Implementation of the Conservation Strategy for Tahoe Yellow Cress (*Rorippa subumbellata*) 2007 Annual Report

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EXECUTIVE SUMMARY

Tahoe yellow cress (*Rorippa subumbellata* Roll.) is a rare species of plant endemic to the shores of Lake Tahoe in California and Nevada. It is listed as "endangered" in both states and is a candidate for federal listing under the Endangered Species Act. Ongoing threats to the species led to development of the Conservation Strategy (CS) for Tahoe yellow cress (Pavlik *et al*. 2002a) that was finalized in 2002 through a memorandum of understanding / conservation agreement (MOU/CA) with 13 signatories.

The overall intent of the CS is to preclude listing Tahoe yellow cress under the Endangered Species Act (ESA) through restoration of a self-sustaining metapopulation dynamic. Such a dynamic should allow the species to persist in sandy beach habitat around Lake Tahoe despite periodic high water levels and recreational impacts. The CS specifies a decision-making framework and focused research agenda to assist land and resource managers to meet the conservation needs of the species.

For nearly six years, the implementation of the CS of Tahoe yellow cress at Lake Tahoe has been an operating example of the adaptive management process by successfully integrated the following components:

- a Conservation Agreement to implement the Conservation Strategy executed by 13 stakeholders from the public and private sector
- a Decision-making framework that includes a Technical Advisory Group (TAG), Adaptive Management Working Group (AMWG), and Executive Committee
- a Key Management Question (KMQ) framework for guiding a focused program of restoration research
- long-term funding

This is the seventh Tahoe yellow cress annual report completed since 2001. The annual reports provide a record of all conservation activities related to Tahoe yellow cress and are utilized at quarterly AMWG meetings and the annual Executive Committee meeting.

Results from the annual Tahoe yellow cress lake-wide survey inform many management activities. These annual field surveys date back to 1978, and since that time, Tahoe yellow cress has been observed at 62 sites around the lake. The greatest number of occupied sites in a single year was 47, while the fewest number of occupied sites was only 9. Results of the 2007 survey reinforced several trends and management models. The cyclic model of Tahoe yellow cress presence was again reinforced when the lake level dropped two feet and the number of occupied sites increased from 24 to 30. Total abundance was also greater (estimated stem count increased two and half times) but local abundance remained very low with the majority of occupied sites supporting fewer than 100 stems. About half of the occupied sites were on private lands and half were on public lands. However, fenced enclosures on public lands protected a little less than half of the 2007 estimated stem count.

Just as the annual survey has provided valuable management data, results from research efforts have supported the adaptive management process. An expanded analysis of the 2003-2006 experimental data will be presented in 2008 in the seventh technical report in the series: "Implementing the Conservation Strategy for Tahoe yellow cress VII. Management and science implications of a multi-

year experimental reintroduction". The report will present the following components of a successful restoration prescription:

- Successful greenhouse propagation and outplanting techniques for TYC (How)
- Influence of genetic source and vigor (What)
- Optimal habitat characters across a full spectrum of lake elevations (Where)
- Influence of lake elevation and seasonality (When)

While the outplanting of container-grown plants (founders) has been a main research focus, other experiments have tested translocation. Translocation moves field-grown plants from one location to another, potentially used to mitigate unavoidable impacts of construction or other development projects on the shores of Lake Tahoe. In 2007, the AMWG approved experimental translocation of naturally occurring TYC plants, but imposed a limit of 10% of stems at any one "donor" site in 2007. Although useful data were produced, the experimental design could have been more robust with more "receptor" sites. The U.S. Forest Service Lake Tahoe Basin Management Unit (LTBMU), which owns the greatest number of occupied Tahoe yellow cress sites, was not willing to allow translocation of naturally occurring plants to occur on their properties this year. Efforts to install the experiment on private property were successful at one site, but two other owners wanted assurances from the Tahoe Regional Planning Agency (TRPA) that experimental plants (or their offspring) would not interfere with future plans their properties. However, clear regulatory direction regarding experimentation on a sensitive plant species has not been available. It will be difficult to implement necessary research projects and conservation measures on both public and private property in the absence of such regulatory direction. Consequently, fencing and population restoration on public lands will continue to be the predominant management tools for TYC conservation.

To address private property issues, the Stewardship Program continued its efforts to create educational materials about TYC conservation for landowners and interested businesses. There was difficulty coordinating Friends of Tahoe yellow cress meetings with the activities of lakefront landowners. In addition, the Natural Resources Conservation Service has secured funding to help willing landowners develop conservation plans on their properties. However, a lack of clarity remains over the types of proposed fencing and signage for private property owners that are allowed under current regulations and whether new regulations would need to be added to the updated Shorezone Plan.

The Adaptive Management Working Group (AMWG) continued to implement the adaptive management program in 2007. Total in-kind cost contributed by all agencies for staff time participation and materials amounted to a minimum of $64,509. Although this is an underestimate since some agencies did not report expenditures, several agency positions were unfilled for the entire year and agency representation at meetings declined in 2007. The AMWG made several significant changes to the 5 Year Management Plan covering 2006-2010. First, the number of action items was reduced and streamlined to more accurately focus on important tasks in the appropriate implementation years. Second, the budget section was revised to include a more detailed accounting of funds made available for contracting and to identify the funding source, the contract amount, the contract administrator, and the recipient. Contracted funds in the amount of $473,400 have been or will be made available for the implementation of the CS for the period from 2006-2010. The plan now clearly identifies the contract task and the implementation year supported by the funding.

1.0 INTRODUCTION

Tahoe yellow cress (*Rorippa subumbellata* Roll.) is a low-growing, herbaceous perennial plant that is endemic to the shores of Lake Tahoe in California and Nevada. Since first scientifically described in 1941, Tahoe yellow cress has been observed at 62 sites around the lake. The greatest number of occupied sites occurred in both 2004 and 2005, with 47 occupied sites. The fewest number of occupied sites occurred in 1995 and 1996, when only 9 sites were occupied.

The narrow geographic and ecological ranges of Tahoe yellow cress (TYC), combined with cursory observations of how the species is affected by lake level dynamics and human impact, led to conservation concerns as early as the 1970's. The species was listed as Endangered by the State of California in 1982 and as Critically Endangered by the State of Nevada in 1983. At the federal level, Tahoe yellow cress was listed as a Category 1 candidate (under the Endangered Species Act (ESA) 1973 with amendments) in 1986, but later downgraded to a species of concern in 1996. In response to near extinction of the species between 1995 and 1999, Tahoe yellow cress was upgraded to a priority 2 Candidate for federal listing in 1999 (64 FR 57533). This status prompted federal, state, and local agencies to form a Technical Advisory Group (TAG) to develop and implement a conservation strategy for the species. The Conservation Strategy for Tahoe yellow cress (Pavlik *et al*. 2002) was finalized in 2002. In 2005, the U.S. Fish and Wildlife Service (FWS) re-classified TYC to a priority 8 Candidate because of "continued commitments to conservation demonstrated by regulatory and land management agencies participating in the Conservation Strategy" (69 FR 77167).

The overall intent of the Conservation Strategy (CS) is to preclude the need to list Tahoe yellow cress under ESA through restoration of a self-sustaining metapopulation dynamic. A metapopulation dynamic refers to spatio-temporal changes in distribution and abundance where some subpopulations persist over long periods of time while others come and go through the processes of local colonization and extirpation. Achieving a positive dynamic (e.g. colonization events outnumber extirpation) requires understanding the species through surveys and research that directly supports management and restoration activities.

The CS specifies a decision-making framework and focused research agenda to assist land and resource managers to meet the recovery needs of the species. As part of the implementation process, the TAG and the TYC Adaptive Management Working Group (AMWG) assisted in the development of five "key management questions" (KMQs) intended to implement the Conservation Strategy by focusing research on the restoration of metapopulation dynamics in the context of an adaptive management framework. For nearly six years, the implementation of the CS of Tahoe yellow cress at Lake Tahoe has been an operating example of the adaptive management process by successfully integrated the following components:

- a Conservation Agreement to implement the Conservation Strategy executed by 13 stakeholders from the public and private sector
- a Decision-making framework that includes a Technical Advisory Group (TAG), Adaptive Management Working Group (AMWG), and Executive Committee
- a Key Management Question (KMQ) framework for guiding a focused program of restoration research
- long-term funding

This is the seventh Tahoe yellow cress annual report completed since 2001. The annual reports provide a record of all conservation activities related to Tahoe yellow cress and are utilized at quarterly AMWG meetings and the annual Executive Committee meeting. Section 2 of this report presents results from the annual TYC lake-wide survey. Section 3 presents a summary of results from 2007 research activities. Although the research has been presented in separate technical reports over the last several years, the seventh technical report in the series, "Implementing the Conservation Strategy for Tahoe yellow cress VII. Management and science implications of a multi-year experimental reintroduction", will present the expanded analysis of the 2003-2006 experimental data. Section 4 discusses the achievements of the Friends of Tahoe yellow cress Stewardship Program. Section 5 lists the 2007 membership of the AMWG and presents the progress on the development of "Site-specific Information Sheets" that contain comprehensive information on all sites. Section 6 presents the 5 Year Management Plan that guides all activities related to Tahoe yellow cress conservation. This year the management plan has been updated and streamlined in several ways, including a more detailed account of allocated funding sources for implementation of the Conservation Strategy.

2.0 2007 FIELD SURVEYS

2.1 METHODS

2.1.1 SITE NAMES

Data on the number and location of occupied TYC sites around Lake Tahoe have been critical for making management decisions. Appendices D and E of the CS presented occurrence and stem count data for a total of 51 known, historical, and potential native Tahoe yellow cress habitat sites for the years 1978-2000 (Pavlik *et al*. 2002a). These tables were subsequently combined into one comprehensive spreadsheet that has been called Appendix C since 2003 (found in this report). Although the number of named sites has fluctuated, in 2005, Appendix C was consolidated to 62 site names, reflecting some modifications of the 51 original names and additional new sites. The Nevada Natural Heritage Program (NNHP) conducted further consolidation and review in 2006 and determined that there were many inconsistencies in Appendix C in the historical data for the LTBMU sites on the south shore. For example, it was not always possible to tell if tallied plants had occurred within or outside of an enclosure. NNHP recommended that enclosure data for Baldwin Beach, Tallac Creek, and Taylor Creek be combined with the larger site data for future survey and ranking purposes. Enclosures have been tracked separately in order to assess their utility, and the 62 site names have been retained in 2007 for consistency.

2.1.2 SITE RANKING

The CS established site rankings for the purposes of identifying conservation, restoration, and management priorities. Based on the index of viability scores, sites were ranked as Core, High, Medium, and Low priority sites. (For a detailed discussion on site ranking methods and results, refer to page 53 of the CS.) In 2003, the TAG revised the site rankings in Table 13 of the CS to incorporate additional data collected since 2000. The revised rankings of 2003 better reflect the metapopulation dynamics of the species through two complete high and low lake level cycles.

Consequently, the TAG will maintain the 2003 site rankings into the future, until another high/low cycle is completed. Unranked sites will be ranked as minimum data analysis requirements are met. A total of 39 sites are ranked: 10 Core, 6 High, 13 Medium, and 9 Low. No additional sites met the minimum ranking criteria in 2007.

2.1.3 DATA COLLECTION

The annual, lake-wide survey for Tahoe yellow cress was conducted on September 4-7, 2007. Participants included; Stu Osbrack, Cecilia Reed, Carlos Torres, and Andrew Solvilla (U.S. Forest Service [USFS]); Susan Levitsky and Renee Renwick (California Department of Fish and Game [CDFG]); Tamara Sasaki, Nathan Shasha, Lisa Fields, Silver Hartman, and Nancy Lozano (California State Parks [CSP]); Eric Gillies (California State Lands Commission [CSLC]); Don Guy (California Department of Water Resources [DWR]); Peter Maholland (Nevada Division of State Lands [NDSL]); Jacqui Grandfield (California Tahoe Conservancy [CTC]); Meri McEneny (private).

The 15 participants were divided into 5 teams, allocated a portion of the 62 sites, and given a set of annual field survey forms developed by NNHP. Datasheets were pre-printed with the site name, ownership, legal access, and previous plant occurrence information, and each was accompanied by a map delineating the site boundaries. DWR provided a boat to access inundated and isolated shorelines. At a site, team members covered the entire width of exposed beach, from waters edge to the backshore stabilized vegetation. If the site was inundated, the boat approached and traveled along the shoreline to assess any exposed habitat. Disturbance, including inundation and wave action, and search effort were recorded at both occupied and unoccupied sites. Search effort is defined as the amount of person-minutes spent actively searching for and/or collecting data on Tahoe yellow cress. Any modifications to existing site boundaries were delineated using Global Positioning System (GPS) technology.

In 2007, the data collection protocol and annual field survey forms for ranked sites that were revised in 2006 were used (Appendix A). For unranked sites, data collection protocols and survey forms established in 2004 were utilized (Appendix B). All annual survey forms, including GPS data, were provided to NNHP for addition to the Nevada sensitive species and GIS database and are available upon request.

2.2 RESULTS

Lake level during the first week of September 2007 decreased almost two feet from that recorded a year before (from 6,228.2 ft to 6,226.3 ft Lake Tahoe Datum (LTD)). A peak lake elevation of 6227.6 ft was recorded in the first of June 2007 that was sustained for only a week before beginning a steady decline (Fig 1).

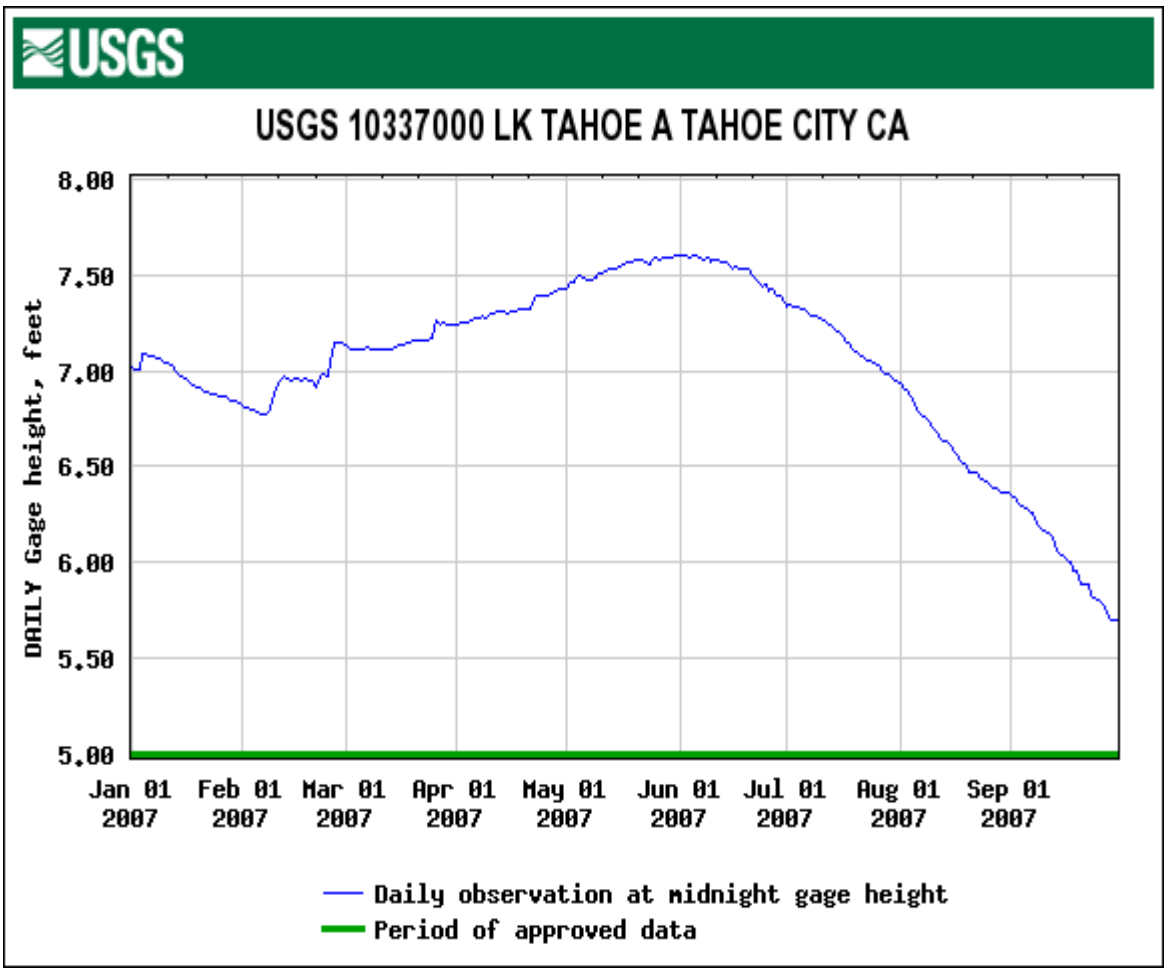

Figure 1. Elevation of Lake Tahoe in 2007 at the USGS Tahoe City Station (add 6,220.0 ft to gage height on the y axis).

