intensity and frequency of wildfires. The plant communities found in a given area are the first guide to the existing fuel types, and plant communities that have similar ignition, combustion, and fire spread characteristics can be grouped together to represent a fuel type.

Under normal circumstances, the age structure of vegetation could be used as a means to estimate fuel loads, based on a map of years-since-last-fire (Map 3-2) overlaid with a map of fuel types (plant communities). However, the fuel structure on SCI is changing dramatically as the Island recovers from the final removal of feral goats in 1991. There has been no attempt to date to estimate fuel loads for fire planning.

The following pages present a series of photos showing the various vegetation communities found on the Island as fuel types. Plot numbers cited in photo captions correspond to transect numbers sampled in NRO's long-term vegetation trend study (Tierra Data 2004). Detailed descriptions of each community are presented in Chapter 2, with a vegetation map.

Canyon Woodland

Plot 48, 1995

Plot 48, 2002

Plot 48, 1995

Horse Beach Canyon

Plot 5, 1996

Maritime Desert Scrub (MDS) – Boxthorn


Plot 26, 2000


Plot 26, 2003


Plot 67, 1992


Plot 67, 2002

Plot 77, 1992

Plot 77, 2002

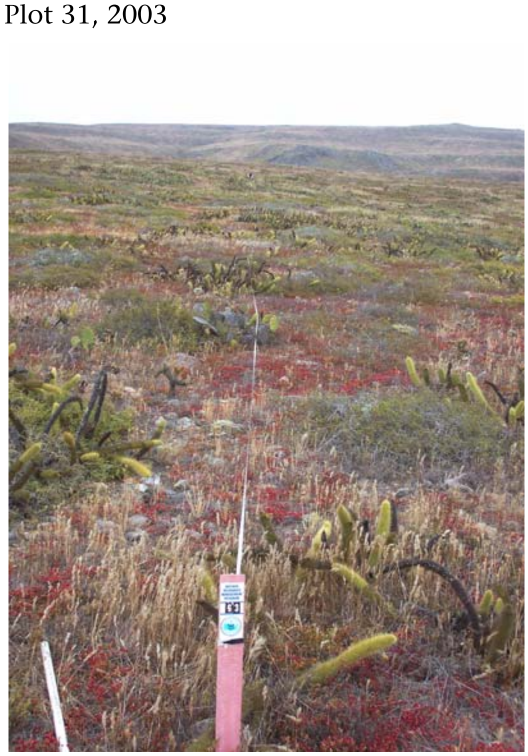
Pyramid Cove

MDS – Boxthorn/Grassland

Plot 31, 1992

Plot 31, 2003

Plot 63, 1994

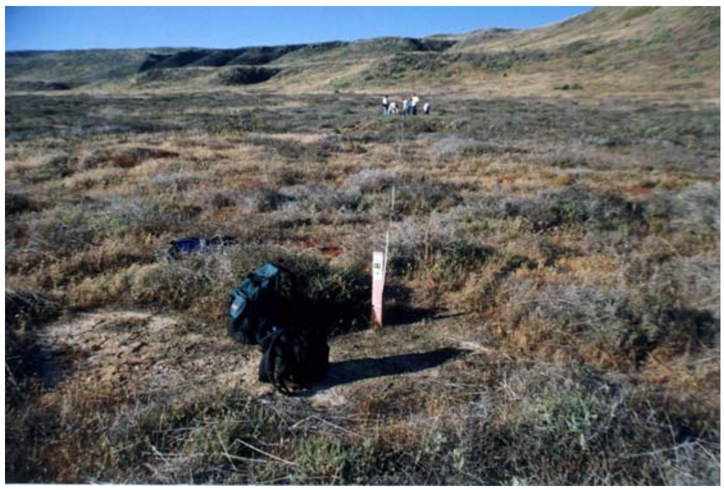


Plot 63, 2003

MDS – Grassland Complex (terrace faces and flats)


Plot 31, 1992


Plot 31, 2003


Plot 59, 2000


Plot 22, 2000


Plot 29, 1994

Plot 31, 2000

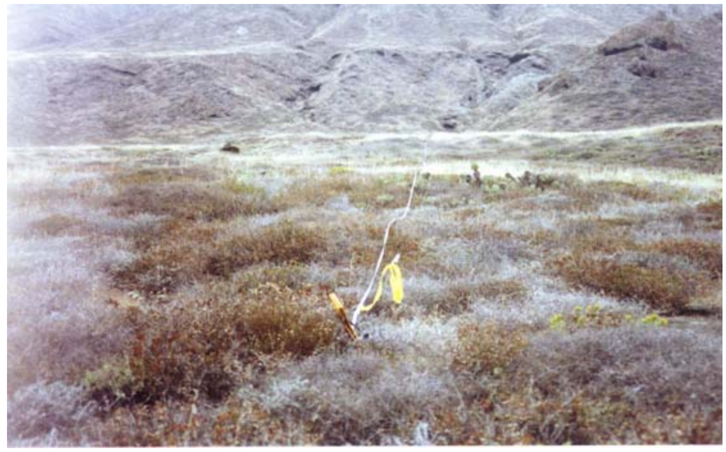
Plot 29, 2002

Plot 29, 2003

MDS – Pyramid Cove

Plot 31, 1992

Plot 31, 2002

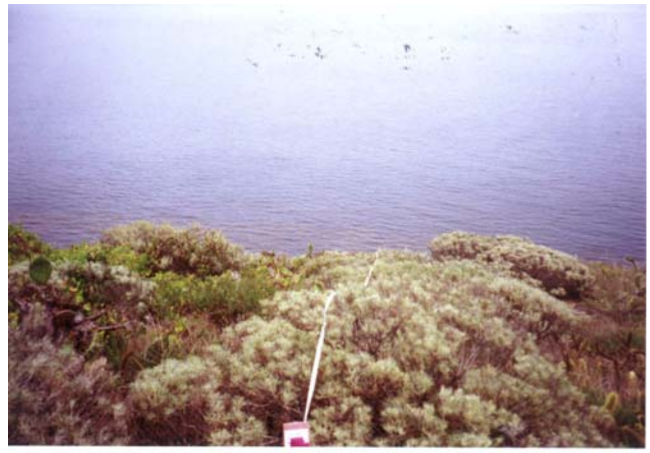


Plot 46, 1996

Plot 39, 1995

Maritime Sage Scrub (MSS) – Northeast Escarpment

Plot 34, 1992



Plot 35, 1996

Plot 51, 1996

Plot 51, 1996

Plot 35, 1992

Plot 35, 1992

Plot 34, 2000

MDS – Canyon Walls and Escarpments

Plot 33, 1995

Eastern canyon

Plot 57, 1992

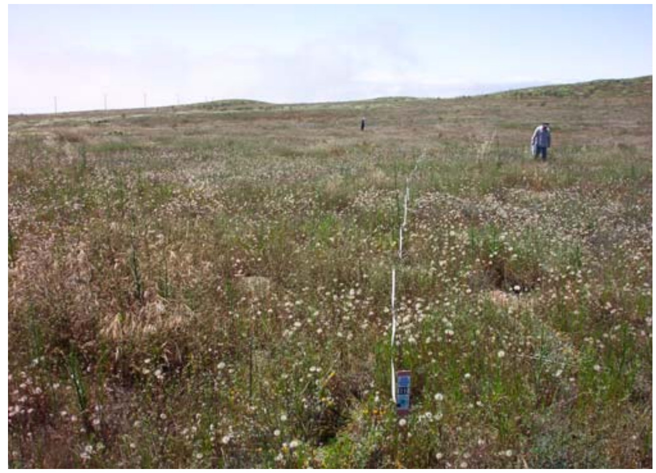
Plot 33, 1996

Plot 57, 2000

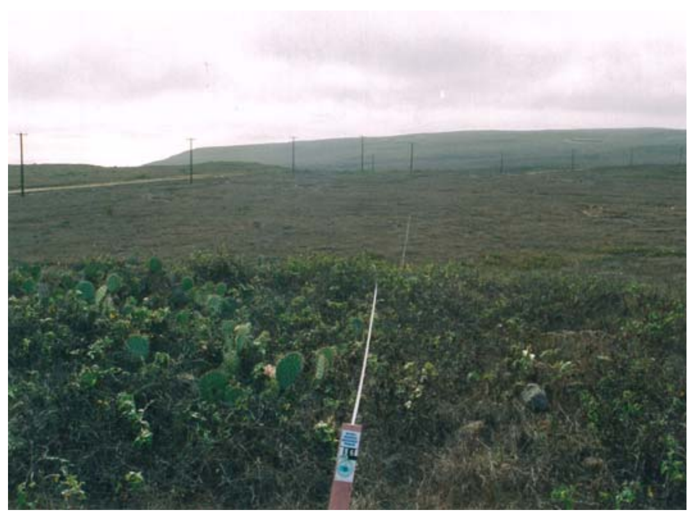
Plot 33, 2000

Grasslands, Loamy Soils


Plot 25, 1996


Plot 25, 2003


Plot 95, 1992


Plot 95, 2002

Plot 27, 1994

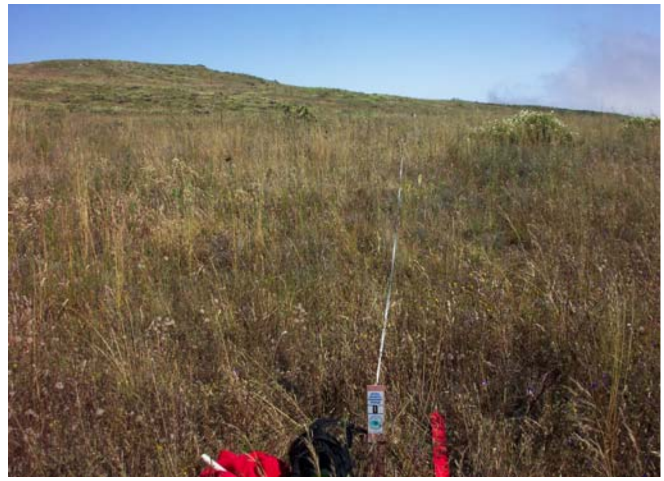
Plot 27, 2003

Plot 27, 1996

Plot 8, 1994

Grasslands, Clay Soils


Plot 1, 1996


Plot 1, 2003


Plot 18, 1992


Plot 18, 2000


Plot 40, 1992


Plot 40, 2003

Stabilized Sand Dunes

Plot 21, 1992

Plot 21, 2002

Coastal Salt Marsh

Plot 58, 1992

Plot 58, 1996

3.4.2 Fuel Model Descriptions

Identification of fuel models allows for mathematical calculation of fire spread and fire intensity by treating vegetation types as a standard fuel complex with predictable behavior assumptions based on the amount of combustible material present and an array of fuel characteristics (distribution, form, density, loading, depth, diameter, etc.). There are currently 13 standard fuel models in use in the U.S., ranging from short grass habitat to various forest types, plus five custom fuel models specific to California (Anderson 1982, Andrews *et al.*2003). Using standard fire behavior modeling software such as Behave or BehavePlus, it is possible to evaluate potential fire behavior under various weather and fuel conditions.

When calculating a fire danger rating using these models, mid-flame wind speeds (MFWS) are determined by the specific fuel model and friction loss of a 20-ft wind speed due to vegetation cover. They are adjusted by a factor of 0.4 for all SCI unsheltered fuel models except Fuel Model 4 (tall, dense brush), which has an adjustment factor of 0.6. For example, a 10 mile per hour (mph) recorded 20-ft wind speed would be multiplied by the factor and recorded as a four-mph MFWS in all fuels, except Fuel Model 4, which would have a six-mph MFWS.

The following fuel model assumptions are used in this Plan.

Fire Behavior Fuel Model 1 - Grass Group

Fire spread is governed by the fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Very little shrub is present, generally less than one-third of the area.

Refer to Photographs 1, 2 and 3 for visual illustrations of Fuel Model 1.

Fuel Model Values for Estimating Fuel Model 1 Fire Behavior

Total Fuel Load of < 3-inch dead and live	0.74 tons/acre
Dead fuel load, 1/4-inch	0.74 tons/acre
Live fuel load, foliage	0 tons/acre
Fuel bed depth	2.0 feet


Photo 1. Fuel Model 1, grass group.


Photo 2. Fuel Model 1, grass group.


Photo 3. Fuel Model 1, grass group.

Fire Behavior Fuel Model 2 – Grass Group (and Short Shrub)

Fire spread is primarily through the fine herbaceous fuels, either curing or dead. Fires are surface fires that move rapidly through the cured grass and associated material. In addition to litter, the dead-down stemwood from the open shrub community contributes to fire intensity. Sparse Boxthorn and other short shrubs that generally cover one-third to two-thirds of the area fit into this model. Also, the area experiencing invasion by coyote brush north of Stone Station fits this model.

Refer to Photographs 4, 5 and 6 for visual illustrations of Fuel Model 2.

Fuel Model Values for Estimating Fuel Model 2 Fire Behavior

Total fuel load, < 3-inch dead and live	4.0 tons/acre
Dead fuel load, 1/4-inch	2.0 tons/acre
Live fuel load, foliage	0.5 tons/acre
Fuel bed depth	1-2 feet

Photo 4. Fuel Model 2, grass and short shrub.

Photo 5. Fuel Model 2, grass and short shrub.

Photo 6. Fuel Model 2, grass and short shrub.

Fire Behavior Fuel Model 3 – Grass Group (Tall/Dense Grass and Weeds)

Fires in this fuel are the most intense of the grass group and display high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across sparse areas. Stands are tall, (about 3 ft) and coarse. Approximately 2/3 thirds or more of the stand is considered dead or cured and maintains the fire.

Refer to Photographs 7, 8 and 9 for visual illustrations of Fuel Model 3.

Fuel Model Values for Estimating Fuel Model 3 Fire Behavior

Total fuel load, < 3-inch dead and live	3.5 tons/acre
Dead fuel load, <1/4-inch	3.0 tons/acre
Live fuel load, foliage	0.5 tons/acre
Fuel bed depth	3-4 feet

Photo 7. Fuel Model 3, tall, dense grass and weeds.

Photo 8. Fuel Model 3, tall, dense grass and weeds.

Photo 9. Fuel Model 3, tall, dense grass and weeds.

Fire Behavior Fuel Model 4 – Shrub Group (Tall, >6-feet Mature Chaparral)

Fire intensity and fast-spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, 6 or more feet tall SCI mixed chaparral, fit this fuel model. Besides flammable foliage, dead woody material in the stands significantly contribute to the fire intensity. Height of stands within this fuel model depends on local conditions and soils. A deep litter layer may also hamper suppression efforts.

Refer to Photographs 10 and 11 for visual illustrations of Fuel Model 4.

Fuel Model Values for Estimating Fuel Model 4 Fire Behavior

Total fuel load, < 3-inch dead and live	13.0 tons/acre
Dead fuel load, <1/4-inch	5.0 tons/acre
Live fuel load, foliage	5.0 tons/acre
Fuel bed depth	>6.0 feet

Photo 10. Fuel Model 4, tall shrubs.

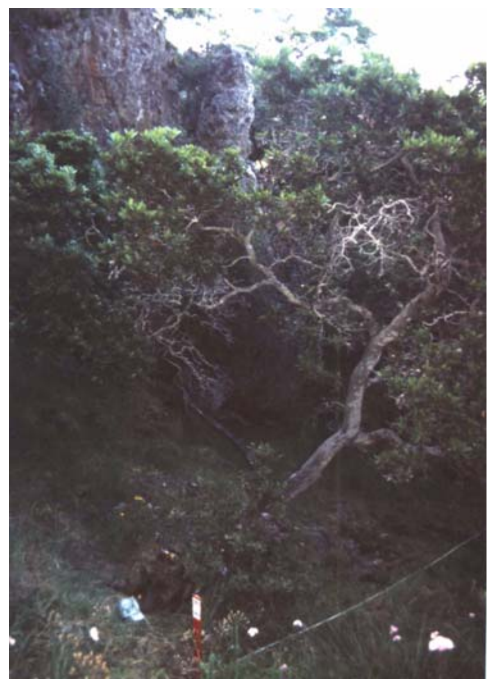


Photo 11. Fuel Model 4, tall shrubs.

Fire Behavior Fuel Model 5 – Shrub Group Excluding Chaparral (Short <6 feet)

Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in theunderstory. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material. Usually shrubs are short and almost totally cover the area. Mature Boxthorn, and other young, green shrubs with little to no dead wood fall in this fuel model.

Refer to Photographs 12, 13 and 14 for visual illustrations of Fuel Model 5.

Fuel Model Values for Estimating Fuel Model 5 Fire Behavior

Total fuel load, < 3-inch dead and live	3.5 tons/acre
Dead fuel load, <1/4-inch	1.0 tons/acre
Live fuel load, foliage	2.0 tons/acre
Fuel bed depth	2.0 feet

Photo 12. Fuel Model 5, short shrub.

Photo 13. Fuel Model 5, short shrub.

Photo 14. Fuel Model 5, short shrub.

Fire Behavior Fuel Model 6 – Shrub Group (Short, <6-feet tall, Mature Chaparral

Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but this requires moderate winds, greater than 8-mph at mid-flame wind height. Fire will drop to the ground at lower wind speeds or at openings in the stand. The shrubs are older but not as tall as fuel model 4, nor do they contain as much fuel as fuel model 4. A broad range of shrub conditions is covered by this model. However, the key SCI shrub community is chaparral.

Refer to Photographs 15 and 16 for visual illustrations of Fuel Model 6.

Fuel Model Values for Estimating Fuel Model 6 Fire Behavior

Total fuel load, < 3-inch dead and live	6.0 tons/acre
Dead fuel load, <1/4-inch	1.5 tons/acre
Live fuel load, foliage	0 tons/acre
Fuel bed depth	2.5 feet

Photo 15. Fuel Model 6, shrubs under 6 ft.

Photo 16. Fuel Model 6, shrubs under 6 ft.

Fire Behavior Fuel Model 9 – Tree Group (Hardwood Litter)

Fires run through the surface litter and ground fuel ladders faster than other tree group fuel models and have longer flame heights. Fall fires in hardwoods are the most intense and are predictable, but high winds will actually cause higher rates than predicted because of spotting caused by rolling rocks and blowing leaves and embers. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting and crowning.

Refer to Photographs 17 and 18 for visual illustrations of Fuel Model 9.

Fuel Model Values for Estimating Fuel Model 9 Fire Behavior

Total fuel load, < 3-inch dead and live	3.5 tons/acre
Dead fuel load, <1/4-inch	2.9 tons/acre
Live fuel load, foliage	0 tons/acre
Fuel bed depth	0.2 feet

Photo 17. Fuel Model 9, hardwood litter.

Photo 18. Fuel Model 9, hardwood litter.

Combined Fire Behavior Fuel Model for Mature Boxthorn

Fire behavior and fuel model values for mature boxthorn are estimated by customizing a fuel model by combining Fuel Model 5 (65%) and Fuel Model 1 (35%). This is because standard fuel models do not apply well to the boxthorn type.

Photo 19. Combined Fuel Model, Mature Boxthorn.

Photo 20. Combined Fuel Model, Mature Boxthorn.

3.4.3 Fire Behavior

Wildland fire can be effectively modeled to predict the expected fire behavior in a wildfire or prescribed fire based upon the following elements:

- established or customized vegetation fuel models;
- recorded or projected relative humidity or fine fuel moisture percentages;
- known slope percentages;
- aspect (direction the slope faces the sun); and
- time of day (relationship of solar radiation and the amount of heat fuels are exposed to).

Table 3-5 compares fire behavior by various fuel models under the same fire weather and slope conditions.

Table 3-5. Comparison of fire behavior by various fuel models under the same fire weather conditions and slope percentage

Fuel Model	Rate of Spread (feet/minute)	Flame Length (feet)	Fire Size in 30-Minutes (Acres)
1-Grass	89	4.3	68
2 -Grass and Short Shrub	41	6.6	14
3 -Grass Group (Tall/Dense Grass and Weeds)	124	13.5	133
4 -Shrub Group (Tall, >6-feet Mature Chaparral)	122	23.6	100
5 -Shrub Group (Short <6 feet)	24	5.8	4.8
6 -Shrub Group (Short, <6-feet tall, Mature Chaparral	36	6.1	11
9 -Tree Group (Hardwood Litter)	8	2.9	0.7
Combined (Typical Mature Boxthorn) Fuel Model 5 (65%) & Fuel Model 1 (35%)	46	5.8	18

Assumptions for Fire Weather and Fire Behavior Conditions	
Wind Speed	10 mph
1-hr Fine fuel Moisture	5%
10-hr Fuel Moisture	7%
100-hr Fuel Moisture	9%
Live Woody Fuel Moisture	100%
Live Herbaceous Fuel Moisture	50%
Percent of Slope	+30%

3.4.4 Interpretation for Fire Suppression

The following interpretations (Table 3-6) for fire suppression are made based on expected fire behavior derived from the above fuel models.

Table 3-6. Fire Suppression Interpretation.

Flame Length (ft)	Fireline Intensity (btu/ft/sec)	Interpretation
< 4	< 100 (moderate)	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 - 8	100 - 500 (high)	Fires are too intense for direct attack by persons using hand tools.
8 - 11	500 - 1,000 (very high)	Fires may present serious control problems - torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective without aerial fire chemical support.
>11	>1,000 (severe)	Crowning, spotting and major fire runs are probable. Control efforts at head of fire are ineffective. Indirect attack techniques most successful.

3.5 Fire Weather

The Channel Islands region belongs to the Mediterranean Dry Summer Subtropical climatic type, where the sea has a strong moderating influence on air temperatures across all seasons (Yoho *et al.* 2000). Diurnal differences in temperature are generally small and characterized by relatively cool days and warm nights. Of the eight Channel Islands, San Clemente Island is the southern-most and driest. Yoho *et al.* (2000)

described general climatic patterns in the Channel Islands region and San Clemente, deriving much of their regional climate information from Kimura (1974). The outer coastal waters around SCI are typically warmer than the water around the northern Channel Islands. Air temperatures are coolest in February and warmest around September. Although days in early summer may be frequently cloudy, summer is characterized by a lack of moisture. Ninety-five percent of annual precipitation falls between November and April.

The regional distribution of precipitation varies from north to south, so that SCI as the southern-most Channel Island is considerably more arid than even Catalina Island lying just to the north (Figure 3-1). Much of the rain that falls regionally originates with frontal storms in the winter advancing from the northwest. Air flow in the region is typically northwesterly, and the northwest winds are strongest and most constant during the warm months. In advance of the winter storms, winds in the region are commonly southeasterly, then shift back northwesterly as a storm passes out of the area. Relative humidity generally varies over the course of a day, often reaching 100% at night and in the early morning hours, then declining to about 60% as the day proceeds and the drying effects of solar radiation increase. The relative humidity drops considerably lower during Santa Ana conditions in fall and winter (Yoho *et al.* 2000).

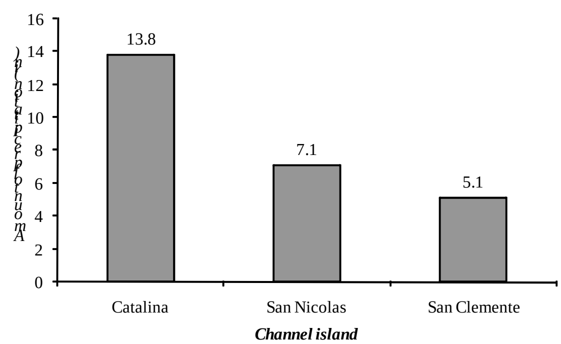
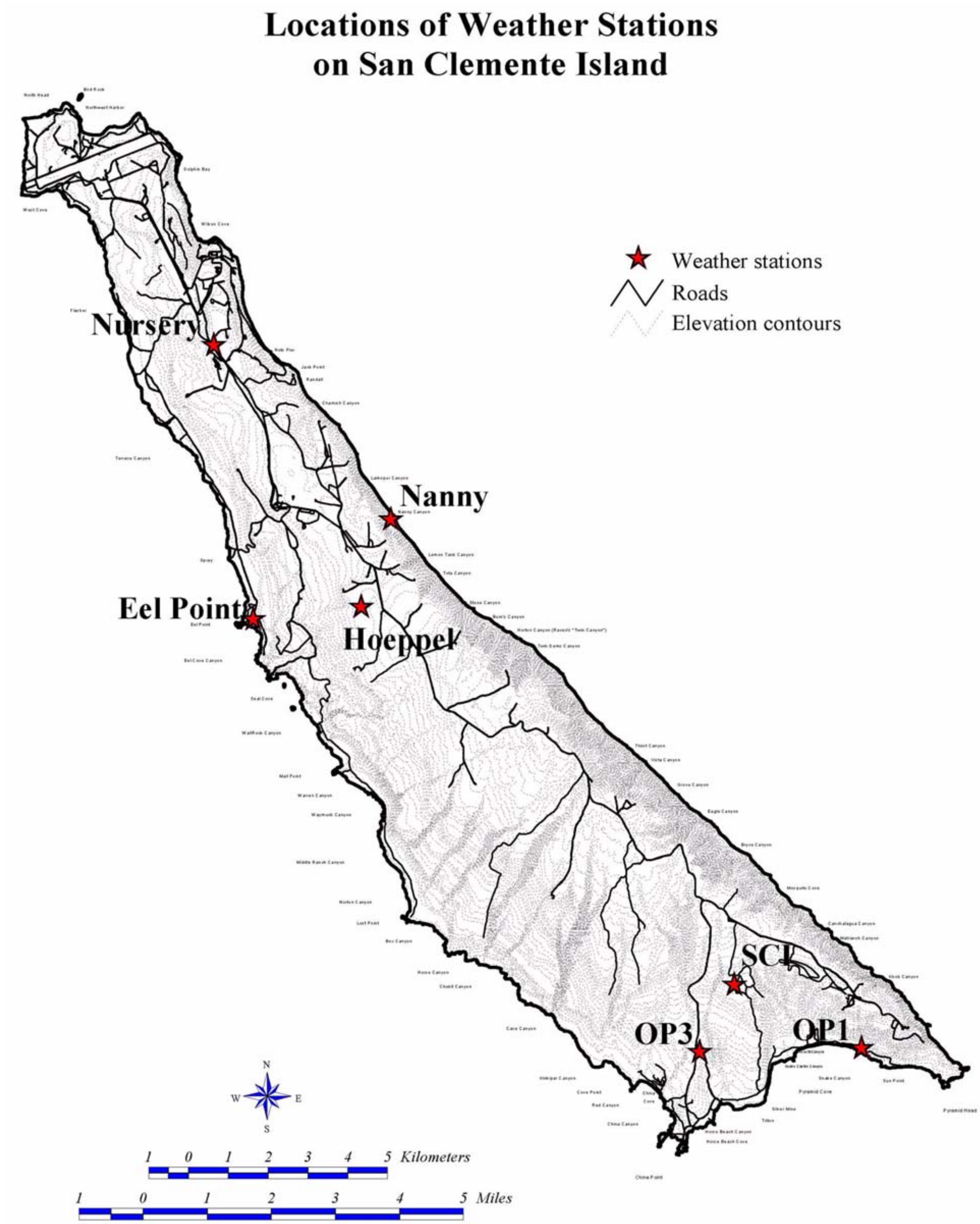


Figure 3-1. Distribution of annual rainfall within the southern group of Channel Islands, California (Kimura 1974, Yoho et al. 2000).

Several weather stations have been established in recent years to track weather patterns on the island (Map 3-3), although not all are still in operation. All stations have measured wind, temperature, relative humidity, and rainfall. The former Eel Point station and all current stations also record solar radiation, soil temperature and moisture, and leaf wetness. Data are collected electronically at each station and transmitted via modem to Stone Station, where software automatically consolidates and analyzes it (Yoho *et al.* 2000). Current conditions at the OP1 station can be accessed at any time on the World Wide Web at <www.csun.edu/~hfgeg010/ san-clem.html>. Maintenance of the weather stations and the data set is administered by the Geography Department at California State University Northridge via a cooperative agreement with the U.S. Navy.



Map 3-3. Locations of weather stations on San Clemente Island, California.

3.5.1 Air Temperature

August and September are the warmest months on SCI, and January and February are the coolest months. Yoho *et al.* (2000) reported a second peak of warm temperatures in November at the central stations at Nanny and Hoeppel, which they attributed to Santa Ana wind conditions. These secondary peaks in temperature were not detected at the northern and southern stations in the current data set, possibly due to less exposure to easterly winds at these locations. From 1996 to 2001, annual mean temperature at Nursery was 59^{o}F, mean maximum was 79^{o}F, and the mean minimum was 45^{o}F (Figure 3-2). September was the warmest month at Nursery, with an average high of 88^{o}F.

The south end of the island is warmer than the north end. At both OP1 (since 1996) and OP3 (since 1999), the annual mean temperature was 61^{o}F, mean maximum was 84^{o}F, and mean minimum was 48^{o}F (Figure 3-2). The warmest month for both stations was August at a maximum temperature of about 97^{o}F, and OP3 sustained its maximum temperatures into September as well. Annual temperatures at all three stations (though to a lesser degree at Nursery) were more variable throughout the year than recorded at Eel Point, suggesting more of a moderating influence of the marine environment on temperatures at lower elevations on the island compared to higher locations on SCI (Yoho *et al.* 2000).

3.5.2 Relative Humidity

At Nursery annual mean relative humidity recorded was 83%, with a mean maximum of 100% and a mean minimum of 33% (Figure 3-3). Highest average humidities were in March, June and July, while the lowest mean readings were October, November and December. December consistently has the lowest mean relative humidities at Nursery. Despite no evident substantial effects of the Santa Ana winds on temperatures at Nursery (see previous section), the low relative humidities recorded at the station late in the year is consistent with drier air conditions associated with the Santa Ana season.

Relative humidity readings were at least 10% lower on average at the southern stations than at the northern station at Nursery. OP1 had a mean annual relative humidity of 73%, a mean maximum of 100%, and a mean minimum of 21% (Figure 3-3). OP3 was drier than OP1, recording an annual mean relative humidity of 65%, a mean maximum of 100%, and a mean minimum of 11% (Figure 3-3). As with Nursery on the other end of the island, highest relative humidities were recorded in June and lowest in October, November and December at both OP1 and OP3.

Relative humidity fluctuates throughout the day, typically increasing through the late afternoon to its greatest level at midnight, and decreasing to reach its minimum level around 13:00 in the afternoon. Fog greatly influences the humidity of the Island; when it persists, humidity levels exceed 70%. It generally comes in around 18:00 in the evening and recedes around 10:00 in the morning (R. Montague, pers. comm.).

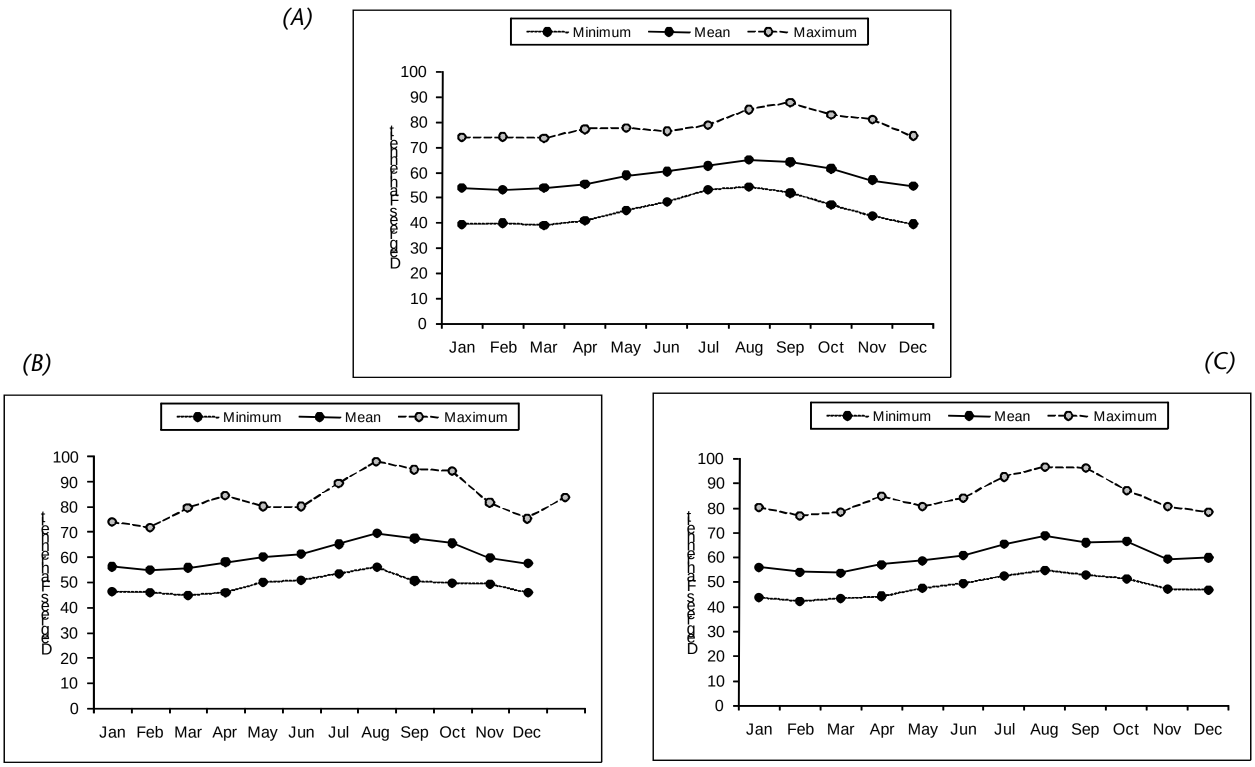


Figure 3-2. Monthly temperatures at (A) Nursery (1996-2001), (B) OP1 (1996 - 2000), and (C) OP3 (1999-2001).

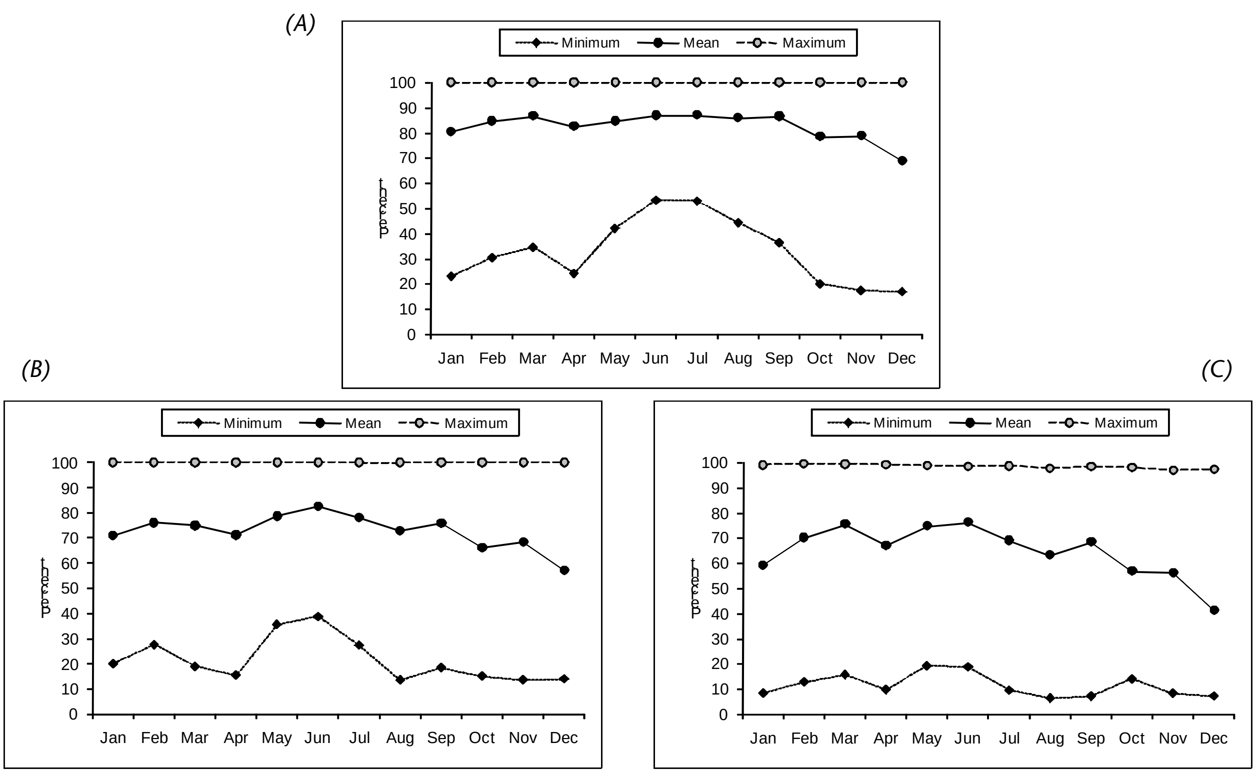


Figure 3-3. Monthly relative humidities at (A) Nursery (1996-2001), (B) OP1 (1996 - 2000), and (C) OP3 (1999 - 2001).

The largest difference among stations was in the summertime (June to September), when minimum readings averaged about 47% relative humidity at Nursery, 24% at OP1, and only 10% at OP3. OP3 had the least data available for analysis, so it is difficult to evaluate if these differences in humidity readings remain a consistent weather theme for the island. Finally, SCI experiences an increase in relative humidity in September that is not evident in August or October (Yoho *et al*. 2000). Whether this continues to hold true when more data are available remains to be seen.

3.5.3 Precipitation

The island experiences dramatic fluctuations in annual rainfall over relatively short time spans. Most rainfall occurs from November-April (Figure 3-4). An exception was an unusually dry February and March 1997 in southern California leading up to the 1997–1998 El Niño winter. No rainfall was recorded at most stations on the island for those two months. Little rain falls on SCI between May and October, and fog drip at that time is likely a vital source of moisture to the SCI ecosystem during this otherwise typically dry season.

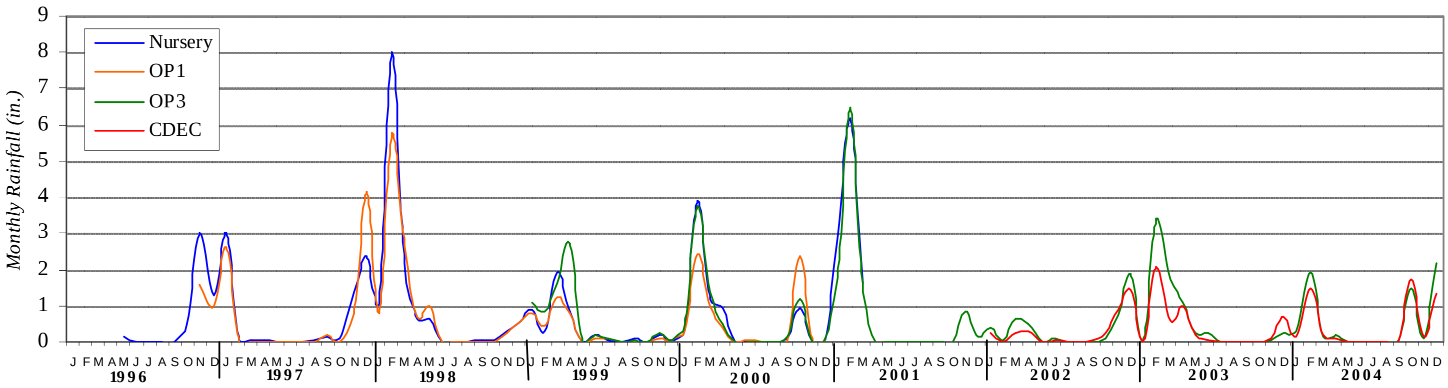


Figure 3-4. Monthly precipitation totals on SCI from 1996 – 2004 (1996-2001 data from the Nursery and OP1, 1996-2004 for OP3 weather stations; 2002-2004 data from CDEC weather station "SCI" near the top of Horse Beach Canyon).

4.0 Fire Management Guidelines

Fire Management Goal: "Protect life, property, and maximize training opportunities, while protecting natural ecosystem functions and diversity, and minimizing total cost."

4.1 Overview

Based on a foundation of Federal Fire Policy guiding principles (Section 1.4.1), the approach taken in this Fire Plan can be summarized as follows:

- Place values on what is at risk both for military and natural resources sustainability.
- Adopt land management units to improve ability to focus on specific conflict areas from logical control points.
- Meet the goal (cited in Section 1.1) and objectives of the INRMP using habitat condition thresholds that:
  - are based on a desired community condition including its distribution, structure and function, compared to a baseline or reference condition.
  - manage risk to communities of extreme fire condition, rather than mimic an evolutionary condition.
  - place controls on fire return interval, severity, and size.
  - provide for sustained populations of management focus species and all natives.
- Adopt prevention measures that align fire ignition risk with fuel hazard condition using a Fire Danger Rating System (FDRS).
- Keep fires small by cutting down response time.
- Implement three types of fuels management:
  - high-intensity safety corridors or buffers (seven areas identified).
  - defensible space around structures.
  - low-intensity landscape modification that also meets habitat restoration objectives.

- Build up capacity by ensuring sufficient access roads and communication, available suppression assets, and human resources.
- Implement partnerships for effective and cost-efficient achievement of objectives.
- Set up the needed information feedback, reporting, and monitoring system to evaluate, adapt, and improve management decisions.

4.2 Defining Successful Fire Management

4.2.1 Guiding Principles and Priorities

***Objective:* Implement the Guiding Principles of the Federal Wildland Fire Management Policy and DoD INST 6055.6 into SCI wildland fire management:**

- Ensure human safety is the top priority in all fire management activities.
- Plan for fire as an essential ecological process.
- Support land and resources management plans.
- Establish fire policy on a foundation of sound risk management.
- Ensure the economic viability of fire management.
- Base fire management on the best available science.
- Consider public health and environmental quality in fire management decision-making.
- Make coordination and cooperation an essential element of cost-efficiency and fire management effectiveness.
- Maintain a program of ongoing standardization of fire management policy and procedures.

***Objective:* Prevent and contain loss of human life, facilities, natural and cultural resources, and military readiness values due to wildfire.**

I. The following Fire Management Guiding Principles for SCI will be adopted:

A. There will be no net loss of training access and opportunities due to wildland fire management (SAIA).

B. There will be no net loss of long-term natural and cultural resource values across the Island due to wildland fire management.

1. Support the goal and objectives of the SCI INRMP.

2. Fire management tactics will minimize detrimental impact to sensitive natural or cultural resources.

II. Fires will be suppressed at minimum cost, considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives.

A. As the initial lines of defense, unplanned ignitions will be prevented and fuel loads will be managed through the following: (1) the establishment and use of high intensity safety corridors or buffers; (2) the establishment of defensible space around structures; and (3) low-intensity landscape modification that also meets ecological objectives.

1. The primary purpose of pre-suppression management in the wildland environment will be to reduce the risk of ignitions and adverse ecological effects of wildland fire, and the associated cost of fire suppression.

B. Due to the high cost of providing the manning and equipment necessary for the suppression of wildland fire, using timely and appropriate suppression response through use of tactical and strategic planning, it is extremely necessary to manage suppression protection. Using both civilian and military resources, operational costs can be reduced. Annual risk analysis along with recorded statistics will help in determining future funding and needs of the suppression protection of wildland fire on SCI.

III. Standardized definitions and terms accepted across other federal agencies or in the National Fire Plan will be used in wildland fire planning.

IV. Wildland fire strategy and control will be based upon designated Land Management Units. These are (See Map 1-1):

A. LMU-1 Northwest Harbor

B. LMU-2 Airfield

C. LMU-3 Dolphin Cove

D. LMU-4 West Cove

E. LMU-5 Wilson Cove

F. LMU-6 NOTS Pier

G. LMU-7 Terrace Canyon

H. LMU-8 VC3

I. LMU-9 Lemon Tank

J. LMU-10 Eel Point

K. LMU-11 Seal Cove

L. LMU-12 Mt. Thirst

M. LMU-13 Lost Point

N. LMU-14 Cave Canyon

O. LMU-15 Eagle Canyon

P. LMU-16 Upper China Canyon

Q. LMU-17 China Cove

R. LMU-18 Pyramid Cove

S. LMU-19 Mosquito Cove

V. Firefighting resources will be allocated based on guiding principles, above.

A. Assets at risk from wildland fire will be valued in advance to guide the allocation of Fire Department resources. The valuation of assets will be based on the following general principles:

- Priority 1: Human life, firefighter safety.
- Priority 2: High-value, vulnerable facilities, structures, habitats, natural and cultural resources.
- Priority 3: Major military planned exercises, and other natural or cultural resources of concern.
- Priority 4: Air quality, fire suppression cost.

B. Assets at risk from wildland fire will be prioritized in advance, whether facilities or natural resources, by assigning relative values and considering both commodity and non-commodity values, so that Fire Department resources may be allocated according to potential losses.

C. Pre-suppression management projects will be prioritized based on:

- Priority 1: Greatest potential reduction of wildfire suppression cost and the value of assets to the Island, as a whole, for the investment required.
- Priority 2: Projects for which the Fire Department receives funding from benefiting organizations and parties with responsibilities for those assets.

D. When pre-suppression management strategies are primarily needed to protect natural resources assets, first priority will be placed on assets that fall under regulatory compliance.

E. Pre-suppression management projects affecting non-regulated natural resource assets will subsequently be prioritized based on the "no net loss of resource value" principle by NRO and the SCI Wildland Fire Coordination Group led by the OIC. (Fire Department will receive a prioritized list of pre-suppression work to be implemented as time and funding permit.)

F. Identify natural resource assets and circumstances requiring funds for losses associated with wildfire. Assign a relative value to these losses on a per-acre basis (Chapter 2).

4.2.2 Fire Management Success Thresholds (Design Criteria) For Natural Resources

Objective: Support Fire Management Success Thresholds (design criteria) for achieving the INRMP's goal and objectives for each Land Management Unit and ecological community, such that each habitat is resilient and self-sustaining, all native species are self-sustaining, (plants and wildlife), and exotic species are minimized, while ensuring maximum flexibility in high-value military areas for military use.

I. The following INRMP strategies will be adopted to de-conflict military training and natural resources management in land management units (LMUs):

A. For LMUs with highest military value, the management emphasis will be aimed at maximizing those military values with consideration of the resource values.

B. For LMUs with high military value, the management emphasis will be aimed at protecting those military values with increasing flexibility for maintaining natural resources values as an integral part of day-to-day operations.

C. For LMUs with medium military value, the management emphasis will be aimed at maintaining those military values with high flexibility for maintaining natural resources values as an integral part of day-to-day operations.

D. Fore LMUs with low and lowest military value, the management emphasis will be aimed at maintaining those military values to the extent possible and with greatest flexibility for maintaining natural resources values as an integral part of day-to-day operations.

II. INRMP management goals for each land management unit and ecological community will be sought by achieving fire intervals, patch sizes, and fire intensities that are expected to protect long-term community sustainability. These success thresholds are design criteria for fire management, and are not punitive in that no penalty is assessed when they are not achieved; however, a change in management practice is expected when it is clear success thresholds are not realistic. Success thresholds relate to management objectives or desired future conditions in various habitats and for protected species. If any of the following thresholds are exceeded, then the situation will be evaluated for impacts to sensitive resources, and if found detrimental, then enhanced pre-suppression or suppression tools will be applied to correct the situation. "Enhanced pre-suppression and suppression tools" may mean: use of fuelbreaks and/or use of retardant; pre-positioning of a suppression asset such as a fire truck or helicopter during an incendiary activity; fuels management by prescribed burning; or restrictions on activities that are incendiary in nature. This accelerated use of fire management tools in such a situation means effort will occur beyond the baseline implementation of Fire Plan measures. Such a decision will first be vetted by the Environmental Program/NRO and the SCI Wildland Fire Coordination Group led by the OIC. This Group will then decide on implementation and funding mechanisms that will be carried forward to appropriate parties.

A. Regardless of the military or natural resources value rating, any fires that burn at National Park Service (NPS) Rating Severity 5 (See Table 4-9) will be considered potentially beneficial and will not be assessed as a negative impact for adjusting fire suppression resources.

B. Similarly, any fire that stays within the firebreak boundaries of Impact Areas I and II or any other firing range will be reported but will not be used as justification for providing additional fire suppression resources above the standard response defined in the Wildland Fire Management Plan.

C. The rationale for establishing fire size thresholds in different habitats is to support the planning of necessary suppression response as well as pre-fire season activities to protect values at risk. For example, wildland fire organizations may plan the availability and deployment of suppression assets around a ten-acre fire size as a rule of thumb. A threshold fire size for planning purposes very much depends on the management objective and the balance of risk and harm that could occur in a particular environment. For example, a smaller fire size is acceptable as a planning criteria baseline in a wildland-urban interface with high ignition risk, fire spread potential, and human life at stake. The following will also be considered:

1. Actual fire history.
2. Potential fire behavior (new fire scenarios) due to new circumstances.
3. The risk of exceeding a threshold for the temporary loss of territory for a management focus wildlife species, which would result in permanent harm to achieving management objectives for that species, in a single incident.
4. The risk of exceeding a threshold for the population and genetic viability of a target plant species.
5. The scale of the patchiness that is acceptable as a management objective for a plant community or wildlife habitat.
6. Alternative locations where wildlife and plant population objectives may be met.

D. Decisions on fire size thresholds for habitats will be reviewed every five years based on the same considerations outlined in IIB above. As conditions improve for the land and species that are the focus of natural resources management, the risk of harming them from a fire incident or regime change lessens. Therefore, fire management can be adjusted accordingly. A five-year review of thresholds will allow the expense of fire management to be adjusted commensurate with values at risk.

E. Habitat Condition Success Thresholds are shown in Table 4-1.

III. The sustainability of the Island ecosystem will be assessed with respect to impacts of the fire regime based on other indicators than those described above (Section 4.2.2). The assessment will use sustainability criteria and indicators considered nationally for fire effects in conjunction with the wildlife, Vegetation Trend, and other Island-specific monitoring programs identified in the INRMP. Assessments will be included in annual reviews and in the update of the Wildland Fire Management Plan (see section 4.5.4.1). The assessed factors will include but will not be limited to the following:

- annual productivity
- ecosystem and landscape fragmentation
- area and level of infestation by exotic weeds
- presence and status of species of concern
- presence and extent of representative species
- area of land with accelerated erosion
- change in extent of bare ground
- military readiness indicators
- economic cost of fire management (fiscal impact)

Table 4-1. Summary of habitat or plant community thresholds for managing the impacts of wildland fire.

Habitat or Plant Community	Maximum Patch Size[1]	Maximum Acres [1, 2] (approximate % of Island habitat area)	Average Fire Return Interval for Habitat or Plant Community[3]	Fire Severity Considered as Impact[4]
Canyon Woodland	3 acres	30 (<5%) over 5 years	at least 40 years	starting at Moderate
High Density Sage Sparrow[5]	5 acres	45 (5%) over 5 years	at least 40 years	starting at Moderate
Moderate Density Sage Sparrow [5]	20 acres	None specified	at least 40 years	starting at Moderate
Low-density Sage Sparrow and other boxthorn or Boxthorn/Grassland transition[5]	40 acres	None specified	None specified	starting at Moderate
Maritime Desert Scrub of Terrace Complexes[6]	None	None specified	at least 5 years in grasslands, at least 10 years in shrublands	starting at Lightly Burned
Maritime Desert Scrub of Pyramid Cove	None[7]	None specified	None specified	starting at Moderate only in Horse Beach Canyon
Maritime Sage Scrub	200 acres	None specified	at least 20 years	None specified
Loamy Grassland[8]	300 acres	None specified	at least 5 years	None specified
Clay Grassland[9]	300 acres	None specified	at least 5 years	None specified

1 Calculations will be based on fires mapped using a minimum 1/2-acre mapping unit for boundaries (including unburned inclusions) and severity.

2 This is based on assumption that boxthorn must be 20 cm in height before it is used by sage sparrows (Munkwitz et al. 2000), and this much growth can occur in one good growing season or one El Niño cycle (about 7-10 years).

3 These thresholds are planning guidelines only. The determination and tracking of fire return intervals over time will be addressed in the INRMP. Fire may return at about every X years on average. Some places will never burn and be very "old", while some will burn more frequently than once in X years. Determination of fire return interval on SCI is complicated by lack of sufficient fire history data to establish a baseline for habitats or plant communities of interest.

4 Moderate means Score 3 on severity scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts. Lightly Burned (Score 5) means litter and duff are blackened but not evenly converted to ash; grasses and herbs are burned to ash with some resprouting; shrubs are singed/stressed and many resprout/recover; there is no effect on mature trees but seedlings/saplings may be killed.

5 For areas with highest military value, the usual boxthorn objectives will not apply (e.g. Northwest Harbor, China Cove). The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to avoid a repeat burn within five years. In addition to the above, threshold conditions for boxthorn from the INRMP are incorporated into the WFMP as follows: Within delineated high-density sage sparrow areas, maintain a threshold percentage of the first-terrace boxthorn community in the reference condition (Vegetation Trend monitoring plot 6) of 28% cover of boxthorn (50% of total plant cover) and less than 20% cover exotics (13% of total plant cover) based on long-term vegetation monitoring plots. Maintain a threshold percentage of the second-terrace boxthorn in 14% cover boxthorn and less than 50% cover of exotics. Improve, where possible, the condition of this plant community by reducing the distribution and abundance of non-native species. Evaluate the condition of exotics over at least one seven-year El Niño cycle.

6 Threshold conditions from the INRMP are incorporated into the WFMP as follows: Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one seven-year El Niño cycle.

7 None specified except boxthorn outside Impact Areas is tallied with the 40-acre maximum for Low-density Sage Sparrow habitat. Threshold conditions for Pyramid Cove from the INRMP are incorporated into the WFMP as follows: Control invasive exotic grasses using appropriate wildland fire management protocols. Reduce exotics from the 1992-93 baseline condition of 40% by maintaining the current pace of shrub recovery.

8 In contrast to patch sizes for other communities, exceeding thresholds in grassland will not justify enhanced suppression resources to correct except when nesting by the San Clemente loggerhead shrike is occurring in the coyote brush that occupies this type. Guideline conditions from the INRMP are incorporated into the WFMP as follows: Improve the dominance of needlegrass and other native herbaceous species from the 1992-93 baseline of 29% by a favorable burning regime. Reduce exotics from the 1992-93 baseline of 58% by a favorable burning regime, as evaluated over at least one 7-year El Niño cycle.

9 Decrease exotic cover in clay grasslands by 10% in 10 years from the 1992-93 baseline of 70% of total cover, as measured over at least one El Niño cycle. Coyote brush (Baccharis pilularis) invasion of moist, clay grasslands may be temporary and this shrub community is not specifically protected from fire unless locally occupied by a nesting San Clemente loggerhead shrike. So, until further understanding changes this approach, no situation is identified (except nesting by San Clemente loggerhead shrike) in which enhanced fire suppression would be justified due to exceeding threshold values.

4.2.2.1 MDS-Boxthorn Fire Management

IV. Fire in the boxthorn community carries risks based on the nature of the fire regime experienced. The greatest risks of fire in boxthorn habitat generally arise from fire return intervals that are too short such that there is a risk of type conversion of the habitat or long-term loss of shrubs. Also, overly-frequent fires result in shrubs that are not large enough (less than 20 cm) or of insufficient density to support sage sparrows or other dependent species. On the other hand, areas that remain unburned may have degraded community values due to their dominance by exotic annual grasses. Prescribed fire may be the best management tool available to control these exotic grasses, but it has had mixed success elsewhere, as documented in the literature. Introduced annual grasses deplete surface water earlier in the season than the native perennial grasses, and this diminishes water supply to seedlings. The more abundant and earlier-germinating annual grass species can form dense stands and monopolize resources, thereby restricting the growth and survival of native seedlings (Bartolome and Gemmill 1981; Dyer, Fossum, and Menke 1996; Dyer and Rice 1997; Hamilton, Holzapfel, and Mahall 1999; Brown and Rice 2000). Fire timing and intensity can play an important role in affecting the ratio of natives to exotics. In contrast to the fall, in the spring annual seeds are highly susceptible to fire damage (Keeley 2001). Complete and continuous shrub canopy cover does not allow expression of the community's natural biodiversity.

Fire interval and patch size thresholds will be applied using the following guideline criteria.

A. Because of the potential benefit that could come from less severe fires, only fires that are of moderate severity (Score 3 in Table 4-7) or higher will be considered toward fire patch sizes and thresholds on maximum acreage burned in boxthorn. Minimum mapping unit for fire boundaries (including unburned inclusions) will be 0.5 acres. Where possible, smaller fires will be mapped to understand the conditions under which fires self-extinguish.

B. In high-density boxthorn/sage sparrow habitat (Map 2-5), fire patch sizes will be kept to less than five acres.

C. In high-density boxthorn/sage sparrow habitat, no more than 45 acres will burn over a five-year period. This acreage represents approximately 5% of all high-density sage sparrow habitat and was selected so that no more than 10% of all high-density sage sparrow habitat would burn during one El Nino cycle, which is usually seven to 10 years.

D. In moderate-density boxthorn/sage sparrow habitat, fire patch sizes will be kept to less than 20 acres.

E. In low-density boxthorn/sage sparrow habitat, fire patch sizes will be kept to less than 40 acres.

F. For areas with highest military value, the usual boxthorn objectives will not apply. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years.

G. The status of the boxthorn community will be evaluated on sites with different fire history in order to verify proper fire management.

1. Upon approval of the SCI Wildland Fire Coordination Group, experimental burns will be conducted to clarify the response of this community to fire, in consultation with the USFWS.
2. Experiments on boxthorn recovery will be conducted using various clearing treatments on a small site.
3. As a matter of management interest in achieving INRMP goals for sustainability of each ecological community on the Island, a guiding assumption is that a minimum baseline age or maturity of a plant

community can be key to it sustainability. Therefore, average fire return interval across the boxthorn community as a whole will be studied in relation to habitat value for the sage sparrow, infestation by exotic grasses, soil cryptogam condition, and other metrics of community health. Details will be developed in the INRMP.

4.2.2.2 Canyon Shrubland/Woodland Fire Management

V. Fire risks to Canyon Shrubland and Woodland resources are as follows:

- Reduced shrub or tree recruitment, especially for those that reproduce infrequently;
- Possible biodiversity decline due to loss of herbaceous perennials and short-lived shrubs from the community due to a simplified structure from shrub canopy closure (fewer edges and openings); and
- Type conversion (change from shrubland to grassland due to too-short fire interval).

In contrast, a mature shrub community on the Island tends to be less diverse than one with openings or other variation in structure due to soil, topography, etc. The native herbaceous perennials may decline in areas without some process such as fire to open up stands. Certain of the listed species depend on this periodic or geographic variation for their niche, or to eliminate competitive species. In this case, some fire may be an asset to provide these niches.

A. The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, shrubland or woodland boundaries stay the same or increase, woodlands on eroding or erodible surfaces stabilize, and a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife.

1. Appendices D and E of the INRMP discuss management focus species for SCI.

2. For fire management, the selection of focus species should be stressor- or threat-based, meaning they should be selected to be the those most at risk from an altered fire regime, especially in combination with drought and invasives, etc. Simple presence/absence from a checklist could be the start of this kind of analysis. The selection of species should also meet these criteria:

a. A clear link should be established between monitoring and management objectives and questions that relate to fire as an integral ecological process and a potential stressor on plant communities and species. This link should be described in an explicit conceptual models of fire effects, and include other ambient (not species) indicators also identified in the context of these conceptual models.

b. The approach should be applicable across a range of budgets and spatial scales, including species, community, and landscape.

c. It would be best to link the selection to other monitoring programs to improve its predictive power.

3. Examples of fire regime sensitivity include: short-lived species with sedentary life histories that depend on understory or herbaceous plants such as some butterflies; species that depend on an open vegetation condition; canopy-dependent species; interior versus edge species; others that have narrow requirements; understory versus tall canopy dominants.
4. Specific predictions with respect to fire and other stressors for plant communities and species would consider:
   a. Fire intervals outside the resilience of particular plant communities such that type conversion is possible; fire size that creates a uniform fire regime across the reserve over many decades; fire intensity that kills seeds or resprouting capability, or low intensity that does not germinate heat- or smoke-germinated seeds; fire season which has a differential effect on the herbaceous layer.
   b. Invasives that can outcompete natives and prevent the normal sequence of post-fire conditions from proceeding.
   c. Erosion due to extreme fire regime.
5. Consider the following plants as Management Focus Plants from the INRMP, such that they are considered independently from their plant communities for management (habitat management is not assumed to be sufficient for their protection, or they play a disproportionate role in health of the community):

- San Clemente Island Indian paintbrush (*Castilleja grisea*)
- San Clemente Island larkspur (*Delphinium variegatum kinkiense*)
- San Clemente Island woodland star (*Lithophragma maximum*)
- San Clemente Island broom (*Lotus dendroideus traskiae*)
- San Clemente Island bushmallow *(Malacothamnus clementinus)*
- Santa Cruz Island rock cress (*Sibara filifolia*)
- Santa Cruz ironwood (*Lyonothamnus floribundus* spp. *asplenifolius*)
- Southern California tree mallow *Lavatera assurgentiflora* ssp. *glabra*
- Island oak *Quercus tomentella*
- Spike-moss *Selaginella bigelovii*
- Lemonadeberry *Rhus integrifolia*
- Cliff spurge *Euphorbia misera*
- Plants Rare on Island, but Common Elsewhere:
- Chamise *Adenostoma fasciculata*
- Canyon live oak *Quercus chrysolepis*
- Island redberry *Rhamnus pirifolia*
- California lilac *Ceanothus megacarpus*
- Chaparral currant *Ribes malvaceum*
- Honeysuckle *Lonicera hidpidula* var. *vacillans*
- Blue elderberry *Sambucus mexicana*
- Boxthorn *Lycium brevipes brevipes*

6. Consider the following terrestrial Management Focus Wildlife from the INRMP:

- Grasshopper sparrow (*Ammodramus savannarum*).

- SCI loggerhead shrike
- San Clemente sage sparrow
- Western snowy plover
- Feral rodents and cats
- San Clemente Island fox
- Deer mice
- Ants and brown-headed cowbirds.

B. Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire severity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.

C. Because of the potential benefit that could come from less severe fires, only fires that are of moderate severity (Score 3 in Table 4-7) or higher will be considered toward fire patch sizes and thresholds on maximum acreage burned in Canyon Shrublands/ Woodlands. Minimum mapping unit for fire boundaries (including unburned inclusions) will be 0.5 acres. Where possible, smaller fires will be mapped to understand the conditions under which fires self-extinguish.

D. Fires will be kept to less than three acres that are of moderate severity or higher (Score 3 on NPS scale).

E. No more than 30 acres across the Island (about 4% of all canyon woodland habitat) will be burned over a five-year period.

F. As a matter of management interest in achieving INRMP goals for sustainability of each ecological community on the Island, a guiding assumption is that a minimum baseline age or maturity of a plant community can be key to it sustainability. Therefore, average fire return interval across the Canyon Shrubland/Woodland community as a whole will be studied in relation to habitat value for wildlife, tree recruitment, and other metrics of community health. Details will be developed in the INRMP.

4.2.2.3 Boxthorn/Grassland Fire Management

VI. Fire management thresholds in Boxthorn/Grassland Transition areas will be the same as low-density boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire should be considered as a useful tool in control of exotic grasses that could improve the condition of these areas to support natives. The experiments with prescribed fire in the boxthorn community will be evaluated to determine if prescribed fire will benefit these transition areas in their ability to contribute to sustainable native Island communities. This will be developed further in the INRMP.

4.2.2.4 MDS Terrace Complex Fire Management

VII. The risks to natural resources values in the MDS Terrace Complex community (comprised of the plant communities MDS-prickly pear and MDS-cholla with interspersed grasslands and shrublands) are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery. At the same time, allowing some fires can reduce fuel loads that may lead to over-hot fires, and native grasses and forbs may be enhanced and exotics reduced under a fire regime where timing and severity are controlled. This habitat is a primary foraging area for the loggerhead shrike, and past fires in this habitat in SHOBA could hypothetically be described as an "attractive nuisance" to the shrike, leading to difficulties in its management. According to annual monitoring reports of the shrike program during years when there were fires, shrikes may be attracted to burned areas because of at least temporarily enhanced foraging on the opened-up ground. They tend to set up housekeeping in canyons adjacent to burned sites. This has led to their concentration in SHOBA where, ironically, they are difficult to protect from subsequent fire hazard as they nest and raise their young near where ordnance is routinely delivered.

A. In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS Severity 5 (Table 4-3) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment.

B. There will be no controls on patch size except to prevent fires from entering or crossing canyons and high fire management area on south side of Chukit Canyon boundary and along SHOBA Ridge Road.

4.2.2.5 MDS Pyramid Cove Fire Management

VIII. In Maritime Desert Scrub of Pyramid Cove, protect rare species while allowing light fire.

A. Protect Horse Beach Canyon from moderate severity (NPS severity 3, Table 4-3) or hotter fires by applying pre-suppression and suppression tools.

B. Excessively frequent or large fires may affect certain sensitive species that occur in these locations, but their tolerance to fire varies and is largely unknown.

C. Evaluate the potential impacts of fire on *Sibara filifolia*. There have been no known fires in its habitat on SCI and fuels are low. Is the seed fire tolerant or is it released before fuels are in a condition to carry a fire? Compare habitat of Sibara here with that where it was recently rediscovered on Santa Catalina Island for insight into its habitat preferences to help improve our ability to define a desired future condition for Sibara habitat.

D. Boxthorn areas outside the Impact Areas will have the same objectives as that of low-density boxthorn (see item IV D above). Boxthorn within Impact Areas will not be managed for potential occupation by the San Clemente Sage sparrow. Monitoring the effects of fire at these locations could help guide fire management in boxthorn elsewhere on the Island.

4.2.2.6 Maritime Sage Scrub Fire Management

IX. Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub that allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water.

A. Because of the potential benefit that could come from less severe fires, only fires that are of moderate severity (Score 3 in Table 4-7) or higher will be considered toward fire patch sizes and thresholds on maximum acreage burned in Maritime Sage Scrub. Minimum mapping unit for fire boundaries (including unburned inclusions) will be 0.5 acres. Where possible, smaller fires will be mapped to understand the conditions under which fires self-extinguish.

B. Fire patch sizes will be kept to less than 200 acres.

C. As a matter of management interest in achieving INRMP goals for sustainability of each ecological community on the Island, a guiding assumption is that a minimum baseline age or maturity of a plant community can be key to it sustainability. Therefore, average fire return interval across the Maritime Sage Scrub community as a whole will be studied in relation to habitat value for wildlife, shrub recruitment, and other metrics of community health. Details will be developed in the INRMP.

4.2.2.7 Loamy Grasslands Fire Management

X. The risk to natural resources from short fire return intervals appears to be low in Loamy Grasslands and fire is expected to be a useful tool in control of exotic grasses. There may be risk to some native perennial herbs with extremely short fire intervals.

A. Achieve a minimum five-year return interval for wildland fires larger than 300 acres. However, no additional resources will be expended in case of a repeat fire in the same location, nor will pre-suppression dollars be spent to prevent repeat fires in loamy grasslands due to their tolerance of shorter fire intervals. Manage fire for openness of grasslands, mulch control, and native plants, to enhance transit and prey availability for Island fox, and prey availability for the shrike.

B. Allow the boundaries of shrublands and grasslands to return to their historic condition with fire playing an ecological role in maintaining these boundaries, fostering conditions suitable for supporting the full range of targeted sensitive species, and protecting life, property, and military uses.

C. Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage risk of high-severity fire.

D. Experiment with fire management to improve native dominance, protect sensitive plant populations, and achieve an open grassland condition.

4.2.2.8 Clay Grasslands Fire Management

XI. The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic grasses. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species, native endemic herbs and grasses.

A. Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as five-10 years. Achieve a minimum five-year return interval. Prevent fire from burning larger than 300 acres, but this is not a threshold that should be used to justify enhanced suppression resources if exceeded.

B. Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the shrike.

C. Coyote brush *(Baccharis pilularis)* colonization of moist, clay grasslands may be temporary or permanent, and this shrub community is not specifically protected from fire unless locally occupied by a nesting SCLS. Coyote brush is a native colonizing shrub. Similar to other colonizing events by native shrubs, it is expected to reduce the flammability of this vegetation at first (McPherson 1995, 1997), because the displacement of herbaceous species will make fires less likely to carry. However, continued development of the coyote brush overstory, coupled with a dry spell that reduces moisture content of the brush, contributes to increased probability of a hot, intense crown fire very unlike what is normal to a grassland (McPherson 2001), and could potentially contribute to crown fires entering sensitive canyon woodlands. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding threshold values.

4.2.2.9 Coastal Habitats Fire Management

XII. No fire risk is anticipated, so no management direction is provided for: Active Dune, Stabilized Sand Dune, Coastal Strand, and Coastal Salt Marsh.

4.3 Fire Management

4.3.1 Preventing Ignitions

Objective: As a first priority, use prevention and other pre-suppression measures to control fire.

I. Use defensible space principles to protect all facilities in the wildland environment, such that they will survive a wildfire without suppression assets. Maintain a 30-ft fuel management zone around all structures that cannot afford to be lost in a wildfire, or 100 ft if fuels are heavier than grass or light brush. Consult with NRO before conducting such clearing. NRO facilities including the shrike cage complex, the field station, and fox holding cages should be managed with defensible space principles.

A. Generally, fuel modification zone distance will be measured horizontally from the edges of structures; however, the extent to which vegetation management is needed to create survivable space is based on site-specific conditions and may not be uniform for all structures. Highly flammable vegetation, such as California sagebrush (*Artemisia californica),* buckwheat (*Eriogonum* sp.*)* will be shortened to four-six inches in height. All other vegetation within fuel management zones will be pruned to a height of not greater than 24 inches. If vegetation is very dense, it may be thinned so that the spacing between shrubs is 2.5 times their height. All exotic shrubs or trees shall be removed during fuel reduction/treatment, and weed control will be performed annually to prevent the accumulation of thatch from invasive exotic plants. Trees may be left if they are limbed up and the vertical distance between the nearest shrub and the lower fuel layer of the tree branches is 10 feet. Separation of tree canopies should be 10-30 feet depending on slope.

B. Hazard reduction around all buildings will be accomplished using hand tools such as pole saws, pruning shears and weed whackers for pruning, cutting and thinning out the surrounding vegetation. Cut vegetation will be clipped to four-inch lengths and left on the site as mulch, not to exceed four inches in depth, or removed from the site, at the discretion of the CNRSW Botanist.

II. To prevent electrocution to birds using power lines and subsequent fires, install protective perches atop power poles.

III. Range Users and others affected by fire management will be educated about fire prevention, how to report fires, and the importance of successfully achieving the Navy's fire management objectives.

A. Expand the current natural resources brief given at indoctrination training or support the development of a separate natural resources orientation program for new personnel. Familiarize personnel with the SCI Fire Reporting Checklist in Appendix E.

B. Create a video or digitized compact disc for distribution to new personnel and for use at meetings and conferences. The video should feature educational information about the sensitive plant and wildlife species on SCI (a video has been produced on the shrike), why the Navy is required to manage for them, and how to avoid disturbing the habitats in which they reside.

C. Develop a brochure or series of brochures about natural resources on SCI (some are currently under development). Highlight key issues such as sensitive species management, non-native species control, and fire management.

Objective: Align fire ignition risk with fuel hazard conditions to reduce wildfire occurrence using an effective Fire Danger Rating System (FDRS).

I. The start and end of fire season will be declared when live fuel moisture reaches ~ 200%. At the start of fire season, fuelbreaks and drivable roads should be in place, and water storage containers should be filled at VC-3, Mt. Thirst, TAR 10, or other appropriate location. This is also when the FDRS will be announced on a daily basis to manage fire risk and guide the staging and availability of necessary suppression assets.

A. To support fire weather prediction and declare the start and end of fire season, CNRSW staff or the Wildland Fire Coordinator will chart live fuel moisture levels in key fuel species. The start and end of fire season should be declared when live fuel moisture reaches or drops below about 200%. The WFC will advise the OIC when to announce the start and end of fire season.

B. The moisture content of living fuels plays a significant role in fire initiation and spread in these fuels; however, we presently cannot model plant moisture content using actual SCI data. Using live fuel moisture data from elsewhere in San Diego County will over-predict fire behavior on SCI. We can, however, monitor live fuel moisture content, associate it with observed fire behavior or compare it to elsewhere in the county, and develop fire season and fire management guidelines specific to SCI. The dry weight measurement is preferred because it only responds to changes in the amount of water present in the fuel and not the fuel physiology (Pyne *et al*. 1996). Fluctuations in live fuel moisture are a function of the amount of water available to the plant as well as its geographic location within the plant community. Unlike dead fuel moisture, the fluctuation in live fuel moisture is a seasonal phenomenon. Consequently, live fuel moisture measurements will be more influenced by long-term environmental conditions than dead fuel moisture. How to sample for live fuel moisture is described in the 1979 Countryman and Dean publication "Measuring Moisture Content in Living Chaparral: A Field User's Manual."

1. The Wildland Fire Coordinator or CNRSW staff will regularly chart live-fuel moisture in the key fuel species California sagebrush *(Artemisia californica),* boxthorn *(Lycium californicum),* coyote brush *(Baccharis pilularis),* or other appropriate shrub. The locations for monitoring live fuel moisture will be selected to represent the training areas where ignitions are most likely to occur, and for site accessibility.

2. Some guidelines for establishing live fuel moisture plots are as follows:

   a. *Site Selection.* Countryman and Dean make the following observations about selecting sampling sites and sample size: 1) Climatic variation, including microclimates, is the primary parameter to consider in setting the boundaries of sampling areas, and 2) The sampling location chosen should be large enough so that the sampling itself does not adversely affect the shrubs due to repeated sampling, yet small enough that micro climate does not change within the sampling area. It is suggested that a sampling area is not larger than 2500 m^2 (0.25 hectares ~ 0.6 acres), and a sample size of at least two plants in a sampling area.

   b. Monitoring live fuel moisture at four sites on SCI, revisiting each site once per month is recommended.

   c. *Site Characterization.* Prior to the onset of data collection, initial site characterization measurements will be made. Each site characterization should enumerate the slope, aspect, approximate shrub size, cover, density, and distribution of shrub species. In addition, photographs and GPS measurements should be taken at each site for future reference. Sites will be marked with inconspicuous flagging and rebar to signal the approximate boundaries of the sampling locations.

d. *Species Selection.* A species that draws down fuel moisture quickly in the summer and is common to other locations will be selected, so that data may be shared. For example, the USFS uses chamise on the Angeles National Forest, as does the county of Los Angeles. Purple sage *(Salvia* sp.*),* black sage *(Salvia mellifera),* California sagebrush, manzanita *(Arctostaphylos* sp.*),* and hoary-leaf ceanothus *(Ceanothus crassifolius)* are used at other sites in southern California, but not nearly to the extent as chamise. California sagebrush is recommended at SCI to support regional comparisons.

e. *Field Techniques.* After an area has been selected and flagged for sampling, field personnel will simply browse in a pseudo-random fashion through the sampling area clipping branchwood with foliage from new growth and old growth on the shrub species being sampled. Branchwood sampled will be no larger than 1/8 inch in diameter. Field personnel should contact the lab prior to collection to confirm that processing can occur that day, and to inform the staff that samples will be arriving within a certain period of time. Since the fuel moisture is expected to vary vertically, most samples will be taken from the upper limbs of each shrub. Care will be taken so that no more than two new-growth and two old-growth clippings are taken from any single shrub. In addition, sample material should be loosely arranged within the container; compressing the sample will bias the results. Old growth and new growth are readily apparent to the naked eye, but field personnel should be trained to distinguish the two during a "sampling orientation." Current protocols make no distinction between the fuel moisture in the foliage and in the twigs, only between new and old growth; however, variability of the foliage measurements are expected to be much higher than branchwood. Consequently, crews will separate the foliage from the branchwood for both the old and new growth.

f. The foliage and branchwood from the old and new growth should be placed in four separate sampling containers. Each container should have already been weighed in the lab to the nearest 0.1 g. Polypropylene sampling bottles rated up to at least 130 degrees C should be used for storing and weighing the samples. The use of these bottles is recommended in place of traditional paint cans because of their improved seal. Label each bottle individually, making sure to label both the bottle and its associated cap. Countryman and Dean recommend weighing three old-growth and new-growth samples, each containing at least 25 to 35 grams of sample dry. Since the mass of the sample dry is only known after the experiment, this roughly translates into approximately 3/4 of a one quart paint can during the middle summer months.

g. Altogether 12 samples should be taken at each site: three old-growth foliage; three old-growth branchwood; three new-growth foliage; three new-growth branchwood. After the samples have been collected, crews should place them in an ice chest for transport to the laboratory. The ice chest should be kept cool enough to keep the samples from physiologically decomposing, approximately 15 degrees C, but not so cold such that the sample is damaged by freezer burn.

h. All samples should be weighed and placed in the drying oven within two to three hours of collection. In addition, all samples should be collected between 11:00 AM and 3:00 PM in the spring and 11:00 AM and 2:00 PM in the fall. Do not collect any samples if the shrubs are wet from rain, dew, or fog. Prior to departure from the site record the following observations: (a) wet and dry bulb temperature from a sling psychrometer; (b) percent cloud cover; and (c) condition of the fuels (a descriptive list should be provided enumerating available choices).

i. *Laboratory Technique*. The following section is adapted from Countryman and Dean (1979). Upon arrival at the laboratory, weigh and record each collection bottle to the nearest 0.1g making sure that there is no accumulated dirt on the exterior of the bottle during weighing. Unscrew the bottle cap and place only the bottle inside of the mechanical drying oven. The caps can be set aside. As mentioned above, the oven should be preheated for at least one hour to between 103 degrees C and 105 degrees C prior to inserting the samples. The samples should be allowed to dry for at least 15 hours prior to removal from the oven. Upon removal from the oven, seal the bottles immediately to prevent them from absorbing the moisture present in the laboratory. Reweighing of the dried samples can only occur after the cans have sufficiently cooled in order to prevent additional error. Weigh and record the sampling bottle to the nearest 0.1g after cooling.

j. *Logistic Arrangements*. CNRSW or the Wildland Fire Coordinator will need 24 bottles (12 bottles/site and two sites/day). Sampling teams of two people may work best. A sampling day, covering two sites, should only require 1.5 hours (20-30 minutes to collect samples from each site, the remaining time for lab work and transit time). Each group will also be responsible for returning to the lab the following day to remove the samples from the oven and re-weigh them.

II. The following general Fire Danger Rating System for SCI will be adopted for SHOBA and other locations (Table 4-2). Naval Special Warfare training areas and ranges (TARs) treated more specifically below (Table 4-3). Both FDRS charts are designed around a five-minute fire engine getaway, 15-minute helicopter getaway and 30-minute response to a fire leaving fuelbreaks in the Impact Area, MIR, or other fuelbreak approved by this Plan or its amendment. This FDRS applies to everyone and all use of ammunition, including use of the MIR.

A. The daily rating will be based upon weather data collected at the OP 1 and OP 3 weather stations.

B. The following ordnance are considered incendiary: pyrotechnics, tracers, demolitions, white phosphorous, illumination flares, and other heat/flame producing devices, including blanks. Ordnance definitions will conform to the Naval Ordnance Manual.

Table 4-2. SCI/SHOBA Fire Danger Rating System (including TARs in SHOBA). Also applies to areas north of SHOBA outside of TAR use.

Fire Danger Rating	Caution to Be Exercised	Necessary Precautions
LOW <4 mph 20-ft wind speed> 11-12% 1-hr FFM	Use normal caution during military training exercises. Fires may start easily, but will have low rate of spread and fire intensity, i.e. less than 30 acres of spread per hour.	Care should be taken; however, any type of ammunition can be used during this condition. Consistent with NALFSCIINST 5560.4D, smoking is not permitted in vehicles or in remote areas of SCI.* Any designated training area with required fuel treatment using retardant fuelbreaks and strip burning must be completed by start of fire season annually.
MODERATE 4-5 mph 20-ft wind speed 11-12% 1-hr FFM	Use extra caution. Fires may start very easily. Fires are expected to have moderate rate of spread and fire intensity. i.e. less than 100 acres of spread per hour.	All Low Fire Danger Precautions, and all required fuelbreaks are in place. This condition is the beginning of a fire ignition concern. Any type of small arms rounds or other non-incendiary ordnance may be used within designated ranges. The use of pyrotechnics, demolitions, white phosphorous and illumination ammunition and other heat/flame producing devices within designated training areas (outside of SHOBA Impact Area I & II or other area with fuel treatment meeting standards of the Fire Management Plan or its amendment) will be limited as much as possible to night time activity, a cleared area, or areas previously burned over. Training exercises using heat/flame producing devices will be conducted in the night time, early morning (before 1000 hours) or late evening (after 1900 hours) when relative humidities can be expected to be at their maximum.
HIGH 6-8-mph 20-ft. wind speed 9-10% 1-hr FFM	Use extra caution. Fires are expected to have high rate-of-spread and fire intensity. More than 100 acres of spread per hour.	All Moderate Fire Danger Precautions, and all required fuelbreaks are in place. A helicopter will be placed on fire alert on SCI between 0900 and one-half hour after sunset whenever training activities are scheduled within SHOBA such that the aircraft can be airborne in 5 minutes. Other SCI military helicopter missions can take place during this fire alert; however, a fire dispatch should be given a high priority. North of SHOBA and apart from NSWG TAR use, a quick-attack fire engine and crew will meet the 3-minute notification, 5-minute getaway, and 30-minute on-site criteria in the event of a fire. This fire suppression apparatus scheduling and location to be coordinated with SCORE. Use of TARs north of SHOBA is guided by a separate FDRS.
VERY HIGH 9-10 mph 20-ft wind speed 5-8% 1-hr FFM	Extra protection caution. Fires will start easily and spread rapidly. Fires are expected to exceed 100 acres in one hour and burn very hot. Fires will be hard to contain at designated roads and fuel treatment areas without aerial suppression assets and 2 wildland fire engine companies.	All High Fire Danger Precautions are in place. Firing of all types of ammunition will be permitted at all times, unless restricted by the Range Manager. Restrictions on the use of pyrotechnics, demolitions, illumination ammunition and heat/flame producing devices (including blanks and tracers), and white phosphorous will be in place for all other designated training areas during the period of 0800 to one-half hour after sunset. However, these restrictions will not apply to night time (1900 to 0800 hours) training activities, in cleared areas or previously burned areas. A helicopter with crew and water bucket is to be placed on fire alert during daylight hours whenever training activities are scheduled within SHOBA. This helicopter will be allowed to conduct other missions, providing the water bucket and water re-fill capabilities are appropriately placed such as at VC-3 or the helopad at OP-3, and ready for pick up by the helicopter crew, and meets the criteria of a 30-minute elapsed time for responding to the site of any fire occurring on the southern end of SCI. Firefighting will then be designated as the "highest priority" mission, except for those routine ignitions within SHOBA Impact Area I & II. Fires inside SHOBA Impact Area I & II that have the potential to go beyond Impact Area I & II boundaries will be considered the same as any other wildland fire during this fire danger period. All other fires within Impact Area I & II will not be considered "highest priority" missions. Outside of SHOBA, a quick-attack wildland fire engine, with a 3-person crew, is to be located in the vicinity where the highest fire hazard military training is taking place. This means a safe distance away with line-of-sight visibility, as approved by the Range Safety Officer/Safety Observer. The decision about where to put standby firefighting resources will be approved by the Wildland Fire Coordinator, who will coordinate with the Range Safety Officer/Safety Observer and with SCORE.
EXTREME >10 mph 20-ft wind speed <5% 1-hr FFM	Use extreme caution and allow only essential and high cost military training operations to continue under these conditions. Fires will spread at extreme rates of speed and by long distance spotting. Fires will burn at unacceptable intensities.	All Very High Fire Danger Precautions are in place. A helicopter, pilot and crew will be on ready fire alert at the SCI Auxiliary Landing Field, and will not be assigned any other mission, except upon specific agreement between the Wildland Fire Coordinator and the Range Manager.

** NALFSCIINST 5560.4D defines remote areas as anywhere except Wilson Cove, Airfield, West Cove Beach and paved roadways, which includes the unpaved portion of SCI Ridge Road south of VC-3 to Stone Gate. No smoking between the plane and the terminal at the Airfield.*

1. Ammunition restrictions for incendiary ordnance vary with respect to wildfire hazard conditions, beyond standard range rules. This may include pyrotechnics, tracers, demolitions, flares, BL&P (NALC D349), PUFF (NALC D290 and D291), VTNF (NALC D334), white phosphorous (WP) five-inch ammunition, and illumination ordnance (NGF/artillery/mortar) (except for on-deck marking, one round per event only).
2. The following ammunition is *not* considered incendiary: small arms rounds (50 caliber or less with no exploding warhead or burning devices; a solid piece of metal that doesn't get very hot), and high explosives. All NGF ammunition must be high explosive and must be fused to function PD, MT, or CVT (as requested by Naval Gunfire Spotter).

C. On EXTREME fire days when fuelbreaks are not as effective at stopping a fire without suppression backup, training must be conducted with precautions on use of incendiary ordnance, and suppression assets shall be readily available.

III. A Fire Danger Rating System will be adopted specifically for NSWG TARs outside of SHOBA (Table 4-3). This FDRS is designed around a 10-minute response to the scene with a quick-attack fire suppression apparatus (see Section 4.4.1 IV for specifications).

A. In all cases, the initial response will be to take action to suppress the fire and call the Fire Department immediately. Recommended Special Warfare Firefighting Equipment should include (all prices are current estimated (2005) and subject to change):

- Five collapsible Backpack Fire Pumps @ $145 each
- Five Fire Swatters @ $31.50 each
- Two Fire Shovels with forward turned step @ $42 each
- 1,000 feet of 1 ½inch cotton jacket hose - 10 sections @ $149 each
- 1,000 feet of one-inch cotton jacket hose - 10 sections @ $120 each
- Two Female to male hose adapters (1 ½inch female to one-inch male)
- Two Twin tip fog-stream nozzles one-inch
- Two cases of WD881/4 (36 bottles per case) four-ounce bottles of foam @ $63 per case

B. For TAR 10 in LMU 7, the road immediately south of the dunes will remain passable for two-wheel drive vehicle. A staging area for a portable water tank and emergency vehicle will be located in the immediate vicinity of TAR 10. For TAR 17 in LMU 10, the unpaved road to Seal Cove along the LMU boundary will remain passable by two-wheel drive emergency vehicles to the canyon directly east of Eel Point. The road to Horse Beach Canyon will also always remain drivable for pre-suppression work related to TAR activity. Other road passage requirements are already addressed in LMUs where incendiary ordnance are used outdoors (see Firefighting Infrastructure Section 4.4.1).

Table 4-3. Fire Danger Rating System for NSWG TARs outside of SHOBA.

Fire Danger Rating	Caution to Be Exercised	Necessary Precautions
In all cases, the initial response will be to take immediate action to suppress the fire (if deemed safe) and call the Fire Department. Federal Fire and the Range Safety Officer/Safety Observer will jointly decide if it is safe for the exercise to continue or be postponed until after an incident. The road from just south of the dunes to approximately Marine Terrace Canyon or about 3100 yards (range of tracers used) from TAR 10 must remain passable for access for firefighting and function as a firebreak. The use of retardant sprayed from a ground rig may be necessary as containment lines along existing trails. For TAR 17, the unpaved road to Seal Cove along the LMU boundary should remain passable by two-wheel drive emergency vehicles to the canyon directly east of Eel Point. A gate should be installed at that location. Beyond this point, the road should remain passable by 4-wheel drive emergency vehicles. Emergency personnel should have access through the ordnance magazine area as necessary for fire suppression. Standby quick-attack fire apparatus location will be approved by the Wildland Fire Coordinator, who will coordinate with the Range Safety Officer/Safety Observer and with SCORE. Scheduling of quick-attack to be coordinated with SCORE.		
LOW <4 mph 20-ft wind speed> 11-12% 1-hr FFM	Use normal caution during military training exercises. Fires may start easily, but will have low rate of spread and fire intensity, i.e. less than 30 acres of spread per hour.	Care should be taken; however, any type of ammunition can be used within a designated TAR during this condition. Consistent with NALFSCIINST 5560.4D, smoking is not permitted in vehicles or in any designated TAR.
MODERATE 4-5 mph 20-ft wind speed 11-12% 1-hr FFM	Use extra caution. Fires may start very easily. Fires are expected to have moderate rate of spread and fire intensity, i.e. less than 100 acres of spread per hour.	All Low Fire Danger Precautions are in effect. This condition is the beginning of a fire ignition concern. Standby fire truck and quick action by wildland fire trained and qualified cadre members is essential to minimize any fire spread during this or higher condition. Whenever any type of incendiary ordnance is in use within a designated TAR, a fully equipped fire truck, with a minimum of 300 gallons of water, and staffed with 3 wildland fire certified personnel shall be placed in the vicinity where the training is taking place and available to take initial action. The decision about where to place the standby fire engine will be that of the Range Safety Officer/Safety Observer, but there must be line-of-sight visibility and the ability to be pumping water within 10 minutes of an ignition report. The use of pyrotechnics, demolitions and other heat/flame producing devices within that TAR will be limited as much as possible to night-time activity, a cleared area or areas previously burned over. Training exercises using white phosphorous, illumination and tracer heat/flame producing ordnance devices may be conducted in the early morning (before 0800 hours) or late evening (after 1900 hours) when relative humidity is at its highest. One cadre member shall be equipped for and trained in the proper technique in taking on-site wildland fire weather. Weather recordings will be taken every two hours during any training exercise using heat producing ordnance or devices, and restrictions added if the Fire Danger Rating increases. The only exception is when the on-site night-time weather recordings indicate that Fire Weather conditions have reduced to LOW.
HIGH 6-8-mph 20-ft. wind speed 9-10% 1-hr FFM	Use extra caution. Fires are expected to have high rate-of-spread and fire intensity. More than 100 acres of spread per hour in grassland.	All Moderate Fire Danger Precautions are in effect. Restrictions on the use of pyrotechnics, demolitions, illumination, heat/flame producing devices (including blanks and tracers), and white phosphorous will be in place for all TARS during the period of 0800 to 1900 hours. However, these restrictions do not apply to night-time (1900 to 0800 hours) training activities, in cleared areas or previously burned areas. The only exception is when the on-site night-time weather recordings indicate a reduction in Fire Weather condition to MODERATE.
VERY HIGH 9-10 mph 20-ft wind speed 5-8% 1-hr FFM	Extra protection caution. Fires will start easily and spread rapidly. Fires are expected to exceed 100 acres in one hour and burn very hot. Fires will be hard to contain at designated roads and fuel treatment areas without aerial suppression assets or 2 wildland fire engine companies.	All High Fire Danger Precautions are in place. Firing of all types of non-heat producing ammunition will be permitted at all times within a designated TAR. If an ignition occurs, training will cease and firefighting will be designated as the "highest priority" mission.
EXTREME >10 mph 20-ft wind speed <5% 1-hr FFM	Use extreme caution and allow only essential and high cost military training operations to continue under these conditions. Fires will spread at extreme rates of sped and by long distance spotting. Fires will burn at unacceptable intensities	All Very High Fire Danger Precautions are in place. If already on standby for other training missions, the helicopter, pilot and crew on ready fire alert at the SCI Auxiliary Landing Field will be summoned for suppression support.
** NALFSCIINST 5560.4D defines remote areas as anywhere except Wilson Cove, Airfield, West Cove Beach and paved roadways, which includes the unpaved portion of SCI Ridge Road south of VC-3 to Stone Gate. No smoking between the plane and the terminal at the Airfield.*		

C. Review the fire planning requirements and ignition potential in TARs 6, 11, and 12 once any ignition occurs. At present, there does not appear to be an ignition concern at these locations based on the training exercises expected.

IV. The FDRS requirements for suppression assets and personnel will be evaluated based on evolving data that augment the following two-year summary of fire weather. Table 4-6 shows the results of applying the FDR parameters shown in Table 4-2 and Table 4-3 to data collected at the OP3 weather station for the 1999 and 2000 fire seasons, evaluated by season and by time of day. Fire danger ratings are apportioned by quarters during the Spring (May 15–July 15), and Summer (July 16 –September 15, and Fall (September 16 – November 15) periods of the fire season, and by early morning, midday, and early evening time periods. It shows the expected peak fire danger time during the 1300 hour when HIGH, VERY HIGH, and EXTREME ratings are combined, and this is expected to continue through mid- to late afternoon. It would then be expected to subside in the evening when onshore winds bring in moisture-laden air. **Due to missing data from the RAWS weather station when it was not fully operational, especially wind data, and due to circumstances of where the RAWS station is placed, the averages shown below should *not* be used to estimate number of days to plan for helicopter (or other suppression asset) standby time. The actual number of days in the VERY HIGH and EXTREME categories is expected to be fewer than that shown in Table 4-6.**

V. Remote Automated Weather Stations (RAWS) will provide consistent and accessible fire weather information on a daily basis.

A. Upgrade computer system in the FFD to provide fire weather processing capability and video views of fire.

B. Consider moving the OP3 weather station closer to the Observation Point so recordings will be more reflective of Impact Area 2 wind conditions.

C. Wire the weather station into OP3 so weather forecasting can occur on-site.

D. Add an additional RAWS weather station at Mt. Thirst to reflect ridge top blustery conditions.

E. Until fire weather forecasting can be achieved in-house, subscribe to the NOAA Riverside Fire Weather Service for conditions at 0800 and 1300, or other appropriate fire applications support service.

VI. The Fire Danger Rating will be projected by the Wildland Fire Coordinator and announced by the OIC daily on a website accessible to all operators, or by other method agreeable to the SCI Wildland Fire Coordination Group led by the OIC (Section 4.4.2).

A. The Fire Danger Rating can also be determined in real time or multiple times per day, on an hourly or as-needed basis. The FDRS can be implemented on a more frequent basis than daily with appropriate weather monitoring locations and use of portable weather belts. This will require the ability to read Fine Fuel Moisture (FFM), to be interpreted based on Table 4-4.

B. The FDRS may be implemented on a site-specific or more localized basis by adjusting which RAWS station is used or through the use of portable weather belts. Similarly, the ability to collect FFM data will be necessary.

VII. The ready-alert status of aerial support will vary based on the projected FDR in SHOBA.

A. When the FDRS is HIGH and training is taking place in SHOBA, either a contracted helicopter or military HC-85 unit (if training is taking place in SHOBA) will be on fire alert on SCI for response to wildland fire during daytime hours 0900 to 1900 such that the aircraft can be airborne in five minutes. Other SCI military helicopter missions can take place during this fire alert; however, a fire dispatch will be given a high priority.

B. When the FDRS is VERY HIGH and training is taking place in SHOBA, either a contracted helicopter or military HC-85 unit will be on Island for response to wildland fire. A helicopter with crew and water bucket will be placed on fire alert during daytime hours of 1000 to 1900 such that the aircraft can be airborne in five minutes from notification. This helicopter will be allowed to conduct other missions, providing the water bucket and water re-fill capabilities appropriately placed at VC-3, the helopad at OP-3, or other appropriate location, and ready for pick up by the helicopter crew and meets the goal of a 30-minute elapsed time for responding to the site of any fire occurring on the southern end of SCI. Firefighting will then be designated as the "highest priority" mission, except for those routine ignitions within SHOBA Impact Area I & II. Fires inside SHOBA Impact Area I & II that demonstrate the potential to go beyond Impact Area I & II boundaries will be considered the same as any other wildland fire during this fire danger period. All other fires within Impact Area I & II will not be considered as a "highest priority" mission. For training outside of SHOBA, a quick-attack wildland fire engine, with a 3-person crew will be located in the vicinity where the highest fire hazard military training is taking place. This means a safe distance away with line-of-sight visibility, as approved by the Range Safety Officer/Safety Observer in charge of the training activity.

C. When the FDRS is EXTREME and training is taking place in SHOBA, a helicopter will be on ready standby alert from SCI Auxiliary Landing Field with no other assigned responsibilities.

D. If a helicopter is not available, then training in SHOBA will be restricted to non-incendiary ordnance use and time periods as described in the FDRS.

VIII. The SCORE Range User's Manual should be updated and/or an Island-wide Fire Management Instruction to augment the SCORE Range User's Manual should be written that includes the FDRS and reaches the entire spectrum of those who need to know, explaining all protocols required for use of ordnance and any other training activity on SCI, as well as protocols for all other activities that carry risk of fire ignition and may require fire response.

The Instruction will apply to all users of the Island as well as personnel stationed there as part of the shore facilities support. The Environmental Program/NRO will work with SCORE to update the User's Manual with rules that operators must adhere to, so that no operator need be familiar with the contents of a Biological Opinion.

IX. The FDRS will be evaluated and revised on an annual basis based on whether it is providing military trainers needed flexibility, new resource information, improved weather data, and updated fire history.

4.3.2 Predicting Fire Severity

Fuel Moisture. The amount of moisture in the fuels will affect how easily a fuel will ignite and intensely it will burn. There are two types of fuel moisture: dead fuel moisture and live fuel moisture. Dead fuel moisture is the moisture content in fuel material that is dead. Live fuel moisture is the moisture of living, growing fuels. Both are measured in percentage of weight. Dead fuel moisture is changed by the moisture content of the air. Time lag is the time it takes for the moisture content of fuels and the surrounding air to equalize. Time lag is expressed as a rate (usually in hours). Grass is considered a one-hour fuel. It takes about one hour of exposure to change the dead fuel moisture in grass up or down.

Annual cured grass hygroscopic exchange (daytime). A rising air temperature and lowering relative humidity means dropping fine-fuel moisture fuels (Figure 4-1a). The solar heat (sun) dries out air above the fuel. Moisture present in fuel is freely exchanged with surrounding air.

Annual cured grass hygroscopic exchange (nighttime). Dropping air temperatures and rising relative humidity increase fine-fuel moisture levels (Figure 4-1b). Moisture from the surrounding air is absorbed by the fine fuels. San Clemente Island is blessed with late afternoon, night time and early morning fog (high moisture) conditions. These high moisture conditions creates a high fine fuel moisture condition until the mid-morning and afternoon solar temperatures begin to rise and creates lower fine fuel moisture conditions raising the potential for fire ignition and fire spread.

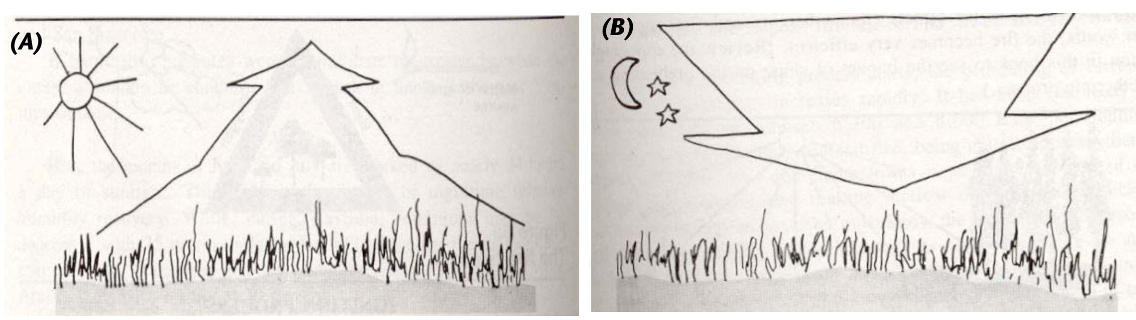


Figure 4-1. Hygroscopic moisture exchange in (A) daytime and (B) nighttime conditions.

Fine Fuel Moisture Content versus Fire Rate of Spread. For fine dead fuels (one-hour time-lag fuels), fuel moisture content is important rate of wildland fire spread. A fuel moisture level of 25 percent is considered to be the level of extinction. At 25 percent, the heat source is generally insufficient to drive out enough water vapor to continue to support combustion. Table 4-4 illustrates how fine fuel moisture percents relate to wildland fire spread:

Table 4-4. Wildland fire rate of spread as determined by Fine Fuel Moisture.

Fine Fuel Moisture (one-hour) Content	Wildland Fire Rate of Spread Factor
25%	1
20%	2
15%	3
10%	7
5%	20
3%	32

Therefore, when the fine fuel moisture is below 10% the wildland fire rate of spread will increase as the fine fuel moisture decreases. Table 4-5 depicts the expected fire severity from low to extreme for SCI fire planning purposes.

Table 4-5. Expected fire severity based upon fine fuel moisture content.

FINE FUEL MOISTURE (1-HR) CHART																					
	Relative Humidity (%)																				
Dry Bulb Temperature (F°)	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 84	85 - 89	90 - 94	95 - 99	100
10 - 29	1	2	2	3	4	5	5	6	7	8	8	8	9	9	10	11	12	12	13	13	14
30 - 49	1	2	2	3	4	5	5	6	7	7	7	8	9	9	10	10	11	12	13	13	13
50 - 69	1	2	2	3	4	5	5	6	6	7	7	8	8	9	9	10	11	12	12	12	13
70 - 89	1	1	2	2	3	4	5	5	6	7	7	8	8	8	9	10	10	11	12	12	13
90 - 109	1	1	2	2	3	4	4	5	6	7	7	8	8	8	9	20	10	11	12	12	13
109+	1	1	2	2	3	4	4	5	6	7	7	8	8	8	9	10	10	11	12	12	12

Extreme fire severity
High fire severity
Moderate fire severity
Low fire severity

The San Clemente Island Fire Danger Rating is based upon Fine Fuel Moisture (one-hr) and wind speeds. Fire ignition, intensity and rate of spread (fire severity) is based upon low fine fuel moistures and high wind speeds. The San Clemente Island Fire Danger Rating illustrates the relationship between fine fuel moistures and wind speeds. Table 4-6 presents a summary of the number of days under various fire danger ratings based on weather data from 1999-2004 at OP3.

Table 4-6. Sample analysis of proposed Fire Danger Ratings OP3 using weather data from 1999-2004 fire seasons, showing the number of days within each indicated time period for each FDR Category. Due to missing data from the RAWS weather station when it was not fully operational, especially wind data, and due to artifacts of where the RAWS station is placed, the averages shown below should not be used to estimate number of days to plan for helicopter (or other suppression asset) standby time. The actual number of days in the Very High and Extreme categories is expected to be fewer than that shown.

