Placer County Water Agency
Middle Fork American River
Weather Modification Project

Draft

California Environmental Quality Act
Initial Study/Negative Declaration

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April 2018

SUMMARY

INTRODUCTION

This draft initial study/negative declaration (IS/ND) has been prepared to evaluate a potential weather modification project for the Placer County Water Agency (PCWA) Middle Fork American River Project (MFP) in compliance with the California Environmental Quality Act (CEQA). PCWA is the lead agency under CEQA and is responsible for determining whether the project may cause a significant environmental effect.

PROJECT DESCRIPTION

PCWA proposes to implement the Middle Fork American River Project Weather Modification Project (Project or Proposed Project). The Project would include seasonal implementation of an aerial cloud seeding program for the MFP watershed using aircraft equipped with focused silver iodide dispersal technology. The Project would not result in any ground disturbing activities and is strictly designed to augment the natural rate of snowfall that occurs in orographic clouds as they develop and progress over the headwaters that drain into PCWA's primary storage reservoirs, Hell Hole and French Meadows. The incremental increases in snowpack and subsequent runoff resulting from the Project would improve PCWA's reservoir storage volumes and operational flexibility in drier water years while reducing potential impacts to local water supplies during prolonged periods of drought. The Proposed Project is described in detail in Chapter 2.0 of this IS/ND.

FINDINGS

As the CEQA lead agency, PCWA finds that there is no substantial evidence that implementing the Proposed Project would result in any significant environmental effects, because the Proposed Project (1) is limited in geographic scope to the upper Middle Fork American River and Rubicon River watersheds; (2) would selectively target specific storm systems; and (3) is subject to specific predetermined suspension criteria to ensure snowpack falls within the range of historical hydrologic conditions. Therefore, a negative declaration has been prepared.

CUMULATIVE IMPACTS

CEQA requires that PCWA evaluate the cumulative impacts of the Proposed Project. Based on the evidence and analyses presented in this IS/ND, the Proposed Project in combination with past, present, or reasonably foreseeable future projects would not result in a cumulative impact. There is no evidence that the Proposed Project, in combination with other weather modification programs in adjacent watersheds or across the state, would incrementally contribute to significant environmental impacts. Because of the proximity of the Proposed Project to the El Dorado Cloud Seeding Program implemented by the Sacramento Municipal Utility District (SMUD), PCWA would coordinate with SMUD to prevent redundant or duplicative cloud seeding efforts.

GROWTH-INDUCING IMPACTS

CEQA requires that a proposed project be evaluated for its potential to cause growth-inducing impacts. For the purpose of this analysis, a growth-inducing effect is one that encourages growth in excess of existing land use plans, growth management plans, or policies. The Proposed Project would increase snowfall and subsequent runoff into MFP reservoirs, which would support PCWA's primary goal of meeting the existing and planned water supply needs of Placer County and generating hydroelectric power. Because the Proposed Project would not affect PCWA's water rights or water supply contracts, which are the basis of local land use plans, the Project would not result in any growth-inducing impacts.

DETERMINATION

Based on the evaluation presented in this IS and pursuant to the CEQA Guidelines, PCWA determines that the Proposed Project:

(1) would not significantly degrade the environment or adversely impact any individual fish, wildlife, or botanical resources, nor their associated populations or habitats;

(2) would not result in population growth– or economic growth–inducing impacts; and

(3) would not incrementally contribute to any cumulative impacts.

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Acronyms and Other Abbreviations

µ	micron(s)
µg	microgram(s)
µg/L	micrograms per liter
°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
AQCR	air quality control region
ARB	California Air Resources Board
B.P.	Before Present
Basin Plan	*Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan*
ca.	circa
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CENSARE	Central Sierra Research
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CNPS	California Native Plant Society
CO	carbon monoxide
dB	decibel(s)
dBA	A-weighted decibel(s)
DNL	day-night noise level
DWR	California Department of Water Resources
EDCAPCD	El Dorado County Air Pollution Control District
EIR	environmental impact report
EIS	environmental impact statement
ENF	Eldorado National Forest
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FR	Federal Register
GHG	greenhouse gas
GPS	global positioning system
I-80	Interstate 80
IFR	instrument flight rules
IPCC	Intergovernmental Panel on Climate Change
IS	initial study
kW	kilowatt(s)
L_{eq}	energy-equivalent noise level

L_{dn}	day-night average noise level
LTAB	Lake Tahoe Air Basin
MCAB	Mountain Counties Air Basin
MFP	Middle Fork American River Project
MND	mitigated negative declaration
msl	mean sea level
$MTCO_2e$	metric tons of carbon dioxide equivalent
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
ND	negative declaration
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NO_X	oxides of nitrogen
NWS	National Weather Service
PAC	Protected Activity Center
PCAPCD	Placer County Air Pollution Control District
PCCP	*Placer County Conservation Plan*
PCWA	Placer County Water Agency
PG&E	Pacific Gas and Electric Company
PM_{10}	particulate matter with aerodynamic diameter less than 10 micrometers
$PM_{2.5}$	particulate matter with aerodynamic diameter less than 2.5 micrometers
PRC	California Public Resources Code
Project	Middle Fork American River Weather Modification Project
Proposed Project	Middle Fork American River Weather Modification Project
Reclamation	U.S. Bureau of Reclamation
RWQCB	regional water quality control board
SEL	sound exposure level
SMUD	Sacramento Municipal Utility District
SR	State Route
SVAB	Sacramento Valley Air Basin
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TNF	Tahoe National Forest
U.S. 50	U.S. Highway 50
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VELB	valley elderberry longhorn beetle
VOC	volatile organic compound
WDR	waste discharge requirement
WMA	Weather Modification Association

1.0 INTRODUCTION

1.1 INTRODUCTION AND REGULATORY GUIDANCE

This initial study/negative declaration (IS/ND) has been prepared in accordance with the California Environmental Quality Act (CEQA) (California Public Resources Code [PRC] Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.). The contents of this document provide the rationale and justification for a negative declaration pursuant to CEQA for the Middle Fork American River Weather Modification Project (Project or Proposed Project).

This IS/ND is a public document to be used by the Placer County Water Agency (PCWA), the CEQA lead agency, to determine whether the Proposed Project may have a significant effect on the environment pursuant to CEQA. If the lead agency finds substantial evidence that any aspect of a proposed project may have a significant individual or cumulative effect on the environment that cannot be mitigated, regardless of whether the overall effect is adverse or beneficial, then the lead agency must prepare either an environmental impact report (EIR), a supplement to a previously prepared EIR, or a subsequent EIR to analyze the proposed project at hand (PRC Sections 21080[d] and 21082.2[d]).

If the lead agency finds no substantial evidence that the proposed project or any of its aspects may cause a significant impact on the environment with mitigation, a negative declaration (ND) (or mitigated negative declaration [MND]) shall be prepared with a written statement describing the reasons that the proposed project, which is not exempt from CEQA, would not have a significant effect on the environment and therefore does not require the preparation of an EIR (CEQA Guidelines, Section 15371).

According to Section 15070 of the CEQA Guidelines, an ND or MND shall be prepared for a project subject to CEQA when either:

- the IS shows there is no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment; or
- the initial study identifies potentially significant effects, but:
    - revisions to the project plans or proposals made by or agreed to by the applicant before the proposed IS and MND are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and
    - there is no substantial evidence, in light of the whole record before the agency, that the proposed project as revised may have a significant effect on the environment.

1.2 LEAD AGENCY

The lead agency is the public agency with primary responsibility for a proposed project. In accordance with CEQA Guidelines Section 15051(b)(1), "The lead agency will normally be the agency with general governmental powers." PCWA's staff has initiated preliminary planning of the Proposed Project, which requires approval from the PCWA Board of Directors. Therefore, based on the criteria described above, PCWA is the lead agency for the Proposed Project.

1.3 PURPOSE AND DOCUMENT ORGANIZATION

The purpose of this IS/ND is to evaluate the potential environmental impacts of the Proposed Project. This document is divided into the following chapters:

- **Chapter 2.0, "Project Description,"** describes the Proposed Project in detail, explains the process used for notifying and involving the public during Project planning, and describes coordination with relevant agencies and organizations.
- **Chapter 3.0, "Environmental Checklist,"** describes the environmental setting for each environmental subject area; evaluates a range of impacts classified as "no impact," "less than significant," "less than significant with mitigation incorporated," or "potentially significant" in response to the environmental checklist; and provides an environmental determination for the Proposed Project.
- **Chapter 4.0, "References,"** provides a bibliography of sources cited in the IS/ND.
- **Chapter 5.0, "List of Preparers,"** identifies staff members and consultants responsible for preparation of this document.

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Placer County Water Agency (PCWA) is a public agency created and existing pursuant to the provisions of the Placer County Water Agency Act (California Water Code, Appendix, Chapter 81). PCWA proposes to implement an annual aerial cloud seeding program targeting orographic[1] clouds in the upper Middle Fork American River Project (MFP) watershed, using aircraft equipped with silver iodide dispersal technology. This proposed design and implementation of aerial cloud seeding in the MFP watershed is referred to in this initial study/negative declaration (IS/ND) as the Project or Proposed Project. Figure 2-1 depicts the Project area, which encompasses the upper MFP watershed.

This chapter identifies and describes the specific components included in the Proposed Project, the physical processes of cloud seeding, and the specialized equipment used. In addition, this chapter describes the planning principles and criteria used to direct and/or suspend the mobilization of cloud seeding–equipped aircraft on a storm-to-storm basis.

2.2 PROJECT LOCATION AND SETTING

The Middle Fork American River watershed, which encompasses a drainage area of approximately 616 square miles, originates in the Granite Chief Wilderness and Desolation Wilderness areas and joins the North Fork American River approximately 21 miles upstream of Folsom Dam. The watershed ranges in elevation from approximately 500 feet above mean sea level (msl) to 8,400 feet msl. The watershed is characterized by hot, dry summers and mild, wet winters, with most precipitation falling between October and March. Precipitation falls as rain in the lower elevations and snow at elevations greater than about 5,000 feet msl. Elevations higher than about 6,000 feet msl are typically covered by snow until May. Years tend to be at the extremes—either wet or dry—with high interannual variability, with few years receiving the "average" amount of precipitation. Mean annual precipitation and runoff in the watershed ranges from approximately 35 inches in dry years to 94 inches in wet years.

PCWA owns and operates the MFP and holds appropriative water rights for the MFP pursuant to Permits 13856 and 13858, issued on Applications 18085 and 18087 by the State Water Rights Board, the predecessor to the State Water Resources Control Board (SWRCB). SWRCB Permits 13856 and 13858, both issued in 1963 and amended in 1975, allow for the combined diversion and storage of 310,000 acre-feet per annum of MFP water held in two onstream storage reservoirs (French Meadows and Hell Hole).

[1] Orographic clouds form when an air mass is forced from a low elevation to a higher elevation as it moves over rising terrain. As the air mass gains altitude it quickly cools down, which can raise the relative humidity to 100 percent and create clouds and, under the right conditions, precipitation.

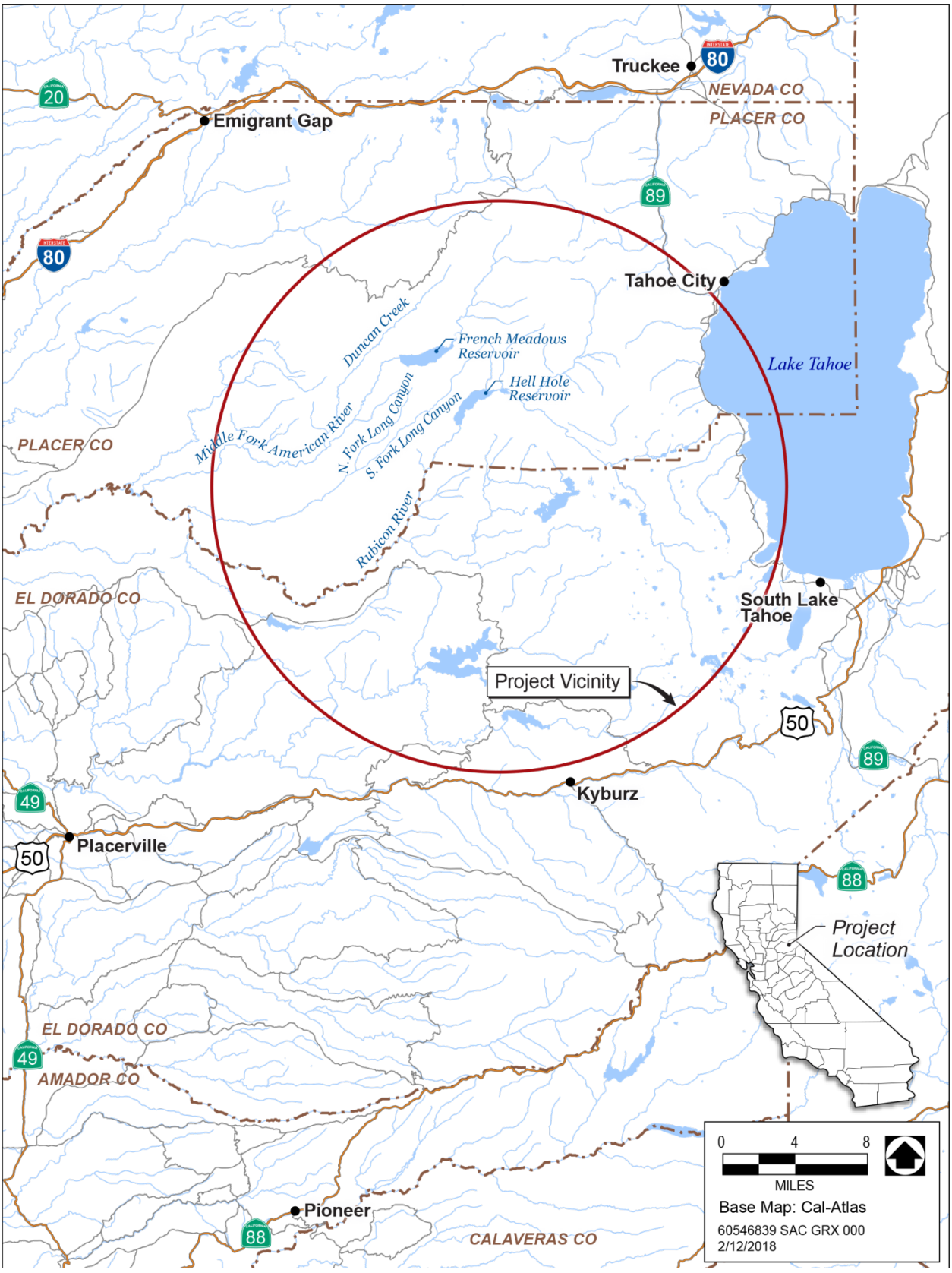


Figure 2-1. Project Area

PCWA's MFP is a multipurpose project designed to manage streamflows of the Middle Fork American River, the Rubicon River, and their tributaries for beneficial Domestic, Municipal & Industrial, Recreational, and Irrigation uses and for generation of hydroelectric power. Principal project features include two storage reservoirs, five associated diversion dams (Duncan, North Fork Long Canyon, South Fork Long Canyon, Middle Fork Interbay, and Ralston Afterbay), and five power plants (French Meadows, Hell Hole, Middle Fork, Ralston, and Oxbow) with a combined generation capacity of approximately 224 megawatts. The two major storage reservoirs (French Meadows and Hell Hole) hold a combined storage capacity of approximately 342,000 acre-feet.

The MFP, which began operation in 1967, is located predominantly in Placer County, California, on the western slope of the Sierra Nevada; a small MFP component (a portion of Ralston Afterbay Dam) is located in El Dorado County. The MFP is located almost entirely in the Tahoe and Eldorado national forests, with a small portion located on PCWA-owned or private land. The MFP stores and releases water seasonally to meet consumptive demands in western Placer County and to generate power for California's electrical grid.

The MFP is operated under a 50-year license (Project No. 2079) issued by the Federal Power Commission, predecessor of the Federal Energy Regulatory Commission (FERC). The existing license expired February 28, 2013, and PCWA is seeking renewal of its license to continue operation and maintenance of the MFP. Pursuant to authorization from FERC on March 7, 2013, PCWA is operating the MFP under an annual license, under the terms and conditions of the prior license, until FERC issues a new license. PCWA anticipates that FERC will issue a new license for the MFP in the first quarter of 2019.

During the relicensing process, PCWA collaborated extensively with state and federal resource agencies, Native American tribes, nongovernmental organizations, and members of the public (relicensing participants) to develop technical study plans and proposed new license conditions. To date, more than 280 public meetings have been conducted with relicensing participants on various resource topics. In addition, PCWA performed extensive data collection, analysis, and modeling, which have been documented in technical study reports and other project documentation that are referenced throughout this document. The MFP relicensing studies provide a comprehensive description of the Middle Fork American River watershed and its resources where aerial cloud seeding operations would be focused under the Proposed Project.

The target area for aerial cloud seeding includes portions of the watersheds of the upper Middle Fork American River and Rubicon River ~~(including Duncan Creek and the North and South Forks of Long Canyon Creek)~~ in Placer and El Dorado counties (Figure 2-2). Based on prevailing weather patterns, the probable seeding flight tracks that would be used most frequently are those oriented westerly and southwesterly (Figure 2-2). These tracks would be located over the Sierra Nevada foothills, generally paralleling the crest. Because of the rising terrain, flight levels on seeding tracks generally would be restricted to no lower than 9,000–12,000 feet msl. Other tracks are envisioned to the northwest of the target zone, to seed

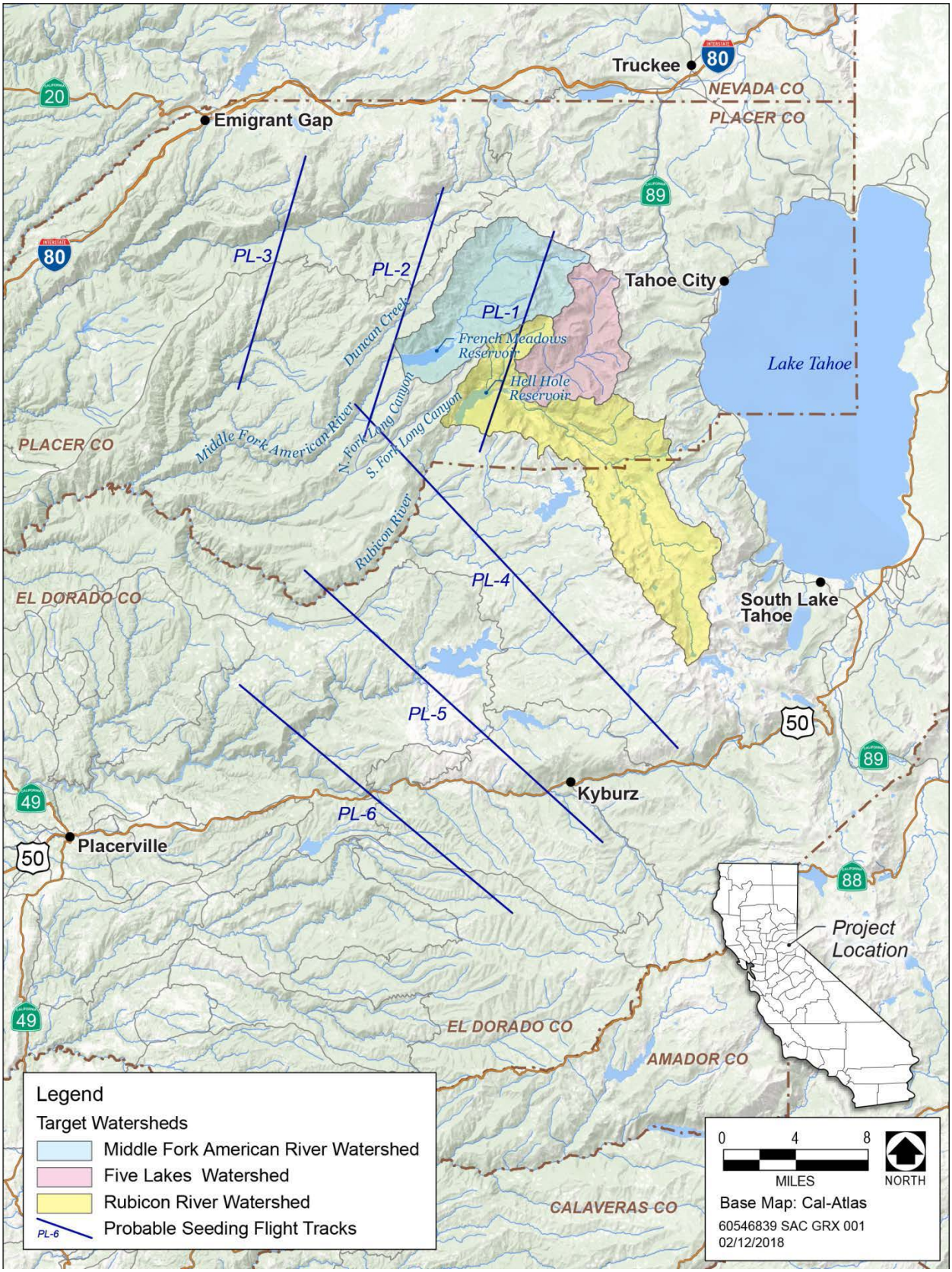


Figure 2-2. Target Watersheds

storms coming from that direction, but terrain would drive the minimum seeding altitudes up to 11,000 feet in this area. PCWA would target clouds in the target area to increase snowpack in the MFP, which drain into PCWA's primary storage reservoirs, Hell Hole and French Meadows.

2.3 PROJECT OBJECTIVES

Implementing the Proposed Project would allow PCWA to augment the natural rate of snowfall that occurs in orographic clouds as they develop and progress over the headwaters that drain into PCWA's primary storage reservoirs, Hell Hole and French Meadows. The potential for the Proposed Project to generate incremental increases in snowpack and subsequent runoff would improve PCWA's reservoir storage volume and operational flexibility in drier water years to reduce potential impacts on local water supplies, and to increase hydropower generation and recreational opportunities during prolonged periods of drought and/or in drier years.

The Proposed Project is designed to meet the following objectives:

- Increase winter snow accumulations in the MFP target area and increase peak reservoir storage.
- Increase the MFP's dry-year water supply reliability.
- Increase the MFP's hydroelectric power generation.
- Implement cloud seeding using best available technology.
- Minimize the potential for environmental effects of the program.

2.4 CLOUD SEEDING BACKGROUND

Cloud seeding can be described as the process through which cloud and precipitation development are artificially influenced by the measured introduction of inert/nontoxic agents that have been scientifically proven to affect physical cloud forming and precipitation processes.

The practice of cloud seeding began in the 1940s, when scientists discovered that raindrops form around particles in the atmosphere and that injecting particles into clouds can initiate precipitation. Clouds form when temperatures in the atmosphere reach saturation or a relative humidity of 100 percent. This saturated condition causes water vapor to condense around a nucleus, forming a cloud droplet. The nuclei, which may be small particles like salts formed through evaporation off the oceans, are known as "cloud condensation nuclei."

Clouds can be composed of water droplets, ice crystals, or a combination of the two. Clouds that are entirely warmer than freezing are sometimes referred to as "warm clouds." Likewise, clouds that are colder than freezing are sometimes referred to as "cold clouds." Cold clouds may have cloud bases that are warmer than freezing. Precipitation can occur naturally from both types of clouds.

In warm clouds, when cloud droplets survive long enough—especially when they are of different sizes—cloud water droplets may collide and grow. Eventually droplets may reach raindrop size and fall to the ground as rain. This process, called "collision/coalescence," is especially important in tropical clouds but can also occur in more temperate climates. In cold regions, cloud water droplets may not freeze because they are pure. In a laboratory environment, pure water droplets can remain unfrozen down to a temperature of -39 degrees Celsius (°C) (-38 degrees Fahrenheit [°F]). By contrast, natural impurities in the atmosphere can cause cloud droplets that are colder than freezing (usually referred to as "supercooled") to freeze. These supercooled cloud droplets cause icing to occur on aircraft. The natural impurities, referred to as "freezing nuclei," often consist of tiny soil particles or bacteria. A supercooled cloud droplet can be frozen when it collides with one of these natural freezing nuclei, thus forming an ice crystal, in a process called "contact nucleation."

A water droplet may also be formed on a freezing nucleus that has hygroscopic (water-attracting) characteristics. This same nucleus can then cause the water droplet to freeze at temperatures less than about -5°C (23°F), forming an ice crystal, in a process known as "condensation/freezing." Once an ice crystal is formed within a cloud, it will grow as cloud droplets around it evaporate and add their mass to the ice crystal, eventually forming a snowflake (diffusional growth). Ice crystals can also gain mass as they fall and contact, then freeze other supercooled cloud droplets, in a process called "riming." These snowflakes may fall to the ground as snow if temperatures at the surface are 0°C (32°F) or colder. They may reach the surface as raindrops if surface temperatures are warmer than freezing.

Research conducted in the late 1940s demonstrated that tiny particles of silver iodide could mimic nature and serve as freezing nuclei at temperatures colder than about -5°C (23°F). In fact, these silver iodide particles were shown to be much more active at temperatures between -5°C (23°F) and -15°C (5°F) than the natural freezing nuclei found in the atmosphere. As a consequence, most of today's attempts to modify clouds to produce more precipitation (or reduce hail) have used silver iodide as a seeding agent.