This year's drop of almost two feet was accompanied by an increase of 6 TYC-occupied sites, from 24 to 30 (Figure 2). Lake elevations of 6,225 to 6,226 ft are considered transitional between low water (6,220-6,224 ft) and high water (6,227-6,229 ft). In such years, the amount of available habitat is intermediate and annual survey data suggests that the number of occupied sites may then depend on the magnitude and range of the level change, how many sites were occupied during the previous year, and how quickly the lake level rose or fell between years. The last time the lake dropped from very high water (6,228ft) to a transition level (6,225 ft) was in 2001 when the number of occupied sites increased from 17 to 29 sites. The greater magnitude of increase between 2000 and 2001 compared to an increase of only 6 sites between 2006 and 2007 may be due to the greater extent of exposed habitat resulting from a three foot drop compared to a two foot drop. In contrast, the lake increased from 6,223 ft in 2003 to 6,225 ft in 2005, but the same high number of sites (47) was occupied in both years. The fact that Tahoe yellow cress did not respond immediately to the change in lake elevation that year may have been due to the three year period of sustained low water immediately prior and the great abundance of plants at occupied sites during low water years.

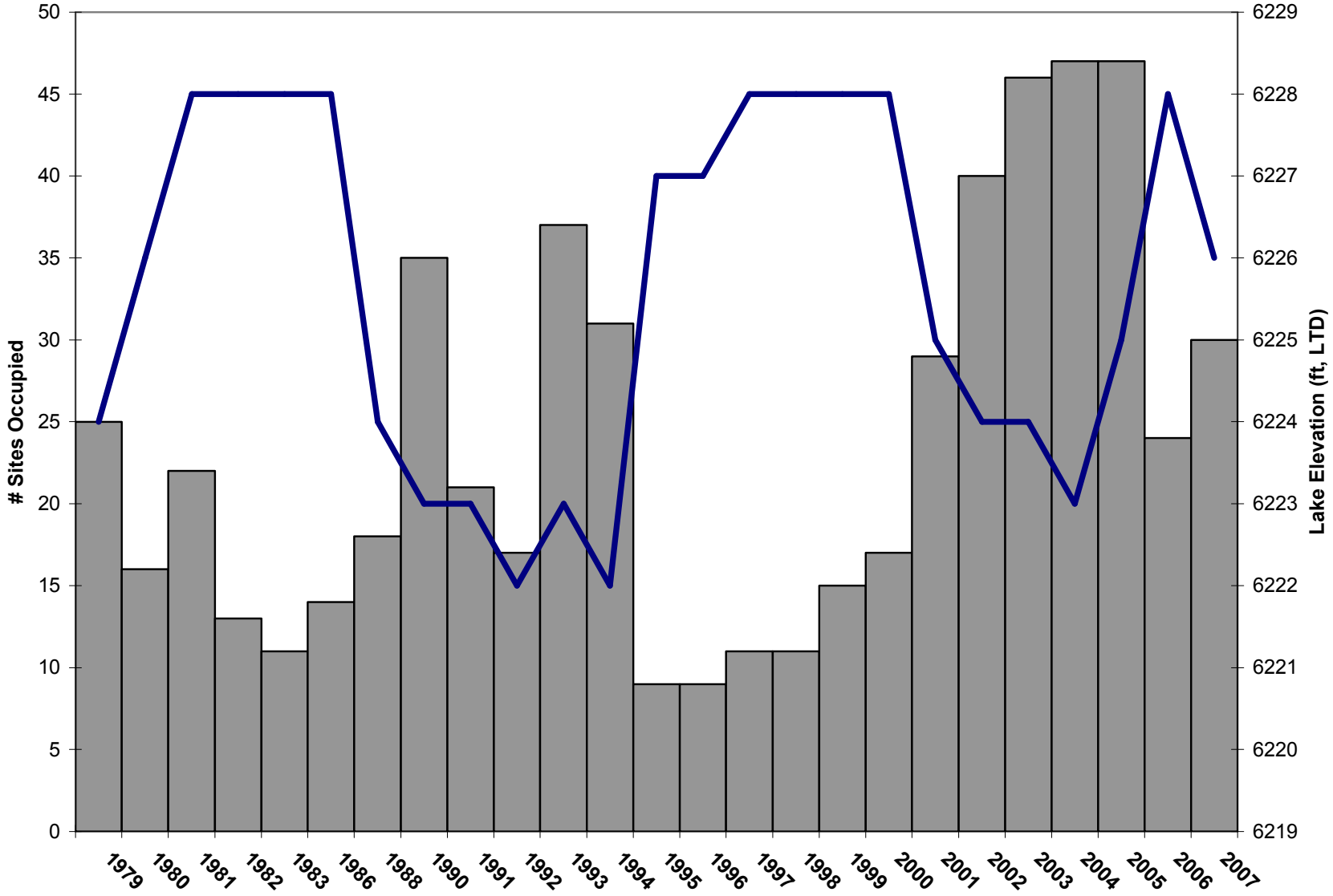

Figure 2. Lake level and number of Tahoe yellow cress sites occupied by survey year (solid blue line = lake level LTD)

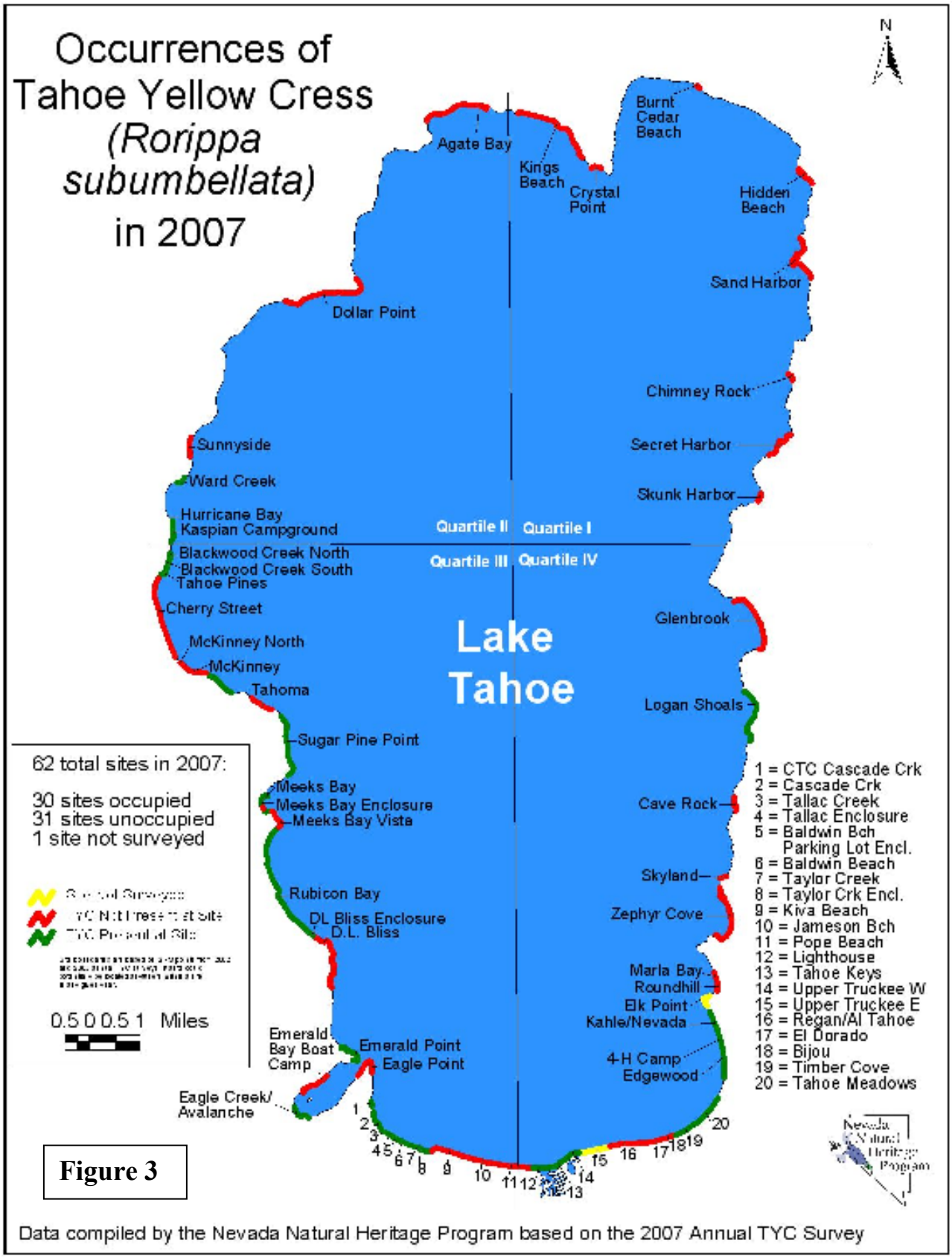

Figure 3

Data compiled by the Nevada Natural Heritage Program based on the 2007 Annual TYC Survey

The locations of the 30 occupied sites are shown in the map compiled annually by NNHP (Figure 3). Tahoe yellow cress re-appeared at nine sites in 2007 that had been occupied in 2005 but were presumably submerged during high-water in 2006. These re-appearances could be due to the emergence of dormant plants or rootstock established in a previous year or from a re-colonization event in this year (possibly from dispersing seeds). Since the dispersal patterns and source-sink relationships between occupied sites are unknown, it is not possible to identify which mechanism was responsible for a re-appearance at a site. However, microsatellite DNA analysis currently underway at the University of Nevada Reno could provide insight into the mechanism of re-appearance (see section 3.4).

Although the decrease in lake level of two feet presumably exposed habitat at most sites, TYC disappeared from three sites that had been occupied in 2006; Marla Bay, Jameson, and Pope Beach. Both Jameson and Marla Bay were probably new, ephemeral colonizations during 2006. Although these sites were occupied during the survey period in September 2006, no plants were present during an attempt in mid-October 2006 to collect seed or fresh material at either site. At Pope Beach, the cluster of 40 plants recorded during the 2006 survey occupied a small expanse of back beach habitat that was inundated by runoff from Pope Marsh in 2007.

The number of stems counted at any one site ranged from 10 to 3,529 during 2007, while survey effort, in terms of recorded person minutes, ranged from 10 to 306 minutes (Table 1). The total estimated stem count from all 30 sites (11,847 stems) was two and a half times greater than in 2006 when only 4,560 were counted. Survey effort increased slightly in 2007 to 3,162 minutes (53 hours) from 2,419 minutes (40 hours) in 2006. However, search effort was not recorded for 14 surveyed sites, so the actual increase is much greater. If the median search time of 50 minutes was applied across the 14 sites, the search time for 2007 increased by about 700 minutes (12 hours). Ideally, search effort would be normalized between years by dividing by total exposed search area (available habitat area). This is not, however, possible at the present time.

Table 1. Stem counts and survey effort for 62 Tahoe yellow cress sites in September 2007 (NA = not available, NS = not surveyed, X= plants known to be present).

SITE NAME	Ownership	Rank	# minutes	# stems
Sunnyside	Private/Placer Co	UNRANKED	50	0
Ward Creek	Private	HIGH	135	403
Kaspian Campground	USFS	UNRANKED	80	15
Blackwood North	Private	CORE	90	305
Blackwood South	Private/Placer Co	CORE	270	2,761
Tahoe Pines (Fleur Du Lac)	Private	UNRANKED	10	11
Cherry Street/Tahoe Swiss Village	Private	LOW	10	0
McKinney North/Shores	Private	UNRANKED	20	0
McKinney Creek	Private	LOW	45	42
Tahoma	Private	LOW	15	0
Sugar Pine Point State Park	CA State Parks	UNRANKED	150	69
Meeks Bay	USFS	HIGH	140	110
Meeks Bay Enclosure (+ 1 new encl)	USFS	UNRANKED	30	0
Meeks Bay Vista	Private	UNRANKED	10	0
Rubicon Bay	Private	MEDIUM	306	158
DL Bliss Enclosure	CA State Parks	MEDIUM	3	6
DL Bliss State Park	CA State Parks	UNRANKED	23	0

SITE NAME	Ownership	Rank	# minutes	# stems
Emerald Point	CA State Parks	MEDIUM	32	10
Emerald Bay Boat Camp	CA State Parks	MEDIUM	10	0
Eagle Creek/Avalanche	CA State Parks	HIGH	113	404
Eagle Point	CA State Parks	MEDIUM	10	0
CTC Cascade Creek	CTC	UNRANKED	20	22
Cascade Creek	Private/USFS	HIGH	60	56
Tallac Enclosure	USFS	CORE	90	149
Tallac Creek (outside Enclosure)	USFS	CORE	45	26
Baldwin Beach	USFS	MEDIUM	90	49
Baldwin Bch Parking Lot Encl (+ 1 new encl)	USFS	UNRANKED	30	98
Taylor Creek Enclosure	USFS	CORE	60	1,124
Taylor Creek	USFS	UNRANKED	60	143
Kiva Beach/Valhalla	USFS	LOW	75	0
Jameson	Private	UNRANKED	NA	0
Pope Beach	USFS	LOW	90	0
Lighthouse	Private	CORE	NA	259
Tahoe Keys	Private	MEDIUM	NA	255
Upper Truckee West	CTC	CORE	NA	50
Upper Truckee East	CTC	CORE	NA	3,529
Regan/Al Tahoe	Private/City SLT	LOW	NA	0
El Dorado Beach	City SLT	LOW	NA	0
Bijou (Timber Cove Lodge)	Public	UNRANKED	NA	0
Timber Cove	Private	MEDIUM	NA	27
Tahoe Meadows	Private	CORE	NA	X
Edgewood	Private	CORE	NA	753
4-H Camp/City Pump House	UNR/City	MEDIUM	NA	111
Kahle/Nevada	USFS	HIGH	180	761
Elk Point	Private	UNRANKED	NS	NS
Roundhill	USFS	UNRANKED	NA	0
Marla Bay	Private	UNRANKED	30	0
Zephyr Cove	Private/USFS	HIGH	135	0
Skyland	Private	UNRANKED	10	0
Cave Rock	NV State Parks	MEDIUM	15	0
Logan Shoals/Vista	Private	MEDIUM	90	45
Glenbrook	Private	MEDIUM	60	0
Skunk Harbor	USFS	UNRANKED	30	0
Secret Harbor	USFS	MEDIUM	90	0
Chimney Rock	USFS	UNRANKED	60	0
Sand Harbor	NV State Parks	LOW	60	0
Hidden Beach	NV State Parks	UNRANKED	20	0
Burnt Cedar Beach	IVGID	UNRANKED	10	0
Crystal Point	Private/Placer Co	UNRANKED	5	0
Kings Beach	Private/Public	UNRANKED	30	0
Agate Bay	Private	UNRANKED	45	0
Dollar Point	Private	LOW	120	0
TOTALS			**2,862**	**11,847**

Ranked sites supported the majority of stems (97%) and required the majority of the search effort (80%) (Table 2). Core sites, which accounted for 16% of surveyed sites, supported 75% of all stems.

High, Medium, and Low priority sites supported 15, 5, and 1% of all stems, respectively. Unranked sites supported only 3% of the stem count.

Table 2. Stem count and survey effort in the 2007 annual survey by site ranking category.

Rank	N	# Stems	# survey minutes
CORE	10	8,956	555
HIGH	6	1,734	763
MEDIUM	13	661	706
LOW	9	138	415
UNRANKED	24	358	723
Total	62	11,847	2,862

The number of stems counted at each site was classified into 8 abundance categories (Figure 4). Although the number of unoccupied sites declined by 5, the majority of sites (11) still had fewer than 50 stems. Only five sites supported over 500 stems each and three of these had a stem count that exceeded the Minimum Viable Population (MVP) size of 1,200 stems. According to the CS, a population with 1,200 stems has a 90% probability of persisting over 20 years of rising and falling lake levels.

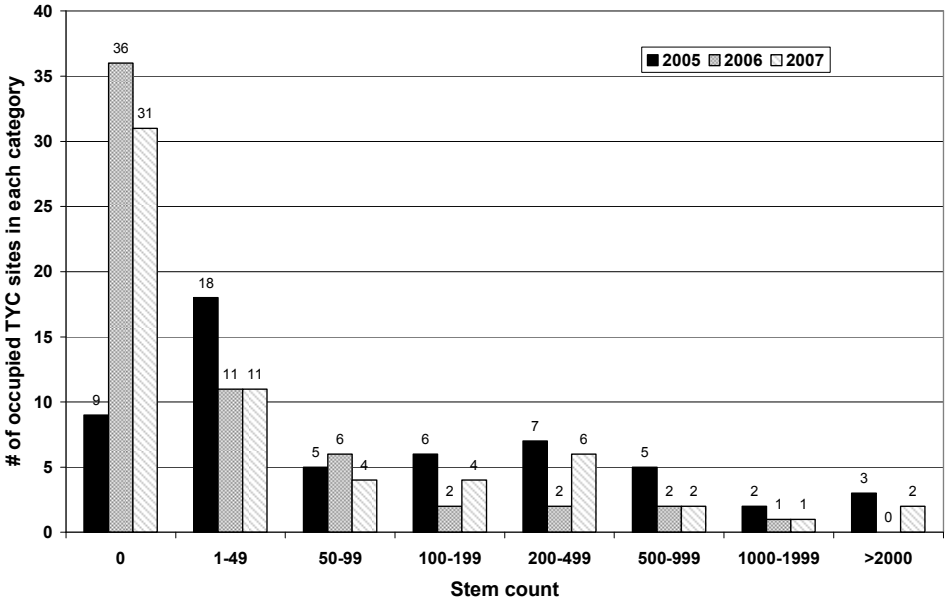

Figure 4. The number of occupied Tahoe yellow cress sites in 8 stem count abundance categories during 2005-2007.