	May 15-Jul 15			Jul 16 - Sep 15			Sep 16 - Nov 15			Fire Season Totals		
FDR	Minimum # Days in Any Given Year	Maximum # Days in Any Given Year	Average # Days / Year	Minimum # Days in Any Given Year	Maximum # Days in Any Given Year	Average # Days / Year	Minimum # Days in Any Given Year	Maximum # Days in Any Given Year	Average # Days / Year	Minimum # Days in Any Given Year	Maximum # Days in Any Given Year	Average # Days / Year
Time of Day: 06:00 Hours												
Low	0	30	9.7	1	19	7.0	1	12	5.8	5	61	22.5
Moderate	28	57	43.5	34	48	41.5	24	39	34.7	86	144	119.7
High	3	8	5.7	4	14	9.2	6	12	9.3	17	30	24.2
Very High	0	4	1.7	0	4	1.8	3	9	4.8	6	11	8.3
Extreme	0	2	<1	0	4	2.2	1	10	4.5	13	3	7.0
Time of Day: 13:00 Hours												
Low	0	1	<1	0	0	0	0	1	<1	0	1	<1
Moderate	6	13	9.3	0	6	2.0	4	14	6.5	15	24	17.8
High	27	38	33.5	16	27	21.0	18	29	25.7	69	91	80.2
Very High	10	22	15.5	30	39	34.5	14	29	21.7	59	87	71.7
Extreme	0	4	2.3	2	7	4.5	2	14	5.5	8	22	12.3
Time of Day: 18:00 Hours												
Low	0	1	<1	0	1	<1	0	5	2.0	1	5	2.8
Moderate	21	30	26.2	4	14	17.0	23	36	31.3	68	84	74.5
High	19	34	24.8	18	29	26.0	8	15	10.3	55	72	61.2
Very High	2	10	6.2	14	29	13.2	4	10	6.3	19	34	25.7
Extreme	0	8	3.3	2	14	5.2	7	22	10.0	11	29	18.5

4.3.3 Fuels Management

Background

Fire protection that includes the use of strategic fuels management to protect human life, facilities, and threatened and endangered species can also benefit wildlife by increasing habitat diversity, buffering catastrophic habitat losses for sensitive species (e.g. a single event that removes much of the habitat needed by a species for reproduction such as for nesting), improving natural edge effects, and reducing erosion by keeping fires smaller and cooler and so consuming less vegetation. The well-planned use of prescribed fire will reduce fuel loads and result in future unplanned wildfires burning in smaller patches with less intensity, and provide for safer, less costly fire suppression. Younger age classes of vegetation are expected to reduce flame lengths during a fire and thus improve the opportunity for suppression. Fuels management can be accomplished before or after the fire season between November and April, with good weather conditions and approval of the SCI Wildland Fire Coordinator Group.

Both firebreaks and fuelbreaks are essential components of any fire management program. Firebreaks are maintained in a bare soil condition and provide access for fire suppression, and a safe place from which to fight fires and set backfires. Fuelbreaks are a fuel management zone where the vegetation has been modified through mowing, trimming, or burning to segregate, slow, and control the spread of fire. Fuelbreaks are approximately 80% more effective than an existing 30-ft firebreak at stopping the flank of a fire, and 20% more effective at stopping the head of a fire (Green 1977; R. Montague, pers. obs.). The increase in effectiveness is seen primarily on medium to hot fires. The minimum width of a fuelbreak required for firefighter safety has been studied (Green 1977), and is the root of defensible space concepts. It is considered to be 100 ft where there are buildings a firefighter can get behind, but 300 ft in a wildland situation. The greater width of the fuelbreak allows more time for the fire's heat to dissipate before reaching the firefighter. In addition, the persistent fine fuels in the fuelbreak allows the firefighter to use backfiring strategies to more effectively control a wildfire. As a result of better control, fuelbreaks created by controlled burning can result in less overall acreage consumed by fire in the long run.

Prescribed fire is likely to be the most environmentally compatible alternative to establishing fuelbreaks when compared to retardant use, disking, and herbicides. Burns will be accomplished in patches or strips that vary in width and placement due to aspect and other factors. The shrub component of the burned area as a whole will reach maturity only in patches under such a regime, but age classes will range from zero to 40 years or more in these patches. The design of the prescribed burn, including the fire intensity at which it is burned, depends on the fire management objective. Vegetated islands and buffer strips can be planned and placed to protect sensitive resources.

***Objective:* Control fuel loads to keep fires small in high conflict areas with sensitive resources.**

***Objective:* Enhance biological diversity and habitat for sensitive species through the appropriate use of fire and fuel treatment measures.**

I. Recognize Federal Fire Policy and the risks of prescribed burning (Figure 4-2).

II. Maintain optimal firebreak/fuelbreak configuration and maintenance for fire containment and access for fire suppression, integrated with security requirements.

- ***A.*** Several areas are identified on Map 4-1 as strategic for fire management to protect natural resources values from ignitions. These features include herbicided fuelbreaks, fuelbreaks created through use of fire retardant and/or prescribed fire, and roads that are to be managed as firebreaks along the borders of Management Units and in strategic locations in the SHOBA Impact Areas. Table 4-7 decribes the project footprint of firebreaks, fuelbreaks, and fuels treatment under the WFMP.

Figure 4-2. Federal Fire Policy statement regarding prescribed burns, including management of prescribed fire risks.

Federal Fire Policy:
"Prescribed burning is a well-established practice utilized by public and private land managers. In order to effectively use prescribed fire, land managers must prepare comprehensive burn plans. Each plan specifies desired fire effects; weather conditions that will result in acceptable fire behavior; and the forces needed to ignite, hold, monitor, and extinguish the fire...Success has been built around qualified and experienced people, their understanding of plant communities and terrain conducive to the use of fire, adequate funding, a supportive public, and a willingness on the part of the agency to assume a reasonable amount of risk to achieve desired results."

Prescribed Fire Implementation Goals:

- ☐ The use of wildland fire is accepted as an essential process in a fully integrated program to improve forest and rangeland health and to maintain wildland ecosystems.
- ☐ Wildland fuels are managed at levels consistent with wildland fire protection and resource management objectives identified in land and resource management plans.
- ☐ Agencies collectively and cooperatively develop and maintain an organization that can effectively plan and safely implement prescribed fire and fuel management programs.

Therefore, federal agencies will:

- jointly develop programs to plan, fund, and implement an expanded program of prescribed fire in fire-dependent ecosystems.
- facilitate the planning and implementation of landscape-scale prescribed burns across agency boundaries. Seek opportunities to enter into partnerships with Tribal, State, and private land managers to achieve this objective where appropriate.
- require appropriate treatment of fuel hazards created by resource-management and land-use activities.
- conduct all prescribed fire projects consistent with land and resource management plans, public health considerations, and approved prescribed burn plans.
- implement the National Wildfire Coordinating Group (NWCG) interagency prescribed fire qualification and certification standards.
- train and maintain a qualified and adequate work force to plan and implement interagency prescribed fire projects safely and effectively, and make these personnel available when needed.
- jointly develop simple, consistent hiring and contracting procedures for prescribed fire activities.
- conduct research and development on fuel treatment alternatives and techniques.

Prescribed Fire Administrative Barrier Goals:

- ☐ Administrative procedures support the accomplishment of prescribed burning programs and objectives.

Therefore, federal agencies will:

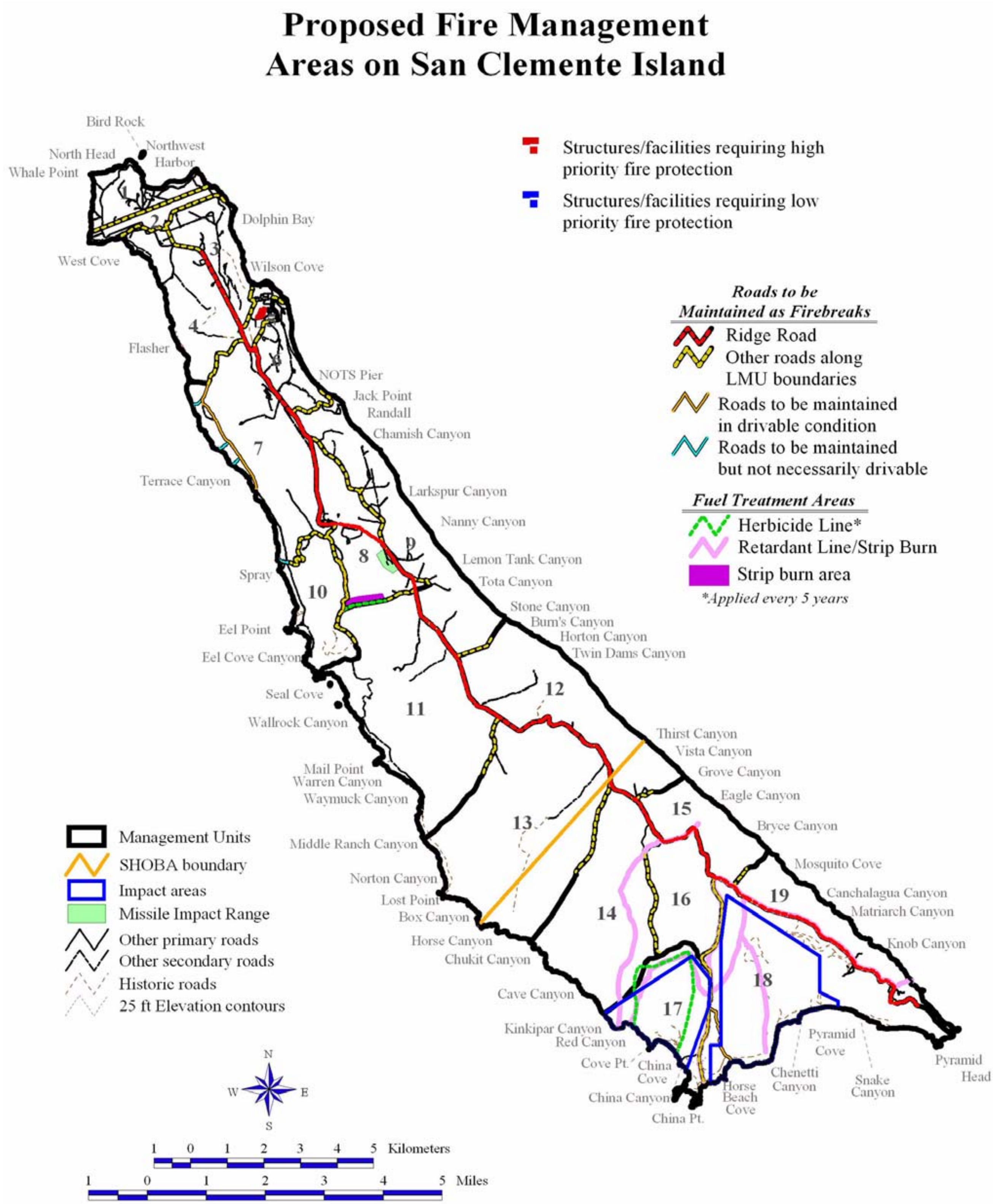
- seek authority to eliminate internal barriers to the transfer and use of funds for prescribed fire on non-federal lands and among federal agencies.
- seek authority to provide administrative direction to eliminate barriers to carrying over from one year to the next all funds designated for prescribed fire.
- work with the Office of Personnel Management to acquire authority for hazard pay to compensate employees exposed to hazards while engaged in prescribed burning activities.
- clarify that prescribed burn positions qualify for primary coverage under special firefighter retirement and issue appropriate guidance to field offices.

Prescribed Fire Risk Management Goals:

- ☐ Risk of escaped prescribed fire is minimized through sound planning and execution.
- ☐ Agencies within the Departments of Agriculture and Interior support employees when properly planned and conducted prescribed fire projects have unfavorable outcomes.

Therefore, federal agencies will:

- jointly develop an assessment process for determining the probability of success and/or failure associated with the use of prescribed fire and evaluating potential positive and negative consequences. As part of this process, the effects of not conducting the project will also be evaluated.
- jointly develop tools to identify, assess, and mitigate risks from prescribed fires.
- create an organizational climate that supports employees who implement a properly planned prescribed fire program.
- reevaluate prescribed burn planning and execution requirements to ensure adequacy of direction without unnecessary constraint.



Map 4-1. Proposed fire management areas on San Clemente Island.

Table 4-7. Project footprint of firebreaks and fuels management under the WFMP. All treatments except road maintenance may need to occur during the breeding season of the federally protected wildlife species.

Firebreak or Fuel Treatment	Area or Length
Ridge Road to be maintained to function as a firebreak	20.6 miles (no new unvegetated footprint)
Existing roads to be maintained in drivable condition	32 miles (no new unvegetated footprint)
Strip burns	Up to 5 miles/year, rotated along roads or fuelbreaks over a 10-year period up to 20 miles (72.6 acres)
Prescribed burns in patches	Up to 300 acres/year for strategic fuels management and to achieve INRMP objectives for sensitive natural resources
Herbicide treatment as needed	Up to 5 miles once every 5 years (12.1 acres)
Fire retardant application	7.1 miles (25.8 acres), could be up to 15 miles in future (54.5 acres)

B. The use of herbicide, retardant, and prescribed burns are all options for fuelbreak establishment that are easier on the land and natural/cultural resources than disked or bladed firebreaks. They are also options when unexploded ordnance pose a danger to ground-disturbing equipment. However, at least a road interior to the fuelbreak or a significant topographic feature is still needed for staging of suppression assets during a fire or for aerial suppression units to work from. Whether to use prescribed fire, retardant, or herbicide alone or in combination depends on fuel condition, cost, logistics, risk of increasing invasive weeds, and the term each is expected to last before reapplication is necessary. It may be advisable to rotate the placement of burns, herbicides, or retardant as much as possible within a band, to minimize repeated impact and environmental consequences such as increasing invasive species or erosion.

C. Fuelbreak location has been adjusted from year-to-year based on the location of shrike nests, change in target location, ongoing discussions with SCORE, and budget constraints. These adjustments are likely to continue. For example, herbicide application was effective initially, but it type-converted a fuelbreak strip to cholla *(Opuntia prolifera),* and subsequently prevented follow-up applications from becoming effective. The road to Horse Beach Canyon has in the past been proposed for retardant application alongside it, but the lack of loggerhead shrike nests in that canyon made it a low priority, and the canyon's protection was lost to budget concerns. The current proposal is to maintain the Horse Beach Canyon road in drivable condition.

D. The proposed techniques for installing fuelbreaks in SHOBA are, to some degree, experimental. Monitoring should be used to evaluate alternative techniques and their effectiveness, and the need to repeat or augment them.

E. The following BMP's apply to the use of fire retardant applied preemptively for fuelbreak purposes.

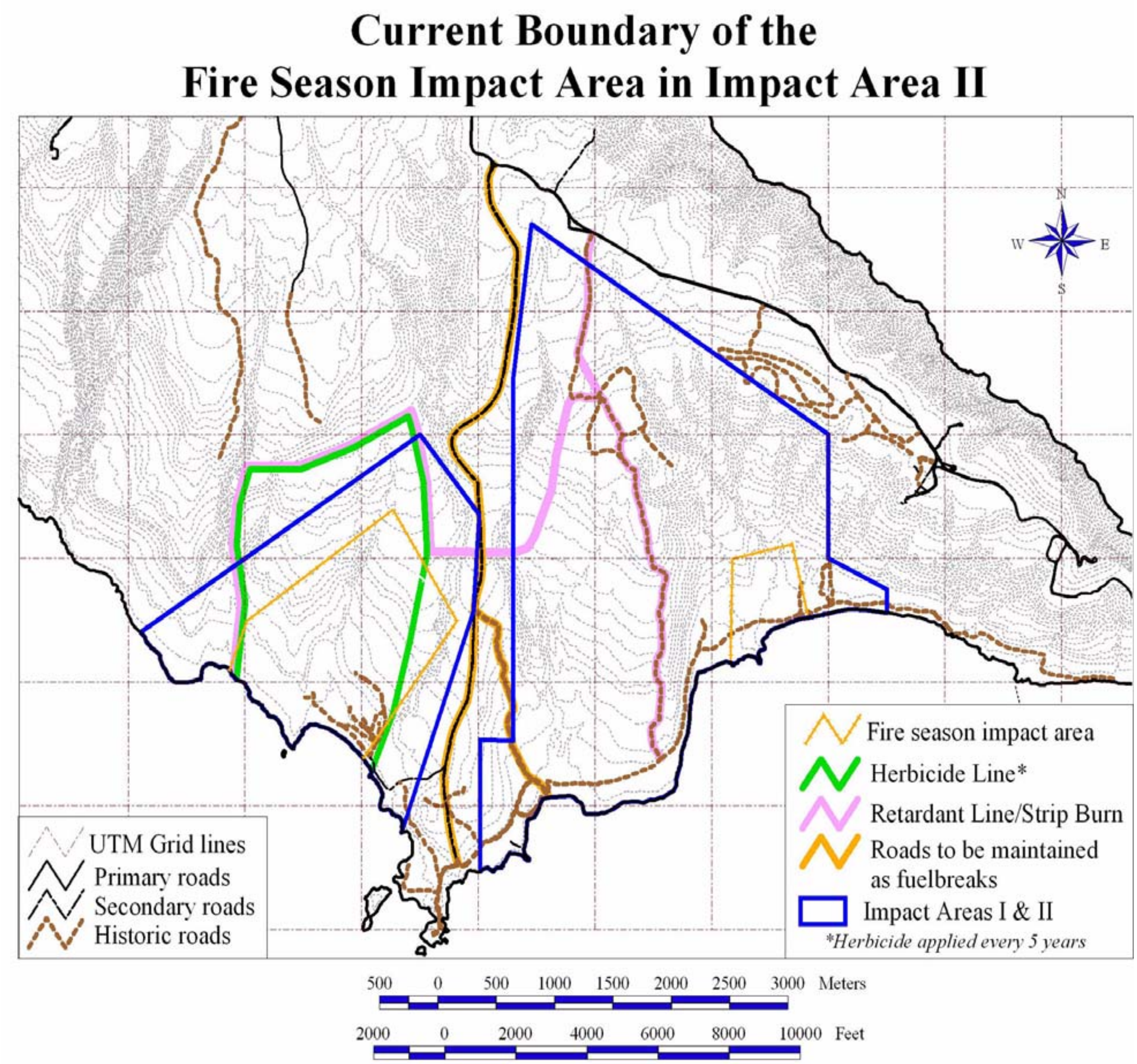
1. Develop application protocols for the use and application of the fire retardant Phos-Chek D75-F that minimize the effects of application on plant and wildlife communities. Consider the following:

2. The temporary fertilizing effect of retardants from residual NH3, NH4, and total phosphorus, which occur in the natural environment, might promote annual grasses. This effect has been shown to disappear after the year of application in two separate studies (Hamilton et al. 1998). The ecological effect of the foam or retardant application depends on which product is applied. Foams act as surfactants (like a soap), while retardants have a mild fertilizer effect due to the ammonia component of the chemical (Hamilton et al. 1998). If conditions are sufficiently moist after retardant application, biomass production will likely increase during the growing season when the chemical is applied, but the effect will not persist. Under dry conditions, no effect on biomass production is likely (Hamilton et al. 1998). Weedy grasses that can exploit the additional nitrogen could gain an advantage over native plants under moist conditions. Annual grassland in California doubled its biomass from approximately 6 tons/ha to 12 tons/ha following application of diammonium phosphate retardant (Larson and Duncan 1982, cited in Adams and Simmons 1999). Native legumes germinated, but failed to establish on retardant-treated areas. Similar decreases in native legumes the first growing season after application of ammonium-based retardant were shown in an Australian eucalyptus community (Bradstock et al. 1987). In laboratory studies with algae, aquatic invertebrates, and fish (Hamilton et al. 1998), short-term toxicity tests showed that both fire-retardant and foam-suppressant chemicals were very toxic to aquatic organisms including algae, invertebrates, and fish. Foam suppressants were more toxic than fire-retardant chemicals. Both foams and retardants have variable degradability but generally the persistence of effects depends on post-application weather patterns (Larson and Duncan 1982; Larson and Newton 1996; Hamilton et al. 1998). The material is expected to last until there is about one inch of rain, or repeated fog can have the same dissipating effect (M. Rogers and R. Montague, pers. comm.).
3. Apply retardant after grasses have seeded out to avoid a fertilizing effect or rotate use within the fuel management zone to avoid repeated application.
4. Application by aerial spraying or from roads will prevent damage to habitats caused by vehicle or foot traffic. "Develop a system whereby EOD units may ensure ranges are safe for aerial application of fire retardant or prescribed fire in a non-wildfire situation.
5. Only a small width (20 ft.) of the larger fuel modification zone (200 ft. wide) will need retardant in any given year, reducing the need for repeated application in the same area.
6. Some years may not require any application depending on weather, fuel loads, and training schedules.
7. Retardant will be applied adjacent to and outside of the previous year's retardant line. The previous year's retardant line will then be allowed to burn to reduce any increase in exotic species caused by the application of the retardant. Rotating the placement of burns, herbicides, or retardant as much as possible within a band is advisable, to minimize repeated impact and environmental consequences such as increasing invasive species or erosion.

8. A controlled burn within the area of concern soon after retardant application will maximize the effectiveness of the retardant line.
9. Application of retardant after the winter rains will reduce the risks of chemicals washing into water sources.
10. Avoid establishment of chemical mixing areas near water, and avoiding aerial flight patterns that may result in accidental application to fresh or sea water resources.
11. Application of retardants will be performed in conjunction with long-term monitoring of soil and vegetation responses to this activity. Direct, long-term impacts to plant and wildlife communities are thought to be insignificant at this time (Hamilton et al. 1998; Adams and Simmons 1999; Bradstock et al. 1987; Hamilton et al. 1998; Larson and Duncan 1982; Larson and Newton 1996).
12. Survey for rare plants in advance of application so that populations will be avoided. At least 300 feet will be maintained between the retardant line and *Sibara filifolia* plants.
13. Avoid, if possible, use of fire retardant, especially repeated applications, on soils that are naturally low in nutrients and upon which the native plant community may depend on this impoverished nutrient status. An example may be the first-terrace boxthorn community.
14. Areas around occupied nesting areas will be sprayed with adequate coordination between monitors and applicators.
15. Fire retardants will only be used when deemed necessary to maintain the military mission and protect sensitive resources.

F. The Environmental Program/NRO Director will ensure, in cooperation with OIC, that roads and fuelbreaks which comprise the firefighting network (see Map 4-1) are open before the start of fire season.This can be accomplished before or after the fire season between November and April, with good weather conditions and approval of the SCI Wildland Fire Coordinating Group.

G. Once the planned fuelbreak in the SHOBA Impact Areas are in place, the existing restrictions on use of incendiary ordnance, as well as the fire season target area size will be superseded by the FDRS (Map 4-2). Should a fire emanate from activities in this target area, escape beyond the Land Management Unit and burn sensitive resource exceeding success threshold objectives defined in this Plan, this policy will be immediately adjusted for the remainder of the fire season upon evaluation of cause.



Map 4-2. Existing fire season impact area boundaries. The Fire Season Boundaries are based on the BO FWS-CA-2808 (23 July 2002), reinitiation of BO 1-6-97-21). Under this Fire Plan, the Fire Season Boundaries will be superseded by the FDRS once the firebreaks shown are in place.

III. Establish prescribed burning**,** through a regular burn plan**,** as an integral part of a proactive fire and fuels management and long-term habitat conservation program on SCI. The initial requirement for pre-suppression work is for about five miles per year of strip burns, and 100–300 acres per year of other fuel treatment in patches.

A. Confine all fires to designated zones and prevent fires from exceeding prescriptions.

B. Submit deviations or additions to any Annual Burn Plan (see Burn Plan guidelines) to NRO staff for approval and NEPA review. Such changes must also be approved by the Federal Fire Department and the SCI Wildland Fire Coordinating Group. Proposed burns that affect occupied habitat of any kind will likely receive some reasonable delay in approval, or possibly no approval at all.

C. When conducting prescribed burns primarily for safety reasons, consider in the design, any opportunities for habitat or species protection and enhancement consistent with meeting the primary objective.

D. Accomplish fuels management by using a burn plan in concert with the firefighters who know the best strategies for managing burns to protect resource values, and with natural resources staff, who can identify in planning stages potential biological conflicts to avoid during burning.

E. The OIC has approval authority for all prescribed burn plans.

F. The WFMP incorporates the following BMP's for prescribed fire.

1. Confine all fires to designated zones and prevent fires from exceeding prescriptions.
2. Submit deviations or additions to any Annual Burn Plan (see Burn Plan guidelines) to NRO staff for approval and NEPA review. Such changes must also be approved by the FFD and the SCI Wildland Fire Coordinating Group. Proposed burns that affect habitat occupied by federally listed species or other sensitive species believed to be at risk from a burn will likely receive some reasonable delay in approval or possibly no approval at all.
3. Consider in the design any opportunities for habitat or species protection and enhancement consistent with meeting the primary objective, when conducting prescribed burns primarily for safety reasons.
4. Accomplish fuels management by using a burn plan in concert with firefighters and with natural resources staff, who can identify in planning stages potential biological conflicts to avoid during burning.
5. Survey rare plants in advance of prescribed fire application so that populations will be avoided by location or timing, or prescribed fire will be planned to provide a resource benefit.

IV. Drip torches and fire retardant materials will be kept with the Type 3 equivalent truck belonging to the FFD. The purchase of a helitorch is recommended for prescribed fire applications.

V. Continue to evaluate the use and application of fire retardant from roads (ground spraying) and by aerial spraying in inaccessible areas (or those with unexploded ordnance concerns) as a means to prevent damage to sensitive resources that can result from disked or bladed firebreaks.

VI. Estimate fuel load changes in conjunction with the Vegetation Trend Long-term Monitoring Program. Use visual (photos with markers) and standard fuel models. This is important as shrub recovery continues throughout the Island. It is important in boxthorn where no standard fuel model exists. In the boxthorn case, the method would be to clip a one square-foot area and obtain biomass by one-hour, 10-hour, and 100-hour fuels.

4.3.4 Fire Suppression

Objective: ***Control, confine, and contain fires to protect life, property, natural ecosystem, and cultural resource values by providing appropriate fire suppression response while minimizing total cost.***

I. In the event of a fire, the Range User will call Security (Dispatch) at 524-9214.

II. To achieve FMP goals, availability and deployment of suppression assets will be guided by the following design criteria during MODERATE or higher fire danger:

- Notification to Federal Fire Department is within three minutes of first incident report. Dispatch center (Security) will notify Federal Fire (Phone 524-9911) immediately after receiving an emergency incident report.
- Response time for a helicopter after initial incident report will be 15 minutes from the ground. Response time for Federal Fire will be five minutes from the station from initial report to Dispatch.
- On scene arrival to fires will be 30-minutes from first report. (For SHOBA Impact Areas, this applies to fires threatening to leave the designated fuelbreaks, not every ignition.)
- For TARs, assets will be on scene and pumping water or other suppressant within 10 minutes of reported incident.

III. A natural resources officer will be notified with the dispatch to a wildland fire. At least three names, as a standard operating procedure, will be available to the Dispatch Officer. A qualified natural resources professional will accompany the Incident Commander during pre-suppression and suppression fire management activities in the field and advise the Incident Commander when possible and as needed.

IV. Structures all have high priority, but some are more prone to damage than others due to human occupancy, value, or exposure of high-value building contents to fire.

A. All occupied or potentially occupied buildings will be first priority for suppression.

B. Historic structures will be fully protected. Use the minimum suppression measures possible to eliminate a potential threat.

C. Bunkers will have lower priority because they are protected by soil and vegetation management.

V. Once human life and high-value structures are not at risk, the first wildland priority will be to keep fires within fuelbreak LMU boundaries. Additional priorities that apply to all LMUs will be as follows, listed in order of importance:

A. Prevent fires from approaching active nests of the San Clemente loggerhead shrike with aerial water drops or fire apparatus from within established safety zones.

B. When a fire occurs in the west shore boxthorn habitat on the first or second terraces outside Impact Area I or II, keep the fire as small as possible. Control with direct attack from established safety zones, including use of a helicopter if already on Island. Because ground disturbance is more likely to be damaging in the long term than a fire, aerial suppression or backburning is preferred over entry with suppression equipment into habitat areas.

C. Fires will be prevented from entry into Canyon Shrubland/Woodland. Fires that enter canyon shrubland or woodland will kept as small as possible. Control with direct attack including use of a helicopter.

D. Fires that threaten to repeat-burn Canyon Shrubland/Woodland stands that are less than five years old (based on most recent fire in which shrubs were consumed) will be kept as small as possible rather than containing at logical control lines. This applies to boxthorn on the first or second terrace of the west shore. This does *not* apply to coyote brush-grassland areas from Stone Station northward on the upper plateau.

E. Fires that cross the fuelbreak in Impact Area I or II in SHOBA will be prevented from entering canyons and contained within that land management unit as the highest suppression objective. Secondarily, fires will be contained to a control line such as a road, fuelbreak, base of terrace slope, land management unit boundary, ridge, or other logical terrain feature. Terrace slopes (as opposed to the flats) will be protected if possible.

F. For shrublands not in canyons, fires will be controlled, confined, and contained using logical terrain features such as roads, fuelbreaks, canyon rims, land management unit boundaries.

G. Dumping sea water on fresh water sources or jurisdictional waters of the U.S. will be avoided during fire suppression practice. Roads are appropriate for dumping sea water for practice. Sea water dumps are permitted during suppression incidents. Also, avoid using both fresh water and sea water in the same bucket during practice, to preclude adding salt water to fresh water areas.

H. Water buckets will be kept wherever a helicopter is staged.

I. Portable water tanks for refilling during suppression will be pre-staged at VC-3, the helopad at OP-3, at Mt. Thirst, near TAR 10, and other appropriate locations as found necessary as this Plan is implemented. These will be at least 10,000 gallons each.

J. Consistent with NALF SCI INST3502.1A (November 19, 1991) “Brush/Grass Firefighter Training for SCI Personnel,” the Federal Fire Department will provide annual brush firefighting training. In addition to the training required by the Instruction, FFD will ensure that military personnel manning the quick-attack fire suppression apparatus will have proper training, equivalent to 40 hours, for providing initial response to a wildland fire. The WFC will organize a training program for FFD San Diego personnel assigned to SCI. WFC will appoint along with the Wildland Fire Coordination Group, military and civilian personnel, to assist in support of suppression efforts during a wildland fire incident on SCI.

VI. Pre-season briefings on minimal impact, ”light hand on the ground” suppression tactics (MIST) will occur between the Fire Department and the Natural Resources Office. Minimal impact guidelines are provided for each FMU in Chapter 5. Suppression tactics are selected that cause the least collateral damage, and are commensurate with effective wildfire containment and control strategies, firefighter and public safety, and resource values to be protected. See Table 4-8 for examples of MIST guidelines used by other federal agencies.

Table 4-8. MIST guidelines.

COMMAND AND GENERAL STAFF
Evaluate each and every suppression tactic during planning and strategy sessions to see that they meet Fire Plan objectives and minimum impact management guidelines.
Discuss possible minimum impact management techniques with Federal Fire staff during briefings.
TACTICAL STANDARDS
Fire line construction will be minimized by taking advantage of natural barriers, rock outcrops, trails, roads, parking areas, and other existing fuelbreaks.
Fire lines will be the minimum width necessary to halt the spread of the fire and will be placed to avoid impacts to natural and cultural resources vulnerable to the effects of fire and fire suppression activities.
Consider alternatives to fire line construction such as using water only, or allowing fire to burn to natural barriers.
Clearing and scraping will be minimized.
On-site suppression best management practices will be discussed in advance of fire season.
The use of bulldozers for fire line construction is prohibited.
Use paved surfaces such as parking areas to stage crews, equipment and supplies.
AIRCRAFT HELICOPTERS
Use existing roads, landing pads, and parking areas for helicopter landings.
RETARDANT AIRCRAFT
Minimize number of drops to what is essential for control of fire.
RESTORATION OF FIRE SUPPRESSION ACTIVITIES
General: a) remove all signs of human activity (plastic flagging, small pieces of aluminum foil, litter); b) pack out all garbage and unburnables.

VII. Proper safeguards for cultural resources during fire management will be implemented. Provide proper safeguards for cultural resources during fire management. Proper safeguards include use of MIST during suppression as described above. Sufficient location and value information will be provided on firefighting maps to identify and prioritize suppression or pre-suppression response. Resource Advisors, both for cultural and natural resources, will be present at prescribed burns. Federal Fire personnel will receive an annual cultural resource protection briefing from the cultural staff. Rehabilitation of sites affected by suppression will be conducted so that there is no permanent loss of cultural resource values.

A. Sensitive locations include both known sites and areas that may contain buried deposits. These areas will be avoided if at all possible. New firebreaks will be avoided, but if needed, will involve a qualified archaeologist and may need to go through the Section 106 process of the National Historic Preservation Act, including survey, test and evaluation of any sites, monitoring, and State Historic Preservation Officer (SHPO) and tribal consultation. Mechanical equipment should not be brought into these areas and no fire lines may be cut during suppression action.

B. Avoid use of bulldozers at cultural resource sites. Since the use of bulldozers to create fire lines during suppression is not anticipated, impacts to cultural resources may be due to water drops, to the fire itself, looting, or erosion.

C. Due to the nature of fires and the need to protect life and property, sensitive locations may not always be avoidable. Efforts will be made to minimize damage when work must be done in these locations. The affected area will be examined by a qualified archaeologist as soon as possible to determine if any cultural resources were impacted; Advisory Council on Historic Preservation (Council), SHPO, and tribal consultation may be required if resources are impacted.

D. As per 36 CFR Part 800.12 (a) emergency procedures for handling historic properties (cultural resources that are eligible to the National Register) can be developed in consultation with the SHPO, tribes, and the Council. This would replace the 106 process during any legitimate emergency; emergency is defined in 36 CFR Part 800.12(a) as "a disaster or emergency declared by the President, a tribal government or the governor of a State or which respond to other immediate threats to life or property." Emergency plans may also be a part of a Programmatic Agreement. If no plan is available, the Council, SHPO, and tribes should be notified and given at least seven days to respond. If this is not possible, the Council, SHPO, and tribes should be notified with as much time given as possible under the circumstances.

E. Historic structures will be fully protected. Use the minimum suppression measures possible to eliminate a potential threat.

F. Prescribed burning can be an effective cultural resource management strategy, by reducing fuel loads and the potential for heat damage of artifacts at or near the surface from intense or long-duration fires. Prescribed fire sites containing cultural resources will be analyzed on a case-by-case basis.

G. Educate firefighters about the scientific value of preserving the context in which cultural resources are found and to avoid removing them during firefighting. Federal Fire Department personnel will receive a cultural resource protection briefing from the cultural staff.

H. Rehabilitation of sites affected by suppression should be conducted so that there is no permanent loss of cultural resource values.

I. Take advantage of improved visibility of the ground surface after both wildland and prescribed fires to conduct more thorough archeological surveys.

VIII. The primary fire suppression asset during fire season will be a wildland fire Type 3 equivalent engine (a high-clearance, all-wheel drive brush rig which can also act as a water tender, analogous to a crash-rescue rig in terms of cost and manning), staffed with three firefighters seven days a week or a helicopter, with pilot, based at the Airfield on all HIGH, VERY HIGH and EXTREME fire danger days when field training is scheduled in SHOBA. Three persons are required on the engine because one would be responsible for manning the vehicle and pump, the second a nozzle, and the third would be the runner go-between as well as provide initial hand response (backpack sprayer, shovel, or other tool).

A. The wildland fire Type 3 or equivalent engine, with a three-person crew, will be allowed to be away from the station on natural resources or fire pre-suppression project work on LOW or MODERATE fire danger days when training using incendiary ordnance is not taking place. This crew will be in constant radio contact and will meet a 30-minute on-scene fire response time frame.

B. The wildland fire Type 3 or equivalent engine, with a three-person crew, will be located near their principal base of operations and will meet a 5-minute get-away fire dispatch response on all HIGH, VERY HIGH and EXTREME fire danger days. When the TARs are in use, the FDRS protocols will apply.

C. The single resource unit will be relocated to a field site location in the near vicinity of any ongoing military training operation using flame producing devices on VERY HIGH and EXTREME fire danger days. This means a safe distance away with line-of-sight visibility, as approved by the Range Safety Officer/Safety Observer in charge of the training activity.

IX. Design criteria for a suppression ready-response during higher fire danger days will be five minutes for engine “getaway”, 15 minutes or less for aerial suppression getaway, and 30 minutes or less for arrival on site. For Impact Areas I, II, or the Missile Impact Range (MIR), this will pertain to fires with potential to escape the fuelbreak. For TARs, assets should be on scene and operating (e.g. pumping water) within 10 minutes of reported incident. Current options for air support are a private helicopter (using Office of Aircraft Services contract procedures), HC-85 military helicopter, and resources summoned through interagency channels available through the MOU between the U.S. Navy and Cleveland National Forest.

A. A helicopter, with crew and water bucket, will be on fire standby at SCI on every predicted HIGH, VERY HIGH, or EXTREME Fire Danger Day when military field training is scheduled.

1. Continue the current Memorandum of Understanding between the HC-85 Reserve Unit and the Environmental Program/NRO, or a similar agreement with any available military helicopter squadron.

2. Prepare a three-year renewable (annually) contract for a private helicopter equipped with a water/ Class A foam bucket system from the period of June 15 through November 1.
    a. Explore the option of requiring the contractor to supply a small (75- to 100-gallon) four-wheel drive fuel truck to service and refuel the helicopter near the fire scene or at other pre- designated sites close to the fire area. This option would reduce the normal 20-30 minute round-trip flight time to and from the SCI Naval Auxiliary Landing Field to re-fuel after every two hours of flight. This requirement makes for longer and more effective firefighting use of the helicopter.
    b. The contract helicopter should be stationed at the SCI Naval Auxiliary Landing Field near the fire station during fire season, or closer to SHOBA if possible.
    c. The contract helicopter will be initially dispatched, along with the wildland fire engine, on all wildland fires on SCI. This contract helicopter will reduce response time and support the ground firefighting resources in the earlier stages of a fire. The contract initial attack helicopter is considered the most effective choice due to the following:
        1. Helps to contain wildfires at the outer edges of Impact Area II between the pre-established fuel break (just outside the unexploded ordnance areas) and the actual Impact Area boundary,
        2. Enhances the protection of sensitive areas and/or single nesting areas,
        3. Aids the ground firefighting effort to contain wildfires along roads, fuelbreaks, and other fuel treatment areas by cooling fire intensities and rapid knock-down of small spot fires (that spot over containment lines) before they can become larger.
    d. After the three-year contract period, the Environmental Program/NRO and the Fire Department will prepare an analysis to evaluate the positive and/or negative resource values effects of having this private helicopter as the prime rapid initial attack firefighting resource.
    e. A room and radio for the pilot will be coordinated by mutual agreement between NRO and SCORE.

X. Improve access to a 2,000-gallon water tender truck from SCI Public Works or other source, and possibly a nurse water tanker to draw from during incidents. Otherwise, require that private helicopter contractor provide their own.

XI. All services will be able to link from key locations on the Island immediately and on the same frequency. (See also under Firefighting Infrastructure Section 4.4.1.) A key investment in improved radio and telephone communication systems is necessary so that reporting of a fire incident reaches Federal Fire in three minutes or less from time of first knowledge.

XII. Improve access to high-speed Internet service for managing real-time fire information and weather data, in a manner similar to what is currently working for SCORE contractors.

XIII. Locations where the use of mechanical equipment will be avoided will be identified in the Fire Atlas (Chapter 5).

4.3.5 Post-suppression Rehabilitation

Background

Reestablishment of plant cover after a fire is the most effective form of soil stabilization. Generally, seeding of burned areas is not recommended due to the unfavorable cost-versus-benefit ratio and concerns about non-natives interfering with the establishment of the native plant species. However, there are several factors that influence whether an area should be allowed to revegetate naturally or be artificially aided. Considerations include:

- Soil type and slope.
- Past history of the site and condition of the seedbank - is there sufficient seed in the soils or neighboring unburned sites to promote natural recovery or has the site been burned in such a way that the seedbank is depleted or dominated by invasive species?
- Recovery time available before the start of the rainy season around October 15. Many natives are slow growing.
- Control of invasive exotic grasses.
- Regulatory concerns such as impacts to threatened or endangered species or wetlands.
- Other uses of the site, such as is it heavily used by the military?

Once a determination is made to artificially advance the revegetation process, whether through ground preparation or seeding, the next decision should be whether the site should be restored or rehabilitated. The Bureau of Land Management (BLM) offers the following distinction between restoration and rehabilitation (1998):

> *Restoration is the use of a diverse mixture of native species to obtain a plant community that is similar in appearance and function to the historic vegetation.*
>
> *Rehabilitation is the "repair" of a wildland fire area...to obtain a stable plant community that will protect the burned area from erosion and invasion of unwanted species.*

Considerations for restoration versus rehabilitation include such factors as timing, presence of protected species, and cost. Restoration tends to take longer and be more expensive than rehabilitation, but it may be desirable for various reasons such as management of rare species habitat and invasive plant species control.

***Objective:* Conduct rehabilitation of sites affected by wildland fire management practices so that there is no permanent loss of natural resources values.**

I. Firelines and bladed areas disturbed by fire suppression activity should be immediately rehabilitated following a fire by ripping compacted swales, installing water bars, broad rolling dips, mulching with native Island material, or other appropriate activity.

II. Post-fire erosion control through seeding will not be conducted as a general practice, but only with proper justification in a written rehabilitation plan that contains success criteria. Seeding after fires is generally not considered effective for erosion control and can be detrimental to native plant community development.

- ***A.*** Any post-fire seeding, such as of firelines and areas of concentrated fire suppression activities will occur only if necessary and with seed native to the Island immediately after a fire, as approved by the NRO Botanist.
- ***B.*** After a burn, formulate a post-burn weed eradication plan to prevent major infestations and establishment of noxious weeds.
  - *1.* Evaluate the need to revegetate based on:
    - *a.* Estimated desired vegetation cover and actual vegetation cover post-fire. Consider revegetation if cover remains less than 30%.
    - *b.* Revegetate only after high-severity fires.
    - *c.* Invasive plant condition. Consider revegetation if cover of weeds is 20% to 80%.
    - *d.* Consider steepness of slope and proximity to drainages.
    - *e.* Consider threat to rare plant populations.
  - *2.* For noxious weeds, formulate and implement a small patch eradication program by spraying or other method.
  - *3.* Consider carefully-timed mowing as an alternative for large infestations.
- ***C.*** Mulch as necessary to hold soil and provide for the establishment of seed.
- ***D.*** Only natives will be used for post-fire seeding.

III. If cultural resources may have been impacted by fire-related activity, the affected area will be examined by a qualified archaeologist as soon as possible to determine if any cultural resources were impacted.

4.4 Wildland Fire Planning

4.4.1 Firefighting Infrastructure

Objective: Maintain effective firefighting infrastructure and communication systems for fire response, control, and incident command.

I. Communication infrastructure will be improved to shorten fire response time and provide effective incident command during suppression. The standard required is as follows:

- Reporting a fire incident must reach FFD in three minutes or less from time of first knowledge.
- Helicopter operators must have communication with the Fire Chief during a fire. Helicopter pilots need appropriate communication equipment so the pilot can hear military frequencies, air-to-air frequencies and the Incident Commander on the ground.
- Each of the 11 different Island commands and civilian aircraft must have communication systems that can link from key locations on the Island immediately and on the same frequency. There is a need to communicate with Marine Band, VHF, UHF, and aircraft.

A. A Pacific Mobile Emergency Radio System (PACMER), which is a trunk radio system, could meet these requirements, and is suggested if found appropriate.

B. Replicate SCORE's communications capacity at the Fire Department for tracking FDRS and video views of current fires. This is to remedy the Battalion Chief's problem of excessive time required to download weather information using the current computer system.

II. Access and operational condition of key fire roads will be maintained at their original design standard or better, while protecting wildlife habitat, sensitive species, soil productivity, watershed functioning, and water quality.

A. Roads occurring along LMU boundaries and that form part of a fuelbreak system are necessary for fire access, control, and containment.

B. These roads will be designed and maintained to a standard accessible to a Type 3 Fire Engine.

C. Ensure incorporation of Best Management Practices (BMPs) in the preliminary engineering, design, and construction of roads (OPNAVINST 5090.1C, Ch. 22-6.7(h)).

1. Erosion control BMPs for firelines will remain flexible to permit a skilled equipment operator some judgement in the field.

2. On secondary (unpaved) roads, use water bars or other method to reduce the severity of water flow. (California Department of Forestry Forest Practice Rules, Southern District, and PRC Title 14, U.S. Forest Service) *a.* Install water bars or similar diversion structures at all natural water courses regardless of the maximum specified distances, except where permanent drainage structures are provided. Leave filter strips of vegetation intact for sediment filtering purposes. Do not allow firebreaks to enter directly into drainages.

b. Position water bars to disperse water into some form of plant cover, duff, slash, rocks or other less erodible material. Water bars shall be constructed to provide for unrestricted discharge at the lower end of the water bar and to spread the water in such a manner that erosion will be minimized.

c. Cut water bars diagonally to a minimum of six inches into the dozer line surface to maintain a continuous embankment immediately adjacent to the lower edge of the water bar cut. Maximum height of the berm should be sufficient to transport the water runoff.

d. Construct water bars with sufficient depth and width to allow passage of vehicles on ridge lines during military and future Fire Department training exercises.

e. Use best judgement in placing water bars to avoid problems in other areas. Facilitate erosion control on firebreaks by permitting equipment operators to go 20–30 feet beyond the limits of the break when necessary where erosion control structures are placed, as long as there are no sensitive species or jurisdictional waters of the U.S.

f. Support the acquisition of angle blade and dozer attachments to properly install water bars. Tactical dozers are marginally appropriate for such endeavors.

g. Experiment with cross-ripping or other techniques to be used in lieu of water bars for successful erosion control, less long-term disturbance, and better grass and shrub regeneration.

h. Remove all berms and cat piles (mounds of soil remaining after bulldozing) to minimize erosion during fire line rehabilitation or removal.

i. Surface blade or scrape existing dirt roads to remove and minimize the occurrence of vegetation (i.e., potential fuels) and maintain integrity of roads.

D. Support the realignment of roads that cause excessive erosion, rehabilitation of discontinued roads causing erosion, and subsequent maintenance to design standards. Close and rehabilitate firebreaks that are no longer needed for firefighting without conversion to fuelbreaks. Abandoned firebreaks should be recontoured and reshaped to as natural condition as possible, with appropriate erosion control structures such as water bars placed as necessary, then allowed to revegetate naturally or reseeded to native vegetation to accelerate recovery.

E. The Environmental Program/NRO, SCORE, and the OIC should arrive at a consensus of priority need for a minimum network of roads to meet requirements for Fleet readiness, safety and security, fire control, and environmental protection.

III. Operational condition of fuelbreaks will be maintained at their original design standard or better as described in Section 4.3.2, while protecting wildlife habitat, sensitive species, soil productivity, watershed functioning, and water quality.

IV. The FFD's Type-3 equivalent engine and crew will be the principal resource for conducting initial prescribed fires and implementing the other recommended fuel treatment programs. This will not be done at the expense of crash-rescue or structural response capability. The Federal Fire Department has one Type-3 fire apparatus on Island, housed in Wilson Cove at Station 10. This is a high clearance, two-wheel drive engine with a 250 gallon-per-minute (gpm) pump, 750-gallon water tank, and 100-gallon Class A and B foam capacity. It is manned with a four-man crew and responds to reported wildland fires and incidents. The FFD engine may be staffed by on-Island personnel or by flying on-shift personnel out from the mainland by helicopter, with back-up using call-back (overtime) personnel. Any additional quick-attack apparatus will have at least a Class A foam unit, high clearance, and all-wheel drive. It will meet the standards of the National Interagency Wildfire Coordinating Group with the following minimum requirements:

- ***A.*** Pump minimum flow rating is 150 gpm at rated pressure of 250 pounds per square inch (psi).
- ***B.*** Tank minimum capacity is 300 gallons.
- ***C.*** Minimum hose length is 500 ft of 1-1/2 inch hose and 500 ft of one-inch hose.
- ***D.*** Three trained personnel (40 hours basic wildland firefighting) available to man the engine, pump, hose, and hand tools. These individuals could be assigned other responsibilities besides wildfire response.

V. Other Best Management Practices will be implemented as appropriate, as follows:

- ***A.*** The potential impact due to the spread of weeds as a result of hazard fuel reduction projects along roads and around structures is minimized by evaluating these projects for effectiveness, eliminating invasive species and providing annual weed abatement.
- ***B.*** To the extent feasible, he Navy will monitor any sensitive plant species that is affected by a wildfire to develop basic information on the effect of fire on that species. Fire response information should be incorporated into the sensitive species database as part of the Navy's inventory and monitoring programs.
- ***C.*** Avoiding potential impacts to geology and soils by improved wildfire suppression; avoiding building fire lines during suppression; by conducting only small-sized prescribed fires; and using existing roads and trails for fuelbreaks. The WFMP provides post-burn rehabilitation guidelines to avoid soil erosion or exotic weed establishment after wildland fire.

D. Preventing potential impacts to the health and safety of firefighters and others by improved fire suppression, a policy that keeps firefighter safety as the first priority during incidents, providing adequate survivable space, developing and communicating evacuation plans, and improving coordination and education notification procedures.

VI. A Biological Opinion (BO) was issued on the San Clemente Island Military Operations and Fire Management Plan November 2008, addressing this WFMP in concert with military training activities, on November 17, 2008 (FWS-LA-09B0027-09F0040). The Terms and Conditions issued under this BO that pertain to the WFMP overlap substantially with the measures described by the Navy in this Plan. The fire-related conservation measures are identified below.

A. **FMP-M-1.** The Navy will evaluate firelines and bladed areas disturbed by fire suppression activity and rehabilitate these areas as practicable and appropriate.

B. **FMP-M-2.** The Navy's Natural Resource Office will determine whether seeding is appropriate for post fire erosion control. Seeding would be overseen by the San Clemente Island Botany Program and would use native seed collected from San Clemente Island.

C. **FMP-M-3.** The Navy will evaluate the potential impacts of fire on Santa Cruz Island rock-cress, San Clemente Island bush mallow, and San Clemente Island larkspur.

D. **FMP-M-4.** When designing and implementing fuel breaks, the Navy will factor in the need to protect canyon shrubland/woodland occupied by shrikes. Coordination between Navy Natural Resource personnel and applicators will occur prior to fuel break installation in the proximity of occupied nesting areas.

E. **FMP-M-5.** The Navy will minimize impacts to listed species and occupied habitat associated with Phos-Chek application by considering the locations of federally-listed species in advance of fuel break installation. This will allow the Navy to avoid impacts to the extent practicable. The Navy will avoid application of Phos-Chek within 91.5 m (300 ft) of mapped Santa Cruz Island rock-cress locations and avoid application of Phos-Chek within 91.5 m (300 ft) of other mapped listed species to the extent consistent with fuelbreak installation.

F. **FMP-M-6.** The Navy will monitor soil and vegetation responses to retardants and herbicides and use this information to maximize the effectiveness of fuelbreak installation and minimize impacts to native vegetation.

G. **FMP-M-7.** The Navy will coordinate the development of burn plans with natural resources staff to identify potential biological issues.

H. **FMP-M-8.** The Navy will consider the locations of federally-listed plants in advance of prescribed fire application so that impacts can be avoided by location or timing where possible and plan prescribed fire to provide a resource benefit where appropriate.

I. **FMP-M-9.** The Navy will conduct experimental burns to evaluate the response of the boxthorn plant community to fire.

J. **FMP-M-10.** The Navy will conduct prescribed fire experiments to evaluate their effectiveness in controlling non-native annual plants.

K. **FMP-M-11**. The Navy will establish post-fire recovery plots to monitor recovery and identify new infestations of non-native invasive plants associated with both wildfire and prescribed fire.

L. **FMP-M-12.** The Navy will evaluate burn areas and prioritize them appropriate for inclusion in the weed eradication program, as appropriate.

M. **FMP-M-13.** The Navy will conduct pre-season briefings on minimal impact suppression tactics (MIST) for the fire fighting personnel. This would include guidelines on fire suppression materials and tactics, including limitations associated with Phos-Chek and salt water drops.

N. **FMP-M-14.** The Navy will conduct an annual review of fire management and fires that will allow adaptive management, if required, as outlined on page 4-56 of the draft Wildland Fire Management Plan (September 2005 draft). The Service will be included as an invited stakeholder to participate in this annual review.

O. **FMP-M-l5.** The Navy will staff and train a Wildland Fire Coordinator prior to modifying existing training restrictions or increasing distribution of ignition sources on San Clemente Island. The equipment and tools necessary for this staff person to accomplish the duties of this position will be in place prior to any increasing ignition sources on the island.

P. **FMP-M-16.** The Navy will submit a final San Clemente Island Fire Management Plan to the Service prior to increasing ignition sources on the island.

4.4.2 Coordinating Improved Organizational Capacity

Objective: Improve the organizational capacity, cost-effectiveness and efficiency of wildland firefighting.
Objective: Build fire suppression, fuel treatment, and in-house fire weather prediction capability to achieve objectives of this Fire Plan.
Objective: Improve capability and the cost-effectiveness of fire suppression, while opening opportunities for prescribed fire as a management tool for habitat restoration and protection of endangered species by enhanced resource sharing and coordination.

I. A three-quarters time Wildland Fire Coordinator position with the FFD will be staffed or assigned to current staff.

A. This position, at a minimum, should be at the Supervisor level (GS-10) in the FFD Organization, and have a background in natural resources. See Appendix F for additional qualifications.

B. This billet would be responsible for all wildland fire related activities (wildland fire suppression, aviation management (water dropping deployment targets) and fuels pre-planning) and be the Fire Department's principal liaison with Military Operators, Aviation Units, and Natural Resources Staff.

C. This person would coordinate all wildland fire training, collection and dissemination of fire weather and Fire Danger Rating information to all Island users, make the necessary notifications and interpret restrictions based upon the fire weather information and pre- planned operational guides. The Coordinator will map fire boundaries and severity levels.

D. In coordination with NRO staff this position would manage the implementation of the proposed SCI prescribed fire and fuelbreak projects, including application of fire retardant, and prepare annual budget requests.

II. If funding for three to four weeks per year of overtime pay is provided for wildland fire support on SCI, FFD will supply off-duty firefighter support, using existing staffing levels. Funding may be needed for flying personnel out to SCI or shipping equipment. As an alternative to overtime pay, the current DoD Instruction allows for the use of "call when needed" reserve units to fill this need.

III. Two to three additional seasonal (June 1 to November 1) fuels technicians should be hired to support the Wildland Fire Coordinator in implementing the fuels/prescribed fire program. Alternatively, the current DoD Instruction allows for the use of "call when needed" reserve units to fill this need.

A. This crew will have, at a minimum, the 40-hour Basic Wildland Fire Training Course.

B. The support requirement for pre-suppression work is for up to five miles per year of strip burns, and 100–300 acres per year of other fuel treatment in patches.

C. The continued need for staffing of these two to three seasonal firefighters will be determined after a five-year review of the effectiveness of other recommendations in this Plan by the OIC and the Environmental Program/NRO.

IV. A San Diego County Department of Defense Wildland Fire Coordinating Group should be established. The purpose of the Coordinating Group is to ensure everything possible is being done to share wildland and prescribed fire personnel, equipment and specialized skills, establish Standard Operating Procedures when sharing these resources, and to conduct joint wildland and prescribed fire training exercises. This Group should have a Charter and Rules of Operation. Potential membership should include those that have resources to support fire management on DoD lands, including:

- San Diego Area Federal Fire Department
- San Clemente Island Federal Fire Department
- Marine Corps Air Station Miramar Fire Department
- Marine Corps Base Camp Pendleton Fire Department

- Navy Reserve Unit HC-85
- Navy Helicopter Unit–ASNI
- Navy Landing Craft Air Cushion (LCAC) hovercraft group

A. A Prescribed Fire Implementation Team should be established consisting of representatives of all DoD fire departments in San Diego County. This Prescribed Fire Team would be available for all DoD fire departments, if requested. Reimbursement funding procedures would be established by the Wildland Fire Coordinating Group.

V. A Rapid Wildland Fire Response Team for SCI should be established, using existing Federal Fire Department Mutual Aid Agreements, to provide joint support during periods when the SCI Fire Department exceeds their wildland firefighting capabilities.

A. Use the established Incident Command System (ICS) terminology, procedures, and certification standards required in all federal wildland fire policy, which the DoN is a signatory partner, in all wildland and prescribed fire activities.

B. Work with the Area Fire Coordinator to accomplish this and other objectives related to SCI. California Department of Forestry is the Area Fire Coordinator for San Diego County and is inter-linked with Orange County Fire Authority, which could also provide additional wildland firefighting resources.

C. Consider working with the Navy LCAC Facility to develop coordination, operational and dispatch procedures to send a Type-3 engine equivalent and Rapid Wildland Fire Response Team to San Clemente Island via hovercraft during a wildland fire emergency on SCI.

VI. An SCI Wildland Fire Coordination Group led by the OIC will be established that involves user command representatives including SCORE, as well as representatives from Federal Fire Department, Public Works, EOD, and natural and cultural resources.

4.4.3 Working With Resource Agency Partners

Objective: Formalize an agreement with USFWS on implementation of this Plan that achieves a sound approach to long-term military mission sustainability and ecosystem health, and supports the goals and objectives of the SCI INRMP.

I. Continue to review how natural resources are managed by LMU with INRMP updates and reviews in order to deconflict military requirements and natural resources, and so that specific fire management prescriptions can be refined.

II. Reinitiate consultation on fire's effects on listed species with USFWS. as needed

III. As far as possible, create positive incentives for excellent stewardship of natural resources in this agreement.

- ***A.*** Ensure that decisions are aligned with broader ecosystem management objectives of the INRMP. Protect against short term, project-by-project erosion of military mission flexibility.
- ***B.*** Structure any agreement so that flexibility of use is granted in exchange for mutually agreed-upon performance measures.
  - *1.* Seek mutual agreement on indicators of long-term success in programmatic agreements with respect to military range sustainability and ecosystem health.
  - *2.* Provide funding preference to projects that define measures of success in advance.
- ***C.*** Ensure undesirable precedence is not set that may have negative ramifications to the U.S. Navy mission.

IV. Use performance- or results-based statements of desired end outcomes to the partnership in the style and spirit of Government Performance and Review Act (GPRA).

- ***A.*** The agreement will allow for performance-based flexibility in land use when federally listed species are present (accountability for outcomes, while maximizing flexibility for progress towards mutually agreed-upon thresholds).
- ***B.*** The agreement will:
  - *1.* Benefit the listed species.
  - *2.* Support ecosystem goals.
  - *3.* Target results rather than activities or processes. Thresholds are defined jointly.
  - *4.* Provide for incentive-based, consistently rewarding investment in good stewardship.
  - *5.* Provide certainty and predictability.
  - *6.* Assure access to natural resources in support of the military mission.
  - *7.* Be cost- and time-effective.

V. Future consultations will use the INRMP as the fundamental basis and programmatic approach to SCI natural resources management. Consultations should tier off of this program.

VI. Adaptive management strategies will be implemented to accommodate new insight from monitoring, scientific findings, or management policies.

4.4.4 Fire Reporting, Information Management, and Monitoring for Better Decisions

Objective: ***Set up effective monitoring and information management to validate and adapt decisions.***

I. All fires will be reported consistent with the SCI Fire Reporting Checklist in Appendix E. It is especially important to report all running fires regardless of size and location, and regardless of whether the ignition stays within the management objective and does not cross fuelbreaks.

- ***A.*** The Wildland Fire Coordinator will coordinate SCI users, hosts, and FFD to provide accurate and timely fire reporting. The person on scene and first responders have the best opportunity to record the most accurate data.
- ***B.*** SCORE will report all fires in SHOBA to the Wildland Fire Coordinator, whether in or out of Impact Areas. The report should include the location, cause if known, ignition point, and direction of spread, and all contents of the Checklist in Appendix E. These reports will not be used as justification for providing additional fire suppression resources above the standard response defined in the this Plan.
- ***C.*** The fire will be photographed. If possible, the helicopter crew should take a 35-mm/digital photograph of the fire, labelled with date and grid location.
- ***D.*** NRO will map fire boundaries and include in a fire incident report. The Wildland Fire Coordinator should also photograph the fire if on scene during the incident.
- ***E.*** NRO should digitize the fire map for storage in the Fire Databank. NRO should maintain the fire databank.
- ***F.*** Weather condition at time of fire, should be reported, both from the closest RAWS station and based on observations of those involved in the incident suppression in the final fire report.
- ***G.*** The Environmental Program/NRO will conduct an initial assessment after each fire incident to determine if any immediate corrective action is necessary that cannot wait until the Annual Review (section 4.5.4.1) to stay within the parameters defined in this Plan.

II. An annual final report of a wildland fire will include information on fire effects or SEVERITY (damage to resources). Wildland fires can result in a net benefit to natural resources, and an evaluation of actual damage (based on success thresholds) will be a routine part of the reporting process both internally and to regulatory agencies. (See the success thresholds described under each habitat category in INRMP Sections 4.1.1 through 4.1.8.)

A. In all cases no matter what the military or natural resources value rating, fires that burn at National Park Service (NPS) Rating severity 5 (Table 4-9) are considered potentially beneficial and are not assessed as a negative impact for adjusting fire suppression resources.

Table 4-9. Fire severity classes and definitions, adapted from National Park Service (1992).

FIRE SEVERITY CLASS	Effects on Litter/Duff	Effects on Herbs/Grasses	Effects on Shrubs	Effects on Trees
1 Completely Burned	Burned to ash	Burned to ash	Burned to ash, few resprouts	Burned to ash or killed by fire
2 Heavily Burned	Burned to ash	Burned to ash	Burned to ash, some resprouts	Killed by fire or severely stressed
3 Moderately Burned	Burned to ash	Burned to ash	Burned to singed, some resprouts	Crown damage only to smaller trees
4 Lightly Burned	Blackened, but not evenly converted to ash	Burned to ash, some resprouting	Singed/stressed, many resprout/recover	No effect on mature trees, may kill seedlings/saplings
5 Scorched	Blackened	Singed/stressed, many resprout/recover	Not affected, slight stress	No effect on trees
6 Unburned	Unburned inclusions within a fire should be marked as 6			

B. Actual resource damage from fire (fire severity) can be assessed partly by fire severity mapping using a standardized table of ratings post-fire.

C. Determine and implement a means to evaluate displacement of focus management wildlife species.

D. Consider the duration of effect when assessing fire severity, which relates to resource recovery. For instance, fires that consume whole stands of trees may take decades for recovery of community values, and there is a risk of permanent loss of the stand.

E. Determine if fires remain within successful management thresholds as defined in this Plan.

III. Prioritize monitoring and research projects as follows:

-*Priority 1*: Provides support for evaluating a fire management guideline and adjusting implementation of this Plan (including how money is spent).

-*Priority 2*: Supports improved or more cost-effective management of sensitive species.

IV. Fire mapping and record-keeping will be used to support natural resources decision-making.

A. Annually update the GIS-based fire history. Incorporate fire history, new fire mapping, fire corridors, and vegetation fuel (age) classes into the GIS database for use in future fire planning.

B. For evaluating fire intensities, NRO should implement the National Park Service's post fire monitoring protocol (1992). The following is an adaptation of that protocol for trial use on SCI:

C. Prescribed fires will be monitored using a simple procedure, such as photography, to document prescribed burn parameters, the success in attaining prescribed burn objectives, and future prescription refinements.

1. The Wildland Fire Coordinator will be responsible for prescribed fire monitoring and post-fire reporting. Access to a camera, global positioning system, and Arc/View software for a geographic information system will be necessary.
2. Fire flame lengths and fuel condition before and after the burn will be recorded.
3. Weather data along with fire history will be tracked, using the most appropriate RAWS stations. Document relative humidity, wind speed and direction, shading and cloud cover.
4. Any trends in the causes and locations of fires and relate will be documented and checked if correlated with prevention efforts.
5. Prescribed fire costs by acreage and fuel-type will be documented for future planning.
    a. Monitor any changes in wildfire number and size due to fuel management practices, human population trends, weather, or suppression capabilities over time.
    b. Monitor topography, fire behavior, fire effects and smoke dispersal on all fires daily.

D. The WFC and OIC will monitor initial burns that have more of an experimental component to burn objectives. Consider the following.

1. Identify a reference site, on-site or off-site.
2. Using a 50-meter plot/transect layout, monitor the following attributes or variables: vegetative fuels, species cover, species composition/frequency, presence/absence of rare species or weeds, composite burn index.
3. Monitor fire intensity.
4. Document conditions before the burn (these are U.S. Department of Interior "FIREMON" from the Fire Management Program Center, National Interagency Fire Center Monitoring Handbook):
    a. Slope, aspect, elevation;
    b. Ambient conditions (RAWS or belt weather kit; fuel moisture (preferred method is to use a drying oven, a COMPUTRAC, or a moisture probe, or may be calculated using BEHAVE. Record in percent);
    c. Dry bulb temperature, relative humidity, wind speed and direction, shading and cloud cover;
    d. 10-hour timelag fuel moisture (weigh 10-h timelag fuel moisture (TLFM) sticks at a standard weather station or onsite. ANother option is to take the measurement from an automated weather

station with a 10-h TLFM sensor. If none of these methods are available, calculate the 10-h TLFM from the 1-h TLFM which is calculated from dry bulb temperature, relative humidity, and shading. Record in percent);

e. Timelag fuel moisture (1, 100-, 1000-h). If required for fire behavior prediction in the primary fuel models affected, measure 1-h, 100-h, and 1000-h TLFM as well, in the same manner as 10-h using an appropriate method. See guidelines by Countryman and Dean 1979 or Norum and Miller 1984).

f. Live fuel moisture. Fuel models may also require measurement of woody or herbaceous fuel moisture. Follow the sampling guidelines described under "timelag fuel moisture (1-, 100-, 1000-h). Live fuel moisture is measured in percent.

g. Drought index. Calculate the drought index as defined in your Refuge's Fire Management Plan. Common drought indices are the Energy Release Component (ERC) or the Keetch-Byram Drought Index (1<:BDI). Other useful indices are the Palmer Drought Severity Index (PDSI) and the Standardized Precipitation Index (SPI).

h. Fireline Safety. If it would be unsafe to stand close to the flame front to observe rate of spread, place timing devices or firecrackers at known intervals, and time the fire as it triggers these devices.

i. Perimeter or area growth based on periodic fire assessment.

j. Baseline community description, including relative cover of dominants (using 50:20 rule).

k. Non-point source erosion potential based on percent bare ground.

V. NRO will integrate fire-related information needs with the existing long-term vegetation trend monitoring program to validate success thresholds for each plant community in terms of improved sensitive species protection and effect on mission.

A. Implement post-fire recovery plots to monitor recovery and identify new infestations of noxious weeds associated with both wildfire and prescribed fire, and a weed management plan to prioritize them for eradication.

B. Reports on the long-term trend monitoring program should routinely include assessment of fire response when relevant to a particular existing plot, or in plots located specifically to monitor recovery.

VI. Conduct focused research to improve management approach and techniques.

A. Improve fire management strategy development by evaluating the status of plant communities on sites with different fire history.

B. Conduct experimental burns to clarify the response of the boxthorn plant community to fire in consultation with the USFWS.

C. Experiment with prescribed fire as an appropriate and effective tool for controlling exotic annual grasses that are pervasive in the environment. Populations of invasive annual plants have been reduced when fire is applied while seeds are suspended above ground in their inflorescences. In order to use burning effectively, managers must know the differential effect fire of a certain timing, minimum temperature, and duration of exposure would have on both the native and exotic grass and forb components of the vegetation necessary to kill seeds.

VII. Support adaptive management decision-making with research and monitoring directly related to validating or modifying the goals, objectives, and policies of this Plan.

4.5 Implementation

4.5.1 Fire Management Instructions

Objective:* *To achieve full and complete implementation of critical aspects of this Fire Plan, formalize mandates, protocols, procedures, and other priorities so that guidelines become standard operating procedure and are fully enforced.

I. An Island-wide Fire Management Instruction should be implemented to augment the SCORE Range Users Manual that includes the FDRS and reaches the entire spectrum of those who need to know, explaining all standard operating procedures and protocols required for use of ordnance and any other training activity on SCI, as well as protocols for all other activities that carry risk of fire ignition and may require fire response. The Instruction should apply to all tenants and users of the Island as well as personnel stationed there as part of shore facilities support.

II. Current U.S. Navy Instructions and guidelines related to fire should be modified to acknowledge the new Federal Wildland Fire Policy signed by the Navy, the wildland firefighting responsibility on SCI, and Federal Fire's link to training and operations support and threatened/endangered species protection.

4.5.2 Assignment of Responsibility for Elements of the Fire Plan

Objective:* *Assign responsibility for key elements of the Plan for effective and cost-efficient implementation, and so that funding can be obtained in a timely manner.

I. *CNRSW Assistant Chief of Staff for Public Safety:* Communication system upgrade.

A. Improve radio and telephone communication system so that reporting of a fire incident reaches Federal Fire in three minutes or less from time of first knowledge. [unknown cost]

B. Improve access to high-speed Internet service for managing real-time fire information and weather data. [unknown cost]

II. *Naval Base Coronado Public Works Center:* Road design, construction, and maintenance to a standard that functions as a fuelbreak, and that will support a quick-attack, four-wheel drive fire engine for emergency response. Priority roads are SCI Ridge Road and certain others along Land Management Unit boundaries that are expected to serve as part of an Island fuelbreak system. [unknown cost]

III. *Federal Fire Department:*

A. Advise the OIC when live fuel moisture in the wildland environment reaches ~ 200%, so that the OIC may announce the start and end of fire season. Declare start and end of fire season. Fire season is when the FDRS will be announced on a daily basis to manage fire risk and guide the staging and availability of necessary suppression assets.

B. Provide training to military personnel that will be manning a first-response fire apparatus staged to provide 10-minute response during training exercises that occur during hazardous fire weather conditions such as the Range Safety Officer.Safety Observer. The WFC will organize a training program for FFD San Diego personnel assigned to SCI. WFC will appoint along with the Wildland Fire Coordination Group, military and civilian personnel, to assist in support of suppression efforts during a wildland fire incident on SCI.

C. Training of two-three support staff assigned to Wildland Fire Coordinator, each should have 40 hours each of wildland fire training. [$7,500 each or contracted support $15,000] Alternatively, the current DoD Instruction allows for the use of "call when needed" reserve units to fill this need.

D. Quick attack, all-wheel drive fire apparatus on Island to specifications (see Section 4.4.1 IV). [$60,000 - $97,000]

E. Wildland Fire Support Crew: three-four weeks of overtime pay for existing off-duty Federal firefighters or contracted. [$20,000+] Alternatively, the current DoD Instruction allows for the use of "call when needed" reserve units to fill this need.

F. Set up seasonal Rapid Wildland Fire Response Team agreement [no direct cost..existing mechanisms are available].

G. GS 10-11 Wildland Fire Coordinator by modifying an existing billet. [training cost $5,000+]

H. Wildland Fire Coordinating Group [no direct cost].

I. Computer system upgrade for Fire Chief on Island to achieve high-speed Internet access. [$5,000+]

J. Update Fire Instructions for consistency with DoD fire policy. [no direct cost]

K. For routine prescribed fire monitoring and post-fire reporting, access to a camera, global positioning system, and Arc/View software for a geographic information system will be necessary. [$4,000+]

L. Participate with NRO in monitoring prescribed burns that have more of an experimental component to burn objectives.

IV. CNRSW/Environmental Program:

A. Aerial suppression support: private helicopter [$100,000/yr, becoming less as FDRS becomes more refined and with communications upgrade. Likely to be reduced to $40,000/yr or less.]

B. Prescribed Fire Program, including coordinating priorities among operators, natural resources managers, and EOD. Make recommendations to OIC. Estimated newly burned additions are up to one mile per year of fuelbreaks and 300 acres per year of additional strip or patch burns. Work with WFC to monitor prescribed burns that have more of an experimental component to burn objectives. [$50,000 contracted, or $35,000 with oversight cost contributed by WFC].

C. Monitoring [$15,000-$20,000/year]

1. Fire perimeter and severity mapping
2. Fire effects analysis on listed species
3. Maintenance of the Fire Databank Consolidate all fire data (e.g. ignition source, weather) collected by NRO and by other groups in a GIS database.

D. The Navy will provide the Federal Fire Department, and its cooperators through the use of the Incident Command System, information concerning sensitive resources, including maps of sensitive natural and cultural resources that are updated annually. This will assure that any collateral damage to natural and cultural resources are minimized and that resource protection is integrated into the strategic planning of all fire and fuels management activities.

E. Federal Fire Department personnel will receive a cultural resource protection briefing from the cultural staff.

F. Support the Wildland Fire Coordinator in charting live fuel moisture levels in key fuel species. The WFC will advise the OIC when to announce the start and end of fire season.

G. Adaptive management annual review and update

1. Initial assessment after each fire incident to determine if any immediate corrective action is necessary that cannot wait until the Annual Review to stay within the parameters defined in this Plan.
2. Annual review [$7,500 per year]
3. Major update in five years [$30,000]

V. Naval Base Coronado/SCI Officer In Charge:

A. Coordinate development of an Island-wide Instruction or modification of the SCORE Range Manual (or both) to communicate fire-related range rules to Island users.

B. Establish an SCI Wildland Fire Coordination Group. [no direct cost]

C. Announce the start and end of fire season upon advice by the Wildland Fire Coordinator.

D. Review, with the Environmental Program/NRO, the continued need for staffing of two to three seasonal firefighters after a five-year annual review of the effectiveness of other recommendations in this Plan.

E. Sign and approve prescribed burn plans and coordinate annual implementation of prescribed burns. Receive recommendations from operators, natural resources managers, and EOD on Prescribed Fire Program.

VI. *SCORE:*

A. Monitor and document ignition sources and impacts of fire management on training. [no new direct cost]

B. SHOBA Fuelbreak Installation [$230,000/year]. (Other fuelbreaks are considered above under Prescribed Fire Program, estimated newly burned additions at about one mile per year of fuelbreaks and 300 acres per year of additional strip or patch burns.)

VII. *CNRSW Environmental Program, Federal Fire Department and/or SCORE:*

A. RAWS weather station upgrade, maintenance and monitoring [$10,000, then $8,000 per year for weather data processing]. Ensure RAWS are providing consistent and accessible fire weather information on a daily basis. Alternatively, hook-up to Riverside Fire Lab meteorologist in the meantime is about $20,000/year; a low-cost alternative could be to work with North Island Meteorological Division who already has the capacity to support this need.

B. Fire Danger Rating System implementation.

C. Education [$7,500 per year]

D. Develop Island-wide Instruction on compliance with FDRS and other Fire Management Plan requirements [no direct cost]

VIII. *Individual Military Units, As Appropriate*. Quick attack, all-wheel drive fire apparatus on Island to specifications (see Section 4.4.1 IV). [$60,000 - $97,000]

4.5.3 Schedule and Funding Requirements

Objective: Implement this Plan strategically and cost-effectively to achieve its goal and objectives, based on adaptive management principles.

I. Prioritize fire management decisions and projects based on greatest potential reduction of wildfire suppression and liability cost, and the value of assets at risk from fire, as a whole, for the investment required.

II. Implement Year One priorities.

- Improve communication to achieve the three-minute fire reporting threshold, and ground-to-air capability: Island-wide; ground to helicopter (HC-85 and private) with FFD.
- Establish and maintain as needed SHOBA fuelbreaks at Impact Areas I and II.
- Assign one Wildland Fire Coordinator (fire supervisor grade) and two or three seasonal fuels technicians as crew members.
- Implement the FDRS and all other aspects of the fire prevention program.
- Ensure a helicopter is on Island on HIGH, VERY HIGH, and EXTREME fire danger days.
- Move RAWS at OP3 to better reflect the wind conditions of IA 2 and add wiring so the information can be read by the Range Safety Officer/Safety Observer at OP3.
- Acquire one quick-attack fire suppression apparatus wildland fire engine to station on-Island to National Wildfire Coordinating Group Standards (see Section 4.4.1 IV).
- Establish an SCI Wildland Fire Coordinating Group led by the OIC.
- Prescribed fire work requested by Explosive Ordnance Disposal units who may want to search areas for unexploded ordnance.

III. Implement Year Two priorities.

- Establish San Diego County DoN Wildland Coordination Group.
- Purchase RAWS for Mt. Thirst area.
- Improve access to high-speed Internet service for managing real-time fire information and weather data, in a manner similar to what is currently working for SCORE contractors.
- Purchase new computer system for installation in SCI Battalion Chief's office so that fire reports can be downloaded faster and fires can be viewed on the office monitor.

IV. Implement Year Three priorities.

- Prescribed Fire Program for fuels management and natural resources objectives.
- Implement other key fuelbreaks by priority (Section 4.3.2).
- Update fire history and natural resources maps for the Fire Plan.

4.5.4 Process for Plan Amendment

***Objective:* Improve and refine wildland fire management to maximize flexibility for training and minimize wildfire losses, by adaptively adjusting success criteria and priorities based on past Fire Department accomplishments, new risks and hazards, new biological information, and changes in policy.**

4.5.4.1 Annual Review and Updates

I. The OIC and NRO will jointly conduct an annual meeting among parties with a stake in wildland fire management to reassess priorities and success criteria, and build on the past year's experience. The goal will be to provide the Fire Department with a revised annual prescribed fire implementation schedule, reach an agreement regarding fuelbreak acreages, and revise overall fire management thresholds for the Island and each habitat. The following information will be gathered and prepared for presentation at this meeting:

- **A.** The following information will be gathered and prepared for presentation at this meeting:
  1. An annual summary of fire incidents and cause.
  2. Maps of all fires, including burn size and burn severities across each fire.
  3. An assessment of each fire's effects on natural resources.
  4. New fire frequency, year-of-last-fire maps.
  5. Number of fires and acres consumed in areas that had a previous fire within the past five years.
  6. Prescribed fire acreages and photographs of results.
  7. New biological survey results.
  8. New fire risks or protection requirements such as new training tactics and locations, new weapons, or new facilities.
  9. New BO's or other policy adoptions.
  10. Pertinent conclusions of the long-term vegetation monitoring program, and an assessment of any new erosion post-fire.
  11. New resources or equipment acquired by the Fire Department.
  12. Prescribed burns for the upcoming year.

II. Re-appraisal of natural resources valuations will be conducted at least biennially. Maps of sensitive natural and cultural resources are updated annually. This will assure that any collateral damage to natural and cultural resources are minimized and that resource protection is integrated into the strategic planning of all fire and fuels management activities.

4.5.4.2 Five-Year Review

I. The Environmental Program/NRO will convene and confer with the WFMP Working Group in five years to determine if an update is necessary.

- ***A.*** The Fire Atlas pages (Chapter 5), which direct the Fire Department regarding location of firefighting assets, topography, and natural and cultural resource values at risk, will be completely updated every five years, with annual updates of sensitive species locations or as deemed necessary by NRO.
- ***B.*** The update will include revised maps of sensitive areas, values at risk, firefighting infrastructure, and any new training scenarios.

II. NRO will update the WFMP in five years if it has not been done earlier. If found beneficial, this update will be done in tandem with the SCI INRMP update.

5.0 Strategies by Management Unit

In this chapter, individual land management units are looked at in detail as a practical way to organize fire management to assure compatibility with natural resources. Management priorities shift from unit to unit as both resource values and military values and use change. Here are general fire suppression guidelines to be used in all LMUs, summarized from Chapter 4:

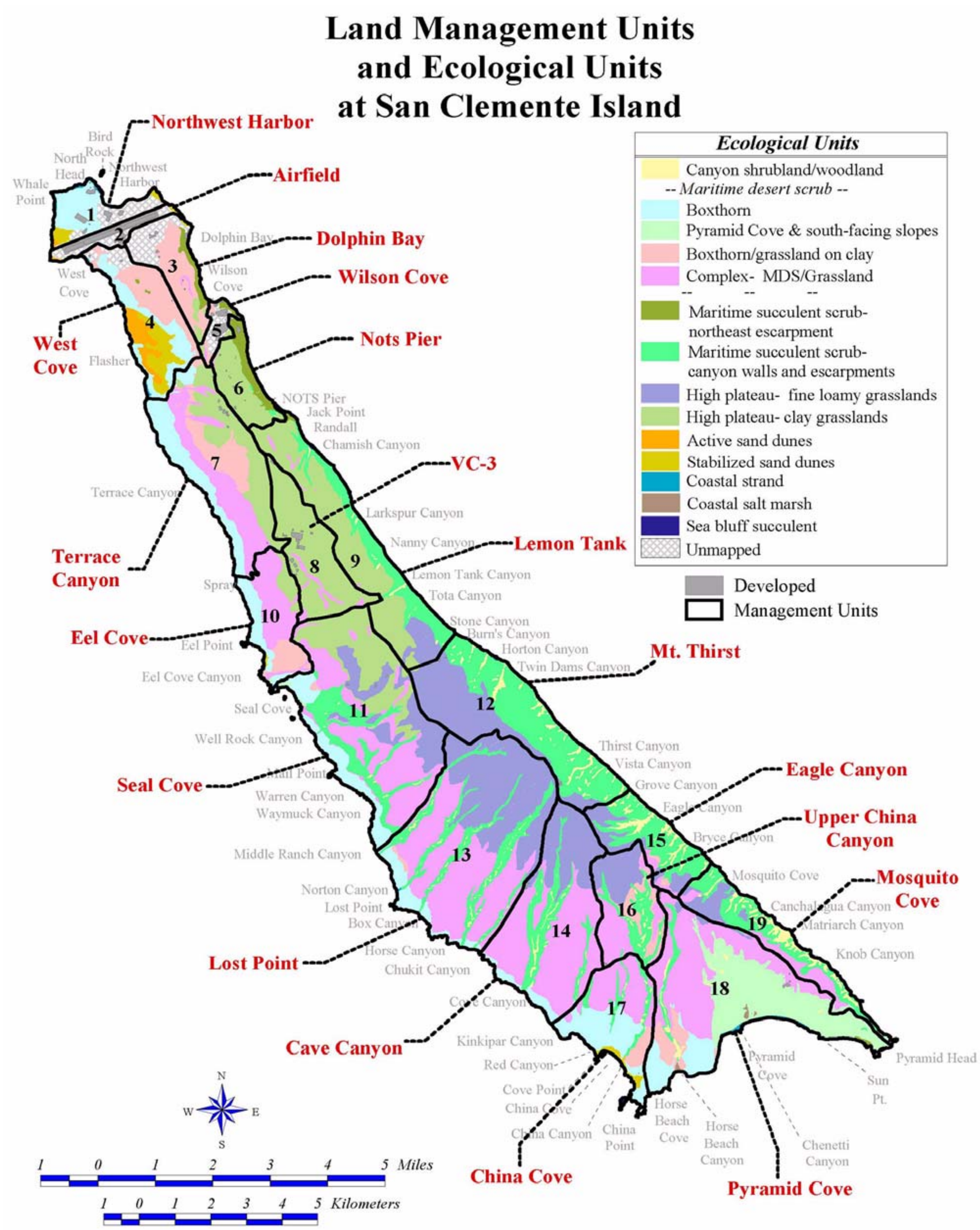
- Once human life and high-value structures are not at risk, the first wildland priority is to keep fires within fuelbreak or LMU boundaries. Additional priorities that apply to all LMUs are as follows:
    - Strive to prevent fires from approaching active nests of the San Clemente loggerhead shrike with aerial water drops or fire apparatus from within established safety zones.
    - When a fire occurs in the west shore boxthorn habitat on the first or second terraces outside Impact Area I or II, keep the fire as small as possible. Control with direct attack from established safety zones, including use of a helicopter if already on Island. Because ground disturbance is more likely to be damaging in the long term than a fire, aerial suppression or backburning is preferred over entry with suppression equipment into habitat areas.
    - Attempt to prevent fires from entering Canyon Shrubland/Woodland. Fires that enter canyon shrubland or woodland will kept as small as possible. Control with direct attack including use of a helicopter.
    - Fires that threaten to repeat-burn Canyon Shrubland/Woodland stands that are less than five years old (based on most recent fire in which shrubs were consumed) will be kept as small as possible rather than containing at logical control lines. This applies to boxthorn on the first or second terrace of the west shore. This does not apply to coyote brush-grassland areas from Stone Station northward on the upper plateau.
    - Fires that cross the fuelbreak in Impact Area I or II in SHOBA will be prevented from entering canyons and contained within that land management unit as the highest suppression objective. Secondarily, fires will be contained to a control line such as a road, fuelbreak, base of terrace slope, land management unit boundary, ridge, or other logical ter-

rain feature. Terrace slopes (as opposed to the flats) will be protected if possible.

- For shrublands not in canyons, fires will be controlled, confined, and contained using logical terrain features such as roads, fuelbreaks, canyon rims, land management unit boundaries.
- Dumping sea water on fresh water sources or jurisdictional waters of the U.S. will be avoided during fire suppression practice. Roads are appropriate for dumping sea water for practice. Sea water dumps are permitted during suppression incidents. Also, avoid using both fresh water and sea water in the same bucket during practice, to preclude adding salt water to fresh water areas

- Whenever time and opportunity permit, priority will be for minimal impact, "light hand on the ground" suppression tactics (MIST). (See Table 4-6.)
- Proper safeguards for cultural resources during fire management will be implemented. Provide proper safeguards for cultural resources during fire management. Proper safeguards include use of MIST during suppression as described above. Sufficient location and value information will be provided on firefighting maps to identify and prioritize suppression or pre-suppression response. Resource Advisors, both for cultural and natural resources, will be present at prescribed burns. Federal Fire personnel will receive an annual cultural resource protection briefing from the cultural staff. Rehabilitation of sites affected by suppression will be conducted so that there is no permanent loss of cultural resource values.

Map 5-1 depicts Land Management Units.



Map 5-1. Land Management Units on San Clemente Island.

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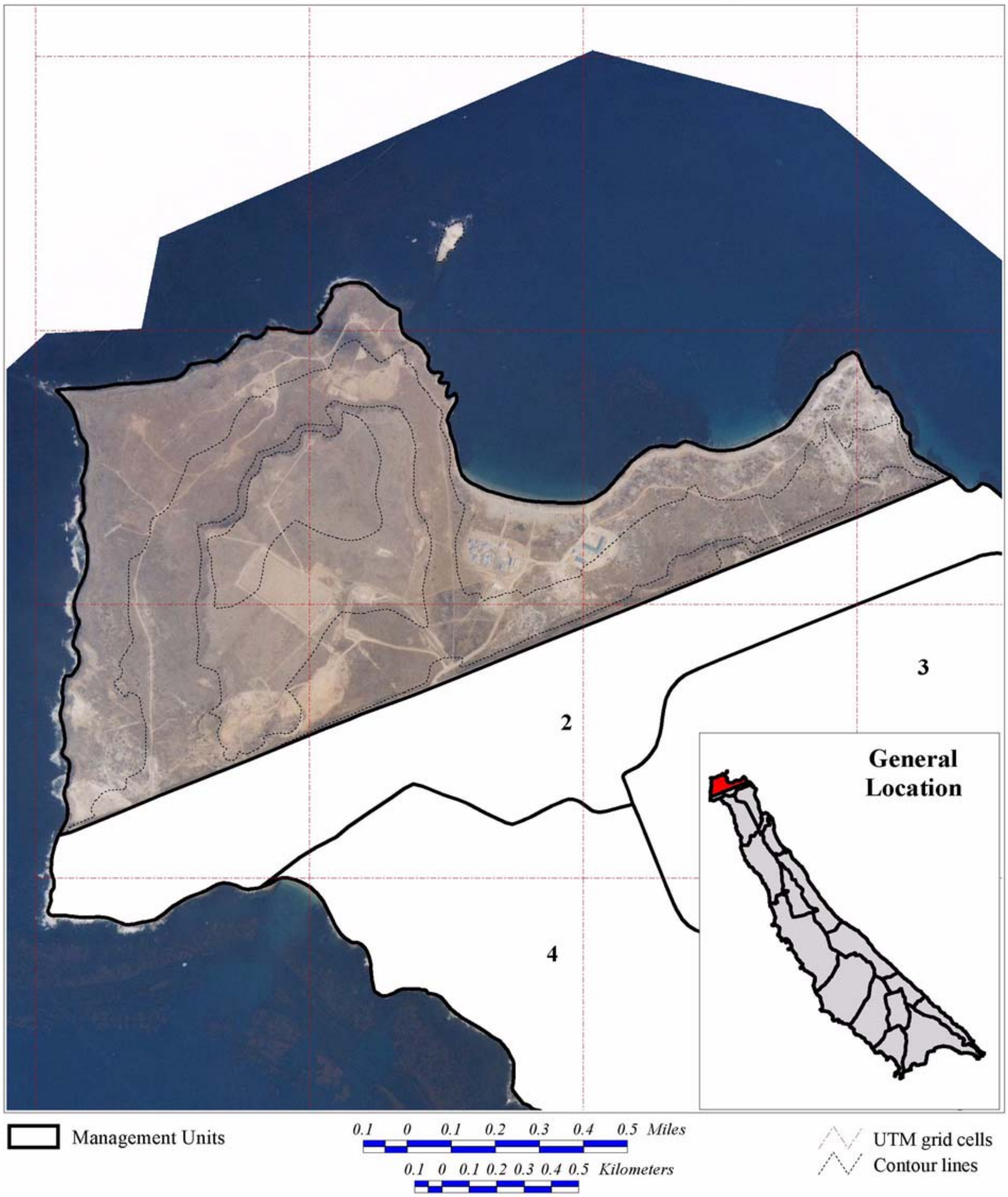
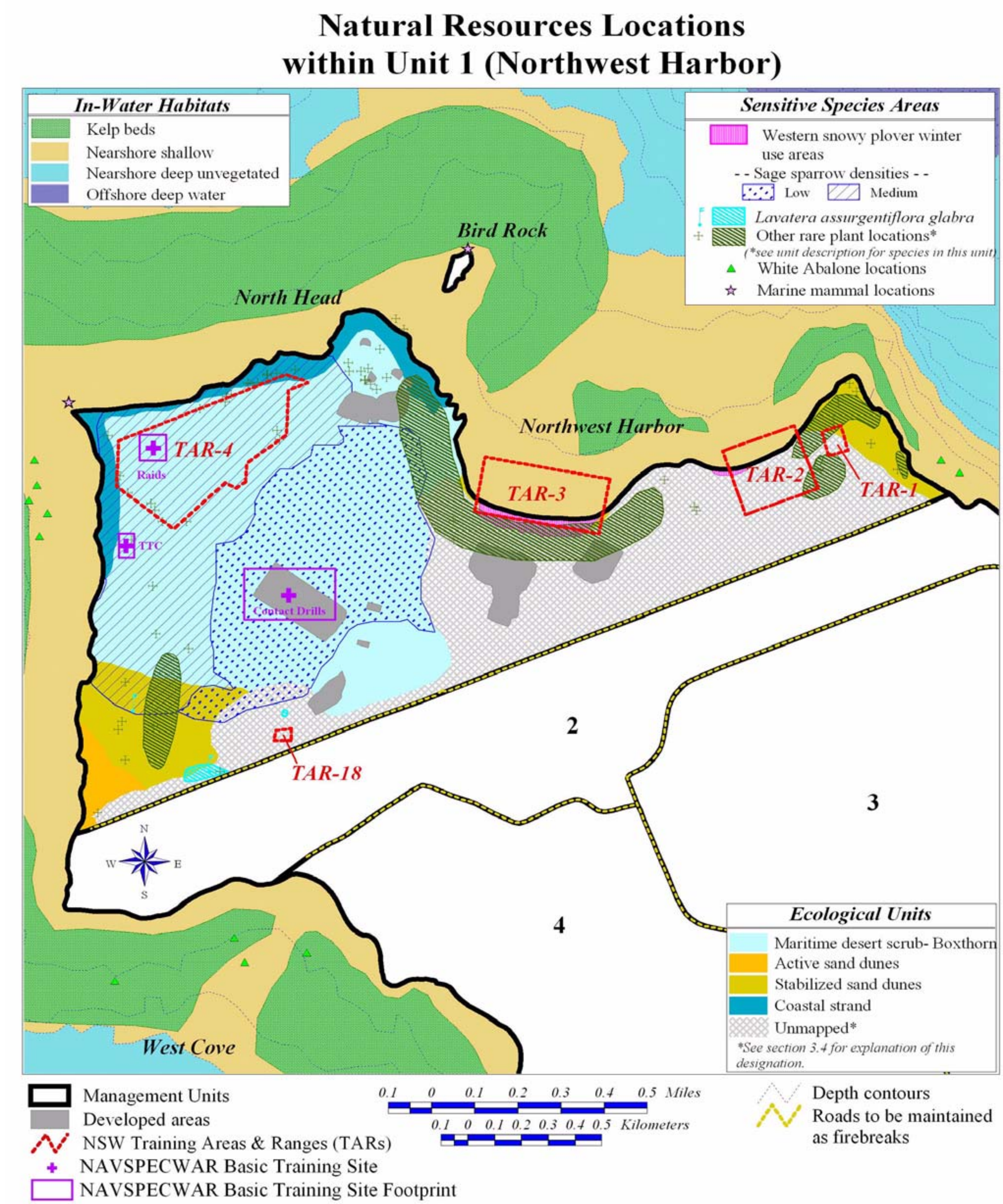
Aerial Photo and Topography of Unit 1 (Northwest Harbor)





Map 5-2. Natural Resources Locations within Unit 1- Northwest Harbor.

Location: Unit 1 - Northwest Harbor

Military Value: Highest
Naval Special Warfare
- Land Special Operations
- Maritime Special Operations
- Air Special Operations
- Information Special Ops

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses
Recreational camping, off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses
- Recreational diving and fishing areas offshore
- Boxthorn monitoring
- San Clemente sage sparrow monitoring
- Quarrying (borrow pits)

Facilities
- TAR 1-4, 18; BTS
- BUD/S Camp
- Maritime Operations Facility
- Small Arms Range
- Demolition Ranges (3)
- Hand Grenade Range

Roads: Primary- 2.3 mi (3.7 km)
Secondary- 4.8 mi (7.7 km)

Natural Resources Value: Medium
Ecological Units
- MDS Boxthorn (333.8 ac)
- Active sand dunes (10.7 ac)
- Stabilized sand dunes (70.9 ac)
- Coastal strand (33.1 ac)
- Sea stacks

Wildlife
- San Clemente sage sparrow*
- Snowy plover*
- Brown pelican*
- Island night lizard*
- Island fox
- marine mammal haul-out site
- endemic dune beetles possible

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants
- *Aphanisma blitoides*
- *Astragalus nevinii*
- *Camissonia guadalupensis*
- *Cryptantha traskiae*
- *Eriophyllum nevinnii*
- *Eschscholzia ramosa*
- *Lavatera assurgentiflora glabra*
- *Lupinus guadalupensis*
- *Lycium brevipes hassei*
- *Phacelia floribunda*

Resource Values-Cultural

Natural Resources Management Emphases
- Highest military value. Maximize military values with consideration of the resource values.
- Active dunes, because Northwest Harbor may be the only location where the processes that sustain these dunes are still ongoing on the Island.
- San Clemente sage sparrows, though a small proportion of the total population, were the subject of Section 7 consultation for the construction and use of TAR 4, BTS.
- Island tree mallow, because this is the only Island location where it remains in its natural state and 85% of the existing known SCI population lives in Northwest Harbor.
- High value for *Cryptantha traskiae* (50% of population occurs in this unit).

Fire Suppression
- This is a high priority fire management area due to incendiary activities and federally protected resources.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering sensitive resource areas.

Fire Management
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- This area has very high military value, so the usual boxthorn objectives will not apply. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale where litter, duff, and grasses burned to ash; shrubs are burned to singed with some resprouts) mapped using a 1/2-acre minimum mapping unit for boundaries (including unburned inclusions) and intensity.
- This area is a good location for further investigation of fire's effects on boxthorn to improve management objectives, since there is a history of past fires.
- Evaluate fire vulnerability of Island tree mallow and protect from hot fires with brush clearing or retardant.
- Annually review impact of fire management measures on training and natural/cultural resources, and make adjustment as necessary.

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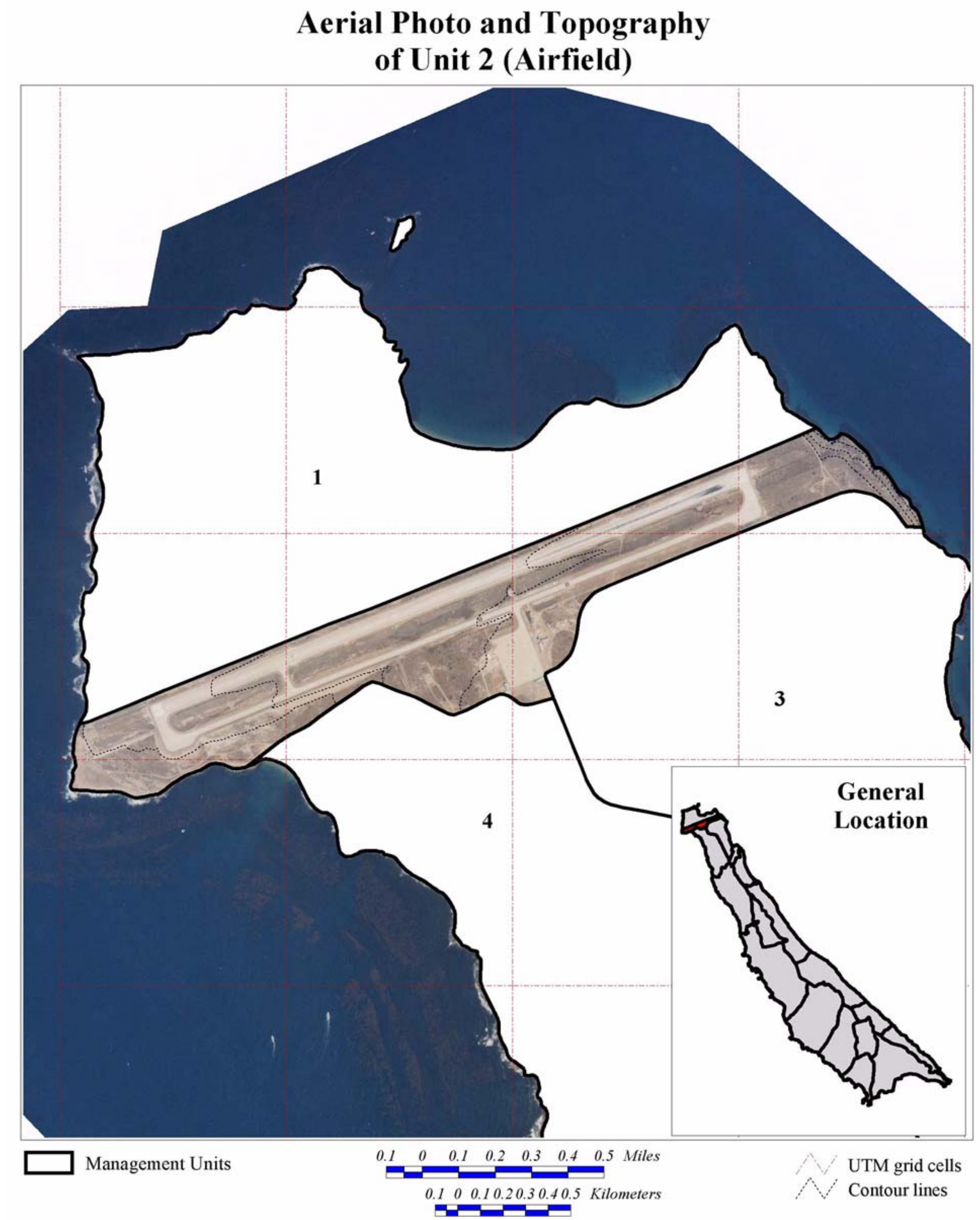
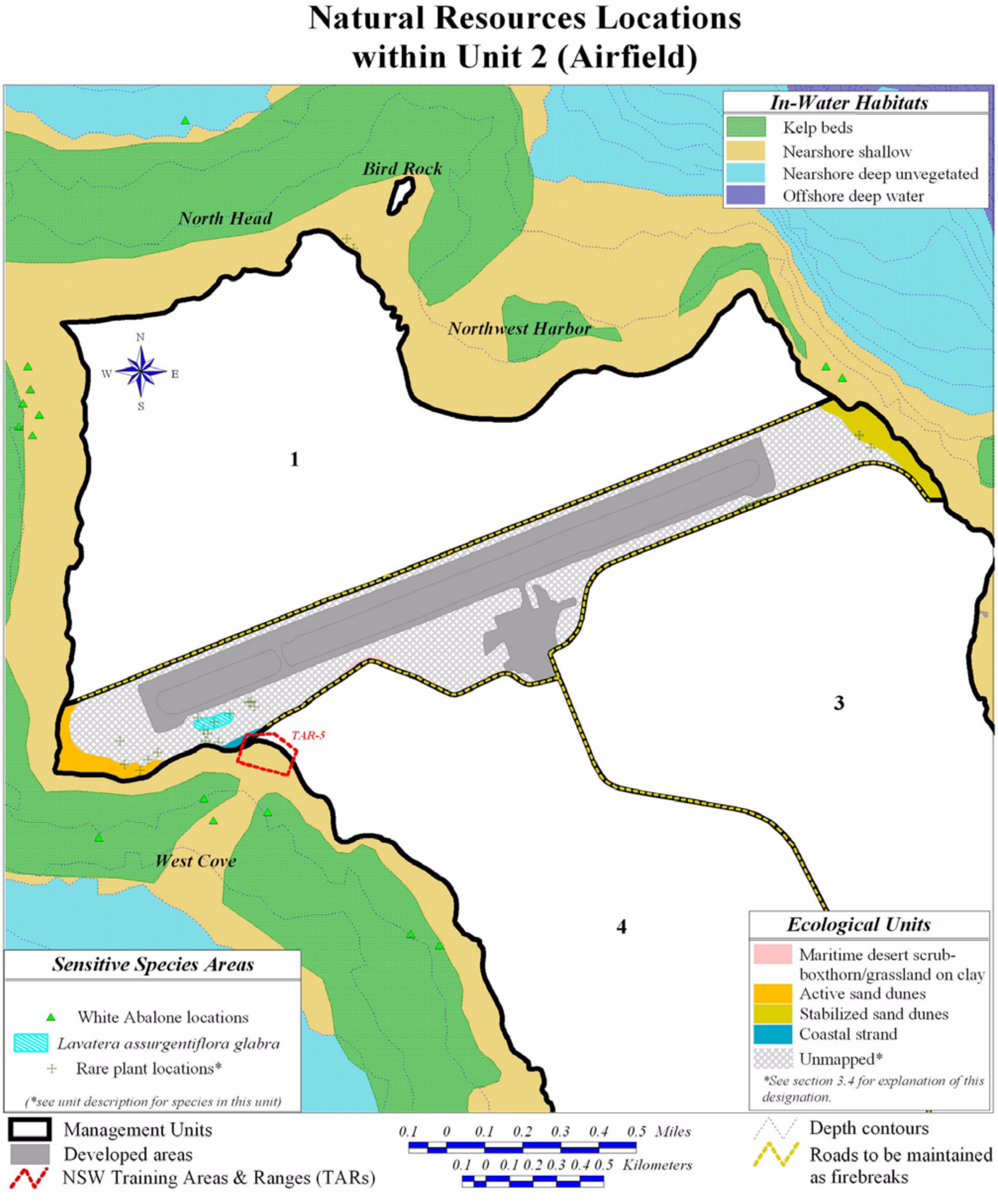

Aerial Photo and Topography
of Unit 2 (Airfield)
1
3
4
General
Location
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.1 0.2 0.3 0.4 0.5 Kilometers
UTM grid cells
Contour lines



Map 5-3. Natural Resources Locations within Unit 2- Airfield.