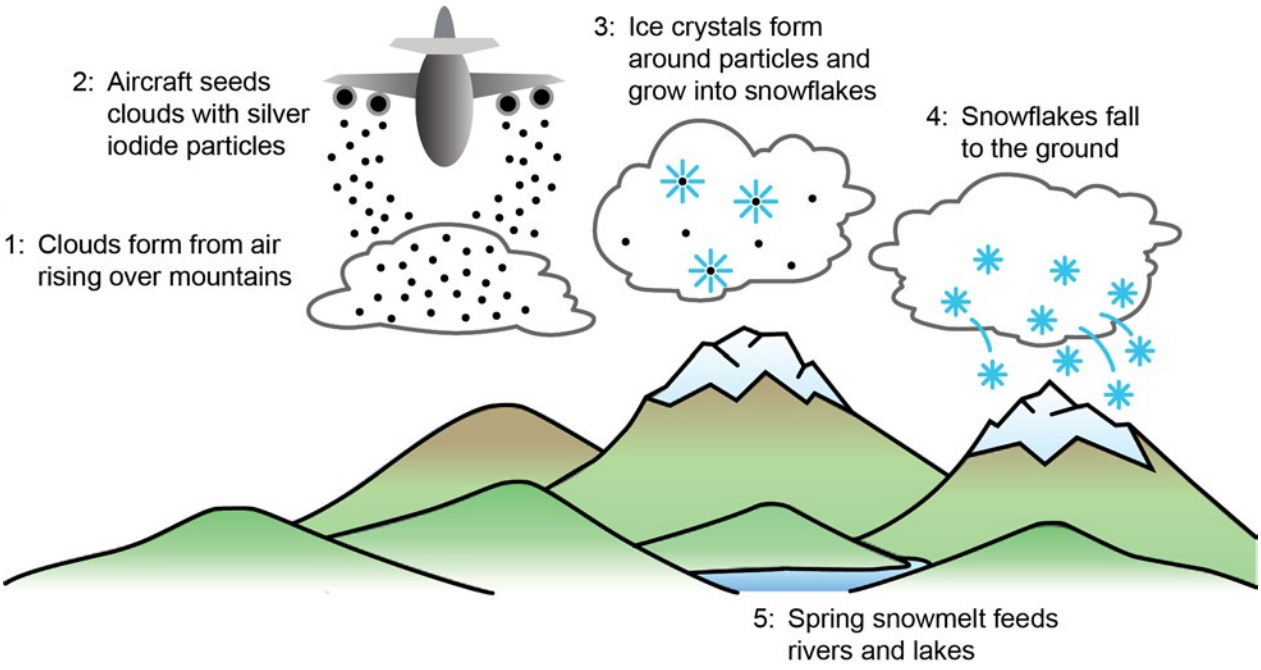
By definition, these programs are conducted to affect the colder portions of clouds, typically cloud regions that are -5°C (23°F) or colder (e.g., "cold clouds"). These programs are sometimes called cold cloud or glaciogenic seeding programs. Glaciogenic cloud seeding can be conducted in summertime clouds by seeding clouds whose tops pass through the -5°C (5°F) level and winter stratiform clouds that reach at least the -5°C (23°F) level.

Common agents used for winter cloud seeding include silver iodide and dry ice. Dry ice particles can be released effectively only from aircraft. Silver iodide nuclei can be dispersed by aircraft or by dispersion devices on the ground (often referred to as generators). In aircraft-based releases, the nuclei are dispersed either by a using a flare to release a vapor containing the nuclei or by burning a solution of silver iodide dissolved in acetone as the aircraft flies through the clouds. The seeding agent is delivered at either the base or the top of the cloud, at calculated optimal distances upwind of a target watershed. Top seeding allows for direct

injection of the seeding agent into the supercooled cloud top, while base seeding involves releasing the seeding agent in the updraft of a cloud base.

When nuclei are released by devices on the ground, air currents carry the nuclei downwind and upward into the targeted clouds. The agents (such as silver iodide) are generally designed to encourage the initial growth of cloud droplets or the development and growth of cloud ice. Within 20–30 minutes, snow within the seeding plume can reach the surface in the target area.

Typically, aerial cloud seeding is the most effective way to accurately target a particular cloud because it can be completed close to the potential cloud candidates. Figure 2-3 shows generally how cloud seeding works. This "chain of events" in the cloud seeding process has been verified by numerous detailed experiments conducted in the Sierra Nevada and other mountainous regions of the western United States.



Source: SMUD 2016

Figure 2-3. Conceptual Graphic of Winter Cloud Seeding

The California Department of Water Resources (DWR) supports the use of cloud seeding to enhance the state's water supply and promotes further research and development to increase the effectiveness of cloud seeding programs (DWR 2013). In addition, DWR cites policy statements from the American Meteorological Society (AMS 2013, as cited in DWR 2013) and the World Meteorological Organization (WMO 2013, as cited in DWR 2013) supporting the effectiveness of winter cloud seeding for increasing precipitation (DWR 2013). DWR's 2009 and 2013 updates to the *California Water Plan* (DWR 2009, 2013) contained a set of policy recommendations for cloud seeding. Recommendation #1 to increase precipitation enhancement states:

> The State should support the continuation of current projects as well as the development of new projects and help in seeking research funds for both old and new projects. Operational funding support for new projects may be available in the Integrated Regional Water Management program.

The Weather Modification Association (WMA) has adopted a statement on the efficacy of cloud seeding (WMA 2016):

> Under certain atmospheric conditions cloud microphysical and precipitation processes can be intentionally modified using existing cloud seeding methodologies to yield beneficial effects. Beneficial effects are those in which favorable benefit/cost ratios are realized without producing detrimental environmental impacts.

The WMA statement specifically addresses the effectiveness of winter precipitation programs in mountainous regions of the western United States, with increases of 5–15 percent consistently reported. The statement cites advances in cloud seeding materials, instruments, and computer models used to monitor and predict weather conditions, and the remote control systems used to operate ground-based systems.

Water and power agencies throughout the West have also found cloud seeding to be effective. For example, the Atmospheric Water Resources Research Group of the Fresno State College Foundation CENSARE (Central Sierra Research) (now California State University, Fresno Foundation) conducted extensive research in the central Sierra Nevada. The Sierra Cooperative Pilot Project, conducted by the U.S. Bureau of Reclamation (Reclamation) and the states of California and Nevada between 1977 and 1987, studied the effectiveness of ground-based and aerial cloud seeding and the physical mechanisms affecting Sierra Nevada clouds and storms. The project determined that Sierra Nevada storms often have rapidly changing phases and clouds that are frequently efficient natural snowfall producers (Reynolds and Dennis 1986; Reynolds 1988; Hunter 2007). In addition, the state of Wyoming's more recent Weather Modification Pilot Program was a rigorously designed, randomized trial conducted to quantify the effectiveness of cloud seeding in Wyoming. After nearly a decade of work, scientists concluded that cloud seeding could boost precipitation by 5–15 percent in treated events (NCAR et al. 2014).

Although cloud seeding increases the amount of precipitation in the target area, it has not been found to reduce naturally occurring precipitation in downwind areas. Clouds continually regenerate and release only a portion of their moisture in rainfall or snowfall. Cloud seeding marginally increases this portion. DWR summarized the findings of two environmental documents prepared by Reclamation under the National Environmental Policy Act (NEPA): the Project Skywater programmatic environmental impact statement (EIS) (1977) and the Sierra Cooperative Pilot Project environmental assessment (1981). As summarized in DWR's California Water Plan Updates (DWR 2009, 2013), those Reclamation NEPA impact evaluations found no evidence that cloud seeding reduces downwind precipitation. The reports state that in some cases, the increased precipitation may extend up to 100 miles downwind of the target watershed. In a similar 2010 study published in the journal *Atmospheric Research* (Silverman

2010), data showed that Pacific Gas and Electric Company's (PG&E's) ground-based cloud seeding program in the Mokelumne River watershed increased snowpack in the West Walker River watershed on the eastern side of the Sierra Nevada. Furthermore, a more recent article in the same journal (DeFelice et al. 2014) examined "extra-area" effects from five different cloud seeding programs and found that the spatial extent of the positive extra-area seeding effects extended to a couple hundred kilometers downwind.

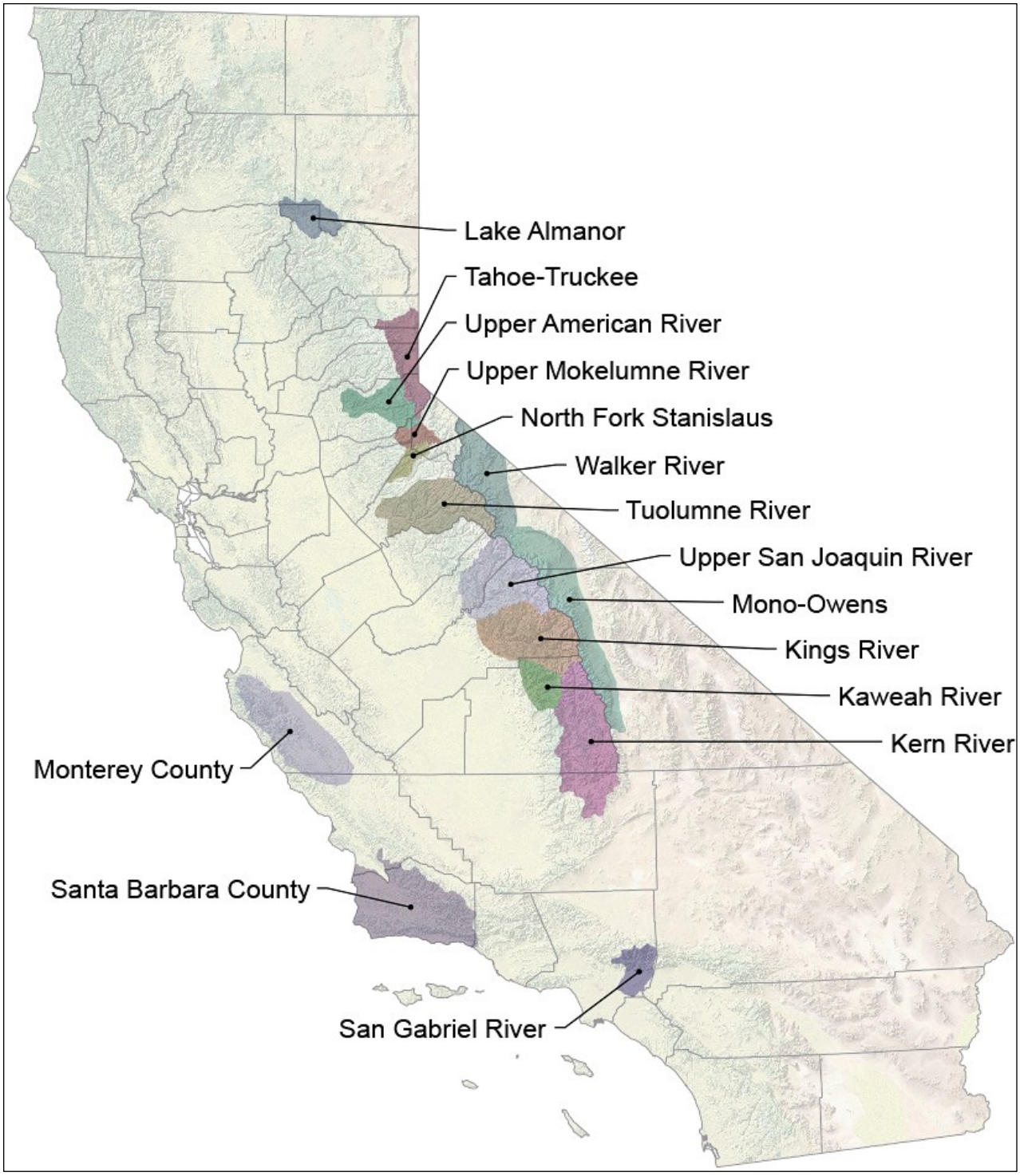
Several water and power agencies in California conduct cloud seeding to trigger additional rain and snow to enhance water supply and power generation. Among these agencies are Sacramento Municipal Utility District (SMUD), PG&E, Modesto Irrigation District, Southern California Edison, Kings River Conservation District, the Los Angeles County Department of Public Works, and Santa Barbara County Water Agency. Figure 2-4 shows where cloud seeding programs were occurring in California as of 2011.

The potential effects of cloud seeding were evaluated by Reclamation in its Project Skywater programmatic EIS in 1977 and its Sierra Cooperative Pilot Project environmental assessment in 1981. The results of Reclamation's findings were summarized by DWR in the *California Water Plan Update 2013* (DWR 2013) and by a literature summary prepared for the California Energy Commission (Hunter 2007).

According to Reclamation, the amounts of silver iodide used in cloud seeding are minimal, often 100 times less than industry emissions into the atmosphere in many parts of the country. Reclamation determined that watershed concentrations would be extremely low because only small amounts of seeding agent are used, and that accumulations in the soil, vegetation, and surface runoff have not been large enough to measure above natural background levels. The literature summary (Hunter 2007) found that silver iodide has low toxicity and does not accumulate in soils at levels above natural background, and that the other chemicals used in cloud seeding are used in low quantities and are not harmful to plant or animal life.

A more recent summary prepared by WMA (2009) supports the information presented above, showing that silver iodide does not result in harmful effects on the environment. WMA summarizes the history of silver discharges to the environment from industry and early efforts by the U.S. Environmental Protection Agency (EPA) and other agencies to regulate industrial sources and the comparatively small amount of silver used for cloud seeding. That summary describes the very low water solubility of silver iodide and explains how this property makes silver iodide particles an effective cloud seeding agent, in that they are not dissolved in the water present in clouds and precipitation during use. This property also reduces the potential for harmful effects from silver iodide because it does not dissolve and release silver ions.

WMA also explains that the very low amounts of silver ions that could dissolve into rainwater and snowmelt are bound by the water's naturally occurring mineral content. Finally, WMA's summary describes the results of studies, including sampling of more than 100 Sierra Nevada lakes and rivers, that found that silver was not present at concentrations above background (Stone 1986, as cited in WMA 2009). WMA concluded that silver iodide is safe for use in cloud seeding programs.



Source: DWR 2013

Figure 2-4. Weather Modification Programs in California in 2011

A recent literature summary completed for PG&E (Cardno Entrix 2011) reached similar conclusions. The PG&E literature summary cites the insolubility of silver iodide and explains how that characteristic makes it useful for cloud seeding and limits its bioavailability and effects on the environment. The report describes the potential valence states of silver and states that the solid or elemental silver and silver ions (Ag+) are the only forms that can occur in the environment. However, the free silver ion forms complexes with organic matter, manganese, and iron in water, which reduces its bioavailability. In addition to its low solubility and low toxicity, any silver deposited during cloud seeding would be diluted by snowmelt. The report cites EPA's ambient water quality criterion of 4.1 micrograms per liter (µg/L) in freshwater with a hardness of 120 milligrams per liter as the acute toxic limit, and other environmental concentrations and doses (Eisler 1996) that could affect the environment. However, these values are for silver ions in solution, whereas the silver iodide used in cloud seeding is insoluble. This study concluded that no evidence exists that silver iodide, as currently used for cloud seeding, has adverse effects on human health or the environment.

In 2017, SMUD received questions about the use of silver iodide in cloud seeding during public comments on the proposed expansion of its El Dorado Cloud Seeding Program. SMUD commissioned a study to further investigate the potential for toxic effects of silver iodide in response to local concerns. According to the report (SMUD 2017), there are no documented environmental hazards associated with silver iodide, and to date no studies have identified adverse environmental impacts of seeding clouds with silver iodide. No federal, state, or local regulations establish acceptable levels of exposure for silver iodide. In natural waters, silver iodide has such extremely low solubility (0.984 µg/L) that it is generally considered to be insoluble, and is thus not bioavailable or toxic. In contrast, known environmental hazards and regulations are associated with dissolved silver (free silver ion [Ag+]) because, unlike insoluble silver iodide, dissolved silver is bioavailable and potentially toxic to sensitive organisms.

Silver iodide is not typically measured in isolation in the environment, with existing analytical methods relying on measurements of total silver. Total silver would include any contributions from silver iodide. SMUD has monitored silver in water samples and fish tissue at various times over the past several decades. Measurements of total silver, including both dissolved and particulate silver, in all years ranged from <0.008 to 0.86 µg, which in all cases is significantly below the U.S. Environmental Protection Agency (EPA) secondary drinking water threshold (100 µg dissolved silver) (SMUD 2017).

2.5 PROJECT COMPONENTS

2.5.1 Operations

Proposed Operational Practices

The Proposed Project would disperse silver iodide via aircraft. Common practice for aircraft used for cloud seeding is to outfit the planes' wings with brackets that hold multiple silver iodide flares. Aerial seeding allows more precision in the locations of silver iodide releases as the aircraft fly directly above or within the targeted clouds. For example, releasing the nuclei in

clouds at the -5°C (23°F) level (the activation temperature of silver iodide) can lead to immediate nucleation (formation of ice crystals).

Silver iodide nuclei would be generated using cloud nucleating generators or flares (Figure 2-5). The flares are similar to roadside flares and consist of a paper tube with an igniter at the end, sealed with a plastic cap. All chemicals used in the program would be stored and transported according to applicable laws and regulations.

Figure 2-5. Delivery Methods: Wing-Mounted Burn-in-Place Flare Racks Mounted on Specialty Aircraft *(top)*; 20-Gram Ejectable Flares Carried on Cessna 340A *(bottom)*

The aircraft used would be based at a commercial airport, most likely in Sacramento (e.g., McClellan, Mather). PCWA would use a specialty contractor that would provide meteorological services, seeding aircraft, and flight crews to conduct cloud seeding services when appropriate atmospheric conditions are present. The contractor would be chosen based on a competitive bid, based on the experience of the contractor's meteorologists, pilots, and equipment technicians in supporting climatological studies, precipitation enhancement, weather forecasting, and other specialized projects.

Cloud seeding activities would generally begin with the first rainfall and proceed into the spring. PCWA anticipates that cloud seeding operations would typically start in mid-November and end in late April; however, earlier and/or later operations would remain an option, depending on the region's climatic and water supply conditions and PCWA's operational requirements. This would allow PCWA to take advantage of potential seeding opportunities indicated by long-range forecasts outside the normal operations period. Cloud seeding would be conducted each winter and would proceed until the end of the rainy season, or until the suspension criteria indicate that cloud seeding should be curtailed or stopped for the season.

During the operations period, the contractor would monitor the weather and identify storm events that are potentially seedable. The contractor crewmembers would be on standby 24 hours per day, 7 days per week during this period, and would be available for flight within 120 minutes of identification of seedable conditions. During the operations period, PCWA would communicate with neighboring agencies (e.g., SMUD) to ensure that cloud seeding operations are coordinated.

PCWA and the program's meteorological contractor would routinely monitor gages located throughout the watershed that record precipitation, snowpack water content, streamflow, reservoir storage, and ambient temperature. In addition, the meteorologist would monitor special circumstances such as flood potential based on National Weather Service (NWS) flash-flood warnings, avalanche risk, ongoing search and rescue in the target area, and the potential to produce crop-damaging hail. PCWA would also evaluate whether seeding could affect areas that have recently burned or could have unstable soils because of recent seismic events, including recent or potential landslides. These suspension criteria are instrumental in controlling program costs and avoiding undue erosion, landslides, mudflows, and/or downstream flooding. PCWA and the meteorologist would jointly make decisions regarding when to invoke the suspension criteria.

PCWA's currently proposed suspension criteria, which are based on similar cloud seeding projects (Figure 2-4), are listed below. PCWA may modify these criteria for the Proposed Project as appropriate to further tailor them to changing climactic conditions in the target area.

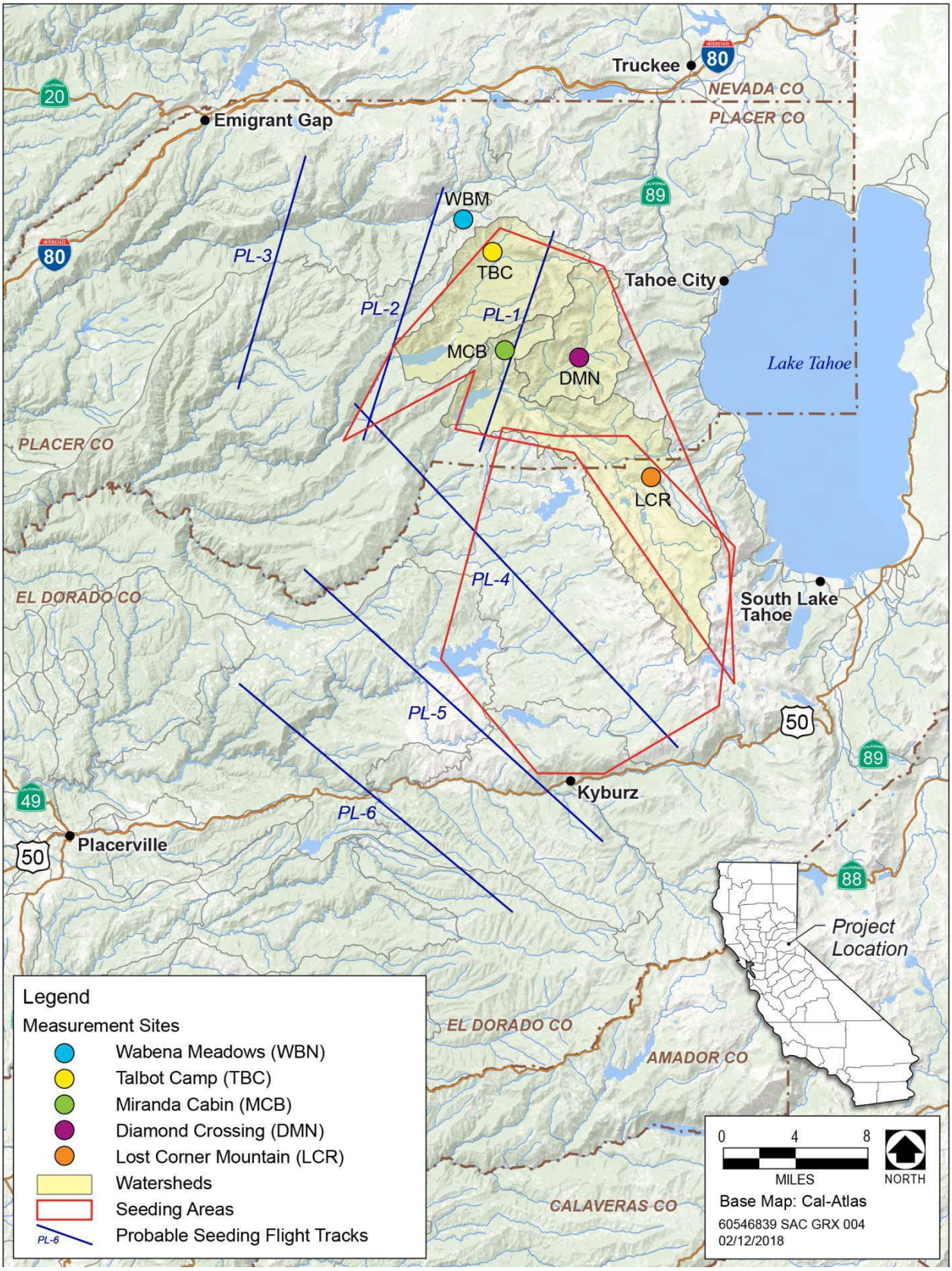


Figure 2-6. Snowpack Monitoring Locations

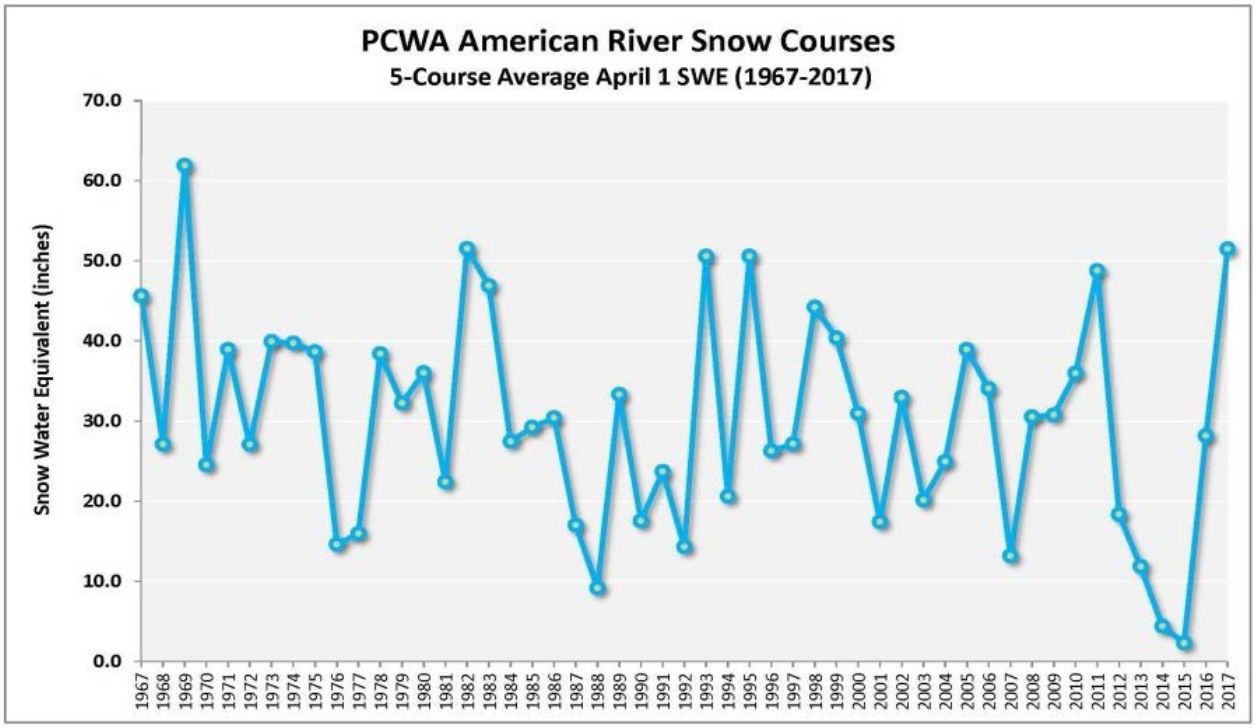


Figure 2-7. Historical Snow Water Content Conditions: 1967 to 2017

equal or exceed the wettest 25 percent of years based on the period of record), cloud seeding will be suspended.