Approximately 45% of occupied sites were associated with creek mouths. These sites supported 89% of all stems counted in 2007 (Table 3). The greatest abundances of stems were recorded for Taylor Creek, Blackwood Creek, and the mouth of the Upper Truckee River. Of the ten core sites, seven are associated with creeks. A creek tends to increase the amount of topographic diversity

along the shoreline because it builds and erodes beach sands which are kept well-oxygenated and moisture rich. Sites at creek mouths also remain in open, early successional stages due to disturbance by stream meandering. These conditions are optimal for TYC colonization and persistence.

Table 3. Ownership, rank, and stem counts of occupied sites associated with creek mouths in 2007.

SITE NAME	Ownership	Rank	# Stems	Creek Name
Blackwood North	Private	CORE	305	Blackwood
Tahoe Meadows	Private	CORE	61	?
Tallac Enclosure	USFS	CORE	149	Tallac
Edgewood	Private	CORE	753	Edgewood
Taylor Creek Enclosure	USFS	CORE	1,124	Taylor
Blackwood South	Private/Placer Co	CORE	2,761	Blackwood
Upper Truckee East	CTC	CORE	3,529	Upper Truckee
Eagle Creek/Avalanche	CA State Parks	HIGH	404	Eagle
Kahle/Nevada	USFS	HIGH	761	Burke
Ward Creek	Private	HIGH	403	Ward
4-H Camp/City Pump House	UNR/City	MEDIUM	111	Burke
Baldwin Beach	USFS	MEDIUM	49	Tallac
Taylor Creek	USFS	UNRANKED	26	Taylor
Sugar Pine Point State Park	CA State Parks	UNRANKED	69	General
Total			**10,710**	

Almost half (47%) of the occupied Tahoe yellow cress sites occurred on private lands, while 53% were on lands managed by public agencies (Figure 5). Private sites and those under mixed public/private ownership accounted for 44% of the counted stems. Protection measures were present on both public and private property.

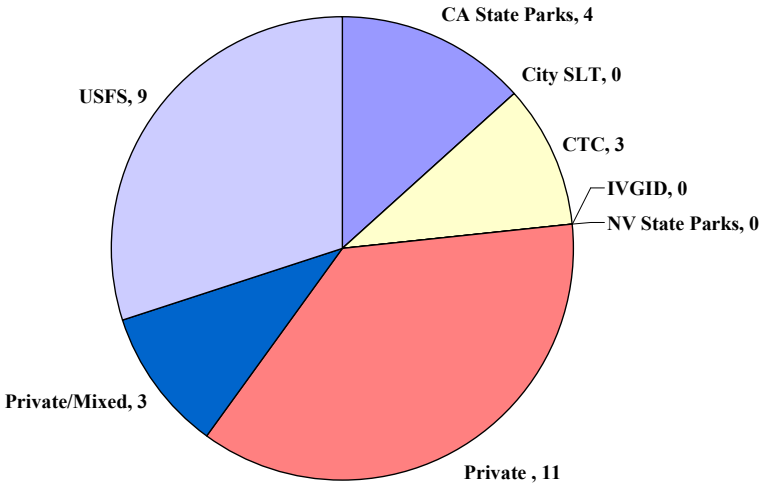

Figure 5. Ownership of occupied Tahoe yellow cress sites in 2007.

Permanent, fenced enclosures are present at 10 sites on public lands: Dl Bliss and Sugar Pine Point (CSP); Upper Truckee East (CTC); Sand Harbor (NDSP); and Meeks Bay, Tallac Creek, Baldwin Beach (2), Taylor Creek, and Nevada Beach (USFS). The USFS has installed a temporary fence around the experimental plantings at Pope, Ebright, and Nevada Beaches during the growing season. The fence at D.L. Bliss, which has protected fewer than 7 plants since 2001, is scheduled to be removed in 2008. The AMWG agreed that the site no longer supports suitable habitat since only 6% of the outplanting in 2006 survived and the beach topography is high elevation with some stabilized vegetation and apparent low water availability. For these reasons, the AMWG also had concerns that the enclosure could present a misleading representation of TYC conservation to the public and that other higher priority CSP lands could be protected with fencing instead.

On private lands, a fence has protected the cluster of plants at the creek mouth at Tahoe Meadows since at least 2004. In 2007, a fence was newly installed several feet down the beach from lawns of about 5 houses at Tahoe Keys, allowing Tahoe yellow cress and lupines to colonize. At Edgewood Golf Course, hay bale wattles are still protecting the erosion feature that was colonized extensively in 2006. TRPA denied a request by the golf course to fill in the large hole because of the Tahoe yellow cress presence. BMP Ecosciences began negotiations with Edgewood to conduct an experimental translocation of some of the plants to the northern end of the property, but a lack of regulatory clarity (as to whether the Edgewood plants should be protected) stalled the project until it was too late in the season (see section 3.3).

The most common recorded disturbances -- footprints, trash, boat dragging, beach raking -- were in evidence on occupied beaches. Canada geese were observed grazing and trampling Tahoe yellow cress along with other vegetation. Several non-native plant species occur along the shoreline, including the commonly encountered wooly mullein (*Verbascum thapsis*) and Bull thistle (*Cirsium vulgare*). These species occur in suitable Tahoe yellow cress habitat and could locally reduce abundance if not controlled.

In 2006, Eurasian watermilfoil (*Myriophyllum spicatum*) was discovered rooted on the beach at Avalanche in Emerald Bay. Eurasian watermilfoil (EWM) is a perennial, submersed, aquatic plant that roots in bottom sediments. It is a serious weed that disperses by fragmentation and forms large mats that reduce light penetration, changes water chemistry and water flow, outcompetes native aquatic plants, and hinders boat navigation. The rooting of fragments on the beach out of the water is not a common occurrence and although fragments were again present out of the water in 2007, they are not likely to pose a direct threat to Tahoe yellow cress growing in the vicinity. Removal projects for submerged infestations have been implemented by CSLC and CSP. In 2007, EWM was also present in Taylor Creek near the enclosure and in Meeks Creek, also near the enclosure.

2.3 DISCUSSION

The detection of Tahoe yellow cress at all 10 Core sites and 20 other priority and unranked sites during the 2007 annual survey means that there were a sufficient number of occupied sites that the AMWG can operate under Level 1 (normal conditions) of the Imminent Extinction Contingency Plan defined in the Conservation Strategy. Existing policies and guidelines will remain in effect for protection of existing occurrences and potentially suitable habitat.

Results of the 2007 survey reinforced several trends and management models. The cyclic model of Tahoe yellow cress presence was again reinforced when the lake level dropped and the number of occupied sites increased. Total abundance was also greater (estimated stem count increased two and half times since the previous year) but local abundance remained very low with the majority of occupied sites supporting fewer than 100 stems. In such a transitional lake level year, occupied sites generally had low topographic diversity with limited suitable habitat (possibly as a result of the extreme high lake level the previous year). However, the vast majority of stems were concentrated around creek mouths which tend to be more variable habitats. As in recent surveys, about half of the occupied sites were on private lands and half were on public lands.

Fenced enclosures on public lands protected a little less than half (48%) of the 2007 estimated stem count. Fencing on public property continues to be the predominant management tool for conservation because formal conservation measures on private property have yet to be implemented.

3.0 2007 RESEARCH ACTIVITIES

Just as the annual survey has provided valuable management data, results from research efforts have supported the adaptive management process. The 2007 research activities are divided into three sections. Section 3.1 summarizes the fates of experimental reintroductions installed from 2003 to 2006 and discusses management implications. Section 3.2 presents the second-year demographic data from the 2006 experimental translocation while section 3.3 describes the new experimental design for the 2007 translocation and the first year results. Finally, section 3.4 briefly summarizes genetic research using microsatellite DNA analysis.

3.1 EXPERIMENTAL REINTRODUCTIONS

From 2003 through 2006, the program of experimental reintroduction has included the installation of a total of 7,500 container-grown plants (founders) at 11 sites around the lake. The pilot project in 2003 primarily addressed objectives on techniques for nursery propagation, fencing, outplanting, and monitoring at four sites. In 2004, the scope of the project expanded and two additional sites were outplanted that were large enough to accommodate the installation of a replicated design with "cause and effect" monitoring to evaluate KMQs. In 2005, the replicated experimental design was repeated at two sites and three additional sites were outplanted. However, the poor initial quality of the container-grown plants used in that year compromised the results and so that data will not be used in future analyses. In 2006, the replicated experimental design was repeated for the third time at two sites and two new sites were included in the reintroduction.

An expanded analysis of the 2003-2006 experimental data will be presented in the seventh technical report in the series: "Implementing the Conservation Strategy for Tahoe yellow cress VII. Management and science implications of a multi-year experimental reintroduction". The report will investigate the aggregate effects of genetics, microhabitat, and water relations on founder performance (a founder indicates an outplanted individual associated with a particular cohort) and present the following components of a successful restoration prescription:

- Successful greenhouse propagation and outplanting techniques for TYC (How)
- Influence of genetic source and vigor (What)
- Optimal habitat characters across a full spectrum of lake level (Where)
- Influence of lake level and seasonality (When)

Monitoring of the 2003 to 2006 cohorts was continued in 2007. High lake level during 2006 inundated portions of every outplanted site, covering or eroding nearly all previous cohorts of founders. Of the 6,269 plants that were installed from 2003 to 2005 at nine sites around the lake, only 30 plants from the 2005 cohort at Pope Beach and 38 plants from the 2003 cohort at Zephyr Cove were present at the start of the 2006 growing season (these were used in the translocation experiment). Since all founders from previous cohorts not used in the translocation were under water and/or buried under sand, the ability to monitor the persistence of these cohorts essentially came to an end. The founders were not permanently marked because metal stakes are not allowed in the shorezone and the temporary wooden stakes were washed away or buried. Consequently, there is no certain way to know the origin of reappearing plants (i.e. from experimental or natural colonization events), it can only be inferred from circumstantial evidence.

Observations during 2007 suggest that plants from the submerged cohorts may have "reappeared" at 2 of the 8 sites that experienced inundation (Table 4). As described in the CS, a "reappearance" of plants at a site could be from four sources: 1) emergence of rootstock from naturally occurring plants or outplanted founders that survived inundation; 2) the progeny of seed subsequently produced by those naturally occurring plants or founders; 3) from seed deposited from offsite or 4) some combination of the three. Although it is not possible to determine the exact mechanism for a site, the stems at two sites "reappeared" around the previously outplanted area, while at other sites the outplanted areas were still inundated. According to the annual survey record in Appendix C, the

Table 4. The fate of the inundated 2003 to 2005 cohorts at nine sites.

Site Name	Year(s) Planted	2007 Stem Count	Likely "reappearance" from 03 to 05 cohort?
Avalanche	2003	404	Yes- stems present in vicinity of planted area
Zephyr Cove	2003	0	
Taylor Creek	03,04	1,124	No- planted area still inundated
Sand Harbor	03,04	0	
Upper Truckee	04,05	3,529	No- planted areas still inundated
Nevada Beach	04,05	761	Yes- stems present in vicinity of planted area
Ebright	2005	7	No- planted area still inundated
Pope Beach	2005	0	
Hidden Beach	2005	0	

combined site of Eagle Creek/Avalanche had never supported more than 220 stems prior to the outplanting of 300 stems in 2003. Of the 404 stems counted in 2007, many were growing near naturally occurring plants above the planted area but it was not possible for the surveyors to determine if any members of the outplanted 2003 cohort had reappeared. At Nevada Beach, the

enclosure quickly converted to upland vegetation after the upper reaches of Burke Creek were modified in the 1980's and the site had supported only one small cluster of stems since 1990. During 2007, the 761 stems were located along the eroded banks of Burke Creek within the enclosure. The colonization of this habitat is very likely due to the combination of the higher water table and prodigious seed production by the outplanted founders. The combined seed production of the 2004 and 2005 cohorts at Nevada Beach was 408,600. The site was also planted in 2006 and that cohort produced almost 10,000 seeds, so it is not possible to know which seed were deposited and ultimately germinated.

No new outplantings were conducted during 2007 that were not related to the translocation experiment (see section 3.3). A brief summary of the second year demography of the 2006 cohort follows:

During 2006, 1,175 container-grown Tahoe yellow cress (founders) were outplanted at seven enclosures: Lester Beach at D.L. Bliss State Park (CSP), at Taylor and Tallac Creek at Baldwin Beach (USFS), Ebright Beach (USFS), Pope Beach (USFS), Upper Truckee East (CTC) and Nevada Beach (USFS). Although this is the greatest number of sites outplanted in a single year (five were planted in 2005), it was the fewest plants ever installed because high lake level severely limited the available habitat space. Founders were installed in four different microhabitats: moist shoreline, high beach, meadow, and scrub. These microhabitats were defined chiefly by the elevation above the lake and each represented different moisture and topographic regimes.

Two sites were not monitored in 2007. At D.L. Bliss, only 6 plants of the 2006 outplanting survived to September 2007. The beach topography is high above the shore with stabilized vegetation and low soil water availability. Since the site no longer supports suitable habitat, the fence is scheduled to be removed in 2008. Ebright was also not monitored since the USFS would have needed to install a temporary fence and by early 2007, no wooden stakes were left in the plot. Only 14 plants in the moist shoreline had survived to September 2006 so it was not cost-effective to follow the fate of these few individuals. However, 7 plants were present at the beginning of the 2007 growing season.

Second year survivorship and reproductive output of the 2006 cohort at five sites was variable (Table 5). Overall, founders at Nevada Beach had the most robust performance of all the sites. The second year founders in the moist shoreline and high beach were large and had a combined estimated seed production of over 100,000 seeds. Survivorship in the high beach was also impressive at Tallac, but the mean canopy area of surviving founders was 5 to 7 times smaller than those at Nevada and consequently they produced a total of only 12,201 seeds. Surviving founders at the other sites were similarly small and not very robust.

Table 5. Second year survivorship and reproductive output of the 2006 founder cohort at five sites in different microhabitats by September 2007.

Site and Habitat	Founders (# planted)	Survivorship (%)	Reproduction (%)	Survivorship to reproduction (%)	Mean canopy area (cm2)	Mean seed output (per plant)	Total seed production
Nevada							
High Beach	100	69	94	65	256	897	56,522
Moist shoreline	48	88	93	81	360	1287	50,175
Scrub	50	54	67	36	67	345	4,488
Pope							
High Beach	120	58	71	41	91	337	13,132
Moist shoreline	50	28	100	28	87	222	2,887
Tallac							
High Beach	150	77	50	39	50	298	12,201
Meadow	75	16	8	1	4	10	10
Taylor							
High Beach	100	14	86	12	105	360	3,965
Meadow	50	26	23	6	7	50	50
UTE							
Meadow	250	10	8	1	11	0	0

Total survivorship to reproduction was variable among the microhabitats (Figure 6). Across most sites, the best performance was in the high beach, while the moist shoreline was optimal at only one site (Nevada). The biggest surprise in the second year demography of the 2006 cohort was the poor performance in the meadow habitat. During 2006, total survivorship at the three sites with meadow habitat was uniformly high (82-85%) and seed production was moderate (see Figure 5 in the 2006 technical report). However, the majority of these founders did not persist into their second year.

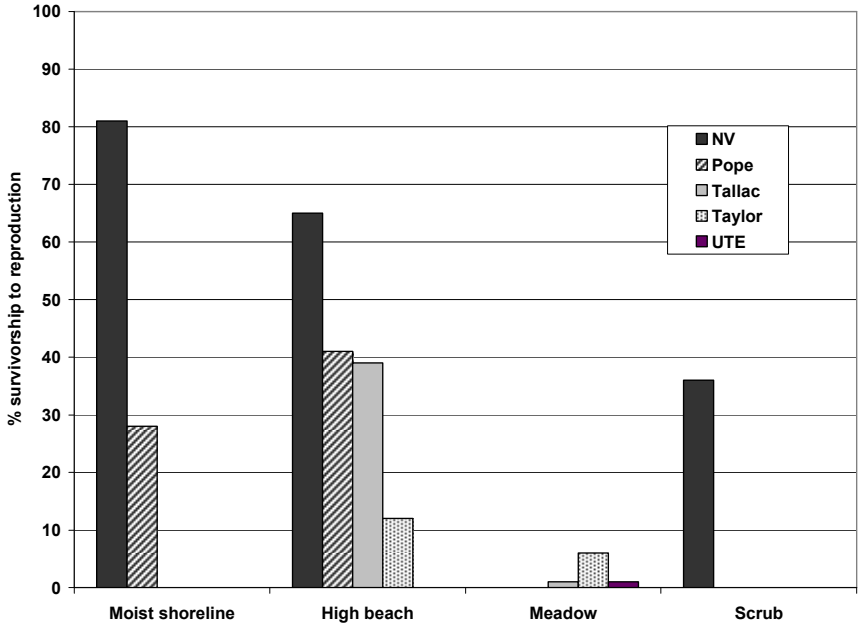

Figure 6. Total survivorship to reproduction of the 2006 cohort in four microhabitats at five sites, September 2007.

Total survivorship in 2007 ranged from only 10% at UTE to 26% at Taylor (Table 5). Reproduction was very low- fewer than 6% of the founders reproduced at Taylor and only 1% at UTE and Tallac.

The drastic reduction is likely due to the two foot drop in lake level from the previous year that probably prevented founders from getting roots established deep enough to keep up with the decline in water table. If the lake level had stayed high, these plants may have been able to persist. Cursory evidence from outplantings performed in the 1980's suggests that this may be the case, but it would need to be tested under the right conditions. Either way, the 2006 and 2007 data, along with failed outplantings in the meadow habitat at Taylor Creek during 2003 and 2004 (low lake level years) suggest that meadow habitat is optimal and acts as a TYC refuge only when the lake is very full and the water table remains high.