Location: Unit 2 - Airfield

Military Value: Highest
Air
Fleet Carrier Landing Practice
Night Operations
HC-85 Operations
Surface
Support Surface to Air MISSILEX
Combat Search & Rescue
Fleet Marine Air
Air Command & Control
Night Operations
RDT&E
Ocean Engineering
Missile Tests
Unmanned Aerial Vehicle Tests
Radio Frequency Tests
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Recreational camping, missile impacts, bombing, small arms/live fire, detonations (small detonations at airfield proper only), laser designator.
Quarrying (borrow pits)
Other Uses
Essential for all aspects of Island support
Recreational fishing areas offshore
Snowy plover monitoring
Facilities
Tactical Air Navigation Facilities
Roads: Primary- 5.0 mi (8.1 km)
Secondary- 1.4 mi (2.2 km)

Natural Resources Value: Lowest
Ecological Units
MDS Boxthorn/grassland (1.2 ac)
Active sand dunes (10.7 ac)
Stabilized sand dunes (70.9 ac)
Coastal strand (33.1 ac)
Wildlife
Snowy plover*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Astragalus miguelensis
Astragalus nevinii
Camissonia guadalupensis
Cryptantha traskiae
Eriophyllum nevinii
Lavatera assurgentiflora glabra

Resource Values-Cultural

Natural Resources Management Emphases
- Highest military value. Maximize military values with consideration of natural resources values.

Fire Suppression
- This is a low priority fire management zone due to lack of fuels proximate to occupied facilities or sensitive resources.
- The first fire suppression response is to send a Type 3 equivalent wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native grasses.

Fire Management
- Annually maintain at least a 30-foot minimum defensible space fuel management zone around all combustible structures or facilities by June 15.
- Fire management thresholds are the same as low-density San Clemente sage sparrow/boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.

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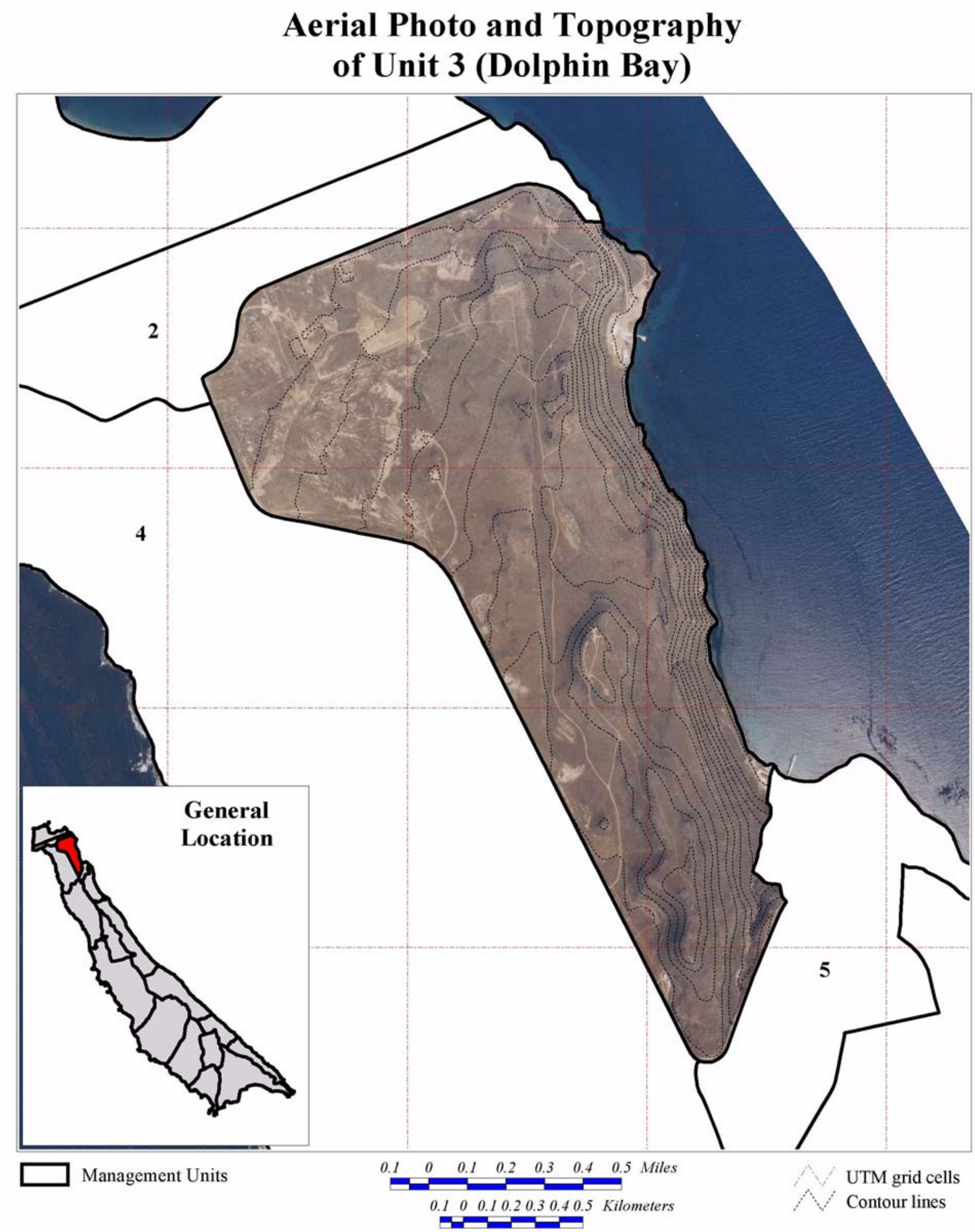
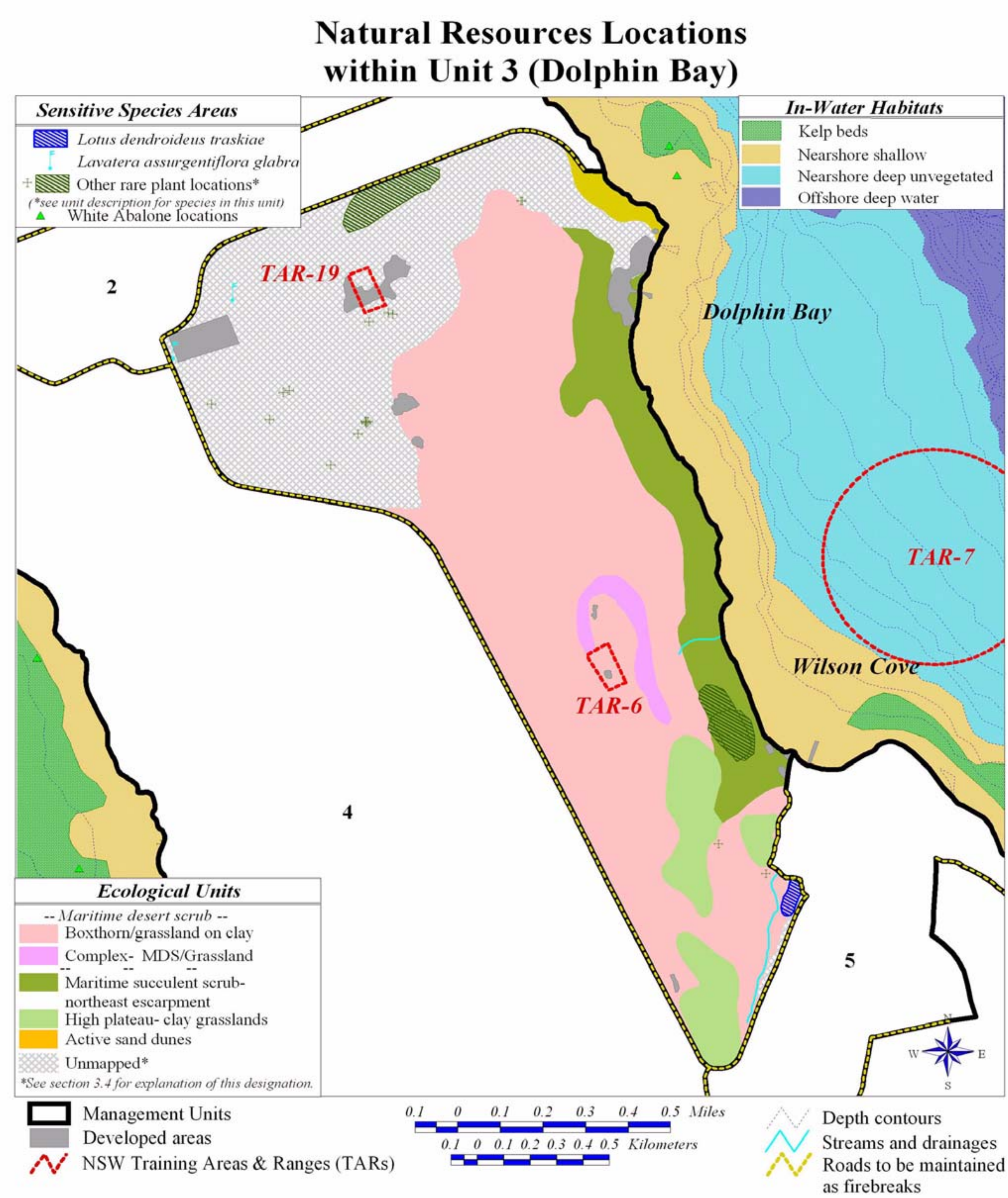

Aerial Photo and Topography
of Unit 3 (Dolphin Bay)
2
4
5
General
Location
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.1 0.2 0.3 0.4 0.5 Kilometers
UTM grid cells
Contour lines



Map 5-4. Natural Resources Locations within Unit 3- Dolphin Bay.

Location: Unit 3 - Dolphin Bay

Military Value: Low
Fleet Marine Ground
Ground Operations
Naval Special Warfare
Land Special Operations
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, parachute drops, bombing, small arms/live fire, detonations (all sizes), laser designator.
Other Uses
Recreational fishing areas offshore
Facilities
ASR Radar
TAR 6
Fuel Farm
Water Tank
North Light Pier
RDT&E Lab
Roads: Primary- 3.9 mi (6.2 km)
Secondary- 6.5 mi (10.4 km)

Natural Resources Value: Lowest
Ecological Units
MDS/Grassland Complex (14.0 ac)
MDS Boxthorn/grassland (458.6)
Maritime Sage Scrub northeast escarpment (103.2 ac)
Grasslands, clay soils (54.2 ac)
Stabilized sand dunes (9.4 ac)
Wildlife
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Astragalus miguelensis
Astragalus nevinii
Camissonia guadalupensis
Eriophyllum nevinii
Lavatera assurgentiflora glabra
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
Phacelia floribunda
**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

Natural Resources Management Emphasis
- Low military value. Maintain military values to the extent possible and with flexibility for maintaining natural resources values as an integral part of day-to-day operations.

Fire Suppression
- This is a medium priority fire management area due to relatively low values and lack of fuels adjacent to structures, but proposed use of TAR 6 could increase ignitions potential.
- The first fire suppression response is to send a Type 3 equivalent wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native grasses.

Fire Management
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Annually maintain at least a 30-foot minimum defensible space fuel management zone around all combustible structures or facilities by June 15.
- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.
- Fire management thresholds in boxthorn/grassland complex are the same as low-density San Clemente sage sparrow/boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. Seek a fire return interval of at least 20 years, and patch sizes that do not exceed 200 acres.

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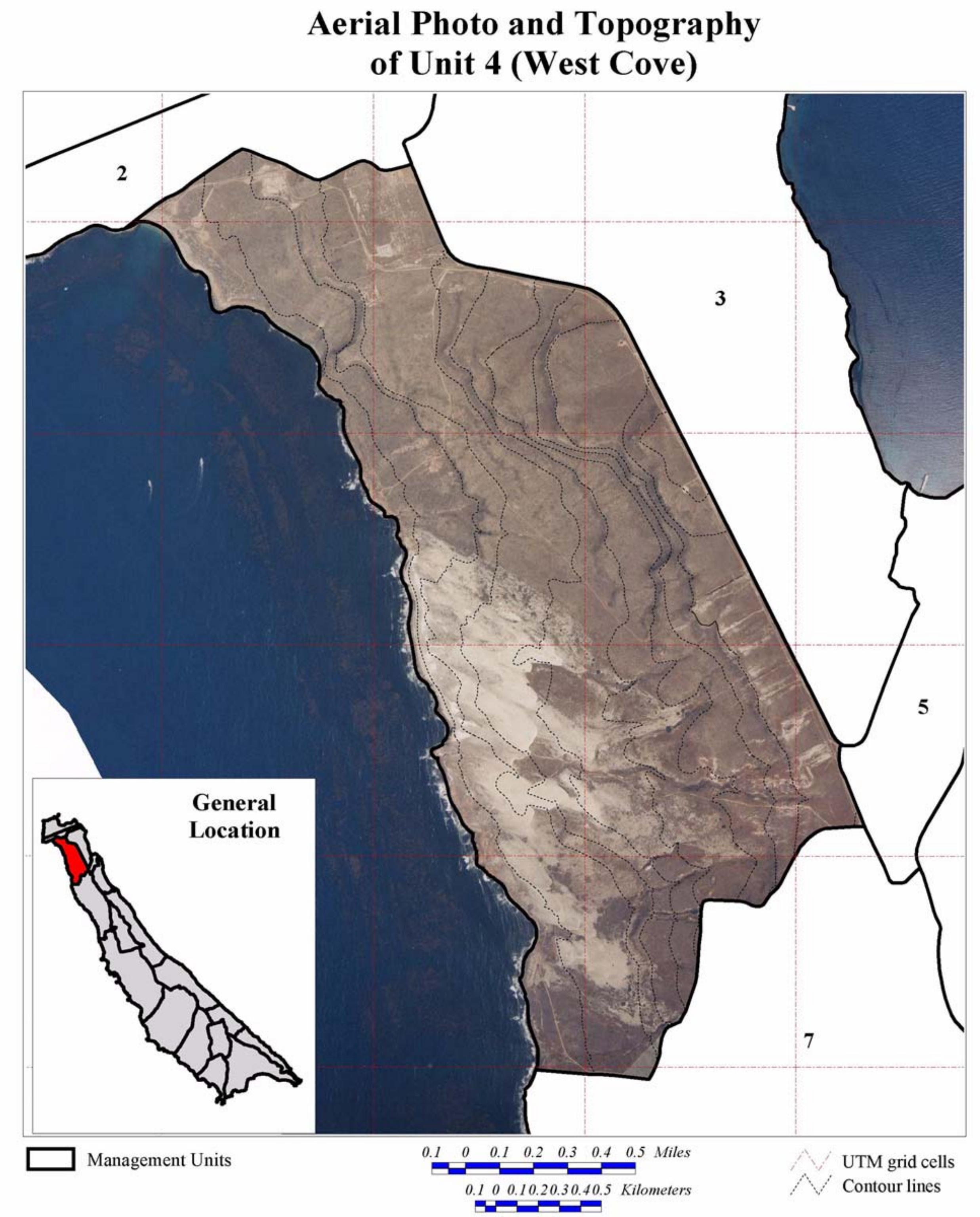
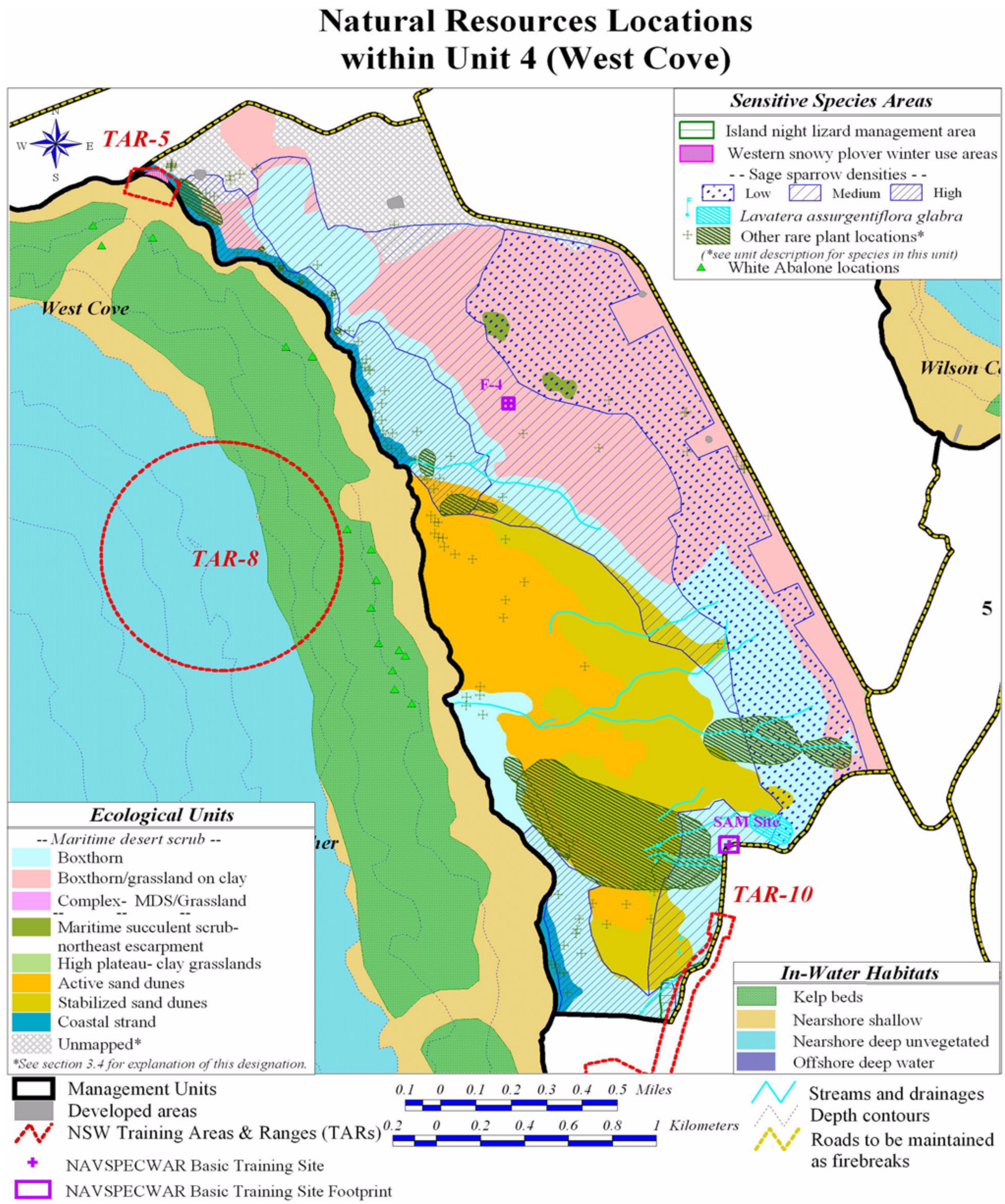

Aerial Photo and Topography
of Unit 4 (West Cove)
2
3
5
7
General
Location
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.10.20.30.40.5 Kilometers
UTM grid cells
Contour lines



Map 5-5. Natural Resources Locations within Unit 4- West Cove.

Location: Unit 4 - West Cove

Military Value: Medium
Fleet Marine Ground
Ground Operations
Fire Support Coordination
Ground Reconnaissance and Surveillance
Naval Special Warfare
Land Special Operations
Maritime Special Operations
THIRD Fleet
Multi-warfare Operations
Prohibited Uses
Missile impacts, fixed wing landings, parachute drops, bombing, small arms/live fire, detonations (small detonations in northeast portion only), laser designator.
Other Uses
Location of SCORE's Cable Termination van and future site of Shallow Water Range instrumentation cables
Recreational fishing areas offshore
Wildlife surveys
Habitat restoration (boxthorn, dunes)
Facilities
TAR 5 F-4 BTS
Roads
Primary- 3.7 mi (6.0 km)
Secondary- 5.6 mi (9.1 km)

Natural Resources Value: High
Ecological Units
MDS/Grassland complex (0.2 ac)
MDS Boxthorn/grassland (458.6 ac)
MDS Boxthorn (428.7 ac)
Maritime Sage Scrub northeast escarpment (6.1 ac)
Grasslands, clay soils (1.2 ac)
Active sand dunes (201.8 ac)
Stabilized sand dunes (241.8 ac)
Coastal strand (36.4 ac)
Wildlife
San Clemente sage sparrow*
Snowy plover*
Island night lizard*
Island fox
endemic dune beetles possible
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Aphanisma blitoides
Astragalus miguelensis
Astragalus nevinii
Atriplex pacifica
Calandrinia maritima
Camissonia guadalupensis
Crossosoma californicum
Cryptantha traskiae
Dudleya virens virens
Eschscholzia ramosa
Jepsonia malvifolia
Lavatera assurgentiflora glabra
Lupinus guadalupensis
Resource Values-Cultural

Natural Resources Management Emphases

- Medium military value. Maintain military values with high flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Erosion control of dune roads.
- San Clemente sage sparrow high density area east of dunes.
- High value for *Lavatera assurgentiflora glabra* (12% of extant population occurs in this unit). Also historic records from this general area.
- High value for *Cryptantha traskiae* (42% of population occurs in this unit).
- High value for *Camissonia guadalupensis clementina* (70% of population occurs in this unit).
- Invasive species management.

Fire Suppression

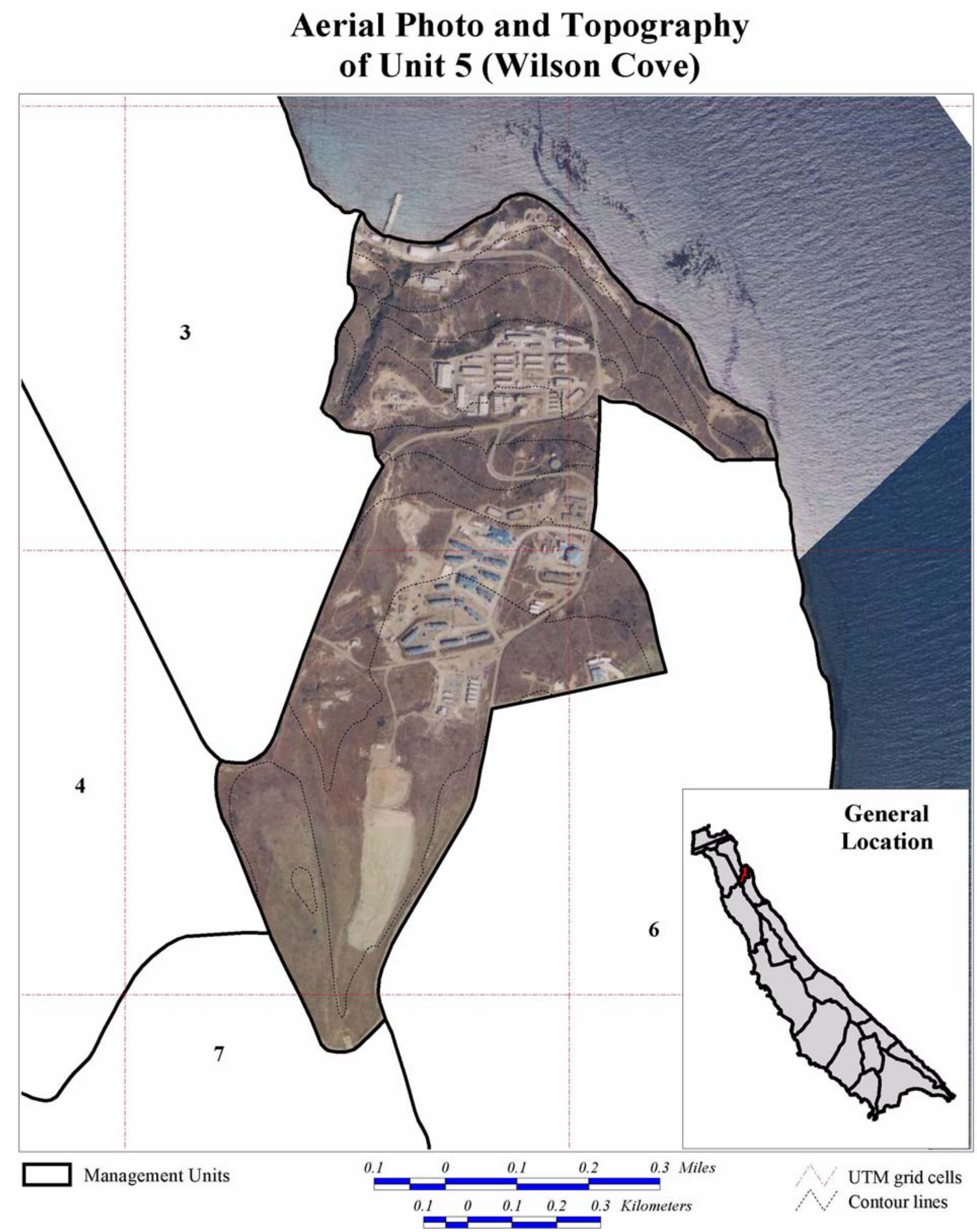
- This is a medium priority fire management area due to high natural resources values but low fuels, no fire history.
- The first fire suppression response is to send a Type 3 equivalent wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native grasses. No ground suppression equipment in boxthorn habitat. Stay on roads.
- If the fire is in the low-terrace boxthorn habitat at moderate or higher intensity, the fire suppression response is direct attack without ground disturbance, as soon as possible to keep the fire to the smallest size possible.

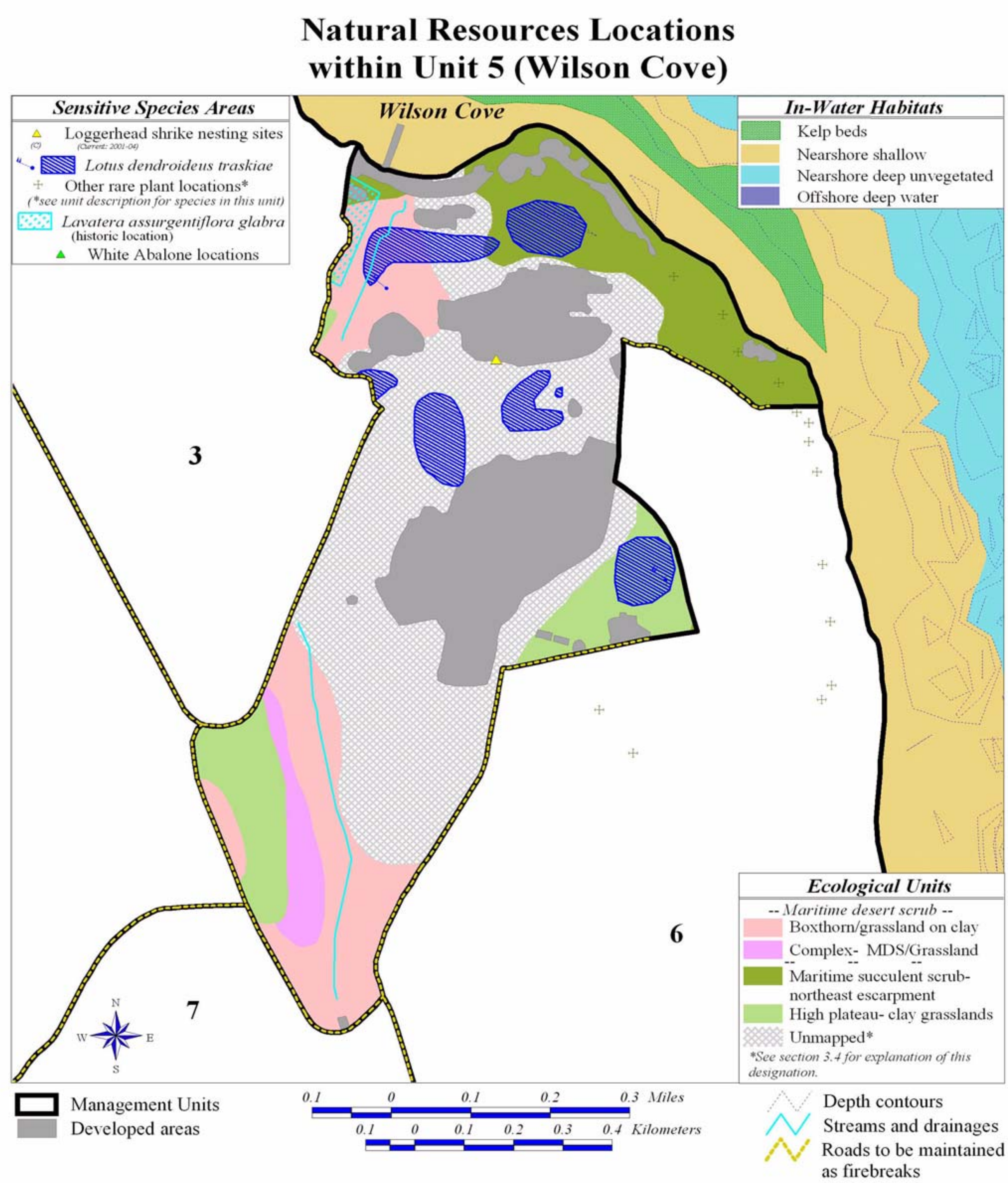
Fire Management

- South boundary road should be drivable with Type 3 equivalent asset to prevent fire encroachment into next LMU.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.

Land Management Unit 4 (*Cont'd*)

- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species and native forbs.
- Fire interval control will be by maintaining high-density and moderate-density San Clemente sage sparrow/boxthorn on a 40-year or greater average fire return interval for the entire community. (Fire may return at about every 40 years on average. Some places will never burn and be very "old", while some will burn more frequently than once in 40 years.)
- Fire patch size thresholds will be applied by using the following guidelines. In high-density boxthorn/San Clemente sage sparrow habitat, fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts) should be kept less than 5 acres.
- In moderate-density boxthorn/San Clemente sage sparrow habitat, 20-acre patch size limits for fires that burn at moderate intensity or higher will be the standard.
- In low-density boxthorn/San Clemente sage sparrow habitat, 40 acres will be the standard. Calculations will be based on fires mapped using a minimum 1/2-acre mapping unit for boundaries (including unburned inclusions) and intensity.
- In high-density boxthorn/San Clemente sage sparrow habitat, no more than 45 acres (about 5% of all high-density San Clemente sage sparrow habitat) may be burned over a 5-year period. This is based on assumption that boxthorn must be 20 cm in height before it is used by San Clemente sage sparrows (Munkwitz et al. 2000), and this much growth can occur in one good growing season or one El Niño cycle (about 7-10 years).
- Fire management thresholds in boxthorn/grassland complex are the same as low-density boxthorn/San Clemente sage sparrow habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic plants. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.


Aerial Photo and Topography
of Unit 5 (Wilson Cove)
3
4
6
7
General
Location
Management Units
0.1 0 0.1 0.2 0.3 Miles
0.1 0 0.1 0.2 0.3 Kilometers
UTM grid cells
Contour lines



Map 5-6. Natural Resources Locations within Unit 5- Wilson Cove.

Location: Unit 5 - Wilson Cove

Military Value: High
Fleet Marine Ground
Fire Support Coordination
Engineering Operations
Naval Special Warfare
Land Special Operations
Maritime Special Operations
THIRD Fleet
Theater-level Operations
Multiwarfare Operations
Support Fleet Battle Exercises
RDT&E
Ocean Engineering
Prohibited Uses
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, parachute drops, bombing, small arms/live fire, detonations (all sizes), laser designator.
Other Uses
Recreational fishing areas offshore
Facilities
Wilson Cove contains virtually all of the permanent billeting, dining, transportation, recreation, and port facilities for Island personnel.
Roads: Primary- 3.7 mi (5.9 km)
Secondary- 1.2 mi (2.0 km)

Natural Resources Value: Lowest
Ecological Units
MDS/Grassland complex (6.8 ac)
MDS Boxthorn/grassland (40.3 ac)
Maritime Sage Scrub northeast escarpment (31.4 ac)
Grasslands, clay soils (25.0 ac)
Wildlife
San Clemente loggerhead shrike*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Artemisia nesiotica
Lavatera assurgentiflora glabra (historic location)
Lotus dendroideus var. *traskiae**
**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

Natural Resources Management Emphases
- High military value. Protect those military values with increasing flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Historic location for island tree mallow.
- Trask's island lotus (17% of population occurs in this unit).
- Invasive species management.

Fire Suppression
- This is a high priority area for human and structural fire protection. Primary pre-suppression strategy is enforcement of defensible space 30-ft. clear zone around structures, with 100-ft. clear zone if vegetation is anything but mowable grass or light brush, to be accomplished by June 15.
- The first fire suppression response is to send a Type 3 wildland engine to all reported wildland fires. The strategy is to control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native grasses.

Fire Management
- All military operations will be FDRS compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Fire management thresholds in boxthorn/grassland complex are the same as low-density San Clemente sage sparrow/boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic plants. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla by maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.

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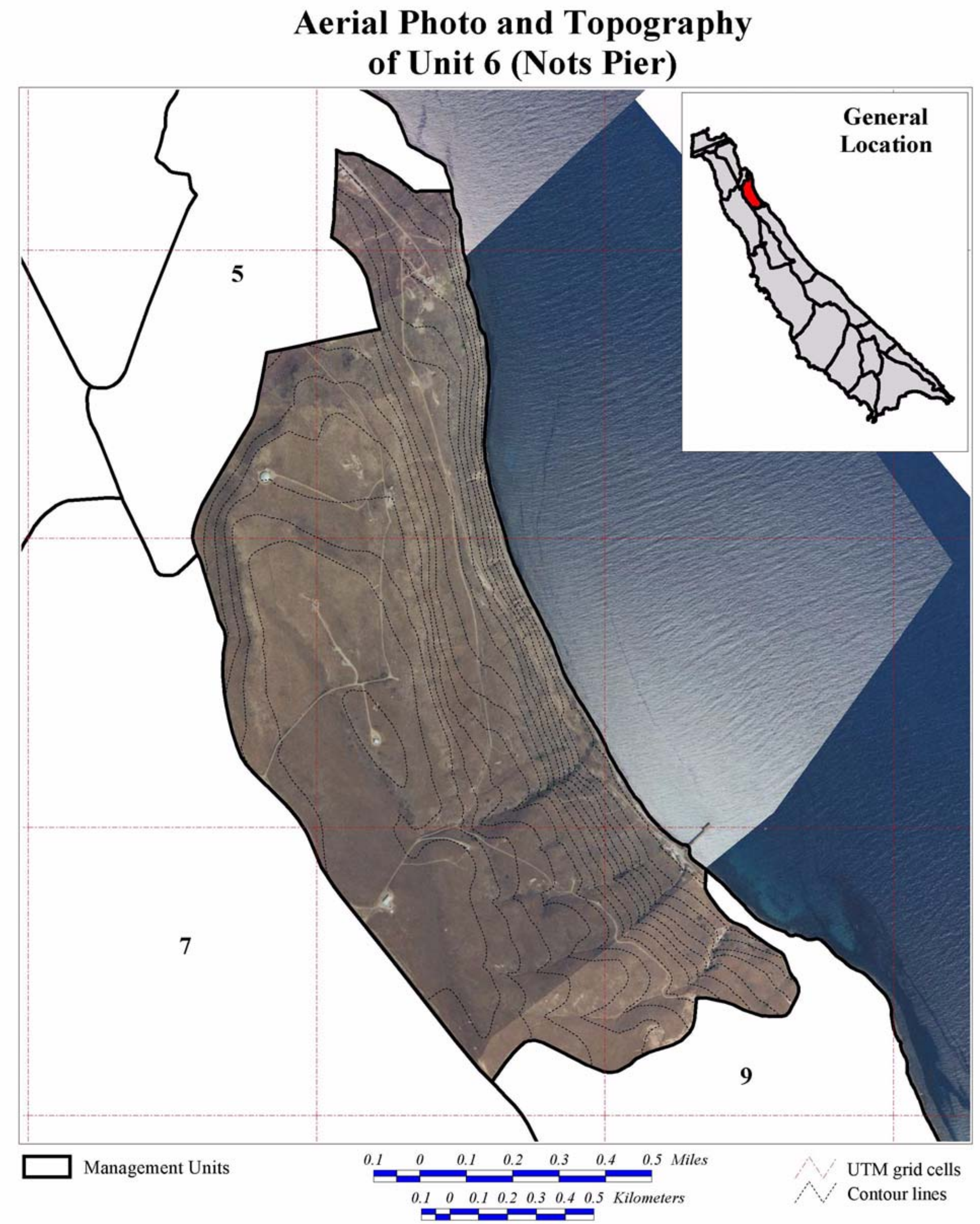
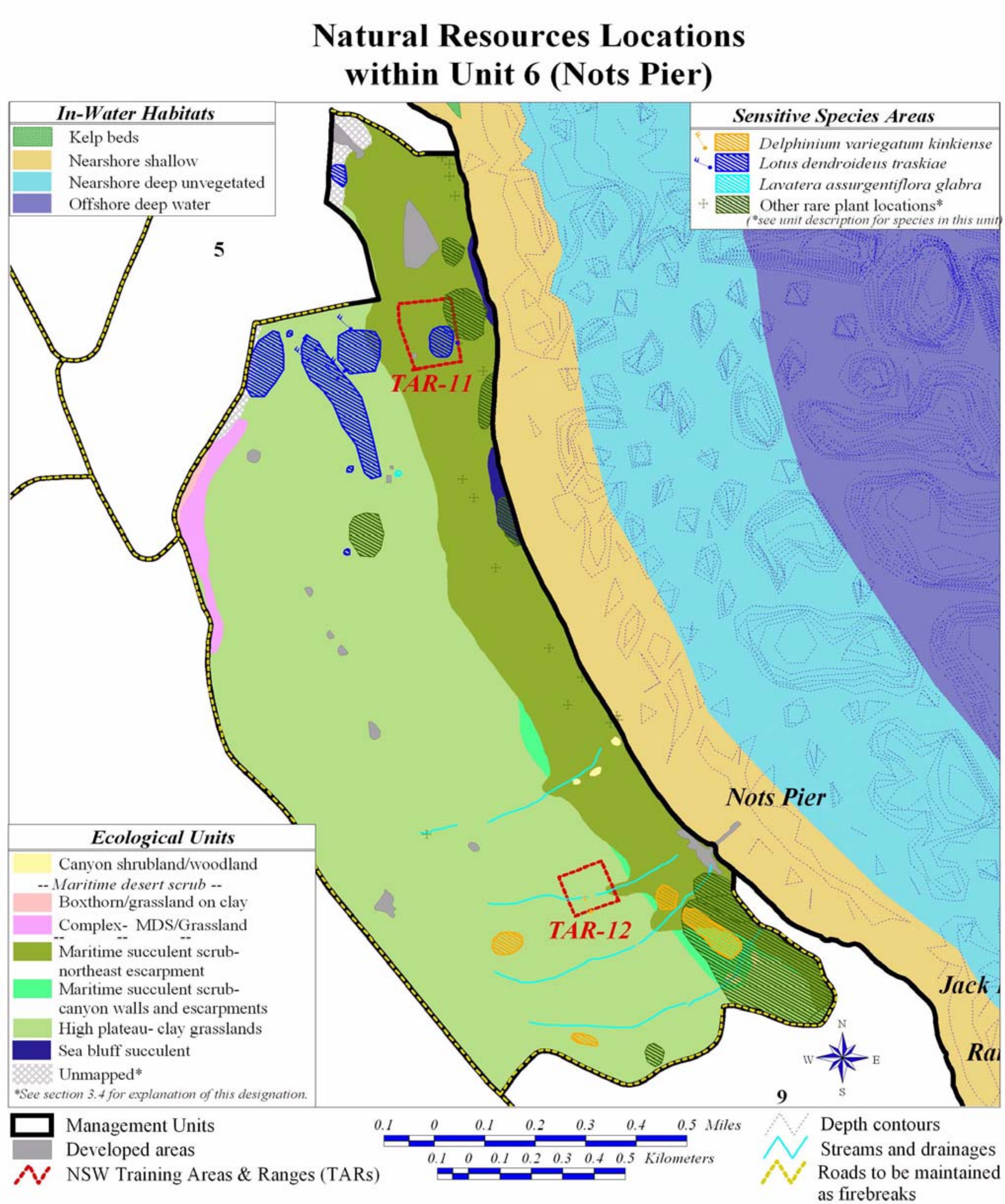

Aerial Photo and Topography
of Unit 6 (Nots Pier)
General
Location
5
7
9
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.1 0 0.1 0.2 0.3 0.4 0.5 Kilometers
UTM grid cells
Contour lines



Map 5-7. Natural Resources Locations within Unit 6- Nots Pier.

Location: Unit 6 - NOTS Pier

Military Value: High

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations

RDT&E
- Ocean Engineering

THIRD Fleet
- Multiwarfare Operations

Prohibited Uses
- Off-road vehicles, heavy wheeled vehicles, tracked vehicles, missile impacts, fixed wing landings, bombing, detonations (all sizes), laser designator.

Other Uses
- Center of SPAWARSYSCEN RDT&E activities on SCI
- Recreational fishing areas offshore

Facilities
- TARs 11 and 12
- Wind Farm
- Water Tank

Roads
- Primary- 1.9 mi (3.1 km)
- Secondary- 7.3 mi (11.7 km)

Natural Resources Value: Low

Ecological Units
- Canyon woodland (1.1 ac)
- MDS/Grassland complex (9.9 ac)
- MDS Boxthorn/grassland (1.4 ac)
- Maritime Sage Scrub northeast escarpment (192.3 ac)
- Maritime Sage Scrub (11.2 ac)
- Grasslands, clay soils (497.9 ac)
- Sea bluff succulent (5.2 ac)

Wildlife
- San Clemente sage sparrow*
- Island night lizard*
- Island fox

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants
- *Artemisia nesiotica*
- *Astragalus nevinii*
- *Delphinium variegatum kinkiense**
- *Delphinium variegatum thornei*
- *Dudleya virens virens*
- *Eriogonum giganteum formosum*
- *Lavatera assurgentiflora glabra*
- *Lotus dendroideus* var. *traskiae**
- *Lupinus guadalupensis*
- *Lycium brevipes*

**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

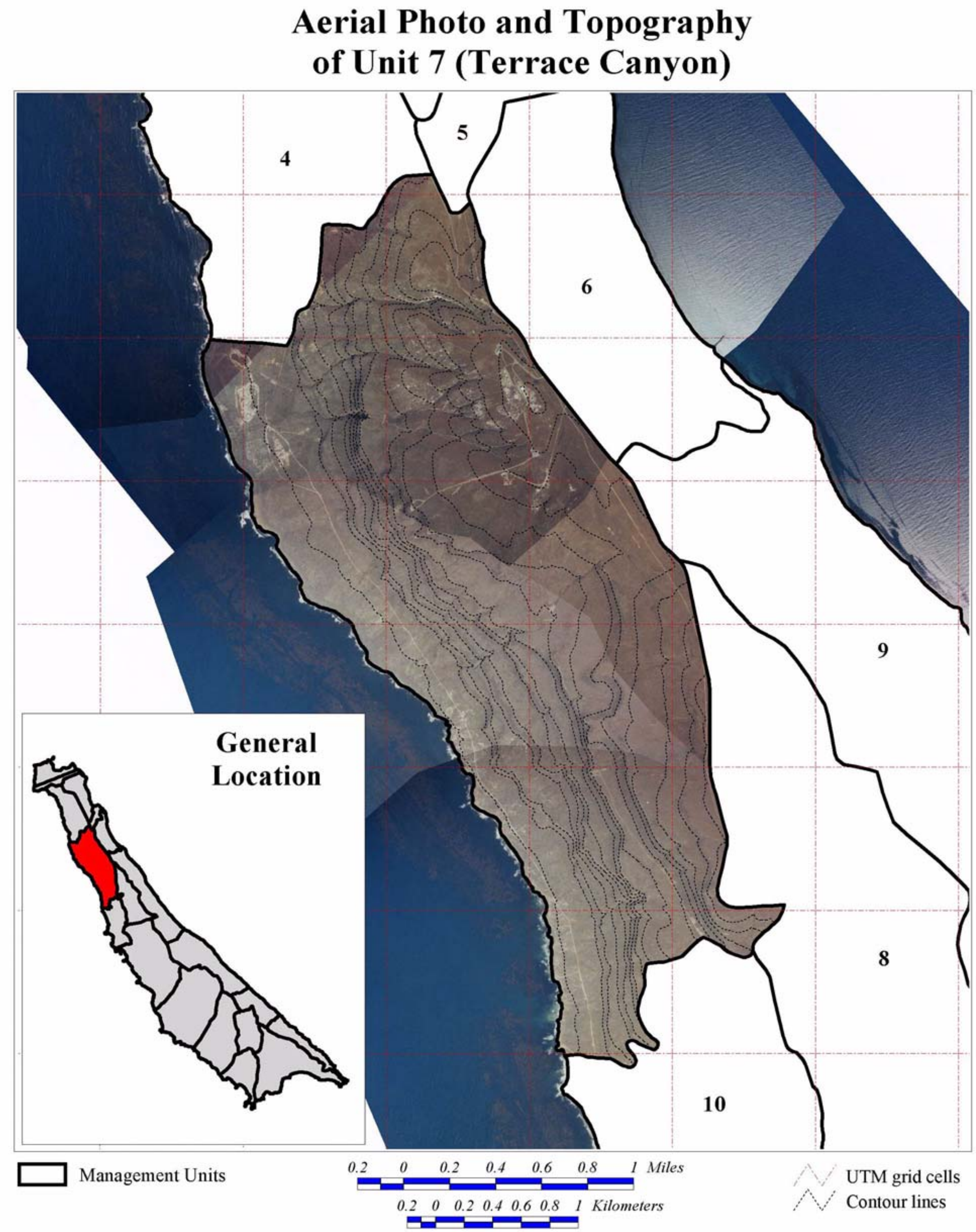
Natural Resources Management Emphases
- High military value. Protect those military values with increasing flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- High value for Trask's island lotus (32% of population occurs in this unit).
- Historic location for island tree mallow.
- Improve understanding of where needlegrass currently resides to help focus restoration objectives.

Fire Suppression

- This is a medium priority area for fire suppression due to moderate potential for ignitions.
- The first fire suppression response is to send a Type 3 wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native grasses. A helicopter may be summoned if it is already on standby for other training activities.

Fire Management

- All military operations will be FDRS compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures that cannot afford to be lost in a wildfire by June 15.
- Manage fire for openness of grasslands and native endemic forbs, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike. Manage fire to enhance status of Trask's island lotus.
- Use prescribed fire to manage fuel loads and achieve a mosaic of grassland and shrub, while considering the impacts of fire on rare shrubs and native forbs.
- Fire management thresholds in boxthorn/grassland complex are the same as low-density San Clemente sage sparrow/boxthorn habitat. Risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.by maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres



Aerial Photo and Topography of Unit 7 (Terrace Canyon)
4
5
6
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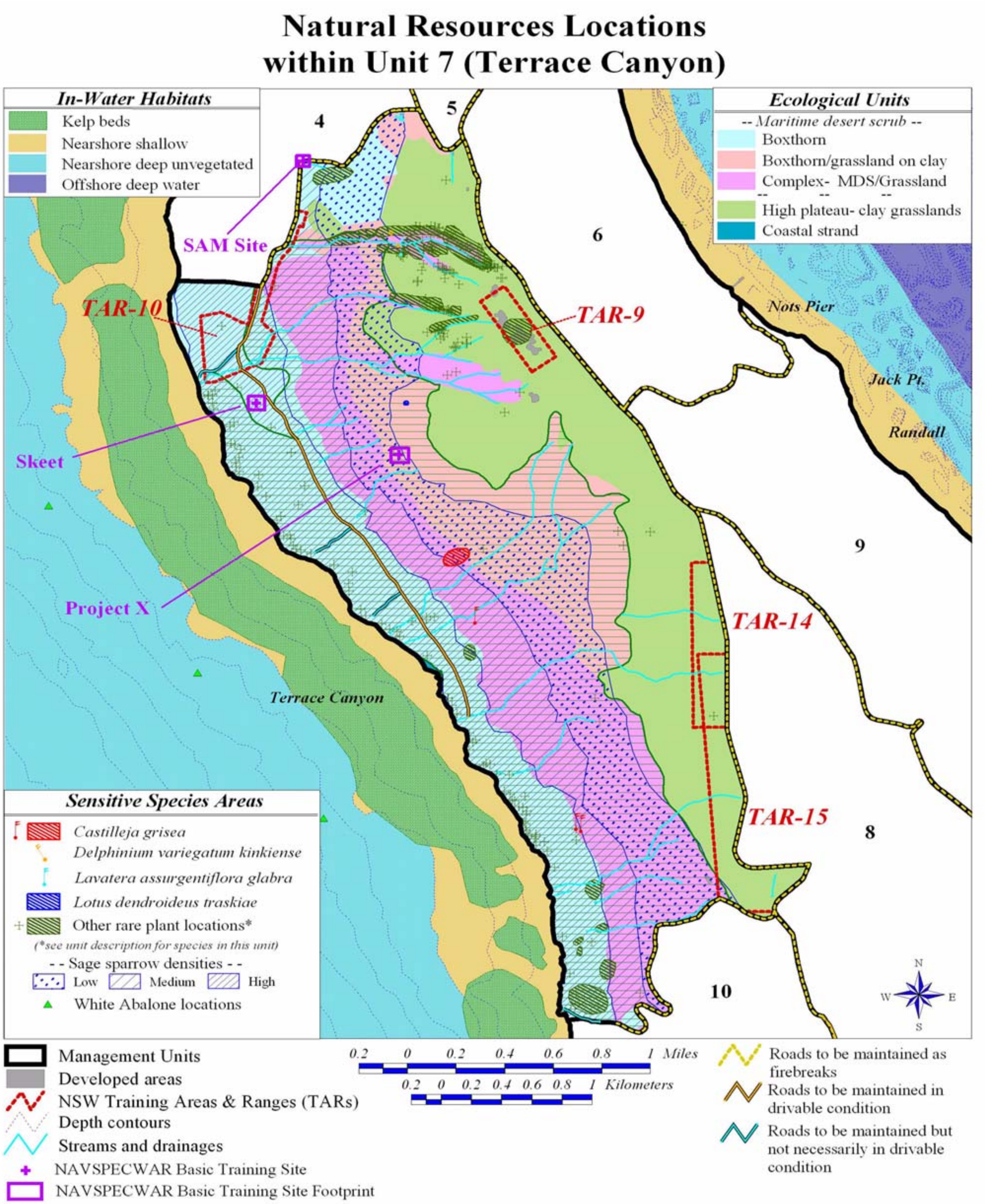
8
10
General Location
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-8. Natural Resources Locations within Unit 7- Terrace Canyon.

Location: Unit 7 - Terrace Canyon

Military Value: Medium
Fleet Marine Air
Night Operations
Fleet Marine Ground
Ground Operations
Command & Control
Ground Reconnaissance & Surveillance
Naval Special Warfare
Land Special Operations
Maritime Special Operations
Air Special Operations
Information Special Operations
RDT&E
Radio Frequency Tests
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Landing craft, missile impacts, fixed wing landings, bombing, laser designator.
Other Uses
Contains the Photo Lab complex of buildings which, though unoccupied, are used for many RDT&E and training events
Recreational fishing areas offshore
Facilities
TARs 9 & 10, portions of 14 & 15, BTS
Roads: Primary- 3.9 mi (6.3 km)
Secondary- 13.8 mi (22.2 km)

Natural Resources Values: High
Ecological Units
MDS/Grassland complex (765.8 ac)
MDS Boxthorn/grassland (415.4 ac)
MDS Boxthorn (647.5 ac)
Grasslands, clay soils (824.3 ac)
Coastal strand (2.5 ac)
Wildlife
San Clemente sage sparrow*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Aphanisma blitoides
Artemisia nesiotica
Astragalus nevinii
Atriplex pacifica
Brodiaea kinkiensis
Camissonia guadalupensis
*Castilleja grisea**
Crossosoma californicum
*Delphinium variegatum kinkiense**
Dudleya virens virens
Eriophyllum nevinii
Eschscholzia ramosa
Frankenia salina
Galvezia speciosa
Hazardia cana
Heteromeles arbutifolia
Lavatera assurgentiflora glabra
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
Munzothamnus blairii
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

Natural Resources Management Emphases
- Medium military value. Maintain those military values with high flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- San Clemente sage sparrow high density area.
- Island night lizard management area.
- San Clemente Island larkspur.

Fire Suppression

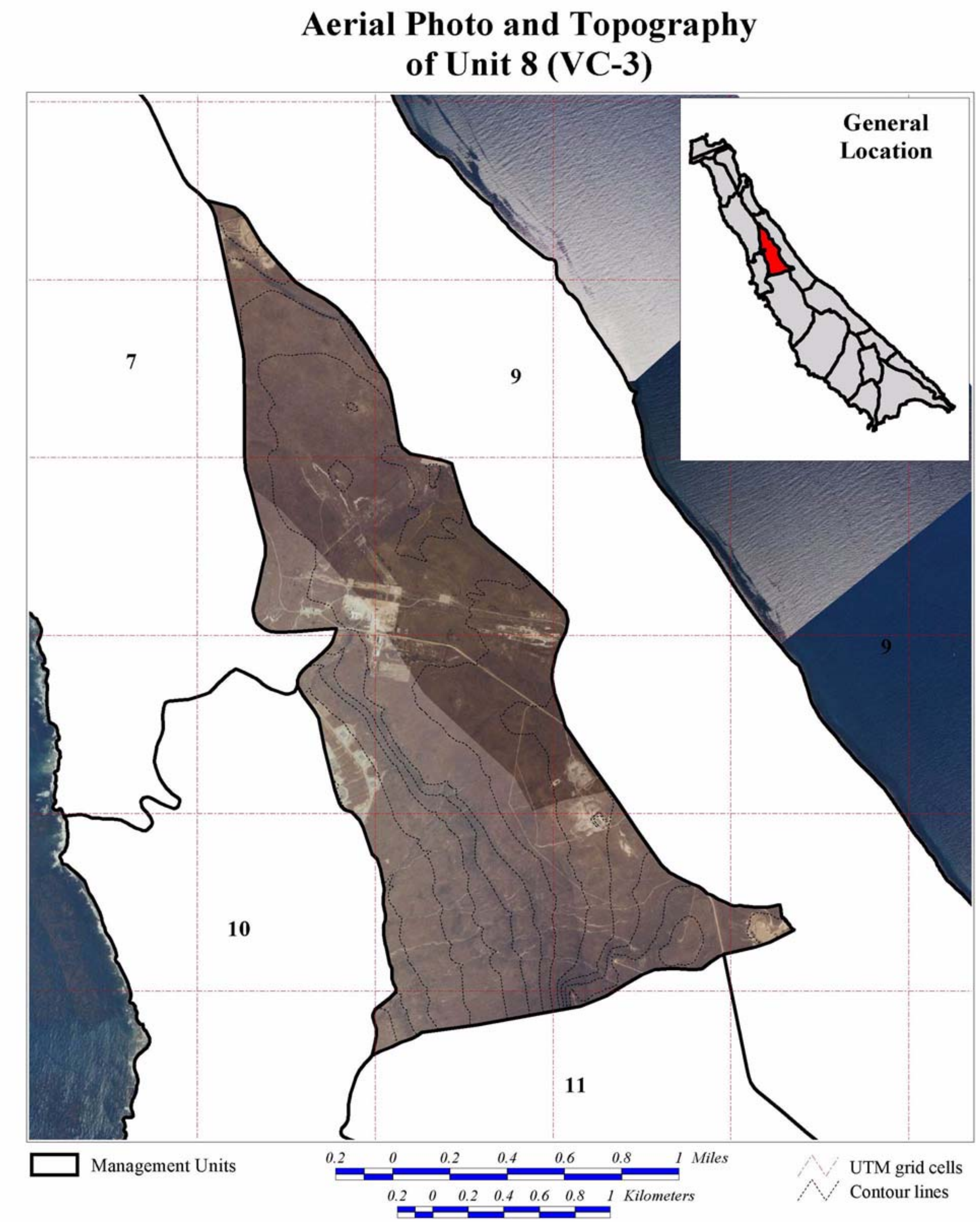
- This is a high priority fire management area due to potential for ignitions and high natural resources values.
- If the fire is in the low-terrace boxthorn habitat at moderate or higher intensity, the first fire suppression response is direct attack without ground disturbance, as soon as possible to keep the fire to the smallest size possible.
- No ground suppression equipment in boxthorn habitat. Stay on roads. Water storage at TAR 10 during fire season.
- Send a Type 3 equivalent wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native species. Annually maintain a 30-foot minimum defensible space clearing around all combustible structures or facilities in this LMU by June 15.

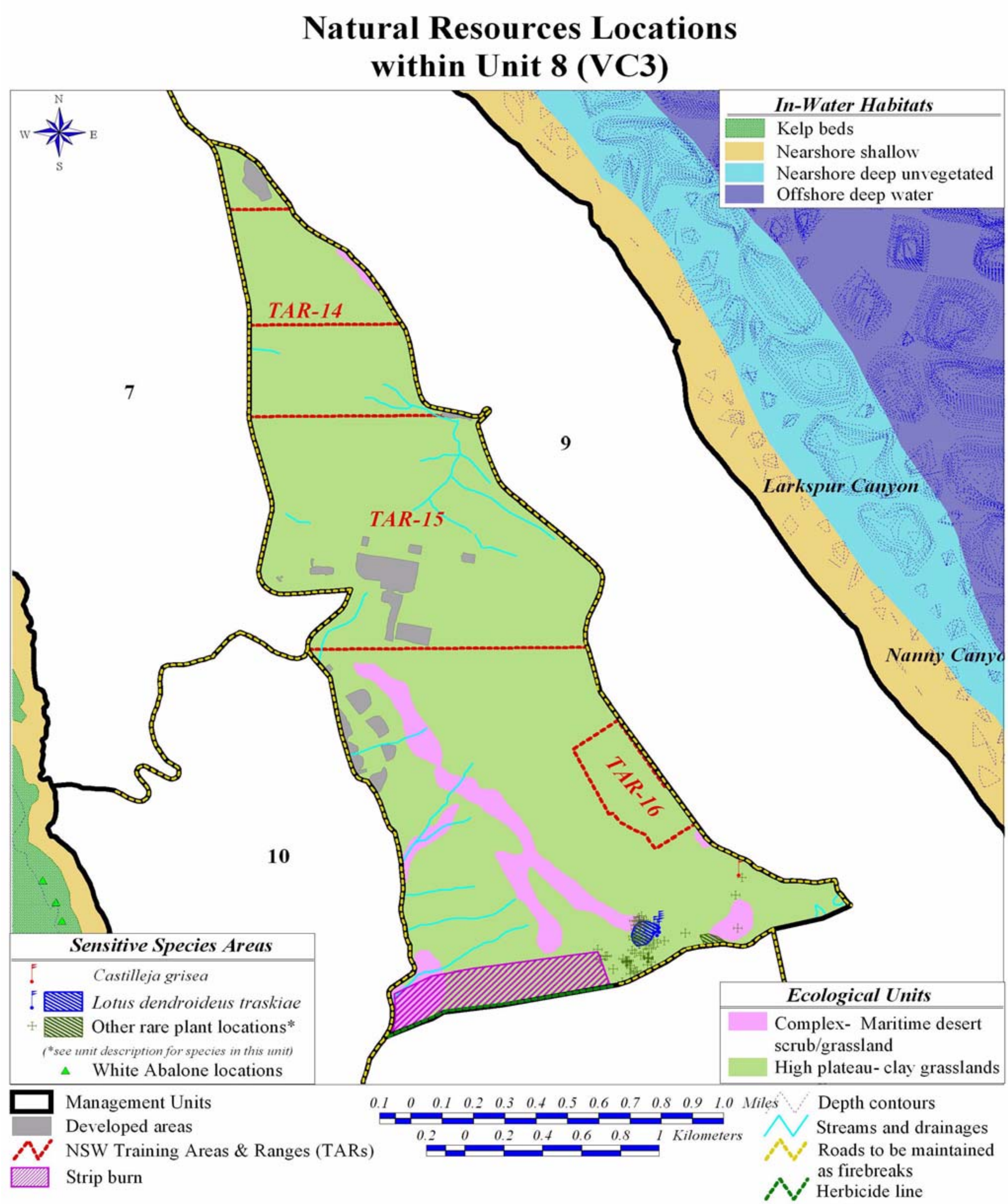
Fire Management

- The road from just south of the dunes to approximately Marine Terrace Canyon or about 3100 yards (range of tracers used) from TAR 10 must remain passable for access for firefighting and function as a firebreak. The use of retardant sprayed from a ground rig may be necessary.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.

Land Management Unit 7 (*Cont'd*)

- Fire interval control will be by maintaining high-density and moderate-density San Clemente sage sparrow/boxthorn habitat on a 40-year or greater average fire return interval for the entire community. (Fire may return at about every 40 years on average. Some places will never burn and be very "old", while some will burn more frequently than once in 40 years.)
- Fire patch size thresholds will be applied by using the following guidelines. In high-density boxthorn/San Clemente sage sparrow habitat, fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts) should be kept less than 5 acres.
- In moderate-density boxthorn/San Clemente sage sparrow habitat, 20-acre patch size limits for fires that burn at moderate intensity or higher will be the standard.
- In low-density boxthorn/San Clemente sage sparrow habitat, 40 acres will be the standard. Calculations will be based on fires mapped using a minimum 1/2-acre mapping unit for boundaries (including unburned inclusions) and intensity.
- In high-density boxthorn/San Clemente sage sparrow habitat, no more than 45 acres (about 5% of all high-density San Clemente sage sparrow habitat) may be burned over a 5-year period. (This is based on assumption that boxthorn must be 20 cm in height before it is used by San Clemente sage sparrows (Munkwitz *et al.* 2000), and this much growth can occur in one good growing season or one El Niño cycle (about 7-10 years).)
- Fire management thresholds in boxthorn/grassland complex are the same as low-density boxthorn/San Clemente sage sparrow habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic plants. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment. Manage for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons and SHOBA Ridge Road.


Aerial Photo and Topography
of Unit 8 (VC-3)
General
Location
7
9
9
10
11
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-9. Natural Resources Locations within Unit 8- VC3.

Location: Unit 8 - VC-3

Military Value: Highest
Fleet Marine Air
- Combat Search & Rescue
- Troop Lifts
- Air Command & Control
- Night Operations

Fleet Marine Ground
- Ground Operations
- Engineering Operations
- Command & Control
- Ground Reconnaissance & Surveillance

Naval Special Operations
- Land Special Operations
- Air Special Operations
- Information Special Operations

THIRD Fleet
- Theater-level Operations
- Multi-warfare Operations
- Realistic Threat, Complex EW
- Support Fleet Battle Exercises

RDT&E
- Missile Tests
- Unmanned Aerial Vehicle Tests

Prohibited Uses
- Landing craft, fixed wing landings, bombing, small arms/live fire, small detonations (<30 lbs), laser designator.

Other Uses
Facilities
- TARs 14, 15 and 16
- Munitions storage

Roads: Primary- 3.7 mi (6.0 km)
Secondary- 8.4 mi (13.5 km)

Natural Resources Value: Lowest
Ecological Units
- MDS/Grassland complex (88.9 ac)
- Grasslands, clay soils (1250.0 ac)

Wildlife
- San Clemente loggerhead shrike*
- Island night lizard*
- Island fox

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants
- *Brodiaea kinkiensis*
- *Ceanothus megacarpus var. insularis*
- *Eriogonum giganteum formosum*
- *Eriophyllum nevinii*
- *Galvezia speciosa*
- *Hazardia cana*
- *Heteromeles arbutifolia var. macrocarpa*
- *Lotus dendroideus* var. *traskiae**
- *Lupinus guadalupensis*
- *Munzothamnus blairii*

**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

Natural Resources Management Emphases
- Highest military value. Maximize those military values with consideration of the resource values.
- High fire risk area.
- Invasive species control.

Fire Suppression
- This is a high priority fire management area due to potential for ignitions.
- Ensure fire does not cross boundaries of management unit, while deriving maximum burn benefit for non-native plant control in grasslands.
- The first fire suppression response is to send a quick-attack wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native grasses. This action will be supported by a helicopter, if already on standby for other training activities, on High, Very High and Extreme fire danger days.
- Water storage at VC-3 during fire season for re-filling quick-attack fire suppression apparatus.

Fire Management
- Tie in the southwest boundary of unit to the Lost Point Trail with prescribed fire. All other boundaries of LMU should be secured with roads appropriate for use as firebreaks. This may require augmentation of road width with strip burning or retardant application. Use fire retardant to prevent fire escape from Missile Impact Range if found vulnerable to escape.
- Development of the VC-3 airfield for small fixed-wing aircraft would benefit firebreak installation in SHOBA.
- Annually maintain at least a a 30-foot minimum defensible space clearing around all combustible structures or facilities by June 15.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and for San Clemente loggerhead shrike.
- Use prescribed fire to foster mosaic of native grassland and shrub, while considering impacts of fire on rare shrub species and native forbs.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic plants. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.

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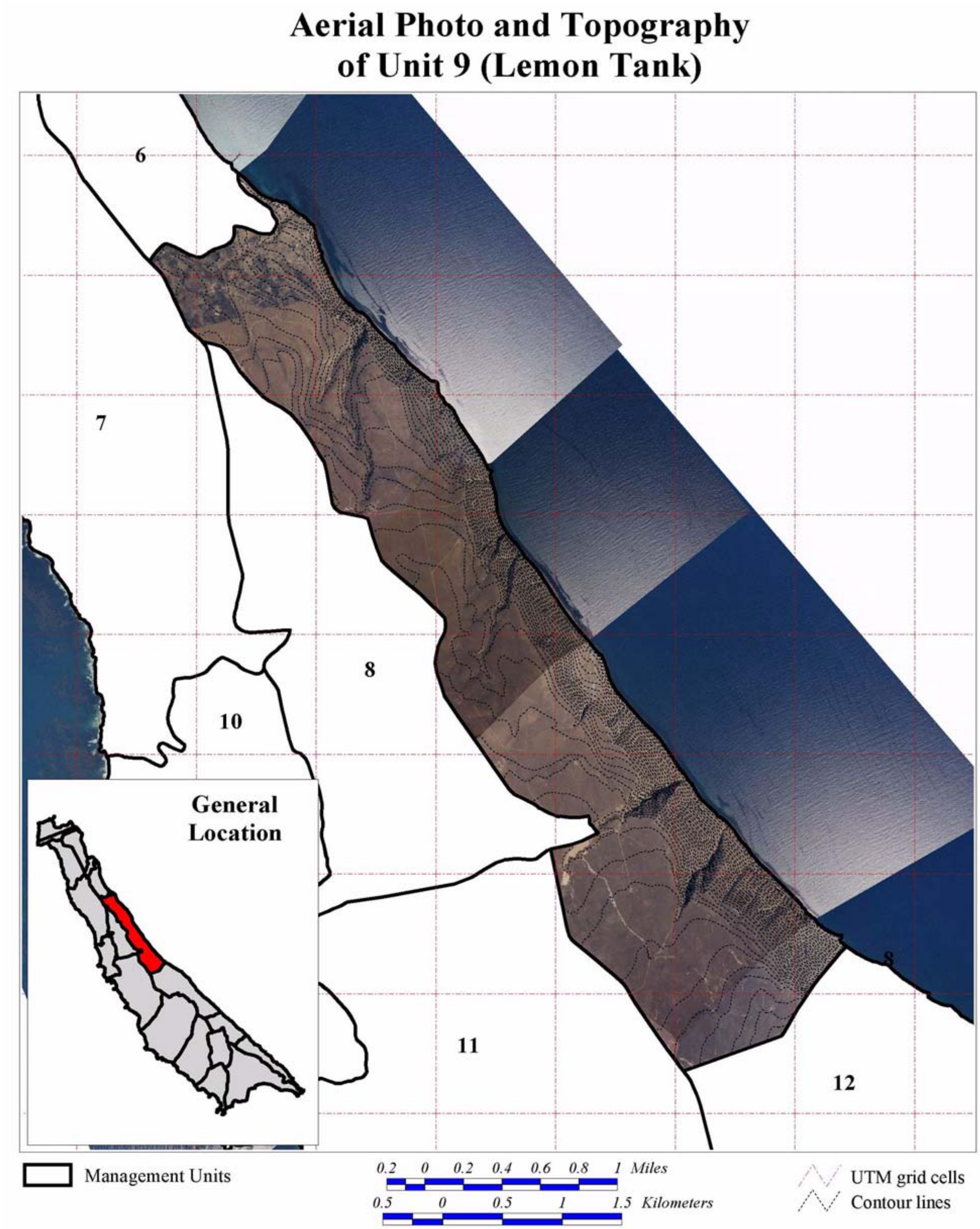
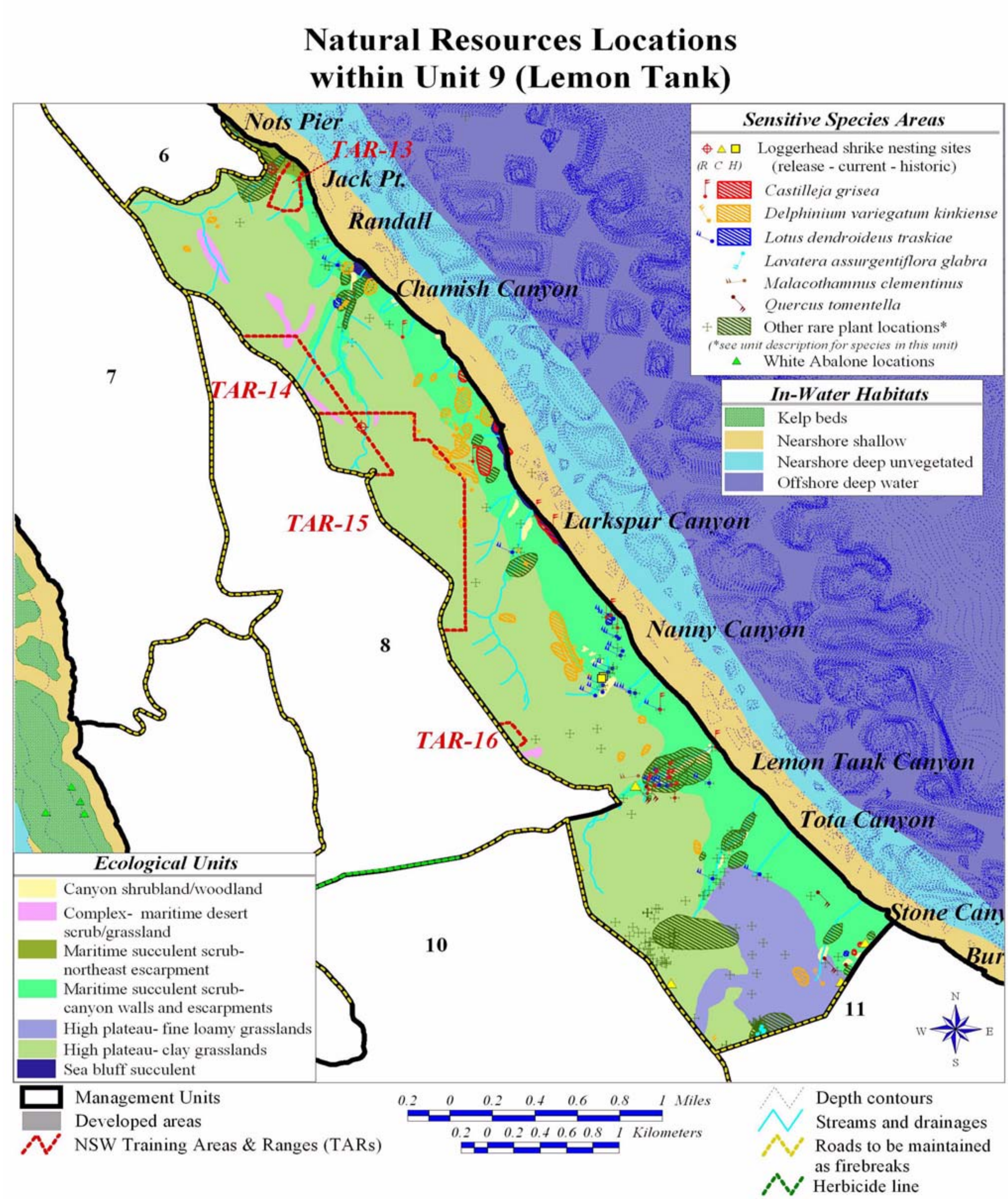

Aerial Photo and Topography
of Unit 9 (Lemon Tank)
6
7
8
10
11
12
General
Location
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.5 0 0.5 1 1.5 Kilometers
UTM grid cells
Contour lines



Map 5-10. Natural Resources Locations within Unit 9- Lemon Tank.

Location: Unit 9 - Lemon Tank

Military Value: Low
Fleet Marine Ground
Ground Operations
Engineering Operations
Command & Control
Ground Reconnaissance & Surveillance
Naval Special Warfare
Land Special Operations
Maritime Special Operations
Air Special Operations
Information Special Operations
RDT&E
Radio Frequency Tests
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, landing craft, missile impacts, fixed wing landings, bombing, laser designator.
Other Uses
Facilities
TAR 13, portions of TARs 14, 15, & 16
Roads: Primary- 2.9 mi (4.7 km)
Secondary- 11.3 mi (18.2 km)

Natural Resources Value: High
Ecological Units
Canyon woodland (25.3 ac)
MDS/Grassland complex (28.6 ac)
Maritime Sage Scrub northeast escarpment (20.1 ac)
Maritime Sage Scrub (665.6 ac)
Grasslands, clay soils (1488.2 ac)
Grasslands, loamy soils (216.7 ac)
Sea bluff succulent (16.0 ac)
Wildlife
San Clemente loggerhead shrike*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Aphanisma blitoides, Artemisia nesiotica, Astragalus nevinii, Brodiaea kinkiensis, Castilleja grisea, Ceanothus megacarpus var. insularis, Coreopsis giganteum, Dodecatheon clevelandii ssp. insulare, Delphinium variegatum kinkiense*, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinnii, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Heteromeles arbutifolia var. macrocarpa, Jepsonia malviflora, Lavatera assurgentiflora glabra, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Malacothamnus clementinus*, Microseris douglasii platycarpa, Munzothamnus blairii, Phacelia floribunda, Phacelia lyonii, Quercus tomentella, Scrophularia villosa, Munzothamnus blairii, Triteleia clementina*
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

Natural Resources Management Emphases

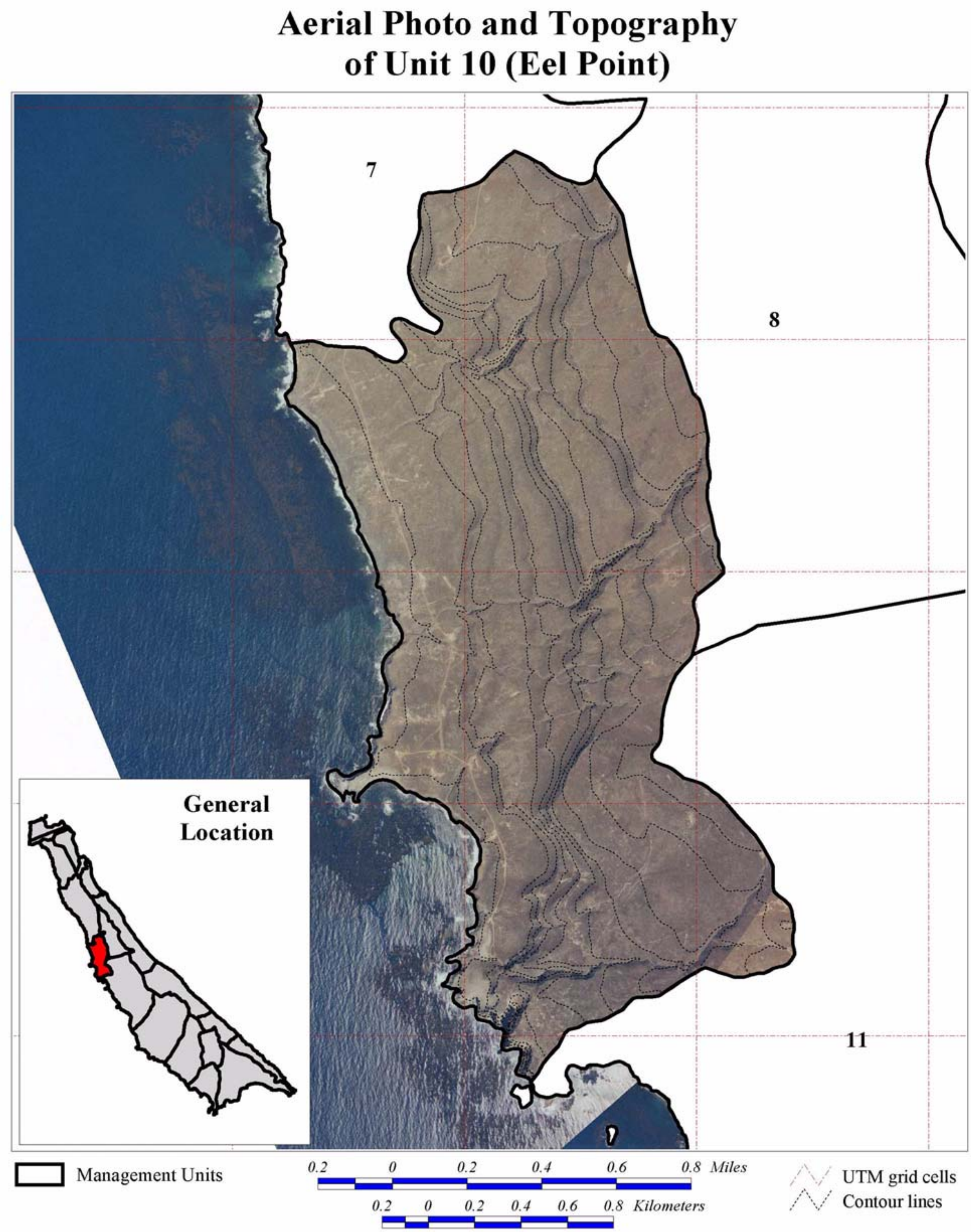
- Low military value. Maintain those military values to the extent possible and with greatest flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Historic location for island tree mallow.
- High value for San Clemente Island larkspur (72% of population occurs in this unit).
- High fire encroachment risk from the west.
- High value for *Lavatera assurgentiflora glabra* (4% of population occurs in this unit).
- High value for Island oak (13% of the population occurs in this unit).
- High value for *Coreopsis giganteum*- only known island location.

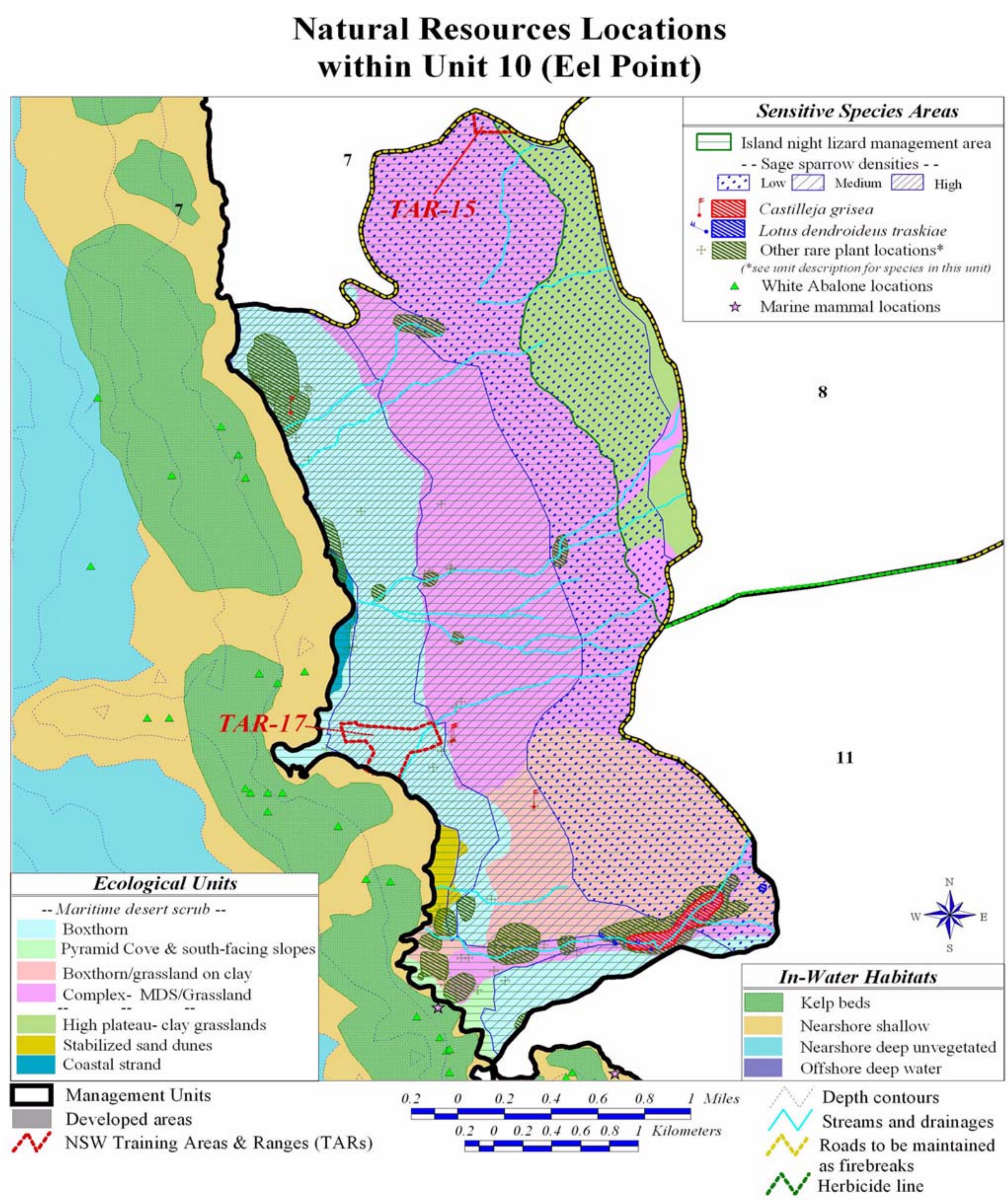
Fire Suppression

- This is a high priority fire suppression area due to high natural resources values and risk of ignitions from west.
- The first fire suppression response is to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Send a Type 3 equivalent wildland engine to all reported fires. Control and contain fire at LMU boundaries or roads. Keep the wildland fire to the smallest size possible. This action will be supported by a helicopter, if already on standby for other training activities, on High, Very High and Extreme fire danger days.

Fire Management

- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- This is a high priority grassland restoration area because of high percentage of endemic forms including the endangered San Clemente Island larkspur. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Protect Trask's island lotus from competition (from non-native grasses and iceplant) using managed fire. Protect from vehicle impacts if necessary.
- Protect Island oaks from fires that will damage trees or seedlings or saplings.
- In shrublands and woodlands recruitment should exceed mortality of all management focus species and all native trees. Canyon shrubland or woodland boundaries should continue to stay the same or increase, and a diverse habitat structure should exist sufficient to support self-sustaining populations of all native plants and wildlife. Also oaks and other woodlands on eroding or erodible surfaces should develop on stable, non-eroding sites.
- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturation, reproduction and recruitment are the biggest risks of fire.
- Small patch size will be targeted by keeping to less than three acres, moderate intensity or higher fires (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period by fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but recruits prolifically from seed after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic plants. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic grasses. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Coyote brush *(Baccharis pilularis)* is not specifically protected from fire unless locally occupied by a nesting SCLS. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding threshold values.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and control the risk of stand-replacing fire.


Aerial Photo and Topography
of Unit 10 (Eel Point)
7
8
11
General
Location
Management Units
0.2 0 0.2 0.4 0.6 0.8 Miles
0.2 0 0.2 0.4 0.6 0.8 Kilometers
UTM grid cells
Contour lines



Map 5-11. Natural Resources Locations within Unit 10- Eel Point.

Location: Unit 10 - Eel Point

Military Value: High

Fleet Marine Air

- Combat Search & Rescue
- Troop Lifts
- Night Operations

Fleet Marine Ground

- Ground Operations
- Engineering Operations
- Ground Reconnaissance & Surveillance

Naval Special Warfare

- Land Special Operations
- Maritime Special Operations
- Air Special Operations
- Information Special Operations

THIRD Fleet

- Multiwarfare Operations

Prohibited Uses

Landing craft, missile impacts, fixed wing landings, bombing, laser designator.

Other Uses

Recreational diving and fishing areas off-shore

Facilities

- TAR-17
- Little Rock IR SAM
- Sites with Mobile EW

Roads

Secondary- 10.2mi (16.5 km)

Natural Resources Value: Highest

Ecological Units

- MDS/Grassland complex (555.6 ac)
- MDS Boxthorn/grassland (189.5 ac)
- MDS Pyramid Cove/South-facing slopes (9.6 ac)
- MDS Boxthorn (260.4 ac)
- Grasslands, clay soils (135.7 ac)
- Stabilized sand dunes (9.9 ac)
- Coastal strand (6.6 ac)
- Sea stacks

Wildlife

- San Clemente sage sparrow*
- Island night lizard*
- Xantus's murrelet
- Island fox

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants

Aphanisma blitoides, Artemisia nesiotica, Astragalus nevinii, Atriplex pacifica, Camissonia guadalupensis, Castilleja grisea, Crossosoma californicum, Cryptantha traskiae, Dudleya virens virens, Eschscholzia ramosa, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis*

**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

Natural Resources Management Emphases

- High military value,. Protect those military values with increasing flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- High fire incidence from Eel Point area.
- San Clemente sage sparrow high density area.
- Historic location for island tree mallow.
- Erosion from plateau roads.
- Invasive species control.

Fire Suppression

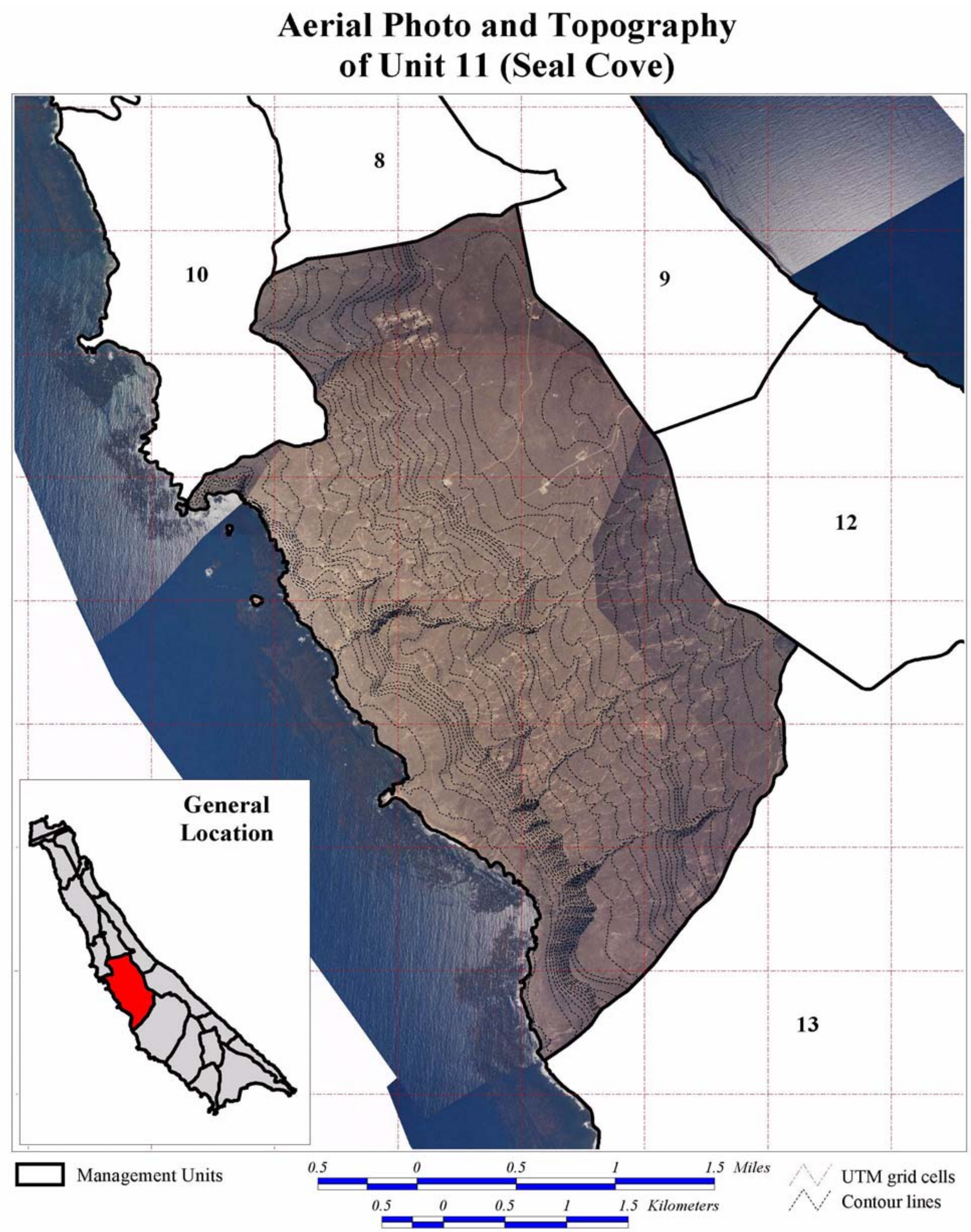
- This is a high priority fire management area to keep fires out of high density San Clemente sage sparrow habitat and from crossing south of Eel Cove Canyon. Use retardant or prescribed fire fuels management as necessary to achieve objectives.
- Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native species. If the fire is in the low-terrace boxthorn habitat, the first fire suppression response is direct attack without ground disturbance, including use of a helicopter if already on-Island and available, as soon as possible to keep the fire to the smallest size possible.

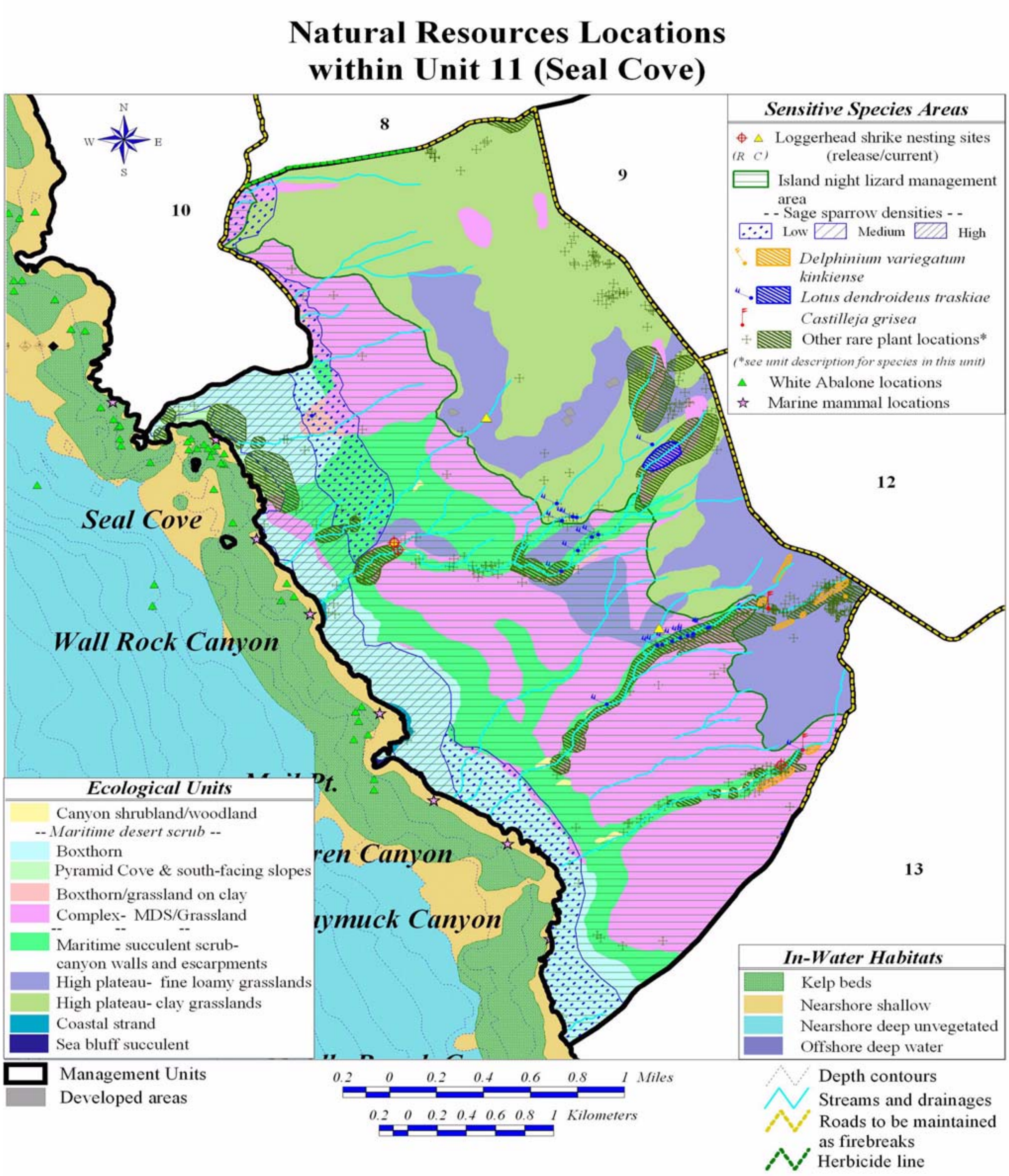
Fire Management

- The Lost Point Trail should remain passable by two-wheel drive emergency vehicles to the canyon directly east of Eel Point. A gate should be installed at that location. Beyond this point, the road should remain passable by 4-wheel drive emergency vehicles. Emergency personnel should have access through the ordnance magazine area as necessary for fire suppression.
- Evaluate locations of potential fire escape from Eel Cove vicinity military activity, and implement, if necessary, a retardant fuelbreak to protect high-density San Clemente sage sparrow habitat, canyon woodlands, and cliff spurge at vulnerable locations if found to be advantageous.

Land Management Unit 10 (*Cont'd*)

- No ground suppression equipment in boxthorn habitat. Stay on roads.
- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures or facilities in this LMU by June 15.
- This area has very high military value but also value for San Clemente sage sparrows and a Jeopardy Opinion was once threatened for proposed use at this location. So the usual boxthorn objectives will apply in high-density and moderate-density boxthorn/San Clemente sage sparrow habitat. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale where litter, duff, and grasses burned to ash; shrubs are burned to singed with some resprouts) mapped using a 1/2-acre minimum mapping unit for boundaries (including unburned inclusions) and intensity.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Cliff spurge *(Euphorbia misera)* community on slope above Eel Point should be managed to protect from repeated fire, erosion, exotic grass competition and hot fires that kill the shrub.
- In shrublands and woodlands recruitment should exceed mortality of all focus management species and all native trees. Shrubland or woodland boundaries should stay the same or expand, and a diverse habitat structure should exist sufficient to support self-sustaining populations of all native plants and wildlife.
- Small patch size will be targeted by keeping to less than three acres, moderate intensity or higher fires (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but recruits prolifically from seed after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic grasses. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic grasses. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses. Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Coyote brush *(Baccharis pilularis)* is not specifically protected from fire unless locally occupied by a nesting SCLS. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding threshold values.
- Evaluate the increasing fuel hazard occurring with shrub expansion to devise fuel management measures and manage the risk of stand-replacing fire.


Aerial Photo and Topography
of Unit 11 (Seal Cove)
8
10
9
12
13
General
Location
Management Units
0.5 0 0.5 1 1.5 Miles
0.5 0 0.5 1 1.5 Kilometers
UTM grid cells
Contour lines



Map 5-12. Natural Resources Locations within Unit 11- Seal Cove.

Location: Unit 11 - Seal Cove

Military Value: High
Fleet Marine Air
Combat Search & Rescue
Troop Lifts
Night Operations
Fleet Marine Ground
Ground Operations
Engineering Operations
Ground Reconnaissance & Surveillance
Naval Special Warfare
Land Special Operations
Maritime Special Operations
Air Special Operations
Information Special Operations
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Landing craft, missile impacts, fixed wing landings, bombing, laser designator.
Other Uses
SCORE's Tombstone Radar
Recreational diving and fishing areas off-shore
Facilities
Sites with Mobile EW
Roads
Primary- 2.7 mi (4.4 km)
Secondary- 9.6 mi (15.5 km)

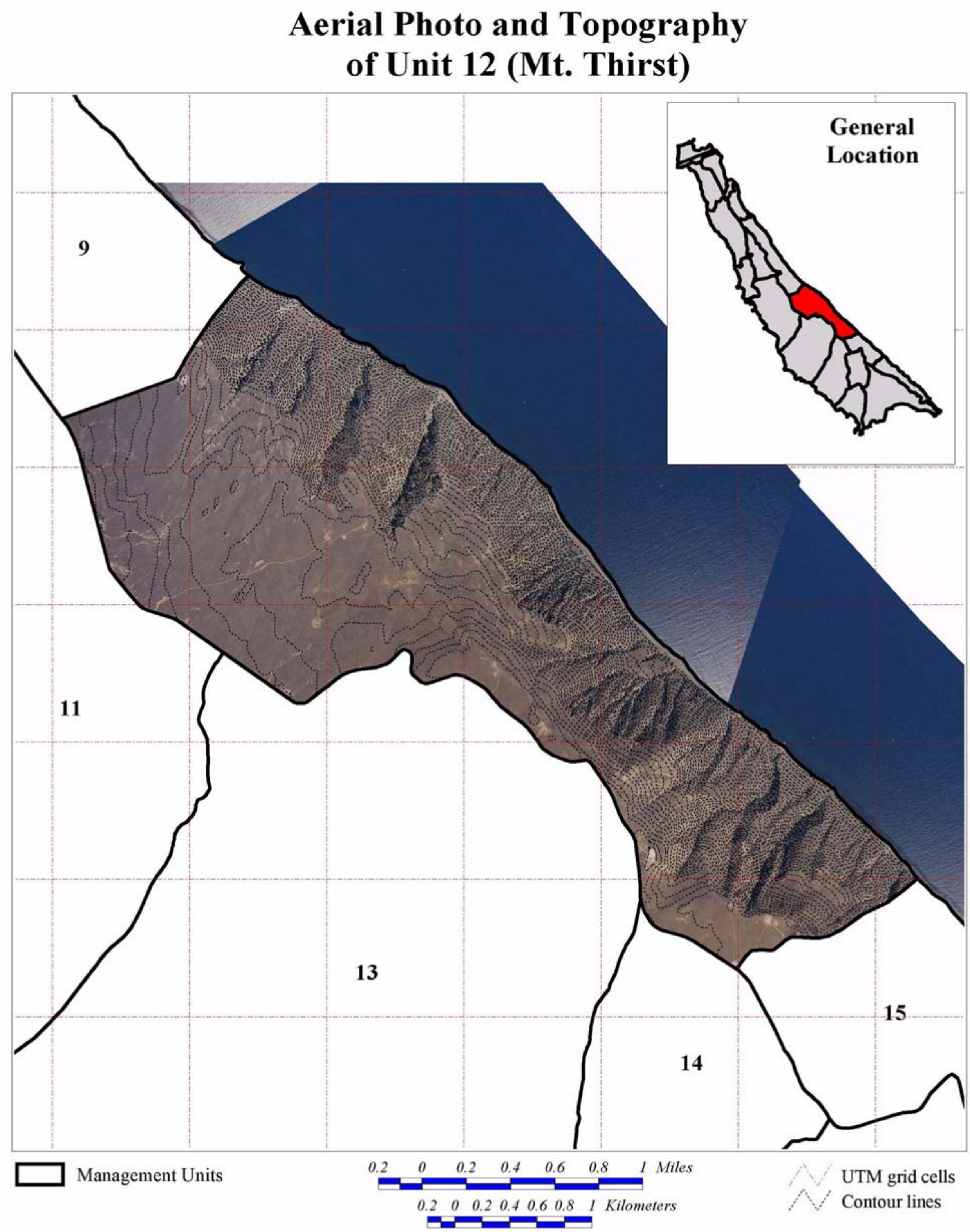
Natural Resources Value: Highest
Ecological Units
Canyon woodland (11.2 ac)
MDS/Grassland complex (1260.4 ac)
MDS Boxthorn/grassland (19.6 ac)
MDS Pyramid Cove/South-facing slopes (29.1 ac)
MDS Boxthorn (501.1 ac)
Maritime Sage Scrub (645.1 ac)
Grasslands, clay soils (989.8 ac)
Grasslands, loamy soils (681.4 ac)
Coastal strand (6.9 ac)
Sea bluff succulent (1.8 ac)
Sea stacks
Wildlife
Ashy storm-petrel
San Clemente loggerhead shrike*
San Clemente sage sparrow*
Island night lizard*
Xantus's murrelet
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Aphanisma blitoides, Artemisia nesiotica, Astragalus nevinii, Atriplex pacifica, Brodiaea kinkiensis, Castilleja grisdea, Ceanothus megacarpus var. insularis, Crossosoma californicum, Cryptantha traskiae, Delphinium variegatum kinkiense*, Dodecatheon clevelandii ssp. insulare, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinnii, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Heteromeles arbutifolia var. macrocarpa, Hazardia cana, Jepsonia malvifolia, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Microseris douglasii platycarpa, Phacelia floribunda, Phacelia lyonii, Munzothamnus blairii, Triteleia clementina*
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

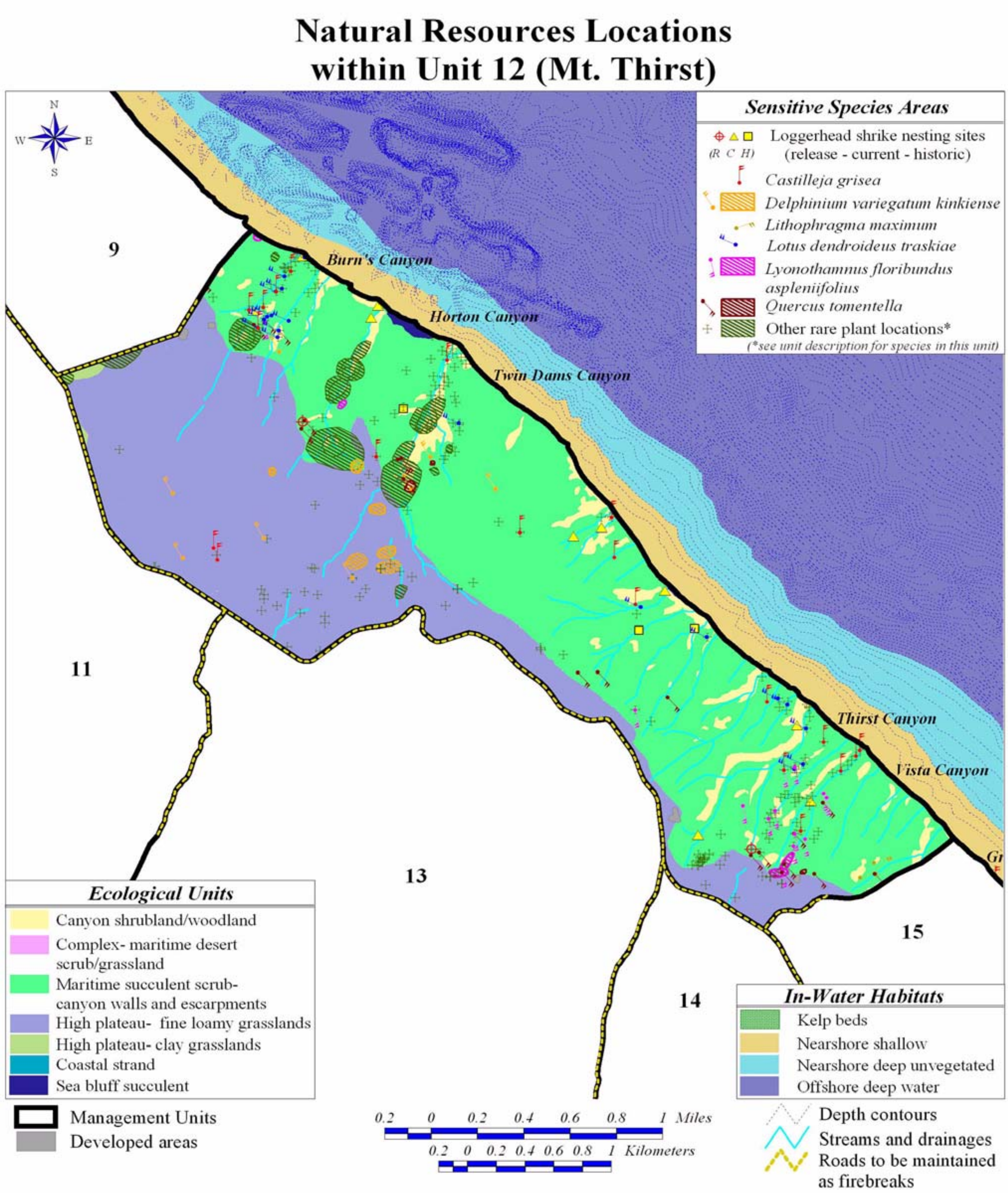
Natural Resources Management Emphases
- High military value. Protect those military values with increasing flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- High fire incidence from Eel Point area.
- San Clemente sage sparrow high density area.
- Historic location for island tree mallow.
- Erosion from plateau roads.
- Invasive species control.