Snowmelt

Target Area: PCWA will collect snow depth and water content data (Figure 2-7) in the target area in conjunction with DWR's California Cooperative Snow Survey at five established snow course sites shown on Figure 2-6: Wabeena Meadows, Talbot Camp, Miranda Cabin, Diamond Crossing, and Lost Corner Mountain. These data will be used to project snowmelt volumes entering PCWA reservoirs and estimate the seasonal water supply forecast to determine whether continued cloud seeding is warranted. If the February 1 runoff forecast indicates that snowmelt runoff will be at or greater than the 25 percent exceedance level (e.g., the April through July runoff to MFP reservoirs will be suspended.

American River Basin: PCWA will use DWR's spring (April–July) snowmelt runoff forecast to determine whether excessive snowmelt is projected occur in the American River basin. The median forecast of unimpaired runoff volume below Folsom Lake is compared with threshold flow values of 1,700 thousand acre-feet (TAF) (February), 1,600 TAF (March), and 1,500 TAF (April). If the projected flow exceeds the threshold for that given months runoff forecast, cloud seeding will be suspended.

Rain Flood Conditions

Unlike snowmelt, rain flood conditions require continued surveillance and immediate action.

Target Area: PCWA will use data from the California Nevada River Forecast Center (e.g., precipitation and runoff forecasts) to estimate individual storm runoff volumes for Hell Hole and French Meadows reservoirs. The runoff volume will be compared with the remaining reservoir storage volumes. If the estimated runoff volume exceeds the available storage by 10,000 acre-feet, seeding may be suspended.

American River Basin: If water releases from Folsom Dam exceed 35,000 cubic feet per second (cfs), seeding will be suspended until the release is reduced to below 20,000 cfs and the freezing level falls below 4,500 feet.

Special Circumstances

Severe Weather Threats: Cloud seeding will be suspended if an NWS flash-flood warning is in effect over any part of the target area.

Avalanche: If the Sierra Avalanche Center has identified an "extreme" avalanche risk in the target area, cloud seeding will be suspended until the risk is reduced.

Fire and Potential for Mudflows or Erosion: PCWA will coordinate with the Tahoe and/or El Dorado National Forests, El Dorado and/or Placer County Fire Departments and the California Department of Forestry and Fire Protection, as appropriate, regarding risks for severe erosion or mudflows following wildfires in the Project area. If a storm event following a fire in the target area could create the potential for mudflows or severe erosion, PCWA will suspend cloud seeding until the risk is reduced.

Emergency: Cloud seeding will be suspended if there is an ongoing search-and-rescue mission or other official emergency response in the target area that would be affected by increased snowfall.

Hail: If requested by the El Dorado County or Placer County Agricultural Commissioner to protect crops, PCWA will discuss the situation and suspend cloud seeding if storms could produce hail after March 15.

Other: PCWA and the meteorologist will retain independent authority to suspend cloud seeding if unforeseen conditions develop during storm events that could result in flooding or other adverse conditions.

2.5.2 Aircraft and Crew

PCWA would retain a private contractor to conduct the cloud seeding operations. The contractor would operate from an airport in the Sacramento area for a PCWA project because of the availability of instrument flight rules (IFR)[2] approaches, hangar facilities, and aircraft

[2] IFR is an instrument approach wherein the aircraft begins final approach without first having executed a procedure turn.

maintenance. The standard Cessna 340A seeding aircraft to be used for the Project has a fuel capacity of 183 gallons and endurance of 5.5 hours and, together with all seeding equipment, can handle seeding missions of up to 4.5 hours. Experience shows that most actual seeding missions last 2 to 2.5 hours. For the purposes of this IS/ND, calculations are based on an assumed maximum of 80 missions per year.

The aircraft are equipped with ejectable flare racks, two burn-in-place flare racks, a global positioning system (GPS), and a data logging system. Additionally, a GPS-based terrain mapping system would provide the flight crew with increased situational awareness during IFR and nighttime seeding operations, enhancing safety. All contractor cloud seeding aircraft would hold current Federal Aviation Administration (FAA) Restricted category airworthiness certificates. This certificate is required by the FAA for weather control operations.

The aircraft are modified to carry two wing-mounted flare racks for the use of 150-gram burn-in-place flares and one belly-mounted ejectable flare rack for the use of 20-gram ejectable flares (Figure 2-5). The wing-mounted racks are capable of holding 12–16 flares on each side, or a total of 24–32 flares. The belly-mounted racks are capable of holding 102 ejectable flares each, and up to three racks can be mounted.

The contractor crew would consist of a pilot, a copilot, and a remotely located meteorologist. The contractor would rotate experienced pilots between summer and winter projects, and thus, would generally have personnel ready for any project. Contractor pilots would be trained before any project on weather recognition, proper seeding procedures, flight in icing conditions, crew coordination, and flight safety and judgment.

2.6 COMPLIANCE AND REPORTING

The Proposed Project would not require any regulatory permits or approvals; however, federal and state agencies require that agencies planning weather modification programs comply with the following reporting procedures.

2.6.1 Federal

NOAA would require PCWA to file an annual “Initial Report on Weather Modification Activities,” also known as NOAA Form 17-4; an interim report; and an annual completion report. The annual report contains a summary of the program, including the number of days and hours of operation and the amount of seeding material applied.

2.6.2 State

State requirements for sponsors of weather modification projects consist of filing a notice of intent with DWR at the outset and every 5 years thereafter. The notice of intent must be published in local newspapers of regular circulation in the affected counties at least 21 days before the start of cloud seeding, and proof of publication must be filed with DWR. PCWA would be required to keep records and file a biennial report. In addition, PCWA would be

required to send annual letter notices to the board of supervisors of each affected county (in this case, El Dorado and Placer counties) and to DWR.

2.6.3 Local

PCWA is the lead agency for the Proposed Project. The PCWA Board of Directors would adopt an ND before certifying the CEQA documentation and approving the Project.

3.0 ENVIRONMENTAL CHECKLIST

Following is the environmental checklist form (CEQA Guidelines, Appendix G) that provides discussion of the environmental impacts associated with implementation of the Middle Fork American River Weather Modification Project.

1. **Project title:** Middle Fork American River Weather Modification Project

2. **Lead agency name and address:** Placer County Water Agency, P.O. Box 6570, 144 Ferguson Road, Auburn, CA 95604

3. **Contact person and phone number:** Benjamin Barker, Environmental Scientist, (530) 823-1742, bbarker@pcwa.net

4. **Project location:** Placer and El Dorado counties; Tahoe and Eldorado national forests

5. **Project sponsor's name and address:** Placer County Water Agency, P.O. Box 6570, 144 Ferguson Road, Auburn, CA 95604

6. **General plan designation**: U.S. Forest Service (USFS) National Forest Lands

7. **Zoning:** Timberland; mill mixed use; downtown mixed use; residential; and open space

8. **Description of the Project:** Implementation of a weather modification (cloud seeding) program in the Middle Fork American River watershed. Refer to Chapter 2.0 for a detailed project description.

9. **Surrounding land uses and setting:** The target area is located on the western slope of the central Sierra Nevada and is generally used as National Forest Land. The landscape is characterized by steep canyons and rugged terrain with dense forests and woodlands. The land is rural and there are no residential or commercial developments in the immediate vicinity.

10. **Other public agencies whose approval is or may be required (e.g., permits, financing approval, or participation agreement):**

The proposed project would not require any external permits or approvals; however, agencies planning weather modification programs must comply with the reporting procedures outlined above in Section 2.6.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities/Service Systems	☐ Mandatory Findings of Significance

DETERMINATION: (to be completed by the Lead Agency)

On the basis of this initial evaluation:

☒ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Benjamin Barker — Signature

4/20/2018 — Date

Signature

Date

EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact.

5. " The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

6. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a. Earlier Analysis Used. Identify and state where they are available for review.

    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:

    a. The significance criteria or threshold, if any, used to evaluate each question; and

    b. The mitigation measure identified, if any, to reduce the impact to less than significance.

3.1 AESTHETICS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

3.1.1 Environmental Setting

Placer County can be divided into three geographically distinct areas: the foothills, Roseville to Penryn; the Gold Country, Newcastle to Dutch Flat; and the high Sierra, Alta to Tahoe. The foothills contain farmland, oak outcroppings, and the more developed area of Roseville and Rocklin. In the Gold Country, Gold Rush–era towns and the Tahoe National Forest and Auburn State Recreation Area provide scenic opportunities. In the high Sierra, Lake Tahoe and other undeveloped areas provide plenty of views. (Placer County Visitors Bureau & California Welcome Center 2017.) Primary watercourses in Placer County include the North and Middle Forks of the American River. Placer County's aesthetic and scenic resources are not specified in the general plan (Placer County 2013).

El Dorado County has a broad range of landscapes that change with the gradual increase in elevation. The diverse environments of the region are represented by distinct natural communities and landforms that display different development patterns and historical features. This broad diversity is an important element of El Dorado County's visual heritage and one that many residents value as part of their quality of life. Rolling hills dotted with mature oaks and oak woodlands, agricultural land, apple orchards and vineyards, evergreen forests and snow-capped mountains, scenic rivers, alpine lakes, and historic structures all contribute to the visual character found in the county (El Dorado County 2003). In El Dorado County, wetlands are considered scenic resources (El Dorado County 2015).

Existing sources of light and glare vary throughout the counties with more nighttime lighting and potential glare sources in developed areas. The target area is remote and does not contain major sources of light and glare.

According to the California Department of Transportation's (Caltrans's) California Scenic Highway Program, in Placer County, State Route (SR) 49, Interstate 80 (I-80) along the county's northern border, SR 89, and SR 28 are eligible for listing as state scenic highways, but have not been officially designated. In El Dorado County, U.S. Highway 50 (U.S. 50) and SR 89 are officially designated state scenic highways. SR 49 is eligible for listing as a state scenic highway, but has not been officially designated (Caltrans 2011). Also according to Caltrans, two scenic vista points are located within Placer County: Emigrant Gap Vista Point near the junction of SR 20 and SR 80 and Alice Richardson Vista Point near Lake Tahoe. There are three additional scenic vista points in El Dorado County: Emerald Bay/Vikingsholm Vista Point near Lake Tahoe, Christmas Valley Vista Point south of Lake Tahoe, and Silver Lake Vista Point on SR 88 (Caltrans 2015).

3.1.2 Discussion of Impacts

a) **No Impact**. Views from the scenic vistas could include the area's snowpack, which often remains into the spring and summer. The Proposed Project could add to the snowpack visible from these vistas. Because snow is an important part of the view from these scenic vistas, the additional increment of snow that would be added by the Project would have no adverse impact on the vistas listed above and could have a beneficial effect during years in which fewer storms contribute to the snowpack. There would be no ground disturbance to affect views from scenic vistas. Therefore, no impact would occur.

b) **No Impact**. The Proposed Project would not involve any ground disturbance that would damage any scenic resources, including those within a state scenic highway. Therefore, no impact would occur.

c) **No Impact**. The Proposed Project would not require construction of structures that could degrade the existing visual character of the Project area. Planes conducting aerial seeding would fly above or within storm clouds and would not typically be seen from the ground. Flares would be attached to airplanes and would not be visible to casual observers on the ground. Expanded cloud seeding activities would result in an increase in snowfall and snowpack that could extend the presence of snow cover later into the spring. The target area is naturally subject to frequent winter storms with substantial snowfall. During years with above-average snowfall, PCWA would implement suspension criteria (Section 2.5.1) to curtail cloud seeding activities. Therefore, no change to existing visual character or quality would occur as a result of the Proposed Project. Thus, no impact would occur.

d) **No Impact**. The Proposed Project would not involve a substantial new source of light or glare. Cloud seeding units would use a flame to vaporize the silver iodide/acetone

solution or ignition of silver iodide flares. However, the flame would be very small and the flares would be enclosed in spark arrestors and would be lit only during cloud seeding events, in remote locations not visible from public viewing areas. Aircraft would comply with existing FAA regulations regarding safety lighting, would generally work at altitudes of greater than 8,000 feet, and would not introduce substantial lighting or glare. Therefore, no impact would occur.

3.2 AGRICULTURE AND FORESTRY RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.2.1 Environmental Setting

Agriculture and timber are important resources in El Dorado and Placer counties. Agricultural land uses, including apple orchards and vineyards, are concentrated at the lower elevations

while timber production occurs primarily at the higher elevations. The coniferous forests on the western slope of the Sierra Nevada are economically important timber lands.

The majority of the land in the target area is unmapped by the Farmland Mapping and Monitoring Program of the California Department of Conservation (DOC 2014a). Only a few Williamson Act lands exist in the target area (DOC 2014b). This indicates that very few agricultural uses occur in the target area.

3.2.2 Discussion of Impacts

a) **No Impact**. The Proposed Project would not require construction of permanent features, and would not result in changes in the physical environment that could result in the conversion of agricultural land, including Important Farmland, to nonagricultural uses. Therefore, no impact would occur.

b) **No Impact**. As described above, the Proposed Project would not result in physical changes that could conflict with existing zoning for agricultural uses or conflict with a Williamson Act contract. Therefore, no impact would occur.

c) **No Impact**. The Proposed Project would not involve changes in land use or zoning for, or cause rezoning of, forestry resources. No impact would occur.

d) **No Impact**. As described above, the Proposed Project would not result in physical changes to the environment that could cause the loss of forest land or conversion of forest land to non-forest uses. No impact would occur.

e) **No Impact**. See the responses to questions a) and d) above. The Proposed Project would not result in physical changes to the environment that could directly or indirectly result in the conversion of agricultural land, including Important Farmland, to nonagricultural uses or result in the conversion of forest land to non-forest uses. No impact would occur.

3.3 AIR QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

3.3.1 Environmental Setting

California Air Basins

To manage common and local air quality problems, California is divided into 15 air basins, each of which is associated with one or more air pollution control district or air quality management district (also called air districts). Placer County Air Pollution Control District (PCAPCD) is one of 35 local air districts established pursuant to Section 40002 of the California Health and Safety Code. PCAPCD is a "county" district, with its jurisdiction being Placer County extending from Lake Tahoe in the east, over the crest of the Sierra Nevada, to the Sacramento Valley in the west.

PCAPCD is unique in that it crosses three distinct air basins: Sacramento Valley Air Basin (SVAB), Mountain Counties Air Basin (MCAB), and the Lake Tahoe Air Basin (LTAB). The SVAB, MCAB, and LTAB vary in the types and levels of air pollution. Each air basin is affected not only by locally generated air pollution, but also by naturally occurring and human-generated air pollution from the San Francisco Bay Area and the Central Valley.

Air quality in El Dorado County is regulated by the El Dorado County Air Pollution Control District (EDCAPCD) in the MCAB.

Climate and Meteorology

The climate in the MCAB varies considerably depending on elevation and proximity to the Sierra Nevada crest. The terrain in this area makes it possible for various microclimates to exist in relatively close proximity. The pattern of mountains and hills causes wide variations in rainfall, air temperature, and winds across the western slope. Air temperature variations have an important influence on wind flow, dispersion along mountain ridges, vertical mixing, and photochemistry.

The Sierra Nevada receives large amounts of precipitation from storms moving in from the Pacific Ocean in the winter, with lighter amounts from intermittent "monsoonal" moisture flows from the south and cumulus buildup in the summer. Precipitation levels are greatest in the highest mountain elevations, but decline rapidly toward the western portion of the basin. Winter air temperatures in the western foothills usually dip below freezing only at night and precipitation is mixed as rain or light snow. In the summer, air temperatures in the western end of Placer routinely exceed 100°F.

From an air quality perspective, the varying topography and meteorology of the MCAB greatly influence the concentration of emissions in the basin. Regional air flows are affected by the mountains and hills, which direct surface air flows, causing shallow vertical mixing that hinders dispersion and results in localized concentrations of pollutants.

Inversion layers, where warm air overlies cooler air, frequently occur and trap pollutants close to the ground. In the winter, these conditions can lead to carbon monoxide (CO) "hotspots" along heavily traveled roads and at busy intersections. The longer daylight hours, stagnant air, high air temperatures, and plentiful sunshine of summer provide the conditions and energy for the photochemical reaction between volatile organic compounds (VOC) and oxides of nitrogen (NO_X) that results in the formation of ozone.

In the summer, the strong upwind valley winds flowing into the basin from the Central Valley to the west is an effective transport medium for ozone precursors and ozone generated in the San Francisco Bay Area, Sacramento Valley, and San Joaquin Valley. These transported pollutants contribute to the sources of ambient ozone levels in the MCAB and are partly responsible for the exceedances of California ambient air quality standards (CAAQS) and national ambient air quality standards (NAAQS) for ozone (EDCAPCD 2002).

Ambient Air Quality Standards

Under the Clean Air Act (CAA), EPA has developed numerical concentration-based standards, or NAAQS, for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone, measured as either VOCs or total NO_X, CO, nitrogen dioxide, oxides of sulfur, respirable particulate matter (particulate matter with aerodynamic diameter less than 10 or 2.5 micrometers [PM_{10} and

$PM_{2.5}$]), and lead (Code of Federal Regulations Title 40, Part 50). The CAA also gives states the authority to establish air quality rules and regulations. The State of California has adopted the NAAQS and promulgated additional CAAQS for criteria pollutants. The CAAQS are more stringent than the federal primary standards.

Attainment Status

EPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation by EPA means that there is not enough information to appropriately classify an AQCR, so the area is considered attainment.

EPA has delegated the authority for ensuring compliance with the NAAQS to the California Air Resources Board (ARB). ARB has delegated responsibility for implementation of the CAA and California CAA to local air pollution control agencies. With respect to the CAAQS, the MCAB is currently designated as a nonattainment area for ozone and PM_{10}, and as an attainment or unclassified area for all other pollutants. The "unclassified" designation is used in an area where the available information is insufficient to determine the attainment status. With respect to the NAAQS, the MCAB is designated as a nonattainment area for ozone and as an attainment or unclassified area for all other pollutants.

Thresholds of Significance

PCAPCD has established quantitative thresholds for the evaluation of air quality impacts in CEQA documents. Emissions exceeding PCAPCD's emission thresholds could contribute to air quality problems in the MCAB and would therefore result in a significant air quality impact. Table 3-1 summarizes applicable thresholds for project construction and operations.

Table 3-1. PCAPCD Significance Thresholds for Criteria Pollutants

	Construction Phase Project-Level	Operational Phase Project-Level	Operational Phase Cumulative
ROG (lb/day)	82	55	55
NO_X (lb/day)	82	55	55
PM_{10} (lb/day)	82	82	82

Notes: lb/day = pounds per day; NO_X = oxides of nitrogen; PM_{10} = particulate matter with aerodynamic diameter less than 10 micrometers; PCAPCD = Placer County Air Pollution Control District; ROG = reactive organic gases

EDCAPCD has published the *Guide to Air Quality Assessment*, an advisory document for lead agencies, consultants, and project applicants to use when preparing CEQA documents

(EDCAPCD 2002). EDCAPCD has established project-level operational significance thresholds for ROG and NO_X. Table 3-2 lists the EDCAPCD-adopted thresholds of significance for criteria pollutant emissions. Projects resulting in emissions that exceed these thresholds would be considered to have a significant impact.

Table 3-2. EDCAPCD Significance Thresholds for Criteria Pollutants

	Daily Pollutant Emissions (lb/day)	
	ROG	NO_X
EDCAPCD Threshold of Significance	82	82

Notes: EDCAPCD = El Dorado County Air Pollution Control District; lb/day = pounds per day; NO_X = oxides of nitrogen; ROG = reactive organic gases

Sensitive Receptors

Sensitive receptors are defined as locations where pollutant-sensitive members of the population may reside or where the presence of air pollutant emissions could adversely affect use of the land. Sensitive members of the population include those who may be more negatively affected by poor air quality than other members of the population, such as children, the elderly, or the infirmed. In general, residential areas, hospitals, daycare facilities, elder-care facilities, elementary schools, and parks typically contain a high concentration of these sensitive population groups.

3.3.2 Discussion of Impacts

a) Less than Significant. Air quality plans describe air pollution control strategies planned by city, county, or regional governments to bring an area that does not attain federal and state air quality standards into compliance with the requirements of the federal CAA and CCAA.

Two criteria were used to determine whether the Proposed Project would conflict with or obstruct implementation of the air quality plan. The first criterion is whether the Proposed Project is consistent with the projections for population and vehicle miles traveled that were used as the basis of the air quality plans. The Proposed Project would not result in an increase in population in the Project area and would not add a substantial enough number of vehicle miles traveled to exceed the projections used by PCAPCD. The second criterion is whether the Proposed Project would increase the frequency or severity of existing air quality violations, contribute to new violations, or delay the timely attainment of air quality standards.

PCAPCD and EDCAPCD have developed thresholds of significance for criteria pollutants to evaluate regional impacts of project-specific emissions of air pollutants and their impact on the air quality plans. Emissions exceeding these thresholds have not been

accommodated in the air quality plans and would not be consistent with such plans and therefore would be considered impacts.

Operational emissions were estimated based on use of a standard Cessna 340A seeding aircraft with endurance up to 4.5 hours. Experience shows that most actual seeding missions last from 2 to 2.5 hrs. Table 3-3 shows the results of operational emissions calculations compared with PCAPCD and EDCAPCD emission thresholds (see also Appendix A to this IS/ND). The estimates are conservative because they assume that cloud seeding would not be curtailed because of the suspension criteria. During actual operations, cloud seeding would not occur during periods of ample snowpack or erosion or flooding risks, and the amount of seeding would vary from year to year.

Table 3-3. Summary of Operational Emissions under Existing Conditions and from the Proposed Project

	Daily Pollutant Emissions (lb/day)			
	ROG	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project	12.15 Kg (26 lbs)	1.17Kg (2.6 lbs)	0.32 Kg (.7 lbs)	0.29Kg (.63 lbs)
PCAPCD Threshold of Significance	55	55	82	–
Exceeds Thresholds?	*No*	*No*	*No*	–
EDCAPCD Threshold of Significance	82	82	–	–
Exceeds Thresholds?	*No*	*No*	–	–

Notes: EDCAPCD = El Dorado County Air Pollution Control District; Kg = Kilograms; lb/day = pounds per day; NO_X = oxides of nitrogen; PCAPCD = Placer County Air Pollution Control District; $PM_{2.5}$ = particulate matter with aerodynamic diameter less than 2.5 micrometers; PM_{10} = particulate matter with aerodynamic diameter less than 10 micrometers; ROG = reactive organic gases

EDCAPCD does not have numeric thresholds of significance for $PM_{2.5}$ and PM_{10}. PCAPCD does not have numeric thresholds of significance for $PM_{2.5}$.

As shown in Table 3-3, the total emissions for PCWA's existing cloud seeding activities and the Proposed Project would be well below PCAPCD and EDCAPCD thresholds. Because this conservative estimate of emissions is well below the PCAPCD and EDCAPCD thresholds, the Proposed Project would not conflict with applicable attainment plans. This impact would be less than significant.

b) **Less than Significant.** As described in the response to question a), the Proposed Project's emissions would be well below PCAPCD and EDCAPCD standards. Therefore, the Project would not violate air quality standards. This impact would be less than significant.

c) **Less than Significant.** As described above, emissions would be well below thresholds. This activity would not generate a cumulatively considerable contribution to regional air quality pollutants in an area that is nonattainment under a state or federal ambient air quality standard. Furthermore, the Proposed Project is not a land use project that would generate trips or increase population. Therefore, the Proposed Project's air quality impact would be less than cumulatively considerable.

d) **No Impact.** The Proposed Project does not include construction or operation of any diesel emissions–generating sources near any sensitive receptors. Therefore, no impact would occur.

e) **Less than Significant.** Although offensive odors rarely cause any physical harm, they can be unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and air districts. The emissions from cloud-seeding equipment and aircraft would not generate substantial odors, and operations would occur mainly away from publicly accessible areas. This impact would be less than significant.

3.4 BIOLOGICAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.4.1 Environmental Setting

The target area for the Proposed Project is in the upper elevations of the western slope of the Sierra Nevada in Northern California; it encompasses approximately 144 square miles of primarily National Forest System lands in Placer and El Dorado counties, including portions of the upper Rubicon River watershed draining to Hell Hole Reservoir and the upper Middle Fork American River watershed draining to French Meadows Reservoir (see Figure 2-2 in Chapter 2.0, Project Description"). This analysis of biological resources is based on the following studies, reports, and databases pertinent to the evaluation of impacts of the Proposed Project on the target area:

- *Final Environmental Impact Statement for HydroPower License Middle Fork American River Hydroelectric Project—FERC Project No. 2079-069* (FERC 2013)
- *Sacramento Municipal Utility District El Dorado Cloud Seeding Program Expansion Initial Study and Mitigated Negative Declaration* (SMUD 2017a)
- *Environmental Effects of Silver Iodide from Cloud Seeding Operations Sacramento Municipal Utility District Hydro License Implementation FERC Project No. 2101* (SMUD 2017b)
- *Placer County General Plan Update* (Placer County 2013)
- *2004 El Dorado County General Plan A Plan for Managed Growth and Open Roads; A Plan for Quality Neighborhoods and Traffic Relief* (El Dorado County 2016)
- U.S. Forest Service (USFS) List of Sensitive Plant Species by Forest (USFS 2013a)
- USFS List of Sensitive Wildlife Species by Forest (USFS 2013b)
- *Sierra Nevada Forest Plan Amendment* (USFS 2004)
- *Sierra Nevada Forests Management Indicator Species Amendment* (USFS 2007)
- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2017)
- U.S. Fish and Wildlife Service (USFWS) Species List (USFWS 2017)
- California Native Plant Society (CNPS) Electronic Inventory of Rare and Endangered Plants of California (CNPS 2017)

The results of CNDDB, USFWS, and CNPS database searches are provided in Appendix B.

The elevation of the target area ranges from approximately 4,000 to 10,000 feet. A wide range of aquatic habitats occurs in the target area, including lakes, ponds, reservoirs, streams, wet meadows, and other wetlands.

Terrestrial vegetation communities occurring in the target area include coniferous forest such as subalpine conifer at the highest elevations, red fir, white fir, Jeffrey pine, sierran mixed conifer, lodgepole pine, and ponderosa pine. In addition, most waterways and other aquatic habitats support some component of adjacent riparian vegetation.