The poor second year performance in the meadow has important management implications. Most of the fences on public lands essentially enclose higher elevation habitat as shown in Figure 7. Data from outplantings in 2003 through 2006 indicate that the majority of TYC seed production occurs in moist habitats near the lake and thus, these lower elevation microhabitats (<6,228ft) function as "seed factories" for the species. Figure 7 shows a hypothetical site and how the fence is protecting only a small portion of suitable Tahoe yellow cress habitat and completely fails to protect the very valuable low elevation habitat that is likely required for sustaining the population at that site. However, public agencies are not allowed to install permanent fencing in the shorezone that might get inundated. Changes in land use planning would be required to remedy this situation. For example, a combination of signage and creative re-vegetation at a creek mouth may be used to create a "special reservation area" around the entire Stream Environment Zone (SEZ) (Figure 8). The periodic use of some type of enforcement patrol might also be necessary. These measures could potentially signal beach users that they are entering an area that deserves special consideration. While it may be unrealistic to expect that people would change their behavior voluntarily, ultimately it is up to the public agencies to adopt land use planning measures that will accommodate the population dynamics of Tahoe yellow cress, especially at core and high priority sites.

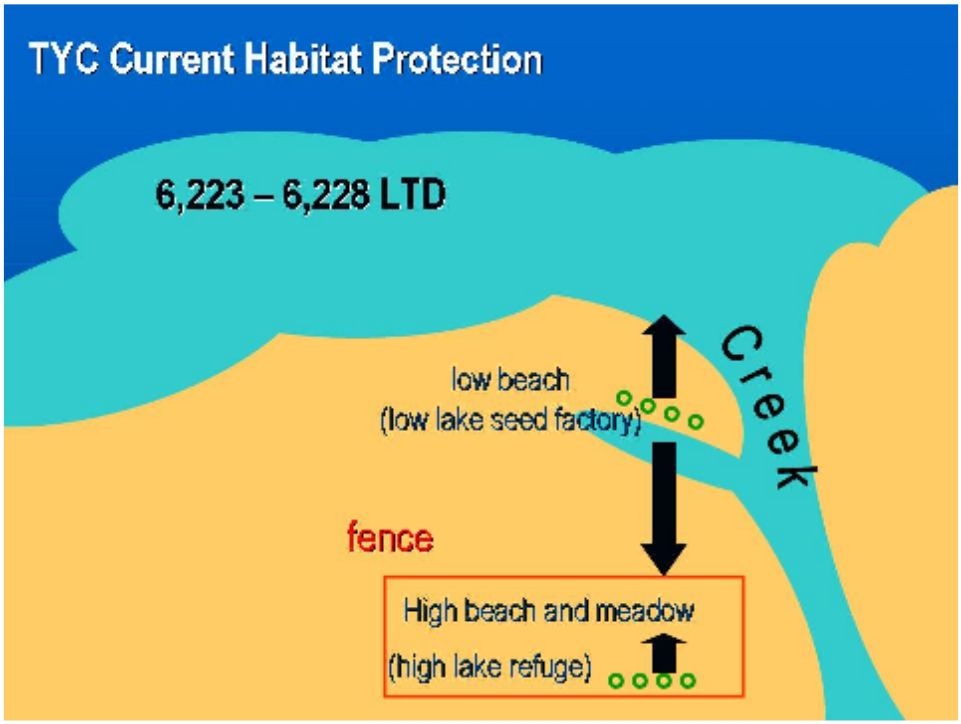

Figure 7. Fence placement in high elevation microhabitats at a hypothetical site with the majority of seed production occurring outside the fence.

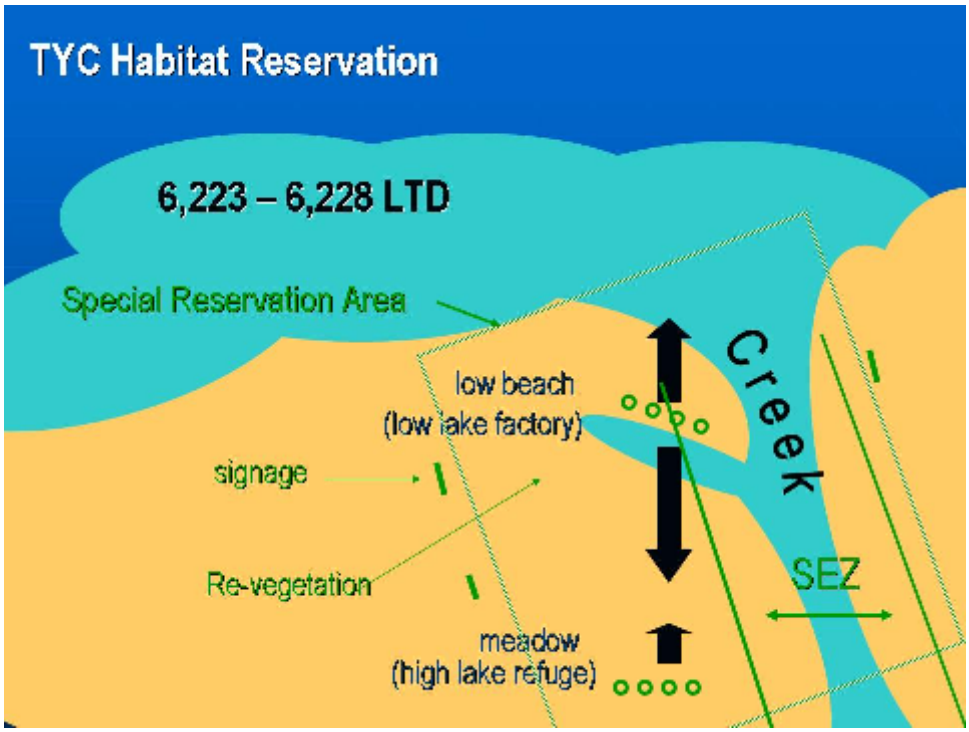

Figure 8. A hypothetical "Special Reservation Area" that protects all available Tahoe yellow cress habitat and the SEZ at a creek mouth.

3.2 TRANSLOCATION

3.2.1 BACKGROUND

Translocation involves moving established plants in the field from one location (the donor) to another location (the receptor), either at the same or different site. It has been used as mitigation for the disruption of sensitive species habitat and as a salvage measure to preserve individuals when habitat is destroyed. In the past, many translocation projects have lacked a rigorous experimental component and adequate monitoring. In addition, translocation projects are often undertaken with little or no knowledge of the horticultural requirements or genetic architecture of the species.

Translocation could play an important role in the implementation of the Conservation Strategy in several ways. First, the CS states that "a number of research questions can be answered using monitoring data and translocation experiments" (section II.K,pg 96 and pg 99). KMQ 1 is all about de-emphasizing individual plants and specific (small) patches of sandy habitat in favor or conserving/restoring the metapopulation dynamic. While we have learned the relative risk of loss (through unsuccessful establishment) of container-grown plants in different habitats across the years, the risk of loss to naturally occurring populations from utilizing translocation is still unknown. If the methods are comparable, then both outplanting and translocation are potential conservation/ restoration tools that could be used to “create or enlarge TYC populations” (KMQ 3) and promote conditions that favor a positive metapopulation dynamic. Second, it is the responsibility of the AMWG to address the impact to the Stewardship efforts of generating good will by offering more tools to both the private and public sector or conversely, the impact of not investigating a potential technology.

Translocation could be an effective conservation/restoration/mitigation measure for TYC for three reasons. First, the horticultural requirements of the species are known. Over 7,500 plants have been successfully propagated in the greenhouse and outplanted at 11 locations around the lake. Second, three studies on TYC genetics have concluded that the species has low levels of genetic diversity and populations are not differentiated, and therefore, genetic contamination may not be a concern. Finally, demographic monitoring and physiological monitoring of the water status of outplanted individuals has enabled researchers to gain an understanding of optimal and suboptimal habitat conditions. After an informal consultation with the USFWS regarding the disturbance of natural populations of a candidate species, the TAG approved a pilot scale project to translocate outplanted TYC in 2005. However, the results from the 2005 pilot were compromised by vandalism

The California Department of Fish and Game (CDFG) supported further translocation research with $48,000 in Section 6 funds that were contracted to BMP Ecosciences in 2006 that will support work into 2008. The objective of the research is to test translocation as a potential restoration/mitigation option for unavoidable impacts of construction or other development projects on the shores of Lake Tahoe.

3.2.2 2006 TRANSLOCATION

For the 2006 experimental translocation, replicated blocks of plants were moved between high beach habitats at two sites with similar elevations. A total of 38 three-year old founders from the 2003

cohort were moved from Zephyr Cove to Tallac Creek on June 8th, 2006. The translocation of the individuals from Zephyr Cove was essentially a salvage measure to save them from inundation. Thirty one-year old founders from the 2005 cohort were moved from Pope Beach to Taylor Creek. At both sites, plants were installed in three replicated blocks of 10-14 plants. The translocation occurred at the same time as the outplanting of container-grown plants so that direct comparisons could be made between the methods.

The first year demographic performance of translocated founders was similar to that of container-grown founders at both receptor sites in 2006, suggesting that translocation is also a feasible conservation/ mitigation tool. The risk in testing translocation also appeared to be lower because unexpectedly, 15 of the 30 plants that were dug up and moved from Pope re-sprouted later in the season in their former locations. Significantly, the re-sprouted plants actually out-performed one year-old founders in the 2006 cohort with greater survivorship to reproduction and estimated seed production. The total of the 10 surviving transplants at Taylor and the re-sprouts resulted in a net loss of only 5 plants (17%) for that translocation effort. The gain of 29 plants from the Zephyr Cove-Tallac translocation resulted in an overall net increase in the number of TYC protected by the project.

In 2007, the pattern continued and the performance of translocated and container-grown founders was again very similar. Mean survivorship in September of translocants and container-grown founders at Tallac was 69 and 77%, respectively (Table 6). At Taylor Creek, 20% of the translocants from Pope survived and second year survivorship of the container-grown plants was 14%. Plant size was rather small, regardless of source and consequently, seed production was moderate. At Pope Beach, the individuals that had re-sprouted in 2006 had a much greater mean seed output than either the translocated or the container-grown plants and by September 2007, 5 more founders appeared to re-sprout and occupy the outplanting spot near the wooden stake.

Table 6. Second year performance of the 2006 container-grown and translocation cohorts at Tallac and Taylor Creek September 2007.

Site	Source	N	Canopy area (cm^2)	Seed output (# per plant)	Survivorship (%)	Survivorship to reproduction (%)	Total seed production (# per site)
Tallac	container	150	50.5	297.6	76.7	38.7	12,201
Tallac	translocation	36	40.4	344.4	69.4	33.3	1,722
Taylor	container	100	105.0	360.4	14.0	12.0	3,965
Taylor	translocation	30	85.1	254.1	20.0	20.0	1,271
Pope	translocation re-sprouts*	30	168.1	586.9	66.7*	56.7*	9,997

* 15 plants from 2005 cohort reappeared in 2006, 20 were present in 2007 with 17 in fruit

Mean survivorship to reproduction in 2007 (the proportion of planted/translocated founders that were in fruit in September) declined by almost half at Tallac when compared to 2006 for both translocants and container-grown founders (Figure 9). In contrast, mean survivorship to reproduction at Taylor increased in 2007. Differences in microtopographical site elevation and in measured xylem

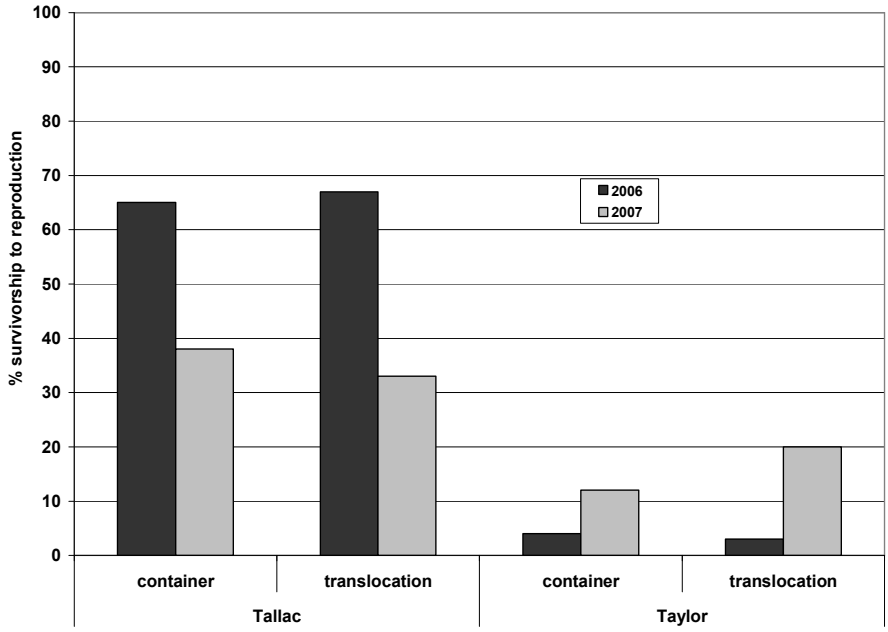

Figure 9. First and second year mean survivorship to reproduction of container-grown and translocated founders at two sites in September of 2006 and 2007.

water potentials were likely responsible for the differential performance of translocated founders at the Tallac and Taylor Creek receptor sites. The high beach plots at Taylor were essentially one foot higher above the lake than the Tallac plots and the mean predawn water potential in August of founders at Tallac (-1.9 bars) was significantly higher (less stressful) than at Taylor (-3.6 bars), indicating that plants at Taylor were experiencing greater baseline water stress in the middle of the growing season (data not shown). Although water potentials were not measured in 2007, it may be that the decrease in lake level in 2007 caused increased water stress among founders at Tallac that had not developed deep roots in 2006 because of a shallow depth to the water table at that site. In contrast, the few founders that were able to survive at Taylor in 2006 may have developed deeper root systems that buffered them against a declining water table. Consequently, second year reproduction increased at Taylor while it declined at Tallac.

Overall, second year demographic performance was again more strongly dependant on site characters and lake level than the method of translocation or outplanting container-grown plants. In addition, the continued persistence and robust reproduction of the re-sprouts at Pope helped to offset any losses from the testing of translocation and may have even lead to an increase in seed production at that site.

3.2.3 2007 TRANSLOCATION

In 2006 the AMWG only approved translocation of experimental individuals of Tahoe yellow cress that had been outplanted as part of a reintroduction project. As previously mentioned, the rising lake in 2006 inundated all past cohorts so there were no outplanted Tahoe yellow cress available for a translocation experiment in 2007. In addition, results from the 2006 translocation indicated that one-

year-old outplanted individuals with limited root development were not likely to provide an appropriate surrogate for naturally occurring plants that have more extensively developed above and below ground root systems. Therefore, the AMWG approved translocation of naturally occurring TYC, but imposed a limit of 10% of the naturally occurring stems that emerged at a site in 2007 that could be available for the translocation experiment (these will subsequently be referred to as "donor" stems or plants). To ensure that the arbitrary limit of 10% would produce statistically valid results, BMP analyzed the variances in the data from the 2006 translocation and the 2006 outplanting and determined that the 50 container-grown plants used in blocks in past outplantings represented a sufficient sample size.

The 2007 experimental design was developed to test the question: Do the methods of translocation (of naturally occurring TYC) and outplanting (of container-grown TYC) result in the same demographic performance (i.e survival and reproduction rates) in a given microhabitat? If the results were not significantly different, then it would be appropriate to apply the lessons learned from the reintroduction efforts over the last four years regarding the effects of microhabitat, site, and lake elevation to translocation and it would not be necessary to test these factors using naturally occurring plants.

The experiment utilized a paired-design of one container-grown plant for each naturally occurring translocated plant, with 50 replicate pairs per site. For each pair, a naturally occurring plant from the donor location was translocated to the receptor location and a container-grown plant was outplanted one half meter away at the same elevation. The translocation took place at Upper Truckee East (a California Tahoe Conservancy (CTC) property) on August 2, 2007. Plants were moved from the west end of the beach near the river mouth to the east edge of the enclosure where plants had been previously outplanted. At Blackwood Creek, which is private property with a public easement through Placer County, plants were moved from the south to the north side of the creek on August 1. The North Blackwood homeowner was very cooperative and pleased with the project. The lake level was 6,227.0 ft LTD, approximately 0.6 ft lower than the peak elevation for the season reached at the beginning of June. As in past experiments, the plots were watered for three days after outplanting/translocation and monitored at 2, 4, and 8 weeks.

By October, the pattern of total 8 week survivorship of container-grown and translocated plants was different between the sites, with a greater proportion of translocants surviving at UTE and more container-grown founders surviving at Blackwood (Table 7). The container-grown plants were significantly more likely to survive than translocated plants at Blackwood according to the contingency analysis ($p<0.05$ for both Pearson's Test and Fisher's Exact Test) but there was no significant differences at UTE. Plants at both sites were very small, regardless of source, and did not reproduce at all. Although the mean canopy size of translocated plants was slightly larger then container-grown plants at UTE, it was the opposite at Blackwood and the differences were not significant.