Fire Suppression
- This is a high priority fire management area due to high natural resources and military values.
- Keep fires out of high density San Clemente sage sparrow habitat and from crossing south of Eel Cove Canyon. Use retardant or prescribed fire fuels management as necessary to achieve objectives.
- The first fire suppression response is to send a Type 3 wildland engine to all reported fires. If the fire is in the low-terrace boxthorn habitat or threatens canyon woodlands at moderate or higher intensity, the first fire suppression response is direct attack without ground disturbance, including use of a helicopter if available, as soon as possible to keep the fire to the smallest size possible.
- No ground suppression equipment in boxthorn habitat. Stay on roads.
- Control and contain fire at LMU boundaries or roads, while allowing the wildland fire to be a beneficial management tool to control non-native species. This action will be supported by a helicopter on High, Very High and Extreme fire danger days if already on standby due to other training activities.

Fire Management

- Evaluate locations of potential fire escape from Eel Cove vicinity military activity, and implement fuelbreak to protect high-density San Clemente sage sparrow habitat, canyon woodlands, and cliff spurge at vulnerable locations if found to be advantageous.
- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures or facilities in this LMU by June 15.
- This area has very high military value, so the usual boxthorn objectives will not apply except in high-density San Clemente sage sparrow habitat. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale where litter, duff, and grasses burned to ash; shrubs are burned to singed with some resprouts) mapped using a 1/2-acre minimum mapping unit for boundaries (including unburned inclusions) and intensity.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- In shrublands and woodlands recruitment should exceed mortality of all focus management species and all native trees. Shrubland or woodland boundaries should stay the same or expand, and a diverse habitat structure should exist sufficient to support self-sustaining populations of all native plants and wildlife.
- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Small patch size will be targeted by keeping to less than three acres moderate intensity or higher fires (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but recruits prolifically from seed after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic grasses. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- The risk to natural resources from short fire return intervals in clay grasslands appears to be low and fire is expected to be a useful tool in control of exotic grasses. Use prescribed fire to foster a mosaic of grassland with shrubs in patches or on knolls, while considering the impacts of fire on rare shrub species and native herbs and grasses.
- Few specific fire thresholds are identified because clay grassland is likely to maintain its health at fire intervals as short as 5-10 years. Achieve a minimum 5-year return interval. Attempt to prevent fire from burning larger than 300 acres, but this is *not* a threshold that should be used to justify enhanced suppression resources if exceeded.
- Manage fire for openness of grasslands and for native perennial herbs and grasses, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Coyote brush *(Baccharis pilularis)* is not specifically protected from fire unless locally occupied by a nesting SCLS. So, until further understanding changes this approach, no situation is identified (except nesting by SCLS) in which enhanced fire suppression would be justified due to exceeding threshold values.
- Evaluate the increasing fuel hazard occurring with shrub expansion to devise fuel management measures and manage the risk of stand-replacing fire.


Aerial Photo and Topography
of Unit 12 (Mt. Thirst)
General
Location
9
11
13
14
15
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-13. Natural Resources Locations within Unit 12- Mt. Thirst.

Location: Unit 12 - Mt. Thirst

Military Value: Medium
Fleet Marine Air
Command & Control
Night Operations
Fleet Marine Ground
Ground Operations
Naval Special Warfare
Land Special Operations
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Off-road vehicles, heavy wheeled vehicles, tracked vehicles, landing craft, missile impacts, fixed wing landings, bombing, laser designator.
Other Uses
Recreational fishing areas offshore
Facilities
Mt. Thirst Radar
Mt. Vista Communications TACAN
Stations Peak Communications
Natural Resources Station Stone
Roads
Primary- 4.7 mi (7.6 km)
Secondary- 2.9 mi (4.7 km)

Natural Resources Value: High
Ecological Units
Canyon woodland (158.1 ac)
MDS/Grassland complex (<1 ac)
Maritime Sage Scrub (1474.3 ac)
Grasslands, clay soils (9.1 ac)
Grasslands, loamy soils (1078.0 ac)
Coastal strand (<1 ac)
Sea bluff succulent (7.4 ac)
Wildlife
San Clemente loggerhead shrike*
San Clemente sage sparrow*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Brodiaea kinkiensis, Castilleja grisea, Convolvulus simi-lans, Delphinium variegatum kinkiense*, Delphinium var-iegatum thornei, Dudleya virens virens, Eriogonum giganteum formosum, Eschscholzia ramosa, Galium cata-linense acrispum, Galvezia speciosa, Hazardia cana, Het-eromeles arbutifolia var. macrocarpa, Jepsonia malviflora, Lithophragma maximum, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Lyonothamnus floribundus aspleni-folius, Microseris douglasii platycarpa, Phacelia lyonii, Quercus tomentella, Scrophularia villosa, Munzothamnus blairii, Trifolium gracilentum palmeri, Triteleia clementina*
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

Natural Resources Management Emphases

- Medium military value. Maintain those military values with high flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- High fire encroachment risk in the southwest corner.
- Erosion from plateau roads.
- San Clemente Island larkspur.
- High value for Island oak (62% of the population occurs in this unit).
- High value for Santa Cruz ironwood (5% of population occurs in this unit).
- High value for *Castilleja grisea* (35% of population occurs in this unit).

Fire Suppression

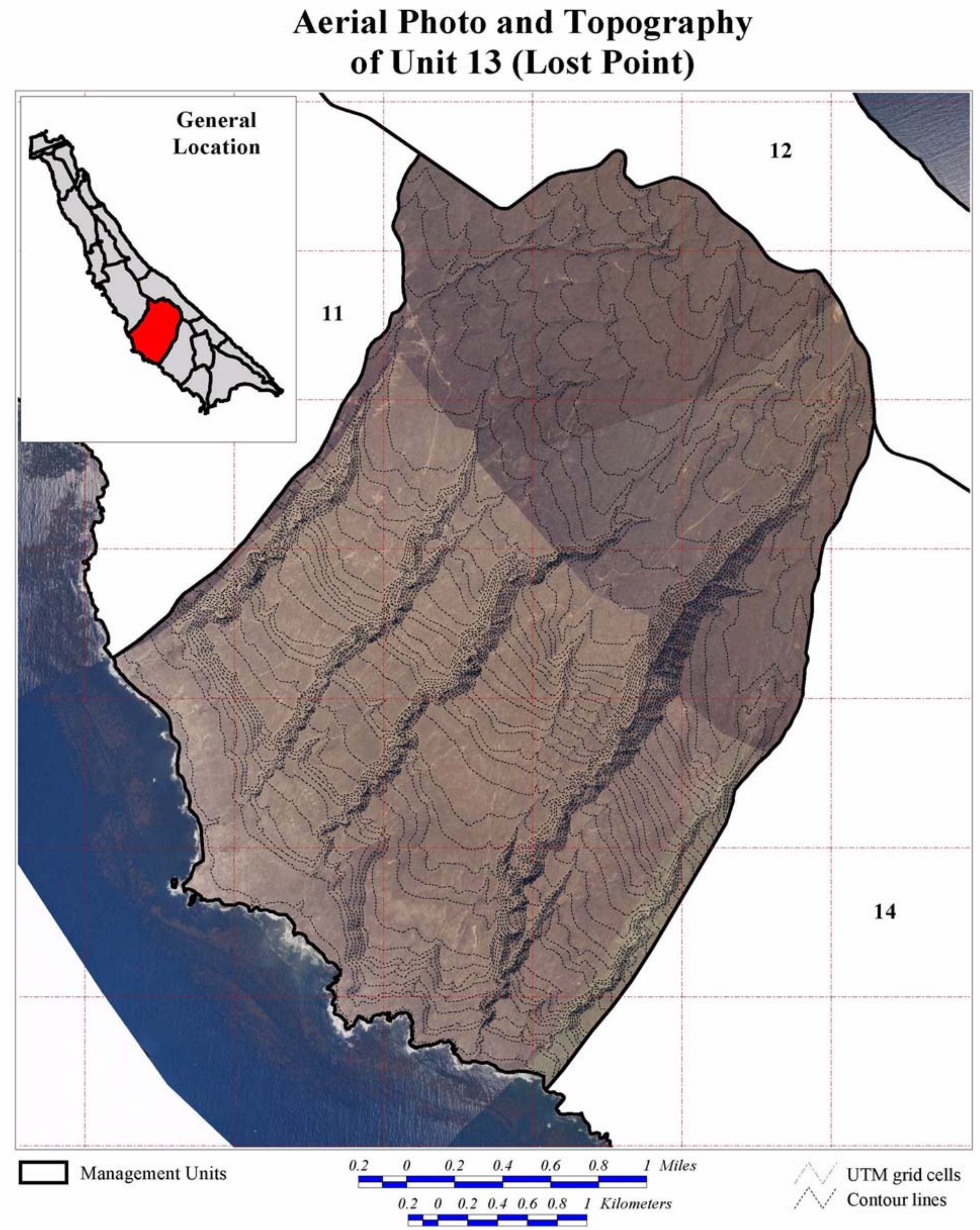
- This is a high priority fire suppression area due to high value natural resources.
- Portable water tank should be staged here and full during fire season.
- Ensure fires do not cross SHOBA Ridge Road.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads or LMU boundaries.

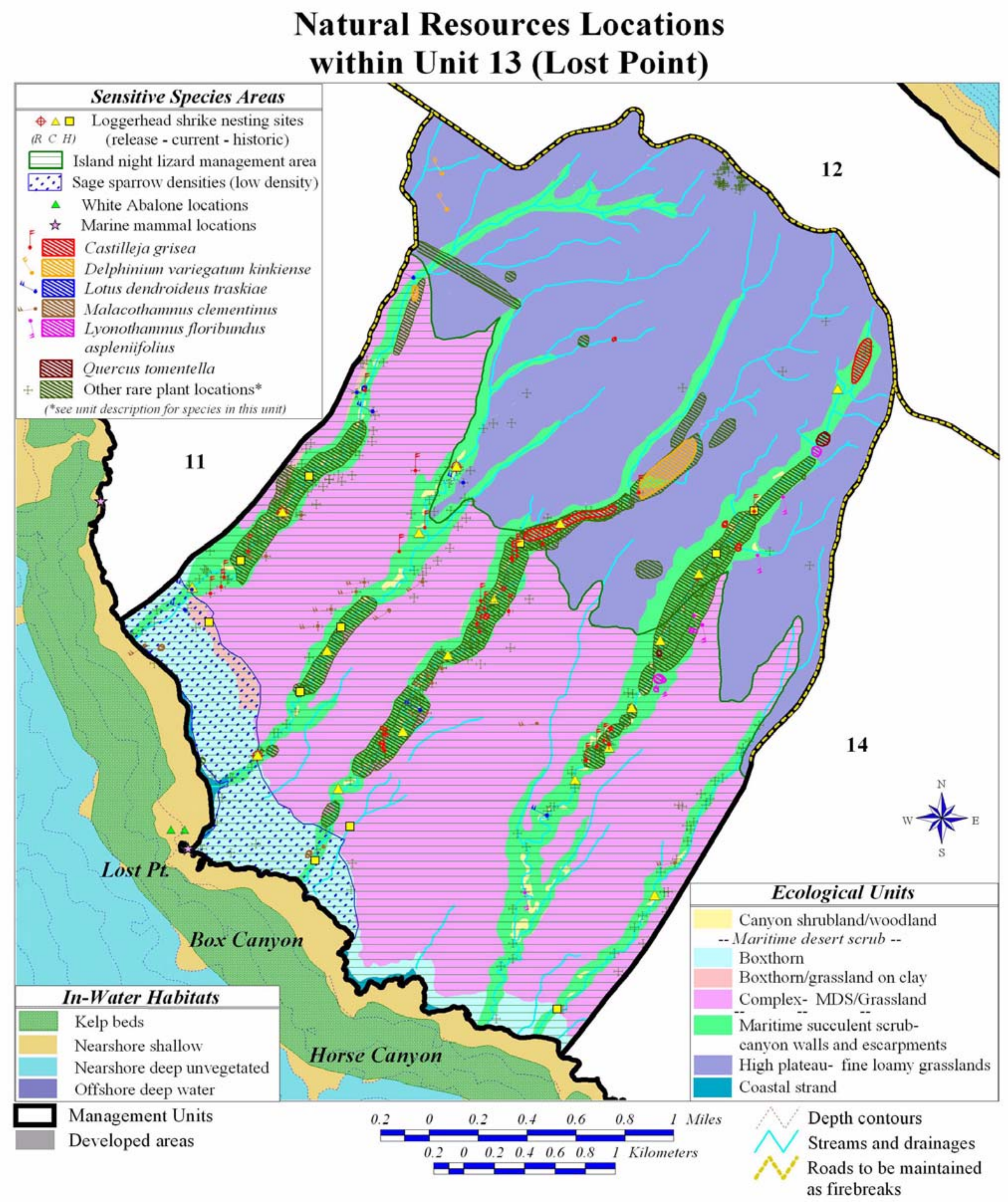
Fire Management

- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure that fires do not cross Ridge Road.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.

Land Management Unit 12 (*Cont'd*)

- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures or facilities in this LMU by June 15.
- Manage fire for openness of grasslands and native forbs, to enhance transit and prey availability for fox, and prey availability for the San Clemente loggerhead shrike.
- Evaluate the increasing fuel hazard with shrub encroachment to devise fuel management measures and manage the risk of stand-replacing fire.
- Allow no mortality of any individual ironwood tree to excessively hot or frequent fire. Consider the use of prescribed fire to protect entire groves from stand-replacing loss, to improve seedbed conditions, and reduce exotics.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic grasses. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.


Aerial Photo and Topography
of Unit 13 (Lost Point)
General
Location
11
12
14
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-14. Natural Resources Locations within Unit 13- Lost Point.

Location: Unit 13 - Lost Point

Military Value: Lowest
Fleet Marine Air
Combat Search & Rescue
Troop Lifts
Night Operations
Naval Special Warfare
Land Special Operations
Fleet Marine Ground
Ground Operations
Ground Reconnaissance & Surveillance
THIRD Fleet
Multiwarfare Operations

Prohibited Uses
Landing craft, missile impacts, fixed wing landings, bombing, laser designator.
Other Uses
Recreational diving and fishing areas offshore
Facilities
REWS
Roads
Primary- 2.8 mi (4.5 km)
Secondary- 4.7 mi (7.6 km)

Natural Resources Value: Highest
Ecological Units
Canyon woodland (44.2 ac)
MDS/Grassland complex (1845.0 ac)
MDS Boxthorn/grassland (27.4 ac)
MDS Boxthorn (289.7 ac)
Maritime Sage Scrub (792.4 ac)
Grasslands, loamy soils (1756.1 ac)
Coastal strand (17.6 ac)
Sea stacks
Wildlife
San Clemente loggerhead shrike*
Island night lizard*
Island fox
San Clemente sage sparrow*
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Aphanisma blitoides, Artemisia nesiotica, Atriplex pacifica, Brodiaea kinkiensis, Castilleja grisea, Crossosoma californicum, Delphinium variegatum kinkiense*, Dudleya virens virens, Eriogonum giganteum formosum, Eschscholzia ramosa, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Jepsonia malviflora, Lotus argophyllus adsurgens, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Lyonothamnus floribundus asplenifolius, Malacothamnus clementinus*, Phacelia floribunda, Phacelia lyonii, Rhamnus pirifolia, Munzothamnus blairii, Triteleia clementina*
**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

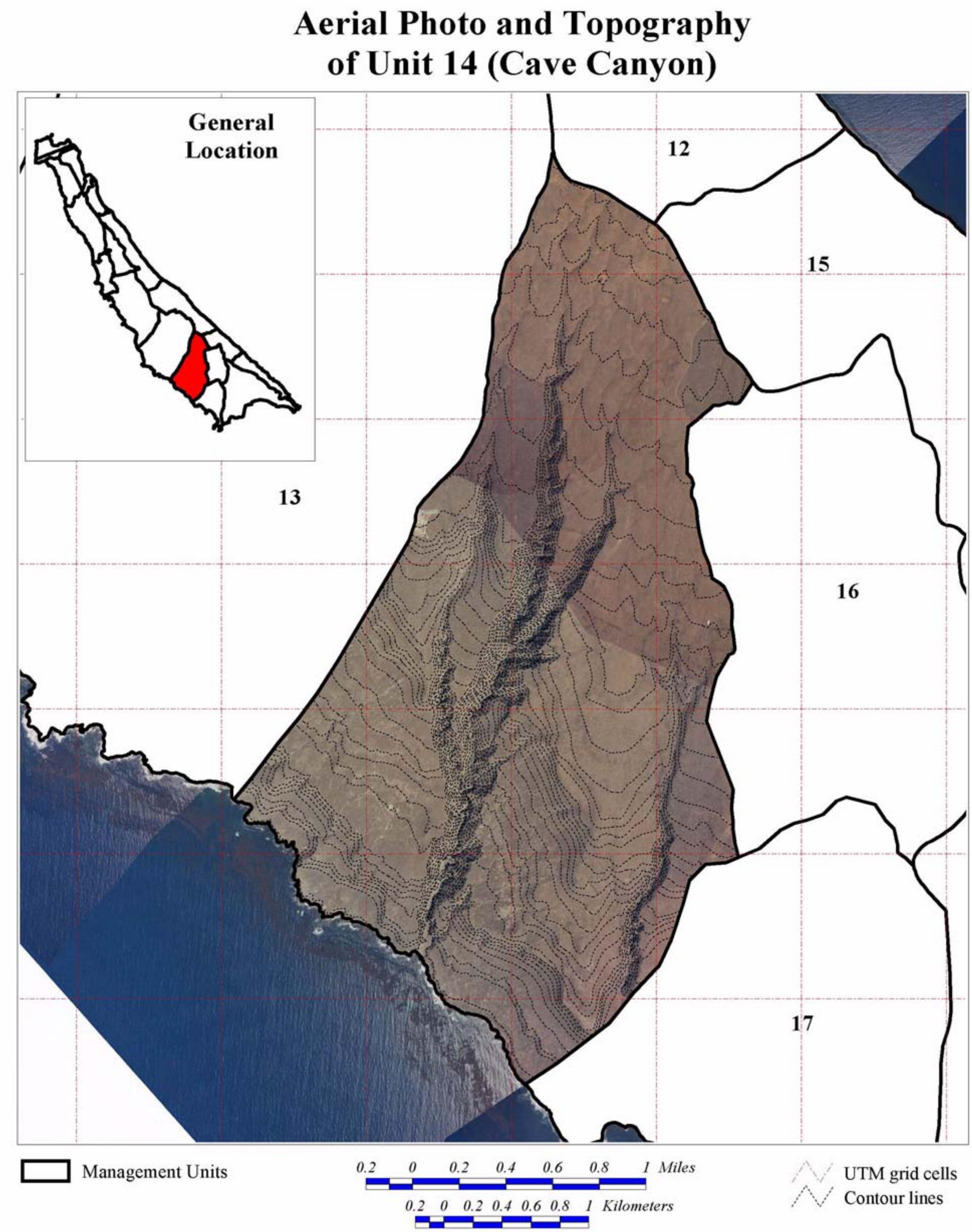
Natural Resources Management Emphases
- Lowest military values. Maintain those military values to the extent possible and with greatest flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Erosion from plateau.
- High value for *Malacothamnus clementinus* (30% of population occurs in this unit).
- High value for Santa Cruz ironwood (2% of population occurs in this unit).

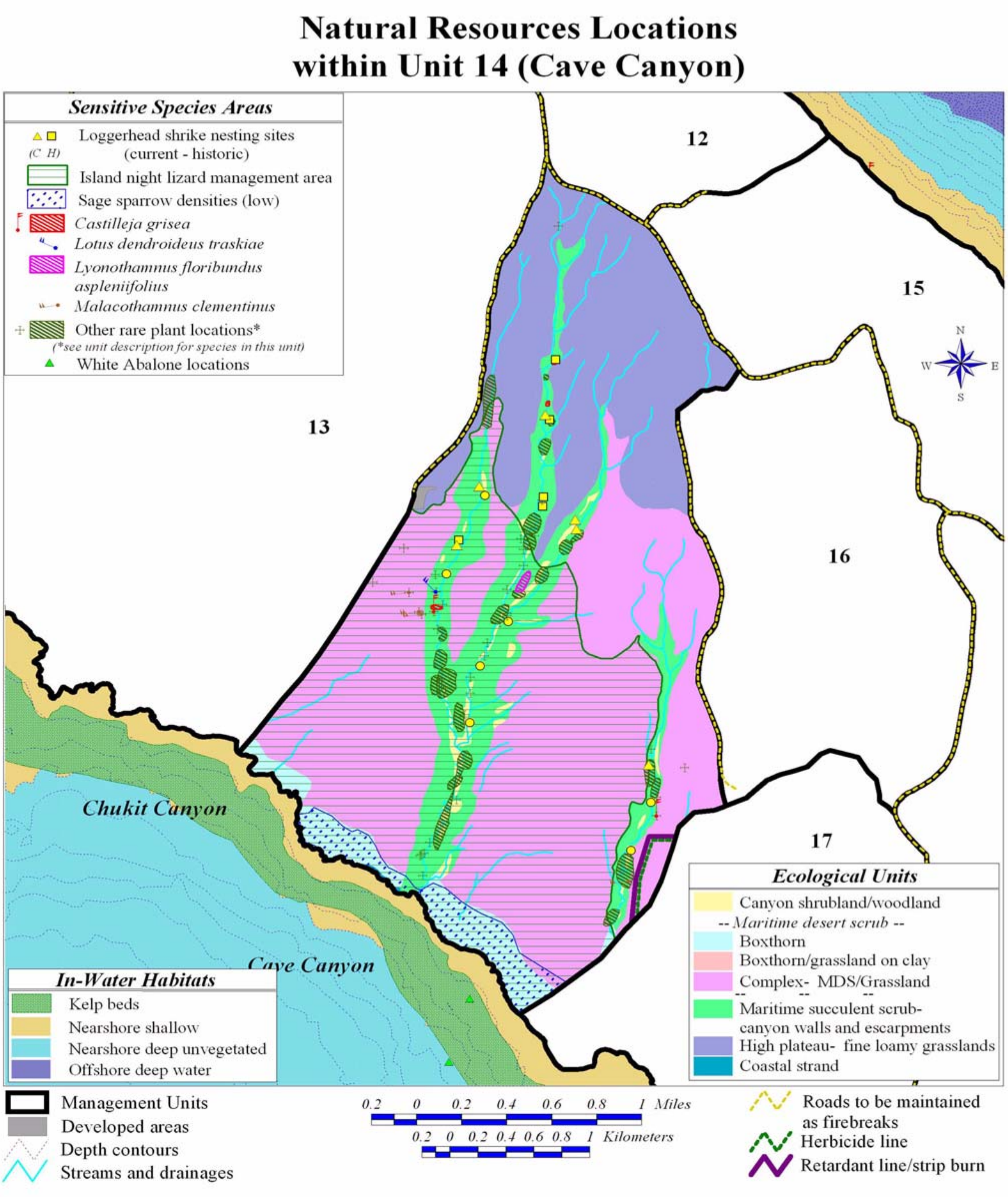
Fire Suppression
- This is a high priority fire suppression area due to high value military resources (REWS), natural resources and historic fires.
- Ensure fires do not cross Ridge Road.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.

Fire Management
- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure fires do not cross Ridge Road.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures or facilities in this LMU by June 15.

Land Management Unit 13 (*Cont'd*)

- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. Also that oaks and other woodlands on eroding or erodible surfaces develop on stable sites.
- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Fire management thresholds in boxthorn/grassland complex are the same as low-density San Clemente sage sparrow/boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- The risks to natural resources values in the terrace complex community are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery.
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment. Manage for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons and high fire management area on south side of Chukit Canyon boundary and along SHOBA Ridge Road.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic grasses. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.
- Manage fire for openness of grasslands and for native plants, to enhance transit/prey availability for fox, and prey availability for the San Clemente loggerhead shrike.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of stand-replacing fire.


Aerial Photo and Topography
of Unit 14 (Cave Canyon)
General
Location
12
15
13
16
17
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-15. Natural Resources Locations within Unit 14- Cave Canyon.

Location: Unit 14 - Cave Canyon

Military Value: Medium
Air
Electronic Warfare
Night Operations
Surface
Electronic Warfare
Mortar/artillery emplacements (EWTGPAC)
Fleet Marine Air
Electronic Warfare
Night Operations
Third Fleet
Electronic Warfare
Multiwarfare Operations
Prohibited Uses
Recreational camping, fixed wing landings, parachute drops.
Other Uses
Range Electronic Warfare Simulator
Facilities
OP-3
Roads
Primary- 3.1 mi (5.0 km)
Secondary- 1.7 mi (2.8 km)

Natural Resources Value: Medium
Ecological Units
Canyon Woodland (43.6 ac)
MDS/Grassland complex (1602.8 ac)
MDS Boxthorn/grassland (<1 ac)
MDS Boxthorn (151.3 ac)
Maritime Sage Scrub (461.6 ac)
Grasslands, loamy soils (732.7 ac)
Coastal strand (3.0 ac)
Sea stacks
Wildlife
San Clemente loggerhead shrike*
Island night lizard*
Island fox
San Clemente sage sparrow*
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Castilleja grisea, Crossosoma californicum, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinnii, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Malacothamnus clementinus*, Phacelia floribunda, Phacelia lyonii, Rhamnus pirifolia, Munzothamnus blairii*
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

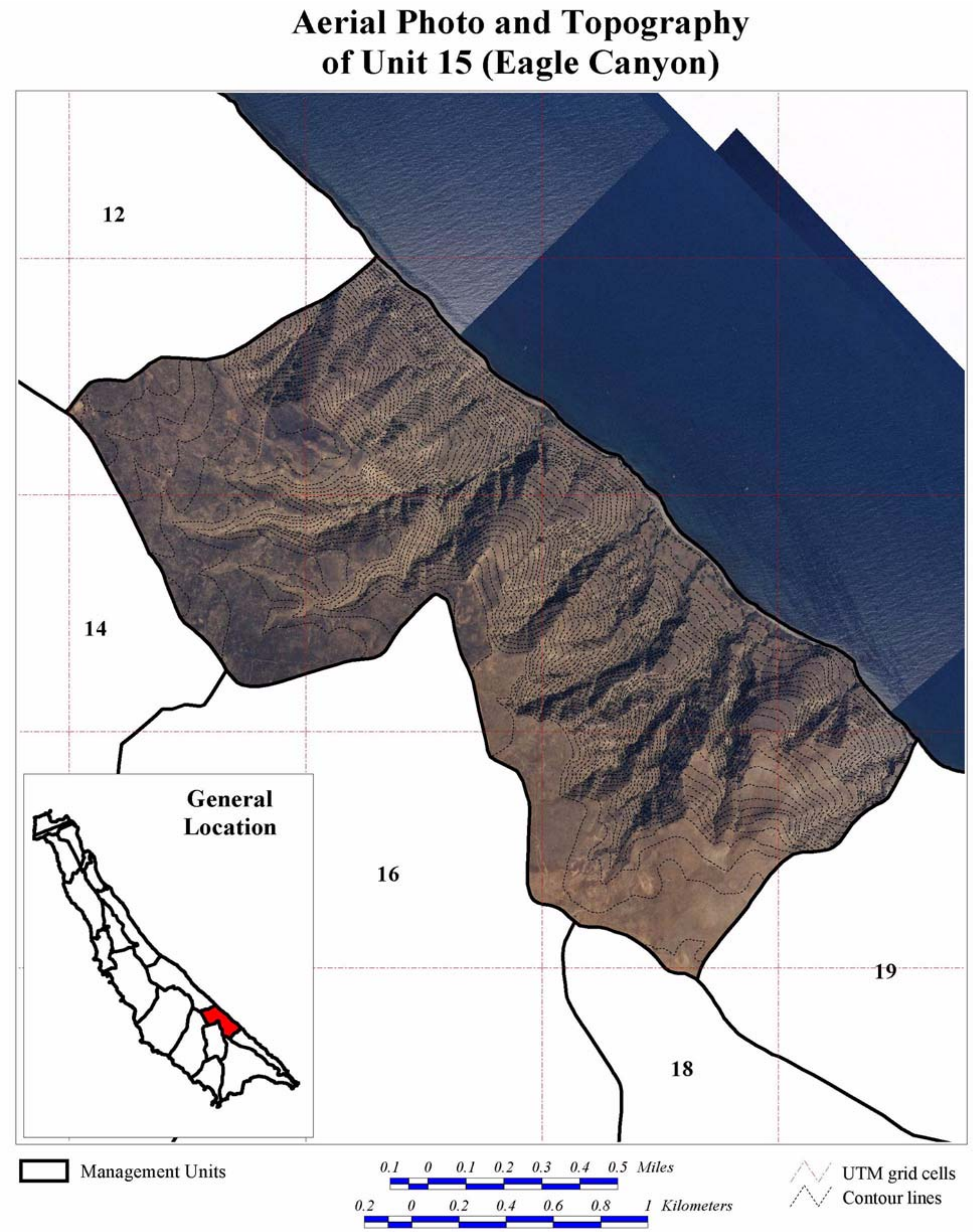
Natural Resources Management Emphases
- Medium military value. Maintain those military values with high flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Erosion from plateau.
- High value for Santa Cruz ironwood (1% of population occurs in this unit).

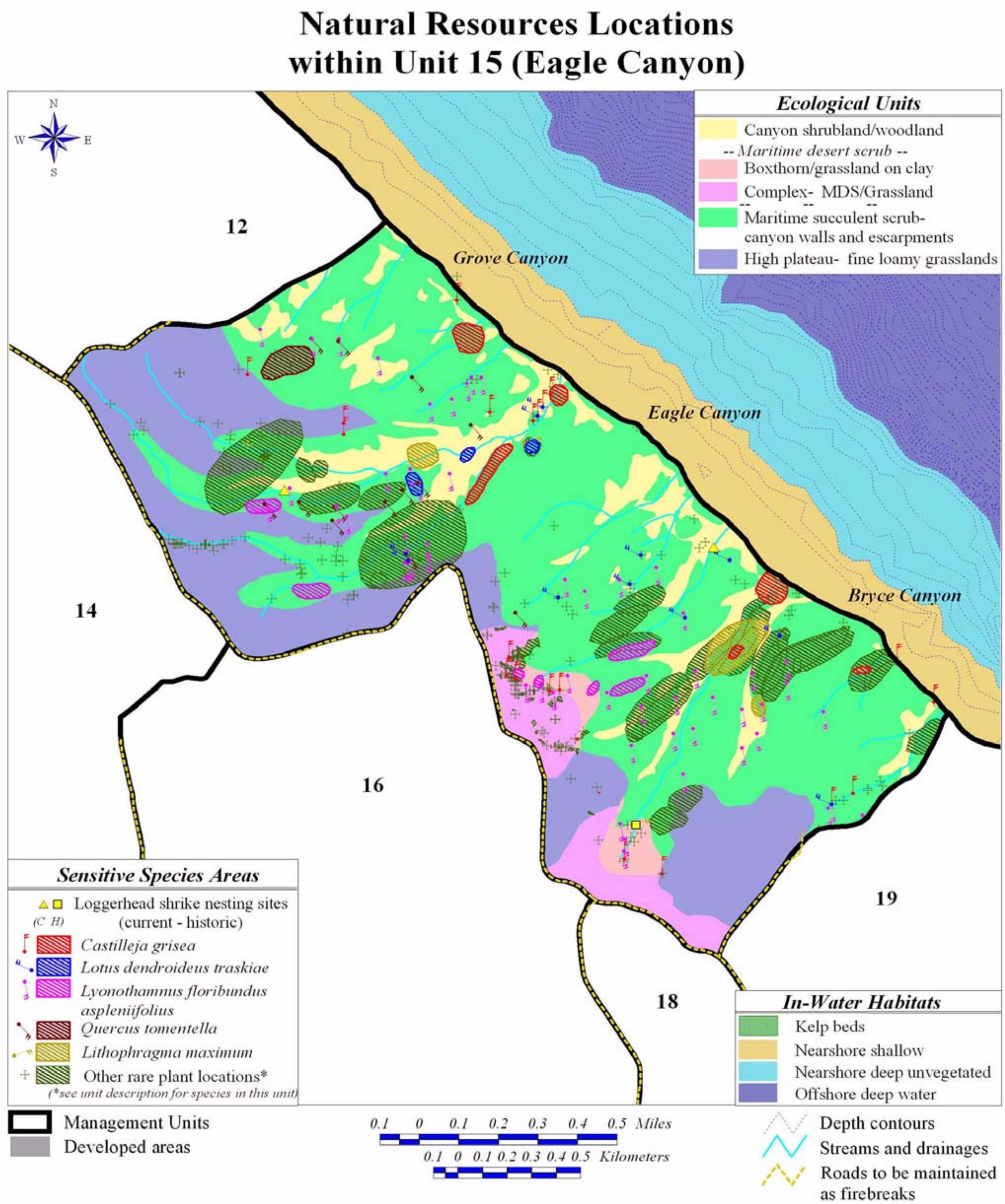
Fire Suppression
- This is a high priority fire suppression area due to high value natural resources and high ignitions.
- Attempt to prevent fires from entering or crossing Chukit Canyon from the south.
- Ensure fires do not cross Ridge Road or Chukit Canyon. Use prescribed strip burns or fuelbreak at vulnerable locations to accomplish this objective.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.

Fire Management
- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure fires do not cross Ridge Road. Evaluate the benefits of establishing a fuelbreak on the southeast side of Chukit Canyon at locations where shrublands and woodlands are vulnerable, and establish this fuelbreak as necessary.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures by June 15.

Land Management Unit 14 (*Cont'd*)

- Evaluate the increasing fuel hazard occurring with shrub expansion to devise fuel management measures and manage the risk of stand-replacing fire.
- In low-density San Clemente sage sparrow/boxthorn habitat. 40 acres will be the standard. Calculations will be based on fires mapped using a minimum 1/2-acre mapping unit for boundaries (including unburned inclusions) and intensity.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. Also that oaks and other woodlands on eroding or erodible surfaces develop on stable sites.
- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres of woodland across the Island (about 40% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Fire management thresholds in boxthorn/grassland complex are the same as low-density San Clemente sage sparrow/boxthorn habitat. The risk to natural resources from short fire return intervals appears to be low and fire is expected to be a useful tool in control of exotic grasses.
- Use prescribed fire to foster a mosaic of grassland and shrub, while considering the impacts of fire on rare shrub species.
- The risks to natural resources values in the terrace complex community are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery.
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment. Manage for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons and high fire management area on south side of Chukit Canyon boundary and along SHOBA Ridge Road.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic plants. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.


Aerial Photo and Topography
of Unit 15 (Eagle Canyon)
12
14
16
18
19
General
Location
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-16. Natural Resources Locations within Unit 15- Eagle Canyon.

Location: Unit 15 - Eagle Canyon

Military Value: Lowest
Fleet Marine Ground
Ground Operations
Fire Support Coordination
THIRD Fleet
Multiwarfare Operations

Prohibited Uses
Recreational camping, fixed wing landings, parachute drops.
Other Uses
Recreational fishing areas offshore
Facilities
Roads
Primary- 2.9 mi (4.6 km)
Secondary- 0.7 mi (1.2 km)

Natural Resources Value: Medium
Ecological Units
Canyon woodland (143.3 ac)
MDS/Grassland complex (61.1 ac)
MDS Boxthorn/grassland (21.2 ac)
Maritime Sage Scrub (648.1 ac)
Grasslands, loamy soils (287.0 ac)
Wildlife
San Clemente loggerhead shrike*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Castilleja grisea, Ceanothus megacarpus insularis, Delphinium variegatum kinkiense*, Delphinium variegatum thornei, Dudleya virens virens, Eriogonum giganteum formosum, Eriophyllum nevinii, Galium catalinense acrispum, Galvezia speciosa, Hazardia cana, Jepsonia malviflora, Linanthus pygmaeus ssp. pygmaeus, Lithophragma maximum, Lotus argophyllus adsurgens, Lotus dendroideus* var. *traskiae*, Lupinus guadalupensis, Lyonothamnus floribundus asplenifolius, Microseris douglasii platycarpa, Phacelia floribunda, Phacelia lyonii, Quercus tomentella, Rhamnus pirifolia, Munzothamnus blairii, Trifolium gracilentum palmeri, Triteleia clementina*
**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

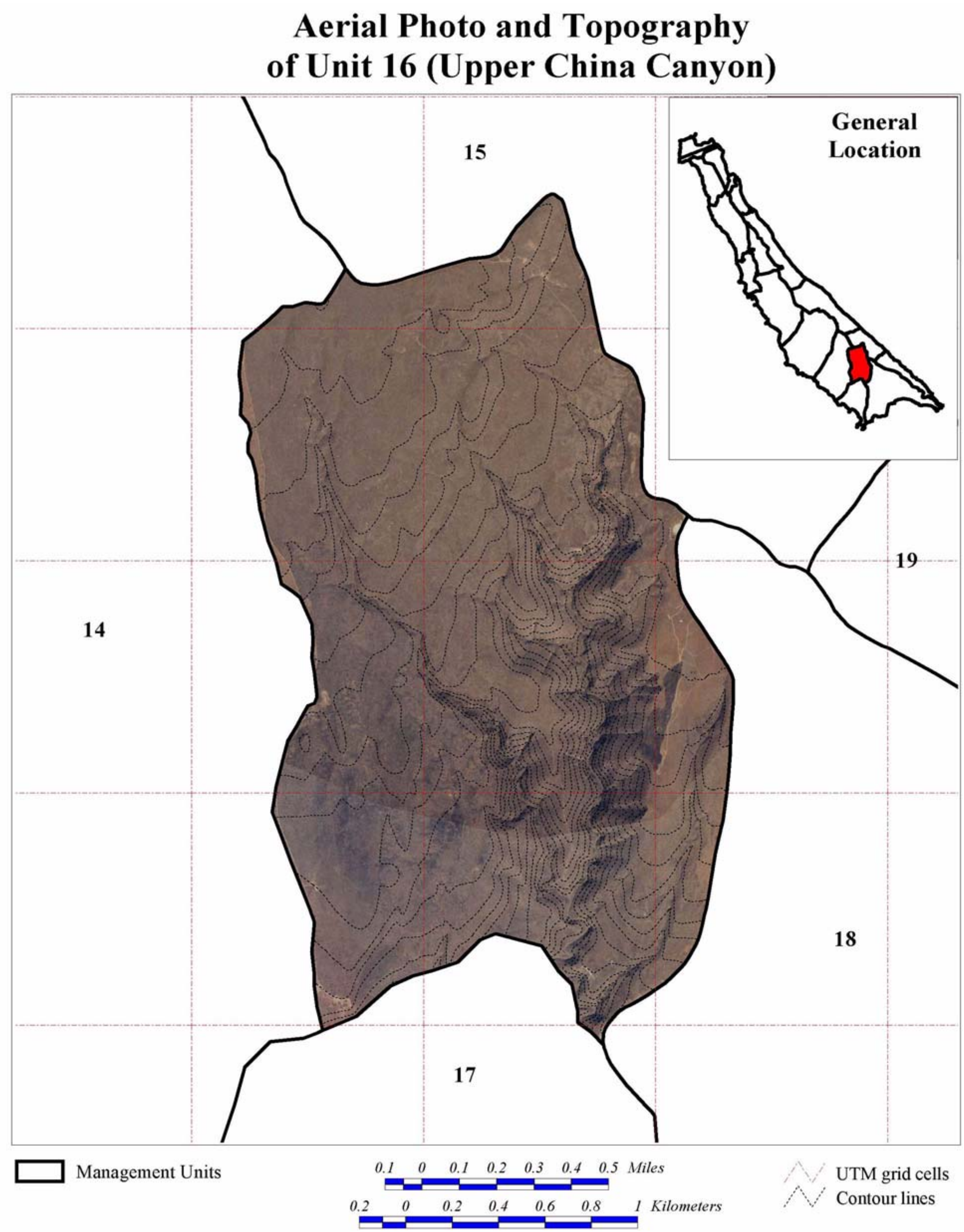
Natural Resources Management Emphases
- Lowest military values. Maintain those military values to the extent possible and with greatest flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- High fire encroachment risk from the west.
- Eagle Canyon is the benchmark canyon for cherry woodlands.
- San Clemente Island woodland star.
- High value for Island oak (25% of the population occurs in this unit).
- High value for Santa Cruz ironwood (21% of population occurs in this unit).

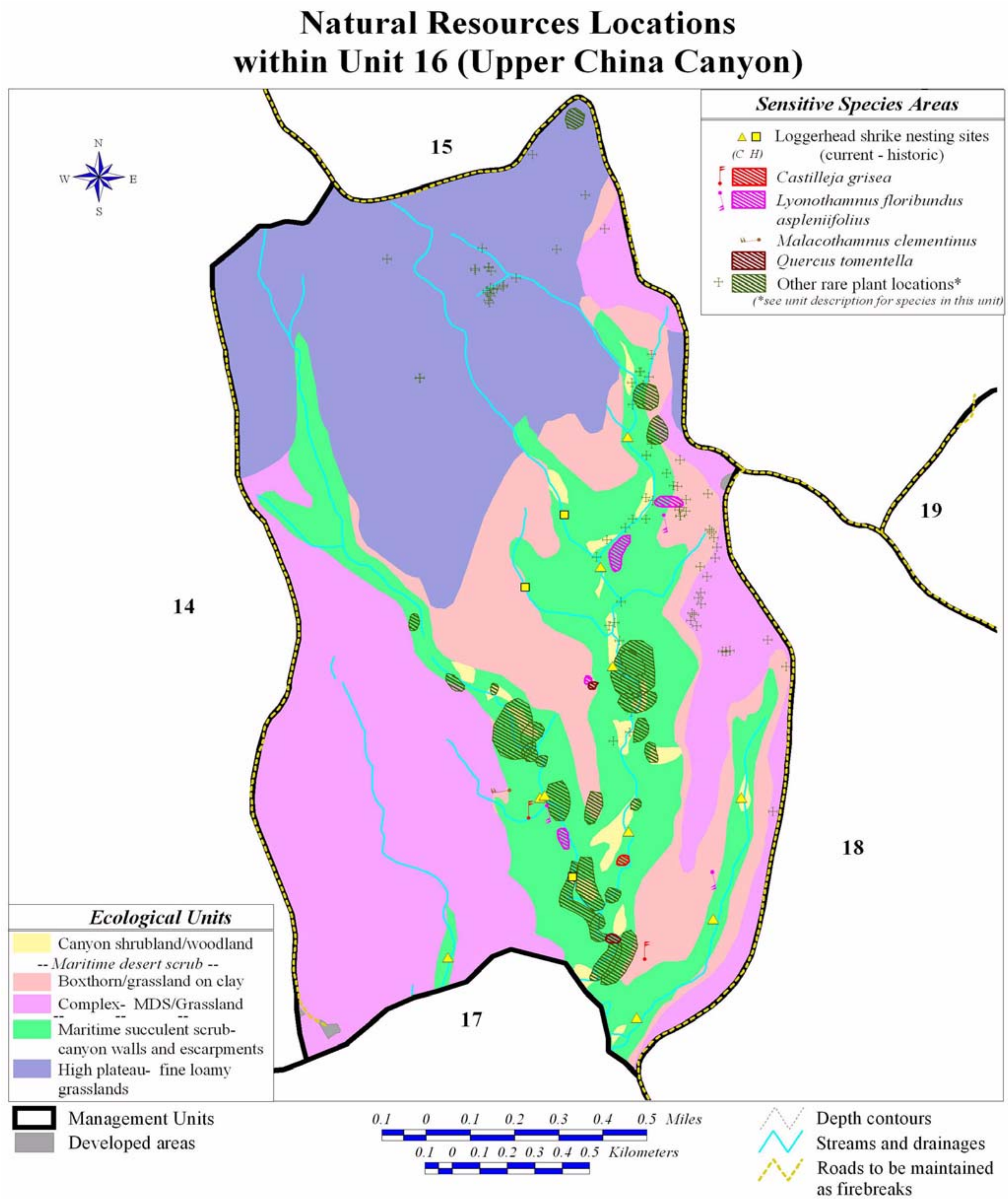
Fire Suppression
- This is a moderate priority fire suppression area due to high value, vulnerable natural resources and fuel buildup, and past ignitions.
- Ensure fires do not cross Ridge Road.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.

Fire Management
- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure fires do not cross Ridge Road.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.

Land Management Unit 15 (*Cont'd*)

- Evaluate the increasing fuel hazard occurring with shrub expansion to devise fuel management measures and manage the risk of stand-replacing fire.
- Allow no mortality of any individual ironwood tree to excessively hot or frequent fire. Consider the use of prescribed fire to protect entire groves from stand-replacing loss, to improve seedbed conditions, and reduce exotics.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. Also that oaks and other woodlands on eroding or erodible surfaces develop on stable sites. Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire. Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic plants. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge. Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.


Aerial Photo and Topography
of Unit 16 (Upper China Canyon)
General Location
15
14
19
18
17
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-17. Natural Resources Locations within Unit 16- Upper China Canyon.

Location: Unit 16 - Upper China Canyon

Military Value: Lowest
Fleet Marine Ground
Ground Operations
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Swimming, recreational camping, landing craft, fixed wing landings, parachute drops.
Other Uses
Facilities
No infrastructure
Roads
Primary- 2.8 mi (4.6 km)
Secondary- 1.8 mi (2.9 km)

Natural Resources Value: Low
Ecological Units
Canyon Woodland (22.3 ac)
MDS/Grassland complex (412.1 ac)
MDS Boxthorn/grassland (188.9 ac)
Maritime Sage Scrub (300.1 ac)
Grasslands, loamy soils (391.1 ac)
Wildlife
San Clemente loggerhead shrike*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Artemisia nesiotica
*Castilleja grisea**
Ceanothus megacarpus insularis
Convolvulus simulans
Crossosoma californicum
Dudleya virens virens
Eriogonum giganteum formosum
Galium catalinense acrispum
Galvezia speciosa
Hazardia cana
Jepsonia malvifolia
Lotus argophyllus adsurgens
Lupinus guadalupensis
Lyonothamnus floribundus asplenifolius
*Malacothamnus clementinus**
Quercus tomentella
Munzothamnus blairii
Trifolium gracilentum palmeri
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

Natural Resources Management Emphases
- Lowest military values. Maintain those military values to the extent possible and with greatest flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Maintain roads necessary for accessing areas of high military value in neighboring units.

Fire Suppression

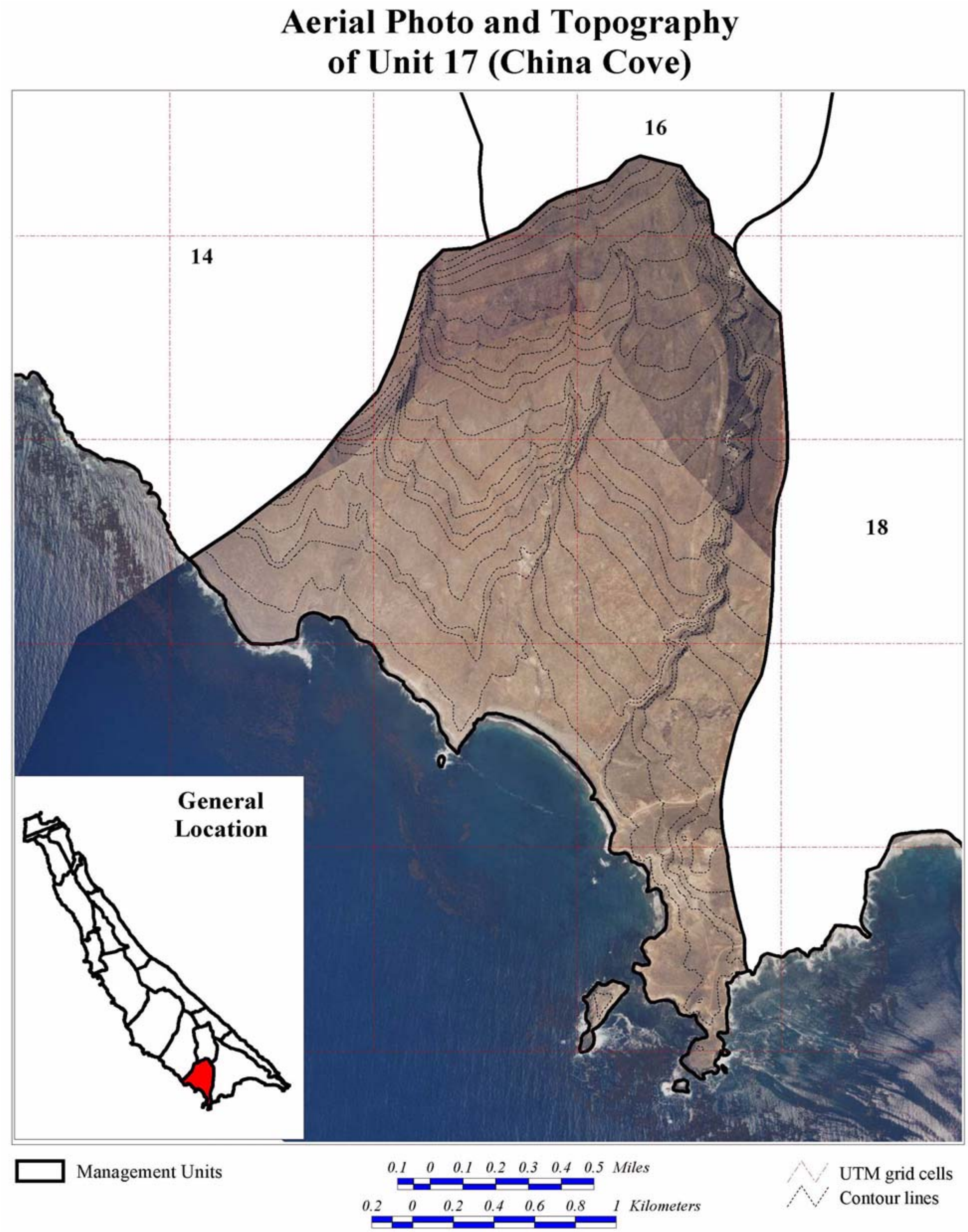
- This is a high priority fire suppression area due to nesting San Clemente loggerhead shrikes and high ignitions.
- Ensure fires do not cross SHOBA Ridge Road.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.

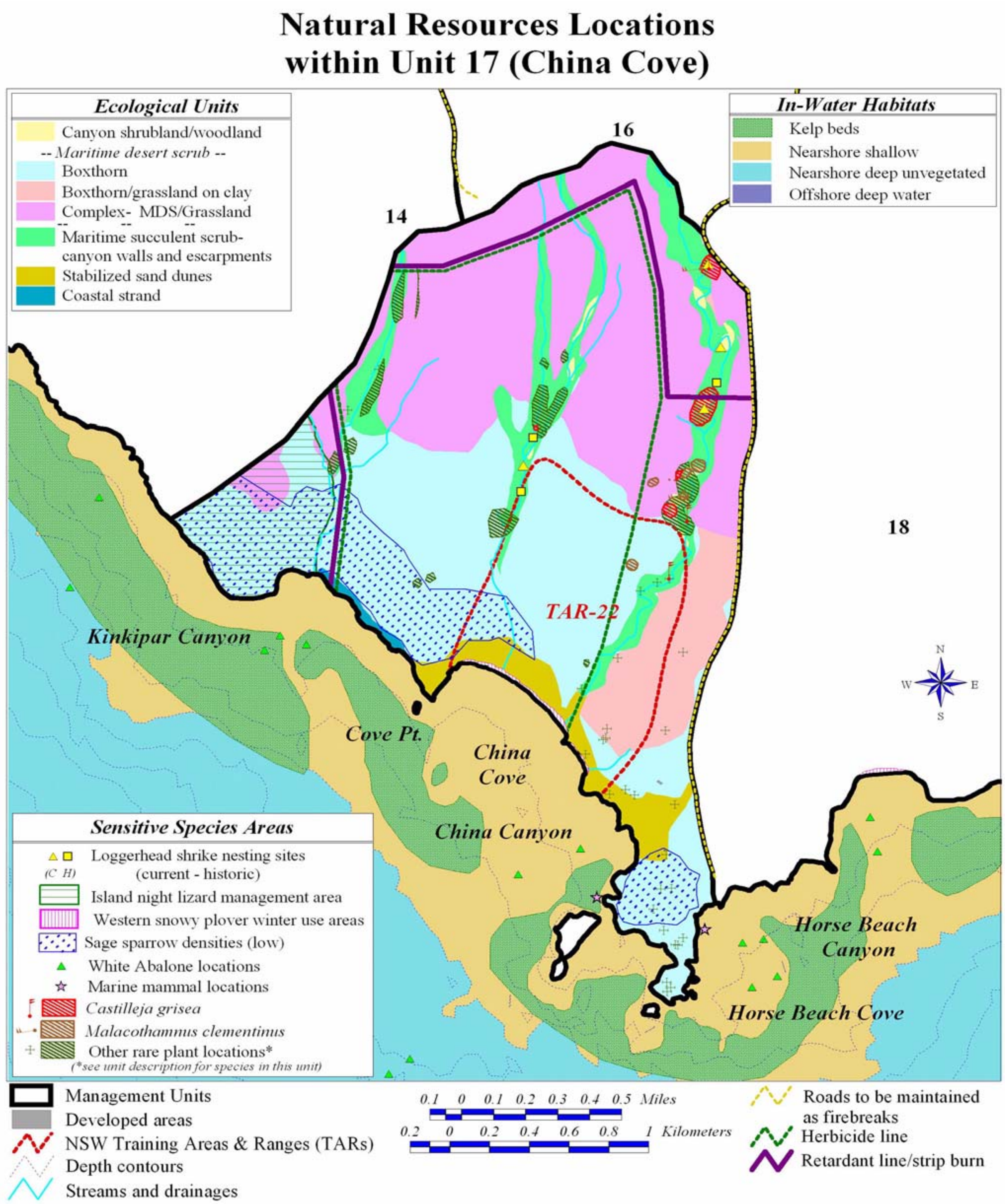
Fire Management

- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure fires do not cross Ridge Road.
- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures by June 15.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Evaluate the increasing fuel hazard occurring with shrub encroachment to devise fuel management measures and manage the risk of stand-replacing fire.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. Also that oaks and other woodlands on eroding or erodible surfaces develop on stable sites.

Land Management Unit 16 (*Cont'd*)

- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- The risks to natural resources values in the terrace complex community are that excessively hot, frequent, or large fires may delay or prevent woody plant recovery.
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment. Manage for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons and high fire management area along SHOBA Ridge Road.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but a plant that seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.
- The risk to natural resources from short fire return intervals appears to be low in loamy grasslands and fire is expected to be a useful tool in control of exotic grasses. There may be risk to some native perennial herbs with extremely short fire intervals, but as of now which herbs cannot be identified due to lack of knowledge.
- Achieve a minimum 5-year return interval for wildland fires larger than 300 acres. However, no extra suppression resources will be summoned in case of a repeat fire in the same location. Manage fire for openness of grasslands and native plants, to enhance transit and prey availability for Island fox, and prey availability for the San Clemente loggerhead shrike.


Aerial Photo and Topography
of Unit 17 (China Cove)
16
14
18
General
Location
Management Units
0.1 0 0.1 0.2 0.3 0.4 0.5 Miles
0.2 0 0.2 0.4 0.6 0.8 1 Kilometers
UTM grid cells
Contour lines



Map 5-18. Natural Resources Locations within Unit 17- China Cove.

Location: Unit 17 - China Cove

Military Value: Highest
Air
Live and Inert Ordnance
Night Operations
Surface
FIREX
Live ordnance
Mortar/artillery emplacements (EWTGPAC)
Fleet Marine Air
Live and Inert Ordnance
Night Operations
Fleet Marine Ground
Ground Operations
Fire Support Coordination
Engineering Operations
Live ordnance
Naval Special Warfare
Land Special Operations
Maritime Special Operations
Third Fleet
Theater-level Operations
Multi-warfare Operations
Support Fleet Battle Exercises
RDT&E
Missile Tests
Prohibited Uses
Recreational camping, fixed wing landings, parachute drops.
Other Uses
Recreational diving and fishing areas off-shore (access may be restricted at certain time in some areas due to military operations)
Facilities
OP-2, TAR 22, Impact Areas II and IIA
China Cove beach
Roads: Secondary- 2.7 mi (4.4 km)

Natural Resources Value: Medium
Ecological Units
Canyon woodland (10.2 ac)
MDS/Grassland complex (551.6 ac)
MDS Boxthorn/grassland (111.4 ac)
MDS Boxthorn (596.1 ac)
Maritime Sage Scrub (163.4 ac)
Stabilized sand dunes (66.9 ac)
Coastal strand (7.2 ac)
Sea stacks
Wildlife
Ashy strom-petrel
San Clemente loggerhead shrike*
San Clemente sage sparrow*
Snowy plover*
Island night lizard*
Island fox
Xantus's murrelet
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
Aphanisma blitoides
Artemisia nesiotica
Camissonia guadalupensis
*Castilleja grisea**
Cryptantha traskiae
Dudleya virens virens
Eriogonum giganteum formosum
Eschscholzia ramosa
Galium catalinense acrispum
Galvezia speciosa
Hazardia cana
Lotus argophyllus adsurgens
*Malacothamnus clementinus**
Phacelia lyonii
Triteleia clementina
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

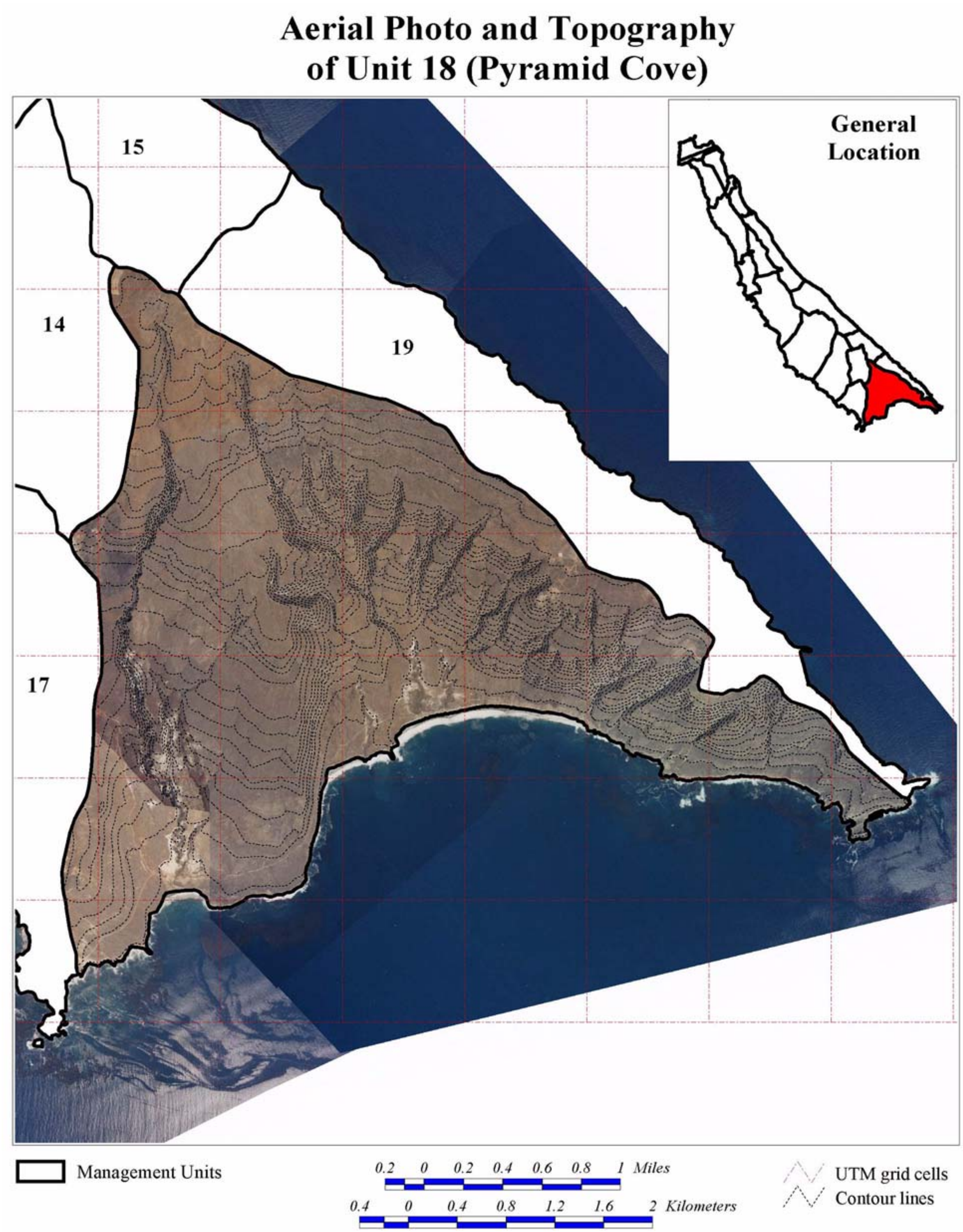
Natural Resources Management Emphases
- Highest military value. Maximize those military values with consideration of the resource values.
- High value for *Malacothamnus clementinus* (27% of population occurs in this unit).

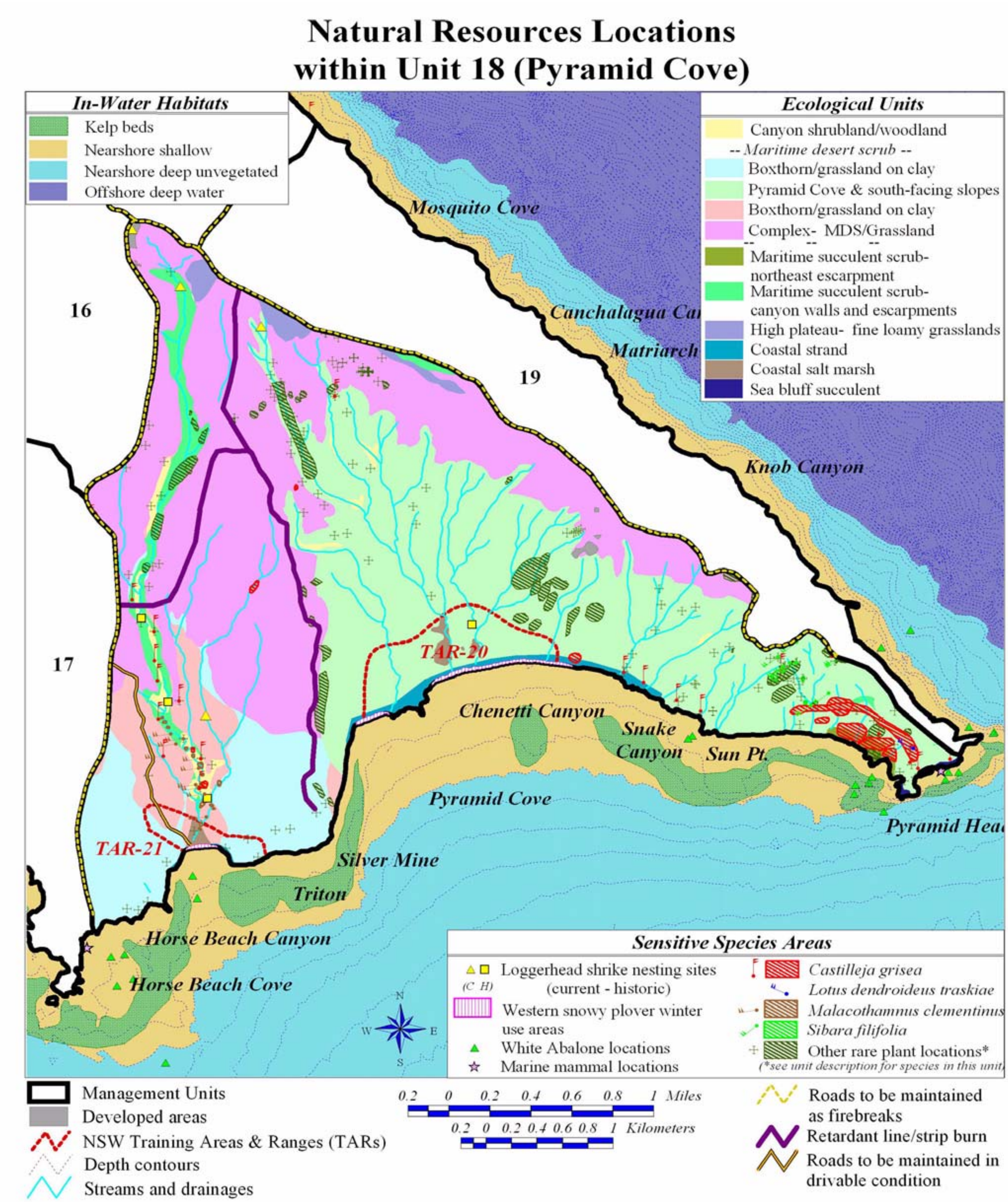
Fire Suppression
- This is a high priority fire management area due to nesting San Clemente loggerhead shrikes and high ignitions.
- Ensure fires do not cross established fuelbreak around Impact Area.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.

Fire Management
- Ensure fuelbreaks are installed by June 15 each year.

Land Management Unit 17 (*Cont'd*)

- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Any fire that stays within the fire control boundaries of Impact Areas I and II, or any other firing range, should be reported but will not be used as justification for providing additional fire suppression resources above the standard response defined in the Wildland Fire Management Plan.
- For areas with very high military value, the usual boxthorn objectives will not apply. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale where litter, duff, and grasses burned to ash; shrubs are burned to singed with some resprouts) mapped using a 1/2-acre minimum mapping unit for boundaries (including unburned inclusions) and intensity.
- Reduce the percent cover of invasive plants from the 1992-93 baseline of 41% on the faces, 53% on the flats, as evaluated over at least one 7-year El Niño cycle. Black mustard population expanding along China Road.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. Also that oaks and other woodlands on eroding or erodible surfaces develop on stable sites.
- Foster recruitment and improved age structure in woodlands, especially oak and ironwood woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment. Manage for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons and high fire management area on south side of Chukit Canyon boundary and along SHOBA Ridge Road.
- Excessively hot, frequent, or large fires may affect the health and biodiversity of Maritime Sage Scrub. California sagebrush is a very flammable fuel, but seeds prolifically after fire. Promote a fire regime in Maritime Sage Scrub which allows native shrubs and herbaceous species to out-compete prickly pear and cholla. This means maintaining their competitiveness for light and water. Fire return interval should exceed 20 years. Patch sizes will not exceed 200 acres.


Aerial Photo and Topography
of Unit 18 (Pyramid Cove)
15
14
19
17
General
Location
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.4 0 0.4 0.8 1.2 1.6 2 Kilometers
UTM grid cells
Contour lines



Map 5-19. Natural Resources Locations within Unit 18- Pyramid Cove.

Location: Unit 18 - Pyramid Cove

Military Value: Highest

Air
- Live and Inert Ordnance
- Night Operations

Surface
- FIREX
- Live ordnance
- Mortar/artillery emplacements (EWTGPAC)

Fleet Marine Air
- Live and Inert Ordnance
- Air Command & Control
- Night Operations

Fleet Marine Ground
- Ground Operations
- Fire Support Coordination
- Engineering Operations
- Command & Control
- Live ordnance
- Ground Reconnaissance & Surveillance

Naval Special Warfare
- Land Special Operations
- Maritime Special Operations
- Information Special Operations

THIRD Fleet
- Theater-level Operations
- Multi-warfare Operations
- Support Fleet Battle Exercises

RDT&E
- Missile Tests

Prohibited Uses
- Recreational camping, fixed wing landings, parachute drops.

Other Uses
- Recreational diving and fishing areas off-shore (access may be restricted at certain time in some areas due to military operations)

Facilities
- OP1
- Impact Area I
- TARs 20 & 21
- Horse beach
- Pyramid Cove beach

Roads
- Primary- 4.9 mi (7.9 km)
- Secondary- 4.0 mi (6.5 km)

Natural Resources Value: Highest

Ecological Units
- Canyon woodland (53.5 ac)
- MDS/Grassland complex (1455.8 ac)
- MDS Boxthorn/grassland (218.6 ac)
- MDS Pyramid Cove/South-facing slopes (1531.0 ac)
- MDS Boxthorn (412.8 ac)
- Maritime Sage Scrub northeast escarpment (17.0 ac)
- Maritime Sage Scrub (123.5 ac)
- Grasslands, clay soils (<1 ac)
- Grasslands, loamy soils (42.1 ac)
- Coastal strand (51.0 ac)
- Coastal salt marsh (19.3 ac)
- Sea bluff succulent (3.9 ac)
- Sea stacks

Wildlife
- San Clemente loggerhead shrike*
- Snowy plover*
- Island night lizard*
- Island fox

**Federal listed species- Endangered, Threatened, Proposed*

Rare Plants
- *Artemisia nesiotica*
- *Astragalus nevinii*
- *Atriplex pacifica*
- *Castilleja grisea**
- *Convolvulus simulans*
- *Camissonia guadalupensis*
- *Crossosoma californicum*
- *Delphinium variegatum thornei*
- *Dudleya virens virens*
- *Eriogonum giganteum formosum*
- *Eriophyllum nevinnii*
- *Eschscholzia ramosa*
- *Galium catalinense acrispum*
- *Galvezia speciosa*
- *Hazardia cana*
- *Lepidium virginicum robinsonii*
- *Lotus argophyllus adsurgens*
- *Lotus dendroideus* var. *traskiae**
- *Lupinus guadalupensis*
- *Malacothamnus clementinus**
- *Phacelia floribunda*
- *Rhamnus pirifolia*
- *Sibara filifolia**

**Federal listed species- Endangered, Threatened, Proposed*

Resource Values-Cultural

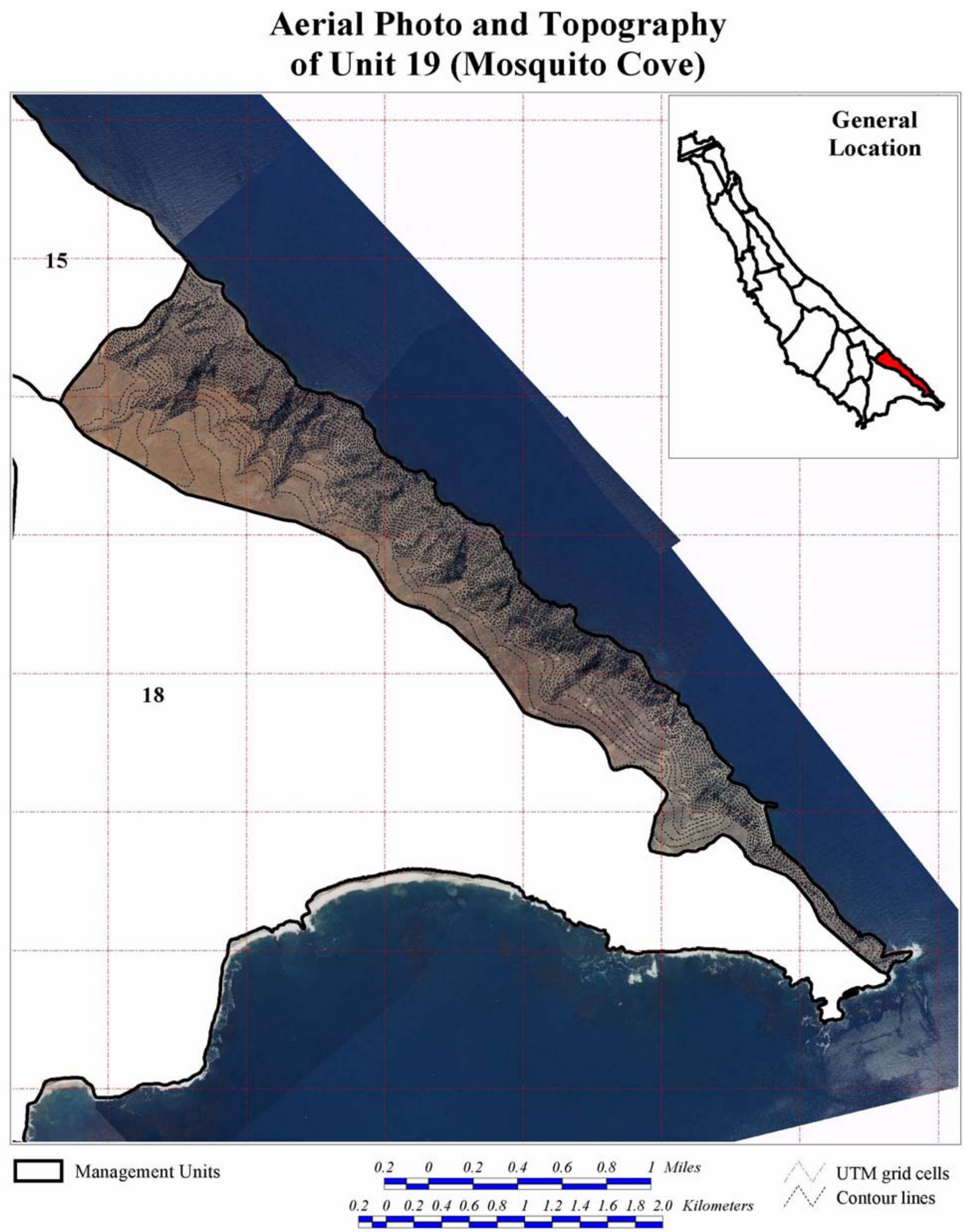
Natural Resources Management Emphases
- Very high military value. Maximize those military values with consideration of the resource values.
- Horse Beach Canyon is the benchmark site for toyon groves.
- Maintain the existing salt marsh boundaries, allowing no shrinkage.
- This unit supports all or most of the Island populations of *Sibara filifolia*, *Lotus argophyllus* var. *adsurgens*, and *Euphorbia misera*. It may contain the grass thought to be extinct, *Dissanthelium californicum*.
- High value for *Castilleja grisea* (34% of population occurs in this unit).
- High value for *Malacothamnus clementinus* (42% of population occurs in this unit).

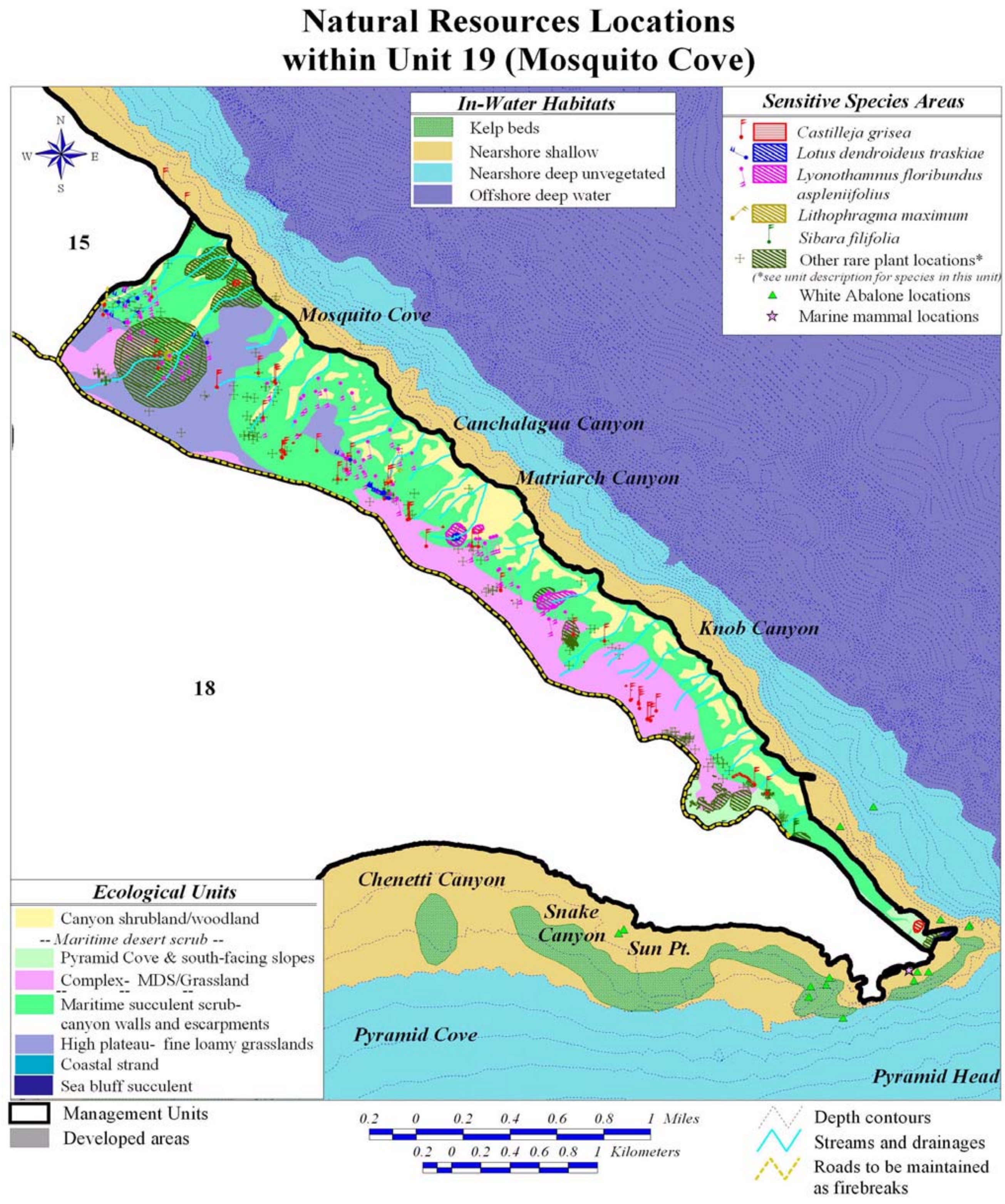
Fire Suppression

- This is a high priority fire management area due to high value natural resources and military value, and high ignitions.
- Ensure fires do not cross established fuelbreak around Impact Area.
- Ensure fires do not cross Ridge Road.

Fire Management

- Sensitive resources that may benefit from light fires of controlled size.
- Protect Horse Beach Canyon from moderate intensity (NPS intensity 3) or hotter fires by applying pre-suppression and suppression tools. The road to Horse Beach Canyon should also always remain drivable for pre-suppression work related to TAR activity.
- Establish a fuelbreak around target areas at vulnerable locations where fire may enter into canyons or shrublands or sensitive plant populations. Fuelbreak must be at least 300 feet from *Sibara filifolia.*
- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure fires do not cross Ridge Road.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads or LMU boundaries.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- Control invasive exotic grasses using appropriate wildland fire management protocols.
- Maintain shrub and woodland cover within the canyons at existing levels, or greater if this does not conflict with training needs.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla and maintain existing shrubland boundaries at a minimum.
- Any fire that stays within the fire control boundaries of Impact Areas I and II, or any other firing range, should be reported but will not be used as justification for providing additional fire suppression resources above the standard response defined in the Wildland Fire Management Plan.
- For areas with very high military value, the usual boxthorn objectives will *not* apply. The focus will be on preventing vegetation type conversion by enlisting pre-suppression or suppression tools to prevent a repeat burn within five years. For a fire to be counted as a burn it must be at least a moderate burn (Score 3 on NPS scale where litter, duff, and grasses burned to ash; shrubs are burned to singed with some resprouts) mapped using a 1/2-acre minimum mapping unit for boundaries (including unburned inclusions) and intensity.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife.
- Foster recruitment and improved age structure in woodlands. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 woodland acres across the Island (about 4% of all canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- In the terrace face-terrace flat complex, manage for periodic, cool fires of NPS intensity 5 (litter and duff blackened but not converted to ash, herbs and grasses singed or stressed but some recover and at least some resprout; shrubs are not affected or show minor stress but at least some recover or resprout; and no effect on mature trees, seedlings, or saplings) to keep the grassland in an open condition and control exotics, while favoring shrub and tree recruitment. Manage for fire return intervals five years or longer in grasslands, 10 years or longer in shrublands. No controls on patch size except to prevent fires from entering or crossing canyons.
- Evaluate fire tolerance of *Sibara filifolia* seed. Compare habitat of *Sibara* here with that where it was recently rediscovered on Santa Catalina Island for insight into its habitat preferences to help improve our ability to define a desired future condition for Sibara habitat.


Aerial Photo and Topography
of Unit 19 (Mosquito Cove)
General
Location
15
18
Management Units
0.2 0 0.2 0.4 0.6 0.8 1 Miles
0.2 0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2.0 Kilometers
UTM grid cells
Contour lines



Map 5-20. Natural Resources Locations within Unit 19- Mosquito Cove.

Location: Unit 19 - Mosquito Cove

Military Value: Lowest
Fleet Marine Ground
Ground Operations
Fire Support Coordination
THIRD Fleet
Multiwarfare Operations
Prohibited Uses
Recreational camping, fixed wing landings, parachute drops.
Other Uses
Recreational diving and fishing areas off-shore
Facilities
Roads
Primary- 4.2 mi (6.7 km)
Secondary- 0.6 mi (1.0 km)

Natural Resources Value: High
Ecological Units
Canyon woodland (183.4 ac)
MDS/Grassland complex (251.7 ac)
MDS Pyramid Cove/South-facing slopes (41.8 ac)
Maritime Sage Scrub(573.4 ac)
Grasslands, loamy soils (201.8 ac)
Coastal strand (<1 ac)
Sea bluff succulent (1.7 ac)
Sea stacks
Wildlife
Ashy storm-petrel
San Clemente loggerhead shrike*
Island night lizard*
Island fox
**Federal listed species- Endangered, Threatened, Proposed*
Rare Plants
*Castilleja grisea**
Delphinium variegatum thornei
Dudleya virens virens
Eriogonum giganteum formosum
Eriophyllum nevinnii
Galium catalinense acrispum
Galvezia speciosa
Hazardia cana
Heteromeles arbutifolia var. macrocarpa
Jepsonia malviflora
Lithophragma maximum
Lotus argophyllus adsurgens
Lotus dendroideus var. *traskiae**
Lupinus guadalupensis
Lyonothamnus floribundus asplenifolius
Rhamnus pirifolia
*Sibara filifolia**
Munzothamnus blairii
Triteleia clementina
**Federal listed species- Endangered, Threatened, Proposed*
Resource Values-Cultural

Natural Resources Management Emphases
- Lowest military value. Maintain those military values to the extent possible and with greatest flexibility for maintaining natural resources values as an integral part of day-to-day operations.
- Canchalagua Canyon is the benchmark site for Santa Cruz ironwood.
- High fire encroachment risk from the west.
- High value for Santa Cruz ironwood (71% of population occurs in this unit).

Fire Suppression
- Ensure fires do not cross Ridge Road.
- The first fire suppression response is to send all available on-Island fire resources as soon as possible consistent with the fire danger rating day, to keep the wildland fire to the smallest size possible and to prevent moderate or higher intensity fires from entering canyons or sensitive resource areas. Fires in grassland may be contained at roads, LMU boundaries, or canyon or shrubland edges.

Fire Management
- Use prescribed strip burns or fuelbreak at vulnerable locations to ensure fires do not cross Ridge Road.

Land Management Unit 19 (*Cont'd*)

- Annually maintain a 30-foot minimum defensible space clearing around all combustible structures or facilities in this LMU by June 15.
- Evaluate the increasing fuel hazard occurring with shrub expansion to devise fuel management measures and manage the risk of stand-replacing fire.
- All military operations will be Fire Danger Rating System compliant for the fire danger rating predicted for 1300 hours of any specific date.
- The objective of fire management in shrublands and in woodlands is that recruitment exceeds mortality of all focus management species and all native trees, that shrubland or woodland boundaries stay the same or increase as far as fire has any control on this, and that a diverse habitat structure exists sufficient to support self-sustaining populations of all native plants and wildlife. High fire intensity that kills adult shrubs or trees or short fire intervals that prevent maturations, reproduction and recruitment are the biggest risks of fire.
- Fires will be kept to less than three acres that are moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- No more than 30 acres (about 4% of canyon woodland habitat) may be burned over a 5-year period for fires of moderate intensity or higher (Score 3 on NPS scale where litter, duff, and grasses are burned to ash; shrubs are burned to singed with some resprouts).
- Allow no mortality of any individual ironwood tree to excessively hot or frequent fire. Consider the use of prescribed fire to protect entire groves from stand-replacing loss, to improve seedbed conditions, and reduce exotics.
- Promote a fire regime which allows native shrubs and herbaceous species to out-compete prickly pear and cholla.

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Appendix A: Fire Management Acronyms

Acronym	Definition
ACOS	Assistant Chief of Staff
ASBS	Area of Special Biological Significance
ATV	All Terrain Vehicles
BI	Burning Index
BLM	Bureau of Land Management
BMPs	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CARB	California Air Resources Board
CAX	Combined Arms Exercise
CDFG	California Department of Fish and Game
CFR	Crash, Fire & Rescue
CINCPACFLT	Commander-in-Chief U.S. Pacific Fleet
CNF	Cleveland National Forest
CNPS	California Native Plant Society
CNRSW	Commander Navy Region Southwest
CO	Carbon monoxide
CO	Commanding Officer
COMCARGRU ONE	Commander Carrier Group One
COMHELWINGRES	Commander Helicopter Wing Reserve
COMPACFLT	Commander Pacific Fleet
COMTHIRDFLT	Commander Third Fleet
CRMP	Cultural Resources Management Program
CSC	California Species of Special Concern
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment
EFEX	Expeditionary Fires Exercise
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EWTGPAC	U.S. Marine Corps Expeditionary Warfare Training Group Pacific
F&ES	Fire and Emergency Services
FC2	Former Category
FDRS	Fire Danger Rating System
FE	Federally Endangered
FFD	Federal Fire Department
FMO	Fire Management Officer
FMP	Fire Management Plan
FMU	Fire Management Unit
FPE	Federal Proposed Endangered
FSA	Fire Support Area
FSC	Federal Species of Concern
FT	Federal Threatened
GIS	Geographic Information System
GPRA	Government Performance and Review Act

Acronym	Definition
HMMWV	High Mobility Multipurpose Wheeled Vehicle
I MEF	First Marine Expeditionary Force
ICS	Incident Command System
INRMP	Integrated Natural Resources Management Plan
INS	Immigration and Naturalization Service
INST	Instruction
JTFEX	Joint Training Fire Exercise
LCAC	Landing Craft Air Cushion
LMU	Land Management Unit
MAROPS	Literal Warfare Training Facility for Naval Special Warfare (no. of runway)
MCB	Marine Corps Base
MDS	Maritime Desert Scrub
MFWS	Mid-flame wind speeds
MILCON	Militatry Construction
MIR	Missile Impact Range
MIST	Minimal impact suppression tactics
MOU	Memorandum of Understanding
mph	Miles per hour
MWTC	Mountain Warfare Training Center
NALF	Naval Auxiliary Landing Field
NASNI	Naval Air Station North Island
NBC	Naval Base Coronado
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System
NO_2	Nitrogen dioxide
NOx	Nitrous Oxide, smog
NOAA	National Oceanic & Atmospheric Administration
NOLF	Naval Outlanding Field
NPS	National Park Service
NR/CR	Natural Resources/Cultural Resources
NRCS	Natural Resource Conservation Service
NRO	Natural Resources Office
NSWG-1	Naval Special Warfare Group One
NWCG	National Wildlife Coordinating Group
O_3	Ozone
OIC	Officer In Charge
OMP	Operations Management Plan
OPNAVINST	Naval Operations Instruction
PACMER	Pacific Mobile Emergency Radio System
PIF	Partners in Flight
PM-10	Respirable particulate matter
ppm	Parts per minute
PTE	Primary Training Elements
RAWS	Remote Automated Weather Stations
RCMP	Range Complex Management Plan
RDT&E	Research, Development, Training and Education
REWS	Range Electronic Warfare System
RSO	Range Safety Officer
RWQCB	Regional Water Quality Control Board
SAIA	Sikes Act Improvement Act
SACEX	Supporting Arms Coordination Exercise

Acronym	Definition
SCAQMD	South Coast Air Quality Management District
SCI	San Clemente Island
SCIRC	San Clemente Island Range Complex
SCLS	San Clemente loggerhead shrike
SCORE	Southern California Offshore Range
SE	State Endangered
SERE	Survival Evasion Resistance and Escape
SHOBA	Shore Bombardment Area
SHPO	State Historic Preservation Office
SO_2	Sulfur dioxide
SOCAL	Southern California
SPAWARSYSCEN	Space and Naval Warfare Systems Center
ST	State Threatened
SWANCC	Solid Waste Agency of Northern Cook County
SWDIV	Southwest Division Naval Facilities Engineering Command
USACOE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
USMC	U.S. Marine Corps
WFC	Wildland Fire Coordinator

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Appendix B: Fire Management Glossary

Most of these definitions come from the National Fire Plan at <National Fire Plan Web Site.htm>. Others are from U.S Department of Interior/U.S. Department of Agriculture on definitions used to apply federal fire policy, and the U.S. Fish and Wildlife web site on fire management <http://fire.r9.fws.gov/ifcc/monitor>. Other references are the following:

United States Department of the Interior and U.S. Department of Agriculture (USDI/USDA). 1995. Federal Wildland Fire Management Policy and Program Review. Final report. 18 December 1995. 45p.

US Department of Agriculture-Forest Service Intermountain Forest & Range Experiment Station (USDA-Forest Service). 1983. How to Predict the Spread and Intensity of Forest and Range Fires. General Technical Report INT-143. Prepared by Richard C. Rothermel. Ogden, UT.

Term	Definition
Aerial ignition	Ignition of fuels b dropping incendiary devices or materials from aircraft.
Air tanker	A fixed-wing aircraft equipped to drop fire retardants or suppressants.
Anchor point	An advantageous location, usually a barrier to fire spread, from which to start building a fire line. An anchor point is used to reduce the chance of firefighters being flanked by fire.
Backfire	A fire set along the inner edge of a fire control line to stop a spreading wildfire by reducing the fuel or changing the direction of force of the fire's convection column. The term applies best where skilled techniques are required for successful execution.
Backpack pump	A portable sprayer with hand-pump, fed from a liquid-filled container fitted with straps, used mainly in fire and pest control.
Bambi bucket	A collapsible bucket slung below a helicopter. Used to dip water from a variety of sources for fire suppression.
Behave	A system of interactive computer programs for modeling fuel and fire behavior that consists of two systems: BURN and FUEL.
Blackline	Fuel between the fireline and the fire that has been burned out. Line is not complete until fuel is burned out between fireline and fire.
Bucket drops	The dropping of fire retardants or suppressants from specially designed buckets slung below a helicopter.
Burn out	Setting fire inside a control line to widen it or consume fuel between the edge of the fire and the control line.
Chain	A unit of linear measurement equal to 66 feet.
Contain a fire	A fuel break around the fire has been completed. This break may include natural barriers or manually and/or mechanically constructed line.
Control a fire	The complete extinguishment of a fire, including spot fires. Fireline has been strenghtened so that flare-ups from within the perimeter of the fire will not break through this line.
Control line	All built or natural fire barriers and treated fire edge used to control a fire.
Crown fire (Crowning)	The movement of fire through the crowns of trees or shrubs more or less independently of the surface fire.
Dead fuels	Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.
Defensible space	An area either natural or manmade where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildland fire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a structure that is cleared of flammable brush or vegetation.

Term	Definition
Direct attack	Any treatment of burning fuel, such as by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.
Dozer	Any tracked vehicle with a front-mounted blade used for exposing mineral soil.
Dozer line	Fire line constructed by the front blade of a dozer.
Drip torch	Hand-held device for igniting fires by dripping flaming liquid fuel on the materials to be burned; consists of a fuel fount, burner arm, and igniter. Fuel used is generally a mixture of diesel and gasoline.
Dispatcher	A person employed who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control in first attack, and sends them to the proper place.
Environmental Assessment (EA)	EAs were authorized by the National Environmental Policy Act (NEPA) of 1969. They are concise, analytical documents prepared with the public participation that determine if an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document allowing agency compliance with NEPA requirements.
Environmental Impact Statement (EIS)	EISs were authorized by the National Environmental Policy Act (NEPA) of 1969. Prepared with public participation, they assist decision makers by providing information, analysis and an array of action alternatives, allowing managers to see the probably effects of decisions on the environment. Generally, EISs are written for large-scale actions or geographical areas.
Escaped fire	A fire which has exceeded or is expected to exceed initial attack capabilities or prescription.
Fine (light) fuels	Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.
Fire intensity	The rate of heat energy release per unit time per unit length of fire front. Usually expressed as Btu/sec/ft or kW/sec/m.
Fire regime	Fires of similar frequency, intensity, extent, and season. The manifestation of the biological, physical, climatic and anthropomorphic components of an ecosystem as reflected in the type, frequency, and size of fires.
Fire return interval	How often a fire burns a given area; often expressed in terms of fire return intervals (e.g., fire returns to a site every 5–15 years).
Fire risk	1) The chance of a fire starting as determined by the presence and activity of causative agents; 2) A causative agent; 3) A number related to the potential number of firebrands (an ember usually transported through the air) to which a given area will be exposed during the rating day.
Fire season	1) Period(s) of the year during which wildland fires are likely to occur, spread, and affect resource values sufficient to warrant organized fire management activities; 2) A legally enacted time during which burning activities are regulated by state or local authority.
Fire severity	Fire severity is a subjective classification. It is rated separately for organic substrate and vegetation impacts, and is related to fire intensity, duration, and other factors.
Firebreak	Any natural or constructed barrier bladed to bare earth and used to segregate, stop, and control the spread of fire or provide a control line from which to work.
Fireline	A bare mineral soil line constructed as fire is burning used to contain a wildfire. The width of a fireline is 1 1/2 times the size of the surrounding vegetation.
Flash fuels	Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, that ignite readily and are consumed rapidly when dry. Also called fine fuels.
Forb	A plant with a soft, rather than permanent woody stem, that is not a grass or grass-like plant.
Fuel hazard	A fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition or suppression difficulty.

Term	Definition
Fuelbreak	Any natural or constructed barrier that includes mowed or modified vegetation which is used to segregate, slow, and control the spread of fire or provide a control line from which to work. Wide strip or block of land on which the native vegetation has been permanently modified to diminish the energy of fires burning so that they can be more readily extinguished. It may or may not have a fireline constructed in it prior to fire occurrence.
Fuel model	Simulated fuel complex (orcombination of vegetable types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.
Fuel moisture (Fuel moisture content)	The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.
Goal	Broad statement of intent, direction and purpose. An enduring, visionary description of a desired trajectory. A goal is not necessarily completely obtainable.
Head of a fire	The side of the fire having the fastest rate of spread.
Initial attack	The wildfire control efforts taken by resources that are first to arrive at a wildfire.
Interface, or wildland interface	The geographical meeting point of two diverse systems, wildland and structures. At this interface, structures and vegetation are sufficiently close that a wildland fire could spread to structures or a structure fire ignite vegetation.
Ladder fuels	Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning.
Light (fine) fuels	Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less then 1/4-inch in diameter and have a timelag of one hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.
Litter	Top layer of the forest, scrubland, or grassland floor, directly above the fermentation layer, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.
Live fuels	Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.
National Wildfire Coordinating Group	A group formed under the direction of the Secretaries of Agriculture and the Interior and comprised of representatives of the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service and Association of State Foresters.The group's purpose is to facilitate coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend action, or resolve issues and problems of substantive nature. NWCG is the certifying body for all courses in the National Fire Curriculum.
Objective	Specific statement that describes a desired condition. Can be quantitative or qualitative. Should remain a reasonable proposition for approximately five years or so.
Policy	Formally-adopted strategy or decision to carry out a course of action.
Prescribed fire	Any fire ignited by management actions under certain predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.
Prescribed Fire Plan (Burn Plan)	This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.
Prescription	Measurable criteria that define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.
Pre-suppression	Activities in advance of fire occurrence to ensure effective suppression action. Includes recruiting and training, organizational planning, maintaining fire equipment and control improvements, procuring equipment and supplies, and fuel modification.

Term	Definition
Remote sensing	The use of photographic and digital image products for determining the earth's surface characteristics. These products, or data, are acquired from aircraft or satellite platforms.
Smoke management	Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires.
Spark arrester	A device installed in a chimney, flue, or exhaust pipe to stop the emission of sparks and burning fragments.
Strategy	Explicit description of ways and means chosen to achieve objectives.
Strike team	Specified combinations of the same kind and type of resources, with common communications, and a leader.
Strike team leader	Person responsible to a division/group supervisor for performing tactical assignments given to the strike team.
Structure fire	Fire originating in and burning any part or all of any building, shelter, or other structure.
Suppressant	An agent, such as water or foam, used to extinguish the flaming and glowing phases of combustion when direction applied to burning fuels.
Suppression	All the work of extinguishing or containing a fire, beginning with its discovery.
Surface fuels	Loose surface litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, heavier branchwood, downed logs, and stumps interspersed with or partially replacing the litter.
Task/Activity/ Method	A specific step, practice, or method to accomplish work, usually organized sequentially with time lines and duty assignments. These become obsolete quickly, and should be updated annually.
Water tender	A ground vehicle capable of transporting specified quantities of water.
Weather Information and Management System (WIMS)	An interactive computer system designed to accommodate the weather information needs of all federal and state natural resources management agencies. Provides timely access to weather forecasts, current and historical weather data, the National Fire Danger Rating System (NFDRS), and the National Interagency Fire Management Integrated Database (NIFMID).
Wildland	An area of primarily vegetative fules in which development is limited to roads, power lines, and similar transportation facilities. Structures, if any, are widely scattered. For SCI, this is most of the Island.
Wildland fire	A fire occurring in the wildland environment, spreading through vegetative fuels, that may or may not include structures. Includes three types: *Ignition*: Any fire start whether or not it is a "running" (spreading) fire. *Wildfire*: A fire that is uncontrolled and is burning outside of Fire Plan resource management objectives. *Wildland Fire Use (or Wildland FIre Within Resource Objectives)*: A wildfire that is burning within predetermined control and containment parameters and within Fire Plan resource management objective.It may or may not require a suppression response.
Wildland urban interface	The line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Appendix C: Current Fire Management Agreements

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Department of Defense
INSTRUCTION

NUMBER 6055.06
December 21, 2006

USD(AT&L)

SUBJECT: DoD Fire and Emergency Services (F&ES) Program

References: (a) DoD Instruction 6055.6, "DoD Fire and Emergency Services Program," October 10, 2000 (hereby canceled)
(b) DoD 6055.06-M, "DoD Fire and Emergency Services Certification Program," February 23, 2006
(c) DoD Directive 3025.1, "Military Support to Civil Authorities (MSCA)," January 15, 1993
(d) DoD Directive 2000.12, "DoD Antiterrorism (AT) Program," August 18, 2003
(e) through (as), see Enclosure 1

1. PURPOSE

This Instruction:

1.1. Reissues Reference (a) to update policy and criteria for the allocation, assignment, operation, and administration of the DoD F&ES Program.