Because of the remote nature of most of the target area, development and human disturbances are generally limited to activities such as recreation and forest management practices, except at more developed and heavily used recreation sites such as those in the vicinity of Hell Hole and French Meadows reservoirs.

The Desolation Wilderness and Granite Chief Wilderness areas overlap the target area. Two large fires and one small fire have affected portions of the target area in the recent decade. The Star Fire (2001) affected nearly one-third of the lower portion of the Dolly Creek–Middle Fork American River subwatershed at and just below French Meadows Reservoir. The King Fire (2014) burned a small portion of the lower Hell Hole Reservoir–Rubicon River subwatershed at and below Hell Hole Reservoir. The Bear Fire (2001) burned a relatively small area at the lower end of the Miller Creek–Rubicon River subwatershed.

The target area supports a wide array of native flora and fauna, including special-status species, rare habitats, and important fish and game resources, as described in Section 3, “Environmental Analysis (Fisheries, Terrestrial Ecosystems and Special-Status Species)” of the final environmental impact statement for the Middle Fork American River Project’s Federal Energy Regulatory Commission relicensing (FERC 2013).

Special-status plants and wildlife are those species protected by the State of California as endangered, threatened, or rare, and candidate for listing; included on California Rare Plant Rank Lists 1 and 2; California species of special concern; California fully protected species; species federally listed as threatened or endangered or proposed for listing; and species designated as USFS Sensitive and management indicator species for the Eldorado and Tahoe national forests.

A total of 18 special-status wildlife species (two invertebrates, three amphibians, six birds, six mammals, and one fish) and 32 special-status plant species are known to occur or have potential to occur in the target area or vicinity, based on a review of database searches conducted for the Project (Appendix B).

Existing Effects of Climate Change

As a result of climate change in recent decades, summers along the west slope of the Sierra Nevada, where the target area is located, have become longer, hotter, and drier, and the region has been experiencing more frequent droughts with reduced snowpack. Higher temperatures

have resulted in elevated snow levels and earlier snowmelt in the mountains (DWR 2013a). Many special-status plant and animal species in the target area have life history requirements that are limited by climatic conditions and are generally adapted to longer, colder winters with greater precipitation, especially in the form of snow at higher elevations. As temperatures become warmer, species with low tolerance for climate changes may be forced to higher elevations because vegetation changes cannot necessarily keep pace with changes in climate; species at the highest elevations have nowhere to go. Some species are not very mobile and may not have the ability to disperse to new areas, and many special-status species have low adaptive capacities or low behavioral plasticity in response to environmental variation (Kershner 2014). For example, martens are directly dependent on winter snowpack for their survival because their winter prey are subnivean (under-snow) species that depend on deep snow for foraging and caching, and some rely on dens in deep snow for thermal protection during winter (Kershner 2014).

Climate change also has resulted in regional declines in streamflow and summer low flows and has changed streamflow timing. All of these factors can substantially affect breeding, feeding, and other essential behavior patterns of aquatic or riparian-associated species. Specifically for Sierra Nevada yellow legged-frog and California red-legged frog, sufficient water must be available long enough for larvae to fully develop. Increased frequency of drought, decreased streamflow, and warmer temperatures have caused streams and breeding pools to dry up faster and more frequently. The highest egg mass counts for Sierra Nevada yellow-legged frog have been recorded in years that have followed high snowpack, and reduced snowpack may reduce recruitment success for this and other special-status amphibians as summer drying of breeding pools increases (Lacan et al. 2008). Increasing snowpack within historical norms would therefore generally benefit special-status species that depend on winter snowpack or on aquatic habitats and minimum streamflows.

Hotter, drier conditions have also contributed to increased frequency and intensity of regional wildfires. A recent example in the target area is the King Fire of 2014, which burned thousands of acres of forest habitat. Frequent, high-intensity fires have many negative effects on species that live in these forest habitats, primarily the loss of habitat.

3.4.2 Discussion of Impacts

a) Less than Significant. The Proposed Project would not result in substantial adverse effects (direct or indirect) on special-status species, as defined above.

Potential habitat for special-status species is present in and near the target area; however, the Project does not include any ground disturbances, and therefore, would not have any direct impacts on special-status species habitats.

The Proposed Project also would not result in direct impacts on special-status species individuals in the form of direct injury or mortality (e.g., bird or bat strikes) resulting from aircraft used for cloud seeding operations. Flights would be sufficiently high above the landscape to avoid such individuals and would occur during storm events, primarily in winter

(see Section 2.5.1, "Operations," in Chapter 2.0, "Project Description") when high-elevation bird migration flights and bat foraging and migration flights would be unlikely. Furthermore, special-status birds nesting or roosting high in trees (e.g., bald eagles) would not likely be indirectly disturbed by excessive noise from Project flights during winter storms because the flights would generally occur outside the breeding season; the noise of Project flights would likely be masked by storm noise that would typically occur during the flights; and the duration of Project flights during each storm would be relatively short (2 to 3.5 hours in total).

Potential indirect effects of the Proposed Project on special-status plant and wildlife species that occur in the target area are unlikely. The Project would disperse small quantities of silver iodide particles over the approximately 144-square-mile target area with the intent of modestly increasing snowfall during winter and potentially increasing snowmelt in spring and summer.

The amount of silver iodide used in cloud seeding is minimal; prior studies have documented that silver iodide has low bio-toxicity because it has very low solubility and would not form potentially harmful silver ions, and does not accumulate in soils at levels above natural background (SMUD 1975, 2017b; Hunter 2007; WMA 2009; Cardno Entrix 2011; DWR 2013b). Any water quality effects would be further diluted by modest increases in snowmelt from seeding activities.

After nearly a decade of studies, scientists concluded that cloud seeding could boost precipitation by 5–15 percent in treated events (NCAR et al. 2014); the Desert Research Institute (see WMI 2016) reports seasonal enhancements of 4–10% of additional water. However, Sacramento Municipal Utility District (SMUD) reported no definitive proof of enhancements from ground-based cloud seeding over the history of its program (Leidy 2016). Cloud seeding has not been found to reduce naturally occurring precipitation in downwind areas (DWR 2013b).

Potential precipitation increases are not expected to result in changes to climatic or hydrologic patterns (e.g., rainfall, snowfall, snowpack, snowmelt amount or timing) outside the natural historical range. Studies of SMUD's historic ground-based cloud seeding operations, in which a few thousand to nearly 60,000 grams of silver iodide were released in any given year (based on 80 annual seeding flights, within the range of use for the Proposed Project), identified that maximum increases in snowpack duration of less than 6 days would be possible, with subsequent shortening of the growing season by an average of less than 2 days per year (Leidy 2016).

These potential changes in snowpack and growing season would not have a substantial effect on plant or wildlife survival. In particular, the current climate trend has been toward shorter snowpack durations and warmer temperatures overall; therefore, any increases in snowpack caused by cloud seeding would be within historical norms and could help to ameliorate the warming and drying trends. Plant and wildlife species in the target area are

well adapted to natural variations in snowfall (which are much greater than incremental changes expected from weather modification) and the resultant conditions (Leidy 2016).

In addition, as part of the project, PCWA would follow standard established suspension criteria to avoid and minimize the potential for downstream flooding or other damaging events such as erosion, landslides, avalanches, or mudflows that could directly or indirectly affect special-status species (see Chapter 2.0, "Project Description"). Further discussion of the potential effects of cloud seeding on hydrology and water quality is provided in Section 3.9, "Hydrology and Water Quality," and in a recent analysis conducted for a similar project in neighboring watersheds for SMUD (SMUD 2017a).

The California Department of Water Resources supports these findings and asserts that cloud seeding activities can be conducted without significant adverse impacts on the natural and human environment (DWR 2013).

In summary, cloud seeding operations would result in negligible effects on water quality; minimal to no changes in the growing season; and potentially modest increases in climatic and hydrologic factors (rain/snowfall, snowpack, and snowmelt) that could alleviate recent warming and drying trends by helping to maintain snowpack within historical norms. This effect would be generally beneficial for special-status species that are adapted to greater snowpack and resultant hydrology that has been more typical of the region. Therefore, the impacts of the Proposed Project on special-status plant and wildlife species would be less than significant. The effect of additional rain/snowfall, snowpack, and snowmelt on special-status plants and wildlife could be beneficial.

b) **Less than Significant.** The Proposed Project would not result in substantial adverse effects (direct or indirect) on riparian habitat or other sensitive natural community, as defined above.

Riparian habitats and other sensitive natural communities (e.g., fens) are present in and near the target area; however, the Project would not involve any ground disturbance, and therefore, would not have any direct impacts on these communities.

Riparian vegetation in the target area is found generally in narrow fringes along the edges of the streams or surrounding wetlands or open water (e.g., reservoirs). Under natural hydrologic conditions, high spring flows seasonally inundate stream margin habitats and floodplains. Additionally, peak storm flows naturally occur at with enough frequency to scour floodplain soils and redeposit sediment, which is needed to rejuvenate habitat for many riparian species. Under natural conditions, fens (and other wetlands) also experience variable surface water inputs.

The use of silver iodide as part of the Proposed Project would have no substantial effect on riparian or other sensitive communities because it has not been shown to accumulate in soils at levels above natural background, as stated in the response to question a) above.

An observable effect of cloud seeding activities would be an occasional increase in stream and river flows over without-Project conditions. These flow increases would occur in different locations and at different times depending on snowmelt, and would result in an overall increase in long-term average annual flows of area streams and rivers. However, the flows would remain within the historical range, which is naturally highly variable based on ambient climatic conditions during the snowmelt period. A small increment of additional soil erosion, streambank alteration, or localized flooding could occur. These effects on habitat would not be substantial, however, because the target area is frequently subject to large amounts of snowfall and subsequent snowmelt. Most erosion and sediment flux in rivers occurs during major flood events, when cloud seeding operations would be suspended. Furthermore, PCWA's program suspension criteria would curtail cloud seeding that could contribute to high streamflows. Overall, any incremental erosion and localized flooding caused by snowmelt occurring because of the Proposed Project would be less than the erosion and localized flooding that occurs in years with heavy storms and major snow accumulation. See Section 3.9, "Hydrology and Water Quality," for further discussion.

The increase in snowpack and snowmelt resulting from the Proposed Project is not expected to be detrimental to riparian vegetation or other sensitive communities in the target area. The species found in the region are well adapted to natural snowfall variations (which are much greater than the incremental changes expected from weather modification) (Leidy 2016) and increases in snowpack resulting from cloud seeding would be within historical norms for the region. In addition, the Proposed Project could have a beneficial effect on riparian vegetation or other sensitive communities. Increased rainfall and streamflow may increase the period of time that soil moisture is available to support plant growth (Leidy 2016) and could ameliorate the warming and drying trends that have been occurring in the region as a result of climate change.

In summary, the Proposed Project would have a less-than-significant impact on riparian habitat or other sensitive natural communities from changes in water quality or increases in streamflow; the effect of additional snowpack and snowmelt on riparian vegetation could be beneficial.

c) **Less than Significant.** Wetlands and other waters of the United States, including Hell Hole and French Meadows reservoirs, are present in and near the target area and are subject to natural fluctuations in water levels and surface water inputs. The Proposed Project would not involve any ground disturbance, and therefore, would not have any direct impacts on wetlands.

Potential indirect impacts of the Project on wetlands are similar to those described for riparian and other sensitive habitats in the response to question b), above. In summary, the Proposed Project would have a less-than-significant impact on federally protected wetlands from changes in water quality or increases in streamflow; the effect of additional snowpack and snowmelt on riparian vegetation could be beneficial.

d) **Less than Significant.** The Proposed Project does not propose any ground disturbance. Cloud seeding flights would be high above the landscape, would occur outside typical migration periods for the wildlife species considered in this analysis, and would occur during storm events when attempts by wildlife to access nursery sites would be unlikely; see additional relevant discussion under question a). Therefore, the Proposed Project would not directly interfere with the movement of wildlife species or with an established movement corridor, nor would the Project impede use of or access to native wildlife nursery sites.

Some migratory mammals generally move from higher to lower elevations as snow depth increases. In average years, only a slight increase in the snowpack and duration of snow cover would be expected at the higher elevations as a result of the Proposed Project. In addition, the Project would occur in an area subject to major winter storms that result in varying durations and intensity of winter conditions. The nominal changes in snowpack depth and duration would not be expected to inhibit the use of deer fawning areas, impede natural migrations from higher to lower elevations between the winter and summer ranges, or reduce the extent of fawning habitat or the winter and summer ranges of mule deer herds.

Therefore, the impact of the Proposed Project on the movement of wildlife species, on established migratory corridors, or on the use of wildlife nursery sites would be less than significant.

e) **No Impact.** Most land within the target area is managed by USFS; only limited areas are subject to county policies or ordinances in Placer and El Dorado counties. Lands subject to county regulations are designated for either Timberland (Placer County) or Natural Resources (El Dorado County) land uses. The Proposed Project is compatible with county- and USFS-designated uses, which are primarily for forest products, recreation, and natural resources. The Project does not propose any ground disturbances and no trees would be removed or otherwise affected. Enhanced rain/snowfall, snowpack, and snowmelt and the use of silver iodide are not expected to have any substantial indirect effects on vegetation communities, water quality or hydrology, or special-status species, as described above in response to questions a) through d), which are the subjects of local regulation.

Therefore, the Proposed Project would not conflict with any local policies or ordinances, including tree preservation policies that protect biological resources. No impact would occur.

f) **No Impact.** The target area is not located within an adopted habitat conservation plan area, natural community conservation plan area, or other approved local, regional, or state habitat conservation plan area. Therefore, no impact would occur.

3.5 CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐
e) Cause a substantial adverse change in the significance of a Tribal Cultural Resource pursuant to AB 52?	☐	☐	☐	☒

3.5.1 Environmental Setting

Ethnographic Setting

Ethnographically, the Middle Fork American River is situated at the intersection of the Nisenan (sometimes referred to as the Southern Maidu) and Washoe prehistoric spheres of influence. Both the Nisenan and the Washoe seem to have used the area now occupied by Union Valley Reservoir (Deal and Bennett 1996). Because a large portion of the Project area is located at higher elevations with cold winter temperatures and deep snow, prehistoric usage of these locales would have been seasonal.

Nisenan

The Nisenan territory included the drainages of the Yuba, Bear, and American rivers, and the lower drainages of the Feather River, from the crest of the Sierra Nevada to the banks of the Sacramento River. According to Bennyhoff (1961:204–209), the southern boundary with the Miwok was probably a few miles south of the American River.

In the Nisenan territory, several political divisions, constituting tribelets, each had their own respective headmen who lived in the larger villages. In general, substantial and permanent Nisenan villages were not established on the valley plain between the Sacramento River and the foothills, although this area was used as a rich hunting and gathering ground. Hill Nisenan,

located near Placerville, formed one such tribelet with strong affiliations with groups along the ridges and lower drainages of the American River (Wilson and Towne 1978:387). According to Kroeber (1925:831), the larger villages could have had populations in excess of 500 individuals, although small settlements consisting of 15–25 people and extended families were more common.

According to Wilson and Towne (1978), no village sites are depicted along the Middle Fork American River. All villages noted by Wilson and Towne (1978) are farther downstream located outside of the target area.

Studies in the Project area indicate that Native Americans deliberately burned the meadows to increase forage and improve the habitat, clear the areas around habitations, kill insects, improve wild seed crops, and facilitate travel and hunting (Deal and Alblinger 1998; Deal and Bennett 1996). Nets, traps, rodent hooks, and fire were all used for hunting small game. Freshwater clams and mussels were gathered in the larger watercourses, such as the lower American River. Other aquatic food sources available to native populations in the western portion of the Project area would have included fish such as salmon and sturgeon, which would have been netted or caught with the aid of weirs.

Washoe

Culturally, the Washoe are linked to both California and the Great Basin. Washoe core territory extended from Honey Lake on the north to the West Walker River on the south, and from the Pine Nut Range on the east, west to the Sierra Nevada crest. Northerners (*Wel mel ti*) used areas from Eagle Valley north to Honey Lake; southerners (*Hunga lel ti*) occupied the area south of Woodfords; and valley dwellers (*Pau wa lu*) wintered in the Truckee Meadows (Nevers 1976). The presence of Washoe place names on the western slope of the Sierra Nevada and ethnographic accounts of seasonal rounds extending from the edges of Yosemite Valley north to the town of Colusa (d'Azevedo 1956; Freed 1966) indicate that seasonal rounds extended well beyond the core territory, and may have encompassed a large portion of the current Project area.

Washoe population estimates are generally low, from 550 in 1861 to 300–400 in 1900 (d'Azevedo 1966:323), although John Reese, a Carson Valley businessman of the 1850s, estimated the Carson Valley Washoe population at 2,000–3,000 individuals at the time of historic contact (d'Azevedo 1966:332–324).

Washoe subsistence relied on extensive knowledge of the environment. The Washoe people gathered plants in earliest spring, moving to Lake Tahoe as snow conditions allowed to fish and socialize. In summer, family groups gathered plant foods and hunted in mountain valleys, moving to lower elevations for seed harvests in mid to late summer, when communal rabbit and antelope drives were held. A major celebration began the pine nut harvest, and from September through late October, nuts to be stored for winter subsistence were gathered whenever the opportunity presented itself. The Washoe combined the techniques of foragers, who moved to a resource patch and ranged out from the residential base daily to gather, and those of collectors, who gathered specific resources in organized groups and stored food for at

least part of the year, making fewer residential moves than foragers as defined by Binford (1980).

Historic Setting

Much of the current Project area is encompassed by Eldorado National Forest. The historic overview for Eldorado National Forest (ENF) (Supernowicz 1983) documents the history of the forest at length. The aspects of the historic setting that are of special interest to the Project area are summarized below.

- **Early Exploration and Settlement.** Early European travelers through or near the western end of the Project area included Gabriel Moraga and a group of Spanish explorers in 1806–1808, and fur trappers and explorers in the 1820s. Jedediah Smith led a group of trappers along the edge of the foothills to the American River in search of a pass over the Sierra Nevada in 1826 (Flint et al. 2000). Kit Carson and John C. Fremont crossed the mountains near Lake Tahoe and descended to Sutter's Fort along the South Fork of the American River in 1844. During the early 1850s, El Dorado County had one of the largest populations in the state, as miners, agriculturalists, loggers, and merchants all settled in the area. Abandoned wagon roads, ditches, flumes, and homesteads testify to the density and intensity of mining usage and support services and industries, such as local agriculture and ranches that remained after the miners left. Advances in mining technology inspired a second mining boom in 1890, but this activity was short-lived.

- **Mining.** A number of historic mining districts, including Folsom, Shingle Springs, Placerville, Pacific, and White Rock (Clark 1992) can be found along the U.S. 50 corridor west of the Project area. An elaborate network of ditches and flumes was constructed beginning in the mid-19th century to provide power for miners. As the call for hydraulic power increased, so did the size of the ditches, providing water first for placer mining and later for the region's agriculture. This water conveyance infrastructure laid the groundwork for later irrigation districts and hydroelectric power.

- **Ranching.** Ranching and cattle and sheep grazing in the Sierra Nevada began during the Gold Rush to supply miners, and continued to supply travelers as well as shipping to local towns even as the Gold Rush began to die down. By the 1880s, fruit orchards covered the foothills. Grazing became one of the biggest industries in Placer County and several neighboring counties in the 1870s. The foothills and Sierra Nevada offered an advantage to cattlemen in that the areas were unsettled, so there was little competition for the land. Sheepherders quickly followed, including numbers of Basques who carved figures that can still be seen on aspen trees today (Supernowicz 1996).

- **Lumbering.** Lumbering operations in the region began in 1849 at Sutter's Mill. Logging became more intense to support mining-related development during the

Gold Rush, resulting in substantial changes to the forest as the demand for wood products escalated. A large portion of the early logging in El Dorado County, including within ENF, began in the early 1890s as the American River Land & Lumber Company, which eventually became the Michigan-California Lumber Company (Palmer et al. 1994). In the 1930s and 1940s, a recession hit the timber industry; for example, operations of the Michigan-California Lumber Company ceased in 1951 (Polkinghorn 1966). Still, the postwar boom and new access to international markets quickly saw the resumption of extensive activity in ENF and other forests of the Sierra Nevada.

- **Water Development.** Water was needed for mining activities. After the ditch systems had been established, temporary dams were constructed by miners, while more permanent dams for hydroelectric power were built starting in the 1870s. This dam construction progressed, with larger dams and more modern construction methods to keep up with population growth. Hydroelectric development has intensified considerably since then, resulting in a broad network of facilities. The current Project is a direct result of that 20th century expansion.

- **Forest Service Administration.** The depletion of timber resources by the late 19th century contributed to the enactment of the Forest Reserve Act in 1891, which in turn led to the establishment of the Stanislaus and Lake Tahoe forest reserves. Because of these forest reserves' unwieldy sizes and management difficulties, Eldorado National Forest was created in 1910 from portions of the Stanislaus and Lake Tahoe forests. In the 1930s, men from the Civilian Conservation Corps carried out extensive projects in the forest, including firefighting and construction of ranger stations and fire lines (Supernowicz 1983).

- **Recreation.** Recreation became a main attraction to the area as early as the 1920s. Campers, hunters, and fishermen enjoyed the mountains and wildlife. Bootleggers also used the forest extensively in the 1920s, keeping forest rangers busy looking for illegal stills. The Project area continues to be used extensively and intensively by recreationalists, with campers, hikers, fishermen, and off-road-vehicle enthusiasts enjoying the natural resources available in the TNF and ENF.

Cultural Resource Investigations

Archaeological surveys of the region began in the 1940s, although they intensified after federal legislation to protect cultural resources was enacted in the 1960s. These surveys have been conducted by ENF personnel, and by private cultural resources management companies, generally in anticipation of timber sales or before large-scale public works projects such as dam construction. Most of the previously recorded sites consist of prehistoric flaked stone scatters; isolated bedrock milling stations; multi-constituent sites; historic homesteads; the remains of railroad logging grades and camps; and ditches, dams, and other features associated with mining and water conveyance.

AB 52 Consultation

PCWA initiated formal AB 52 consultation via a letter dated February 16, 2018 with the United Auburn Indian Community (UAIC). PCWA and UAIC held a call on March 28, 2018 to discuss the Proposed Project pursuant to AB 52. Because there are no ground disturbing activities associated with the Proposed Project, and the seeding agent used is not soluble in water and is nontoxic, UAIC determined the project does not have the potential to affect Tribal Cultural Resources (TCR's) and did not wish to consult further on the Proposed Project pursuant to AB 52.

3.5.2 Discussion of Impacts

a, b) **Less than Significant.** The Proposed Project would not require ground disturbance (e.g., grading, excavation). To ensure that the Project's cloud seeding would create a weather pattern within the range of normal variability for the region, PCWA would implement suspension criteria to reduce potential for increased erosion. Further, PCWA would coordinate with fire personnel regarding burn scar zones that could create the potential for mudflows or severe erosion. Therefore, historical resources should not be affected by increased erosion as a result of the Proposed Project. This impact would be less than significant.

c) **No Impact.** The Proposed Project would not require ground disturbance (e.g., grading, excavation) or construction. In addition, the Project area is located in an area of Paleozoic and Mesozoic quartzite, schist, and minor amounts of crystalline limestone and dolomite and partially within Mesozoic (plutonic) granitic rocks. These formations do not contain fossils. No impact would occur.

d) **Less than Significant.** The Proposed Project would not require ground disturbance (e.g., grading, excavation) and therefore would not result in the discovery or disturbance of human remains.

e) **No Impact.** PCWA consulted with the Native American Heritage Commission (NAHC) and local Native American groups pursuant to CEQA Section 21080.3, including amendments outlined in Assembly Bill (AB) 52. The consultation included contacting the local Native American tribes identified by the NAHC who expressed an interest in the Proposed Project pursuant to AB 52. The United Auburn Indian Community of the Auburn Rancheria (UAIC) responded to PCWA's AB 52 notification provided in Appendix C. Due to the lack of ground disturbance under the Proposed Project and that the seeding agent used is not soluble in water and nontoxic, UAIC indicated that the project does not appear to have the potential to impact TCRs (if present) and did not wish to consult further on the Proposed Project pursuant to AB 52.

In addition NAHC's search of the Sacred Lands file has not provided definitive evidence indicating that TCRs, as defined in PRC Section 21074, are present in the target area.

Furthermore, since the project does not involved ground disturbing activities, no impact to TCRs would occur.

3.6 GEOLOGY AND SOILS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

3.6.1 Environmental Setting

Geology

The Project area is located on the west slope of the northern Sierra Nevada. Originally beneath the ocean, the Sierra Nevada range was formed when the Pacific Plate was subducted beneath the North American Plate more than 200 million years ago (the Mesozoic Era). This massive pressure resulted in the uplift of the range and formed large intrusions of molten granitic rock (the granitic batholith). The range was later subject to additional faulting and volcanic activity during the Tertiary Period (approximately 50 million years ago), and to repeated glaciations during the Pleistocene ice ages. This province consists of Pliocene and older deposits that have been uplifted as a result of plate tectonics, granitic intrusion, and volcanic activity.

The Sierra Nevada geomorphic province is characterized by steep-sided hills and narrow, rocky stream channels. The mountainous topography is broken by the steep canyons of the American, Silver, and Rubicon rivers and their tributaries. Plateaus of generally moderate relief are located between these steep canyons.

Soils

The target area includes a wide variety of soil types because of the diversity of soil-forming characteristics in the region. Soils weathered from volcanic parent materials dominate the productive timber lands. Soils found below 4,500 feet are typically considered highly productive while the soils above 4,500 feet tend to be coarser in texture and shallower, thus reducing their productivity. At higher elevations, most soils have been removed by glacial action, leaving large expanses of glaciated rock outcrops with pockets of soils weathered from alluvium, glacial till and outwash, and granitic rock (USFS 1988).

Seismicity

The foothills of the Sierra Nevada are characterized by extremely low seismicity. According to the *Fault Activity Map of California*, no active faults have been identified in the target area (CGS 2010). In addition, no known earthquake faults have been identified in the target area, according to the most recent Alquist-Priolo Earthquake Fault Zoning Map (DOC 2017).

Shrink-Swell Potential

Shrink-swell potential is the potential for a soil's volume to change with a loss or gain in moisture; soils swell when wet and shrink when dry. If the shrink-swell potential is rated moderate to high, volume changes can eventually damage subsurface structures if the structures are not designed and constructed appropriately to resist the changing soil conditions. Soils with high clay content tend to be most affected by shrink and swell. The presence of a fluctuating, shallow groundwater table greatly enhances the potential for soil to undergo shrink and swell. Volume changes of expansive soils can result in the consolidation of soft clays after the water table drops or fill is placed.

3.6.2 Discussion of Impacts

a) Less than Significant. Based on a review of the most recent Alquist-Priolo Earthquake Fault Zoning Map and the Fault Activity Map of California, the target area does not include any known earthquake faults. Although earthquakes have occurred in the northern Sierra Nevada in the past, they have been of low magnitude.

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining or basement walls and underground pipelines, and slope instability. Factors determining liquefaction potential are the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands, peat deposits, and younger Holocene-age sediments are susceptible to liquefaction, while older, well-consolidated deposits generally are stable under the influence of seismic ground shaking.

The Proposed Project would result in higher amounts of snowfall and snowmelt across the target area and could cause a small increment of additional groundwater infiltration, particularly adjacent to streams and rivers that occasionally experience increased flows. However, to ensure that the Project's cloud seeding would create a weather pattern remaining within the range of normal variability for the region, PCWA would estimate the seasonal water supply forecast, based on historic data from 1990 to the present. These data would be used to determine whether to continue cloud seeding. Cloud seeding suspension criteria would be applied in conditions that could increase the potential for hazards such as liquefaction. For example, cloud seeding would be suspended if the February 1 snowmelt forecast were to indicate that snowmelt runoff would be at or greater than the 25 percent exceedance level (e.g., the April through July runoff to MFP reservoirs would equal or exceed the wettest 25 percent of years based on the period of record).

Further, depth to groundwater is only one factor that contributes to liquefaction. The area also must have soils susceptible to liquefaction and must be subject to seismic events. Because the target area does not include any known earthquake faults, the seismic shaking necessary to cause liquefaction would be highly unusual. Also, the areas directly adjacent to streams and rivers typically do not include structures that could be affected by liquefaction, particularly in the target area. Therefore, the potential slight increase in groundwater infiltration associated with additional snowfall and snowmelt in any given year would not likely contribute to seismic-related ground failure, including liquefaction, and would not expose people or structures to the risk of loss, injury, or death associated with liquefaction.

Most landslides are triggered or accelerated during very wet winter seasons or storms characterized by flooding along streams and rivers. During these events, however, PCWA would suspend cloud seeding because of flood hazard concerns. Unstable slopes that are prone to

landslide failure would likely fail during major rainfall events or heavy rainfall seasons unaffected by cloud seeding activities. The Proposed Project is intended to enhance snowfall rather than rainfall during smaller storm events when flooding and damage to downstream hydroelectric facilities is not a risk. Cloud seeding operations would cease during heavy precipitation events, consistent with PCWA's suspension criteria. These criteria would also preclude cloud seeding in burn areas that are more susceptible to landslides. Therefore, the increase in snowfall and snowmelt across the target area would not be expected to contribute to landslides and would not expose people or structures to the risk of loss, injury, or death associated with landslides.

There are no physical components of the Proposed Project that would affect ground rupture, significant seismic shaking, ground failure, or liquefaction. If any of these were to occur, the event would not be expected to result in the exposure of people or structures to the risk of loss, injury, or death, because no structures are associated with the Project.

Based on the low risk for ground rupture, significant seismic shaking, ground failure, and liquefaction and the lack of physical components, the Proposed Project is unlikely to result in loss, injury, or death. Therefore, this impact would be less than significant.

b) **Less than Significant.** The Proposed Project would result in higher amounts of snowfall and snowmelt across the target area and could cause a small increment of additional soil erosion and topsoil loss associated with an occasional increase in stream and river flows. However, the target area is subject to major winter storms and their associated erosive forces. The Project's incremental contribution to this additional soil erosion from snowmelt would be less than occurs in years with heavy storms and major snow accumulation. In those years, PCWA would implement the program's suspension criteria and would curtail cloud seeding that could result in high flows and the ensuing substantial erosion, including in burn areas.

The percentage increases in precipitation from cloud seeding are much smaller than the interannual variability associated with natural precipitation. Any incremental increases in flows would occur in different areas at different times with each seeded storm event, resulting in an overall increase in the long-term average annual flows of area streams and rivers. Although some increase in erosion and topsoil loss would be expected with the higher streamflows induced by cloud seeding, these effects are not anticipated to be substantial. This conclusion has been reached because cloud seeding efforts are and would be intermittent (not all storms are or would be seeded); because such efforts increase snowfall only incrementally in the long term; and because most erosion in rivers and streams occurs during flood events when cloud seeding operations would be suspended.

In addition, the Proposed Project would not require any ground disturbance that would result in substantial soil erosion or the loss of topsoil. This impact would be less than significant.

c) **No Impact.** The Proposed Project would not result in direct land disturbance. Therefore, the Project would not be expected to contribute to on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. No impact would occur.

d) **No Impact**. Expansive soils can shrink or swell as a result of moisture change. Over time, in the absence of proper design and construction, these volume changes can damage building foundations, underground utilities, and other subsurface facilities and infrastructure. The increased snowfall and snowmelt resulting from the Proposed Project would not have substantial effects related to expansive soils because the increased precipitation and runoff would occur in the winter and spring, when soils in the target area are already saturated. The Proposed Project would not result in direct land disturbance and no project related impacts would occur on expansive soils. No impact would occur.

e) **No Impact.** The Proposed Project does not involve the provision of wastewater service, use of septic tanks, or disposal of wastewater. Therefore, no impact would occur.

3.7 GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

3.7.1 Environmental Setting

"Global climate change" is the common term used to describe an increase in the average temperature of the Earth's atmosphere and oceans, and its projected continuation. The causes of global climate change have been linked to both natural processes and human actions. According to the Intergovernmental Panel on Climate Change (IPCC), increasing greenhouse gas concentrations resulting from human activity, such as fossil fuel combustion and deforestation without adequate revegetation, have been largely responsible for human-induced global warming (IPCC 2013).

Increases in atmospheric GHG concentrations reduce the amount of solar radiation reflected back into space, intensifying the natural "greenhouse effect" and resulting in an increase in global average temperatures. The most common GHGs resulting from human activity are carbon dioxide, methane, and nitrous oxide. The IPCC and AB 32 also define GHGs to include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Climate change is a complex phenomenon that has the potential to alter local climatic patterns and meteorology. Increases in anthropogenic GHG emissions have been unequivocally linked to recent warming and climate shifts. Modeling indicates that climate change will result globally and regionally; still, uncertainty remains when researchers aim to precisely characterize local climate characteristics and predict how ecological and social systems will react locally to changes in the climate. Nonetheless, it is widely understood that substantial climate change is expected to occur in the future.

No current federal law specifically relates to climate change or the reduction of GHGs; however, California has adopted legislation addressing various aspects of climate change and mitigation of GHG emissions. Much of this legislation establishes a broad framework for the state's long-term GHG reduction and climate change adaptation program. Of particular importance is AB 32

(Chapter 488, Statutes of 2006), the California Global Warming Solutions Act of 2006, which has established a statewide goal to reduce GHG emissions to 1990 levels by 2020 and authorized a cap-and-trade program that applies to large stationary GHG sources. In September 2016, Governor Brown signed Senate Bill 32 (Chapter 249, Statutes of 2016) and AB 197 (Chapter 250, Statutes of 2016), which require California to reduce GHG emissions to at least 40 percent below 1990 levels by 2030 and invest in the communities most affected by climate change.

PCWA has a strong interest in the issues of climate change, carbon footprints, GHG emissions, and energy efficiency. In July 2009 PCWA prepared the *PCWA Energy and Greenhouse Gas Benchmark Study (*PCWA 2009*)*. The intent of the study was to gain a more thorough understanding of energy use by PCWA and the implications of climate change to PCWA. This study gave background information, benchmarked PCWA's energy use, inventoried GHG emissions, and developed energy and GHG emissions options. Since that time, PCWA has voluntarily reported its GHG emissions to The Climate Registry, a non-profit organization governed by U.S. states and Canadian provinces and territories. The Climate Registry designs and operates voluntary and compliance GHG reporting programs globally, and assists organizations in measuring, reporting, and verifying the carbon in their operations in order to manage and reduce it.

Thresholds of Significance

EDCAPCD regulates local air quality and air quality sources in El Dorado County. EDCAPCD has not established thresholds of significance for GHG emissions. As discussed in Section 3.3, "Air Quality," PCAPCD has primary responsibility for air quality management in Placer County. PCAPCD has developed specific thresholds of significance for the analysis of GHG emissions in CEQA documents. According to PCAPCD, if total GHG emissions would be less than 1,100 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year, the contribution of the Proposed Project could be considered less than cumulatively considerable because it would be relatively small compared to the cumulative GHG emissions in Placer County. No further analysis of GHG emissions would be required. However, the Proposed Project would still be required to comply with state and local regulations such as building codes and energy efficiency standards. (PCAPCD 2017.)

3.7.2 Discussion of Impacts

a) **Less than Significant.** No construction or physical structures are associated with the Proposed Project; therefore, the Project would generate GHG emissions only from aircraft. Table 3-4 shows the Proposed Project's total estimated operational GHG emissions.

As shown in Table 3-4, annual aircraft operational emissions were estimated to be 79.47 $MTCO_2e$. The Proposed Project's total operational GHG emissions for a year would be much less than PCAPCD's threshold of significance of 1,100 $MTCO_2e$ per year. Thus, the impact of the Project's GHG emissions on the environment would be less than significant.

Table 3-4. Annual Greenhouse Gas Emissions during Operation of the Proposed Project

Emissions Source	Total Emissions ($MTCO_2e$)[1]
Aircraft	79.47
PCAPCD Operational Threshold ($MTCO_2e$/year)	1,100.0

Notes: $MTCO_2e$ = metric tons carbon dioxide equivalent; PCAPCD = Placer County Air Pollution Control District

[1] Emissions are rounded to the nearest tenth. Totals are approximate due to rounding.

Source: Modeled by AECOM in 2017

b) **Less than Significant.** PCAPCD has not yet adopted a qualified plan, policy, or regulation to reduce GHG emissions. Therefore, the most applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions is AB 32, which codified the state's GHG emissions reduction targets for the future. ARB adopted the AB 32 Scoping Plan as a framework for achieving AB 32. The Scoping Plan outlines a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. These strategies are geared toward sectors and activities that generate significant amounts of GHGs. For example, the majority of measures address buildings, energy usage, waste and wastewater generation, goods movement, on-road transportation, water usage, and gases with high global warming potential. Activities associated with the Proposed Project are not considered by the AB 32 Scoping Plan to have a high potential to emit GHGs. The intent, purpose, and function of the Proposed Project align with the goals of ARB's AB 32 Scoping Plan. The Proposed Project would increase snowfall through cloud seeding, snowmelt runoff to MFP reservoirs, and subsequent hydropower generation. Additionally, the Project would be consistent with measures related to the AB 32 Scoping Plan, such as the Renewable Portfolio Standard and investments in renewable energy. None of the AB 32 reduction strategies are applicable to the Proposed Project. Therefore, the impact of the Proposed Project related to a potential conflict with an applicable GHG plan would be less than significant.

3.8 HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

3.8.1 Environmental Setting

A "hazardous material" is a substance or combination of substances that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may pose a potential hazard to human health or the environment when handled improperly. Within typical construction sites, materials that could be considered hazardous may include fuels, motor oil, grease, various lubricants, solvents, soldering equipment, and glues.

The Hazardous Waste and Substances Sites List, also known as the Cortese List (Government Code Section 65962.5), is a planning document used by the State of California and its various local agencies and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. The list, or a site's presence on the list, has bearing on the local permitting process and on compliance with CEQA.

Wildland fires represent a substantial threat in the Project area, particularly during the hot, dry summer months. The California Department of Forestry and Fire Protection (CAL FIRE) has established a system to classify fire hazards as Moderate, High, or Very High. This fire hazard classification system accounts for fuel availability, topography, and climate (e.g., temperature and the potential for strong winds). The majority of the target area is within areas designated as High or Very High fire hazard severity zones (CAL FIRE 2007).

El Dorado County has two primary airports, Placerville Airport and Georgetown Airport. Several smaller airports are located in the western portion of the county: Swansboro Country Airport northwest of Camino, Dubey Airport northeast of Coloma, and Perryman Airport southwest of Camino. Lake Tahoe Airport is located in the city of South Lake Tahoe. Placer County has three smaller airports used by private planes, helicopters, and small jets:

- Lincoln Airport, in the valley near I-80 and north on SR 65
- Auburn Airport, in the Sierra Nevada foothills near I-80
- Truckee-Tahoe Airport, on SR 267 near I-80, 20 minutes from Lake Tahoe

Potential hazards and associated impacts related to emissions of toxic air contaminants are discussed in Section 3.3, "Air Quality."

3.8.2 Discussion of Impacts

a) **Less than Significant.** The Proposed Project would not include the routine transportation, use, or disposal of hazardous materials that could create a significant hazard to the public. PCWA is not proposing to store or use hazardous materials at or above regulatory threshold amounts at any Project site; therefore, PCWA is not currently planning to prepare a hazardous materials business plan and file it with Placer County Environmental Health Services.

PCWA's cloud seeding program would use small quantities of hazardous materials, including acetone, and fuels and lubricants. Silver iodide would be used as the seeding agent. Silver iodide would be stored in flares similar to the type used for emergency roadside flares.

Silver iodide is one of the most common nucleating materials used in cloud seeding, including projects in the Sierra Nevada (Cardno Entrix 2011). It is commonly used in photography and as an antiseptic. The crystalline structure of silver iodide closely resembles that of ice, and as such, it makes a very effective surrogate for ice as a nucleating agent in clouds.

Another reason that silver iodide is commonly used for cloud seeding is that it is practically insoluble in water; that is, it stays in the solid form rather than dissolving in water. This characteristic is essential to the success of cloud seeding, because if the nucleating agent were to dissolve in water, it would no longer be useful as a nucleation site for precipitation. In addition, by remaining in a solid form, the introduced silver iodide does not become biologically available (i.e., available for uptake) in the environment, and as such does not adversely affect human health or the environment (SMUD 2017).

As described in Section 2.0, "Project Description," several multiyear studies have been conducted on cloud seeding, including the geochemistry and toxicity of silver iodide. These studies are unanimous in their conclusion that silver iodide used in cloud seeding is practically insoluble; does not tend to dissociate to its component ions of silver and iodine; and is not biologically available in the aquatic environment, but instead remains in soils and sediments.

These studies are the basis for DWR's recommendation, in the 2009 California Water Plan Update, of weather modification by cloud seeding. Based on these comprehensive studies of the environmental effects of the use of silver iodide for cloud seeding, no evidence exists to show that it causes adverse effects on human health or the environment (Cardno Entrix 2011).

The potential for human ingestion of the silver iodide used for cloud seeding is low. The target area has no lands that are used for agriculture. Furthermore, as described in the Cardno Entrix review, human exposure to low doses of silver iodide does not have substantial health effects. Silver iodide has been used in nasal sprays, dental fillings, and eating utensils. The silver iodide tends to remain in solid form and would fall across the target area bound in snowflakes, then would run off into area streams at very low concentrations. As described above, in addition to being insoluble in water, which reduces the potential for exposure in drinking water, silver iodide tends to bind to solid media (soils and sediments), reducing its availability for uptake by plants. Therefore, any risk of exposure to silver iodide in food would be less than significant.

The cloud seeding flares would consist of a glaciogenic pyrotechnic composition glued into a paper tube, with the igniter held into the end and sealed with a plastic cap. The electronic igniter would be activated using the voltage supplied either from the ground-based, remotely controlled flare unit to the firing box or from the seeding aircraft. When activated, the flare

would burn for 3½ to 4 minutes. The flares may contain ammonium perchlorate, zinc powder, aluminum powder, silver iodide, copper iodide, and ammonium iodide. Burning a seeding flare would release approximately 16 grams of microscopic particles of silver iodide.

PCWA would be required to comply with existing regulations regarding hazardous materials. The purpose of these regulations is to protect the public health by improving the handling and transport of hazardous materials and ensuring a coordinated and rapid emergency response. The California Highway Patrol and Caltrans enforce regulations related to the transportation of hazardous materials on local roadways, and the California Department of Toxic Substances Control regulates the use of these materials, as outlined in Title 22 of the California Code of Regulations. PCWA and its contractors would be required to comply with the California Environmental Protection Agency's Unified Program (e.g., hazardous materials release response plans and inventories, California Uniform Fire Code hazardous materials management plans and inventories). Such compliance would reduce the potential for an accidental release of hazardous materials during installation and operation of the cloud nucleating generators.

The Proposed Project would comply with all relevant federal, state, and local statutes and regulations related to transport, use, or disposal of hazardous materials. Therefore, the Project would not be expected to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. This impact would be less than significant.

b) **Less than Significant.** During aerial operations, a release of hazardous materials would be expected only in the event of an airplane accident. However, such an event would be highly unusual. The pilots for PCWA's consultant are trained before any project regarding weather recognition, proper seeding procedures, flight in icing conditions, crew coordination, and flight safety and judgment. Therefore, the Proposed Project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment. This impact would be less than significant.

c) **Less than Significant.** The ground-based portion of the proposed aerial operations would occur entirely at existing airports. Therefore, the potential for risks related to emissions or handling of hazardous materials within one-quarter mile of an existing or proposed school during cloud seeding would be remote. This impact would be less than significant.

d) **No Impact.** No ground disturbance is associated with the Proposed Project. The ground-based portion of the proposed aerial operations would occur entirely at existing airports. Therefore, the Proposed Project would not create a significant hazard to the public or the environment related to a listed hazardous materials site. No impact would occur.

e) **No Impact.** For the proposed aerial cloud seeding, the airplanes would use public airports for flight preparation, takeoff, and landing. However, these uses would not be expected to create an unusual hazard for people residing or working in the area of the airport. Therefore, no impact would occur.

f) **No Impact.** As described under question e), the airplanes would use public airports. These uses would not be expected to create an unusual hazard for people residing or working in the area of the airport. Therefore, no impact would occur.

g) **No Impact.** The Proposed Project would result in higher amounts of snowfall across the target area. Increased snowfall could increase the time necessary to remove snow from roadways, which could delay emergency vehicle access and evacuations. However, the area is subject to major winter storms and the associated delays in roadway snow removal. The Proposed Project's incremental contribution to the time necessary to remove snow from roadways would be less than occurs in years with heavy storms and major snow accumulation. In those years, PCWA would implement the program's suspension criteria and would curtail cloud seeding that could cause large amounts of snowfall that could delay snow removal from roadways.

The percentage increases in precipitation from the Proposed Project would be much smaller than the interannual variability associated with natural precipitation. Some increase in the time necessary to remove snow from roadways would be expected with the higher snowfall induced by cloud seeding; however, these effects would not be substantial. This conclusion has been reached because cloud seeding efforts are and would be intermittent (not all storms are or would be seeded); because cloud seeding efforts increase snowfall only incrementally in the long term; and because delays in road clearing are most pronounced during large storm events, when cloud seeding operations would be suspended.

The Proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, no impact would occur.

h) **No Impact.** The flare systems used for the aerial cloud seeding component would be attached to planes and would only be released during winter storm conditions. Therefore, they would have no effect related to wildland fires.

Silver iodide nuclei would be generated using flares. The flares would be similar to roadside flares, consisting of a paper tube with an igniter at the end sealed with a plastic cap. The transport, storage, and use of these flare systems would be required to comply with all applicable federal, state, and local ordinances and design standards.

Operation would not occur until sufficient rainfall has occurred to reduce the local risk of wildfires. Because the flare systems would be operated only during wet-weather conditions in the winter season, they would not be expected to pose a wildfire risk.

Therefore, the Proposed Project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. No impact would occur.

3.9 HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

3.9.1 Environmental Setting

The Proposed Project is located in the upper American River watershed. Existing water quality objectives for physical, chemical, and bacterial constituents are established in the *Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan* (Basin Plan) (Central Valley RWQCB 2016); "Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California" (65 *Federal Register* [FR] 31682, May 18, 2000), and the "Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants" (57 FR 60848, December 22, 1992). The Basin Plan includes water quality objectives established by the SWRCB for waters in the Upper American River watershed. Water quality in the target area reservoirs and waterways is generally high and meets applicable water standards and objectives.

3.9.2 Discussion of Impacts

a) **No Impact.** The Project would have only minimal effects on water quality and would not violate water quality standards or waste discharge requirements (WDRs). As described in Chapter 2.0, "Project Description," the cloud seeding program would disperse small quantities of silver iodide particles. The particles would initially be contained the snowpack, but would then be transported downgradient as overland runoff and into streams and reservoirs as part of snowmelt. Concerns regarding the potential impacts of silver on water quality are limited to dissolved silver. However, silver iodide is a salt with very low water solubility compared with other silver salts (e.g., silver nitrate) and it has low toxicity. Therefore, silver iodide has not been a regulatory priority.

Neither EPA nor the State of California has developed water quality standards or criteria for silver iodide. EPA develops ambient water quality criteria to protect aquatic life (EPA 2016); however, the water quality criteria developed for silver (EPA 1980) are not for silver iodide but for silver ions (Ag+), which occur in the environment as a result of

industrial discharges. In California, the Porter-Cologne Water Quality Control Act requires the SWRCB and RWQCBs to develop water quality policies, plans, and objectives to protect state waters. However, no water quality standards or criteria are available for silver iodide, and silver iodide is currently not discussed in the Basin Plan (Central Valley RWQCB 2016). In addition, the State of California's 303(d) report (Central Valley RWQCB 2014) does not identify water bodies in the target area as water quality limited for silver. Furthermore, the Basin Plan does not identify cloud seeding as an activity that can result in water quality problems and has not developed WDRs for cloud seeding that would limit the use of silver iodide. Both EPA's and the State of California's water quality standards note that the bioavailability of silver ions in freshwater is diminished by the presence of dissolved minerals such as chloride, carbonate, and sulfide ions (hardness), and by particulates and dissolved carbon. Thus, even if a portion of the silver iodide used in cloud seeding were present as silver ions, its bioavailability would be reduced by these naturally occurring water quality parameters. Silver iodide has not been found to have harmful effects on the environment.

Overall, the Project would not violate water quality standards or WDRs because no federal or state standards or WDRs exist for silver iodide, and because silver iodide is not soluble in water and would not form silver ions. Therefore, no water quality standards or WDRs would be violated. No impact would occur.

b) **No Impact.** The Proposed Project would not use groundwater, introduce impervious surfaces, or redirect surface waters; therefore, it would not deplete groundwater supplies or interfere with groundwater recharge. Rather, the Project would increase precipitation, snowmelt, overland runoff, and the amount of water reaching downstream waterways and reservoirs. This would likely result in a beneficial environmental effect on groundwater recharge and groundwater elevations in the Central Valley, where groundwater elevations have declined. Therefore, the Project's additional precipitation would have no impact on groundwater supplies and could have a beneficial effect by promoting groundwater recharge.

c) **Less than Significant.** The Proposed Project would not involve grading or construction of structures that would alter the existing drainage patterns of the target area, and would not alter the course of any river or stream. The Proposed Project would result in increased snowfall and snowmelt across the target area and could result in a small increment of additional soil erosion. However, the Project would occur in an area that is subject to major winter storms, including rain, snow, and rain following snow (i.e., rain-on-snow), and that is frequently exposed to these erosive forces. Any incremental erosion caused by snowmelt occurring because of the Project would be less than occurs in years with heavy storms and major snow accumulation. In these years, PCWA would implement the program's suspension criteria and would curtail cloud seeding that could result in high flows and extreme erosion, including erosion in burn areas. Therefore, snowfall and snowmelt resulting directly from cloud seeding would not result in

substantial on- or off-site erosion and its erosive effects on the target area, including rivers and streams. This impact would be less than significant.

d) **Less than Significant.** The Proposed Project would not involve grading or construction of structures that would alter the target area's existing drainage patterns or alter the course of any river or stream. The Project would result in increased snowfall and snowmelt across the target area and could result in a small increment of additional localized flooding. However, the Project would occur in an area that is subject to major winter storms, including rain, snow, and rain-on-snow events, and is frequently exposed to high flows and high water levels. The rivers and streams in the area occur in rugged terrain, and many are located in deep canyons with channels composed of boulders and exposed bedrock. These waterways quickly pass high flows to downstream reservoirs. These impoundments have dams that release increasing amounts of water as water levels rise. Farther downstream, flooding is controlled by Folsom Lake and Folsom Dam, which are operated by the U.S. Army Corps of Engineers for flood control. In addition, flood control for the Sacramento area is provided by miles of levees along the Sacramento and American rivers. Many of these levees have been upgraded by the Sacramento Area Flood Control Agency and certified by the U.S. Army Corps of Engineers to have lowered flood risks.

Overall, any incremental flooding caused by snowmelt occurring because of the Project would be less than occurs in years with heavy storms and major snow accumulation. In these years, PCWA would implement the program's suspension criteria and would curtail cloud seeding that could contribute to high streamflows and downstream flooding. As described in Chapter 2.0, "Project Description," the meteorologist would monitor special circumstances such as flood potential based on NWS flash-flood warnings. Therefore, snowfall and snowmelt resulting directly from cloud seeding would not result in substantial flooding. The impact related to potential for flooding in the target area or downstream in the American River and urban areas would be less than significant.

e) **Less than Significant.** The Proposed Project would result in increased snowfall and snowmelt across the expanded target area. Only a small percentage of the expanded target area consists of towns, commercial areas, and highway surfaces, and only a small percentage of the snowfall induced directly by Project cloud seeding would fall directly in these areas and create runoff. Furthermore, most stormwater generated in these areas is not handled by stormwater drainage systems, but by sloped roadway shoulders that promote overland runoff and local infiltration.

The Proposed Project would be designed to produce snow that would not immediately produce runoff. The resulting overland flow would be attenuated by the forest vegetative cover that dominates the target area. If there were a risk that a storm could produce rain, or rain-on-snow that could result in high flows, PCWA would implement

the program's suspension criteria and would curtail cloud seeding that could result in high flows, including stormwater flows.

In addition, the Proposed Project would not create substantial additional sources of polluted runoff. The Project would produce snowfall and snowmelt containing silver iodide particles. Any solvents used to dissolve or vaporize the silver iodide (e.g., acetone) would be completely combusted.

The Proposed Project would be designed to produce snowfall, and not rainfall resulting in stormwater. PCWA intends to ensure that the Project would create a weather pattern that would remain within the range of normal variability for the region, and would use predetermined criteria to determine when the program should be curtailed or suspended. Snowfall would occur in forested areas, not in urbanized areas served by stormwater drainage systems. Therefore, any impacts on the capacity of existing or planned stormwater drainage systems, or from events that could introduce substantial additional sources of polluted runoff, would be less than significant.

f) **No Impact.** The Proposed Project would not require grading or excavation or any substantial ground disturbance. In addition, the Project would not require any wetland fill or any industrial discharges, and therefore would not require any federal or state wetland or discharge permits. As described and evaluated above, the Project would not result in substantial erosion or violate any water quality standards or WDRs. Erosion in burned areas could produce runoff containing ash; however, this occurs under existing conditions, and the Project's suspension criteria could limit the amount of snow and runoff to less than occurs in years with heavy snow. Therefore, the potential water quality effects of the Project were addressed in questions a), c), and e) above, and the Project would not otherwise substantially degrade water quality. No impact would occur.

g) **No Impact.** The Proposed Project would not place any housing. Therefore, the Project would have no impact related to placing housing within a flood hazard area for a 100-year storm event.

h) **No Impact.** No housing or other structures would be constructed within a 100-year flood hazard area. Therefore, no impact would occur.

i) **No Impact.** The Proposed Project does not include alteration or construction work on a dam; would not expose people or structures to a significant risk of loss, injury, or death involving flooding; and would not result in the failure of a levee or dam. The Project would not include placement of housing or other occupied structures downstream of levees or dams. The Project would result in increased snowfall and snowmelt across the target area and could result in a small increment of additional localized flooding. However, the Project would occur in an area that is subject to major winter storms, including rain, snow, and rain-on-snow, and is frequently exposed to high flows and high water levels. The area's rivers and streams convey flow to the reservoirs in the MFP,

all of which have dams that were constructed to impound water for hydroelectric power generation. Any incremental runoff generated by snowmelt as a result of the Project would be less than occurs in years with heavy storms and major snow accumulation. In these wet years, PCWA would implement the program's suspension criteria and would curtail cloud seeding that could contribute to flooding. Given these factors, the additional increment of snowfall and snowmelt resulting directly from cloud seeding would not expose people or structures to a significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam. This impact would be less than significant.

j) **Less than Significant.** The Proposed Project is located in the Sierra Nevada and would not be subject to a seiche or tsunami. The Project area is generally not prone to mudslides. As described above regarding flooding and erosion issues, the Proposed Project would result in increased snowfall and snowmelt across the target area and could result in a small incremental risk of mudflows. However, the Project would occur in an area that is subject to major winter storms, including rain, snow, and rain-on-snow events, and mudflows can occur under these conditions. To minimize this risk, PCWA would implement suspension criteria, which would include measures to curtail cloud seeding when there is a risk of rainfall or a rain-on-snow event that could result in mass wasting, particularly in areas where fires have removed vegetation that protects topsoil. Therefore, the Proposed Project would have no impact related to inundation by seiche or tsunami, and the impact related to any risks of mudflow would be less than significant.

3.10 LAND USE AND PLANNING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

3.10.1 Environmental Setting

The target area covers portions of El Dorado County and Placer County. Much of the area is undeveloped. In addition, much of the Project area consists of high country and steep ravines and is undevelopable. There are no cities or census-designated places in the target area.

3.10.2 Discussion of Impacts

a) **No Impact.** The Proposed Project would not involve construction of permanent features. Therefore, the Project would not physically divide an established community. No impact would occur.

b) **No Impact.** The Proposed Project would not change any land uses and would not include other changes to the existing environment that could result in conflicts or inconsistencies with general plan policies, land use designations, or zoning ordinances of either of the counties in the target area.

c) **No Impact.** The Proposed Project is not located within the boundaries of an applicable habitat conservation plan. Placer County is in the process of approving the *Placer County Conservation Plan*, which includes a joint natural community conservation plan and habitat conservation plan to protect fish and wildlife and fulfill the requirements of the federal Endangered Species Act, the California Endangered Species Act, and the Natural Community Conservation Planning Act. The PCCP also includes a county aquatic

resources program to protect streams, wetlands, and other water resources and fulfill the requirements of the federal Clean Water Act and analogous state laws and regulations. However, the PCCP applies only to those portions of Placer County east and downslope of Auburn/SR 49 (excluding the cities of Auburn, Loomis, Rocklin, and Roseville). Therefore, the Proposed Project would not conflict with the provisions of the PCCP. No impact would occur.

3.11 MINERAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.11.1 Environmental Setting

An extensive range of extractive mineral resources can be found throughout Placer County, many of which have been mined since the Gold Rush. Gold, silver, chromium, tungsten, and aggregate are the principal mineral resources in the Project vicinity. According to the *El Dorado County General Plan*, the county's mineral resource areas are predominantly in the Placerville area (El Dorado County 2015). Only small areas at the western end of the Project area are identified as having mineral resources.

3.11.2 Discussion of Impacts

a) **No Impact.** The Proposed Project does not involve any mining activities, nor would any ground disturbance occur near active mining facilities. Implementing the Proposed Project would not result in the loss of any known mineral resources that are of value to the region or residents of the state. Therefore, no impact would occur.

b) **No Impact.** The Proposed Project does not involve any mining activities, nor would any ground disturbance occur near active mining facilities. Implementing the Proposed Project would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Therefore, no impact would occur.

3.12 NOISE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.12.1 Environmental Setting

Noise-sensitive land uses generally include those for which exposure would result in adverse effects (e.g., sleep disturbance, annoyance) and those for which quiet is an essential element of their intended purpose. Residences are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other land uses typically considered sensitive to noise include hospitals, convalescent facilities, parks, auditoriums, amphitheaters, public meeting rooms, motels, hotels, churches, schools, libraries, and other uses where low interior noise levels are essential.

The target area is located in Placer and El Dorado counties. The Project area is largely mountainous and unpopulated; however, there are several unincorporated communities in the area at lower elevations where potential noise-sensitive land uses include rural residences. Existing ambient noise sources in the Project area are primarily vehicular traffic on local roads. Given the rural nature of the areas where aircraft would seed storm clouds, ambient noise levels are expected to be quite low: at or below 50 A-weighted decibels (dBA) energy-equivalent noise level (L_{eq}), 45 dBA L_{eq}, and 40 dBA L_{eq} during the daytime, evening, and nighttime hours, respectively.

Aircraft Noise Impact Criteria

The FAA has identified threshold noise levels for community impacts from aircraft. Table 3-5 summarizes the criteria used to assess potential aircraft noise impacts. The criteria are presented in terms of the level of noise increase.

Table 3-5. Criteria for Determining Impacts of Changes in Aircraft Noise

DNL Noise Exposure Level	Increase in DNL with the Proposed Project
DNL 65 dB and higher	DNL 1.5 dB or higher
DNL 60–65 dB	DNL 3.0 dB or higher
DNL 45–60 dB	DNL 5.0 dB or greater

Notes:
dB = decibels; DNL = day-night noise level
The DNL metric represents noise as it occurs over a 24-hour period, with one important exception: DNL treats noise occurring at night differently from daytime noise. In determining DNL, the metric assumes that the A-weighted levels occurring at night (defined as 10 p.m. to 7 a.m.) are 10 dB louder than they actually are. This 10 dB increase is applied to account for the fact that there is a greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive because nighttime ambient noise is less than daytime ambient noise.
Source: FAA 2015

3.12.2 Discussion of Impacts

a) **Less than Significant.** Cloud seeding is typically done by small aircraft, such as a Cessna 340A. The aircraft would likely be based at a commercial airport, most likely McClellan Airfield in Sacramento. During selected storms, the plane would fly cloud seeding tracks upwind of the target area. To provide a conservative evaluation, this noise assessment assumes that the aircraft would fly up to 80 missions of 4.5 hours each, for a total of approximately 360 flight hours on an annual basis.

The measured average sound exposure level (SEL) for a Cessna 340 aircraft would be approximately 66 decibels (dB) (Port of Seattle/Sea-Tac Airport 2010). This aircraft has relatively small (75.5-inch-diameter) propellers to reduce noise and meet International Civil Aviation Organization Annex 16 noise requirements. Therefore, the average SEL for a Cessna 340A would be lower than 66 dB. Conservatively assuming a noise level of 66 dB SEL, the operating altitude, and 4.5 hours of operation per day, this activity would result in a day-night noise level of 43.7 day-night average noise level (L_{dn}) dB. This

estimate assumes an aircraft traveling over a 23-mile track every 5 minutes for 4.5 hours per day at 263 miles per hour. This level of noise is well below the FAA threshold noise levels. Therefore, this impact would be less than significant.

b) **No Impact.** Heavy truck traffic can generate groundborne vibration, which varies considerably depending on vehicle type, weight, and pavement conditions. No construction would be required for the Proposed Project. Thus, no groundborne vibration would result. No impact would occur.

c) **Less than Significant.** The Proposed Project's noise generation would be intermittent. The seeding aircraft would fly a total of up to 360 flight hours per year. However, this activity may not occur every year, and the noise levels during those times would be less than significant. Therefore, the Proposed Project would not introduce a permanent noise source and any increase in noise along existing roadways from pilot traffic would be negligible. Therefore, this impact would be less than significant.

d) **Less than Significant.** The Proposed Project would generate temporary aircraft noise. As discussed in the response to question a) above, the noise from cloud seeding aircraft (Cessna 340A aircraft) would originate at a commercial airport, most likely McClellan Airfield in Sacramento, and would be approximately 43.7 dB L_{dn}. This level of noise would not result in an increase of 5 dB or greater above the assumed ambient noise levels of 40–50 dB for rural areas (Table 3-7).

e) **No Impact.** The Proposed Project would require aircraft to take off and land; however, those noise impacts are addressed in the land use compatibility plan for the airport. Thus, the Proposed Project would not expose people residing or working in the Project area to excessive noise levels. No impact would occur.

f) **No Impact.** Several small private airstrips are located in the target area. However, the Proposed Project would not affect any airstrip operations (e.g., change flight schedules or flight paths) or cause noise in those areas because the cloud seeding aircraft would not use those airstrips. Thus, the Proposed Project would not expose people residing or working in the Project area to excessive noise levels. No impact would occur.

3.13 POPULATION AND HOUSING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.13.1 Environmental Setting

The target area covers portions of El Dorado County and Placer County. Much of the area is undeveloped national forest land. In addition, much of the Project area consists of high country and steep ravines and is undevelopable. There are no cities or census-designated places in the target area.

3.13.2 Discussion of Impacts

a) **No Impact.** The Proposed Project would not induce population growth either directly or indirectly, by creating new housing or employment opportunities or by extending roads or other infrastructure. The Project would not require any construction workers. No impact would occur.

b) **No Impact.** The Proposed Project would not involve ground disturbance or construction of permanent features. Therefore, the Project would not displace any existing housing or necessitate the construction of replacement housing elsewhere. No impact would occur.

c) **No Impact.** See the response to question b) above. The Proposed Project would not displace people or require the construction of housing elsewhere. No impact would occur.

3.14 PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
PUBLIC SERVICES.				
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☐	☒
b) Police protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

3.14.1 Environmental Setting

Fire protection in the Project area is provided by Eldorado National Forest, CAL FIRE, the Placer County Fire Department, and the El Dorado County Fire Protection District. Police protection is provided by the El Dorado County and Placer County sheriff's departments and ENF law enforcement officers. Public school service is provided by local school districts such as the El Dorado Union High School District and Pollock Pines Elementary School District. El Dorado County operates parks and recreational facilities near the Project area; however, most recreation areas lie within ENF.

3.14.2 Discussion of Impacts

a) **No Impact.** The Proposed Project would not generate population or entail development that would increase the demand for fire protection services and facilities such that constructing new or expanding existing fire protection services and facilities would be required to maintain response times and service ratios. In addition, the Project-related use of flares would be delayed until sufficient rainfall has occurred to reduce concerns about fire safety. No impact would occur.

b) **No Impact.** The Proposed Project would not increase the population in the Project area by creating new housing or employment opportunities that would increase demand for police protection. Therefore, the Project would not require constructing new or expanding existing police protection services and facilities to maintain response times or service ratios. No impact would occur.

c) **No Impact.** The Proposed Project would not increase the population of the Project area by creating new housing or employment opportunities. Therefore, the Project would not result in the need for new schools. No impact would occur.

d) **No Impact.** The Proposed Project would not increase the population of the Project area by creating new housing or employment opportunities. Therefore, the Project would not result in the need for new parks. Existing recreational opportunities in the Project area would remain (see Section 3.15, "Recreation," of this IS/ND). No impact would occur.

e) **No Impact.** The Proposed Project would not increase demands for other public facilities because it would not include new housing or business structures or indirectly increase housing or businesses in the Project vicinity. The Proposed Project would not alter the current demand for public services, and no additional services or changes to existing services would be required. Therefore, no impact would occur.

3.15 RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.15.1 Environmental Setting

The majority of the target area is forested and unpopulated. Recreation opportunities, including hiking, skiing, watersports, camping, and other outdoor activities are available throughout the Project area. Several ski parks exist within the target area.

3.15.2 Discussion of Impacts

a) **No Impact.** The Proposed Project does not include new housing or business structures that would result in an increase in the use of existing neighborhood and regional parks or other recreational facilities. Therefore, no impact would occur.

b) **No Impact.** The Proposed Project does not include recreational facilities that might adversely affect the environment. The Project would not include recreational facilities and would not create new housing or employment opportunities that would require constructing new recreational facilities or expanding existing facilities. Therefore, no impact would occur.

3.16 TRANSPORTATION/TRAFFIC

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

3.16.1 Environmental Setting

The Proposed Project would not use trucks or other vehicles on existing roadways, except to transport pilots to and from the airport. For aerial seeding, the aircraft used for cloud seeding would be based at a commercial airport, most likely McClellan Airfield in Sacramento. Contractor crew members would be on standby 24 hours per day, 7 days per week in Sacramento during Project periods, and would be available for flight within 120 minutes of identification of seedable conditions. The pilots would stand by at the Sacramento airport if conditions are slow to develop, and thus would be ready to launch at any time.

3.16.2 Discussion of Impacts

a) **Less than Significant.** Pilot trips would make a negligible contribution to local traffic volumes. Because of the very low number of Project trips, the Proposed Project would not affect local transportation modes or relevant components of the circulation system, such as intersections, streets, highways and freeways, pedestrian and bicycle paths, or mass transit. Therefore, the Proposed Project would not conflict with adopted applicable policies or plans related to the performance of the circulation system. This impact would be less than significant.

b) **Less than Significant.** As discussed in the response to question a) above, the number of Project-related vehicle/truck trips generated would represent a minimal temporary increase in traffic. Because peak traffic levels would be below applicable thresholds and would occur over a very short period, they would not degrade traffic operations along the roadways used by Project trucks and workers to access the site. Because the Project would generate very few trips, the Proposed Project would not conflict with any applicable congestion management programs (county, Caltrans, or regional transportation management plan) or other standards established by the relevant county congestion management agency for designed roads or highways. Therefore, this impact would be less than significant.

c) **No Impact.** The aircraft used for cloud seeding would be based at a commercial airport, most likely in McClellan Airfield in Sacramento. Project operation would incrementally increase the number of flights occurring during the annual six-month seeding period. The addition of approximately 80 trips during this six months would incrementally increase flight activity at the staging airport but would not alter air traffic patterns, or change air traffic locations as no buildings would be constructed as part of the project. The cloud seeding tracks and target area are located outside of the areas of influence of McClellan Airfield (SACOG 1999) and the Proposed Project would not result in substantial safety risks related to air traffic patterns. Therefore, no impact would occur.

d) **No Impact.** Because no ground disturbance or construction would occur, and minimal vehicle trips would be required, the Proposed Project would not substantially increase hazards due to a design feature or incompatible use, and would not construct

transportation facilities or result in road damage or related traffic hazards. Therefore, no impact would occur.

e) **No Impact.** Since the Proposed Project is strictly aerial, no truck trips would be generated, and emergency access would not be affected. Therefore, no impact would occur.

f) **No Impact.** The Proposed Project would not change the local circulation system or result in substantial increases in roadway traffic. Thus, the Project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, and would not decrease the performance or safety of such facilities. Therefore, no impact would occur.

3.17 UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒
h) Have a substantial adverse impact on energy consumption or conservation?	☐	☐	☒	☐

3.17.1 Environmental Setting

Water supply and wastewater treatment in El Dorado County are provided by several local agencies, including PCWA, El Dorado Irrigation District, and El Dorado County Water Agency. Most stormwater in the Project area is not handled by stormwater drainage systems. The stormwater drainage systems along U.S. 80 are designed to handle the high runoff rates that occur during winter storms. Commercial waste recycling and disposal are provided by private firms such as El Dorado Disposal Service or Recology Auburn Placer. The nearest large regional landfill is Sacramento County's Kiefer Landfill, located along SR 16.

3.17.2 Discussion of Impacts

a) **No Impact.** The Proposed Project does not include any uses that would generate wastewater or require a water supply. Thus, the Project would not exceed the wastewater treatment requirements of the applicable RWQCB. No impact would occur.

b) **No Impact.** The Proposed Project would not require or result in the construction of new or expanded water or wastewater treatment facilities. The Project would not require potable water; thus, no new or expanded water supplies or entitlements would be required as a result of the Project. No impact would occur.

c) **No Impact.** The Proposed Project would not require construction of permanent facilities that would generate stormwater runoff. The Project would not include any new housing or employment opportunities that would require new stormwater drainage facilities or expansion of existing facilities. Cloud seeding would produce additional snowfall in the target area; however, the increase would occur over a large area that is generally unpopulated and where the small communities in the area do not require stormwater collection systems. Therefore, the Proposed Project would not require or result in the construction of new stormwater drainage facilities or the expansion of existing facilities that would cause significant effects. For a more detailed discussion of the Project's potential stormwater impacts on water quality, see Section 3.9, "Hydrology and Water Quality." No impact would occur.

d) **No Impact.** As discussed in the responses to questions a) and b) above, the Proposed Project would not require any water supply and no water treatment or distribution facilities would be constructed. For these reasons, no new or expanded water supply entitlements would be needed. No impact would occur.

e) **No Impact.** As discussed in the responses to questions a) and b) above, the Proposed Project would not include any uses that would require wastewater treatment. Therefore, the Project would not affect the capacity of wastewater treatment providers that serve the area. No impact would occur.

f) **No Impact.** No construction would be required for the Proposed Project. The Project would not generate substantial debris or waste. Therefore, no impact would occur.

g) **No Impact.** As discussed in the responses to questions f) above, the Proposed Project would not generate substantial debris or waste. Any waste would be disposed of in compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, no impact would occur.

h) **Less than Significant.** The Proposed Project would not have a substantial impact on energy consumption or conservation. During the winter season, cloud seeding aircraft would consume aviation fuel. However, the Project would not result in a wasteful or inefficient use of energy. Overall, the Project would result in energy conservation by expanding PCWA's sources of renewable energy and would reduce GHG emissions. Therefore, the Proposed Project would not adversely affect energy resources or energy conservation. Furthermore, the Project would not result in an unnecessary or wasteful use of energy. Any impacts on base or peak energy demand would be less than significant.

3.18 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

3.18.1 Discussion of Impacts

a) **Less than Significant.** The Proposed Project would not require grading or excavation or the construction of new permanent structures. PCWA would conduct the program in a strategic manner (i.e., during selected storms) and in a way that would produce localized increases in snowfall. PCWA's approach would be to increase snowfall, but to curtail cloud seeding activities at times when continued cloud seeding could produce runoff volumes that could result in extreme erosion or flooding. Furthermore, the increased snowfall would occur in an area that is frequently subject to large winter storms with heavy snowfall, and the increased snowfall from cloud seeding would be less than occurs during years with the heaviest natural snowfall. Moreover, the

additional snowfall would generally result in beneficial effects on wetlands, because it would prolong inundation or saturation, and on other habitats, because the additional moisture would promote plant growth. The additional snowfall also would not have adverse effects on plants or wildlife, including eliminating a plant or animal community or causing a special-status fish or wildlife species to drop below self-sustaining levels. Because the Project would not result in ground disturbance it would not affect historic or archeological resources. The overall impact of the Proposed Project on the quality of the environment would be less than significant.

b) **Less than Significant.** Cloud seeding projects are currently conducted throughout the Sierra Nevada to enhance rainfall and snowpack. Thus, the geographical setting for evaluating the cumulative effects of cloud seeding is the Sierra Nevada region, including the watersheds of California rivers with cloud seeding programs that drain to the Central Valley. As described throughout this IS/ND, the environmental impacts of the Proposed Project would be less than significant or the Project would have no impact. This conclusion is supported by studies and literature reviews conducted by numerous agencies, including DWR as part of the *California Water Plan Update 2013* (DWR 2013).

CEQA requires that PCWA assess whether the Proposed Project's incremental effects would be significant when viewed in connection with the effects of other projects. However, there is no evidence that any of the effects of PCWA's program, which would be less than significant, could combine with the effects of other programs in adjacent watersheds or across the state. Based on the analysis presented in this IS/ND, the Proposed Project would not contribute incrementally to considerable environmental changes. Therefore, the potential cumulative effects of the Proposed Project on cultural resources would be less than cumulatively considerable, and for other resources no cumulative impact would occur and no further evaluation is required.

c) **Less than Significant.** The Proposed Project would not have substantial impacts on human beings. The Project would not result in substantial air pollutant emissions, risk of exposure to hazardous materials, or risks of flooding, and the techniques used to disperse cloud seeding materials would not result in substantial noise or traffic. Therefore, the Project would have no substantial adverse effects, either directly or indirectly, on human beings. Impacts would be less than significant.

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APPENDIX A

Middle Fork Precipitation Enhancement Project Emissions Analysis

Aircraft emissions calculations El Dorado Cloud Seeding

Existing Conditions (2013-2014 season data):

42	flights
2.5	hours per flight
343 bip flares used	
660 eject flares used	
3500	gallons of 100LL fuel used
BIP flare = 150g	
EJ flares = 20g	
plane used = Cessna 340A	
engine = TSIO-520	
453.592	grams/lb
96.71	hours of flight
0.718	Kg/L
3.78541	L/Gallons
37.22469238	fuel usage per hour

Project

80	flights
3	hrs per flight
8933.926171	gallons 100LL avgas fuel
	Scale up flares by 2.4x
	~823.2 BIP flares
	~1584 EJ flares
240	hours total flight

ROG emissions rate		12.1	g/Kg
Nox emissions rate TSIO-520-WB		1.17	g/Kg
CO emissions rate TSIO-520-WB		1299	g/Kg
PM total emissions rate TSIO-520-C		0.317	g/Kg
CO2 emission; rate		18.4	lbs/gallon

Note: ROG emissions based on hydrocarbon (HC) emission rate.

Existing Conditions

total weight of fuel used	9784.527768	kg											
ROG total emissions	118392.786	grams	261.0116272	lbs	2.6989104	lbs per hour emitted		6.747276062	lbs emitted per flight per day		283.39	lbs per season
NOx emissions	11447.89749	grams	25.23831436	lbs	0.260969	lbs per hour emitted		0.652422561	lbs emitted per flight per day		27.40	lbs per season
CO emissions	12710101.57	grams	28021.00031	lbs	289.74253	lbs per hour emitted		724.3563309	lbs emitted per flight per day		30,422.97	lbs per season
PM total emissions	3101.695302	grams	6.838073208	lbs	0.070707	lbs per hour emitted		0.17676748	lbs emitted per flight per day		7.42	lbs per season
CO2 emissions	66240	lbs of co2			684.93434	lbs per hour emitted		1712.335849	lbs emitted per flight per day		71,918.11	lbs per season

Project

total weight of fuel used	24281.73575	kg											
ROG total emissions	293809.0026	grams	647.7385019	lbs	2.6989104	lbs per hour emitted		8.096731274	lbs emitted per flight per day		647.74	lbs per season
NOx emissions	28409.63083	grams	62.63256589	lbs	0.260969	lbs per hour emitted		0.782907074	lbs emitted per flight per day		62.63	lbs per season
CO emissions	31541974.74	grams	69538.20777	lbs	289.74253	lbs per hour emitted		869.2275971	lbs emitted per flight per day		69,538.21	lbs per season
PM total emissions	7697.310233	grams	16.96967811	lbs	0.070707	lbs per hour emitted		0.212120976	lbs emitted per flight per day		16.97	lbs per season
CO2 emissions	164384.2415	lbs of co2			684.93434	lbs per hour emitted		2054.803019	lbs emitted per flight per day		164,384.24	lbs per season

Net Increase

	Net Increase Per Day	Net Increase Per Season	Net Change (MT)
ROG emissions	1.35	364.35	
NOx emissions	0.13	35.23	
CO emissions	144.87	39,115.24	
PM emissions	0.04	9.55	
CO2 emissions	342.47	92,466.14	42.07

*avgas sds came from http://www.shell.com.au/motorists/shell-fuels/msds-tds/_jcr_content/par/textimage_278c.stream/1468561712721/42cc39fc0b31146bc1c4d344c08422206521206f80d031b5f89f9b697c327c81/avgas-100ll-pds.pdf

*aviation fuel emisisosn came from https://www.nap.edu/catalog/24612/exhaust-emissions-from-in-use-general-aviation-aircraft

*https://www3.epa.gov/otaq/models/nonrdmdl/nonrdmdl2010/420r10015.pdf

*CO2 aviation fuel emissions rate, https://www.eia.gov/environment/emissions/co2_vol_mass.cfm

APPENDIX B

Database Searches

IPaC **U.S. Fish & Wildlife Service**

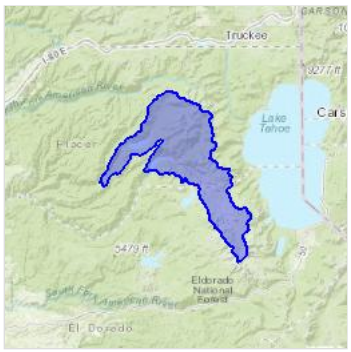
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

El Dorado and Placer counties, California



Local offices

Reno Fish And Wildlife Office

(775) 861-6300
(775) 861-6301

1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147

http://www.fws.gov/nevada/

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
North American Wolverine Gulo gulo luscus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
Sierra Nevada Yellow-legged Frog Rana sierrae There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/9529	Endangered

Fishes

NAME	STATUS
Cui-ui Chasmistes cujus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/456	Endangered
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Lahontan Cutthroat Trout Oncorhynchus clarkii henshawi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3964	Threatened
Steelhead Oncorhynchus (=Salmo) mykiss There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1007	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Sierra Nevada Yellow-legged Frog Rana sierrae https://ecos.fws.gov/ecp/species/9529#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are USFWS Birds of Conservation Concern that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the E-bird data mapping tool (year-round bird sightings by birders and the general public) and Breeding Bird Survey (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the E-bird Explore Data Tool.

NAME	BREEDING SEASON
Black Swift Cypseloides niger https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
California Spotted Owl Strix occidentalis occidentalis https://ecos.fws.gov/ecp/species/7266	Breeds Mar 10 to Jun 15
Calliope Hummingbird Stellula calliope https://ecos.fws.gov/ecp/species/9526	Breeds May 1 to Aug 15
Cassin's Finch Carpodacus cassinii https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Lewis's Woodpecker Melanerpes lewis https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30

Olive-sided Flycatcher Contopus cooperi https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Rufous Hummingbird selasphorus rufus https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Williamson's Sapsucker Sphyrapicus thyroideus https://ecos.fws.gov/ecp/species/8832	Breeds May 1 to Jul 31
Willow Flycatcher Empidonax traillii https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

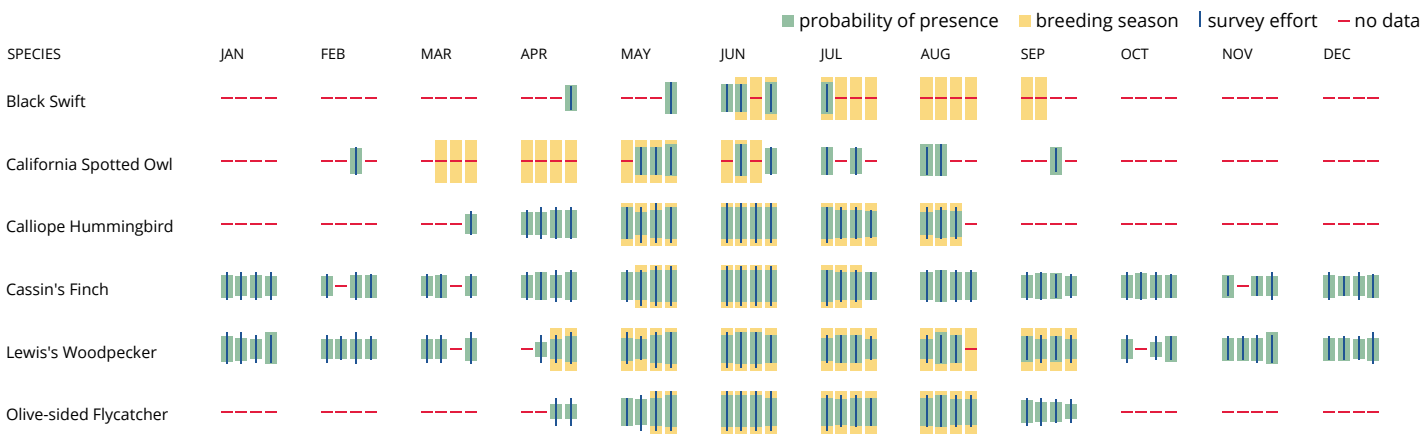
Breeding Season (▪)
Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

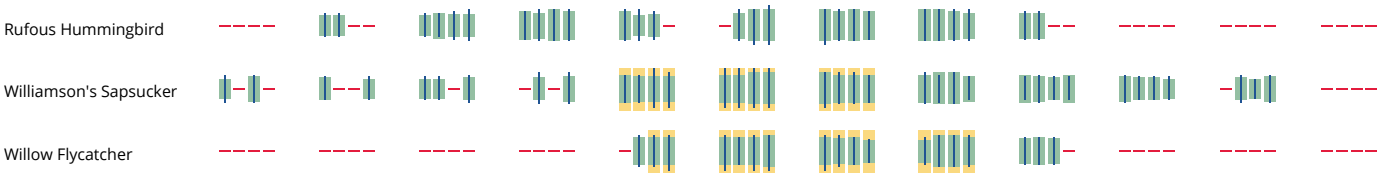
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the Endangered Species Act (ESA).

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER EMERGENT WETLAND
- PEMC
- PEMA
- PEMB
- PEMF
- PEMFh

FRESHWATER FORESTED/SHRUB WETLAND
- PSSC
- PSSA
- PFOA
- PFOC
- PSSB
- PSSCh

FRESHWATER POND
- PUBH
- PUBF
- PABH
- PABF
- PUBHh
- PUBHx

LAKE
- L1UBGh
- L1UBH
- L2USCh
- L1UBHh
- L2ABH
- L2USAh
- L2ABF

OTHER
- PUSC

RIVERINE
- R3USC
- R3UBH
- R4USC
- R3USA

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or

adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

CNPS California Native Plant Society

Plant List

Inventory of Rare and Endangered Plants

40 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3912014, 3912023, 3912015, 3912012, 3812083, 3812072, 3812082, 3912024 3912022 and 3912013;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank	Habitats	State Listing Status	Federal Listing Status
Allium sanbornii var. sanbornii	Sanborn's onion	Alliaceae	perennial bulbiferous herb	May-Sep	4.2	S4?	G3T4?	• Chaparral • Cismontane woodland • Lower montane coniferous forest		
Arabis rigidissima var. demota	Galena Creek rockcress	Brassicaceae	perennial herb	Jul-Aug	1B.2	S1	G3T3Q	• Broadleafed upland forest • Upper montane coniferous forest		
Artemisia tripartita ssp. tripartita	threetip sagebrush	Asteraceae	perennial shrub	Aug	2B.3	S2	G5T4T5	• Upper montane coniferous forest (openings)		
Astragalus austiniae	Austin's astragalus	Fabaceae	perennial herb	(May)Jul-Sep	1B.3	S2S3	G2G3	• Alpine boulder and rock field • Subalpine coniferous forest		
Astragalus whitneyi var. lenophyllus	woolly-leaved milk-vetch	Fabaceae	perennial herb	Jul-Aug	4.3	S4	G5T4	• Alpine boulder and rock field • Subalpine coniferous forest (rocky)		
Bolandra californica	Sierra bolandra	Saxifragaceae	perennial herb	Jun-Jul	4.3	S4	G4	• Lower montane coniferous forest • Upper montane coniferous forest		
Botrychium ascendens	upswept moonwort	Ophioglossaceae	perennial rhizomatous herb	Jul-Aug	2B.3	S2	G3G4	• Lower montane coniferous forest		

								• Meadows and seeps
Botrychium crenulatum	scalloped moonwort	Ophioglossaceae	perennial rhizomatous herb	Jun-Sep	2B.2	S3	G4	• Bogs and fens • Lower montane coniferous forest • Meadows and seeps • Marshes and swamps (freshwater) • Upper montane coniferous forest
Botrychium minganense	Mingan moonwort	Ophioglossaceae	perennial rhizomatous herb	Jul-Sep	2B.2	S3	G4G5	• Bogs and fens • Lower montane coniferous forest • Meadows and seeps (edges) • Upper montane coniferous forest
Botrychium montanum	western goblin	Ophioglossaceae	perennial rhizomatous herb	Jul-Sep	2B.1	S2	G3	• Lower montane coniferous forest • Meadows and seeps • Upper montane coniferous forest
Botrychium paradoxum	paradox moonwort	Ophioglossaceae	perennial rhizomatous herb	Aug	2B.1	S1	G3G4	• Alpine boulder and rock field (limestone and marble) • Upper montane coniferous forest (moist)
Bruchia bolanderi	Bolander's bruchia	Bruchianceae	moss		4.2	S3	G3G4	• Lower montane coniferous forest • Meadows and seeps • Upper montane coniferous forest
Carex davyi	Davy's sedge	Cyperaceae	perennial herb	May-Aug	1B.3	S3	G3	• Subalpine coniferous forest • Upper montane coniferous forest

Carex limosa	mud sedge	Cyperaceae	perennial rhizomatous herb	Jun-Aug	2B.2	S3	G5	• Bogs and fens • Lower montane coniferous forest • Meadows and seeps • Marshes and swamps • Upper montane coniferous forest
Ceanothus fresnensis	Fresno ceanothus	Rhamnaceae	perennial evergreen shrub	May-Jul	4.3	S4	G4	• Cismontane woodland (openings) • Lower montane coniferous forest
Chaenactis douglasii var. alpina	alpine dusty maidens	Asteraceae	perennial herb	Jul-Sep	2B.3	S2	G5T5	• Alpine boulder and rock field (granitic)
Chlorogalum grandiflorum	Red Hills soaproot	Agavaceae	perennial bulbiferous herb	May-Jun	1B.2	S3	G3	• Chaparral • Cismontane woodland • Lower montane coniferous forest
Claytonia megarhiza	fell-fields claytonia	Montiaceae	perennial herb	Jul-Sep	2B.3	S2	G5	• Alpine boulder and rock field • Subalpine coniferous forest (rocky or gravelly)
Epilobium oreganum	Oregon fireweed	Onagraceae	perennial herb	Jun-Sep	1B.2	S2	G2	• Bogs and fens • Lower montane coniferous forest • Meadows and seeps • Upper montane coniferous forest
Erigeron eatonii var. nevadincola	Nevada daisy	Asteraceae	perennial herb	May-Jul	2B.3	S2S3	G5T2T3	• Great Basin scrub • Lower montane coniferous forest • Pinyon and juniper woodland
Erigeron miser	starved daisy	Asteraceae	perennial herb	Jun-Oct	1B.3	S3?	G3?	• Upper montane coniferous forest (rocky)
	Donner	Polygonaceae	perennial	Jul-Sep	1B.2	S2	G5T2	• Meadows

Eriogonum umbellatum var. torreyanum	Pass buckwheat		herb					and seeps • Upper montane coniferous forest
Glyceria grandis	American manna grass	Poaceae	perennial rhizomatous herb	Jun-Aug	2B.3	S3	G5	• Bogs and fens • Meadows and seeps • Marshes and swamps (streambanks and lake margins)
Hackelia amethystina	amethyst stickseed	Boraginaceae	perennial herb	Jun-Jul(Aug)	4.3	S4	G4	• Lower montane coniferous forest • Meadows and seeps • Upper montane coniferous forest
Lewisia kelloggii ssp. hutchisonii	Hutchison's lewisia	Montiaceae	perennial herb	(Apr)May-Aug	3.2	S3	G3G4T3Q	• Upper montane coniferous forest
Lewisia kelloggii ssp. kelloggii	Kellogg's lewisia	Montiaceae	perennial herb	(Apr)May-Aug	3.2	S2S3	G3G4T2T3Q	• Upper montane coniferous forest
Lewisia longipetala	long-petaled lewisia	Montiaceae	perennial herb	Jul-Aug(Sep)	1B.3	S2	G2	• Alpine boulder and rock field • Subalpine coniferous forest (mesic, rocky)
Lewisia serrata	saw-toothed lewisia	Montiaceae	perennial herb	May-Jun	1B.1	S2	G2	• Broadleafed upland forest • Lower montane coniferous forest • Riparian forest
Ophioglossum pusillum	northern adder's-tongue	Ophioglossaceae	perennial rhizomatous herb	Jul	2B.2	S1	G5	• Meadows and seeps • Marshes and swamps (margins)
Phacelia stebbinsii	Stebbins' phacelia	Hydrophyllaceae	annual herb	May-Jul	1B.2	S3	G3	• Cismontane woodland • Lower montane coniferous forest • Meadows and seeps
Piperia colemanii	Coleman's rein orchid	Orchidaceae	perennial herb	Jun-Aug	4.3	S4	G4	• Chaparral • Lower montane

								coniferous forest	
Poa sierrae	Sierra blue grass	Poaceae	perennial rhizomatous herb	Apr-Jul	1B.3	S3	G3	• Lower montane coniferous forest	
Potamogeton epihydrus	Nuttall's ribbon-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	(Jun)Jul-Sep	2B.2	S2S3	G5	• Marshes and swamps (assorted shallow freshwater)	
Pseudostellaria sierrae	Sierra starwort	Caryophyllaceae	perennial rhizomatous herb	May-Aug	4.2	S3	G3G4	• Chaparral • Cismontane woodland • Lower montane coniferous forest • Upper montane coniferous forest	
Rhamnus alnifolia	alder buckthorn	Rhamnaceae	perennial deciduous shrub	May-Jul	2B.2	S3	G5	• Lower montane coniferous forest • Meadows and seeps • Riparian scrub • Upper montane coniferous forest	
Rorippa subumbellata	Tahoe yellow cress	Brassicaceae	perennial rhizomatous herb	May-Sep	1B.1	S1	G1	• Lower montane coniferous forest • Meadows and seeps	CE
Scutellaria galericulata	marsh skullcap	Lamiaceae	perennial rhizomatous herb	Jun-Sep	2B.2	S2	G5	• Lower montane coniferous forest • Meadows and seeps (mesic) • Marshes and swamps	
Silene occidentalis ssp. occidentalis	Western campion	Caryophyllaceae	perennial herb	Jun-Aug	4.3	S3	G4T3	• Chaparral • Lower montane coniferous forest • Upper montane coniferous forest	
Sphaeralcea munroana	Munro's desert mallow	Malvaceae	perennial herb	May-Jun	2B.2	S1	G4	• Great Basin scrub	
Viola tomentosa	felt-leaved violet	Violaceae	perennial herb	(Apr)May-Oct	4.2	S3	G3	• Lower montane coniferous	

forest
• Subalpine coniferous forest
• Upper montane coniferous forest

Suggested Citation

California Native Plant Society, Rare Plant Program. 2017. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 03 November 2017].

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The California Lichen Society

CNDDB_2017	CNDI	CNDDI	CNDDB_202	CNDI	CNDI	CNDI	CNDDB_2024	C	CNDI	ELMCODE__E	ELMCODE__S	ELMCODE__C
ABNKC12040	42	13736	27343	1	2	1	1/5 mile	P		ABNKC12040	Accipiter cooperii	Cooper's hawk
ABNKC12060	136	13243	26673	1	2	1	1/5 mile	P		ABNKC12060	Accipiter gentilis	northern goshawk
ABNKC12060	145	13244	26662	1	2	1	1 mile	P		ABNKC12060	Accipiter gentilis	northern goshawk
ABNKC12060	429	64484	64563	1	2	1	80 meters	P		ABNKC12060	Accipiter gentilis	northern goshawk
ABNKC12060	118	14094	26694	1	2	1	1 mile	P		ABNKC12060	Accipiter gentilis	northern goshawk
ABNKC12060	109	13446	26698	1	2	1	1 mile	P		ABNKC12060	Accipiter gentilis	northern goshawk
ABNKC12060	281	13679	26514	1	2	1	1/5 mile	P		ABNKC12060	Accipiter gentilis	northern goshawk
AAAAA01085	431	A1047	102608	1	2	1	1/10 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	428	A1043	102605	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	427	A1042	102604	8	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	426	A1041	102603	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	429	A1044	102606	5	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	423	A1037	102599	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	425	A1039	102601	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	424	A1038	102600	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	418	A1032	102592	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	422	A1035	102596	1	2	1	1/10 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	420	A1034	102594	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	421	A1262	102595	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	419	A1033	102593	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	417	A1012	102573	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	416	A1010	102571	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	415	A1009	102570	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	414	A1008	102569	4	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	413	A1007	102568	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	411	A1006	102566	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	409	A1004	102564	4	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	410	A1005	102565	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	408	A1003	102563	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	407	A1002	102562	3	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	406	A1001	102561	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	402	A0996	102557	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	403	A0997	102558	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	401	A0995	102556	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	404	A0998	102559	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	399	A0990	102552	3	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	400	A0994	102555	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	398	A0987	102548	13	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	397	A0986	102545	3	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	396	A0982	102544	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	394	A0980	102540	1	2	1	1/10 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	392	A0978	102538	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	393	A0979	102539	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	391	A0977	102537	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	389	A0975	102534	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander

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AAAAA01085	390	95703	102536	1	2	2	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	386	A0971	102530	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	384	A0967	102526	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	385	A0969	102528	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	383	A0966	102525	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	387	A0972	102531	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	382	A0964	102524	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	381	A0962	102522	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	380	A0960	102519	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	377	A0952	102512	1	2	1	1/10 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	379	A0956	102515	1	2	1	nonspecific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	378	A0954	102514	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	376	A0951	102510	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	375	A0947	102507	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	374	A0945	102505	1	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	373	A0943	102503	1	2	1	1/5 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	372	A0936	102495	3	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	371	95767	102493	1	2	2	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	370	A0932	102491	2	2	1	specific area	A			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	369	A0930	102490	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	368	A0928	102488	1	2	1	1/10 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	367	A0927	102487	1	2	1	1/10 mile	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AAAAA01085	365	A0924	102485	1	2	1	80 meters	P			Ambystoma macrodactylum sigillatum	southern long-toed salamander
AMAFA01013	4	30646	4274	1	2	1	1/5 mile	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	101	30427	96182	1	2	2	1/5 mile	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	100	95052	96181	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	102	95057	96200	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	62	94903	96027	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	61	94902	96026	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	60	94901	96025	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	58	94898	96023	1	2	1	specific area	A		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	59	94899	96024	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	103	95062	96204	1	2	1	80 meters	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	57	94896	96021	4	2	1	specific area	A		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	5	30556	12745	1	2	1	1/5 mile	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	106	95074	96215	1	2	1	1/5 mile	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	105	95073	96212	1	2	1	1 mile	P		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	7	30589	8125	1	2	1	nonspecific area	U		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
AMAFA01013	8	30588	8121	1	2	1	nonspecific area	U		AMAFA01013	Aplodontia rufa californica	Sierra Nevada mountain beaver
PDAST0S1S2	1	86864	87822	1	1	1	2/5 mile	P	2B.3	PDAST0S1S2	Artemisia tripartita ssp. tripartita	threetip sagebrush
PDFAB0F120	3	70026	92240	1	1	3	4/5 mile	P	1B.3		Astragalus austiniae	Austin's astragalus
PDFAB0F120	4	91196	92247	1	1	1	2/5 mile	P	1B.3		Astragalus austiniae	Austin's astragalus
PDFAB0F120	5	91197	92248	1	1	1	2/5 mile	P	1B.3		Astragalus austiniae	Austin's astragalus
PDFAB0F120	6	91198	92249	1	1	1	2/5 mile	P	1B.3		Astragalus austiniae	Austin's astragalus
CTT84250CA	60	13259	28664	1	3	1	1/5 mile	P		CTT84250CA	Big Tree Forest	Big Tree Forest

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PDBRA40130	27	83738	84760	1	1	1	1 mile	P	1B.3	PDBRA40130	Boechera tularensis	Tulare rockcress
IIHYM24250	157	98448	99880	1	2	1	2/5 mile	P			Bombus occidentalis	western bumble bee
IIHYM24250	153	98447	99875	1	2	1	1 mile	P			Bombus occidentalis	western bumble bee
IIHYM24250	154	70026	99877	1	2	3	4/5 mile	P			Bombus occidentalis	western bumble bee
PPOPH010S0	1	35111	75	1	1	1	2/5 mile	P	2B.3	PPOPH010S0	Botrychium ascendens	upswept moonwort
PPOPH010S0	30	97928	99322	1	1	1	specific area	A	2B.3	PPOPH010S0	Botrychium ascendens	upswept moonwort
PPOPH010S0	32	97930	99325	1	1	1	80 meters	P	2B.3	PPOPH010S0	Botrychium ascendens	upswept moonwort
PPOPH010S0	31	97929	99324	1	1	1	80 meters	P	2B.3	PPOPH010S0	Botrychium ascendens	upswept moonwort
PPOPH010L0	51	84448	85477	1	1	1	80 meters	P	2B.2	PPOPH010L0	Botrychium crenulatum	scalloped moonwort
PPOPH010L0	50	84446	85476	1	1	1	80 meters	P	2B.2	PPOPH010L0	Botrychium crenulatum	scalloped moonwort
PPOPH010L0	126	A6346	108103	1	1	1	specific area	A	2B.2	PPOPH010L0	Botrychium crenulatum	scalloped moonwort
PPOPH010L0	52	84449	85479	1	1	1	specific area	A	2B.2	PPOPH010L0	Botrychium crenulatum	scalloped moonwort
PPOPH010L0	33	70334	71222	1	1	1	80 meters	P	2B.2	PPOPH010L0	Botrychium crenulatum	scalloped moonwort
PPOPH010L0	41	70486	71379	1	1	1	80 meters	P	2B.2	PPOPH010L0	Botrychium crenulatum	scalloped moonwort
PPOPH010R0	71	99349	100805	1	1	1	specific area	A	2B.2	PPOPH010R0	Botrychium minganense	mingan moonwort
PPOPH010R0	110	A5794	107536	1	1	1	specific area	A	2B.2	PPOPH010R0	Botrychium minganense	mingan moonwort
PPOPH010K0	26	91271	92319	1	1	1	80 meters	P	2B.1	PPOPH010K0	Botrychium montanum	western goblin
PPOPH010K0	9	70427	71317	1	1	1	80 meters	P	2B.1	PPOPH010K0	Botrychium montanum	western goblin
PMCYP033H0	10	82342	83357	1	1	1	2/5 mile	P	1B.3	PMCYP033H0	Carex davyi	Davy's sedge
PMCYP033H0	19	82441	83455	1	1	1	nonspecific area	L	1B.3	PMCYP033H0	Carex davyi	Davy's sedge
PMCYP037K0	4	35210	28980	1	1	1	80 meters	P	2B.2	PMCYP037K0	Carex limosa	mud sedge
PMCYP037K0	38	99340	100885	1	1	1	specific area	A	2B.2	PMCYP037K0	Carex limosa	mud sedge
PDAST20065	6	27945	20726	1	1	1	1/5 mile	P	2B.3	PDAST20065	Chaenactis douglasii var. alpina	alpine dusty maidens
IITRI11010	2	60330	60366	1	2	2	nonspecific area	A		IITRI11010	Cryptochia excella	Kings Canyon cryptochian caddisfly
IITRI77010	4	60330	60650	1	2	2	nonspecific area	A		IITRI77010	Desmona bethula	amphibious caddisfly
PDBRA110D2	3	72818	73685	1	1	1	specific area	A	1B.1	PDBRA110D2	Draba asterophora var. macrocarpa	Cup Lake draba
ABPAE33040	62	14010	25304	1	2	1	nonspecific area	A		ABPAE33040	Empidonax traillii	willow flycatcher
ABPAE33040	140	65863	65942	1	2	1	nonspecific area	L		ABPAE33040	Empidonax traillii	willow flycatcher
ABPAE33040	104	30668	4384	1	2	1	nonspecific area	U		ABPAE33040	Empidonax traillii	willow flycatcher
AMAFJ01010	314	A5492	107223	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	307	A5476	107206	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	310	A5485	107214	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	313	A5491	107222	1	2	1	1/5 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	309	A5481	107212	1	2	1	nonspecific area	A			Erethizon dorsatum	North American porcupine
AMAFJ01010	306	A5473	107203	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	308	A5477	107208	1	2	1	1/5 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	305	A5472	107202	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	311	A5489	107217	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	312	A5490	107221	1	2	1	1 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	304	A5470	107200	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	303	A5469	107199	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	301	A5466	107196	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	291	A5388	107122	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	294	A5406	107136	1	2	1	3/5 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	293	A5400	107132	1	2	1	1/5 mile	P			Erethizon dorsatum	North American porcupine

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AMAFJ01010	292	A5398	107128	1	2	1	1/5 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	295	A5451	107178	1	2	1	1 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	296	A5455	107185	1	2	1	1/10 mile	P			Erethizon dorsatum	North American porcupine
AMAFJ01010	297	A5457	107188	1	2	1	nonspecific area	A			Erethizon dorsatum	North American porcupine
AMAFJ01010	298	A5458	107189	1	2	1	80 meters	P			Erethizon dorsatum	North American porcupine
PDAST3M2K0	24	97677	99007	1	1	1	3/5 mile	P	1B.3	PDAST3M2K0	Erigeron miser	starved daisy
PDAST3M2K0	20	78267	79186	1	1	1	nonspecific area	L	1B.3	PDAST3M2K0	Erigeron miser	starved daisy
PDAST3M2K0	7	26443	21202	1	1	1	80 meters	P	1B.3	PDAST3M2K0	Erigeron miser	starved daisy
PDAST3M2K0	6	26442	3530	1	1	1	80 meters	P	1B.3	PDAST3M2K0	Erigeron miser	starved daisy
PDAST3M2K0	28	98044	99011	1	1	1	specific area	A	1B.3	PDAST3M2K0	Erigeron miser	starved daisy
PDPGN086U9	4	31043	3528	1	1	1	1/5 mile	P	1B.2	PDPGN086U9	Eriogonum umbellatum var. torreyanun	Donner Pass buckwheat
PDPGN086U9	1	13933	3529	4	1	1	specific area	U	1B.2	PDPGN086U9	Eriogonum umbellatum var. torreyanun	Donner Pass buckwheat
PDPGN086U9	11	30499	3997	1	1	1	specific area	U	1B.2	PDPGN086U9	Eriogonum umbellatum var. torreyanun	Donner Pass buckwheat
PDPGN086U9	14	30498	3994	1	1	1	specific area	U	1B.2	PDPGN086U9	Eriogonum umbellatum var. torreyanun	Donner Pass buckwheat
PDPGN086U9	13	30497	3995	1	1	1	specific area	U	1B.2	PDPGN086U9	Eriogonum umbellatum var. torreyanun	Donner Pass buckwheat
PMPOA2Y080	10	80403	81389	1	1	1	nonspecific area	L	2B.3	PMPOA2Y080	Glyceria grandis	American manna grass
PMPOA2Y080	11	80404	81390	1	1	1	nonspecific area	L	2B.3	PMPOA2Y080	Glyceria grandis	American manna grass
PMPOA2Y080	5	80401	32147	1	1	1	nonspecific area	L	2B.3	PMPOA2Y080	Glyceria grandis	American manna grass
AMAJF03010	189	34775	29197	1	2	1	2/5 mile	P		AMAJF03010	Gulo gulo	California wolverine
AMAJF03010	188	34774	29198	1	2	1	nonspecific area	U		AMAJF03010	Gulo gulo	California wolverine
AMAJF03010	201	75657	76683	1	2	1	1/5 mile	P		AMAJF03010	Gulo gulo	California wolverine
AMAJF03010	84	13481	23300	1	2	1	1 mile	P		AMAJF03010	Gulo gulo	California wolverine
AMAJF03010	81	14024	23296	1	2	1	1 mile	P		AMAJF03010	Gulo gulo	California wolverine
ABNKC10010	96	14269	26908	1	2	1	80 meters	P		ABNKC10010	Haliaeetus leucocephalus	bald eagle
ABNKC10010	275	75367	76384	1	2	1	80 meters	P		ABNKC10010	Haliaeetus leucocephalus	bald eagle
ABNJB15010	1	22141	8671	1	2	1	nonspecific area	U		ABNJB15010	Histrionicus histrionicus	harlequin duck
AAAAD09020	26	14032	28297	1	2	1	1/5 mile	P		AAAAD09020	Hydromantes platycephalus	Mount Lyell salamander
AMAEB03012	2	58727	58763	1	2	1	1 mile	P		AMAEB03012	Lepus americanus tahoensis	Sierra Nevada snowshoe hare
AMAEB03012	15	A4572	106263	1	2	1	80 meters	P		AMAEB03012	Lepus americanus tahoensis	Sierra Nevada snowshoe hare
PDPOR040K0	14	22217	10092	1	1	1	specific area	U	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	3	14237	22463	3	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	5	14046	18633	3	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	4	14044	21430	1	1	1	80 meters	P	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	17	95288	96427	3	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	6	13987	18914	2	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	7	14107	18915	2	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	9	22878	18913	4	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	11	22876	22451	1	1	1	80 meters	P	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040K0	12	22875	22452	2	1	1	specific area	A	1B.3	PDPOR040K0	Lewisia longipetala	long-petaled lewisia
PDPOR040E0	5	13209	4495	2	1	1	specific area	U	1B.1	PDPOR040E0	Lewisia serrata	saw-toothed lewisia
PDPOR040E0	7	13195	4496	1	1	1	specific area	U	1B.1	PDPOR040E0	Lewisia serrata	saw-toothed lewisia
IMBIV27020	26	85524	86547	1	2	1	80 meters	P		IMBIV27020	Margaritifera falcata	western pearlshell
AMAJF01014	193	A4602	106296	1	2	1	80 meters	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	152	55749	55765	1	2	1	1 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	147	55719	55735	1	2	2	1 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten

CNDDB_2017	CNDI	CNDDI	CNDDB_202	CNDI	CNDI	CNDI	CNDDB_2024	C	CNDI	ELMCODE__E	ELMCODE__S	ELMCODE__C
AMAJF01014	6	30432	4217	1	2	1	1/5 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	1	30427	4220	1	2	2	1/5 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	2	30428	4218	1	2	1	1/5 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	3	30429	4221	1	2	1	1/5 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	63	55232	55232	1	2	1	2/5 mile	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	64	55234	55234	1	2	1	nonspecific area	A		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	66	55239	55239	1	2	1	nonspecific area	A		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	69	55242	55242	1	2	1	nonspecific area	A		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	192	A4601	106295	1	2	1	80 meters	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	67	50278	55240	1	2	2	nonspecific area	A		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	65	55235	55235	1	2	1	nonspecific area	A		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01014	191	A4600	106294	1	2	1	80 meters	P		AMAJF01014	Martes americana sierrae	Sierra marten
AMAJF01021	81	13985	23646	1	2	1	1 mile	P		AMAJF01021	Martes pennanti	fisher - West Coast DPS
AMAJF01021	449	50277	50277	1	2	1	nonspecific area	A		AMAJF01021	Martes pennanti	fisher - West Coast DPS
AMAJF01021	450	50278	50278	1	2	2	nonspecific area	A		AMAJF01021	Martes pennanti	fisher - West Coast DPS
AMACC01110	25	68372	68570	1	2	1	nonspecific area	L		AMACC01110	Myotis volans	long-legged myotis
AMACC01110	24	68371	68569	1	2	1	1/5 mile	P		AMACC01110	Myotis volans	long-legged myotis
AMAEA0102H	68	69993	70833	1	2	1	3/5 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	152	79840	80843	1	2	1	2/5 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	51	69944	70773	1	2	1	nonspecific area	A		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	153	79841	80844	1	2	1	nonspecific area	A		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	110	77285	78200	1	2	1	80 meters	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	86	70026	70879	1	2	3	4/5 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	364	81754	82720	1	2	1	1/10 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	84	55719	70876	1	2	2	1 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	83	70024	70875	1	2	1	1/5 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	85	70025	70878	1	2	1	3/5 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AMAEA0102H	17	70087	70952	1	2	1	1 mile	P		AMAEA0102H	Ochotona princeps schisticeps	gray-headed pika
AFCHA02081	9	13941	14873	1	2	1	specific area	U		AFCHA02081	Oncorhynchus clarkii henshawi	Lahontan cutthroat trout
PPOPH020F0	3	46237	46237	1	1	1	1/10 mile	P	2B.2	PPOPH020F0	Ophioglossum pusillum	northern adder's-tongue
ABNKC01010	123	25431	5610	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	121	25427	5611	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	381	60119	60155	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	120	25428	5612	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	394	64493	64572	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	392	64491	64570	1	2	1	specific area	L		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	382	60120	60156	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	393	64492	64571	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	399	64511	64590	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	383	60122	60158	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	398	64507	64586	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	395	64496	64575	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	405	64578	64657	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	406	64579	64658	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	119	25429	5613	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey

CNDDB_2017	CNDI	CNDDI	CNDDB_202	CNDI	CNDI	CNDI	CNDDB_2024	C	CNDI	ELMCODE__E	ELMCODE__S	ELMCODE__C
ABNKC01010	397	64506	64585	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	396	64504	64583	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	60	14248	26811	1	2	1	1/10 mile	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	442	76560	77519	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	444	76572	77554	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	443	76562	77530	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	445	76577	77559	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	141	30184	4980	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
ABNKC01010	441	76529	77474	1	2	1	80 meters	P		ABNKC01010	Pandion haliaetus	osprey
PDHYD0C4D0	37	30103	22201	2	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	11	13238	18273	1	1	1	specific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	10	13212	13719	4	1	1	specific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	52	63814	63909	1	1	1	1/10 mile	P	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	36	30104	21997	2	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	12	13265	18272	9	1	1	specific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	24	13714	13716	1	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	44	30102	19851	1	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	64	95265	96402	2	1	1	specific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	47	43604	43604	1	1	1	nonspecific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	63	95264	96397	1	1	1	specific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	56	73149	74081	1	1	1	80 meters	P	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	27	13161	18262	3	1	1	specific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	59	95244	96379	1	1	1	nonspecific area	A	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	61	95247	96382	1	1	1	2/5 mile	P	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	60	95245	96381	1	1	1	nonspecific area	L	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	62	95263	96395	1	1	1	80 meters	P	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	35	30077	5012	1	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	46	30111	5009	1	1	1	1/5 mile	P	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	45	30108	5016	3	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
PDHYD0C4D0	42	30112	5000	1	1	1	specific area	U	1B.2	PDHYD0C4D0	Phacelia stebbinsii	Stebbins' phacelia
ABNYF07090	16	90956	92003	1	2	1	3/5 mile	P			Picoides arcticus	black-backed woodpecker
PMPOA4Z310	21	93597	94723	11	1	1	specific area	A	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOA4Z310	23	93599	94725	2	1	1	specific area	A	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOA4Z310	25	93601	94727	2	1	1	specific area	A	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOA4Z310	24	93600	94726	2	1	1	specific area	A	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOA4Z310	28	93604	94731	1	1	1	specific area	A	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOA4Z310	26	93602	94728	1	1	1	80 meters	P	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOA4Z310	27	93603	94729	3	1	1	specific area	A	1B.3	PMPOA4Z310	Poa sierrae	Sierra blue grass
PMPOT03080	1	28014	19048	1	1	1	1/5 mile	P	2B.2		Potamogeton epihydrus	Nuttall's ribbon-leaved pondweed
AAABH01340	24	22218	7837	1	2	1	nonspecific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	175	50298	50298	1	2	1	1/10 mile	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	643	95695	96834	1	2	1	2/5 mile	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	8	30411	4271	1	2	1	nonspecific area	U		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	642	95689	96829	1	2	1	80 meters	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	177	50329	50329	2	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog

CNDDB_2017	CNDI	CNDDI	CNDDB_202	CNDI	CNDI	CNDI	CNDDB_2024	C	CNDI	ELMCODE__E	ELMCODE__S	ELMCODE__C
AAABH01340	9	30410	4272	1	2	1	nonspecific area	U		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	131	45953	45953	10	2	1	nonspecific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	10	30409	4273	3	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	22	22220	7835	2	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	296	73924	74921	2	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	297	73925	74923	2	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	653	95719	96855	1	2	1	80 meters	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	652	95718	96854	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	651	95717	96853	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	650	95716	96852	1	2	1	2/5 mile	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	127	44953	44953	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	649	95712	96847	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	332	74603	75611	1	2	1	80 meters	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	26	22214	7840	1	2	1	specific area	U		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	647	95704	96842	2	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	648	95708	96844	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	126	44951	44951	2	2	1	nonspecific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	112	44933	44933	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	113	44934	44934	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	646	95703	96840	1	2	2	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	672	95766	96903	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	671	95765	96902	1	2	1	specific area	L		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	673	95767	96904	1	2	2	80 meters	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	75	44739	44739	1	2	1	1/5 mile	P		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	91	44796	44796	1	2	1	nonspecific area	L		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
AAABH01340	331	74600	75608	1	2	1	specific area	A		AAABH01340	Rana sierrae	Sierra Nevada yellow-legged frog
PDRHA0C010	3	72077	73003	1	1	1	1/10 mile	P	2B.2	PDRHA0C010	Rhamnus alnifolia	alder buckthorn
PDRHA0C010	17	98201	99609	1	1	1	specific area	A	2B.2	PDRHA0C010	Rhamnus alnifolia	alder buckthorn
PDRHA0C010	2	72074	73001	2	1	1	specific area	A	2B.2	PDRHA0C010	Rhamnus alnifolia	alder buckthorn
PDRHA0C010	1	72073	73000	1	1	1	2/5 mile	P	2B.2	PDRHA0C010	Rhamnus alnifolia	alder buckthorn
PDBRA270M0	10	14215	3105	1	1	1	80 meters	P	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	15	14226	3915	2	1	1	specific area	U	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	14	14245	3914	2	1	1	specific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	25	32013	3947	7	1	1	specific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	24	32012	3948	1	1	1	specific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	36	A6103	107855	1	1	1	specific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	16	14228	3426	2	1	1	specific area	U	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	33	70991	71909	1	1	1	80 meters	P	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	17	14204	3427	4	1	1	specific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	18	14198	13187	1	1	1	specific area	U	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	28	30484	3999	1	1	1	80 meters	P	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	37	A6105	107858	3	1	1	specific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	30	43911	43911	1	1	1	1/10 mile	P	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	19	14115	25919	3	1	1	nonspecific area	A	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress
PDBRA270M0	38	A6118	107871	1	1	1	80 meters	P	1B.1	PDBRA270M0	Rorippa subumbellata	Tahoe yellow cress

CNDDB_2017	CNDI	CNDDI	CNDDB_202	CNDI	CNDI	CNDI	CNDDB_2024	CI	CNDI	ELMCODE__E	ELMCODE__S	ELMCODE__C
PDLAM1U0J0	10	43332	43332	2	1	1	specific area	A	2B.2	PDLAM1U0J0	Scutellaria galericulata	marsh skullcap
ABPBX03010	61	13662	24906	1	2	1	1/5 mile	P			Setophaga petechia	yellow warbler
PDMAL140F0	1	43451	43451	1	1	1	1 mile	P	2B.2	PDMAL140F0	Sphaeralcea munroana	Munro's desert mallow
PDLAM1X1A0	13	A1649	103238	1	1	1	80 meters	P	2B.3	PDLAM1X1A0	Stachys pilosa	hairy marsh hedge-nettle
PMPOT03091	9	50806	50806	1	1	1	1 mile	P	2B.2		Stuckenia filiformis ssp. alpina	slender-leaved pondweed
PDVIO04280	25	25906	13722	2	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	23	25903	18343	1	1	1	1/5 mile	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	29	25899	5325	1	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	32	30096	5005	1	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	33	30095	5006	1	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	39	30080	5010	4	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	35	30099	5007	1	1	1	80 meters	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	40	30084	20844	1	1	1	80 meters	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	34	30098	5008	1	1	1	80 meters	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	38	30083	5013	1	1	1	80 meters	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	37	30082	5014	1	1	1	80 meters	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	36	30081	5015	2	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	42	26114	4921	1	1	1	80 meters	P	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	44	30093	5001	2	1	1	specific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
PDVIO04280	41	26113	4922	1	1	1	nonspecific area	U	4.2	PDVIO04280	Viola tomentosa	felt-leaved violet
AMAJA03012	87	56373	56389	1	2	1	1/10 mile	P		AMAJA03012	Vulpes vulpes necator	Sierra Nevada red fox
AMAJA03012	117	75957	76960	1	2	1	nonspecific area	A		AMAJA03012	Vulpes vulpes necator	Sierra Nevada red fox

APPENDIX C

Native American Consultation

PCWA
water • energy • stewardship

PLACER COUNTY WATER AGENCY
SINCE 1957

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MAIL
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Auburn, CA 95604
PHONE
(530) 823-4850
(800) 464-0030
WWW.PCWA.NET

February 16, 2018

VIA CERTIFIED MAIL

Gene Whitehouse
Chairman
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603

SUBJECT: Middle Fork American River Weather Modification Project

Dear Chairman Whitehouse:

Placer County Water Agency (PCWA) hereby notifies you of its intent as lead agency to prepare an environmental document pursuant to the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) to evaluate the proposed Middle Fork American River Weather Modification Project (Project). The Project is located in the geographic area traditionally and culturally affiliated with the United Auburn Indian Community (UAIC) of the Auburn Rancheria, as identified by UAIC in its Assembly Bill 52 (AB 52) Notification Request letter to PCWA dated November 23, 2015. PCWA would like to learn about any tribal cultural resources that may be present within the Project area and understand any concerns the UAIC may have regarding the Project, consistent with AB 52 and CEQA.

The Project would include seasonal implementation of an aerial cloud seeding program for the Middle Fork American River Project watershed using aircraft equipped with focused silver iodide dispersal technology. The Project would not result in any ground disturbing activities and is strictly designed to augment the natural rate of snowfall that occurs in orographic clouds as they develop and progress over the headwaters that drain into PCWA's primary storage reservoirs, Hell Hole and French Meadows (see attachment). The incremental increases in snowpack and subsequent runoff resulting from the Project would improve PCWA's reservoir storage volumes and operational flexibility in drier water years while reducing potential impacts to local water supplies during prolonged periods of drought.

Please consider this letter and attached preliminary project information PCWA's formal notification to UAIC of a proposed project and the opportunity for consultation pursuant to AB 52 and CEQA. If UAIC would like to request consultation on the Project, UAIC must respond in writing to PCWA within 30 days. (Pub. Resources Code § 21080.3.1(d)).

The Project has timing requirements which may require PCWA to meet certain implementation deadlines if the Project moves forward. Therefore PCWA will follow CEQA's AB 52 statutory timelines strictly. If UAIC does not wish to consult on the Project, we would appreciate you letting us know as soon as possible. If PCWA does not obtain a response from UAIC postmarked within 30 days of this letter, we will assume UAIC does not wish to consult on the Project. For consistency, PCWA will count 30 days from the postmark date of this letter to the postmark date of your response. Your timely response is appreciated.

Correspondence regarding the Project may be sent to PCWA Attn: Benjamin Barker at P.O. Box 6570 Auburn, CA 95604, or via e-mail to bbarker@pcwa.net. I look forward to hearing from the UAIC regarding this Project.

PLACER COUNTY WATER AGENCY

Respectfully,

Benjamin Barker
Environmental Scientist

BB:vf

Enclosure

c: Jason Camp, Tribal Historic Preservation Officer, UAIC
Marcos Guerrero, Cultural Resources Manager, UAIC

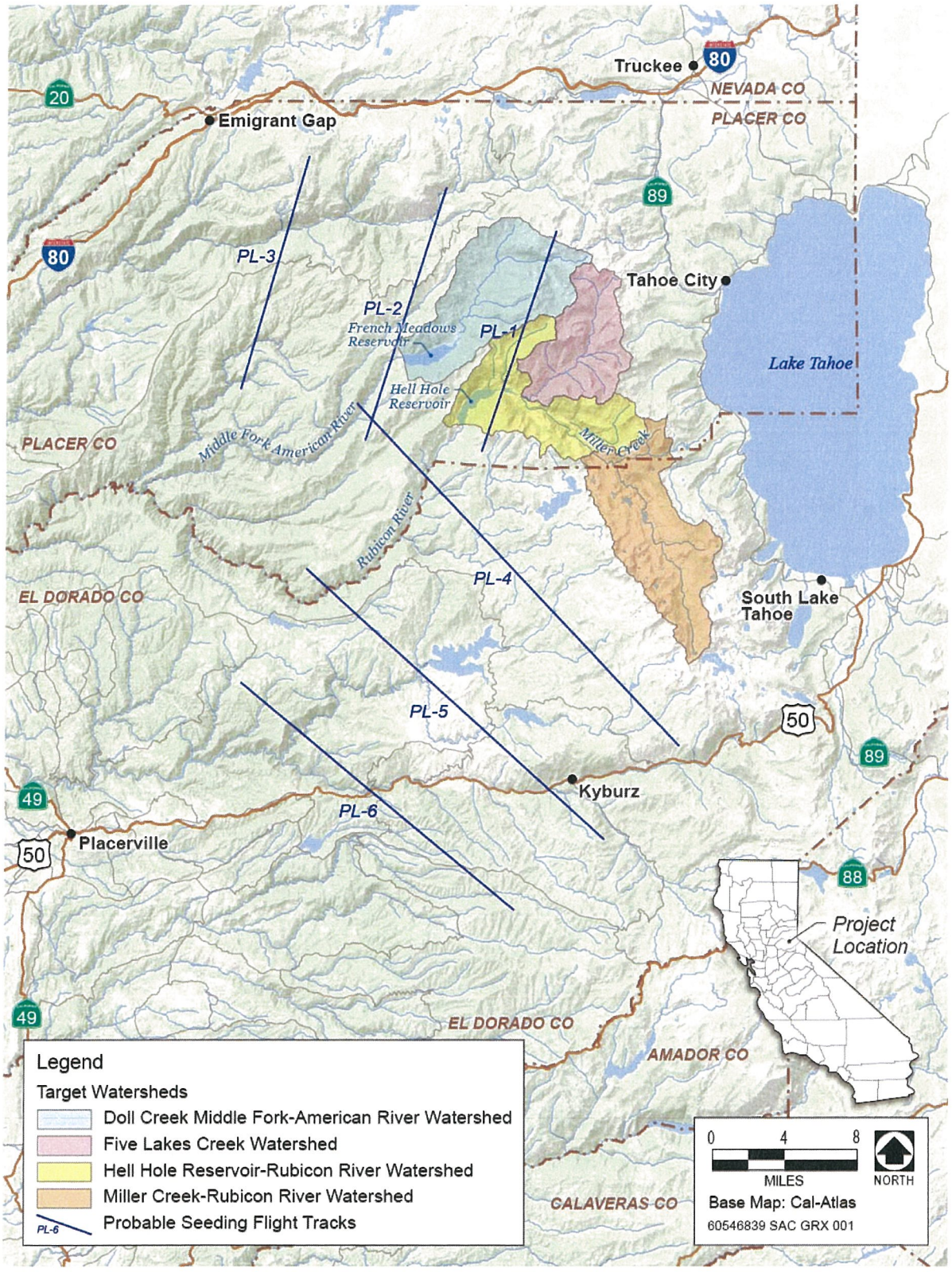

Figure 2-2. Target Watersheds

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

February 6, 2018

Richard Deis
AECOM

Sent Via Email: Richard.deis@aecom.com

RE: Middle Fork American Rover Cloud Seeding Initial Study, Placer County

Dear Mr. Deis:

Attached is a consultation list of tribes with traditional lands or cultural places located within the boundaries of the above referenced project.

Government Code §65352.3 requires local governments to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose of avoiding, and/or mitigating impacts to cultural places in creating or amending general plans, including specific plans. As of July 1, 2015, Public Resources Code Sections 21080.3.1 and 21080.3.2 require public agencies to consult with California Native American tribes identified by the NAHC for the purpose mitigating impacts to tribal cultural resources:

> Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, **the lead agency shall provide formal notification** to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section. (Public Resources Code Section 21080.3.1(d))

The law does not preclude agencies from initiating consultation with the tribes that are culturally and traditionally affiliated with their jurisdictions. The NAHC believes that in fact that this is the best practice to ensure that tribes are consulted commensurate with the intent of the law.

In accordance with Public Resources Code Section 21080.3.1(d), formal notification must include a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation. The NAHC requests that lead agencies include in their notifications information regarding any cultural resources assessment that has been completed on a potential "area of project affect" (APE), such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

   - A listing of any and all known cultural resources have already been recorded on or adjacent to the APE;
   - Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;
   - If the probability is low, moderate, or high that cultural resources are located in the APE.
   - Whether the records search indicates a low, moderate or high probability that unrecorded cultural resources are located in the potential APE; and
   - If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

- Any report that may contain site forms, site significance, and suggested mitigation measurers.

  All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure in accordance with Government Code Section 6254.10.

3. The results of any Sacred Lands File (SFL) check conducted through Native American Heritage Commission. **A search of the SFL was completed for the USGS quadrangle information provided with negative results.**

4. Any ethnographic studies conducted for any area including all or part of the potential APE; and

5. Any geotechnical reports regarding all or part of the potential APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS is not exhaustive, and a negative response to these searches does not preclude the existence of a cultural place. **A tribe may be the only source of information regarding the existence of a tribal cultural resource.**

This information will aid tribes in determining whether to request formal consultation. In the case that they do, having the information beforehand well help to facilitate the consultation process.

Lead agencies or agencies potentially undertaking a project are encouraged to send more than one written notice to tribes that are traditionally and culturally affiliated to a potential APE during the 30-day notification period to ensure that the information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance we are able to assure that our consultation list contains current information. If you have any questions, please contact me at my email address: Sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst
(916) 573-0168

Native American Heritage Commission
Native American Contacts
2/6/2018

Colfax-Todds Valley Consolidated Tribe
Pamela Cubbler, Treasurer
P.O. Box 4884 Miwok
Auburn , CA 95604 Maidu
PCubbler@colfaxrancheria.com
(530) 320-3943

Washoe Tribe of Nevada and California
Darrel Cruz, Cult Res Dept. THPO
919 Highway 395 South Washoe
Gardnerville , NV 89410
darrel.cruz@washoetribe.us
(775) 265-8600 x10714
(775) 546-3421 Cell

Shingle Springs Band of Miwok Indians
Nicholas Fonseca, Chairperson
P.O. Box 1340 Miwok
Shingle Springs , CA 95682 Maidu
nfonseca@ssband.org
(530) 387-1400
(530) 387-8067 Fax

Tsi Akim Maidu
Grayson Coney, Cultural Director
P.O. Box 510 Maidu
Browns Valley , CA 95918
tsi-akim-maidu@att.net
(530) 274-7497

Tsi Akim Maidu
Don Ryberg, Chairperson
P.O. Box 510 Maidu
Browns Valley , CA 95918
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(530) 274-7497

(530) 559-8595

United Auburn Indian Community of the Auburn Rancheria
Gene Whitehouse, Chairperson
10720 Indian Hill Road Maidu
Auburn , CA 95603 Miwok
(530) 883-2390 Office

(530) 883-2380 Fax

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was pr oduced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed: Middle Fork American Rover Cloud Seeding Initial Study, Placer County.

APPENDIX D

Noise Level Calculations

Aircraft Fly-over Noise Calcs		
T	number of seconds in a Day	86,400
$SEL_{,j}$	individual Sound Exposure Level readings during the Day	66
W_j	time of day weighting for the jth aircraft passby (10 dB for night)	10
	(For CNEL W_j is 4.7 dB for evening)	4.7
S	Aircraft Speed (mile per hour)	263
	Aircraft Speed (mile per minute)	4.383
D	Flight Distance (mile)	23
Ta	Duration of flight along one track (minute)	5.247
Tb	Duration of flights per day (3 hours) in minutes	180
N	number of Sound Exposure Level readings during the Day	34
L_{dn}	Day/Night Average Sound Level (denoted DNL in contour plots)	42