Table 7. Survivorship and canopy size of container-grown and translocated plants at two sites, October 2007 (Values in a column followed by different letters are significantly different within a site [Fisher's Exact Test p<.05])

Site	Source	N	# Alive	Canopy (cm^2)
Upper Truckee East	Container	49	22 a	4.38 a
	Translocation	50	29 a	6.62 a
Blackwood	Container	50	28 a	4.63 a
	Translocation	50	17 b	2.66 a

The overall survivorship of 46% of translocants and 50% of container-grown plants across both sites is rather low compared to outplantings in optimal habitats in past years. For instance, survivorship in the meadow habitat in 2006 was around 85% at all three planted sites and in 2004, total survivorship across all habitats hovered around 75% for most sites. The lower survivorship in 2007 was likely a function of postponing the outplanting date to the beginning of August. Past outplantings have occurred around the time of peak lake elevation from mid-May to early June. The only other late planting occurred in late July, 2004 at UTE. Compared to the June planting that year, reproduction of the July cohort in the optimal berm habitat was reduced by half and founders did not reproduce at all in the high beach indicating that late plantings strongly limit growth and reproduction. Timing of outplanting is scheduled to be tested in 2008.

The translocation was delayed until August because the AMWG was debating the terms of using naturally occurring plants in the experiment and because of obstacles in site selection. The original experimental design had a more robust experimental sample size of 7 sites, including three USFS enclosures (Taylor Creek, Baldwin Beach, Meeks Bay), Edgewood Golf Course, and Ward Creek in addition to UTE and Blackwood. However, efforts to install the experiment at the other sites stalled until it was too late in the season to proceed.

At Edgewood, the majority of Tahoe yellow cress stems were in an eroded pit at the edge of the green and the golf course mangers wanted assurances from TRPA that they would be granted a permit to fill in the pit after the Tahoe yellow cress was moved. As previously mentioned, the AMWG was opposed to using all of the stems at a site in translocation at any site. Also, the TRPA had denied a permit request from the golf course earlier in the year, citing a lack of mitigation options. Although the limited results from the 2006 pilot translocation suggest that translocation may be a viable tool at some sites, further testing is required before it will be possible to develop new policy.

The land owners at Ward Creek welcomed the idea of planting "wildflowers" on their property, but hesitated when they realized it was the same plant that had stalled installation of their pier for several years. As with the Edgewood managers, they also wanted assurances from TRPA that the plant would not interfere with any future management on their property.

In 2007 the Forest Service did not support the experimental translocation of 10% of the stems within a population of naturally occurring Tahoe yellow cress on Forest Service land. The Forest Service did however support the translocation of container-grown individuals. The opinion of the Forest Service is that translocation of natural populations should only be implemented as a last resort tool for populations that are going to be impacted by approved project implementation. Furthermore, to

take naturally occurring TYC would require a permit from the Regional Forester not the Forest Supervisor. The following regulations apply:

FSH 2609.25 – BOTANICAL PROGRAM MANAGEMENT HANDBOOK
CHAPTER 10 - SENSITIVE PLANT PROGRAM MANAGEMENT

15.20 SENSITIVE SPECIES COLLECTION

Permit collection of sensitive plants only for specific and designated scientific purposes. Use non-destructive collection techniques whenever possible, taking only parts of plants and leaving a live root system, so that populations are not jeopardized. Administer authorized collecting at the lowest organizational level consistent with the area of collection involved. Signing authority for the collection of sensitive plant species follows:

b. Permits may only be issued for populations that are large enough to tolerate such collection. Removal of specimens must not alter the viability of the population. Amount of live plants or plant material to be collected from a population must be limited to the minimum needed for purposes of the survey. Collecting activities must not affect more than 2-5% of any single population. The Investigator(s) must agree to consult with the Forest Botanist or Forest Sensitive Plant Coordinator whenever questions about population viability arise.

3.3 GENETIC RESEARCH

Microsatellite DNA analysis has become the preferred tool in the field of conservation genetics for questions regarding population genetic structure and source-sink dynamics. A microsatellite is a short block of DNA that is repeated many times within the genome. The repeated sequence is very simple, consisting of two, three or four nucleotides. The lab uses VNTRs (variable number tandem repeats) which are repeating DNA sequences that are created from small errors in DNA replication. Many repeats tend to be concentrated at the same locus and the number of repeats at a particular locus is hypervariable (highly polymorphic) between individuals of the same species. It is for this reason that microsatellite sequences can be used for genetic fingerprinting and paternity testing.

Microsatellite loci can be isolated from genomic DNA and then amplified using PCR (polymerase chain reaction) technology. High levels of variability at the microsatellite loci permit resolution of fine scale spatial and temporal patterns in order to assess recent genetic bottlenecks, determine founder effects and how the metapopulation dynamic maintains genetic variation.

Previous DNA analysis of Tahoe yellow cress conducted by the National Forest Genetic Electrophoresis Laboratory (NFGEL) used allozymes to assess genetic variation and concluded there was little genetic variation (Saich and Hipkins 2000, DeWoody and Hipkins 2004). Both allozyme and mitochondrial DNA are protein products of conservative genes that are acted on by natural selection. These protein products have low levels of mutations. In contrast, microsatellites are non-coding and have no phenotypic expression; therefore mutation rates are faster since these sequences are not acted on by natural selection. Compared to allozymes, microsatellites exhibit greater variability and afford a finer level of genetic resolution.

The Lab for Ecological and Evolutionary Genetics at the University of Nevada Reno (UNR) is conducting the genetic analysis. The lab, headed by Dr. Mary Peacock, agreed in 2007 to set up a contract for $50,000 in R7 funds with the USFS in early 2008 to 1) screen newly developed genomic libraries for a sufficient number of variable markers and 2) screen recently collected TYC samples from previous TYC surveys (2006 and 2007). So far, 4 genomic libraries have been developed for TYC and the genetic analysis has developed 11 primers for 34 DNA microsatellites. Primers are short sequences of DNA designed to amplify the microsatellite loci.

If enough genetic variability is present, the fine scale resolution of microsatellites will enable researchers to identify genetic "fingerprints" of individual TYC. The patterns of variation present among individual Tahoe yellow cress and between different populations will help to determine the spatial structure of the metapopulation and how the metapopulation dynamic maintains genetic variation. This knowledge will help managers to better direct protection and conservation efforts towards sites that contribute the most to the maintenance of genetic diversity. The work will address a variety of key management questions including:

- What is the spatial structure of the TYC metapopulation?
- What is the direction and magnitude of gene flow between core and satellite populations?
- Do genetic differences between core populations increase with distance?
- How does the metapopulation maintain genetic variation? – rare recolonization events? seed banks?

4.0 FRIENDS OF TAHOE YELLOW CRESS STEWARDSHIP PROGRAM

Up to 50% of TYC is located on private land, so a solid stewardship program is required for successful implementation of the Conservation Strategy. A Stewardship committee was formed at the beginning of the year with the following members: Leslie Allen, University of Nevada Cooperative Extension; Jan Brisco, Tahoe Lakefront Owner's Association; Susan Levitsky, CA Fish and Game; Jane Schmidt, U.S. Natural Resources Conservation Service; with Alison Stanton, BMP Ecosciences consulting on research issues on private property. The goal of the committee is to create and distribute educational materials about conservation of TYC to landowners and interested businesses and to facilitate research on the development of conservation and management tools such as translocation and outplanting of container-grown plants. Funding is being provided for Leslie Allen's participation with the Stewardship subcommittee through a grant of $70,400 from the U.S. Bureau of Reclamation.

Jane Schmidt secured SNPLMA R 8 funding of $45,000 to provide technical assistance to private landowners interested in protecting TYC on their lands. The stated goal of the project is provide a minimum of 10 private property owners with conservation plans and to provide signage and demonstrate the use of temporary fencing options in protect plants.

Three constituents are being targeted by the stewardship program:

- Homeowners – the TLOA identified several TYC-friendly landowners to help review and comment on educational materials for both private homes and vacation rentals. A

draft "Pledge of Support" with accompanying Options/Levels of Support document was handed out to the AMWG for feedback.

- Business owners – focus on distribution of rack cards and tent cards to interested businesses; include education on TYC at the annual contractors' BMP workshop and in shorezone permits; develop bi-lingual materials.
- Tourists - purchase media time on TV, outreach to local newspapers, place rack cards at tourist kiosks, and place tents at cooperating businesses.

The goal for 2007 was to begin with lakefront homeowners private and conduct 6 meetings on the program, but there was difficulty in coordinating meetings and none occurred. A new goal for 2008 was identified to develop a Community Engagement Strategy with the following components:

- Open up channels of communication to listen, address fears and adapt
- Emphasize common concerns
- Use relevant and simple language
- Develop transparent regulatory process that limits unintended consequences
- Streamline involvement process
- Provide positive reinforcement for participation

5.0 2007 AGENCY ACTIVITY REPORTS

The CS requires a brief summary of annual agency staff time and expenditures on conservation and management activities specific to Tahoe yellow cress. Table 8 provides the hourly breakdown of staff time for each agency for 2003-2007. The number of staff hours spent on Tahoe yellow cress amounted to at least 1,532 hours, of which 250 hours were for the annual survey. Total in-kind cost contributed by each agency for all staff time and materials amounted to a minimum of $64,509 (some agencies did not report expenditures). Contracted funding is discussed in Section 6.1.

Table 8. Summary of agency hours spent on Tahoe yellow cress related activities during the 2003-2007 period.

Agency/Year	2003	2004	2005	2006	2007
TRPA	150	326.5	200	No report	No report
USFWS	400	390	70	60	80
USFS	1,168	516.5	980	1,240	700
NDSL/NDF	436	333	89	116	54
NNHP	160	95	175	190	83
CDFG	272	325	334	380	209
CDPR	403	218	358	233	139
CTC	1,024	140	606	No report	95
CSLC	400	224	235	181	110
TLOA	100	48	No report	No report	50
NRCS					12
Total	**4,109**	**2,616**	**3,047**	**2,400**	**1,532**

In collaboration with the TAG, the CTC developed an Agency Activity Report form in 2004 to assist management agencies in describing the following activities: Site-specific conservation activities for each Tahoe yellow cress location undertaken during the previous growing season; general Tahoe yellow cress conservation activities (i.e. public outreach, consultation, TAG participation, etc.); significant disturbances to the species or its habitat and subsequent response; planned Tahoe yellow cress conservation activities anticipated for the upcoming year; and all shorezone projects undertaken within potentially suitable Tahoe yellow cress habitat. Agency Activity Report forms for 2007 are supplied in Appendix G.

5.1 AMWG MEMBERSHIP

The Executives approved the formation of the Adaptive Management Working Group (AMWG) at the Executive meeting in November, 2005. The Technical Advisory Group (TAG) operates as a Subcommittee of the AMWG and consists of AMWG members with interest and expertise in technical topics. The 2007 AMWG members are in Table 9. Although they are not signatories on the MOU, both NRCS and UNCE have become funded and active participants. No representative from TRPA attended meetings in 2007 except for the Executive Meeting in September. The Forest Botanist position at the LTBMU has been vacant since October 2006, although Shana Gross was Acting Forest Botanist from May 15-August 31 and Stu Osbrack also attended meetings. Another position will become vacant in 2008 when Susan Levitsky retires from CDFG. Susan has been a crucial and valuable member of the AMWG since she began facilitating the quarterly meetings in 2004 and co-chairing the Stewardship Committee with Jan Brisco. Susan's enthusiastic participation will be missed.

Table 9. Membership of the Tahoe yellow cress Adaptive Management Working Group (AMWG) in 2007.

Agency or Entity	AMWG Representative
TRPA	none
USFWS	Steve Caicco, Botanist
USFS LTBMU	Shana Gross, Acting Forest Botanist (from May 15-August 31) Stu Osbrack, Acting Sensitive Plant Coordinator
NDSP	Peter Maholland, Conservation Staff Specialist
NDF	Roland Shaw, Forester
NNHP	Jennifer Newmark, Program Biologist
CDFG	Susan Levitsky, Staff Environmental Scientist (meeting facilitator)
CSP	Tamara Sasaki, Environmental Scientist
CTC	Jacqui Grandfield, Recreation Specialist (beginning in November)
CSLC	Eric Gillies, Staff Environmental Scientist
TLOA	Jan Brisco, Executive Director
BMP ECOSCIENCES	Bruce Pavlik, Principal and Alison Stanton, Research Botanist
NRCS	Jane Schmidt, District Conservationist
UNCE	Leslie Allen, Environmental Education Coordinator

5.2 SITE-SPECIFIC INFORMATION SHEETS

The CSLC, in consultation with the AMWG, developed a Site-Specific Information Sheet in 2005 (see the template in Appendix E). General information in the Information Sheet includes the site location, ownership, viability index, priority rank, and whether the site is a TRPA threshold site. The form also includes important information for management: site description, survey history, population and ecological characteristics, potential threats/concerns. Finally, the forms include descriptions of past and current activities and include recommendations for future management. The purpose of the Information Sheets is to provide a comprehensive repository of information pertaining to Tahoe yellow cress for all named locations. This format fulfills the intent of Appendix J in the CS, Proposed Actions for Core and High Priority Sites, and expands the number of sites to include private lands. The information will be useful for project review on both public and private lands in the shorezone. The public agencies are using the Information Sheets to develop Site-Specific Management Plans by expanding the recommendation section. Information Sheets for private lands could be used to develop a management plan in the future if mitigation or other circumstances required.

A total of 58 named sites have been assigned to AMWG members to complete the site- specific information sheets prior to review by the group. Final approved forms are submitted to Eric Gillies, CSLC, for inclusion in a comprehensive file that will be periodically updated. The CSLC is taking primary responsibility for completing Information Sheets for private lands. To date, information sheets for 29 sites have been completed and 7 are in draft. However, most of these have not been reviewed by the AMWG. The list of Site-Specific Information Sheet assignments and status is in Appendix F.

6.0 FIVE YEAR MANAGEMENT PLAN

The signatories of the CS MOU developed a list of initial management and monitoring responsibilities (Table 14 in the CS). In 2005, the AMWG modified the format and content of Table 14 to produce a 5 Year Management Plan to guide all activities related to Tahoe yellow cress conservation including Funding; Management; Regulation; Research; Restoration; and Stewardship. Each section specifies actions and the entities responsible for a 5 year period. Each year's plan includes the previous year for reference, the plan for the current year, and projected actions for the subsequent three years. For 2007, the plan contains actions from 2006-2010, and the AMWG made several significant changes to the plan. First, the number of action items was reduced and streamlined to more accurately focus on important tasks in the appropriate implementation years (see the complete plan in Appendix D). Next, the budget section was revised to include a more detailed accounting of funds made available for contracting and to identify the funding source, the contract amount, the contract administrator, and the recipient. The contract task and the implementation year supported by the funding are also identified.

6.1 FUNDING

Table 10 presents awarded (and promised) funding for the period from 2006 to 2010 to keep with the format of the 5 Year Management Plan but no funding has been secured for 2009 and 2010.

Contracted funds in the amount of $473,400 have been or will be made available for the implementation of the CS from 2006 through 2008. For research and restoration activities, a congressional earmark of $100,000 for Tahoe yellow cress to the US Fish and Wildlife Service was contracted to BMP Ecosciences in 2006 to conduct outplanting research and participate in the AMWG process. Some of these funds were carried into 2007 to support technical reporting and AMWG participation. The California Department of Fish and Game (CDFG) supported restoration mitigation research with $48,000 in Section 6 funds that were contracted to BMP Ecosciences in 2006 that will be carried into 2008. The Round 6 Sierra Nevada Public Lands Management Act (SNPLMA) award of $350,000 to the USFS LTBMU specified $200,000 for contracting and $150,000 was allocated for the LTBMU to support staff time and other products. A contract for $109,950 in R6 funds was set up with BMP in April 2007 that eill carry into the beginning of 2008. A new contract for approximately $80,000 in remaining R6 funds is expected to be set up with BMP in 2008. The funded tasks are identified in Table 10. A R7 SNPLMA award of $150,000 specified $50,000 for contracting with the remainder for LTBMU use. A contract for approximately $50,000 of R7 funds is expected to be set up with the University Nevada Reno (UNR) to conduct microsatellite DNA analysis.

For Stewardship activities, the Bureau of Reclamation (BOR) awarded $70,400 to the University of Nevada Reno Cooperative Extension (UNRCE) to further develop the Stewardship Program and educational outreach materials. The Nevada Division of State Parks (NDSP) contributed $11,000 in Lake Tahoe license plate funds to the effort. In addition, the Natural Resources Conservation Service (NRCS) was awarded $45,000 in R8 SNPLMA funds. These funds will not be contracted so they are omitted from Table 10, but the funds will be used to develop site-specific plans with private property owners for Tahoe yellow cress conservation.

TABLE 10. Contracted funding sources for the TYC Conservation Strategy for 2006 to 2010 (2009 and 2010 are currently unsupported).

					Supported year				
Funding Source	**Amount**	**Administrator**	**Recipient**	**Tasks**	**2006**	**2007**	**2008**	**2009**	**2010**
Congressional earmark	**$100,000**	**USFWS**	**BMP**	AMWG participation	x	x			
				annual survey coordination/participation	x				
				Annual report	x				
				Nursery oversight	x				
				Experimental demographic outplanting and monitoring	x				
				Technical reporting	x	x			
Section 6	**$48,000**	**CDFG**	**BMP**	Nursery oversight		x	x		
				Mitigation/translocation feasibility experiment		x	x		
				Experimental demographic and disturbance monitoring		x	x		
				Technical reporting		x	x		
SNPLMA R6	**$109,000**	**USFS**	**BMP**	Task 1 Expanded analysis of 2003-2006 data		x	x		
				Task 2Experimental demographic outplanting and monitoring		x			
				Task 3 AMWG participation		x			
				Task 4 Manuscript preparation		x	x		
SNPLMA R6 to be contracted in 2008	**$85,000**	**USFS**	**BMP**	Task 1 Experimental demographic outplanting and monitoring			x		
				Task 2 Collaboration with UNR			x		
				Task 3 AMWG participation			x		
				Task 4 Private lands engagement : research and monitoring,long-term annual survey strategy			x		
				Task 5 Public land habitat reserve planning			x		

TABLE 10. Contracted funding sources for the TYC Conservation Strategy for 2006 to 2010 (2009 and 2010 are currently unsupported).