1.2. Establishes a DoD Fire and Emergency Services Working Group (F&ESWG).

1.3. Authorizes other publications such as guides, handbooks, and manuals to provide specific information on the DoD F&ES Program, including but not limited to:

1.3.1. Reference (b).

1.3.2. DoD Emergency Medical Services (EMS) Program.

1.3.3. DoD F&ES Fitness and Wellness Program.

1.3.4. Fire Fighter Chemical, Biological, Radiological, Nuclear, or High-Yield Explosive (CBRNE) and Weapons of Mass Destruction (WMD).

1.3.5. DoD F&ES Standards of Response Coverage.

1.3.6. DoD Wildland Fire Management Program.

2. APPLICABILITY

This Instruction applies to:

2.1. The Office of the Secretary of Defense (OSD), the Military Departments, Chairman of the Joint Chiefs of Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the Department of Defense (hereafter referred to collectively as the "DoD Components"). The term "Military Services," as used herein, refers to the Army, the Navy, the Air Force, and the Marine Corps.

2.2. DoD operations, activities, and installations worldwide, including Government-owned, contractor-operated facilities and non-DoD activities operating on DoD installations.

3. DEFINITIONS

Terms used in this Instruction are defined in Enclosure 2.

4. POLICY

It is DoD policy to:

4.1. Establish and maintain a comprehensive F&ES Program as an element of the overall DoD Environmental, Safety, and Occupational Health Program.

4.2. Protect DoD personnel and the public from risk of death, injury, illness, or property damage as a result of DoD activities.

4.3. Prevent and minimize loss of DoD lives and damage to property and the environment occurring in periods of peace, war, homeland security/defense, military operations other than war, and humanitarian operations.

4.4. When called upon and approved by appropriate authority, make DoD F&ES capabilities available to assist civil authorities under mutual aid agreements, host nation support agreements, and Defense Support of Civil Authorities (DSCA).

4.5. Enhance DoD mission capability by protecting the U.S. homeland and critical bases of operation through preventive risk management, education, emergency response, and risk communication.

5. RESPONSIBILITIES

5.1. The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) shall:

5.1.1. Oversee implementation of this Instruction.

5.1.2. Represent the Secretary of Defense on both internal and interagency matters on the F&ES Program.

5.1.3. Establish the F&ESWG, comprised of members from OSD, the Military Services, and the Defense Logistics Agency (DLA) to provide technical advice on F&ES matters.

5.1.4. Provide criteria, guidance, and instructions to incorporate fire suppression, fire prevention, and emergency service elements in appropriate DoD program and budget documents.

5.2. The Deputy Under Secretary of Defense (Installations and Environment) (DUSD(I&E), under the USD(AT&L), shall:

5.2.1. Prepare DoD publications as needed to provide specific policy and standards for the DoD F&ES Program.

5.2.2. Advocate for resources and support planning, programming, and budgeting processes for the F&ES Program.

5.2.3. Advise USD(AT&L) on appropriate DoD-wide goals, objectives, and performance measures for F&ES performance.

5.2.4. Conduct a formal management review at least annually and, as a minimum, include an assessment of the DoD Component programs and F&ESWG activities.

5.2.5. Provide an information copy of the management review to the Under Secretary of Defense for Policy (USD(P)) through the Assistant Secretary of Defense for Homeland Defense (ASD(HD)) and the Assistant Secretary of Defense for International Security Policy (ASD(ISP)).

5.2.6. Participate with the ASD(HD), ASD(ISP), Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs, and Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict to represent F&ES aspects related to installation protection and emergency response issues.

5.2.7. Request focused program evaluations of aspects of the F&ES Program from the DoD Inspector General as needed.

5.2.8. Issue guidance to the DoD Components on the annual DoD F&ES Awards Program.

5.2.9. Appoint an OSD representative to the F&ESWG.

5.3. The Under Secretary of Defense (Personnel and Readiness), through the Assistant Secretary of Defense for Health Affairs (ASD(HA)), shall:

5.3.1. Serve as the principal advocate for EMS programs within the Department of Defense.

5.3.2. Promote language in the Defense Planning Guidance and the Defense Health Program (DHP) Medical Planning Guidance in consultation with DUSD(I&E) to ensure sufficient resources are allocated in the DoD Components' budgets to carry out the provisions of this Instruction.

5.3.3. Review the DoD Components' planning, programming, budgeting, and execution of the EMS programs within available fiscal guidance and overall DHP priorities to comply with subparagraph 5.3.2., above.

5.3.4. Provide technical and medical expertise to DUSD(I&E) for EMS.

5.3.5. Advise each Military Department to appoint a medical EMS consultant who should directly advise the Military Department consultant to the F&ESWG on all relevant medical issues.

5.4. Under the USD(P):

5.4.1. The ASD(HD), as the focal point for DSCA, shall:

5.4.1.1. Consult with DUSD(I&E) on matters involving F&ES aspects such as first response.

5.4.1.2. Provide advice to DUSD(I&E) on DSCA policy as it relates F&ES.

5.4.1.3. Consult with DUSD(I&E) on developing F&ES requirements for installation preparedness such as CBRNE/WMD response and assistance to civil authorities during contingencies.

5.4.2. The ASD(ISP), as the focal point for CBRNE foreign consequence management (FCM), shall:

5.4.2.1. Consult with DUSD(I&E) on matters involving F&ES FCM aspects in CONUS environments.

5.4.2.2. Provide advice to DUSD(I&E) on FCM activities related to F&ES for the Secretary of Defense.

5.4.2.3. Consult with DUSD(I&E) on developing F&ES requirements for outside the Continental United States (OCONUS) installation preparedness such as CBRNE/WMD response and assistance to host nation civil authorities during contingencies.

5.5. The Heads of the DoD Components maintaining organized F&ES programs shall:

5.5.1. Establish and maintain programs that conform to the requirements and procedures in this Instruction.

5.5.2. Plan, program, and budget for F&ES requirements, and execute F&ES programs.

5.5.3. Emphasize prevention as a means to enhance the total F&ES effort and other fire prevention techniques to eliminate the causes of fires and to prevent death, injuries, and property damage if fire occurs.

5.5.4. Provide management support, resources, and professionally qualified F&ES staff sufficient to ensure effective implementation of F&ES programs at all organizational levels.

5.5.5. Annually review the deviations from this Instruction ensuring that the risk of deviation is accepted at the proper management level.

5.5.6. Annually provide DUSD(I&E) a summary of deviations from policy.

5.5.7. Assess F&ES programs for compliance with requirements and effectiveness of execution.

5.5.8. Participate in management reviews conducted by DUSD(I&E).

5.5.9. Recognize and encourage F&ES excellence through participation in the annual DoD F&ES Awards Program.

5.5.10. Appoint representatives to the F&ESWG, including a medical consultant for EMS.

5.5.11. Implement procedures to report F&ES activities using the National Fire Incident Reporting System (NFIRS).

5.5.12. Encourage all DoD Component fire departments to achieve and maintain the Commission on Fire Accreditation International (CFAI) accreditation.

5.5.13. Implement the procedures in paragraph 6 to organize, train, and equip F&ES for each installation, site, or operation.

5.5.14. Implement procedures to ensure that an installation commander may provide aid to the local community under immediate response authorities (to save lives, prevent human suffering, and mitigate great property damage), defined in DoD Directive 3025.1 (Reference (c)).

5.5.15. Implement procedures to report all requests from the National Interagency Fire Center (NIFC), National Incident Coordination Center , and subordinate Geographic Area Coordination Centers for certified DoD civilian fire fighters to support Type I Incident Management Teams to the appropriate supported Combatant Commander.

5.5.16. Implement procedures to sustain and recapitalize F&ES apparatus.

5.5.17. Establish and maintain emergency plans for the F&ES response to natural and man-made disasters, including acts of terrorism per the requirements of DoD Directive 2000.12 (Reference (d)), and ensure that operational procedures are developed for sustained emergency operations.

5.6. The Secretary of the Navy shall:

5.6.1. Administer and maintain the NFIRS for the DoD Components, including summarization and analysis of F&ES response data.

5.6.2. Administer and maintain the CFAI Self-Assessment and Accreditation Program for all the DoD Components.

5.6.3. Provide CFAI self-assessment, peer assessment, and peer assessor team leader training for all the DoD Components. Any DoD Component deviating from the requirements for CFAI accreditation shall provide for its own training.

5.7. The Secretary of the Air Force shall:

5.7.1. Administer and maintain the DoD Fire and Emergency Services Certification Program (F&ESCP) for all DoD Components.

5.7.2. Establish and maintain the DoD Fire Academy and provide technical training to DoD fire fighters.

5.7.3. Administer and maintain the DoD F&ES Fitness and Wellness Program for all the DoD Components.

5.8. The Combatant Commanders, through Chairman of the Joint Chiefs of Staff, shall use the procedures in paragraph 6 and operational risk management (ORM) in operational planning and execution to ensure F&ES protection of personnel, equipment, and facilities.

5.9. The DoD F&ESWG shall:

5.9.1. Consist of representatives from each of the Military Services, DLA, the DoD Fire Academy, and OSD. OSD will be represented by DUSD(I&E) and membership will be augmented as necessary based on current issues at hand to include but not limited to ASD(HD), ASD(HA), and ASD(ISP).

5.9.2. Recommend new and revised strategic planning guidance for all aspects of F&ES.

5.9.3. Establish guidelines to govern operation of the working group.

5.9.4. Establish procedures to rotate the working group chair annually among the DoD Components.

5.9.5. Meet at the call of the chair to share information, discuss items of mutual interest, and recommend policies and priorities to OSD related to all aspects of F&ES.

5.9.6. Recommend new and revised DoD policy for all aspects of F&ES.

5.9.7. Provide technical review of F&ES issues at the request of OSD.

5.9.8. Provide an annual report to DUSD(I&E).

5.9.9. Recommend guidance on the DoD F&ES Awards Program.

6. PROCEDURES

6.1. Standards. Comply with the relevant standards promulgated by the Department of Labor-Occupational Safety and Health Administration, National Fire Protection Association (NFPA) National Fire Codes (Reference (e)), Unified Facilities Criteria (UFC) 3-600-01 (Reference (f)), and other fire safety criteria published by the Department of Defense.

6.2. Fire Department Organizational Statement

6.2.1. Develop and maintain a written statement or policy that establishes the F&ES organization, the scope of services, and the level of service objectives described in Enclosure 3.

6.2.2. Specifically determine, document, and provide the response capability required for CBRNE and other hazardous material (HAZMAT) incidents at each installation based on mission needs, installation protection considerations, and defense priorities using requirements in Enclosure 4.

6.3. Staffing Requirements. Determine, document, and provide staffing required to meet the level of service objectives using the tools and guidance in Enclosure 5.

6.4. Apparatus Requirements. Determine, document, and provide apparatus, including backup apparatus, needed to meet the level of service objectives established in paragraph 6.2 and using requirements in Enclosure 6.

6.5. Fire Prevention. Implement fire prevention programs consisting of the minimum elements described in Enclosure 7.

6.6. Telecommunication Capability. Implement around-the-clock capability to conduct dedicated F&ES communications using the requirements in Enclosure 8.

6.7. Fitness and Wellness. Implement an F&ES Fitness and Wellness Program based on the current DoD requirements and guidance from NFPA 1500, 1582, and 1583 (References (g), (h), and (i)), and the International Association of Fire Chiefs/International Association of Fire Fighters Wellness Initiative (Reference (j)).

6.8. Immediately Dangerous to Life or Health (IDLH). Implement procedures to plan for and respond to emergencies to IDLH atmospheres using established standards, local conditions' risk considerations, and the requirements of Part 1910.134 of 29 CFR (Reference (k)), including the two-in/two-out provisions for interior structure and aircraft fires.

6.9. Safety and Occupational Health. Continuously improve fire fighter safety and health using established standards and the following:

6.9.1. Monitor fire fighter injury and illness trends, analyze data to focus prevention efforts, and implement mishap prevention initiatives.

6.9.2. Analyze work processes to identify fire fighter injury and illness risk. Using ORM, implement initiatives to reduce risk by the greatest extent possible thereby preventing illness and injury.

6.9.3. Implement health promotion, disease and injury prevention, and population health programs, as required by DoD Directive 1010.10 (Reference (l)), with special emphasis on smoking cessation.

6.9.4. Implement medical surveillance programs according to DoD 6055.5-M (Reference (m)).

6.10. Training and Equipment. Ensure fire departments are prepared, by virtue of appropriate training and equipment, to respond (both on and off the installation) to emergencies involving facilities, structures, aircraft, transportation equipment, HAZMAT, and both natural and man-made disasters (including acts of terrorism).

6.11. F&ESCP. Implement and monitor the F&ESCP as described in Reference (b).

6.12. Fire Department Uniforms. Establish and implement policies stating that workstation uniforms worn by F&ES personnel will conform to NFPA 1975 (Reference (n)).

6.13. Personal Protective Clothing and Protective Equipment (PPC&PE). Establish and implement policies that ensure:

6.13.1. Use of PPC&PE for F&ES personnel during emergency operations is designed for the purpose for which they are used, and is certified to meet the appropriate NFPA standard.

6.13.2. Use of commercial off-the-shelf PPC&PE, when available.

6.13.3. Issuance of PPC&PE to all DoD F&ES personnel is commensurate with their assigned tasks. Do not assign DoD F&ES to emergency response duties until they are provided with and properly trained to use a complete set of PPC&PE.

6.13.4. Serviceability of F&ES personnel PPC&PE.

6.14. Fire Incident and Emergency Services Investigation and Reporting

6.14.1. Complete NFIRS reports for all F&ES incidents (emergency or non-emergency) where the fire department responds.

6.14.1.1. All NFIRS reporting modules are mandatory for use by DoD fire departments and shall be completed in accordance with the current version of the NFIRS Complete Reference Guide (available at http://www.nfirs.fema.gov/_download/nfirs50crg2006_0328.pdf (Reference (o)).

6.14.1.2. DoD is recognized within NFIRS by the state designation "DD."

6.14.1.3. Contact the DoD NFIRS Program Manager at the Naval Safety Center, 375 A Street, Norfolk, VA 23511-4399 or at http://www.safetycenter.navy.mil for technical assistance.

6.14.2. Investigate all fire losses to real property, wildland areas, and personal property (excluding military aircraft flight-related operations and Navy ships underway) to determine point of origin and fire cause before initiating other safety or legal investigations.

6.14.3. Provide point of origin and fire cause determination for subsequent safety or legal investigations.

6.14.4. Provide an independent fire investigation and report for fire losses meeting the Class A accident threshold defined by DoD Instruction 6055.7 (Reference (p)).

6.15. Program Evaluation and Improvement

6.15.1. Implement procedures to evaluate and improve all aspects of the F&ES Program at all management levels.

6.15.2. Implement procedures to compile DoD Component F&ES Program status in an annual management review to the DUSD(I&E) that addresses, at a minimum, the following categories as described in the CFAI F&ES Self-Assessment Manual (Reference (q)):

6.15.2.1. Governance and Administration

6.15.2.2. Assessment and Planning

6.15.2.3. Goals and Objectives

6.15.2.4. Financial Resources

6.15.2.5. Programs

6.15.2.6. Physical Resources

6.15.2.7. Human Resources

6.15.2.8. Training and Competency

6.15.2.9. Essential Resources

6.15.2.10. External Systems Relations

6.15.3. Implement procedures for self-assessment of F&ES using Reference (q) or equivalent program.

6.15.4. Implement procedures to validate F&ES self-evaluation and improvement through achieving CFAI certification (preferred) or equivalent program that at a minimum contains an evaluation performed by external F&ES personnel and addresses the categories in paragraph 6.15.2.

6.15.5. Update annually all program evaluation and improvement procedures.

6.16. Deviation from Minimum Requirements. Deviation from minimum requirements increases risk. Conscious, informed decisions must be made to accept the risk posed by the deviation at an appropriate leadership level. Use the following to develop DoD Component-specific risk management procedures to address deviations from requirements in this Instruction.

6.16.1. Short-Term Deviations. Short-term deviations from requirements are those caused by immediate circumstances resulting in reduced capability for less than 90 days. Short-term deviations should be addressed internal to the installation through normal management options.

6.16.2. Temporary Deviations. Temporary deviations are those deviations from minimum requirements that result in capability loss for more than 90 days but less than 1 year. Temporary deviations shall be documented in a "get-well" plan that at a minimum contains the following. The get-well period in the plan shall not exceed 3 years.

6.16.2.1. An assessment of the risk caused by the deviation.

6.16.2.2. A description of measures to minimize increased risk caused by the deviation.

6.16.2.3. Detailed steps and timelines planned to meet the requirements.

6.16.2.4. Communication strategy for informing those affected by the deviation (e.g., housing residents, building occupants) that a deviation has occurred and the plan to remedy that deviation.

6.16.2.5. Strategy to update the installation commander regularly of the increased risk and the status of the get-well plan to meet the requirements.

6.16.2.6. Formal approval of the installation commander acknowledging acceptance of increased risk, commitment to carry out provisions in the plan, and the expiration date of the approval.

6.16.2.7. Formal review by the management level with line authority at least one level higher than the installation commander (e.g., Major Command). The reviewer shall be in the direct chain of command of the approver.

6.16.3. Long-Term Deviations. Long-term deviations are not expected to be remedied. Essentially long-term deviations waive the requirements of this Instruction. Document long-term deviations from minimum requirements in a document that contains:

6.16.3.1. An assessment of the risk caused by the deviation.

6.16.3.2. A description of measures to address the increased risk caused by the deviation.

6.16.3.3. A communication strategy for informing those affected (e.g., housing residents, building occupants) that a deviation has occurred and the measures being taken to minimize the risk of the deviation.

6.16.3.4. Approval by the applicable DoD component head. The approval shall contain clear statements that the approver has accepted the increased risk caused by the deviation and that the approval is not valid for more than 3 years. If the approval authority changes, deviation shall be briefed to the new approval authority. Expiring approval may be reviewed provided all steps in the approval process are reaccomplished or revalidated.

6.16.4. All Temporary and Long-Term Deviations. Copies of all temporary and long-term deviations from standards shall be forwarded to the DUSD(I&E).

7. INFORMATION REQUIREMENTS

The NFIRS has been assigned Report Control Symbol DD-AT&L(AR)1765 in accordance with DoD 8910.1-M (Reference (r)).

8. EFFECTIVE DATE

This Instruction is effective immediately.

Kenneth Krieg
Under Secretary of Defense for
Acquisition, Technology and Logistics

Enclosures – 9
E1. References, continued
E2. Definitions
E3. F&ES Standards of Response Coverage
E4. HAZMAT/CBRNE Response Capability
E5. Staffing Requirements
E6. Apparatus Requirements
E7. Fire Prevention
E8. Telecommunication
E9. Sample Worksheet for Fire Department Staffing

E1. ENCLOSURE 1

REFERENCES, continued

(e) National Fire Protection Association (NFPA), "National Fire Codes," 2006[1]
(f) Unified Facility Criteria (UFC) 3-600-01, "Design: Fire Protection Engineering for Facilities," April 17, 2003[2]
(g) NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, latest edition adopted[1]
(h) NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments, latest edition adopted[1]
(i) NFPA 1583, Standard on Health-Related Fitness Programs for Fire Fighters, latest edition adopted[1]
(j) International Association of Fire Chiefs Guide to Implementing the IAFC/IAFF Fire Service Joint Labor Management Wellness/Fitness Initiative, current edition[3]
(k) Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory protection," current edition
(l) DoD Directive 1010.10, "Health Promotion and Disease/Injury Prevention," August 22, 2003
(m) DoD 6055.5-M, "Occupational Medical Surveillance Manual," May 4, 1998
(n) NFPA 1975, "Standard on Station/Work Uniforms for Fire and Emergency Services," latest edition adopted[1]
(o) Federal Emergency Management Agency, United Sates Fire Administration, National Fire Incident Reporting System, Version 5.0, July 25, 2002[4]
(p) DoD Instruction 6055.7, "Accident Investigation, Reporting, and Record Keeping," October 3, 2000
(q) Commission on Fire Accreditation International, "Fire & Emergency Services Self-Assessment Manual," latest edition adopted[5]
(r) DoD 8910.1-M, "DoD Procedures for Management of Information Requirements," June 30, 1998
(s) Title 29, Code of Federal Regulations, Part 1910.156, "Fire brigades," current edition
(t) NFPA 600, "Standard on Industrial Fire Brigades," latest edition adopted [1]
(u) NFPA 403, "Standard for Aircraft Rescue and Fire-Fighting Services at Airports," latest edition adopted[1]
(v) Title 29, Code of Federal Regulations, Part 1910.146, "Permit-required confined spaces," current edition
(w) Federal Wildland Fire Management Policy, January 2001[6]

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[1] Available at http://www.nfpa.org
[2] Available at http://www.wbdg.org/references/pa_dod.php
[3] Available at http://www.iafc.org/associations/4685/files/wellness_fitness_smfd.pdf
[4] Available at http://osfm.fire.ca.gov/pdf/cfirs/NFIRSquickreferenceguide072502.pdf
[5] Available at http://www.cfainet.org/home/index.asp
[6] Available at http://www.nifc.gov/fire_policy/history/index.htm

(x) NFPA Standard 1710, "Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments," latest edition adopted[1]
(y) National Wildfire Coordinating Group, PMS 310-1, "Wildland Fire Qualification System Guide," April 2006[7]
(z) NFPA Standard 1051, "Standard for Wildland Fire Fighter Professional Qualifications," latest edition adopted [1]
(aa) NFPA 1977, Standard on Protective Clothing and Equipment for Wildland Fire Fighting, latest edition adopted [1]
(ab) US Department of Homeland Security, "National Incident Management System," March 1, 2004[8]
(ac) DoD Instruction 2000.18, "DoD Installation Chemical, Biological, Radiological, Nuclear and High-Yield Explosive Emergency Response Guidelines," December 4, 2002
(ad) DoD Instruction 2000.21, "Foreign Consequence Management (FCM)," March 10, 2006
(ae) Title 29, Code of Federal Regulations, Part 1910.120(q), "Emergency response to hazardous substances releases," current edition
(af) Section 2465 of title 10, United States Code, "Prohibition on contracts for performance of fire fighting or security-guard functions," current edition
(ag) "Defense Base Closure and Realignment Act of 1990," as amended (Public Law 101-510)[9]
(ah) DoD Instruction 4100.33, "Commercial Activities Program Procedures," September 9, 1985
(ai) Sections 5121-5206 of title 42, United States Code, "Robert T. Stafford Disaster Relief and Emergency Assistance Act," current edition
(aj) Section 2210 of title 15, United States Code, "Reimbursement for costs of fire fighting on Federal property," current edition[10]
(ak) Section 1856b of title 42, United States Code, "Emergency assistance," current edition
(al) NFPA 1901, "Standard for Automotive Fire Apparatus," latest edition adopted [1]
(am) NFPA 414, "Standard for Aircraft Rescue and Fire-Fighting Vehicles," latest edition adopted [1]
(an) General Services Administration Federal Specification for the Star-of-Life Ambulance, KKK-A-1822E, June 1, 2002[10]
(ao) NFPA 1906, "Standard for Wildland Fire Apparatus," latest edition adopted [1]
(ap) DoD Instruction 6055.1, "DoD Safety and Occupational Health (SOH) Program," August 19, 1998
(aq) Unified Facility Criteria (UFC) 3-600-02, "Inspection, Testing, and Maintenance of Fire Protection Systems," January 1, 2001[2]
(ar) NFPA 1061, "Standard for Professional Qualifications for Public Safety Telecommunicator," latest edition adopted[1]
(as) NFPA Standard 1221, "Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems," latest edition adopted[1]

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[7] Available at http://www.nwcg.gov
[8] Available at http://www.fema.gov/pdf/nims/nims_doc_full.pdf
[9] Available at http://www.acq.osd.mil/installation/reinvest/manual/dbcra90.html
[10] Available at http://gsa.gov/vehiclestandards

E2. ENCLOSURE 2

DEFINITIONS

E2.1. Advanced Life Support (ALS). Functional provision of advanced airway management, advanced cardiac monitoring, manual defibrillation, establishment and maintenance of intravenous access, and drug therapy.

E2.2. Aerial Fire Apparatus. A vehicle equipped with an aerial ladder, elevating platform, aerial ladder platform, or water tower that is designed and equipped to support fire fighting and rescue operations by positioning personnel, handling materials, providing continuous egress, or discharging water at positions elevated from the ground.

E2.3. Aero-Medical Ambulance. A fixed- or rotary-wing aircraft designed for or configured to transport victims or patients from an emergency scene or staging area to a Medical Treatment Facility (MTF).

E2.4. Aggregate Response Time (ART). Total of dispatch time, turnout time, and travel time (defined below). The time elapsed from the receipt of the emergency alarm to when the units arrive on the scene.

E2.5. Aircraft Rescue and Fire Fighting (ARFF). The fire-fighting actions taken to rescue persons and to control or extinguish fire involving or adjacent to aircraft on the ground.

E2.6. ARFF Vehicle. A vehicle intended to carry rescue and fire-fighting equipment for rescuing occupants and combating fires in aircraft at, or in the vicinity of, an airport.

E2.7. Alarm. A signal or message from a person or device indicating the existence of a fire, medical emergency, or other situation that requires fire department action.

E2.8. Ambulance. See Ground Ambulance and/or Aero-Medical Ambulance.

E2.9. Authority Having Jurisdiction. The organization, office, or individual responsible, designated by the DoD Component for approving equipment, materials, and procedures for DoD Component fire departments.

E2.10. Automatic Aid. A legally binding agreement for the automatic response by installation/base fire departments to prearranged areas outside the installation/base and, conversely, an automatic response by the outside municipality/government to prearranged areas inside the installation/base.

E2.11. Basic Life Support (BLS). Functional provision of patient assessment, including basic airway management; oxygen therapy; stabilization of spinal, musculoskeletal, soft tissue, and shock injuries; stabilization of bleeding; and stabilization and intervention for sudden illness, poisoning, heat/cold injuries, childbirth, cardiopulmonary resuscitation (CPR), and automatic external defibrillator (AED) capability.

E2.12. Company. A group of members: (1) under the direct supervision of an officer; (2) trained and equipped to perform assigned tasks; (3) usually organized and identified as ARFF, engine companies, ladder companies, rescue companies, squad companies, or multifunctional companies; and (4) operating with one piece of fire apparatus, except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer.

E2.13. Defensive Operations. Actions taken by a HAZMAT responder during an incident where there is no intentional contact with the material involved. These actions include elimination of ignition sources, vapor suppression, and diking or diverting to keep a release in a confined area. Defensive operations require notification and possible evacuation, but do not involve plugging, patching, or cleanup of spilled or leaking materials.

E2.14. Dispatch Time. The point of receipt of the emergency alarm at the public safety answering point to the point where sufficient information is known to the dispatcher and applicable units are notified of the emergency.

E2.15. Emergency Medical Care. The provision of treatment to patients, including first aid, CPR, BLS (emergency medical technician (EMT) level), advanced life support (paramedic level), and other medical procedures that occur prior to arrival at a hospital or other health care facility.

E2.16. Emergency Medical Services (EMS). Services provided to patients facing immediate medical emergencies that occur outside of MTFs.

E2.17. Engine Companies. Fire companies whose primary functions are to pump and deliver water and perform basic fire fighting, including search and rescue.

E2.18. Fire Apparatus. A fire department emergency vehicle used for rescue, fire suppression, or other specialized functions.

E2.19. Fire Brigade. An organized group of employees who are knowledgeable, trained, and skilled in at least basic fire-fighting operations, and whose full-time occupation might or might not be the provision of fire suppression and related activities for their employer.

E2.20. Fire-Fighting Operations. Operations including rescue, fire suppression, and property conservation in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation.

E2.21. Fire Prevention. Measures such as, but not limited to, training, public education, plans reviews, surveys/inspections, engineering reviews, and life safety code enforcement directed toward avoiding the inception of fire and minimizing consequences if a fire occurs.

E2.22. Fire Suppression. The activities involved in controlling and extinguishing fires.

E2.23. Foreign Consequence Management (FCM). Assistance provided by the U.S. Government to a host nation to mitigate the effects of a deliberate or inadvertent CBRNE attack or event and to restore essential operations and services.

E2.24. Ground Ambulance. A wheeled road vehicle designed for emergency medical care that provides a driver's compartment and a patient compartment to accommodate an EMT/paramedic and two litter patients.

E2.25. HAZMAT First Responders at the Awareness Level. Those persons who, in the course of their normal duties, could be the first on the scene of an emergency involving HAZMAT and who are expected to recognize the presence of HAZMAT, and who have been trained to initiate an emergency response sequence by notifying the proper authorities, and to protect themselves, and secure the area.

E2.26. HAZMAT First Responders at the Operational Level. Those persons who respond to releases or potential releases of HAZMAT as part of the initial response to the incident for the purpose of protecting nearby persons, the environment, or property from the effects of the release, and who are expected to respond in a defensive fashion to control the release from a safe distance without actually trying to stop the release, and keep it from spreading.

E2.27. HAZMAT First Responders at the Technician Level. Those persons who respond to releases or potential releases of HAZMAT for the purpose of controlling the release using specialized protective clothing and control equipment.

E2.28. Immediate Response. For the purpose of this Instruction, immediate response is any form of immediate action taken by a DoD Component or military commander to assist civil authorities or the public to save lives, prevent human suffering, or mitigate great property damage under imminently serious conditions occurring where there has not been any declaration of major disaster or emergency by the President, or there is an attack.

E2.29. Initial Full Alarm Assignment. Those personnel, equipment, and resources ordinarily dispatched upon notification of a structural fire.

E2.30. Installation. For the purpose of this Instruction, an installation is a base, camp, post, station, yard, center, homeport facility for any ship, or other activity under the jurisdiction of the Department of Defense, including any leased facility.

E2.31. Ladder/Truck Companies. Fire companies whose primary functions are to perform the variety of services associated with truck work, such as forcible entry, ventilation, search and rescue, aerial operations for water delivery and rescue, utility control, illumination, overhaul, and salvage work.

E2.32. Mutual Aid. Reciprocal assistance by emergency services under a prearranged agreement or plan.

E2.33. Offensive Operations. Actions taken by a HAZMAT responder, in appropriate chemical-protective clothing, to handle an incident in such a manner that contact with the released material may result. These actions include approaching the point of release for patching or plugging to slow or stop a leak, containing a material in its own package or container, and cleanup operations that may require overpacking or transfer of a product to another container.

E2.34. Operational Risk Management (ORM). The process of identifying, assessing, and controlling risks and making operational decisions that balance risk with mission benefit.

E2.35. Personal Protective Clothing and Protective Equipment (PPC&PE). Equipment or clothing worn by a person to provide protection from hazards to which the person is likely to be exposed while performing duties.

E2.36. Quint. Fire apparatus with a permanently mounted fire pump, a water tank, a hose storage area, an aerial ladder or elevating platform with a permanently mounted waterway, and a complement of ground ladders.

E2.37. Rescue. Those activities directed at locating endangered persons at an emergency incident, removing those persons from danger, treating the injured, and ensuring the victims are transported to an appropriate health care facility.

E2.38. Risk Communication. An interactive process or exchange of information and opinions among interested parties or stakeholders concerning a risk, potential risk, or perceived risk to human health, safety, or the environment.

E2.39. Special Operations. For the purpose of this Instruction, special operations are emergency operations that require specialized or advanced equipment or training. Examples include, but are not limited to, HAZMAT/CBRNE mitigation operations; technical rescue such as rescue from heights, water, or confined spaces; and response to medical emergencies.

E2.40. Standards of Response Coverage. Level of service policies that establish the distribution and concentration of F&ES resources for an installation or region.

E2.41. Team. Two or more individuals who have been assigned a common task and are in communication with each other, coordinate their activities as a work group, and support the safety of one another.

E2.42. Travel Time. The time that begins when units are enroute to the emergency incident and ends when units arrive at the scene.

E2.43. Turnout Time. The time beginning when units are notified of the emergency to the beginning point of travel time.

E3. ENCLOSURE 3

F&ES STANDARDS OF RESPONSE COVERAGE

E3.1. ORGANIZATION

E3.1.1. Document the establishment of organized, dedicated fire departments on installations and sites and for operations based on mission needs. Divide installations (including multiple activities serviced by a consolidated fire department) into Fire and Emergency Services Demand Zones (F&ESDZ), which are smaller areas that represent a single demand for fire services. Base ART criteria within given F&ESDZ.

E3.1.2. On DoD installations, sites, and facilities, and for operations where an organized, dedicated fire department is not justified and external assistance is not readily available, organize, train, and equip fire brigades in accordance with Part 1910.156 of 29 CFR (Reference (s) and NFPA 600 (Reference (t)). Include the brigade's functions and workplace in the written statement or policy. Personnel expected to do interior structural fire suppression shall be physically capable, certified, and trained to perform the required tasks.

E3.1.3. On DoD installations where external assistance is readily available and is incorporated into the response, develop a memorandum of understanding with the external agency that addresses the response services and permits the external agencies to visit for preplanning purposes.

E3.2. SCOPE OF SERVICES

Define and document the scope of services the fire department is expected to provide based on a review of the mission and unique characteristics of the installation. The scope of services shall consider, at a minimum, provisions for the following (even if the fire department is not expected to deliver the service):

E3.2.1. First response to HAZMAT incidents, including CBRNE and WMD

E3.2.2. EMS

E3.2.3. Fire prevention

E3.2.4. Fire suppression

E3.2.5. Response to ARFF emergencies

E3.2.6. Wildland fire protection and prevention

E3.2.7. Response to natural as well as man-made catastrophic events (e.g., hurricanes and floods)

E3.2.8. Confined space and technical rescue

E3.2.9. Response to nearby Federal Agency facilities in the event normal F&ES are inhibited

E3.2.10. Other significant service delivery

E3.3. LEVEL OF SERVICE OBJECTIVES

Define and document level of service objectives based on mission needs and the minimum requirements for:

E3.3.1. Operations in Table E3.T1.

E3.3.2. Prevention in Table E3.T2.

E3.3.3. Management in Table E3.T3.

E3.4. STRUCTURAL FIRE RESPONSE

Plan for and respond to structural fires using standards in Table E3.T1 and local conditions' risk considerations.

E3.5. ARFF RESPONSE

Use NFPA 403 (Reference (u)) as the baseline for agent quantities for ARFF response based on the mission assigned aircraft, with a service objective of conforming to the requirement 90 percent of the time. DoD Components may base agent quantity on larger nonassigned aircraft that are present more than 50 percent of the time. Due to variation in ARFF vehicle agent quantity, DoD Components may round to the nearest 500 gallons of agent required by Reference (u).

E3.5.1. DoD Components may incorporate technology or agent combinations that provide equivalent quantities of agent to that required by Reference (u), when such technology and agent combinations are validated by recognized scientific/research laboratories using recognized study methodology and published in reports available for scientific review.

E3.5.2. ARFF services shall be provided 24 hours per day when aircraft are present, even when no aircraft movement or maintenance activities are in progress. Use operational risk assessment procedures to determine the appropriate amount of resources needed during periods of inactivity.

E3.5.3. When available, include structural fire suppression forces to provide additional rescue and fire suppression personnel to establish agent resupply for sustained operations.

E3.6. EMERGENCY MEDICAL SERVICES RESPONSE

E3.6.1. DoD Components shall plan for situations requiring EMS using standards in Table E3.T1, requirements of local jurisdictions, and local risk conditions.

E3.6.2. Where fire departments provide first responder or higher level EMS, establish and maintain emergency medical response programs that are staffed with appropriately certified emergency medical personnel and equipment.

E3.6.3. EMS shall be provided in accordance with installation or local medical protocols.

E3.6.4. The DoD Component medical community shall provide medical guidance for EMS programs.

E3.7. RESCUE RESPONSE

Plan for and respond to situations requiring rescue using established standards and the following:

E3.7.1. For confined space rescue, refer to Part 1910.146 of 29 CFR (Reference (v)).

E3.7.2. Where fire departments provide rescue services, establish and maintain a rescue response capability staffed with appropriately trained and equipped rescue personnel.

E3.7.3. Use Military Department rescue response requirements.

E3.8. WILDLAND FIRE RESPONSE

Plan for and respond to wildland fires on installations using 2001 Federal Wildland Fire Management Policy (Reference (w)), established standards, local conditions' risk considerations, and the following:

E3.8.1. For installations with burnable acreage or bordered by burnable acreage, prepare an Installation Wildland Fire Management Plan that identifies:

E3.8.1.1. All wildland fire management strategies including military training availability, ecosystem sustainability, and protection of F&ES personnel and the public.

E3.8.1.2. Wildland fire preparedness, preplanned dispatch for both initial and extended attack, and prescribed fire and prevention per NFPA Standard 1710 (Reference (x)). If required, the minimum level of service for wildfire suppression shall consist of a direct wildland attack capability within 10 minutes of arrival of the initial wildland fire company at the fire scene.

E3.8.2. Train all personnel involved in wildland fire management activities to the appropriate Publication Management System (PMS) 310-1 (Reference (y)) or NFPA Standard 1051 (Reference (z)), and all personnel shall be outfitted with protective clothing and equipment per NFPA 1977 (Reference (aa)).

E3.9. DISASTER RESPONSE

Plan for and respond to natural and man-made disasters including acts of terrorism using established standards, local conditions' risk considerations, and the following:

E3.9.1. Establish and maintain Disaster Preparedness Plans for F&ES response to natural and man-made disasters, including acts of terrorism, as described in Reference (d).

E3.9.2. Ensure F&ES operational procedures are developed for sustained emergency operations.

E3.9.3. Appoint an F&ES officer who, in addition to any other duties, maintains the F&ES Disaster Preparedness Plan at all DoD installations having fire departments.

E3.9.4. Coordinate F&ES Disaster Preparedness Plans with Fire Department Disaster Preparedness Plans of all local jurisdictions of civil government (e.g., city, county, fire district that adjoin the installation).

E3.9.5. Test or exercise Disaster Preparedness Plans at least once in each fiscal year.

E3.9.6. Integrate and coordinate F&ES Emergency Response Plans with installation Emergency Response and Risk Communication Plans.

TABLE E3.T1. MINIMUM LEVEL OF SERVICE OBJECTIVES – OPERATIONS[1]

PROGRAM ELEMENT	ART (minutes)[2]	RATE (%)[3]	COMPANIES[4]	STAFF[4]
Structural Fire				
First Arriving Company	7	90	1	4
Initial Full Alarm Assignment	12	90	3	13
Other Fire Response/Investigative Response				
First Arriving Company	7	90	1	4
HAZMAT/CBRNE				
First Arriving Company (Defensive Operations)[5]	7	90	1	4
Full Alarm Assignment (Offensive Operations)[5]	22	90	3	15
Emergency Medical				
First Arriving Company (BLS with AED)	7	90	1	2
Transport Unit (BLS with AED)	12	90	1	2
ALS Capability	12	90	1	2
ARFF				
Unannounced First Arriving Company	5	90	1	3
Announced First Arriving Company[6]	1	90	1	3
Additional Units – should arrive at 30-second intervals	-	-	-	-
Technical Rescue				
First Arriving Company	7	90	1	4
Full Alarm Assignment	22	90	3	13
Wildfire				
As required to meet Installation Wildland Fire Management Plan	-	-	-	-
Other Response				
As required to meet NFPA standard, other consensus standard, or installation standard of cover	-	-	-	-

[1]This table deviates from NFPA standards based on historical risk profile of DoD installations.
[2]Consists of dispatch time, turnout time, and the remainder travel time.
[3]Fractile response rate indicates the percentage of responses that are equal to or less than the ART.
[4]Indicates the minimum number of companies and personnel required to safely and effectively perform initial operations for the respective program element. These minimum requirements do not provide sustainment capability and will not provide sufficient resources for major incidents.
[5] See Enclosure 4.
[6] Assumes pre-positioned units for an announced emergency; ARFF apparatus will be capable of responding to any incident on the runways within 1 minute.

NOTE: During actual emergency operations the incident commander determines the deployment of available resources using ORM principles.

TABLE E3.T2. MINIMUM LEVEL OF SERVICE OBJECTIVES – PREVENTION

PROGRAM ELEMENT	REQUIREMENT	FREQUENCY
Fire Risk Management Surveys/Inspections	Survey/inspect all facilities.[1] (including areas such as piers, open storage locations, etc.)	Annual
Plan Review	Review all military construction, sustainment/ restoration and modernization, and self-help projects.	As required
Public Fire Education Programs	Provide programs that inform and motivate all installation personnel on individual fire prevention responsibilities.	Quarterly

[1]Family housing is excluded except for common areas in multifamily units.

TABLE E3.T3. MINIMUM LEVEL OF SERVICE OBJECTIVES – MANAGEMENT

PROGRAM ELEMENT	REQUIREMENT
Incident Command	Provide command and control of all incidents consistent with the National Incident Management System (see Reference (aa)).
Supervision	Provide effective direction and oversight for subordinate personnel.
Planning	Provide required strategic and operational plans.
Budget	Provide budget requirements and manage program costs.
Program Management	Provide effective and efficient F&ES programs to the installation.

E4. ENCLOSURE 4

HAZMAT/CBRNE RESPONSE CAPABILITY

E4.1. RESPONSE

Plan for and respond to HAZMAT/CBRNE incidents using established standards, local conditions' risk considerations, and the following:

E4.1.1. Determine and establish the appropriate HAZMAT/CRBNE response capability for each installation fire department and emergency service using the guidelines in DoD Instruction 2000.18 (Reference (ac)) and DoD Instruction 2000.21 (Reference (ad)) at overseas locations. The response capability shall be defined in terms of capability organic to the installation and capability provided through mutual aid.

E4.1.2. Meet the requirements of Part 1910.120(q) of 29 CFR (Reference (ae)).

E4.2. OFFENSIVE OPERATIONS

E4.2.1. Capability.

E4.2.1.1. Perform initial risk assessment, perform limited rescues, select and provide decontamination procedures, and mitigate releases of HAZMAT/CBRNE incidents that require entry into the hot zone. Offensive operations require the use of personnel trained and certified to the HAZMAT Technician level.

E4.2.1.2. Determine whether the capability will be delivered by the installation fire department, the installation fire department with mutual aid from the surrounding community, or solely from the surrounding community.

E4.2.2. Requirements. Provide staff for the appropriate level of HAZMAT/CBRNE capability.

E4.2.2.1. A minimum of 15 personnel is required on scene. Responding personnel are not required to be F&ES personnel, but may be assigned to other installation organizations such as environmental engineering. However, responding personnel must meet the training and certification requirements specified below and be available for immediate response (24/7).

E4.2.2.2. At least seven personnel on scene shall be trained and certified to the HAZMAT Technician level.

E4.2.2.3. At least one person on scene shall be trained and certified to the HAZMAT Incident Commander level.

E4.2.2.4. At least five personnel on scene shall be trained and certified to at least the HAZMAT Operations level.

E4.2.2.5. At least two personnel on scene shall be trained and certified to at least the EMT BLS level and shall have on-scene medical transport capability.

E4.2.3. Limitations

E4.2.3.1. The fire department's ability to perform offensive operations may be limited due to the following:

E4.2.3.1.1. The nature of the incident including, but not limited to, the product, substance, or agent; the incident complexity, and expected duration.

E4.2.3.1.2. The number of casualties or persons exposed.

E4.2.3.1.3. The actual number and qualifications of the required responding personnel.

E4.2.3.2. CBRNE terrorist incidents may present extraordinary challenges such as mass contamination, secondary devices/attacks, and large multiple victim extractions. These challenges are well beyond the minimum response requirement and will significantly limit the ability to perform offensive operations until additional resources are available. Local commanders should be kept informed of the fire department's capability and notified of any changes regarding CBRNE capability.

E4.2.3.3. In the event the fire department's offensive operations are limited, every effort shall be made to conduct defensive operations.

E4.3. DEFENSIVE OPERATIONS

E4.3.1. Capability. The fire department's capability is determined by its ability to perform initial risk assessment, emergency decontamination, and confinement and mitigation of HAZMAT/CBRNE releases that do not require entry into the hot zone.

E4.3.2. Requirements. A minimum of a single engine company consisting of four personnel is required on-scene. All personnel shall be trained and certified to at least the HAZMAT Operations level.

E4.3.3. Limitations. The fire department may not perform defensive operations when the risks of intervening are greater than the risks of allowing the incident to conclude naturally.

E5. ENCLOSURE 5

STAFFING REQUIREMENTS

E5.1. REQUIREMENTS

Determine and document staffing required to meet level of service objectives using the sample worksheet at Enclosure 9 and contracting, cross-staffing, and mutual aid considerations.

E5.1.1. Assumptions. When completing the sample worksheet at Enclosure 9, assume "one major response" at any given time.

E5.1.2. Contracting

E5.1.2.1. Funds shall not be obligated or expended for entering into a contract for the performance of fire-fighting functions at any military installation or facility within the continental United States (CONUS) unless specifically exempted by law (e.g., see 10 U.S.C. 2465 (Reference (af)).

E5.1.2.2. The DoD Components may contract with local governments for the provision of fire protection services at military installations to be closed under the Defense Base Realignment and Closure Act of 1990 (Reference (ag)).

E5.1.2.3. When contract F&ES are permitted, statements of work shall be performance oriented and meet the intent of this Instruction and DoD Instruction 4100.33 (Reference (ah)).

E5.1.3. Cross-Staffing. The Military Departments shall establish policy on cross-staffing F&ES apparatus consistent with staffing requirements. This policy shall identify minimum staffing levels to ensure that a sufficient number of members are assigned, on duty, and available to safely and effectively respond. Use of cross-staffing reduces the capability to meet the minimum level of service objectives for multiple incidents.

E5.1.4. Mutual Aid. If practical, a portion of the required F&ES for a DoD installation may be provided for under a mutual aid agreement.

E5.1.4.1. Mutual aid is specifically authorized by sections 5121-5206 of 42 U.S.C. (Reference (ai)) and permits routine assistance to and from local jurisdictions as defined in a mutual aid agreement. Fire chiefs, through the installation commander, may also provide aid under the Immediate Response Authority per Reference (c).

E5.1.4.2. Mutual aid agreements do not change DoD response requirements (ART criteria or number of companies for level of service objectives). DoD fire companies shall be properly staffed in accordance with Enclosure 3, Table E3.T1.

E5.1.4.3. Mutual aid shall conform to section 2210 of 15 U.S.C. (Reference (aj)), which provides for compensation to municipalities for direct costs and losses (over and above normal operating costs) sustained while fighting fire on Federal property. Each agreement shall provide the terms for reimbursement of each party for all or any part of the costs incurred in furnishing F&ES to the other party.

E5.1.4.4. In accordance with section 1856b of 42 U.S.C. (Reference (ak)), in the absence of any agreement, installation commanders are authorized to render emergency assistance to preserve life and property in the vicinity of a DoD installation when, in their opinion, such assistance is in the best interest of the United States, under immediate response authorities described in DoD Directive 3025.1 (Reference (c)).

E5.1.4.5. In connection with mutual aid F&ES assistance agreements, any service performed by DoD personnel, civilian or military, shall constitute service rendered in the line of duty. The performance of such service by any other individual shall not constitute such individual as an officer or employee of the United States.

E5.1.4.6. Any continuing or additional aid provided to the local community outside of immediate response authorities shall follow procedures in Reference (c) and be approved by the USD(AT&L).

E6. ENCLOSURE 6

APPARATUS REQUIREMENTS

E6.1. FRONTLINE APPARATUS REQUIREMENTS

E6.1.1. Determine, document, and procure apparatus required to meet the level of service objectives established in Enclosure 3 and the following:

E6.1.1.1. Structural Apparatus. Provide structural apparatus to meet the ART in Enclosure 3, Table E3.T1. New structural apparatus shall comply with the provisions of NFPA 1901 (Reference (al)). Provide aerials and quints for multiple high-rise buildings or where fixed aerial operations are required. Specific requirements for aerials and quints shall be determined by the DoD Component based on local conditions' risk considerations.

E6.1.1.2. ARFF Vehicles. Provide ARFF vehicles per Reference (u) as adjusted for military aircraft hazards. New ARFF vehicles shall comply with the provisions of NFPA 414 (Reference (am)) except ARFF apparatus assigned to rapid deployment forces shall be transportable by military airlift (e.g., C-130, C-17).

E6.1.1.3. Ambulances. Where fire departments provide EMS transport service, provide ambulances to meet ART in Enclosure 3, Table E3.T1. New ambulances shall comply with the provisions of General Services Administration's Federal Specification KKK-A-1822E (Reference (an)).

E6.1.1.4. Wildland. Where fire departments provide wildland fire suppression that cannot be accessed via structural fire apparatus, provide wildland fire apparatus to meet the Installation Fire Management Plan. New wildland fire apparatus shall comply with the provisions of NFPA 1906 (Reference (ao)).

E6.1.1.5. Other Specialized Apparatus. Provide where required to meet level of service objectives that cannot be addressed by structural or ARFF apparatus above. Other specialized apparatus shall comply with the provisions of the applicable NFPA standard.

E6.1.2. Develop and implement sustainment and recapitalization plans for apparatus as part of planning, programming, and budgeting efforts.

E6.2. BACKUP APPARATUS REQUIREMENTS

Determine and document apparatus needed to replace front-line apparatus that is out of service and to provide surge capability for major incidents. Apparatus may be placed in service and staffed by recalled F&ES personnel during major incidents. Obtain apparatus by retaining apparatus that became excess through normal replacement programs. Do not procure new apparatus to meet these requirements. Recommended allowances for backup apparatus are listed in Table E6.T1.

TABLE E6.T1. BACKUP APPARATUS, RECOMMENDED ALLOWANCE[1, 2]

IN-SERVICE, STAFFED/CROSS-STAFFED ENGINE, ARFF, OR AMBULANCE COMPANIES	RECOMMENDED BACKUP APPARATUS
One to Four	1
Five to Nine	2
Ten or More	3

[1]The DoD Components may provide additional backup apparatus to include aerial, rescue, and specialized apparatus at large installations or regional departments that have multiple units of these types.
[2]The DoD Components may increase or decrease according to specific requirements.

E7. ENCLOSURE 7

FIRE PREVENTION

E7.1. PROGRAM ELEMENTS

Implement fire prevention programs that cover, as a minimum, the following:

E7.1.1. Engineering and Plans Review. The plans for all military construction projects, facility modernization, rehabilitation programs, or self-help projects shall be reviewed by a certified fire inspector to ensure that all construction contains the fire protection and life safety features required by Reference (f) and applicable NFPA codes. The UFC requires a registered fire protection engineer to conduct a technical design review. Fire inspectors do not conduct technical design reviews (hydraulic calculations, occupant load/exit calculations, etc.), but review plans to ensure all required features are present and local emergency response elements are incorporated.

E7.1.2. Fire Risk Management Surveys/Inspections. Certified fire inspection personnel shall conduct fire risk management surveys of facilities. Hazardous conditions shall be reported as specified in DoD Instruction 6055.1 (Reference (ap)) and promptly corrected or incorporated into the DoD installation's hazard abatement plan. See Enclosure 3, Table E3.T2.

E7.1.3. Smoke Detectors. Smoke detection systems shall be installed and maintained per UFC 3-600-02 (Reference (aq)) in buildings where safety to life is a principal concern. This includes all buildings used for sleeping purposes. Additionally, programs shall be established to:

E7.1.3.1. Require the installation of smoke detectors in all DoD owned, leased, and public/private venture housing and in all mobile homes on DoD property, and recurring inspection of smoke detectors as a prerequisite for assignment to mobile home space on DoD property.

E7.1.3.2. Require carbon monoxide detectors as appropriate in those homes that use fossil fuel.

E7.1.4. Residential Sprinkler Systems. Provide residential sprinkler systems per Reference (f).

E7.1.5. Public Fire and Injury Prevention Education Promotion.

E7.1.5.1. Public Fire and Injury Prevention Education programs shall be developed to inform and motivate DoD personnel and families of DoD personnel, who reside or work on DoD installations or in Government-leased facilities, as to their individual responsibilities in fire prevention.

E7.1.5.2. Fire prevention and/or safety materials, including nominal value incentive and educational items, are an authorized expenditure of funds in promoting fire prevention and safety as an integral part of the Public Fire Education Program.

E8. ENCLOSURE 8

TELECOMMUNICATION

E8.1. CAPABILITY

Maintain around-the-clock capability to conduct essential F&ES communications.

E8.1.1. When provided by the fire department, F&ES telecommunicators shall be:

E8.1.1.1. Trained in the proper use of communications equipment including telephone, radio, and other electrical or electronic alarm signal receiving systems.

E8.1.1.2. Trained for dispatching fire apparatus and for requesting medical, police, or other fire department assistance, as necessary.

E8.1.1.3. Dedicated public safety or equivalent telecommunicators.

E8.1.1.4. Certified as Telecommunicator I or II per Reference (b).

E8.1.1.5. Capable of speaking bilingually when required at OCONUS locations and some CONUS locations.

E8.1.2. The DoD Components shall implement the installation F&ES alarm and communication function where feasible.

E8.1.2.1. Consolidate with an established continuously manned emergency communications center for all emergency services (fire, police, ARFF, medical, explosive ordnance disposal, etc.). Telecommunicators employed at the consolidated communications center shall meet the requirements of NFPA Standard 1061 (Reference (ar)).

E8.1.2.2. F&ES communications center staffing shall be in addition to the requirement for a fully staffed structural and ARFF response. Where F&ES personnel can be assigned on a rotational basis to operate the alarm receiving and communications equipment, F&ES personnel shall meet the requirements of Reference (ar) in fire alarm communications.

E8.1.2.3. Where fire suppression is provided by other than DoD fire departments, F&ES fire alarm communications shall be consolidated with other continuously staffed functions such as military police or security. Telecommunicators employed at the consolidated facility shall meet the requirements of Reference (ar).

E8.1.2.4. DoD F&ES communications and dispatch functions may be provided by municipal F&ES or other outside agencies when those agencies compare favorably with DoD standards and can meet the prescribed communications criteria.

E9. ENCLOSURE 9

SAMPLE WORKSHEET FOR FIRE DEPARTMENT STAFFING

LINE	LEVEL OF SERVICE OBJECTIVE	MINIMUM STAFFING
	OPERATIONS (The total operational staffing reflects the minimum fire department staffing needed to perform the specified service-level objectives safely and effectively. The total operational staffing provides the capability to handle only one major incident at a time.)	
1	Fire department daily staffing required to meet most demanding service level objectives (Enclosure 3, Table E3.T1)[1]	
2	Additional daily staffing required to meet installation ART standards, not included in Line 1	
3	Additional daily staffing required to meet airfield ARFF requirements, not included in Line 1	
4	Total Organic Daily Staffing [Line 1+ Line 2 + Line 3]	
5	Automatic/mutual aid daily staffing that meets service-level objectives	
6	Allowable daily cross-staffing (per paragraph E5.1.3)	
7	Adjusted Daily Staffing [Line 4 – (Line 5 + Line 6)]	
8	Personnel Staffing Factor (Service factor used to provide complete coverage 24 hours per day, 365 days per year for a single position. The factor includes leave, non-available training, and excused absences.)	
9	Total Operational Staffing (Line 7 x Line 8)	
	PREVENTION (These baseline requirements may be increased or decreased depending on the DoD Component's assessment of the need for full-time personnel.)	
10	Area requiring Fire Prevention Surveys in thousands of square feet = prevention personnel required $< 1{,}000 = 1$ $\geq 1{,}000$ and $< 3{,}000 = 2$ $\geq 3{,}000$ and $< 5{,}000 = 3$ $\geq 5{,}000$ and $< 8{,}000 = 4$ $\geq 8{,}000$ and $< 11{,}000 = 5$ $\geq 11{,}000$ and $< 14{,}000 = 6$ $\geq 14{,}000$ and $< 17{,}000 = 7$ $\geq 17{,}000$ and $< 20{,}000 = 8$ $\geq 20{,}000$ = Determined by the DoD Component	

E9. ENCLOSURE 9

SAMPLE WORKSHEET FOR FIRE DEPARTMENT STAFFING, contined

LINE	LEVEL OF SERVICE OBJECTIVE	MINIMUM STAFFING
	MANAGEMENT (These requirements only reflect management staffing required for operations and prevention objectives. These baseline requirements may be increased or decreased depending on the DoD Component's assessment of the need for full-time personnel. Additional personnel may be required for public fire education, fire alarm communications, emergency medical, program management, administration, and maintenance of fire protection systems.)	
11	Fire Chief for fire departments with 10 or more personnel = 1	
12	Deputy Fire Chief for fire departments with 40 or more personnel = 1	
13	Assistant Fire Chief (Shift Supervisor) for fire departments with 20 or more personnel = 2	
14	Assistant Fire Chief (Fire Prevention) for fire departments with 4 or more personnel = 1	
15	Assistant Fire Chief (Training) for fire departments with 30 or more personnel = 1	
16	Battalion/District/Station Chief (Supervisory Fire Fighter). At large or consolidated installations, additional shift supervisors are warranted where physical dispersion of fire stations makes it unmanageable for one shift supervisor to provide immediate direction of day-to-day operations.	
17	Total Management Staffing (Line 11 + Line 12 + Line 13 + Line 14 + Line 15 + Line 16)	
	TELECOMMUNICATIONS (These performance requirements for telecommunicator personnel are based on NFPA 1221 (Reference (as)) requirements. For exceptions to dedicated telecommunicator personnel, see Enclosure 8.)	
18	Personnel required to answer 95% of alarms within 15 seconds and 99% of alarms within 40 seconds. Communications centers that provide emergency medical dispatching protocols shall have at least two telecommunicators on duty at all times. At least one supervisor shall be on duty and available to the telecommunicators when more than two telecommunicators are on duty.	
	TOTAL FIRE DEPARTMENT STAFFING (Line 9 + Line 10 + Line 17 + Line 18)	

[1]Do not include incident commanders who are covered under the management staffing.

5 January 2001
Revision 1

Commander Naval Special Warfare Group ONE
Littoral Warfare Training Facility (LWTF)
Operations and Scheduling
San Clemente Island

FIRE MANAGEMENT PLAN

Ref: (a) NALF San Clemente Island Instruction 5102.1, 15 Jan 99
(b) Wildland Fire Policy for NALF SCI, NASNI Instruction 11320.1, 31 Oct 96
(c) NSWC Range Safety Operations Course, June 1998
(d) U.S. Fish and Wildlife Service, Biological Opinion, 15 Mar 97

Tab: (a) Fire Bill
(b) Current Fire Danger Ratings
(c) Pending Fire Danger Ratings
(d) Briefing Guide
(e) Fire Reporting Checklist

1. Purpose. The purpose of this plan is to reduce the incidence and severity of brush fires during tactical training on San Clemente Island.

2. Background. Wildland fire is a threat to Naval Special Warfare (NSW) training and combat readiness. The incidence of wildfire in the U.S. is increasing, and historic wildfires on SCI have burned valuable habitat of federally-listed threatened and endangered species, which occupy NSW training areas. For the period 1997-1999 there were an average of 18 fires per year on SCI. These fires burned an average of 1,336 acres per year.

3. Scope. Strategies to prevent and contain wildland fire shall be given the highest priority in the planning and execution of military operations. This Fire Management Plan consists of instructions, a Fire Bill (see Tab (a)), Fire Danger Ratings, Briefing Guide, and a Fire Reporting Checklist. The key to fire management is quality training in planning, briefings, preparedness to suppress fires when they occur, interoperability in calling in other fire-fighting resources, communications, and reporting.

4. Applicability. These procedures apply to NSW operations and scheduling of training conducted out of the Maritime Operations (MAROPS) facility, SCI. They apply to Training Areas and Ranges (TARs), other ranges, training areas, and impact areas.

5. Fire Danger Ratings

a. Current Fire Danger Ratings. Current Fire Danger Ratings are defined in Tab (b). The Fire Danger Rating System for SCI is maintained and administered by Commander, Navy Region Southwest (CNRSW) Environmental Department, Natural Resources Office (NRO). At the present time SCI uses a system comprised of two ratings: Fire Season and Non-Fire Season. The ratings are based on information from the U.S. Forest Service (USFS) and local conditions. Specific ratings are determined by an analysis of season, wind speed, temperature, humidity, and especially the moisture content of the vegetation on SCI. The dates of the Fire Season on SCI are determined and disseminated by NRO annually in message format to all island tenants and users. When the Fire Season ends, NRO will notify all units at SCI.

b. Pending Fire Danger Ratings. Pending Fire Danger Ratings are described in Tab (c). CNRSW is in the process of revising the SCI Fire Management Plan, and one of the changes will be to adopt the USFS system of Fire Danger Ratings. This system incorporates a more sophisticated network of weather inputs, is nationwide, and is disseminated daily on a USFS web site. The system uses five Fire Danger Ratings which are color coded: Blue, Green, Yellow, Orange, and Red.

6. Responsibility

a. Commanding Officers are responsible for the safety of their units. This includes weapons safety, explosives safety and wildland fire safety.

b. MAROPS OIC is responsible for coordination with the SCI Fire Department and the CNRSW NRO and for briefing incoming personnel on the SCI fire situation. MAROPS personnel should brief incoming platoons on the SCI fire situation prior to each series of evolutions. This fire situation awareness briefing should include: fire-fighting procedures; reporting procedures, fire facilities and assets (e.g., helicopter); fire threats to personnel, facilities and wildlife; and seasonal restrictions (e.g., fire season dates and specific NSW restrictions).

c. Range Officers In Charge (ROIC)/Range Safety Officers (RSO) are responsible for briefing fire prevention and suppression during range evolution briefings and managing and reporting wildland fires during range evolutions.

d. CNRSW NRO should brief MAROPS personnel annually on wildfire prevention and natural resource protection.

e. Federal Fire should brief MAROPS personnel annually on fire suppression tactics, techniques and procedures and reporting.

7. Coordination

a. The Southern California Offshore Range (SCORE) SCI Range Manager will monitor all range and maneuver area fires as they occur, and is authorized to assist the SCI Fire Department to safeguard government property and personnel. This will include the control of firing and the removal of units from training areas threatened by fire. Maximum effort will be made not to interfere with scheduled training. However, safety considerations shall take precedence.

b. Aerial fire fighting is the primary method of attacking wildland fires during fire season. This is a secondary mission of the HC-85 detachment based at the NALF SCI airfield. When HC-85 is not on duty, the CNRSW NRO can activate arrangements with a contract service to provide an alert fire-fighting helicopter. When planning tactical evolutions, MAROPS schedulers should confirm whether HC-85 is on alert for firefighting or whether the NRO needs to have the contract helicopter perform this service.

8. Planning and Briefings

a. Planning. The NSWC Range Operations Safety (ROS) Guide stresses that, "The effect of range operations on endangered species of wildlife (if any), and on proper land use policies must also be taken into consideration in the selection and use of a site for NSW range evolutions." Wildland fire is a threat to NSW personnel, facilities and continued access to SCI as a training site. The failure to prevent and suppress wildland fires could have the most serious consequences for NSW training and platoon readiness for deployment. The dangers of wildland fires will be discussed in the planning, risk assessment and conduct of each range evolution. NSW-caused fires on SCI have historically been started by:

- Explosives
- Flares
- Grenades

- Small Arms Ammunition (ball and tracer, up to .50 caliber)

b. Briefings. ROIC/RSOs will include in their evolution briefings a discussion of the following topics (see Tab (d)):

(1) Wildland fire threat (dates of fire season and potential wind conditions)
(2) Operational restrictions (if any)
(3) Potential ignition sources
(4) Fire prevention procedures
(5) Location of firebreaks and fuel breaks in relation to training site
(6) Reporting procedures (including UTM grid reference)
(7) Positioning of NSW on-site fire suppression equipment (water buffalo, shovels, rigs, swatters, etc.)
(8) Availability of external fire-fighting assets (Helo and SCI Federal Fire)
(9) <u>During Fire Season ROIC/RSOs shall designate a Fire Detection Officer, who will have the responsibility to monitor the potential for wildland fire and report such fires, if they occur, to SCI Security.</u>

9. Communications. The primary agency for fire reporting and response is the Dispatcher at Security. SCI Federal Fire Department is not manned to receive fire calls or dispatch fire fighting units. Security's main emergency line (4-9911) is a multi-line trunk with phones that ring simultaneously at the Federal Fire unit in Wilson Cove (Station 10), at the Airfield (Station 11), the Airfield Tower, and Medical. Thus, a call to Security is just as fast, and more reliable, than a call on a single line to Federal Fire.

10. Priorities. The following wildland fire-fighting priorities shall be observed during the execution of suppression efforts:

a. Fire fighter and military and civilian personnel safety is the highest priority. All wildland fire management plans and activities shall reflect this commitment.

b. Protection of property or natural and/or cultural resources are secondary priorities, based on the relative values at risk, commensurate with suppression costs.

c. Wildland fires shall be suppressed at minimum cost, considering benefits and values at risk and consistent with resource management objectives.

11. Procedures

a. Initial Actions. Upon discovering a fire on any range, impact or training area, the ROIC/RSO will determine immediate actions to protect personnel. This will include an assessment of whether the fire can be suppressed or extinguished by personnel present. It is important to remember that fire fighting is, at best, a very dangerous proposition. Without proper training, fire fighting can be deadly. In making this determination, the following facts should be considered with the greatest importance placed on safety of personnel:

(1) Size and type of fire

(2) Location, speed, and direction in which the fire is spreading. (Use UTM grid coordinates to convey location.)

(3) Probability of injury to those personnel who will attempt to suppress the fire. Is the area safe for Federal Fire personnel to respond? Is there unexploded ordnance present? Can it be removed successfully with minimum danger to personnel?

(4) Probability of damage to government property and natural resources

(5) Equipment available to combat the fire.

b. Reporting. As soon as practicable after initial assessment, the ROICs/RSOs will immediately notify Security (and the Fire Department which monitors the same line) by the most expeditious means possible stating the exact location and extent of the fire (see Tab (d) for a list of reporting elements). In reporting a wildfire, there are three essential elements of information: (1) the nature of the fire; (2) the approximate grid location; and (3) whether it is safe for Federal Fire to enter the area. The grid location is especially important. SCI Federal Fire now uses a system of 1,000-meter grid squares based on the Universal Transverse Mercator (UTM) system. This is published for SCI users in a booklet, SCI Crash Grid and Island Location Quick Reference Map Book. **Detailed grid location information is essential to rapid-fire response.** It is also important to tell the Dispatcher that it is safe for Federal Fire units and personnel to enter the danger area! There have been instances where Federal Fire responded to an NSW fire location, only to be deterred from entering by the sign of a raised red "Range is HOT; Do Not Enter" flag. Someone should be assigned to meet Federal Fire units and escort them into the danger area.

Secondary notification should be to the SCI Range Manager and the Island OIC. The Fire Department will then instruct the ROICs/RSOs as to what action to take prior to the arrival of the Fire Department. The ROICs/RSOs will remain in the area with his unit subject to the orders of the Fire Chief. Due to the possibility of duds, under no circumstances will anyone enter an impact area in SHOBA to fight fires.

c. In the event of a fire emergency, immediately halt the training evolution in progress.

d. Evacuate the space of all non-essential personnel. If in a building, close doors and windows on the way out.

e. Attempt to suppress and contain the fire, without endangering the platoon, utilizing all available firefighting equipment. Remain on station as long as it is safe to do so, or until relieved by Fire Department personnel.

f. Evacuate all personnel and all equipment to safety as long as the removal of equipment does not endanger personnel.

g. Have a senior man account for all personnel involved in the training evolution, and stand by to provide assistance to the Fire Department.

h. Advise the NSWG-1 MAROPS as soon as practical after appropriate fire-fighting procedures have been initiated.

i. In most cases the CNRSW NRO office will provide maps that will show areas where fire fighting is <u>not</u> approved. For example, it would do more damage to the environment (sage sparrow habitat) fight a fire rather than letting it burn to the closest road or fuel break. NRO should provide maps with "approved" and "non-approved" areas for fire fighting. In the "non-approved" areas, vehicles would be restricted from off-road travel.

12. Fire Prevention Plan

a. Many wildland fires result from careless acts. All reasonable means available must be taken to prevent such fires, and to reduce damage when they do occur. All personnel must be aware of the dangers of fire at SCI and train in a manner that minimizes fires.

b. Wildland fires remain the most destructive (and costly) threats to SCI training and natural resources. In past years more money has been spent on some ranges for fire prevention, fire fighting, and post-fire restoration than was obligated for range improvements. NSW and MAROPS will coordinate with SCORE and NRO in development of the SCI Fire Management Plan and other fire prevention measures, including firebreak planning and control burns.

c. Burning of powder may be conducted in designated demolition area. Powder burning will be accomplished per appropriate directives. Units conducting powder burns shall have fire extinguishers, water, and shovels at the burn site.

13. Control burns. Control burning may be done only under the supervision of the SCI Fire Department and NRO. Requests for control burning on ranges and in training areas will be submitted to the SCI Fire Department who will coordinate burning with the CNRSW NRO.

DEPARTMENT OF THE NAVY
COMMANDER NAVAL AIR STATION NORTH ISLAND
COMMANDER HELICOPTER WING RESERVE

COMHELWINGRES
3120
Ser 32/ 101
4 May 00

NASNI
3120
Ser 01/136
4 May 00

LETTER OF AGREEMENT
BETWEEN
COMMANDING OFFICER, NAVAL AIR STATION NORTH ISLAND
AND
COMMANDER, HELICOPTER WING RESERVE

Subj: UTILIZATION OF COMHELWINGRES HELICOPTERS TO SUPPORT AIRBORNE FIRE FIGHTING REQUIREMENTS FOR NAVAL AUXILIARY LANDING FIELD (NALF) SAN CLEMENTE ISLAND, CALIFORNIA

Ref: (a) COMNAVAIRESFOR, COMNAVAIRPAC, COMTHIRDFLT ltr of 1 Feb 94

1. Purpose. This letter of agreement is promulgated to establish mutually agreed upon scheduling and procedures in support of airborne fire fighting requirements for NALF San Clemente Island (SCI), CA. This agreement outlines the role of HC 85 helicopter assets in support of NAS North Island requirements. Additionally, it identifies resource and maintenance sources for fire fighting equipment to be used in conjunction with this tasking.

2. Discussion. Effective 1 May 2000, HC 85 will provide airborne helicopter fire fighting support for NALF San Clemente Island, CA during those periods when HC 85 has assets deployed aboard NALF San Clemente supporting Southern California Offshore Range (SCORE) operations.

3. Responsibilities

a. Commander Helicopter Wing Reserve will

(1) Task HC 85 to provide helicopter services in support of NALF San Clemente Island airborne fire fighting. These requirements are defined as the following:

(a) Sufficient assets to support one aircraft capable of supporting fire fighting missions on NALF San Clemente Island, CA during designated fire season.

Subj: UTILIZATION OF COMHELWINGRES HELICOPTERS TO SUPPORT AIRBORNE FIRE FIGHTING REQUIREMENTS FOR NAVAL AUXILIARY LANDING FIELD (NALF) SAN CLEMENTE ISLAND, CALIFORNIA

(b) One qualified aircrew to perform airborne fire fighting.

(c) Support to be provided during periods when the unit is scheduled to support SCORE operations.

(d) Maintain daily operational and administrative control of HC 85. Scheduling authority for HC 85 detachments will be coordinated with Fleet Area Control and Surveillance Facility (FACSFAC) for deployment to NALF San Clemente Island in support of SCORE operations. Scheduling requirements will be in accordance with those as set forth in reference (a).

b. Commander Naval Air Station North Island will:

(1) Purchase heliborne fire fighting equipment in sufficient quantities to provide one functional asset and one backup asset aboard NALF San Clemente Island. This equipment shall be approved by NAVAIR for use with HC 85 aircraft.

(2) Ensure the SCI Officer in Charge coordinates local fire fighting operations. He will determine under what conditions and on what parts of the island heliborne assets will be used to fight fires. Additionally, he will notify the SCORE range of fire fighting requirements and deconflict those operations if required.

4. Effective Date. This agreement is effective upon approval and signature of all parties below. It remains in effect until a need for review, modification or cancellation becomes apparent and is agreed upon by both parties.

CAPT D. B. BELL, CHWR

CAPT D. R. O'BRIEN, CO, NASNI

Copy to:
HC 85
NALF SCI
SCORE Range

OPERATING PLAN

Between

COMMANDER NAVAL BASE SAN DIEGO

for the

FEDERAL FIRE DEPARTMENT

and

UNITED STATES FOREST SERVICE

CLEVELAND NATIONAL FOREST

I. OPERATION PLAN (Annual Fire Protection Plan)

Operating procedures to be used by the Cleveland National Forest(CNF) and Federal Fire Department (FFD), in response to implementation of the Interagency Fire Agreement, between the United States Forest Service, Cleveland National Forest and the Federal Fire Department dated May 15, 1993.

II. AUTHORITY FOR OPERATION PLAN

Operation Plan shall conform to, and be consistent with, applicable Forest Service or Federal Fire Department policy. The annual operation plan shall be developed in accordance with the Interagency Fire agreement between the Commander Naval Base San Diego and the Cleveland National Forest.

III. PURPOSE OF OPERATION PLAN

The purpose of this plan is to identify each agency's resources and responsibilities, and how they are exercised for implementing the Interagency Fire Agreement.

IV. DEFINITIONS AND DESCRIPTIONS

A. Fire Protection Areas: Those areas upon which one of the agencies has primary responsibility for fire suppression. This responsibility is by law or ownership.

B. Mutual Aid Assistance: Those areas on either side of the boundary which are mutually identified as areas in which a fire could pose a threat to the protection area of the adjoining agency. Upon receipt of a report of fire within the Mutual aid area either agency shall ensure an appropriate suppression response is sent immediately. See enclosed map for locations of the Mutual Aid Assistance Areas.

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XII. Administrative Listings

V. FIRE PROTECTION ORGANIZATION AND FACILITIES

A. The Cleveland National Forest suppression/detection organization consists of the following resources:

Engines (Brush)	22 Type III
Lookouts	2
Helicopters	2 Type III
Airtanker	1 Type I
Hand crews	2 Type I: 20 member Hot Shot
Hand crews	1 Type II

B. The Federal Fire Department fire Suppression organization consists of the following resources:

Engines	16 Type I
Engines (Brush)	4 Type III
Crash Trucks	9
Water Tender	1 2500 Gallon

C. Leased Facilities: Each agency maintains two separate reciprocal lease agreements. Under these lease agreements, prevention inspections, and responsibility definitions are outlined for each agency.

VI. AIR OPERATIONS

The Federal Fire Department will request Firefighting aircraft through the Cleveland National Forest as assistance by hire for wildfires within Federal Fire Department Jurisdiction. Cleveland National Forest aviation personnel will report to the Federal Fire Department Incident Commander at the incident.

VII. DESIGNATION OF AUTHORIZED AGENCY REPRESENTATIVES

On fires confined to the protection area of either agency then the ranking officer of the protecting agency will become incident commander.

Boundary fires shall be managed by the Unified Command concept.

Fire Protection and Mutual Aid Zone Map

IX. PROCEDURES

A. Fire Reporting:

Forest Service will promptly notify FFD of fires burning on or threatening FFD responsibility areas or facilities under CNF protection. FFD will promptly notify CNF of Fires burning on or threatening National Forest System lands or facilities under FFD direct protection.

B. Assistance by Hire and Resource Order Process: During the Suppression action of a fire, FFD and CNF can use assistance-by-hire resources in accordance with the Interagency Fire Agreement. All requests must be clear and precise and shall be processed and recorded through the dispatching systems including, but not limited to, incident name, order number, and request number.

C. Initial Attack: Both agencies shall use their preplanned attack procedures within the mutual aid zones.

D. Training: Emergency operations training (fire, hazmat, EMS, etc.) opportunities will be made available to either agency.

E. Documentation and Accounting: Each agency will bear the cost of it's own initial attack forces on any response within the mutual aid dispatch area. The order number of the agency having protection responsibility at the point of origin will be used throughout the duration of the fire.

F. Repair of Resource damage: It shall be the responsibility of the agency that has jurisdiction to ensure repair of all resource damages incurred by the suppression action. All agencies will take necessary steps to minimize resource damage.

G. Communications.

FREQUENCY PLAN

Cleveland National Forest
Frequencies to be used on incidents:

Net	Transmit	Receive
Forest (Direct)	168.750	168.750
Forest (Repeat)	170.500	168.750
Tactical	168.200	168.200
Air to Ground	170.00	170.00
Administrative (Direct)	168.150	168.150
Administrative (Repeat)	169.725	168.150

Federal Fire Department
Frequencies to be used on Incidents

Net	Transmit	Receive
OES White Net 1	154.280	154.280
San Diego County Red Net	155.085	155.085

X. GENERAL PROCEDURES

A. Periodic Review: The CNF and FFD will make available, during fire season, at least one day for an on-the-ground inspection of this operating plan.

B. Updating this Plan: As needed, each agency will submit to the other, any revisions for approval.

This plan has been reviewed and is hereby approved as developed:

UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE
CLEVELAND NATIONAL FOREST

Approved by: ______________________ Date: 8/10/94
for: Dave Bacon
Fire Chief(Acting)

DEPARTMENT OF THE NAVY,
COMMANDER, NAVAL BASE, SAN DIEGO
FEDERAL FIRE DEPARTMENT

Approved by: ______________________ Date: 8-17-94
Dave Inman
Fire Chief

(IA-5-92-02-005)
INTER-AGENCY FIRE AGREEMENT
BETWEEN
COMMANDER NAVAL BASE SAN DIEGO
AND
U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
CLEVELAND NATIONAL FOREST

THIS INTER-AGENCY FIRE AGREEMENT, is made and entered into between the USDA Forest Service, Cleveland National Forest, hereinafter referred to as the Forest Service; and the Commander Naval Base San Diego, hereinafter referred to as the Federal Fire Department, under the provisions of 31 USC section 1535; 42 USC section 1856. Signatories to this agreement hereinafter are refered to as the parties.

WITNESSETH:

WHEREAS, responsibility for prevention and control of wildfires on U.S. Navy lands rests with the Federal Fire Department, and for National Forest System lands, with the Forest Service, and

WHEREAS, the Forest Service maintains prevention, detection, and suppression forces throughout the National Forests covering areas near and adjacent to lands which the Federal Fire Department protects, and the Federal Fire Department maintains prevention, detection, and suppression forces to protect areas near and adjacent to lands which the Forest Service protects, and

WHEREAS, it is to the mutual advantage of both the Federal Fire Department and the Forest Service to coordinate their efforts in the prevention, detection, and suppression of wildfires in and adjacent to their respective areas of responsibility, without duplication, and

WHEREAS, it is the intent of the parties hereto that Federal Fire Department firefighters be allowed to assist in the suppression of wildfires on all National Forest System lands, and other lands upon which the Forest Service is obligated to deploy suppression forces, and

WHEREAS, it is the intent of the parties hereto that Forest Service firefighters be allowed to assist in the suppression of wildfires on all U.S. Navy lands which the Federal Fire Department is committed to protect, and

WHEREAS, each of the parties hereto maintains equipment and personnel for the suppression of fires within its own jurisdiction and areas, and

WHEREAS, the parties desire to augment their respective fire protection capabilities in areas near and contiguous to their own in the event of conflagrations and attendant emergencies, and

WHEREAS, the lands of the parties hereto are near, adjacent or contiguous so that mutual assistance in a fire emergency is desired and feasible, and

WHEREAS, it is the policy of the parties to this agreement to render assistance, within their respective capabilities, to neighboring fire suppression organizations when such assistance is deemed necessary as herein set forth,

NOW THEREFORE, in consideration of the above premises, the parties hereto agree as follows:

I. DEFINITION OF TERMS

A. Annual Fire Protection Plan. This is a document that provides:

1. Maps showing boundaries delineating Federal Fire Department and Forest Service areas of responsibility under this agreement.

2. Protection and firefighting facilities and equipment which are available for cooperative use, subject to each party's regulations and procedures.

3. Details of reimbursable and nonreimbursable costs and services, including provisions for overhead costs, if any.

4. Details of interagency air operations.

5. Resourse ordering and dispatch procedures.

6. Designations of authorized agency representatives.

B. Mutual Aid Assistance This is assistance given at no cost to the protecting agency, which includes such initial attack resources as engines and supervisory officers and, in general, require less than 2 hours travel or response time. Because they are initial attack resources of the supporting agency, they should be released as soon as possible. In no case should they be held beyond the 24-hour mutual aid period without consent of the supporting agency. Resources that are held beyond this period or require more than a two hour response period are no longer Mutual Aid Assistance but will be Assistance by Hire.

C. Assistance by Hire Assistance by Hire is the providing of fire suppression resources, by one agency to another, on a full reimbursement basis. All requests to hire fire protection assistance must be clear and precise and shall be processed and recorded through the disptaching systems of the participating agencies. Requests not processed in this manner will not be reimbursable.

All requests for fire suppression assistance in an agency's direct protection area shall be Assistance by Hire, except Mutual Aid Assistance. Personnel, equipment, or supplies provided by the supporting agency, but not specifically ordered by the protecting agency, shall be considered a voluntary contribution.

D. Direct Cost. These are those costs directly related to the suppression effort. These costs are not to include dispatch or other administrative costs.

E. First 24 hours. This shall mean the period of fire suppression from the time of initial dispatch to the fire and ending 24 hours later.

F. Initial Attack Forces. These are suppression personnel and equipment (air and/or ground) of either or both agencies that are initially dispatched to a fire in accordance with a predetermined dispatch plan.

G. Overhead Cost. These, as applicable to services provided under this agreement, are those costs not directly chargeable to suppression efforts, but which are part of the overall cost of operation.

1. Forest Service overhead costs are chargeable at the current Forest Service overhead assessment rate.

2. Federal Fire Department overhead costs are chargeable at the current Federal Fire Department overhead assessment rate.

H. Reciprocal Fire Protection Services. These shall mean nonreimbursable, Mutual Aid, fire protection assistance, extended by either party to lands of the other, as each may be in a position to furnish. These lands are described and shown in the annual fire protection plan.

I. Reimbursable Fire Protection Services. This shall mean fire protection resources exceeding reciprocal fire protection services furnished by either party, at the request of the other. This is Assistance by Hire.

J. Reinforcements. These are all additional personnel and equipment needed to facilitate suppression action following initial attack.

II. RECIPROCAL FIRE PROTECTION 42 USC section 1856

A. The Forest Service shall respond with initial attack resources on wildfires on Federal Fire Department protected lands as requested by the Federal Fire Department.

B. The Federal Fire Department shall respond with initial attack resources on wildfires on Forest Service protected lands as requested by the Forest Service.

C. Both Parties agree:

1. Annually, prior to April first of each year, the Federal Fire Department and the Forest Service shall mutually review this agreement and outline those Mutual Aid resources available to each other and the dispatching procedures necessary for the activations of these forces. A list of these resources and procedures are shown in the Annual Operating Plan, Exhibit A.

2. The receiving party shall reimburse the assisting party for all costs, including overhead, incurred by the assisting party for reinforcement and services furnished beyond the Mutual Aid resources during the first 24-hour period and for <u>all</u> costs (including the Mutual Aid forces) incurred beyond the first 24-hour period, in accordance with section III of this agreement

3. When suppressing wildfires on lands for which the other party is responsible, each of the parties to this agreement do hereby expressly waive all claims against the other party for compensation for any loss, damage, personal injury, or death occurring in consequence of the performance under this section of this agreement.

4. Wildfires resulting from prescribed fires which escaped and which were ignited by or at the direction or under the supervision of one of the parties to this agreement shall be the responsibility of that party. All suppression costs shall be borne by the responsible party.

III. <u>REIMBURSABLE FIRE PROTECTION 31 USC section 1535</u>

A. The Forest Service shall respond with Forest Service personnel and Forest Service equipment to requests by the Federal Fire Department for assistance in the suppression of incidents in those areas outside the 2 hour response time. Upon request the Forest Service will assist the Federal Fire Department in the suppression of incidents with Forest Service owned equipment and with non-Forest Service owned air tankers and helicopters under current contractual agreement with the Forest Service. Such requests would be assistance by hire and all costs are reimbursable to the Forest Service.

B. The Forest Service shall maintain accurate personnel time reports, aircraft and other equipment use records to support reimbursement billings to the Federal Fire Department.

C. All bills for services provided to the Federal Fire Department will be mailed to the following address for payment:

Commander Naval Base San Diego
937 North Harbor Drive
San Diego, California 92101
Attn. Comptroller

D. The Federal Fire Department shall reimburse the Forest Service for Assistance by Hire personnel, aircraft, and equipment costs when actually ordered for and working under the supervision of the Federal Fire Department. Reimbursement will be based on actual Forest Service personnel labor rates, including fringe benefits and Forest Service equipment use rates.

E. The Federal Fire Department shall reimburse, on the basis of actual cost, the Forest Service for supplies ordered by the Forest Service at the request and with the approval of the Federal Fire Department.

F. The Federal Fire Department agrees that all bills will have a due date 60 days after the date of issuance. If payment cannot be made before the 60 days expire, then a 30-day extension, with oral or written justification, may be requested. Written notice that a bill is contested must be mailed to the address listed below within 60 days of issuance of original bill, and must fully explain the area of dispute. Contested items will be resolved not later than 180 days following control of the fire. The uncontested portion of the bill may be paid pursuant to normal requirements with a notation that the contested portion is being withheld, or the entire bill may be paid with a credit provided when final resolution is made.

For bills remaining unpaid at the close of the fiscal year, Federal Fire Department must provide obligational amounts to the Forest Service.

Payments for reimbursement made pursuant to the above billing will refer to the bill number using SF-1081, and will be sent to the appropriate billing address:

Cleveland National Forest
10845 Rancho Bernardo Road Ste. 200
San Diego, California 92127-2107
Attention:Budget and Finance

G. Both Parties agree:

1. The Forest Service and the Federal Fire Department will not be expected to deplete their own protection resources to the detriment of their normal protection responsibilities.

2. It shall be the responsibility of each agency to inform all responsible persons within their organization of the contents of this Agreement.

3. Nothing herein shall be construed as obligating the Forest Service or the Federal Fire Department to expend or as involving the United States in any contract or other obligation for the future payment of money in excess of appropriations authorized by law and administratively allocated for this work.

4. The annual fire protection plan shall cover reimbursable services to be furnished by each agency. It shall include the current equipment rental rates and aircraft hourly rates of each agency, and further provide that salary and wage costs of personnel assigned to fire suppression shall be at the actual cost of the sending agency.

IV. MISCELLANEOUS CONDITIONS

A. Annually, prior to April first of each year, the parties hereto shall meet and review the Annual Fire Protection Plan. Further, this agreement shall be reviewed by the respective parties each year, and an addendum attached to the Agreement with any changes. Finally, the addendum shall be signed by the appropriate representative of each party.

B. Either party may terminate this agreement by providing 60 days written notice to the other. Unless terminated by written notice, this agreement shall remain in force indefinitely.

C. Either agency shall notify the other party in advance of prescribed burning operations in areas of mutual protection or adjacent to boundaries.

D. Fire prevention and law enforcement efforts shall be coordinated to the maximum extent possible.

E. Both agencies shall furnish each other or otherwise make available upon request such maps, documents, instructions, records, and reports including but not limited to fire reports and law enforcement reports, which either agency considers necessary in connection with this agreement, subject to the United States Department of Agriculture and/or the United States Navy policies and regulations.

F. Each agency, when suppressing wildfires for the other agency, shall adhere to the suppression and mopup standards of the receiving agency insofar as facilities and personnel are available. If adequate facilities and personnel are not available to meet standards, the sending agency shall notify the other agency at the earliest possible time.

G. Personnel of either agency shall, upon discovering or receiving reports of wildfires on areas protected by the other agency, report such wildfires promptly to the responsible agency in accordance with current practice and instructions as described in the annual fire protection plan.

H. When a wildfire is on or threatening lands of both parties, either agency may, upon its own initiative and without reimbursement, go upon lands of the other to engage in wildfire suppression activities for the protection of its lands. The responsible field unit shall be recognized as being in charge of wildfire suppression until a qualified officer is present and available to assume responsibility.

When a wildfire is burning on or near lands of both parties and reinforcements are required in addition to the initial attack forces, the parties may agree upon one of the following:

1. Division of fire responsibilities based upon ownership, acreage, access, or damage potential.

2. Dual agency fire organization with unified command.

3. One agency to assume total fire effort, with the other agency maintaining full liaison with the fire organization.

   When one party performs work or otherwise incurs expenses for which the other party is responsible, the officers in charge shall reach agreement, including cost reimbursement, as to the specific work to be performed while on the ground. Such agreements shall be in writing and modified as necessary by changing fire situations. Plan for suppression action, mopup, and patrol shall be arrived at in the meeting, agreed upon, and be recorded in writing at that time.

I. Equipment owned and used by either agency to suppress fires on land for which the other is responsible shall normally be operated, serviced, and repaired by the owning agency. Exceptions to this practice, where needed, shall be agreed to in writing by both parties, in advance.

J. All aircraft and pilots used to transport Forest Service personnel or that are directly controlled by the Forest Service shall be certified by a qualified Forest Service Aviation or Office of Aviation Services inspector prior to Forest Service use.

K. This agreement is not intended to conflict with or supercede any agreements between the Department of Defense and the Department of Agriculture and/or the Department of the Interior.

L. To comply with Public Law 91-190, the National Environmental Policy Act of 1969, the Federal Fire Department and Forest Service agree to direct their program activities covered by this agreement toward managing and enhancing the environment for the widest range of beneficial uses without its degradation or risk to health or safety or other undesirable consequences.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the dates shown below.

Commander Naval Base,
San Diego

F.K.Holian

Signature

15 MAY 93

Date

F.K. HOLIAN
RADM U.S. NAVY

USDA Forest Service
Cleveland National Forest

Anne Fege

Signature

May 3 1993

Date

ANNE S. FEGE
FOREST SUPERVISOR

GENERAL PROVISIONS
INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

1. **GENERAL.**

a. This agreement between Commanding Officer NAS North Island, hereafter referred to as SUPPLIER, and Commander, Naval Base, San Diego (COMNAVBASE), hereafter referred to as RECEIVER, is negotiated for support of Federal Fire Department at NAS North Island, NALF San Clemente Island, OLF Imperial Beach, and SERE Camp, Warner Springs, per the following directives, and to a practicable and feasible extent:

(1) NAVCOMPT Manual, Volume 3
(2) NAVCOMPT Manual, Volume 7
(3) Defense Regional Interservice Support Manual 4000.19-R
(4) CINCPACFLTINST 11000.3
(5) COMNAVBASE SAN DIEGO INST 11320.1

b. This agreement is contingent upon the continuation of current functional/funding responsibilities of SUPPLIER and/or RECEIVER as established by higher authority. This agreement may be superseded by current directives from higher authority and/or any separately negotiated agreements between RECEIVER and SUPPLIER'S tenant activities. Supplier shall be notified when separate and/or superseding agreements have been negotiated for firefighting services which are not or will not be funded or covered under this agreement. When responsibilities are changed by superseding directives, this agreement will be amended to reflect such changes including any necessary adjustments to funding requirements.

2. SUPPORT.

a. Supplies and Services. SUPPLIER agrees to provide services, supplies, utilities, assistance, and data as defined in Annex II. Under terms of this agreement, SUPPLIER will provide support within available resources. RECEIVER shall finance all mission-related functions not specifically mentioned in Annex II.

b. Fire Protection Support: RECEIVER agrees to provide fire protection, prevention and inspection support to SUPPLIER and it's tenant activities as delineated in Annex III. SUPPLIER will render appropriate support and assistance to ensure that fire protection and prevention measures are established and maintained onboard NAS North Island and it's satellite activities.

c. Facilities: Real property will be assigned by SUPPLIER for joint and/or exclusive use of RECEIVER as indicated in Annex IV.

3. **FUNDING.** Initially RECEIVER shall provide appropriate funding document(s) based on estimated reimbursable support costs as listed in Annex V. Funding document(s), citing chargeable appropriation, may be submitted to SUPPLIER either quarterly or on an annual basis showing cost breakdown for each fiscal quarter. RECEIVER shall provide additional funding in the event that it is required by SUPPLIER to provide support currently estimated as negligible and/or for which RECEIVER's usage increases costs above those listed in Annex V.

4. **RELATIONSHIPS.**

a. SUPPLIER and RECEIVER mutually acknowledge and agree to encourage frequent communication among those personnel who implement service and support objectives. Discussions regarding funding procedures, support techniques, and related matters will facilitate common understanding of responsibilities and ensure effective execution of this agreement.

b. RECEIVER shall advise SUPPLIER of planned changes or increases to support requirements in sufficient time to enable SUPPLIER to respond and/or modify this agreement and to allow programming or budgeting for additional resources. Additions or changes to requirements will be accepted only within staffing/funding capabilities of SUPPLIER and/or when necessary resources are provided by RECEIVER on a reimbursable or direct cite basis.

5. **REVISIONS**. Revision requests will be forwarded in writing and once mutually agreed upon, will be numbered.

6. **PROCEDURES AND INSTRUCTIONS**. SUPPLIER and RECEIVER will maintain procedures and instructions currently in effect. Changes affecting SUPPLIER and/or RECEIVER will be initiated under joint sponsorship.

SPECIFIC PROVISIONS

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

DEPARTMENTAL SUPPORT

REIMBURSABLE
NONREIMBURSABLE

ADMINISTRATION (CODES 11, 90)

1. (AD) LEGAL SERVICES

Common Servi

SUPPLIER WILL: Legal assistance services and advice regarding legal and quasi-legal matters is available to RECEIVER military personnel through Naval Legal Service Office Detachment.

RECEIVER SHALL: Point of contact is Naval Legal Service Office Detachment, North Island, 545-6270.

2. (AE) POSTAL SERVICES/MAIL HANDLING PROCEDURES

Common Servic

SUPPLIER WILL: As directed by OPNAV and COMNAVDAC postal instructions, implement procedures and perform services associated with Navy's conversion to Positive Postal Accountability for Official (Penalty) Mail. Provide point of consolidation for all station/tenant outgoing official letter mail (activities with assigned ZIP Codes 92135-XXXX). NASNI Mail Center will process all official correspondence for mailing using electronic postage metering stamps, official permit imprints. Official mail requiring special handling will also be processed by SUPPLIER, including registered mail, certified mail, correspondence requiring return receipts. (Responsibilities concerning Overnight Mail Services/Parcel Post are herein detailed under "Specific Provisions" for Supply Department.) Collect outgoing personal mail from official U.S. Mail letter drop boxes located on station and deliver to NASNI Branch U.S. Post Office. Any official mail found in drop boxes and/or delivered to Branch Post Office will be returned to RECEIVER for proper handling. Provide Postal Directory services for military personnel, conduct periodic postal inspections as required, and assign/publish nine-digit ZIP Codes (ZIP + 4) required for use by RECEIVER/TENANT when located onboard NASNI.

DEPARTMENTAL SUPPORT

REIMBURSABLE/ NONREIMBURSABLE

ADMINISTRATION (CODES 11, 90)

1. (AD) LEGAL SERVICES

SUPPLIER WILL: Legal assistance services and advice regarding legal and quasi-legal matters is available to RECEIVER military personnel through Naval Legal Service Office Detachment. — Common Service

RECEIVER SHALL: Point of contact is Naval Legal Service Office Detachment, North Island, 545-6270.

2. (AE) POSTAL SERVICES/MAIL HANDLING PROCEDURES

SUPPLIER WILL: As directed by OPNAV and COMNAVDAC postal instructions, implement procedures and perform services associated with Navy's conversion to Positive Postal Accountability for Official (Penalty) Mail. Provide point of consolidation for all station/tenant outgoing official letter mail (activities with assigned ZIP Codes 92135-XXXX). NASNI Mail Center will process all official correspondence for mailing using electronic postage metering stamps, official permit imprints. Official mail requiring special handling will also be processed by SUPPLIER, including registered mail, certified mail, correspondence requiring return receipts. (Responsibilities concerning Overnight Mail Services/Parcel Post are herein detailed under "Specific Provisions" for Supply Department.) Collect outgoing personal mail from official U.S. Mail letter drop boxes located on station and deliver to NASNI Branch U.S. Post Office. Any official mail found in drop boxes and/or delivered to Branch Post Office will be returned to RECEIVER for proper handling. Provide Postal Directory services for military personnel, conduct periodic postal inspections as required, and assign/publish nine-digit ZIP Codes (ZIP + 4) required for use by RECEIVER/TENANT when located onboard NASNI. — Common Service

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSAI

ADMINISTRATION

RECEIVER SHALL: Utilize the guard mail system for mailing unclassified material to destinations onboard NASNI, whenever possible. Ensure that only authorized items are sent via guard mail. When required by SUPPLIER, establish pick-up/delivery points and/or be responsible for conveyance of guard mail to NASNI Postal Directory for processing. Comply with procedures specified in NASNIINST 5110.2 series "Guard Mail Services at NAS North Island" appropriate sections of NASNIINST 5218.2 series, and updated command messages/memorandums/notices as published. Points of contact are: NASNI Official Mail Control Officer (OMCO), Bldg. 605, Code 111, 545-8171; and Postal Directory, Mail Center, Bldg. 3, Code 11120, 545-5513.

4. (AE) POSTAL/GUARD MAIL SERVICES (NALF SAN CLEMENTE ISLAND) — Common Servic

SUPPLIER WILL: At NAS North Island, provide mail pick-up and delivery to/from NAS North Island Operations Department for NALF SCI. Mail pick-up/delivery may be curtailed, at SUPPLIER'S option, as dictated by current workload requirements.

RECEIVER SHALL: Be responsible for conveyance of U.S. mail and guard mail to/from NALF SCI designated pick-up points. Comply with NALFSCIINST 5112.6 series "Instructions for Handling U.S. Mail on San Clemente Island". At NALF SCI, pick-up and deliver RECEIVER U.S. mail and guard mail to/from air terminal. Point of contact is Postal Officer, SCI-4-9120.

5. (AE) MESSAGE SERVICE (NALF SAN CLEMENTE ISLAND) — Nonreimbursab

SUPPLIER WILL: Provide message traffic services as required at NALF SCI.

RECEIVER SHALL: Be responsible for pick-up and delivery of message traffic. Point of contact at NALF SCI is Communications Center, SCI-4-9122.

6. (AX) CLASSIFIED MATERIAL DISPOSAL — Common Service

SUPPLIER WILL: Provide Classified Material Destruction Facility for disposal of classified documents per OPNAVINST 5510.1 series "DON Information and Personnel Security Program Regulation".

DEPARTMENTAL SUPPORT

REIMBURSABLE/ NONREIMBURSABLE

ADMINISTRATION

RECEIVER SHALL: Comply with NASNIINST 2601.3 "Emergency Plan for Security of Communication Security Material", and NASNIINST 5510.22 "Destruction of Classified Documents". Point of contact is Facility Operator, Bldg 380, 545-7432.

7. (AX) CLASSIFIED MATERIAL STORAGE AND DISPOSAL (NALF SAN CLEMENTE ISLAND) — Common Service

SUPPLIER WILL: Provide limited space for classified material storage and handling and limited facilities for disposal.

RECEIVER SHALL: Comply with NASNIINST 2601.3 "Emergency Plan for Security of Communication Security Material", and NASNIINST 5510.22 "Destruction of Classified Documents". Conform to NALF SCI standard operating procedures for storage and disposal. Notify Communications Officer 24 hours in advance of requirement. Point of contact is COMM OFF, NALF SCI, SCI-4-9122.

8. (AY) ADMINISTRATIVE SERVICES — Common Service

SUPPLIER WILL: Exercise administrative control on matters pertaining to occupancy of NAS North Island/NALF SCI. Include RECEIVER in distribution of applicable SUPPLIER publications, notices, etc., per NASNIINST 5215.2 "NASNI Directive Distribution" and NALFSCIINST 5605.1 "NALF SCI Directives Distribution".

RECEIVER SHALL: Prepare supporting directives required to accomplish administration of RECEIVER personnel. Contact NAS North Island Administrative Services Officer, 545-8171, to coordinate RECEIVER requirements and address specific questions. Point of contact at NALF SCI is Administrative Officer, SCI-4-9127.

9. (AZ) PUBLIC AFFAIRS — Common Service

SUPPLIER WILL: Provide public affairs assistance for implementation of RECEIVER's public affairs program onboard NAS North Island.

RECEIVER SHALL: Maintain liaison with SUPPLIER's Public Affairs Officer, Code 00B, 545-8167.

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSAB

ADMINISTRATION

10. (BA) CHAPLAIN/RELIGIOUS SERVICES — Common Servic

SUPPLIER WILL: Provide worship services and spiritual counseling to RECEIVER personnel.

RECEIVER SHALL: Comply with NASNIINST 1730.2 "Regulations Governing Use of NAS North Island Chapels". Point of contact is Command Chaplain, Code 00C, 545 8213.

11. (BD) LIBRARY SERVICES — Common Servic

SUPPLIER WILL: Provide station library services to authorized military and civilian personnel. Post library regulations and hours of operation.

RECEIVER SHALL: Maintain responsibility for return of all library materials checked out by personnel attached to RECEIVER activity. Ensure all civilian and military personnel check out through library prior to detachment from station. Comply with NASNIINST 5070.2 "Station Library Regulations". Point of contact is Administrative Librarian, Station Library, Bldg. 650, 545-9213.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

CIVILIAN PERSONNEL (CODE 12)

1. (AC) CIVILIAN PERSONNEL SERVICES

Common Service

SUPPLIER WILL: Provide civilian personnel management services to RECEIVER civilian personnel including wage administration, classification, employment, training and career development, and employee/labor relations as defined in Civilian Personnel Servicing Agreement of 7 December 1987.

RECEIVER SHALL: Comply with NASNIINST 12000.4 series "Basic Policies Governing Civilian Personnel Administration". Initiate requests for personnel actions, provide activity orientation to new employees, and prepare required personnel reports in response to SUPPLIER requirements. Fund for costs of hearings, training of RECEIVER personnel (per diem, tuition fees, transportation), and special costs incurred by SUPPLIER when associated with unique and/or extraordinary RECEIVER requirements including, but not limited to, TDY of SUPPLIER personnel and overtime to accomplish unusual work demands.

2. (AC) EQUAL EMPLOYMENT OPPORTUNITY (EEO)

Common Service

SUPPLIER WILL: Provide EEO services previously defined in CPSA of 7 Dec 87.

RECEIVER SHALL: Comply with NASNIINST 12713.3 series "NAS Equal Employment Opportunity Program" Maintain liaison with SUPPLIER Deputy EEO Officer, Code 12EEO, 545-5085.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

SECURITY (CODE 15, 90)

1. (AI) SECURITY AND LAW ENFORCEMENT (NAS NORTH ISLAND)

Common Service except as noted

SUPPLIER WILL: Provide security services as defined in items (a) through (d) below when requested by RECEIVER and/or when required by OPNAVINST 5510.1 "DON Information and Personnel Security Regulation", and NASNIINST 5530.14 "Physical Security and Loss Prevention".

RECEIVER SHALL: Comply with SUPPLIER security regulations and procedures listed in items (a) through (d) below. Per NAVCOMPT, Vol 7, fund for costs of unusual, unique, or inordinate security requirements, should they become significant.

(a) LAW ENFORCEMENT

SUPPLIER WILL: Provide investigative services and written reports concerning misconduct of RECEIVER personnel when not within purview of Naval Investigative Service. Be responsible for vehicular and pedestrian traffic control and vehicular accident investigations.

RECEIVER SHALL: Comply with NASNIINST 5560.4 "Station Vehicle Code". Points of contact are: Investigations Branch, Code 15300, 545-7418; and Police Division, Code 15200, 545-9446

(b) PHYSICAL SECURITY

SUPPLIER WILL: Provide routine perimeter control for protection of resources and loss prevention support. Conduct semi-annual Physical Security Review Board meetings. Provide physical security assistance visits and written evaluations/recommendations to correct/improve RECEIVER security.

RECEIVER SHALL: Per NASNIINST 5530.2 "Physical Security Program", NASNIINST 5530.3 "Physical Security and Anti-Terrorist Threat Condition (THREATCON) Plan", be responsible for security of all RECEIVER structures, areas, personnel, and property. Ensure attendance at semi-annual Physical Security Review Board meetings. Comply with NASNIINST 5512.5 regarding "Procedures for Use of Property Passes and furnish Security Director with listings of persons authorized signature authority. Support command's Loss Prevention Program per NASNIINST 5530.4. Control access to security areas, as required by NASNIINST 5500.5 "Posting and Controlling Access to Security Areas". Point of contact is Physical Security Specialist, Code 15100, 545-7408.

DEPARTMENTAL SUPPORT

REIMBURSABL
NONREIMBURS

SECURITY

(c) PERSONNEL SECURITY

SUPPLIER WILL: Per OPNAVINST 5510.1, provide security clearance program for access to classified material. Evaluate National Agency Check (NAC) results and background investigations. Conduct personal interviews, as required, regarding derogatory NAC results and provide written notice of actions taken.

RECEIVER SHALL: When necessary, initiate requests for security clearances of RECEIVER personnel. Comply with NASNIINST 5511.2 "Security of Classified Material", concerning personnel security requirements. Point of contact is Security Clearance Branch, Code 15110, 545-6128/6130.

(d) PASSES, DECALS, and CIVILIAN ID CARDS

SUPPLIER WILL: Issue civilian identification badges and provide fingerprinting services, as required. Issue permanent and temporary vehical decals to RECEIVER military and civilian personnel, authorized visitors, and contractors. Operate Traffic Court to adjudicate violations onboard NAS North Island and maintain court action records.

RECEIVER SHALL: Comply with NASNIINST 5512.3 regarding "Permanent and Temporary Vehicle Decals and Visitor Passes"; NASNIINST 5512.18 for "Personnel Identification Badges and Passes"; NASNIINST 5560.4 "Station Vehicle Code"; and NASNIINST 5512.6 "Regulations Governing Entry/Exit to NAS North Island and OLF Imperial Beach", which regulates operation of vehicles and local entry/exit procedures. Points of contact are:

Access Control Branch, Code 15120, 545-7413
Visitor's Pass Office, Code 15120, 545-7414
Traffic Court Coordinator, Code 15300, 545-9587

2. (AI) SECURITY AND LAW ENFORCEMENT (NALF SAN CLEMENTE ISLAND)

Common Servi
except as nc

SUPPLIER WILL: Provide routine security patrols and external facility checks in populated areas. Respond to emergency alarms, other emergency situations, and conduct traffic/accident investigations. Security services for special projects or unusual requirements will be negotiated at time of need.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

SECURITY

RECEIVER SHALL: Establish required administrative and internal security measures, coordinating with SUPPLIER for compatibility. Comply with applicable portions of NALFSCIINST 5560.4, "SCI Vehicle Code"; NALFSCIINST 5080.1 "Searches and Seizures," and NASNIINST 5512.7 "Public Access to San Clemente Island". Notify Security Officer when facilities will not be manned. Point of contact is Security Officer, SCI-4-9120.

3. (BW) DISASTER PREPAREDNESS

Common Service

SUPPLIER WILL: Include RECEIVER in SUPPLIER Disaster Preparedness and fallout shelter plans/protective measures to maximum extent possible within mission/funding limitations, per OPNAVINST 3440.16 series "DON Civil Disaster Assistance Program".

RECEIVER SHALL: As applied to existing conditions, be responsive to SUPPLIER Disaster Preparedness augumentation needs and carry out assigned responsibilities as described in SUPPLIER "Disaster Preparedness Plan", NASNIINST 3440.4. Under actual disaster conditions where mission operations cannot, or need not be accomplished, full support for station emergency control/recovery activities will be provided. Point of contact is Disaster Preparedness Coordinator, Code 15800, 545-8173.

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND – COMMANDER, NAVAL BASE, SAN DIEGO

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSAB

STAFF CIVIL ENGINEER (CODES 18, 90)

1. (AF) CUSTODIAL SERVICES

Nonreimbursab
except as not

SUPPLIER WILL: Coordinate with PWC, San Diego for provision of custodial services.

RECEIVER SHALL: Contact NASNI SCE Contract Specialist, Code 1826, 545-5959, for custodial services. Under established reimbursable procedures, job order numbers shall be obtained from, or in conjunction with PWC, San Diego, 545-6791.

2. (AO) TRANSPORTATION

Common Service
except as note

SUPPLIER WILL: Provide on-station scheduled bus service and base taxi for all RECEIVER personnel.

RECEIVER SHALL: Obtain additional transportation services from PWC, San Diego. Maintain Fire Department Vehicle Custody Records. Maintain Civil Engineering Support Equipment (CESE) Allowance Points and CESE Allowance submissions provided to PWC, San Diego.

3. (AP) UTILITIES

Nonreimbursabl
except as notec

SUPPLIER WILL: Coordinate with PWC, San Diego, for provision of following utilities and services: (a) electricity; (b) water; (c) steam; (d) gas; (e) sewage; (f) small plant heating; (g) industrial waste; (h) pneumatic power; (i) propane.

RECEIVER SHALL: In conjunction with PWC, San Diego, establish utility job order numbers for payment of utilities on a reimbursable basis. Comply with NASNIINST 4101.1 regarding "Energy Conservation Program" and NASNIINST 11300.3 "Electrical Contingency Plan" for load-shedding procedures. Point of contact is SCE Utilities Branch/Energy Management Officer, 545-1108.

DEPARTMENTAL SUPPORT

REIMBURSABLE
NONREIMBURSA

STAFF CIVIL ENGINEER

4. (AU) ADMINISTRATIVE OFFICE SPACE

Nonreimbursa

SUPPLIER WILL. Provide RECEIVER 41,063 square feet of administrative/operational space. (See Annex IV, "Facilities List".)

RECEIVER SHALL: Advise SUPPLIER of requirements. Comply with NASNIINST 11013.3 "Construction, Relocation, Repair, Maintenance and/or Modification of Structures and Space Requirements." Assigned spaces are not to be unilaterally reassigned to another RECEIVER (tenant) activity. Point of contact is SCE, Facilities Planner, Code 1835, 545-1124.

5. (AW) REAL PROPERTY MAINTENANCE

Common Servic
except as not

SUPPLIER WILL: Perform normal cyclical maintenance and repair for preservation of structural integrity. Repair internal (built-in) utility systems which are part of structure, i.e., overhead roll-up doors, built-in air conditioning/air movement systems, etc., excluding any peculiar requirements by RECEIVER.

RECEIVER SHALL: Make no repairs without prior approval of SUPPLIER Staff Civil Engineer to ensure compliance with Station Master Plan. When approved by SUPPLIER Staff Civil Engineer, alterations or modifications required solely for RECEIVER's use, repairs required due to RECEIVER's abuse or misuse (including plumbing blockage), and maintenance and repair of window air conditioners and other equipment or utilities unique to RECEIVER's mission will be obtained on a reimbursable basis from PWC, San Diego, and funded by RECEIVER. Comply with NASNIINST 11013.3 regarding facility repair and maintenance procedures and NASNIINST 11014.2 "Submission and Authorization of Work Requests For Maintenance, Repair, Equipment Installation, and Construction/Alteration of Station Facilities. "Point of contact is SCE, Facilities Maintenance Division, Code 18, 545-1116.

6. (AW) CONSTRUCTION/ALTERATION

Nonreimbursabl
except as note

SUPPLIER WILL: Screen, monitor, and approve requests for construction/alterations.

DEPARTMENTAL SUPPORT

REIMBURSABLE/ NONREIMBURSABLE

STAFF CIVIL ENGINEER

RECEIVER SHALL: Not alter, or modify buildings/facilities without prior approval of SUPPLIER Staff Civil Engineer to ensure compliance with Station Master Plan. When approved by SUPPLIER Staff Civil Engineer, alterations or modifications required solely for RECEIVER's use will be obtained on a reimbursable basis from PWC, San Diego and funded by RECEIVER. Comply with NASNIINST 11013.3 regarding facility construction and alterations. Point of contact is SCE, Facilities Maintenance ivision, Code 182, 545-1116.

7. (AW) ROADS AND PARKING AREAS (NAS North Island)

SUPPLIER WILL: Provide normal repair of paved areas and streets. — Common Service

RECEIVER SHALL: Be responsible for cleanliness of assigned parking areas immediately adjacent to occupied facilities. Comply with NASNIINST 11104.1 series regarding "Responsibility of Building and Area Cleaning and Maintenance." Point of contact is Facilities Maintenance Division, Code 182, 545-1116.

8. (AW) ROADS AND PARKING AREAS (NALF SAN CLEMENTE ISLAND)

SUPPLIER WILL: Provide normal repair of roads at NALF SCI — Common Service

RECEIVER SHALL: Be responsible for cleanliness of assigned parking areas immediately adjacent to occupied facilities. Point of contact is SCL, SCI-4-9126

). (AW) GROUNDS MAINTENANCE (NAS NORTH ISLAND)

SUPPLIER WILL: Provide routine grounds maintenance services. Manage, coordinate, and approve landscaping requirements. — Common Service

RECEIVER SHALL: Be reponsible for cleanliness of grounds immediately adjacent to occupied facilities. Comply with NASNIINST 11104.1 regarding grounds maintenance and cleaning. Point of ontact is Contract Specialist, Code 1826, 545-5959.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

STAFF CIVIL ENGINEER

10. (AW) GROUNDS MAINTENANCE (NALF SAN CLEMENTE ISLAND) — Common Service

SUPPLIER WILL: Provide routine grounds maintenance at NALF San Clemente Island.

RECEIVER SHALL: Be responsible for cleanliness of grounds immediately adjacent to occupied facilities. Coordinate with NALF SCI Staff Civil Engineer for grounds maintenance services at RECEIVER's assigned facilities. Point of contact is SCI SCE 4-9126.

11. (AX) REFUSE COLLECTION — Nonreimbursable except as noted

SUPPLIER WILL: Coordinate RECEIVER's refuse collection and disposal requirements with PWC, San Diego.

RECEIVER SHALL: Under established reimbursable procedures, job order numbers shall be obtained from or established in conjunction with PWC, San Diego, 545-6791. Comply with NASNIINST 11350.1 regarding "Collection and Disposal of Waste, Salvageable Material, Trash and Garbage." NASNI point of contact is SCE Contract Specialist, Code 1826, 545-5959.

12. (BM) ENTOMOLOGY SERVICES — Common Service

SUPPLIER WILL: Arrange for and provide routine pest control services and abatement measures.

RECEIVER SHALL: Request entomology services from SCE Facilities Maintenance, Code 182, 545-1116.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSAB

SUPPLY (CODES 19, 90)

1. (AE) OVERNIGHT MAIL SERVICE/PARCEL POST

Common Servic
except as not

SUPPLIER WILL: Receive and process all material requiring commercial overnight delivery (Federal Express, Purolator, etc.) and parcel post services other than those available at U.S. Post Office. Receive and mail all outgoing parcels originating at NAS North Island. Ensure that RECEIVER provides shipping documents with all items to be shipped.

RECEIVER SHALL: Deliver all overnight mail and parcel post, together with appropriate shipping documents, DD Forms 1149 or 1348-1. Ensure documents include all necessary data. Comply with NASNIINST 5218.2 "Conversion to Positive Accountability for Official (Penalty) Mail Costs". Per OPNAVNOTE 5218 of 14 Jan 86, individual commands/tenants/offices are prohibited from depositing official outgoing mail and packages directly into postal channels. Point of contact for overnight shipping services is Supply Department Shipping Office, Bldg. 651-2, Monday through Friday, 0730-1430. Point of contact for parcel post is Supply Department Packing/Shipping Supervisor, Bldg. 651-2, 545-5744/7449, Monday through Friday, 0730-1500.

2. (AG) SUPPLY SERVICES AND FAD III PRIORITY SUPPORT

Common Service
except as note

SUPPLIER WILL: Provide both general and priority supply operations support, as follows: purchasing, receipt of consumable supply system material and all open market material, issue. Per CINCPACFLT Pearl Harbor HI 090527Z Jul 88, RECEIVER has been authorized Force/Activity Designator (F/AD) III Urgency of Need Designator (UND) 3, 6, and 13 for procurement of fire apparatus, arresting gear, and personnel protective equipment.

RECEIVER SHALL: Submit all requisitions and/or appropriate purchase request documents to Supply Department for screening and processing. Ensure propriety and validity of cited accounting data for direct charge to RECEIVER funds. Ensure that requisitions citing FAD III Urgency of Need Designators comply with requirements of OPNAVINST 4614.1 series "Uniform Material Movement and Issue Priority

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

SUPPLY

System (UMMIPS)," and CINCPACFLTINST 4614.1 series "Assignment of Force/Activity Designators (F/AD) Incident to the Uniform Material Movement and Issue Priority System (UMMIPS)." Submit signature cards for personnel delegated purchase request approval authority to Supply Department, Customer Services Branch. Comply with current SUPPLIER instructions, as follows:

NASNIINST 4200.4 (Competition advocacy requirements)
NASNIINST 4440.16 (Procedures for requisition, issue, and return of material)
NASNIINST 4440.18 (Procedures for obtaining material on walk-through/issue-on-request basis)
NASNIINST 4460.16 (Handling and turn-in of reusable shipping containers and devices)
NASNIINST 4600.1 (Shipment of government property by commercial carrier)

Points of contact are: Customer Services/Requisition Processing, Code 19731, X57571/57573; Receipt Processing, Code 19620, X57453; Disposition/Follow-up, Code 19622, X57447; Technical Branch/Library, Code 19733, X57564, Contracts/Buying Branch, Code 1964, X55434; Screening/Delivery, Code 19310, X57452; Traffic Branch, Code 19510, X57448.

3. (AJ) QUARTERS/BILLETING (NALF SAN CLEMENTE ISLAND)

Nonreimbursable except as

SUPPLIER WILL: Furnish quarters on an equitable basis and per OPNAVINST 11103.1 to RECEIVER's permanent civilian and military firefighting personnel on a nonreimbursable basis. Establish policy and occupancy regulations and service charges per OPNAVINST 11103.3, Chapter 6. All billeting is assigned "as available" and coordinated by TOPS (SCI 4-9120) and Billeting Office (SCI 4-9202 04) with all SCI activities.

RECEIVER SHALL: Contact Billeting Office, SCI 4-9022, for current charges and room availability for non-permanent personnel. Comply with applicable sections of SUPPLIER's directives as follows: NALFSCIINST 5000.1 "San Clemente Island Berthing Facilities" and NALFSCIINST 11101.2 "Policy Concerning Barracks Occupancy and Basic Allowances for Quarters (BAQ)."

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSAB

SUPPLY

4. (AM) MESSING (NALF SAN CLEMENTE ISLAND)

Reimbursable as noted

SUPPLIER WILL: Provide contracted mess facility and services for subsistence of permanent enlisted personnel (pay grades E-1 through E-9) and meals for permanent and temporary officers and civilian DOD personnel. Ensure standards, requirements, and schedules are same as those provided to SUPPLIER personnel, unless otherwise negotiated. Requirements from Naval Supply Center SCI include ordering food 13 days prior to barge delivery. Conduct quarterly Food Services Advisory Board meetings.

RECEIVER SHALL: Notify General Mess office in sufficient time to order food, of any changes/requirements regarding manning levels, visitors, inspectors! ALL personnel eating outside of the General Mess must furnish their own paper/plastic plates, cups, utensils. Clean up/disposal of these items/garbage is responsibility of RECEIVER. RECEIVER personnel will pay the contractor directly for meals at regular rates (no surcharge) as established by NFSSO, and as individually compensated for by military COMRATS and/or food allowance portion of Civilian Offshore Allowance. Contact General Mess Manager SCI 4-9197. Pay all/any Mess Bills prior to departure from SCI.

Comply with messing procedures and requirements specified in the following instructions:

NALFSCIINST	11101.1:	"Messing Policy for Enlisted Personnel"
NALFSCIINST	7310.3:	"Reimbursement Procedures for San Clemente Island"
NALFSCIINST	1020.1:	"Uniform Regulations and Policy for NALF San Clemente Island"
NALFSCIINST	1020.2:	"Standard of Dress For All Personnel Utilizing Contract Airline Service, the Dining Facility, and the Enlisted Mess Open (Safety Crab)"
NALFSCIINST	5420.38:	"Food Service Advisory Board"

5. (AO) BARGE SUPPORT

Nonreimbursable except as noted

SUPPLIER WILL: Provide outbound and inbound shipments to/from NALF SCI via scheduled SUPPLIER logistics craft. Publish, via message, changes to operating schedule.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

SUPPLY

RECEIVER SHALL: Comply with NASNIINST 4610.9 "San Clemente Island Barge Shipment Procedures." Contact Nas North Island Traffic Branch/Shipping Section 545-7358 or NALF SCI Supply representative SCI-49156/49154 for exchange of necessary advance information regarding shipments. Barged shipments of arresting gear will not be charged to RECEIVER.

6. (BU) SERVMART (NAS NORTH ISLAND)

SUPPLIER WILL: Provide facilities for operation of NSC, San Diego SERVMART Store. — Not Applicable

RECEIVER SHALL: Purchase general and office supplies, forms, and other expendable material directly from NSC, San Diego SERVMART facility. Prepare and cite RECEIVER accounting data on requisition (DD Form 1348) for direct charge to RECEIVER funds. Comply with NASNIINST 4404.2 "Procedures for Procurement and Control When Drawing Material from SERVMART Retail Supply Self-Service Stores." Point of contact is SERVMART Manager, Bldg. 651-4, 545-6380.

7. (BU) SERVMART AT NALF SAN CLEMENTE ISLAND

SUPPLIER WILL: Operate SERVMART facility aboard NALF San Clemente Island and periodically publish local SERVMART Catalog of items stocked/carried. — Not Applicable

RECEIVER SHALL: Purchase general and office supplies, forms, and other available expendable material from NALF San Clemente Island SERVMART facility. Cite RECEIVER accounting data on requisition (DD Form 1348) for direct charge to RECEIVER funds. Comply with NALFSCIINST 4404.3 "San Clemente Island SERVMART N9990R: establishment of" regarding NALF San Clemente Island SERVMART procurement procedures. Purchase items not in-stock (NIS) and/or not carried (NC) through RECEIVER regular supply channels. Point of contact is SERVMART Manager, Bldg. 60138, SCI-49156/54/53.

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NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

DEPARTMENTAL SUPPORT

REIMBURSABLE
NONREIMBURSA

SUPPLY

8. (ST) PETROLEUM, OIL, AND LUBRICANTS (POL) (NAS NORTH ISLAND) Reimbursable

SUPPLIER WILL: Provide fuels and other POL products from SUPPLIER stocks as required by RECEIVER. Act as liaison between contractors and RECEIVER. Provide itemized receipts of fuel issued and listings of fuel exits with billings. Costs will be based on current price of POL products at time of issue.

RECEIVER SHALL: Reimburse SUPPLIER for fuels and other POL products and, if applicable, pro rata share of contractor fuel truck movements. Provide appropriate requisitions (DD Form 1348-1) citing RECEIVER accounting data for direct charge of fuel issues. Point of contact is Fuel Branch Manager, Bldg. 426, Code 19660, 545-8839. Estimated annual cost is $8,600.

9. PETROLEUM, OIL, AND LUBRICANTS (POL) (NALF SAN CLEMENTE ISLAND) Reimbursable as noted

SUPPLIER WILL: Provide fuels and other POL products from SUPPLIER stocks at NALF San Clemente Island as required by RECEIVER. Provide RECEIVER with itemized receipts of fuel issued. Costs will be based on current price of POL at time of issue.

RECEIVER SHALL: Reimburse SUPPLIER for fuels and other POL products issued at NALF San Clemente Island. Provide appropriate requisitions (DD Form 1348-1) citing RECEIVER accounting data for direct charge of fuel issues. Comply with NASNIINST 10300.1 "Procedures for the Issuance and Replenishment of Petroleum, Oil, and Lubricants at San Clemente Island". Point of contact at NALF SCI is Fuels/Supply Branch, SCI-4-9156/9154. Point of contact at NAS North Island is Fuel Branch Manager, Bldg. 426, Code 19660, 545-8839. Estimated annual cost is $6,000.

DEPARTMENTAL SUPPORT

REIMBURSABLE/NONREIMBURSABLE

AIRCRAFT INTERMEDIATE MAINTENANCE DEPARTMENT (CODES 40, 90)

1. (AS) EQUIPMENT CALIBRATION

SUPPLIER WILL: Within capability of SUPPLIER, provide intermediate "I" level calibration, maintenance and repair of dynamometers to ensure performance at established standards, as required.

Nonreimbursable except as noted

RECEIVER SHALL: Request calibration services, as required. RECEIVER shall fund for all depot level aintenance, repair and parts requirements, on a direct fund citation basis, that exceed SUPPLIER's servicing capabilities. Comply with NASNIINST 13640.1 "Precision Measuring Equipment Calibration and Repair Program." Point of contact is PME Branch Chief, Bldg. 1478, 545-6724. Point of contact at SCI is GEMD Division 49231/49232/49233.

DEPARTMENTAL SUPPORT

REIMBURSABLE
NONREIMBURSA

OPERATIONS (CODES 30, 90)

1. (AO) AIR TRANSPORTATION

Reimbursable

SUPPLIER WILL Provide and control contract air transportation for RECEIVER personnel between NAS North Island and NALF San Clemente Island. Establish air transportation seat charges and notify RECEIVER. Current rate is $55 per seat, one way. Rate is subject to change as air transportation contract is negotiated.

RECEIVER SHALL. Notify NALF San Clemente Island Air Terminal Manifest Officer, SCI 4-9183, in advance of anticipated requirements. Comply with NALFSCIINST 4630.1 "Procedures for NALF SCI Air Terminal Manifest Office (ATMO)" regarding current flight manifesting procedures, NASNIINST 4630.2 "Air Transportation For Transient Personnel" concerning processing personnel through NAS North Island Air Terminal, Bldg 700, and NALFSCIINST 7310.3 "Reimbursement Procedures for San Clemente Island" for reimbursement procedures. Estimated reimbursable cost is $44,000 per year for 400 round trips.

2. (BC) RADIO FREQUENCIES/ELECTRONICS EQUIPMENT INSTALLATION

Common Servic
except as not

SUPPLIER WILL: Issue written authorizations for all types of radio operations and coordinate assignment of call signs.

RECEIVER SHALL: To safeguard against possible interference with existing operations and/or facilities, obtain written authorization of NAS North Island Frequency Coordinator or Ground Electronics Maintenance Officer (GEMO) prior to conducting any type of radio operations and installing electronics equipment onboard NASNI/NALF SCI/OLF IB. Inform SUPPLIER of all changes to radio frequencies. For those in use, SUPPLIER may require RECEIVER to cease or modify operations on crash frequency ONLY. Point of contact is NASNI GEMO, Code 304, 545-8251.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

OPERATIONS

3. (MK) HAND-HELD RADIOS/BASE STATION EQUIPMENT (NALF SAN CLEMENTE ISLAND) — Nonreimbursable

SUPPLIER WILL: At no cost to RECEIVER, procure and provide hand-held and Base Station radios used for intra-island routine operations and during emergencies. Provide repair services at on-island facilities, and supply temporary replacements as necessary.

RECEIVER SHALL: Assume sub-custody of hand-held radios and base station equipment, as applicable. Return equipment to on-island repair facilities as required for repairs and when requested for routine preventative maintenance.

4. (MH) ARRESTING GEAR (NASNI) — Nonreimbursable

SUPPLIER WILL: Be responsible for all arresting gear engine maintenance including specific requirements on Maintenance Requirement Cards (MRC), engine repair/replacement, tune-ups, overhauls, and providing funding for fuel. SUPPLIER will insure that personnel conducting required maintenance will sign 3-M Quarterly Scheduling Board verifying scheduled maintenance was accomplished. SUPPLIER will be responsible for major cyclical maintenance on Arresting Gear (i.e., painting of Arresting Gear). Provide support equipment, i.e., forklifts, trucks, cranes, if required to support arresting gear, major overhauls, service changes, arresting gear changes above normal maintenance requirements.

RECEIVER SHALL: Coordinate with SUPPLIER on the frequency of the SUPPLIER required inspections. RECEIVER has the responsibility for Arresting Gear operation and maintenance, excluding arresting gear engine maintenance, including corrosion control/paint touch up

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSAB

OPERATIONS

5. (MH) ARRESTING GEAR (NALF SCI)

Nonreimbursab

SUPPLIER WILL: Be responsible for all arresting gear engine maintenance including specific requirements on Maintenance Requirement Cards (MRC), engine repair/replacement, tune-ups, overhauls, and providing funding for fuel. SUPPLIER will insure that personnel conducting required maintenance will sign 3-M Quarterly Scheduling Board verifying scheduled maintenance was accomplished. SUPPLIER will be responsible for major cyclical maintenance on Arresting Gear (i.e., painting of arresting gear). Provide support equipment, i.e., forklifts, trucks, cranes, if required to support arresting gear, major overhauls, service changes, arresting gear changes above normal maintenance requirements.

RECEIVER SHALL: Coordinate with SUPPLIER on the frequency of the SUPPLIER required inspections. RECEIVER has the responsibility for arresting gear operation and maintenance, excluding arresting gear engine maintenance, including corrosion control/paint touch up.

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

MORALE, WELFARE AND RECREATION (CODES 90, 92)

1. (BD) SPECIAL SERVICES AND CLUB FACILITIES (NAS NORTH ISLAND) — Nonreimbursable except as noted

SUPPLIER WILL: Provide services and/or facilities including recreation, athletic programs and facilities, child care, theatre, hobby shops, recreation gear issue, golf course, bowling alley, ticket sales, travel office, beaches, swimming pools, officers/enlisted mess facilities including restaurant/bar service and catering, to authorized RECEIVER personnel and dependents to same extent furnished SUPPLIER and other RECEIVER personnel.

RECEIVER SHALL: Comply with SUPPLIER regulations. RECEIVER personnel will pay appropriate fees and charges, when applicable.

2. (BD) SPECIAL SERVICES AND CLUB FACILITIES (NALF SAN CLEMENTE ISLAND) — Nonreimbursable except as noted

SUPPLIER WILL: Provide clubs, theatre, recreation facilities, and athletic programs, which, because of isolation of NALF San Clemente Island, are available to all SUPPLIER and RECEIVER military and civilian personnel.

RECEIVER SHALL: Comply with SUPPLIER regulations. RECEIVER personnel will pay appropriate fees and charges, when applicable.

SPECIFIC PROVISIONS

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

DEPARTMENTAL SUPPORT

REIMBURSABLE/
NONREIMBURSABLE

MISCELLANEOUS SUPPORT

Reimbursable

1. (BZ) TO EXTENT COSTS OF SUPPLIER ARE INCREASED AS A RESULT OF PROVIDING FACILITIES OR SERVICES TO RECEIVER, SUCH COSTS WILL BE BORNE BY RECEIVER WHEN THEY CAN BE DEFINED WITHOUT UNREASONABLE EXPENSE OR DIFFICULTY. SPECIFICALLY, WHEN OVERTIME WORK IS REQUIRED TO MEET SCHEDULE OF RECEIVER, COSTS WILL BE BORNE BY RECEIVER.

SUPPLIER WILL: Determine amount of out-of-pocket costs incurred in furnishing support to RECEIVER and negotiate extent of reimbursement required from RECEIVER prior to commencement of work.

RECEIVER SHALL: Furnish SUPPLIER with appropriate funding documents in amounts negotiated and agreed upon as specific items occur.

2. (BZ) TO EXTENT COSTS OF RECEIVER ARE INCREASED AS A RESULT OF PROVIDING SERVICES TO SUPPLIER, SUCH COSTS WILL BE BORNE BY SUPPLIER WHEN THEY CAN BE DEFINED WITHOUT UNREASONABLE EXPENSE OR DIFFICULTY. SPECIFICALLY, WHEN OVERTIME WORK IS REQUIRED TO MEET SCHEDULE OF SUPPLIER, COSTS WILL BE BORNE BY SUPPLIER.

SUPPLIER SHALL: Furnish RECEIVER with appropriate funding documents in amounts negotiated and agreed upon as specific items occur.

RECEIVER WILL: Determine amount of out-of-pocket costs incurred in furnishing support to SUPPLIER negotiate extent of reimbursement required from SUPPLIER prior to commencement of work.

This miscellaneous support is to include any service provided to SUPPLIER/RECEIVER not specifically identified in Annexes II and III.

SPECI . PROVISIONS

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND – COMMANDER, NAVAL BASE, SAN DIEGO

1. FIRE REGULATIONS

FFD: Develop fire protection/prevention regulations and prepare supporting/supplementing instructions as necessary.

NASNI/SCI: Comply with COMNAVBASE SAN DIEGO INST. 11320.1 "Fire Bill." Department heads and military/civilian supervisors are responsible for receiving, disseminating and ensuring compliance with Fire Protection and Fire Prevention Fire Warden Program requirements. Point of contact is Headquarters, Federal Fire Department, 524-6250
SCI: Provide funds for any unique requirements due to wildland fires at San Clemente Island, to include but not limited to: air tanker support, additional manpower, heavy equipment (bulldozers) to maintain fire breaks.

2. EMERGENCY ASSISTANCE

FFD: If required during emergencies, request assistance from NASNI

NASNI: Provide all necessary assistance, including personnel and equipment, as requested during emergency firefighting operations.

3. ENGINEERING REVIEWS

FFD: Federal Fire Department will review plans for all military construction, facility modernization, and rehabilitation programs/projects to ensure compliance with fire protection criteria.

NASNI: Submit construction plans to Federal Fire Department for review, as appropriate.

4. PUBLIC WORKS SUPPORT

NASNI: Coordinate with PWC, San Diego for support of firefighting operations as follows:

a. Activating fire pumps and opening water main valves for additional water sources;
b. Securing or isolating electricity, flammable liquid, gas and/or steam lines to buildings or areas involved in fire, as required by Fire Chief;
c. Providing vehicles and drivers to transport personnel and equipment, as required;
d. Providing specialized equipment including wreckers, bulldozers, cranes, water tanks, material handling equipment, flood lights, etc., and equipment operators, as required by Fire Chief;
e. Assigning highest priority to the repair and servicing of fire apparatus and firefighting equipment;
f. Inspecting, refilling and maintaining all types of fixed extinguishing systems, fixed fire protection systems, i.e., sprinkler systems, fire alarm, fixed halon, fire hydrants, twin agent fire fighting unit (fueling hot site #1 and #3), dry chemical will be maintained by PWC on a reimbursable basis by NAS North Island;

g. Inspecting, testing and maintaining all fire alarm systems and local building alarm systems, including reporting and detection;
h. Providing of mechanical and technical assistance for testing of sprinkler systems, dry chemical systems, fixed halon and CO_2 flooding installation, standpipe systems, and foam systems, as requested by Fire Chief.

FFD: Will assist Staff Civil Engineer and PWC as requested.

5. EMERGENCY RESOURCES

FFD: Coordinate with Supply Officer to ensure the availability of inventories/supplies/equipment that are required to support arresting gear maintenance and emergency operations.

NASNI: Ensure the availability of reserve supplies including fire extinguishing agents and firefighting equipment required for ready use during major fire emergencies. Provide gasoline/diesel tank trucks to service fire apparatus when needed during emergencies. Maintain Applicable Parts Listing (APL) and warehouse parts in support of Aircraft Arresting Gear Maintenance for NASNI and SCI.

6. INSPECTION AND MAINTENANCE OF FIRE FIGHTING EQUIPMENT AND SYSTEMS

FFD: The maintenance (including recharging), and proper location of all portable first aid fire fighting appliances (fire extinguishers) are functions of the Federal Fire Department. Sprinkler systems will be tested/inspected [illegible] by qualified Fire Department personnel. Fixed Fire Protection systems i.e., sprinkler system, fire alarm, Halon, dry chemical will be maintained by PWC on a reimbursable basis by NASNI.

NASNI/SCI: Immediately notify the Federal Fire Department whenever fire extinguishers have been used. Equipment shall not be used or moved from its assigned location for any purpose except fire fighting and required repair or maintenance. Fire extinguishers requiring servicing shall be taken to NASNI Fire Station 1, Bldg 792, OLFIB Fire Station 4, Bldg 5, or NALFSCI Fire Station 10, Bldg 60142. Notify Fire Chief and PWC, San Diego of impairment (including blockage) of hydrants, water systems, pumps, sprinklers, carbon dioxide and dry chemical systems, and similar equipment. Restoration to service of such equipment will also be reported in a timely manner. Notify the Fire Chief and PWC, San Diego of leaking water mains, standpipes, and sprinkler systems. The Federal Fire Department shall be informed prior to any installation, maintenance, or modifications to any fire protection, fire detection, foam, dry chemical and gaseous systems.

7. BUILDING/FACILITY FIRE SAFETY INSPECTIONS

FFD: Inspections of all structures and outside storage areas will be performed by Federal Fire Department. Inspection frequencies will be determined by higher authority.

8. AIRFIELD FOD CHECKS

FFD: Federal Fire Department will conduct twice daily (i.e., morning/evening) FOD inspections on station runways and taxiways. Provide Operations Duty Officer (ODO) with reports concerning FOD check findings. Observe any other airport surfaces irregularities and include those findings/observations in the daily reports to ODO. This service will terminate in October 1990.

NASNI: Accept/acknowledge results of FOD checks and originate action to resolve/eliminate reported problem areas.

9. OPTICAL LANDING SYSTEM (OLS) LIGHTING

FFD: Federal Fire Department will adjust lighting intensities of OLS twice daily (i.e., dawn/dusk) and perform additional adjustments as requested by Airfield Control Tower. This service will terminate in October 1990.

NASNI: Acknowledge changes to intensity settings. As required, originate requests to change OLS settings based on pilot complaints and observations.

10. OUTDOOR FIRE PROTECTION EQUIPMENT

FFD: Provide assistance as required to PWC/SCE in testing of automatic sprinkler system. Fire Chief will determine whether or not adequate clearance of obstructions exists around sprinkler control valves, siamese pumper connection and fire hydrants.

NASNI: Notify Fire Chief and ensure fire hydrants and automatic sprinkler systems are tested when removed or returned to service. Comply with Fire Department requirements to maintain adequate clearance around and near sprinkler control valves, siamese pumper connections, and fire hydrants. Ensure that exterior telegraphic alarm boxes are obstructed by vegetation and other objects. Fire hydrants shall not be used unless authorized by Fire Chief and P San Diego. Inspection, testing, and maintenance of fire alarm boxes shall be per NAVFACMO-117, Maintenance of Fire Protection Systems.

INTRASERVICE SUPPORT AGREEMENT
NAS NORTH ISLAND/NALF SAN CLEMENTE ISLAND - COMMANDER, NAVAL BASE, SAN DIEGO

11. AIRFIELD ARRESTING GEAR

FFD: Fire Department personnel will maintain airfield arresting gear to established Navy standards. Submit month schedules of planned preventative maintenance services (PMS) to NASNI for approval. Perform required PMS repairs a be responsible for the ordering of supplies necessary to maintain airfield arresting gears. Normal work schedul will be determined by maintenance requirements.

NASNI: Review and approve monthly PMS schedules submitted by Federal Fire Department. Any additional costs incurr by RECEIVER due to SUPPLIER flight schedules, requested maintenance, requested FOD checks, optical landing syst checks, or unforseen circumstances that require FFD arresting gear technicians to work over their normal work shift ours) shall be funded by SUPPLIER.

(47)

DEPARTMENT OF THE NAVY
NAVAL AUXILIARY LANDING FIELD
SAN CLEMENTE ISLAND
NAVAL AIR STATION
NORTH ISLAND
SAN DIEGO, CALIFORNIA 92135-5211

IN REPLY REFER TO:
NALFSCIINST 3502.1A

NOV 19 1991

NALF SAN CLEMENTE ISLAND INSTRUCTION 3502.1A

Subj: BRUSH/GRASS FIREFIGHTER TRAINING FOR SAN CLEMENTE ISLAND (SCI) PERSONNEL

Encl: (1) Personnel required by each division/department.

1. Purpose. To establish a viable program to augment the Island's firefighting force for brush/grass firefighting.

2. Cancellation. NALFSCIINST 3501.1 is hereby cancelled.

3. Background. San Clemente is a grassy Island approximately 22 miles long and 3 1/2 miles wide at its widest point. Rainfall is scarce, usually 5-8 inches between November and March. The grasses and brush grow rapidly during the rainy season and dry quickly during the long dry season. The use of pyrotechnics, ordnance, and off-road vehicles involved in authorized training exercises makes the potential for grass/brush fires extremely high and usually unplanned during the dry season.

4. Discussion. A trained Island Firefighting Team which is familiar with local conditions will have the potential to control grass/brush fires in order to protect plants, animals, and government property. Due to the remoteness of the Island this can most effectively be done utilizing onboard equipment, material, and personnel assets. Since the assigned military/civilian fire department consists of a one engine company, with a second engine manned by the Crash/Fire Division in an emergency, it is essential that non-Fire Department personnel be provided to augment in order to provide adequate personnel to respond to grass/brush fires.

5. Responsibilities.

a. The Federal Fire Department shall publish a training schedule and provide Island personnel classroom and practical training equipment, and supervisory expertise.

b. Each division/department officer/CPO shall be responsible for providing an established number of personnel for training.

c. The Security Department will be the central point of contact and shall be responsible for opening the Facility Emergency Response Locker, issuing equipment, and arranging transportation for personnel and equipment to the designated site.

d. The Medical Department shall assist as required.

e. An adequate supply of appropriate equipment such as hard hats, goggles, coveralls, etc., shall be maintained in the Emergency Response Locker.

f. The Senior Fire Department Officer on the scene shall determine what equipment is suitable for brush fire fighting and will ensure that sufficient equipment is available prior to the onset of fire season.

g. The Safety Leading Petty Officer will be responsible for inventory control once the equipment is obtained on a monthly basis.

h. The Island Duty Officer (IDO) shall oversee the entire evolution. The IDO shall provide what assistance is necessary and ensure that personnel are furnished with adequate supplies of rations and refreshment.

6. Action.

a. All SCI personnel, E-6 and below except Crash/Fire and Security personnel, shall receive brush firefighting training unless specifically exempted for medical reasons or by the Officer in Charge.

b. Once personnel have satisfactorily completed a designated annual firefighting training program they will be placed on a roster and be made available to the SCI Fire Department at the discretion of the Officer in Charge in Charge or his designee (IDO). Enclosure (1) will be utilized as a guide in selecting personnel.

c. Personnel with any type of restrictive medical or physical condition shall be utilized in administrative support functions only.

d. The Brush/Grass fire staging area will be as directed by the senior Fire Department Officer on Island.

e. When required, all personnel shall muster at the staging area, in long pants, sturdy shoes, and if possible long sleeve shirts. Bandannas may be used for breathing.

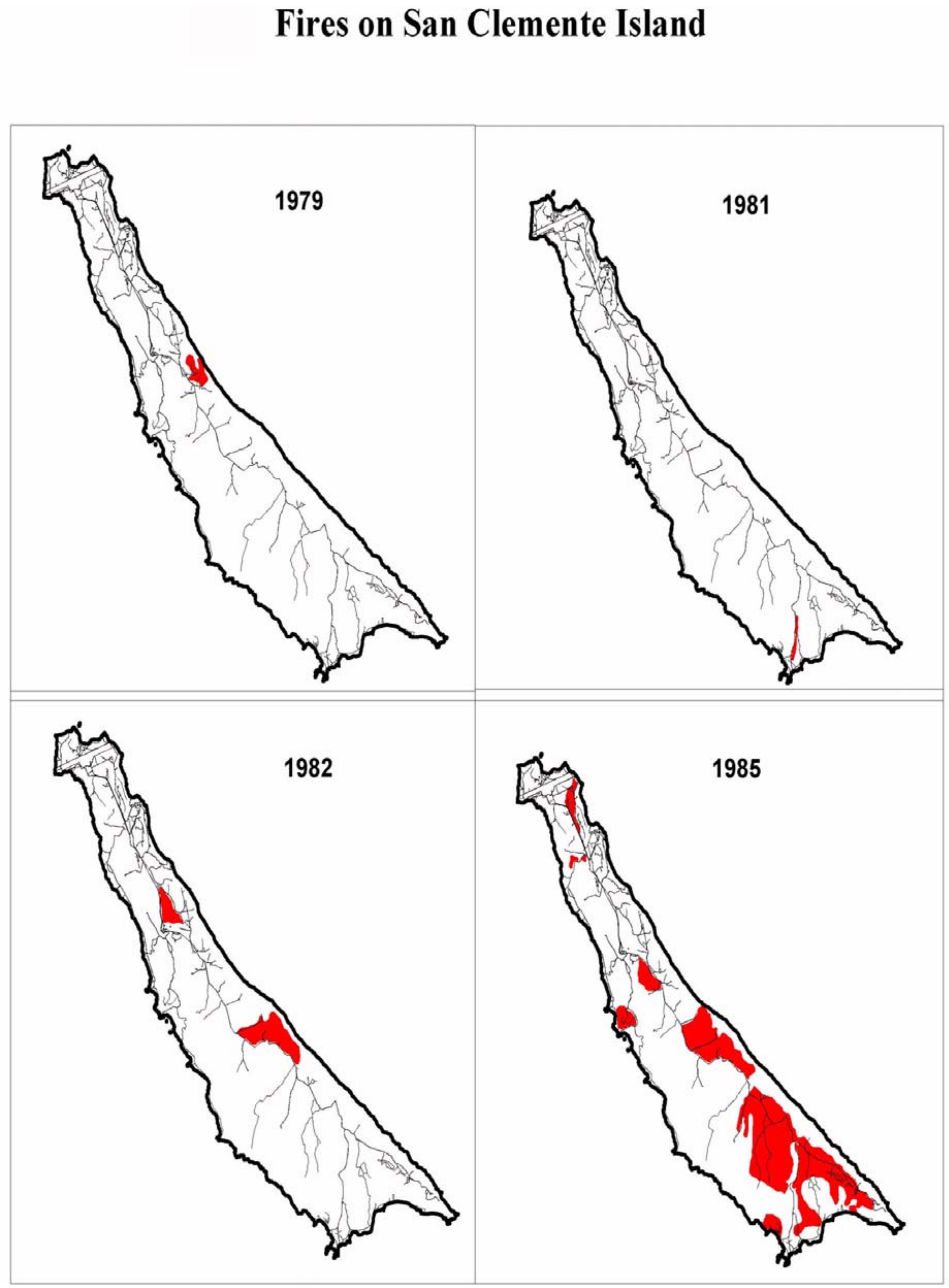
C H Lammers
C. H. LAMMERS

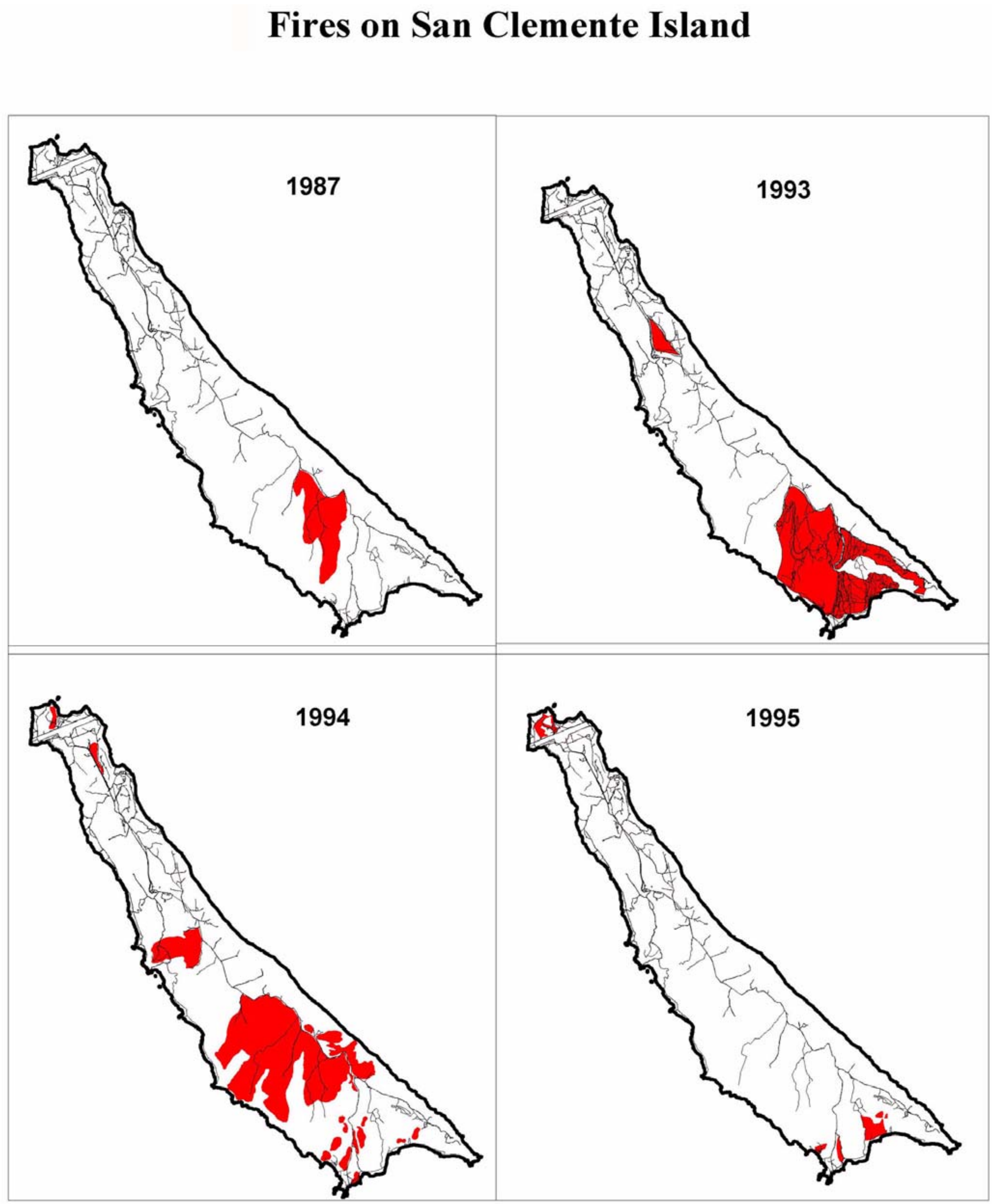
Distribution:
NALFSCIINST 5605.1A
List I

EACH DIVISION/DEPARTMENT WILL PROVIDE PERSONNEL AS FOLLOWS:

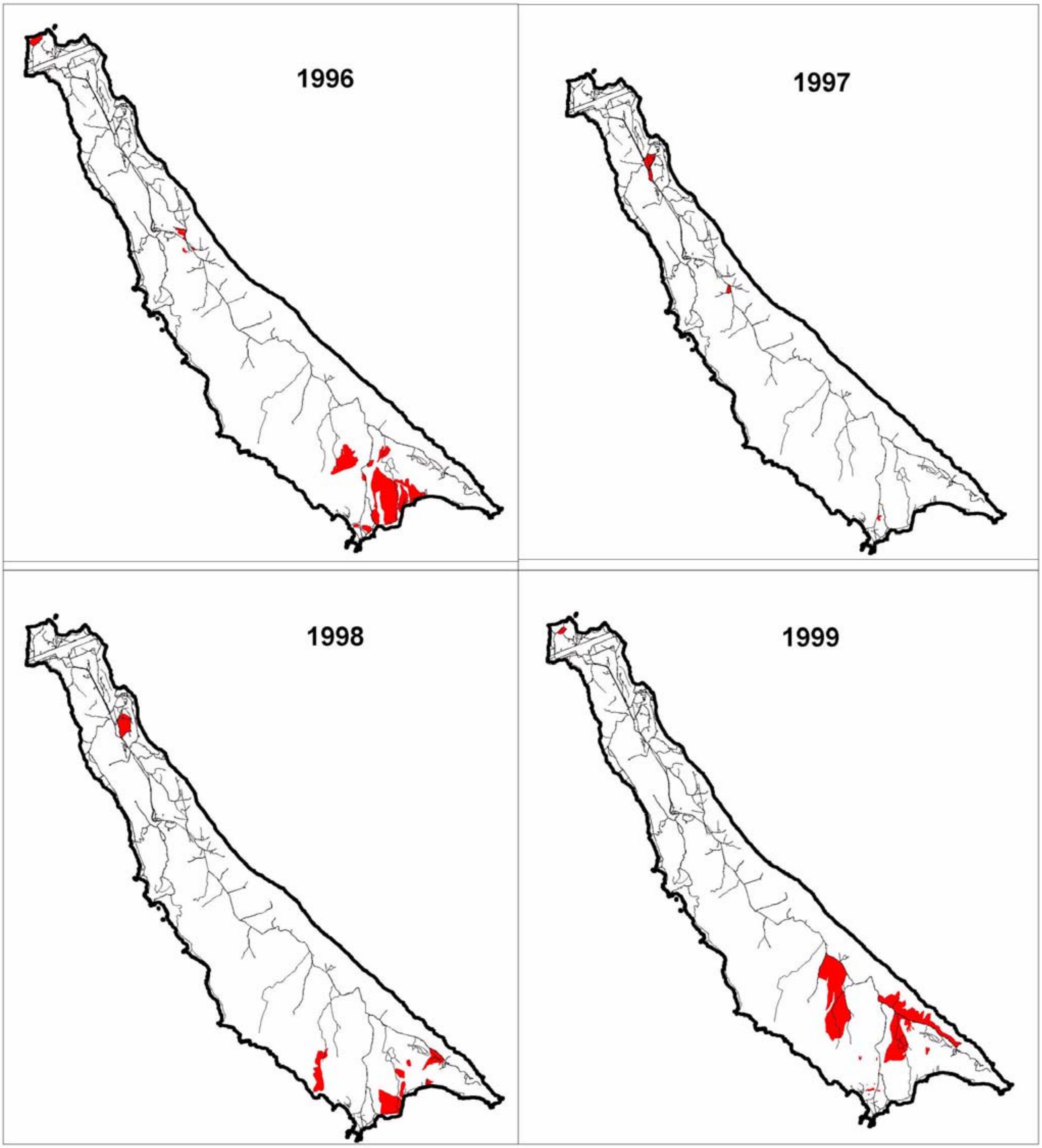
DIVISION/DEPARTMENT	NO. OF PERSONNEL
ADMIN	1
ATC	3
AIR TERMINAL	1
BILLETING	1
COMM	1
CRASH/FIRE	0
GEMD	2
LINE	3
PIER	2
SECURITY	0
SPECIAL SERVICES	1

Appendix D: Locations of Fires by Year

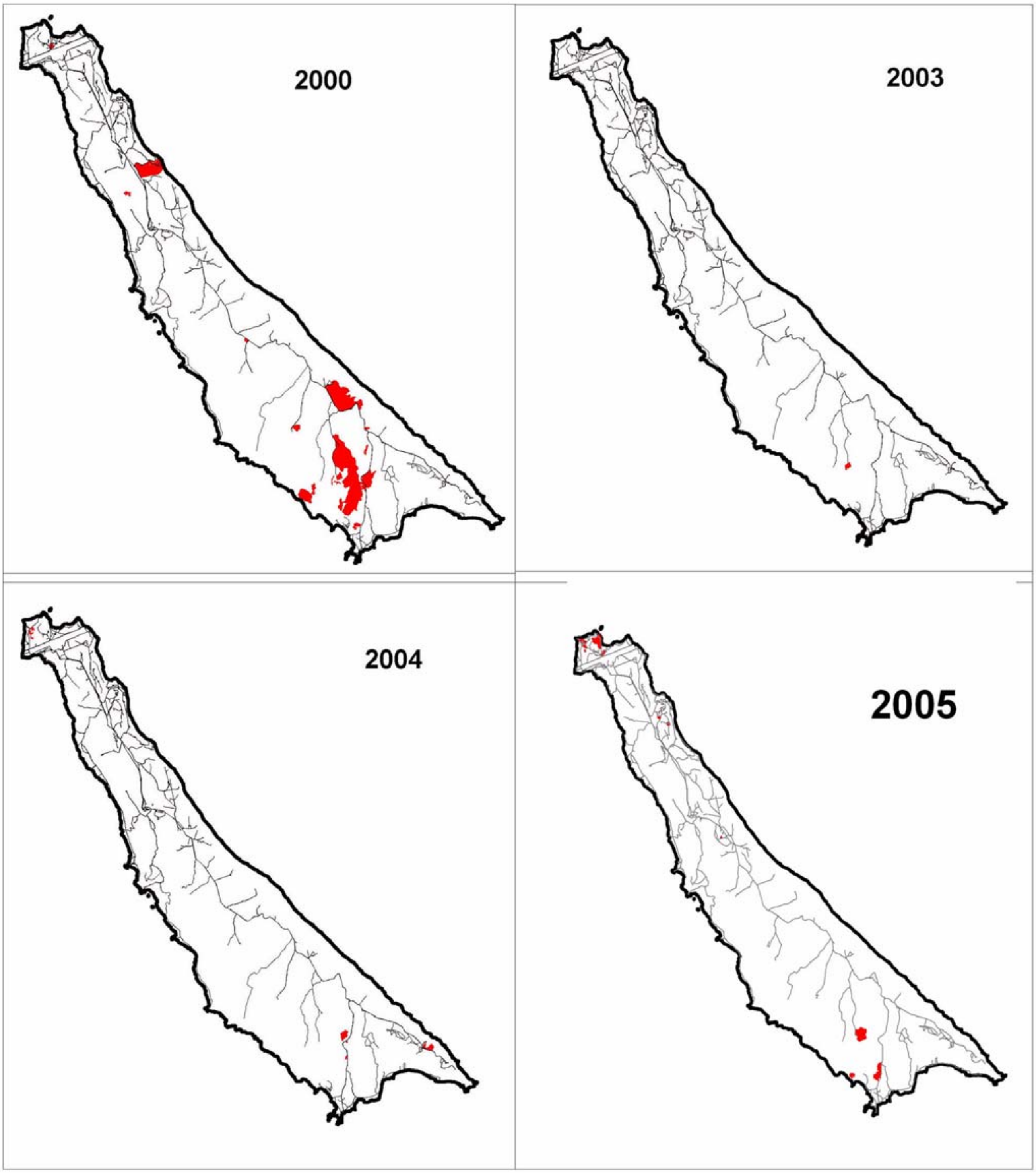


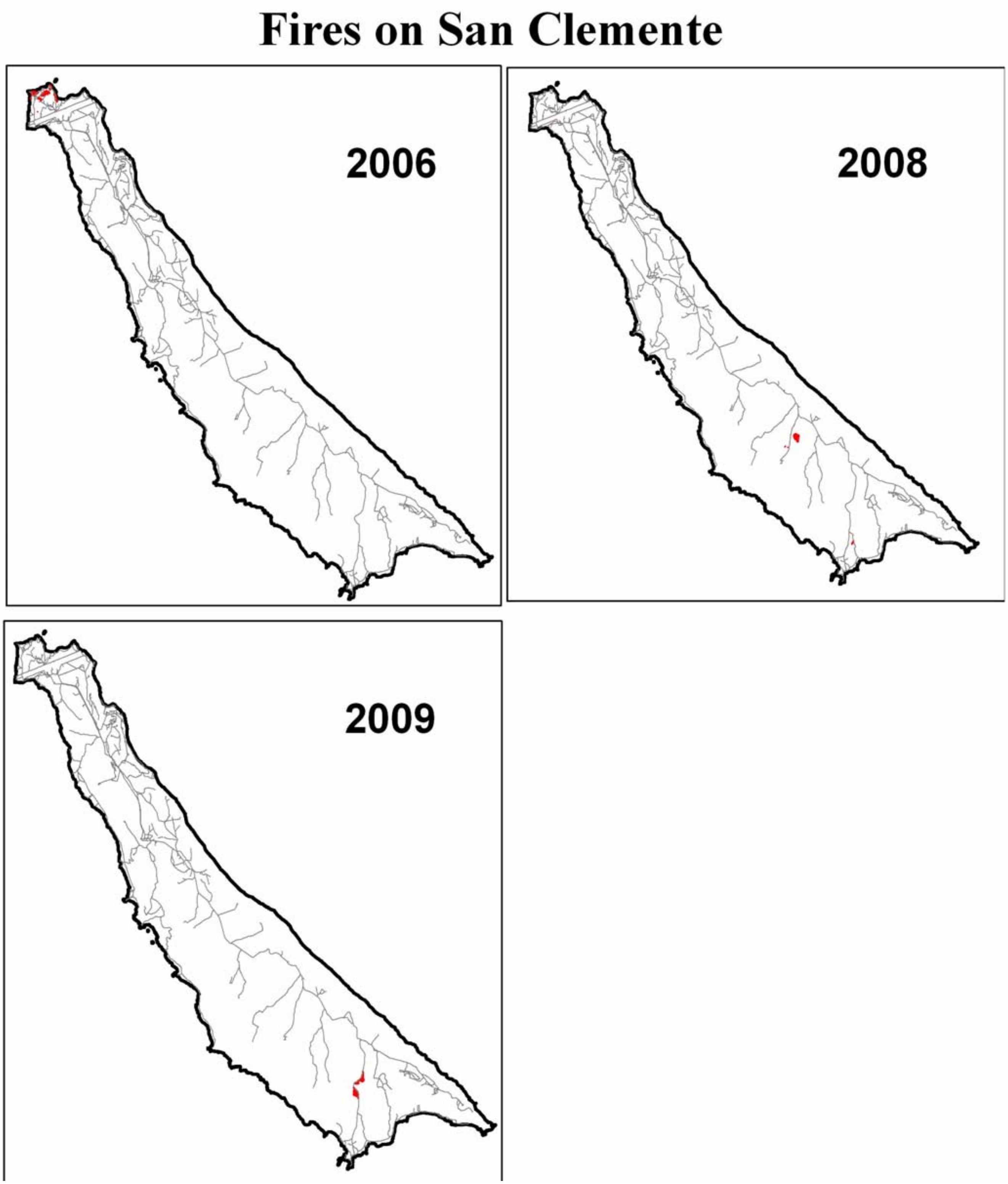

Fires on San Clemente Island
1987
1993
1994
1995

Fires on San Clemente Island



Fires on San Clemente Island




Fires on San Clemente
2006
2008
2009

Appendix E: Wildland Fire Coordinator Qualifications

Responsibilities of Wildland Fire Coordinator

From the SCI Fire Plan:

A. This position, at a minimum, should be at the Captain level in the Federal Fire Department Organization, and have a background in natural resources.

B. This billet would be responsible for all wildland fire related activities (wildland fire suppression, aviation management (water dropping deployment targets) and fuels pre-planning) and be the Fire Department's principal liaison with Military Operators, Aviation Units, and Natural Resources Staff.

C. This person would coordinate all wildland fire training, collection and dissemination of fire weather and Fire Danger Rating information to all Island users, make the necessary notifications and interpret restrictions based upon the fire weather information and pre- planned operational guides. The Coordinator will map fire boundaries and severity levels.

D. In addition to the above, this position would manage the implementation of the proposed SCI prescribed fire and fuelbreak projects, including application of fire retardant, and prepare annual budget requests in coordination with the Natural Resource Staff.

E. The Wildland Fire Coordinator should map fire boundaries and include in a fire incident report. The Coordinator should also photograph the fire if on scene during the incident.

From David:

This person would be responsible for wildland fire related activities (wildland fire suppression, aviation management water dropping deployment targets, and fuels pre-planning) and be the Fire Department’s principal liaison with Military Operation, Aviation Units, and Natural Resources Staff.

Fire Danger Rating System:

A. Collect, interpret, and determination of fire weather and Fire Danger Rating information using predetermined formulas.

B. Notification of fire danger rating to point of contact at SCORE or Security.

Wildland Fires

A. This person would coordinate all wildland fire training within the fire department.

B. Be on scene for wildland fires and file a report and map of general fire area.

C. Assist military assets or private contractor on locations of water drops to put out wildland fires.

D. When possible, obtain an aerial photo of the area burned taken form the fire fighting helicopter.

Controlled burns

A. Conduct controlled burns.

B. Coordinate with Natural Resources or Navy staff on selecting areas for burning for military or natural resource habitat benefit.

C. Manage the implementation of the proposed SCI prescribed fire and fuel-break projects through coordination with contractors applying fire retardant and/or conducting controlled burns via helicopter in SHOBA.

D. Prepare annual budget requests in coordination with the Natural Resource Staff or Navy staff for controlled burns or fuel break installation. Natural Resources or the Navy base users will program funding dollars to support contract.

E. Review fire break installation contract developed b Natural Resources or military users.

Appendix F: Fire Reporting Checklist

Fire Reporting Checklist

File this checklist with the Quarterdeck ASAP after returning from the field. The Wildland Fire Coordinator will submit a copy of the checklist to NRO within 24 hours of the fire

This checklist is to be used and filled out for each fire sighted during operations on San Clemente Island.

Fire Conditions

a. Time of ignition ______

b. Time detected ______

c. Type of Fire (i.e. brush fire, vehicle fire, etc.) ______

d. Location (UTM Grid Map) ______

e. Acres ______

f. Fire's direction of travel from ignition point ______

g. Weather Conditions (visibility, cloud cover, wind direction/speed, temperature, relative humidity) ______

h. Weather Station location ______

i. Fire Danger Rating at time of fire ______

j. Ignition source (from SCORE or other, if known) ______

k. Is life or property threatened? ______

Action *Complete*

1. Notify Security and SCI Federal Fire Department (Telephone 4-9911 or through radio. See list of frequencies below. Security Backup 4-9214.) ______

2. Notify SCI OIC (Telephone 4-9131) ______

3. Notify SCORE (See frequencies below) ______

4. Notify CNRSW NRO (via SCORE) ______

5. Notify EOD, if required ______

Call Signs and Frequencies

	Call Sign
SCORE SCI Range Manager	SHADOW Warrior (Telephone 524-9112 or 313-2450)
SCORE	STARBURST 352.1 UHF)
SCI Control Tower	(278.8 UHF)
FACSFAC	BEAVER (289.9 UHF)
EW Range	WITCH DOCTOR 285.3 UHF
SHOBA Safety Spotter	BURNT TREE 353.4 UHF[1]

Additional Information

1. Fire Response Team arrival time _____
2. Describe method of Suppression, what suppression assets were used (Equipment and personnel, such as helicopter, number of buckets of water, hand swatters, quick-attack apparatus, etc.)
   ____
   ____
   ____
3. Was fire put out or left to burn out naturally? _____
4. Map of fire location and perimeter using GPS *(use ½-acre minimum mapping unit)* _____
5. Map fire severities internal to fire using chart _____
6. Photograph taken? _____

Reporting Person (filling out checklist):

Name *(Please Print)*: ______________________________________

Organization: ______________________________________

Telephone Contact *(for follow-up information)*: ______________________________________

Location (Name of range)/GRID: ______________________________________

Signature & Date ______________________________________

[1] Reference: NALF SCI Instruction 5102.1 San Clemente Island Wildfire Investigation and Reporting Procedures, 15 June 1999. Biological Opinion 1-6-97-F-21.

Appendix G: FARSITE Model Maps and Tables

Table G-1. FARSITE model outputs of fire acreages at nine locales on San Clemente Island.

FARSITE Fire Behavior Model Outputs

Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

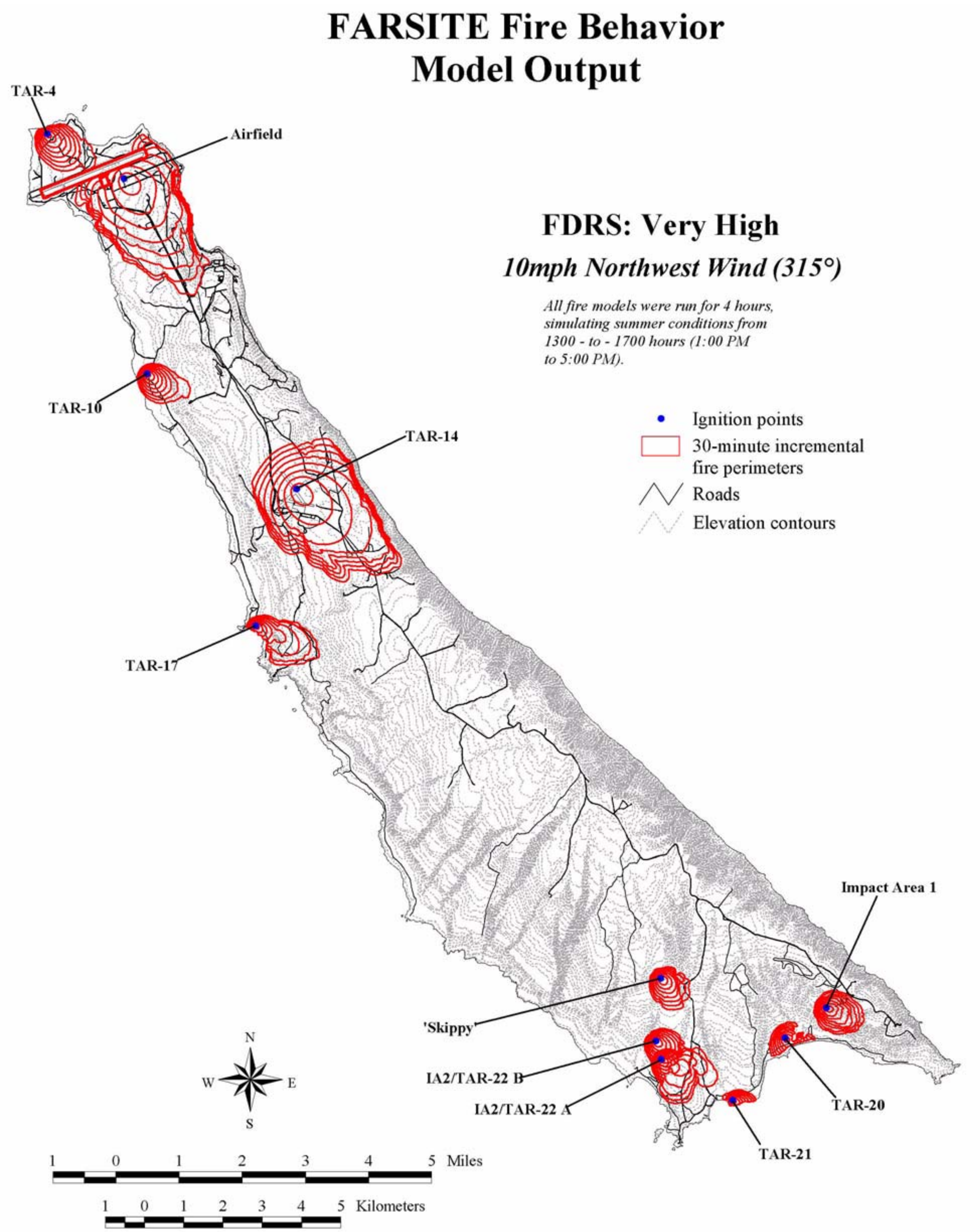
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	Skippy'
1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1330	3.1	58.2	2.1	57.6	2.1	4.5	5.8	2.0	2.1	2.0	1.5
1400	15.5	264.5	10.4	280.8	10.0	19.0	22.2	8.3	10.4	10.0	9.9
1430	39.5	535.6	25.7	666.5	22.7	30.1	46.3	14.0	23.9	25.4	27.4
1500	73.2	825.6	48.3	1094.3	40.5	43.3	85.8	19.9	51.0	49.3	53.2
1530	115.8	1105.2	78.2	1428.9	77.6	57.6	122.7	26.7	130.9	83.1	81.6
1600	165.1	1351.6	116.0	1666.0	172.2	74.5	165.0	34.2	212.1	119.6	113.9
1630	220.8	1545.7	164.7	1885.4	277.1	91.5	212.1	42.7	304.4	155.4	158.1
1700	323.9	1720.1	238.2	2099.8	356.3	112.8	260.8	53.1	406.4	247.4	208.0

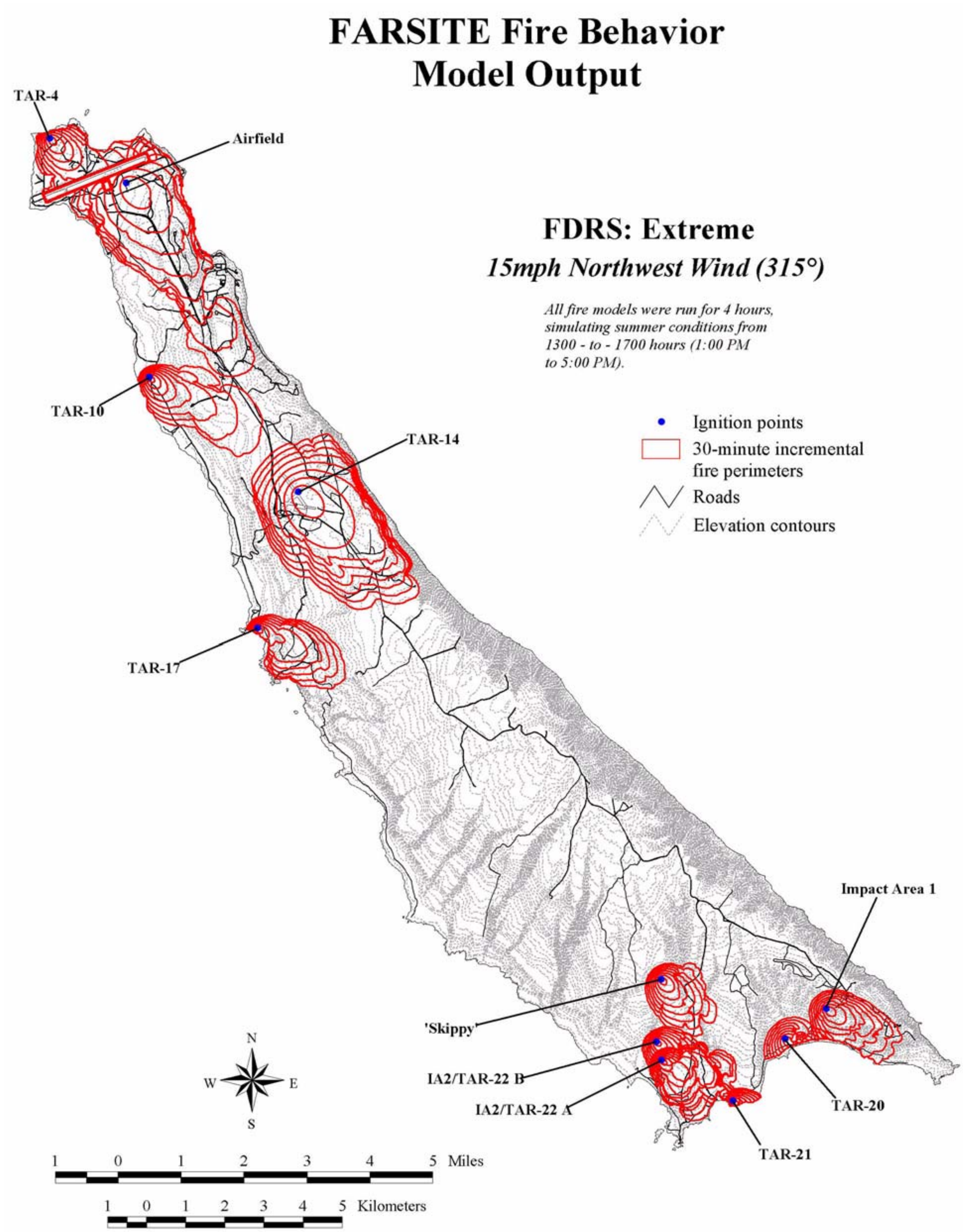
FDRS Extreme, 15 mph NW (315°) wind

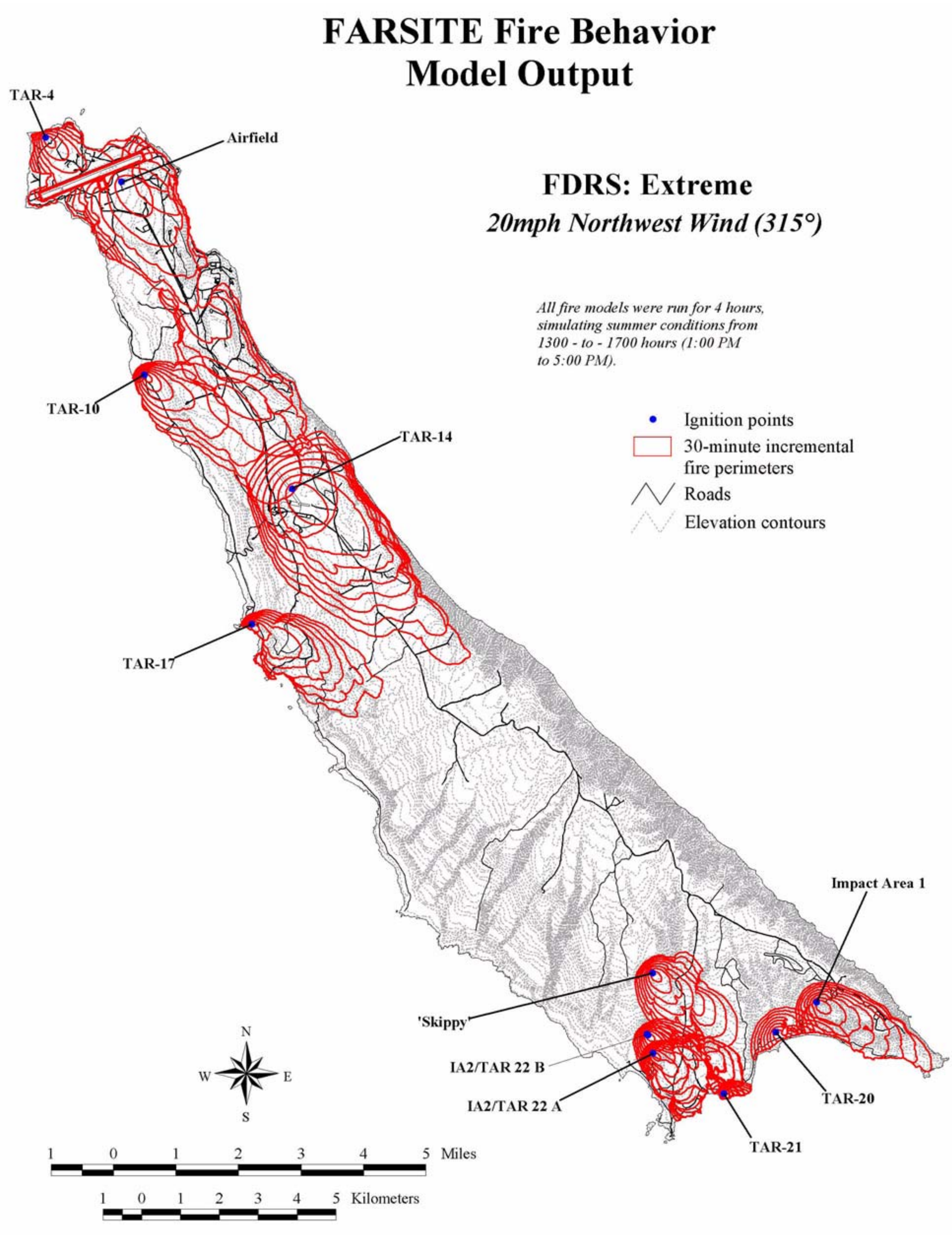
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	Skippy'
1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1330	8.3	119.6	4.8	122.6	4.8	12.3	12.8	4.6	4.8	4.7	6.3
1400	41.6	469.2	24.2	585.1	21.3	26.6	55.8	11.4	22.6	24.0	34.1
1430	99.8	881.3	59.5	1138.3	56.5	44.0	117.7	18.8	101.0	60.8	77.8
1500	183.3	1287.9	115.7	1520.7	199.2	65.0	190.0	27.4	211.2	111.8	137.0
1530	350.1	1607.6	209.5	1865.4	339.2	88.6	299.5	37.9	372.4	234.5	227.2
1600	455.4	1812.5	406.1	2187.7	459.2	121.9	408.0	48.6	504.0	438.3	333.0
1630	535.2	2143.8	687.9	2510.5	596.9	189.0	545.0	62.5	630.0	613.7	454.7
1700	604.9	2543.8	1110.1	2841.5	738.8	240.4	666.0	78.1	766.7	786.8	590.0

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	Skippy'
1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1330	16.4	182.2	8.5	201.6	8.5	16.1	25.4	6.0	8.5	8.5	13.9
1400	79.9	671.5	42.7	847.5	36.0	33.0	106.9	12.9	68.1	43.1	64.8
1430	203.0	1161.7	110.8	1371.8	187.0	55.0	240.3	21.1	198.0	112.4	147.3
1500	382.2	1590.0	254.6	1826.1	367.9	81.8	412.8	31.8	409.6	295.7	276.1
1530	486.7	1956.4	602.2	2270.7	555.0	122.2	591.7	43.0	558.6	545.5	429.4
1600	582.3	2513.4	1152.2	2718.3	749.1	200.2	741.3	54.8	724.2	767.9	621.7
1630	776.8	3200.7	2039.5	3262.5	980.6	273.2	878.7	69.5	833.7	973.6	855.1
1700	983.7	3933.0	3101.8	3875.5	1302.4	367.1	1003.4	84.6	935.7	1121.2	1143.7


FARSITE Fire Behavior
Model Output
FDRS: Very High
10mph Northwest Wind (315°)
All fire models were run for 4 hours, simulating summer conditions from 1300 - to - 1700 hours (1:00 PM to 5:00 PM).
Ignition points
30-minute incremental fire perimeters
Roads
Elevation contours
TAR-4
Airfield
TAR-10
TAR-14
TAR-17
Impact Area 1
'Skippy'
IA2/TAR-22 B
IA2/TAR-22 A
TAR-20
TAR-21
N
W
E
S
1 0 1 2 3 4 5 Miles
1 0 1 2 3 4 5 Kilometers


FARSITE Fire Behavior
Model Output
FDRS: Extreme
15mph Northwest Wind (315°)
All fire models were run for 4 hours, simulating summer conditions from 1300 - to - 1700 hours (1:00 PM to 5:00 PM).
Ignition points
30-minute incremental fire perimeters
Roads
Elevation contours
TAR-4
Airfield
TAR-10
TAR-14
TAR-17
Impact Area 1
'Skippy'
IA2/TAR-22 B
IA2/TAR-22 A
TAR-20
TAR-21
N
W
E
S
1 0 1 2 3 4 5 Miles
1 0 1 2 3 4 5 Kilometers


FARSITE Fire Behavior
Model Output
FDRS: Extreme
20mph Northwest Wind (315°)
All fire models were run for 4 hours, simulating summer conditions from 1300 - to - 1700 hours (1:00 PM to 5:00 PM).
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TAR-14
TAR-17
Impact Area 1
'Skippy'
IA2/TAR 22 B
IA2/TAR 22 A
TAR-20
TAR-21
N
W
E
S
1 0 1 2 3 4 5 Miles
1 0 1 2 3 4 5 Kilometers

Table G-2. FARSITE model outputs of fire acreages at nine locales on San Clemente Island.

FARSITE Fire Behavior Model Outputs

Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

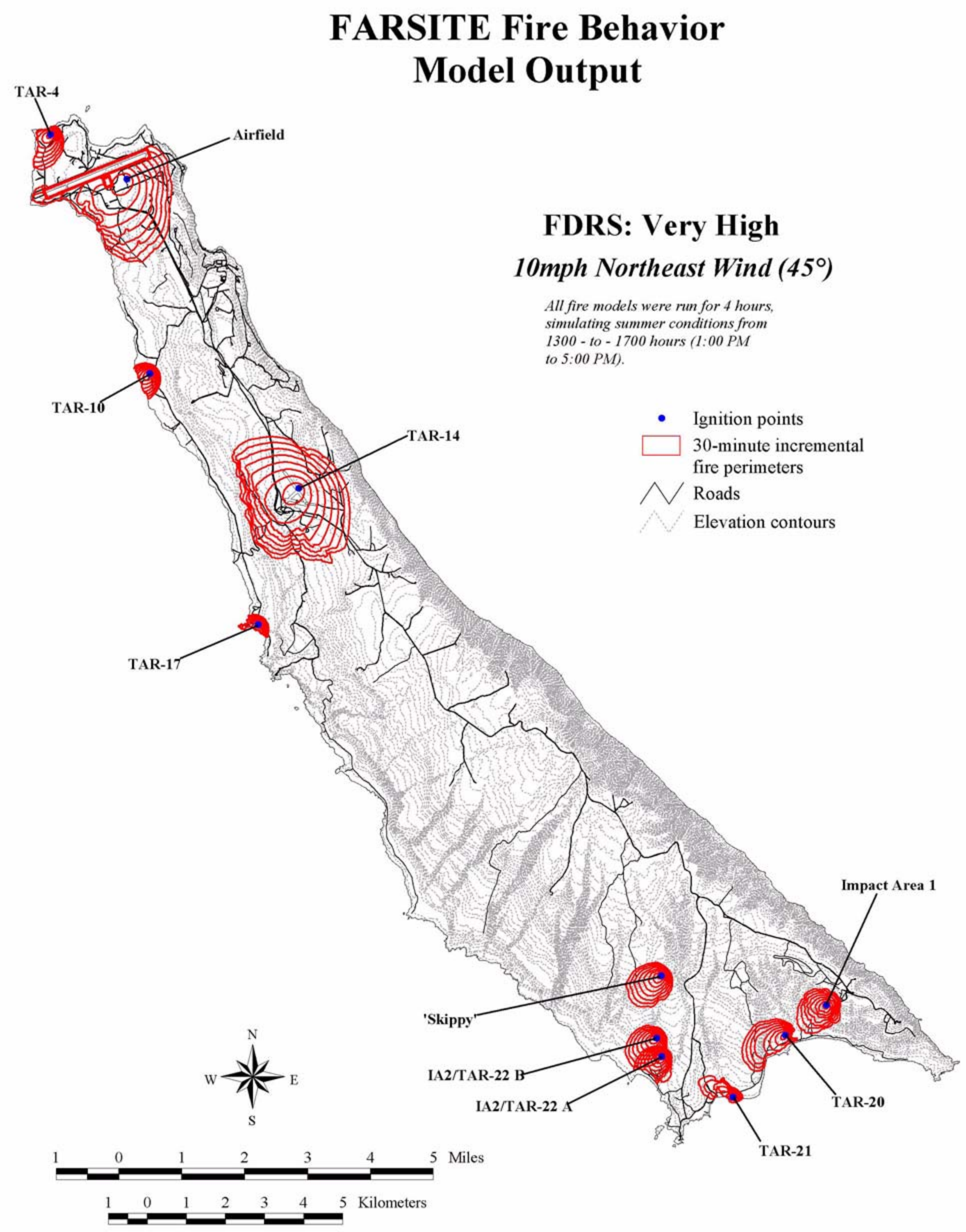
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	Skippy'
1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1330	3.1	57.3	2.1	57.7	2.1	4.4	3.4	2.0	2.1	1.9	2.7
1400	15.7	241.1	10.5	261.6	8.0	21.9	15.4	7.0	10.4	9.2	13.4
1430	38.0	439.5	25.9	485.1	14.0	51.7	33.4	11.3	24.8	24.3	32.4
1500	60.3	632.1	40.6	720.6	22.1	84.6	58.7	18.9	46.4	48.7	62.1
1530	81.3	782.9	54.9	983.7	31.4	135.1	93.6	29.2	73.4	80.6	100.9
1600	105.6	923.8	68.6	1258.2	40.1	178.9	134.0	42.3	96.5	119.5	146.4
1630	129.5	1060.3	81.7	1519.1	47.4	223.9	182.3	69.9	119.4	165.3	196.3
1700	151.3	1190.3	94.8	1785.7	54.5	271.1	242.8	101.8	149.2	214.9	249.7

FDRS Extreme, 15 mph NE (45°) wind

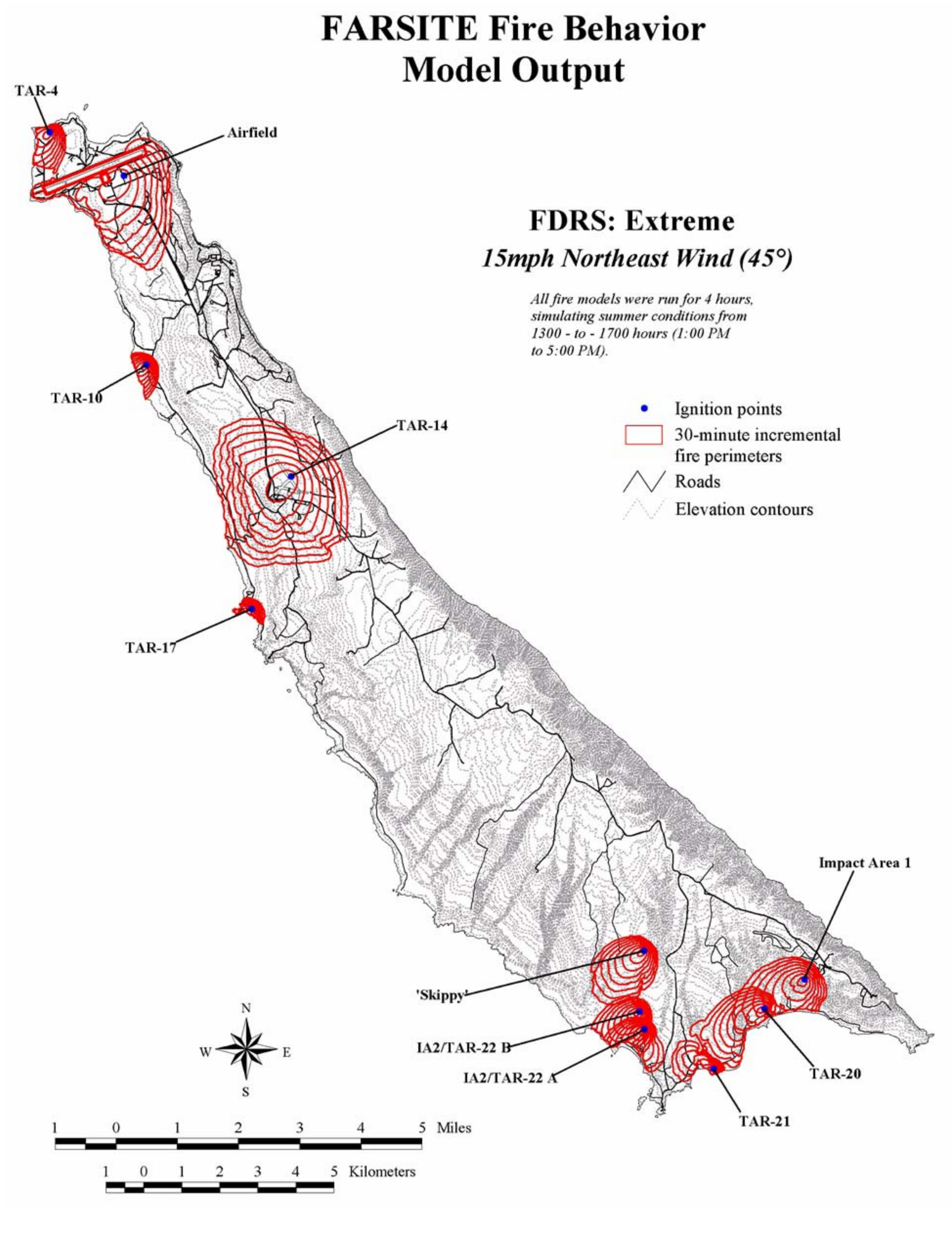
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	Skippy'
1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1330	8.4	113.9	4.9	122.4	4.6	13.0	11.3	4.2	4.9	4.6	6.6
1400	38.2	376.7	23.3	405.8	11.0	60.1	47.3	8.8	23.8	24.8	33.7
1430	69.7	613.5	40.8	698.6	20.4	123.6	118.4	15.7	56.5	63.0	84.3
1500	102.9	793.6	57.1	1037.5	30.9	192.9	227.0	27.1	87.5	119.0	156.3
1530	132.9	968.9	73.5	1423.2	39.8	273.1	327.1	44.6	121.3	190.8	244.0
1600	156.8	1113.3	91.2	1832.6	48.6	368.4	445.3	88.7	171.4	266.4	348.9
1630	176.5	1249.9	109.9	2269.5	57.7	485.7	600.6	142.9	227.3	320.4	467.5
1700	196.2	1409.2	128.2	2681.0	67.7	609.8	743.6	203.0	281.9	372.8	586.4

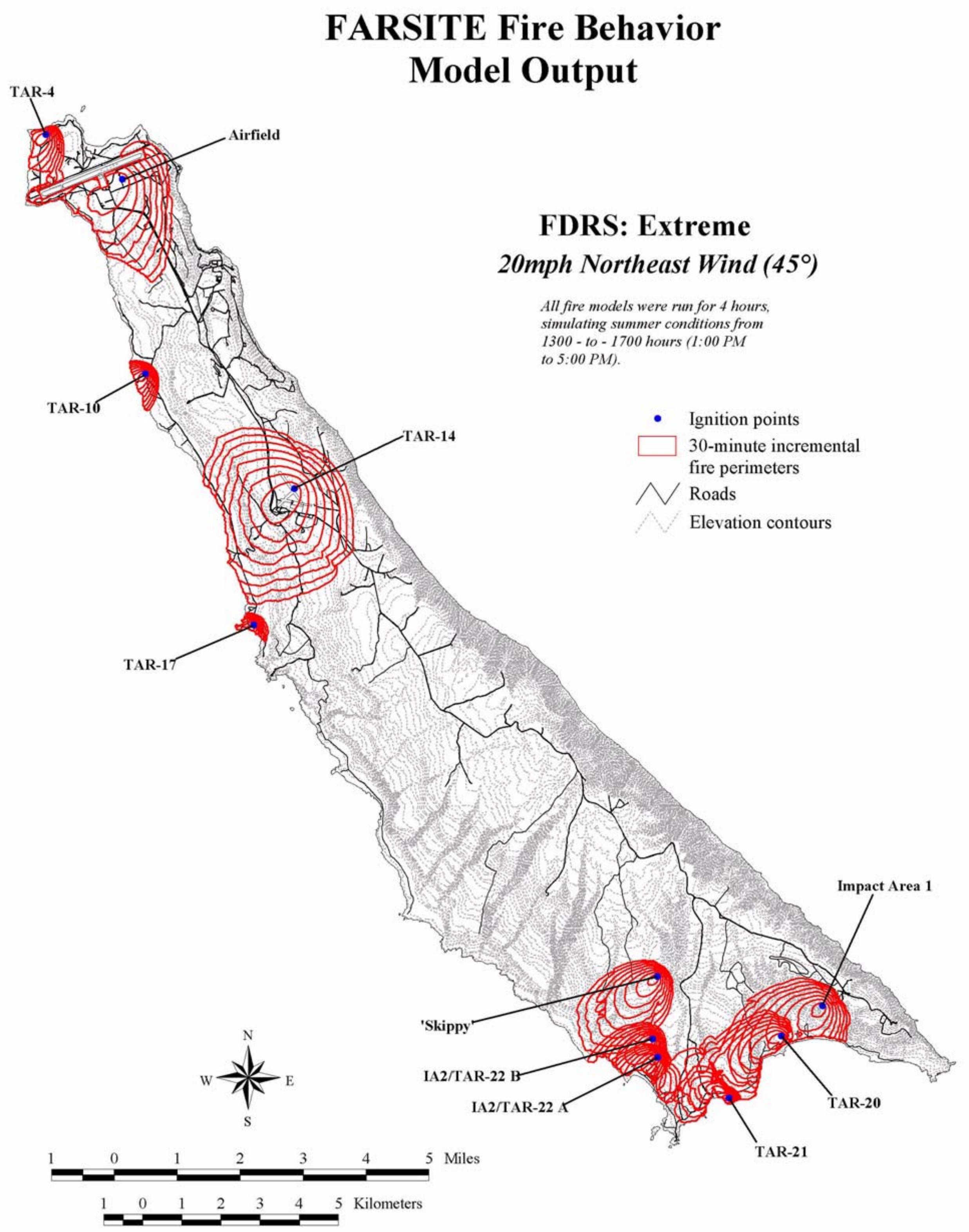
FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	Skippy'
1300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1330	16.5	177.2	8.6	184.1	5.8	27.8	24.0	5.4	8.6	8.4	12.9
1400	54.9	475.0	29.8	503.7	13.0	106.6	123.5	10.4	41.9	45.3	65.7
1430	95.9	672.9	47.1	866.4	24.3	199.5	257.2	19.7	75.6	111.9	159.9
1500	126.8	861.8	63.7	1321.2	33.4	319.9	440.1	32.3	115.3	203.8	286.8
1530	152.5	1017.2	82.4	1810.2	42.0	483.9	638.4	76.2	163.8	265.8	448.1
1600	173.6	1159.2	102.8	2255.9	50.7	666.3	828.6	145.1	222.6	319.9	619.3
1630	215.1	1294.7	122.8	2669.4	60.3	875.5	1028.4	231.5	278.6	377.8	836.9
1700	271.4	1455.4	141.4	3069.5	71.5	1114.4	1269.0	324.9	327.6	446.8	1050.0



FARSITE Fire Behavior
Model Output
TAR-4
Airfield
FDRS: Very High
10mph Northeast Wind (45°)
All fire models were run for 4 hours, simulating summer conditions from 1300 - to - 1700 hours (1:00 PM to 5:00 PM).
TAR-10
Ignition points
30-minute incremental fire perimeters
Roads
Elevation contours
TAR-14
TAR-17
Impact Area 1
'Skippy'
N
W
E
S
IA2/TAR-22 B
IA2/TAR-22 A
TAR-20
TAR-21
1 0 1 2 3 4 5 Miles
1 0 1 2 3 4 5 Kilometers


FARSITE Fire Behavior
Model Output
TAR-4
Airfield
FDRS: Extreme
15mph Northeast Wind (45°)
All fire models were run for 4 hours, simulating summer conditions from 1300 - to - 1700 hours (1:00 PM to 5:00 PM).
TAR-10
TAR-14
Ignition points
30-minute incremental fire perimeters
Roads
Elevation contours
TAR-17
Impact Area 1
'Skippy'
IA2/TAR-22 B
IA2/TAR-22 A
TAR-20
TAR-21
N
W
E
S
1 0 1 2 3 4 5 Miles
1 0 1 2 3 4 5 Kilometers

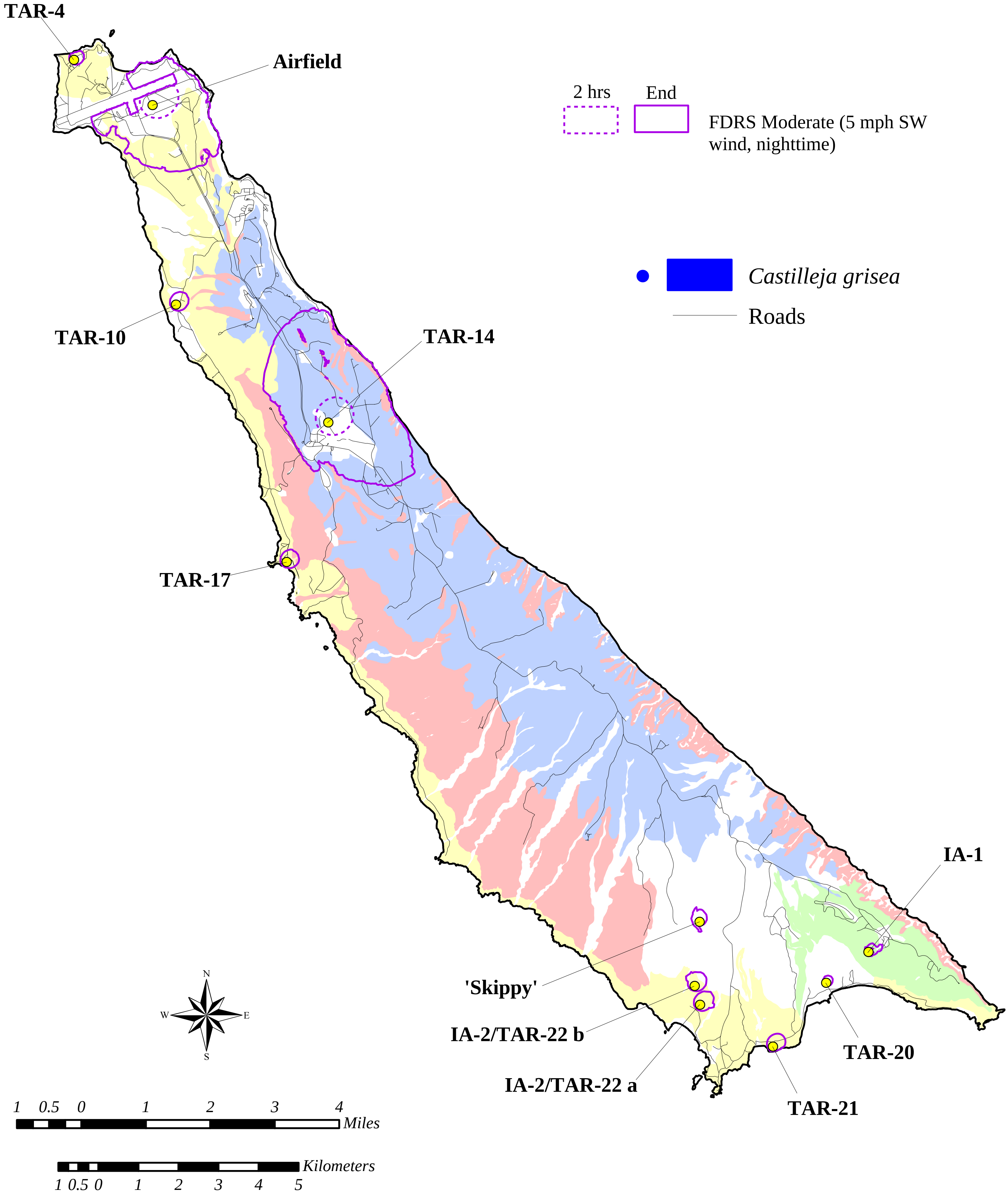


FARSITE Fire Behavior
Model Output
FDRS: Extreme
20mph Northeast Wind (45°)
All fire models were run for 4 hours, simulating summer conditions from 1300 - to - 1700 hours (1:00 PM to 5:00 PM).
Ignition points
30-minute incremental fire perimeters
Roads
Elevation contours
TAR-4
Airfield
TAR-10
TAR-14
TAR-17
Impact Area 1
'Skippy'
IA2/TAR-22 B
IA2/TAR-22 A
TAR-20
TAR-21
N
W
E
S
1 0 1 2 3 4 5 Miles
1 0 1 2 3 4 5 Kilometers

Appendix H: GIS Analysis of Farsite Models and Species Locations on San Clemente Island

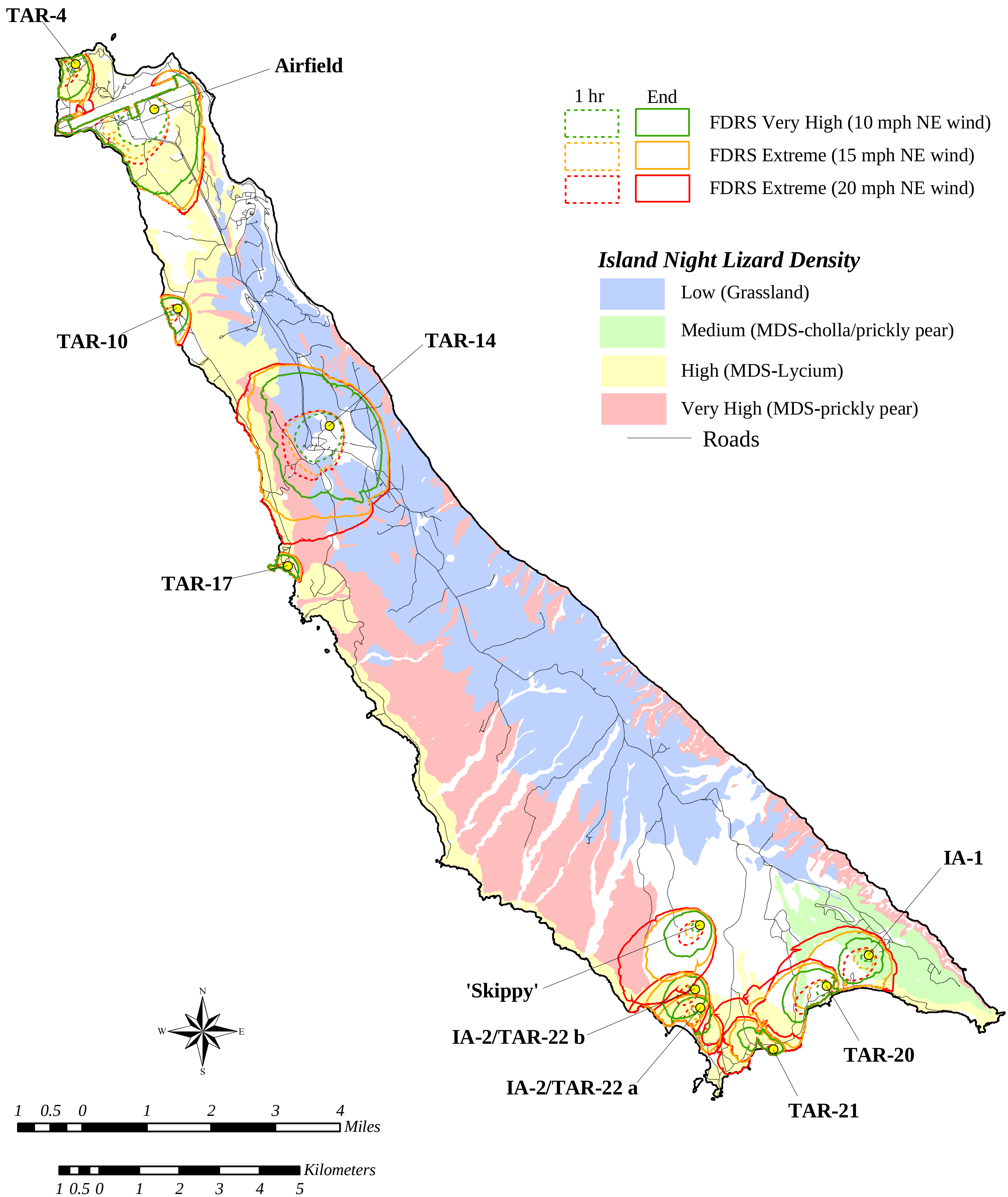
FARSITE Models - Southwest Winds, Nighttime

Island Night Lizards

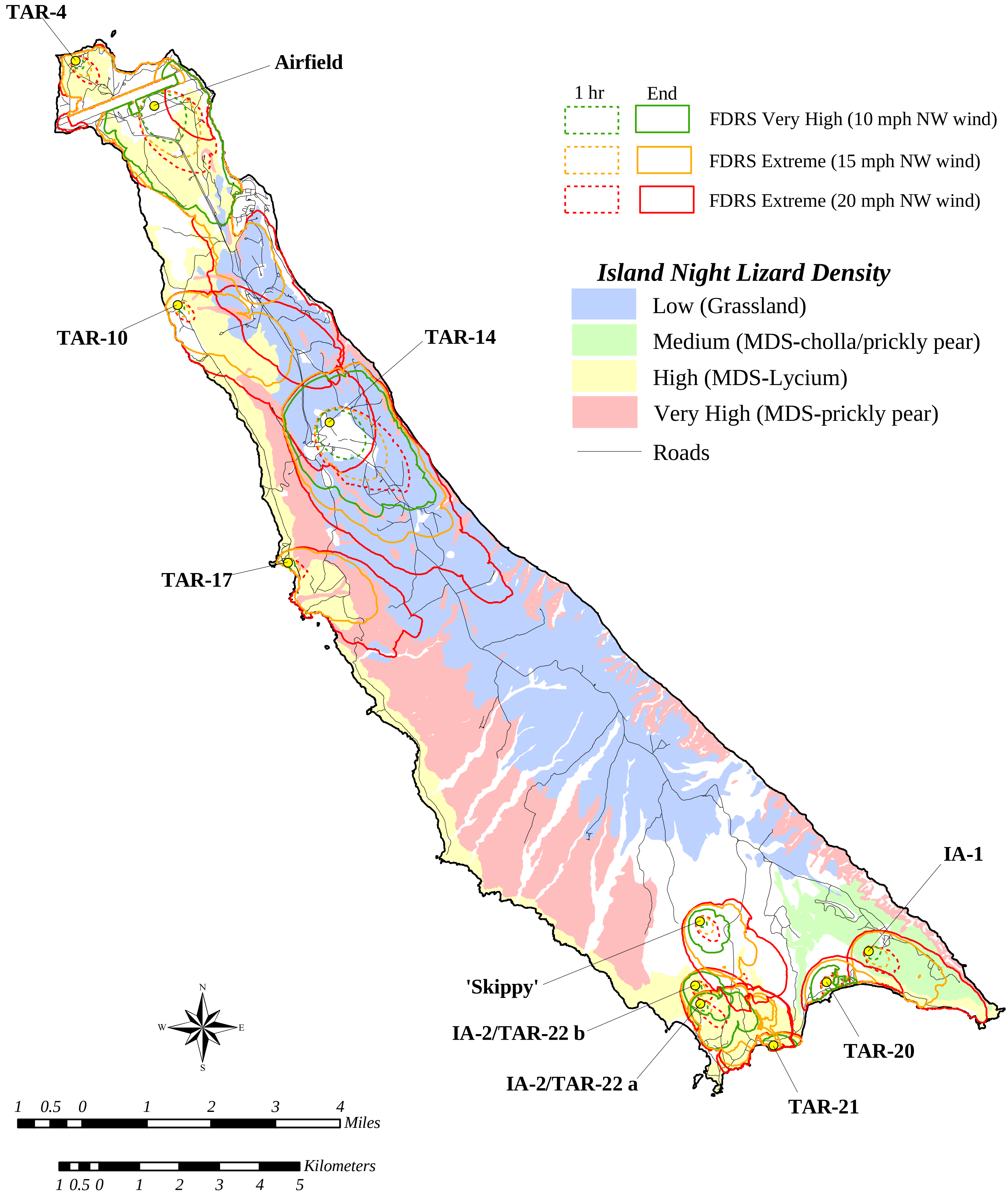


FARSITE Models - Northeast Winds

Island Night Lizards



FARSITE Models - Northwest Winds
Island Night Lizards



Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			2:30	7.9
			3:00	32.2
			3:30	56.9
			4:00	82.1
			4:30	103.4
			5:00	120.4
			5:30	143.5
			6:00	170.1
			6:30	199.7
			7:00	230.2
			7:30	260.1
			8:00	291.6
			8:30	319.7
			9:00	355.1
			9:30	397.4
			10:00	425.5
			10:30	456.1
			11:00	485.1
			11:30	512.9
			12:00	544.3
		4- Very High (MDS-prickly pear)		
			9:30	0.2
			10:00	0.8
			10:30	1.9
			11:00	3.2
			11:30	4.0
			12:00	5.0

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1	**05 mph**	**Southwest Wind**		
		2-Medium (MDS-cholla/prickly pear)		
			0:30	0.4
			1:00	1.7
			1:30	4.1
			2:00	7.5
			2:30	10.9
			3:00	14.2
			3:30	16.8
			4:00	18.3
			4:30	18.9
			5:00	19.4
			5:30	19.4
			6:00	19.7
			6:30	19.8
			7:00	20.2
			7:30	20.2
			8:00	20.3

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			3:00	0.2
			3:30	0.5
			4:00	1.0
			4:30	1.7
			5:00	2.4
			5:30	3.2
			6:00	4.0
			6:30	4.9
			7:00	5.9
			7:30	6.9
			8:00	8.0
			8:30	9.1
			9:00	10.3
			9:30	11.5
			10:00	12.8
			10:30	14.1
			11:00	15.4
			11:30	16.8
			12:00	18.2

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**05 mph**	**Southwest Wind**		
		1-Low (Grassland)		
			0:30	0.3
			1:00	12.9
			1:30	31.6
			2:00	72.2
			2:30	142.4
			3:00	226.6
			3:30	324.1
			4:00	435.5
			4:30	536.3
			5:00	631.1
			5:30	733.0
			6:00	811.2
			6:30	890.3
			7:00	969.2
			7:30	1,076.5
			8:00	1,201.3
			8:30	1,306.1
			9:00	1,400.6
			9:30	1,485.7
			10:00	1,561.4
			10:30	1,634.4
			11:00	1,700.5
			11:30	1,738.3
			12:00	1,793.2
		3-High (MDS-Lycium)		
			9:00	1.6
			9:30	5.9
			10:00	15.5
			10:30	28.0
			11:00	41.7
			11:30	56.3
			12:00	72.3
		4- Very High (MDS-prickly pear)		
			2:30	0.2
			3:00	2.2
			3:30	4.3
			4:00	6.2
			4:30	9.4
			5:00	14.1
			5:30	21.8
			6:00	52.7
			6:30	84.5
			7:00	100.9
			7:30	115.8
			8:00	130.2
			8:30	138.1
			9:00	148.5
			9:30	156.6
			10:00	164.2
			10:30	171.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**05 mph**	**Southwest Wind**		
			11:00	185.7
			11:30	193.7
			12:00	199.2

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			2:30	0.9
			3:00	1.1
			3:30	1.6
			4:00	2.6
			4:30	3.3
			5:00	4.6
			5:30	6.1
			6:00	7.6
			6:30	8.1
			7:00	9.8
			7:30	11.6
			8:00	13.4
			8:30	15.1
			9:00	16.8
			9:30	18.5
			10:00	20.0
			10:30	21.5
			11:00	23.0
			11:30	24.5
			12:00	26.5
		4- Very High (MDS-prickly pear)		
			5:30	0.0
			6:00	0.3
			6:30	0.7
			7:00	1.1
			7:30	1.6
			8:00	2.0
			8:30	2.6
			9:00	3.2
			9:30	3.8
			10:00	4.3
			10:30	4.8
			11:00	5.3
			11:30	5.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			0:30	0.1
			1:00	0.3
			1:30	0.8
			2:00	1.5
			2:30	2.4
			3:00	3.4
			3:30	4.6
			4:00	6.1
			4:30	7.6
			5:00	9.4
			5:30	11.3
			6:00	13.3
			6:30	15.3
			7:00	17.5
			7:30	19.7
			8:00	21.9
			8:30	24.1
			9:00	26.2
			9:30	28.3
			10:00	30.3
			10:30	32.1
			11:00	34.1
			11:30	36.1
			12:00	38.1

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			0:30	0.1
			1:00	0.3
			1:30	0.8
			2:00	1.5
			2:30	2.4
			3:00	3.5
			3:30	4.8
			4:00	6.2
			4:30	7.9
			5:00	9.7
			5:30	11.8
			6:00	14.0
			6:30	16.3
			7:00	18.8
			7:30	21.3
			8:00	23.9
			8:30	26.5
			9:00	29.2
			9:30	31.8
			10:00	34.5
			10:30	37.1
			11:00	39.7
			11:30	42.4
			12:00	45.3

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			0:30	0.1
			1:00	0.4
			1:30	0.8
			2:00	1.6
			2:30	2.5
			3:00	3.6
			3:30	5.0
			4:00	6.6
			4:30	8.4
			5:00	10.2
			5:30	12.0
			6:00	13.7
			6:30	15.3
			7:00	17.0
			7:30	18.6
			8:00	20.1
			8:30	21.7
			9:00	23.2
			9:30	24.6
			10:00	25.1
			10:00	26.0
			10:30	26.4
			10:30	27.2
			11:00	27.6
			11:00	28.4
			11:30	29.0
			11:30	29.2
			11:30	29.9
			12:00	30.3
			12:00	31.2
			12:00	31.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**05 mph**	**Southwest Wind**		
		3-High (MDS-Lycium)		
			2:00	0.0
			2:30	0.4
			3:00	0.9
			3:30	1.6
			4:00	2.4
			4:30	3.3
			5:00	4.3
			5:30	5.1
			6:00	5.7
			6:30	6.4
			7:00	7.0
			7:30	7.5
			8:00	7.9
			8:30	8.1
			9:00	8.3
			10:00	8.3

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			1:00	6.5
			1:30	103.3
			2:00	216.2
			2:30	322.0
			3:00	420.6
			3:30	420.6
			4:00	526.4
	15 mph			
		3-High (MDS-Lycium)		
			1:00	91.9
			1:30	213.8
			2:30	344.0
			3:00	468.9
			3:30	583.1
			4:00	679.3
		4- Very High (MDS-prickly pear)		
			4:00	0.7
	20 mph			
		3-High (MDS-Lycium)		
			0:30	6.2
			1:00	161.2
			1:30	258.5
			2:00	386.9
			2:30	508.4
			3:00	633.5
			3:30	746.0
			4:00	835.0
		4- Very High (MDS-prickly pear)		
			4:00	1.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1		**Northeast Wind**		
	10 mph			
		2-Medium (MDS-cholla/prickly pear)		
			0:30	3.4
			1:00	15.4
			1:30	33.4
			2:00	57.9
			2:30	78.4
			3:00	98.3
			3:30	118.8
			4:00	139.9
	15 mph			
		2-Medium (MDS-cholla/prickly pear)		
			0:30	11.3
			1:00	45.6
			1:30	75.2
			2:00	104.3
			2:30	136.7
			3:00	169.9
			3:30	207.7
			4:00	280.0
		3-High (MDS-Lycium)		
			2:30	0.0
			3:00	3.1
			3:30	6.8
			4:00	10.0
	20 mph			
		2-Medium (MDS-cholla/prickly pear)		
			0:30	23.9
			1:00	62.8
			1:30	97.8
			2:00	136.7
			2:30	218.0
			3:00	282.2
			3:30	348.2
			4:00	413.3
		3-High (MDS-Lycium)		
			2:00	2.7
			2:30	8.2
			3:00	26.5
			3:30	79.1
			4:00	186.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy		**Northeast Wind**		
	15 mph			
		3-High (MDS-Lycium)		
			3:30	0.5
			4:00	5.8
		4- Very High (MDS-prickly pear)		
			4:00	1.5
	20 mph			
		3-High (MDS-Lycium)		
			2:30	1.7
			2:30	0.3
			3:00	37.5
			3:30	91.7
			4:00	175.0
		4- Very High (MDS-prickly pear)		
			3:00	30.2
			3:30	133.7
			4:00	218.8

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-10		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			1:00	0.5
			1:30	5.9
			2:00	10.4
			2:30	15.2
			3:00	20.2
			3:30	25.0
	15 mph			
		3-High (MDS-Lycium)		
			1:00	5.1
			1:30	9.6
			2:00	14.7
			2:30	20.5
			3:00	26.3
			3:30	31.9
			4:00	37.1
	20 mph			
		3-High (MDS-Lycium)		
			0:30	0.7
			1:00	6.4
			1:30	10.8
			2:00	16.3
			2:30	22.2
			3:00	28.1
			3:30	33.6
			4:00	39.5

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14		**Northeast Wind**		
	10 mph			
		1-Low (Grassland)		
			0:30	8.7
			1:00	98.5
			1:30	222.3
			2:00	330.9
			2:30	475.0
			3:00	638.3
			3:30	791.5
			4:00	967.3
		3-High (MDS-Lycium)		
			3:00	2.7
			3:30	15.7
			4:00	32.9
		4- Very High (MDS-prickly pear)		
			1:00	0.0
			1:30	30.1
			2:00	88.5
			2:30	157.6
			3:00	225.3
			3:30	283.3
			4:00	344.3
	15 mph			
		1-Low (Grassland)		
			0:30	35.8
			1:00	173.4
			1:30	286.3
			2:00	436.8
			2:30	637.6
			3:00	719.6
			3:30	1,073.1
			4:00	1,297.9
		3-High (MDS-Lycium)		
			2:30	10.3
			3:00	81.7
			3:30	204.0
			4:00	325.9
		4- Very High (MDS-prickly pear)		
			1:00	39.4
			1:30	142.8
			2:00	254.9
			2:30	374.2
			3:00	466.3
			3:30	540.4
			4:00	602.8
	20 mph			
		1-Low (Grassland)		
			0:30	63.7

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-14		**Northeast Wind**		
			1:00	188.6
			1:30	312.8
			2:00	489.5
			2:30	709.4
			3:00	927.3
			3:30	1,106.9
			4:00	1,389.4
		3-High (MDS-Lycium)		
			2:00	58.6
			2:30	187.5
			3:00	300.7
			3:30	393.7
			4:00	478.8
		4- Very High (MDS-prickly pear)		
			0:30	3.7
			1:00	111.9
			1:30	269.2
			2:00	407.1
			2:30	495.9
			3:00	575.3
			3:30	659.9
			4:00	736.1

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	1.2
			1:00	4.9
			1:30	8.6
			2:00	14.0
			2:30	21.7
			3:00	29.2
			3:30	36.1
			4:00	41.7
		4- Very High (MDS-prickly pear)		
			3:30	0.0
			4:00	1.1
	15 mph			
		3-High (MDS-Lycium)		
			0:30	3.1
			1:00	7.1
			1:30	13.6
			2:00	21.2
			2:30	29.1
			3:30	43.7
			4:00	49.3
		4- Very High (MDS-prickly pear)		
			3:00	0.0
			3:30	2.2
			4:00	6.4
	20 mph			
		3-High (MDS-Lycium)		
			0:30	3.8
			1:00	8.4
			1:30	18.7
			2:00	25.5
			2:30	33.3
			3:00	41.9
			3:30	44.8
			4:00	51.3
		4- Very High (MDS-prickly pear)		
			3:00	0.1
			3:30	3.5
			4:00	7.8

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20		**Northeast Wind**		
	10 mph			
		2-Medium (MDS-cholla/prickly pear)		
			2:30	24.9
			3:00	36.2
			3:30	40.9
			4:00	43.4
		3-High (MDS-Lycium)		
			3:00	0.4
			3:30	6.2
			4:00	15.8
	15 mph			
		2-Medium (MDS-cholla/prickly pear)		
			1:30	22.5
			2:00	34.5
			2:30	40.0
			3:00	43.1
			3:30	46.5
			4:00	50.0
		3-High (MDS-Lycium)		
			2:00	9.1
			2:30	34.5
			3:00	83.0
			3:30	156.3
			4:00	233.5
	20 mph			
		2-Medium (MDS-cholla/prickly pear)		
			1:00	17.5
			1:30	31.6
			2:00	38.6
			2:30	42.4
			3:00	46.2
			3:30	50.2
			4:00	54.9
		3-High (MDS-Lycium)		
			1:30	22.3
			2:00	82.4
			2:30	192.3
			3:00	268.2
			3:30	464.8
			4:00	655.4

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-21		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	2.0
			1:00	7.0
			1:30	11.1
			2:00	18.5
			2:30	28.5
			3:00	41.4
			3:30	68.3
			4:00	99.5
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.2
			1:00	8.7
			1:30	15.4
			2:00	26.3
			2:30	43.2
			3:00	86.4
			3:30	139.7
			4:00	198.0
	20 mph			
		3-High (MDS-Lycium)		
			0:30	5.2
			1:00	10.0
			1:30	18.6
			2:00	30.6
			3:00	142.2
			3:30	148.6
			4:00	155.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-22 A		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	2.1
			1:00	10.4
			1:30	24.8
			2:00	46.4
			2:30	72.4
			3:00	94.5
			3:30	97.6
			4:00	121.7
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.9
			1:00	23.8
			1:30	55.8
			2:00	85.9
			2:30	115.5
			3:00	161.0
			3:30	190.5
			4:00	240.9
	20 mph			
		3-High (MDS-Lycium)		
			0:30	8.6
			1:00	41.6
			1:30	74.1
			2:00	111.3
			2:30	154.2
			3:00	179.5
			3:30	261.8
			4:00	304.4

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	1.8
			1:00	9.1
			1:30	20.6
			1:30	19.6
			2:00	43.9
			2:30	75.0
			3:00	113.5
			3:30	157.8
			4:00	202.3
			4:00	203.7
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.6
			1:00	20.8
			1:30	58.1
			2:00	113.4
			2:30	184.7
			3:00	255.5
			3:30	258.7
			3:30	260.4
			3:30	284.2
			3:30	301.7
			4:00	340.7
			4:00	303.5
			4:00	304.8
			4:00	324.7
	20 mph			
		3-High (MDS-Lycium)		
			0:30	8.1
			1:00	41.0
			1:30	106.7
			2:00	197.4
			2:30	232.8
			2:30	255.4
			3:00	284.0
			3:00	304.9
			3:30	309.5
			3:30	326.9
			3:30	307.9
			4:00	330.3
			4:00	362.5
			4:00	380.3
			4:00	329.1
		4- Very High (MDS-prickly pear)		
			4:00	0.1

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4		**Northeast Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	0.2
			1:00	8.7
			1:30	27.2
			2:00	45.6
			2:30	63.3
			3:00	85.3
			3:30	107.5
			4:00	127.8
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.0
			1:00	28.6
			1:30	55.6
			2:00	84.5
			2:30	112.0
			3:00	133.8
			3:30	152.4
			4:00	170.0
	20 mph			
		3-High (MDS-Lycium)		
			0:30	11.3
			1:00	44.0
			1:30	79.7
			2:00	107.1
			2:30	130.4
			3:00	149.7
			3:30	168.3
			4:00	186.1

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield		**Northwest Wind**		
	10 mph			
		1-Low (Grassland)		
			3:00	21.4
			3:30	33.6
			4:00	53.1
		3-High (MDS-Lycium)		
			1:00	46.9
			1:30	215.9
			2:00	428.6
			2:30	596.5
			3:00	754.4
			3:30	860.9
			4:00	974.1
		4- Very High (MDS-prickly pear)		
			2:00	4.3
			2:30	10.6
			3:00	14.0
			3:30	14.2
			4:00	14.3
	15 mph			
		1-Low (Grassland)		
			2:00	27.8
			2:30	55.8
			3:00	67.7
			3:30	260.8
			4:00	505.5
		3-High (MDS-Lycium)		
			0:30	9.3
			1:00	199.4
			1:30	494.2
			2:00	729.5
			2:30	892.4
			3:00	897.0
			3:30	977.4
			4:00	1,031.5
		4- Very High (MDS-prickly pear)		
			1:30	9.5
			2:00	14.0
			2:30	14.4
			3:00	22.5
			3:30	30.9
			4:00	43.2
	20 mph			
		1-Low (Grassland)		
			1:30	31.2
			2:00	65.2
			2:30	212.1
			3:00	572.7
			3:30	1,062.5

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield		**Northwest Wind**		
			4:00	1,470.5
		3-High (MDS-Lycium)		
			0:30	42.3
			1:00	378.2
			1:30	669.1
			2:00	883.2
			2:30	884.7
			3:00	928.6
			3:30	1,038.5
			4:00	1,148.0
		4- Very High (MDS-prickly pear)		
			1:00	6.9
			1:30	14.0
			2:00	16.8
			2:30	30.9
			3:00	42.9
			3:30	70.0
			4:00	139.7

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
Impact Area 1		**Northwest Wind**		
	10 mph			
		2-Medium (MDS-cholla/prickly pear)		
			0:30	5.8
			1:00	21.5
			1:30	43.6
			2:00	80.2
			2:30	113.1
			3:00	151.5
			3:30	193.3
			4:00	231.2
		3-High (MDS-Lycium)		
			4:00	1.2
	15 mph			
		2-Medium (MDS-cholla/prickly pear)		
			0:30	12.8
			1:00	54.6
			1:30	113.9
			2:00	179.0
			2:30	252.2
			3:00	326.9
			3:30	427.9
			4:00	505.1
		3-High (MDS-Lycium)		
			2:00	0.7
			2:30	19.1
			3:00	35.8
			3:30	52.6
			4:00	75.6
	20 mph			
		2-Medium (MDS-cholla/prickly pear)		
			0:30	25.4
			1:00	105.2
			1:30	214.1
			2:00	326.6
			2:30	446.4
			3:00	554.4
			3:30	639.9
			4:00	697.4
		3-High (MDS-Lycium)		
			1:30	16.7
			2:00	54.4
			2:30	92.6
			3:00	112.8
			3:30	131.5
			4:00	162.2
		4- Very High (MDS-prickly pear)		
			3:30	0.0
			4:00	2.7

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy		**Northwest Wind**		
	15 mph			
		3-High (MDS-Lycium)		
			3:00	0.7
			4:00	10.2
	20 mph			
		3-High (MDS-Lycium)		
			2:00	1.7
			2:30	9.4
			3:00	18.8
			3:30	50.8
			4:00	124.3

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10		**Northwest Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			1:00	3.0
			1:30	8.6
			2:00	15.5
			2:30	31.8
			3:00	54.2
			3:30	85.2
			4:00	141.1
		4- Very High (MDS-prickly pear)		
			3:00	0.6
			3:30	2.3
			4:00	4.9
	15 mph			
		1-Low (Grassland)		
			3:00	45.7
			3:30	106.8
			4:00	321.7
		3-High (MDS-Lycium)		
			0:30	1.0
			1:00	7.9
			1:30	24.4
			2:00	59.5
			2:30	124.0
			3:00	240.9
			3:30	436.4
			4:00	592.3
		4- Very High (MDS-prickly pear)		
			2:00	0.4
			2:30	2.3
			3:00	9.4
			3:30	10.0
			4:00	33.1
	20 mph			
		1-Low (Grassland)		
			2:00	0.5
			2:30	81.3
			3:00	352.4
			3:30	1,006.2
			4:00	1,557.6
		3-High (MDS-Lycium)		
			0:30	2.7
			1:00	16.5
			1:30	60.0
			2:00	168.9
			2:30	387.2
			3:00	606.1
			3:30	668.6
			4:00	721.0

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10		**Northwest Wind**		
		4- Very High (MDS-prickly pear)		
			1:30	0.0
			2:00	2.1
			2:30	12.9
			3:00	38.3
			3:30	114.7
			4:00	211.8

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-14		**Northwest Wind**		
	10 mph			
		1-Low (Grassland)		
			0:30	0.6
			1:00	30.2
			1:30	293.8
			2:00	683.7
			2:30	983.9
			3:00	1,178.5
			3:30	1,350.8
			4:00	1,519.7
		4- Very High (MDS-prickly pear)		
			1:30	2.7
			2:00	11.0
			2:30	35.4
			3:00	69.3
			3:30	87.5
			4:00	124.9
	15 mph			
		1-Low (Grassland)		
			0:30	1.8
			1:00	243.9
			1:30	734.0
			2:00	892.1
			2:30	1,167.4
			3:00	1,422.2
			3:30	1,681.2
			4:00	1,960.2
		4- Very High (MDS-prickly pear)		
			1:00	0.7
			1:30	15.9
			2:00	212.4
			2:30	264.8
			3:00	309.9
			3:30	358.0
			4:00	403.8
	20 mph			
		1-Low (Grassland)		
			0:30	4.8
			1:00	498.1
			1:30	934.3
			2:00	1,282.5
			2:30	1,662.3
			3:00	2,050.9
			3:30	2,510.2
			4:00	3,036.3
		4- Very High (MDS-prickly pear)		
			1:00	4.7
			1:30	38.2
			2:00	79.1

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14		**Northwest Wind**		
			2:30	127.5
			3:00	179.9
			3:30	227.8
			4:00	292.3

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-17		**Northwest Wind**		
	10 mph			
		1-Low (Grassland)		
			3:30	0.1
			4:00	2.3
		3-High (MDS-Lycium)		
			0:30	0.3
			1:00	4.7
			1:30	14.6
			2:00	24.7
			2:30	28.5
			3:00	141.2
			3:30	219.4
			4:00	260.0
		4- Very High (MDS-prickly pear)		
			1:30	0.6
			2:00	7.2
			2:30	14.5
			3:00	21.5
			3:30	48.1
			4:00	84.5
	15 mph			
		1-Low (Grassland)		
			2:30	0.5
			3:00	3.6
			3:30	8.7
			4:00	19.2
		3-High (MDS-Lycium)		
			0:30	1.8
			1:00	14.1
			1:30	40.2
			2:00	167.4
			2:30	262.6
			3:00	315.7
			3:30	371.4
			4:00	408.5
		4- Very High (MDS-prickly pear)		
			1:00	0.8
			1:30	8.5
			2:00	23.1
			2:30	67.3
			3:00	129.5
			3:30	203.7
			4:00	292.6
	20 mph			
		1-Low (Grassland)		
			2:00	0.0
			2:30	2.9
			3:00	11.1
			3:30	54.9

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17		**Northwest Wind**		
			4:00	242.3
		3-High (MDS-Lycium)		
			0:30	4.8
			1:00	25.0
			1:30	214.2
			2:00	287.3
			2:30	370.0
			3:00	414.0
			3:30	432.0
			4:00	439.5
		4- Very High (MDS-prickly pear)		
			1:00	4.3
			1:30	24.0
			2:00	71.7
			2:30	169.7
			3:00	307.4
			3:30	464.6
			4:00	576.4

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20		**Northwest Wind**		
	15 mph			
		3-High (MDS-Lycium)		
			4:00	0.4
	20 mph			
		2-Medium (MDS-cholla/prickly pear)		
			3:30	3.4
			4:00	31.6
		3-High (MDS-Lycium)		
			3:00	0.9
			3:30	14.1
			4:00	32.3

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21		**Northwest Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	2.0
			1:00	8.0
			1:30	13.4
			2:00	19.2
			2:30	25.9
			3:00	33.4
			3:30	41.6
			4:00	51.9
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.5
			1:00	10.8
			1:30	17.9
			2:00	26.5
			2:30	36.5
			3:00	47.1
			4:00	61.7
	20 mph			
		3-High (MDS-Lycium)		
			0:30	5.6
			1:00	12.1
			1:30	20.3
			2:00	30.4
			2:30	41.3
			3:00	52.8
			3:30	67.1
			4:00	81.6

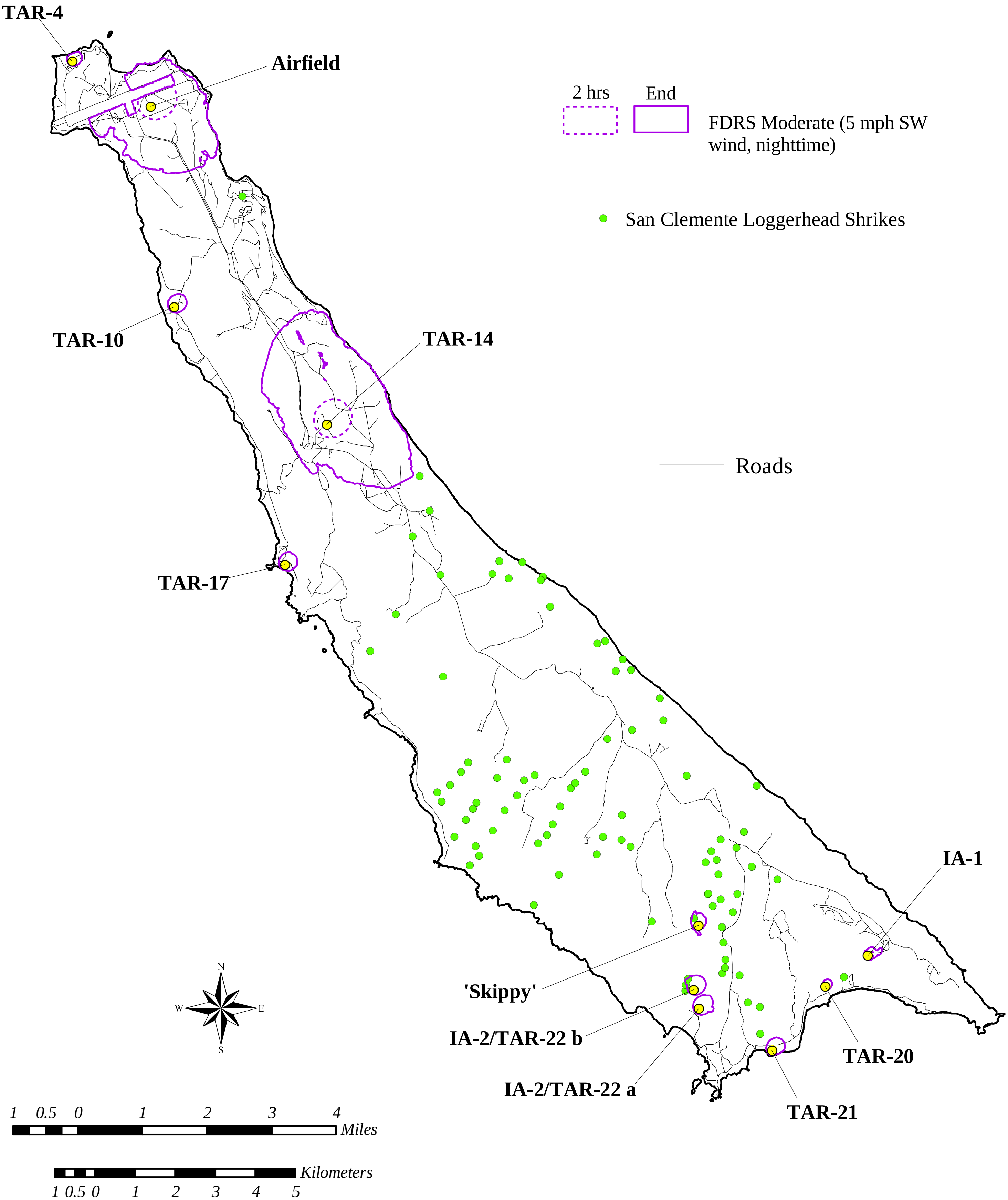
Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A		**Northwest Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	2.1
			1:00	10.4
			1:30	23.4
			2:00	42.5
			2:30	117.8
			3:00	195.4
			3:30	284.3
			4:00	381.2
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.8
			1:00	20.3
			1:30	89.6
			2:00	195.4
			2:30	210.3
			3:00	369.2
			3:30	501.7
			4:00	651.3
	20 mph			
		3-High (MDS-Lycium)		
			0:30	8.5
			1:00	58.9
			1:30	183.3
			2:00	198.0
			2:30	521.6
			3:00	572.8
			3:30	751.2
			4:00	815.0

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B		**Northwest Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			0:30	2.0
			1:00	10.0
			1:30	25.4
			2:00	47.5
			2:30	70.6
			3:00	94.9
			3:30	112.9
			4:00	181.8
	15 mph			
		3-High (MDS-Lycium)		
			0:30	4.7
			1:00	24.0
			1:30	57.8
			2:00	91.4
			2:30	189.2
			3:00	207.7
			3:30	346.1
			4:00	480.0
	20 mph			
		3-High (MDS-Lycium)		
			0:30	8.5
			1:00	43.0
			1:30	94.1
			2:00	254.2
			2:30	466.4
			3:00	568.4
			3:30	725.8
			4:00	929.5

Fire ID	Wind Speed	Night Lizard Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4		**Northwest Wind**		
	10 mph			
		3-High (MDS-Lycium)		
			1:00	22.4
			2:00	54.2
			2:30	95.8
			3:00	144.7
			3:30	199.9
	15 mph			
		3-High (MDS-Lycium)		
			0:30	0.0
			1:00	25.3
			1:30	80.9
			2:30	182.9
			3:00	218.1
			3:30	241.5
			4:00	257.0
	20 mph			
		3-High (MDS-Lycium)		
			0:30	5.7
			1:00	62.8
			1:30	166.6
			2:00	167.1
			2:30	272.4
			3:00	298.2
			3:30	373.9
			4:00	480.5

FARSITE Models - Southwest Winds, Nighttime

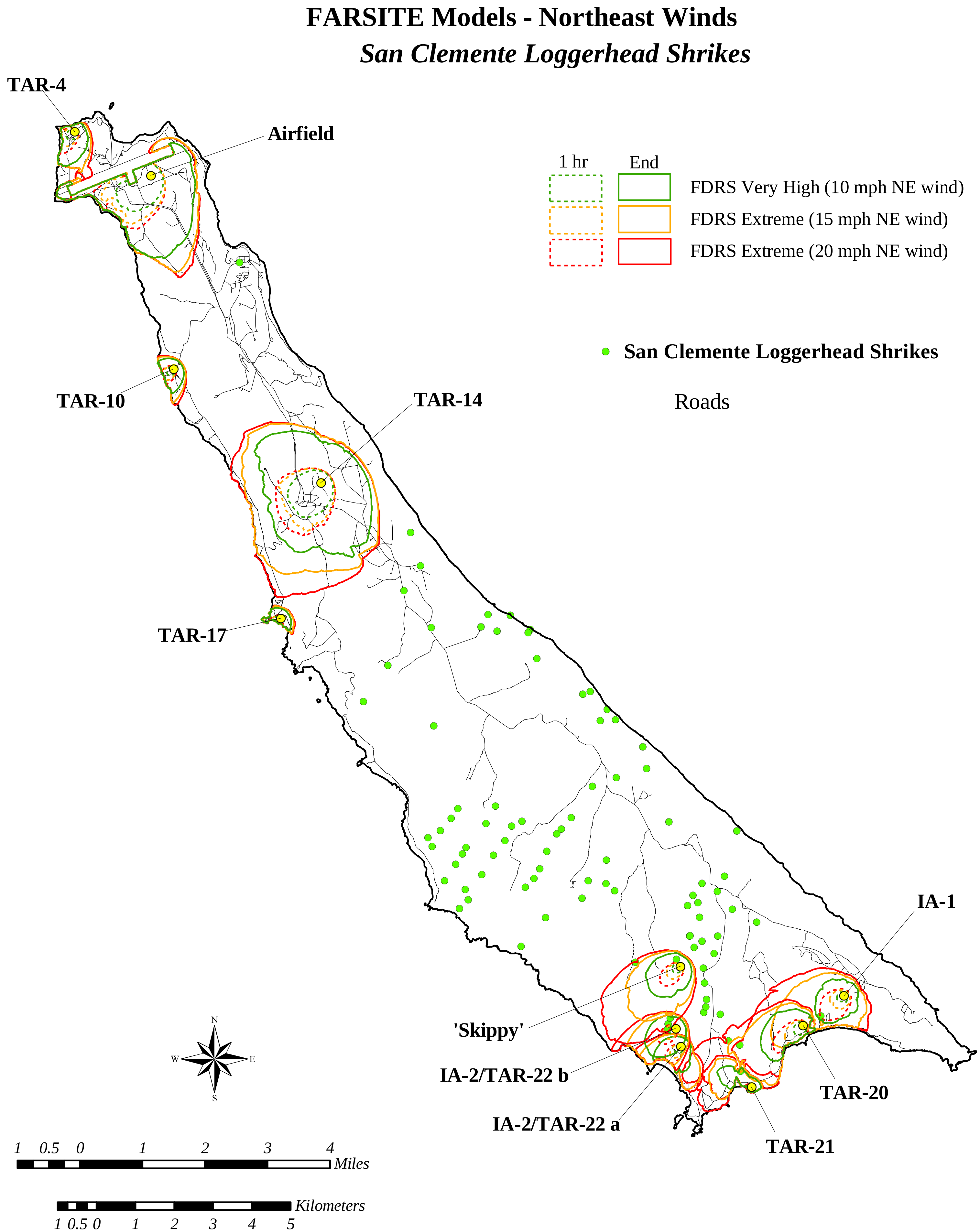
San Clemente Loggerhead Shrikes



Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 2-hour Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	1
2:00	0	0	0	0	0	0	0	0	0	0	1
4:00	0	0	0	0	0	0	0	0	0	0	1
6:00	0	0	0	0	0	0	0	0	0	1	1



FARSITE Models - Northeast Winds
San Clemente Loggerhead Shrikes
TAR-4
Airfield
1 hr
End
FDRS Very High (10 mph NE wind)
FDRS Extreme (15 mph NE wind)
FDRS Extreme (20 mph NE wind)
San Clemente Loggerhead Shrikes
Roads
TAR-10
TAR-14
TAR-17
IA-1
'Skippy'
IA-2/TAR-22 b
IA-2/TAR-22 a
TAR-20
TAR-21
N
W
E
S
1 0.5 0 1 2 3 4
Miles
Kilometers
1 0.5 0 1 2 3 4 5

FARSITE Fire Behavior Model Outputs *Loggerhead Shrike Nests*

Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	1	0	0
1500	0	0	0	0	0	0	0	0	2	0	1
1530	0	0	0	0	0	0	0	0	2	0	1
1600	0	0	0	0	0	0	0	0	2	0	1
1630	0	0	0	0	0	0	0	1	3	0	1
1700	0	0	0	0	0	0	1	1	3	0	1

FDRS Extreme, 15 mph NE (45°) wind

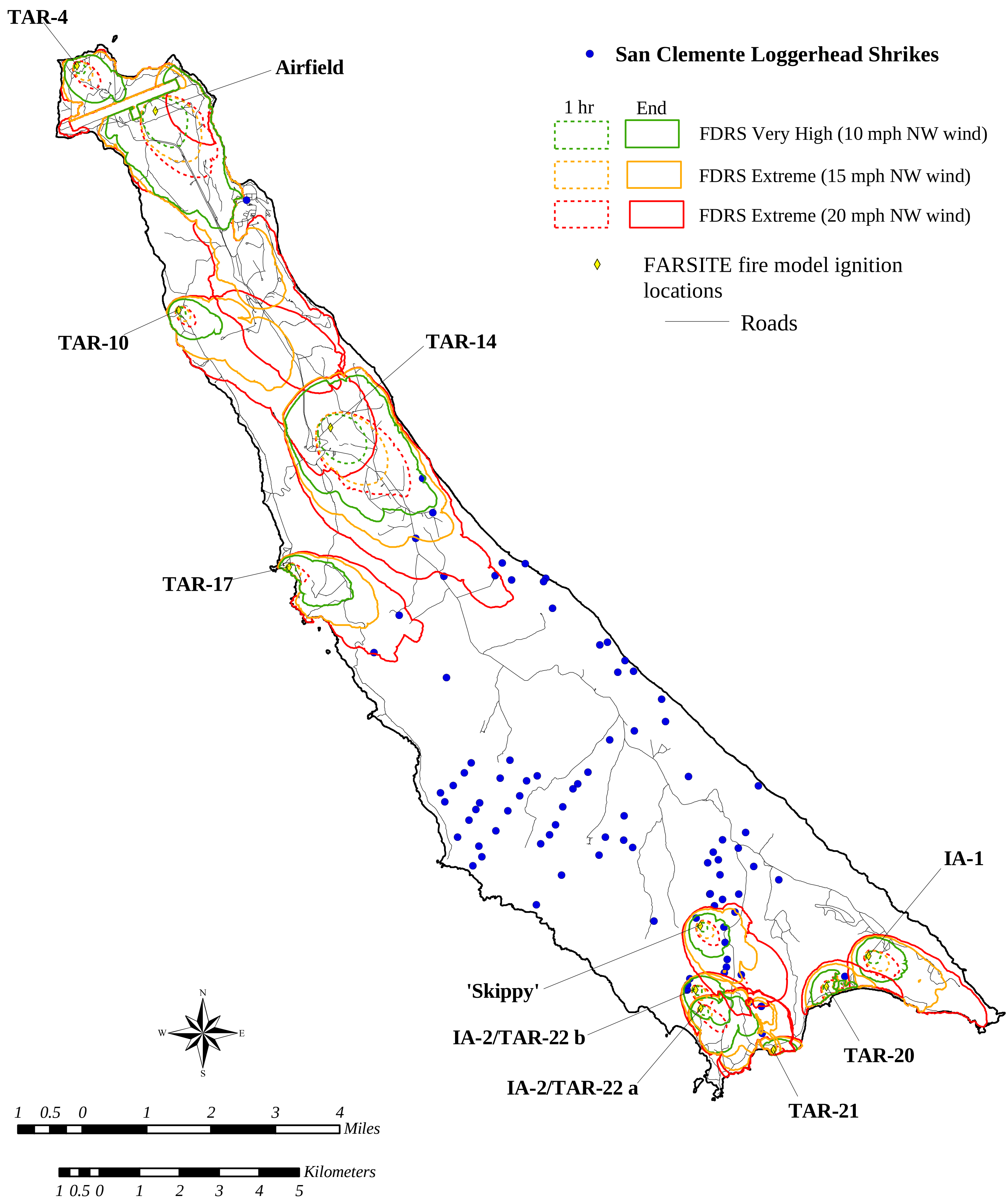
	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	1	0	0
1430	0	0	0	0	0	0	0	0	1	0	0
1500	0	0	0	0	0	0	1	0	2	0	1
1530	0	0	0	0	0	0	1	0	2	0	1
1600	0	0	0	0	0	0	1	1	3	0	1
1630	0	0	0	0	0	0	1	1	3	0	1
1700	0	0	0	0	0	2	1	1	3	0	1

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	1	0	1	0	0
1430	0	0	0	0	0	0	1	0	2	0	0
1500	0	0	0	0	0	0	1	0	3	0	1
1530	0	0	0	0	0	0	1	0	3	0	1
1600	0	0	0	0	0	2	1	1	3	0	1
1630	0	0	0	0	0	3	1	1	3	0	3
1700	0	0	0	0	0	3	2	1	3	0	5

FARSITE Models - Northwest Winds

San Clemente Loggerhead Shrikes



Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	2	0	0
1630	0	0	0	1	0	0	0	0	2	0	1
1700	0	0	0	1	0	0	0	0	3	0	3

FDRS Extreme, 15 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	1
1530	0	0	0	1	0	0	0	0	0	0	3
1600	0	0	0	2	0	0	0	0	1	0	6
1630	0	0	0	2	0	0	0	0	1	2	6
1700	0	0	0	2	0	1	0	0	3	2	8

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	1
1500	0	0	0	2	0	0	0	0	0	0	4
1530	0	0	0	2	0	0	0	0	1	0	5
1600	0	0	0	3	0	1	0	0	4	1	7
1630	0	0	0	3	0	1	0	0	5	2	7
1700	0	0	0	4	2	1	0	0	5	2	9

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Skippy	**05 mph**	**Southwest Wind**		
		MDS/Grassland Complex, mixed soils		
			0:30	0.2
			1:00	0.9
			1:30	2.0
			2:00	3.6
			2:30	5.3
			3:00	7.3
			3:30	9.5
			4:00	11.7
			4:30	13.8
			5:00	15.6
			5:30	17.5
			6:00	19.6
			6:30	21.6
			7:00	23.2
			7:30	25.1
			8:00	25.8
			8:30	25.9
		MSS-canyon walls and escarpments		
			9:00	0.2
			9:30	0.9
			10:00	2.4
			10:30	3.8
			11:00	5.0
			11:30	5.3
			12:00	5.6
			12:30	6.0
			13:00	6.3
			13:30	6.3

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Airfield	**10 mph**	**Northeast Wind**		
		Active Sand Dunes		
			2:30	0.3
			3:00	1.3
			3:30	1.7
			4:00	2.1
		Coastal strand		
			2:00	2.1
			2:30	3.3
			3:00	3.4
			3:30	3.8
			4:00	4.0
		Disturbed/developed		
			0:30	57.3
			1:00	234.6
			1:30	336.1
			2:00	411.1
			2:30	447.7
			3:00	476.4
			3:30	495.9
			4:00	519.1
		Maritime sage scrub		
			2:00	2.7
			2:30	3.7
			3:00	6.1
			3:30	6.1
			4:00	6.2
		MDS-boxthorn/grassland on clay		
			1:00	4.6
			1:30	79.0
			2:00	159.4
			2:30	249.4
			3:00	339.3
			3:30	468.1
			4:00	520.2
		MDS-fine loamy alkali terrace flats		
			1:00	2.0
			1:30	24.3
			2:00	56.9
			2:30	78.1
			3:00	96.9
			3:30	118.8
			4:00	138.0
		Stabilized sand dunes		
			4:00	0.2

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Airfield	**15 mph**	**Northeast Wind**		
		Active Sand Dunes		
			2:00	1.2
			2:30	2.1
			3:00	3.0
		Coastal strand		
			1:30	3.0
			2:00	3.4
			2:30	3.9
			3:00	4.3
		Disturbed/developed		
			0:30	113.9
			1:00	284.8
			1:30	393.9
			2:00	446.7
			2:30	477.0
			3:00	492.9
			3:30	514.5
			4:00	571.6
		Maritime sage scrub		
			1:30	0.5
			2:00	4.3
			2:30	6.1
			3:30	6.2
			4:00	9.1
		MDS/Grassland Complex, mixed soils		
			4:00	0.7
		MDS-boxthorn/grassland on clay		
			1:00	62.5
			1:30	142.8
			2:00	241.4
			2:30	351.4
			3:00	462.4
			3:30	565.7
			4:00	658.2
		MDS-fine loamy alkali terrace flats		
			1:00	29.4
			1:30	71.0
			2:00	95.9
			2:30	127.6
			3:00	143.6
			3:30	144.3
			4:00	149.9
		Stabilized sand dunes		
			3:00	0.4
			3:30	11.2
			4:00	11.7

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**20 mph**	**Northeast Wind**		
		Active Sand Dunes		
			1:30	1.0
			2:00	1.9
			2:30	3.0
		Coastal strand		
			1:00	2.4
			1:30	3.4
			2:00	4.2
			2:30	4.4
		Disturbed/developed		
			0:30	171.0
			1:00	311.6
			1:30	406.1
			2:00	454.8
			2:30	477.6
			3:00	492.9
			3:30	513.2
			4:00	577.6
		Maritime sage scrub		
			1:30	3.2
			2:00	6.1
			2:30	6.1
			3:30	6.3
			4:00	8.9
		MDS/Grassland Complex, mixed soils		
			4:00	1.9
		MDS-boxthorn/grassland on clay		
			0:30	2.1
			1:00	98.2
			1:30	168.9
			2:00	288.8
			2:30	383.2
			3:00	460.7
			3:30	603.5
			4:00	686.1
		MDS-fine loamy alkali terrace flats		
			0:30	4.1
			1:00	63.0
			1:30	89.6
			2:00	123.0
			2:30	141.3
			3:00	141.8
			3:30	148.6
			4:00	157.2
		Stabilized sand dunes		
			2:30	0.4
			3:00	13.1
			3:30	13.7
			4:00	14.2

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1	**10 mph**	**Northeast Wind**		
		Coastal salt marsh		
			4:00	0.1
		MDS/Grassland Complex, mixed soils		
			2:00	0.0
			2:30	0.8
			3:00	2.1
			3:30	3.5
			4:00	5.7
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	3.4
			1:00	15.4
			1:30	33.4
			2:00	58.6
			2:30	92.8
			3:00	132.0
			3:30	178.8
			4:00	237.0

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1	**15 mph**	**Northeast Wind**		
		Coastal salt marsh		
			2:00	0.5
			2:30	58.0
			3:00	58.5
			3:30	66.1
		Coastal strand		
			2:00	0.5
			2:30	2.1
			3:00	2.8
			3:30	3.2
			4:00	3.7
		MDS/Grassland Complex, mixed soils		
			2:00	0.6
			2:30	1.9
			3:00	3.8
			3:30	9.2
			4:00	32.5
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	11.3
			1:00	47.3
			1:30	118.4
			2:00	170.7
			2:30	263.6
			3:00	378.6
			3:30	513.3
			4:00	632.6

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Impact Area 1	**20 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			3:30	0.2
			4:00	4.0
		Coastal salt marsh		
			1:30	3.6
			2:00	11.7
		Coastal strand		
			1:30	1.4
			2:00	7.4
			2:30	8.7
			3:00	9.1
			3:30	9.4
			4:00	9.5
		MDS/Grassland Complex, mixed soils		
			1:30	0.2
			2:00	1.3
			2:30	10.7
			3:00	84.2
			3:30	162.7
			4:00	293.2
		MDS-boxthorn/grassland on clay		
			3:30	2.3
			4:00	9.0
		MDS-fine loamy alkali terrace flats		
			3:00	13.5
			3:30	59.3
			4:00	115.0
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	24.0
			1:00	123.5
			1:30	192.6
			2:00	410.4
			2:30	600.3
			3:00	700.2
			3:30	773.0
			4:00	815.7
		MSS-canyon walls and escarpments		
			4:00	0.9

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy	**10 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			4:00	0.1
		MDS/Grassland Complex, mixed soils		
			0:30	2.5
			1:00	10.7
			1:30	27.9
			2:00	54.7
			2:30	90.5
			3:00	132.2
			3:30	178.4
			4:00	228.0
		MSS-canyon walls and escarpments		
			0:30	0.2
			1:00	2.7
			1:30	4.6
			2:00	7.4
			2:30	10.4
			3:00	14.1
			3:30	17.9
			4:00	21.4

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy	**15 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			3:00	0.8
			3:30	1.5
			4:00	3.8
		MDS/Grassland Complex, mixed soils		
			0:30	4.9
			1:00	29.0
			1:30	75.2
			2:00	141.8
			2:30	221.3
			3:00	314.8
			3:30	420.2
			4:00	477.2
		MDS-fine loamy alkali terrace flats		
			3:30	0.9
			4:00	8.7
		MSS-canyon walls and escarpments		
			0:30	1.7
			1:00	4.6
			1:30	8.6
			2:00	14.0
			2:30	22.1
			3:00	32.7
			3:30	44.2
			4:00	95.2

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy	**20 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:30	1.1
			3:00	4.5
			3:30	5.7
			4:00	5.9
		MDS/Grassland Complex, mixed soils		
			0:30	10.6
			1:00	58.7
			1:30	146.9
			2:00	257.4
			2:30	385.2
			3:00	468.1
			3:30	609.1
			4:00	730.6
		MDS-boxthorn/grassland on clay		
			3:30	0.0
		MDS-fine loamy alkali terrace flats		
			2:30	1.5
			3:00	44.5
			3:30	102.7
			4:00	184.9
		MSS-canyon walls and escarpments		
			0:30	2.2
			1:00	6.9
			1:30	12.9
			2:00	29.2
			2:30	59.4
			3:00	101.3
			3:30	118.5
			4:00	124.4

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**10 mph**	**Northeast Wind**		
		MDS-fine loamy alkali terrace flats		
			0:30	2.1
			1:00	10.5
			1:30	25.5
			2:00	39.6
			2:30	53.7
			3:00	67.0
			3:30	79.8
			4:00	92.6

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**15 mph**	**Northeast Wind**		
		MDS-fine loamy alkali terrace flats		
			0:30	4.9
			1:00	22.7
			1:30	39.3
			2:00	55.3
			2:30	71.3
			3:00	88.7
			3:30	106.8
			4:00	124.7

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**20 mph**	**Northeast Wind**		
		Coastal strand		
			4:00	0.1
		MDS-fine loamy alkali terrace flats		
			0:30	8.6
			1:00	28.6
			1:30	42.7
			2:00	58.9
			2:30	77.1
			3:00	96.9
			3:30	116.4
			4:00	132.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**10 mph**	**Northeast Wind**		
		High plateau - clay grasslands		
			0:30	57.7
			1:00	261.6
			1:30	453.6
			2:00	629.2
			2:30	822.4
			3:00	1,024.2
			3:30	1,213.3
			4:00	1,401.6
		MDS/Grassland Complex, mixed soils		
			1:00	0.0
			1:30	44.8
			2:00	91.4
			2:30	161.3
			3:00	231.2
			3:30	290.1
			4:00	352.1
		MDS-boxthorn/grassland on clay		
			3:00	2.8
			3:30	15.7
			4:00	31.8
		MSS-canyon walls and escarpments		
			4:00	0.1

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-14	**15 mph**	**Northeast Wind**		
		High plateau - clay grasslands		
			0:30	122.4
			1:00	364.0
			1:30	552.0
			2:00	775.8
			2:30	1,031.9
			3:00	1,270.3
			3:30	1,508.5
			4:00	1,733.6
		MDS/Grassland Complex, mixed soils		
			1:00	41.8
			1:30	146.5
			2:00	261.6
			2:30	384.0
			3:00	494.8
			3:30	598.6
			4:00	688.3
		MDS-boxthorn/grassland on clay		
			2:30	4.2
			3:00	21.7
			3:30	42.8
			4:00	69.4
		MDS-fine loamy alkali terrace flats		
			2:30	3.0
			3:00	42.9
			3:30	118.4
			4:00	185.6
		MSS-canyon walls and escarpments		
			4:00	1.4

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**20 mph**	**Northeast Wind**		
		Coastal strand		
			3:30	0.1
			4:00	0.7
		High plateau - clay grasslands		
			0:30	180.5
			1:00	388.2
			1:30	590.3
			2:00	843.9
			2:30	1,108.4
			3:00	1,321.1
			3:30	1,591.2
			4:00	1,825.2
		MDS/Grassland Complex, mixed soils		
			0:30	3.7
			1:00	115.5
			1:30	276.0
			2:00	431.4
			2:30	538.9
			3:00	645.3
			3:30	754.0
			4:00	855.3
		MDS-boxthorn/grassland on clay		
			2:30	8.7
			3:00	27.9
			3:30	51.3
			4:00	81.9
		MDS-fine loamy alkali terrace flats		
			2:00	46.0
			2:30	151.8
			3:00	219.8
			3:30	265.4
			4:00	298.7
		MSS-canyon walls and escarpments		
			4:00	1.1

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**10 mph**	**Northeast Wind**		
		Coastal strand		
			3:30	0.0
			4:00	0.2
		MDS/Grassland Complex, mixed soils		
			3:30	0.1
			4:00	1.2
		MDS-fine loamy alkali terrace flats		
			0:30	2.1
			1:00	7.3
			1:30	12.9
			2:00	20.4
			2:30	29.1
			3:00	36.9
			3:30	43.7
			4:00	49.2
		Stabilized sand dunes		
			4:00	0.0

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**15 mph**	**Northeast Wind**		
		Coastal strand		
			3:00	0.1
			4:00	0.1
		MDS/Grassland Complex, mixed soils		
			3:00	0.0
			3:30	2.4
			4:00	7.4
		MDS-fine loamy alkali terrace flats		
			0:30	4.2
			1:00	10.0
			1:30	18.9
			2:00	28.5
			2:30	36.7
			3:30	51.2
			4:00	55.9
		Stabilized sand dunes		
			3:00	0.0
			3:30	0.3
			4:00	0.5

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**20 mph**	**Northeast Wind**		
		Coastal strand		
			3:00	0.1
			3:30	3.1
			4:00	3.2
		MDS/Grassland Complex, mixed soils		
			3:00	0.1
			3:30	3.7
			4:00	9.3
		MDS-fine loamy alkali terrace flats		
			0:30	5.1
			1:00	11.5
			1:30	21.8
			2:00	30.4
			2:30	38.4
			3:00	47.0
			3:30	49.7
			4:00	55.0
		Stabilized sand dunes		
			3:00	0.0
			3:30	0.2
			4:00	0.5

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20	**10 mph**	**Northeast Wind**		
		Coastal salt marsh		
			2:00	0.1
			2:30	0.2
			3:00	0.3
			3:30	0.6
			4:00	0.9
		Coastal strand		
			1:30	0.3
			2:00	1.1
			2:30	1.6
			3:00	1.7
			3:30	1.9
			4:00	1.9
		MDS/Grassland Complex, mixed soils		
			2:30	2.0
			3:00	19.8
			3:30	41.2
			4:00	64.1
		MDS-boxthorn/grassland on clay		
			4:00	0.1
		MDS-fine loamy alkali terrace flats		
			3:00	0.4
			3:30	6.2
			4:00	15.6
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	4.4
			1:00	21.9
			1:30	51.4
			2:00	83.5
			2:30	131.3
			3:00	156.7
			3:30	174.1
			4:00	188.5

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-20	**15 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			3:30	0.0
			4:00	5.3
		Coastal salt marsh		
			1:30	0.0
			2:00	0.3
			2:30	0.6
			3:00	0.7
			3:30	0.8
			4:00	0.9
		Coastal strand		
			1:00	0.9
			1:30	1.5
			2:00	1.9
			2:30	2.0
			3:00	2.1
		MDS/Grassland Complex, mixed soils		
			1:30	2.8
			2:00	30.1
			2:30	61.8
			3:00	91.7
			3:30	120.4
			4:00	147.1
		MDS-boxthorn/grassland on clay		
			2:30	0.8
			3:00	7.9
			3:30	32.3
			4:00	63.8
		MDS-fine loamy alkali terrace flats		
			2:00	9.1
			2:30	33.8
			3:00	75.1
			3:30	124.0
			4:00	165.2
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	13.0
			1:00	59.3
			1:30	119.3
			2:00	151.4
			2:30	174.1
			3:00	190.6
			3:30	205.5
			4:00	220.0
		MSS-canyon walls and escarpments		
			4:00	4.5

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20	**20 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:30	2.1
			3:00	9.6
			3:30	18.4
			4:00	20.6
		Coastal salt marsh		
			1:30	0.1
			2:00	0.2
			2:30	0.5
			3:00	1.6
			3:30	1.9
			4:00	4.7
		Coastal strand		
			1:00	1.2
			1:30	1.5
			2:00	1.7
			2:30	1.7
			3:00	2.2
			3:30	2.3
			4:00	2.6
		MDS/Grassland Complex, mixed soils		
			1:00	1.8
			1:30	33.3
			2:00	67.6
			2:30	100.4
			3:00	131.6
			3:30	162.3
			4:00	190.5
		MDS-boxthorn/grassland on clay		
			1:30	0.1
			2:00	6.0
			2:30	39.3
			3:00	80.7
			3:30	182.8
			4:00	200.5
		MDS-fine loamy alkali terrace flats		
			1:30	22.1
			2:00	76.4
			2:30	152.4
			3:00	205.6
			3:30	271.0
			4:00	440.7
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	27.9
			1:00	103.6
			1:30	142.4
			2:00	167.8
			2:30	186.3
			3:00	203.3
			3:30	217.3

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20	**20 mph**	**Northeast Wind**		
			4:00	235.3
		MSS-canyon walls and escarpments		
			2:30	0.6
			3:00	7.0
			3:30	10.4
			4:00	18.1

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**10 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			3:00	0.1
			3:30	0.5
			4:00	1.2
		Coastal salt marsh		
			2:00	0.1
			2:30	0.4
			3:00	0.5
			3:30	0.8
		Coastal strand		
			1:00	5.0
			1:30	5.1
			2:00	5.4
		MDS-boxthorn/grassland on clay		
			2:00	3.2
			2:30	9.6
			3:00	16.3
			3:30	30.1
			4:00	45.9
		MDS-fine loamy alkali terrace flats		
			0:30	2.0
			1:00	2.1
			1:30	6.0
			2:00	10.0
			2:30	13.6
			3:00	19.0
			3:30	30.0
			4:00	47.4
		MSS-canyon walls and escarpments		
			3:00	0.7
			3:30	0.8
			4:00	0.9

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**15 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:30	0.1
			3:00	0.8
			3:30	1.6
			4:00	3.3
		Coastal salt marsh		
			1:30	0.1
			2:00	0.6
			2:30	1.1
			3:00	1.3
		Coastal strand		
			0:30	0.1
			1:00	0.2
			1:30	0.5
			3:30	0.5
			4:00	0.7
		MDS-boxthorn/grassland on clay		
			1:30	1.7
			2:00	8.7
			2:30	18.1
			3:00	38.6
			3:30	54.9
			4:00	71.1
		MDS-fine loamy alkali terrace flats		
			0:30	4.0
			1:00	8.5
			1:30	13.2
			2:00	17.1
			2:30	23.9
			3:00	31.6
			3:30	83.1
			4:00	124.9
		MSS-canyon walls and escarpments		
			2:30	0.7
			3:00	1.0
			3:30	1.1
			4:00	1.3

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**20 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:30	0.3
			3:00	1.0
			3:30	2.3
			4:00	18.5
		Coastal salt marsh		
			1:30	0.7
			2:00	1.3
			2:30	1.5
		Coastal strand		
			0:30	0.3
			1:00	0.6
			1:30	1.0
			3:00	1.3
			3:30	1.3
			4:00	13.4
		MDS-boxthorn/grassland on clay		
			1:30	3.7
			2:00	11.4
			2:30	28.9
			3:00	48.5
			3:30	48.9
			4:00	65.5
		MDS-fine loamy alkali terrace flats		
			0:30	4.7
			1:00	9.2
			1:30	13.7
			2:00	18.0
			2:30	40.4
			3:00	91.2
			3:30	161.1
			4:00	170.2
		MSS-canyon walls and escarpments		
			2:00	0.1
			2:30	0.8
			3:00	1.0
			3:30	1.1
			4:00	1.4
		Stabilized sand dunes		
			4:00	52.2

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**10 mph**	**Northeast Wind**		
		MDS-boxthorn/grassland on clay		
			4:00	7.2
		MDS-fine loamy alkali terrace flats		
			0:30	2.1
			1:00	10.4
			1:30	24.8
			2:00	46.4
			2:30	72.4
			3:00	94.5
			3:30	106.1
			4:00	122.5
		MSS-canyon walls and escarpments		
			3:00	0.1
			3:30	3.6
			4:00	9.4
		Stabilized sand dunes		
			2:30	1.0
			3:00	1.8
			3:30	9.7
			4:00	10.1

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**15 mph**	**Northeast Wind**		
		Coastal strand		
			3:30	6.7
			4:00	6.9
		MDS-boxthorn/grassland on clay		
			2:30	0.0
			3:00	16.6
			3:30	40.1
			4:00	60.4
		MDS-fine loamy alkali terrace flats		
			0:30	4.9
			1:00	23.8
			1:30	55.8
			2:00	86.0
			2:30	115.2
			3:00	137.8
			3:30	159.8
			4:00	189.4
		MSS-canyon walls and escarpments		
			2:30	4.0
			3:00	8.4
			3:30	11.8
			4:00	15.4
		Stabilized sand dunes		
			1:30	0.6
			2:00	1.6
			2:30	2.1
			3:00	2.8
			3:30	3.0
			4:00	3.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**20 mph**	**Northeast Wind**		
		Coastal strand		
			2:30	0.1
			3:00	0.4
			3:30	0.5
			4:00	0.8
		MDS-boxthorn/grassland on clay		
			2:00	0.0
			2:30	12.5
			3:30	55.8
			4:00	69.6
		MDS-fine loamy alkali terrace flats		
			0:30	8.6
			1:00	41.6
			1:30	74.1
			2:00	111.2
			2:30	141.0
			3:00	172.6
			3:30	204.7
			4:00	235.5
		MSS-canyon walls and escarpments		
			2:00	1.7
			2:30	7.0
			3:00	9.8
			3:30	13.4
			4:00	17.2
		Stabilized sand dunes		
			1:00	0.3
			1:30	1.4
			2:00	2.3
			2:30	3.0
			3:00	3.6
			3:30	4.0
			4:00	4.3

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**10 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:30	0.1
			3:00	0.3
			3:30	0.3
		MDS/Grassland Complex, mixed soils		
			3:30	0.8
			4:00	3.5
		MDS-boxthorn/grassland on clay		
			2:00	0.0
		MDS-fine loamy alkali terrace flats		
			0:30	1.9
			1:00	9.2
			1:30	20.2
			2:00	41.0
			2:30	71.2
			3:00	108.8
			3:30	152.2
			4:00	197.0
		MSS-canyon walls and escarpments		
			1:00	0.0
			1:30	4.1
			2:00	7.7
			2:30	9.3
			3:00	10.3
			3:30	12.1
			4:00	14.1

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-22 B	**15 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:00	0.2
			2:30	0.3
			3:00	0.3
		Coastal strand		
			3:00	0.8
			3:30	1.5
			4:00	2.0
		MDS/Grassland Complex, mixed soils		
			3:00	1.0
			3:30	6.8
			4:00	18.0
		MDS-boxthorn/grassland on clay		
			1:00	0.0
		MDS-fine loamy alkali terrace flats		
			0:30	4.6
			1:00	19.5
			1:30	54.8
			2:00	109.4
			2:30	179.7
			3:00	249.3
			3:30	294.2
			4:00	332.0
		MSS-canyon walls and escarpments		
			1:00	5.2
			1:30	8.1
			2:00	9.4
			2:30	10.8
			3:00	13.1
			3:30	15.6
			4:00	18.0
		Stabilized sand dunes		
			3:00	1.7
			3:30	1.8
			4:00	2.3

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-22 B	**20 mph**	**Northeast Wind**		
		Canyon shrubland/woodland		
			2:00	0.2
			2:30	0.3
		Coastal strand		
			2:00	0.4
			2:30	1.4
			3:00	1.8
			3:30	1.8
		MDS/Grassland Complex, mixed soils		
			3:00	2.7
			3:30	11.7
			4:00	25.5
		MDS-boxthorn/grassland on clay		
			1:00	0.0
		MDS-fine loamy alkali terrace flats		
			0:30	8.3
			1:00	38.3
			1:30	103.3
			2:00	193.1
			2:30	251.4
			3:00	299.6
			3:30	345.2
			4:00	397.0
		MSS-canyon walls and escarpments		
			0:30	0.1
			1:00	7.0
			1:30	8.6
			2:00	9.8
			2:30	11.5
			3:00	14.2
			3:30	16.7
			4:00	19.5
		Stabilized sand dunes		
			2:00	0.4
			2:30	1.2
			3:00	1.4
			3:30	1.6
			4:00	1.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**10 mph**	**Northeast Wind**		
		Coastal strand		
			1:30	0.3
			2:00	1.2
			2:30	1.6
			3:00	2.0
			3:30	2.1
			4:00	2.2
		MDS-fine loamy alkali terrace flats		
			0:30	3.1
			1:00	15.7
			1:30	37.7
			2:00	59.2
			2:30	79.7
			3:00	103.0
			3:30	126.4
			4:00	147.8
		Stabilized sand dunes		
			4:00	0.4

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**15 mph**	**Northeast Wind**		
		Coastal strand		
			1:00	0.5
			1:30	1.4
			2:00	1.7
			2:30	1.7
			3:00	1.8
			3:30	1.8
			4:00	1.8
		Disturbed/developed		
			4:00	1.8
		MDS-fine loamy alkali terrace flats		
			0:30	8.4
			1:00	13.1
			1:30	68.3
			2:00	100.6
			2:30	129.7
			3:00	153.0
			3:30	172.4
			4:00	190.0
		Stabilized sand dunes		
			2:30	0.6
			3:00	1.1
			3:30	1.4
			4:00	1.6

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-4	**20 mph**	**Northeast Wind**		
		Active Sand Dunes		
			4:00	1.8
		Coastal strand		
			1:00	1.1
			1:30	1.5
			2:00	1.5
			2:30	1.6
			3:00	1.7
		Disturbed/developed		
			3:30	21.9
			4:00	58.6
		MDS-fine loamy alkali terrace flats		
			0:30	16.5
			1:00	53.8
			1:30	93.3
			2:00	111.2
			2:30	148.6
			3:00	169.4
			3:30	188.3
			4:00	206.1
		Stabilized sand dunes		
			1:30	0.1
			2:00	0.7
			2:30	1.2
			3:00	1.5
			3:30	2.3
			4:00	2.4

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**10 mph**	**Northwest Wind**		
		Disturbed/developed		
			0:30	58.2
			1:00	217.7
			1:30	302.7
			2:00	362.7
			2:30	433.6
			3:00	466.4
			3:30	485.5
			4:00	510.1
		High plateau - clay grasslands		
			3:00	21.4
			3:30	33.6
			4:00	53.0
		Maritime sage scrub		
			1:30	0.4
			2:00	10.9
			2:30	33.4
			3:00	56.1
			3:30	81.5
			4:00	96.6
		MDS/Grassland Complex, mixed soils		
			2:00	4.3
			2:30	10.6
			3:00	14.0
			4:00	14.1
		MDS-boxthorn/grassland on clay		
			1:00	46.9
			1:30	248.4
			2:00	447.6
			2:30	564.7
			3:00	766.7
			3:30	866.7
			4:00	928.8
		MDS-fine loamy alkali terrace flats		
			2:30	4.9
			3:00	22.7
			3:30	77.2
			4:00	110.8
		Stabilized sand dunes		
			2:30	1.5
			3:00	1.8
			3:30	2.2
			4:00	2.6

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Airfield	**15 mph**	**Northwest Wind**		
		Active Sand Dunes		
			3:00	0.0
			3:30	0.2
			4:00	0.4
		Coastal strand		
			3:30	0.1
			4:00	0.9
		Disturbed/developed		
			0:30	110.3
			1:00	253.0
			1:30	332.0
			2:00	412.0
			2:30	462.2
			3:00	493.6
			3:30	523.8
			4:00	560.2
		High plateau - clay grasslands		
			2:00	27.8
			2:30	55.8
			3:00	67.7
			3:30	272.2
			4:00	552.8
		Maritime sage scrub		
			1:00	0.1
			1:30	20.1
			2:00	58.0
			2:30	93.7
			3:00	107.7
			3:30	111.7
			4:00	125.4
		MDS/Grassland Complex, mixed soils		
			1:30	9.5
			2:00	14.0
			2:30	14.4
			3:00	22.5
			3:30	30.9
			4:00	43.2
		MDS-boxthorn/grassland on clay		
			0:30	9.3
			1:00	216.1
			1:30	578.7
			2:00	769.7
			2:30	934.9
			3:00	991.8
			3:30	1,024.6
			4:00	1,037.0
		MDS-fine loamy alkali terrace flats		
			2:00	4.1
			2:30	43.3
			3:00	95.1

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**15 mph**	**Northwest Wind**		
			3:30	145.9
			4:00	187.6
		MSS-canyon walls and escarpments		
			4:00	1.5
		Stabilized sand dunes		
			2:00	1.0
			2:30	1.4
			3:00	30.7
			3:30	31.0
			4:00	31.2

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Airfield	**20 mph**	**Northwest Wind**		
		Active Sand Dunes		
			2:30	0.8
			3:00	0.9
			3:30	1.0
			4:00	2.7
		Canyon shrubland/woodland		
			3:30	0.3
			4:00	2.5
		Coastal strand		
			3:00	0.0
			3:30	0.5
			4:00	8.5
		Disturbed/developed		
			0:30	139.9
			1:00	259.5
			1:30	339.8
			2:00	424.4
			2:30	467.8
			3:00	496.2
			3:30	522.6
			4:00	558.3
		High plateau - clay grasslands		
			1:30	31.2
			2:00	65.2
			2:30	218.2
			3:00	627.8
			3:30	1,120.6
			4:00	1,535.5
		Maritime sage scrub		
			1:00	2.9
			1:30	60.5
			2:00	104.6
			2:30	114.0
			3:00	143.2
			3:30	193.7
			4:00	244.2
		MDS/Grassland Complex, mixed soils		
			1:00	6.9
			1:30	14.0
			2:00	16.8
			2:30	30.9
			3:00	42.9
			3:30	70.0
			4:00	113.2
		MDS-boxthorn/grassland on clay		
			0:30	42.3
			1:00	399.3
			1:30	716.2
			2:00	933.9
			2:30	1,008.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**20 mph**	**Northwest Wind**		
			3:00	1,021.1
			3:30	1,049.1
			4:00	1,140.4
		MDS-fine loamy alkali terrace flats		
			2:00	43.1
			2:30	77.9
			3:00	134.2
			3:30	195.7
			4:00	231.6
		MSS-canyon walls and escarpments		
			3:00	2.8
			3:30	7.7
			4:00	51.6
		Sea bluff succulent		
			3:30	0.0
			4:00	0.3
		Stabilized sand dunes		
			2:00	1.0
			2:30	35.9
			3:00	36.2
			3:30	36.6
			4:00	36.9

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1	**10 mph**	**Northwest Wind**		
		MDS/Grassland Complex, mixed soils		
			1:00	0.7
			1:30	2.7
			2:00	8.2
			2:30	16.1
			3:00	23.9
			3:30	36.3
			4:00	51.0
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	5.8
			1:00	21.5
			1:30	43.5
			2:00	77.5
			2:30	106.6
			3:00	141.1
			3:30	175.7
			4:00	209.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1	**15 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			3:00	0.6
			3:30	2.1
		Coastal strand		
			2:30	0.5
			3:00	1.6
			3:30	1.9
			4:00	2.1
		MDS/Grassland Complex, mixed soils		
			1:00	1.2
			1:30	8.0
			2:00	19.5
			2:30	37.7
			3:00	42.2
			3:30	72.8
			4:00	112.7
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	12.8
			1:00	54.6
			1:30	109.7
			2:00	170.5
			2:30	261.3
			3:00	363.7
			3:30	467.0
			4:00	548.0
		MSS-canyon walls and escarpments		
			4:00	0.0

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Impact Area 1	**20 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			2:00	1.1
			2:30	2.1
		Coastal strand		
			2:00	2.1
			3:00	2.3
			3:30	2.6
			4:00	2.7
		Maritime sage scrub		
			3:00	0.4
			3:30	8.6
			4:00	15.7
		MDS/Grassland Complex, mixed soils		
			1:00	3.5
			1:30	14.5
			2:00	39.2
			2:30	77.0
			3:00	120.7
			3:30	156.9
			4:00	182.1
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	25.4
			1:00	103.3
			1:30	225.7
			2:00	370.3
			2:30	508.9
			3:00	612.6
			3:30	662.5
			4:00	736.4
		MSS-canyon walls and escarpments		
			2:30	0.0
			3:30	42.4
			4:00	60.3

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy	**10 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			3:30	0.9
			4:00	1.9
		MDS/Grassland Complex, mixed soils		
			0:30	1.5
			1:00	10.0
			1:30	25.1
			2:00	48.1
			2:30	70.0
			3:00	93.7
			3:30	119.5
			4:00	152.2
		MDS-boxthorn/grassland on clay		
			3:30	0.7
			4:00	2.0
		MSS-canyon walls and escarpments		
			1:30	2.3
			2:00	5.1
			2:30	11.6
			3:00	20.2
			3:30	36.9
			4:00	49.9

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
Skippy	**15 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			2:00	0.4
			2:30	3.0
			3:00	5.0
			3:30	8.7
			4:00	12.1
		MDS/Grassland Complex, mixed soils		
			0:30	6.3
			1:00	31.4
			1:30	66.2
			2:00	105.7
			2:30	172.5
			3:00	191.8
			3:30	309.7
			4:00	409.2
		MDS-boxthorn/grassland on clay		
			2:00	0.8
			2:30	2.0
			3:00	3.5
			3:30	10.8
			4:00	14.6
		MDS-fine loamy alkali terrace flats		
			3:00	23.6
			3:30	25.7
			4:00	25.8
		MSS-canyon walls and escarpments		
			1:00	2.6
			1:30	11.5
			2:00	30.6
			2:30	50.0
			3:00	70.3
			3:30	93.5
			4:00	119.7

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy	**20 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			1:30	3.3
			2:00	5.2
			2:30	12.1
			3:00	16.4
			3:30	22.0
			4:00	28.8
		MDS/Grassland Complex, mixed soils		
			0:30	13.9
			1:00	55.9
			1:30	113.5
			2:00	201.9
			2:30	314.4
			3:00	453.0
			3:30	606.5
			4:00	785.0
		MDS-boxthorn/grassland on clay		
			1:30	1.3
			2:00	2.1
			2:30	4.1
			3:00	12.6
			3:30	44.0
			4:00	108.2
		MDS-fine loamy alkali terrace flats		
			2:00	1.2
			2:30	2.8
			3:00	5.4
			3:30	11.3
			4:00	16.1
		MSS-canyon walls and escarpments		
			1:00	8.9
			1:30	29.1
			2:00	64.2
			2:30	96.0
			3:00	134.1
			3:30	158.0
			4:00	197.3

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**10 mph**	**Northwest Wind**		
		MDS/Grassland Complex, mixed soils		
			2:30	3.4
			3:00	19.4
			3:30	45.3
			4:00	68.4
		MDS-boxthorn/grassland on clay		
			3:30	0.7
			4:00	30.2
		MDS-fine loamy alkali terrace flats		
			0:30	2.1
			1:00	10.4
			1:30	25.7
			2:00	48.3
			2:30	74.8
			3:00	96.6
			3:30	118.7
			4:00	139.4

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**15 mph**	**Northwest Wind**		
		High plateau - clay grasslands		
			3:00	45.7
			3:30	106.8
			4:00	321.8
		MDS/Grassland Complex, mixed soils		
			1:30	1.9
			2:00	25.0
			2:30	63.2
			3:00	100.2
			3:30	128.9
			4:00	194.5
		MDS-boxthorn/grassland on clay		
			2:30	20.9
			3:00	101.0
			3:30	261.0
			4:00	370.6
		MDS-fine loamy alkali terrace flats		
			0:30	4.8
			1:00	24.2
			1:30	57.6
			2:00	92.4
			2:30	125.3
			3:00	135.1
			3:30	191.5
			4:00	222.2

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**20 mph**	**Northwest Wind**		
		High plateau - clay grasslands		
			2:00	0.5
			2:30	81.3
			3:00	349.2
			3:30	1,063.5
			4:00	1,962.8
		MDS/Grassland Complex, mixed soils		
			1:00	0.4
			1:30	28.0
			2:00	77.4
			2:30	125.9
			3:00	213.3
			3:30	329.2
			4:00	417.2
		MDS-boxthorn/grassland on clay		
			2:00	52.6
			2:30	221.2
			3:00	368.6
			3:30	372.3
			4:00	373.6
		MDS-fine loamy alkali terrace flats		
			0:30	8.5
			1:00	42.3
			1:30	82.7
			2:00	124.1
			2:30	172.7
			3:00	220.7
			3:30	267.7
			4:00	308.9
		MSS-canyon walls and escarpments		
			4:00	16.3

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**10 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			2:30	0.1
			3:00	0.4
			3:30	1.6
			4:00	3.0
		High plateau - clay grasslands		
			0:30	57.6
			1:00	280.8
			1:30	787.2
			2:00	1,079.4
			2:30	1,244.7
			3:00	1,428.3
			3:30	1,592.8
			4:00	1,748.9
		MDS/Grassland Complex, mixed soils		
			1:30	2.7
			2:00	11.0
			2:30	76.9
			3:00	104.1
			3:30	133.0
			4:00	163.4
		MSS-canyon walls and escarpments		
			2:00	3.8
			2:30	107.1
			3:00	133.0
			3:30	155.7
			4:00	181.9

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-14	**15 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			2:00	0.4
			2:30	1.5
			3:00	4.4
			3:30	7.4
			4:00	9.6
		High plateau - clay grasslands		
			0:30	122.6
			1:00	584.4
			1:30	856.1
			2:00	1,039.2
			2:30	1,319.4
			3:00	1,544.0
			3:30	1,793.1
			4:00	2,037.8
		MDS/Grassland Complex, mixed soils		
			1:00	0.7
			1:30	271.4
			2:00	364.4
			2:30	417.3
			3:00	455.9
			3:30	496.2
			4:00	530.7
		MSS-canyon walls and escarpments		
			1:30	10.9
			2:00	99.8
			2:30	127.1
			3:00	170.4
			3:30	212.5
			4:00	262.0

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**20 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			1:30	0.5
			2:00	19.9
			2:30	22.9
			3:00	26.3
			3:30	29.7
			4:00	32.8
		High plateau - clay grasslands		
			0:30	201.6
			1:00	842.2
			1:30	1,169.5
			2:00	1,542.8
			2:30	1,902.1
			3:00	2,240.1
			3:30	2,535.8
			4:00	2,830.0
		High plateau - fine loamy grasslands		
			3:00	0.2
			3:30	88.8
			4:00	282.2
		MDS/Grassland Complex, mixed soils		
			1:00	4.7
			1:30	106.0
			2:00	140.9
			2:30	183.4
			3:00	215.8
			3:30	270.9
			4:00	318.7
		MSS-canyon walls and escarpments		
			1:00	0.7
			1:30	95.8
			2:00	121.6
			2:30	165.4
			3:00	235.4
			3:30	336.8
			4:00	405.5
		Sea bluff succulent		
			4:00	4.4

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-17	**10 mph**	**Northwest Wind**		
		High plateau - clay grasslands		
			3:30	0.1
			4:00	2.3
		MDS/Grassland Complex, mixed soils		
			1:30	0.6
			2:00	7.9
			2:30	16.2
			3:00	23.4
			3:30	35.3
			4:00	71.6
		MDS-boxthorn/grassland on clay		
			2:00	0.1
			2:30	19.6
			3:00	99.3
			3:30	169.0
			4:00	183.6
		MDS-fine loamy alkali terrace flats		
			0:30	2.1
			1:00	9.9
			1:30	21.1
			2:00	31.0
			2:30	40.3
			3:00	47.7
			3:30	70.7
			4:00	96.7
		MSS-canyon walls and escarpments		
			4:00	0.2
		Stabilized sand dunes		
			2:00	0.1
			2:30	0.2
			3:00	0.5
			3:30	0.5

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**15 mph**	**Northwest Wind**		
		High plateau - clay grasslands		
			2:30	0.5
			3:00	3.6
			3:30	8.7
			4:00	19.2
		MDS/Grassland Complex, mixed soils		
			1:00	13.1
			1:30	21.5
			2:00	37.1
			2:30	63.9
			3:00	126.9
			3:30	201.0
			4:00	273.0
		MDS-boxthorn/grassland on clay		
			1:30	11.2
			2:00	128.4
			2:30	183.6
			3:00	183.6
			3:30	195.6
			4:00	196.8
		MDS-fine loamy alkali terrace flats		
			0:30	4.8
			1:00	7.5
			1:30	22.8
			2:00	32.4
			2:30	83.1
			3:00	135.4
			3:30	173.2
			4:00	205.7
		MDS-shallow cobbly fine loam, slopes and terraces		
			3:00	1.7
			3:30	10.1
			4:00	15.5
		MSS-canyon walls and escarpments		
			2:30	0.8
			3:00	6.2
			3:30	6.3
			4:00	23.5
		Stabilized sand dunes		
			1:30	0.2
			2:00	0.3
			4:00	2.9

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-17	**20 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			3:30	0.7
			4:00	1.4
		High plateau - clay grasslands		
			2:00	0.0
			2:30	2.9
			3:00	11.1
			3:30	30.7
			4:00	116.7
		High plateau - fine loamy grasslands		
			3:30	24.2
			4:00	118.9
		MDS/Grassland Complex, mixed soils		
			1:00	4.8
			1:30	24.9
			2:00	68.4
			2:30	163.4
			3:00	252.9
			3:30	338.6
			4:00	385.7
		MDS-boxthorn/grassland on clay		
			1:00	1.3
			1:30	119.2
			2:00	183.2
			2:30	196.0
			3:00	197.1
			3:30	197.2
			4:00	198.2
		MDS-fine loamy alkali terrace flats		
			0:30	8.5
			1:00	29.0
			1:30	39.2
			2:00	110.3
			2:30	171.9
			3:00	210.4
			3:30	227.9
			4:00	232.9
		MDS-shallow cobbly fine loam, slopes and terraces		
			2:00	0.3
			2:30	11.9
			3:00	19.8
			3:30	26.1
			4:00	36.7
		MSS-canyon walls and escarpments		
			2:00	4.4
			2:30	7.4
			3:00	55.6
			3:30	126.4
			4:00	202.6

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**20 mph**	**Northwest Wind**		
		Stabilized sand dunes		
			1:00	0.1
			1:30	0.3
			3:30	6.1
			4:00	6.1

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-20	**10 mph**	**Northwest Wind**		
		Coastal salt marsh		
			1:00	0.4
			1:30	0.8
			2:00	1.2
			2:30	1.6
			3:00	2.4
			3:30	2.6
			4:00	2.8
		Coastal strand		
			1:00	0.7
			1:30	1.0
			2:00	1.4
			2:30	1.8
			3:00	2.3
			3:30	2.6
			4:00	2.9
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	4.5
			1:00	17.8
			1:30	28.3
			2:00	40.6
			2:30	52.1
			3:00	67.7
			3:30	84.3
			4:00	105.1

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20	**15 mph**	**Northwest Wind**		
		Coastal salt marsh		
			0:30	0.1
			1:00	0.7
			1:30	1.3
			2:00	2.3
			2:30	2.8
			3:00	3.0
			3:30	11.7
		Coastal strand		
			0:30	0.3
			1:00	0.7
			1:30	1.2
			2:00	2.0
			2:30	2.3
			3:00	3.0
			3:30	3.2
			4:00	3.3
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	12.0
			1:00	24.1
			1:30	41.5
			2:00	56.9
			2:30	83.5
			3:00	115.9
			3:30	165.5
			4:00	216.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-20	**20 mph**	**Northwest Wind**		
		Coastal salt marsh		
			0:30	0.3
			1:00	0.7
			1:30	1.5
			2:00	2.1
			2:30	3.8
			3:00	11.7
		Coastal strand		
			0:30	0.7
			1:00	1.5
			1:30	2.2
			2:00	3.0
			2:30	3.5
			3:00	4.4
			3:30	5.8
			4:00	6.6
		MDS-shallow cobbly fine loam, slopes and terraces		
			0:30	15.1
			1:00	30.8
			1:30	51.3
			2:00	76.7
			2:30	113.5
			3:00	175.1
			3:30	246.7
			4:00	339.8

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**10 mph**	**Northwest Wind**		
		Coastal strand		
			1:30	0.1
			2:00	0.2
			3:30	0.3
			4:00	0.5
		MDS-boxthorn/grassland on clay		
			3:30	0.0
			4:00	2.8
		MDS-fine loamy alkali terrace flats		
			0:30	2.0
			1:00	8.0
			1:30	13.3
			2:00	19.0
			2:30	25.7
			3:00	33.2
			3:30	41.3
			4:00	48.7

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**15 mph**	**Northwest Wind**		
		Coastal salt marsh		
			3:30	0.3
			4:00	1.0
		Coastal strand		
			1:30	0.2
			2:00	0.2
			2:30	0.2
			3:00	0.2
			4:00	0.2
		MDS-boxthorn/grassland on clay		
			3:00	0.0
			3:30	3.7
			4:00	9.1
		MDS-fine loamy alkali terrace flats		
			0:30	4.6
			1:00	10.8
			1:30	17.7
			2:00	26.3
			2:30	36.3
			3:00	46.8
			3:30	56.6
			4:00	65.7

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-21	**20 mph**	**Northwest Wind**		
		Coastal salt marsh		
			3:30	0.2
			4:00	0.7
		Coastal strand		
			1:00	0.0
			1:30	0.1
			2:00	0.1
			3:00	0.1
			3:30	0.4
		MDS-boxthorn/grassland on clay		
			3:00	0.3
			3:30	4.7
			4:00	9.6
		MDS-fine loamy alkali terrace flats		
			0:30	5.6
			1:00	12.1
			1:30	20.1
			2:00	30.2
			2:30	41.1
			3:00	52.4
			3:30	61.9
			4:00	71.5

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**10 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			4:00	0.6
		MDS/Grassland Complex, mixed soils		
			3:30	0.2
			4:00	2.9
		MDS-boxthorn/grassland on clay		
			2:00	8.3
			2:30	8.3
			3:00	48.2
			3:30	93.5
			4:00	147.9
		MDS-fine loamy alkali terrace flats		
			0:30	2.1
			1:00	10.4
			1:30	23.4
			2:00	34.3
			2:30	109.5
			3:00	147.3
			3:30	191.4
			4:00	229.6
		MSS-canyon walls and escarpments		
			1:30	0.5
			2:00	8.4
			2:30	13.1
			3:00	16.6
			3:30	18.4
			4:00	24.4
		Stabilized sand dunes		
			3:30	0.0
			4:00	1.0

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-22 A	**15 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			3:00	3.9
			3:30	9.6
			4:00	19.8
		Coastal salt marsh		
			3:00	0.8
			3:30	1.0
		Coastal strand		
			3:30	0.4
			4:00	0.7
		MDS/Grassland Complex, mixed soils		
			2:30	8.3
			3:00	12.2
			3:30	21.5
			4:00	30.6
		MDS-boxthorn/grassland on clay		
			1:30	53.2
			2:00	86.8
			2:30	174.4
			3:00	214.8
			3:30	251.9
			4:00	273.0
		MDS-fine loamy alkali terrace flats		
			0:30	4.8
			1:00	20.3
			1:30	36.4
			2:00	94.2
			2:30	159.2
			3:00	226.1
			3:30	296.3
			4:00	384.8
		MSS-canyon walls and escarpments		
			1:00	2.3
			1:30	11.4
			2:00	30.2
			2:30	34.5
			3:00	39.2
			3:30	47.4
			4:00	50.8
		Stabilized sand dunes		
			2:30	0.2
			3:00	0.9
			3:30	1.1
			4:00	1.6

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**20 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			2:00	4.0
			2:30	5.9
			3:00	19.0
			3:30	20.9
			4:00	23.5
		Coastal salt marsh		
			2:00	0.0
			2:30	1.2
		Coastal strand		
			2:30	0.6
			3:00	0.9
			3:30	1.4
		MDS/Grassland Complex, mixed soils		
			2:30	2.5
			3:00	11.8
			3:30	26.9
			4:00	53.3
		MDS-boxthorn/grassland on clay		
			1:00	33.5
			1:30	69.7
			2:00	91.5
			2:30	219.5
			3:00	223.4
			3:30	276.6
			4:00	281.6
		MDS-fine loamy alkali terrace flats		
			0:30	8.5
			1:00	25.4
			1:30	113.7
			2:00	206.6
			2:30	295.6
			3:00	383.2
			3:30	464.0
			4:00	526.3
		MSS-canyon walls and escarpments		
			1:00	9.2
			1:30	14.6
			2:00	18.9
			2:30	30.4
			3:00	33.3
			3:30	36.0
			4:00	40.4
		Stabilized sand dunes		
			2:00	0.4
			2:30	2.8
			3:00	2.9
			3:30	3.5
			4:00	3.6

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**10 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			3:00	0.2
			3:30	0.9
			4:00	1.7
		MDS/Grassland Complex, mixed soils		
			2:00	1.9
			2:30	12.3
			3:00	21.9
			3:30	30.5
			4:00	41.1
		MDS-boxthorn/grassland on clay		
			3:00	0.0
			3:30	0.2
			4:00	2.3
		MDS-fine loamy alkali terrace flats		
			0:30	2.0
			1:00	10.0
			1:30	25.4
			2:00	47.5
			2:30	70.7
			3:00	95.5
			3:30	112.4
			4:00	177.5
		MSS-canyon walls and escarpments		
			2:30	0.2
			3:00	2.1
			3:30	11.4
			4:00	24.8

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-22 B	**15 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			2:00	0.1
			2:30	1.2
			3:00	3.6
			3:30	6.6
			4:00	13.2
		Coastal salt marsh		
			3:30	0.9
			4:00	1.0
		Coastal strand		
			3:30	0.4
			4:00	0.5
		MDS/Grassland Complex, mixed soils		
			1:30	3.1
			2:00	15.0
			2:30	26.3
			3:00	44.9
			3:30	66.2
			4:00	87.7
		MDS-boxthorn/grassland on clay		
			2:00	0.0
			2:30	8.8
			3:00	144.6
			3:30	188.4
			4:00	229.1
		MDS-fine loamy alkali terrace flats		
			0:30	4.7
			1:00	24.0
			1:30	57.8
			2:00	92.0
			2:30	181.0
			3:00	232.8
			3:30	303.1
			4:00	398.8
		MSS-canyon walls and escarpments		
			2:00	5.3
			2:30	16.9
			3:00	27.4
			3:30	46.0
			4:00	53.9
		Stabilized sand dunes		
			4:00	0.5

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-22 B	**20 mph**	**Northwest Wind**		
		Canyon shrubland/woodland		
			1:30	0.0
			2:00	1.1
			2:30	6.5
			3:00	16.5
			3:30	26.1
			4:00	26.9
		Coastal salt marsh		
			2:30	0.3
			3:00	0.5
		Coastal strand		
			2:30	0.4
			3:00	0.4
			3:30	1.0
			4:00	11.4
		MDS/Grassland Complex, mixed soils		
			1:00	0.1
			1:30	9.1
			2:00	22.4
			2:30	44.0
			3:00	69.8
			3:30	111.2
			4:00	151.8
		MDS-boxthorn/grassland on clay		
			1:30	0.0
			2:00	100.8
			2:30	220.0
			3:00	263.6
			3:30	267.6
			4:00	272.5
		MDS-fine loamy alkali terrace flats		
			0:30	8.5
			1:00	43.0
			1:30	94.1
			2:00	153.4
			2:30	237.5
			3:00	322.3
			3:30	457.9
			4:00	540.5
		MSS-canyon walls and escarpments		
			1:30	9.2
			2:00	17.7
			2:30	35.2
			3:00	45.8
			3:30	56.2
			4:00	63.6
		Stabilized sand dunes		
			3:00	47.8
			3:30	48.5
			4:00	49.1

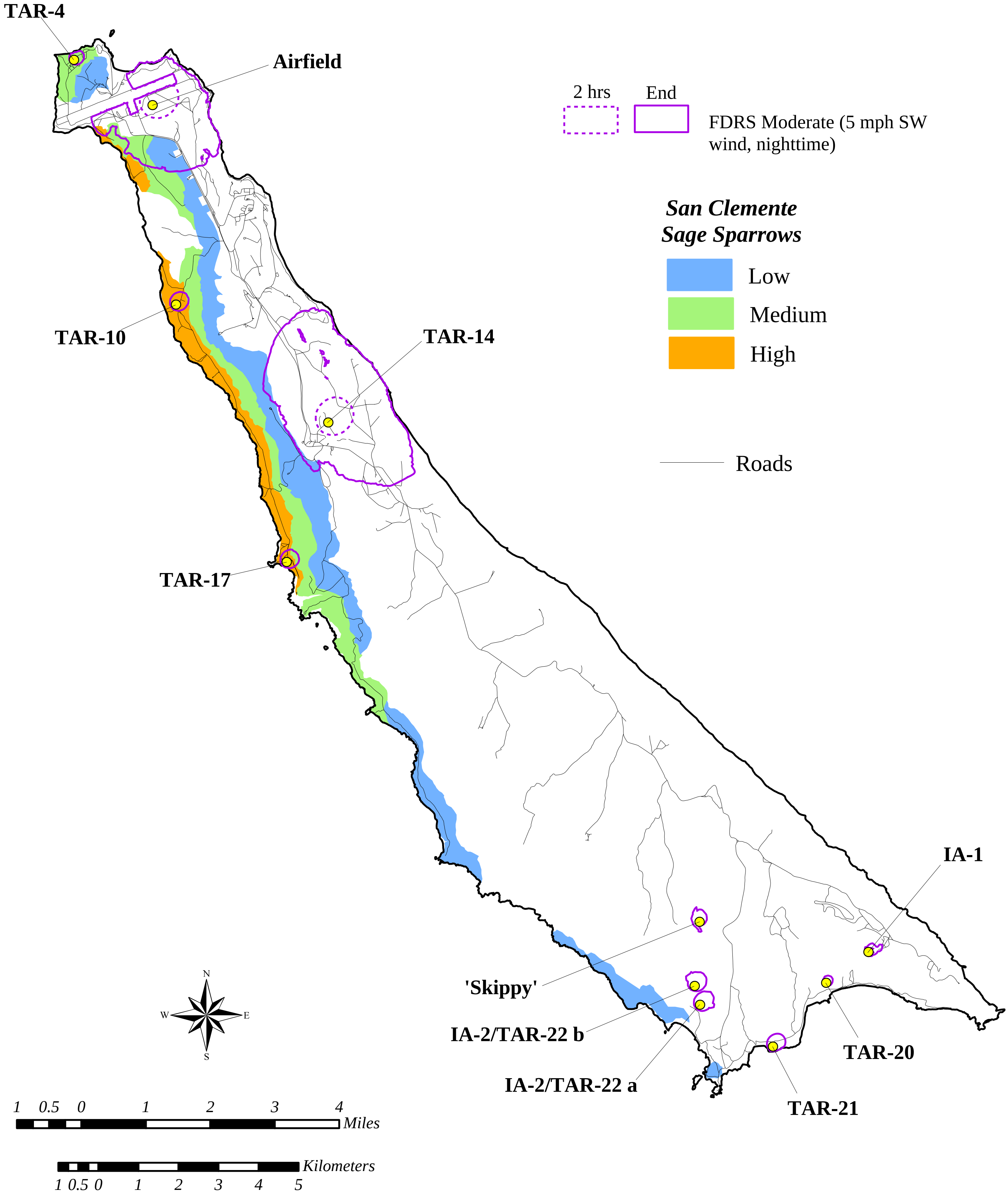
Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-4	**10 mph**	**Northwest Wind**		
		Coastal strand		
			2:30	0.1
			3:00	0.3
			3:30	0.6
			4:00	0.7
		Disturbed/developed		
			3:30	0.3
			4:00	51.5
		MDS-fine loamy alkali terrace flats		
			0:30	3.1
			1:00	20.4
			1:30	39.5
			2:00	73.2
			2:30	115.8
			3:00	164.7
			3:30	219.9
			4:00	267.7
		Stabilized sand dunes		
			4:00	4.0

Fire ID	Wind Speed	Ecosite	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-4	**15 mph**	**Northwest Wind**		
		Coastal strand		
			2:00	0.1
			2:30	13.7
			3:00	14.0
			3:30	14.4
			4:00	15.0
		Disturbed/developed		
			2:00	0.1
			2:30	90.3
			3:00	157.5
			3:30	207.7
			4:00	259.3
		MDS-fine loamy alkali terrace flats		
			0:30	8.3
			1:00	41.5
			1:30	99.8
			2:00	166.6
			2:30	245.5
			3:00	282.5
			3:30	310.6
			4:00	326.8
		Stabilized sand dunes		
			2:30	0.6
			3:00	1.5
			3:30	1.8
			4:00	2.2

Fire ID	Wind Speed	Ecosite	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**20 mph**	**Northwest Wind**		
		Active Sand Dunes		
			3:30	0.0
			4:00	1.4
		Coastal strand		
			2:00	0.1
			2:30	0.3
			3:00	0.8
			3:30	1.5
			4:00	2.2
		Disturbed/developed		
			1:30	16.9
			2:00	128.0
			2:30	190.6
			3:00	253.4
			3:30	356.8
			4:00	434.3
		Maritime sage scrub		
			3:30	5.8
			4:00	31.5
		MDS-boxthorn/grassland on clay		
			3:30	59.6
			4:00	157.5
		MDS-fine loamy alkali terrace flats		
			0:30	16.4
			1:00	79.9
			1:30	186.2
			2:00	231.5
			2:30	293.8
			3:00	325.1
			3:30	341.2
			4:00	349.9
		Stabilized sand dunes		
			2:00	0.7
			2:30	1.4
			3:00	1.6
			3:30	4.1
			4:00	4.2

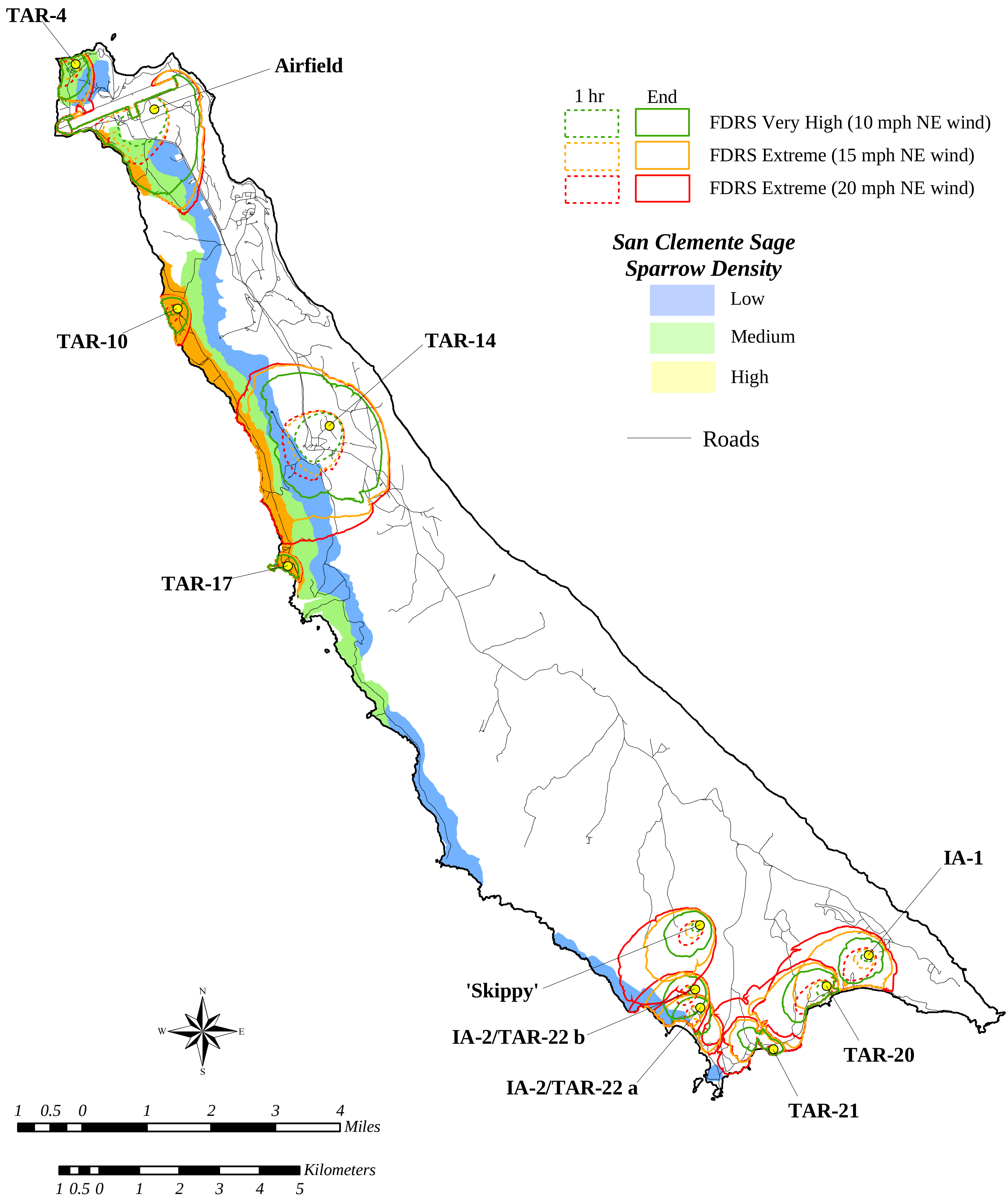
FARSITE Models - Southwest Winds, Nighttime

San Clemente Sage Sparrows



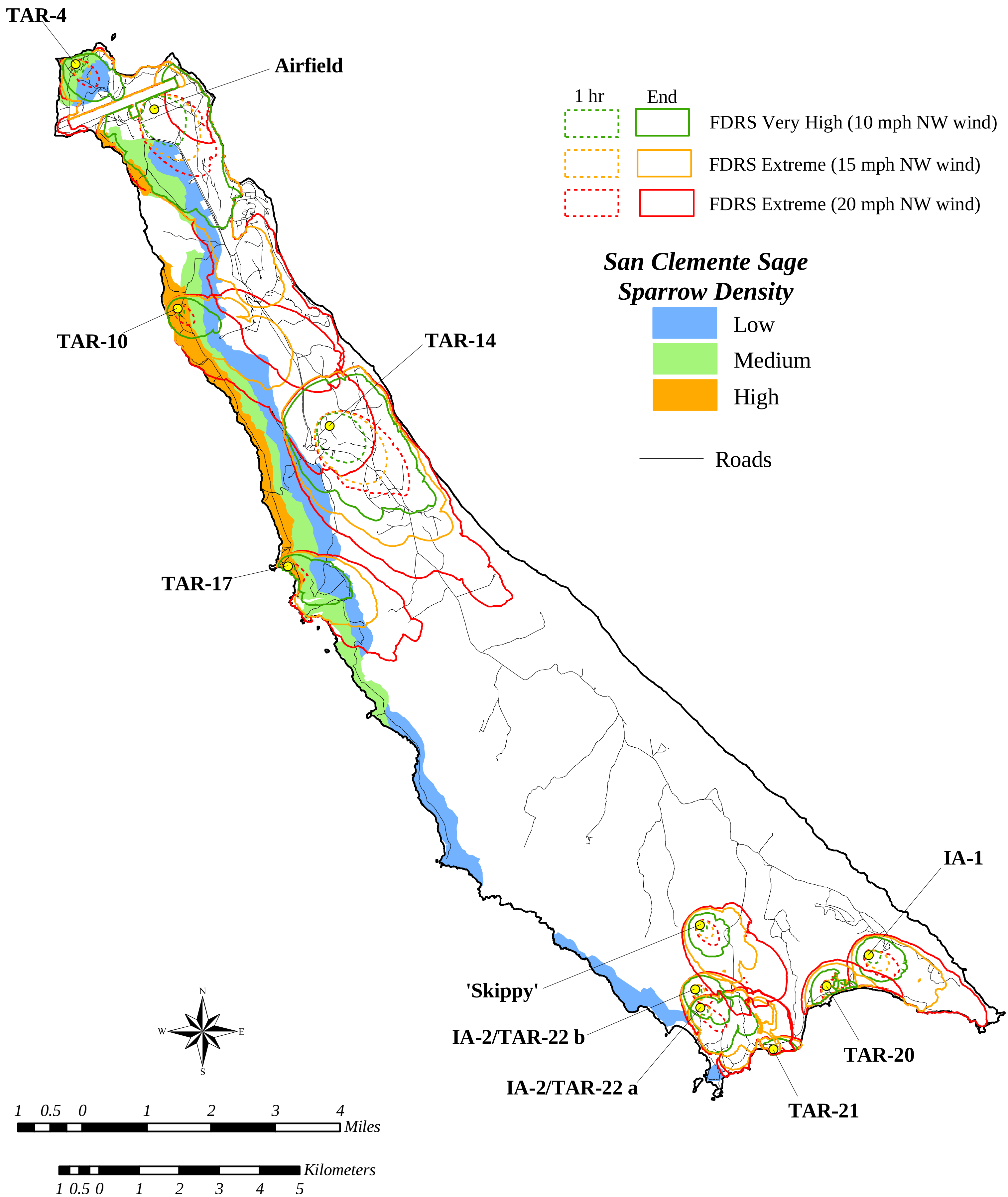
FARSITE Models - Northeast Winds

San Clemente Sage Sparrows



FARSITE Models - Northwest Winds

San Clemente Sage Sparrow Habitat



Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**05 mph**	**Southwest Wind**		
		1-Low		
			5:00	0.1
			5:30	6.0
			6:00	13.8
			6:30	22.8
			7:00	32.7
			7:30	43.0
			8:00	51.8
			8:30	61.1
			9:00	70.5
			9:30	81.0
			10:00	92.4
			10:30	105.0
			11:30	115.4
			12:00	125.6
		2-Medium		
			5:00	0.1
			5:30	3.1
			6:00	8.3
			6:30	14.8
			7:00	22.2
			7:30	31.3
			8:00	40.2
			8:30	47.9
			9:00	55.2
			9:30	63.7
			10:00	72.7
			10:30	81.4
			11:00	100.9
			11:30	108.0
			12:00	114.8
		3-High		
			10:30	0.1
			11:00	2.8
			11:30	6.9
			12:00	10.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**05 mph**	**Southwest Wind**		
		2-Medium		
			10:30	0.1
			11:00	0.4
			11:30	0.8
			12:00	1.3
		3-High		
			0:30	0.1
			1:00	0.3
			1:30	0.8
			2:00	1.5
			2:30	2.4
			3:00	3.5
			3:30	4.7
			4:00	6.2
			4:30	7.8
			5:00	9.5
			5:30	11.4
			6:00	13.5
			6:30	15.6
			7:00	17.8
			7:30	20.1
			8:00	22.4
			8:30	24.7
			9:00	27.1
			9:30	29.4
			10:00	31.8
			10:30	34.2
			11:00	36.4
			11:30	38.6
			12:00	40.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**05 mph**	**Southwest Wind**		
		1-Low		
			7:00	0.8
			7:30	3.1
			8:00	9.0
			8:30	15.7
			9:00	20.3
			9:30	22.2
			10:00	24.7
			10:30	28.0
			11:00	32.3
			11:30	38.4
			12:00	46.2

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**05 mph**	**Southwest Wind**		
		2-Medium		
			0:30	0.1
			1:00	0.5
			1:30	1.3
			2:00	2.4
			2:30	3.8
			3:00	5.4
			3:30	7.3
			4:00	9.3
			4:30	11.5
			5:00	13.8
			5:30	15.9
			6:00	17.7
			6:30	19.3
			7:00	1.4
			7:30	2.6
			8:00	3.4
			8:30	4.0
			9:00	4.3

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**10 mph**	**Northeast Wind**		
		1-Low		
			1:30	15.1
			2:00	53.4
			2:30	92.5
			3:00	114.0
			3:30	132.4
			4:00	146.0
		2-Medium		
			1:00	16.5
			1:30	84.4
			2:00	131.6
			2:30	153.0
			3:00	174.4
			3:30	203.8
			4:00	232.2
		3-High		
			1:30	1.8
			2:00	19.4
			2:30	35.8
			3:00	51.0
			3:30	67.6
			4:00	80.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
Airfield	**15 mph**	**Northeast Wind**		
		1-Low		
			1:00	4.8
			1:30	45.9
			2:00	94.1
			2:30	119.5
			3:00	140.4
			3:30	156.6
			4:00	176.3
		2-Medium		
			1:00	85.9
			2:00	110.8
			2:30	146.5
			3:00	185.6
			3:30	220.8
			4:00	240.5
		3-High		
			1:00	1.8
			1:30	82.7
			2:00	103.6
			2:30	128.8
			3:00	135.5

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**20 mph**	**Northeast Wind**		
		1-Low		
			1:00	14.2
			1:30	62.0
			2:00	104.7
			2:30	128.2
			3:00	149.3
			3:30	169.2
			4:00	195.2
		2-Medium		
			0:30	13.4
			1:00	123.1
			1:30	149.4
			2:00	181.1
			2:30	223.8
			3:00	265.2
			3:30	291.9
			4:00	299.1
		3-High		
			1:00	24.9
			1:30	47.6
			2:00	76.1
			2:30	84.5

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Skippy	**20 mph**	**Northeast Wind**		
		1-Low		
			3:30	18.5
			4:00	77.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**10 mph**	**Northeast Wind**		
		3-High		
			0:30	2.1
			1:00	10.5
			1:30	25.2
			2:00	38.3
			2:30	51.4
			3:00	63.9
			3:30	76.3
			4:00	88.5

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**15 mph**	**Northeast Wind**		
		3-High		
			0:30	4.9
			1:00	22.4
			1:30	37.8
			2:00	52.7
			2:30	68.1
			3:00	84.6
			3:30	102.1
			4:00	119.4

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**20 mph**	**Northeast Wind**		
		3-High		
			0:30	8.6
			1:00	27.8
			1:30	43.0
			2:00	58.4
			2:30	75.8
			3:00	94.9
			3:30	113.8
			4:00	131.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**10 mph**	**Northeast Wind**		
		1-Low		
			1:00	0.2
			1:30	45.3
			2:00	97.4
			2:30	158.1
			3:00	230.7
			3:30	293.9
			4:00	355.5
		2-Medium		
			3:30	1.0
			4:00	8.0

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**15 mph**	**Northeast Wind**		
		1-Low		
			1:00	153.4
			2:00	258.5
			2:30	355.3
			3:00	426.5
			3:30	485.0
			4:00	537.4
		2-Medium		
			2:00	4.2
			2:30	45.0
			3:00	102.3
			3:30	160.6
			4:00	206.6
		3-High		
			2:30	1.9
			3:00	42.4
			3:30	120.2
			4:00	188.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-14	**20 mph**	**Northeast Wind**		
		1-Low		
			0:30	5.5
			1:00	129.6
			1:30	264.4
			2:00	363.2
			2:30	436.3
			3:00	503.4
			3:30	555.3
			4:00	612.6
		2-Medium		
			1:30	20.2
			2:00	90.6
			2:30	143.6
			3:00	196.2
			3:30	250.6
			4:00	302.5
		3-High		
			2:00	43.8
			2:30	152.9
			3:00	222.9
			3:30	268.6
			4:00	302.3

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**10 mph**	**Northeast Wind**		
		2-Medium		
			3:30	0.0
			4:00	1.2
		3-High		
			0:30	2.1
			1:00	7.2
			1:30	12.4
			2:00	18.5
			2:30	24.6
			3:00	30.6
			3:30	36.6
			4:00	41.7

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**15 mph**	**Northeast Wind**		
		2-Medium		
			3:00	0.1
			3:30	2.4
			4:00	7.6
		3-High		
			0:30	4.2
			1:00	9.7
			1:30	16.2
			2:00	23.1
			2:30	30.2
			3:30	43.8
			4:00	48.2

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**20 mph**	**Northeast Wind**		
		2-Medium		
			3:00	0.2
			3:30	3.6
			4:00	9.5
		3-High		
			0:30	4.9
			1:00	10.8
			1:30	17.4
			2:00	24.3
			2:30	31.6
			3:00	39.6
			3:30	45.4
			4:00	50.2

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**10 mph**	**Northeast Wind**		
		1-Low		
			2:00	0.9
			2:30	8.0
			3:00	13.5
			3:30	18.8
			4:00	23.7

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**15 mph**	**Northeast Wind**		
		1-Low		
			1:30	7.4
			2:00	15.8
			2:30	25.6
			3:00	38.6
			3:30	46.2
			4:00	52.8

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**20 mph**	**Northeast Wind**		
		1-Low		
			1:00	5.5
			1:30	15.6
			2:00	30.2
			2:30	42.4
			3:00	50.7
			3:30	57.9
			4:00	64.1

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**10 mph**	**Northeast Wind**		
		1-Low		
			3:30	7.4
			4:00	23.2

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**15 mph**	**Northeast Wind**		
		1-Low		
			2:00	4.3
			2:30	33.5
			3:00	69.0
			3:30	82.3
			4:00	93.3

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**20 mph**	**Northeast Wind**		
		1-Low		
			1:30	8.7
			2:00	58.2
			2:30	78.2
			3:00	90.6
			3:30	105.7
			4:00	128.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**10 mph**	**Northeast Wind**		
		1-Low		
			2:30	0.5
			3:00	6.5
			3:30	14.9
			4:00	24.6
		2-Medium		
			0:30	3.1
			1:00	15.7
			1:30	38.0
			2:00	60.3
			2:30	80.8
			3:00	98.2
			3:30	113.3
			4:00	125.3

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**15 mph**	**Northeast Wind**		
		1-Low		
			2:00	2.3
			2:30	13.3
			3:00	27.1
			3:30	41.7
			4:00	57.6
		2-Medium		
			0:30	8.4
			1:00	38.2
			1:30	69.6
			2:00	99.4
			2:30	118.3
			3:00	128.3
			3:30	133.3
			4:00	136.8

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**20 mph**	**Northeast Wind**		
		1-Low		
			1:30	0.6
			2:00	9.3
			2:30	24.7
			3:00	41.0
			3:30	59.5
			4:00	75.7
		2-Medium		
			0:30	16.5
			1:00	54.9
			1:30	93.8
			2:00	116.1
			2:30	126.3
			3:00	131.2
			3:30	135.1
			4:00	138.5

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**10 mph**	**Northwest Wind**		
		1-Low		
			1:00	3.9
			1:30	50.2
			2:00	121.1
			2:30	160.5
			3:00	187.3
			3:30	213.1
			4:00	229.4
		2-Medium		
			1:30	12.5
			2:00	41.8
			2:30	105.0
			3:00	191.1
			3:30	242.7
			4:00	273.7
		3-High		
			3:00	7.6
			4:00	20.1

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**15 mph**	**Northwest Wind**		
		1-Low		
			1:00	41.5
			1:30	138.9
			2:00	190.1
			2:30	228.0
			3:00	257.5
			3:30	287.1
			4:00	307.2
		2-Medium		
			1:00	4.6
			1:30	31.8
			2:00	153.1
			2:30	236.0
			3:00	280.6
			3:30	297.8
			4:00	305.1
		3-High		
			2:30	4.2
			3:00	20.5
			3:30	40.7
			4:00	68.8

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
Airfield	**20 mph**	**Northwest Wind**		
		1-Low		
			0:30	0.1
			1:00	88.6
			1:30	185.7
			2:00	236.1
			2:30	275.5
			3:00	335.4
			3:30	335.4
			4:00	388.4
		2-Medium		
			1:00	8.3
			1:30	83.5
			2:00	214.4
			2:30	269.2
			3:00	288.0
			3:30	303.4
			4:00	310.6
		3-High		
			2:00	0.0
			2:30	14.4
			3:00	35.3
			3:30	57.8
			4:00	80.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**10 mph**	**Northwest Wind**		
		1-Low		
			3:30	7.9
			4:00	43.8
		2-Medium		
			2:00	1.8
			2:30	13.1
			3:00	32.2
			3:30	52.9
			4:00	67.0
		3-High		
			0:30	2.1
			1:00	10.4
			1:30	25.7
			2:00	46.4
			2:30	65.0
			3:00	83.8
			3:30	104.0
			4:00	122.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**15 mph**	**Northwest Wind**		
		1-Low		
			2:00	0.3
			2:30	37.4
			3:00	91.6
			3:30	210.9
			4:00	289.8
		2-Medium		
			1:30	8.9
			2:00	38.3
			2:30	62.2
			3:00	77.6
			3:30	92.4
			4:00	116.1
		3-High		
			0:30	4.8
			1:00	24.2
			1:30	50.6
			2:00	77.2
			2:30	108.3
			3:00	141.2
			3:30	171.4
			4:00	201.6

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-10	**20 mph**	**Northwest Wind**		
		1-Low		
			1:30	1.7
			2:30	126.2
			3:00	238.8
			3:30	278.7
			4:00	337.0
		2-Medium		
			1:00	4.9
			1:30	40.1
			2:00	123.4
			2:30	146.3
			3:00	182.2
			3:30	221.6
			4:00	254.6
		3-High		
			0:30	8.5
			1:00	37.8
			1:30	68.9
			2:00	107.1
			2:30	153.3
			3:00	201.0
			3:30	246.8
			4:00	285.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**10 mph**	**Northwest Wind**		
		1-Low		
			2:00	11.9
			2:30	28.6
			3:00	47. 0
			3:30	68.6
			4:00	92.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**15 mph**	**Northwest Wind**		
		1-Low		
			1:30	6.9
			2:00	29.7
			2:30	56.3
			3:00	92.8
			3:30	134.4
			4:00	179.5

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-14	**20 mph**	**Northwest Wind**		
		1-Low		
			1:30	13.6
			2:00	39.7
			2:30	79.7
			3:00	130.6
			3:30	182.6
			4:00	233.3

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**10 mph**	**Northwest Wind**		
		1-Low		
			2:30	6.1
			3:00	52.4
			3:30	59.5
			4:00	41.3
		2-Medium		
			1:30	0.7
			2:00	7.9
			2:30	30.4
			3:00	67.7
			3:30	103.1
			4:00	130.8
		3-High		
			0:30	2.1
			1:00	9.9
			1:30	20.8
			2:00	30.9
			2:30	34.4
			3:00	44.0
			3:30	48.4
			4:00	51.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**15 mph**	**Northwest Wind**		
		1-Low		
			1:30	0.8
			2:00	73.7
			2:30	153.7
			3:00	171.5
			3:30	200.5
			4:00	225.6
		2-Medium		
			1:00	0.6
			1:30	20.6
			2:00	80.9
			2:30	129.8
			3:00	179.5
			3:30	219.2
			4:00	248.8
		3-High		
			0:30	4.8
			1:00	19.8
			1:30	33.9
			2:00	40.5
			2:30	45.5
			3:00	48.9
			3:30	53.1
			4:00	56.7

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-17	**20 mph**	**Northwest Wind**		
		1-Low		
			1:30	63.8
			2:30	213.7
			3:00	249.0
			3:30	283.3
			4:00	303.8
		2-Medium		
			1:00	6.4
			1:30	80.8
			2:00	150.0
			2:30	210.4
			3:00	249.6
			3:30	275.1
			4:00	302.0
		3-High		
			0:30	8.4
			1:00	28.4
			1:30	36.8
			2:00	42.4
			2:30	45.9
			3:00	50.5
			3:30	54.1
			4:00	57.2

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**15 mph**	**Northwest Wind**		
		1-Low		
			4:00	0.1

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 A	**20 mph**	**Northwest Wind**		
		1-Low		
			3:30	0.0
			4:00	2.8

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-22 B	**20 mph**	**Northwest Wind**		
		1-Low		
			4:00	5.7

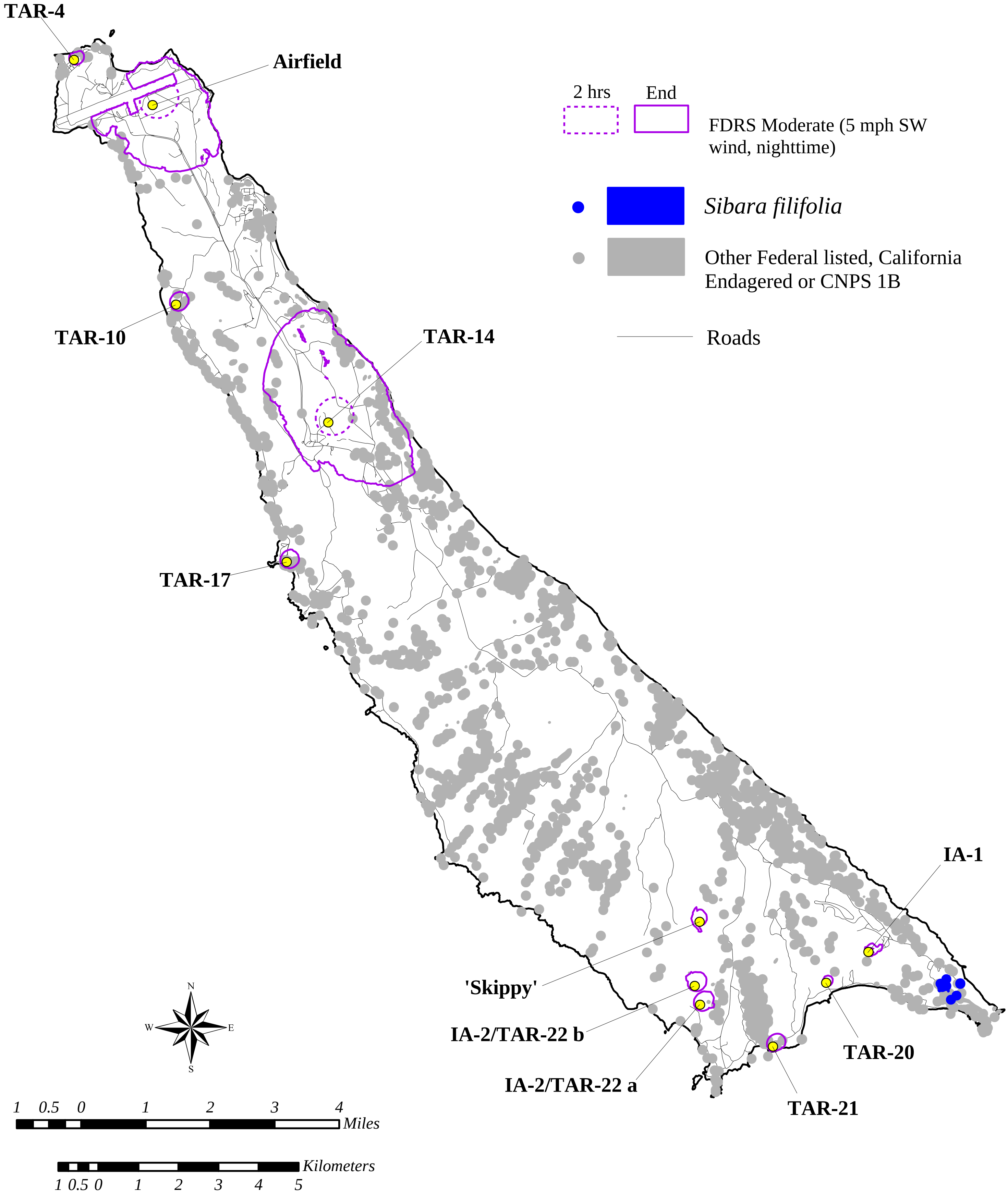
Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-4	**10 mph**	**Northwest Wind**		
		1-Low		
			1:30	7.6
			2:00	25.9
			2:30	52.7
			3:00	85.7
			3:30	121.8
			4:00	139.8
		2-Medium		
			0:30	3.1
			1:00	15.5
			1:30	31.9
			2:00	47.3
			2:30	63.1
			3:00	79.4
			3:30	95.1
			4:00	109.9

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time *(hr:min)*	Cumulative Acres Burned
TAR-4	**15 mph**	**Northwest Wind**		
		1-Low		
			1:00	12.3
			1:30	52.0
			2:00	108.0
			2:30	138.2
			3:00	150.3
			3:30	151.0
		2-Medium		
			0:30	8.3
			1:00	29.3
			1:30	47.9
			2:00	70.0
			2:30	91.9
			3:00	113.6
			3:30	131.3
			4:00	141.3

Fire ID	Wind Speed	Sparrow Habitat	Elapsed Time (hr:min)	Cumulative Acres Burned
TAR-4	**20 mph**	**Northwest Wind**		
		1-Low		
			0:30	1.6
			1:00	44.1
			1:30	111.3
			2:00	140.8
			2:30	150.9
			3:00	150.9
		2-Medium		
			0:30	14.8
			1:00	35.8
			1:30	57.4
			2:00	83.8
			2:30	110.3
			3:00	130.6
			3:30	141.9
			4:00	148.0

FARSITE Models - Southwest Winds, Nighttime

Sibara filifolia

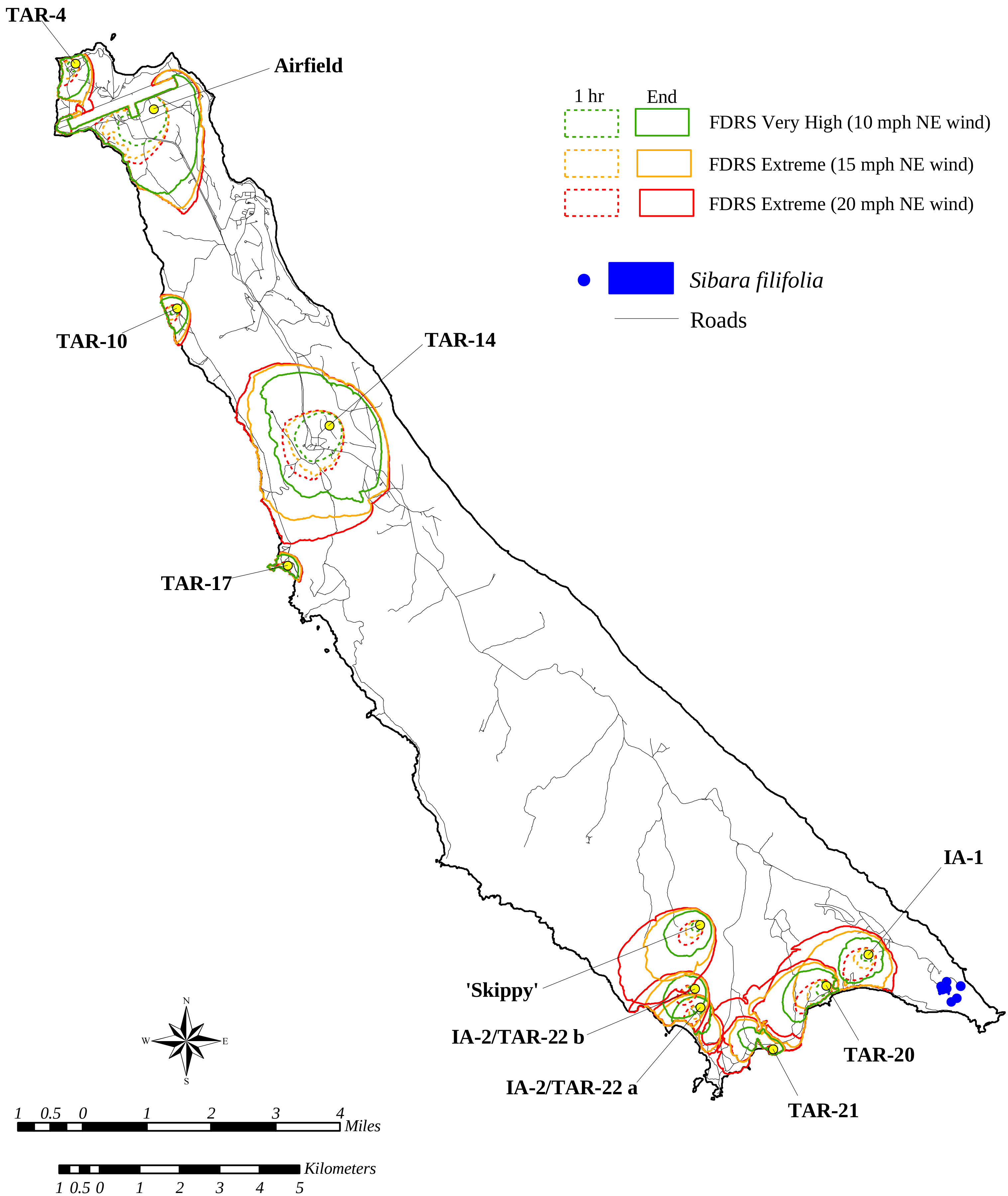


Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 2-hour Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0

FARSITE Models - Northeast Winds
Sibara filifolia



Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***'Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

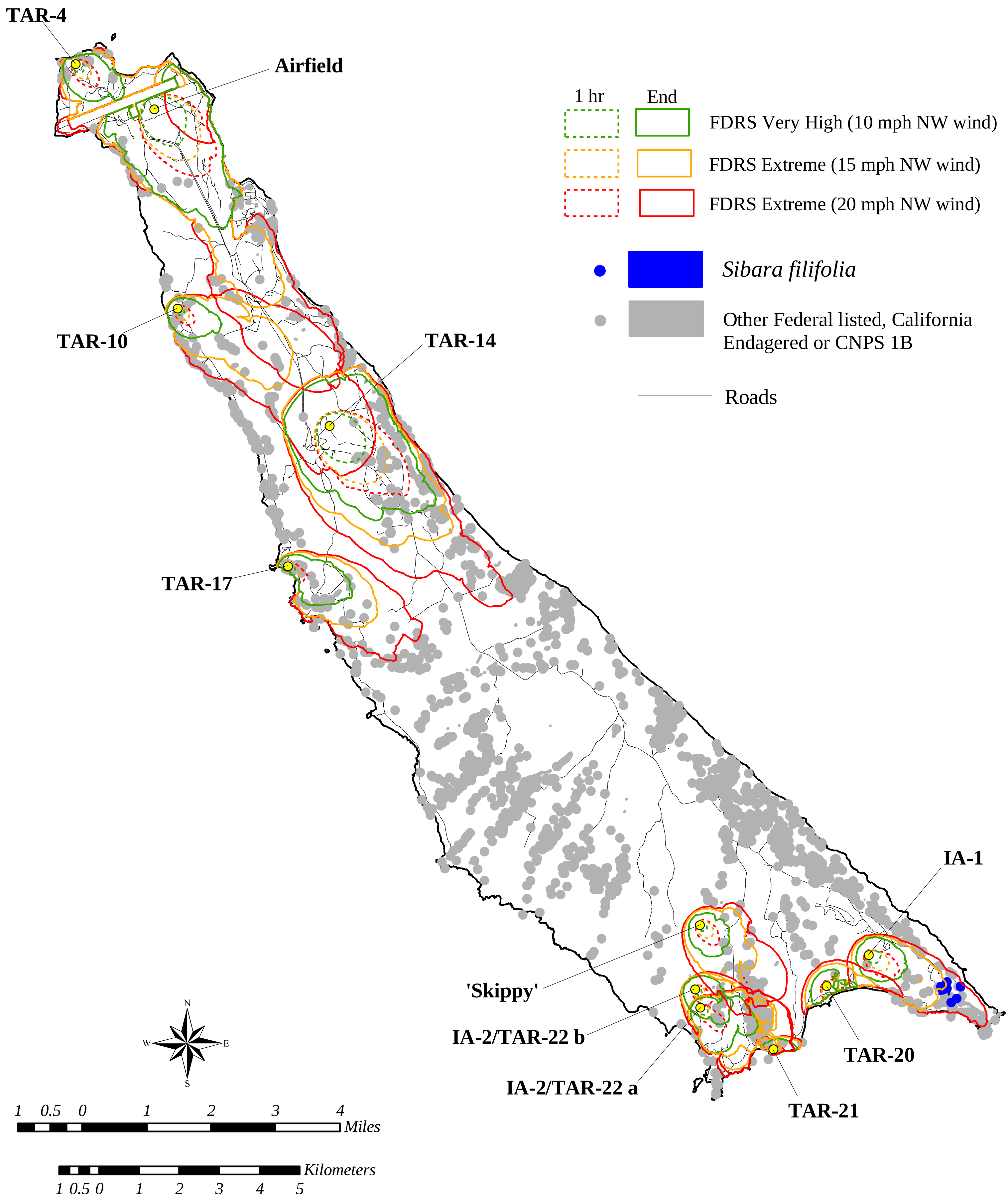
FDRS Extreme, 15 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***'Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***'Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FARSITE Models - Northwest Winds
Sibara filifolia



Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 15 mph NW (315°) wind

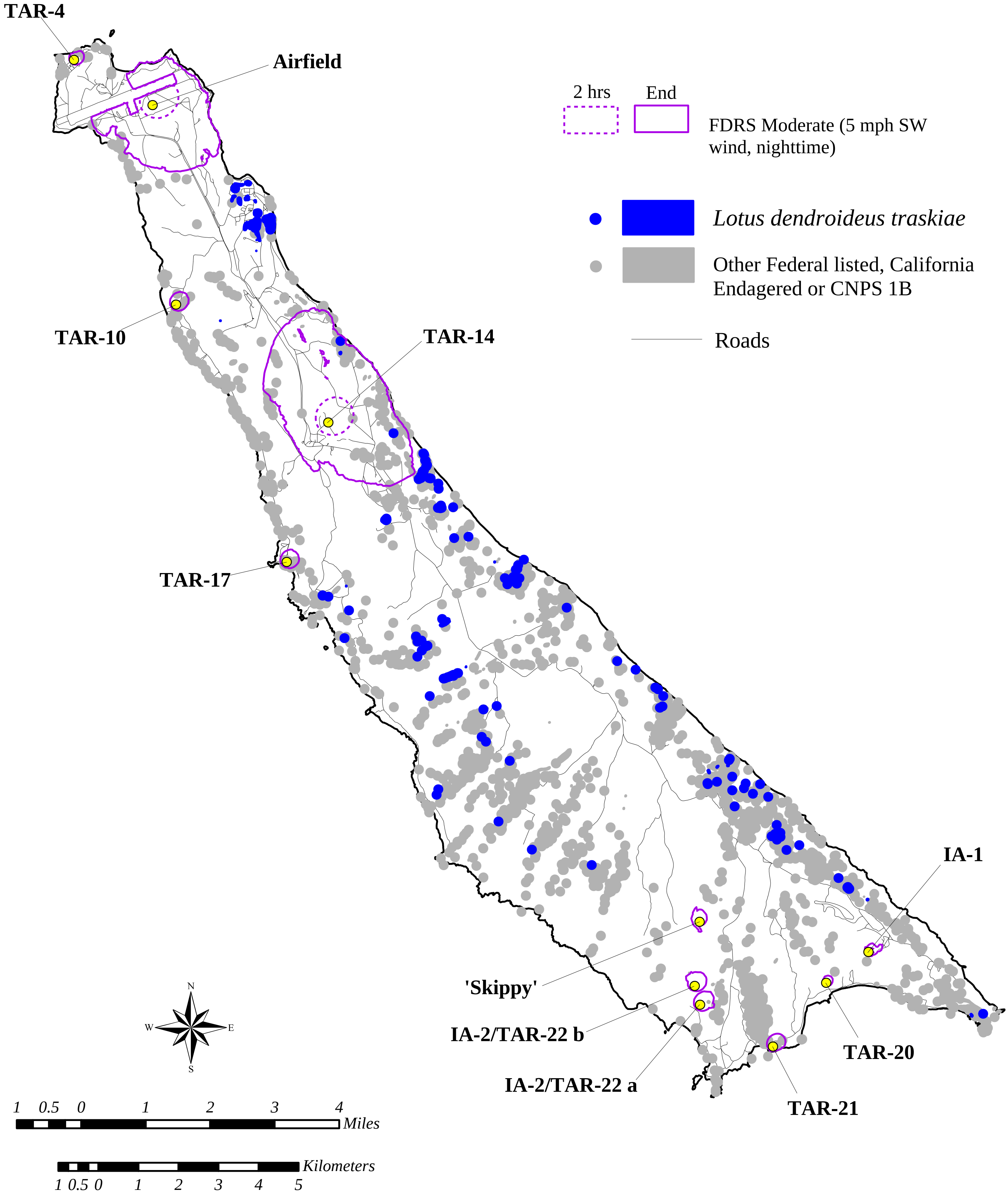
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	1//11	0	0	0	0

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	2//61	0	0	0	0
1600	0	0	0	0	0	0	11//800+	0	0	0	0
1630	0	0	0	0	0	0	14//850+	0	0	0	0
1700	0	0	0	0	0	0	14//850+	0	0	0	0

FARSITE Models - Southwest Winds, Nighttime

Lotus dendroideus traskiae



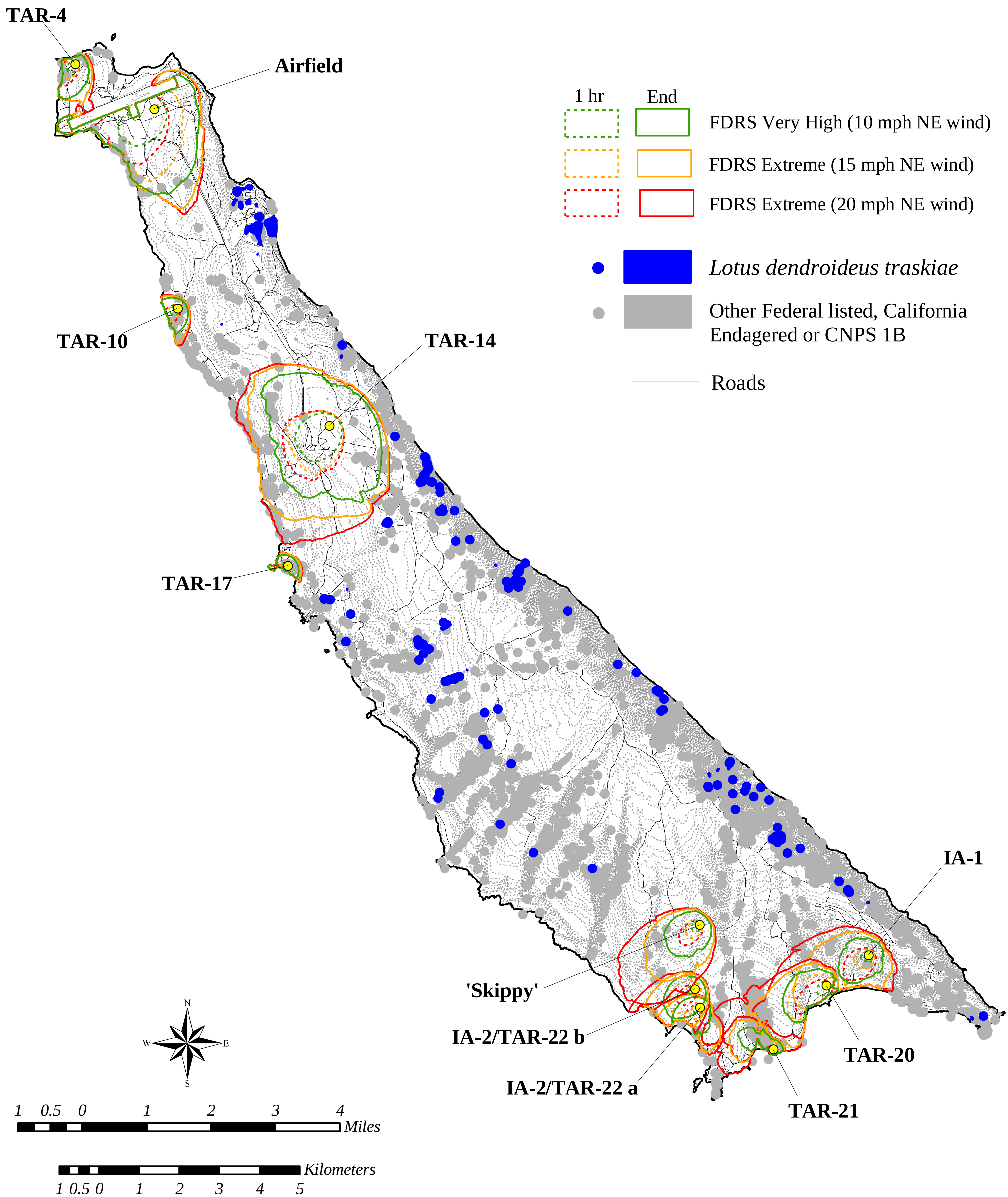
Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 2-hour Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	2//2	0	0	0	0	0	0	0
4:00	0	0	0	3//3	0	0	0	0	0	0	0
6:00	0	0	0	3//3	0	0	0	0	0	0	0

FARSITE Models - Northeast Winds

Lotus dendroideus traskiae



Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	*TAR-4*	*Airfield*	*TAR-10*	*TAR-14*	*TAR-17*	*TAR-20*	*Impact Area 1*	*TAR-21*	*IA-2/ TAR-22a*	*IA-2/ TAR-22b*	*'Skippy'*
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 15 mph NE (45°) wind

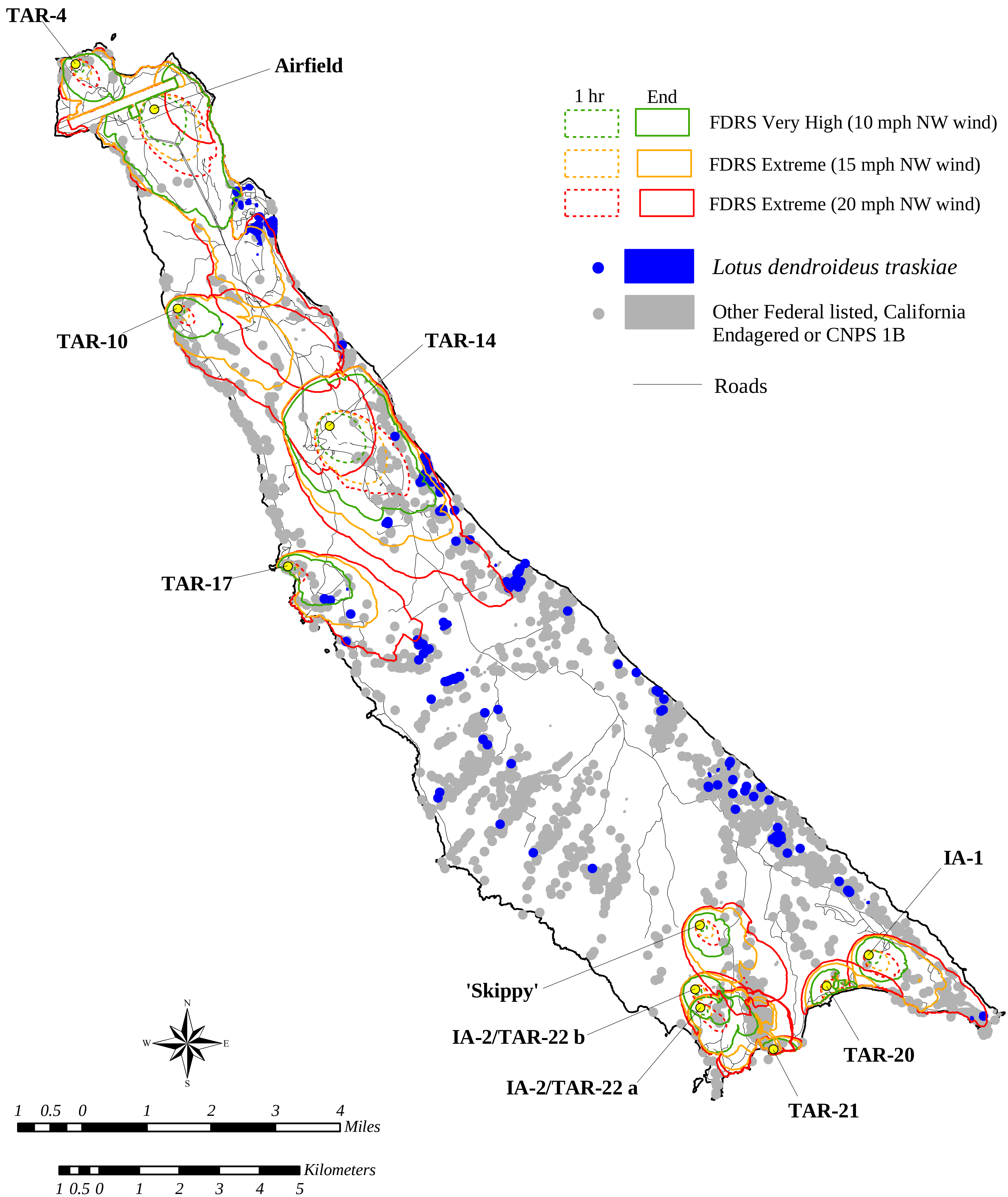
	Acreage Burned by 30-minute Intervals										
Time	*TAR-4*	*Airfield*	*TAR-10*	*TAR-14*	*TAR-17*	*TAR-20*	*Impact Area 1*	*TAR-21*	*IA-2/ TAR-22a*	*IA-2/ TAR-22b*	*'Skippy'*
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	*TAR-4*	*Airfield*	*TAR-10*	*TAR-14*	*TAR-17*	*TAR-20*	*Impact Area 1*	*TAR-21*	*IA-2/ TAR-22a*	*IA-2/ TAR-22b*	*'Skippy'*
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FARSITE Models - Northwest Winds

Lotus dendroideus traskiae



Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	1//1	0	0	0	0	0	0	0
1530	0	0	0	2//8	0	0	0	0	0	0	0
1600	0	0	0	4//73	0	0	0	0	0	0	0
1630	0	0	0	5//74	2//46	0	0	0	0	0	0
1700	0	2//50	0	5//74	3//63	0	0	0	0	0	0

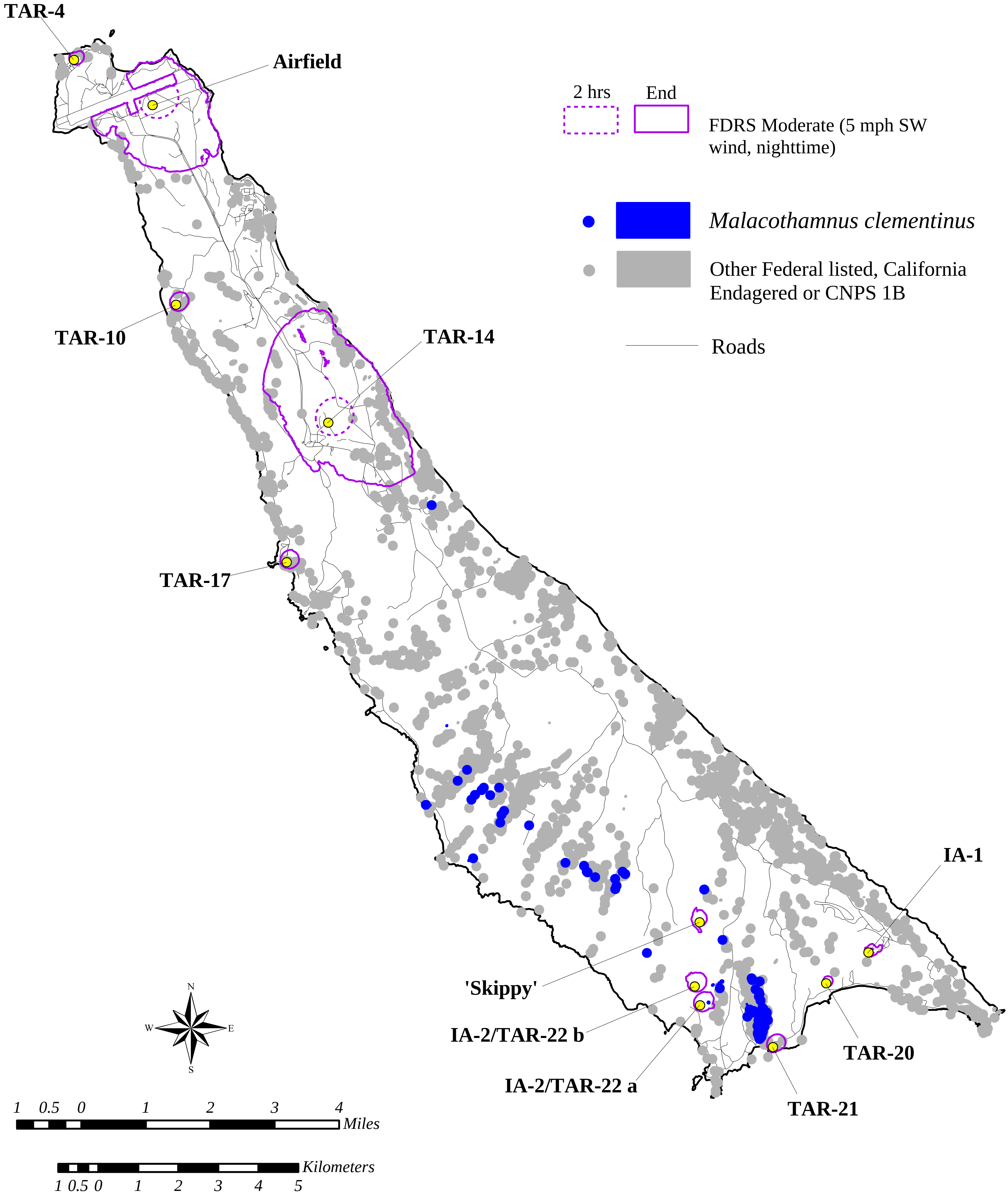
FDRS Extreme, 15 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	1//1	0	0	0	0	0	0	0
1500	0	0	0	3//66	2//98	0	0	0	0	0	0
1530	0	2//120	0	4//98	4//129	0	0	0	0	0	0
1600	0	2//220	1//10	7//304	4//129	0	0	0	0	0	0
1630	0	4//250	1//10	10//452	5//140	0	0	0	0	0	0
1700	0	7//450	1//10	13//507	5//140	0	0	0	0	0	0

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	3//40	2//98	0	0	0	0	0	0
1500	0	2//120	1//10	4//41	3//115	0	0	0	0	0	0
1530	0	3//123	1//10	6//154	4//126	0	0	0	0	0	0
1600	0	6//233	1//10	11//519	4//126	0	0	0	0	0	0
1630	0	8//483	1//10	11//519	4//126	0	0	0	0	0	0
1700	0	11//674	1//10	13//679	5//172	0	2//25	0	0	0	0

FARSITE Models - Southwest Winds, Nighttime
Malacothamnus clementinus

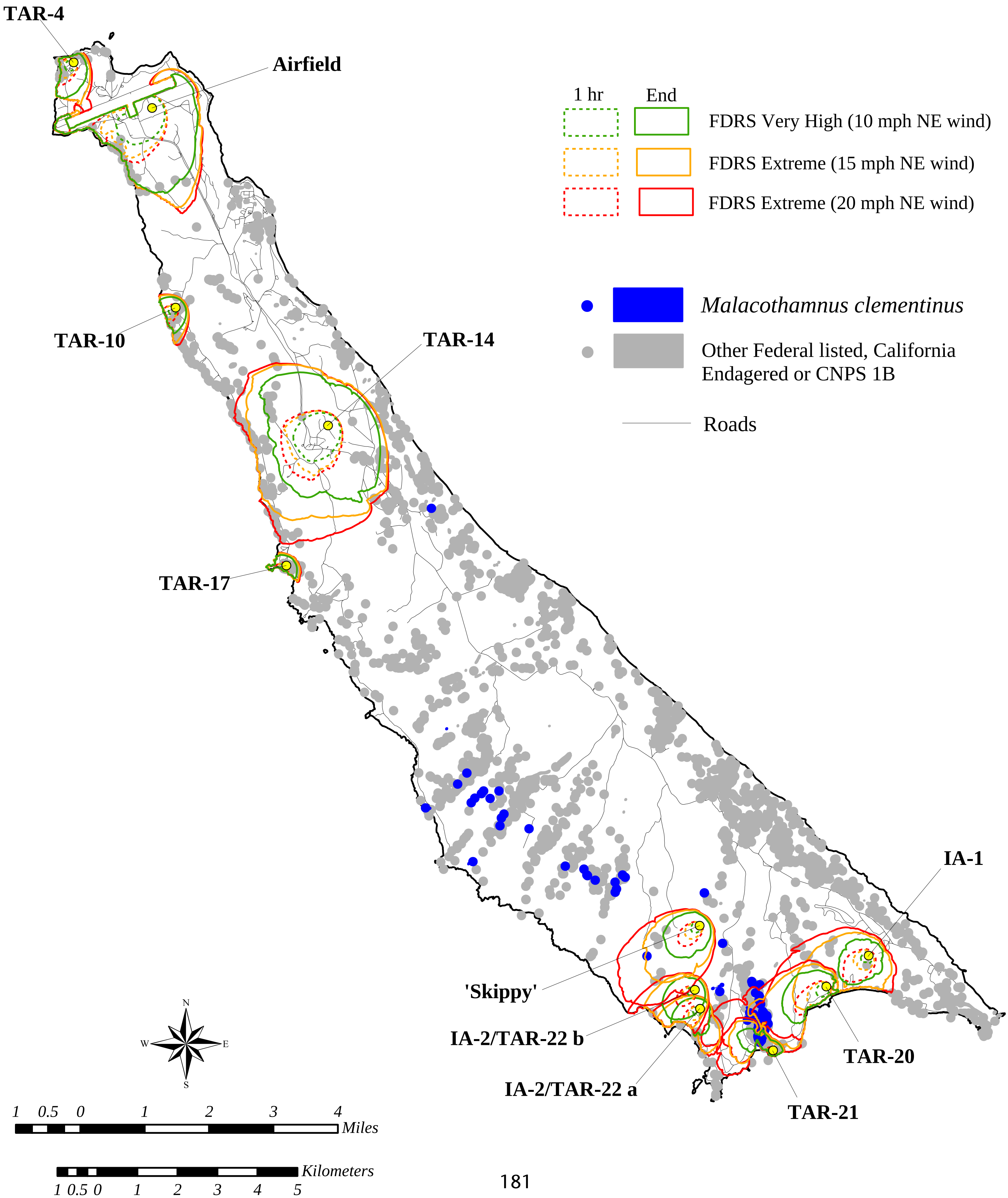


Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 2-hour Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	1//?	0	0
4:00	0	0	0	0	0	0	0	0	1//?	0	0
6:00	0	0	0	0	0	0	0	0	1//?	0	0

FARSITE Models - Northeast Winds
Malacothamnus clementinus



Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	2//17	0	0	0
1600	0	0	0	0	0	0	0	5//426	0	0	0
1630	0	0	0	0	0	0	0	5//826	0	0	0
1700	0	0	0	0	0	0	0	6//827	1//?	0	0

FDRS Extreme, 15 mph NE (45°) wind

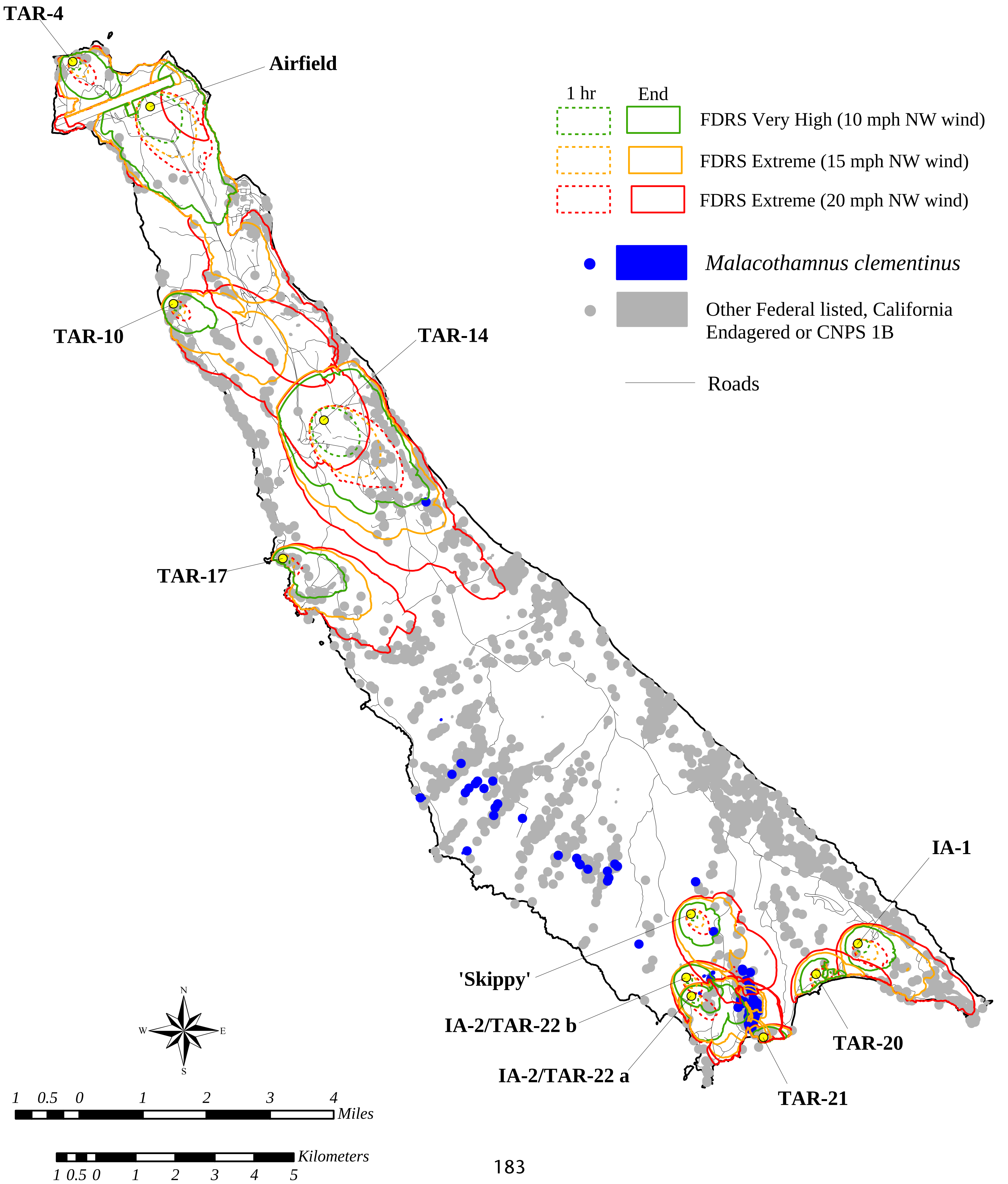
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	2//17	0	0	0
1530	0	0	0	0	0	0	0	5//426	0	0	0
1600	0	0	0	0	0	0	0	5//826	0	0	0
1630	0	0	0	0	0	0	0	9//827	1//?	0	0
1700	0	0	0	0	0	5//151	0	7//837	1//?	0	1//?

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	3//23	0	0	0
1530	0	0	0	0	0	2//35	0	6//432	0	0	1//?
1600	0	0	0	0	0	16//1158	0	7//833	0	0	1//?
1630	0	0	0	0	0	17//1158+	0	7//833	1//?	0	1//?
1700	0	0	0	0	0	17//1158+	2//135	9//849	1//?	0	1//?

FARSITE Models - Northwest Winds

Malacothamnus clementinus



Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
	Acreage Burned by 30-minute Intervals										
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	1//?	0	0
1530	0	0	0	0	0	0	0	0	1//?	1//?	0
1600	0	0	0	0	0	0	0	0	1//?	2//?	0
1630	0	0	0	0	0	0	0	0	1//?	4//?	0
1700	0	0	0	0	0	0	0	0	5//25+	6//?	1//28

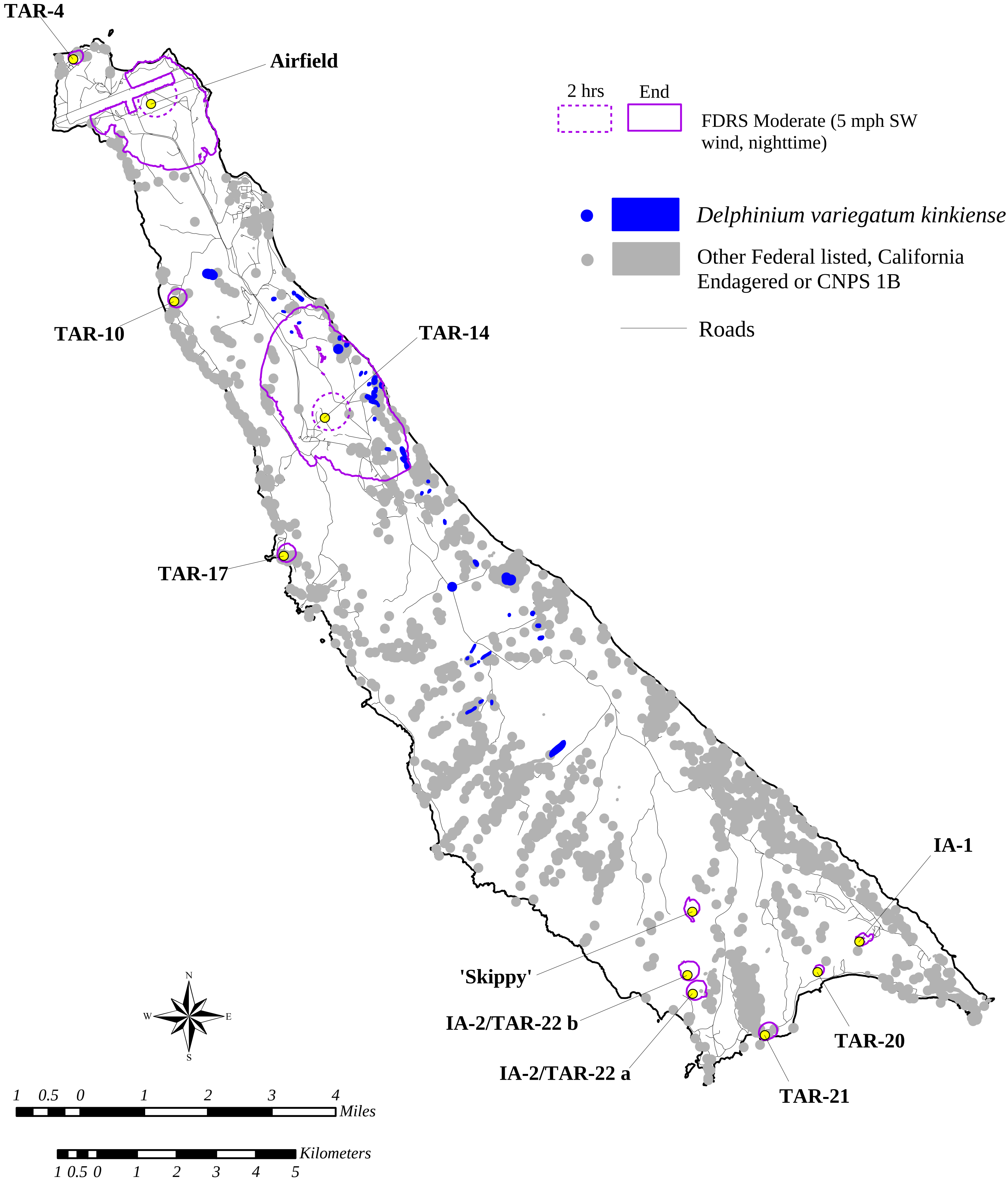
FDRS Extreme, 15 mph NW (315°) wind

Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
	Acreage Burned by 30-minute Intervals										
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	1//?	1//?	0
1500	0	0	0	0	0	0	0	0	1//?	2//?	1//28
1530	0	0	0	1//?	0	0	0	0	3//18+	5//?	1//28
1600	0	0	0	1//?	0	0	0	0	12//453+	9//23+	1//28
1630	0	0	0	1//?	0	0	0	0	17//945+	19//453+	1//28
1700	0	0	0	1//?	0	0	0	1//1	18//955+	21//478+	1//28

FDRS Extreme, 20 mph NW (315°) wind

Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
	Acreage Burned by 30-minute Intervals										
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	1//?	1//?	1//28
1500	0	0	0	1//?	0	0	0	0	3//18+	3//?	1//28
1530	0	0	0	1//?	0	0	0	0	13//473+	14//450+	1//28
1600	0	0	0	1//?	0	0	0	0	20//1105+	21//1060+	2//31
1630	0	0	0	1//?	0	0	0	0	20//1105+	23//1105+	4//31+
1700	0	0	0	1//?	0	0	0	3//23	20//1105+	23//1105+	10//85+

FARSITE Models - Southwest Winds, Nighttime
Delphinium variegatum kinkiense



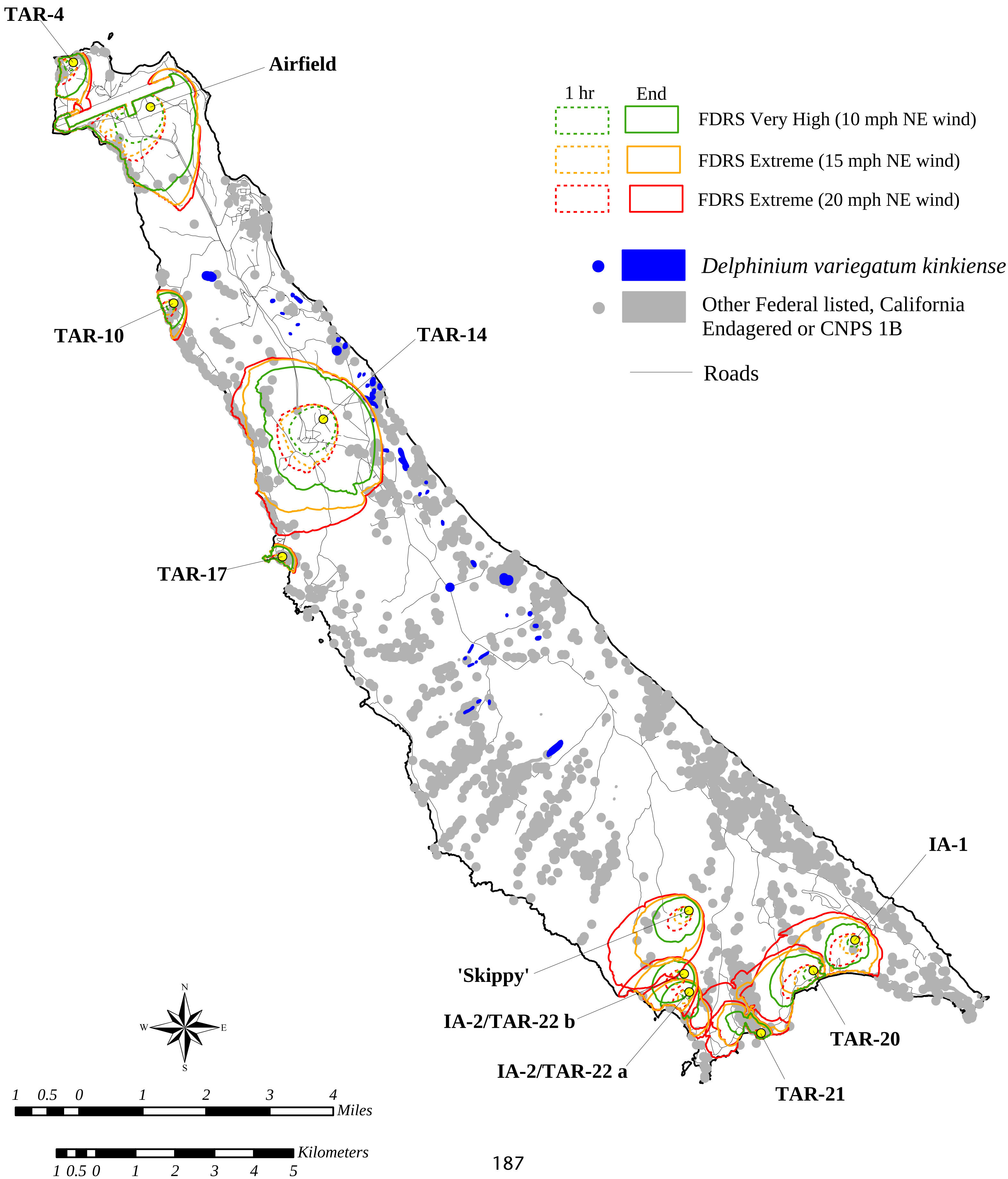
Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 2-hour Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	4//1458	0	0	0	0	0	0	0
0:00	0	0	0	9//3172	0	0	0	0	0	0	0
2:00	0	0	0	16//4452	0	0	0	0	0	0	0
4:00	0	0	0	19//4627+	0	0	0	0	0	0	0
6:00	0	0	0	24//5002+	0	0	0	0	0	0	0

FARSITE Models - Northeast Winds

Delphinium variegatum kinkiense



FARSITE Fire Behavior Model Outputs *Delphinium kinkiense*

Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***'Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

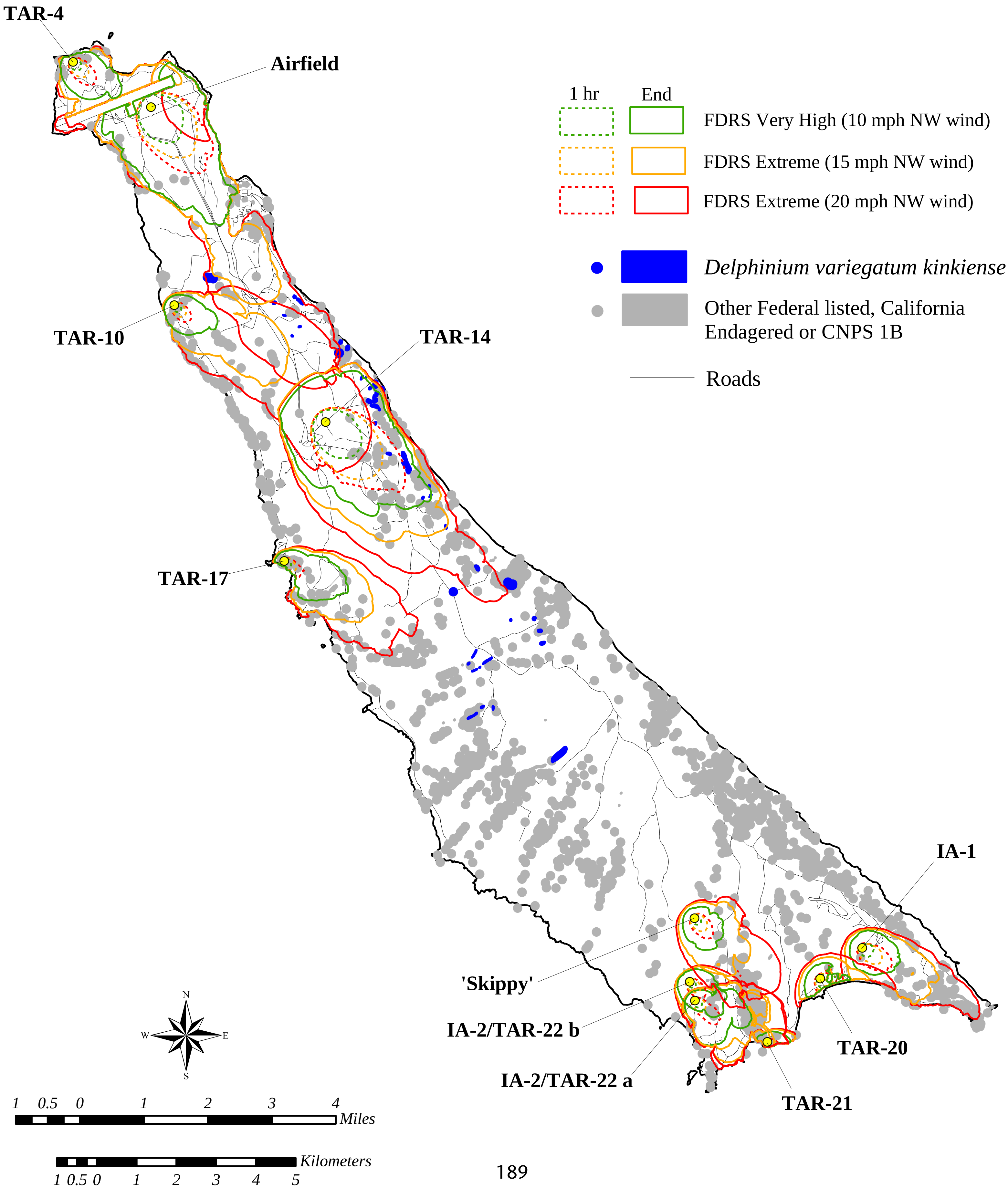
FDRS Extreme, 15 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***'Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	4//118	0	0	0	0	0	0	0

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***'Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	3//100	0	0	0	0	0	0	0

FARSITE Models - Northwest Winds
Delphinium variegatum kinkiense



FARSITE Fire Behavior Model Outputs *Delphinium kinkiense*

Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	3//675	0	0	0	0	0	0	0
1530	0	0	0	10//3000+	0	0	0	0	0	0	0
1600	0	0	0	15//4500+	0	0	0	0	0	0	0
1630	0	0	0	17//5000+	0	0	0	0	0	0	0
1700	0	0	0	20//6300+	0	0	0	0	0	0	0

FDRS Extreme, 15 mph NW (315°) wind

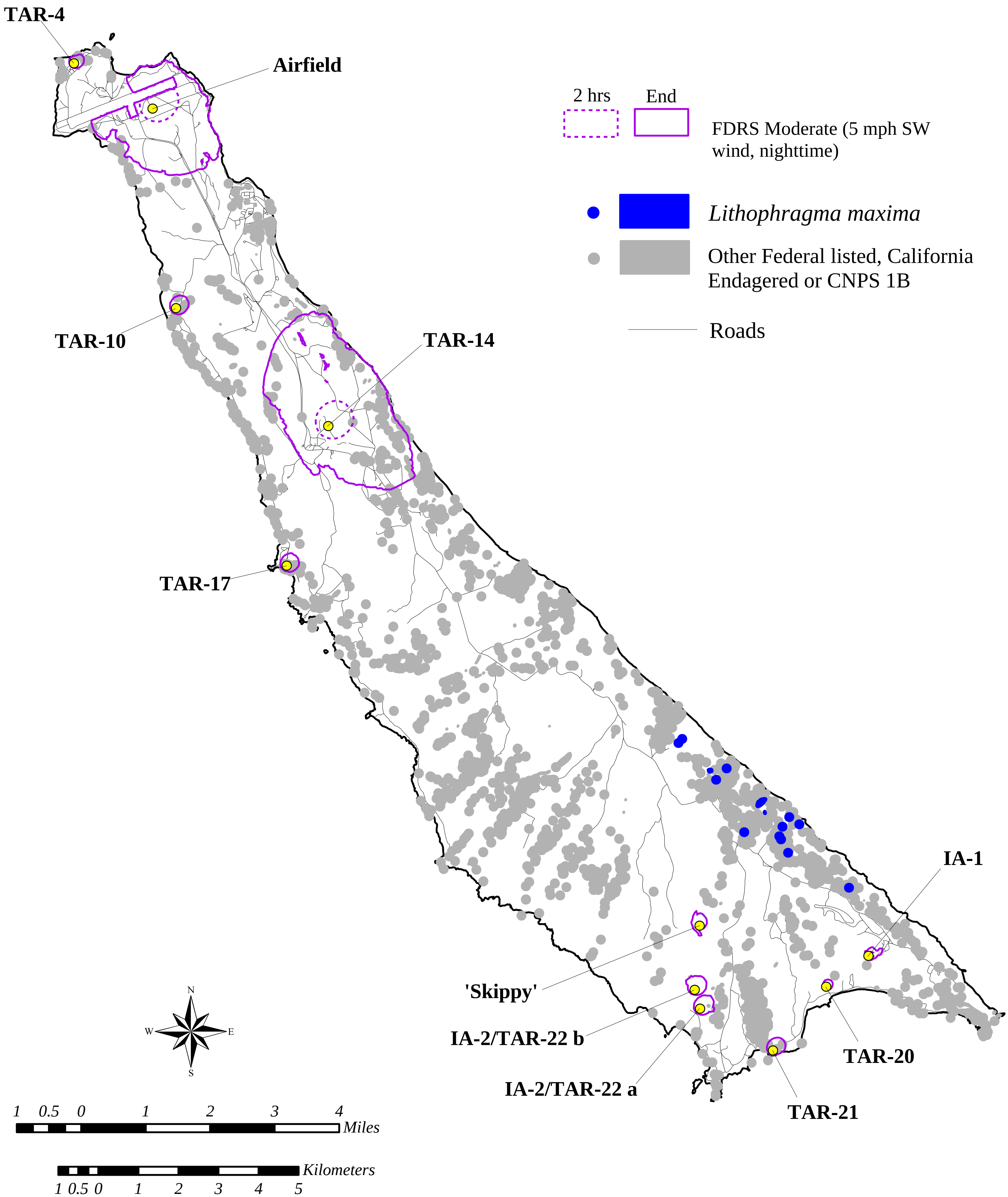
	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	5//2500+	0	0	0	0	0	0	0
1500	0	0	0	11//3500+	0	0	0	0	0	0	0
1530	0	0	0	15//4500+	0	0	0	0	0	0	0
1600	0	0	0	17//4700+	0	0	0	0	0	0	0
1630	0	0	0	18//5250+	0	0	0	0	0	0	0
1700	0	0	0	22//6500+	0	0	0	0	0	0	0

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	1//20	0	0	0	0	0	0	0
1430	0	0	0	7//2750+	0	0	0	0	0	0	0
1500	0	0	0	14//4000+	0	0	0	0	0	0	0
1530	0	0	0	16//4600+	0	0	0	0	0	0	0
1600	0	1//300	0	18//5250+	0	0	0	0	0	0	0
1630	0	6//600+	1//100	22//6500+	0	0	0	0	0	0	0
1700	0	8//5500+	4//550	23//8000+	0	0	0	0	0	0	0

FARSITE Models - Southwest Winds, Nighttime

Lithophragma maxima

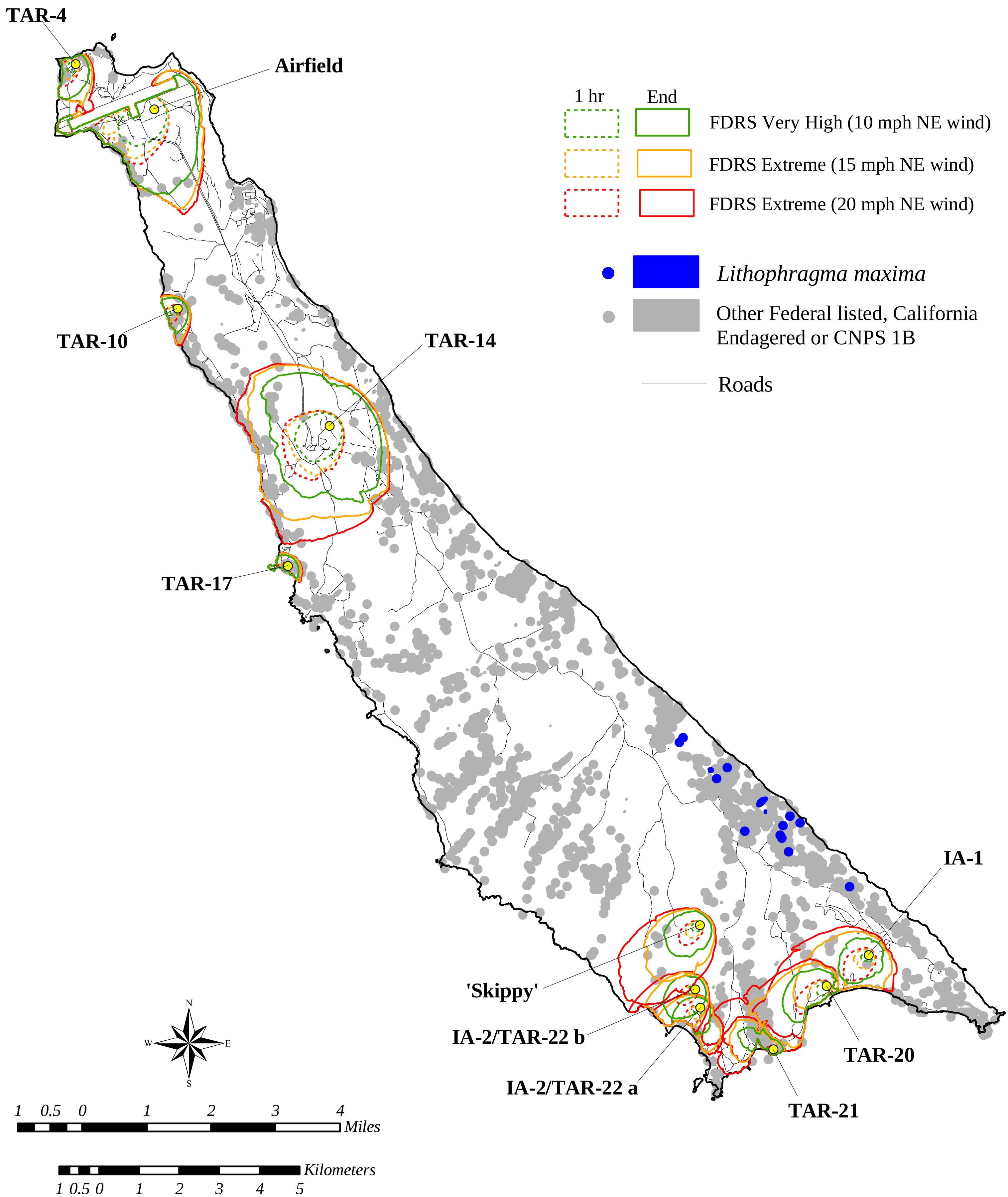


Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 2-hour Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0
6:00	0	0	0	0	0	0	0	0	0	0	0

FARSITE Models - Northeast Winds
Lithophragma maxima



FARSITE Fire Behavior Model Outputs *Lithophragma maxima*

Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

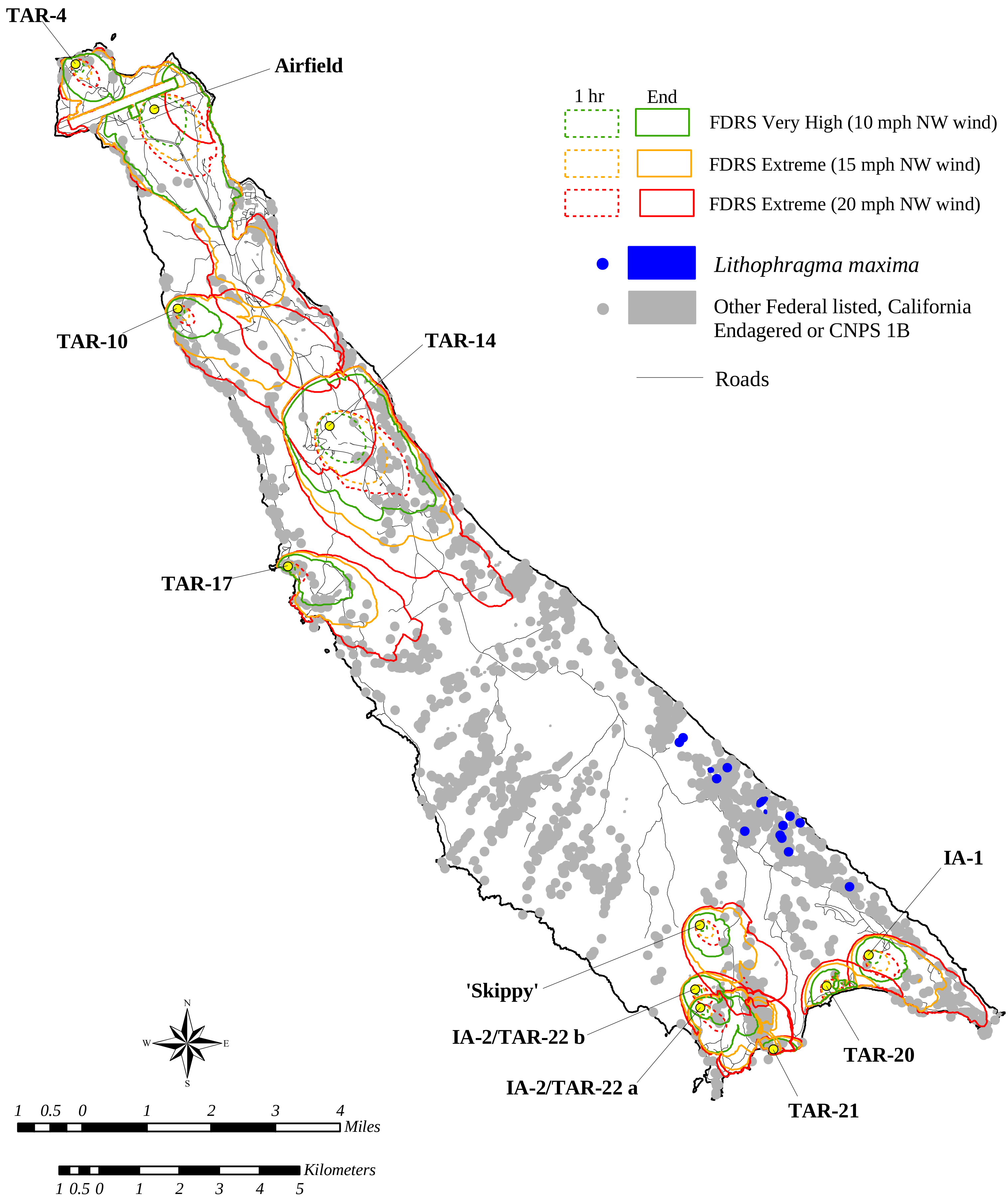
FDRS Extreme, 15 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FARSITE Models - Northwest Winds
Lithophragma maxima



FARSITE Fire Behavior Model Outputs *Lithophragma maxima*

Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

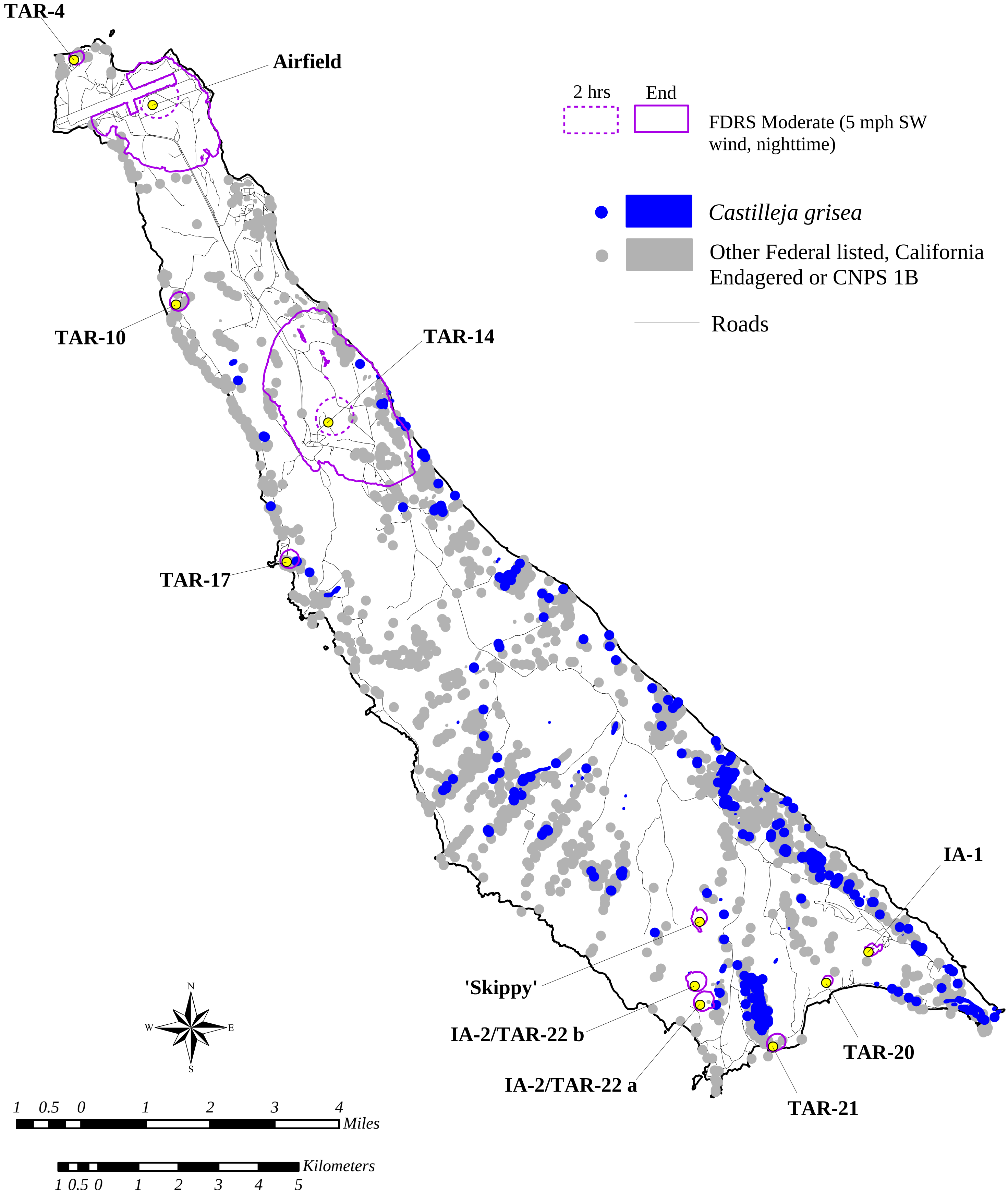
FDRS Extreme, 15 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	TAR-4	Airfield	TAR-10	TAR-14	TAR-17	TAR-20	Impact Area 1	TAR-21	IA-2/ TAR-22a	IA-2/ TAR-22b	'Skippy'
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FARSITE Models - Southwest Winds, Nighttime
Castilleja grisea



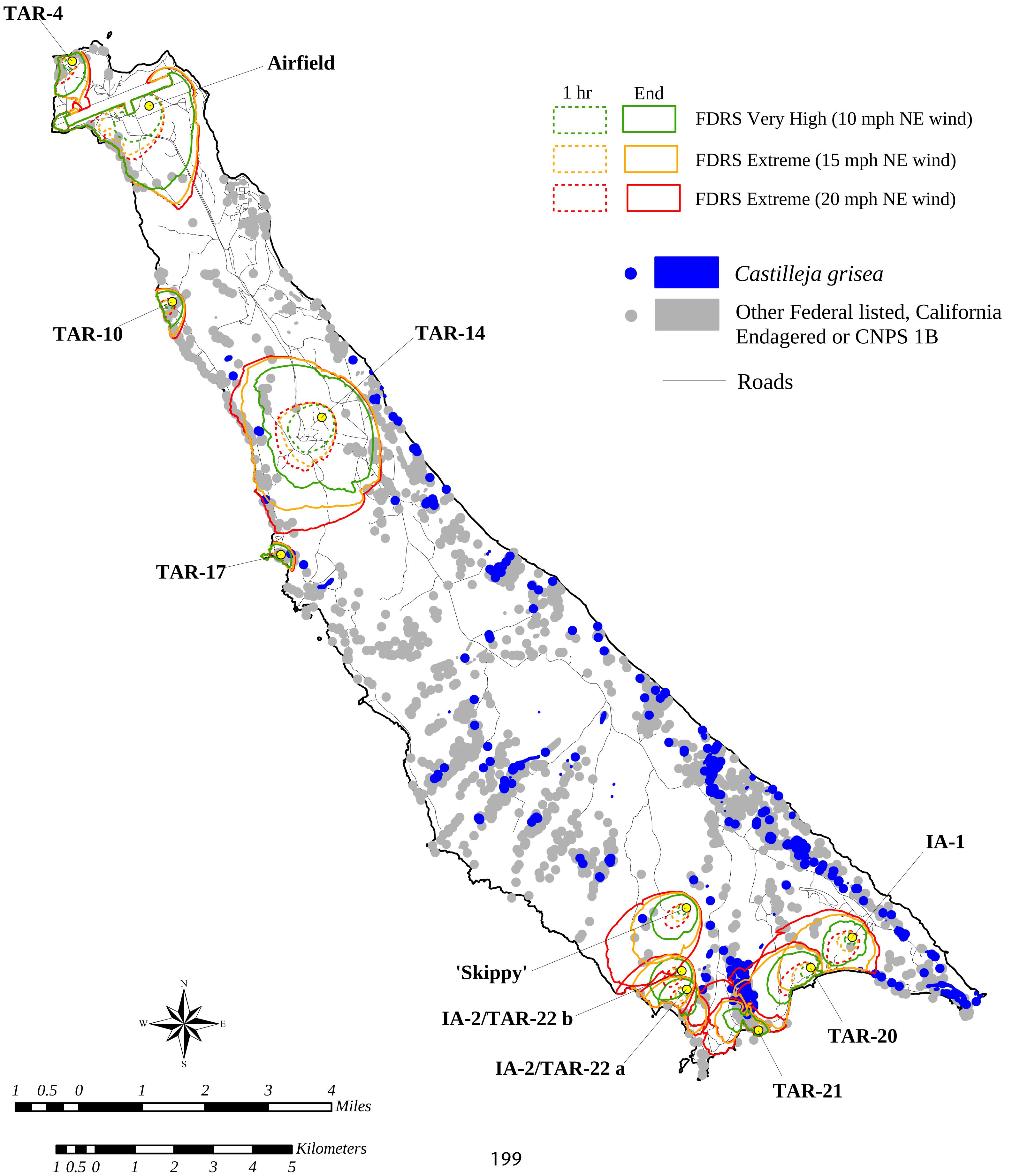
Southwest Winds (Nighttime)

FDRS Moderate, 5 mph SW (225°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
18:00	0	0	0	0	0	0	0	0	0	0	0
20:00	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	3//130+	0	0	0	0	0	0	0
2:00	0	0	0	3//130+	0	0	0	0	0	0	0
4:00	0	0	0	3//130+	1//56	0	0	0	0	0	0
6:00	0	0	0	5//147+	1//56	0	0	0	0	0	0

FARSITE Models - Northeast Winds

Castilleja grisea



Northeast Winds

FDRS Very High, 10 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	0	0	0	0	0	0	0	0
1630	0	0	0	0	0	0	0	0	0	0	0
1700	0	0	0	0	0	0	0	0	0	0	0

FDRS Extreme, 15 mph NE (45°) wind

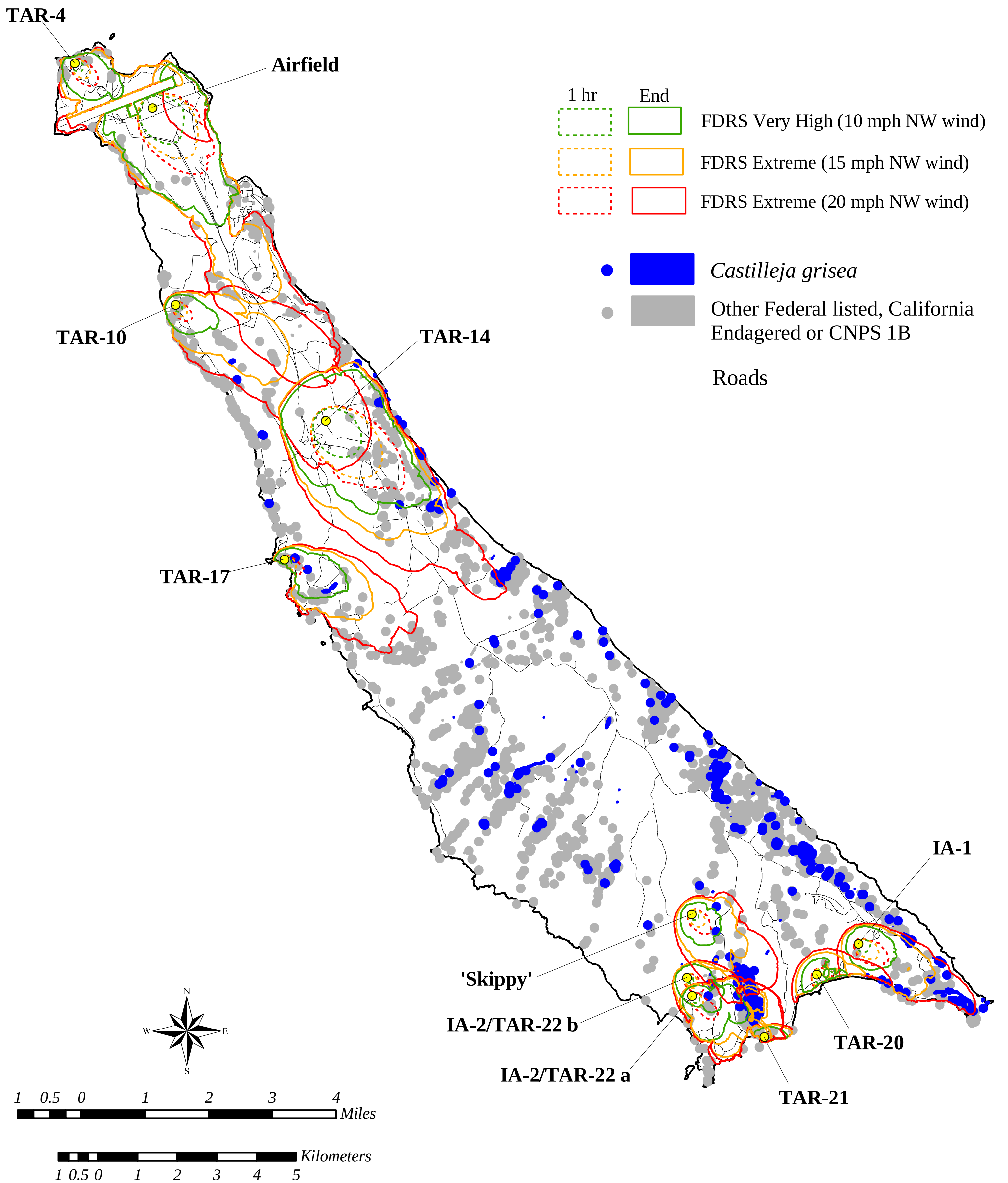
	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	0
1600	0	0	0	1//500	0	0	0	0	0	0	0
1630	0	0	0	1//500	1//111	0	1//50	0	0	1//1	1//14
1700	0	0	0	1//500	1//111	2//3	1//50	0	0	1//1	1//14

FDRS Extreme, 20 mph NE (45°) wind

	Acreage Burned by 30-minute Intervals										
Time	***TAR-4***	***Airfield***	***TAR-10***	***TAR-14***	***TAR-17***	***TAR-20***	***Impact Area 1***	***TAR-21***	***IA-2/ TAR-22a***	***IA-2/ TAR-22b***	***Skippy'***
1300	0	0	0	0	0	0	0	0	0	0	
1330	0	0	0	0	0	0	0	0	0	0	
1400	0	0	0	0	0	0	0	0	0	0	
1430	0	0	0	0	0	0	0	0	0	0	
1500	0	0	0	1//500	0	0	0	0	0	0	
1530	0	0	0	1//500	0	1//1	1//50	0	0	0	1//14
1600	0	0	0	2//501	0	4//313	1//50	0	0	0	2//15
1630	0	0	0	2//501	2//111+	6//648	1//50	0	0	1//1	2//15
1700	0	0	0	2//501	2//111+	7//688	3//53	1//10	0	1//1	2//15

FARSITE Models - Northwest Winds

Castilleja grisea



FARSITE Fire Behavior Model Outputs *Castilleja grisea*

Northwest Winds

FDRS Very High, 10 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	*TAR-4*	*Airfield*	*TAR-10*	*TAR-14*	*TAR-17*	*TAR-20*	*Impact Area 1*	*TAR-21*	*IA-2/ TAR-22a*	*IA-2/ TAR-22b*	*Skippy'*
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	1//56	0	0	0	0	0	0
1530	0	0	0	1//90	2//59	0	0	0	1//23	0	0
1600	0	0	0	2//100	2//59	0	0	0	1//23	1//?	0
1630	0	0	0	2//115	3//79	0	0	0	1//23	3//25+	0
1700	0	0	0	2//130	3//79	0	0	0	3//333	4//25+	1//20

FDRS Extreme, 15 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	*TAR-4*	*Airfield*	*TAR-10*	*TAR-14*	*TAR-17*	*TAR-20*	*Impact Area 1*	*TAR-21*	*IA-2/ TAR-22a*	*IA-2/ TAR-22b*	*Skippy'*
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	2//8	0	0	0	0	0	0
1500	0	0	0	1//90	3//18	0	0	0	1//23	2//23+	1//15
1530	0	0	0	2//140	3//38	0	1//50	0	2//33	3//33+	1//20
1600	0	0	0	5//256	3//38	0	3//131	0	2//33	6//343+	1//20
1630	0	0	1//100	7//280	3//38	0	4//178	0	2//33	6//343+	3//140
1700	0	0	1//200	8//288	3//38	0	5//216	0	9//705	8//498+	3//190

FDRS Extreme, 20 mph NW (315°) wind

	Acreage Burned by 30-minute Intervals										
Time	*TAR-4*	*Airfield*	*TAR-10*	*TAR-14*	*TAR-17*	*TAR-20*	*Impact Area 1*	*TAR-21*	*IA-2/ TAR-22a*	*IA-2/ TAR-22b*	*Skippy'*
1300	0	0	0	0	0	0	0	0	0	0	0
1330	0	0	0	0	0	0	0	0	0	0	0
1400	0	0	0	0	0	0	0	0	0	0	0
1430	0	0	0	0	4//130+	0	0	0	1//23	2//2+	1//20
1500	0	0	0	5//210	4//130+	0	4//178	0	2//33	3//12+	1//20
1530	0	0	1//100	6//220	4//130+	0	5//218	0	3//333	6//322+	3//140
1600	0	0	2//200+	8//255	4//130+	1//10	8//318+	0	6//633	8//325+	5//310+
1630	0	0	2//200+	12//405	4//130+	1//50	12//668+	0	9//713	11//625+	9//550+
1700	0	0	2//200+	13//425+	4//130+	3//131	16//1168+	0	10//723	12//745+	13//890+