					Supported year				
Funding Source	**Amount**	**Administrator**	**Recipient**	**Tasks**	**2006**	**2007**	**2008**	**2009**	**2010**
SNPLMA R7 to be contracted in 2008	**$50,000**	**USFS**	**UNR**	Develop microsatellite DNA techniques			x		
NV State license plate	**$11,000**	**NDSP**	**UNRCE**	Stewardship tasks	x	x	x		
BOR	**$70,400**	**BOR**	**UNRCE**	TYC identification aids			x		
				School materials			x		
				Tri-fold brochure		x	x		
				Tourist Rack Card		x	x		
				Launch "Friends of TYC" group			x		
				Report on successes in conserving TYC			x		

6.2 MANAGEMENT

Many of the management activities of the last past three years have focused on implementing the research agenda. Management in 2008 represents a transition from the research phase to an active restoration phase that may require modifications in land use planning strategies. As discussed in Section 3.1, most of the fences on public lands essentially enclose higher elevation habitat and fail to protect the "seed factory" at lower elevations. Fencing in lower elevation habitat that is subject to inundation is either problematic or strictly prohibited and so new solutions are required to adequately protect the full spectrum of Tahoe yellow cress at some Core sites, particularly at creek mouths. The potential intra-agency conflicts between resource and recreation interests needs to be acknowledged and addressed in identifying new land use planning strategies. The management tasks for public lands for 2008 are:

- Implement intra-agency coordination meetings to develop land use planning for Core and high ranked sites.
- Complete and review Site Specific Management Plans for all public lands.

The protection of Tahoe yellow cress is equally important on private property because up to 50% of the annual survey stem counts are found on private lands. Both NRCS and UNRCE will be taking the lead to collaborate with TLOA to develop innovative community engagement strategies that will increase the role of private landowners as stakeholders in Tahoe yellow cress conservation and protection. The management tasks for 2008 on private property are:

- Secure access to private sites for future surveys and potential restoration implementation
- Assist private landowners in developing site-specific management/conservation plans
- Complete and review Site Specific Information Sheets for all private sites.

6.3 REGULATION

Integration of AMWG conservation activities into basin-wide planning efforts are addressed in the following actions in the plan:

- Continue coordination between the AMWG and the Interagency Shorezone Review Committee on project application review.
- Continue to provide comments on the Regional Plan Update.
- Continue to provide comments on the TRPA Shorezone EIS.
- Continue to provide comments on the Environmental Improvement Program (EIP) update.

With respect to implementation of the Conservation Strategy, the examples of the regulatory concerns of private property owners and a public agency discussed in Section 3.3 illustrate how the lack of regulatory direction regarding experimentation on a sensitive plant species is impeding research efforts to develop management tools.

On private property, the owners that declined to participate in the translocation experiment did so because they wanted assurances from TRPA that the presence of the plant would not interfere with any future management on their property. At the moment it is unclear how TRPA would be able to provide this since the TRPA threshold standard for sensitive plants (V-3) and the Code of Ordinances (Chapter 75) have been interpreted as a"non-degradation" standard that would apparently prohibit disturbing naturally occurring individuals in any way. Several members of the

AMWG (CDFG, USFWS, TLOA) met with the Executive Director of TRPA after the Executive meeting in September, 2007 to discuss the TRPA threshold. They noted that the current threshold, which dates to 1983, is arbitrary and outdated and not relevant to the current understanding of the biology of the species. They discussed potential permit conditions for translocation that would 1) limit the transplantation of natural TYC plants to the minimum number necessary to meet statistical requirements as long as that number was within the comfort zone of the AMWG for the source population; 2) any translocation would include sufficient outplanting of container-grown individuals to offset any loss of individuals within a population; 3) transplantation of "mother plants" (large and persistent plants that have been identified at several core sites) would be prohibited; and 4) experimental translocation of TYC was being implemented based on the underlying science specific to the species and should not be applied to any other plant species in the region. These conditions were deemed to fully mitigate any significant adverse effects and make translocation allowable under 75.2.A of the TRPA Code of Ordinances, but this decision was never recorded in a formal memo by TRPA Staff. If these conditions were formally adopted, they would provide guidance in the design and installation of a translocation experiment but they still do not provide any assurance to the private property owner.

The USFS did not support the translocation experiment of naturally occurring individuals on FS lands; the FS believes that translocation of naturally occurring individuals should only be implemented as a last resort tool for populations that are going to be impacted by approved project implementation. In addition, Regional direction (FSH 2609.25.10.15.20) does not allow this activity "***Use non-destructive collection techniques whenever possible, taking only parts of plants and leaving a live root system, so that populations are not jeopardized"*** and ***"Collecting activities must not affect more than 2-5% of any single population".***

Given the regulatory concerns on both private and public lands it is the responsibility of the AMWG to cooperate with the federal and state regulatory agencies and address the following issues:

- Identify permissible experimental actions for TYC conservation on both public and private lands
- Identify conditions and parameters for private landowner participation in TYC experimentation
- Address regulatory and time constraints on management actions within the agencies

6.4 RESEARCH AND RESTORATION

Several research products are scheduled to become available in 2008 that are being funded through a R6 SNPLMA contract between the LTBMU and BMP Ecosciences. A technical report on the expanded analysis of the 2003-2006 experimental data: "Implementing the Conservation Strategy for Tahoe yellow cress VII. Management and science implications of multi-year experimental reintroduction" will investigate the aggregate effects of genetics, microhabitat, or water relations on founder performance (a founder indicates an outplanted individual associated with a particular cohort). The report will present specific restoration prescriptions according to lake level, founder

genotype, microhabitat, and expected persistence that specifies the how, what, when, and where for successfully outplanting TYC.

Three manuscripts for publication in peer-reviewed scientific journals such as Conservation Biology will address different aspects of the development and implementation of the Conservation Strategy. The first paper will focus on the biological evaluation of TYC and analysis of the long-term monitoring data that lead to an understanding of the life history dynamics of the species. The second paper will present the adaptive management framework for implementing the Conservation Strategy. The final paper will present the comprehensive methodology and results from the experimental reintroductions using the expanded analysis of the 2003-2006 dataset. The proposed titles of the manuscripts are as follows:

> Developing a Conservation Strategy for Tahoe Yellow Cress (*Rorripa subumbellata*):
>
> I. Using Long-term Monitoring to Characterize Metapopulation Dynamics
>
> II. Accommodating Metapopulation Dynamics with a Framework for Restoration and Adaptive Management
>
> III. Experimental Reintroductions

The research program has been designed to address the Key Management Questions but several questions remained unanswered in 2008. Results from experimental plantings in 2003 to 2006 have identified the optimal techniques, plant characteristics, habitat conditions, and logistical factors for restoration efforts, but the missing piece is the determination of the optimal timeframe for planting that will provide the best performance of restoration plantings. The regulatory window for TYC surveys and activities extends from June 15 to September 30, but past plantings have primarily been tested around the time of maximum lake elevation in May and June. Limited data from a later season planting in July 2004 suggested that late planting strongly limited growth and reproduction in both mesic and xeric microhabitats. Therefore, a second phase of experimental outplanting is needed to test plant performance at different planting times during the survey window for TYC. An outplanting design was developed in 2007 but was not implemented due to low availability of quality container-grown plants at the NDF Washoe nursery. The outplanting design specifies that 50 container-grown plants will each be installed at 4-5 sites around the lake every five weeks for a total of 200 plants per site. That work is expected to be funded with a second R6 SNPLMA contract between the LTBMU and BMP Ecosciences. A second year of validation testing of the 2008 design will be required in 2009 and the LTBMU is expected to submit a R9 SNPLMA proposal in January 2008 to fund the second phase.

Another important management question that will be addressed in 2008 concerns the role of genetic factors in dispersal. For instance, if managers can learn both the direction and magnitude of gene flow between core and satellite populations, they can better direct protection and conservation efforts towards sites that contribute the most to the maintenance of genetic diversity. Through the expected R7 SNPLMA contract with the LTBMU, the Lab for Ecological and Evolutionary Genetics at UNR will be using DNA microsatellites to determine the spatial structure of the metapopulation and how the metapopulation dynamic maintains genetic variation. Microsatellite DNA analysis has become

the preferred tool in the field of conservation genetics for questions regarding population genetic structure and source-sink dynamics. Additional funds may be sought to expand the analysis with select screening of herbarium samples dating back to 1904. That portion of the project would address more temporal questions regarding changes in genetic structure of a population over time.

6.5 STEWARDSHIP

Continue outreach and distribute materials for public education and private land owner participation in conservation activities:

- Tri-fold brochure for use with private landowners
- Tourist rack card for broader public education opportunities

Outreach to the greater community can take place within the context of a community engagement strategy. Community engagement is an active process that seeks to open lines of communication among stakeholders in order to address the common concerns and fears of the participants regarding the conservation and protection of a rare and endangered plant. The goal is to develop trust so that collaborative and effective approaches to conservation can be identified and implemented. Desired outcomes of the engagement strategy may include the following:

- Develop a transparent regulatory process that limits unintended consequences
- Streamline involvement process
- Provide positive reinforcement for participation
- Determine clear signage and fencing parameters and conditions

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8.0 PHOTOS

Photo1 Planting additional TYC at Washoe Nursery

Photo 2 Executive Meeting field trip to Baldwin Beach enclosure September 2007.

Photo 3 A) Proposed translocation donor site at Edgewood Golf Course and
B) Proposed TYC donor plants established in the beach collapse

A) B)

Photo 4 Proposed receptor site at the north end of Edgewood property (TYC present)

Photo 5 A) Donor site at Blackwood South B) Receptor site at Blackwood North

A)

B)

Photo 6 Translocation of a naturally occurring plant at Blackwood South on August 3, 2007.

Photo 7 A) Donor site at Upper Truckee East B) Receptor site at Upper Truckee East

A)

B)

Photo 8 Translocant on the left and container-grown TYC on the right at UTE.

9.0 APPENDICES

Appendix A: Annual Field Survey Form for ranked sites

TAHOE YELLOW CRESS *(Rorippa subumbellata)* FIELD SURVEY FORM FOR RANKED SITES

Survey date: _____

Surveyor: _____ Affiliation: _____

Email: _____ Telephone: _____

LOCATION (attach copy of quad map showing boundaries and pictures taken)

Site name: _____

USGS quad: S. Lake Tahoe Emerald Bay Meeks Bay Homewood Tahoe City Kings Beach Marlette Lake Glenbrook

County: El Dorado Placer Washoe Carson Douglas **Site ownership:** Private State Federal City/Local

Legal access: _____

TYC Present? Yes No Actual Number of Plants: _____

Number of plants within cluster_____ Actual Number or Estimated Percentage in each phenological stage (circle one)

Juvenile: _____ Senescent: _____ Flowering: _____ Fruiting (may also be flowering): _____

Amount of person minutes spent in search? _____

Previous plant occurrence? Yes No Date plant last observed: _____

SITE BOUNDARY OR CLUSTER (individual clusters are equal to TYC that is within 13 m radius): (record additional clusters on back or on additional data sheets)

GPS Coordinates taken: (UTM NAD 27, Zone 11) – be specific about where the coordinates are from (centroid, endpoints, cluster, etc.)

Easting: _____ Northing: _____ Location: _____

Easting: _____ Northing: _____ Location: _____

Easting: _____ Northing: _____ Location: _____

Easting: _____ Northing: _____ Location: _____

LAND USES, IMPACTS, AND MANAGEMENT RECOMMENDATIONS

Cover of footprints within patch: <5% 5-25% 26-50% 51-75% >75%

Note vegetation removal, trash, recreational impacts, vandalism and/or other impacts:

_____

_____

_

Enclosure effectiveness: good fair poor Comment: _____

Possible management actions and other notes:

Appendix B: Survey Protocols for Tahoe Yellow Cress Annual Surveys

For following protocol refers to the data sheet for unranked sites. For ranked sites, use the field form for ranked sites. Stems may be estimated at ranked sites and assigned an abundance category.

1-Survey Date: Date of on the ground survey work

2-Surveyor/E-mail/Affiliation/Telephone: At least list survey leader with their contact information (normally person who has conducted surveys in past); ideally list all participants and contact info. Contact information is very important to include in case questions arise about the survey data.

3-Location: This information will be filled out prior to survey for all known sites. When a new site is found fill out the information for Site name, Site ownership and Legal access.

4-TYC Present: Circle appropriate response after surveying site.

5-Actual number of stems, or estimated stems: After surveying the site this should be a total (or estimate when there are too many plants to count) of all the clusters found at each site.

6-Amount of person minutes spent in search: Total the time spent on each site, by each individual.

7-Previous plant occurrence: On site with a previous occurrence this will be filled out prior to the survey using the information from past surveys that is stored at NV natural heritage.

8-Date plant last observed: On site with a previous occurrence this will be filled out prior to the survey using the information from past surveys that is stored at NV natural heritage program (NNHP).

9-Cluster: If two clusters are separated by less than 13 m, consider them one cluster. For TYC clusters separated by a distance greater than 13 m, they should be treated as two separate clusters. Use exact measurement, if you can pace it off this is okay just be sure you and your team members are correct in pacing. Refer to 10-GPS coordinates below for additional information about working with and about the logic behind the cluster definition. Page one has space for the first cluster only. Space for clusters two and three can be found on page two, any additional clusters can be found on the additional cluster page; please fill in the cluster number in the blank after cluster.

10-GPS Coordinates: The preferred reading should be in Nad 27, zone 11, if you do not take a reading in this zone or datum make sure you indicate where it was taken. Because the site boundaries have been established, surveyors are only responsible for GPSing TYC clusters/individuals. Most of the GPS units we will be using are only accurate to within 3 to 9 meters (m) and for NNHP Biotics an error within about 6.5 m is acceptable. Therefore, for example, if you find a cluster that is less than 6.5 m in diameter, simply take a central point. For one cluster with a diameter larger than 6.5 m, endpoint or corner coordinates can be taken. If two clusters are separated by less than 13 m, consider them one cluster and either take one point on each of the outer edges or one central point. For TYC clusters separated by a distance greater than 13 m, they should be treated as two separate clusters, and GPS coordinates should be obtained for each cluster (either end points or central points). NNHP will keep track of these clusters, but they will be subsets of the overall population at that site. **It is critical to indicate what and where particular coordinates are from and if they are central points or endpoints in order to ensure proper data interpretation!** Drawing pictures is helpful as well. Additionally, if you take multiple points for clusters and outlying individuals within a site, document what data you have taken and how it should be interpreted by NNHP.

11- Number of plants in cluster__ Actual Number or Estimated Percentage in each phenological stage (circle one). Juvenile: _____ Senescent: _____ Flowering: _____ Fruiting (may also be flowering): _____ Min. Rosette Diameter (cm): _____ Max. Rosette Diameter (cm):

Record the actual or estimated number of plants within the cluster then circle actual number if you count each individual plant within the cluster or estimated percent if you estimate the phenology of the cluster. Then recorded the number/percent in each of the phenological stages.The last thing in the box is the min. and max. rosette size within the cluster.

12-Elevation/Lake Level: This information will be filled in by NNHP after the survey. If you know the information you can fill it in.

13-Distance to lake water line (meters): Measure meters to Lake Tahoe for each cluster. If there is another body of water closer note this also.

14-Sketch beach profile: Sketch the beach profile and any dominate markers that help to identify the site. Either draw in space provided or use back site of map. If have time, it is nice to also include a map of the locations of each cluster.

15-Substrate/soils: The size for each type of substrate is based on USDA's *Comparison of size particle classes* from the Field Book for Describing Sampling Soils version 2.0. Give a percentage to each category of substrate (make sure this adds up to 100%) for the area within the cluster to 0.3 meters outside of it. If you are unsure use a ruler to measure the substrate until you get a feel for it. It is also a good idea to do the first percentage estimate with the group to try to calibrate everyone into the percentage estimates.

16-Total Vegetation % cover: This is a measurement of how much % cover of vegetation is within each cluster to 0.3 m away from cluster.

17-Associated vegetation: Include any vegetation found within the cluster, include species when possible. Then include the percent cover of each of the species within the cluster; this should add up to 100%. Don't forget to include TYC.

18-Non-native species: Circle yes or no if there are any non-native species found within the cluster. Identify the non-native species with an * next to their names.

19-Land use and impacts: This data is for the whole site, not individual clusters.

20-Cover of footprints/Impacts to site: Record everything that you see within the site, especially if found within actual clusters.

21-Management actions/other notes: Use this for any suggestions or notes about abnormalities, for example, if a cluster of TYC is growing on a 50% slope recorded that information here.

Appendix C: Presence (X) and Absence (0) of Tahoe Yellow Cress (1978-2007)

SITE NAME	NNHP EO NUMBER	OWNERSHIP/YR ELEVATION	1978 6224	1979 6224	1980 6226	1981 6228	1982 6228	1983 6228	1986 6228	1988 6224	1989 6224	1990 6223	1991 6222	1992 6223	1993 6223	1994 6222	1995 6227	1996 6227	1997 6228	1998 6228	1999 6228	2000 6228	2001 6225	2002 6224	2003 6224	2004 6223	2005 6225	2006 6228	2007 6226
Sunnyside	929	Private/Placer Co		0	0	0	NS	NS	NS	NS	NS	0	NS	NS	X	0	0	0	0	0	0	0	0	0	0	0	NS	0
Ward Creek	921	Private	X	50	136	20	9	121	285	186	NS	172	X	X	X	X	0	0	NS	0	0	0	NS	443	52	66	127	147	403
Kaspian Campground	901	USFS											11	10	NS	NS	NS	NS	0	NS	NS	0	1	0	0	1	4	0	15
Blackwood North		Private		0	78	49	152	100	197	246	NS	151	11	NS	X	X	0	0	X	0	0	30	100	60	27	54	416	21	305
Blackwood South	919	Private/Placer Co		35	25	58	56	359	1073	423	NS	814	NS	NS	X	X	0	0	X	X	X	600	205	272	168	163	18	667	2761
Tahoe Pines (Fleur Du Lac)		Private																	0	0	0	0	0	0	43	18	91	2	11
Cherry Street/Tahoe Swiss Village	937	Private										X	NS	NS	X	X	0	0	0	0	0	0	0	36	109	51	25	0	0
McKinney North/Shores		Private													39	27	0	0	0	0	0	0	0	12	50	63	159	0	0
McKinney Creek	928	Private		0	NS	0	NS	NS	NS	NS	NS	19	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1	2	5000	0	42
Tahoma	918	Private		2	1	1	0	0	0	0	NS	0	NS	NS	X	X	0	0	0	0	0	0	0	NS	7	3	500	0	0
Sugar Pine Point State Park		CA State Parks																					13	383	104	86	908	12	69
Meeks Bay	917	USFS		40	25	91	0	0	0	4	NS	152	290	148	0	0	NS	X	10	X	X	1	6	106	42	0	25	0	110
Meeks Bay Enclosure (+ 1 new encl)		USFS																			X	X	X	X	25	11	0	0	0
Meeks Bay Vista	910	Private			15	15	0	0	0	NS	NS	0	NS	NS	X	0	NS	NS	NS	0	NS	0	0	0	230	NS	0	0	0
Rubicon Bay	936	Private		0	NS	19	45	55	161	182	NS	35	NS	NS	X	X	NS	NS	NS	0	30	0	4	39	387	698	5000	11	158
DL Bliss Enclosure	916	CA State Parks		0	0	0	0	0	0	0	X	X	NS	NS	X	X	X	X	X	X	X	X	7	4	2	1	1	1	6
DL Bliss State Park		CA State Parks		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	302	0	0
Emerald Point	924	CA State Parks		X	0	0	0	0	0	NS	NS	X	700	440	984	X	0	0	0	0	NS	0	1	X	70	157	244	0	10
Emerald Bay Boat Camp	914	CA State Parks		15	0	0	0	0	0	NS	NS	8	0	0	X	X	0	0	NS	0	NS	0	5	X	0	24	77	0	0
Eagle Creek/Avalanche	915	CA State Parks		15	NS	NS	NS	NS	NS	NS	NS	27	150	220	155	X	0	0	NS	0	NS	0	51	35	265	493	601	71	404
Eagle Point	927	CA State Parks											20	28	61	X	0	0	0	0	NS	0	0	0	0	15	12	0	0
CTC Cascade Creek		CTC																							31	X	54	0	22
Cascade Creek	925	Private/USFS		0	NS	0	NS	0	0	NS	NS	170	NS	NS	X	0	X	X	X	X	100	100	28	24	75	125	NS	0	56
Tallac Enclosure	912	USFS		0	NS	0	NS	0	0	NS	NS	X	NS	NS	X	0	X	X	X	X	65	70	182*	49	33	14	28	90	149
Tallac Creek (outside Enclosure)		USFS		0	NS	0	0	NS	60	68	NS	11	81	75	X	X	X	X	X	X	X	X	200*	40	13	0	31	0	26
Baldwin Beach	931	USFS		0	35	45	0	0	0	0	NS	4	1500	1821	X	X	X	X	0	X	X	X	4	7	62	54	54	19	49
Baldwin Bch Parking Lot Encl		USFS																						X	25	24	11	213	98
Taylor Creek Enclosure		USFS		5	100	111	429	408	191	52	NS	329	383	73	X	X	X	30	X	X	3	50	882	1152	910	521	540	664	1124
Taylor Creek	911	USFS		0	0	0	0	0	0	0	NS	0	0	0	0	0	0	0	0	0	0	0	52	457	614	1102	509	2	143
Kiva Beach/Valhalla	913	USFS		31	NS	X	NS	NS	NS	NS	NS	NS	614	2480	NS	NS	0	0	0	0	0	0	0	0	60	99	136	0	0
Jameson		Private																					0	0	0	0	NS	13	0
Pope Beach	909	USFS		21	0	11	NS	NS	86	262	NS	31	X	X	15	X	0	0	0	0	0	0	4	14	16	7	4	40	0
Lighthouse	938	Private		10	0	X	0	0	NS	X	NS	X	X	X	X	X	0	0	0	0	100	250	474	394	432	18	185	99	259
Tahoe Keys	926	Private		10	0	X	0	0	NS	X	NS	X	NS	NS	X	X	X	0	0	0	0	NS	X	921	4660	1010	1723	150	255
Upper Truckee West	908	CTC		37	20	172	148	211	80	167	NS	537	NS	NS	X	X	X	X	X	0	0	8	453	253	610	1289	425	0	50
Upper Truckee East	907	CTC		50	165	1000	NS	NS	1500	2895	NS	6529	NS	NS	X	X	X	415	X	X	1000	3000	3171	14434	13660	5000	5000	1872	3529
Regan/Al Tahoe	905	Private/City SLT		14	0	0	0	0	0	0	NS	90	NS	NS	X	X	0	0	0	0	0	0	25	210	600	330	139	0	0
El Dorado Beach	906	City SLT		1	0	0	0	0	0	0	NS	0	NS	NS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bijou (Timber Cove Lodge)	903	Public																					0	2	18	25	20	0	0
Timber Cove	904	Private		0	NS	7	325	478	150	4	NS	22	NS	NS	0	0	0	0	0	0	0	0	0	0	1	2	26	0	27
Tahoe Meadows	902	Private		25	10	10	0	NS	NS	NS	NS	6	NS	NS	X	0	0	0	0	X	15	60	36	60	60	17	1070	61	X

Appendix C: Presence (X) and Absence (0) of Tahoe Yellow Cress (1978-2007)

SITE NAME	NNHP EO NUMBER	OWNERSHIP/YR ELEVATION	1978 6224	1979 6224	1980 6226	1981 6228	1982 6228	1983 6228	1986 6228	1988 6224	1989 6224	1990 6223	1991 6222	1992 6223	1993 6223	1994 6222	1995 6227	1996 6227	1997 6228	1998 6228	1999 6228	2000 6228	2001 6225	2002 6224	2003 6224	2004 6223	2005 6225	2006 6228	2007 6226
Edgewood	2	Private		11	120	619	778	738	600	1235	NS	377	NS	NS	X	X	0	0	X	X	300	300	178	621	335	106	346	257	753
4-H Camp/City Pump House	1	UNR/City	65	X	12	26	24	5	210	96	NS	6	NS	NS	X	0	NS	0	0	0	0	0	44	104	77	33	28	5	111
Kahle/Nevada	8	USFS	57	200	8	2	176	385	760	519	NS	66	8	13	10	X	0	0	0	0	25	100	0	1	1	1	78	82	761
Elk Point	14	Private		30	0	0	NS	NS	NS	NS	NS	20	NS	NS	14	X	NS	NS	NS	0	0	0	NS	NS	NS	NS	NS	NS	NS
Roundhill	9	USFS											50	0	15	NS	NS	NS	NS	NS	NS	NS	NS	19	45	25	19	0	0
Marla Bay		Private																					0	NS	15	10	1	11	0
Zephyr Cove	11	Private/USFS					X	NS	NS	X	NS	X	100	145	53	X	0	0	0	0	0	0	4	93	66	59	X	0	0
Skyland	5	Private		20	0	0	NS	NS	NS	NS	NS	34	NS	NS	X	X	NS	NS	NS	0	NS	NS	NS	NS	NS	64	NS	0	0
Cave Rock	17	NV State Parks										X	NS	NS	X	X	0	0	0	0	0	18	6	12	0	0	3	0	0
Logan Shoals/Vista	6	Private		100	12	428	0	0	309	133	NS	1430	43	64	NS	X	NS	NS	NS	0	NS	0	NS	0	NS	1135	0	50	45
Glenbrook	4	Private		500	9	143	800	500	NS	NS	10	70	NS	NS	X	X	0	0	0	0	NS	0	0	NS	983	164	292	0	0
Skunk Harbor	16	USFS										X	0	NS	0	0	0	0	0	0	NS	0	0	0	0	0	0	0	0
Secret Harbor	12	USFS										X	7	33	0	0	0	0	0	0	NS	0	0	27	92	NS	33	0	0
Chimney Rock	13	USFS											9	19	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	0	0
Sand Harbor	3	NV State Parks		1	0	0	NS	NS	NS	NS	NS	0	NS	NS	0	0	0	0	0	0	0	0	0	0	3	29	112	0	0
Hidden Beach		NV State Parks																	NS	NS	NS	NS	NS	3	19	13	7	0	0
Burnt Cedar Beach		IVGID																	NS	NS	NS	NS	NS	4	0	0	NS	0	0
Crystal Point	933	Private/Placer Co													X	X	NS	NS	0	0	NS	0	0	0	0	0	NS	0	0
Kings Beach	932	Private/Public					X	NS	NS	NS	NS	NS	0	NS	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Agate Bay	920	Private		0	0	0	NS	NS	NS	NS	NS	0	NS	NS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dollar Point	934	Private											X	NS	X	X	0	0	0	0	NS	0	0	10	83	315	1000	0	0
Total Sites			**3**	**38**	**39**	**39**	**41**	**41**	**41**	**41**	**41**	**45**	**50**	**50**	**52**	**52**	**52**	**52**	**53**	**53**	**54**	**55**	**60**	**63**	**64**	**64**	**62**	**62**	**62**
No. of Sites Not Surveyed			**0**	**0**	**8**	**1**	**11**	**13**	**13**	**15**	**37**	**2**	**24**	**28**	**5**	**5**	**12**	**10**	**12**	**5**	**17**	**6**	**8**	**6**	**3**	**3**	**6**	**2**	**1**
No. of Sites Surveyed			**3**	**38**	**31**	**38**	**29**	**27**	**27**	**25**	**3**	**43**	**25**	**21**	**47**	**47**	**40**	**42**	**41**	**48**	**37**	**49**	**52**	**57**	**61**	**61**	**56**	**60**	**61**
No. of Sites Occupied			**3**	**25**	**16**	**22**	**13**	**11**	**14**	**18**	**2**	**35**	**21**	**17**	**37**	**31**	**9**	**9**	**11**	**11**	**15**	**17**	**29**	**40**	**46**	**47**	**47**	**24**	**30**
No. of Sites Unoccupied				**13**	**15**	**16**	**16**	**16**	**13**	**7**	**1**	**8**	**5**	**4**	**10**	**16**	**31**	**33**	**32**	**37**	**12**	**32**	**23**	**17**	**15**	**14**	**9**	**38**	**32**

Totals are based on 2003/2004 site name reconciliation.

Appendix D: Five Year Management Plan (2006-2010)

Action	Entity	2006	2007	2008	2009	2010
Management						
AMWG meetings	AMWG	x	x	x	x	x
Annual Executive meeting	Executive Committee	x	x	x	x	x
Annual survey	AMWG and partners	x	x	x	x	x
Annual report	BMP Ecosciences	x	x	x	x	x
Incorporate TYC database into TIMMS real-time database	NNHP;TRPA			x	x	
Conduct intra-agency conservation coordination (reserve planning) meetings for core sites	AMWG & Agency staff		x	x	x	x
Develop survey protocols that detect meta-pop dynamic	BMP Ecosciences			x	x	
Secure access to private lands for surveys and possible restoration	TLOA	x	x	x	x	
Do Site-Specific Information for private sites	CSLC; Friends of TYC	x	x	x		
Assist private stakeholders in drafting management plans	NRCS			x	x	x
Do Site-Specific management plans for public sites	Agency owners	x	x	x		
Appropriately sign all enclosures	Agency owners	x	x	x	x	x
Update Site Rankings when appropriate	TAG	x	x	x	x	x
Maintain TYC Enclosures	Agency owners	x	x	x	x	x
Investigate private land acquisition opportunities	CTC; USFS	x	x	x	x	x

Action	Entity	2006	2007	2008	2009	2010
Regulation						
TRPA Shorezone EIS	TRPA; AMWG review	x	x	x		
Review Environmental docs for public projects (BOR, DWR, TROA, EIS/EIRs)	CSLC	x	x	x	x	x
Review private landowner requirements in project review	CSLC	x	x	x	x	x
Coordinate w/ Interagency Shorezone Review Committee on project application review	CSLC	x	x	x	x	x
P7 Environmental Threshold Review	TRPA;BMP Ecosciences; TAG	x	x			
Assess species' listing status	FWS; CDFG					
Add emergency fencing for high water protection (per imminent extinction plan) to all agency MOUs with TRPA	TRPA; USFS; CDPR; NDSP; CTC			x		
Research						
Greenhouse propagation	USFS;NDF	x	x	x	x	
Nursery oversight	BMP Ecosciences	x	x	x	x	
Mitigation/translocation feasibility experiment	BMP Ecosciences,CDFG	x	x	x	x	
Experimental plant installation and monitoring	BMP Ecosciences	x	x	x	x	
Technical reporting	BMP Ecosciences	x	x	x	x	x
Develop microsatellite DNA techniques	UNR		x	x	x	
Apply microsatellite results to management problems	UNR; BMP Ecosciences			x	x	

Action	Entity	2006	2007	2008	2009	2010
Restoration						
Translate research results into restoration prescriptions	BMP Ecosciences			x	x	
Test prescriptions at multiple sites	BMP Ecosciences			x	x	
Large scale propagations for restoration purposes	USFS;NDF			x	x	
Enhance Core populations to meet MVP	BMP Ecosciences			x	x	
Enhance High priority populations to meet MVP	BMP Ecosciences			x	x	
Implement new survey protocol to detect metapopulation dynamic	BMP Ecosciences			x	x	x
Stewardship						
Create education materials for public	UNCE		x			
TYC identification aids	UNCE		x			
School materials	UNCE		x	x		
Brochures			x	x		
Tri-fold	CSLC			x		
Tourist Rack Card	UNCE		x			
Launch "Friends of TYC" group	TLOA & AMWG			x		
Determine signage & fencing	AMWG & TRPA					
Develop "Pledge of Support"	CDFG w/AMWG		x	x		
Develop "Thank You"s	UNCE		x			
Conduct thank you event	UNCE				x	
Identify partners to sponsor actions	UNCE		x	x		
Work with visitor bureaus & motels to distribute info	UNCE			x	x	
Conduct education forums for landowners, contractors, etc	UNCE, TLOA & AMWG			x	x	
Report on successes in conserving TYC	UNCE			x	x	

Appendix E: Tahoe Yellow Cress Site-Specific Information Sheet Example

Tahoe Yellow Cress Site-Specific Information: Dollar Point (934)

Prepared by: Eric Gillies, California State Lands Commission (CSLC), in collaboration with the Tahoe Yellow Cress Technical Advisory Group (TAG)

Date: May 10, 2005 (rev. _____)

County/State: Placer County, California

Location: Tahoe City Public Utility District (TCPUD) Recreation Area (public access point), Lake Forest, The Northshore, and Dollar Point private residential areas off North Lake Blvd (Highway 28) northeast of Tahoe City

Ownership/Management: Private (approx. 12 individual parcels) and TCPUD

Contact Information: Eric Gillies, CSLC, (916) 574-1897, gilliee@slc.ca.gov

Meets Ranking Criteria: Yes, surveyed 14 consecutive years with 2 NS events (Table 1)

Viability Index and Rank: unranked (2000); -8, Medium Priority Restoration Site (2004)

Lake Elevation Persistence: Low only

TRPA Threshold Site: No. The site should count toward maintaining a minimum number of populated sites (26 sites); however, if conducting a threshold attainment evaluation during a high water year (>6224 ft LTD), the population would not be persistent due to inundation.

Site Description

The Dollar Point site has several scattered Tahoe yellow cress populations located along the approximate 1.6-kilometer shoreline reach. The shoreline reach is from TCPUD Recreation Area on the west to approximately 500 meters west of Dollar Point on the east (see attached map). Because of the great distant between the eastern and western clusters and each having different habitat characteristics, this site may warrant splitting into two. The historic population is the eastern clusters and the western clusters were first observed in 2002.

Survey History

Table 1 provides a summary of the survey history and results for the Dollar Point site. This Tahoe yellow cress site was first observed in 1991 and was observed in 1993 and 1994, which was within a

low water period. Plants were not observed from 1995 to 2001, which, except for 2001, was a high water period. The site was not surveyed in 1992 and 1999. Plants have been observed in 2002, 2003, and 2004. Surveys have occurred over one full high/low lake elevation cycle. Currently, its persistence is at 50% (6 out of 12 years).

Table 1. Tahoe Yellow Cress Annual Survey Summary – Dollar Point

Year	Lake Elev. (ft. LTD)	Survey Data	Stem Count	Comment
1991	6222	X	n/a	1st year of site record
1992	6223	NS	-	
1993	6223	X	191	1993 Shorezone Survey data
1994	6222	X	n/a	
1995	6227	0	-	
1996	6227	0	-	
1997	6228	0	-	6 year high lake elevation period
1998	6228	0	-	
1999	6228	NS	-	
2000	6228	0	-	
2001	6225	0	-	Lake elevation transition year (high to low)
2002	6224	X	10	Western cluster near TCPUD Recreation Area 1st observed
2003	6224	X	83	
2004	6223	X	315	

X = present; 0 = absent; NS = not surveyed

Population and Ecological Characteristics

During the comprehensive 1993 Shorezone Survey, 191 stems were observed. The population in 2002 had only 10 stems, which was a year following a period of high water years, 1995 to 2000, and a transition year, 2001 (Table 1). In 2004, with lake elevation falling below 6223 ft Lake Tahoe Datum (LTD), 315 stems where observed in several clusters. Presently, this site appears to persist when lake elevation is at or below 6224 ft LTD and has greater abundance when lake elevation is 6223 ft LTD and below.

The population on the west end near the TCPUD Recreation Area is typically very small with few plants (<10). The substrate has little sand (<10%) and is mostly fine to medium gravel (>85 %) on a relatively flat shoreline (1-2 % slope). Associated species include *Epilobium* spp., willow (*Salix* spp.), and *Trifolium* spp. with 20-50% total vegetative cover. The cluster's distance to the lake in 2004 (lake elevation 6223 ft LTD) was 25 to 35 meters.

The population clusters at the east end are more extensive and in different habitat. The substrate is mostly sandy and fine gravel (>85%) with larger gravels to large cobbles making up the rest of the beach substrate. Associated species include pigweed (*Chenopodium* spp.), mullein (*Verbascum thapsus*), sweet clover (*Melilotus alba*) and some willow saplings. The beach has overall low vegetation cover (10-15%) in strips paralleling the shoreline. Tahoe yellow cress has been observed within the understory of large mullein and sweet clover plants. The sandy and fine gravel beach begins to narrow and become very limited with cobbles beginning to dominate the substrate with denser weedy species such as clover (*Lotus purshianus*) as the shoreline begins to bend around the

point. The cluster's distance to the lake in 2004 (lake elevation 6223 ft LTD) was typically about 5 meters.

There is approximately 800-meter stretch of shoreline between the west and east clusters, where plants are not observed. This stretch is a steep sloping beach with no vegetation and the substrate consists of 100% fine to medium gravel. Its characteristics are very dissimilar to locations where the plants are observed and described above.

Potential Threats/Concerns (ranked in order of significance)

1. High lake elevation levels (>6224 ft LTD)
2. Recreation (beaching watercrafts and foot traffic/beach use)
3. Shoreline projects (private piers, revetment, and utility projects)

Past Activities

No Tahoe yellow cress conservation actions have occurred in the area.

Present Activities

The area has been surveyed for shorezone projects including shoreline revetment projects. In 2003, TCPUD did some sewer line repair and revetment work adjacent to some of the populations. Plants were found growing against the silt fences during the 2003 survey. Construction activities did not appear to have a detrimental effect since nearly four times the number of plants were observed in the following year. There is a moderate amount of shoreline development that can occur in or around the clusters. Shoreline project approving agencies need to ensure pre-construction surveys for Tahoe yellow cress are conducted, which is required under CSLC lease agreements; however, not all shoreline projects require a lease form CSLC, e.g., revetment projects.

Recreational use is moderate to heavy during the summer months. Temporary fencing of the clusters similarly designed at Sugar Pine Point or signage during low water years and when the plants are present may be a strategy for the area. The TAG Stewardship Subcommittee needs to strategize on how to outreach to the private landowners and have them consider entering into Voluntary Conservation Agreements.

Recommendations:

- Site will continue to be part of the annual surveys, although surveys probably do not need to occur when lake elevation is above 6225 ft LTD. This should be confirmed early into the next high water or transition period.
- Initiate outreaching efforts to the private landowners and have them consider entering into Voluntary Conservation Agreements.
- Although the site is a medium priority for restoration efforts, the site is highly susceptible to high lake levels and there would need to be support from the many private landowners.

Appendix F: Site-Specific Information Sheet progress

SITE NAME	NNHP EO NUMBER	OWNERSHIP	Preparer	DOCUMENT DATE/STATUS
Sunnyside	929	Private/Placer Co	CSLC	
Ward Creek	921	Private	CSLC	in-draft
Hurricane Bay		Private	Not assigned	N/A
Kaspian Campground	901	USFS	USFS	
Blackwood North		Private	CSLC	
Blackwood South	919	Private/Placer Co	CSLC	
Tahoe Pines (Fleur Du Lac)		Private	CSLC	in-draft
Cherry Street/Tahoe Swiss Village	937	Private	CSLC	28-Oct-05
McKinney Shores		Private	CSLC	28-Oct-05
McKinney Creek	928	Private	CSLC	28-Oct-05
Tahoma	918	Private	CSLC	
Sugar Pine Point State Park		CSP	CSP	11-Nov-05
Meeks Bay & Enclosure	917	USFS	USFS	
Meeks Bay Vista	910	Private	CSP	30-Dec-05
Rubicon Bay	936	Private	CSP	30-Dec-05
DL Bliss State Park & Enclosure	916	CSP	CSP	14-Dec-05
Emerald Point	924	CSP	CSP	30-Dec-05
Emerald Bay Boat Camp	914	CSP	CSP	29-Nov-05
Eagle Creek/Avalanche	915	CSP	CSP	30-Dec-05
Eagle Point	927	CSP	CSP	22-Nov-05
CTC Cascade Creek		CTC	CTC	20-Dec-05
Cascade Properties	925	Private	CTC	20-Dec-05
Tallac Creek & Enclosure	912	USFS	USFS	
Baldwin Beach	931	USFS	USFS	
Taylor Creek & Enclosure	911	USFS	USFS	
Kiva Beach/Valhalla	913	USFS	USFS	
Jameson		Private	Not assigned	N/A
Pope Beach	909	USFS	USFS	
Lighthouse	938	Private	CTC	20-Dec-05
Tahoe Keys	926	Private	CTC	20-Dec-05
Upper Truckee West	908	CTC	CTC	20-Dec-05
Upper Truckee East	907	CTC	CTC	20-Dec-05
Regan/Al Tahoe	905	Private/City SLT	CTC	20-Dec-05
El Dorado Beach	906	City SLT	CSLC	01-May-06
Bijou (Timber Cove Lodge)	903	Public	CSLC	01-May-06
Timber Cove	904	Private	CSLC	01-May-06
Tahoe Meadows	902	Private	CSLC	10-May-06
Edgewood	2	Private	USFS	
4-H Camp/City Pump House	1	UNR/City	USFS	23-Sep-06
Kahle/Nevada & Enclosure	8	USFS	USFS	
Elk Point	14	Private	TRPA	
Roundhill	9	USFS	USFS	

SITE NAME	NNHP EO NUMBER	OWNERSHIP	Preparer	DOCUMENT DATE/STATUS
Marla Bay		Private	USFS	23-Sep-06
Zephyr Cove	11	Private/USFS	USFS	
Skyland	5	Private	NDSP	in-draft
Cave Rock	17	NDSP	NDSP	in-draft
Logan Shoals & Vista	10 & 6	Private	NDSP	in-draft
Glenbrook	4	Private	USFS	23-Sep-06
Skunk Harbor	16	USFS	USFS	
Secret Harbor	12	USFS	USFS	
Chimney Rock	13	USFS	USFS	
Sand Harbor	3	NDSP	NDSP	in-draft
Hidden Beach		NDSP	NDSP	in-draft
Burnt Cedar Beach		IVGID	USFS	23-Sep-06
Crystal Point	933	Private/Placer Co	CSLC	19-Oct-05
Kings Beach	932	Private/Public	CSLC	
Agate Bay	920	Private	CSLC	
Dollar Point (approved template)	934	Private	CSLC	10-May-05

Appendix G: Agency Management Activity Report Forms for 2007

US Forest Service (USFS)
US Fish and Wildlife Service (USFWS)
California State Lands Commission (CSLC)
California Department of Fish and Game (CDFG)
California State Parks (CSP)
Nevada Natural Heritage Program (NNHP)
Nevada Division of State Parks/ Nevada Division of Forestry (NDSP/NDF)
Tahoe Lakefront Owner's Association (TLOA)

USDA Forest Service Lake Tahoe Basin Management Unit
Tahoe Yellow Cress Conservation Activities 2007 Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to the TYC TAG no later than **December 31** of each year.
Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	USDA Forest Service-Lake Tahoe Basin Management Unit
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to AMWG:	December 12, 2007
Prepared by:	Stuart Osbrack, Acting Ecologist-TES Plant Coordinator

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
Ebrights Ski Beach	Temporary fence	80	2500
Nevada/Kahle			
Nevada beach Enclosure	Temporary fence	80	2500
Pope Beach	Temporary fence	80	2500
Tallac Creek			
Tallac Enclosure			
Taylor Creek			
Taylor Creek Enclosure			
Zephyr Cove			
Forest Service Beaches	Annual Survey	100	3000
	Site Specific Conservation Activities Totals	340	10500

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
TAG, AMWG, and Executive Meeting participation	100	3,000
Annual Report, Experimental Design, and Proposed Translocation Project Review	100	3,000
Facilitation of R6 SNPLMA Contract with BMP Ecosciences ($109,000)	30	1,000
Additional TYC Review, Reports, SNPLMA Proposals and Budget	130	4,000
General Conservation Activities Totals	360	11,000

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

Continuation with outplanting and translocation study Annual Survey UNR Micro-satellite Genetic Studies

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:
Pope Beach Bathroom Replacement	Retrofit of Pope Beach Bathrooms-First Stage of Implementation
No Projects were implemented during the reporting period, however several projects were surveyed for and will be implemented in the future	New bathrooms on several beaches GID improvement at Roundhill Renewel of permit at Roundhill Master Plan revision at Zephyr Cove
Projects below are planned for the near future	
Roundhill Fuel Reduction Project	Roundhill fuels reduction
Nevada Beach Campground Retrofit	Retrofit of Nevada Beach Campground
South Shore Fuels Reduction and Healthy Forest Restoration Project	South Shore fuels reduction
East Shore Beaches ATM and Access Management Plan	Trail upgrades and realignment.

US Fish and Wildlife Service
Tahoe Yellow Cress Conservation Activities Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future

This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to the TYC TAG no later than **December 31** of each year.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	USFWS
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to AMWG:	12/18/2007

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
	Site Specific Conservation Activities Totals		

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
TAG/AMWG/EXEC meeting participation	80	6,442
General Conservation Activities Totals		6,442

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

AMWG/TAG/EXEC Meetings and annual survey

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:

California State Lands Commission

Agency Tahoe Yellow Cress Conservation Activities 2007 Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future.

This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to the TYC AMWG no later than **December 31** of each year.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	California State Lands Commission
Reporting period:	January 1, 2007 through December 31, 2007
Enter date report submitted to TAG:	December 17, 2007

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
	Site Specific Conservation Activities Totals		

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e., public outreach, consultation, AMWG/TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
TYC AMWG/TAG	53	5989
Site-Specific Plans	5	565
2007 Annual Survey	26	2938
Shorezone Project Planning/Review/TYC Project Site Reviews	8	904
TYC Executive Meeting	18	2034
General Conservation Activities Totals	110	12430

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year (2008):

- Finishing and maintaining Site-Specific Information sheets for all TYC sites
- Continued Participation on TAG, AMWG, Stewardship Subcommittee, and Exec meetings
- Participating in 2008 Annual Survey
- Continue Shorezone Project Review and Agency Coordination

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:
Green Property (Rubicon Bay)	New recreation pier and redesign of a creek flume. Pier already constructed, flume work constructed in 2007. CDFG lead agency/CSLC oversight. TYC provided protection via fencing and worker awareness.
Jameson Beach Property	Proposed new pier; no TYC present

California Department of Fish & Game
Tahoe Yellow Cress Conservation Activities Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future

This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to Alison Stanton, BMP Ecosciences by **December 14, 2007**.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	California Department of Fish & Game
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to AMWG:	20 December 2007

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
none			
	Site Specific Conservation Activities Totals		

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
AMWG coordination and prep	84	
Contract preparation	24	
Annual Survey	28	
Exec meeting	19	
Stewardship activities	54	
General Conservation Activities Totals	209	

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:

California State Parks
Tahoe Yellow Cress Conservation Activities Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future

This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to Alison Stanton, BMP Ecosciences by **December 14, 2007**.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	California State Parks
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to AMWG:	12/4/07

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
General Creek	Protection fencing	12	$456.00
	Site Specific Conservation Activities Totals	12	$456.00

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
AMWG and Executive Committee participation	59	$2,694.00
Preserve vs. Reserve Planning at Eagle Creek, Emerald Bay State Park	9	$408.00
Annual Lake-wide Survey of TYC	59	$1,943.00
General Conservation Activities Totals	127	$5,045.00

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

Participate in AMWG and TYC Executive Committee meetings and assignments; monitor TYC at park units and install/maintain temporary and other fencing and signs as needed; and participate in lake-wide annual TYC survey.

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:

Nevada Natural Heritage Program
Agency Tahoe Yellow Cress Conservation Activities

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Technical Advisory Committee (TAC) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future

This form provides a standardize format to assist management agencies in submitting their annual report to the TAG. This report should be completed by each management agency and submitted to the TYC TAG no later than **December 31** of each year.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	Nevada Natural Heritage Program
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to TAG:	17 December 2007

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
	Site Specific Conservation Activities Totals		

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
Comprehensive update and reconciliation of all TYC sites through 2004	40	1320
Attendance at TAG meetings	10	330
Provide annual TYC survey form and maps	20	660
Provide GIS map for annual report	5	165
Update and maintain virtual TYC library on the NNHP website	8	264
General Conservation Activities Totals	83	2739

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

Update the database with 2006 data; provide GIS map for annual report; attend TYC TAG meetings when possible; provide 2007 data forms for site specific surveys; update and maintain the TYC virtual library on the NNHP website.

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:

Nevada Division of State Parks/Nevada Division of Forestry
Tahoe Yellow Cress Conservation Activities Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future

This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to Alison Stanton, BMP Ecosciences by **December 14, 2007**.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	Nevada Division of State Parks/Nevada Division of Forestry
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to AMWG:	Dec 08, 2007

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
Cave Rock	None	0	$0
Sand Harbor	None	0	$0
Hidden Beach	Removal of remaining damaged fence	2	$78
	Site Specific Conservation Activities Totals	2	$78.00

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
Public outreach – NDSP provided funding assistance on TYC outreach activities, including initial development of postcard and brochure.	8.25	$936
Attendance at/preparation for AMWG meetings (Peter Maholland, NDSP)	24.7	$955.50
Attendance at/preparation for AMWG meetings (Roland Shaw, NDF)	6	$234
Continuing work on Site Specific Management Forms	8	$312
Annual Site Surveys, September 04 and 05	13	$507
Document, Proposal, and Report Review	5.5	$214.50
General Conservation Activities Totals	52	$3,159

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
Sand Harbor	No significant disturbances; no response required.		
Hidden Beach	No significant disturbances; no response required.		
Cave Rock	No significant disturbances; no response required.		
	Totals	0	$0

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

Participate in TYC AMWG meetings and annual surveys Provide assistance as needed for research and restoration planning.

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location:
None	

Tahoe Lake Front Owners Association
Tahoe Yellow Cress Conservation Activities Annual Report

As agreed to in the Tahoe Yellow Cress (TYC) Conservation Agreement, the TYC Adaptive Management Working Group (AMWG) shall prepare an annual report describing the status of TYC. A component of the annual report is a reporting by each of the participating agencies on TYC conservation activities undertaken or planned for the future

This form provides a standardize format to assist management agencies in submitting their annual report to the AMWG. This report should be completed by each management agency and submitted to Alison Stanton, BMP Ecosciences by **December 14, 2007**.

Please complete the following fields. Press the tab key to scroll from field to field:

Enter name of reporting agency:	Tahoe Lake Front Owners Association
Reporting period:	January 1 through December 31, 2007
Enter date report submitted to AMWG:	December 17, 2007

Describe in the table below site-specific conservation activities for each TYC site within the agency's jurisdiction undertaken during the previous growing season. Please use site names as listed in the TYC Conservation Strategy:

List TYC site name:	Describe site specific activities:	Staff hours involved	Cost (include staff time and other costs)
	Site Specific Conservation Activities Totals		

Describe in the field below general TYC conservation activities undertaken by the agency during the reporting period (i.e. public outreach, consultation, TAG participation, etc.):

Describe general conservation activities:	Staff hours involved	Cost (include staff time and other costs)
Attended AMWG and stewardship meetings.	10	
Assisted folks with management plans, and pre-project planning.	10	
Hosted the Annual Executives Luncheon	10	2500
Worked to obtain property owner permission for outplanting sites	10	
Prepared various hand-outs, discussed training seminars, and had information at our Annual Membership Meeting in August.	10	
General Conservation Activities Totals	50	7500

Please describe in the field below any significant disturbances to the species or its habitat on land within agencies jurisdiction and subsequent response:

List TYC site name:	Describe disturbance and response:	Staff hours involved	Cost (include staff time and other costs)
	Totals		

Please describe in the field below planned TYC conservation activities anticipated for the upcoming year:

Continue participation in Stewardship, AMWG, and outreach with private land owners.

List and describe in the table below all shorezone projects within the agency's jurisdiction undertaken within potentially suitable TYC habitat:

Project Name (list below):	Project Description including location: