Appendix A
Glossary and Acronyms

A-1 Glossary of Terms

A-2 Acronyms List

ESA

A-1 Glossary of Terms

APPENDIX A-1
Glossary of Terms

Term	Definition
14 CFR PART 36	This regulation, titled "Noise Standards: Aircraft Type and Airworthiness Certification," establishes noise standards for the civil aviation fleet. Certain extensions for compliance are included in the Aviation Safety and Noise Abatement Act of 1979.
14 CFR PART 77	This regulation, titled "Safe, Efficient Use and Preservation of the Navigable Airspace," establishes standards for determining obstructions and their potential effects on aircraft operations. Objects are considered to be obstructions to air navigation according to 14 CFR Part 77 if they exceed certain heights or penetrate certain imaginary surfaces established in relation to airport operations. Objects classified as obstructions are subject to an FAA aeronautical analysis to determine their potential effects on aircraft operations.
14 CFR PART 91	This regulation, titled "General Operating and Flight Rules," includes an amendment issued by the FAA on September 25, 1991 (to 14 CFR 91) in conformance with requirements of the Airport Noise and Capacity Act of 1990. The amendment to the aircraft operating rules required a phased transition to an all Stage 3 aircraft fleet operating in the 48 contiguous United States and the District of Columbia by December 31, 1999.
14 CFR PART 121	This regulation titled “Air Carrier Certification,” establishes the process for safely implementing air carrier operations and ensuring compliance with applicable standards. The certification process determines an applicant’s ability to conduct air carrier operations in a manner compliant with all regulation and safety standards.
14 CFR PART 139	This regulation titled “Certification of Airports,” establishes the certification process for airports seeking to accommodate air carrier passenger operations. Specifically, the regulations requires the FAA to certify airports that serve scheduled and unscheduled air carrier aircraft with more than 30 seats; serve scheduled air carrier operations in aircraft with more than 9 seats but less than 31 seats; and are required to have a certificate by the FAA administrator.
14 CFR PART 150	This regulation, titled "Airport Noise Compatibility Planning," sets forth criteria for developing a 14 CFR Part 150 Noise Compatibility Program, an FAA-assisted program designed to increase the compatibility of land and land uses in the areas surrounding an airport that are most directly affected by operation of the airport. The specific purpose is to reduce the adverse effects of noise as much as possible by implementing both on-airport noise abatement measures and off-airport noise mitigation measures. The basic products of an 14 CFR Part 150 program typically include (1) noise exposure maps for the existing condition and for 5 years in the future; (2) workable on-airport noise abatement measures (preferential runway use programs, new or preferential flight tracks), (3) off-airport noise mitigation measures (land acquisition, soundproofing, or special zoning); (4) an analysis of the costs and the financial feasibility of the recommended measures; and (5) policies and procedures related to the implementation of on- and off-airport programs. Community involvement opportunities are provided throughout all phases of noise compatibility program development.

Term	Definition
A-WEIGHTED DECIBEL (dBA)	The ear does not respond equally to different frequencies of sound. It is less efficient at low and high frequencies than it is at medium or speech-range frequencies. Thus, to obtain a single number representing the sound level of a noise having a wide range of frequencies in a manner representative of the ear's response, it is necessary to reduce the effects of the low and high frequencies with respect to the medium frequencies. The resultant sound level is said to be A-weighted, and the units are decibels (dB); hence, the abbreviation is dBA. The A-weighted sound level is also referred to as the noise level. Sound level meters have an A-weighting network for measuring noise in A-weighted decibels.
ACCEPTABLE	Relating to noise Day-Night Average Sound Level (DNL) not exceeding 65 decibels. Noise exposure may be of some concern, but common building construction will make the indoor environment acceptable, and the outdoor environment will be reasonably pleasant for recreation and play. As defined by 14 CFR Part 150, *Airport Noise Compatibility Planning*.
ACOUSTICS	(1) The science of sound, including the generation, transmission, and effects of audible and inaudible sound waves. (2) The physical qualities (such as size and shape) of a room or other enclosure that determine the audibility and perception of speech and music.
ADVISORY CIRCULAR (AC)	An external Federal Aviation Administration (FAA) publication consisting of non-regulatory material of a policy, guidance, or informational nature.
AIRCRAFT OPERATION	An aircraft arrival (landing) or an aircraft departure (takeoff) each represent one aircraft operation; therefore, an arrival and departure is counted as two operations. A low approach, below traffic pattern or a touch-and-go operation is counted as both a landing and a takeoff, i.e., two operations. The FAA records aircraft operations in four categories: air carrier, air taxi, general aviation, and military.
AIR CARRIER	Operations performed in revenue service by certificated route air carriers.
AIR TAXI/COMMUTER	Operations performed by operators of aircraft holding an air taxi certificate. This category includes commuter airline operations (excluding certificated commuter airlines), mail carriers under contract with the U.S. Postal Service, and operators of nonscheduled air taxi service.
GENERAL AVIATION	All civil aircraft operations not classified as air carrier or air taxi operations.
MILITARY	Operations performed by military groups, such as the Air National Guard, the U.S. Air Force, or the U.S. Marine Corps. Aircraft operations may also be described as local or itinerant:
LOCAL	Local operations are performed by aircraft that (1) operate in the local traffic pattern or within sight of the airport, (2) are known to be departing for, or arriving from, local practice areas within a 20-mile radius of the airport, or (3) execute simulated or practice instrument approaches or low passes at the airport. Touch-and-go operations are counted as two local operations.
ITINERANT	All aircraft operations other than local operations.
NAVIGATIONAL AID(NAVAID)	A facility designed for use as an aid to air navigation, including landing aids, lights, any apparatus or equipment for disseminating weather information; for signaling for radio direction-finding or for radio or other electronic communication; and any other structure or mechanism having a similar purpose for guiding and controlling flight in the air or the landing or takeoff of aircraft.
AIRPORT ENVIRONS	The area surrounding an airport that is considered to be directly affected by the presence and operation of the airport.
AIRPORT IMPROVEMENT PROGRAM (AIP)	A program administered by the FAA to provide financial grants-in-aid for airport planning, airport development projects, and noise compatibility programs. The AIP was established through the Airport and Airway Improvement Act of 1982, which was incorporated as Title V of the Tax Equity and Fiscal Responsibility Act of 1982 (Public Law 97-248). Funds are appropriated by the U.S. Congress for the AIP annually.

Term	Definition
AIRPORT NOISE AND CAPACITY ACT OF 1990	Commonly referred to as the national noise policy; the Act was enacted on November 5, 1990 (Public Law 101-508). Two important provisions of the Act were the establishment of a national aviation noise policy (Sections 9308 and 9309) and the creation of a passenger facility charge (Sections 9110 and 9111), which enables airport sponsors to impose fees on the tickets issued to eligible enplaning passengers. An amendment to 14 CFR Part 91, "Transition to an All Stage 3 Fleet Operating in the 48 Contiguous United States and the District of Columbia," and new 14 CFR Part 161, "Notice and Approval of Airport Noise and Access Restrictions", implement the national noise policy. 14 CFR Part 158, "Passenger Facility Charges," implements that portion of the Act authorizing the imposition of such a charge.
AIRPORT SURVEILLANCE RADAR (ASR)	Radar providing aircraft position data in terms of azimuth and range. ASR does not provide altitude data. It is designed for range coverage up to 60 nautical miles and is used by terminal area air traffic control.
AIRPORT TRAFFIC CONTROL TOWER (ATCT)	A central operations facility in the terminal area air traffic control system, consisting of a tower cab structure and an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling, and other devices, to provide safe and expeditious movement of terminal area air traffic.
AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)	A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en route phase of flight.
AIRSPACE	Space in the air above the surface of the earth or a particular portion of such space, usually defined by the boundaries of an area on the surface projected upward.
AIR TRAFFIC CONTROL (ATC)	A service operated by appropriate authority (the FAA) to promote the safe, orderly, and expeditious flow of air traffic.
ATTENUATION	Acoustical phenomenon whereby a reduction of sound energy is experienced between the noise source and the receiver. This energy loss can be attributed to atmospheric conditions, terrain, vegetation, man-made features, and natural features.
AVIATION ENVIRONMENTAL DESIGN TOOL (AEDT)	A computer model developed by the FAA and required by the FAA for use in 14 CFR Part 150 studies, environmental assessments, and environmental impact statements for developing existing and future aircraft noise exposure maps.
AVIATION SAFETY AND NOISE ABATEMENT ACT OF 1979	The purpose of the Act is to assist airport sponsors in preparing and carrying out noise compatibility programs and in assuring continued safety for aviation. The Act also contains provisions extending to January 1, 1988, the requirement for certain types of aircraft to comply with 14 CFR Part 36.
AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS)	Continuous radio broadcast of recorded air traffic control information at selected high activity airports.
BUILDING CODE	A legal document that sets forth requirements to protect the public health, safety, and general welfare as they relate to the construction and occupancy of buildings and structures. The code establishes the minimum acceptable conditions for matters found to be in need of regulation. Topics generally covered are exits, fire protection, structural design, sanitary facilities, lighting, and ventilation. Sound insulation may also be included.
BUILDING PERMIT	A permit issued by a local political jurisdiction (village, town, city, or county) to erect or modify a structure.
CONTROLLED AIRSPACE	Airspace of defined dimensions within which air traffic control service is provided to IFR and to Visual Flight Rule (VFR) flights in accordance with the airspace classification.
COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)	Community noise equivalent level (CNEL), in decibels, represents the average noise level over a 24-hour day, adjusted to an equivalent level to account for the lower tolerance of people to noise during evening hours (7:00 p.m. – 10:00 p.m.) and nighttime hours (10:00 p.m. – 7:00 a.m.) relative to daytime hours. The FAA recognizes CNEL as a substitute metric for DNL for projects in California.

Term	Definition
DAY-NIGHT AVERAGE SOUND LEVEL (DNL)	A measure used to predict, by a single number rating, cumulative aircraft noise that affects communities in airport environs. DNL represents decibels of noise as measured by an A-weighted sound-level meter. In the DNL procedure, the noise exposure from each aircraft takeoff or landing is calculated at ground level around an airport, and these noise exposure levels are accumulated for a typical 24-hour period. (The 24-hour period often used is the average day of the peak month for aircraft operations during the year being analyzed.) Daytime and nighttime noise exposure is considered separately. A weighting factor equivalent to a penalty of 10 decibels is applied to operations between 10:00 p.m. and 7:00 a.m. to account for the increased sensitivity of people to nighttime noise. DNLs can be expressed graphically on maps using either contours or grid cells.
DECIBEL (dB)	A unit for measuring the volume of a sound, equal to the logarithm of the ratio of the intensity of the sound to the intensity of an arbitrarily chosen standard sound.
DISTANCE MEASURING EQUIPMENT (DME)	Equipment (ground and airborne) used to measure and report to the pilot the slant range distance, in nautical miles, of an aircraft from the DME navigational aid.
DURATION	The length of time that a noise event, such as an aircraft flyover, is experienced (typically reported in seconds). “Duration” may also refer to the length of time that the noise event exceeds a specified threshold noise level.
ENVIRONMENTAL ASSESSMENT (EA)	CEQ states that an EA is a “concise document” that takes a “hard look” at expected environmental effects of a proposed action.
EQUIVALENT CONTINUOUS SOUND LEVEL (LEQ)	Leq is the sound level, expressed in dBA, of a steady sound which has the same A-weighted sound energy as the time-varying sound over the averaging period. Unlike Sound Exposure Level (SEL), Leq is the average sound level for a specified time period (e.g., 24 hours, 8 hours, 1 hour, etc.). Leq is calculated by integrating the sound energy from all noise events over a given time period and applying a factor for the number of events.
FEDERAL AVIATION ADMINISTRATION (FAA)	The FAA, an agency of the U.S. Department of Transportation, is charged with (1) regulating air commerce to promote its safety and development; (2) achieving the efficient use of navigable airspace of the United States; (3) promoting, encouraging, and developing civil aviation; (4) developing and operating a common system of air traffic control and air navigation for both civilian and military aircraft; and (5) promoting the development of a national system of airports.
FLIGHT TRACK	The average flight path flown by aircraft within specific corridors. Deviation from these tracks occurs because of weather, pilot technique, air traffic control, and aircraft weight. Individual flight tracks within a corridor are "averaged" for purposes of modeling noise exposure using the FAA’s Integrated Noise Model.
GENERAL PLAN	An overall plan of a political jurisdiction setting forth the goals and objectives of the jurisdiction, policies for development and redevelopment, and maps showing the spatial arrangement of land uses, circulation routes, and community facilities. This is sometimes referred to as a comprehensive plan or community plan.
GLIDE PATH	A FAA navigational system that: (1) provides the vertical (or altitude) profile followed by an aircraft during the approach and landing; (2) is an electronic vertical guidance provided by airborne and ground instruments for instrument approaches using equipment such as an instrument landing system (ILS) as well as visual ground aids, such as a visual approach slope indicator (VASI), for a visual flight rule (VFR) approach or for the visual portion of an instrument approach and landing.
GLOBAL POSITIONING SYSTEM (GPS)	A navigational system that uses a series of satellites orbiting the earth to provide non-precision guidance in azimuth, elevation, and distance measurement.
GROUND EFFECT	The excess attenuation of sound associated with absorption or reflection of noise by manmade and physical features on the ground surface.
GROUND TRACK	The trajectory of an aircraft flight path projected onto the ground surface.
HELIPAD	A small area designated for takeoff, landing, or parking of helicopters.

Term	Definition
INCOMPATIBLE LAND USE	Residential, public, recreational, and certain other noise-sensitive land uses that are designated as unacceptable within specific ranges of cumulative (DNL) noise exposure as set forth in 14 CFR Part 150, Appendix A, Table 1.
INSTRUMENT APPROACH PROCEDURE (IAP)	An aircraft approach to an airport, with intent to land, by a pilot flying in accordance with an IFR flight plan, when the visibility is less than 3 miles and/or when the ceiling is at or below the minimum initial approach altitude.
INSTRUMENT APPROACH RUNWAY	A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved.
INSTRUMENT FLIGHT RULES (IFR)	Rules specified by the FAA for flight under weather conditions that do not meet the minimum requirements for VFR (see also). Under these conditions the pilot must rely on instruments to fly and navigate.
INSTRUMENT LANDING SYSTEM (ILS)	A system that provides, in the aircraft, the lateral and longitudinal (localizer), and vertical (guidance) electronic guidance necessary for an instrument landing.
INSTRUMENT OPERATION	An aircraft operation in accordance with an IFR flight plan or an operation where IFR separation between aircraft is provided by a terminal control facility or air route traffic control center.
LAND USE COMPATIBILITY	The compatibility of land uses surrounding an airport with airport activities and particularly with the noise from aircraft operations.
LAND USE CONTROLS	Controls established by local or state governments to implement land use planning. The controls include zoning, subdivision regulations, land acquisition (in fee simple, lease-back, or easements), building codes, building permits, and capital improvement programs (to provide sewer, water, utilities, or other service facilities).
LAND USE PLANNING	Comprehensive planning carried out by units of local government, for all areas under their jurisdiction, to identify the optimum uses of land and to serve as a basis for the adoption of zoning or other land use controls.
LOCALIZER (LOC)	Navigational equipment that provides electronic course guidance. The ground-based equipment sends two signals, which, when received and receded by airborne equipment with equal intensity, indicate that the aircraft is on course. If the received and receded signals have unequal intensity, then the aircraft is off course. A localizer is the part of an ILS that provides lateral and longitudinal course guidance to the runway.
LOCALIZER-TYPE DIRECTIONAL AID (LDA)	A navigational aid used for non-precision instrument approaches with utility and accuracy comparable to a localizer; however, it is not part of a complete ILS and its signal is not typically aligned with the runway.
LOUDNESS	The judgment of the intensity of a sound by a person, loudness depends primarily on the sound pressure of the stimulus. Over much of the loudness range, it takes about a threefold increase in sound pressure (approximately 10 decibels) to produce a doubling of loudness.
MAXIMUM SOUND LEVEL (Lmax)	The maximum A-weighted sound level, in dBA, for a given noise event. The peak noise level reached by a single aircraft event.
NOISE	Noise is any sound that is considered to be undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying.
NOISE ABATEMENT PROCEDURES	Changes in runway use, flight approach and departure routes and procedures, and other air traffic procedures that are intended to shift adverse aviation effects away from noise-sensitive areas (such as residential neighborhoods).
NOISE CONTOURS	Lines drawn on a map that connect points of equivalent noise exposure levels. For aircraft noise analyses conducted using DNL, noise contours are usually drawn in 5-DNL intervals, such as connections of DNL 75 exposure, DNL 70 exposure, DNL 65 exposure, and so forth.

Term	Definition
NOISE-SENSITIVE LAND USE	A land use that can be adversely affected by high levels of aircraft noise. Residences, schools, hospitals, religious facilities, libraries, and other similar uses are typically considered to be noise-sensitive.
NONDIRECTIONAL RADIO BEACON (NDB)	A low/medium frequency radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction-finding equipment can determine the aircraft's bearing to or from the radio beacon and track to or from the station.
NON-PRECISION INSTRUMENT APPROACH PROCEDURE	A standard instrument approach procedure for which no glide slope guidance is provided. Typical non-precision instrument approach procedures include VOR (see *Very High Frequency Omnidirectional Range*), GPS (see *Global Positioning System*), NDB (see *Nondirectonal Radio Beacon*), and LOC (see *Localizer*) approach procedures.
NORMALLY UNACCEPTABLE	DNL higher than 65 but not higher than 75 decibels (see *Unacceptable*) - the noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building construction may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.
PATTERN	The configuration or form of a flight path flown by an aircraft, or prescribed to be flown, as in making an approach for landing.
PRECISION APPROACH PATH INDICATOR (PAPI)	An airport lighting facility in the terminal area navigation system used under VFR conditions, through a single row of two to four lights, radiating high intensity red or white beams to indicate whether the aircraft is on, above, or below the required runway glide slope.
PRECISION INSTRUMENT APPROACH PROCEDURE	A standard instrument procedure for a pilot to approach an airport, in which both electronic course guidance and an electronic glide scope are provided. For example, an approach using an ILS is considered a precision instrument approach.
RETROFIT	The retroactive modification of existing jet aircraft engines for noise reduction purposes.
RUNWAY	A defined rectangular area on an airport for the purpose of landing and taking off of aircraft. Runways are numbered in relation to their magnetic direction, rounded to the nearest 10 degrees (i.e., Runway 14, Runway 32).
SINGLE EVENT	Noise generated by a single event, such as a single aircraft flyover.
SOUND EXPOSURE LEVEL (SEL)	SEL is a time-integrated measure, expressed in decibels, of the sound energy of a single noise event. The sound level is integrated over the period that the level exceeds a threshold (normally 65 dBA for aircraft noise events). Therefore, SEL accounts for the duration of the sound. SELs for aircraft noise events depend on the location of the aircraft, the type of operation (landing, takeoff, or overflight), and the type of aircraft.
SOUND LEVEL (NOISE LEVEL)	The weighted sound pressure level obtained by the use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.
SOUND LEVEL METER	An instrument consisting of a microphone, an amplifier, an output meter, and frequency-weighting networks used to measure noise and sound levels in a specified manner.
STANDARD INSTRUMENT DEPARTURE (SID)	A preplanned and published instrument departure route.
STANDARD TERMINAL ARRIVAL ROUTE (STAR)	A preplanned and published instrument arrival route.
TERPS	Certain airspace needs to be cleared for aircraft operations. This airspace is determined by the application of operating rules and terminal instrument procedures (TERPS). Removing obstructions to air navigation, except those that an FAA aeronautical analysis determined need not be removed, satisfies these requirements. Subpart C of 14 CFR Part 77 defines obstructions to air navigation. (See FAA Handbook 8260.3B.)
TERMINAL AREA FORECAST (TAF)	The Terminal Area Forecast (TAF) is the official FAA forecast of aviation activity for U.S. airports. Forecasts are prepared for major users of the National Airspace System including air carrier, air taxi/commuter, general aviation, and military.

Term	Definition
TERMINAL RADAR APPROACH CONTROL (TRACON)	Radar approach facility generally serving more than one airport, providing separation; safety alerts; and sequencing of arrival, departure, and transitioning air traffic.
UNACCEPTABLE	DNL above 75 decibels-Noise exposure at the site is so severe that the construction cost to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.
VERY HIGH FREQUENCY (VHF) OMNIDIRECTIONAL RANGE (VOR)	A radio transmitter facility in the navigation system radiating a VHF radio wave modulated by two signals, the relative phases of which are compared, resolved, and displayed by a compatible airborne receiver to give the pilot a direct indication of bearing relative to the facility.
VFR AIRPORT	An airport without an authorized or planned instrument approach procedure.
VISUAL APPROACH	An approach to an airport wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of a radar facility and having air traffic control authorization, may deviate from the prescribed instrument approach procedure and proceed to and land at the airport of destination, served by an operational ATCT, by visual reference to the surface.
VISUAL APPROACH SLOPE INDICATOR (VASI)	An airport lighting facility in the terminal area navigation system used primarily under VFR conditions. It provides vertical visual guidance to indicate whether the aircraft is on, above, or below the glide slope to the runway.
VISUAL FLIGHT RULES (VFR)	A set of regulations that a pilot may operate under when weather conditions meet certain minimum requirements. The requirements are designed to provide sufficient visibility so that other aircraft can be seen and avoided. Under VFR, the pilot generally controls the attitude of the aircraft by relying on what can be seen out the window, although this may be supplemented by referring to the instrument panel.
ZONING AND ZONING ORDINANCES	Ordinances that divide a community into zones or districts according to the current and potential use of properties for the purpose of controlling and directing the use and development of those properties. Zoning is concerned primarily with the use of land and buildings, the height and bulk of buildings, the proportion of a lot that buildings may cover, and the density of population of a given area. As an instrument for noise compatibility plan implementation, zoning deals principally with the use and development of privately owned land and buildings. The objectives of zoning are to establish regulations that provide locations for all essential uses of land and buildings and ensure that each use is located in the most appropriate place. In noise compatibility planning, zoning can be used to achieve two major aims: (1) to reinforce existing compatible land uses and promote the location of future compatible uses in vacant or underdeveloped land, and (2) to convert existing incompatible uses to compatible uses over time.

SOURCE: Environmental Science Associates, 2020.

A-2 Acronyms List

APPENDIX A-2
Acronyms List

A	Agriculture
AA	Action Area
AARF	Aircraft Rescue and Firefighting
AB	Assembly Bill
AC	Advisory Circular
AEDT	Aviation Environmental Design Tool
AIP	Airport Improvement Program
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
APE	Area of Potential Effects
APU	Auxiliary Power Unit
BA	Biological Assessment
BIH	Bishop Airport
BFE	Base Flood Elevation
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CALTRANS	California Department of Transportation
CARB	California Air Resources Board
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CH_4	Methane
CHRIS	California Historical Resources Information System
CLUP	Comprehensive Land Use Plan
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalents
CWA	Clean Water Act
dB	Decibel
dBA	A-Weighted Decibel
DNL	Day/Night Average Sound Level
DOT	Department of Transportation
EA	Environmental Assessment
ECOS	Environmental Conservation Online System
EIC	Eastern Information Center
EMFAC2017	Emissions Factor 2017
EO	Executive Order
ESA	Endangered Species Act
ESTA	Eastern Sierra Transit Authority
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GA	General Aviation
GBUAPCD	Great Basin Unified Air Pollution Control District
GHG	Green House Gas

GSA	General Study Area
GSE	Ground Support Equipment
GSP	Groundwater Sustainability Plan
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
HMMA	Hazardous Material Management Act
HSWA	Hazardous and Solid Waste Amendments Act of 1984
IPaC	Information, Planning, and Consultation
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt Hours
LADWP	Los Angeles Department of Water and Power
LDA	Landing Distance Available
LI	Light Industrial
LOS	Level of Service
LWCF	Land and Water Conservation Fund Act
MPH	Miles Per Hour
MS4	Municipal Separate Storm Sewer System
MT	Metric Tons
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFHL	National Flood Hazard Level
NHPA	National Historic Preservation Act
NPL	National Priorities List
NO_2	Nitrogen Dioxide
N_2O	Nitrous Oxide
NOAA	National Oceanic and Atmosphere Administration
NPDES	National Pollutant Discharge Elimination System
NPIAS	National Plan of Integrated Airport System
NPL	National Priorities List
NPS	National Park Service
NR	Natural Resources
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NRI	National Rivers Inventory
NWI	National Wetland Inventory
OS-40	Open Space – 40 acre minimum
OVGA	Owens Valley Groundwater Authority
OVLMP	Owens Valley Land Management Plan
O_3	Ozone
P	Public
Pb	Lead
PF	Public Service Facilities
PFC	Perfluorocarbons
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Microns in Diameter
PM_{10}	Particulate Matter Less Than or Equal to 10 Microns in Diameter
PPB	Parts Per Billion
PPM	Parts Per Millions
RCRA	Resources Conservation and Recovery Act
RMH-7200	Single Residence Mobile Home Combined – 7,200 sq ft minimum
RSA	Runway Safety Area
RTP	Regional Transportation Plan
RVZ	Runway Visibility Zone
RWY	Runway
SARA	Superfund Amendments and Reauthorization Act
SCE	Southern California Edison
SDWA	Safe Drinking Water Act

SF_6	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SSC	Species of Special Concern
SWFL	Southwester Willow Flycatcher
SWIS	Solid Waste Information System
SWRCB	State Water Resources Control Board
THPO	Tribal Historic Preservation Officer
$\mu g/m^3$	Micrograms Per Cubic Meter
US EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

Appendix B
References

APPENDIX B
References

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Appendix C
List of Preparers and Reviewers

ESA

APPENDIX C
List of Preparers and Reviewers

C-1 Principal FAA Reviewers

Edvige B. Mbakoup, Environmental Protection Specialist, Los Angeles Airports District Office. M.P.H., Environmental Health Science; B.S., Biology. Ms. Mbakoup is an FAA Environmental Protection Specialist and Project Manager with eight years of experience in the federal government. Responsible for detailed FAA evaluation of the NEPA document and regulatory agency consultations.

C-2 Inyo County Department of Public Works

Ashley Helms, Deputy Public Works Director. Inyo County Project Manager. B.S., Engineering Science. Seven years of experience with public works projects, including airport capital improvement projects. Responsible for project management for the airport sponsor.

C-3 Environmental Science Associates

Anna Schwyter, Wetland Ecologist, Anna is a wetland ecologist with four years of experience with environmental resource management. Anna specializes in soil science, wetland and riparian ecology, habitat restoration, and biological monitoring in a wide range of ecosystems. She has extensive knowledge of wetland biogeochemistry and carbon sequestration and has conducted scientific surveys and research in these fields.

Autumn Ward, Principal Associate. Project Director. M.S. Aeronautics and B.S. Aviation Business Administration. 18 years of experience in airport environmental planning, with expertise in aircraft noise modeling and preparation of NEPA documents. Responsible for project management, project approach, technical writing, and QA/QC.

Chris Jones, AICP, Principal Associate. Project Manager. J.D. and B.A., Sociology. 18 years of experience in the environmental field as a project manager, technical lead, and author of NEPA and CEQA environmental documentation for various aviation, transportation, land use, and energy projects. Responsible for Project Management, NEPA documentation, CEQA documentation, land use, and environmental justice.

Chris Nottoli, Noise Analyst, Chris Nottoli has over 8 years of experience in modeling aviation and surface transportation noise. He serves as the technical lead of ESA's aircraft noise modeling group. Chris has worked on a wide range of consulting projects for over 30 domestic and international airports supporting the needs of the client and community. He has advanced knowledge of aviation practices and environmental concepts of aircraft noise modeling.

Dominic Scarano, Air Quality Analyst, Dominic Scarano has over six years of experience in modeling aviation noise and air quality. Dominic has worked on over 25 domestic and international airports supporting the needs of the client and community. He has advanced knowledge of aviation practices and environmental concepts of aircraft noise and air quality modeling.

Elbert Hsiung, Air Quality Analyst, Elbert has over four years of experience in performing air quality, greenhouse gases, health risk assessments, energy, and noise analyses. He has assisted in preparing and refining of air quality, GHG, and noise assessments to support planning and environmental review, including California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) documents.

Heidi Koenig, Senior Archaeologist, Heidi Koenig is a Registered Professional Archaeologist specializing in California archaeology and compliance with NEPA, CEQA, and Section 106 of the National Historic Preservation Act. Her experience includes over 20 years of conducting cultural resources identification efforts, significance evaluations, development of environmental documentation, implementation programs, and consultation support with the State Historic Preservation Officer.

Jeffery Covert, Aviation specialist with over four years of experience providing sustainability and air quality consulting services at airports nationwide. At ESA, he focuses his time serving clients using his skills in air quality, renewable energy planning, vehicle electrification planning and implementation, stakeholder coordination, and grant funding assistance.

Patrick Hickman, AICP, Land Use Planner/Landscape Architect. Patrick Hickman has 15 years providing expertise in airport land use compatibility planning, environmental analysis, GIS analysis and mapping, site planning and design, and transportation planning. Responsible for project management, NEPA documentation, CEQA documentation, land use, and environmental justice, and QA/QC.

Appendix D
Aviation Activity Forecast

D-1 Bishop Airport Aviation Activity Forecast Approval

D-2 Bishop Airport Aviation Activity Forecast Update

D-3 Bishop Airport Aviation Activity Forecast

D-4 Terminal Area Forecast for Bishop Airport

D-1 Bishop Airport Aviation Activity Forecast Approval

ESA

U.S. Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Airports Division
Los Angeles Airports District Office

777 S. Aviation Blvd, Suite 105
El Segundo, CA 90245

December 28, 2022

Ms. Ashley Helms
Deputy Director of Public Works - Airports
County of Inyo
703 Airport Road
Bishop, CA 93514

Bishop Airport (BIH)
Aviation Activity Forecast Approval

Dear Ms. Helms,

The Federal Aviation Administration (FAA) has reviewed the Demand Forecasts you submitted for Bishop Airport (BIH), Bishop California from the email dated November 16, 2022. The FAA concurs with this forecast for airport planning purposes.

Our approval is based on the following:

- The forecast is supported by reasonable planning assumptions and current data
- The forecast appears to be developed using acceptable forecasting methodologies

Approval of this forecast does not automatically justify any of the capital improvements shown on the ALP or recommended in the master plan. All future projects will need to be justified by current activity levels at the time of proposed implementation. The approved forecasts may be subject to additional analysis, or the FAA may request a sensitivity analysis if this data is to be used for environmental or Part 150 noise planning purposes.

FAA approval of this forecast does not constitute justification for future projects. Justification for future projects will be made based on activity levels at the time the project is requested for development. Documentation of actual activity levels meeting planning activity levels will be necessary to justify AIP funding for eligible projects.

If you have any questions about this forecast approval, please call me at 424-405-7268.

Sincerely,

Maurice Light

Maurice Light
Community Planner

D-2 Bishop Airport Aviation Activity Forecast Update

ESA

County of Inyo
AIRPORT DIVISION
703 Airport Road, Bishop CA
(760) 872-2971

Michael Errante, Airport Manager
Ashley Helms, Deputy Airport Manager
Steve Loven, Airport Operations Supervisor

November 17, 2022

Maurice Light
Community Planner
Los Angeles Area District Office
Federal Aviation Administration

RE: Bishop Airport Aviation Activity Forecast

Inyo County submitted an Aviation Activity Forecast (AAF) for the Bishop Airport (BIH) in March 2020. The forecast was approved by the Los Angeles (LA) Airports District Office (ADO) on April 29, 2020 and was subsequently used in the analysis for the Environmental Assessment of the Proposed Commercial Airline Service at the Bishop Airport (August 2021). The forecast was developed using the 2019 service levels at the Mammoth Yosemite Airport (MMH) as a baseline – three daily flights in the winter season and a single daily flight for the remainder of the year. Assumptions included the phased addition of three daily winter flights between 2024 and 2028, and the transition from the CRJ 700 to the Embraer 175 between 2025 and 2029.

Commercial service began at BIH in December 2021 with an average of three daily flights through March 26, 2022. Due to multiple factors, year one did not include year around service – with no service in the spring (March 27 – June 3) or fall (September 6 – December 14). Summer service included two flights per week between June 4 and June 23, and 6 flights per week for the remainder of the season. The winter 2022/2023 season will begin on December 15 with four daily operations. The total number of air carrier operations for the 2022 will be 632, a decrease of 48 percent from the 2020 AAF.

As of the date of this letter, there have been 9,553 enplanements in 2022, and an additional 1,000 – 1,500 are anticipated during the December 15-31 timeframe. The 10,500 – 11,000 enplanements expected for 2022 is substantially lower than the 21,416 enplanements included in the 2020 AAF, however this is primarily due to the nearly 50 percent reduction in available seats. Average load factors were similar to those used for the 2020 AAF calculations.

The Environmental Assessment for the proposed Runway 12-30 Safety Area Improvement Project is underway. For purposes of assessing potential impacts associated with the Proposed Project, No Action alternative, and all feasible project alternatives, Inyo County proposes to use the actual enplanement numbers for the Current Study Year (2022) and the enplanement forecasts for the future study years (2024 and 2029) from the 2020 AAF.

Thank you,

A Helms

Ashley Helms
Deputy Director of Public Works – Airports
County of Inyo

County of Inyo

DEPARTMENT OF PUBLIC WORKS

168 N. Edwards Street, Independence, CA 93526

Main 760.878-.0201 Fax 760.878.2001

1/14/2021

Jaime Duran
Lead Planner – Los Angeles ADO

While preparing the air quality and noise analyses for the ongoing Environmental Assessment for the Part 139 Certification project at Bishop Airport, discrepancies were discovered between the Aviation Activity Forecast for the Airport, approved by the FAA on April 28, 2020, and the number of operations calculated by the environmental consultant. Two formula errors were found in the forecast spreadsheet:

1. The original formula for December for years 2026 – 2033 included two flights from LAX for 31 days; the corrected formula includes one flight for 31 days and one flight for 15 days.
2. The formula for February in years 2024, 2028 and 2032 did not take the leap year into account.

The modifications to the number of operations and enplanements are shown on the following page.

Additionally, the forecast assumed a 2-3% cancelation rate for the winter season. The consultant did not take the cancelation rate into account when calculating operations in order to present the maximum potential impact in the noise analysis.

The discrepancy between the number of operations in the two documents are summarized below:

	Approved Forecast	**Environmental Assessment**
2022	1,196	1,210
2028	1,970	1,942

Please let me know if additional information, or a correction to the forecast, is required.

Thank you,

A Helms

Ashley Helms
Inyo County Public Works

Table 6: BIH Aircraft Operations Forecast

	Air Carrier*	Commuter / Air Taxi	General Aviation	Military	Total Aircraft Operations
2018	1050	6	23000	3000	27056
2019	1212	6	23000	3000	27218
2020	1212	6	23000	3000	27218
2021	1196	6	23000	3000	27202
2022	1196	6	23000	3000	27202
2023	1226	6	23000	3000	27232
2024	1434	6	23000	3000	27440
2025	1434	6	23000	3000	27440
2026	1525	6	23000	3000	27531
2027	1732	6	23000	3000	27738
2028	1970	6	23000	3000	27976
2029	1970	6	23000	3000	27976
2030	1970	6	23000	3000	27976
2031	1970	6	23000	3000	27976
2032	1970	6	23000	3000	27976
2033	1970	6	23000	3000	27976
	Compound Annual Growth Rate				
2018-2021	4%	-	-	-	0.2%
2023-2028	17%	-	-	-	0.9%
2028-2033	0%	-	-	-	0%

*Air Carrier flights before December 2020 land at MMH

Notes: (1) CAGR for Total Operations at BIH from 2018-2021 is 1.5%
(2) Air Carrier operations assume 3% cancelation rate in winter season

REVISED Table 6: BIH Aircraft Operations Forecast

	Air Carrier*	Commuter/ Air Taxi	General Aviation	Military	Total Aircraft Operations
2018	1050	6	23000	3000	27056
2019	1212	6	23000	3000	27218
2020	1212	6	23000	3000	27218
2021	1196	6	23000	3000	27202
2022	1196	6	23000	3000	27202
2023	1226	6	23000	3000	27232
2024	1441	6	23000	3000	27447
2025	1434	6	23000	3000	27440
2026	1493	6	23000	3000	27499
2027	1701	6	23000	3000	27707
2028	1920	6	23000	3000	27926
2029	1938	6	23000	3000	27944
2030	1938	6	23000	3000	27944
2031	1938	6	23000	3000	27944
2032	1950	6	23000	3000	27956
2033	1938	6	23000	3000	27944
	Compound Annual Growth Rate				
2018-2021	4%	-	-	-	0.2%
2023-2028	16%	-	-	-	0.8%
2028-2033	0%	-	-	-	0%

*Air Carrier flights before December 2020 land at MMH

Notes: (1) CAGR for Total Operations at BIH from 2018-2021 is 1.5%
(2) Air Carrier operations assume 3% cancelation rate in winter season

D-3 Bishop Airport Aviation Activity Forecast

County of Inyo
DEPARTMENT OF PUBLIC WORKS
168 N. Edwards Street, Independence, CA 93526
Main 760.878-.0201 Fax 760.878.2001

Jaime Duran, Lead Airport Planner
Los Angeles Airports District Office
Federal Aviation Administration
777 S. Aviation Boulevard, Suite #150
El Segundo, CA 90245

Dear Mr. Duran,

Inyo County is pleased to submit the Aviation Activity Forecast for the Bishop Airport, in Bishop, California. The primary assumption of the 15 year forecast is the transition of commercial service from the Mammoth Yosemite Airport in the fall of 2020. The forecast starts with the current MMH service levels as a baseline, adding 3 daily flights to the winter season over years 2024 – 2029. Additional growth in enplanement numbers are due to gradual increases in flight load factors and a modest increase in aircraft size. Air carrier operations are predicted to increase 4% between the base year and 2021, and 17% between 2023 and 2028. Commuter, military and general aviation operations are expected to remain consistent.

Thank you,

Michael Errante, P.E.
Director of Public Works
Inyo County
760.878.0201

DRAFT AVIATION ACTIVITY FORECAST
BISHOP AIRPORT

Prepared by Inyo County Public Works
Independence, CA
March 2020

Section 1. Introduction and Background

This document presents the forecasted aviation activity for the Bishop Airport (Airport or BIH) and reflects the transition of scheduled commercial air service from Mammoth Yosemite Airport (MMH) to BIH in the fall of 2020. Forecasts are included for enplaned passengers and aircraft operations – including air carrier, commuter, general aviation, military and cargo operations. These forecasts use 2018 as the base year, and analyze three future years – 2023, 2028 and 2033. Due to a degree of uncertainty regarding the initiation of air service at BIH, this forecast is limited to 15 years, and will be re-evaluated after several years of enplanement data is available for the new service.

Section 2. Sources of Historical Data, Forecasting Methods and Assumptions

2.1 Historical Data Sources

The Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) for both BIH and MMH were used as the primary source of historical data for passenger enplanements and aircraft operations. Other references include the 2017 Mammoth Yosemite Airport Aviation Activity Forecast and 2019 Addendum, both prepared by Mead & Hunt; and the 2017 Bishop Airport Passenger Traffic Study, prepared by Leigh Fisher.

2.2 Forecasting Methods

The methods used in the creation of this forecast included an analysis of the historical air service to MMH, the current FAA TAF, the constraints present at MMH and BIH, available lodging, and an assessment of the expansion of service desired by Mammoth Mountain Ski Area (MMSA) and Mammoth Lakes Tourism (MLT).

2.3 Forecasting Assumptions

i. In the fall/winter of 2020, United Airlines will transfer service from MMH to BIH, see airline letter of support in Appendix A.
ii. Mammoth Mountain Ski Resort will continue to draw large amounts of winter tourism to the Eastern Sierra area.
iii. Tourism will continue to be the main driver of the Eastern Sierra economy, with winter tourism to MMSA creating the largest demand for air travel to the area.
iv. Charter service will continue and may expand at MMH.
v. Greater reliability in the air service will gradually increase the flight load factors and will justify additional daily flights.
vi. There will be no large upsets to the price of aviation fuel or air travel behavior.
    a. This assumes a return to normalcy after the Covid-19 pandemic by the fall of 2020.

Section 3. Historical Passenger Enplanements and Aircraft Operations in the Eastern Sierra

This section summarizes the historical operations to the Eastern Sierra region that are pertinent to this forecast – this includes all aviation operations at the Bishop Airport, and commercial airline operations at the Mammoth Yosemite Airport. The source of data for BIH was the FAA 2018 TAF, which is on a Federal Fiscal Year basis. The 2019 Mammoth Yosemite Airport Aviation Activity Forecast Addendum, prepared by Mead & Hunt, was used as the data source for MMH. This report drew from airline records for enplanement data and Hot Creek Aviation (the Fixed Base Operator) for operations data.

3.1 Bishop Airport

Approximately 87% of general aviation operations and 97% of military operations in the Easter Sierra occur at the Bishop Airport. In the last several years Jet Suite X, a scheduled charter service serving the Mammoth Airport, has diverted to BIH numerous times when weather conditions limit access at MMH (these diversions are not represented in the TAF data). There are currently no air carrier operations at BIH.

Table 1 : BIH Historical Aviation Activity - Operations

	Air Carrier	Commuter	Total	General Aviation	Military	Total Aircraft Operations
2009	2	-	2	23000	3000	26000
2010	-	-	-	23000	3000	26000
2011	-	-	-	23000	3000	26000
2012	-	-	-	23000	3000	26000
2013	-	2	2	23000	3000	26000
2014	-	-	-	23000	3000	26000
2015	-	4	4	23000	3000	26000
2016	-	-	-	23000	3000	26000
2017	-	-	-	23000	3000	26000
2018	-	-	-	23000	3000	26000

Source: FAA 2018 TAF data for BIH, accessed February 2020

3.2 Mammoth Yosemite Airport

The current commercial air service to the Eastern Sierra region began in December 2008, when Alaska Airlines started service between the Los Angeles International Airport (LAX) and MMH. This air service was made possible by the public private alliance created between the Mammoth Mountain Ski Area (MMSA), the Town of Mammoth Lakes and Mammoth Lakes Tourism (MLT). This alliance manages the air service and provides financial support in the form of Minimum Revenue Guarantee Contract's, largely through the Tourism Business Improvement District tax managed by MLT.

Yearly enplanements grew quickly in the first few years of service, and have declined each year since the peak in 2013. Due to the location and elevation of MMH, weather issues have led to a 9-18% cancelation rate during the winter seasons. The MMH forecast provides additional analysis of the enplanement trends, including the cessation of service by Alaska Airlines in 2018.

Table 2: MMH Historical Enplanement/Operations Information

	Enplanements	Air Carrier Operations	Air Taxi Operations
2009	5,021	312	1628
2010	19,798	1228	1840
2011	26,196	1394	1824
2012	27,246	1564	1688
2013	30,858	1530	1784
2014	25,892	1404	1514
2015	23,504	1234	1472
2016	22,253	990	1634
2017	21,278	970	2976
2018	22,594	1050	2926

Source: Mammoth Yosemite Airport Aviation Activity Forecast 2019 Addendum, Mead & Hunt

Section 4. Lodging and Demand

The following section is included from the 2017 Bishop Airport Passenger Study, prepared by Leigh Fisher:

In 2016, an estimated 8,000 lodging units were located in Inyo and Mono Counties, including 4,900 fixed structures and 3,100 campground and recreational vehicle sites, as shown in Table 3. Of the fixed structures, hotel, motel, and lodge units accounted for 65% of total, followed by condos with 32%, and chalet, cabin, hostel or other units with 3%.

Table 3: Estimated Lodging Units by Type

Eastern Sierra Region

County/town	Condo	Hotel, motel, and lodge (a)	Chalet, cabin, hostel, or other	Total	Campground and recreational vehicle site	Total	Percent of total
	Lodging units						
	Fixed structures						
Mono county							
Mammoth Lakes	1,558	1,871	148	3,577	842	4,419	55%
Inyo county							
Bishop	--	931	--	931	1,134	2,065	26%
Big Pine	--	104	--	104	276	380	5%
Independence	--	30	--	30	261	291	3%
Lone Pine	--	278	--	278	589	867	11%
Subtotal--Inyo County	--	1,343	--	1,343	2,260	3,603	45%
Total	1,558	3,214	148	4,920	3,102	8,022	100%
Percent of total	19%	40%	2%	61%	39%	100%	
Percent of fixed structures	32%	65%	3%	100%			
	Estimated potential occupants per day						
Mono county							
Mammoth Lakes	7,615	7,912	671	671	3,346	19,544	63%
Inyo county (b)							
Bishop	--	1,862	--	1,862	4,536	6,398	20%
Big Pine	--	208	--	208	1,104	1,312	4%
Independence	--	60	--	60	1,044	1,104	4%
Lone Pine	--	556	--	556	2,356	2,912	9%
Subtotal--Inyo County	--	2,686	--	2,686	9,040	11,726	37%
Total	7,615	10,598	671	18,884	12,386	31,270	100%
Percent of total	24%	34%	2%	60%	40%	100%	
Percent of fixed structures	40%	56%	4%	100%			

Eastern Sierra Region includes Inyo and Mono counties.

(a) Includes bed and breakfasts.
(b) For Inyo county lodging, the number of occupants was estimated based on 2 occupants per hotel, motel, or lodging unit and 4 occupants per unit for all other types of lodging.

Sources: Mono county--Mammoth Lakes Tourism, preliminary estimates for Mammoth Lakes, December 2016.
Inyo county--Adventure Trails of the Eastern Sierra, Final Environmental Impact Statement, June 2014, www.inyocounty.us.

At 100% occupancy, the fixed structures in the Eastern Sierra Region could accommodate 18,884 people per day. During the winter season (December through March), the fixed structure lodging units in Inyo and Mono counties could accommodate 1.4 million people, assuming an average occupancy rate of 60%, to a maximum of 2.3 million, assuming 100% occupancy.

New construction of lodging facilities in the Eastern Sierra include:

- The Tioga Inn Project, located at 22 Vista Point Road near the intersection of SR 120/US 395 and about one-half mile south of Lee Vining, was originally proposed in 1993 to provide a full range of services and facilities for tourists (to Yosemite National Park, the Mono Basin National Scenic Recreation Area, and the Eastern Sierra generally), as well as meeting facilities, jobs and employee housing opportunities for area residents. The current revised proposal includes 80 new workforce bedrooms, an additional 100 seats to the full-service restaurant, and a third story to the hotel to reduce its footprint while retaining the full 120 guest rooms. The current proposal includes substantial additional parking, a park-and-ride facility for Lee Vining residents, and bus parking for Yosemite transit vehicles. The Mono County Community Development Department is planning to prepare a Subsequent Environmental Impact Report (SEIR) and Specific Plan for the Tioga Inn development. (The Sheet, Notice of Public Scoping Meeting and Preparation of Subsequent Environmental Impact Report/Specific Plan for Tioga Inn, October 22, 2016, www.thesheetnews.com.)
- Bishop Paiute Hotel and Business Incubator and Bishop Paiute Casino Project, located in the northern portion of the Bishop Paiute Reservation, includes the modernization and addition of 22,360 square feet to the existing Casino, a 60-room hotel, and a new 75-seat restaurant. Construction of the proposed project is expected to begin in March 2017. (County of Inyo, Planning Department, Environmental Assessments for Bishop Paiute Hotel and Business Incubator and Bishop Paiute Casino Project, October 18, 2016, www.inyoplanning.org)

In 2017, Mammoth Mountain was acquired by the KSL Capital Partners and Aspen/Snowmass, who became Alterra Mountain Company in early 2018. That year, Alterra created the Ikon Pass, a season pass that links 41 ski resorts across the country and world. There are now several hundred thousand Ikon pass holders across the country, which has increased visitorship to MMSA from regions beyond California.

Section 5. Forecasts

5.1 Passenger Enplanements

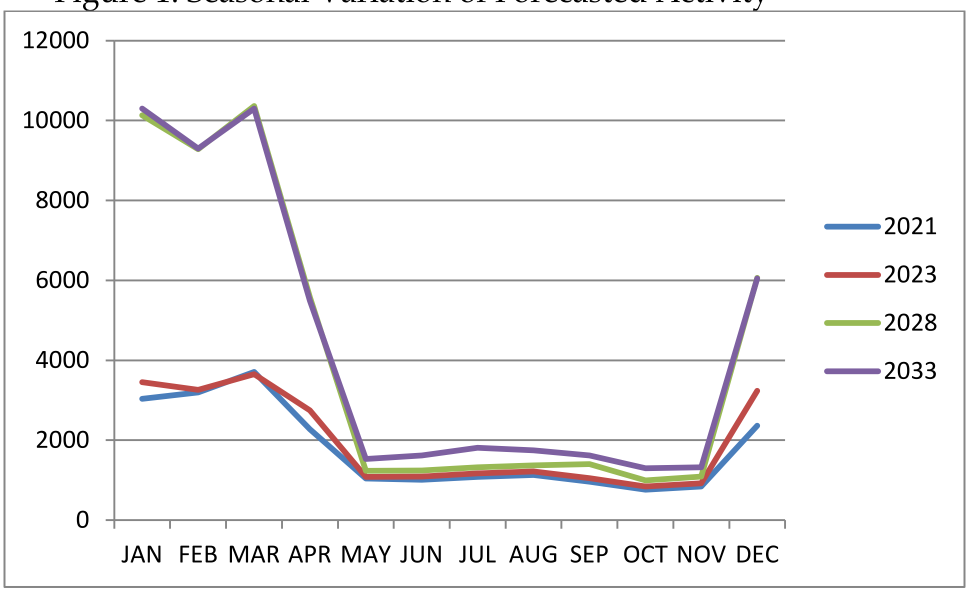
The forecast begins with three years (including the base year) of service at MMH, and is consistent with the MMH forecast. A transition of service to BIH is assumed in year 2021 (December 2020), with the same schedule of flights currently serving MMH.

i. Fleet Mix: This forecast assumes air service by United Express at BIH will start with the Bombardier CRJ 700, a C-II aircraft with 70 seats, which currently provides service to MMH. Over the first five years, the fleet will transition to the Embraer 175, a C-III with 76 seats.

ii. Load Factor: The average load factor of the United flights to the Eastern Sierra may temporarily decrease with the initiation of service at BIH, particularly with the passengers originating in Los Angeles. This load factor is predicted to grow quickly in the first few years of service as passengers see fewer cancelations due to weather, and find that there are reliable transportation options from BIH to various tourist destinations in Inyo and Mono counties. Load factors do fluctuate year to year depending on snow fall, being negatively impacted during drought years.

iii. Seasonal Schedule: The largest demand for commercial flights to the region occurs during the peak ski season, roughly December 15 – April 15. The current service to MMH includes three daily flights during the winter season; decreasing to one daily flight in the spring, summer and fall. This forecast assumes the same seasonal schedule will occur at BIH, with little growth during the spring-fall seasons.

Figure 1: Seasonal Variation of Forecasted Activity



iv. Peak Month Enplanements: In the years 2012-2018, the peak month of service at MMH has alternated between January, February and March, with March as the most consistent. The peak month percentage remaining relatively constant between 18-20%. (Source: Mead & Hunt, Mammoth Yosemite Airport Aviation Activity Forecast – 2019 Addendum). This forecast predicts the peak month percentage to remain consistent with the historical data.

Table 4: Peak Month Enplanement		
	Peak Month (March)	Peak Month % of Annual
2023	3,656	15%
2028	10,366	21%
2033	10,296	20%

v. Anticipated Changes to Service

Year	**Change to Service**
2024	Second flight to SFO
2025	DEN flight upgrades to E-175
2026	SFO and LAX are upgraded to E-175
2027	New daily flight to SAN in winter season
2028	Second flight to LAX in winter season
2029	LAX summer flights upgrade to an e-175

The changes will occur at the start of the ski season (Dec. 15) of the prior year. Due to the relatively low number of enplanements in this forecast, the addition of a single flight during the winter season leads to a large growth percentage.

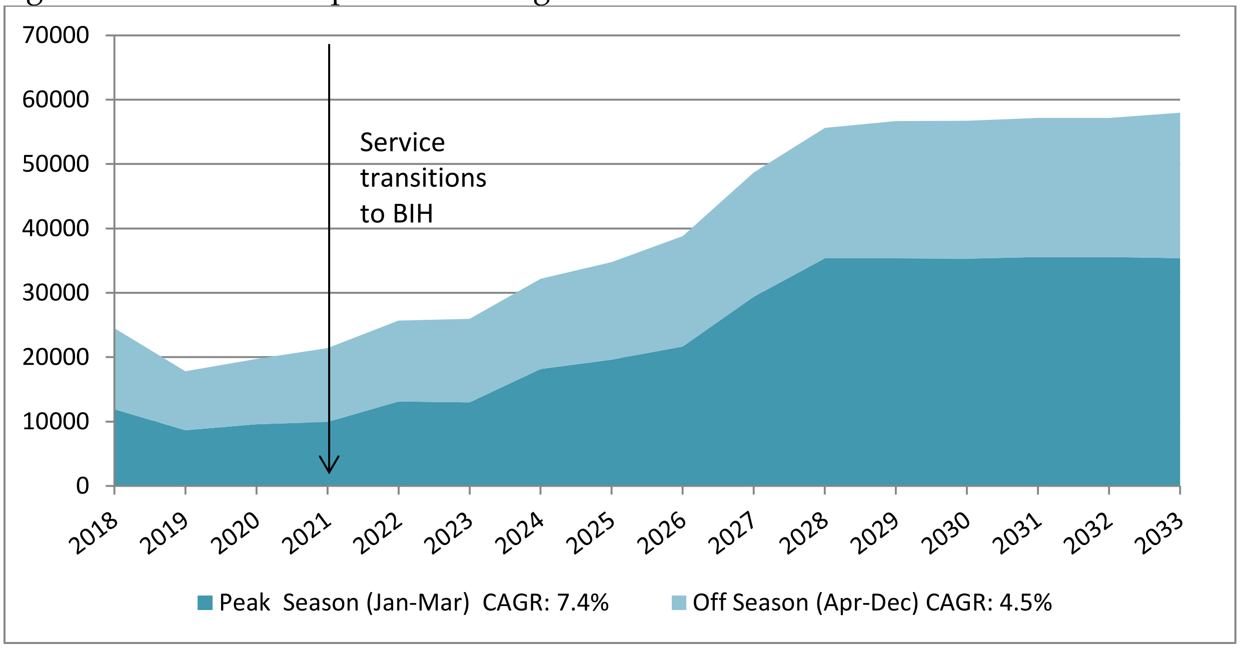
Table 5: BIH Forecast

	Year	Enplanements	Growth	Percent Growth
Base Year	2018	24,523		
Forecast	2019	17,821	-6,702	-27%
	2020	19,734	1,913	11%
	2021	21,416	1,682	9%
	2022	22,878	1,462	7%
	2023	23,742	864	4%
	2024	28,902	5,160	22%
	2025	31,299	2,397	8%
	2026	35,004	3,706	12%
	2027	43,516	8,512	24%
	2028	50,092	6,576	15%
	2029	51,160	1,068	2%
	2030	51,265	106	0%
	2031	51,655	390	1%
	2032	51,921	266	1%
	2033	52,480	558	1%

2018-19 source: FAA MMH TAF

Note: Base year and years 2019-2020 occur at MMH

Figure 2: Forecast of Enplaned Passengers



5.2 Aircraft Operations

General aviation and military operations at BIH are anticipated to remain constant over the forecast years. MMH is assumed to be the primary destination for charter flights, with occasional diversions to BIH during inclement weather. Air carrier operations are forecasted to add three daily flights to the winter season schedule over the initial 8 years of service at Bishop. These additional flights may be limited by the terminal facilities at BIH, and the timing of the planned Central Terminal (depicted on the Bishop Airport ALP, approved 5/20/19).

Table 6: BIH Aircraft Operations Forecast

	Air Carrier(2)	Commuter/ Air Taxi	General Aviation	Military	Total Aircraft Operations
2018*	1050	6	23000	3000	27056
2019*	1212	6	23000	3000	27218
2020*	1212	6	23000	3000	27218
2021	1196	6	23000	3000	27202
2022	1196	6	23000	3000	27202
2023	1226	6	23000	3000	27232
2024	1434	6	23000	3000	27440
2025	1434	6	23000	3000	27440
2026	1525	6	23000	3000	27531
2027	1732	6	23000	3000	27738
2028	1970	6	23000	3000	27976
2029	1970	6	23000	3000	27976
2030	1970	6	23000	3000	27976
2031	1970	6	23000	3000	27976
2032	1970	6	23000	3000	27976
2033	1970	6	23000	3000	27976
	Compound Annual Growth Rate				
2018-2021	4%	-	-	-	0.2% (1)
2023-2028	17%	-	-	-	0.9%
2028-2033	0%	-	-	-	0%

*Air Carrier flights before December 2020 land at MMH

Notes: (1) CAGR for Total Operations at BIH from 2018-2021 is 1.5%

(2) Air Carrier operations assume 3% cancelation rate in winter season

5.3 Comparisons with the 2018 TAF and MMH Forecast

The 2018 TAF for MMH predicts no growth in enplanements or air carrier operations over the forecast period. The TAF maintains enplanements and operations at a level lower than any year in the prior ten years of service; historical data from MMH show enplanement numbers nearly double the predicted enplanements. The decline from the peak in 2013 was due to numerous factors, the largest likely being the high cancelation rate due to weather. The substantial drop in 2019 was due in large part to Alaska Airlines discontinuing service prior to the 18/19 winter season. The cancelation rate at BIH is predicted to be less than 3%; the increased reliability is anticipated to renew interest in flights to the Eastern Sierra.

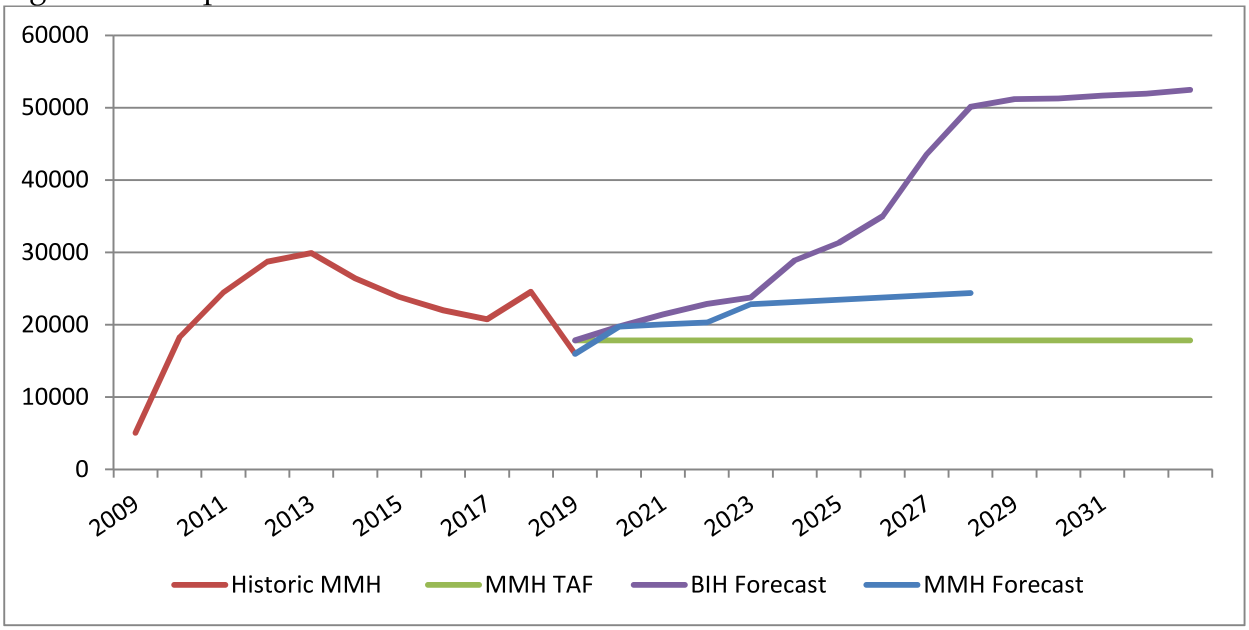
Table 7: Comparison to 2018 TAF				
	Year	Bishop Forecast	FAA 2018 TAF (a)	Percent Variance
Passenger Enplanements				
Base year	2018	24,523	24,523	0%
Base yr. + 5	2023	23,525	17,821	32%
Base yr. + 10	2028	50,027	17,821	181%
Base yr. + 15	2033	52,480	17,821	194%
Air Carrier Operations				
Base year	2018	1,050	970	8%
Base yr. + 5	2023	1,226	970	26%
Base yr. + 10	2028	1,970	970	103%
Base yr. + 15	2033	1,970	970	103%
Total Operations				
Base year	2018	27,056	26,970	0%
Base yr. + 5	2023	27,232	26,970	1%
Base yr. + 10	2028	27,976	26,970	4%
Base yr. + 15	2033	27,976	26,970	4%

(a) Includes air carrier operations from MMH and GA/Military from BIH

The recent MMH 10 year forecast (Mead & Hunt, 2019) predicts modest growth over the forecast period. Assumptions include a second flight to LAX in the winter season beginning in 2020 and the addition of a winter flight to SAN in 2023; load factors remain relatively low. The BIH forecast introduces additional flights over a longer timeframe, with a total of three additional winter season flights. This forecast also assumes higher load factors due to greater reliability.

Table 8: Comparison to MMH 2019 Forecast				
	Year	Bishop Forecast	FAA 2018 TAF (a)	Percent Variance
Passenger Enplanements				
Base year	2018	24,523	22,594	9%
Base yr. + 5	2023	28,118	22,824	23%
Base yr. + 10	2028	50,523	24,387	107%
Base yr. + 15	2033	52,480	N/A	
Air Carrier Operations				
Base year	2018	1,050	1,050	0%
Base yr. + 5	2023	1,226	1,458	-16%
Base yr. + 10	2028	1,970	1,458	35%
Base yr. + 15	2033	1,970	N/A	
Total Operations				
Base year	2018	28,112	27,050	4%
Base yr. + 5	2023	29,284	27,458	7%
Base yr. + 10	2028	30,492	27,458	11%
Base yr. + 15	2033	30,492		
(a) Includes air carrier operations from MMH and GA/military from BIH				

Figure 3: Comparison of historical data and forecasts



Appendix A

Airline Letter of Support

UNITED

Dan Malinowski
Director, Domestic Network Planning
Network Planning

Attn: Mark McClardy
Director FAA Western-Pacific Region
777 S. Aviation Blvd., Suite 150
El Segundo, CA 90245

December 12, 2019

Dear Mr. McClardy:

In May 2018 United airlines shared our support of Mammoth Lakes commercial service to switch from Mammoth Yosemite Airport (MMH) to Bishop Airport (BIH) in late 2020. Once open, United will immediately shift our current LAX service on Canadair CRJ-700 aircraft to BIH. We hope to have commercial service available in time for seasonal service to/from SFO and DEN to begin in the latter half of December 2020.

Regarding ARFF equipment needed, in addition to the CRJ-700 we will consider our full set of regional aircraft (E-175, CRJ-200, ERJ-145, etc.) for BIH service in the future. We anticipate less operational restrictions than MMH today, allowing increased aircraft options.

We look forward to this new chapter of service in the Mammoth Lakes region.

If any follow-up information is required, please contact:

Tom Kremer
Principal, Domestic Network Planning
Thomas.Kremer@United.com

Sincerely,

Dan Malinowski
Director, Domestic Network Planning

CC via Email:

Clint Quilter	Eric Clark
Public Works Director	COO
Inyo County	Mammoth Lakes Resort

D-4 Terminal Area Forecast for Bishop Airport

ESA

APO TERMINAL AREA FORECAST DETAIL REPORT
Forecast Issued March 2022

BIH

	AIRCRAFT OPERATIONS														
	Enplanements			Itinerant Operations					Local Operations						
Fiscal Year	**Air Carrier**	**Commuter**	**Total**	**Air Carrier**	**Air Taxi & Commuter**	**GA**	**Military**	**Total**	**Civil**	**Military**	**Total**	**Total Ops**	**Total Tracon Ops**	**Based Aircraft**
REGION:AWP **STATE:**CA **LOCID:**BIH															
CITY:BISHOP **AIRPORT:**BISHOP															
2018	0	0	0	0	0	16,000	3,000	19,000	7,000	0	7,000	26,000	0	34
2019	0	4	4	0	0	16,000	3,000	19,000	7,000	0	7,000	26,000	0	29
2020	0	0	0	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2021*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2022*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2023*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2024*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2025*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2026*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2027*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2028*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40
2029*	0	19	19	0	250	7,000	800	8,050	3,500	0	3,500	11,550	0	40

Appendix E
Agency Coordination

E-1 Notice of Preparation

E-2 Notice of Preparation Contact List

ESA

APPENDIX E

Agency Coordination

E-1 Introduction

Under 40 CFR § 1501.4, federal agencies are required to involve environmental agencies, applicants, and the public, to the extent practicable, in the preparation of EAs. The primary components of the agency coordination and consultation and public involvement program for this EA include:

- Issuance of Notice of Preparation of a Draft Environmental Assessment
- Publication of the Draft EA Notice of Availability;
- Circulation of the Draft EA and for agency and public review; and
- Preparation of a Final EA that will include responses to comments received on the Draft EA.

Keeping agencies and the public informed and gathering their input is an essential component of any environmental study. The following sections summarize the agency coordination and public involvement program for this EA.

E-2 Notice of Preparation

On January 13, 2023, Inyo County issued a Notice of Preparation of an Environmental Assessment for the Runway 12-30 Runway Safety Area Improvement Project at Bishop Airport. An example of the Notice of Preparation is provided in Appendix E-1. The mailing list for the Notice of Preparation is provided in Appendix E-2. Two responses were received from the Notice of Preparation:

E-3 California State Historic Preservation Officer

On March 15, 2024 The FAA initiated correspondence with the California State Historic Preservation Officer (SHPO) and communicated its determination that the Proposed Project would not alter, directly or indirectly, any of resources within or intersected by the area of potential effects as defined in 36 CFR § 800.5. Consultation with the SHPO in accordance with Section 106 of the NHPA is ongoing at the time of Draft EA publication.

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E-1 Notice of Preparation

County of Inyo
AIRPORT DIVISION
703 Airport Road, Bishop CA
(760) 872-2971

Michael Errante, Airport Manager
Ashley Helms, Deputy Airport Manager
Steve Loven, Airport Operations Supervisor

1/13/2023

Martin Adams
LADWP
P.O. Box 51111
Los Angeles, CA 90051-0100

SUBJECT: Notice of Preparation of an Environmental Assessment for the Runway 12-30 Runway Safety Area Improvement Project at Bishop Airport

Dear Sir or Madam:
Inyo County (County), in coordination with the Federal Aviation Administration (FAA), is preparing an Environmental Assessment (EA) for proposed improvements to the Runway 12-30 Runway Safety Area (RSA) at Bishop Airport in unincorporated Inyo County, California. The EA is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA)(42 U.S.C. §§ 4321-4335), Council of Environmental Quality (CEQ) regulations (40 CFR parts 1500-1508), FAA Order 10.50.1F, *Environmental Impacts: Policies and Procedures*, and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. It is anticipated the Draft EA will be completed in Summer 2023 and made available for agency and public review. After consideration of the environmental findings and public and agency comments, the FAA will make its decision to either prepare an Environmental Impact Statement or issue a Finding of No Significant Impact. The project is also subject to discretionary review and approval by Inyo County and is subject to the requirements of the California Environmental Quality Act (CEQA)(Pub. Res. Code § 21000 *et seq*.). A draft CEQA document will be prepared for the Proposed Project and released to the public for review and comment in tandem with the release of the Draft EA.
On behalf of the FAA, we are sending you this letter to:

1) inform you of the preparation of the EA,
2) request any information relevant to project's environmental setting to be considered in the EA, and
3) obtain an understanding of any interest, issues, concerns your agency may have regarding the Proposed Project.

Proposed Project Location
Bishop Airport (BIH or the Airport) is a public-use airport located in Inyo County (County) in the Eastern Sierra region of California. The Airport is owned and operated by Inyo County, the airport sponsor, and is situated on land leased from the City of Los Angeles Department of Water and Power (LADWP). BIH is located approximately 1.5 miles east of the city of Bishop and approximately 45 miles southeast of the town of Mammoth Lakes. The location of the Airport is shown on **Attachment 1**.

Background
A Runway Safety Area (RSA) is a rectangular area surrounding a runway that is designed to enhance safety for aircraft that undershoot, overrun, or otherwise leave the paved runway surface. Per FAA regulations, an airport must keep the RSA cleared, graded, drained, and accessible by firefighting and rescue equipment. The FAA defines RSA standards and dimensions based on the type of aircraft using the airport. Following these guidelines, the standard RSA for Runway 12-30 would be 500 feet wide, centered on the runway centerline, and extend 1,000 feet beyond the runway end. The RSA surface should have no more than a three percent slope for 200 feet off the runway end and a maximum slope of five percent thereafter. The FAA regularly re-evaluates standard and non-standard RSAs at

airports nationwide and requires airports to make incremental improvements where necessary. In situations where there is insufficient land available in which to develop a standard RSA, or if existing obstacles make a standard RSA impossible, the FAA works with airports to find alternative solutions. Bishop Airport is currently maintaining a non-standard RSA for Runway 12-30. The Proposed Project would bring the RSA into compliance with FAA regulations.

Description of the Proposed Project

To satisfy FAA regulations for runways serving the type of aircraft currently operating on Runway 12-30, the Proposed Project would correct the nonstandard length, width, and grading for the RSA. The RSA beyond the Runway 12 end would be brought into compliance with FAA standards by cutting, filling, grading, and compacting approximately 7.8 acres of land within the RSA beyond the Runway 12 end. This area is beyond the current Airport perimeter fence on land outside the current leasehold with the Los Angeles Department of Water and Power (LADWP), but within the Airport's easement. An existing LADWP unpaved patrol road would be relocated outside the runway's Object Free Area (OFA), which is the same length as the RSA with a width of 800 feet. The portion of relocated road would be approximately 15 feet wide and 1/4 mile long. In addition, approximately 1,635 linear feet (LF) of existing fence would be removed and approximately 2,175 LF of new perimeter fence would be installed beyond the OFA boundary.

The RSA beyond the Runway 30 end would be brought into compliance with FAA standards by clearing, cutting, filling, and grading approximately 6.5 acres. This area is outside the current leasehold with LADWP, but within the Airport's easement. In addition, approximately 2,000 LF of fence would be removed and approximately 3,125 LF of new fence would be installed outside the OFA.

The necessary fill material for the RSAs will generally be taken from the cut material in the RSAs. In the event more material is required, a borrow area has been identified immediately adjacent to the RSA beyond the Runway 12 end. The RSA alongside the runway are generally in compliance with FAA regulations but would be graded to ensure an adequate, flat surface throughout. The Proposed Project is depicted on **Attachment 2, 3** and **4.**

Need for the Proposed Project

The compliant portion of the RSA beyond the Runway 12 end has been determined to be 715 feet short of the required 1,000 feet. Similarly, the RSA beyond the Runway 30 end has been determined to be 360 feet short of the required 1,000 feet. The Proposed Project would correct these deficiencies and bring the RSAs into compliance with FAA regulations.

We appreciate your input on the proposed RSA Improvement Project at BIH. If you would like additional information or wish to discuss the project, you can contact me at (760) 878-0200 or by email at ahelms@inyocounty.us. You may also mail any comments or information you feel is pertinent to the environmental review process to:

Ashley Helms
Deputy Director - Bishop Airport
PO Box Q
Independence, CA 93526.

If you wish to receive notice of publication of the Draft EA and the Draft CEQA document, please confirm your point of contact and address. We kindly request that you provide your comments or other information within thirty (30) days of receipt of this letter.

Sincerely,

A Helms

Ashley Helms,
Deputy Director - Bishop Airport

CC: Federal Aviation Administration, Los Angeles Airports District Office

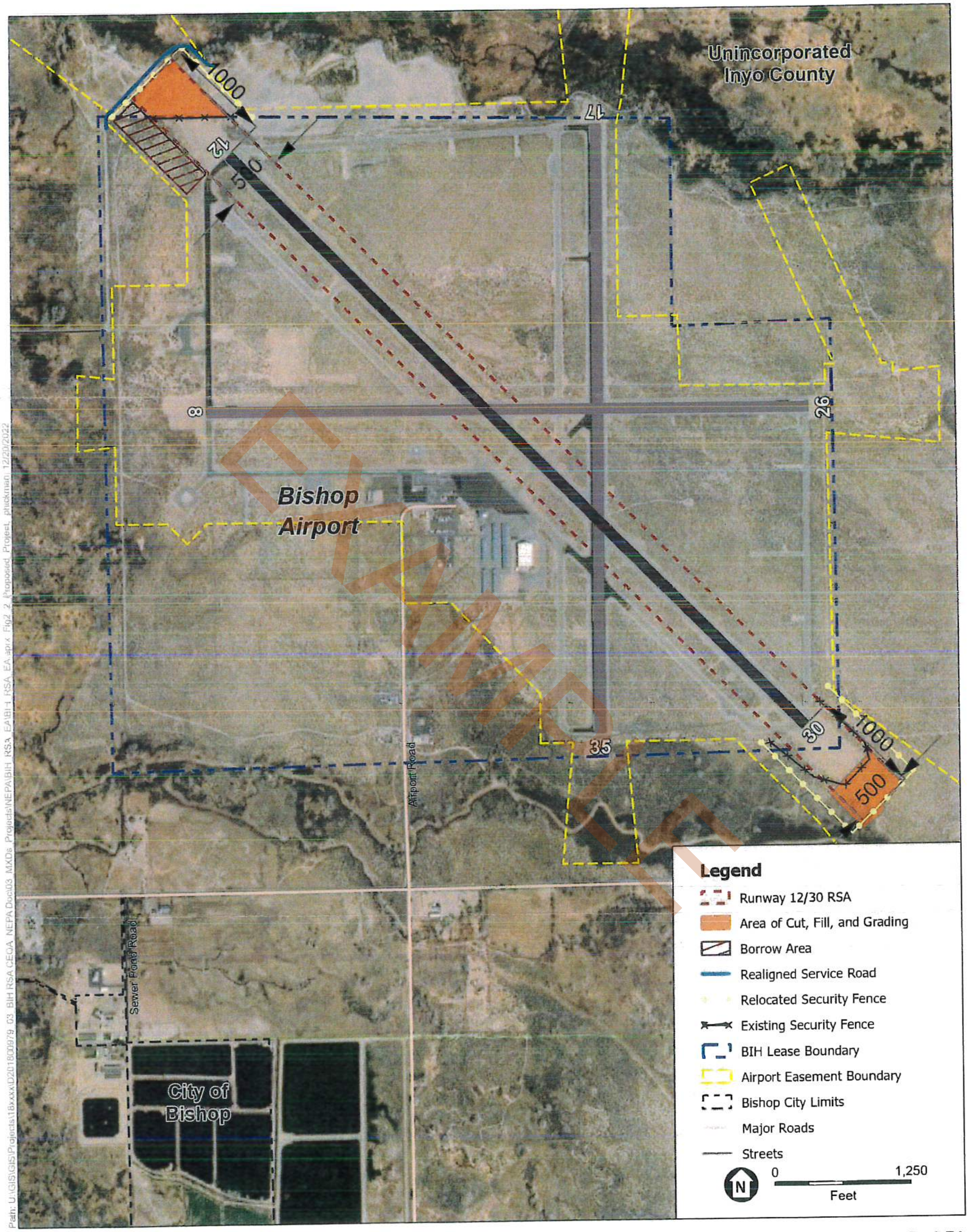
Attachments:
1. Project Location
2. Proposed Project – Overall Project
3. Proposed Project – Runway 12 RSA
4. Proposed Project – Runway 30 RSA

SOURCE: Esri; Inyo County Department of Public Works; ESA, 2020.

Runway Safety Area Improvement Project at Bishop Airport Draft EA

Figure 1
Bishop Airport Location

ESA



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway Safety Area Improvement Project at Bishop Airport Draft EA

Figure 2
Proposed Project
Runway 12/30

ESA

SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway Safety Area Improvement Project at Bishop Airport Draft EA

Figure 3
Proposed Project
Runway 12 End

ESA

SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway Safety Area Improvement Project at Bishop Airport Draft EA

Figure 4
Proposed Project
Runway 30 End

ESA

E-2 Notice of Preparation Contact List

TABLE 1
NOTICE OF PREPARATION CONTACT LIST

Agency	Point of Contact	Address
Federal		
US Army Corps of Engineers, Los Angeles District (USACE)		915 Wilshire Blvd, Ste 1101 Los Angeles, CA 90017
US Fish and Wildlife Service, Pacific Southwest Region Headquarters (USFWS)		Federal Building 2800 Cottage Way Sacramento, CA 95825
US Environmental Protection Agency, Region 9 (USEPA)	Jean Prijatel, Manager – Environmental Review Branch	US EPA Mail Code 2252A 1200 Pennsylvania Ave, NW Washington, D.C. 20460
US Natural Resource Conservation Service (NRCS)	Carlos Suarez, State Conservationist	430 G St., # 4164 Davis, CA 95616-4164
Federal Aviation Administration, Los Angeles Airports District Office (FAA)	Cathryn Cason, Manager	777 S Aviation Blvd, Ste 150 El Segundo, CA 90245
Federal Emergency Management Agency, Region 9 (FEMA)	Robert Fenton, Jr., Region 9 Administrator	
State		
California Department of Fish and Wildlife, Inland Deserts Region		787 North Main Street, Suite 220 Bishop, CA 93514
California Environmental Protection Agency (CalEPA)	Yana Garcia, Secretary for Environmental Protection	P.O. Box 2815 Sacramento, CA 95812-2815
Office of Environmental Health Hazard Assessment (OEHHA)	Amy Gilson, Deputy Director, External and Legislative Affairs	Post Office Box 4010 Sacramento, CA 95812-4010
California Air Resources Board (CARB)	Stanley Young, Director of Communications	P.O. Box 2815 Sacramento, CA 95812
Department of Resources Recycling and Recovery (CalRecycle)		Department of Resources Recycling and Recovery (CalRecycle) P.O. Box 4025 Sacramento, CA 95812-4025
State Water Resources Control Board, Lahontan Region (State Water Board)		15095 Amargosa Road, Bldg 2, Ste 210, Victorville, CA 92394

TABLE 1
NOTICE OF PREPARATION CONTACT LIST

Agency	Point of Contact	Address
Office of Historic Preservation (SHPO)	Julianne Polanco, State Historic Preservation Officer	1725 23rd Street Suite 100 Sacramento, CA 95816
Governor's Office of Planning and Research (OPR)	Scott Morgan, Chief Deputy Director, State Clearinghouse Director	1400 Tenth Street Sacramento, CA 95814
California Department of Transportation, District 9 (Caltrans)		500 S. Main Street Bishop, CA 93514
Local		
Inyo County Clerk-Recorder	Danielle Sexton	P.O. Drawer F Independence, CA 93526
Los Angeles Department of Water and Power (LADWP)	Martin L. Adams, General Manager	P.O. Box 51111 Los Angeles, CA 90051-0100
City of Bishop, Department of Public Works		P. O. Box 1236 Bishop, CA 93514
Inyo County Local Agency Formation Commission (LAFCO)		P. O. Drawer L Independence, CA 93526
Inyo County CalRecycle Enforcement Agency, Enviornmental Health Services		P. O. Box 427 Independence, CA 93526
Bishop Unified School District	Katie Kolker, Superintendent	656 W. Pine Street Bishop, CA 93514
Inyo-Mono Resource Conservation District		270 North See Vee Lane, Suite 6 Bishop, CA 93514
Owens Valley Groundwater Authority		P. O. Box 337 Independence, CA 93514
Bishop Area Chamber of Commerce	Tawni Thomson, Executive Director	690 North Main Street Bishop, CA 93514
Tribal		
Big Pine Paiute Tribe of the Owens Valley	Jacqueline "Danelle" Gutierrez, Tribal Historic Preservation Officer	PO Box 700 Big Pine, CA 93513

TABLE 1
NOTICE OF PREPARATION CONTACT LIST

Agency	Point of Contact	Address
Big Pine Paiute Tribe of the Owens Valley	L'eaux Stewart, Chairperson	PO Box 700 Big Pine, CA 93513
Bishop Paiute Tribe	Harlan Dewey, Tribal Historic Preservation Officer	50 Tu Su Lane Bishop, CA 93514
Bishop Paiute Tribe	Meryl Picard, Tribal Chairwoman	50 Tu Su Lane Bishop, CA 93514
Fort Independence Indian Community of Paiutes	Sean Scruggs, Tribal Historic Preservation Officer	PO Box 67 (Fort) Independence, CA 93526
Fort Independence Indian Community of Paiutes	Carl Dahlberg, Chairman	PO Box 67 Independence, CA 93526
Lone Pine Paiute-Shoshone Tribe	Janet Hansen, Chairperson	PO Box 747 Lone Pine, CA 93545
Lone Pine Paiute-Shoshone Tribe	Mel O. Joseph, Environmental Director	PO Box 747 Lone Pine, CA 93545
Timbisha Shoshone Tribe	Barbara Durham, Tribal Historic Preservation Officer	621 W. Line Street Suite 109 Bishop, CA 93514
Timbisha Shoshone Tribe	George Gholson, Chairperson	621 W. Line Street Suite 109 Bishop, CA 93514
Twenty-Nine Palms Band of Mission Indians	UNKNOWN, Tribal Historic Preservation Officer	46-200 Harrison Place Coachella, CA 92236
Twenty-Nine Palms Band of Mission Indians	Darrell Mike, Tribal Chairperson	46-200 Harrison Place Coachella, CA 92236
Cabazon Band of the Mission Indians	Jacquelyn Barnum, Environmental Director	84-245 Indio Springs Parkway Indio, CA 92203
Cabazon Band of the Mission Indians	Doug Todd Welmas	84-245 Indio Springs Parkway Indio, CA 92203
Torez Martinez Desert Cahuila Indians	Thomas Tortez, Jr., Tribal Chairman	PO Box 1160 Thermal, CA 92274

TABLE 1
NOTICE OF PREPARATION CONTACT LIST

Agency	Point of Contact	Address
Torez Martinez Desert Cahuila Indians	Michael Mirelez, Cultural Resource Coordinator	PO Box 1160 Thermal, CA 92274

SOURCE: Environmental Science Associates, 2022.

Appendix F
Public Involvement

APPENDIX F
Public Involvement

F-1 Introduction

Under 40 CFR § 1501.4, federal agencies are required to involve environmental agencies, applicants, and the public, to the extent practicable, in the preparation of EAs. The primary components of the agency coordination and consultation and public involvement program for this EA include:

- Publication of the Notice of Preparation of the Draft EA;
- Circulation of the Draft EA and for agency and public review; and
- Preparation of a Final EA that will include responses to comments received on the Draft EA.

Keeping agencies and the public informed and gathering their input is an essential component of any environmental study. The following sections summarize the public involvement program for this EA.

[FORTHCOMING]

Appendix G
Air Quality Technical Analysis

G-1 Air Quality Technical Analysis Report

Draft

RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Air Quality and Climate Analysis

Prepared for
Inyo County Department of Public Works

February 2024

Draft

RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Air Quality and Climate Analysis

Prepared for
Inyo County Department of Public Works

February 2024

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500
esassoc.com

ESA

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TABLE OF CONTENTS
Air Quality and Climate Analysis

List of Tables

PROPOSED IMPROVEMENT OF THE RUNWAY SAFETY AREA AT BISHOP AIRPORT

Air Quality and Climate Analysis

1. Introduction and Overview

This report provides an analysis and overview of the air quality and climate modeling data preparation and resulting aircraft and roadway operational emissions for the 2022 Existing Condition and future years of 2024 and 2029 at Bishop Airport (BIH). This air quality and climate analysis was prepared as a part of the Environmental Assessment (EA) for the construction of new runway safety areas (RSA) for Runway 12/30. The FAA's Aviation Environmental Design Tool version 3e (AEDT 3e) was used to develop aircraft and ground support equipment (GSE) emissions. The Project's construction emissions were estimated using the California Emissions Estimator Model (CalEEMod) (Version 2020.4.0) software, which is a statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with construction and operations from a variety of land use projects. CalEEMod is based on outputs from the CARB OFFROAD model and the CARB on-road vehicle emissions factor (EMFAC) model, which are emissions estimation models developed by CARB and used to calculate emissions from construction and operational activities. Roadway emissions during construction and operations were estimated outside of CalEEMod using EMFAC2021 emission factors.

The aircraft and roadway operational emissions were prepared using the existing and forecasted aircraft and vehicle activity for the BIH EA. A detailed discussion of the model inputs used to develop air quality and greenhouse gas (GHG) emissions calculations is included in the following sections.

2. Regulatory Setting

This section provides information pertaining to regulatory conditions in the project area, which includes the Great Basin Valleys – Air Basin. For example, this includes information on attainment/nonattainment designations, and applicable regulatory criteria and/or thresholds that will be applied to the results of the air quality assessment.

2.1 Federal

The United States Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3) and its precursors such as oxides of nitrogen (NO_x) and volatile organic compounds (VOCs), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). In complying with the National Environmental Policy Act (NEPA), the FAA must determine if a Federal Action would cause criteria pollutant concentrations to exceed the NAAQS.

FAA will evaluate if the emissions caused by the Proposed Action would result in a significant impact under the FAA's NEPA threshold (discussed in Section 3.2 below). While there are four air quality plans in the Great Basin Unified Air Pollution Control District (GBUAPCD), none of them are applicable to the project area.

Exhibit 4-1 of the FAA's 1050.1F Desk Reference provides the FAA's significance thresholds for air quality:

> *"The action would cause pollutant concentrations to exceed one or more of the [NAAQS], as established by the [EPA] under the [CAA], for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations."*

2.2 State of California

The Clean Air Act (CAA) allows states to adopt air quality regulations and standards provided they are at least as stringent as the NAAQS. The California Air Resources Board (CARB) was tasked with establishing the California Ambient Air Quality Standards (CAAQS) via the California Clean Air Act of 1988 (CCAA). This motion established CAAQS for pollutants not covered in the NAAQS including sulfates, H_2S, vinyl chloride, and visibility-reducing particles.

Like NAAQS, geographic areas that do not meet the CAAQS are called "nonattainment areas." The CARB is responsible for enforcing regulations to achieve and maintain the NAAQS and CAAQS. The CARB is responsible for reviewing operations and programs in local air districts and requires each air district with jurisdiction over a nonattainment area to develop a strategy for achieving the NAAQS and CAAQS. The local air district, in this case the GBUAPCD, is responsible for the development, implementation, and enforcement of rules and regulations designed to attain the NAAQS and CAAQS in the Great Basin Valleys – Air Basin.

The California Air Toxics Program is an established two-step process of risk identification and risk management to address potential health effects from exposure to toxic substances in the air. In the risk identification step, CARB and (Office of Environmental Health Hazard Assessment OEHHA) determine if a substance should be formally identified, or "listed," as a TAC in California. In the risk management step, CARB reviews emission sources of an identified TAC to determine whether regulatory action is needed to reduce risk. Based on results of that review, CARB has promulgated a number of Airborne Toxic Control Measures (ATCMs), both for stationary and mobile sources, including On-Road and Off-Road Vehicle Rules. These ATCMs include measures such as limits on heavy-duty diesel motor vehicle idling and emission standards for off-road diesel construction equipment in order to reduce public exposure to DPM and other TACs. These actions are also supplemented by the Assembly Bill (AB) 2588 Air Toxics “Hot Spots” program and Senate Bill (SB) 1731, which require facilities to report their air toxics emissions, assess health risks, notify nearby residents and workers of significant risks if present, and reduce their risk through implementation of a risk management plan. SCAQMD has further adopted two rules to limit cancer and non-cancer health risks from facilities located within its jurisdiction. Rule 1401 (New Source Review of Toxic Air Contaminants) regulates new or modified facilities, and Rule 1402 (Control of Toxic Air Contaminants from Existing Sources) regulates facilities that are already operating. Rule 1402 incorporates requirements of the AB 2588 program, including implementation of risk reduction plans for significant risk facilities.

2.2.1 Great Basin Unified Air Pollution Control District

GBUAPCD is the air pollution control agency with jurisdiction over Alpine, Mono, and Inyo County. The Great Basin Valleys - Air Basin (Air Basin) covers the whole GBUAPCD jurisdiction. The purpose of the GBUAPCD is to enforce federal, state, and local air quality regulations and to ensure that the federal and state air quality standards are met.

There are four air quality plans that are currently adopted by the GBUAPCD: Owens Valley PM10 State Implementation Plan (SIP), Mono Basin PM10 SIP, Coso Junction PM_{10} SIP, and the Mammoth Lakes Air Quality Management Plan (AQMP). None of these air quality plans are applicable to the proposed action.

2.2.2 Greenhouse Gases

The climate change regulatory setting – international, federal, state, and local – is complex and rapidly evolving. The EPA is responsible for implementing federal policies to address GHGs. The federal government administers a wide array of public-private partnerships to reduce the quantity of GHGs generated in the United States. The EPA has published endangerment findings for greenhouse gases indicating that emissions of GHGs from new motor vehicles and certain aircraft contribute to air pollution that endangers the public health and welfare under the CAA, Section 202(a).

The Council on Environmental Quality (CEQ) affirmed that NEPA and its implementing regulations (40 CFR 1500 et. seq.) apply to GHGs and climate change. GHGs include carbon dioxide (CO_2), methane (CH_4), NO_2, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3). Despite this guidance, there are no significance thresholds associated with GHGs. CEQ instructs Federal agencies to disclose a project’s contribution to GHGs in a study area although the need to disclose such emissions for General Conformity purposes does not exist.

A number of California statutes, policies and regulations have been promulgated to reduce the growth in GHG emissions. The FAA has not established a significance threshold for climate and GHG emissions, nor has the FAA identified specific factors to consider in making a significance determination for GHG emissions. Given the small percentage of emissions that aviation projects contribute, a NEPA analysis is not required to attempt to link specific climate impacts to the Proposed Action or alternative(s).

2.3 Attainment Status

The Airport is located in Inyo County, within the GBUAPCD. The NAAQS and CAAQS attainment status for the GBUAPCD is presented in **Table 2-1.**

2.4 Existing Conditions

GBUAPCD monitors air quality at 14 locations throughout Inyo County. The closest air quality monitoring station is located at the White Mountain Research Center on East Line St., about 1.2 miles southeast of the Airport. The White Mountain Research Center monitors concentrations of ozone, CO, SO_2, $PM_{2.5}$ and PM_{10}. There are no monitoring stations that measure concentrations of NO_2 near the Airport. **Table 2-2** summarizes air quality data from the White Mountain Research Station for the most recent four years.

The climate of the GSA and Air Basin is determined by its terrain and geographical location. The Basin is situated in a valley with the Sierra Nevada Mountains to the west and the White-Inyo Mountains to the east. The Sierra Nevada Mountains to the west act as a barrier to precipitation creating a ‘rain shadow’ in the basin. For this reason, the region has an arid climate with an average annual rainfall of about five inches. The temperature typically varies between 22°F to 97°F throughout the year with the hottest months in June through August. The average wind speed ranges from around five miles per hour (mph) in the fall to seven mph in the spring.

TABLE 2-1
CAAQS AND NAAQS IN THE GREAT BASIN VALLEYS – AIR BASIN

Criteria Air Pollutant	NAAQS Attainment Status	CAAQS Attainment Status
Ozone (1-Hour) Ozone (2015 8-Hour)	Unclassified/Attainment Unclassified/Attainment	Nonattainment
CO (1-Hour and 8-Hour)	Unclassified/Attainment	Attainment
NO_2 (1-Hour) NO_2 (Annual)	Unclassified/Attainment Unclassified/Attainment	Attainment
SO_2 (1-Hour) SO_2 (24-Hour and Annual)	Unclassified/Attainment Unclassified/Attainment	Attainment
PM_{10} (24-Hour)	Unclassified/ Nonattainment (Owens Valley)	Nonattainment
$PM_{2.5}$ (2012 Annual) $PM_{2.5}$ (2006 24-Hour)	Unclassified/Attainment Unclassified/Attainment	Attainment
Lead	Unclassified/Attainment	Attainment

SOURCE: EPA, 2022. CARB, 2020.

TABLE 2-2
AIR QUALITY MONITORING DATA SUMMARY (2019-2022)

Pollutant	Monitoring Data by Year			
	2019	2020	2021	2022
Ozone (O_3)				
Highest 1 Hour Average (ppm)	0.069	0.079	0.081	0.075
Days over National Standard	0	0	0	0
Highest 8 Hour Average (ppm)	0.064	0.073	0.075	0.068
Days over National Standard (0.070 ppm)	0	1	4	0
Sulfur Dioxide (SO_2)				
Highest 1 Hour Average (ppb)	0.9	0.9	0.6	0.6
Days over National Standard (75 ppb)	0	0	0	0
Highest 24 Hour Average (ppb)	0.2	0.3	0.3	0.4
Days over National Standard (140 ppb)	0	0	0	0
Carbon Monoxide (CO)				
Highest 1 Hour Average (ppm)	1.6	2.2	0.9	0.3
Days over Federal Standard (35 ppm)	0	0	0	0
Highest 8 Hour Average (ppm)	1.2	1.7	0.8	0.3
Days over National Standard (9.0 ppm)	0	0	0	0
Particulate Matter ≤ 10 Microns (PM_{10})				
Highest 24 Hour Average ($\mu g/m^3$) [a]	742	788	151	478
Estimated Days over National Standard (150 $\mu g/m^3$)	3	10	0	3
Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$)				
Highest 24 Hour Average ($\mu g/m^3$) [a]	98.9	196.9	89.7	42.2
Estimated Days over National Standard (35 $\mu g/m^3$)	--	--	--	--

SOURCES: EPA. Outdoor Air Quality Data; Monitor Values Report. 2022.
NOTES:
ppm = parts per million
ppb = parts per billion
$\mu g/m^3$ = micrograms per cubic matter
-- There was insufficient data available to determine the value
[a] exceptional events excluded

2.4.1 Existing Inventory

The sources of air emissions associated with the Airport are typical of a small commercial service facility used mainly by general aviation aircraft. Emission sources include aircraft during the landing/take-off cycle and airport-related motor vehicles (e.g., passenger vehicles, heavy trucks, shuttles, etc). The Airport does not include any stationary sources such as diesel-powered generators. Emissions from aircraft auxiliary power unit (APU) and ground support equipment (GSE) were modeled for commercial service jet aircraft using AEDT default GSE assignments. Detailed GSE information is shown in **Table 3-1**. The bulk of air pollutants emissions generated from the Airport are produced by aircraft operations and off-airport vehicular travel.

The existing condition (2022) air pollutant emissions inventory for the Airport is presented in **Table 2-3**. The existing conditions air pollutant emissions inventory was developed using the most recent version of FAA's AEDT 3e[1] and the EMFAC2021 web database for motor vehicles.

TABLE 2-3
EXISTING CONDITIONS AIR POLLUTANT EMISSIONS INVENTORY (ANNUAL TONS)

Source	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	92.13	5.17	5.52	0.96	0.17	0.17
GSE	5.36	0.19	0.45	0.00	0.02	0.02
Off-Airport Vehicular Travel	1.34	0.19	2.12	0.01	0.56	0.17
Total	**98.83**	**5.55**	**8.09**	**0.97**	**0.75**	**0.36**

SOURCE: Environmental Science Associates, 2023.

NOTES:
CO = carbon monoxide
NO_x = oxides of nitrogen
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter
SO_X = oxides of sulfur
VOC = volatile organic compound
Aircraft emissions inventory includes emissions from APU

Similar to the existing calculations conducted for the criteria pollutants, existing GHG emissions were calculated for aircraft operations and off-airport vehicular travel. **Table 2-4** shows GHG emissions at the Airport for 2022. Using AEDT 3e, the amount of CO_2 was calculated for aircraft operations. CH_4 and nitrous oxide (N_2O) for aircraft were calculated using the methods found in the FAA *Aviation Emissions and Air Quality Handbook* (Version 3, Update 1). Emissions of GHGs from mobile sources, such as light-duty vehicles associated with passenger traffic and larger trucks, were calculated using the EMFAC2021 web database.

[1] The AEDT model replaced FAA's legacy modeling tools for emissions (the Emissions and Dispersion Modeling System (EDMS)) and noise (the Integrated Noise Model (INM)).

TABLE 2-4
EXISTING CONDITIONS (2022) GREENHOUSE GAS EMISSIONS
(ANNUAL METRIC TONS)

Source		Carbon Dioxide Equivalent (CO_2e) (metric tons)
Aircraft*		2,004.80
Off-Airport Vehicular Travel		1,411.92
	2022 Total	**3,416.72**

SOURCE: Environmental Science Associates, 2023.

*Includes emissions from GSE

3. Air Quality

3.1 Thresholds of Significance

Exhibit 4-1 of FAA Order 1050.1F provides the FAA's significance threshold for air quality, which states, "The action would cause pollutant concentrations to exceed one or more of the NAAQS, as established by the EPA under the CAA, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations." Since the GSA is not located in an EPA-designated nonattainment or maintenance area for any of the NAAQS, the General Conformity Rule (Section 176(c)(1) of the CAA) de minimis thresholds are not applicable to the Proposed Action.

3.2 Methodology

3.2.1 Construction

The Project's construction emissions were estimated using the CalEEMod software, which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant emissions associated with construction and operations from a variety of land use projects. The model was developed for the CAPCOA in collaboration with the California air districts. CalEEMod is based on outputs from the CARB OFFROAD model and the CARB EMFAC model, which are emissions estimation models developed by CARB and used to calculate emissions from construction activities, heavy-duty off-road equipment, and on-road vehicles. Emissions from on-road vehicles were estimated outside of CalEEMod using EMFAC2021 emission factors for haul and material vendor trucks and worker vehicles.

3.2.1.1 No Action Construction

The No Action Alternative would require construction activities to relocate the existing Runway 12 PAPI as implementation of a permanently displaced threshold would necessitate continued use of declared distances. This activity would require minor trenching and pouring of concrete to install the base for the PAPI. The estimated construction duration by phase for this activity is provided in **Table 3-1**. The maximum annual emissions of criteria pollutants for the No Action Alternative are indicated in **Table 3-2**.

TABLE 3-1
ESTIMATED CONSTRUCTION SCHEDULE FOR NO ACTION ALTERNATIVE

Activity	Start Date	End Date	Duration (Work Days)
Trenching	9/1/2023	9/1/2023	1
Construction	9/2/2023	9/2/2023	1

SOURCE: ESA, 2023, in consultation with Inyo County Public Works.

TABLE 3-2
MAXIMUM REGIONAL CONSTRUCTION EMISSIONS FOR NO ACTION ALTERNATIVE

	Emissions (tons per year)					
	VOC	NO_X	CO	SO_X	PM10	PM2.5
Construction Phases						
Trenching	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Construction	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Construction Emissions	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

Note: Totals may not add up exactly due to rounding in the modeling calculations.
SOURCE: ESA, 2023.

3.2.1.2 Proposed Project Construction

Construction activities associated with the Proposed Project would generate temporary and short-term emissions of criteria pollutants. Construction related emissions are expected from site preparation, grading, and skimming activities. During the site preparation phase approximately 11,276 cy of soil would be exported. During the grading phase approximately 50,000 cy of soil would be exported. Proposed Project construction is expected to commence in September 2023 and would last approximately 3 months. Construction duration by phase is provided in **Table 3-3**. If project construction commences later than the anticipated start date, air quality impacts would be less than those analyzed herein, because a more energy-efficient and cleaner burning construction equipment fleet mix would be expected in the future, pursuant to State regulations that require construction equipment fleet operators to phase-in less polluting heavy-duty equipment. Therefore, air quality impacts would generally be less than those analyzed herein due to the likelihood of less emissions generated.

The specific construction fleet may vary due to specific needs at the time of construction. The duration of construction activity and associated construction equipment was estimated based on consultation with Inyo County Public Works and CalEEMod default assumptions. A detailed summary of construction equipment assumptions by phase is provided in the modeling files in Appendix A of this Report.

The maximum daily regional emissions from these activities are estimated by construction phase. Maximum annual criteria pollutant emissions are shown in **Table 3-4**.

TABLE 3-3
ESTIMATED CONSTRUCTION SCHEDULE

Activity	Start Date	End Date	Duration (Work Days)
Site Preparation	9/1/2023	9/30/2023	30
Grading/Excavation	9/1/2023	11/30/2023	91
Skimming	9/1/2023	9/15/2023	15

SOURCE: ESA, 2023, in consultation with Inyo County Public Works.

TABLE 3-4
MAXIMUM REGIONAL CONSTRUCTION EMISSIONS UNDER THE PROPOSED PROJECT

	Emissions (tons per year)					
	VOC	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Construction Phases						
Site Preparation	0.07	0.69	0.55	<0.01	0.04	0.02
Grading	0.42	3.94	3.53	0.01	0.39	0.22
Skimming	0.01	0.13	0.09	<0.01	0.01	<0.01
Total Construction Emissions	**0.51**	**4.76**	**4.17**	**0.01**	**0.44**	**0.24**

Note: Totals may not add up exactly due to rounding in the modeling calculations.
SOURCE: ESA, 2023.

3.2.2 Operations

Operational emissions of criteria air pollutants were estimated for the No Action Alternative and Proposed Action for two future conditions: 2024 and 2029. The No Action alternative would not result in any construction emissions. Consistent with guidance provided in FAA Order 1050.1F and the FAA's *Aviation Emissions and Air Quality Handbook* (Version 3, Update 1), the following criteria air pollutants were evaluated to produce an emissions inventory for future aircraft operations at BIH: CO, ozone precursors (VOCs and NO_x), oxides of sulfur (SO_x), PM_{10} and $PM_{2.5}$.

The air quality evaluations for the No Action Alternative and the Proposed Action for aircraft and GSE were conducted using the FAA's AEDT 3e. The air quality analysis includes emissions estimates for Airport operations that are anticipated to result from the No Action Alternative and Proposed Action. For aircraft AEDT inputs, the air quality analysis used the same airframe types, engine types, operational counts, flight tracks, and vertical profiles used for the noise analysis. These inputs are described in the Noise Appendix. The AEDT default mixing height of 3,000 feet above field elevation (AFE) was used. Aircraft startup emissions were also computed for engine types in AEDT that support startup emissions calculations; this calculation excludes aircraft piston, turboprop, and turboshaft engines. For calculation of aircraft taxi emissions, the AEDT default BIH taxi times of 12 minutes 18 seconds for taxi out and 6 minutes 6 seconds for taxi in was used. Helicopter taxi paths were established in order to ensure that taxi emissions were calculated for helicopters as well as fixed-wing aircraft.

For calculation of GSE emissions, the values in **Table 3-5** were used as inputs to AEDT. Default AEDT assignments, equipment type, default horsepower, and load factor values were used.

TABLE 3-5
GROUND SUPPORT EQUIPMENT DETAILS USED IN AEDT MODELING

Equipment Type	AEDT Equipment Type (Assumed)	Horse-power	Load Factor	2022 Operating Hours	2024 Operating Hours	2029 Operating Hours
Fuel Truck	Diesel - F750, Dukes Transportation Services, DART 3000 to 6000 gallon - Fuel Truck	175	0.25	345.2	404.5	463.0
Service Truck	Diesel - F250 / F350 - Service Truck	235	0.2	97.4	105.7	129.1
Catering Truck	Diesel - Hi-Way / TUG 660 chasis - Catering Truck	71	0.53	22.0	25.8	40.5
Aircraft Tractor	Diesel - Stewart & Stevenson TUG MC - Aircraft Tractor	86	0.8	65.5	80.3	94.9
Belt Loader	Gasoline - Stewart & Stevenson TUG 660 - Belt Loader	107	0.5	66.0	77.5	121.4
Baggage Tractor	Gasoline - Stewart & Stevenson TUG MA 50 - Baggage Tractor	107	0.55	227.2	243.3	295.8
Ground Power Unit	Diesel - TLD, 28 VDC - Ground Power Unit	71	0.75	257.4	257.4	257.4
Ground Power Unit	Gasoline - TLD - Ground Power Unit	107	0.75	264.1	264.1	264.1
Lavatory Truck	Gasoline - TLD 1410 - Lavatory Truck	97	0.25	33.0	0.0	0.0

SOURCE: ESA, 2022.

Operational roadway emissions are divided into two types: employee and visitor. Employee trips and vehicle miles traveled (VMT) include Airport workers (e.g. Airport Operations, ESTA, Air Ambulance, TSA employees) coming to and from home and work as well as delivery trucks (e.g. FedEx, UPS) servicing the Airport's operations. Employee trips were assumed to use a mix of gasoline, diesel, and propane powered vehicles. Visitor trips and VMT include passenger vehicles (e.g. taxis, shuttles, cars, light trucks, and SUVs) from travelers passing through the Airport to their final destinations as well as other light duty vehicles from restaurant patrons and hangar leasees. All visitor trips are assumed to use gasoline powered vehicles. Trip generation for all scenarios was provided by the Applicant and is summarized in **Table 3-6**. VMT was calculated by multiplying the number of trips by the length of the trip for all estimated trips. Where information was not known, it was assumed that an employee's one-way trip length would be 4 miles and a delivery truck's one-way trip length would be 60 miles. The frequency of trips varied from multiple times a day to once a month according to each specific trip type. Aggregate emission factors for employees and visitors were then computed for each scenario using the EMFAC2021 web database. Employee emissions were calculated using the following vehicle types: HHDT, LDA, LDT1, LDT2, LHDT1, LHDT2, MDV, MHDT, OBUS, and UBUS. Visitor emissions include the following vehicle types: LDA, LDT1, LDT2, and MDV. An aggregate model year was assumed for all vehicle types based on the calendar year of the scenario analyzed.

TABLE 3-6
TRIP GENERATION SUMMARY

Scenario (Year)	Trips/Day	Trips/Year
Employee Trips		
Existing (2022)	125	45,518
No Action (2024)	125	45,518
No Action (2029)	127	46,514
Proposed Action (2024)	125	45,518
Proposed Action (2029)	127	46,514
Visitor Trips		
Existing (2022)	89	32,436
No Action (2024)	197	71,974
No Action (2029)	195	71,246
Proposed Action (2024)	197	71,974
Proposed Action (2029)	195	71,246

SOURCE: Inyo County Public Works, 2020.

3.3 No Action Alternative

Table 3-7 summarizes air quality emissions for the No Action Alternative in 2024 and 2029. The No Action emissions inventory includes aircraft operations, GSE, and off-airport vehicular travel in 2024 and 2029.

TABLE 3-7
NO ACTION ALTERNATIVE EMISSIONS INVENTORY (ANNUAL TONS) SUMMARY

	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2024 No Action Alternative						
Aircraft	92.19	5.41	6.11	1.04	0.16	0.16
GSE	4.52	0.16	0.38	0.00	0.02	0.02
Off-Airport Vehicular Travel	3.30	0.41	1.79	0.01	0.97	0.27
Total	**100.01**	**5.98**	**8.28**	**1.05**	**1.15**	**0.45**
2029 No Action Alternative						
Aircraft	93.32	5.55	6.95	1.14	0.17	0.17
GSE	4.05	0.15	0.33	0.00	0.02	0.02
Off-Airport Vehicular Travel	2.42	0.30	1.15	0.01	0.94	0.26
Total	**99.79**	**6.00**	**8.43**	**1.15**	**1.13**	**0.45**

SOURCE: ESA, 2023.
NOTE: Numbers may not add, due to rounding.

3.4 Proposed Project Alternative

Table 3-8 summarizes air quality emissions for the Proposed Project in 2024 and 2029. The Proposed Action emissions inventory includes aircraft operations, GSE, and off-airport vehicular travel in 2024 and 2029.

TABLE 3-8
PROPOSED ACTION ALTERNATIVE EMISSIONS INVENTORY (ANNUAL TONS) SUMMARY

	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2024 Proposed Action						
Aircraft	92.19	5.41	6.11	1.04	0.16	0.16
GSE	4.52	0.16	0.38	0.00	0.02	0.02
Off-Airport Vehicular Travel	3.30	0.41	1.79	0.01	0.97	0.27
Total	**100.01**	**5.98**	**8.28**	**1.05**	**1.15**	**0.45**
2029 Proposed Action						
Aircraft	93.32	5.55	6.95	1.14	0.17	0.17
GSE	4.05	0.15	0.33	0.00	0.02	0.02
Off-Airport Vehicular Travel	2.42	0.30	1.15	0.01	0.94	0.26
Total	**99.79**	**6.00**	**8.43**	**1.15**	**1.13**	**0.45**

SOURCE: ESA, 2023.
NOTE: Numbers may not add, due to rounding.

3.5 Mitigation, Avoidance, or Minimization Measures

The Proposed Project does not exceed the applicable significance thresholds for any pollutants. Therefore, no mitigation measures are required.

4. Climate

FAA Order 1050.1F determines the need for and establishes the extent of the GHG assessment required for airport-related actions and projects. The GHG assessment for this EA includes direct and indirect emissions inventories for construction activities including construction activities, heavy-duty off-road equipment, and on-road vehicles, as well as operational emissions including landside sources (area and mobile) and airside sources (aircraft operations and GSE). A GHG inventory was prepared for construction activities associated with the Proposed Project in year 2023. GHG emissions inventories were prepared for the Proposed Project and No Action Alternative. Operational emissions were estimated for two future conditions: 2024 and 2029. The analysis of GHG emissions generally follows the same methodology and modeling tools as the air quality criteria pollutant emissions analysis as discussed in Section 3.2. The Proposed Action is unlikely to produce more than a negligible increase in demand to electrical supply.

In terms of analyzing GHG emissions from the Proposed Project, the analysis includes the area within the Airport's geographical boundary which is defined as the geographic boundary of the Airport plus the airspace around the Airport, extending upward to the full extent of AEDT's modeled flight paths, as well as the roads and public transit routes that deliver employees, passengers, and suppliers to and from the Airport. The altitudes used in the analysis include AEDT's modeled flight paths, which are approximately 10,000 feet AFE for aircraft departures, and approximately 6,000 feet AFE for arrivals. The GHG inventory clearly distinguishes the Proposed Action's GHG emissions from other relevant indirect sources affiliated with airport operations.

GHGs include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Increasing concentrations of GHGs in the atmosphere affect global climate. Anthropogenic (i.e., man-made) sources of GHG emissions are primarily associated with the combustion of fossil fuels, including aircraft fuel.

Mass emissions of GHGs are accounted for by converting emissions of specific pollutants to CO_2e emissions by applying the proper global warming potential (GWP) value for each specific pollutant. GWP represents the amount of heat captured by a mass of a specific GHG compared to a similar mass of CO_2. These GWP ratios are provided by the Intergovernmental Panel on Climate Change (IPCC) in its Fifth Assessment Report (AR5).[2] By applying the GWP ratios, project-related CO_2e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO_2 over a 100-year period is used as a baseline.

4.1 Thresholds of Significance

The FAA has not established a significance threshold for climate and GHG emissions, nor has the FAA identified specific factors to consider in making a significance determination for GHG emissions. The CEQ has noted that "it is not currently useful for the NEPA analysis to attempt to

[2] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, p.87.

link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand.” [3]

4.2 Methodology

4.2.1 Construction

Construction activities associated with the No Action Alternative and Proposed Project would result in emissions of CO_2 and, to a lesser extent, CH_4 and N_2O. Construction-period GHG emissions were estimated with the same CalEEMod emissions software and EMFAC2021 emission factors based on the same construction schedule and activities as described above in Section 3.2 above.

4.2.2 Operations

Fossil fuel combustion is the primary source of GHG emissions at the Airport. The GHG evaluations for the No Action Alternative and the Proposed Project 2024 and 2029 were performed primarily using the FAA’s AEDT 3e model and the EMFAC2021 web database. GHG emissions for aircraft and on-road vehicles were calculated similar to the methodology described in *Section 3.2 Methodology* for Air Quality. The EMFAC2021 web database was used to determine the emission factors for each scenario.

4.3 Construction

The No Action Alternative construction GHG emissions are shown in **Table 4-1**.

TABLE 4-1
CONSTRUCTION GREENHOUSE GAS EMISSIONS – NO ACTION ALTERNATIVE

Emissions Sources	CO_2 (Metric Tons per Year)	CH_4 (Metric Tons per Year)	N_2O (Metric Tons per Year)	CO_2e (Metric Tons per Year)
Off-Road Equipment	0.18	0.0000600	0.00000	**0.18**
On-Road Sources	0.12	0.0000506	0.00167	**0.12**
Project Total GHG Emissions	***0.30***	***0.0001106***	***0.00167***	***0.30***

NOTES: Totals may not add up exactly due to rounding in the modeling calculations.

CO_2e = carbon dioxide equivalent

SOURCE: ESA, 2023

The Proposed Project construction GHG emissions are shown in **Table 4-2**.

[3] Federal Aviation Administration, 1050.1F Desk Reference, https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/ (Accessed August 26, 2020).

TABLE 4-2
CONSTRUCTION GREENHOUSE GAS EMISSIONS – PROPOSED PROJECT

Emissions Sources	CO_2 (Metric Tons per Year)	CH_4 (Metric Tons per Year)	N_2O (Metric Tons per Year)	CO_2e (Metric Tons per Year)
Off-Road Equipment	853.37	6.59	0.00	**859.96**
On-Road Sources	91.60	0.04	3.06	**94.70**
Water and Office	112.04	0.13	0.19	**112.35**
Project Total GHG Emissions	***1,057.01***	**6.76**	**3.24**	**1,067.02**

NOTES: Totals may not add up exactly due to rounding in the modeling calculations.

CO_2e = carbon dioxide equivalent

SOURCE: ESA, 2023

4.4 No Action Alternative

The GHG emissions associated with the No Action Alternative include aircraft operations and ground transportation activities. **Table 4-3** presents estimated levels of GHG emissions at BIH in 2024 and 2029 for the No Action Alternative.

TABLE 4-3
GREENHOUSE GAS OPERATIONAL EMISSIONS INVENTORY – NO ACTION ALTERNATIVE

Operational Year	Emission Source	CO_2 (Metric Tons per Year)	CH_4 (Metric Tons per Year)	N_2O (Metric Tons per Year)	Estimated GHG Emissions Inventory in CO_2e (MT/year)
2024	Aircraft	2,023.20	10.10	40.80	**2,074.10**
	Off-Airport Vehicular Travel	1,416.41	0.03	0.16	**1,463.85**
	Total	**3,439.61**	**10.13**	**40.96**	**3,537.95**
2029	Aircraft	2,425.00	9.80	42.30	**2,477.10**
	Off-Airport Vehicular Travel	1,176.69	0.02	0.12	**1,214.27**
	Total	**3,601.69**	**9.82**	**42.42**	**3,691.37**

NOTE: Totals may not add up exactly due to rounding in the modeling calculations.

CO_2e = carbon dioxide equivalent

SOURCE: ESA, 2023.

4.4 Proposed Action Alternative

GHG emissions in the Proposed Project would result from fuel burn associated with aircraft operations, GSE, and motor vehicles. **Table 4-4** presents estimated levels of GHG emissions at BIH in 2024 and 2029 for the Proposed Project.

TABLE 4-4
GREENHOUSE GAS OPERATIONAL EMISSIONS INVENTORY – PROPOSED PROJECT

Operational Year	Emission Source	CO_2 (Metric Tons per Year)	CH_4 (Metric Tons per Year)	N_2O (Metric Tons per Year)	Estimated GHG Emissions Inventory in CO_2e (MT/year)
2024	Aircraft	2,023.20	10.10	40.80	**2,074.10**
	Off-Airport Vehicular Travel	1,416.41	0.03	0.16	**1,463.85**
	Total	**3,439.61**	**10.13**	**40.96**	**3,537.95**
2029	Aircraft	2,425.00	9.80	42.30	**2,477.10**
	Off-Airport Vehicular Travel	1,176.69	0.02	0.12	**1,214.27**
	Total	**3,601.69**	**9.82**	**42.42**	**3,691.37**

NOTE: Totals may not add up exactly due to rounding in the modeling calculations.

CO_2e = carbon dioxide equivalent

SOURCE: ESA, 2023.

As shown in Tables 4-3 and 4-4, there would be an increase in GHG emissions at BIH in 2024 and 2029 if the Proposed Project were implemented. However, there are no significance thresholds established for aviation GHG emissions, and the FAA has not identified specific factors to consider in making a significance determination for GHG emissions, especially as it may be applied to a particular project. Due to the minimal construction GHG emissions and negligible change the Proposed Project would have on the Airport’s existing operational footprint, there would be little, if any, increase in vulnerability to future climate impacts from the implementation of the Proposed Project.

4.5 Mitigation, Avoidance, or Minimization Measures

As the FAA has not established a significance threshold for climate and GHG emissions, the Proposed Project does not exceed a significance threshold for GHG emissions. Therefore, no mitigation measures are required.

G-2 California Air Resources Board Facility Emissions Report – Great Basin Unified Air Pollution Control District

Year	ARBID	FACID	Facility	Primary Sector	NAICS Code	NAICS Description	Address	City	State	Zip Code	Latitude	Longitude	Tract	County
2020	100690	3050309	Coso Energy Developers (BLM E&W) - Geothermal	Electricity Generation	221119	Other Electric Power Generation	3 Gill Station Coso Road, Little Lake, CA 93542	Little Lake	California	93542	36.004	-117.799	CA06027000800	Inyo
2020	101669	3050309	Coso Power Developers (Navy II) - Geothermal	Electricity Generation	221119	Other Electric Power Generation	3 Gill Station Coso Road, Little Lake, CA 93555	Little Lake	California	93555	36.02	-117.791	CA06027000800	Inyo
2020	101670	3050309	Coso Finance Partners (Navy I) - Geothermal	Electricity Generation	221119	Other Electric Power Generation	3 Gill Station Coso Road, Little Lake, CA 93542	Little Lake	California	93542	36.037	-117.797	CA06027000800	Inyo

Unit: Greenhouse Gases - metric tons (1000 kg); Criteria Pollutants - tons (2000 lbs); Toxic Pollutants - pounds (lbs)

District	Basin	Cap-and-Trade	Total GHG	Non-Biomass GHG	Biomass CO2	CO2	CH4	N2O	Covered GHG	VOC	NOx	SOx	PM10	PM2.5	Benzene	13-Butadiene	Chromium Hexavalent	Diesel PM	Formaldehyde
Great Basin Unified APCD	Great Basin Valleys	No	120,187	120,187	0	120,187	0	0	0	0.3	2.2	0	18.7	3.5				895	
Great Basin Unified APCD	Great Basin Valleys	No	123,603	123,603	0	123,603	0	0	0	0.3	2.2	0	18.7	3.5				895	
Great Basin Unified APCD	Great Basin Valleys	No	70,969	70,969	0	70,969	0	0	0	0.3	2.2	0	18.7	3.5				895	

Hydrochloric Acid	Hydrogen Sulfide	Nickel
	187,098	
	187,098	
	187,098	

Appendix H
Biological Assessment

ESA

Draft

RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Biological Assessment

Prepared for
Inyo County Department of Public Works

March 2023

Draft

RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Biological Assessment

Prepared for
Inyo County Department of Public Works

March 2023

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RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Biological Assessment

1. Introduction

This Biological Assessment (BA) has been prepared in support of the proposed Runway 12/30 Safety Area Improvement Project (Proposed Project) at Bishop Airport (BIH or Airport). To implement the Proposed Project, the Federal Aviation Administration (FAA) as the lead agency must undertake review under the *National Environmental Policy Act* (NEPA) pursuant to the requirements of Section 102(2)(C) of the NEPA and Council on Environmental Quality Regulations (CEQ Regulations) (Title 40 Code of Federal Regulations [CFR] parts 1500-1508), FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. Accordingly, Inyo County is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with the Proposed Project. As part of this process, this BA was developed to identify and discusses the potential effects on threatened and endangered species protected under the *Endangered Species Act of 1973* (ESA) (16 U.S.C. § 1531 *et seq*) that may result from implementation and operation of the Proposed Project and provides a summary of the effect determination. Other sensitive species of interest, such as state-listed threatened and endangered species, are also addressed in this BA.

1.1 Description of the Proposed Project

Bishop Airport is owned and operated by Inyo County and is situated on land leased from the City of Los Angeles Department of Water and Power (LADWP). Inyo County also holds an easement on and in areas around the leasehold ensuring indefinite use of the property as an airport. BIH is designated in the FAA's 2023-2027 National Plan of Integrated Airport Systems (NPIAS) as a general aviation airport. The Airport serves general aviation activity, limited military activity, as well as charter and air cargo operations. Beginning in December 2021, commercial air passenger service was introduced to BIH and the Airport will continue to serve commercial air passenger service into the foreseeable future. It is anticipated that the Airport will be redesignated as a nonprimary reliever airport in the next update to the NPIAS.

Currently, the Runway 12 Runway Safety Area (RSA) meets FAA's design guidelines for approximately 285 feet prior to the threshold and 640 feet beyond the runway end. Similarly, the Runway 30 RSA meets FAA design guidelines for approximately 640 feet prior to the threshold and 245 feet beyond the runway end. The remaining 715 feet at the north end and 360 feet at the south end feature excessive slopes, noncompliant grading, and/or excessive vegetation. Declared distances are employed on Runway 12/30 to ensure adequate RSAs. In addition, an LADPW service road currently runs through the RSA off the Runway 12 end and the airport security fence runs through the RSAs off both the Runway 12 and Runway 30 ends. The Proposed Project would correct these deficiencies by cutting, grading, and filling the noncompliant portions of the RSA, so that it can meet FAA standards without the use of declared distances. The Proposed Project would include the following elements:

Runway 12

- Approximately 7.8 acres of land within the RSA beyond the Runway 12 end would be cut, filled, graded, and compacted.
- An existing unpaved LADWP patrol road would be relocated outside the runway object free area (OFA). The portion of relocated road would be approximately 15 feet wide and 0.25 mile long.
- Approximately 1,635 linear feet (LF) of existing perimeter fence would be removed and approximately 2,175 LF of new perimeter fence would be installed beyond the OFA boundary.

Runway 30

- Approximately 6.5 acres of land within the RSA beyond the Runway 30 end would be cleared of vegetation, cut, filled, and graded. This would correct the current deficiency and bring the RSA into compliance with FAA standards.
- Approximately 2,000 LF of existing perimeter fence would be removed and approximately 3,125 LF of new perimeter fence would be installed outside the OFA.

Runway Sides

- The RSA alongside the runway is generally in compliance with FAA regulations but would be graded to ensure an adequate, flat surface throughout.

The necessary fill material for the RSAs will be taken from the cut material in the RSAs. In the event more material is required, a borrow area has been identified immediately adjacent to the RSA off the Runway 12 end.

1.2 Project Location

BIH is located approximately two miles east of the town of Bishop, California and 267 miles northeast of the city of Los Angeles. **Figure 1** depicts the Airport location regionally and **Figure 2** depicts the immediate vicinity of the Airport. The Airport is bordered by North Fork Bishop Creek to the north, Poleta Road to the south, and areas of open space and grazing land between the Airport and the city of Bishop to the west and between the Airport and the Owens River to the east. The survey location is on the Bishop, Poleta Canyon, Laws, and Fish Slough quadrangles 7.5-Minute series. The elevation of the survey location ranges from 4,080 feet to 4,130 feet above sea level.

1.3 Need for the Proposed Project

The FAA regularly re-evaluates standard and non-standard RSAs at airports nationwide and requires airports to make incremental improvements where necessary. In situations where there is insufficient land available in which to develop a standard RSA, or if existing obstacles make a standard RSA impossible, the FAA works with airports to find alternative solutions. Bishop Airport is currently maintaining a non-standard RSA for Runway 12/30. Furthermore, BIH is a Part 139 certificated airport.[1] The Airport is required to comply with the requirements of the Part 139 certification program. Under 14 CFR § 139.309, Part 139 certificated airports must provide and maintain RSAs that are compliant with FAA's design standards. Accordingly, the need for the Proposed Project is to bring the RSA into compliance with FAA regulations.

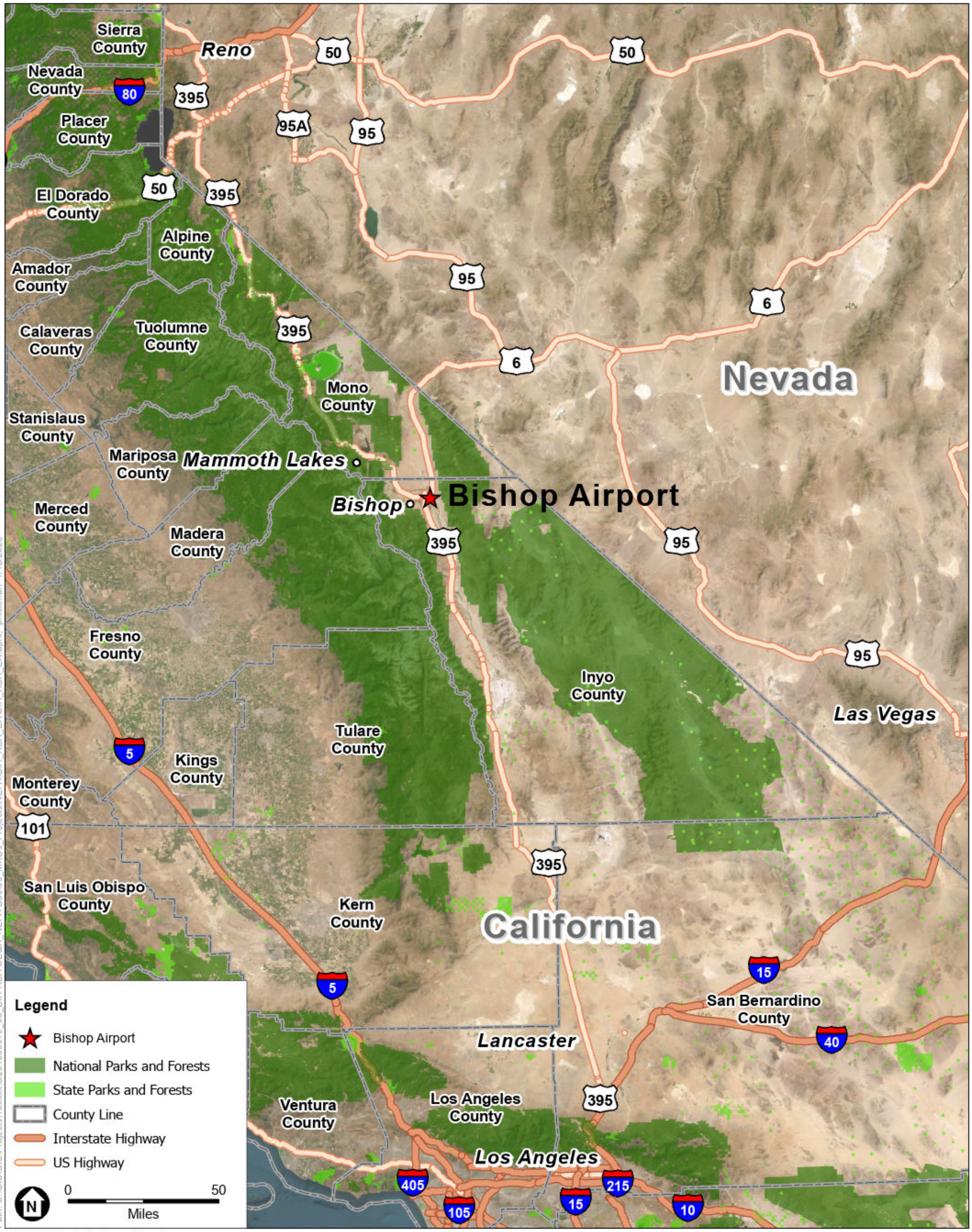
2. Identification of the Action Area

An Action Area (AA) was developed to evaluate potential impacts to biological resources that could result from the implementation of the Proposed Project. The AA includes all areas to be directly affected by the Proposed Project as well as indirect impacts that could affect surrounding habitats. **Figure 3** depicts the AA.

The AA includes a 500-foot buffer surrounding Runway 12/30, including the designated RSA that extends 800-feet beyond the runway for purposes of determine the presence of nesting birds. In addition, the LADWP unpaved access road, areas around the perimeter fence, and routes to be used to access the RSA by construction equipment and personnel were also included within the AA.

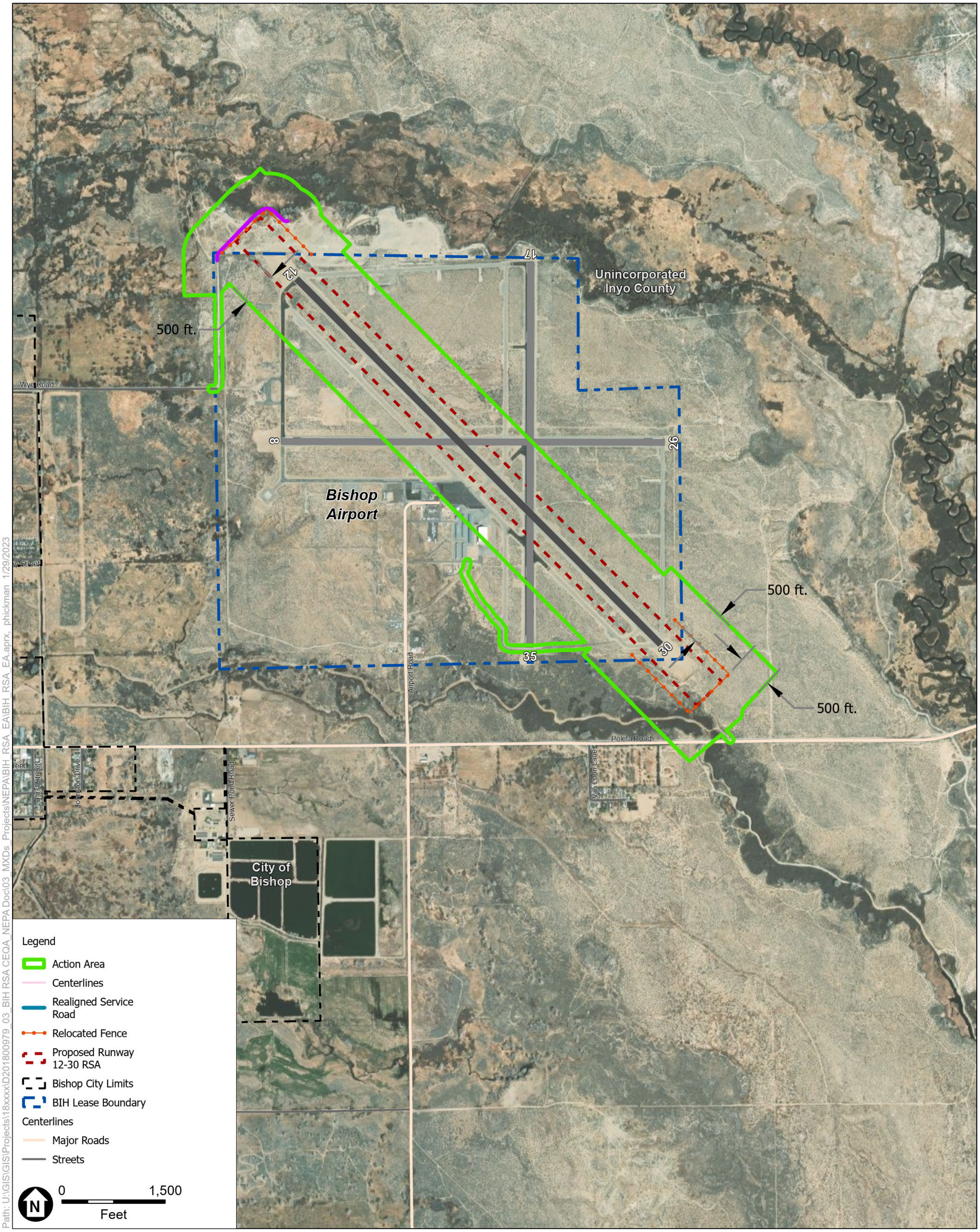
The region has an average annual precipitation of 4.84 inches. Temperatures range from an average annual maximum temperature of 99.7°F to an average annual minimum temperature of 54.5°F.

[1] 14 CFR Part 149 provides the certification requirements for airports to accommodate commercial air passenger service.



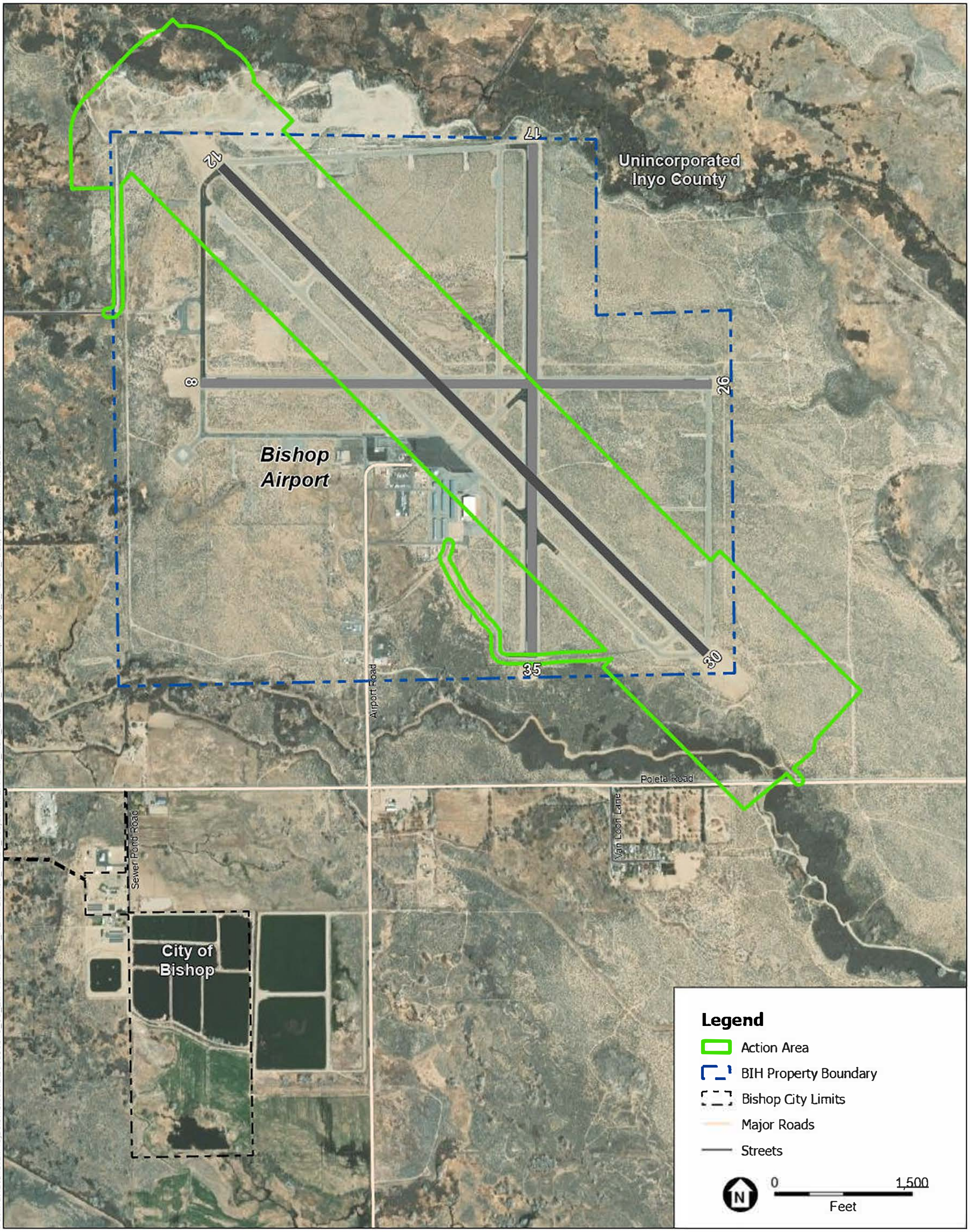
SOURCE: Esri; Inyo County Department of Public Works; ESA, 2020.

Figure 1
Bishop Airport Location



SOURCE: ESRI; Inyo County Department of Public Works; ESA, 2020; USGSTopo, 2021.

Figure 2
Bishop Airport Vicinity Map



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Biological Assessment

Figure 3
Biological Resources - Action Area

ESA

3. Methods

3.1 Review of Background Information

Prior to performing reconnaissance biological surveys, ESA reviewed publicly available data, subscription-based biological resource data, and survey area-specific information. Data sources that assisted in this analysis include:

- Topographic maps (USGS 2022a)
- Historic and current aerial imagery (Google, Inc. 2022)
- The CDFW California Natural Diversity Database (CNDDB) (CDFW 2022a-d)
- The National Wetlands Inventory (NWI) (USFWS 2022a)
- National Hydrography Dataset (NHD), (USGS 2022b)
- The California Native Plant Society (CNPS) Rare Plant Inventory online database (CNPS 2022a)
- Soil maps from the Natural Resources Conservation Service (NRCS) (NRCS 2022)
- iNaturalist (iNaturalist 2022)
- Information for Planning and Consultation (IPaC) (USFWS 2022b)
- Biological Assessment for the Proposed Commercial Air Service at Bishop Airport (October 2020)

3.2 Survey Dates and Surveying Personnel

Biological reconnaissance surveys of the survey area were conducted by ESA Biologists on November 1, 2022. Surveys were conducted to observe and characterize vegetation communities in the survey area and to assess habitat quality and potential for common and special-status wildlife species to occur within the survey area or the vicinity. Surveys were also conducted by ESA biologists in June 2019 and May 2020 to assess biological resources and potential for use by the southwestern willow flycatcher (*Empidonax traillii extimus*, SWFL), including habitat that might be impacted by potential future commercial aircraft operations.

3.3 Regulatory Context

Biological resources in the survey area may fall under the jurisdiction of various regulatory agencies and be subject to their regulations. In general, the greatest legal protections are provided for plant and wildlife species that are formally listed by the federal or state government under their respective Endangered Species Acts. The following regulations and agencies are commonly associated with projects that have the potential to affect biological resources:

- Federal Endangered Species Act (FESA)

- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act
- Clean Water Act, Section 404 (CWA) California Endangered Species Act (CESA)
- Fish and Game Code Section 3503, 3503.5, and 3511
- Native Plant Protection Act
- Lake or Streambed Alteration Program
- Porter Cologne Water Quality Act
- CEQA Guidelines Section 15380

4. Existing Conditions

This section provides the environmental baseline for hydrology, vegetation communities and habitats, soils and special-status plant and wildlife species in the AA. The Airport covers approximately 830 acres in Inyo County, California. Data from CDFW Biogeographic Information & Observation System (BIOS) indicates that land within the AA is dominated by low-intensity development, open space, and shrub/scrub habitat. Small portions of emergent herbaceous wetlands, hay/pasture, and woody wetlands occur within the northwest and southeastern ends of the AA. The vegetative communities are described per Sawyer et. al. (2009), U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), and field-verified by ESA biologists. A field survey was conducted on November 1, 2022. Previous field surveys were performed by a field biologist on June 7, 2019 and May 1, 2020.

4.1 Hydrology

An Aquatic Resources Delineation report has been prepared for the Project and all relevant aspects of the survey area are addressed in that report.

4.1 Vegetation Communities and Wildlife

Wildlife habitats and vegetation communities within the survey area could provide potential habitat for special status species and are described in Table 1 and below. Wildlife habitats were mapped for the survey area as shown in Figure 3.

4.1.1 Upland Habitats

The survey area primarily consists of upland habitat. This includes areas with a mixture of low-intensity development, open space, and shrub/scrub habitat. The open areas surrounding the runway are routinely graded and maintained by the Airport Operations staff for general aviation usage, which requires low-growing vegetation. The area to the northwest of the survey area was previously used for gravel mining, and is largely abandoned, except for occasional off-highway vehicle use. The shrub/scrub habitat consists of primarily low-growing ruderal grassland and common shrub species. The upland vegetation communities within the survey area are described below.

Airport infrastructure (buildings, runways, taxiways, etc.), gravel and paved roads, and actively managed areas are bare or have sparse vegetation. Within the maintained object-free areas adjacent to the runways, low-growing angle-stemmed buckwheat (*Eriogonum maculatum*), cryptantha (*Cryptanthum micrantha*), and short-podded mustard (*Hirschfeldia incana*) are present.

Rubber rabbitbrush scrub (Ericameria nauseosa Alliance)

Airport property and surrounding areas outside of the actively maintained runway and taxiway object free areas consist of rubber rabbitbrush (*Ericameria nauseosa*) as the primary shrub species, with interspersed greasewood (*Sarcobatus vermiculatus*), and saltbush (*Atriplex* spp.). herbaceous cover is generally sparse, and includes buckwheat, cruptantha, and short-podded mustard.

4.1.2 Wetland Habitats

Wetland habitats at the far north and south ends of the survey area were identified through research using the USFWS NWI database and field surveys conducted on November 1, 2022. Rawson Canal is a perennial stream located on the southeastern end of Runway 30 and is potential habitat for wetland and stream species. Rawson Canal is located within the Crowley Lake Watershed and empties into the Owen River.

The USFWS NWI identifies the presence of freshwater forested/shrub riparian habitat slightly within and immediately surrounding the survey area. Field surveys confirm that these areas consist of perennial herbaceous vegetation, shrubby willow trees (*salix* sp.), and rose (*Rosa* sp.) bushes at the northern end of Runway 12. In addition, small areas of willow shrubs and rose thicket are located to the south along Rawson Canal. The wetland vegetation communities within the survey area are described below.

Sandbar willow thicket (*Salix exigua Alliance*)

Dense thickets of sandbar willow (*Salix exigua*) are present within the northwestern and southeastern ends of the survey area. Stands are almost uniformly comprised of sandbar willow, with interspersed Wood's rose (*Rose woodsii*). Due to high density of sandbar willow, very little herbaceous cover is present. Breaks in this community contain small patches of cattail (*Typha* sp.). Along Rawson Canal, small clusters of common reed (*Phragmites australis*) are also present within this community.

Fremont cottonwood-willow riparian forest (*Populus fremontii-Salix gooddingii-S. lasiolepis S laevigata* Alliance)

Patches of Fremont cottonwood (*Populus fremontii*) are scattered along the north edge of the survey area, primarily near the transition from upland to riparian areas. Co-occurring species include black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), and red willow (*Salix* *laevigata*). Herbaceous cover associated with this community is variable and includes stands of perennial pepperweed (*Lepidium latifolium*), saltgrass (*Distichlis spicata*), and reeds (*Juncus* sp.).

Willow riparian woodland (*Salix gooddingii-S. lasiolepis Salix laevigata Alliance*)

Small areas of willow riparian woodland are present in the northern portion of the survey area, at its closest proximity to North Fork Bishop Creek. Black willow, red willow, and arroyo willow are dominant or co-dominant in this vegetation alliance. Areas of sandbar willow and Wood's rose occur in the shrub layer, with an herbaceous layer including Indian hemp dogbane (*Apocynum cannabium*), saltgrass, and reeds. This vegetation alliance is considered a sensitive natural community with a S3 ranking.

Saltgrass meadow (*Distichlis spicata Alliance*)

An open saltgrass meadow is located in the survey area northwest of Runway 12. Additional component species of this community include common spike rush (*Eleocharis macrostachya*), scratchgrass (*Muhlenbergia asperifolia*), and reeds. The driest portion of this meadow includes small areas of rabbitbrush, while the wettest include cattail and alkali bulrush (*Bolboschoenus maritimus*) (Sawyer et al. 2009).

5. Species Considered

Section 7 of the ESA requires federal agencies to determine if their actions may have an adverse impact on federally listed threatened or endangered species or result in destruction or adverse modification of their designated critical habitat. Listed species includes both animal and plant species. The ESA is administered by USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries. USFWS is responsible for terrestrial and freshwater organisms, while NOAA Fisheries is mainly responsible for marine wildlife and anadromous fish, such as salmon. Under the ESA, species are listed as either endangered, threatened candidate species, or species of concern.

This section considers special status species protected under the ESA with potential occurrence within the AA. The USFWS and NOAA Fisheries list several endangered, threatened and candidate species, along with species of concern on the IPaC System webpage. Prior to conducting field visits, a literature search was performed to evaluate the potential presence of any protected species and/or their critical habitats within or adjacent to the AA. The list of species is based on a request sent to the USFWS and a database search. The list of sources evaluated as part of the literature search is provided in Section 3, *Methods*.

The potential for occurrence of federal and state listed species are included in Tables 1 and 2. This information is based on the literature review and a field investigation conducted on November 1, 2022. **Appendix A** includes a photo log from the field survey conducted November 1, 2023. **Appendix B** includes the official USFWS federal list of threatened and endangered species, including designated critical habitat for the AA. **Appendix** C provides the current list of the special species of concern listed by the CDFW.

5.1 Special-Status Species

Several species known to occur on or in the vicinity of the survey area are protected pursuant to federal and/or State endangered species laws or have been designated as Species of Special Concern by CDFW. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing. Species recognized under these terms are collectively referred to as “special-status species.”

A list of special-status species with potential to occur on or in the vicinity of the survey area was compiled from a nine-quad search of the California Natural Diversity Database (CNDDB) (CDFW 2022d), a nine-quad search on the CNPS Rare Plant Inventory (CNPS 2022a), a survey area search of the U.S. Fish and Wildlife Service (USFWS) endangered species database (USFWS 2022), and biological literature on the region for the surrounding 7.5 minute USGS topographic quadrangles. The quadrangles for the survey area were Bishop, Poleta Canyon, Laws, and Fish Slough. Figures 5-1 and 5-2 are maps of CNDDB special-status wildlife and plant species occurrences within 5 miles of the survey area.

From the full list of species, each was then individually assessed based on habitat requirements and distribution relative to vegetation communities and habitat features that occur in and around the survey area. A comprehensive list of special-status species that were considered in the analysis is provided in Appendix A, Special-Status Species with Potential to Occur within the Survey Area.

5.1.1 Special Status Plant Species

No special-status plants were identified during the November 1, 2022 biological reconnaissance surveys of the survey area. Based on the habitat types and conditions within the survey area, along with review of background information and database searches, a variety of special-status plant species have potential to occur in the survey area and are listed in Appendix A.

5.1.2 Special Status Wildlife Species

No federal or state-listed wildlife species were observed during the November 1, 2022, reconnaissance surveys within the survey area. Based on the habitat types and conditions within the survey area, along with review of background information and database searches a variety of special-status wildlife species have potential to occur in the survey area and are listed in Appendix A. No in-water work is planned, so no impacts to aquatic species are expected to occur.

6. Listed Species and Critical Habitat in the Action Area

6.1 Review of Federally Listed Species Identified by USFWS to Potentially Occur Within Action Area

Based on the list of species provided by USFWS on December 8, 2022, there are a total of six threatened, endangered, or candidate species with potential to occur within the AA. The list of species provided by USFWS include:

- Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
- Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)
- Owens Pupfish (*Cyprinodon radiosus*)
- Owens Tui Chub (*Gila bicolor ssp. Snyderi*)
- Monarch Butterfly (*Danaus plexippus*)
- Fish Slough Milk-vetch (*Astragalus lentiginosus var. piscinensis*).

The USFWS has designated Critical Habitat for Southwestern Willow Flycatcher, Yellow-billed Cuckoo, Owens Tui Chub, and Fish Slough Milk-vetch; however, no Critical Habitat exists on or adjacent to the AA. All federally listed species included in this BA are depicted in **Table 1**.

TABLE 1
FEDERALLY LISTED SPECIES WITH POTENTIAL TO OCCUR IN THE ACTION AREA

Common Name	Scientific Name	USFWS Listing	Potential Occurrence within Action Area	Habitat Preference
Birds				
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	T	**Low**	Woodland habitat with dense cover and water nearby, including low scrubby vegetation, dense thickets, and abandoned farmland.
Southwestern Willow Flycatcher a	*Empidonax traillii extimus*	E	**Low**	Dense riparian tree and shrub communities near rivers, swamps, and other wetlands.
Fish				
Owens Pupfish	*Cyprinodon radiosus*	E	**Not Expected**	Spring pools, sloughs, irrigation ditches, swamps, and flooded pastures.
Owens Tui Chub	*Gila bicolor ssp. snyderi*	E	**Not Expected**	Standing waters and low gradient
Invertebrate				
Monarch Butterfly	*Danaus plexippus*	C	**High**	Prairies, meadows, and grasslands
Flowering Plants				
Fish Slough Milk-vetch	*Astragalus lentiginosus var. piscinensis*	T	**Low**	Alkaline flats paralleling desert wetland ecosystems in Inyo and Mono counties, California.

NOTES:
Status Codes:
E = Listed as Endangered
T = Listed as Threatened
C = Candidate Species

SOURCE: U.S. Fish and Wildlife Service, Information, Planning, and Consultation (IPaC) System, December 8, 2022.

Southwestern Willow Flycatcher

The SWFL (Empidonax traillii extimus) is a subspecies of Willow Flycatcher found in the Southwestern United States, and the only subspecies of Willow Flycatcher known to breed in the Owens River Valley (Paxton 2000). Several other subspecies of Willow Flycatcher that breed further north pass through the area during spring and fall migration (E. t. brewsteri, E. t. adastus). Multiple databases were queried for records of Willow Flycatchers observed in the project vicinity, with a focus on records between the days of June 15 and July 20 of each year, the "non-migrant period," where individuals observed are presumed to be E. t. extimus (Willow Flycatchers are not reliably separated in the field to subspecies by other means). Records of Willow Flycatchers in the Bishop area were found during 2022 on eBird (eBird 2022b); however, these observations were not during the non-migrant period. The most recent observation during the non-migrant period was in 2003 (CNDDB 2022), approximately six miles northwest of BIH along Horton Creek. A separate search on USFWS ECOS database indicates that there is no SWFL critical habitat within or in close proximity to the survey area. The nearest designated Critical Habitat is located approximately 115 miles south of the Airport.

The SWFL occurs in riparian woodlands in Southern California. It prefers riparian areas dominated by willow trees along streams or the margins of a pond or lake, and at wet mountain meadows. Based on the recent field survey, there is potential suitable habitat to support the SWFL at riparian locations along the North Fork Bishop Creek and Rawson Canal by providing opportunities to forage within or near the survey area on occasion. However, on-site species-specific surveys, conducted by ESA in 2019 and 2020, did not confirm the presence of SWFL within or near the survey area and described the habitat as low-quality. Habitat quality has not changed since these surveys were conducted, and the potential suitable habitat is trimmed for maintenance, therefore potential for occurrence is low.

Yellow-billed Cuckoo

The Western Yellow-billed Cuckoo is primarily a riparian avian species inhabiting dense woodland areas along streams and rivers in the Western United States. They require large, contiguous tracts of riparian habitat for nesting and prefer Cottonwood-willow forests (*Populus spp* and *Salix spp.*) for breeding. Although their migration and wintering behavior is relatively unknown, they have been generally found in scrubby habitat near streams or coastal areas.

Populations of the Yellow-billed Cuckoo have declined precipitously over the past several decades, which has reduced their breeding range and occurrence in the United States. For this reason, the bird species is listed as federally threatened and designated as endangered in the state of California. The CDFW have ranked the species as "critically imperiled" with a very high risk of extirpation in the state due to its restricted range and limited occurrence. Review of CNDDB records for this species indicate that the closest sighting of the Yellow-billed Cuckoo occurred 15 miles south of BIH in 2009. Critical Habitat for the Yellow-billed Cuckoo does not exist on or adjacent to the survey area. The nearest designated critical habitat for this species is located approximately 115 miles south of Bishop Airport. The area within the AA presents low quality foraging habitat and limited tree selection for nesting. In addition, there no larger rivers within or adjacent to the AA. The bird species has also not been detected from site visits conducted at the

Airport and it is unlikely that Yellow-billed Cuckoo would be found within the AA. Therefore, the Proposed Project will have “no effect” on the Yellow-billed Cuckoo or its habitat.

Owens Pupfish

Habitat for the Owens Pupfish consists of spring pools, sloughs, irrigation ditches, swamps, and flooded pastures in the Owens Valley, including Inyo County. However, this fish is confined to five relatively isolated populations, which includes the Fish Slough Area of Critical Environmental Concern (ACEC). The Fish Slough ACEC is a system of springs and marshes cooperatively managed by state and federal departments to maintain the populations of Owens Pupfish. The Fish Slough ACEC is located approximately six miles north of the City of Bishop and the AA. It spans across the Inyo and Mono County border and consists of rare habitat in the Mojave Desert and Great Basin biomes (CDFW 2022b). The ACEC also provides habitat for rare endemic plants, such as the Fish Slough Milk-vetch. Although Fish Slough ACEC is hydrologically connected to the Owens River, its unique biome and distance make it a relatively unlikely path of migration to the North Fork Bishop Creek or Rawson Canal. Therefore, the Proposed Project will have “no effect” on the Owens Pupfish or its habitat.

Owens Tui Chub

Critical Habitat for Owens Tui Chub does not exist on or adjacent to the survey area. The distribution of the Owens Tui Chub extends throughout the Owens River and its larger tributaries extending from its source springs to Owens Lake. However, there are three existing natural populations that are present. They are located at the Owens River Gorge, source springs of the Department’s Hot Creek Hatchery, and at Cabin Bar Ranch near Owens Dry Lake (CDFW 2002, CDFW 2022c). The Owens River Gorge is located about seven miles northwest of the survey area and represents the closest population of this fish species. Additional populations have been established in cooperation with landowners at the Bureau of Land Management’s Mule Spring, Little Hot Creek in Inyo National Forest, and at the University of California White Mountain Research Station owned by the LADWP. Given the distance of North Fork Bishop Creek and Rawson Canal to the Owens River Gorge, combined with its populations’ isolation, it is unlikely that the Owens Tui Chub would be found in the survey area. Therefore, the Proposed Project will have “no effect” on the Owens Tui Chub or its habitat.

Fish Slough Milk-vetch

The Fish Slough Milk-vetch is largely dependent on desert spring-fed wetland ecosystems that consist of highly alkali soils and is listed by the USFWS as a species of concern that could be present in the survey area. After reviewing the CNPS Calflora, the Fish Slough Milk-vetch has been positively identified in Inyo County (CNPS 2022b). However, the closest population is approximately five miles from the survey area and there are no historical records of its presence on Airport property. Furthermore, it has not been detected by field surveys conducted at the Airport. Therefore, the Proposed Project will have “no effect” on the Fish Slough Milk-vetch or its habitat.

Monarch Butterfly

The monarch butterfly is a federal candidate species and not yet listed or proposed for listing under the Endangered Species Act. In the western U.S., monarch butterflies migrate in the fall and overwinter at sites along the Pacific coast and Central Valley. Monarch's host plant, milkweed (Asclepias spp.), and other flowering plants are necessary for monarch butterfly habitat-adult monarchs feed on the nectar of many flowering plants during breeding and migration, but they can only lay eggs on milkweed plants (USFWS 2022d). The study area lies in the migration route of monarch butterflies, and if nectar sources and milkweed are present, individuals may occur. No milkweed plants were observed during field surveys; however, one adult monarch butterfly was observed in the survey area during the November 2022 survey.

6.2 State Listed Species with Potential to Occur within the Action Area

State listed special-status species were identified with the potential to occur in the survey area or in its immediate surroundings. A full list of the special species of concern listed by the CDFW is shown in **Table 2**.

TABLE 2
STATE LISTED SPECIES POTENTIALLY OCCURRING WITH THE ACTION AREA

Common Name	Scientific Name	CDFW Listing	Potential Occurrence within Action Area	Habitat Preference
Mammals				
Owens Valley Vole	*Microtus californicus vallicola*	SSC	Low	Grassy banks near water sources, upland meadows, and unused agricultural fields.
Birds				
Yellow-breasted Chat	*Icteria virens*	SSC	High	Dense shrubbery, including abandoned farm fields, forest openings and edges, swamps, and edges of streams and ponds.
Burrowing Owl	*Athene cunicularia*	SSC	Low	Open dry areas with low vegetation, including grasslands, rangelands, agricultural areas, and deserts.
Yellow Warbler	*Setophaga petechia*	SSC	High	Thickets and other disturbed habitats, particularly along streams and wetlands often among willows.
Northern Harrier	*Circus hudsonius*	SSC	Moderate	Undisturbed tracts of wetlands and grasslands with low, thick vegetation.
Western Yellow-Billed Cuckoo	*Coccyzus americanusoccidentalis*	E	Low	Woodland habitat with dense cover and water nearby, including low scrubby vegetation, dense thickets, and abandoned farmland.

TABLE 2
STATE LISTED SPECIES POTENTIALLY OCCURRING WITH THE ACTION AREA

Common Name	Scientific Name	CDFW Listing	Potential Occurrence within Action Area	Habitat Preference
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E	Low	Dense riparian tree and shrub communities near rivers, swamps, and other wetlands.
Fish				
Owens Pupfish	*Cyprinodon radiosus*	E	Not Expected	Spring pools, sloughs, irrigation ditches, swamps, and flooded pastures.
Owens Tui Chub	*Gila bicolor ssp. snyderi*	E	Not Expected	Standing waters and low gradient

NOTES:

Status Codes:
E = Listed as Endangered
T = Listed as Threatened
SSC = Species of Special Concern

SOURCE: CNPS 2022; Jepson 2022; CDFW 2019, 2022; USFWS 2022

Owens Valley Vole

The Owens Valley Vole makes its home in groundwater-dependent meadows or near streams and riverbanks where soils are moist. During the previous field reviews, soils located within BIH's property limits were identified as dry, and unlikely to support the Owens Valley Vole, due to a lack of suitable habitat for the species. While CNDDB records for this species indicate its presence near the southeast corner of the Airport, all records are historical, with no present records of its occurrence at BIH (CNDBB 2022). It is not expected that this species will occur within the project site.

Yellow-breasted Chat

The Yellow-breasted Chat breeds in areas of dense shrubbery, including abandoned farm fields, clearcuts, powerline corridors, fencerows, forest edges and openings, swamps, and edges of streams and ponds. Its habitat often includes blackberry bushes and other thickets. In arid regions of the West, it can be found in shrubby habitats along rivers. During migration, it usually stays in low, dense vegetation along rivers (eBird 2022a).

The Yellow-breasted Chat is considered by the CDFW as a Bird Species of Special Concern with a low risk of global extinction but a moderate risk of extirpation in the state due to a restricted range, relatively few populations or occurrences, recent and widespread declines, and threats to its population. The Yellow-breasted Chat was observed daily within the survey during field surveys conducted in May 2020 and June 2019 by a professional field biologist. The bird species was identified in the northwestern portion of the survey along North Fork Bishop Creek. In Inyo County, chats historically breed along the Owens River (north to Birchim Canyon), chats were only present at 1 of 18 of its tributaries (Hogback Creek) surveyed 1998-2000 (Shuford et al., 2008b). Birchim Canyon is about 16 miles north-east of the study area, while Hogback Creek is approximately 60 miles south of the study area.

Burrowing Owl

The search on CNDDB showed recent observations of burrowing owls within the vicinity of the Airport, and there were no burrows observed within the survey area during the surveys conducted in November 2022, May 2020, and June 7, 2019. The unpaved portions of the Airport property are generally suitable for burrowing owls, although areas of rabbitbrush may cause a visible obstruction of their surroundings, creating a less suitable condition for the owls. Additionally, no ground squirrels or burrows were observed in the area, and the most suitable areas for burrowing owls are frequently graded as part of BIH's ongoing operations and maintenance activities.

Yellow Warbler

The Yellow Warbler spends the breeding season in thickets and other disturbed habitats, particularly along streams and wetlands. They are often found among willows, but also live in small birch stands in high alpine environments. In the Mountain West they can occur at high elevations and among aspen groves. Yellow Warblers occur in low densities on the Owens Valley floor, in Inyo County (Shuford et al., 2008a). Extensive surveys from 2001-2004 done along 113 kilometers of the lower Owens River found no breeding Yellow Warblers downstream of the Los Angeles Aqueduct (Shuford et al., 2008a). The Yellow Warbler is considered a California Bird Species of Special Concern. However, the CDFW designates the species as secure from global extinction and vulnerable/apparently secure from state extirpation. The species was observed daily within the survey area during field surveys conducted in May 2020 and June 2019. The bird species was identified in the shrubby wetland habitat in the northwestern portion of the survey along North Fork Bishop Creek.

Northern Harrier

The Northern Harrier prefers undisturbed wetlands and grasslands with low but thick vegetation. Breeding habitat includes freshwaters and saline marshes, meadows, old fields, upland prairies, high-desert shrub-steppe, and riverside woodlands. Populations in the western U.S. tend to be found in dry upland habitats. The Northern Harrier is listed as a California Bird Species of Special Concern; however, the CDFW designates the species as secure from global extinction and vulnerable from state extirpation. The species was observed foraging over the Airport grounds during surveys conducted in May 2020 and June 2019 and may roost near the eastern boundary of the Airport. As this species was only seen during visits early in the field season, and not during subsequent visits, this species is unlikely to nest in the survey area.

7. Migratory Bird Treaty Act Bird Species in the Action Area

The Migratory Bird Treaty Act (MBTA) of 1918 makes it illegal for anyone to take any migratory bird, nest, or eggs except under the terms of a valid permit. The migratory bird species in the area include hawks and other raptors, among many others. The birds listed in USFWS IPaC Report (Appendix B) are considered birds of particular concern either because they occur on the

USFWS Birds of Conservation Concern (BCC) list or warrant special attention in the survey area (USFWS 2021). This list is provided in **Table 3** and is included in this assessment for information purposes only.

TABLE 3
MIGRATORY BIRD TREATY ACT BIRD SPECIES POTENTIALLY OCCURRING WITH THE ACTION AREA

Common Name	Scientific Name	USFWS Listing Status	Potential Occurrence within Action Area	Habitat Preference
Birds				
American White Pelican	*pelecanus erythrorhynchos*	NL	Low	Rivers, lakes, reservoirs, estuaries, bays, and open marshes, sometimes inshore marine habitats.
Bald Eagle	*Haliaeetus leucocephalus*	NL	Low	Lakes and reservoirs with lots of fish and surrounding forests.
Black Swift	*Cypseloides niger*	NL	Low	Ledges or shallow caves in steep rock faces and canyons, usually near or behind waterfalls and in sea caves.
Black Tern	*Chlidonias niger*	NL	Low	Coniferous and hardwood forest lands; wetlands; aquatic and riparian habitat associated with all stream types; snags; and special habitat types.
California Gull	*Larus californicus*	NL	Low	Seacoasts, bays, estuaries, mudflats, marshes, irrigated fields, lakes, ponds, dumps, cities, and agricultural lands.
Cassin's Finch	*Carpodacus cassinii*	NL	Low	Open coniferous forest; in migration and winter also in deciduous woodland, second growth, scrub, brushy areas, partly open situations with scattered trees, and sometimes suburbs near mountains.
Clark's Grebe	*Aechmophorus clarkii*	NL	Low	Marshes, lakes, and bays; in migration and winter also sheltered seacoasts, less frequently along rivers.
Evening Grosbeak	*Coccothraustes vespertinus*	NL	Low	Coniferous (primarily spruce and fir) and mixed coniferous- decidouous woodland, second growth, and occasionally parks; in migration and winter in a variety of forest and woodland habitats, and around human habitation.
Franklin's Gull	*Leucophaeus pipixcan*	NL	Low	Seacoasts, bays, estuaries, lakes, rivers, marshes, ponds, irrigated fields, mudflats.

TABLE 3
MIGRATORY BIRD TREATY ACT BIRD SPECIES POTENTIALLY OCCURRING WITH THE ACTION AREA

Common Name	Scientific Name	USFWS Listing Status	Potential Occurrence within Action Area	Habitat Preference
Lesser Yellowlegs	*Tringa flavipes*	NL	Low	Fresh and brackish wetlands, including mudflats, marshes, lake and pond edges, and wet meadows.
Lewis's Woodpecker	*Melanerpes lewis*	NL	Low	Open ponderosa pine forests and burned forests with a high density of standing dead trees (snags).
Olive-sided Flycatcher	*Contopus cooperi*	NL	Low	Boreal forest and in western coniferous forests.
Pinyon Jay	*Gymnorhinus cyanocephalus*	NL	Low	Pinyon-juniper woodlands, sagebrush, scrub oak, chaparral, and ponderosa pine forests.
Rufous Hummingbird	*selasphorus rufus*	NL	Low	Coniferous forest, second growth, thickets, and brushy hillsides, with foraging extending into adjacent scrubby areas and meadows with abundant nectar flowers.
Sage Thrasher	*Oreoscoptes montanus*	NL	Possible	Shrubsteppe habitats in open landscapes of the interior West.
Virginia's Warbler	*Vermivora virginiae*	NL	Low	Open pinyon-juniper and oak woodlands often on steep slopes with shrubby ravines.
Western Grebe	*aechmophorus occidentalis*	NL	Low	Marshes, lakes, and bays; in migration and winter also sheltered seacoasts, less frequently along rivers.
Willet	*Tringa semipalmata*	NL	Low	Open beaches, bayshores, marshes, mudflats, and rocky coastal zones.

NOTES:

Status Codes:
P = Protected under MBTA
NL = Not Listed as Endangered or Threatened

SOURCE: U.S. Fish and Wildlife Service, Information, Planning, and Consultation (IPaC) System, December 8, 2022; NatureServe 2023.

8. Effects of the Proposed Project

The Proposed Project does not include any ground disturbance within or immediately surrounding the Action Area that may affect habitat or threatened or endangered species and there is no designated critical habitat present. The Proposed Project is expected to produce "no effect" on federally listed fish, plant, and avian species within or immediately surrounding the survey area.

Furthermore, the Proposed Project will have no effect on state species of special concern identified during site surveys.

9. Conclusions

The Action Area is primarily existing disturbed or mowed areas that will be leveled and graded. Otherwise, the rabbitbrush/greasewood/saltbush shrub community is not suitable habitat for many of the potential sensitive or protected species. There are no nesting or perching trees within the AA and any nesting or perching trees are a suitable distance away from the project to avoid impacts to wildlife. Riparian areas that could be potential habitat for several species are outside the AA and will not be impacted. The Proposed Project does not include any action that may affect potential habitat for threatened or endangered species.

The Proposed Project will have “no effect” on federally listed fish, plant, and avian species within or immediately surrounding the survey area. Furthermore, the Proposed Project will have no effect on state species of special concern.

APPENDIX A

Field Survey Photo Log – November 1, 2022

Photo 1: Data point 1, Upland.
November 1, 2022

Photo 2: Data point 2, Dry Pond.
November 1, 2022

Photo 3: Data point 3, ED-1.
November 1, 2022

Photo 4: Data point 4, Rubber rabbitbrush scrub upland.
November 1, 2022

	
Photo 5: Data point 5, FFSW-1. November 1, 2022	Photo 6: Data point 6, Disturbed/developed upland. November 1, 2022

	
Photo 7: Data point 7, FEW-1. November 1, 2022	Photo 8: FFSW-2. November 1, 2022

Photo 9: Rawson Canal, looking east. November 1, 2022

Photo 10: Data point 9, FFSW-4 looking northwest. November 1, 2022

Photo 11: Data point 10, Rubber rabbitbrush scrub upland. November 1, 2022

Photo 12: FFSW-3 looking southwest towards E Line Street, inaccessible. November 1, 2022

APPENDIX B
U.S. Fish and Wildlife Service Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
Phone: (775) 861-6300 Fax: (775) 861-6301

In Reply Refer To: December 08, 2022
Project Code: 2023-0022852
Project Name: BIH_RSA_Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Reno Fish And Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, NV 89502-7147
(775) 861-6300

Project Summary

Project Code: 2023-0022852

Project Name: BIH_RSA_Project

Project Type: Airport - Maintenance/Modification

Project Description: Inyo County seeks to bring the Runway Safety Area (RSAs) off both the Runway 12 and 30 ends at Bishop Airport into compliance with FAA requirements (RSA Project). The RSA improvements require certain changes to the Airport Layout Plan (ALP).

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.372660350000004,-118.36411243640129,14z

Counties: Inyo County, California

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Owens Pupfish *Cyprinodon radiosus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4982	Endangered
Owens Tui Chub *Gila bicolor ssp. snyderi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7289	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Fish Slough Milk-vetch *Astragalus lentiginosus var. piscinensis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7947	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

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

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

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

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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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)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American White Pelican *pelecanus erythrorhynchos* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6886	Breeds Apr 1 to Aug 31
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31

NAME	BREEDING SEASON
Black Swift *Cypseloides niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Black Tern *Chlidonias niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Cassin's Finch *Carpodacus cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Franklin's Gull *Leucophaeus pipixcan* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Lewis's Woodpecker *Melanerpes lewis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Pinyon Jay *Gymnorhinus cyanocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15

NAME	BREEDING SEASON
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds Apr 15 to Jul 15
Sage Thrasher *Oreoscoptes montanus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9433	Breeds Apr 15 to Aug 10
Virginia's Warbler *Vermivora virginiae* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9441	Breeds May 1 to Jul 31
Western Grebe *aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5

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. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps 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.

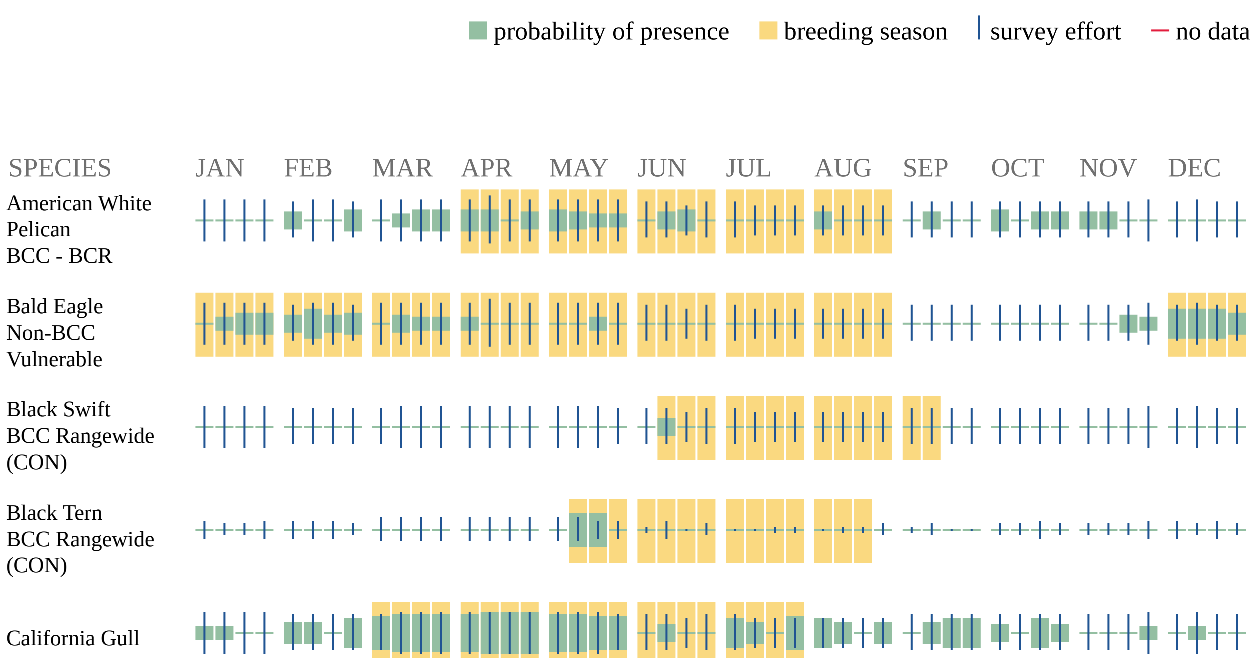
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 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.

Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. 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 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



BCC Rangewide (CON)

Cassin's Finch BCC Rangewide (CON)

Clark's Grebe BCC Rangewide (CON)

Evening Grosbeak BCC Rangewide (CON)

Franklin's Gull BCC Rangewide (CON)

Lesser Yellowlegs BCC Rangewide (CON)

Lewis's Woodpecker BCC Rangewide (CON)

Olive-sided Flycatcher BCC Rangewide (CON)

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Pinyon Jay BCC Rangewide (CON)

Rufous Hummingbird BCC Rangewide (CON)

Sage Thrasher BCC - BCR

Virginia's Warbler BCC Rangewide (CON)

Western Grebe BCC Rangewide (CON)

Willet BCC Rangewide (CON)

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species

- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

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. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures 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 list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

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 and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) 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. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my 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 query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

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.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPaC User Contact Information

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APPENDIX C

CNDDB Special Animals List

SPECIAL ANIMALS LIST

January 2023

State of California

Natural Resources Agency

Department of Fish and Wildlife

Biogeographic Data Branch

California Natural Diversity Database (CNDDB)

Recommended Citation:

California Natural Diversity Database (CNDDB). January 2023. Special Animals List. California Department of Fish and Wildlife. Sacramento, CA.

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Special Animals

“Special Animals” is a broad term used to refer to all the animal taxa tracked by the California Department of Fish and Wildlife’s (CDFW) California Natural Diversity Database (CNDDB), regardless of their legal or protection status. This list is also referred to as the list of “species at risk” or “special status species.” The Special Animals List includes species, subspecies, Distinct Population Segments (DPS), or Evolutionarily Significant Units (ESU) where at least one of the following conditions applies:

- Officially listed or proposed for listing under state and/or federal endangered species acts
- Taxa considered by the Department of Fish and Wildlife to be a Species of Special Concern (SSC)
- Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act Guidelines
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range, but not currently threatened with extirpation
- Population(s) in California that may be peripheral to the major portion of a taxon’s range but are threatened with extirpation in California
- Taxa closely associated with a habitat that is declining in California at a significant rate (e.g., wetlands, riparian, vernal pools, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats, etc.)
- Taxa designated as a special status, sensitive, or declining species by other state or federal agencies, or a non-governmental organization (NGO), and determined by the CNDDB to be rare, restricted, declining, or threatened across their range in California

The Special Animals List contains taxa that are actively inventoried, tracked, and mapped by the CNDDB, as well as taxa for which mapped data may not yet be incorporated into CNDDB user products. For the latter taxa, information at the county and 7.5-minute USGS quadrangle level can be accessed via the CNDDB QuickView Tool.

Taxa with a "Yes" in the "End Notes?" column have additional information in the End Notes section at the back of the list.

Additional information about the California Natural Diversity Database is available on the CNDDB website.

Information on other CDFW resource management programs is available on the Department's Conservation and Management of Wildlife and Habitat website.

The CDFW Wildlife Diversity Program provides additional information on wildlife habitat, threats, and survey guidelines.

NatureServe Element Ranking

The California Natural Diversity Database program is a member of the NatureServe Network of natural heritage programs, and uses the same conservation status methodology as other network programs. The ranking system was originally developed by The Nature Conservancy and is now maintained and recently revised by NatureServe. It includes a **Global rank** (G-rank), describing the status for a given taxon over its entire distribution, and a **State rank** (S-rank), describing the status for the taxon over its state distribution. For subspecies and varieties, there is also a “T” rank describing the global rank for the infraspecific taxon. The next page of this document details the criteria used to assign element ranks, from G1 to G5 for the Global rank and from S1 to S5 for the State rank. Procedurally, state programs such as the CNDDB develop the State ranks. The Global ranks are determined collaboratively among the Heritage Programs for the states/provinces containing the species. NatureServe then checks for consistency and logical errors at the national level. Because the units of conservation may include non-taxonomic biological entities such as populations or ecological communities, NatureServe refers to the targets of biological conservation as “elements” rather than taxa.

An element rank is assigned using standard criteria and rank definitions. This standardization makes the ranks comparable between organisms and across political boundaries. NatureServe has developed a “rank calculator” to help increase repeatability and transparency of the ranking process. The three main categories that are taken into consideration when assigning an element rank are rarity, threats, and trends. Within these three categories, various factors are considered, including:

- Range extent, area of occupancy, population size, total number of occurrences, and number of good occurrences (ranked A or B). Environmental specificity can also be used if other information is lacking.
- Overall threat impact as well as intrinsic vulnerability (if threats are unknown).
- Long-term and short-term trends.

Detailed information on this element ranking methodology can be found on the NatureServe Conservation Status Assessment website.

Listed below are definitions for interpreting global and state conservation status ranks. An element's ranking status may be adjusted up or down depending upon the considerations above.

Global Ranking

The global rank (G-rank) is a reflection of the overall status of an element throughout its global range.

- **GX: Presumed Extinct** – Not located despite intensive searches and virtually no likelihood of rediscovery.
- **GH: Possibly Extinct** – Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct throughout its range.
- **G1: Critically Imperiled** – At very high risk of extinction due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
- **G2: Imperiled** – At high risk of extinction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- **G3: Vulnerable** – At moderate risk of extinction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- **G4: Apparently Secure** – At fairly low risk of extinction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

- **G5: Secure** – At very low risk of extinction due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
- **GNR: Unranked** – Global rank not yet assessed.

State Ranking

The state rank (S-rank) is assigned in much the same way as the global rank, but state ranks refer to the imperilment status only within California's state boundaries.

- **SX: Presumed Extirpated** – Species is believed to be extirpated from the state Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered
- **SH: Possibly Extirpated** – Known from only historical records but still some hope of rediscovery. There is evidence that the species may no longer be present in the state, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
- **S1: Critically Imperiled** – At very high risk of extirpation in the state due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
- **S2: Imperiled** – At high risk of extirpation in the state due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- **S3: Vulnerable** – At moderate risk of extirpation in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- **S4: Apparently Secure** – At a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

- **S5: Secure** – At very low or no risk of extirpation in the state due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
- **SNR: Unranked** – State rank not yet assessed.

Additional Notes on NatureServe Ranks

- Rank Qualifiers
    - Taxa which are subspecies receive a taxon rank (**T-rank**) in addition to the G-rank. Whereas the G-rank reflects the condition of the entire species, the T-rank reflects the global status of just the subspecies. For example, the Point Reyes mountain beaver, *Aplodontia rufa* ssp. *phaea*, is ranked G5T2. The G-rank refers to the whole species, i.e., *Aplodontia rufa*; the T-rank refers only to the global condition of ssp. *phaea*.
    - **C = Captive or Cultivated Only** — taxon at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population not yet established. The "C" modifier is only used at a global level and not at a state level. Possible ranks are GXC or GHC.
    - **Q = Questionable taxonomy** that may reduce conservation priority — Distinctiveness of this entity as a taxon at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at the global level, not at the state level.
- Uncertainty about the status of an element is expressed in two major ways:
    - By expressing the ranks as a **range** of values: e.g., S2S3 indicates the rank is somewhere between S2 and S3.
    - By adding a "**?**" to the rank: e.g., S2?; this represents more certainty than S2S3, but less certainty than S2.

- Other considerations used when ranking a species include the pattern of distribution of the element on the landscape, fragmentation of the population, and historical extent as compared to its modern range. It is important to take an overall view when ranking sensitive elements rather than simply counting element occurrences.

Animal Element Occurrences and Mapping

What is an Element Occurrence?

An Element Occurrence (EO) is a location where a given element has been documented to occur. It is a concept developed and applied within the NatureServe natural heritage network. An EO is not a population, but may indicate that a population is present in that area; likewise, a single population may be represented by more than one EO. An EO is based upon the source documents available at the time of mapping. Both the mapped feature and the text portion of EOs are updated as new information becomes available.

Element Occurrence Definitions Vary by Taxa

The EO definition refers to the types of information mapped. For most animal taxa, the CNDDB is interested in information that indicates the presence of a resident population. However, for many migratory birds, the CNDDB only tracks detections of nest sites or behaviors indicating reproduction is occurring at the site. Details about avian detections are available in the Submitting Avian Detections document. For other taxa where CNDDB tracks only a certain part of the range or life history, the area or life stage is indicated on the list under the “Comment” column.

Mapping Conventions

Information in CNDDB is mapped to balance precision and uncertainty, based upon the source materials used to determine the location of the Element Occurrence. Data with precise location information are mapped with 80m-radius circles or specific polygons. Data with vague location information are mapped with non-specific circular features or non-specific polygons. Non-specific features indicate that the species was found somewhere within the mapped area, but the exact location was unknown. Generally, observations/collections within ¼ mile and/or within continuous habitat are combined into a single EO.

Taxonomic Standards

Taxonomic References and Sources of Additional Information

The CNDDB follows current published taxonomy for animals as recognized by the scientific organizations listed below. The CNDDB reviews publications that propose new taxonomy and nomenclature for CNDDB-tracked species and evaluates whether these proposals are recognized by the larger scientific community. The CNDDB makes every effort to use the best available science in the taxonomy used, but different experts may recognize different names for some time after a taxonomic change is proposed. In these cases, the CNDDB will generally use the preexisting nomenclature until a change is formally recognized beyond the initial publication. In addition, the CNDDB recognizes some taxa identified by experts on the California fauna where these taxa may not be recognized by national biological societies. Generally, the taxonomy used by NatureServe is followed, with additional evaluation of taxonomy from the following sources:

- Reptiles and amphibians:
  - The Center for North American Herpetology
  - The Society for the Study of Amphibians and Reptiles
- Fishes:
  - Fricke, R., Eschmeyer, W. N. & R. van der Laan (eds) 2022. Eschmeyer's catalog of fishes: genera, species, references. Electronic version.
  - Jelks, H.L., S.J. Walsh, N.M. Burkhead, S. Contreras-Balderas, E. Díaz-Pardo, D.A. Hendrickson, J. Lyons, N.E. Mandrak, F. McCormick, J.S. Nelson, S.P. Platania, B.A. Porter, C.B. Renaud, J.J. Schmitter-Soto, E.B. Taylor, and M.L. Warren, Jr. 2008. Conservation status of imperiled North American freshwater and diadromous fishes. Fisheries 33(8):372-407.
  - Lawrence M. Page, Héctor Espinosa-Pérez, Lloyd T. Findley, Carter R. Gilbert, Robert N. Lea, Nicholas E. Mandrak, Richard L. Mayden, and Joseph S. Nelson. 2013. Common and scientific names of fishes from the

United States, Canada, and Mexico, 7th edition. American Fisheries Society, Special Publication 34. 243 pp.
    - Moyle, P. B. 2002. Inland fishes of California. University of California Press.
- Birds:
    - The checklist of the American Ornithologists' Union
- Mammals:
    - The American Society of Mammalogists
    - Bradley, R.D., L.K. Ammerman, R.J. Baker, L.C. Bradley, J.A. Cook, R.C. Dowler, C. Jones, D.J. Schimdly, F.B. Stangl Jr., R.A. Van Den Bussche, and B. Wursig. 2014. Revised checklist of North American mammals north of Mexico, 2014. Museum of Texas Tech University Occasional Papers 327:1-28.

Listing and Special Status Information

CALIFORNIA ENDANGERED SPECIES ACT (CESA) LISTING CODES: The listing status of each species is current as of the date of this list. The most current changes in listing status will be found in the "Endangered and Threatened Animals List," which the CNDDB updates and issues quarterly. Additional information can be found on the California Fish and Game Commission CESA web page.

- SE State listed as endangered
- ST State listed as threatened
- SCE State candidate for listing as endangered
- SCT State candidate for listing as threatened
- SCD State candidate for delisting

FEDERAL ENDANGERED SPECIES ACT (ESA) LISTING CODES: The listing status is current as of the date of this list. The most current changes in listing status will be found in the "Endangered and Threatened Animals List," which the CNDDB updates and issues quarterly. Federal listing actions are published in the Federal Register.

- FE Federally listed as endangered
- FT Federally listed as threatened
- FPE Federally proposed for listing as endangered
- FPT Federally proposed for listing as threatened
- FPD Federally proposed for delisting
- FC Federal candidate species (former Category 1 candidates)

Section 4(c)(2)(A) of the Act requires the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to conduct a review of listed species at least once every five years. Five year reviews are made available by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

OTHER STATUS CODES: The status of species on the Special Animals List according to other conservation organizations is provided below. Taxa on these lists are reviewed for inclusion in the CNDDB Special Animals List, but are not automatically included. For example, taxa that are regionally rare within a portion of California may not be included, because they may be of lesser conservation concern across their full range in California.

- **American Fisheries Society (AFS):**
  - Designations for freshwater and diadromous species were taken from the paper:
    - Jelks, H.L., S.J. Walsh, N.M. Burkhead, S. Contreras-Balderas, E. Díaz-Pardo, D.A. Hendrickson, J. Lyons, N.E. Mandrak, F. McCormick, J.S. Nelson, S.P. Platania, B.A. Porter, C.B. Renaud, J.J. Schmitter-Soto, E.B. Taylor, and M.L. Warren, Jr. 2008. Conservation status of imperiled North American freshwater and diadromous fishes. Fisheries 33(8):372-407.
  - Designations for marine and estuarine species were taken from the paper:
    - Musick, J.A. et al. 2000. Marine, Estuarine, and Diadromous Fish Stocks at Risk of Extinction in North America (Exclusive of Pacific Salmonids). Fisheries 25(11):6-30.
- **Bureau of Land Management (BLM) Sensitive:** Bureau of Land Management Manual §6840 states that "BLM sensitive species are: (1) species listed or proposed for listing under the Endangered Species Act (ESA), and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, which are designated as Bureau sensitive by the State Director(s). All Federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species." Downloadable copies of the California-BLM Special Status Animals and Sensitive Species Lists are available.
- **California Department of Forestry and Fire Protection (CDF) Sensitive:** California Department of Forestry and Fire Protection classifies "sensitive species" as those species that warrant special protection during timber operations. The list of "sensitive species" is given in §895.1 (Definitions) of the California Forest Practice Rules.

- **CDFW Fully Protected:** The classification of Fully Protected was the State's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibians and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under the California and/or federal endangered species acts; the exceptions are white-tailed kite, golden eagle, trumpeter swan, northern elephant seal, and ringtail cat. The white-tailed kite and the golden eagle are tracked in the CNDDB. Three subspecies of ringtail are tracked (*Bassariscus astutus octavus*, *B. a. willetti*, *B. a. yumanensis*), two are not (*B. a. raptor* and *B. a. nevadensis*). The trumpeter swan and northern elephant seal are also not tracked. The Fish and Game Code sections dealing with Fully Protected species state that these species "...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected" species, although take may be authorized for necessary scientific research. This language arguably makes the "Fully Protected" designation the strongest and most restrictive regarding the "take" of these species. In 2003, code sections dealing with Fully Protected species were amended to allow the Department to authorize take resulting from recovery activities for state-listed species. More information on Fully Protected species and the take provisions can be found in the Fish and Game Code: birds at §3511, mammals at §4700, reptiles and amphibians at §5050, and fish at §5515). Additional information on Fully Protected fish can be found in the California Code of Regulations, Title 14, Division 1, Subdivision 1, Chapter 2, Article 4, §5.93. The category of Protected Amphibians and Reptiles in Title 14 has been repealed.
- **CDFW Species of Special Concern (SSC):** It is the goal and responsibility of the Department of Fish and Wildlife to maintain viable populations of all native species. To this end, the Department has designated certain vertebrate species as "Species of Special Concern" because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. The goal of designating SSCs is to halt or reverse their decline by calling attention to

their plight and addressing the issues of concern early enough to secure their long-term viability. Not all SSCs have declined equally; some species may be just starting to decline, while others may have already reached the point where they meet the criteria for listing as a threatened or endangered under state and/or federal endangered species acts.

- **CDFW Watch List Species:** Watch list species are taxa that were previously SSCs but do not currently meet SSC criteria, and for which there is concern and a need for additional information to clarify status.
- **International Union for Conservation of Nature (IUCN) Red List of Threatened Species:** The IUCN assesses, on a global scale, the conservation status of species, subspecies, varieties, and even selected subpopulations in order to highlight taxa threatened with extinction, and therefore promote their conservation. Detailed information is available from the IUCN Red List Online.
- **Marine Mammal Commission (MMC) Marine Mammal Species of Special Concern:** Section 202 of the Marine Mammal Protection Act (MMPA) directs the MMC, in consultation with its Committee of Scientific Advisors, to make recommendations to the Department of Commerce, the Department of the Interior, and other federal agencies on research and management actions needed to conserve species of marine mammals. To meet this charge, the Commission devotes special attention to particular species and populations that are vulnerable to various types of human-related activities, impacts, and contaminants. Such species may include marine mammals listed as endangered or threatened under the federal ESA or as depleted under the MMPA. In addition, the Commission often directs special attention to other species or populations of marine mammals not so listed whenever special conservation challenges arise that may affect them. More information on the MMPA and the list of species is available from the MMC Marine Mammal Species and Populations of Concern website.
- **North American Bird Conservation Initiative (NABCI):** The North American Bird Conservation Initiative is a coalition of government agencies and private organizations that works to ensure the long-term health of North America's native

bird populations. They publish an annual State of the Birds report which includes a watch list of bird species in need of conservation help. Species on the list are assigned to either the Red Watch List for species with extremely high vulnerability, or Yellow Watch List for species that may be range restricted or may be more widespread but with declines and high threats.

- **United States Forest Service (USFS) Sensitive:** The USDA Forest Service defines sensitive species as plant and animal species identified by a regional forester that are not listed or proposed for listing under the federal Endangered Species Act for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Regional Foresters shall identify sensitive species occurring within the region. More information on California species can be found on the Pacific Southwest Region (Region 5) Plants and Animals site, including links to download the Regional Forester's Sensitive Animal Species List.
- **U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern:** The goal of the Birds of Conservation Concern 2021 report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities and draw attention to species in need of conservation action.

Table of Special Status Code Abbreviations

Organization	Abbreviation
American Fisheries Society - Endangered	AFS_EN
American Fisheries Society - Threatened	AFS_TH
American Fisheries Society - Vulnerable	AFS_VU
Bureau of Land Management - Sensitive	BLM_S
Calif Dept of Forestry & Fire Protection - Sensitive	CDF_S
Calif Dept of Fish & Wildlife - Fully Protected	CDFW_FP
Calif Dept of Fish & Wildlife - Species of Special Concern	CDFW_SSC
Calif Dept of Fish & Wildlife - Watch List	CDFW_WL
IUCN - Critically Endangered	IUCN_CR
IUCN - Endangered	IUCN_EN
IUCN - Vulnerable	IUCN_VU
IUCN - Near Threatened	IUCN_NT
IUCN - Least Concern	IUCN_LC
IUCN - Data Deficient	IUCN_DD
Marine Mammal Commission - Species of Special Concern	MMC_SSC
North American Bird Conservation Initiative - Red Watch List	NABCI_RWL
North American Bird Conservation Initiative - Yellow Watch List	NABCI_YWL
U.S. Forest Service - Sensitive	USFS_S
U.S. Fish & Wildlife Service Birds of Conservation Concern	USFWS_BCC

Special Animals List

(935 taxa)

Last updated January 5, 2023

The remainder of this document contains the CNDDB's Special Animals List, current as of the date on the title page of this document.

Invertebrates

PELECYPODA (clams and mussels)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Anodonta californiensis	California floater		G3Q	S2?	None	None	USFS:S	Yes	
Anodonta oregonensis	Oregon floater		G5Q	S2?	None	None	IUCN:LC	Yes	
Gonidea angulata	western ridged mussel		G3	S1S2	None	None	IUCN:VU	Yes	
Margaritifera falcata	western pearlshell		G4G5	S1S2	None	None	IUCN:NT	Yes	
Pisidium ultramontanum	montane peaclam		G1	S1	None	None	IUCN:VU USFS:S	Yes	

GASTROPODA (snails, slugs, and abalones)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ammonitella yatesii	tight coin (=Yates' snail)		G1	S1	None	None	IUCN:VU	Yes	
Ancotrema voyanum	hooded lancetooth		G1G2	S1S2	None	None		Yes	
Assiminea infima	Badwater snail		G1	S1	None	None	IUCN:VU	Yes	
Binneya notabilis	Santa Barbara shelled slug		G1	S1	None	None	IUCN:DD	Yes	
Colligyrus convexus	canary duskysnail		G1G2	S2	None	None		Yes	
Eremarionta immaculata	white desertsnail		G1	S1	None	None	IUCN:VU	Yes	
Eremarionta millepalmarum	Thousand Palms desertsnail		G1	S1	None	None	IUCN:VU	No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Eremarionta morongoana	Morongo (=Colorado) desertsnail		G1G3	S1	None	None	IUCN:NT	Yes	
Eremarionta rowelli bakerensis	Baker's desertsnail		G3G4T1	S1	None	None	IUCN:DD	Yes	
Eremarionta rowelli mccoiana	California Mccoy snail		G3G4T1	S1	None	None	IUCN:DD	Yes	
Fluminicola seminalis	nugget pebblesnail		G2	S2	None	None	IUCN:DD USFS:S	Yes	
Glyptostoma gabrielense	San Gabriel chestnut		G2	S2	None	None		Yes	
Haliotis corrugata	pink abalone		G3?	S2?	None	None	IUCN:CR	No	
Haliotis cracherodii	black abalone		G3	S2	Endangered	None	IUCN:CR	Yes	
Haliotis fulgens	green abalone		G3G4	S2	None	None	IUCN:CR	No	
Haliotis kamtschatkana	pinto abalone		G3G4	S2	None	None	IUCN:EN	No	
Haliotis sorenseni	white abalone		G1	S2	Endangered	None	IUCN:CR	No	
Haplotrema catalinense	Santa Catalina lancetooth		G1	S1	None	None		Yes	
Haplotrema duranti	ribbed lancetooth		G1G2	S1S2	None	None		Yes	
Helisoma newberryi	Great Basin rams-horn		G1	S1S2	None	None	USFS:S	Yes	
Helminthoglypta allynsmithi	Merced Canyon shoulderband		G1	S1	None	None	IUCN:VU	Yes	
Helminthoglypta arrosa monticola	mountain shoulderband		G2G3T1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Helminthoglypta arrosa pomoensis	Pomo bronze shoulderband		G2G3T1	S1	None	None	IUCN:DD	Yes	
Helminthoglypta ayresiana sanctaecrucis	Ayer's snail		G1G2T1T2	S1S2	None	None		Yes	
Helminthoglypta callistoderma	Kern shoulderband		G1	S1	None	None	IUCN:EN	Yes	
Helminthoglypta coelata	mesa shoulderband		G1	S1	None	None	IUCN:VU	Yes	
Helminthoglypta concolor	whitefir shoulderband		G1G2	S1S2	None	None		Yes	
Helminthoglypta fontiphila	Soledad shoulderband		G1	S1	None	None		Yes	
Helminthoglypta greggi	Mohave shoulderband		G2	S2	None	None		Yes	
Helminthoglypta hertleini	Oregon shoulderband		G3Q	S1S2	None	None		Yes	
Helminthoglypta milleri	peak shoulderband		G1	S1	None	None		Yes	
Helminthoglypta mohaveana	Victorville shoulderband		G1	S1	None	None	IUCN:NT	Yes	
Helminthoglypta nickliniana awania	Peninsula coast range shoulderband		G3T1	S1	None	None	IUCN:DD	Yes	
Helminthoglypta nickliniana bridgesi	Bridges' coast range shoulderband		G3T1	S1S2	None	None	IUCN:DD	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Helminthoglypta sequoicola consors	redwood shoulderband		G2T1	S1	None	None	IUCN:DD	Yes	
Helminthoglypta stiversiana williamsi	Williams' bronze shoulderband		G1G2T1	S1	None	None	IUCN:DD	Yes	
Helminthoglypta talmadgei	Trinity shoulderband		G2	S2	None	None		Yes	
Helminthoglypta taylori	westfork shoulderband		G1	S1	None	None		Yes	
Helminthoglypta traskii pacoimensis	Pacoima shoulderband		G1G2T1	S1	None	None		Yes	
Helminthoglypta traskii traskii	Trask shoulderband		G1G2T1	S1	None	None		Yes	
Helminthoglypta uvasana	Grapevine shoulderband		G1	S1	None	None		Yes	
Helminthoglypta vasquezi	Vasquez shoulderband		G1	S1	None	None		Yes	
Helminthoglypta walkeriana	Morro shoulderband		G1	S2	Threatened	None	IUCN:CR	Yes	
Herpeteros angelus	Soledad desertsnail		G1	S1	None	None		No	
Hesperarion plumbeus	leaden slug		G1	S1	None	None		Yes	
Ipnobius robustus	robust tryonia		G1G2	S1	None	None		Yes	
Juga acutifilosa	topaz juga		G2	S2	None	None	IUCN:NT USFS:S	Yes	
Juga chacei	Chace juga		G1	S1	None	None	USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Juga occata	scalloped juga		G1Q	S1	None	None	IUCN:EN USFS:S	Yes	
Juga orickensis	redwood juga		G2	S1S2	None	None		Yes	
Lanx alta	highcap lanx		G2G3	S3	None	None		Yes	
Lanx patelloides	kneecap lanx		G2?	S2	None	None	USFS:S	Yes	
Littorina subrotundata	Newcomb's littorine snail		G5	S1S2	None	None		No	
Megomphix californicus	Natural Bridge megomphix		G1G2	S1S2	None	None		Yes	
Micrarionta facta	Santa Barbara islandsnail		G1G2	S1S2	None	None	IUCN:VU	Yes	
Micrarionta feralis	San Nicolas islandsnail		G1	S1	None	None	IUCN:CR	Yes	
Micrarionta gabbii	San Clemente islandsnail		G1	S1	None	None	IUCN:VU	Yes	
Micrarionta opuntia	pricklypear islandsnail		G1	S1	None	None	IUCN:VU	Yes	
Monadenia callipeplus	downy sideband		G1?	S1S2	None	None		Yes	
Monadenia chaceana	Siskiyou shoulderband		G2G3	S2	None	None		Yes	
Monadenia churchi	Klamath sideband		G2G3	S2	None	None		Yes	
Monadenia circumcarinata	keeled sideband		G3	S3	None	None	BLM:S IUCN:VU	Yes	
Monadenia cristulata	crested sideband		G1?	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Monadenia fidelis leonina	A terrestrial snail		G4G5T1T2	S1S2	None	None		Yes	
Monadenia fidelis pronotis	rocky coast Pacific sideband		G4G5T1	S1	None	None	IUCN:DD	Yes	
Monadenia infumata ochromphalus	yellow-based sideband		G2T1	S1	None	None		Yes	
Monadenia infumata setosa	Trinity bristle snail		G2T2	S2	None	Threatened	IUCN:VU	Yes	
Monadenia marmarotis	marble sideband		G1	S1	None	None		Yes	
Monadenia mormonum buttoni	Button's Sierra sideband		G2T1	S1S2	None	None	IUCN:DD	Yes	
Monadenia mormonum hirsuta	hirsute Sierra sideband		G2T1	S1	None	None	BLM:S IUCN:DD	Yes	
Monadenia troglodytes troglodytes	Shasta sideband		G1G2T1T2	S1S2	None	None	USFS:S	Yes	
Monadenia troglodytes wintu	Wintu sideband		G1G2T1T2	S1S2	None	None	USFS:S	Yes	
Monadenia tuolumneana	Tuolumne sideband		G1	S1	None	None	BLM:S	Yes	
Monadenia yosemitensis	Yosemite sideband		G1	S1S2	None	None		Yes	
Noyo intersessa	Ten Mile shoulderband		G2	S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pomatiopsis binneyi	robust walker		G1	S1	None	None		Yes	
Pomatiopsis californica	Pacific walker		G1	S1	None	None	IUCN:DD	Yes	
Pomatiopsis chacei	marsh walker		G1	S2	None	None		Yes	
Pristiloma shepardae	Shepard's snail		G1	S1	None	None		Yes	
Pristinicola hemphilli	pristine pyrg		G3	S1	None	None	IUCN:DD USFS:S	Yes	
Prophysaon sp. 1	Klamath taildropper		G2	S3	None	None		Yes	Yes
Punctum hannai	Trinity Spot		G1G2	S1S2	None	None		Yes	
Pyrgulopsis aardahli	Benton Valley (=Aahrdahl's) springsnail		G1	S1	None	None		Yes	
Pyrgulopsis archimedis	Archimedes pyrg		G1G2	S1S2	None	None		Yes	
Pyrgulopsis cinerana	Ash Valley pyrg		G1G2	S1S2	None	None		Yes	
Pyrgulopsis diablensis	Diablo Range pyrg		G1	S1	None	None	IUCN:VU	Yes	
Pyrgulopsis eremica	Smoke Creek pyrg		G2	S2	None	None		Yes	
Pyrgulopsis falciglans	Likely pyrg		G1	S1	None	None		Yes	
Pyrgulopsis gibba	Surprise Valley pyrg		G3	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pyrgulopsis greggi	Kern River pyrg		G1	S1	None	None	IUCN:VU	Yes	
Pyrgulopsis lasseni	Willow Creek pyrg		G1G2	S1S2	None	None	USFS:S	Yes	
Pyrgulopsis longae	Long Valley pyrg		G1	S1	None	None		Yes	
Pyrgulopsis owensensis	Owens Valley springsnail		G1G2	S1S2	None	None	USFS:S	Yes	
Pyrgulopsis perturbata	Fish Slough springsnail		G1	S1	None	None		Yes	
Pyrgulopsis rupinicola	Sucker Springs pyrg		G1	S1	None	None		Yes	
Pyrgulopsis taylori	San Luis Obispo pyrg		G1	S1	None	None		Yes	
Pyrgulopsis ventricosa	Clear Lake pyrg		G1	S1	None	None	IUCN:CR	Yes	
Pyrgulopsis wongi	Wong's springsnail		G2	S2	None	None	IUCN:LC USFS:S	Yes	
Radiocentrum avalonense	Catalina mountainsnail		G1	S1	None	None	IUCN:CR	Yes	
Rothelix warnerfontis	Warner Springs shoulderband		G1	S1	None	None	USFS:S	Yes	
Sterkia clementina	San Clemente Island blunt-top snail		G1	S1S2	None	None	IUCN:NT	Yes	
Trilobopsis roperi	Shasta chaparral		G2	S1	None	None	USFS:S	Yes	
Trilobopsis tehamana	Tehama chaparral		G2	S1	None	None	USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Tryonia imitator	mimic tryonia (=California brackishwater snail)		G2	S2	None	None	IUCN:DD	Yes	
Tryonia margae	Grapevine Springs elongate tryonia		G1	S1	None	None		Yes	
Tryonia rowlandsi	Grapevine Springs squat tryonia		G1	S1	None	None		Yes	
Vespericola karokorum	Karok hesperian		G2	S2	None	None	IUCN:DD	Yes	
Vespericola marinensis	Marin hesperian		G2	S2	None	None		Yes	
Vespericola pressleyi	Big Bar hesperian		G1	S1	None	None	USFS:S	Yes	
Vespericola scotti	Benson Gulch hesperian		G1	S1	None	None		Yes	
Vespericola shasta	Shasta hesperian		G3	S3	None	None	USFS:S	Yes	
Vespericola sierranus	Siskiyou hesperian		G3	S1S2	None	None		Yes	
Xerarionta intercisa	horseshoe snail		G1	S1	None	None	IUCN:VU	Yes	
Xerarionta redimita	wreathed cactussnail		G1G2	S1	None	None	IUCN:VU	Yes	
Xerarionta tryoni	Bicolor cactussnail		G1	S1	None	None	IUCN:VU	Yes	

ARACHNIDA (spiders and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aphrastochthonius grubbsi	Grubbs' Cave pseudoscorpion		G1G2	S1	None	None		Yes	
Aphrastochthonius similis	Carlow's Cave pseudoscorpion		G1G2	S1S2	None	None		Yes	
Archeolarca aalbui	Aalbu's Cave pseudoscorpion		G1G2	S1	None	None		Yes	
Banksula californica	Alabaster Cave harvestman		GH	SH	None	None		Yes	
Banksula galilei	Galile's cave harvestman		G1	S1	None	None		Yes	
Banksula grubbsi	Grubbs' cave harvestman		G1	S1	None	None		Yes	
Banksula incredula	incredible harvestman		G1	S1	None	None		Yes	
Banksula martinorum	Martins' cave harvestman		G1	S1	None	None		Yes	
Banksula melones	Melones Cave harvestman		G1	S1	None	None	IUCN:VU	Yes	
Banksula rudolphi	Rudolph's cave harvestman		G1	S1	None	None		Yes	
Banksula tuolumne	Tuolumne cave harvestman		G1	S1	None	None		Yes	
Banksula tutankhamen	King Tut Cave harvestman		G1	S1	None	None		Yes	
Calicina arida	San Benito harvestman		G1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Calicina breva	Stanislaus harvestman		G1	S1	None	None		Yes	
Calicina cloughensis	Clough Cave harvestman		G1	S1	None	None		Yes	
Calicina conifera	Crane Flat harvestman		G1	S1	None	None		Yes	
Calicina diminua	Marin blind harvestman		G1	S1	None	None		Yes	
Calicina dimorphica	Watts Valley harvestman		G1	S1	None	None		Yes	
Calicina macula	marbled harvestman		G1	S1	None	None		Yes	
Calicina mesaensis	Table Mountain harvestman		G1	S1	None	None		Yes	
Calicina minor	Edgewood blind harvestman		G1	S1	None	None		Yes	
Calicina piedra	Piedra harvestman		G1	S1	None	None		Yes	
Calileptoneta briggsi	Briggs' leptonetid spider		G1	S1	None	None		Yes	
Calileptoneta oasa	Andreas Canyon leptonetid spider		G1	S1	None	None		Yes	
Calileptoneta ubicki	Ubick's leptonetid spider		G1	S1	None	None		Yes	
Calileptoneta wapiti	Mendocino leptonetid spider		G1	S1	None	None		Yes	
Fissilicreagris imperialis	Empire Cave pseudoscorpion		G1	S1	None	None	IUCN:VU	Yes	
Hubbardia idria	Idria short-tailed whipscorpion		G1	S1	None	None		Yes	

Scientific Name	**Common Name**	**Comments**	**Global Rank**	**State Rank**	**ESA**	**CESA**	**Other Status**	**Records in CNDDB?**	**End Notes?**
Hubbardia secoensis	Arroyo Seco short-tailed whipscorpion		G1	S1	None	None		Yes	
Hubbardia shoshonensis	Shoshone Cave whip-scorpion		G1	S1	None	None	BLM:S	Yes	Yes
Larca laceyi	Lacey's Cave pseudoscorpion		G1G2	S1	None	None		Yes	
Meta dolloff	Dolloff Cave spider		G3	S3	None	None	IUCN:VU	Yes	
Microcina edgewoodensis	Edgewood Park micro-blind harvestman		G1	S1	None	None		Yes	
Microcina homi	Hom's micro-blind harvestman		G1	S2	None	None		Yes	
Microcina jungi	Jung's micro-blind harvestman		G1	S1	None	None		Yes	
Microcina leei	Lee's micro-blind harvestman		G1	S1	None	None		Yes	
Microcina lumi	Lum's micro-blind harvestman		G1	S1	None	None		Yes	
Microcina tiburona	Tiburon micro-blind harvestman		G2	S2	None	None		Yes	
Neochthonius imperialis	Empire Cave pseudoscorpion		G1	S1	None	None		Yes	
Pseudogarypus orpheus	Music Hall Cave pseudoscorpion		G1G2	S1	None	None		Yes	
Socalchemmis gertschi	Gertsch's socalchemmis spider		G1	S1	None	None		Yes	
Socalchemmis icenoglei	Icenogle's socalchemmis spider		G1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Socalchemmis monterey	Monterey socalchemmis spider		G1	S1	None	None		Yes	
Talanites moodyae	Moody's gnaphosid spider		G1G2	S1S2	None	None		Yes	
Talanites ubicki	Ubick's gnaphosid spider		G1	S1	None	None		Yes	
Telema sp.	Santa Cruz telemid spider		G1G2	S1S2	None	None		No	
Texella deserticola	Whitewater Canyon harvestman		G1	S1	None	None		Yes	
Texella kokoweef	Kokoweef Crystal Cave harvestman		G1	S1	None	None		Yes	
Texella shoshone	Shoshone Cave harvestman		G1	S1	None	None		Yes	

CRUSTACEA, Order Anostraca (fairy shrimp)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Artemia monica	Mono Lake brine shrimp		G3	S3	None	None		Yes	
Branchinecta campestris	pocket pouch fairy shrimp		G2	S1	None	None		Yes	
Branchinecta conservatio	Conservancy fairy shrimp		G2	S2	Endangered	None	IUCN:EN	Yes	
Branchinecta longiantenna	longhorn fairy shrimp		G1	S2	Endangered	None	IUCN:EN	Yes	
Branchinecta lynchi	vernal pool fairy shrimp		G3	S3	Threatened	None	IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Branchinecta mesovallensis	midvalley fairy shrimp		G2	S2S3	None	None		Yes	
Branchinecta sandiegonensis	San Diego fairy shrimp		G2	S2	Endangered	None	IUCN:EN	Yes	
Linderiella occidentalis	California linderiella		G2G3	S2S3	None	None	IUCN:NT	Yes	
Linderiella santarosae	Santa Rosa Plateau fairy shrimp		G1G2	S1	None	None		Yes	
Streptocephalus woottoni	Riverside fairy shrimp		G1G2	S2	Endangered	None	IUCN:EN	Yes	

CRUSTACEA, Order Notostraca (tadpole shrimp)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lepidurus packardi	vernal pool tadpole shrimp		G4	S3	Endangered	None	IUCN:EN	Yes	

CRUSTACEA, Order Diplostraca (water fleas)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Dumontia oregonensis	hairy water flea		G1G3	S1	None	None		Yes	

CRUSTACEA, Order Isopoda (isopods)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Bowmanasellus sequoiae	Sequoia cave isopod		G2	S2	None	None		Yes	
Caecidotea tomalensis	Tomales isopod		G2	S2S3	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Calasellus californicus	An isopod		G2	S2	None	None		Yes	
Calasellus longus	An isopod		G1	S1	None	None		Yes	

CRUSTACEA, Order Amphipoda (amphipods)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hyalella muerta	Texas Spring amphipod		G1	S1	None	None		Yes	Yes
Hyalella sandra	Death Valley amphipod		G1	S1	None	None		Yes	Yes
Stygobromus cherylae	Barr's amphipod		G1	S1	None	None		Yes	
Stygobromus cowani	Cowan's amphipod		G1	S1	None	None		Yes	
Stygobromus gallawayae	Gallaway's amphipod		G1	S1	None	None		Yes	
Stygobromus gradyi	Grady's Cave amphipod		G1	S1	None	None	IUCN:VU	Yes	
Stygobromus grahami	Graham's Cave amphipod		G2	S2	None	None		Yes	
Stygobromus harai	Hara's Cave amphipod		G1G2	S1	None	None	IUCN:VU	Yes	
Stygobromus hyporheicus	hyporheic amphipod		G1	SX	None	None		Yes	
Stygobromus imperialis	Empire Cave amphipod		G1	S1	None	None		Yes	
Stygobromus lacicolus	Lake Tahoe amphipod		G1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Stygobromus mackenziei	Mackenzie's Cave amphipod		G1	S1	None	None	IUCN:VU	Yes	
Stygobromus myersae	Myer's amphipod		G1G2	S1S2	None	None		Yes	
Stygobromus mysticus	Secret Cave amphipod		G1	S1	None	None		Yes	
Stygobromus rudolphi	Rudolph's amphipod		G1	S1	None	None		Yes	
Stygobromus sheldoni	Sheldon's amphipod		G1	S1	None	None		Yes	
Stygobromus sierrensis	Sierra amphipod		G1	S1	None	None		Yes	
Stygobromus tahoensis	Lake Tahoe stygobromid		G1	S1	None	None		Yes	
Stygobromus trinus	Trinity County amphipod		G1	S1	None	None		Yes	
Stygobromus wengerorum	Wengerors' Cave amphipod		G1	S1	None	None	IUCN:VU	Yes	

CRUSTACEA, Order Decapoda (crayfish and shrimp)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pacifastacus fortis	Shasta crayfish		G1	S1	Endangered	Endangered	IUCN:CR	Yes	
Pacifastacus leniusculus klamathensis	Klamath crayfish		G5T5	S3	None	None		No	
Syncaris pacifica	California freshwater shrimp		G2	S2	Endangered	Endangered	IUCN:EN	Yes	

INSECTA, Order Odonata (dragonflies and damselflies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ischnura gemina	San Francisco forktail damselfly		G2	S2	None	None	IUCN:EN	Yes	

INSECTA, Order Plecoptera (stoneflies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Capnia lacustra	Lake Tahoe benthic stonefly		G1	S1	None	None		Yes	
Cosumnoperla hypocrena	Cosumnes stripetail		G2	S2	None	None		Yes	

INSECTA, Order Orthoptera (grasshoppers, katydids, and crickets)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aglaothorax longipennis	Santa Monica shieldback katydid		G1G2	S1S2	None	None	IUCN:CR	Yes	
Ammopelmatus kelsoensis	Kelso jerusalem cricket		G1G2	S1S2	None	None	IUCN:VU	Yes	
Ammopelmatus muwu	Point Conception jerusalem cricket		G1	S1	None	None	IUCN:VU	Yes	
Idiostatus kathleenae	Pinnacles shieldback katydid		G1G2	S1S2	None	None		Yes	
Idiostatus middlekauffi	Middlekauff's shieldback katydid		G1G2	S1	None	None	IUCN:CR	Yes	
Macrobaenetes algodonensis	Algodones sand treader cricket		G1G2	S1S2	None	None		No	
Macrobaenetes kelsoensis	Kelso giant sand treader cricket		G2	S2	None	None	IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Macrobaenetes valgum	Coachella giant sand treader cricket		G1G2	S2	None	None	IUCN:VU	Yes	
Pristoceuthophilus sp. 1	Samwell Cave cricket		G1G3	S1S3	None	None	IUCN:VU	Yes	
Psychomastax deserticola	desert monkey grasshopper		G1G2	S1	None	None	IUCN:VU	Yes	
Stenopelmatus cahuilaensis	Coachella Valley jerusalem cricket		G1G2	S2	None	None	IUCN:VU	Yes	
Tetrix sierrana	Sierra pygmy grasshopper		G1G2	S1	None	None	IUCN:VU	Yes	
Trimerotropis infantilis	Zayante band-winged grasshopper		G1	S1	Endangered	None	IUCN:EN	Yes	
Trimerotropis occidentiloides	Santa Monica grasshopper		G1G2	S2	None	None	IUCN:EN	Yes	
Trimerotropis occulens	Lompoc grasshopper		G1G2	S1S2	None	None	IUCN:EN	Yes	

INSECTA, Order Hemiptera (true bugs)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ambrysus funebris	Nevares Spring naucorid bug		G1	S1	None	None		Yes	
Belostoma saratogae	Saratoga Springs belostoman bug		G1	S1	None	None		Yes	
Oravelia pege	Dry Creek cliff strider bug		G1	S1	None	None		Yes	
Pelocoris biimpressus	Amargosa naucorid bug		G1G3	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Saldula usingeri	Wilbur Springs shorebug		G1	S2	None	None		Yes	

INSECTA, Order Neuroptera (lacewings)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oliarces clara	cheeseweed owlfly (cheeseweed moth lacewing)		G1G3	S2	None	None		Yes	

INSECTA, Order Coleoptera (beetles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aegialia concinna	Ciervo aegilian scarab beetle		G1	S1	None	None	BLM:S IUCN:VU	Yes	
Agabus rumppi	Death Valley agabus diving beetle		G1G3	S1	None	None		Yes	
Agrilus harenus	Harenus jewel beetle		G1G2	S1S2	None	None		Yes	
Anomala carlsoni	Carlson's dune beetle		G1	S1	None	None		Yes	
Anomala hardyorum	Hardy's dune beetle		G1	S1	None	None		Yes	
Anthicus antiochensis	Antioch Dunes anthicid beetle		G1	S3	None	None		Yes	
Anthicus sacramento	Sacramento anthicid beetle		G1	S4	None	None	IUCN:EN	Yes	
Atractelmis wawona	Wawona riffle beetle		G3	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Chaetarthria leechi	Leech's chaetarthrian water scavenger beetle		G1?	S1	None	None		Yes	
Cicindela hirticollis abrupta	Sacramento Valley tiger beetle		G5TH	SH	None	None		Yes	
Cicindela hirticollis gravida	sandy beach tiger beetle		G5T2	S2	None	None		Yes	
Cicindela latesignata	western beach tiger beetle		G2G3	S1	None	None		Yes	
Cicindela ohlone	Ohlone tiger beetle		G1	S1	Endangered	None		Yes	
Cicindela senilis frosti	senile tiger beetle		G2G3T1T3	S1	None	None		Yes	
Cicindela tranquebarica joaquinensis	San Joaquin tiger beetle		G5T1	S1	None	None		Yes	
Cicindela tranquebarica viridissima	greenest tiger beetle		G5T1	S1	None	None		Yes	
Coelus globosus	globose dune beetle		G1G2	S1S2	None	None	IUCN:VU	Yes	
Coelus gracilis	San Joaquin dune beetle		G1	S1	None	None	BLM:S IUCN:VU	Yes	
Coenonycha clementina	San Clemente Island coenonycha beetle		G1G2	S1S2	None	None		Yes	
Cyclocephala wandae	Wandae dune beetle		G1G2	S1S2	None	None		Yes	
Deltaspis ivae	marsh-elder long-horned beetle		G1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Desmocerus californicus dimorphus	valley elderberry longhorn beetle		G3T2T3	S3	Threatened	None		Yes	
Dinacoma caseyi	Casey's June beetle		G1	S1	Endangered	None		Yes	
Dubiraphia brunnescens	brownish dubiraphian riffle beetle		G1	S1	None	None		Yes	
Dubiraphia giulianii	Giuliani's dubiraphian riffle beetle		G1G3	S1S3	None	None		Yes	
Elaphrus viridis	Delta green ground beetle		G1	S1	Threatened	None	IUCN:CR	Yes	
Glaresis arenata	Kelso Dunes scarab glaresis beetle		G2	S2	None	None		Yes	
Habroscelimorpha gabbii	western tidal-flat tiger beetle		G2G4	S1	None	None		Yes	
Hydrochara rickseckeri	Ricksecker's water scavenger beetle		G2?	S2?	None	None		Yes	
Hydroporus leechi	Leech's skyline diving beetle		G1?	S2S3	None	None		Yes	
Hydroporus simplex	simple hydroporus diving beetle		G1?	S1S3	None	None		Yes	
Hygrotus curvipes	curved-foot hygrotus diving beetle		G1	S2	None	None		Yes	
Hygrotus fontinalis	travertine band-thigh diving beetle		G1	S1	None	None		Yes	
Juniperella mirabilis	juniper metallic wood-boring beetle		G1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lepismadora algodones	Algodones sand jewel beetle		G1	S1	None	None		Yes	
Lichnanthe albipilosa	white sand bear scarab beetle		G1	S1	None	None		Yes	
Lichnanthe ursina	bumblebee scarab beetle		G2	S2	None	None		Yes	
Lytta hoppingi	Hopping's blister beetle		G1G2	S2	None	None		Yes	
Lytta insperata	Mojave Desert blister beetle		G1G2	S1S2	None	None		No	
Lytta moesta	moestan blister beetle		G2	S2	None	None		Yes	
Lytta molesta	molestan blister beetle		G2	S2	None	None		Yes	
Lytta morrisoni	Morrison's blister beetle		G1G2	S2	None	None		Yes	
Microcylloepus formicoideus	Furnace Creek riffle beetle		G1	S1	None	None		Yes	
Miloderes nelsoni	Nelson's miloderes weevil		G2	S2	None	None		Yes	
Nebria darlingtoni	South Forks ground beetle		G1	S1	None	None		Yes	
Nebria gebleri siskiyouensis	Siskiyou ground beetle		G4G5T4	S1S2	None	None		Yes	
Nebria sahlbergii triad	Trinity Alps ground beetle		G5T1	S1	None	None		Yes	
Ochthebius crassalus	wing shoulder minute moss beetle		G1G3	S1S3	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ochthebius recticulus	Wilbur Springs minute moss beetle		G1	S1	None	None		Yes	
Onychobaris langei	Lange's El Segundo Dune weevil		G1	S1	None	None		Yes	
Optioservus canus	Pinnacles optioservus riffle beetle		G2	S1	None	None		Yes	
Palaeoxenus dohrni	Dohrn's elegant eucnemid beetle		G3?	S3?	None	None		Yes	
Polyphylla anteronivea	Saline Valley snow-front June beetle		G1	S2	None	None		Yes	
Polyphylla barbata	Mount Hermon (=barbate) June beetle		G1	S2	Endangered	None		Yes	
Polyphylla erratica	Death Valley June beetle		G1G2	S1S2	None	None		Yes	
Polyphylla morroensis	Morro Bay June beetle		G1	S1	None	None		Yes	
Polyphylla nubila	Atascadero June beetle		G1	S1	None	None		Yes	
Prasinalia imperialis	Algodones white wax jewel beetle		G1G2	S1S2	None	None		No	
Pseudocotalpa andrewsi	Andrew's dune scarab beetle		G1	S1	None	None		Yes	
Scaphinotus behrensi	Behrens' snail-eating beetle		G2G4	S2S4	None	None		Yes	
Trachykele hartmani	serpentine cypress wood-boring beetle		G1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Trichinorhipis knulli	Knull's metallic wood-boring beetle		G1	S1	None	None		Yes	
Trigonoscuta brunnotesselata	brown tassel trigonoscuta weevil		G1G2	S1	None	None		Yes	
Trigonoscuta dorothea dorothea	Dorothy's El Segundo Dune weevil		G1T1	S1	None	None		Yes	
Trigonoscuta rothi algodones	Algodones dune weevil		G1G2T1T2	S1S2	None	None		No	
Trigonoscuta rothi imperialis	Imperial dune weevil		G1G2T1T2	S1S2	None	None		No	
Trigonoscuta rothi punctata	Punctate dune weevil		G1G2T1T2	S1S2	None	None		No	
Trigonoscuta rothi rothi	Roth's dune weevil		G1G2T1T2	S1S2	None	None		No	
Trigonoscuta sp.	Doyen's trigonoscuta dune weevil		G1Q	S1	None	None		Yes	Yes
Trigonoscuta stantoni	Santa Cruz Island shore weevil		G1	S1	None	None		Yes	
Vandykea tuberculata	serpentine cypress long-horned beetle		G1	S2	None	None		Yes	

INSECTA, Order Mecoptera (scorpionflies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Orobittacus obscurus	gold rush hanging scorpionfly		G1	S1	None	None		Yes	

INSECTA, Order Diptera (flies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ablautus schlingeri	Oso Flaco robber fly		G1	S2	None	None		Yes	
Apiocera warneri	Glamis sand fly		G1G2	S1S2	None	None		Yes	
Brennania belkini	Belkin's dune tabanid fly		G1G2	S1S2	None	None	IUCN:VU	Yes	
Cophura hurdi	Antioch cophuran robberfly		GX	SX	None	None		No	
Efferia antiochi	Antioch efferian robberfly		G1G2	S1S2	None	None		Yes	
Efferia macroxipha	Glamis robberfly		G1G2	S1S2	None	None		Yes	
Metapogon hurdi	Hurd's metapogon robberfly		G1G2	S1S2	None	None		Yes	
Paracoenia calida	Wilbur Springs shore fly		G1	S1	None	None		Yes	
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly		G1T1	S1	Endangered	None		Yes	
Rhaphiomidas terminatus terminatus	El Segundo flower-loving fly		G1T1	S1	None	None		Yes	
Rhaphiomidas trochilus	San Joaquin Valley giant flower-loving fly		G1	S1	None	None		Yes	

INSECTA, Order Lepidoptera (butterflies and moths)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Adela oplerella	Opler's longhorn moth		G2	S2	None	None		Yes	
Apodemia mormo langei	Lange's metalmark butterfly		G5T1	S1	Endangered	None		Yes	
Areniscythris brachypteris	Oso Flaco flightless moth		G1	S2	None	None		Yes	
Callophrys mossii bayensis	San Bruno elfin butterfly		G4T1	S2	Endangered	None		Yes	
Callophrys mossii hidakupa	San Gabriel Mountains elfin butterfly		G4T1T2	S1S2	None	None	USFS:S	Yes	
Callophrys mossii marinensis	Marin elfin butterfly		G4T1	S1	None	None		Yes	
Callophrys sheridanii comstocki	desert green hairstreak		G3G4	S1S2	None	None		No	
Callophrys thornei	Thorne's hairstreak		G3G4T2	S2	None	None	BLM:S	Yes	Yes
Carterocephalus palaemon magnus	Sonoma arctic skipper		G5T5	S1	None	None		Yes	
Cercyonis pegala carsonensis	Carson Valley wood nymph		G5T1T2	S1S2	None	None		No	
Chlosyne leanira elegans	Oso Flaco patch butterfly		G4G5T1T2	S1S2	None	None		Yes	
Coenonympha tullia yontockett	Yontocket satyr		G5T1T2	S1	None	None		Yes	
Danaus plexippus plexippus pop. 1	monarch - California overwintering population		G4T1T2	S2	Candidate	None	IUCN:EN USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Euchloe hyantis andrewsi	Andrew's marble butterfly		G4G5T1	S1	None	None		Yes	
Eucosma hennei	Henne's eucosman moth		G1	S1	None	None		Yes	
Eugnosta busckana	Busck's gallmoth		G1G3	SH	None	None		Yes	
Euphilotes battoides allyni	El Segundo blue butterfly		G5T1	S1	Endangered	None		Yes	
Euphilotes baueri	Bauer's dotted-blue		G2	S1S2	None	None	USFS:S	No	
Euphilotes enoptes smithi	Smith's blue butterfly		G5T1T2	S2	Endangered	None		Yes	
Euphilotes glaucon comstocki	Comstock's blue butterfly		G5T2	S2	None	None		Yes	
Euphilotes mojave	Mojave dotted-blue		G2G3	S1S2	None	None		No	
Euphydryas editha bayensis	Bay checkerspot butterfly		G5T1	S1	Threatened	None		Yes	
Euphydryas editha monoensis	Mono checkerspot butterfly		G5T2	S1S2	None	None	USFS:S	Yes	
Euphydryas editha quino	quino checkerspot butterfly		G5T1T2	S1S2	Endangered	None		Yes	
Euphyes vestris harbisoni	dun skipper		G5T1	S1S2	None	None		No	
Euproserpinus euterpe	Kern primrose sphinx moth		G1G2	S1	Threatened	None		Yes	Yes
Glaucopsyche lygdamus palosverdesensis	Palos Verdes blue butterfly		G5T1	S1	Endangered	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hesperia miriamae longaevicola	White Mountains skipper		G2G3T1	S1	None	None		Yes	
Hesperopsis gracielae	MacNeill's sootywing		G2G3	S1S2	None	None		No	
Icaricia icarioides albihalos	White Mountains icarioides blue butterfly		G5T2T3	S2?	None	None		Yes	
Icaricia icarioides missionensis	Mission blue butterfly		G5T1	S2	Endangered	None		Yes	
Icaricia icarioides moroensis	Morro Bay blue butterfly		G5T2	S2	None	None		Yes	
Icaricia icarioides parapheres	Point Reyes blue butterfly		G5T1T2	S1S2	None	None		Yes	
Icaricia icarioides pheres	Pheres blue butterfly		G5TX	SX	None	None		Yes	
Icaricia saepiolus albomontanus	White Mountains saepiolus blue butterfly		G5T2	S1S2	None	None		Yes	
Icaricia saepiolus aureolus	San Gabriel Mountains blue butterfly		G5T1	S1	None	None	USFS:S	Yes	
Lycaena hermes	Hermes copper butterfly		G1	S1	Threatened	None	IUCN:VU USFS:S	Yes	
Lycaena rubidus incana	White Mountains copper		G5T2T3	S1	None	None		No	
Panoquina errans	wandering (=saltmarsh) skipper		G4G5	S2	None	None	IUCN:NT	Yes	
Philotiella speciosa bohartorum	Boharts' blue butterfly		G3T1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Plebejus anna lotis	lotis blue butterfly		G4TH	SH	Endangered	None		Yes	
Plebulina emigdionis	San Emigdio blue butterfly		G1G2	S1S2	None	None	USFS:S	Yes	
Polites mardon	mardon skipper		G2	S1	None	None	USFS:S	Yes	
Polites sabuleti albamontana	White Mountains sandhill skipper		G5T2	S2	None	None		No	
Pseudocopaeodes eunus eunus	alkali skipper		G3T2	S2	None	None		No	
Pseudocopaeodes eunus obscurus	Carson wandering skipper		G3T1	S2	Endangered	None		Yes	
Pyrgus ruralis lagunae	Laguna Mountains skipper		G5T1	S1	Endangered	None		Yes	
Speyeria adiaste adiaste	unsilvered fritillary		G1G2T1	S1	None	None		Yes	
Speyeria callippe callippe	callippe silverspot butterfly		G5T1	S1	Endangered	None		Yes	
Speyeria egleis tehachapina	Tehachapi Mountain silverspot butterfly		G5T2	S2	None	None	USFS:S	Yes	
Speyeria nokomis carsonensis	Carson Valley silverspot		G3T1T2	S1	None	None		Yes	
Speyeria zerene behrensii	Behren's silverspot butterfly		G5T1	S1	Endangered	None		Yes	
Speyeria zerene hippolyta	Oregon silverspot butterfly		G5T1	S1	Threatened	None		Yes	
Speyeria zerene myrtleae	Myrtle's silverspot butterfly		G5T1	S1	Endangered	None		Yes	Yes
Speyeria zerene sonomensis	Sonoma zerene fritillary		G5T1	S1	None	None		Yes	

INSECTA, Order Trichoptera (caddisflies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Cryptochia denningi	Denning's cryptic caddisfly		G1G2	S1S2	None	None		Yes	
Cryptochia excella	Kings Canyon cryptochian caddisfly		G1G2	S1S2	None	None		Yes	
Cryptochia shasta	confusion caddisfly		G1G2	S1S2	None	None		Yes	
Desmona bethula	amphibious caddisfly		G2G3	S2S3	None	None		Yes	
Diplectrona californica	California diplectronan caddisfly		G1G2	S1S2	None	None		Yes	
Ecclisomyia bilera	Kings Creek ecclysomyian caddisfly		G1G2	S1S2	None	None		Yes	
Farula praelonga	long-tailed caddisfly		G1G2	S1S2	None	None		Yes	
Goeracea oregona	Sagehen Creek goeracean caddisfly		G3	S1S2	None	None		Yes	
Lepidostoma ermanae	Cold Spring caddisfly		G1G2	S1S2	None	None		Yes	
Limnephilus atercus	Fort Dick limnephilus caddisfly		G3G4	S1	None	None		Yes	
Neothremma genella	golden-horned caddisfly		G1G2	S1S2	None	None		Yes	
Neothremma siskiyou	Siskiyou caddisfly		G1G2	S1S2	None	None		No	
Parapsyche extensa	King's Creek parapsyche caddisfly		GH	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Rhyacophila lineata	Castle Crags rhyacophilan caddisfly		G1G3	S1S2	None	None		Yes	
Rhyacophila mosana	bilobed rhyacophilan caddisfly		G1G2Q	S1S2	None	None		Yes	
Rhyacophila spinata	spiny rhyacophilan caddisfly		G1G2	S3	None	None		Yes	

INSECTA, Order Hymenoptera (ants, bees, and wasps)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Andrena blennospermatis	Blennosperma vernal pool andrenid bee		G2	S2	None	None		Yes	
Andrena macswaini	An andrenid bee		G2	S2	None	None		Yes	
Andrena subapasta	An andrenid bee		G1G2	S1S2	None	None		Yes	
Argochrysis lassenae	Lassen cuckoo wasp		G1	S2	None	None		Yes	
Ashmeadiella chumashae	Channel Islands leaf-cutter bee		G2?	S2?	None	None		Yes	
Bombus caliginosus	obscure bumble bee		G2G3	S1S2	None	None	IUCN:VU	Yes	
Bombus crotchii	Crotch bumble bee		G2	S2	None	Candidate Endangered	IUCN:EN	Yes	Yes
Bombus franklini	Franklin's bumble bee		G1	SH	Endangered	Candidate Endangered	IUCN:CR	Yes	Yes
Bombus morrisoni	Morrison bumble bee		G3	S1S2	None	None	IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Bombus occidentalis	western bumble bee		G3	S1	None	Candidate Endangered	IUCN:VU USFS:S	Yes	Yes
Bombus pensylvanicus	American bumble bee		G3G4	S2	None	None	IUCN:VU	No	
Bombus suckleyi	Suckley's cuckoo bumble bee		G2G3	S1	None	Candidate Endangered	IUCN:CR	Yes	Yes
Ceratochrysis bradleyi	Bradley's cuckoo wasp		G1	S1	None	None		Yes	
Ceratochrysis gracilis	Piute Mountains cuckoo wasp		G1	S1	None	None		Yes	
Ceratochrysis longimala	Desert cuckoo wasp		G1	S1	None	None		Yes	
Ceratochrysis menkei	Menke's cuckoo wasp		G1	S2	None	None		Yes	
Chrysis tularensis	Tulare cuckoo wasp		G1G2	S1S2	None	None		Yes	
Cleptes humboldti	Humboldt cuckoo wasp		G1G2	S1S2	None	None		Yes	
Dufourea stagei	Stage's dufourine bee		G1G2	S1	None	None		Yes	
Eucerceris ruficeps	redheaded sphecid wasp		G1G3	S1S2	None	None		Yes	
Euparagia unidentata	Algodones euparagia		G1G2	S1S2	None	None		Yes	
Habropoda pallida	white faced bee		G1G2	S1S2	None	None		No	
Halictus harmonius	haromonius halictid bee		G1	S3	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hedychridium argenteum	Riverside cuckoo wasp		G1G2	S1S2	None	None		Yes	
Hedychridium milleri	Borax Lake cuckoo wasp		G1	S1	None	None		Yes	
Lasioglossum channelense	Channel Island sweat bee		G1	S3	None	None		Yes	
Melitta californica	California mellitid bee		G4?	S2?	None	None		Yes	
Microbembex elegans	Algodones elegant sand wasp		G1G2	S1S2	None	None		Yes	
Minymischa ventura	Ventura cuckoo wasp		GU	SU	None	None		Yes	
Myrmosula pacifica	Antioch multilid wasp		GH	SH	None	None		Yes	
Neolarra alba	white cuckoo bee		GH	SH	None	None		Yes	
Paranomada californica	California cuckoo bee		G1	S1	None	None		Yes	
Parnopes borregoensis	Borrego parnopes cuckoo wasp		G1G2	S1S2	None	None		Yes	
Perdita algodones	Algodones perdita		G1G2	S1S2	None	None		Yes	
Perdita frontalis	Imperial Perdita		G1G2	S1S2	None	None		Yes	
Perdita hirticeps luteocincta	yellow-banded andrenid bee		GNRTX	SX	None	None		No	
Perdita scitula antiochensis	Antioch andrenid bee		G1T1	S1	None	None		Yes	
Perdita stephanomeriae	a miner bee		GNR	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Philanthus nasalis	Antioch specid wasp		G1	S2	None	None		Yes	
Protodufourea wasbaueri	Wasbauer's protodufourea bee		G1	S1	None	None		Yes	
Protodufourea zavortinki	Zavortink's protodufourea bee		G1	S1	None	None		Yes	
Rhopalolemma robertsi	Roberts' rhopalolemma bee		G1	S1	None	None		Yes	
Sedomaya glamisensis	Glamis night tiphiid		G1G2	S1S2	None	None		No	
Sphaeropthalma ecarinata	Glamis night mutillid		G1G2	S1S2	None	None		No	
Sphecodogastra antiochensis	Antioch Dunes halcitid bee		G1	S1	None	None		Yes	
Stictiella villegasi	Algodones sand wasp		G1G2	S1S2	None	None		No	
Trachusa gummifera	San Francisco Bay Area leaf-cutter bee		G1	S1	None	None		Yes	

Fishes

PETROMYZONTIDAE (lampreys)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Entosphenus folletti	northern California brook lamprey		G1G2	S1S2	None	None	CDFW:SSC	Yes	
Entosphenus lethophagus	Pit-Klamath brook lamprey		G3G4	S3	None	None	AFS:VU CDFW:SSC IUCN:LC	Yes	
Entosphenus similis	Klamath River lamprey		G3G4Q	S3	None	None	AFS:TH CDFW:SSC IUCN:NT USFS:S	Yes	
Entosphenus tridentatus	Pacific lamprey		G4	S3	None	None	AFS:VU BLM:S CDFW:SSC IUCN:LC USFS:S	Yes	
Entosphenus tridentatus ssp. 1	Goose Lake lamprey		G4T1	S1	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Lampetra ayresii	western river lamprey		G5	S3	None	None	AFS:VU CDFW:SSC IUCN:LC	No	
Lampetra hubbsi	Kern brook lamprey		G1G2	S1S2	None	None	AFS:TH CDFW:SSC IUCN:VU USFS:S	Yes	
Lampetra richardsoni	western brook lamprey		G4G5	S3S4	None	None	CDFW:SSC IUCN:LC USFS:S	Yes	

ACIPENSERIDAE (sturgeon)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Acipenser medirostris pop. 1	green sturgeon - southern DPS		G2T1	S1	Threatened	None	AFS:VU IUCN:EN	Yes	
Acipenser medirostris pop. 2	green sturgeon - northern DPS		G2T1	S1	None	None	AFS:VU CDFW:SSC IUCN:VU	Yes	
Acipenser transmontanus	white sturgeon		G4	S2	None	None	AFS:EN CDFW:SSC IUCN:VU	No	

SALMONIDAE (trout and salmon)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oncorhynchus clarkii clarkii	coast cutthroat trout		G5T4	S3	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Oncorhynchus clarkii henshawi	Lahontan cutthroat trout		G5T3	S2	Threatened	None	AFS:TH	Yes	
Oncorhynchus clarkii seleniris	Paiute cutthroat trout		G5T1	S1	Threatened	None	AFS:EN	Yes	
Oncorhynchus gorbuscha	pink salmon		G5	S1	None	None		Yes	
Oncorhynchus keta	chum salmon		G5	S1	None	None		No	
Oncorhynchus kisutch pop. 2	coho salmon - southern Oregon / northern California ESU		G5T2Q	S2	Threatened	Threatened	AFS:TH	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oncorhynchus kisutch pop. 4	coho salmon - central California coast ESU		G5T2Q	S2	Endangered	Endangered	AFS:EN	Yes	Yes
Oncorhynchus mykiss aguabonita	California golden trout		G5T1	S1	None	None	AFS:TH CDFW:SSC USFS:S	Yes	
Oncorhynchus mykiss aquilarum	Eagle Lake rainbow trout		G5T1	S1	None	None	AFS:TH CDFW:SSC USFS:S	Yes	
Oncorhynchus mykiss gilberti	Kern River rainbow trout		G5T1Q	S1	None	None	AFS:TH CDFW:SSC USFS:S	Yes	
Oncorhynchus mykiss irideus pop. 1	steelhead - Klamath Mountains Province DPS		G5T3Q	S2	None	None	CDFW:SSC USFS:S	No	Yes
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS		G5T1Q	S1	Endangered	Candidate Endangered	AFS:EN	Yes	Yes
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS		G5T2Q	S2	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus mykiss irideus pop. 16	steelhead - northern California DPS		G5T2T3Q	S1	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus mykiss irideus pop. 48	steelhead - northern California DPS summer-run		G5TNRQ	S2	Threatened	Endangered	AFS:TH	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oncorhynchus mykiss irideus pop. 49	steelhead - northern California DPS winter-run		G5TNRQ	S3	Threatened	None	AFS:TH	No	
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS		G5T2T3Q	S3	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus mykiss irideus pop. 9	steelhead - south-central California coast DPS		G5T2Q	S2	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus mykiss ssp. 1	Goose Lake redband trout		G5T2Q	S2	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Oncorhynchus mykiss ssp. 2	McCloud River redband trout		G5T1T2	S1S2	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Oncorhynchus mykiss ssp. 3	Warner Valley redband trout		G5T2Q	S1?	None	None	AFS:VU USFS:S	No	
Oncorhynchus mykiss whitei	Little Kern golden trout		G5T2	S3	Threatened	None	AFS:EN	Yes	
Oncorhynchus tshawytscha pop. 11	chinook salmon - Central Valley spring-run ESU		G5T2Q	S2	Threatened	Threatened	AFS:TH	Yes	Yes
Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU		G5T3Q	S3	None	None	AFS:VU CDFW:SSC USFS:S	No	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oncorhynchus tshawytscha pop. 14	chinook salmon - southern Oregon/northern California coastal		G5T3Q	SNR	None	None	CDFW:SSC	No	
Oncorhynchus tshawytscha pop. 17	chinook salmon - California coastal ESU		G5T2Q	S2	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus tshawytscha pop. 30	chinook salmon - upper Klamath and Trinity Rivers ESU		G5T2Q	S2	Candidate	Threatened	CDFW:SSC USFS:S	Yes	
Oncorhynchus tshawytscha pop. 7	chinook salmon - Sacramento River winter-run ESU		G5T1Q	S2	Endangered	Endangered	AFS:EN	Yes	
Prosopium williamsoni	mountain whitefish		G5	S3	None	None	CDFW:SSC	Yes	
Salvelinus confluentus	bull trout		G5	SX	Threatened	Endangered	IUCN:VU	Yes	

OSMERIDAE (smelt)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hypomesus transpacificus	Delta smelt		G1	S1	Threatened	Endangered	AFS:TH IUCN:CR	Yes	
Spirinchus thaleichthys	longfin smelt		G5	S1	Candidate	Threatened	IUCN:LC	Yes	Yes
Thaleichthys pacificus	eulachon		G5	S1	Threatened	None	IUCN:LC	Yes	Yes

CYPRINIDAE (minnows and carp)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Gila coerulea	blue chub		G3G4	S2S3	None	None	CDFW:SSC IUCN:LC	Yes	
Gila elegans	bonytail		G1	SH	Endangered	Endangered	AFS:EN IUCN:CR	Yes	
Gila orcuttii	arroyo chub		G2	S2	None	None	AFS:VU CDFW:SSC IUCN:VU USFS:S	Yes	
Hesperoleucus mitrulus	northern roach		G2	S2	None	None	AFS:VU CDFW:SSC	Yes	
Hesperoleucus parvipinnis	Gualala roach		G3	S3	None	None	CDFW:SSC	Yes	
Hesperoleucus symmetricus serpentinus	Red Hills roach		GNRT1	S1	None	None	AFS:VU BLM:S CDFW:SSC	Yes	
Hesperoleucus symmetricus symmetricus	central California roach		GNRT3	S3	None	None	CDFW:SSC	Yes	
Hesperoleucus venustus navarroensis	northern coastal roach		GNRT3	S3	None	None	CDFW:SSC	Yes	
Hesperoleucus venustus subditus	southern coastal roach		GNRT2	S2	None	None	CDFW:SSC	Yes	
Hesperoleucus venustus x H. symmetricus	Clear Lake roach		G3	S3	None	None	CDFW:SSC	No	
Lavinia exilicauda chi	Clear Lake hitch		G4T1	S1	None	Threatened	AFS:VU USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lavinia exilicauda exilicauda	Sacramento hitch		G4T3	S3	None	None	CDFW:SSC	No	
Lavinia exilicauda harengus	Monterey hitch		G4T3	S3	None	None	CDFW:SSC	Yes	
Mylopharodon conocephalus	hardhead		G3	S3	None	None	CDFW:SSC IUCN:LC USFS:S	Yes	
Pogonichthys macrolepidotus	Sacramento splittail		G3	S3	None	None	AFS:VU CDFW:SSC IUCN:LC	Yes	
Ptychocheilus lucius	Colorado pikeminnow		G1	SX	Endangered	Endangered	CDFW:FP IUCN:VU	Yes	
Rhinichthys osculus ssp. 1	Amargosa Canyon speckled dace		G5T3Q	S3	None	None	AFS:TH BLM:S CDFW:SSC	Yes	Yes
Rhinichthys osculus ssp. 12	Long Valley speckled dace		G5T1	S1	None	None	AFS:EN CDFW:SSC	Yes	Yes
Rhinichthys osculus ssp. 2	Owens speckled dace		G5T2Q	S2	None	None	AFS:TH BLM:S CDFW:SSC	Yes	Yes
Rhinichthys osculus ssp. 8	Santa Ana speckled dace		G5T1	S1	None	None	AFS:TH CDFW:SSC USFS:S	Yes	Yes
Siphateles bicolor mohavensis	Mohave tui chub		G4T1	S1	Endangered	Endangered	AFS:EN CDFW:FP	Yes	
Siphateles bicolor pectinifer	Lahontan Lake tui chub		G4T3	S1S2	None	None	CDFW:SSC	Yes	
Siphateles bicolor snyderi	Owens tui chub		G4T1	S1	Endangered	Endangered	AFS:EN	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Siphateles bicolor ssp. 11	High Rock Springs tui chub		G4TX	SX	None	None		Yes	Yes
Siphateles bicolor ssp. 12	Eagle Lake tui chub		G4T1T2	S1S2	None	None	CDFW:SSC	Yes	Yes
Siphateles bicolor ssp. 14	Pit River tui chub		G4T1T3	S1S3	None	None		No	Yes
Siphateles bicolor thalassinus	Goose Lake tui chub		G4T2T3	S2	None	None	AFS:TH CDFW:SSC	Yes	
Siphateles bicolor vaccaceps	Cow Head tui chub		G4T1	S1	None	None	AFS:EN BLM:S CDFW:SSC	Yes	

CATOSTOMIDAE (suckers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Catostomus fumeiventris	Owens sucker		G3	S3	None	None	CDFW:SSC IUCN:LC	Yes	
Catostomus lahontan	Lahontan mountain sucker		GNR	S2	None	None	CDFW:SSC	Yes	
Catostomus latipinnis	flannelmouth sucker		G3G4	S1	None	None	IUCN:LC	Yes	
Catostomus microps	Modoc sucker		G2	S2	Delisted	Endangered	AFS:EN CDFW:FP IUCN:NT	Yes	
Catostomus occidentalis lacusanserinus	Goose Lake sucker		G5T2Q	S1	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Catostomus rimiculus ssp. 1	Jenny Creek sucker		G5T2Q	S1	None	None	AFS:VU	No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Catostomus santaanae	Santa Ana sucker		G1	S1	Threatened	None	AFS:TH IUCN:EN	Yes	
Catostomus snyderi	Klamath largescale sucker		G3	S3	None	None	AFS:TH CDFW:SSC IUCN:NT	Yes	
Chasmistes brevirostris	shortnose sucker		G1	S1	Endangered	Endangered	AFS:EN CDFW:FP IUCN:EN	Yes	
Deltistes luxatus	Lost River sucker		G1	S1	Endangered	Endangered	AFS:EN CDFW:FP IUCN:EN	Yes	
Xyrauchen texanus	razorback sucker		G1	S1S2	Endangered	Endangered	AFS:EN CDFW:FP IUCN:CR	Yes	

CYPRINODONTIDAE (killifishes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Cyprinodon macularius	desert pupfish		G1	S1	Endangered	Endangered	AFS:EN IUCN:VU	Yes	
Cyprinodon nevadensis amargosae	Amargosa pupfish		G2T1T2	S1S2	None	None	AFS:VU BLM:S CDFW:SSC IUCN:VU	Yes	
Cyprinodon nevadensis nevadensis	Saratoga Springs pupfish		G2T1	S1	None	None	AFS:TH CDFW:SSC IUCN:VU	Yes	
Cyprinodon nevadensis shoshone	Shoshone pupfish		G2T1	S1	None	None	AFS:EN CDFW:SSC IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Cyprinodon radiosus	Owens pupfish		G1	S1	Endangered	Endangered	AFS:EN CDFW:FP IUCN:EN	Yes	
Cyprinodon salinus milleri	Cottonball Marsh pupfish		G1T1Q	S1	None	Threatened	AFS:TH IUCN:EN	Yes	
Cyprinodon salinus salinus	Salt Creek pupfish		G1T1	S1	None	None	AFS:VU CDFW:SSC IUCN:EN	Yes	

GASTEROSTEIDAE (sticklebacks)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Gasterosteus aculeatus microcephalus	resident threespine stickleback	South of Pt. Conception only	G5T2T3	S2S3	None	None		No	Yes
Gasterosteus aculeatus williamsoni	unarmored threespine stickleback		G5T1	S1	Endangered	Endangered	AFS:EN CDFW:FP	Yes	Yes

CENTRARCHIDAE (sunfishes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Archoplites interruptus	Sacramento perch	Within native range only	G1	S1	None	None	AFS:TH CDFW:SSC IUCN:EN	Yes	

EMBIOTOCIDAE (surfperches)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hysterocarpus traskii lagunae	Clear Lake tule perch		G5T3	S3	None	None	CDFW:SSC	Yes	
Hysterocarpus traskii pomo	Russian River tule perch		G5T4	S4	None	None	AFS:VU CDFW:SSC	Yes	
Hysterocarpus traskii traskii	Sacramento-San Joaquin tule perch		G5T2T3	S2S3	None	None		No	

GOBIIDAE (gobies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Eucyclogobius newberryi	tidewater goby		G3	S3	Endangered	None	AFS:EN IUCN:NT	Yes	

COTTIDAE (sculpins)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Cottus asper ssp.	Clear Lake prickly sculpin		G5T1	SNR	None	None	CDFW:SSC	No	
Cottus asperrimus	rough sculpin		G2	S2	None	Threatened	AFS:VU BLM:S CDFW:FP IUCN:NT	Yes	
Cottus gulosus	riffle sculpin		G5	S4	None	None	CDFW:SSC IUCN:LC	No	
Cottus klamathensis klamathensis	Upper Klamath marbled sculpin		G4T1T2	S1S2	None	None	CDFW:SSC	Yes	

Scientific Name	**Common Name**	**Comments**	**Global Rank**	**State Rank**	**ESA**	**CESA**	**Other Status**	**Records in CNDDB?**	**End Notes?**
Cottus klamathensis macrops	bigeye marbled sculpin		G4T2T3	S2S3	None	None	AFS:VU CDFW:SSC	Yes	
Cottus klamathensis polyporus	Lower Klamath marbled sculpin		G4T2T4	S2S4	None	None	CDFW:SSC	Yes	
Cottus perplexus	reticulate sculpin		G4	S2S3	None	None	IUCN:LC	No	

Amphibians

AMBYSTOMATIDAE (mole salamanders)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ambystoma californiense pop. 1	California tiger salamander - central California DPS		G2G3T3	S3	Threatened	Threatened	CDFW:WL IUCN:VU	Yes	
Ambystoma californiense pop. 2	California tiger salamander - Santa Barbara County DPS		G2G3T2	S2	Endangered	Threatened	CDFW:WL IUCN:VU	Yes	
Ambystoma californiense pop. 3	California tiger salamander - Sonoma County DPS		G2G3T2	S2	Endangered	Threatened	CDFW:WL IUCN:VU	Yes	
Ambystoma macrodactylum croceum	Santa Cruz long-toed salamander		G5T1T2	S1S2	Endangered	Endangered	CDFW:FP	Yes	
Ambystoma macrodactylum sigillatum	southern long-toed salamander		G5T4	S3	None	None	CDFW:SSC	Yes	

DICAMPTODONTIDAE (giant salamanders)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Dicamptodon ensatus	California giant salamander		G2G3	S2S3	None	None	CDFW:SSC IUCN:NT	Yes	

RHYACOTRITONIDAE (Olympic salamanders)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Rhyacotriton variegatus	southern torrent salamander		G3G4	S2S3	None	None	CDFW:SSC IUCN:LC USFS:S	Yes	

SALAMANDRIDAE (newts)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Taricha rivularis	red-bellied newt		G2	S2	None	None	CDFW:SSC IUCN:LC	Yes	
Taricha torosa	Coast Range newt	Monterey Co. & south only	G4	S4	None	None	CDFW:SSC	Yes	

PLETHODONTIDAE (lungless salamanders)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aneides niger	Santa Cruz black salamander		G3	S3	None	None	CDFW:SSC	Yes	Yes
Batrachoseps altasierrae	Greenhorn Mountains slender salamander		G2	S2	None	None		Yes	
Batrachoseps bramei	Fairview slender salamander		G3	S3	None	None	USFS:S	Yes	
Batrachoseps campi	Inyo Mountains slender salamander		G3	S3	None	None	BLM:S CDFW:SSC IUCN:EN USFS:S	Yes	

Scientific Name	**Common Name**	**Comments**	**Global Rank**	**State Rank**	**ESA**	**CESA**	**Other Status**	**Records in CNDDB?**	**End Notes?**
Batrachoseps diabolicus	Hell Hollow slender salamander		G3	S3	None	None	IUCN:DD	No	
Batrachoseps gabrieli	San Gabriel slender salamander		G2G3	S2S3	None	None	IUCN:DD USFS:S	Yes	
Batrachoseps incognitus	San Simeon slender salamander		G2	S2	None	None	IUCN:DD USFS:S	No	
Batrachoseps kawia	Sequoia slender salamander		G2	S2	None	None	IUCN:DD	No	
Batrachoseps luciae	Santa Lucia slender salamander		G3	S3	None	None	IUCN:LC	No	
Batrachoseps major aridus	desert slender salamander		G4T1	S1	Endangered	Endangered		Yes	
Batrachoseps minor	lesser slender salamander		G1	S1	None	None	CDFW:SSC IUCN:DD USFS:S	Yes	
Batrachoseps pacificus	Channel Islands slender salamander		G3G4	S3S4	None	None	IUCN:LC	Yes	
Batrachoseps regius	Kings River slender salamander		G2G3	S2S3	None	None	IUCN:VU USFS:S	Yes	
Batrachoseps relictus	relictual slender salamander		G1	S1	Proposed Endangered	None	CDFW:SSC IUCN:DD USFS:S	Yes	Yes
Batrachoseps robustus	Kern Plateau salamander		G3	S3	None	None	IUCN:NT	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Batrachoseps simatus	Kern Canyon slender salamander		G2G3	S2S3	Proposed Threatened	Threatened	IUCN:VU USFS:S	Yes	
Batrachoseps stebbinsi	Tehachapi slender salamander		G2G3	S2S3	None	Threatened	BLM:S IUCN:VU	Yes	
Batrachoseps wakei	Arguello slender salamander		GNR	S1	None	None		Yes	
Ensatina eschscholtzii croceater	yellow-blotched salamander		G5T3	S3	None	None	BLM:S CDFW:WL USFS:S	Yes	
Ensatina eschscholtzii klauberi	large-blotched salamander		G5T2?	S3	None	None	CDFW:WL USFS:S	Yes	
Hydromantes brunus	limestone salamander		G2G3	S2S3	None	Threatened	BLM:S CDFW:FP IUCN:VU USFS:S	Yes	
Hydromantes platycephalus	Mount Lyell salamander		G4	S4	None	None	CDFW:WL IUCN:LC	Yes	
Hydromantes shastae	Shasta salamander		G3	S3	None	Threatened	BLM:S IUCN:VU USFS:S	Yes	Yes
Plethodon asupak	Scott Bar salamander		G1G2	S1S2	None	Threatened	IUCN:VU	Yes	Yes
Plethodon elongatus	Del Norte salamander		G4	S3	None	None	CDFW:WL IUCN:NT	Yes	
Plethodon stormi	Siskiyou Mountains salamander		G3?	S1S2	None	Threatened	IUCN:EN USFS:S	Yes	

ASCAPHIDAE (tailed frogs)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ascaphus truei	Pacific tailed frog		G4	S3S4	None	None	CDFW:SSC IUCN:LC	Yes	

SCAPHIOPODIDAE (spadefoot toads)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Scaphiopus couchii	Couch's spadefoot		G5	S2	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Spea hammondii	western spadefoot		G2G3	S3S4	None	None	BLM:S CDFW:SSC IUCN:NT	Yes	

BUFONIDAE (true toads)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Anaxyrus californicus	arroyo toad		G2G3	S2	Endangered	None	CDFW:SSC IUCN:EN	Yes	Yes
Anaxyrus canorus	Yosemite toad		G2G3	S2	Threatened	None	CDFW:SSC IUCN:EN USFS:S	Yes	Yes
Anaxyrus exsul	black toad		G1	S1	None	Threatened	BLM:S CDFW:FP IUCN:VU USFS:S	Yes	Yes
Incilius alvarius	Sonoran Desert toad		G5	SH	None	None	CDFW:SSC IUCN:LC	Yes	Yes

RANIDAE (true frogs)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lithobates pipiens	northern leopard frog	Native populations only	G5	S2	None	None	CDFW:SSC IUCN:LC	Yes	Yes
Lithobates yavapaiensis	lowland leopard frog		G4	SX	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	Yes
Rana aurora	northern red-legged frog		G4	S3	None	None	CDFW:SSC IUCN:LC USFS:S	Yes	Yes
Rana boylii pop. 1	foothill yellow-legged frog - north coast DPS		G3TNRQ	S4	None	None	BLM:S CDFW:SSC USFS:S	Yes	
Rana boylii pop. 2	foothill yellow-legged frog - Feather River DPS		G3T2	S2	Proposed Threatened	Threatened	BLM:S USFS:S	Yes	
Rana boylii pop. 3	foothill yellow-legged frog - north Sierra DPS		G3T2	S2	None	Threatened	BLM:S USFS:S	Yes	
Rana boylii pop. 4	foothill yellow-legged frog - central coast DPS		G3T2	S2	Proposed Threatened	Endangered	BLM:S USFS:S	Yes	
Rana boylii pop. 5	foothill yellow-legged frog - south Sierra DPS		G3T2	S2	Proposed Endangered	Endangered	BLM:S USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Rana boylii pop. 6	foothill yellow-legged frog - south coast DPS		G3T1	S1	Proposed Endangered	Endangered	BLM:S USFS:S	Yes	
Rana cascadae	Cascades frog		G3G4	S3	None	Candidate Endangered	CDFW:SSC IUCN:NT USFS:S	Yes	
Rana draytonii	California red-legged frog		G2G3	S2S3	Threatened	None	CDFW:SSC IUCN:VU	Yes	Yes
Rana muscosa	southern mountain yellow-legged frog		G1	S1	Endangered	Endangered	CDFW:WL IUCN:EN USFS:S	Yes	Yes
Rana pretiosa	Oregon spotted frog		G2	SH	Threatened	None	BLM:S CDFW:SSC IUCN:VU	Yes	
Rana sierrae	Sierra Nevada yellow-legged frog		G1	S1	Endangered	Threatened	CDFW:WL IUCN:EN USFS:S	Yes	Yes

Reptiles

CHELONIIDAE (sea turtles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Chelonia mydas	green turtle		G3	S1	Threatened	None	IUCN:EN	Yes	

KINOSTERNIDAE (musk and mud turtles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Kinosternon sonoriense	Sonoran mud turtle		G4	SH	None	None	CDFW:SSC IUCN:NT	Yes	

EMYDIDAE (box and water turtles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Emys marmorata	western pond turtle		G3G4	S3	None	None	BLM:S CDFW:SSC IUCN:VU USFS:S	Yes	Yes

TESTUDINIDAE (land tortoises)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Gopherus agassizii	desert tortoise		G3	S2S3	Threatened	Threatened	IUCN:CR	Yes	

GEKKONIDAE (geckos)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Coleonyx switaki	barefoot banded gecko		G4	S1	None	Threatened	BLM:S IUCN:LC	Yes	
Coleonyx variegatus abbotti	San Diego banded gecko		G5T5	S1S2	None	None	CDFW:SSC	Yes	

CROTAPHYTIDAE (collared and leopard lizards)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Gambelia copeii	Cope's leopard lizard		G5	S1S2	None	None	CDFW:SSC IUCN:LC	Yes	
Gambelia sila	blunt-nosed leopard lizard		G1	S1	Endangered	Endangered	CDFW:FP IUCN:EN	Yes	

PHRYNOSOMATIDAE (spiny lizards)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Phrynosoma blainvillii	coast horned lizard		G3G4	S4	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Phrynosoma mcallii	flat-tailed horned lizard		G3	S3	None	None	BLM:S CDFW:SSC IUCN:NT	Yes	
Sceloporus graciosus graciosus	northern sagebrush lizard		G5T5	S3	None	None	BLM:S	Yes	
Uma inornata	Coachella Valley fringe-toed lizard		G1Q	S1	Threatened	Endangered	IUCN:EN	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Uma notata	Colorado Desert fringe-toed lizard		G3	S2	None	None	BLM:S CDFW:SSC IUCN:NT	Yes	
Uma scoparia	Mojave fringe-toed lizard		G3G4	S3S4	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	

XANTUSIIDAE (night lizards)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Xantusia gracilis	sandstone night lizard		G1	S1	None	None	CDFW:SSC IUCN:VU	Yes	
Xantusia riversiana	island night lizard		G3	S3	Delisted	None	IUCN:LC	Yes	
Xantusia vigilis sierrae	Sierra night lizard		G5T1	S1	None	None	CDFW:SSC USFS:S	Yes	Yes

SCINCIDAE (skinks)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Plestiodon skiltonianus interparietalis	Coronado skink		G5T5	S2S3	None	None	BLM:S CDFW:WL	Yes	

TEIIDAE (whiptails and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aspidoscelis hyperythra	orange-throated whiptail		G5	S2S3	None	None	CDFW:WL IUCN:LC USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aspidoscelis tigris stejnegeri	coastal whiptail		G5T5	S3	None	None	CDFW:SSC	Yes	

ANGUIDAE (alligator lizards)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Elgaria panamintina	Panamint alligator lizard		G3	S3	None	None	BLM:S CDFW:SSC IUCN:VU USFS:S	Yes	

ANNIELLIDAE (legless lizards)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Anniella alexanderae	Temblor legless lizard		G1	S1	None	Candidate Endangered	CDFW:SSC	Yes	Yes
Anniella campi	Southern Sierra legless lizard		G1G2	S2	None	None	CDFW:SSC USFS:S	Yes	Yes
Anniella grinnelli	Bakersfield legless lizard		G2G3	S2S3	None	None	CDFW:SSC	Yes	Yes
Anniella pulchra	Northern California legless lizard		G3	S2S3	None	None	CDFW:SSC USFS:S	Yes	Yes
Anniella spp.	California legless lizard		G3G4	S3S4	None	None	CDFW:SSC	Yes	Yes
Anniella stebbinsi	Southern California legless lizard		G3	S3	None	None	CDFW:SSC USFS:S	Yes	Yes

HELODERMATIDAE (venomous lizards)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Heloderma suspectum cinctum	banded Gila monster		G4T4	S1	None	None	BLM:S CDFW:SSC	Yes	Yes

BOIDAE (boas)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Charina umbratica	southern rubber boa		G2G3	S2S3	None	Threatened	IUCN:VU USFS:S	Yes	

COLUBRIDAE (egg-laying snakes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Arizona elegans occidentalis	California glossy snake		G5T2	S2	None	None	CDFW:SSC	Yes	
Diadophis punctatus modestus	San Bernardino ringneck snake		G5T2T3	S2?	None	None	USFS:S	Yes	
Diadophis punctatus regalis	regal ringneck snake		G5TNR	S2	None	None	CDFW:SSC	Yes	
Diadophis punctatus similis	San Diego ringneck snake		G5T4	S2?	None	None	USFS:S	Yes	
Masticophis flagellum ruddocki	San Joaquin coachwhip		G5T2T3	S3	None	None	CDFW:SSC	Yes	
Masticophis fuliginosus	Baja California coachwhip		G5	S1S2	None	None	CDFW:SSC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Masticophis lateralis euryxanthus	Alameda whipsnake		G4T2	S2	Threatened	Threatened		Yes	
Pituophis catenifer pumilus	Santa Cruz Island gophersnake		G5T1T2	S1?	None	None	CDFW:WL	No	
Salvadora hexalepis virgultea	coast patch-nosed snake		G5T4	S3	None	None	CDFW:SSC	Yes	

NATRICIDAE (live-bearing snakes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Thamnophis gigas	giant gartersnake		G2	S2	Threatened	Threatened	IUCN:VU	Yes	
Thamnophis hammondii	two-striped gartersnake		G4	S3S4	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S	Yes	
Thamnophis hammondii pop. 1	Santa Catalina gartersnake		G4T1?	S1	None	None		No	
Thamnophis sirtalis pop. 1	south coast gartersnake	Coastal plain from Ventura Co. to San Diego Co., from sea level to about 850 m.	G5T1T2	S1S2	None	None	CDFW:SSC	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Thamnophis sirtalis tetrataenia	San Francisco gartersnake		G5T2Q	S2	Endangered	Endangered	CDFW:FP	Yes	

VIPERIIDAE (vipers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Crotalus ruber	red-diamond rattlesnake		G4	S3	None	None	CDFW:SSC IUCN:LC USFS:S	Yes	

Birds

ANATIDAE (ducks, geese, and swans)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Anser albifrons elgasi	tule greater white-fronted goose	Wintering	G5T3	S3	None	None	CDFW:SSC	No	
Aythya americana	redhead	Nesting	G5	S3S4	None	None	CDFW:SSC IUCN:LC	No	
Aythya valisineria	canvasback	Nesting	G5	S2	None	None	IUCN:LC	No	
Branta bernicla	brant	Wintering & staging	G5	S2	None	None	CDFW:SSC IUCN:LC	No	
Branta hutchinsii leucopareia	cackling (=Aleutian Canada) goose	Wintering	G5T3	S3	Delisted	None	CDFW:WL	Yes	
Bucephala islandica	Barrow's goldeneye	Nesting	G5	S1	None	None	CDFW:SSC IUCN:LC	No	
Dendrocygna bicolor	fulvous whistling-duck	Nesting	G5	S1	None	None	CDFW:SSC IUCN:LC	Yes	
Histrionicus histrionicus	harlequin duck	Nesting	G4	S1	None	None	CDFW:SSC IUCN:LC	Yes	

PHASIANIDAE (grouse and ptarmigan)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Bonasa umbellus	ruffed grouse		G5	S3S4	None	None	CDFW:WL IUCN:LC	Yes	
Centrocercus urophasianus	greater sage-grouse	Nesting & leks	G3G4	S2S3	None	None	BLM:S CDFW:SSC IUCN:NT USFS:S	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Dendragapus fuliginosus howardi	Mount Pinos sooty grouse		G5T2T3	S2S3	None	None	CDFW:SSC	Yes	Yes
Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse		G5T3	SX	None	None	CDFW:SSC	No	

ODONTOPHORIDAE (partridge and quail)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Callipepla californica catalinensis	Catalina California quail		G5T2	S2	None	None	CDFW:SSC	No	

GAVIIDAE (loons)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Gavia immer	common loon	Nesting	G5	S1	None	None	CDFW:SSC IUCN:LC	No	

DIOMEDEIDAE (albatrosses)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Phoebastria albatrus	short-tailed albatross		G1	S1	Endangered	None	CDFW:SSC IUCN:VU NABCI:RWL	No	

HYDROBATIDAE (storm petrels)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hydrobates furcatus	fork-tailed storm-petrel	Nesting colony	G5	S1	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Hydrobates homochroa	ashy storm-petrel	Nesting colony	G2	S2	None	None	BLM:S CDFW:SSC IUCN:EN NABCI:RWL USFWS:BCC	Yes	
Hydrobates melania	black storm-petrel	Nesting colony	G3G4	S1	None	None	CDFW:SSC IUCN:LC NABCI:YWL USFWS:BCC	Yes	

PELECANIIDAE (pelicans)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pelecanus erythrorhynchos	American white pelican	Nesting colony	G4	S1S2	None	None	CDFW:SSC IUCN:LC USFWS:BCC	Yes	
Pelecanus occidentalis californicus	California brown pelican	Nesting colony & communal roosts	G4T3T4	S3	Delisted	Delisted	BLM:S CDFW:FP USFS:S	Yes	

PHALACROCORACIDAE (cormorants)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Nannopterum auritum	double-crested cormorant	Nesting colony	G5	S4	None	None	CDFW:WL IUCN:LC	Yes	

ARDEIDAE (herons, egrets, and bitterns)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ardea alba	great egret	Nesting colony	G5	S4	None	None	CDF:S IUCN:LC	Yes	
Ardea herodias	great blue heron	Nesting colony	G5	S4	None	None	CDF:S IUCN:LC	Yes	
Botaurus lentiginosus	American bittern		G5	S3S4	None	None	IUCN:LC	No	
Egretta thula	snowy egret	Nesting colony	G5	S4	None	None	IUCN:LC	Yes	
Ixobrychus exilis	least bittern	Nesting	G4G5	S2	None	None	CDFW:SSC IUCN:LC	Yes	
Nycticorax nycticorax	black-crowned night heron	Nesting colony	G5	S4	None	None	IUCN:LC	Yes	

THRESKIORNITHIDAE (ibises and spoonbills)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Plegadis chihi	white-faced ibis	Nesting colony	G5	S3S4	None	None	CDFW:WL IUCN:LC	Yes	

CICONIIDAE (storks)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Mycteria americana	wood stork		G4	S1	None	None	CDFW:SSC IUCN:LC	No	

CATHARTIDAE (New World vultures)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Gymnogyps californianus	California condor		G1	S1	Endangered	Endangered	CDF:S CDFW:FP IUCN:CR NABCI:RWL	Yes	

PANDIONIDAE (ospreys)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pandion haliaetus	osprey	Nesting	G5	S4	None	None	CDF:S CDFW:WL IUCN:LC	Yes	

ACCIPITRIDAE (hawks, kites, harriers, and eagles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Accipiter cooperii	Cooper's hawk	Nesting	G5	S4	None	None	CDFW:WL IUCN:LC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Accipiter gentilis	northern goshawk	Nesting	G5	S3	None	None	BLM:S CDF:S CDFW:SSC IUCN:LC USFS:S	Yes	
Accipiter striatus	sharp-shinned hawk	Nesting	G5	S4	None	None	CDFW:WL IUCN:LC	Yes	
Aquila chrysaetos	golden eagle	Nesting and wintering	G5	S3	None	None	BLM:S CDF:S CDFW:FP CDFW:WL IUCN:LC	Yes	
Buteo regalis	ferruginous hawk	Wintering	G4	S3S4	None	None	CDFW:WL IUCN:LC	Yes	
Buteo swainsoni	Swainson's hawk	Nesting	G5	S3	None	Threatened	BLM:S IUCN:LC	Yes	
Circus hudsonius	northern harrier	Nesting	G5	S3	None	None	CDFW:SSC IUCN:LC USFWS:BCC	Yes	Yes
Elanus leucurus	white-tailed kite	Nesting	G5	S3S4	None	None	BLM:S CDFW:FP IUCN:LC	Yes	
Haliaeetus leucocephalus	bald eagle	Nesting and wintering	G5	S3	Delisted	Endangered	BLM:S CDF:S CDFW:FP IUCN:LC USFS:S	Yes	
Parabuteo unicinctus	Harris' hawk	Nesting	G5	S1	None	None	CDFW:WL IUCN:LC	No	

FALCONIDAE (falcons)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Falco columbarius	merlin	Wintering	G5	S3S4	None	None	CDFW:WL IUCN:LC	Yes	
Falco mexicanus	prairie falcon	Nesting	G5	S4	None	None	CDFW:WL IUCN:LC	Yes	
Falco peregrinus anatum	American peregrine falcon	Nesting	G4T4	S3S4	Delisted	Delisted	CDF:S CDFW:FP	Yes	

RALLIDAE (rails, coots, and gallinules)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Coturnicops noveboracensis	yellow rail		G4	S1S2	None	None	CDFW:SSC IUCN:LC NABCI:RWL USFS:S USFWS:BCC	Yes	
Laterallus jamaicensis coturniculus	California black rail		G3T1	S1	None	Threatened	BLM:S CDFW:FP IUCN:EN NABCI:RWL	Yes	Yes
Rallus obsoletus levipes	light-footed Ridgway's rail		G3T1T2	S1	Endangered	Endangered	CDFW:FP NABCI:RWL	Yes	Yes
Rallus obsoletus obsoletus	California Ridgway's rail		G3T1	S1	Endangered	Endangered	CDFW:FP NABCI:RWL	Yes	Yes
Rallus obsoletus yumanensis	Yuma Ridgway's rail		G3T3	S1S2	Endangered	Threatened	CDFW:FP NABCI:RWL	Yes	Yes

GRUIDAE (cranes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Antigone canadensis canadensis	lesser sandhill crane	Wintering	G5T4	S3S4	None	None	CDFW:SSC	No	
Antigone canadensis tabida	greater sandhill crane	Nesting & wintering	G5T5	S2	None	Threatened	BLM:S CDFW:FP USFS:S	Yes	

CHARADRIIDAE (plovers and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Charadrius montanus	mountain plover	Wintering	G3	S2S3	None	None	BLM:S CDFW:SSC IUCN:NT NABCI:RWL USFWS:BCC	Yes	Yes
Charadrius nivosus nivosus	western snowy plover	Nesting	G3T3	S3	Threatened	None	CDFW:SSC NABCI:RWL	Yes	Yes

SCOLOPACIDAE (sandpipers and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Numenius americanus	long-billed curlew	Nesting	G5	S2	None	None	CDFW:WL IUCN:LC NABCI:YWL	No	

LARIDAE (gulls and terns)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Chlidonias niger	black tern	Nesting colony	G4G5	S2	None	None	CDFW:SSC IUCN:LC USFWS:BCC	Yes	
Gelochelidon nilotica	gull-billed tern	Nesting colony	G5	S1	None	None	CDFW:SSC IUCN:LC NABCI:YWL USFWS:BCC	Yes	Yes
Hydroprogne caspia	Caspian tern	Nesting colony	G5	S4	None	None	IUCN:LC	Yes	Yes
Larus californicus	California gull	Nesting colony	G5	S4	None	None	CDFW:WL IUCN:LC USFWS:BCC	Yes	
Leucophaeus atricilla	laughing gull	Nesting colony	G5	S1	None	None	CDFW:WL IUCN:LC	No	
Rynchops niger	black skimmer	Nesting colony	G5	S2	None	None	CDFW:SSC IUCN:LC NABCI:YWL USFWS:BCC	Yes	
Sternula antillarum browni	California least tern	Nesting colony	G4T2T3Q	S2	Endangered	Endangered	CDFW:FP NABCI:RWL	Yes	Yes
Thalasseus elegans	elegant tern	Nesting colony	G2	S3	None	None	CDFW:WL IUCN:NT USFWS:BCC	No	Yes

ALCIDAE (auklets, puffins, and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Brachyramphus marmoratus	marbled murrelet	Nesting	G3	S2	Threatened	Endangered	CDF:S IUCN:EN NABCI:RWL	Yes	
Cerorhinca monocerata	rhinoceros auklet	Nesting colony	G5	S3	None	None	CDFW:WL IUCN:LC	Yes	
Fratercula cirrhata	tufted puffin	Nesting colony	G5	S1S2	None	None	CDFW:SSC IUCN:LC USFWS:BCC	Yes	
Ptychoramphus aleuticus	Cassin's auklet	Nesting colony	G4	S3	None	None	CDFW:SSC IUCN:NT USFWS:BCC	No	
Synthliboramphus scrippsi	Scripps's murrelet	Nesting colony	G2	S2	None	Threatened	BLM:S IUCN:VU NABCI:RWL USFWS:BCC	Yes	Yes

CUCULIDAE (cuckoos and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Nesting	G5T2T3	S1	Threatened	Endangered	BLM:S NABCI:RWL USFS:S	Yes	

STRIGIDAE (owls)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Asio flammeus	short-eared owl	Nesting	G5	S3	None	None	CDFW:SSC IUCN:LC USFWS:BCC	Yes	
Asio otus	long-eared owl	Nesting	G5	S3?	None	None	CDFW:SSC IUCN:LC USFWS:BCC	Yes	
Athene cunicularia	burrowing owl	Burrow sites & some wintering sites	G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC USFWS:BCC	Yes	Yes
Micrathene whitneyi	elf owl	Nesting	G5	S1	None	Endangered	BLM:S IUCN:LC	Yes	
Psiloscops flammeolus	flammulated owl	Nesting	G4	S2S4	None	None	IUCN:LC NABCI:YWL USFWS:BCC	Yes	
Strix nebulosa	great gray owl	Nesting	G5	S1	None	Endangered	CDF:S IUCN:LC USFS:S	Yes	
Strix occidentalis caurina	northern spotted owl		G3G4T3	S2	Threatened	Threatened	CDF:S NABCI:YWL	No	Yes
Strix occidentalis occidentalis	California spotted owl		G3G4T2T3	S3	None	None	BLM:S CDFW:SSC USFS:S USFWS:BCC	No	Yes

APODIDAE (swifts)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Chaetura vauxi	Vaux's swift	Nesting	G5	S2S3	None	None	CDFW:SSC IUCN:LC USFWS:BCC	No	
Cypseloides niger	black swift	Nesting	G4	S2	None	None	CDFW:SSC IUCN:VU NABCI:YWL USFWS:BCC	Yes	

TROCHILIDAE (hummingbirds)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Calypte costae	Costa's hummingbird	Nesting	G5	S4	None	None	IUCN:LC USFWS:BCC	No	
Selasphorus rufus	rufous hummingbird	Nesting	G4	S1S2	None	None	IUCN:NT NABCI:YWL USFWS:BCC	No	

PICIDAE (woodpeckers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Colaptes chrysoides	gilded flicker		G5	S1	None	Endangered	BLM:S IUCN:LC NABCI:YWL USFWS:BCC	Yes	
Melanerpes lewis	Lewis' woodpecker	Nesting	G4	S4	None	None	IUCN:LC NABCI:YWL USFWS:BCC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Melanerpes uropygialis	Gila woodpecker		G5	S1	None	Endangered	BLM:S IUCN:LC USFWS:BCC	Yes	
Picoides arcticus	black-backed woodpecker		G5	S2	None	None	IUCN:LC	Yes	
Sphyrapicus ruber	red-breasted sapsucker	Nesting	G5	S4	None	None	IUCN:LC	Yes	

TYRANNIDAE (tyrant flycatchers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Contopus cooperi	olive-sided flycatcher	Nesting	G4	S3	None	None	CDFW:SSC IUCN:NT NABCI:YWL USFWS:BCC	Yes	
Empidonax traillii	willow flycatcher	Nesting	G5	S1S2	None	Endangered	IUCN:LC USFS:S	Yes	Yes
Empidonax traillii brewsteri	little willow flycatcher	Nesting	G5T3T4	S1S2	None	Endangered		Yes	Yes
Empidonax traillii extimus	southwestern willow flycatcher	Nesting	G5T2	S1	Endangered	Endangered	NABCI:RWL	Yes	Yes
Myiarchus tyrannulus	brown-crested flycatcher	Nesting	G5	S3	None	None	CDFW:WL IUCN:LC	Yes	
Pyrocephalus rubinus	vermilion flycatcher	Nesting	G5	S2S3	None	None	CDFW:SSC IUCN:LC	Yes	

LANIIDAE (shrikes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lanius ludovicianus	loggerhead shrike	Nesting	G4	S4	None	None	CDFW:SSC IUCN:NT	Yes	
Lanius ludovicianus anthonyi	Island loggerhead shrike		G4T1	S1	None	None	CDFW:SSC NABCI:RWL	No	
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike		G4T1Q	S2	Endangered	None	CDFW:SSC NABCI:RWL	Yes	Yes

VIREONIDAE (vireos)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Vireo bellii arizonae	Arizona Bell's vireo	Nesting	G5T4	S1S2	None	Endangered	BLM:S	Yes	Yes
Vireo bellii pusillus	least Bell's vireo	Nesting	G5T2	S2	Endangered	Endangered	NABCI:YWL	Yes	Yes
Vireo huttoni unitti	Catalina Hutton's vireo		G5T2?	S2	None	None	CDFW:SSC	No	
Vireo vicinior	gray vireo	Nesting	G5	S2	None	None	BLM:S CDFW:SSC IUCN:LC NABCI:YWL USFS:S	Yes	

CORVIDAE (jays, crows, and magpies)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aphelocoma californica cana	Eagle Mountain scrub-jay		G5T3	S3	None	None	CDFW:WL	No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aphelocoma insularis	Island scrub-jay		G1	S1	None	None	IUCN:NT NABCI:RWL USFWS:BCC	No	
Pica nuttalli	yellow-billed magpie	Nesting & communal roosts	G3G4	S3S4	None	None	IUCN:VU NABCI:YWL USFWS:BCC	No	

ALAUDIDAE (larks)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Eremophila alpestris actia	California horned lark		G5T4Q	S4	None	None	CDFW:WL IUCN:LC	Yes	

HIRUNDINIDAE (swallows)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Progne subis	purple martin	Nesting	G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	
Riparia riparia	bank swallow	Nesting	G5	S2	None	Threatened	BLM:S IUCN:LC	Yes	

PARIDAE (titmice and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Poecile atricapillus	black-capped chickadee		G5	S3	None	None	CDFW:WL IUCN:LC	No	

TROGLODYTIDAE (wrens)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren	San Diego & Orange Counties only	G5T3Q	S2	None	None	CDFW:SSC USFS:S USFWS:BCC	Yes	Yes
Cistothorus palustris clarkae	Clark's marsh wren		G5T2T3	S2	None	None	CDFW:SSC	No	
Thryomanes bewickii leucophrys	San Clemente Bewick's wren		G5TX	SX	None	None	CDFW:SSC	No	

POLIOPTILIDAE (gnatcatchers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Polioptila californica californica	coastal California gnatcatcher		G4G5T3Q	S2	Threatened	None	CDFW:SSC NABCI:YWL	Yes	Yes
Polioptila melanura	black-tailed gnatcatcher		G5	S3S4	None	None	CDFW:WL IUCN:LC	Yes	

MIMIDAE (mockingbirds and thrashers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Toxostoma bendirei	Bendire's thrasher		G4	S3	None	None	BLM:S CDFW:SSC IUCN:VU NABCI:RWL USFWS:BCC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Toxostoma crissale	Crissal thrasher		G5	S3	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Toxostoma lecontei	Le Conte's thrasher		G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC NABCI:RWL USFWS:BCC	Yes	Yes

PASSERELLIDAE (sparrows)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aimophila ruficeps canescens	southern California rufous-crowned sparrow		G5T3	S3	None	None	CDFW:WL	Yes	
Aimophila ruficeps obscura	Santa Cruz Island rufous-crowned sparrow		G5T2T3	S2	None	None	CDFW:SSC	No	
Ammodramus savannarum	grasshopper sparrow	Nesting	G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	
Artemisiospiza belli belli	Bell's sage sparrow		G5T2T3	S3	None	None	CDFW:WL	Yes	Yes
Artemisiospiza belli clementeae	San Clemente sage sparrow		G5T2Q	S2	Threatened	None	CDFW:SSC NABCI:YWL	Yes	Yes
Junco hyemalis caniceps	gray-headed junco	Nesting	G5T5	S1	None	None	CDFW:WL	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Melospiza melodia graminea	Channel Island song sparrow		G5T1	S1	None	None	CDFW:SSC USFWS:BCC	Yes	Yes
Melospiza melodia maxillaris	Suisun song sparrow		G5T3	S3	None	None	CDFW:SSC	Yes	
Melospiza melodia pop. 1	song sparrow ("Modesto" population)		G5T3?Q	S3?	None	None	CDFW:SSC	Yes	
Melospiza melodia pusillula	Alameda song sparrow		G5T2T3	S2S3	None	None	CDFW:SSC USFWS:BCC	Yes	
Melospiza melodia samuelis	San Pablo song sparrow		G5T2	S2	None	None	CDFW:SSC USFWS:BCC	Yes	
Melozone aberti	Abert's towhee		G3G4	S4	None	None	IUCN:LC	No	
Melozone crissalis eremophilus	Inyo California towhee		G4G5T2	S2	Threatened	Endangered	NABCI:RWL	Yes	Yes
Passerculus sandwichensis alaudinus	Bryant's savannah sparrow		G5T2T3	S3	None	None	CDFW:SSC	No	
Passerculus sandwichensis beldingi	Belding's savannah sparrow		G5T3	S3	None	Endangered	USFWS:BCC	Yes	
Passerculus sandwichensis rostratus	large-billed savannah sparrow	Wintering	G5T2T3Q	S2	None	None	CDFW:SSC	No	
Pipilo maculatus clementae	San Clemente spotted towhee		G5T1T2	S1S2	None	None	CDFW:SSC	No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pooecetes gramineus affinis	Oregon vesper sparrow	Wintering	G5T3?	S2	None	None	CDFW:SSC NABCI:RWL USFWS:BCC	No	
Spizella breweri	Brewer's sparrow	Nesting	G5	S4	None	None	IUCN:LC	Yes	

ICTERIIDAE (yellow-breasted chats)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Icteria virens	yellow-breasted chat	Nesting	G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	

ICTERIDAE (blackbirds)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Agelaius phoeniceus aciculatus	Kern red-winged blackbird		G5T1T2	S1S2	None	None	CDFW:SSC	No	
Agelaius tricolor	tricolored blackbird	Nesting colony	G1G2	S1S2	None	Threatened	BLM:S CDFW:SSC IUCN:EN NABCI:RWL USFWS:BCC	Yes	
Xanthocephalus xanthocephalus	yellow-headed blackbird	Nesting	G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	

PARULIDAE (wood-warblers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Geothlypis trichas sinuosa	saltmarsh common yellowthroat		G5T3	S3	None	None	CDFW:SSC USFWS:BCC	Yes	Yes
Leiothlypis luciae	Lucy's warbler	Nesting	G5	S3	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Leiothlypis virginiae	Virginia's warbler	Nesting	G5	S2	None	None	CDFW:WL IUCN:LC NABCI:YWL USFWS:BCC	Yes	
Setophaga petechia	yellow warbler	Nesting	G5	S3S4	None	None	CDFW:SSC IUCN:LC	Yes	Yes
Setophaga petechia sonorana	Sonoran yellow warbler	Nesting	G5T2T3	S2	None	None	CDFW:SSC	Yes	Yes

CARDINALIDAE (cardinals)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Cardinalis cardinalis	northern cardinal		G5	S1	None	None	CDFW:WL IUCN:LC	Yes	
Piranga flava	hepatic tanager	Nesting	G5	S1	None	None	CDFW:WL IUCN:LC	Yes	
Piranga rubra	summer tanager	Nesting	G5	S1	None	None	CDFW:SSC IUCN:LC	Yes	

FRINGILLIDAE (finches and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Spinus lawrencei	Lawrence's goldfinch	Nesting	G3G4	S4	None	None	IUCN:LC NABCI:YWL USFWS:BCC	Yes	

Mammals

SORICIDAE (shrews)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Sorex lyelli	Mount Lyell shrew		G3G4	S3S4	None	None	CDFW:SSC IUCN:LC	Yes	
Sorex ornatus relictus	Buena Vista Lake ornate shrew		G5T1	S1	Endangered	None	CDFW:SSC	Yes	
Sorex ornatus salarius	Monterey shrew		G5T1T2	S1S2	None	None	CDFW:SSC	Yes	
Sorex ornatus salicornicus	southern California saltmarsh shrew		G5T1?	S1	None	None	CDFW:SSC	Yes	
Sorex ornatus sinuosus	Suisun shrew		G5T1T2Q	S1S2	None	None	CDFW:SSC	Yes	
Sorex ornatus willetti	Santa Catalina shrew		G5T1	S1	None	None	CDFW:SSC	Yes	
Sorex vagrans halicoetes	salt-marsh wandering shrew		G5T1	S1	None	None	CDFW:SSC	Yes	
Sorex vagrans paludivagus	Monterey vagrant shrew		G5T1	S2	None	None		No	

TALPIDAE (moles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Scapanus latimanus insularis	Angel Island mole		G5T1	SH	None	None		Yes	
Scapanus latimanus parvus	Alameda Island mole		G5T1Q	SH	None	None	CDFW:SSC	Yes	

PHYLLOSTOMIDAE (leaf-nosed bats)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Choeronycteris mexicana	Mexican long-tongued bat		G3G4	S1	None	None	CDFW:SSC IUCN:NT	Yes	
Leptonycteris yerbabuenae	lesser long-nosed bat		G3	S1	Delisted	None	CDFW:SSC IUCN:NT	Yes	Yes
Macrotus californicus	California leaf-nosed bat		G3G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	

VESPERTILIONIDAE (evening bats)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Antrozous pallidus	pallid bat		G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S	Yes	
Corynorhinus townsendii	Townsend's big-eared bat		G4	S2	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S	Yes	
Euderma maculatum	spotted bat		G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Lasionycteris noctivagans	silver-haired bat		G3G4	S3S4	None	None	IUCN:LC	Yes	
Lasiurus cinereus	hoary bat		G3G4	S4	None	None	IUCN:LC	Yes	
Lasiurus frantzii	western red bat		G4	S3	None	None	CDFW:SSC IUCN:LC	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lasiurus xanthinus	western yellow bat		G4G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	
Myotis ciliolabrum	western small-footed myotis		G5	S3	None	None	BLM:S IUCN:LC	Yes	
Myotis evotis	long-eared myotis		G5	S3	None	None	BLM:S IUCN:LC	Yes	
Myotis occultus	Arizona Myotis		G4G5	S1	None	None	CDFW:SSC IUCN:LC	Yes	
Myotis thysanodes	fringed myotis		G4	S3	None	None	BLM:S IUCN:LC USFS:S	Yes	
Myotis velifer	cave myotis		G4G5	S1	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Myotis volans	long-legged myotis		G4G5	S3	None	None	IUCN:LC	Yes	
Myotis yumanensis	Yuma myotis		G5	S4	None	None	BLM:S IUCN:LC	Yes	

MOLOSSIDAE (free-tailed bats)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Eumops perotis californicus	western mastiff bat		G4G5T4	S3S4	None	None	BLM:S CDFW:SSC	Yes	
Nyctinomops femorosaccus	pocketed free-tailed bat		G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	
Nyctinomops macrotis	big free-tailed bat		G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	

OCHOTONIDAE (pikas)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ochotona princeps schisticeps	gray-headed pika		G5T4	S2S4	None	None		Yes	

LEPORIDAE (rabbits and hares)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Brachylagus idahoensis	pygmy rabbit		G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S	Yes	
Lepus americanus klamathensis	Oregon snowshoe hare		G5T3T4Q	S2	None	None	CDFW:SSC	Yes	
Lepus americanus tahoensis	Sierra Nevada snowshoe hare		G5T3T4Q	S2	None	None	CDFW:SSC	Yes	
Lepus californicus bennettii	San Diego black-tailed jackrabbit		G5T3T4	S3S4	None	None		Yes	
Lepus townsendii townsendii	western white-tailed jackrabbit		G5T5	S3?	None	None	CDFW:SSC	Yes	
Sylvilagus bachmani riparius	riparian brush rabbit		G5T1	S1	Endangered	Endangered		Yes	

APLODONTIIDAE (mountain beavers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Aplodontia rufa californica	Sierra Nevada mountain beaver		G5T3T4	S2S3	None	None	CDFW:SSC IUCN:LC	Yes	Yes
Aplodontia rufa humboldtiana	Humboldt mountain beaver		G5TNR	SNR	None	None		Yes	
Aplodontia rufa nigra	Point Arena mountain beaver		G5T1	S1	Endangered	None	CDFW:SSC IUCN:LC	Yes	Yes
Aplodontia rufa phaea	Point Reyes mountain beaver		G5T2	S2	None	None	CDFW:SSC IUCN:LC	Yes	Yes

SCIURIDAE (squirrels and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ammospermophilus nelsoni	Nelson's (=San Joaquin) antelope squirrel		G2G3	S2S3	None	Threatened	BLM:S IUCN:EN	Yes	
Callospermophilus lateralis bernardinus	San Bernardino golden-mantled ground squirrel		G5T1	S1	None	None		No	
Glaucomys oregonensis californicus	San Bernardino flying squirrel		G5T1T2	S1S2	None	None	CDFW:SSC USFS:S	Yes	
Neotamias alpinus	Alpine chipmunk		G4	S3	None	None	IUCN:LC	No	
Neotamias panamintinus acrus	Kingston Mountain chipmunk		G4T1T2	S1S2	None	None		Yes	
Neotamias speciosus callipeplus	Mount Pinos chipmunk		G4T2	S2	None	None	USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Neotamias speciosus speciosus	lodgepole chipmunk		G4T3T4	S2	None	None		Yes	
Urocitellus mollis	Piute ground squirrel		G5	S3	None	None	IUCN:LC	No	
Xerospermophilus mohavensis	Mohave ground squirrel		G2G3	S2S3	None	Threatened	BLM:S IUCN:NT	Yes	
Xerospermophilus tereticaudus chlorus	Palm Springs round-tailed ground squirrel		G5T2Q	S2	None	None	BLM:S CDFW:SSC	Yes	

GEOMYIDAE (pocket gophers)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Thomomys bottae operarius	Owens Lake pocket gopher		G5T1?	S1?	None	None		No	

HETEROMYIDAE (kangaroo rats, pocket mice, and kangaroo mice)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Chaetodipus californicus femoralis	Dulzura pocket mouse		G5T3	S3	None	None	CDFW:SSC	Yes	
Chaetodipus fallax fallax	northwestern San Diego pocket mouse		G5T3T4	S3S4	None	None	CDFW:SSC	Yes	Yes
Chaetodipus fallax pallidus	pallid San Diego pocket mouse		G5T3T4	S3S4	None	None	CDFW:SSC	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Dipodomys californicus eximius	Marysville California kangaroo rat		G4T1	S1	None	None	CDFW:SSC	Yes	
Dipodomys heermanni arenae	Lompoc kangaroo rat		G4T1T2	S1S2	None	None		No	
Dipodomys heermanni berkeleyensis	Berkeley kangaroo rat		G4T1	S2	None	None		Yes	
Dipodomys heermanni dixoni	Merced kangaroo rat		G4T2T3	S2	None	None		Yes	
Dipodomys heermanni goldmani	Salinas kangaroo rat		G4T2T3	S2S3	None	None		No	
Dipodomys heermanni heermanni	Heermann's kangaroo rat		G4T2	S2	None	None		No	
Dipodomys heermanni morroensis	Morro Bay kangaroo rat		G4TH	SH	Endangered	Endangered	CDFW:FP	Yes	
Dipodomys ingens	giant kangaroo rat		G1G2	S1S2	Endangered	Endangered	IUCN:EN	Yes	
Dipodomys merriami collinus	Earthquake Merriam's kangaroo rat		G5T2?	S2	None	None		Yes	
Dipodomys merriami parvus	San Bernardino kangaroo rat		G5T1	S1	Endangered	Candidate Endangered	CDFW:SSC	Yes	
Dipodomys merriami trinidadensis	Valle de la Trinidad kangaroo rat		G5T2T3Q	S2	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Dipodomys nitratoides brevinasus	short-nosed kangaroo rat		G3T1T2	S1S2	None	None	BLM:S CDFW:SSC IUCN:VU	Yes	
Dipodomys nitratoides exilis	Fresno kangaroo rat		G3TH	SH	Endangered	Endangered	IUCN:VU	Yes	
Dipodomys nitratoides nitratoides	Tipton kangaroo rat		G3T1T2	S1S2	Endangered	Endangered	IUCN:VU	Yes	
Dipodomys panamintinus argusensis	Argus Mountains kangaroo rat		G5T1T3	S1S3	None	None		Yes	
Dipodomys panamintinus panamintinus	Panamint kangaroo rat		G5T3	S3	None	None		Yes	
Dipodomys simulans	Dulzura kangaroo rat		G4	S3	None	None	IUCN:LC	No	
Dipodomys stephensi	Stephens' kangaroo rat		G2	S2	Threatened	Threatened	IUCN:VU	Yes	
Dipodomys venustus elephantinus	big-eared kangaroo rat		G4T2	S3	None	None		Yes	
Dipodomys venustus sanctiluciae	Santa Lucia Mountain kangaroo rat		G4TNR	S3	None	None		No	
Dipodomys venustus venustus	Santa Cruz kangaroo rat		G4T1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Perognathus alticola alticola	white-eared pocket mouse		G2TH	SH	None	None	BLM:S CDFW:SSC IUCN:VU USFS:S	Yes	Yes
Perognathus alticola inexpectatus	Tehachapi pocket mouse		G2T1T2	S1S2	None	None	CDFW:SSC IUCN:VU USFS:S	Yes	Yes
Perognathus inornatus	San Joaquin pocket mouse		G2G3	S2S3	None	None	BLM:S IUCN:LC	Yes	Yes
Perognathus inornatus psammophilus	Salinas pocket mouse		G2G3T2?	S1	None	None	CDFW:SSC	Yes	
Perognathus longimembris bangsi	Palm Springs pocket mouse		G5T2	S1	None	None	BLM:S CDFW:SSC	Yes	
Perognathus longimembris brevinasus	Los Angeles pocket mouse		G5T2	S1S2	None	None	CDFW:SSC	Yes	
Perognathus longimembris internationalis	Jacumba pocket mouse		G5T2T3	S2	None	None	CDFW:SSC	Yes	
Perognathus longimembris pacificus	Pacific pocket mouse		G5T1	S2	Endangered	None	CDFW:SSC	Yes	
Perognathus longimembris salinensis	Saline Valley pocket mouse		G5T1	S1	None	None		No	
Perognathus longimembris tularensis	Tulare pocket mouse		G5T1	S1	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Perognathus mollipilosus xanthonotus	yellow-eared pocket mouse		GNRT2	S2	None	None	BLM:S	Yes	

CRICETIDAE (mice, rats, and voles)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Arborimus albipes	white-footed vole		G3G4	S2	None	None	CDFW:SSC IUCN:LC	Yes	
Arborimus pomo	Sonoma tree vole		G3	S3	None	None	CDFW:SSC IUCN:NT	Yes	
Microtus californicus halophilus	Monterey vole		G5T1	S2	None	None		No	
Microtus californicus mohavensis	Mohave river vole		G5T1	S1	None	None	CDFW:SSC	Yes	
Microtus californicus sanpabloensis	San Pablo vole		G5T1T2	S1S2	None	None	CDFW:SSC	Yes	
Microtus californicus scirpensis	Amargosa vole		G5T1	S1	Endangered	Endangered		Yes	
Microtus californicus stephensi	south coast marsh vole		G5T2T3	S2	None	None	CDFW:SSC	Yes	
Microtus californicus vallicola	Owens Valley vole		G5T3	S3	None	None	BLM:S CDFW:SSC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Neotoma albigula venusta	Colorado Valley woodrat		G5T3T4	S1S2	None	None		Yes	
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat		G5T2T3	S2S3	None	None	CDFW:SSC	Yes	
Neotoma fuscipes riparia	riparian (=San Joaquin Valley) woodrat		G5T1Q	S1	Endangered	None	CDFW:SSC	Yes	Yes
Neotoma lepida intermedia	San Diego desert woodrat		G5T3T4	S3S4	None	None	CDFW:SSC	Yes	
Neotoma macrotis luciana	Monterey dusky-footed woodrat		G5T3	S3	None	None	BLM:S CDFW:SSC	Yes	
Onychomys torridus ramona	southern grasshopper mouse		G5T3	S3	None	None	CDFW:SSC	Yes	
Onychomys torridus tularensis	Tulare grasshopper mouse		G5T1T2	S1S2	None	None	BLM:S CDFW:SSC	Yes	
Peromyscus maniculatus anacapae	Anacapa Island deer mouse		G5T1T2	S1S2	None	None	CDFW:SSC	Yes	
Peromyscus maniculatus clementis	San Clemente deer mouse		G5T1T2	S1S2	None	None	CDFW:SSC	No	
Reithrodontomys megalotis distichlis	Salinas harvest mouse		G5T1	S2	None	None		Yes	
Reithrodontomys megalotis santacruzae	Santa Cruz harvest mouse		G5T1Q	S1	None	None		Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Reithrodontomys raviventris	salt-marsh harvest mouse		G1G2	S1S2	Endangered	Endangered	CDFW:FP IUCN:EN	Yes	
Sigmodon arizonae plenus	Colorado River cotton rat		G5T2T3	S1S2	None	None	CDFW:SSC	Yes	
Sigmodon hispidus eremicus	Yuma hispid cotton rat		G5T2T3	S2	None	None	CDFW:SSC	Yes	

DIPODIDAE (jumping mice)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Zapus trinotatus orarius	Point Reyes jumping mouse		G5T1T3Q	S2	None	None	CDFW:SSC	Yes	

ERETHIZONTIDAE (New World porcupines)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Erethizon dorsatum	North American porcupine		G5	S3	None	None	IUCN:LC	Yes	

CANIDAE (foxes, wolves, and coyotes)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Canis lupus	gray wolf		G5	S1	Endangered	Endangered	IUCN:LC	Yes	
Urocyon littoralis catalinae	Santa Catalina Island fox		G3T1	S1	Threatened	Threatened		Yes	Yes
Urocyon littoralis clementae	San Clemente Island fox		G3T1	S1	None	Threatened		Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Urocyon littoralis dickeyi	San Nicolas Island fox		G3T1	S1	None	Threatened		Yes	Yes
Urocyon littoralis littoralis	San Miguel Island fox		G3T1	S1	Delisted	Threatened		Yes	Yes
Urocyon littoralis santacruzae	Santa Cruz Island fox		G3T1	S1	Delisted	Threatened		Yes	Yes
Urocyon littoralis santarosae	Santa Rosa Island fox		G3T1	S1	Delisted	Threatened		Yes	Yes
Vulpes macrotis mutica	San Joaquin kit fox		G4T2	S2	Endangered	Threatened		Yes	
Vulpes vulpes necator pop. 1	Sierra Nevada red fox - southern Cascades DPS		G5TNR	S1	None	Threatened	USFS:S	Yes	
Vulpes vulpes necator pop. 2	Sierra Nevada red fox - Sierra Nevada DPS		G5TNR	S1	Endangered	Threatened	USFS:S	Yes	
Vulpes vulpes patwin	Sacramento Valley red fox		G5T2	S2	None	None		No	

OTARIIDAE (sea lions and fur seals)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Arctocephalus townsendi	Guadalupe fur-seal		G1	S1	Threatened	Threatened	CDFW:FP IUCN:LC	Yes	
Callorhinus ursinus	northern fur-seal		G3	S1	None	None	IUCN:VU	Yes	
Eumetopias jubatus	Steller sea lion		G3	S2	Delisted	None	IUCN:NT MMC:SSC	Yes	

PROCYONIDAE (raccoons and ringtails)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Bassariscus astutus octavus	southern California ringtail		G5TNR	S3	None	None	CDFW:FP	No	
Bassariscus astutus willetti	Palo Verde Mountains ringtail		G5TNR	S2	None	None	CDFW:FP	No	
Bassariscus astutus yumanensis	Yuma ringtail		G5TNR	S2	None	None	CDFW:FP	No	

MUSTELIDAE (weasels and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Enhydra lutris nereis	southern sea otter		G4T2	S3	Threatened	None	CDFW:FP IUCN:EN MMC:SSC	Yes	Yes
Gulo gulo	wolverine		G4	S1	Proposed Threatened	Threatened	CDFW:FP IUCN:LC USFS:S	Yes	
Lontra canadensis sonora	southwestern river otter		G5T1	SH	None	None	CDFW:SSC	Yes	Yes
Martes caurina	Pacific marten		G4G5	S3	None	None	IUCN:LC USFS:S	Yes	
Martes caurina humboldtensis	Humboldt marten		G4G5T1	S1	Threatened	Endangered	CDFW:SSC USFS:S	Yes	Yes
Martes caurina sierrae	Sierra marten		G4G5T3	S3	None	None	USFS:S	Yes	
Mustela frenata inyoensis	Inyo long-tailed weasel		G5T2Q	S2	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Mustela frenata xanthogenys	San Joaquin long-tailed weasel		G5T2T3	S3	None	None		No	
Pekania pennanti	Fisher		G5	S2S3	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S	Yes	Yes
Pekania pennanti pop. 2	Fisher - southern Sierra Nevada ESU		G5T1	S1	Endangered	Threatened	BLM:S CDFW:SSC USFS:S	Yes	
Taxidea taxus	American badger		G5	S3	None	None	CDFW:SSC IUCN:LC	Yes	

MEPHITIDAE (skunks)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Spilogale gracilis amphiala	Channel Islands spotted skunk		G5T3	S3	None	None	CDFW:SSC	Yes	

FELIDAE (cats and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lynx rufus pallescens	pallid bobcat		G5T3?	S3?	None	None		No	
Puma concolor browni	Yuma mountain lion		G5T1T2Q	S1	None	None	CDFW:SSC	Yes	

CERVIDAE (deer, elk, and moose)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Cervus canadensis nannodes	tule elk		G5T3	S3	None	None		No	

ANTILOCAPRIDAE (pronghorn)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Antilocapra americana	pronghorn		G5	S3	None	None	IUCN:LC	No	
Antilocapra americana sonoriensis	Sonoran pronghorn		G5T1	SH	Endangered	None	IUCN:EN	No	

BOVIDAE (sheep and relatives)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Ovis canadensis nelsoni	desert bighorn sheep		G4T4	S3	None	None	BLM:S CDFW:FP USFS:S	Yes	Yes
Ovis canadensis nelsoni pop. 2	Peninsular bighorn sheep DPS		G4T3Q	S2	Endangered	Threatened	CDFW:FP	Yes	Yes
Ovis canadensis sierrae	Sierra Nevada bighorn sheep		G4T2	S2	Endangered	Endangered	CDFW:FP	Yes	

End Notes

Invertebrates

GASTROPODA (snails, slugs, and abalones)

Prophysaon sp. 1

Klamath taildropper

1) This entity is known to be unique morphologically and genetically (Frest & Johannes 2000, Wilke & Duncan 2004, Roth & Sadeghian 2006), but has not been formally described and some may reference it as part of the *Prophysaon coeruleum* species complex.

ARACHNIDA (spiders and relatives)

Hubbardia shoshonensis

Shoshone Cave whip-scorpion

1) BLM Sensitive list uses the scientific name *Trithyreus shoshonensis*.

CRUSTACEA, Order Amphipoda (amphipods)

Hyalella muerta

Texas Spring amphipod

1) First North American hypogean hyalellid.

Hyalella sandra

Death Valley amphipod

1) Population in Texas Springs is an accidental introduction. Population in Nevares Springs may be a new species.

INSECTA, Order Coleoptera (beetles)

Trigonoscuta sp.

Doyen's trigonoscuta dune weevil

1) Sometimes referred to as *Trigonoscuta doyeni*, which is an unpublished manuscript name.

INSECTA, Order Lepidoptera (butterflies and moths)

Callophrys thornei

Thorne's hairstreak

1) Formerly *Mitoura thornei*.

Euproserpinus euterpe

Kern primrose sphinx moth

1) Until its rediscovery in Kern County in 1974, this moth had been thought to be extinct. A second population was later found in San Luis Obispo County (Xerces Society 2005).

Speyeria zerene myrtleae

Myrtle's silverspot butterfly

1) The USFWS and others have not yet determined if the taxonomic expansion by Emmel and Emmel (1998) into *S. z. myrtleae* and *S. z. puntareyes* is warranted. The *Speyereia zerene* along the coast of Marin and Sonoma Counties are federally endangered under the subspecies concept in the 1992 listing.

INSECTA, Order Hymenoptera (ants, bees, and wasps)

Bombus crotchii

Crotch bumble bee

1) Originally advanced to candidacy by the Fish and Game Commission in June 2019. Trial court decision temporarily removed its candidacy in February 2021. State Supreme Court ruling reversed judgement and reinstated its candidacy in Sep 2022 (Supreme Court Case S275412).

Bombus franklini

Franklin's bumble bee

1) Originally advanced to candidacy by the Fish and Game Commission in June 2019. Trial court decision temporarily removed its candidacy in February 2021. State Supreme Court ruling reversed judgement and reinstated its candidacy in Sep 2022 (Supreme Court Case S275412).

Bombus occidentalis

western bumble bee

1) Originally advanced to candidacy by the Fish and Game Commission in June 2019. Trial court decision temporarily removed its candidacy in February 2021. State Supreme Court ruling reversed judgement and reinstated its candidacy in Sep 2022 (Supreme Court Case S275412).

Bombus suckleyi

Suckley's cuckoo bumble bee

1) Originally advanced to candidacy by the Fish and Game Commission in June 2019. Trial court decision temporarily removed its candidacy in February 2021. State Supreme Court ruling reversed judgement and reinstated its candidacy in Sep 2022 (Supreme Court Case S275412).

Fishes

SALMONIDAE (trout and salmon)

Oncorhynchus kisutch pop. 2

coho salmon - southern Oregon / northern California ESU

1) Federal listing refers to populations between Cape Blanco, Oregon and Punta Gorda, Humboldt County, California.
2) State listing refers to populations between the Oregon border and Punta Gorda, Humboldt County, California.

Oncorhynchus kisutch pop. 4

coho salmon - central California coast ESU

1) Federal listing is limited to naturally spawning populations in streams between Punta Gorda, Humboldt County and the San Lorenzo River, Santa Cruz County.
2) State listing is limited to populations south of Punta Gorda, Humboldt County.

Oncorhynchus mykiss irideus pop. 1

steelhead - Klamath Mountains Province DPS

1) This ESU includes all naturally spawned populations residing in streams between the Elk River in Oregon and the Klamath River in California, inclusive.
2) CDFW SSC designation refers only to the California portion of the ESU and refers only to the summer-run.

Oncorhynchus mykiss irideus pop. 10

steelhead - southern California DPS

1) The federal designation refers to fish in the coastal basins from the Santa Maria River (inclusive), south to the U.S. - Mexico Border.

Oncorhynchus mykiss irideus pop. 11

steelhead - Central Valley DPS

1) Federal listing includes all runs in the Sacramento and San Joaquin rivers and their tributaries.

Oncorhynchus mykiss irideus pop. 16

steelhead - northern California DPS

1) The federal designation refers to naturally spawned populations residing below impassable barriers in coastal basins from Redwood Creek in Humboldt County to, and including, the Gualala River in Mendocino County
2) CDFW SSC designation refers only to the summer-run.

Oncorhynchus mykiss irideus pop. 8

steelhead - central California coast DPS

1) Federal listing includes all runs in coastal basins from the Russian River in Sonoma County, south to Soquel Creek in Santa Cruz County, inclusive. It includes the San Francisco and San Pablo Bay basins, but excludes the Sacramento-San Joaquin River basins.

Oncorhynchus mykiss irideus pop. 9

steelhead - south-central California coast DPS

1) Federal listing includes all runs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River.
2) CDFW SSC designation refers to southern steelhead trout.

Oncorhynchus tshawytscha pop. 11

chinook salmon - Central Valley spring-run ESU

1) Federal listing refers to the Central Valley spring-run ESU. It includes populations spawning in the Sacramento River and its tributaries.

Oncorhynchus tshawytscha pop. 13

chinook salmon - Central Valley fall / late fall-run ESU

1) The Central Valley fall/late fall-run ESU refers to populations spawning in the Sacramento and San Joaquin rivers and their tributaries.
2) CDFW SSC designation refers only to the fall-run.

Oncorhynchus tshawytscha pop. 17

chinook salmon - California coastal ESU

1) Originally proposed as part of a larger Southern Oregon and California Coastal ESU. This new ESU was revised to include only naturally spawned coastal spring- and fall-run chinook salmon between Redwood Creek in Humboldt County and the Russian River in Sonoma County.

OSMERIDAE (smelt)

Spirinchus thaleichthys

longfin smelt

1) Federal proposed status (2022-10-07) is for the San Francisco Bay-Delta DPS of the longfin smelt.

Thaleichthys pacificus

eulachon

1) The Federal Threatened status pertains to the "southern DPS" of eulachon that range from central British Columbia, Washington, Oregon, and northern California.

CYPRINIDAE (minnows and carp)

Rhinichthys osculus ssp. 1

Amargosa Canyon speckled dace

1) Current taxonomy considers this taxon to be a distinct population of *Rhinichthys osculus nevadensis*.

Rhinichthys osculus ssp. 12

Long Valley speckled dace

1) Formerly *Rhinichthys osculus* ssp. 5, which did not account for other undescribed subspecies outside of CA.

Rhinichthys osculus ssp. 2

Owens speckled dace

1) Current taxonomy includes the Benton Valley speckled dace (formerly ssp. 4) with the Owens speckled dace.

Rhinichthys osculus ssp. 8

Santa Ana speckled dace

1) Formerly *Rhinichthys osculus* ssp. 3, which did not account for other undescribed subspecies outside of CA.

Siphateles bicolor ssp. 11

High Rock Springs tui chub

1) Formerly *Siphateles bicolor* ssp. 2, which did not account for other undescribed subspecies outside of CA.

Siphateles bicolor ssp. 12

Eagle Lake tui chub

1) Formerly *Siphateles bicolor* ssp. 1, which did not account for other undescribed subspecies outside of CA.

Siphateles bicolor ssp. 14

Pit River tui chub

1) Formerly *Siphateles bicolor* ssp. 3, which did not account for other undescribed subspecies outside of CA.

GASTEROSTEIDAE (sticklebacks)

Gasterosteus aculeatus microcephalus

resident threespine stickleback

1) USFS Sensitive designation refers to the full species.

Gasterosteus aculeatus williamsoni

unarmored threespine stickleback

1) USFS Sensitive designation refer to the full species.

Amphibians

PLETHODONTIDAE (lungless salamanders)

Aneides niger

Santa Cruz black salamander

1) CDFW SSC status uses former subspecies concept of *Aneides flavipunctatus niger*.

Batrachoseps relictus

relictual slender salamander

1) Taxonomy follows Jockusch et al. 2012. Morphological and molecular diversification of slender salamanders (Caudata: Plethodontidae: *Batrachoseps*) in the southern Sierra Nevada of California with descriptions of two new species. Zootaxa 3190:1-30, which synonymized *Batrachoseps* sp. 1, Breckenridge Mountain slender salamander, with *B. relictus*.

Hydromantes shastae

Shasta salamander

1) *Hydromantes shastae* has been proposed to consist of cryptic genetic structuring that may warrant recognition of additional species named as *Hydromantes samweli* and *Hydromantes wintu* (Bingham et al. 2018, Bull. Mus. Comp. Zool. 161(10):403-427). Until formally reviewed by the Fish and Game Commission, all populations in the Shasta salamander complex are legally state threatened.

Plethodon asupak

Scott Bar salamander

1) Since this newly described species was formerly considered to be a subpopulation of *Plethodon stormi* (Mead et al. 2005), and since *Plethodon stormi* is listed as threatened under CESA, *Plethodon asupak* retains the designation as a threatened species under CESA (Calif. Regulatory Notice Register, No. 21-Z, p.916, 25 May 2007).

BUFONIDAE (true toads)

Anaxyrus californicus

arroyo toad

1) At the time of listing, arroyo toad was known as *Bufo microscaphus californicus*, a subspecies of southwestern toad. In 2001, it was determined to be its own species, *Bufo californicus*. Since then, many species in the genus *Bufo* were changed to the genus *Anaxyrus*, and now arroyo toad is known as *Anaxyrus californicus* (Frost et al. 2006).

Anaxyrus canorus

Yosemite toad

1) Formerly *Bufo canorus*; Frost et al. (2006. The Amphibian Tree of Life. Bulletin of the American Museum of Natural History 297: 1-370) placed this species in the genus *Anaxyrus* (Tschudi 1845).

Anaxyrus exsul

black toad

1) Formerly *Bufo canorus*; Frost et al. (2006. The Amphibian Tree of Life. Bulletin of the American Museum of Natural History 297: 1-370) placed this species in the genus *Anaxyrus* (Tschudi 1845).

Incilius alvarius

Sonoran Desert toad

1) Formerly *Bufo alvarius*. Between 2006-2009, the scientific name has been changed to *Cranopsis alvaria*, *Ollotis alvaria*, *Incilius alvarius*, back to *Ollotis alvarius*, and then back to *Incilius alvarius*. The common name has changed from Colorado River toad to Sonoran Desert toad.

RANIDAE (true frogs)

Lithobates pipiens

northern leopard frog

1) Formerly *Rana pipiens*; Frost et al. (2006. The Amphibian Tree of Life. Bulletin of the American Museum of Natural History 297: 1-370) placed this species in the genus *Lithobates* (Fitzinger 1843).

Lithobates yavapaiensis

lowland leopard frog

1) Formerly *Rana yavapaiensis*; Frost et al. (2006. The Amphibian Tree of Life. Bulletin of the American Museum of Natural History 297: 1-370) placed this species in the genus Lithobates (Fitzinger 1843).

Rana aurora

northern red-legged frog

1) An mtDNA study (Shaffer et al. 2004) concluded that *Rana aurora aurora* and *Rana aurora draytonii* should be recognized as separate species with a narrow zone of overlap

Rana draytonii

California red-legged frog

1) An mtDNA study (Shaffer et al. 2004) concluded that *Rana aurora aurora* and *Rana aurora draytonii* should be recognized as separate species with a narrow zone of overlap, and that the range of draytonii extends about 100 km further north in coastal California than previously thought.

Rana muscosa

southern mountain yellow-legged frog

1) Both federally recognized Distinct Population Segments (DPS) of the mountain yellow-legged frog (*Rana muscosa*) are currently Endangered (2021). The mountain yellow-legged frog – northern DPS is known from the southern Sierra Nevada; the mountain yellow-legged frog – southern DPS is known from the Transverse Ranges.

Rana sierrae

Sierra Nevada yellow-legged frog

1) Formerly *Rana muscosa*. *Rana muscosa* was split into *Rana sierrae*, the Sierra Nevada yellow-legged frog, found in the northern and central Sierra Nevada, and *Rana muscosa*, the southern mountain yellow-legged frog, found in the southern Sierra Nevada and southern California.

Reptiles

EMYDIDAE (box and water turtles)

Emys marmorata

western pond turtle

1) CNDDB tracks western pond turtle at the full species level, based on the determination that the previous subspecies split was not warranted (Spinks, P.Q. and Shaffer, H.B. 2005. Range-wide molecular analysis of the western pond turtle (*Emys marmorata*): cryptic variation, isolation by distance, and their conservation implications. Molecular Ecology 14(7):2047-2064).
2) Genus was updated to *Emys* based on findings in: Spinks, P.Q. and Shaffer, H.B. 2009. Conflicting mitochondrial and nuclear phylogenies for the widely disjunct *Emys* (Testudines: Emydidae) species complex, and what they tell us about biogeography and hybridization. Systematic Biology. 58(1):1-20.

XANTUSIIDAE (night lizards)

Xantusia vigilis sierrae

Sierra night lizard

1) Formerly *Xantusia sierrae*; scientific name changed to reflect currently accepted subspecies concept.

ANNIELLIDAE (legless lizards)

Anniella alexanderae

Temblor legless lizard

1) Legless lizards (*Anniella* spp.) in California were traditionally considered one species, but are now considered five species (Pappenfuss and Parham, 2013). The prior (Jennings and Hayes, 1994) and current (Thompson et al. 2016) Species of Special Concern (SSC) projects evaluated the traditional single species taxon and determined all legless lizards in California to be an SSC. Therefore, the SSC status is carried over to the new taxon concepts until further SSC evaluation.

Anniella campi

Southern Sierra legless lizard

1) Legless lizards (*Anniella* spp.) in California were traditionally considered one species, but are now considered five species (Pappenfuss and Parham, 2013). The prior (Jennings and Hayes, 1994) and current (Thompson et al. 2016) Species of Special Concern (SSC) projects evaluated the traditional single species taxon and determined all legless lizards in California to be an SSC. Therefore, the SSC status is carried over to the new taxon concepts until further SSC evaluation.

Anniella grinnelli

Bakersfield legless lizard

1) Legless lizards (*Anniella* spp.) in California were traditionally considered one species, but are now considered five species (Pappenfuss and Parham, 2013). The prior (Jennings and Hayes, 1994) and current (Thompson et al. 2016) Species of Special Concern (SSC) projects evaluated the traditional single species taxon and determined all legless lizards in California to be an SSC. Therefore, the SSC status is carried over to the new taxon concepts until further SSC evaluation.

Anniella pulchra

Northern California legless lizard

1) Legless lizards (*Anniella* spp.) in California were traditionally considered one species, but are now considered five species (Pappenfuss and Parham, 2013). The prior (Jennings and Hayes, 1994) and current (Thompson et al. 2016) Species of Special Concern (SSC) projects evaluated the traditional single species taxon and determined all legless lizards in California to be an SSC. Therefore, the SSC status is carried over to the new taxon concepts until further SSC evaluation.

Anniella spp.

California legless lizard

1) This element represents California records of *Anniella* not yet assigned to new species within the *Anniella pulchra* complex. Legless lizards (*Anniella* spp.) in California were traditionally considered one species, but are now considered five species (Pappenfuss and Parham, 2013). CNDDB has assigned new species concepts to most, but not all, previously known and extant legless lizard occurrences. Where an occurrence of a legless lizard is not known to the species level, the general concept California legless lizard (*Anniella* spp.) will be applied until further evidence is available. All legless lizards in California are a Species of Special Concern (Thomson et al., 2016).

Anniella stebbinsi

Southern California legless lizard

1) Legless lizards (*Anniella* spp.) in California were traditionally considered one species, but are now considered five species (Pappenfuss and Parham, 2013). The prior (Jennings and Hayes, 1994) and current (Thompson et al. 2016) Species of Special Concern (SSC) projects evaluated the traditional single species taxon and determined all legless lizards in California to be an SSC. Therefore, the SSC status is carried over to the new taxon concepts until further SSC evaluation.

HELODERMATIDAE (venomous lizards)

Heloderma suspectum cinctum

banded Gila monster

1) BLM Sensitive designation refers to the full species.

NATRICIDAE (live-bearing snakes)

Thamnophis sirtalis pop. 1

south coast gartersnake

1) CDFW Species of Special Concern treats this population as a distinct taxon, though it is more commonly treated as a subpopulation of *Thamnophis sirtalis infernalis*, the California red-sided gartersnake.

Birds

PHASIANIDAE (grouse and ptarmigan)

Centrocercus urophasianus

greater sage-grouse

1) 20151002 finding was that federal listing of the full species was not warranted, Proposed rule to federally list the Bi-State DPS (Mono Basin of CA and NV; Mono, Alpine, and Inyo counties in California) as threatened was withdrawn 20200331.

Dendragapus fuliginosus howardi

Mount Pinos sooty grouse

1) Formerly merged with *D. obscurus* as blue grouse, but separated on the basis of genetic evidence and differences in voice, behavior, and plumage.
2) The North American Bird Conservation Initiative Watch List designation refers to the full species.

ACCIPITRIDAE (hawks, kites, harriers, and eagles)

Circus hudsonius

northern harrier

1) Formerly considered conspecific with *Circus cyaneus*, but treated as separate on the basis of differences in morphology, plumage, and breeding habitat.

RALLIDAE (rails, coots, and gallinules)

Laterallus jamaicensis coturniculus

California black rail

1) The North American Bird Conservation Initiative Watch List designation refers to the full species.
2) The IUCN designation of Near Threatened refers to the full species.

Rallus obsoletus levipes

light-footed Ridgway's rail

1) The North American Bird Conservation Initiative Watch List designation refers to the full species.

Rallus obsoletus obsoletus

California Ridgway's rail

1) The North American Bird Conservation Initiative Watch List designation refers to the full species.

Rallus obsoletus yumanensis

Yuma Ridgway's rail

1) The North American Bird Conservation Initiative Watch List designation refers to the full species.

CHARADRIIDAE (plovers and relatives)

Charadrius montanus

mountain plover

1) Proposed rule to federally list the mountain plover as threatened was withdrawn 20110512.

Charadrius nivosus nivosus

western snowy plover

1) Federal listing applies only to the Pacific coastal population.
2) CDFW SSC designation refers to both the coastal and interior populations.

LARIDAE (gulls and terns)

Gelochelidon nilotica

gull-billed tern

1) Taxonomy recently changed from *Sterna nilotica*.

Hydroprogne caspia

Caspian tern

1) Taxonomy recently changed from *Sterna caspia*.

Sternula antillarum browni

California least tern

1) Taxonomy recently changed from *Sterna antillarum browni*.
2) North American Bird Conservation Initiative Watch List designation refers to the full species.

Thalasseus elegans

elegant tern

1) Taxonomy recently changed from *Sterna elegans*.

ALCIDAE (auklets, puffins, and relatives)

Synthliboramphus scrippsi

Scripps's murrelet

1) Formerly included in Xantus's murrelet as *Synthliboramphus hypoleucus scrippsi*. Now considered a full species.

STRIGIDAE (owls)

Athene cunicularia

burrowing owl

1) A burrow site = an observation of one or more owls at a burrow or evidence of recent occupation such as whitewash and feathers. Winter observations at a burrow are mapped. Winter observations with or without a burrow in San Francisco, Ventura, Sonoma, Marin, Napa, and Santa Cruz Counties are mapped.

Strix occidentalis caurina

northern spotted owl

1) There are no spotted owl EOs in the CNDDB. All spotted owl location information is maintained in a separate database (https://wildlife.ca.gov/Data/CNDDB/Spotted-Owl-Info). CNDDB subscribers can access these datasets from the same bookmark as the CNDDB layer in BIOS (https://www.wildlife.ca.gov/Data/BIOS).
2) North American Bird Conservation Initiative Watch List designation refers to the full species.

Strix occidentalis occidentalis

California spotted owl

1) There are no spotted owl EOs in the CNDDB. All spotted owl location information is maintained in a separate database (https://wildlife.ca.gov/Data/CNDDB/Spotted-Owl-Info). CNDDB subscribers can access these datasets from the same bookmark as the CNDDB layer in BIOS (https://www.wildlife.ca.gov/Data/BIOS).
2) The North American Bird Conservation Initiative Watch List designation refers to the full species.

TYRANNIDAE (tyrant flycatchers)

Empidonax traillii

willow flycatcher

1) State listing of the full species includes all subspecies.

Empidonax traillii brewsteri

little willow flycatcher

1) State listing of the full species includes all subspecies.
2) North American Bird Conservation Initiative Watch List designation refers to the full species.

Empidonax traillii extimus

southwestern willow flycatcher

1) State listing of the full species includes all subspecies.
2) North American Bird Conservation Initiative Watch List designation refers to the full species.

LANIIDAE (shrikes)

Lanius ludovicianus mearnsi

San Clemente loggerhead shrike

1) Subspecific identity of shrikes currently on San Clemente is uncertain. Mundy et al. (1997a, b) provided evidence *L. l. mearnsi* is genetically distinct from *L. l. gambeli* and *L. l. anthonyi*, whereas Patten and Campbell (2000) concluded, based on morphology, that the birds now on San Clemente are intergrades between *L. l. mearnsi* and *L. l. anthonyi*.

VIREONIDAE (vireos)

Vireo bellii arizonae

Arizona Bell's vireo

1) North American Bird Conservation Initiative Watch List designation refers to the full species.
2) The IUCN designation of Near Threatened refers to the full species.

Vireo bellii pusillus

least Bell's vireo

1) North American Bird Conservation Initiative Watch List designation refers to the full species.
2) The IUCN designation of Near Threatened refers to the full species.

TROGLODYTIDAE (wrens)

Campylorhynchus brunneicapillus sandiegensis

coastal cactus wren

1) CDFW Bird Species of Special Concern report uses the common name San Diego cactus wren.

POLIOPTILIDAE (gnatcatchers)

Polioptila californica californica

coastal California gnatcatcher

1) CDFW Bird Species of Special Concern report uses the common name Alta California gnatcatcher.
2) North American Bird Conservation Initiative Watch List designation refers to the full species.

MIMIDAE (mockingbirds and thrashers)

Toxostoma lecontei

Le Conte's thrasher

1) CDFW SSC designation refers only to the San Joaquin population.
2) The BLM Sensitive designation refers to the San Joaquin Le Conte's thrasher, *Toxostoma lecontei macmillanorum*, although the subspecies concept is not universally recognized.

PASSERELLIDAE (sparrows)

Artemisiospiza belli belli

Bell's sage sparrow

1) North American Bird Conservation Initiative Watch List designation refers to the full species.

Artemisiospiza belli clementeae

San Clemente sage sparrow

1) Subspecific validity uncertain. Recognized by AOU (1957), but not by Patten and Unitt (2002).
2) North American Bird Conservation Initiative Watch List designation refers to the full species.

Melospiza melodia graminea

Channel Island song sparrow

1) Subspecific validity is uncertain. This subspecies when referred to as Santa Barbara song sparrow is extinct. However, the subspecies was merged by Patten (2001) with the San Miguel (*M. m. micronyx*), and San Clemente (*M. m. clementae*) song sparrows as the Channel Island song sparrow with the subspecific name *M. m. graminea*.

Melozone crissalis eremophilus

Inyo California towhee

1) Previously in the genus *Pipilo*.

PARULIDAE (wood-warblers)

Geothlypis trichas sinuosa

saltmarsh common yellowthroat

1) CDFW Bird Species of Special Concern report uses the common name San Francisco common yellowthroat

Setophaga petechia

yellow warbler

1) This element includes the subspecies *S. p. morcormi* and *S. p. brewsteri*, which are tracked under the full species, *S. petechia*, due to difficulty distinguishing them. *S. p. sonorana*, which nests in California only along the Colorado River, is tracked separately.

Setophaga petechia sonorana

Sonoran yellow warbler

1) Nests in California only along the Colorado River. Observations of yellow warblers from other regions are tracked as the full species, *S. petechia*.

Mammals

PHYLLOSTOMIDAE (leaf-nosed bats)

Leptonycteris yerbabuenae

lesser long-nosed bat

1) Federal listing uses the scientific name *Leptonycteris curasoae yerbabuenae*.

VESPERTILIONIDAE (evening bats)

Lasiurus frantzii

western red bat

1) Nomenclature changed from *Lasiurus blossevillii* to *Lasiurus frantzii* based on Baird et al. 2015, J. of Mammalogy 96(6):1255-1274.

APLODONTIIDAE (mountain beavers)

Aplodontia rufa californica

Sierra Nevada mountain beaver

1) The IUCN Least Concern designation refers to the full species.

Aplodontia rufa nigra

Point Arena mountain beaver

1) The IUCN Least Concern designation refers to the full species.

Aplodontia rufa phaea

Point Reyes mountain beaver

1) The IUCN Least Concern designation refers to the full species.

HETEROMYIDAE (kangaroo rats, pocket mice, and kangaroo mice)

Chaetodipus fallax fallax

northwestern San Diego pocket mouse

1) CDFW SSC designation refers to the full species.

Chaetodipus fallax pallidus

pallid San Diego pocket mouse

1) CDFW SSC designation refers to the full species.

Perognathus alticola alticola

white-eared pocket mouse

1) CDFW SSC, BLM Sensitive, and IUCN Endangered designations refer to the full species.

Perognathus alticola inexpectatus

Tehachapi pocket mouse

1) CDFW SSC and IUCN Endangered designations refer to the full species.

Perognathus inornatus

San Joaquin pocket mouse

1) This element includes the subspecies *P. i. inornatus* and *P. i. neglectus*, which are tracked under the full species, *P. inornatus*, due to difficulty distinguishing them. *P. i. inornatus* generally occurs on the eastern side of the San Joaquin Valley, while *P. i. neglectus* generally occurs on the western side. *P. i. psammophilus*, which occurs only in the Salinas Valley, is tracked separately.

CRICETIDAE (mice, rats, and voles)

Neotoma fuscipes riparia

riparian (=San Joaquin Valley) woodrat

1) This species is currently undergoing taxonomic revision

Reithrodontomys megalotis santacruzae

Santa Cruz harvest mouse

1) Synonymous with *Reithrodontomys megalotus longicaudus*, Santa Cruz Island population.

CANIDAE (foxes, wolves, and coyotes)

Urocyon littoralis catalinae

Santa Catalina Island fox

1) The IUCN Near Threatened status refers to the full species.

Urocyon littoralis clementae

San Clemente Island fox

1) The IUCN Near Threatened status refers to the full species.

Urocyon littoralis dickeyi

San Nicolas Island fox

1) The IUCN Near Threatened status refers to the full species.

Urocyon littoralis littoralis

San Miguel Island fox

1) The IUCN Near Threatened status refers to the full species.

Urocyon littoralis santacruzae

Santa Cruz Island fox

1) The IUCN Near Threatened status refers to the full species.

Urocyon littoralis santarosae

Santa Rosa Island fox

1) The IUCN Near Threatened status refers to the full species.

MUSTELIDAE (weasels and relatives)

Enhydra lutris nereis

southern sea otter

1) The IUCN Endangered designation refers to the full species.

Lontra canadensis sonora

southwestern river otter

1) CDFW SSC status refers only to the subspecies *L. canadensis sonora*, which is known in California only from the Colorado River.

Martes caurina humboldtensis

Humboldt marten

1) Federal status refers to the coastal DPS of Pacific marten (*Martes caurina*)

Pekania pennanti

Fisher

1) In 2004, the West Coast DPS of fisher became a candidate for federal listing, and underwent numerous evaluations, proposed rules, and revisions in subsequent years. In 2020, the West Coast DPS was further divided into the Southern Sierra Nevada DPS and the Northern California/Southern Oregon DPS (which also includes Northern Sierra Nevada and Southern Oregon Cascades subpopulations which arose from reintroductions). State threatened and federal endangered statuses apply only to the Southern Sierra Nevada ESU/DPS. State listing defines the northern limit of the SSN ESU as the Merced River, while federal listing uses the Tuolumne River.

BOVIDAE (sheep and relatives)

Ovis canadensis nelsoni

desert bighorn sheep

1) Desert bighorn sheep (*O. c. nelsoni*) in the Peninsular Ranges are tracked as a metapopulation of the subspecies, Peninsular bighorn sheep DPS (*O. c. nelsoni* pop. 2)
2) Fully Protected with the exception of legal hunting conducted in compliance with California Code of Regulations 14 CCR 362.

Ovis canadensis nelsoni pop. 2

Peninsular bighorn sheep DPS

1) The subspecies peninsular bighorn sheep (*O. c. cremnobates*) has been synonymized with *O. c. nelsoni* (Wehausen & Ramey 1993). Peninsular bighorn sheep are now considered to be a metapopulation and are recognized as a federal Distinct Population Segment (DPS).

Appendix I

Cultural Resources Technical Report

Due to the sensitive nature of the resources evaluated in the cultural resources technical analysis, this appendix has been redacted.

Appendix J
Noise Technical Report

Draft

RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Noise Technical Report

Prepared for
County of Inyo Department of Public Works

May 2023

Draft

RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Noise Technical Report

Prepared for
County of Inyo Department of Public Works

May 2023

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Los Angeles	San Diego	
Oakland	San Francisco	

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RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Noise Technical Report

1. Introduction

Inyo County (County) is proposing to improve the Runway Safety Area (RSA) for Runway 12/30 at Bishop Airport (BIH or the Airport) to meet design standards and safety requirements established by the Federal Aviation Administration (FAA). An RSA is a rectangular area surrounding a runway that is designed to enhance safety for aircraft that undershoot, overrun, or otherwise leave the paved runway surface. Currently, Runway 12/30 provides a non-standard RSA in areas beyond the runway ends. The proposed improvements would bring the RSA into compliance with current FAA standards by cutting, filling, grading, and compacting these areas within the RSA. In addition, an existing unpaved patrol road running through the RSA beyond the Runway 12 end would be relocated to outside the runway Object Free Area (OFA) and existing perimeter fencing would be removed from beyond both the Runway 12 and Runway 30 ends and new fencing would be installed beyond the OFA boundary.

The following sections discuss the methodology employed in the modeling process and the modeling results.

2. Methodology

2.1 Introduction

The information described in this section was compiled and incorporated into the FAA's Aviation Environmental Design Tool version 3e (AEDT). The AEDT was used to develop CNEL 65 dB, 70 dB, and 75 dB contours for this analysis. The contours and Community Noise Equivalent Level (CNEL) values were developed and disclosed in accordance with FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, and the 1050.1F Desk Reference.

Three modeling scenarios were evaluated:

- 2022 Existing Conditions
- 2024 No Action Alternative and Proposed Project (henceforth, Future Year 2024)

- 2029 No Action Alternative and Proposed Project (henceforth, Future Year 2029)

The CNEL contours were prepared using existing operational data as well as the FAA approved forecast for BIH. A detailed discussion of the model inputs used to develop these contours is included in the following sections.

2.2 Forecast

The aircraft operations for each scenario described in Section 2.1, were derived from an Aviation Activity Forecast prepared for the County of Inyo in March 2020 and updated in 2022. The FAA's Terminal Area Forecast (TAF) is an official forecast of aviation operations for airports included in the National Plan of Integrated Airport Systems (NPIAS). The number of annual operations in 2022, 2024, and 2029 would be 27,216, 27,450, and 27,948, respectively. The total operations for 2022, 2024, and 2029 used for the analysis were derived from a schedule of operations provided by the County of Inyo and scaled to the approved forecast. A summary of these operations is provided in **Table 1**.

TABLE 1
AIRCRAFT OPERATION SUMMARY

	2022		2024		2029	
Aircraft Category	Operations	Split	Operations	Split	Operations	Split
Single-Engine Piston	10,848	39.9%	10,848	39.5%	10,848	38.8%
Single-Engine Turboprop	7,666	28.2%	7,666	27.9%	7,666	27.4%
Multi-Engine Turboprop	3,762	13.8%	3,762	13.7%	3,762	13.5%
Jet	1,940	7.1%	2,174	7.9%	2,672	9.6%
Helicopter	3,000	11.0%	3,000	10.9%	3,000	10.7%
Total	27,216	100.0%	27,450	100.0%	27,948	100.0%

NOTES:
In November 2022, the County of Inyo provided the 2022, 2024, and 2028 proposed aircraft operations with aircraft types, schedule, and destination.

SOURCE: BIH Aviation Activity Forecast, 2022; FAA TAF, 2022; County of Inyo, 2022.

2.3 Aircraft Fleet Mix

Various aircraft have different noise characteristics dependent upon factors such as size, engine type, and airframe design. Therefore, it is necessary to account for the different aircraft types, or fleet mix, operating in the environment when modeling noise exposure. BIH management provided fleet mix and approximate frequency of civilian fixed-wing, helicopter operations, and military operations. BIH management identified Osprey (V-22) as an aircraft that operates at the airport. The V-22 is not included in the AEDT, and a substitution aircraft type must be approved by the FAA for use in the model. **Attachment J-1** includes the approval letter from the FAA for the substitution of the V-22 with the Sikorsky CH-53 Sea Stallion, as used in the 2021 Part 139 noise study at BIH. The AEDT fleet mix and other operational information used for this analysis is presented in **Attachment J-2**.

2.4 Stage Lengths

An aircraft's stage length (or trip length) refers to the distance an aircraft flies from its origin airport (BIH) to its intended destination. Stage length is important in noise modeling since the longer the distance an aircraft will fly to its destination, the greater the fuel load required and overall weight and, as a result, the lower its departure profile. Once the specific fleet mix was completed, departure destination information was analyzed to determine departure stage lengths. Stage lengths used in the AEDT include the following stages:

Stage Length 1:	0 to 500 miles
Stage Length 2:	500 to 1,000 miles
Stage Length 3:	1,001 to 1,500 miles
Stage Length 4:	1,501 to 2,500 miles
Stage Length 5:	2,501 to 3,500 miles
Stage Length 6:	3,501 to 4,500 miles
Stage Length 7:	4,501 to 5,500 miles
Stage Length 8:	5,501 to 6,500 miles
Stage Length 9:	6,500+ miles

For each modeling scenario, United aircraft operation to Denver were assigned to stage length 2. All other aircraft were assigned to stage length 1.

2.5 Time of Day

Another important component in developing the CNEL contours is determining the day-evening-night use percentages for each AEDT aircraft. This data is important because the CNEL metric is a 24-hour, time-weighted energy average. The time-weighting refers to the fact that noise events occurring during certain noise sensitive time periods receive an additional weighting. For the CNEL metric, noise events occurring between the hours of 7:00:00 p.m. and 9:59:59 p.m. receive a 4.77-dB weighting. Noise events occurring between the hours of 10:00:00 p.m. and 6:59:59 a.m. receive a 10-dB weighting. These weightings attempt to account for the higher sensitivity to noise in the evening and nighttime that would accompany the expected decrease in background noise levels compared with background noise levels during the day. Because noise is measured on a logarithmic scale, a 4.77-dB weighting means each evening event is weighted as equivalent to 3 daytime events and a 10-dB weighting means each nighttime noise event is weighted as equivalent to 10 daytime events.

The aircraft operation data provided for this analysis used day-evening-night percentages as presented in **Table 2**.

TABLE 2
TIME OF DAY PERCENTAGES

Scenario Year	Aircraft Categories	Day	Evening	Night
2022	Piston & Turboprop	99.2%	0.0%	0.8%

TABLE 2
TIME OF DAY PERCENTAGES

Scenario Year	Aircraft Categories	Day	Evening	Night
	Jet	99.4%	0.6%	0.0%
	Helicopters	100.0%	0.0%	0.0%
2024	Piston & Turboprop	99.2%	0.0%	0.8%
	Jet	100.0%	0.0%	0.0%
	Helicopters	100.0%	0.0%	0.0%
2029	Piston & Turboprop	99.2%	0.0%	0.8%
	Jet	90.9%	9.1%	0.0%
	Helicopters	100.0%	0.0%	0.0%

SOURCE: County of Inyo, 2022.

2.6 Runway Use

Runway use percentages are another important component in developing CNEL contours. Some airports have a preferential runway use system that balances noise concerns with the safest and most efficient use of the airport. If a certain runway is used predominantly for departures while another runway is used for arrivals, the noise contours will differ to reflect the type of activity. BIH management provided estimated runway use information. **Table 3** shows the runway use percentages, fixed-wing piston and turboprop aircraft operations, used for all three modeling scenarios.

TABLE 3
FIXED-WING PISTON AND TURBOPROP RUNWAY USE

	Runway						
	12	30	17	35	8	26	Total
Departure							
Day	18%	40%	10%	30%	1%	1%	100%
Evening	25%	55%	5%	15%	0%	0%	100%
Night	30%	70%	0%	0%	0%	0%	100%
Arrival							
Day	40%	18%	30%	10%	1%	1%	100%
Evening	55%	25%	15%	5%	0%	0%	100%
Night	70%	30%	0%	0%	0%	0%	100%

SOURCE: County of Inyo, 2022; Environmental Science Associates, 2023.

Table 4 shows the runway use percentages for jet aircraft operations that were applied in the Part 139 noise analysis. Jet runway use was applied for all three modeling scenarios. BIH management provided ESA with the locations of three helicopter landing pads at the airport, as indicated on the Airport Layout Plan. It is assumed that all three helicopter landing pads will be used equally, as shown in **Table 5**.

TABLE 4
JET RUNWAY USE

	Runway		
	12	**30**	**Total**
Departure			
Day	30%	70%	100%
Evening	30%	70%	100%
Night	0%	0%	0%
Arrival			
Day	70%	30%	100%
Evening	70%	30%	100%
Night	0%	0%	0%

NOTES:

Commercial operations by CRJ-700 and EMB-175 would only occur on Runway 12/30, based on assumptions approved in the Part 139 study.

SOURCE: County of Inyo, 2022; Environmental Science Associates, 2023.

TABLE 5
HELICOPTER RUNWAY USE

	Runway			
	H01	**H02**	**H03**	**Total**
Departure				
Day	33%	33%	33%	100%
Evening	0%	0%	0%	0%
Night	0%	0%	0%	0%
Arrival				
Day	33%	33%	33%	100%
Evening	0%	0%	0%	0%
Night	0%	0%	0%	0%

SOURCE: County of Inyo, 2022; Environmental Science Associates, 2023.

2.7 Flight Track and Flight Track Use Percentages

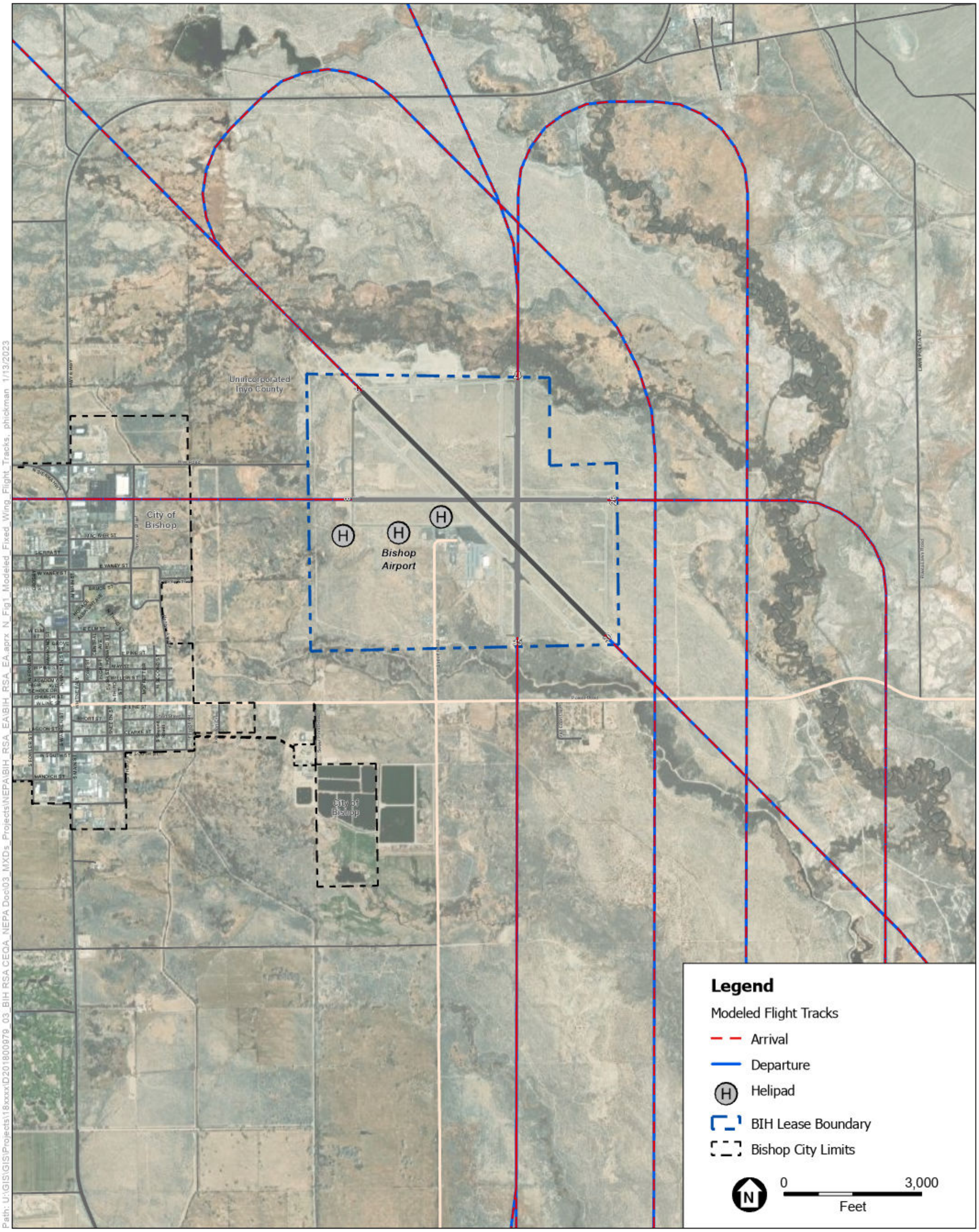
To determine noise levels on the ground, it is not only important to know how many operations are occurring and on what runways, but also to know where the aircraft are flying beyond the runways as they ingress and egress the airport. Flight track and flight track use percentages are a key element in the development of the CNEL contours. Flight tracks were developed based on a review of published flight procedures, as well as the consideration of terrain in the vicinity of BIH. BIH has four published instrument procedures; three are Area Navigation (RNAV) instrument approach procedures, and one is a Localizer-type Directional Aid (LDA) approach.[1] No changes in aircraft arrival or departure flight procedures in the terminal or enroute environments are expected for any Proposed Action Alternative; therefore, the same flight tracks were modeled for each scenario.

For fixed-wing aircraft operations, including Instrument Flight Rules and Visual Flight Rules operations, it was assumed that aircraft would arrive and depart BIH along U.S. Highway 395, one to the northwest and one to the south. Flight track use percentages were assumed at 50 percent to the northwest and 50 percent to the south.

For helicopters, it was assumed that helicopters would arrive and depart BIH along U.S. Highway 395 as well as U.S. Highway 6 to the north. All helicopters were assigned equally to three directions.

The flight track use percentages used in the modeling effort also remained unchanged throughout the proposed analysis years. **Attachment J-2** includes flight track use percentages used by BIH operations. The modeled flight tracks are depicted in **Figures 1** and **2**.

[1] A complete set of approach and departure procedure plates at BIH can be found at http://www.airnav.com/airport/KBIH

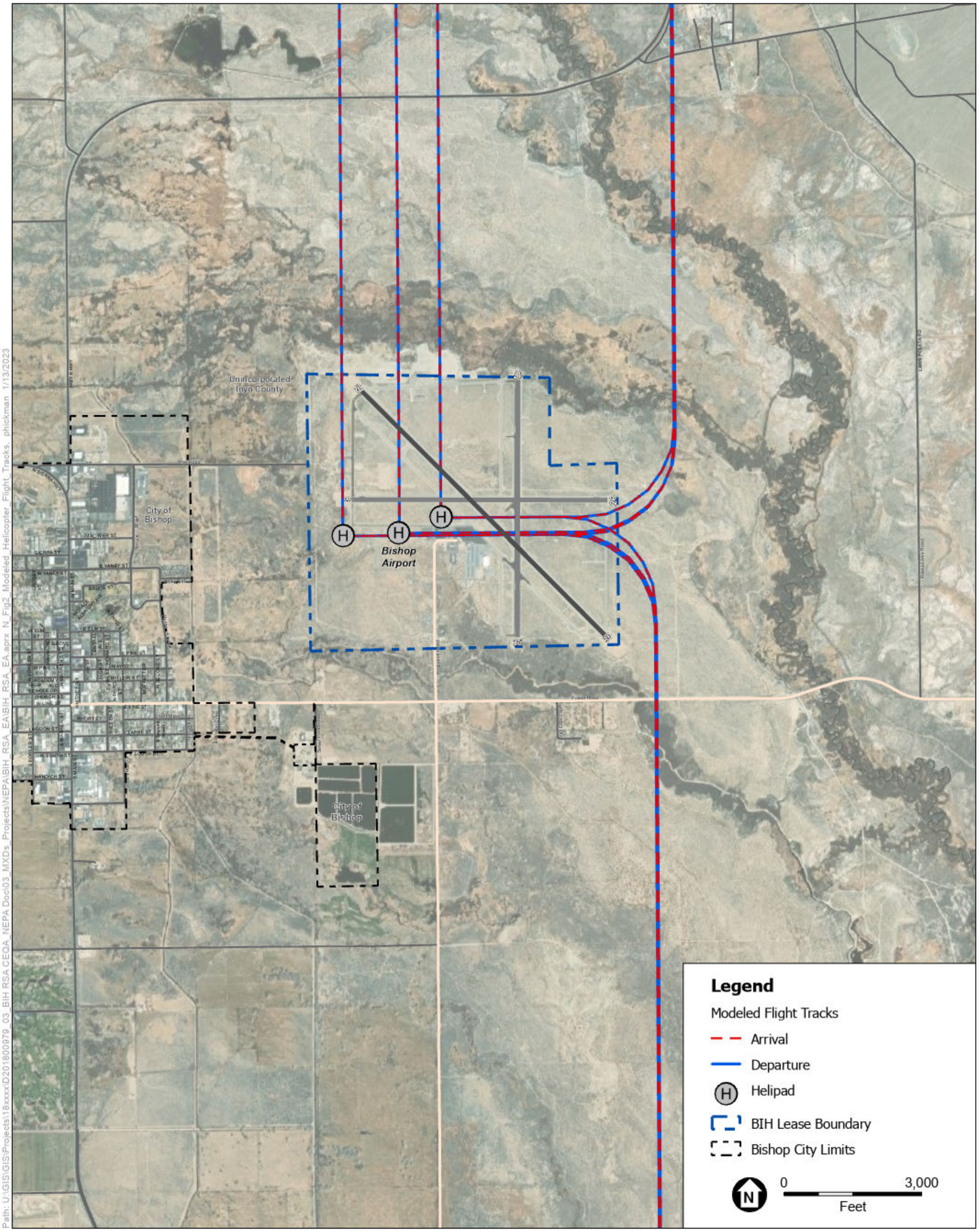


SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway Safety Area Improvement Project at Bishop Airport Draft EA

Figure 1
Modeled Fixed Wing Flight Tracks

ESA



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway Safety Area Improvement Project at Bishop Airport Draft EA

Figure 2
Modeled Helicopter Flight Tracks

ESA

3. Noise Modeling Results

3.1 CNEL Contours

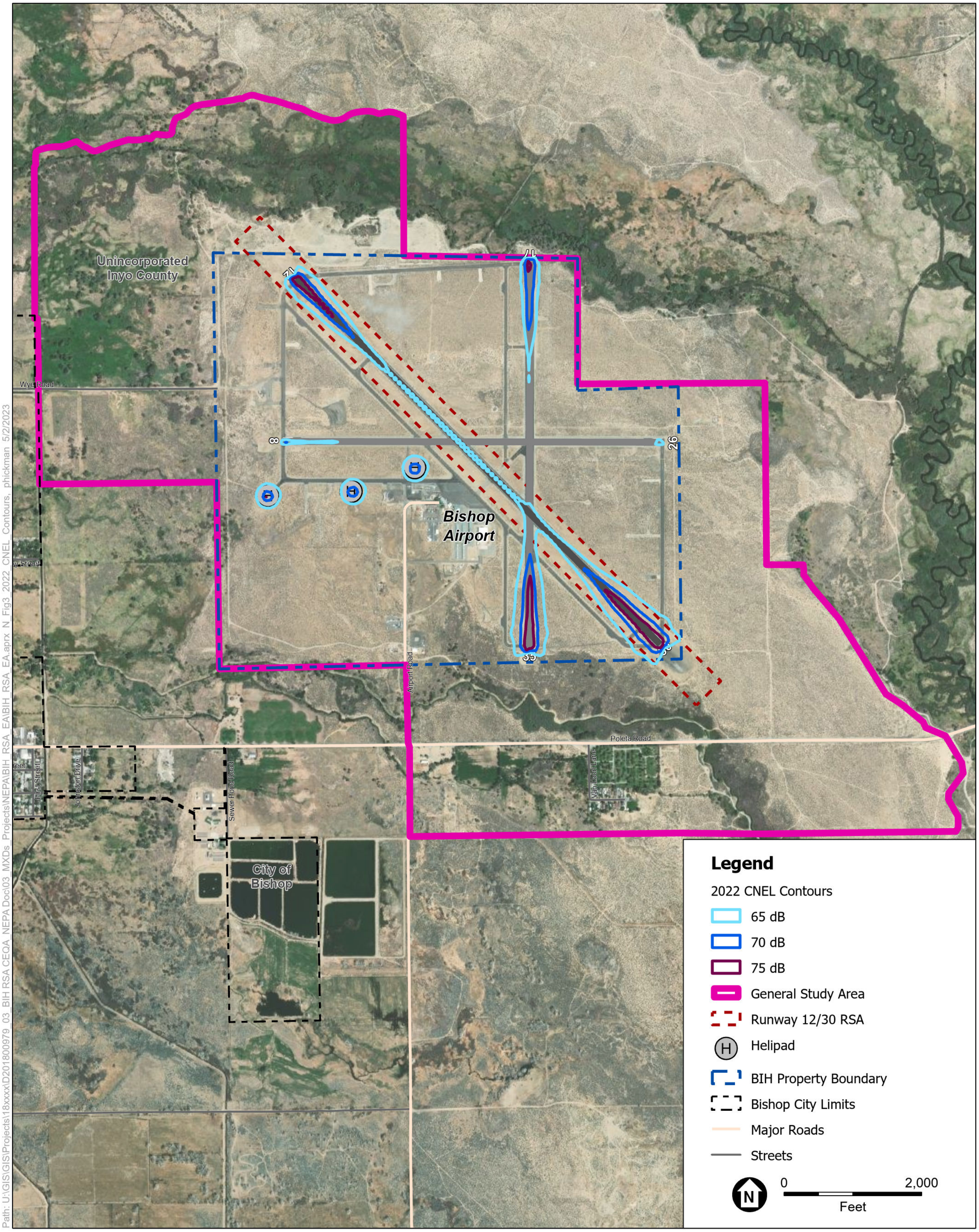
The information described above was compiled and incorporated into the AEDT. The AEDT calculates aircraft noise exposure using a defined network of grid points at ground level around an airport. It computes the noise generated by each aircraft operation, by aircraft type, and engine thrust level along each flight track. The noise exposure levels for each aircraft are then summed at each grid point. The cumulative noise exposure levels at all grid points are then used to develop noise exposure contours for selected values (e.g., CNEL 65, 70 and 75 dB). Using the results of the grid point analysis, noise contours of equal noise exposure can then be plotted.

The CNEL 65-, 70-, and 75-dB contours for 2022 Existing Conditions, 2024 No Action Alternative. And 2024 Proposed Project are shown in **Figures 3**, **4**, and **5**, respectively. The 2029 No Action Alternative and Proposed Project CNEL contours are shown in **Figures 6 and 7**, respectively. These contours represent the 24-hour aircraft noise exposure to areas surrounding BIH on an average annual day. Note that the CNEL 65 dB contour did not extend beyond the airport property line in any of the scenarios modeled. **Table 6** presents the acreages within the CNEL contours for each scenario. Because the CNEL 65 dB contour did not extend beyond the airport property in any modeled scenario, and there are no changes to existing flight procedures, it is expected that noise impacts to wildlife and wilderness areas would be negligible.

TABLE 6
CNEL NOISE CONTOUR AREAS (ACRES)

	Existing Conditions	Future Year No Action		Future Year Proposed Action	
Noise Contour	2022	2024	2029	2024	2029
CNEL 65 or greater	64.9	80.3	90.8	80.1	90.7
CNEL 70 or greater	20.2	23.7	29.1	23.8	28.9
CNEL 75 or greater	5.9	6.6	7.4	6.6	7.4

SOURCE: Environmental Science Associates, 2023.

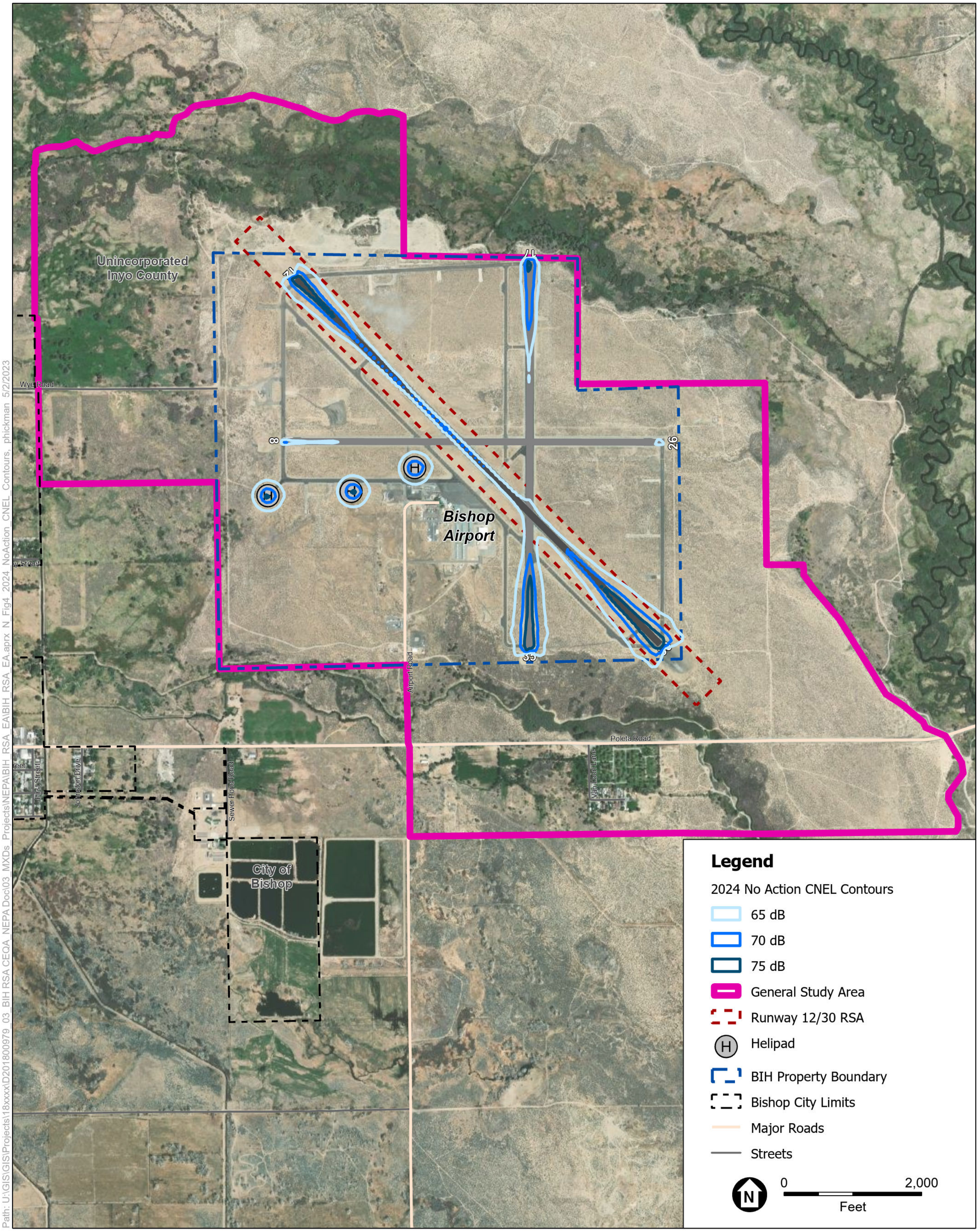


SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway 12/30 Safety Area Improvement Project at Bishop Airport

Figure 3
Existing Conditions (2022) CNEL Contours

ESA



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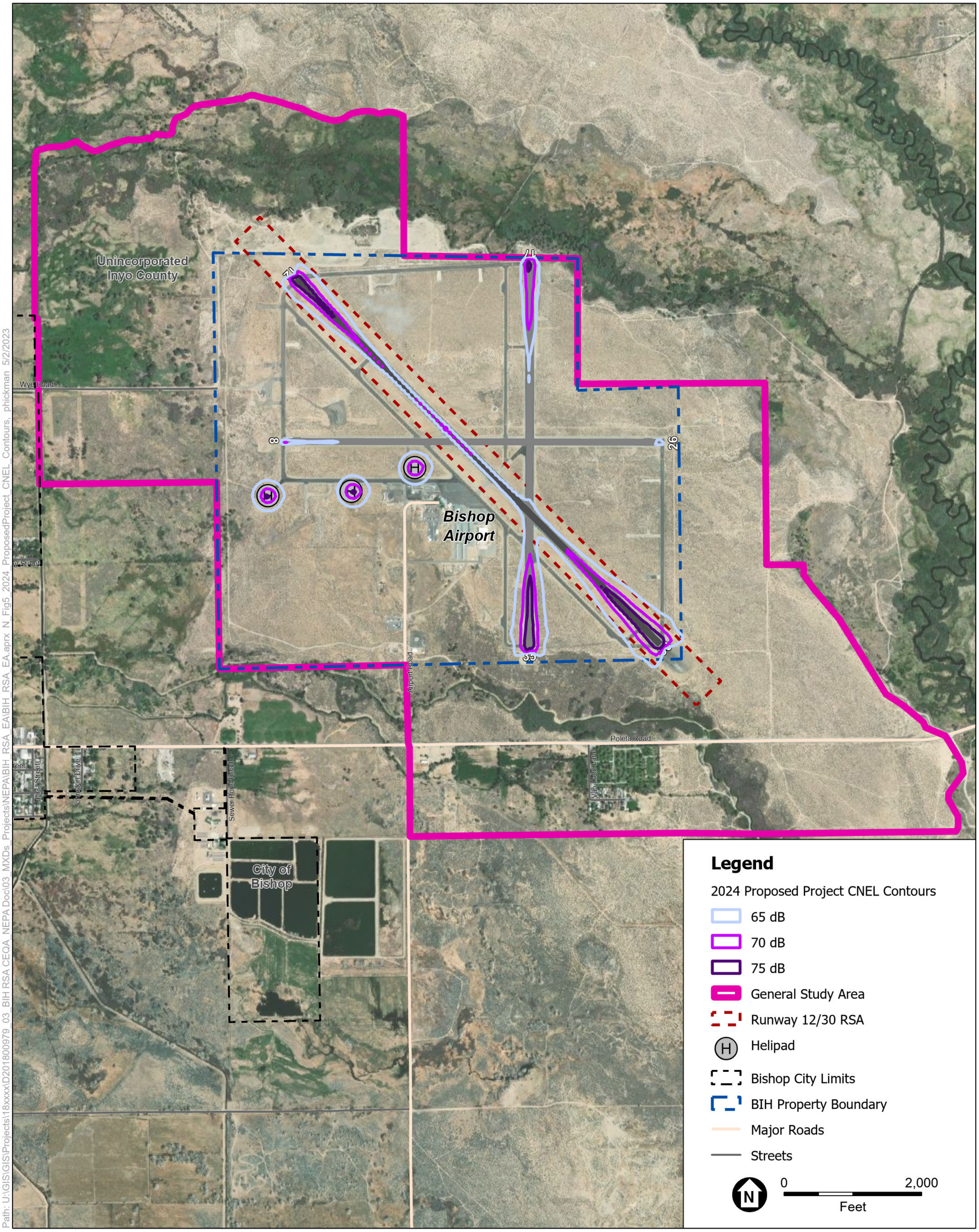
SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway 12/30 Safety Area Improvement Project at Bishop Airport

Figure 4
No Action Alternative
2024 CNEL Contours

ESA



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway 12/30 Safety Area Improvement Project at Bishop Airport

Figure 5
Proposed Project
2024 CNEL Contours

ESA

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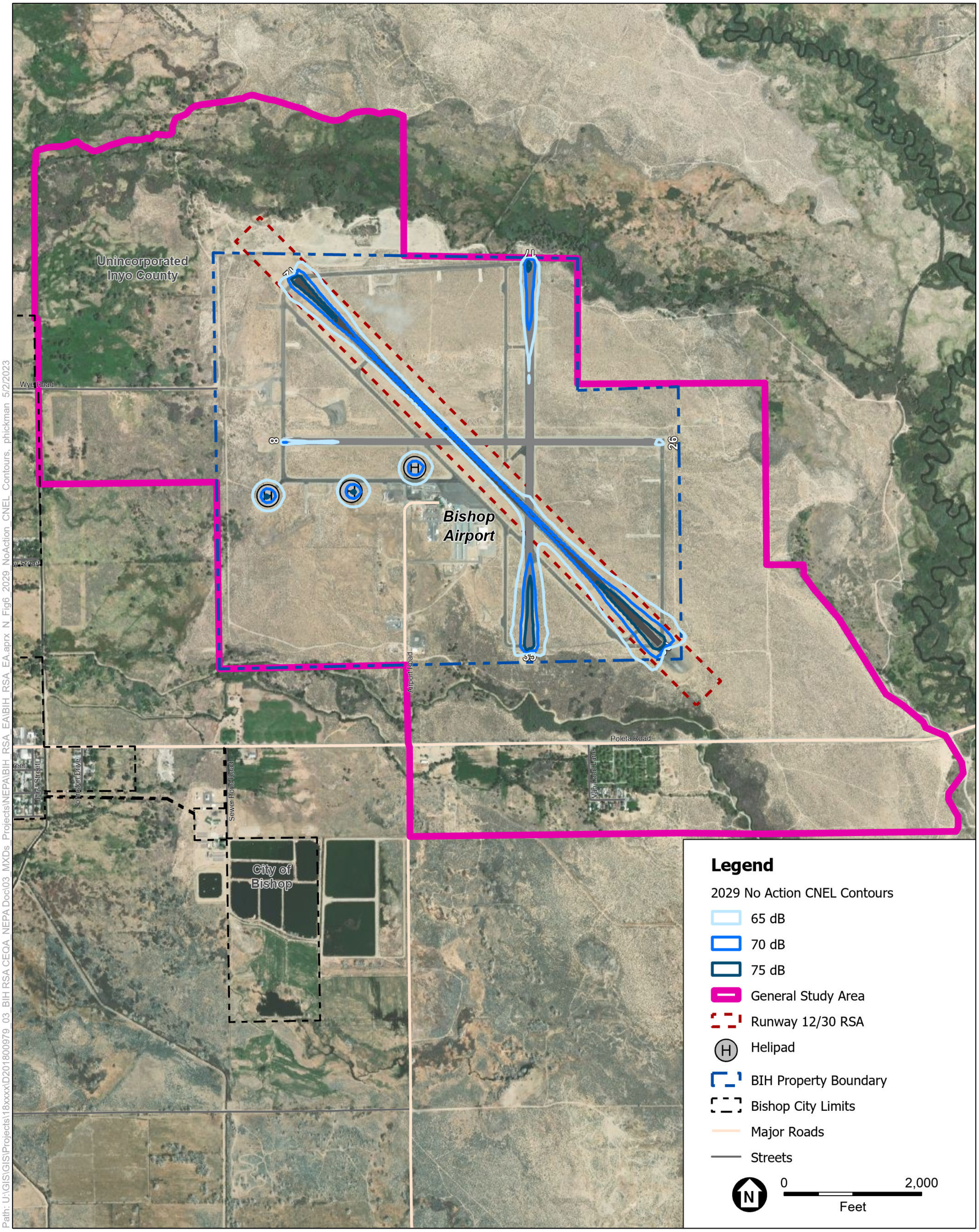
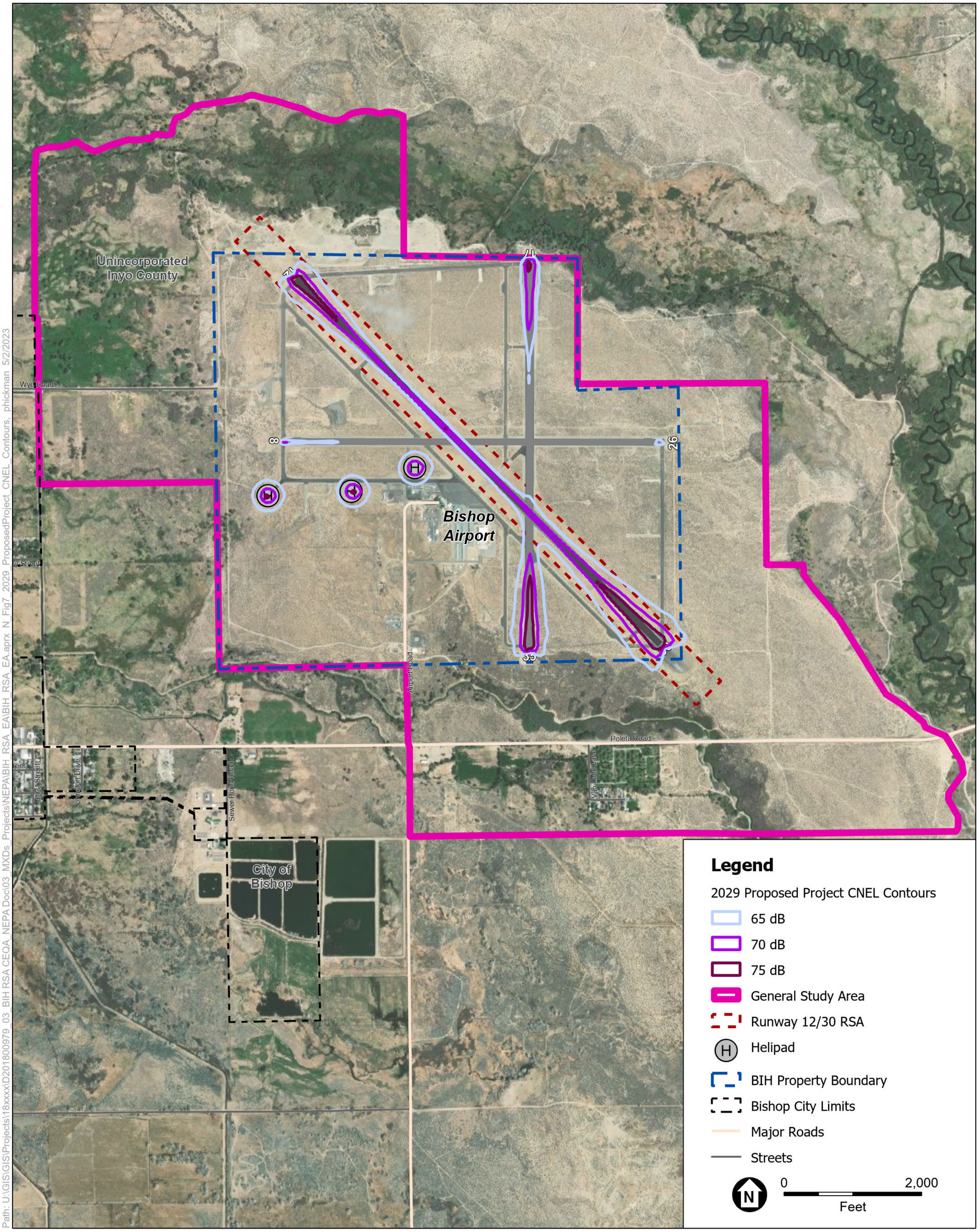


SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway 12/30 Safety Area Improvement Project at Bishop Airport

Figure 6
No Action Alternative
2029 CNEL Contours

ESA



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SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Runway 12/30 Safety Area Improvement Project at Bishop Airport

Figure 7
Proposed Project
2029 CNEL Contours

ESA

Attachment J-1

FAA Letter of Approval Regarding V-22 Osprey Substitution

U.S Department
of Transportation

**Federal Aviation
Administration**

Western-Pacific Region
Office of Airports
Los Angeles Airports District Office

777 S. Aviation Blvd., Suite 150
El Segundo, CA 90245

September 28, 2020

Ashley Helms
Associate Engineer
Inyo County Public Works
168 N. Edwards Street
PO Drawer Q
Independence, CA 93526-0121

Dear Ms. Helms

Bishop Airport
Proposed Part 139 Certification and Operations Specification Amendment
Environmental Assessment – Aircraft Substitution Request

The Federal Aviation Administration (FAA) evaluated the Aviation Environmental Design Tool (AEDT) 3c aircraft substitution request received on August 5, 2020 for the Bishop Airport (BIH) Proposed 139 Certification and Operations Specification Amendment Environmental Assessment. The request was submitted by ESA Airports on behalf of Inyo County (County). The request indicates that approximately 14 days per year the aviation activity at BIH includes use by Osprey (V-22) tiltrotor military aircraft. The V-22 is not an aircraft included within the AEDT 3c model, therefore, approval of a substitution aircraft is necessary for air quality and noise modeling purposes. The ESA Airports request recommended use of Boeing CH-47D Chinook (CH47D ANP type) to model the V-22. On September 9, 2020, the County estimated that the V-22 operates in helicopter mode 90 percent of the time and 10 percent of the time as a fixed wing aircraft at BIH.

The FAA completed its evaluation of this request and recommends that Equipment ID 15 (Sikorsky CH-53 Sea Stallion mapped to the S65 ANP aircraft type) [S65 ANP] be used rather than the CH47D ANP type. The S65 ANP type would generally produce a larger noise signature than the proposed CH47D ANP type and is therefore a more conservative selection given the unique characteristics of the V-22. This substitution is also approved with the understanding that the V-22 will be operating at BIH predominantly in a vertical lift mode. Accordingly, the FAA does not approve the use of CH47D ANP type to model the V-22 operations at BIH.

Please understand that the approval to use the S65 ANP for the V-22 operations is limited to this particular Environmental Assessment at BIH, and for use with AEDT 3c only. Further non-standard AEDT inputs for additional assessments or proposals require separate FAA evaluation and approval.

If you have any questions or concerns, I am available at (650) 827-7613 or by email at Camille.Garibaldi@faa.gov.

Sincerely,

Camille Garibaldi
Environmental Protection Specialist

Attachment J-2
Aircraft Operational Information

ATTACHMENT J-2
Aircraft Operational Information

The following tables present operational information relevant to the modeling of the CNEL contours for the Proposed Improvement of the Runway Safety Area at Bishop Airport Draft Environmental Assessment.

TABLE J1
EXISTING CONDITIONS (2022) ANNUAL AIRCRAFT OPERATIONS

			Arrival			Departure			
Airframe	**Engine**	**Engine Mod Code**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Total**
Cessna 150 Series	CF34-8C1	NONE	2,712	0	0	2,712	0	0	5,424
Cessna 208 Caravan	PT6A-135A	NONE	940	0	0	940	0	0	1,880
Pilatus PC-12	PT6A-21	NONE	2,806	0	87	2,806	0	87	5,786
Piper PA-24 Comanche	PT6A-67	NONE	2,712	0	0	2,712	0	0	5,424
Raytheon Beech 99	O-200	NONE	1,881	0	0	1,881	0	0	3,762
Bombardier CRJ-700	250B17B	NONE	608	0	0	596	12	0	1,216
Cessna 550 Citation Bravo	T700-GE-700	NONE	362	0	0	362	0	0	724
Hughes 500D	TIO-540-J2B2	NONE	709	0	0	709	0	0	1,418
Sikorsky CH-53 Sea Stallion	PW530	NONE	35	0	0	35	0	0	70
Sikorsky UH-60 Black Hawk	T64-GE-6B	NONE	756	0	0	756	0	0	1,512
Grand Total			**13,521**	**0**	**87**	**13,509**	**12**	**87**	**27,216**

SOURCE: BIH, 2022; Environmental Science Associates, 2023.

TABLE J2
2024 FUTURE YEAR ANNUAL AIRCRAFT OPERATIONS

			Arrival			Departure			
Airframe	**Engine**	**Engine Mod Code**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Total**
Cessna 150 Series	O-200	NONE	2,712	0	0	2,712	0	0	5,424
Cessna 208 Caravan	PT6A-135A	NONE	940	0	0	940	0	0	1,880
Pilatus PC-12	PT6A-67	NONE	2,806	0	87	2,806	0	87	5,786
Piper PA-24 Comanche	TIO-540-J2B2	NONE	2,712	0	0	2,712	0	0	5,424
Raytheon Beech 99	PT6A-21	NONE	1,881	0	0	1,881	0	0	3,762
Cessna 550 Citation Bravo	PW530	NONE	362	0	0	362	0	0	724
Embraer ERJ175-LR	CF34-8E5	NONE	725	0	0	725	0	0	1,450
Sikorsky CH-53 Sea Stallion	T64-GE-6B	NONE	643	0	0	643	0	0	1,286
Sikorsky UH-60 Black Hawk	T700-GE-700	NONE	857	0	0	857	0	0	1,714
Grand Total			**13,638**	**0**	**87**	**13,638**	**0**	**87**	**27,450**

NOTE:
Future Year 2024 falls on a leap year and consists of 366 days.

SOURCE: BIH, 2022; Environmental Science Associates, 2023.

TABLE J3
2029 FUTURE YEAR ANNUAL AIRCRAFT OPERATIONS

			Arrival			Departure			
Airframe	**Engine**	**Engine Mod Code**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Total**
Cessna 150 Series	O-200	NONE	2,712	0	0	2,712	0	0	5,424
Cessna 208 Caravan	PT6A-135A	NONE	940	0	0	940	0	0	1,880
Pilatus PC-12	PT6A-67	NONE	2,806	0	87	2,806	0	87	5,786
Piper PA-24 Comanche	TIO-540-J2B2	NONE	2,712	0	0	2,712	0	0	5,424
Raytheon Beech 99	PT6A-21	NONE	1,881	0	0	1,881	0	0	3,762
Cessna 550 Citation Bravo	PW530	NONE	362	0	0	362	0	0	724
Embraer ERJ175-LR	CF34-8E5	NONE	974	0	0	730	244	0	1,948
Sikorsky CH-53 Sea Stallion	T64-GE-6B	NONE	643	0	0	643	0	0	1,286
Sikorsky UH-60 Black Hawk	T700-GE-700	NONE	857	0	0	857	0	0	1,714
Grand Total			**13,887**	**0**	**87**	**13,643**	**244**	**87**	**27,948**

SOURCE: BIH, 2022; Environmental Science Associates, 2023.

TABLE J4
FIXED-WING PISTON AND TURBOPROP RUNWAY USE

Time of Day	Runway 12	30	17	35	8	26	Total
Arrival							
Day	40%	18%	30%	10%	1%	1%	100%
Evening	55%	25%	15%	5%	0%	0%	100%
Night	70%	30%	0%	0%	0%	0%	100%
Departure							
Day	18%	40%	10%	30%	1%	1%	100%
Evening	25%	55%	5%	15%	0%	0%	100%
Night	30%	70%	0%	0%	0%	0%	100%

SOURCE: BIH, 2022; Environmental Science Associates, 2023.

TABLE J5
JET RUNWAY USE

Time of Day	Runway 12	30	17	35	8	26	Total
Arrival							
Day	70%	30%	0%	0%	0%	0%	100%
Evening	70%	30%	0%	0%	0%	0%	100%
Night	0%	0%	0%	0%	0%	0%	0%
Departure							
Day	30%	70%	0%	0%	0%	0%	100%
Evening	30%	70%	0%	0%	0%	0%	100%
Night	0%	0%	0%	0%	0%	0%	0%

Notes:
Commercial operations by CRJ-700 and EMB-175 would only occur on Runway 12/30, based on assumptions approved in the Part 139 study.

SOURCE: BIH, 2022; Environmental Science Associates, 2023.

TABLE J6
HELICOPTER RUNWAY USE

Time of Day	Runway H01	Runway H02	Runway H03	Runway Total
Arrival				
Day	33%	33%	33%	100%
Evening	0%	0%	0%	0%
Night	0%	0%	0%	0%
Departure				
Day	33%	33%	33%	100%
Evening	0%	0%	0%	0%
Night	0%	0%	0%	0%

SOURCE: BIH, 2022; Environmental Science Associates, 2023.

TABLE J7
FLIGHT TRACK USE

Arrival			Departure		
Runway	**Track**	**Track Use %**	**Runway**	**Track**	**Track Use %**
12	12A01	50%	**12**	12D01	50%
	12A02	50%		12D02	50%
30	30A01	50%	**30**	30D01	50%
	30A02	50%		30D02	50%
17	17A01	50%	**17**	17D01	50%
	17A02	50%		17D02	50%
35	35A01	50%	**35**	35D01	50%
	35A02	50%		35D02	50%
08	08A01	50%	**08**	08D01	50%
	08A02	50%		08D02	50%
26	26A01	50%	**26**	26D01	50%
	26A02	50%		26D02	50%

Helipad	**Track**	**Track Use %**	**Helipad**	**Track**	**Track Use %**
H01	H01A01	33.34%	**H01**	H01D01	33.34%
	H01A02	33.33%		H01D02	33.33%
	H01A03	33.33%		H01D03	33.33%
H02	H02A01	33.34%	**H02**	H02D01	33.34%
	H02A02	33.33%		H02D02	33.33%
	H02A03	33.33%		H02D03	33.33%
H03	H03A01	33.34%	**H03**	H03D01	33.34%
	H03A02	33.33%		H03D02	33.33%
	H03A03	33.33%		H03D03	33.33%

NOTES:
Flight track utilization remain unchanged with or without the proposed project.

SOURCE: BIH, 2022; Environmental Science Associates, 2023

Appendix K

Wetlands Delineation Technical Report

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RUNWAY 12/30 SAFETY AREA IMPROVEMENT PROJECT AT BISHOP AIRPORT

Aquatic Resources Delineation Report

Prepared for
Inyo County Public Works

January 2023

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Aquatic Resources Delineation Report

Prepared for
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Atlanta	Orlando	San Diego
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Mobile	Portland	Tampa
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CHAPTER 1
Introduction

Environmental Science Associates (ESA) conducted an aquatic resources delineation for the Runway Safety Area Improvement Project at Bishop Airport (Project) in Inyo County, California (County). This report presents the regulatory framework, methods, and results of the delineation of aquatic resources within the Project area. The survey area for this delineation report includes approximately 403 acres in Inyo County and encompasses areas where Project activities are expected to occur (**Figures 1** and **2**).The purpose of the delineation was to determine the extent of state and federal jurisdiction within each survey area potentially subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA), Regional Water Quality Control Board (RWQCB) under Section 401 of the CWA, and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) and California Department of Fish and Wildlife (CDFW) under Section 1602 of the California Fish and Game Code.

The aquatic resources delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987)*,* A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008a), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008b), and State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2020), where applicable. ESA also reviewed the USACE Sacramento District Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (USACE 2017), Updated Map and Drawing Standards for the South Pacific Division Regulatory Program (USACE 2016), and Aquatic Resource Delineation Report Submittal Workshop (USACE 2019) for information to include in the report, figures, and supporting data.

1.1 Project Description

Runway 12/30 currently has a nonstandard RSA with portions featuring excessive slopes, noncompliant grading, and/or excessive vegetation. In addition, an LADWP service road currently runs through the RSA off the Runway 12 end and the airport security fence runs through the RSA off both the Runway 12 and Runway 30 ends. Inyo County seeks to correct the existing deficiencies in the RSA so it can meet FAA standards for a runway of its type (RSA Project). The RSA improvements require certain changes to the Airport Layout Plan (ALP) and would be funded, in part, by FAA conferred grants. Changes to an ALP and projects receiving funding from the FAA are considered federal actions subject to environmental review under the National Environmental Policy Act of 1969 (NEPA). The RSA Project is also subject to discretionary approval on the part of the County and is thus subject to the California Environmental Quality Act (CEQA).

1.2 Survey Location

The Project location is approximately 2 miles east of the town of Bishop, California in Inyo County (Figures 1 and 2) on the property of the Bishop Airport. The survey area is bordered by North Fork Bishop Creek to the north, Owens River to the east, Line Street to the south, and CA route 395 to the west. The survey location is on the Bishop, Poleta Canyon, Laws, and Fish Slough quadrangles 7.5-Minute series. The elevation of the survey location ranges from 4,080 feet to 4,130 feet above sea level.

1.2.1 Directions to the Survey Area

To navigate to the survey area (37.372987, -118.368002) from Bishop, CA:

- Drive east on East Line Street
- Turn left on Airport Road and continue north 0.7 miles

1.3 Contact Information

Applicant

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Deputy Director, Airports
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Delineator(s)

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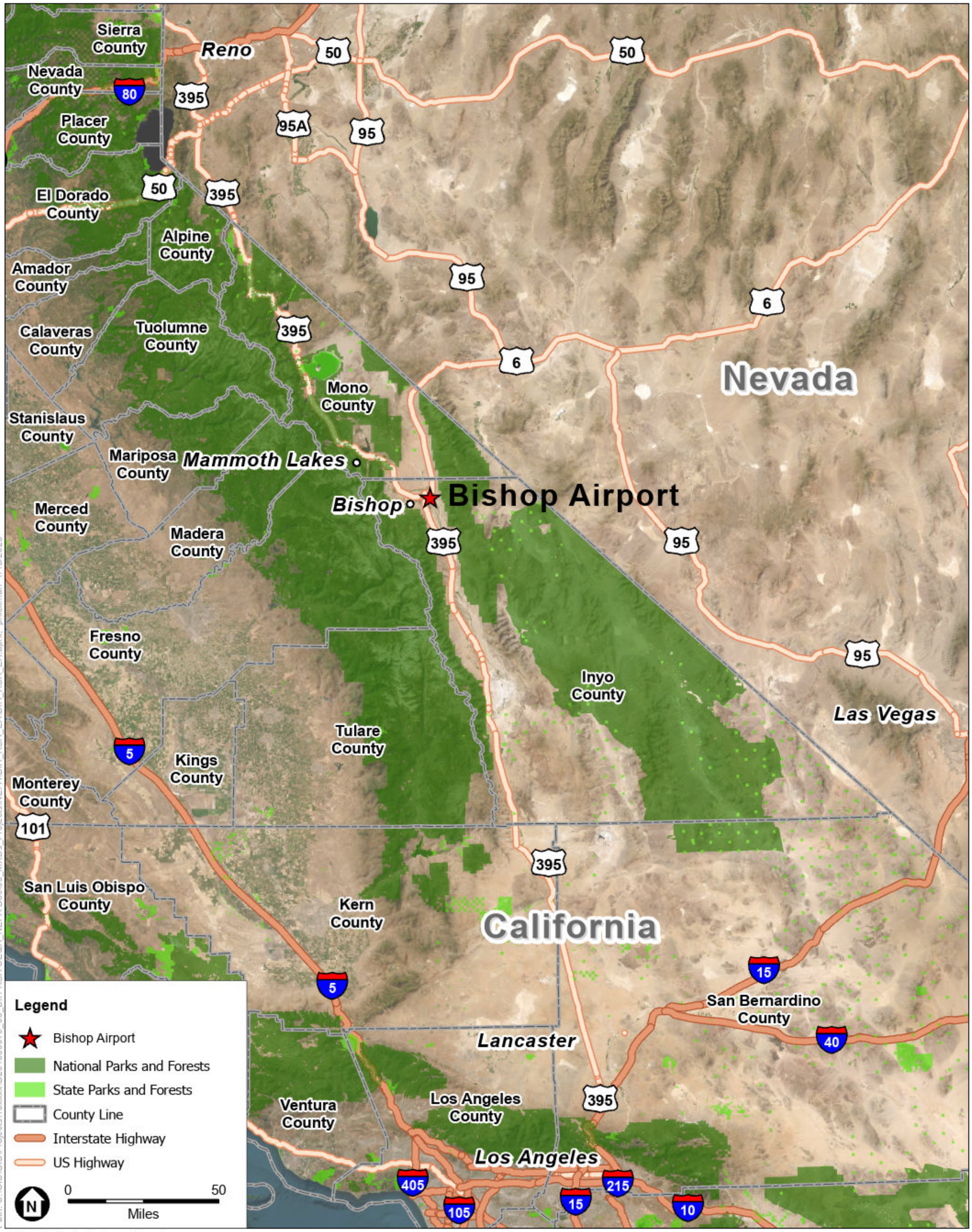
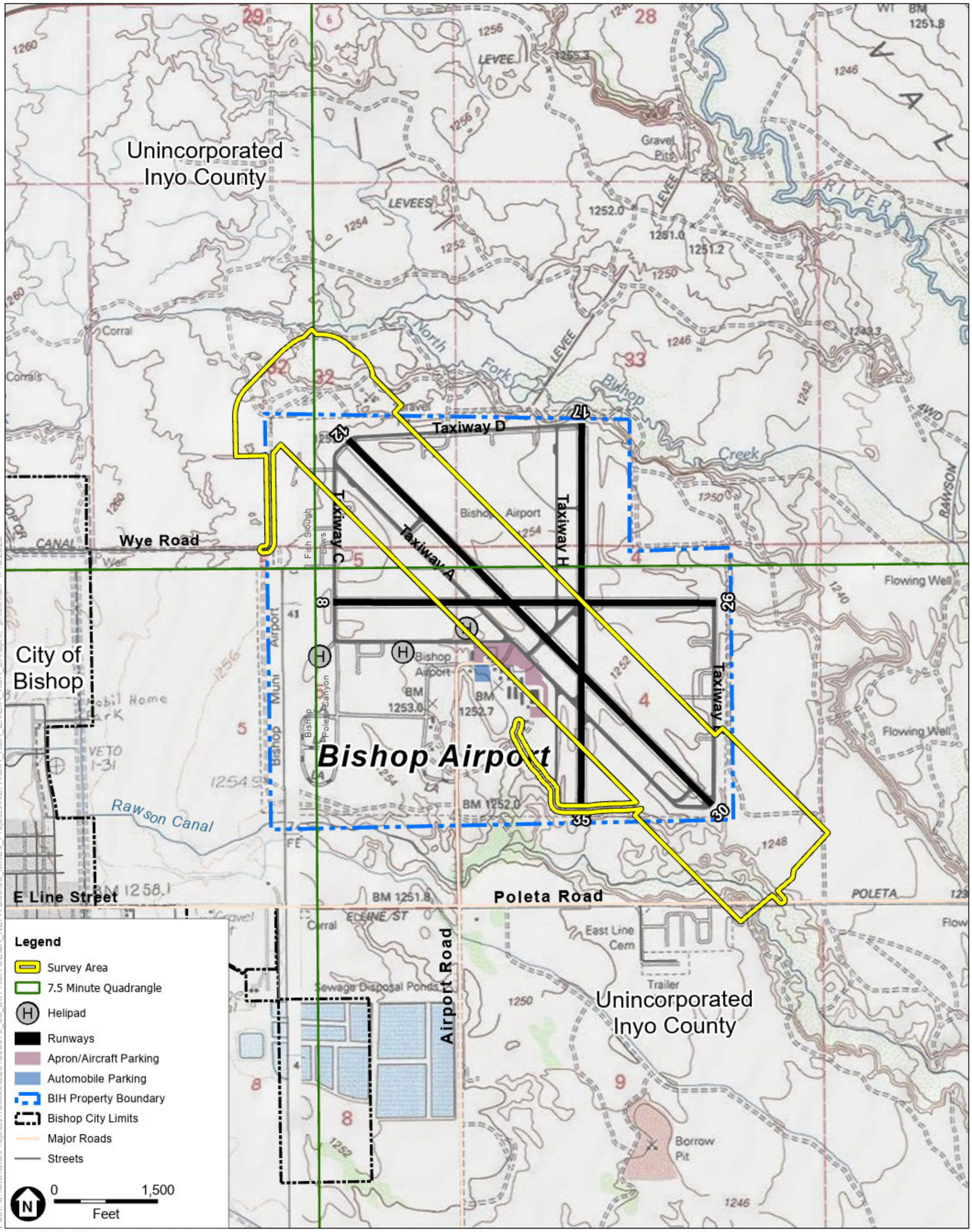


SOURCE: Esri; Inyo County Department of Public Works; ESA, 2020.

Aquatic Resources Delineation Report

Figure 1
Bishop Airport Location

ESA



SOURCE: ESRI; Inyo County Department of Public Works; ESA, 2020; USGSTopo, 2021.

Aquatic Resources Delineation Report

Figure 2
Bishop Airport Vicinity Map

ESA

CHAPTER 2
Existing Conditions

2.1 Aquatic Resources Delineation Survey Area

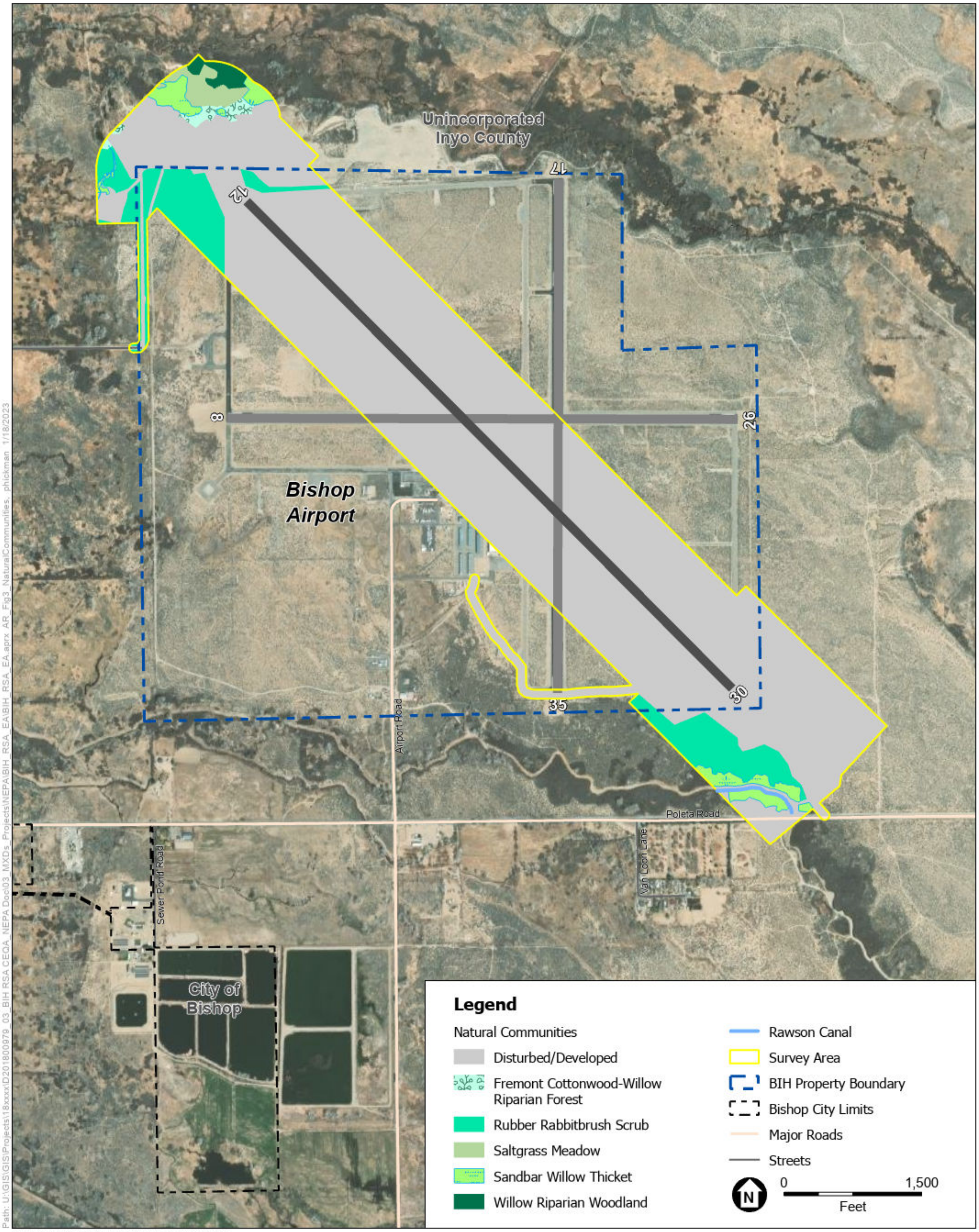
The Project survey area encompasses approximately 403 acres. The survey area includes the area of the proposed runway expansion along with a 100-foot buffer to account for moving wildlife and hydrological resources. The survey area has an average annual precipitation of 4.84 inches. Temperatures range from an average annual maximum temperature of 99.7°F to an average annual minimum temperature of 54.5°F.

The areas surrounding Bishop Airport are generally disturbed. Areas to the north of the Airport—beyond Runway 12—were once used as a gravel quarry and are now frequently used for recreation, including off highway vehicle (OHV) use. On the south end of the survey area—beyond Runway 30—there is riparian scrub on the north and south banks of Rawson Canal. This riparian scrub was too dense to survey on foot, and the southern portion was not accessible due to Rawson Canal and barbed wire fencing. The survey area is not irrigated and is graded including vegetation management to comply with airport regulations. This region has been affected by drought within the watershed in the past few decades.

The survey area was investigated for potential jurisdictional wetlands and non-wetland habitats. The survey area was accessible by foot or vehicle and was walked during surveys, with exception of the area of dense riparian scrub mentioned above, taking care to stay within the 100-foot buffer area and within approved lands.

2.2 Vegetation Communities and Land Cover Types

Vegetation communities and land cover types were mapped in the survey area (**Figure 3**). These include upland habitats (rubber rabbitbrush scrub and disturbed/developed), wetland/riparian habitats (Fremont cottonwood-willow riparian forest, sandbar willow thicket, willow riparian woodland, saltgrass meadow), and canals (Rawson Canal). The area of all vegetation communities and land cover types are included in **Table 2-1** and the vegetation communities found in the survey area are described below.



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022; California Department of Water Resources, 2022.

Aquatic Resources Delineation Report

Figure 3
Natural Communities and Land Cover Types

TABLE 2-1
VEGETATION COMMUNITIES AND LAND COVER TYPES WITHIN THE SURVEY AREA

Vegetation Community/Land Cover Type	Acreage
Open Water, Riparian, and Wetlands[a]	
Sandbar Willow Thicket	9.69
Fremont Cottonwood-Willow Riparian Forest	2.54
Willow Riparian Woodland	2.73
Saltgrass Meadow	4.60
Uplands	
Rubber rabbitbrush scrub	35.93
Developed/Disturbed Land Cover Types	
Disturbed/Developed	347.68

NOTE:
[a] U.S. Fish and Wildlife Service definition of wetland
SOURCE: ESA 2022, CNPS 2022

2.2.1 Wetland Vegetation Communities

Wetland communities at the far north and south ends of the survey area were identified through research using the USFWS National Wetlands Inventory (NWI) database and field surveys conducted on November 1, 2022. The USFWS NWI identifies the presence of freshwater forested/shrub riparian habitat slightly within and immediately surrounding the survey area. Field surveys confirm that these areas consist of perennial herbaceous vegetation, shrubby willow trees (*Salix* sp.), and rose (*Rosa woodsii*) bushes at the northern end—beyond Runway 12.

Rawson Canal is a perennial stream located on the southeastern end—beyond Runway 30—and is potential habitat for wetland and stream species. Rawson Canal is located within the Crowley Lake Watershed and empties into the Owen River. Small areas of willow shrubs and rose thicket are located to the south along Rawson Canal. The wetland vegetation communities within the survey area are described below.

Sandbar willow thicket (Salix exigua Alliance)

Dense thickets of sandbar willow (*Salix exigua*) are present within the northwestern end of the survey area—beyond Runway 12. Stands are almost uniformly comprised of sandbar willow, with interspersed Wood's rose (*Rose woodsii*). Due to high density of sandbar willow, very little herbaceous cover is present. Breaks in this community contain small patches of cattail (*Typha* sp.). Along Rawson Canal, beyond Runway 30, small clusters of common reeds (*Phragmites australis*) are also present within this community.

Fremont cottonwood-willow riparian forest (*Populus fremontii-Salix gooddingii-S. lasiolepis, S. laevigata* Alliance)

Patches of Fremont cottonwood (*Populus fremontii*) are scattered along the north edge of the survey area, beyond Runway 12, primarily near the transition from upland to riparian areas. Co-occurring species include black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), and red willow (*Salix laevigata*). Herbaceous cover associated with this community is variable and includes stands of perennial pepperweed (*Lepidium latifolium*), saltgrass (*Distichlis spicata*), and rushes (*Juncus* spp.).

Willow riparian woodland (*Salix gooddingii-S. lasiolepis Salix laevigata* Alliance)

Small areas of willow riparian woodland are present in the north portion of the survey area, at its closest proximity to North Fork Bishop Creek, beyond Runway 12. Black willow, red willow and arroyo willow are dominant or co-dominant in this vegetation alliance. Areas of sandbar willow and Wood's rose occur in the shrub layer, with an herbaceous layer including Indian hemp dogbane (*Apocynum cannabium*), saltgrass, and reeds.

Saltgrass meadow (*Distichlis spicata* Alliance)

An open saltgrass meadow is located in the survey area northwest of Runway 12. Additional component species of this community include common spike rush (*Eleocharis macrostachya*), scratchgrass (*Muhlenbergia asperifolia*), and rushes. The driest portion of this meadow include small areas of rabbitbrush, while the wettest include cattail and alkali bulrush (*Bolboschoenus maritimus*) (Sawyer et al. 2009).

2.2.2 Upland Habitat

The survey area primarily consists of upland habitat. This includes areas with a mixture of low-intensity development, open space, and shrub/scrub habitat. The open areas surrounding the runway are routinely graded and maintained by the Airport operations staff for general aviation usage, which requires low-growing vegetation. The area to the northwest of the survey area was previously used for gravel mining, and is largely abandoned, except for occasional OHV use. The Los Angeles Department of Water and Power (LADWP) regularly patrol this area to ensure that there are no illegal dumping activities that could compromise the integrity of local water resources. The shrub/scrub habitat consists of primarily low-growing ruderal grassland and common shrub species. The upland vegetation communities within the survey area are described below.

Rubber rabbitbrush scrub (*Ericameria nauseosa* Alliance)

Airport property and surrounding areas outside of the actively maintained runway and taxiway object free areas consist of rubber rabbitbrush (*Ericameria nauseosa*) as the primary shrub species, with interspersed greasewood (*Sarcobatus vermiculatus*), and saltbush (*Atriplex* spp.). herbaceous cover is general sparse, and includes buckwheat, cryptantha, and short-podded mustard.

Disturbed/Developed

Airport infrastructure (buildings, runways, taxiways, etc.), gravel and paved roads, and actively managed areas are bare or have sparse vegetation. Within the maintained object-free areas adjacent to the runways, low-growing angle-stemmed buckwheat (*Eriogonum maculatum*), cryptantha (*Cryptantha micrantha*), and short-podded mustard (*Hirschfeldia incana*) are present.

2.3 Soils

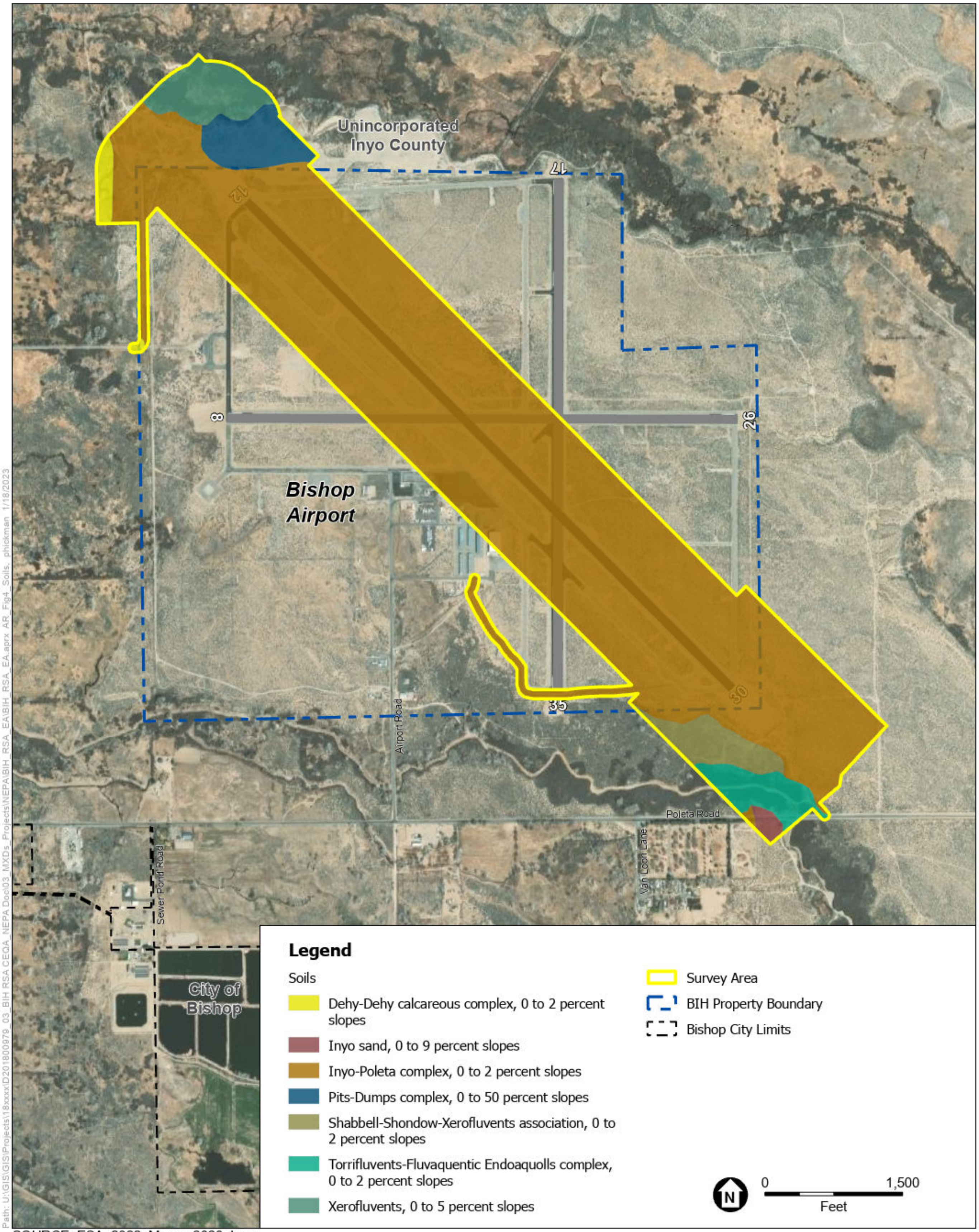
Soils within the survey area are shown in **Figure 4** (USDA 2020). The survey area contains seven soil types belonging to five soil series (Dehy, Inyo, Poleta, Shabbell, Shondow). Four of these soil types are considered hydric, according to the Natural Resources Conservation Service (NRCS). Additional details can be found in **Table 2-2** and in the NRCS soil report (**Appendix A**).

The following resources regarding soils were reviewed:

1. *Hydric Soils List of California*, 2022 (NRCS 2022a) https://www.nrcs.usda.gov/publications/query-by-state.html
2. Natural Resources Conservation Service's (NRCS) *Web Soil Survey*, queried to determine the soils that have been mapped within the survey area (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx; NRCS 2022b)

TABLE 2-2
SURVEY AREA SOILS

Soil Units	Description	Hydric Soil List Y/N
Dehy-Dehy calcareous complex, 0 to 2 percent slopes	Formed on alluvial fans and stream terraces, somewhat poorly drained	Y
Inyo sand, 0 to 9 percent slopes	Formed on dunes and stream terraces, excessively drained with low runoff	N
Inyo-Poleta complex, 0 to 2 percent slopes	Formed on stream terraces, excessively drained with low runnoff	N
Pits-Dumps complex, 0 to 50 percent slopes	Anthropogenic soil found on valley floors and alluvial fans	N
Shabbell-Shondow-Xerofluvents association, 0 to 2 percent slopes	Formed on stream terraces, well drained with very low runoff	Y
Torrifluvents-Fluvaquentic Endoaquolls complex, 0 to 2 percent slopes	Loamy soil formed on stream terraces and depressions, somewhat poorly drained	Y
Xerofluvents, 0 to 5 percent slopes	Gravelly sandy loam soils formed in drainageways, poorly drained	Y



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022; NRCS, 2022.

Aquatic Resources Delineation Report

Figure 4
Soil Map

ESA

2.4 Hydrology

The survey area lies within the Owens River watershed (USGS Hydrologic Unit Code 180901020705) with a drainage area of 2,604 mi^2, which drains into and through the Owens Valley, an arid basin between the eastern slope of the Sierra Nevada Mountains and the western faces of the Inyo and White Mountains. The river terminates at the endorheic Owens Lake south of Lone Pine, CA. The Owens River hydrologic cycle is driven by snowmelt from the Sierra Nevada, Inyo, and White Mountains. The surface hydrology in the survey area has been altered by urban development to include agricultural irrigation ditches and the Los Angeles Aqueduct system.

North Fork Bishop Creek, a tributary to the Owens River, runs northeast and is located beyond the northern boundary of the survey area. Bishop Creek is the largest tributary to the Owens River with three forks, the North, Middle, and South, which converge below the Intake Two reservoir. Bishop Creek converges with the Owens River 2.2 miles southeast of the survey area. At the south end of the survey area Rawson Canal runs southeast and drains to Rawson Ponds, and further downstream is connected to the Owens River via a manmade drainage canal.

ESA reviewed the stream gage information available for the region and there are no stream gages local enough to provide relevant information for survey area conditions.

2.5 Climate

The USACE Antecedent Precipitation Tool was used to query the field survey date and HUC12 Watershed (180901020705). The results are included in **Table 2-3** and as **Appendix B**. The tool indicated that field surveys were conducted during the dry season with an average score of 15.0 (wetter than normal). During delineations in November the field site had normal late dry season conditions for California. In addition, the Agricultural Applied Climate Information System Wetlands (WETS) climate table for the Bishop Airport is included below (**Table 2-4**; NOAA 2022).

TABLE 2-3
ANTECEDENT PRECIPITATION TOOL RESULTS FOR PROJECT SITE ON NOVEMBER 1, 2022

No. of Sampling Points	PDSI Class	Season	Antecedent Precipitation Score	Antecedent Precipitation Condition
8	Severe Drought	Dry Season	15.0	Wetter than Normal

SOURCE: Antecedent Precipitation Tool (v.1.0.19), generated on 11/14/2022

TABLE 2-4
WETS TABLE: MONTHLY TOTAL PRECIPITATION FOR BISHOP AIRPORT, CA

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2017	5.23	2.21	0.09	0.92	0.35	T	T	0.02	T	0	0.16	T	8.98
2018	0.04	T	M	0.4	0.27	0	1.52	0.01	0.06	0.4	0.91	0.26	M
2019	1.89	2.42	1.92	T	0.89	0.03	T	T	0.01	0	0.91	0.19	8.26
2020	0.06	0.16	0.45	0.48	T	T	T	T	T	0	T	0.21	1.36
2021	1.09	0.31	0.01	T	T	T	0.06	0.01	T	0.65	0.13	3.72	5.98
2022 (*current year)*	0	T	0.25	T	0	T	0.17	0.72	1.09	T	M	M	M
Mean (2017-2022)	1.39	0.85	0.54	0.3	0.25	0.01	0.29	0.13	0.19	0.18	0.42	0.88	6.15

NOTE:

1 M = missing and is used when more than one day of data is missing for a month.
2 T = trace and is used when a precipitation is <0.01 inch.

SOURCE: USDA 2022.

CHAPTER 3
Regulatory Framework

3.1 Waters of the U.S.

3.1.1 Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.

In 1986, the term "waters of the United States" was defined as follows (33 CFR 328.3[a]):

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

   (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

   (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

   (iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a)(1) through (4) of this section;

(6) The territorial seas; and

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1) through (6) of this section.

(8) Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for

> the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States

Wetlands (including swamps, bogs, seasonal wetlands, seeps, marshes, and similar areas) are also considered waters of the U.S. (subject to the significant nexus test, described below), and are defined by USACE as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3[b]; 40 CFR 230.3[t]). Indicators of three wetland parameters (i.e., hydric soils, hydrophytic vegetation, and wetlands hydrology), as determined by field investigation, must be present for a site to be classified as a wetland by USACE (Environmental Laboratory 1987).

Section 401 of the CWA gives the state authority to grant, deny, or waive certification of proposed federally licensed or permitted activities resulting in discharge to waters of the U.S. The State Water Resources Control Board (State Water Board) directly regulates multi-regional projects and supports the Section 401 certification and wetlands program statewide. The Regional Water Quality Control Board (RWQCB) regulates activities pursuant to Section 401(a)(1) of the federal CWA, which specifies that certification from the State is required for any applicant requesting a federal license or permit to conduct any activity including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters. The certification shall originate from the State or appropriate interstate water pollution control agency in/where the discharge originates or will originate. Any such discharge will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA.

Solid Waste Agency of Northern Cook County (SWANCC) v. United States

Solid Waste Agency of Northern Cook County (SWANCC) v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001), was a United States Supreme Court decision that determined that the USACE’s use of the "migratory bird rule" to decide the extent of its authority over discharges into "isolated waters" (including isolated wetlands), exceeded the authority that was granted by Section 404 of the Clean Water Act. In 2001 and again in 2003, the agencies developed guidance to address the definition of "waters of the United States" under the Clean Water Act following the SWANCC Supreme Court decision. Isolated, intrastate waters that are capable of supporting navigation by watercraft remain subject to CWA jurisdiction after SWANCC if they are traditional navigable waters. However, SWANCC eliminates CWA jurisdiction over isolated waters that are intrastate and non-navigable.

Rapanos v. United States & Carabell v. United States

The U.S. Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA) have issued a set of guidance documents detailing the process for determining CWA jurisdiction over waters of the U.S. following the 2008 Rapanos decision. The EPA and USACE issued a summary memorandum of the guidance for implementing the Supreme Court's decision in Rapanos that addresses the jurisdiction over waters of the U.S. under the CWA. The complete set of guidance documents, summarized as key points below, were used to collect relevant data for evaluation by the EPA and the USACE to determine CWA jurisdiction over the project and to complete the "significant nexus test" as detailed in the guidelines.

Summary of Key Points

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries;

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable Tributary;

The agencies generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water;

The agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters
- Significant nexus includes consideration of hydrologic and ecologic factors

The significant nexus test includes consideration of hydrologic and ecologic factors. For certain circumstances, the significant nexus test would take into account physical indicators of flow (evidence of an ordinary high water mark [OHWM]), if a hydrologic connection to a Traditionally Navigable Water (TNW) exists, and if the aquatic functions of the water body have a significant effect (more than speculative or insubstantial) on the chemical, physical, and biological integrity of a TNW. The USACE and EPA will apply the significant nexus standard to assess the flow characteristics and functions of a potential water of the U.S. to determine if it significantly affects the chemical, physical, and biological integrity of the downstream TNW.

3.2 Waters of the State

Most projects involving water bodies or drainages are regulated by the RWQCB, the principal State agency overseeing water quality of the State at the local/regional level. The survey area is located within the jurisdiction of the Lahontan RWQCB 6v. Where waters of the State overlap with waters of the U.S., pending verification from the USACE, those waters would be regulated under Section 401 of the CWA which is described in the Regulatory Framework in Section 3.1.

In the absence of waters of the U.S., waters may be regulated under the Porter-Cologne Water Quality Control Act if project activities, discharges, or proposed activities or discharges could affect California's surface, coastal, or ground waters. The permit submitted by the applicant and issued by RWQCB is either a Water Quality Certification in the presence of waters of the U.S. or a Waste Discharge Requirement (WDR) in the absence of waters of the U.S.

The State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (procedures), as prepared by the State Water Resources Control Board, was implemented on May 28, 2020. The procedures include a definition for wetland waters of the state that include 1) all wetland waters of the U.S.; and 2) aquatic resources that meet both the soils and hydrology criteria for wetland waters of the U.S. but lack vegetation.[1]

3.3 Rivers, Streams, and Lakes

Pursuant to Division 2, Chapter 6, Section 1600 et seq. of the FGC, California Department of Fish and Wildlife (CDFW) regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream, or lake which supports fish or wildlife. A notification of a Lake or Streambed Alteration Agreement must be submitted to CDFW for "any activity that may substantially change the bed, channel, or bank of any river, stream, or lake." In addition, CDFW has authority under FGC over wetland and riparian habitats associated with lakes and streams. The CDFW reviews proposed actions, and if necessary, submits to the applicant a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the applicant is the Lake or Streambed Alteration Agreement (LSAA).

1 Less than 5 percent areal coverage at the peak of the growing season.

CHAPTER 4
Methodology

4.1 Pre-Field Review

Prior to completing the aquatic resources delineation, ESA conducted a review of available background information pertaining to the survey area. The following resources were reviewed to obtain information on the hydrology, including information on the local geography and topography:

- United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2022b);
- USGS 7.5' topographic quadrangle maps: Bishop, Poleta Canyon, Laws, and Fish Slough (USGS 2022a);
- Current aerial imagery (Google, Inc.2022);
- Precipitation data from the Applied Climate Information System (NOAA 2022);
- The National Wetlands Inventory (NWI) (USFWS 2022); and
- National Hydrography Dataset (NHD), (USGS 2022b).

4.1.1 National Wetlands Inventory

Aerial maps (Google, Inc. 2022) and the NWI were used to conduct a preliminary assessment of the limits of aquatic features in the survey area. NWI mapped freshwater emergent wetlands, freshwater forested/shrub wetlands, freshwater pond and riverine within the survey area (**Figures 5** and **6**). Field surveys verified the extent of aquatic features.

4.2 Field Survey Methods

A delineation of aquatic resources within the survey area was conducted on November 1, 2022, by ESA Biologists Anna Schwyter and Natalie Lamas. Weather conditions during the delineation were conducive to conducting field surveys and were sunny and clear. Temperatures ranged from 38 degrees to 52 degrees Fahrenheit and winds ranged from 0-32 mph. Field data were collected using an EOS Arrow 100 Global Navigation Satellite System receiver, which provides Satellite-based Augmentation System corrections processing in the field and can provide submeter real-time horizontal accuracy.

The delineation was conducted by walking throughout the survey area to selected areas where aquatic resources were identified during the literature review. Features that were identified as aquatic resources included, but were not limited to, drainages that had an OHWM and defined channels with bed and bank, as well as potential wetlands evidenced by visible hydrologic indicators and/or hydrophytic vegetation. Additional data, such as landforms, vegetation, hydrology, and soils (USACE 2008b) were noted where these characteristics were pertinent to identification of features.

Aquatic resources were identified and delineated following current federal and state methodology and guidelines, including waters of the U.S., waters of the State and FGC Section 1600 resources. Field data forms are included in **Appendix C**.

4.2.1 Waters of the U.S.

Wetlands

The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), hereafter called the "1987 Manual." The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008), hereafter called the "Arid West Supplement." For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed. Wetlands and waters were classified using commonly accepted habitat types; however, the Cowardin classification (Cowardin et al. 1979) of each feature type is noted in the discussion in Chapter 5.

To determine the extent of potential jurisdictional wetlands on a project site, the 1987 Manual and Arid West Supplement were used as a guide for identifying wetland characteristics. Three positive wetland parameters must normally be present for an area to be considered a wetland: 1) a dominance of wetland vegetation, 2) presence of hydric soils, and 3) presence of wetland hydrology. Presence or absence of positive indicators for wetland vegetation, soils and hydrology was assessed per the 1987 Manual and Arid West Supplement guidelines. Data points were taken within suspected wetlands and a paired point was taken (where applicable) in nearby upland areas. Data points were recorded on Arid West Region wetland determination data forms, which are provided in Appendix C.

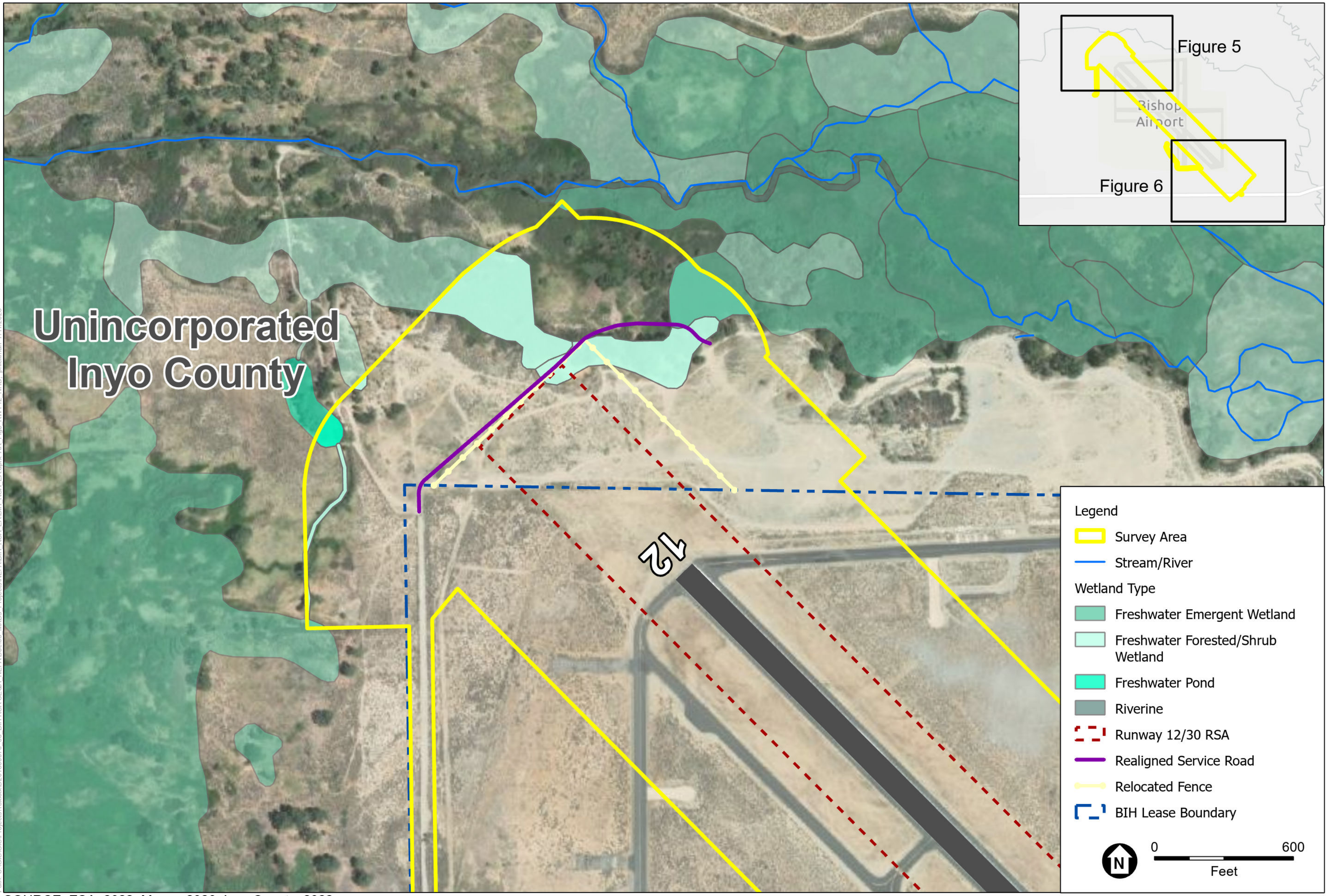
At each data point, a visual assessment of the dominant plant species within the vegetation community was made. Dominant species were assessed using the "Dominance Test" method per the Arid West Supplement. Plants were identified to species using the *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012). The *Arid West 2016 Regional Wetland Plant List* (Lichvar et al. 2016) was used to determine the wetland indicator status of all plants.

Hydric soils were identified using soil indicators presented in the *Regional Supplement to the* Arid West Supplement. Soils at each data point were characterized by color, texture, organic matter accumulation, and the presence or absence of hydric soil indicators. The coloration of the soil samples, matrix, and mottles is assessed using the *Munsell Soil Color Charts* (Munsell 2015).

Presence of wetland hydrology was determined at each data point by presence of one or more of the primary and/or secondary indicators, per guidance of the Arid West Supplement.

Non-Wetland (Other) Waters of the U.S.

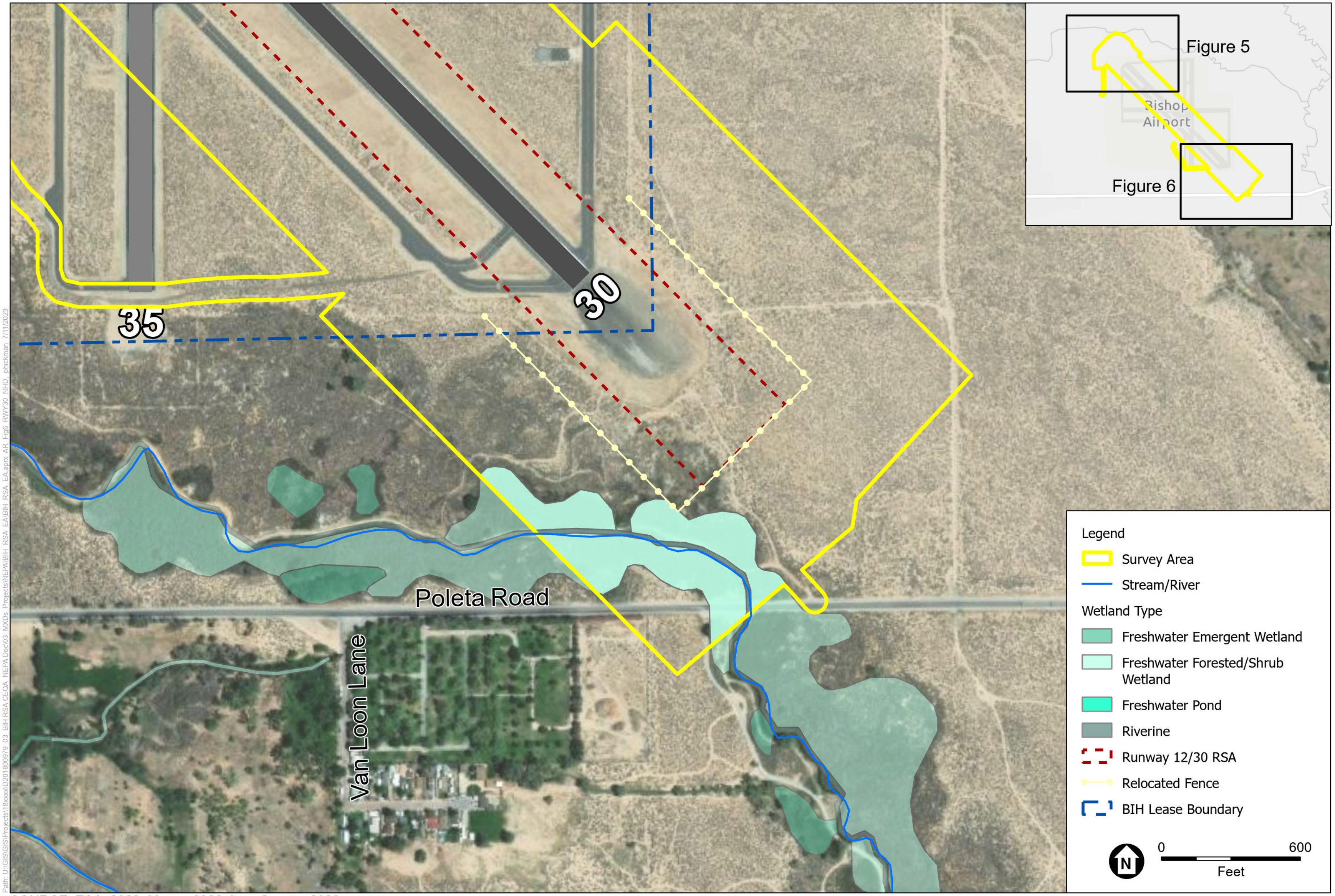
Federal jurisdiction over non-wetland waters of the U.S. extends to the OHWM, defined in 33 CFR 328.3 as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris. In the Arid West region of the United States, waters are variable and include ephemeral, intermittent and perennial channel forms. Delineation methods were completed in accordance with *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (USACE, 2008a).



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022; National Hydrography Dataset, 2022.

Figure 5
Hydrology
Runway 12 End

ESA



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022;
National Hydrography Dataset, 2022.

Aquatic Resources Delineation Report

Figure 6
Hydrology
Runway 30 End

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CHAPTER 5
Results

5.1 Aquatic Resources

The delineation identified aquatic resources in the survey area consisting of freshwater emergent wetlands freshwater forested/scrub wetlands, an ephemeral drainage, and a perennial canal. Aquatic resources were classified using the *Classification of Wetlands and Deepwater Habitats of the United* States (the "Cowardin Classification") (FGDC 2013). The details of the aquatic resources are provided below.

Table 5-1 summarizes the aquatic features by type and these types of resources are discussed in detail in the following sections. All aquatic resources are shown in **Figure 7-1** through **Figure 7-5** at the end of this chapter. **Figures 7-6** and **7-7** depict the delineated wetlands and the Proposed Project. Data forms from the field delineation are included as Appendix C and representative site photographs are included in **Appendix E**. The full table of individual features is presented in **Appendix D**.

TABLE 5-1
AQUATIC RESOURCES WITHIN THE SURVEY AREA

Aquatic Feature	Cowardin Classification	Linear Feet	Area (acres)
Wetlands			
Freshwater Emergent Wetland (FEW-1)	Emergent, Palustrine (PEM)	**N/A**	**1.27**
Freshwater Forest/Shrub Wetlands (FFSW-1, FFSW-2, FFSW-3, FFSW-4)	Scrub-Shrub, Palustrine (PSS)	N/A	7.56
Riverine			
Riverine (ED-1)	Intermittent, Riverine (R4)	650	0.14
Riverine (Rawson Canal)	Intermittent, Riverine Streambed (R4SB)	950	0.21
Total Aquatic Features:		**1600**	**9.19**

5.1.1 Wetlands

Freshwater Emergent Wetlands

Freshwater emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes and are classified as Palustrine Emergent Wetland (PEM) according to the *Classification of Wetlands and Deepwater Habitats of the United States* (FGDC 2013).

The emergent vegetation is present for most of the growing season in most years and these wetlands are dominated by perennial plants. Wildlife frequently use these areas for nesting and feeding, particularly during migration. Surface water is present for extended periods especially early in the growing season but is absent by the end of the growing season in most years. The water table after flooding ceases is variable, extending from saturated to the surface to a water table well below the ground surface.

Data point 7 represents conditions in the emergent wetland and point 6 documents the conditions in the adjacent uplands. Hydric soil indicator includes Redox Dark Surface (F6). Wetland hydrology indicators include Drift Deposits (B3) and Inundation Visible on Aerial Imagery (B7).

Freshwater Forest/Scrub Wetlands

Freshwater forest/scrub wetlands include wetland areas dominated by woody vegetation less than 20 feet tall and are classified as Palustrine Scrub-Shrub (PSS) according to the *Classification of Wetlands and Deepwater Habitats of the United States* (FGDC 2013). Vegetation cover includes true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions. Surface water is present for extended periods especially early in the growing season but is absent by the end of the growing season in most years. Once surface water recedes the water table is variable, extending from saturated to the surface to a water table well below the ground surface. PSS wetlands supply an abundance of food and cover resources for mammals and birds and provide necessary breeding habitat for many migratory bird species.

Sample points 5 and 9 represent conditions in the freshwater forest/scrub wetlands and points 6 and 10 document the conditions in the adjacent uplands. Hydric soil indicators include Redox Dark Surface (F6) and Loamy Mucky Mineral (F1). Wetland hydrology indicators include Inundation Visible on Aerial Imagery (B7) and Thin Muck Surface (C7).

5.1.2 Other Waters

Ephemeral Drainage

Sample point 3 represents conditions in the ephemeral drainage and points 2 and 4 document the conditions in the adjacent uplands. Hydric soil indicators include Redox Dark Surface (F6). Wetland hydrology indicators include Drift Deposits (B3) and Inundation Visible on Aerial Imagery (B7). Aerial imagery shows this drainage containing water for some period of some years, and hydrology may be driven by precipitation events.

Riverine

Rawson Canal represent conditions in the riverine classification. Surface water is present in the channel for extended periods especially early in the growing season. The canal is an open conduit which was artificially created and continuously contains flowing water and forms a manmade secondary connection between Bishop Creek and the Owens River.

5.2 Regulatory Analysis

5.2.1 Waters of the U.S.

After the aquatic resources were delineated, all features were evaluated to determine whether they may be regulated under the CWA, using the parameters set forth under the current regulations defining waters of the United States. **Table 5-2** summarizes the results of this assessment for all aquatic resources in the survey area. The evaluation below uses the guidance provided by USACE and EPA (2008) for application of regulations and case law defining waters of the United States for aquatic resources.

TABLE 5-2
POTENTIAL WATERS OF THE U.S.

Aquatic Resource	Waters of the United States (ac)	Excluded (ac)	Rationale
Wetlands			
Freshwater Emergent Wetland FEW-1	1.27	-	Directly abuts RPW
Freshwater Forest/Shrub Wetland FFSW-1	2.79	-	Directly abuts RPW
Freshwater Forest/Shrub Wetland FFSW-2	0.16	-	Directly abuts RPW
Freshwater Forest/Shrub Wetland FFSW-3	1.8	-	Directly abuts RPW
Freshwater Forest/Shrub Wetland FFSW-4	-	2.82	Adjacent but not directly abutting RPW. No surface hydrologic connection to other wetlands or waters.
Other Waters			
Riverine (Rawson Canal)	0.21	-	RPW
ED-1	-	0.14	Isolated non-RPW that drains to a small pond with no downstream connection to an RPW, adjacent wetlands, or a TNW.
Total Aquatic Features:	**6.23**	**2.96**	

NOTES: ac=acres; RPW=Relatively Permanent Waters

SOURCE: Data compiled by Environmental Science Associates in 2020 and 2022

Relatively Permanent Waters

Rawson Canal is an intermittent streambed that is connected upstream to North Fork Bishop Creek and eventually drains (in part) to the Owens River and Owens Lake, a TNW. Rawson Canal is a RPW, typically having year-round flow. Therefore, Rawson Canal is a non-navigable tributary to a TNW and is therefore a water of the United States.

Wetlands Directly Abutting Relatively Permanent Waters

FFSW-3 directly abuts Rawson Canal because it is within the operational elevation of the canal, and during wet years reaches an elevation where it may drain into the canal thereby establishing a hydrologic connection to the canal. Therefore, FFSW-3 is a wetland directly abutting a RPW and is considered a water of the U.S.

FEW-1, FFSW-1, and FFSW-2 are adjacent to North Fork Bishop Creek. In wet years and during snowmelt and precipitation events they likely exchange surface water with North Fork Bishop Creek. North Fork Bishop Creek is a tributary to the Owens River, a non-navigable tributary to Owens Lake which is a TNW. Therefore, FEW-1, FFSW-1, and FFSW-2 are considered wetland waters of the U.S.

Wetlands Adjacent to but Not Directly Abutting Relatively Permanent Waters

FFSW-4 is adjacent to Rawson Canal but does not directly abut the creek because it is on the opposite side of a road and does not exchange surface water with the canal. Water leaves FFSW-4 through either percolation or evaporation. Based on proximity and soil hydraulic conductivity, FFSW-4 likely shares a groundwater connection with Rawson Canal but lacks a surface hydrologic connection with Rawson Canal and other nearby aquatic resources. Therefore, FFSW-4 does not contribute to the chemical, physical, and biological integrity of the downstream TNW and is not likely to be considered a water of the U.S.

Isolated Non-Relatively Permanent Water

ED-1 is an isolated non-RPW that drains to a small pond with no downstream connection to a RPW, adjacent wetlands, or a TNW. Therefore, ED-1 is not likely to be considered a water of the U.S.

5.2.2 Waters of the State

All the waters and wetlands in the survey area likely qualify as waters of the state. Waters of the state include all features that qualify as waters of the United States. In addition, the definition of waters of the state includes “natural wetlands” and “wetlands created by modification of a surface water of the state.” All wetlands (FEW-1, FFSW-1, FFSW-2, FFSW-3, FFSW-4) and surface waters (ED-1 and Rawson Canal) in the survey area likely qualify as natural aquatic features because there are no artificial hydrologic inputs.

5.2.3 Rivers, Streams, and Lakes

Features potentially subject to regulation under Fish and Game Code Section 1602 are shown in **Table 5-3** and Figures 6-1 through 6-5. Potential CFGC Section 1602 regulated resources include all waters of the state described above with the exception of Freshwater Emergent Wetlands which do not have a defined bed or bank and do not support riparian habitat. The total acreages potentially subject to CDFW jurisdiction for the survey area are provided in Table 5-3.

TABLE 5-3
FEATURES POTENTIALLY SUBJECT TO SECTION 1600 ET SEQ. OF THE FISH AND GAME CODE

Aquatic Feature	Cowardin Type[1]	Vegetated Streambed/ Pond/Lake (Acre)	Unvegetated Streambed/ Pond/Lake (Acre)	Length (feet)	Average Width (feet)	Vegetation/ Land Cover Type	GPS Coordinates (decimal degrees)
Freshwater Forest/Shrub Wetland FFSW-1	Scrub-Shrub, Palustrine	2.7866	-	NA	NA	Sandbar willow thicket	37.38300000, -118.37579900
Freshwater Forest/Shrub Wetland FFSW-2	Scrub-Shrub, Palustrine	0.1581	-	NA	NA	Sandbar willow thicket	37.38323000, -118.37449900
Freshwater Forest/Shrub Wetland FFSW-3	Scrub-Shrub, Palustrine	1.7970	-	NA	NA	Sandbar willow thicket	37.36231300, -118.35446700
Freshwater Forest/Shrub Wetland FFSW-4	Scrub-Shrub, Palustrine	2.8211	-	NA	NA	Sandbar willow thicket	37.36279900, -118.35626900
ED-1	Intermittent, Riverine	-	0.14	650	5	Sandbar willow thicket	37.381544, -118.378334
Riverine (Rawson Canal)	Riverine intermittent streambed (R4SB)	-	0.21	950	8	Open water	37.36248300, -118.35452000
Totals:		**7.5628**	**0.35**	**1600**			

5.3 Conclusions

In total, 6.22 acres of aquatic resources are present in the survey area. Wetlands are waters of the United States comprising 6.01 acres. The isolated freshwater forested shrub wetland (FFSW-4) and ED-1 do not meet the significant nexus criteria to qualify as waters of the US; these make up 2.96 acres.

This report documents the delineation of the boundaries of aquatic resources in the survey area, based on the best professional judgment of ESA investigators. All conclusions presented should be considered preliminary and subject to change pending official review and jurisdictional determination in writing by USACE and/or the State of California.

SOURCE: ESA, 2022

Coordinate System: State Plane California Zone IV (US Feet)
Projection: Lambert Conformal Conic
Datum: NAD 1983 (2011)

Survey Area: 403.210 acres
Map Reference Point

Data Point
Upland
Wetland

Wetlands (9.04 acres)*
Freshwater Emergent Wetland (1.27 acres)
Freshwater Forested/Shrub Wetland (7.77 acres)

Other Waters (0.14 acres)
Ephermeral Drainage (0.14 acres)

Wetlands Outside of Study Area
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

1 inch = 300 feet
0 400
Feet

ESA

*NOTE: Area (acreage) of Wetlands and Other Waters are presented only for the portionlocated within the Survey Area boundary.

Proposed Commercial Airline Service at Bishop Airport

Figure 7-1
Delineation of Wetlands and Other Waters of the U.S.
(1 of 5)

Delineated by: Anna Schwyter
Mapping by: Wes McCullough
Created on: November 29, 2022

SOURCE: ESA, 2022

Coordinate System: State Plane California Zone IV (US Feet)
Projection: Lambert Conformal Conic
Datum: NAD 1983 (2011)

Survey Area: 403.210 acres
Map Reference Point

Data Point
Upland
Wetland

Wetlands (9.04 acres)*
Freshwater Emergent Wetland (1.27 acres)
Freshwater Forested/Shrub Wetland (7.77 acres)

Other Waters (0.14 acres)
Ephemeral Drainage (0.14 acres)

Wetlands Outside of Study Area
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

1 inch = 300 feet
0 400
Feet

Proposed Commercial Airline Service at Bishop Airport

Figure 7-2
Delineation of Wetlands and Other Waters of the U.S.
(2 of 5)

ESA

*NOTE: Area (acreage) of Wetlands and Other Waters are presented only for the portionlocated within the Survey Area boundary.

Delineated by: Anna Schwyter
Mapping by: Wes McCullough
Created on: November 29, 2022

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SOURCE: ESA, 2022

Coordinate System: State Plane California Zone IV (US Feet)
Projection: Lambert Conformal Conic
Datum: NAD 1983 (2011)

ESA

*NOTE: Area (acreage) of Wetlands and Other Waters are presented only for the portionlocated within the Survey Area boundary.

Survey Area: 403.210 acres
Map Reference Point

Data Point
Upland
Wetland

Wetlands (9.04 acres)*
Freshwater Emergent Wetland (1.27 acres)
Freshwater Forested/Shrub Wetland (7.77 acres)

Other Waters (0.14 acres)
Ephermeral Drainage (0.14 acres)

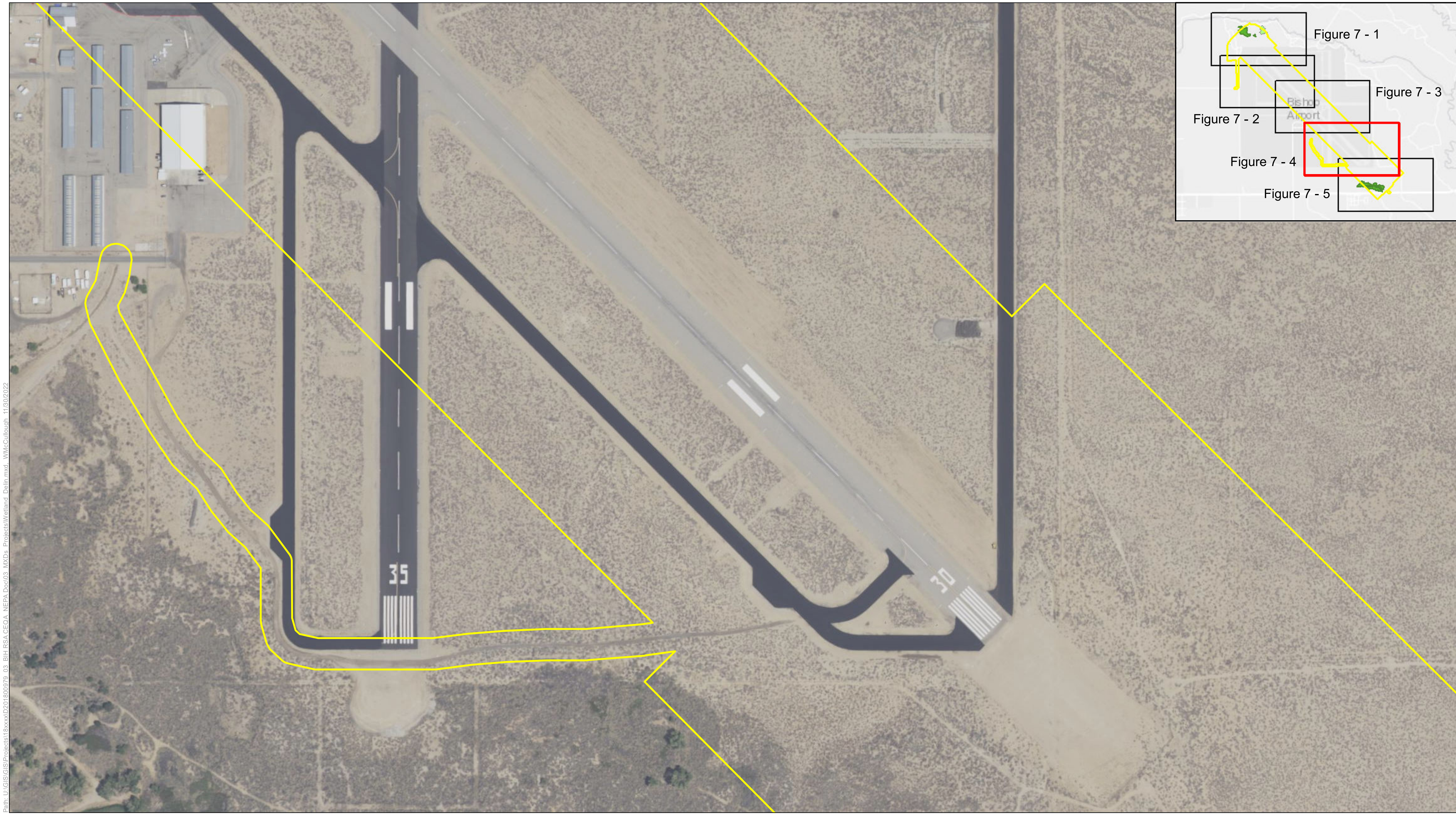
Wetlands Outside of Study Area
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

1 inch = 300 feet
0 400
Feet

Proposed Commercial Airline Service at Bishop Airport

Figure 7-3
Delineation of Wetlands and Other Waters of the U.S.
(3 of 5)

Delineated by: Anna Schwyter
Mapping by: Wes McCullough
Created on: November 29, 2022



SOURCE: ESA, 2022

Coordinate System: State Plane California Zone IV (US Feet)
Projection: Lambert Conformal Conic
Datum: NAD 1983 (2011)

ESA

*NOTE: Area (acreage) of Wetlands and Other Waters are presented only for the portionlocated within the Survey Area boundary.

Survey Area: 403.210 acres
Map Reference Point

Data Point
- Upland
- Wetland

Wetlands (9.04 acres)*
- Freshwater Emergent Wetland (1.27 acres)
- Freshwater Forested/Shrub Wetland (7.77 acres)

Other Waters (0.14 acres)
- Ephermeral Drainage (0.14 acres)

Wetlands Outside of Study Area
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

1 inch = 300 feet
0 400
Feet

Proposed Commercial Airline Service at Bishop Airport

Figure 7-4
Delineation of Wetlands and
Other Waters of the U.S.
(4 of 5)

Delineated by: Anna Schwyter
Mapping by: Wes McCullough
Created on: November 29, 2022

SOURCE: ESA, 2022

Coordinate System: State Plane California Zone IV (US Feet)
Projection: Lambert Conformal Conic
Datum: NAD 1983 (2011)

Survey Area: 403.210 acres
Map Reference Point

Data Point
Upland
Wetland

Wetlands (9.04 acres)*
Freshwater Emergent Wetland (1.27 acres)
Freshwater Forested/Shrub Wetland (7.77 acres)

Other Waters (0.14 acres)
Ephemeral Drainage (0.14 acres)

Wetlands Outside of Study Area
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland

1 inch = 300 feet
0 400
Feet

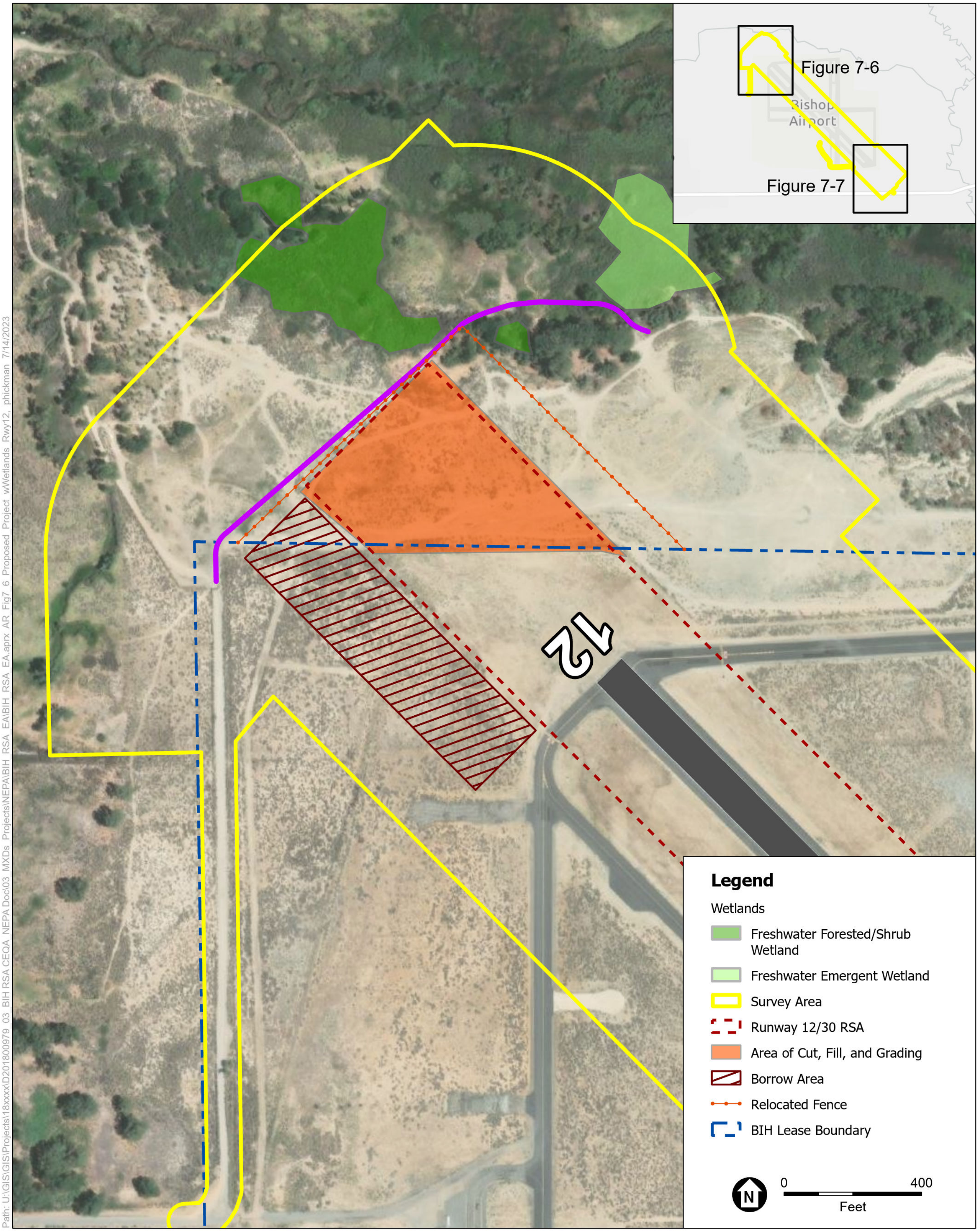
ESA

*NOTE: Area (acreage) of Wetlands and Other Waters are presented only for the portionlocated within the Survey Area boundary.

Proposed Commercial Airline Service at Bishop Airport

Figure 7-5
Delineation of Wetlands and Other Waters of the U.S.
(5 of 5)

Delineated by: Anna Schwyter
Mapping by: Wes McCullough
Created on: November 29, 2022



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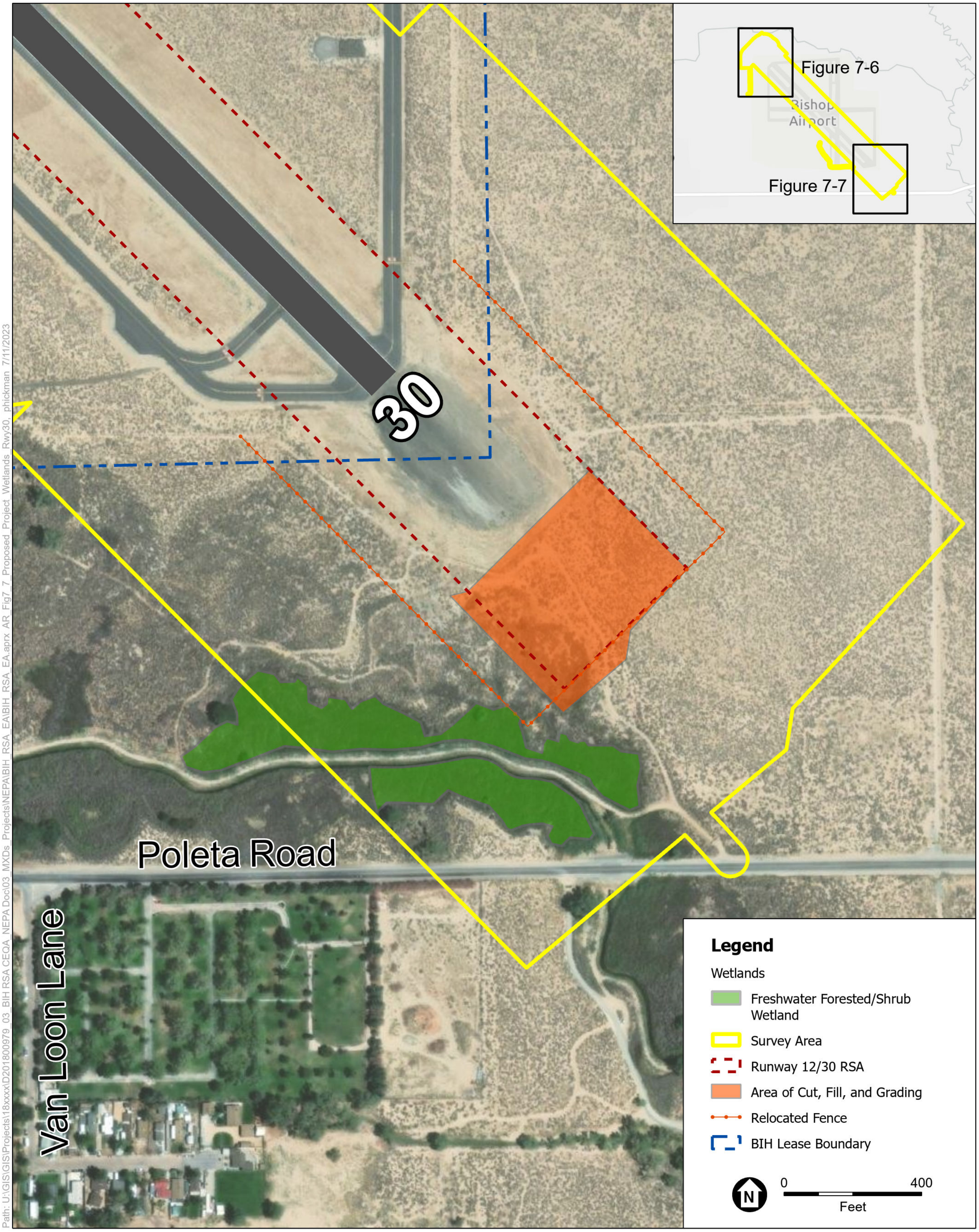
SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Figure 7-6
Delineated Wetlands and Proposed Project
Runway 12

ESA



SOURCE: ESA, 2022; Maxar, 2020; Inyo County, 2022.

Figure 7-7
Delineated Wetlands and Proposed Project
Runway 30

ESA

CHAPTER 6
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Appendix A
Soil Report

United States Department of Agriculture

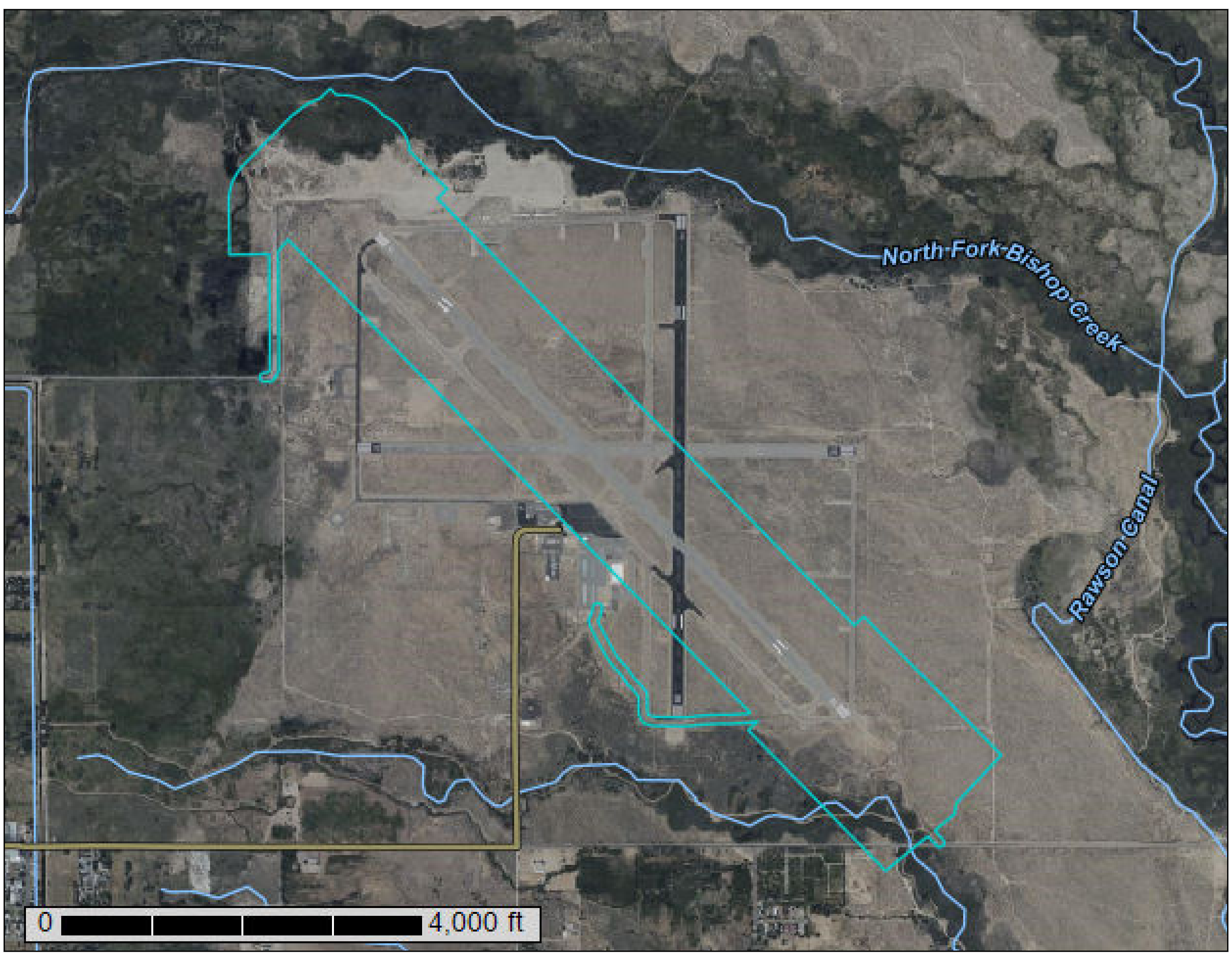
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Benton-Owens Valley Area Parts of Inyo and Mono Counties, California

BIH_RSA_Proposed_Action_Area



November 9, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

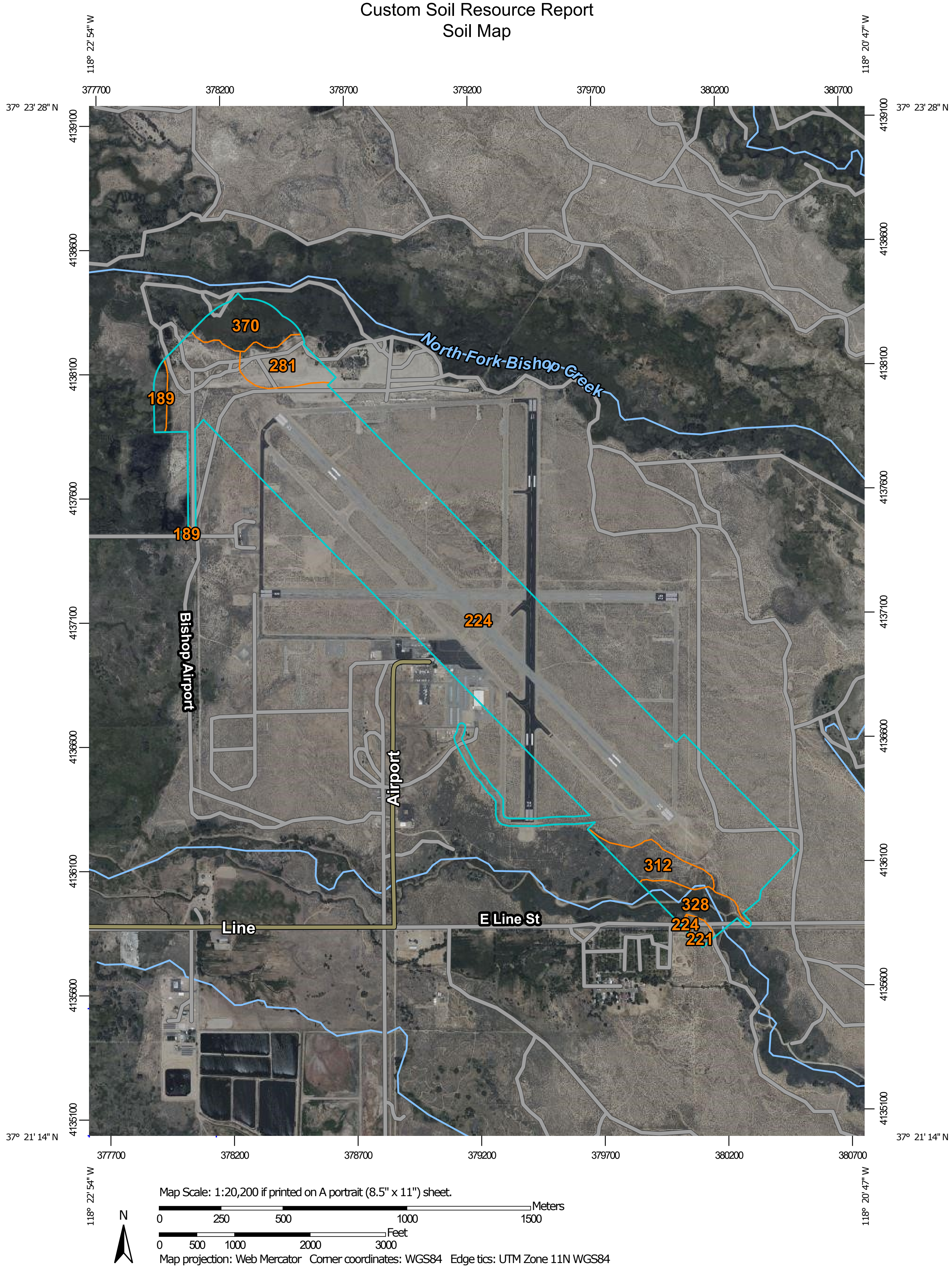
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


118° 22' 54" W
118° 20' 47" W
377700
378200
378700
379200
379700
380200
380700
37° 23' 28" N
37° 21' 14" N
4139100
4138600
4138100
4137600
4137100
4136600
4136100
4135600
4135100
370
281
189
189
224
312
328
224
221
North Fork Bishop Creek
Bishop Airport
Airport
Line
E Line St
Map Scale: 1:20,200 if printed on A portrait (8.5" x 11") sheet.
Meters
0
250
500
1000
1500
Feet
0
500
1000
2000
3000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Benton-Owens Valley Area Parts of Inyo and Mono Counties, California
Survey Area Data: Version 20, Sep 1, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 12, 2019—Jul 15, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
189	Dehy-Dehy calcareous complex, 0 to 2 percent slopes	3.8	0.9%
221	Inyo sand, 0 to 9 percent slopes	2.0	0.5%
224	Inyo-Poleta complex, 0 to 2 percent slopes	346.2	85.9%
281	Pits-Dumps complex, 0 to 50 percent slopes	13.6	3.4%
312	Shabbell-Shondow-Xerofluvents association, 0 to 2 percent slopes	11.4	2.8%
328	Torrifluvents-Fluvaquentic Endoaquolls complex, 0 to 2 percent slopes	11.3	2.8%
370	Xerofluvents, 0 to 5 percent slopes	14.9	3.7%
Totals for Area of Interest		**403.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Benton-Owens Valley Area Parts of Inyo and Mono Counties, California

189—Dehy-Dehy calcareous complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jcwl
Elevation: 3,600 to 4,700 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 140 to 220 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Dehy and similar soils: 45 percent
Dehy and similar soils: 40 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dehy

Setting

Landform: Alluvial fans, stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 18 inches: loamy sand
H2 - 18 to 36 inches: sandy loam
H3 - 36 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: R029XG002CA - Saline Meadow
Hydric soil rating: No

Description of Dehy

Setting

Landform: Stream terraces, alluvial fans

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 26 inches: loam
H3 - 26 to 55 inches: fine sandy loam
H4 - 55 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Ecological site: R029XG002CA - Saline Meadow
Hydric soil rating: No

Minor Components

Unnamed, histosols

Percent of map unit: 3 percent
Landform: Alluvial fans
Hydric soil rating: Yes

Unnamed, wet

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

221—Inyo sand, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: jcyb

Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 140 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition
Inyo and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Inyo

Setting
Landform: Dunes on stream terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Typical profile
H1 - 0 to 5 inches: sand
H2 - 5 to 27 inches: loamy sand
H3 - 27 to 60 inches: stratified coarse sand to gravelly loamy sand

Properties and qualities
Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R029XG016CA - Sand Dune 5-8" P.Z.
Hydric soil rating: No

224—Inyo-Poleta complex, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: jcym
Elevation: 3,680 to 5,000 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 140 to 225 days

Farmland classification: Not prime farmland

Map Unit Composition

Inyo and similar soils: 65 percent
Poleta and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Inyo

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 6 inches: sand
H2 - 6 to 28 inches: loamy sand
H3 - 28 to 60 inches: stratified coarse sand to gravelly loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R029XG016CA - Sand Dune 5-8" P.Z.
Hydric soil rating: No

Description of Poleta

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 8 inches: loamy sand
H2 - 8 to 20 inches: sandy loam
H3 - 20 to 33 inches: indurated
H4 - 33 to 60 inches: stratified gravelly coarse sand to sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R029XG017CA - Loamy 5-8" P.Z.
Hydric soil rating: No

281—Pits-Dumps complex, 0 to 50 percent slopes

Map Unit Composition

Pits: 45 percent
Dumps: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Landform: Valley floors, alluvial fans
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Dumps

Setting

Landform: Valley floors, alluvial fans
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

312—Shabbell-Shondow-Xerofluvents association, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jd2q
Elevation: 3,650 to 4,200 feet
Mean annual precipitation: 4 to 6 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 140 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Shabbell and similar soils: 40 percent
Shondow and similar soils: 30 percent
Xerofluvents and similar soils: 15 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shabbell

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 11 inches: loamy sand
H2 - 11 to 31 inches: sandy loam
H3 - 31 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R029XG002CA - Saline Meadow
Hydric soil rating: No

Description of Shondow

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 24 inches: sandy clay loam
H3 - 24 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 3 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 60.0
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: R029XG002CA - Saline Meadow
Hydric soil rating: No

Description of Xerofluvents

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 4 inches: silt loam
H2 - 4 to 19 inches: sand
H3 - 19 to 29 inches: sandy loam
H4 - 29 to 34 inches: loam

H5 - 34 to 60 inches: stratified sand to loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 24 to 60 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B
Ecological site: R029XG020CA - Moist Floodplain
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 3 percent
Landform: Drainageways
Hydric soil rating: Yes

328—Torrifluvents-Fluvaquentic Endoaquolls complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jd39
Elevation: 3,580 to 4,150 feet
Mean annual precipitation: 5 to 6 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Torrifluvents and similar soils: 60 percent
Fluvaquentic endoaquolls and similar soils: 30 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Torrifluvents

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 6 inches: loam
H2 - 6 to 13 inches: silty clay loam
H3 - 13 to 31 inches: loam
H4 - 31 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Strongly saline (16.0 to 60.0 mmhos/cm)
Sodium adsorption ratio, maximum: 50.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: R029XG020CA - Moist Floodplain
Hydric soil rating: No

Description of Fluvaquentic Endoaquolls

Setting

Landform: Depressions
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Volcanic ash and/or alluvium derived from mixed sources

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 36 inches: loamy sand
H3 - 36 to 45 inches: loam
H4 - 45 to 55 inches: fine sand
H5 - 55 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 12.0
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: R029XG020CA - Moist Floodplain
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

370—Xerofluvents, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: jd4n
Elevation: 4,000 to 7,500 feet
Mean annual precipitation: 4 to 12 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 100 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerofluvents and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerofluvents

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 11 inches: gravelly sandy loam
H2 - 11 to 18 inches: gravelly sandy loam
H3 - 18 to 34 inches: very gravelly loam
H4 - 34 to 60 inches: stratified very gravelly sand to very cobbly sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Surface area covered with cobbles, stones or boulders: 3.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C/D
Ecological site: R029XG027CA - Streambank
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 3 percent
Landform: Alluvial fans
Hydric soil rating: Yes

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Appendix B

Antecedent Precipitation Tool Results

Antecedent Precipitation Tool v.1.0 - Watershed Sampling Summary

Generated on 2022-11-14

User Inputs

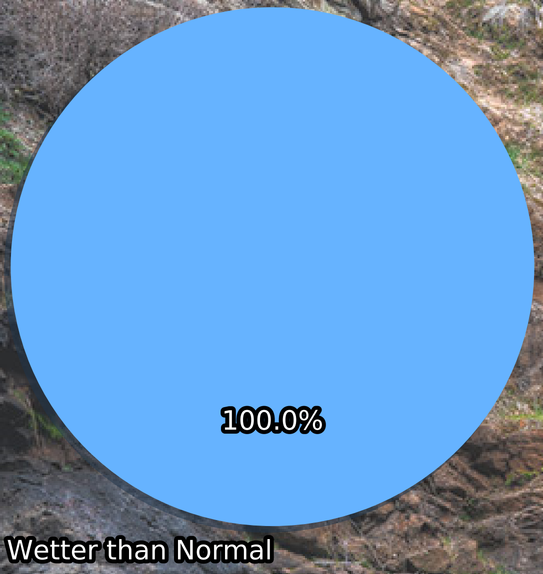
Coordinates	37.380768, -118.377285
Date	2022-11-01
Geographic Scope	HUC12

Intermediate Data

Hydrologic Unit Code	180901020705
Watershed Size	77.17 mi^2
# Random Sampling Points	8

Preliminary Result

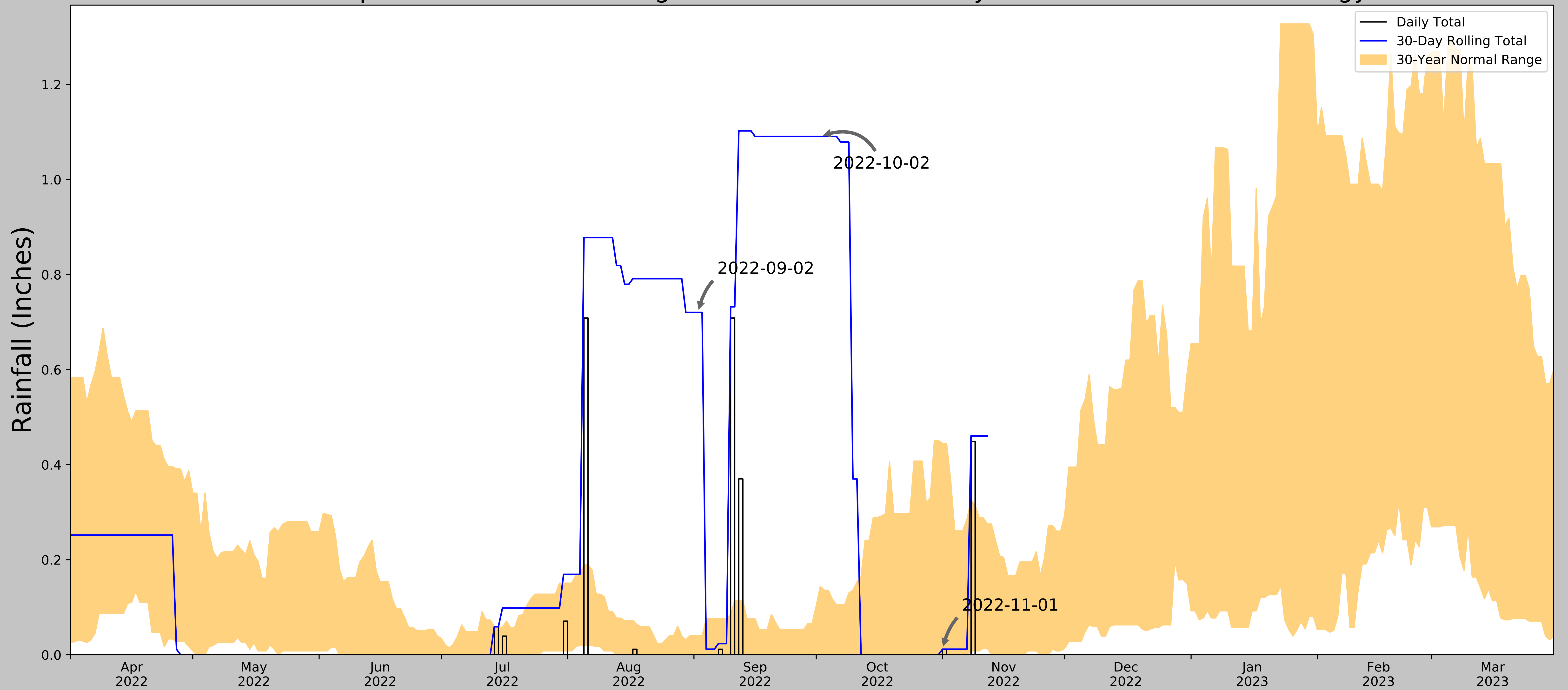
Average Antecedent Precipitation Score	15.0
Preliminary Determination	Wetter than Normal



Sampling Point Breakdown

Antecedent Precipitation Score	Antecedent Precipitation Condition	WebWIMP H_2O Balance	Drought Index (PDSI)	# of Points
15	Wetter than Normal	Dry Season	Severe drought (2022-10)	8

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.380768, -118.377285
Observation Date	2022-11-01
Elevation (ft)	4127.6
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

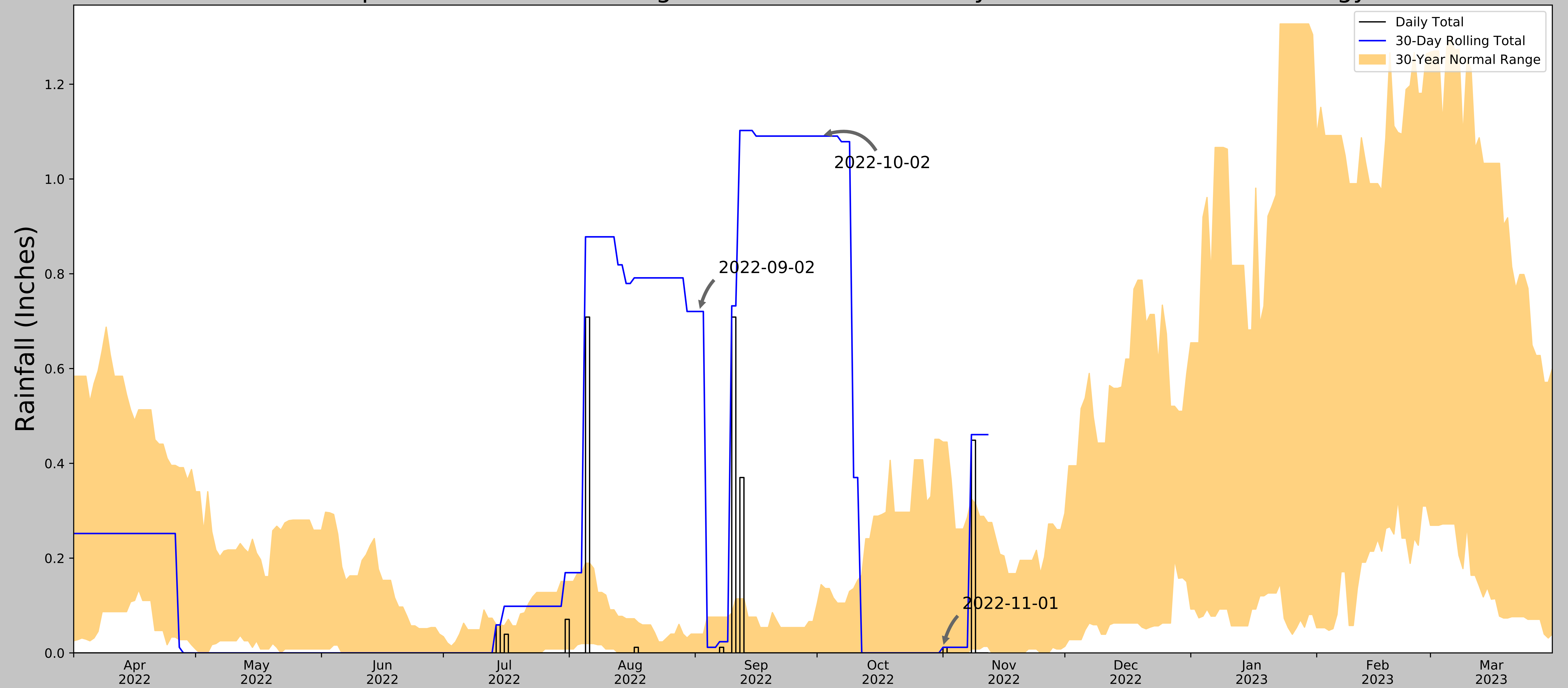
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	1.247	25.566	0.593	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.406076, -118.380802
Observation Date	2022-11-01
Elevation (ft)	4127.6
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

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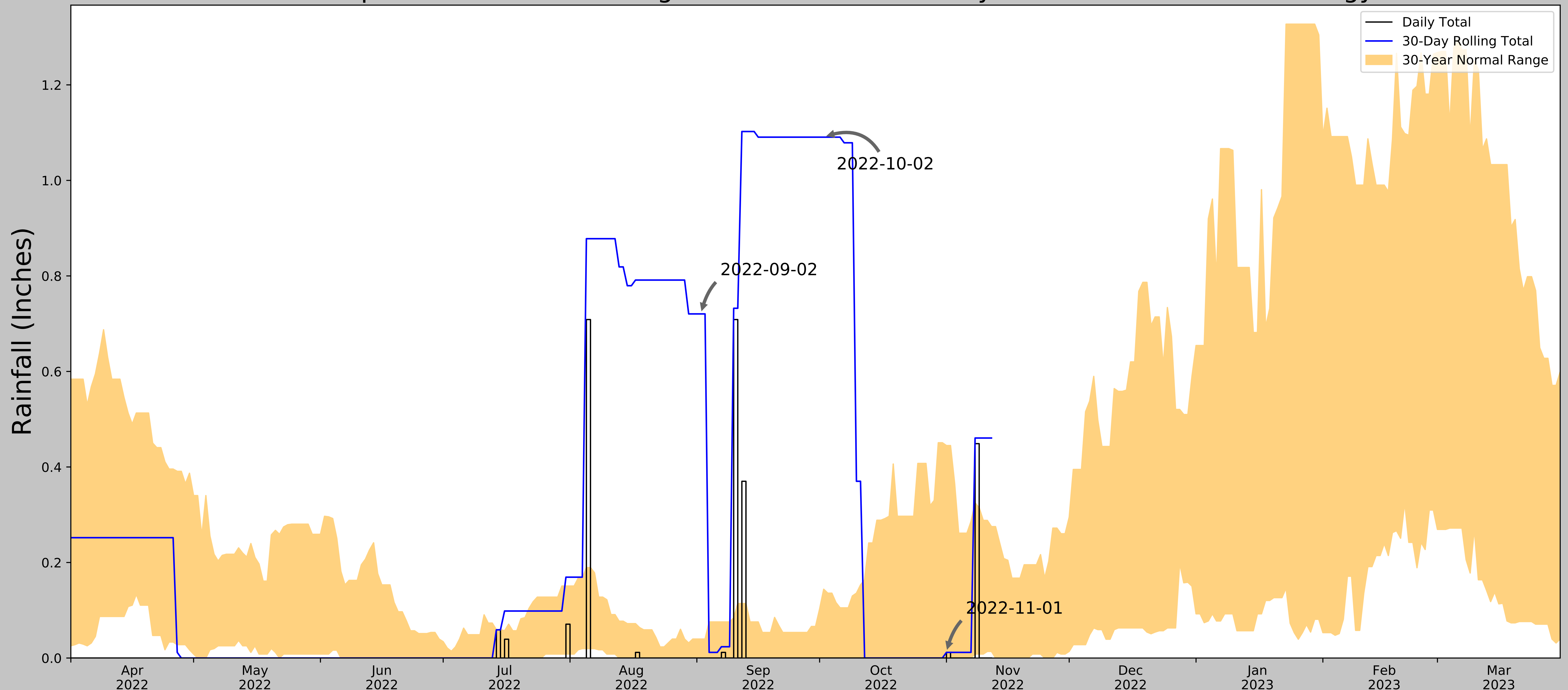
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	2.719	25.566	1.293	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.387039, -118.449967
Observation Date	2022-11-01
Elevation (ft)	4353.86
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

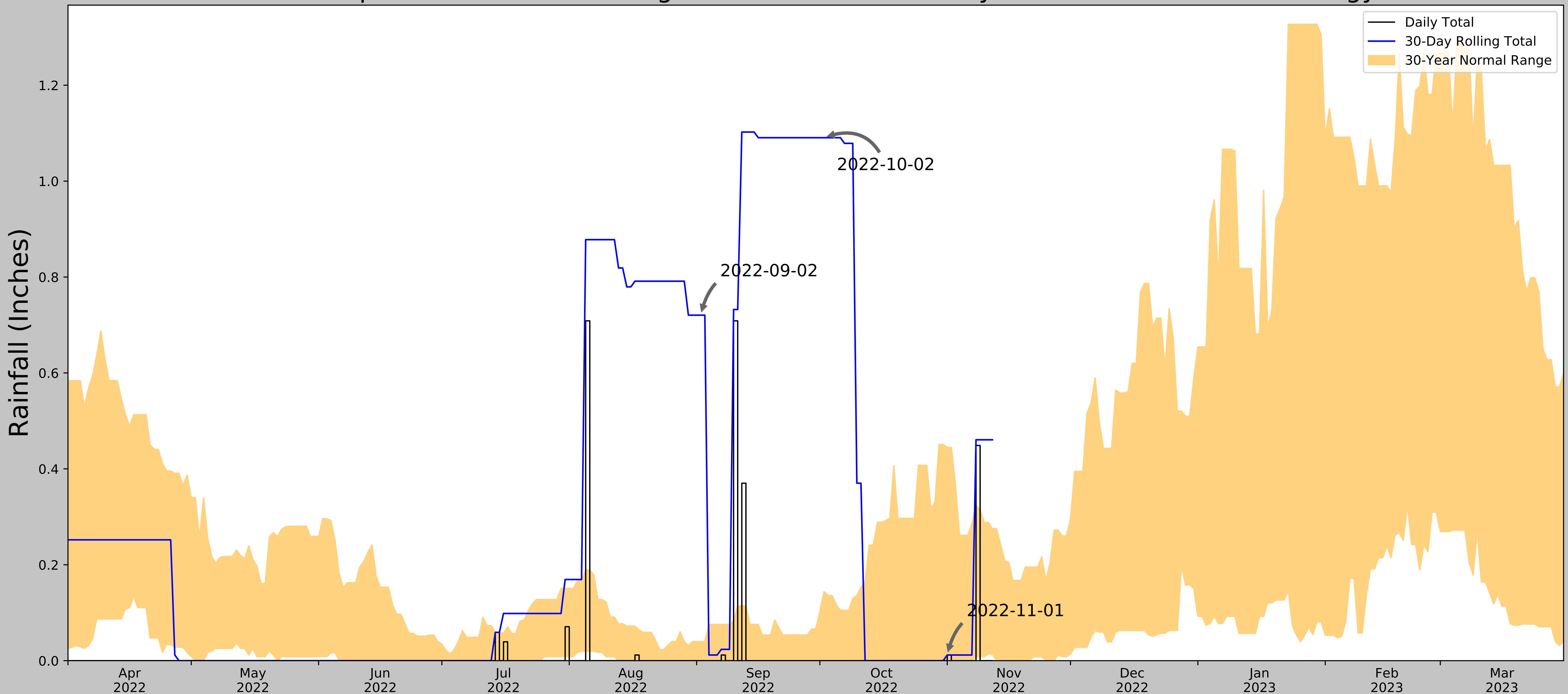
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	5.163	251.826	3.624	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.330653, -118.3379
Observation Date	2022-11-01
Elevation (ft)	4060.56
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

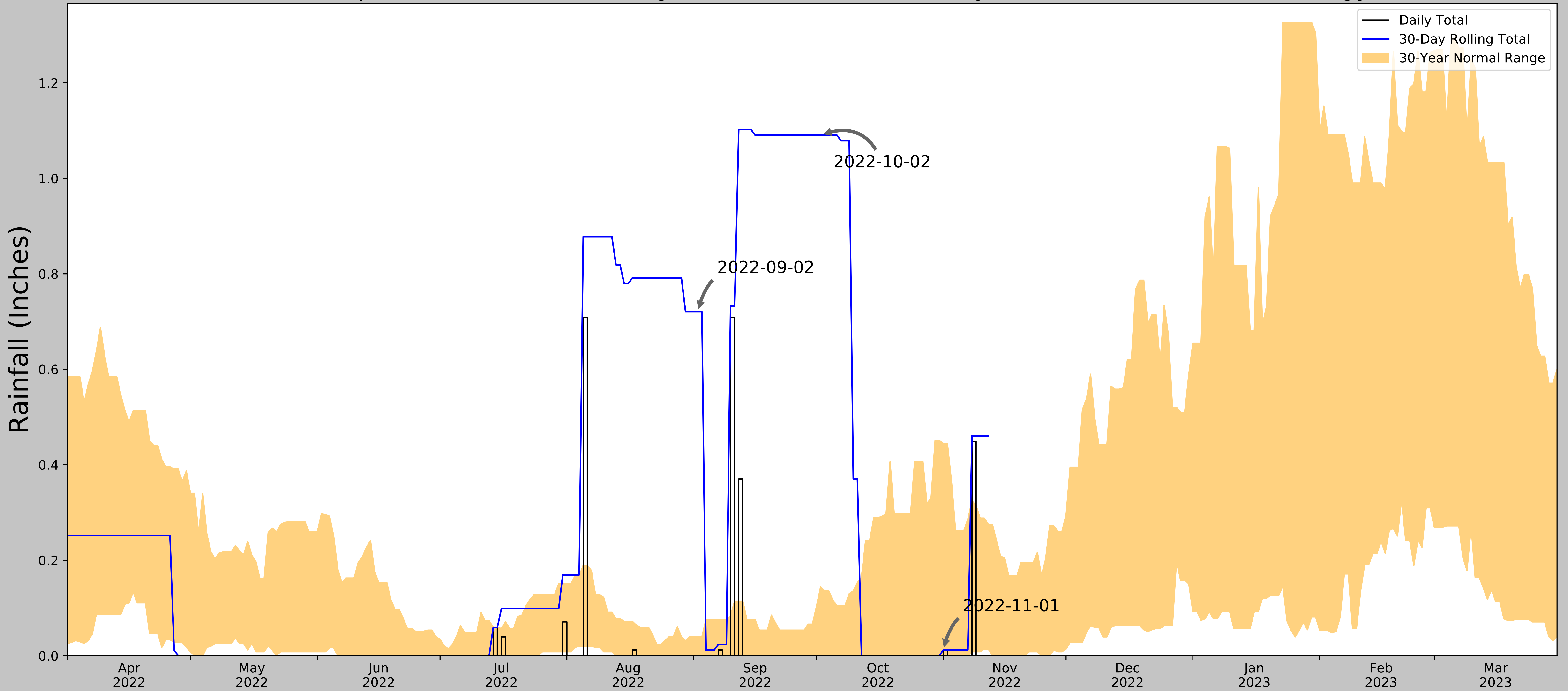
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	3.007	41.474	1.478	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.384651, -118.305248
Observation Date	2022-11-01
Elevation (ft)	4395.61
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

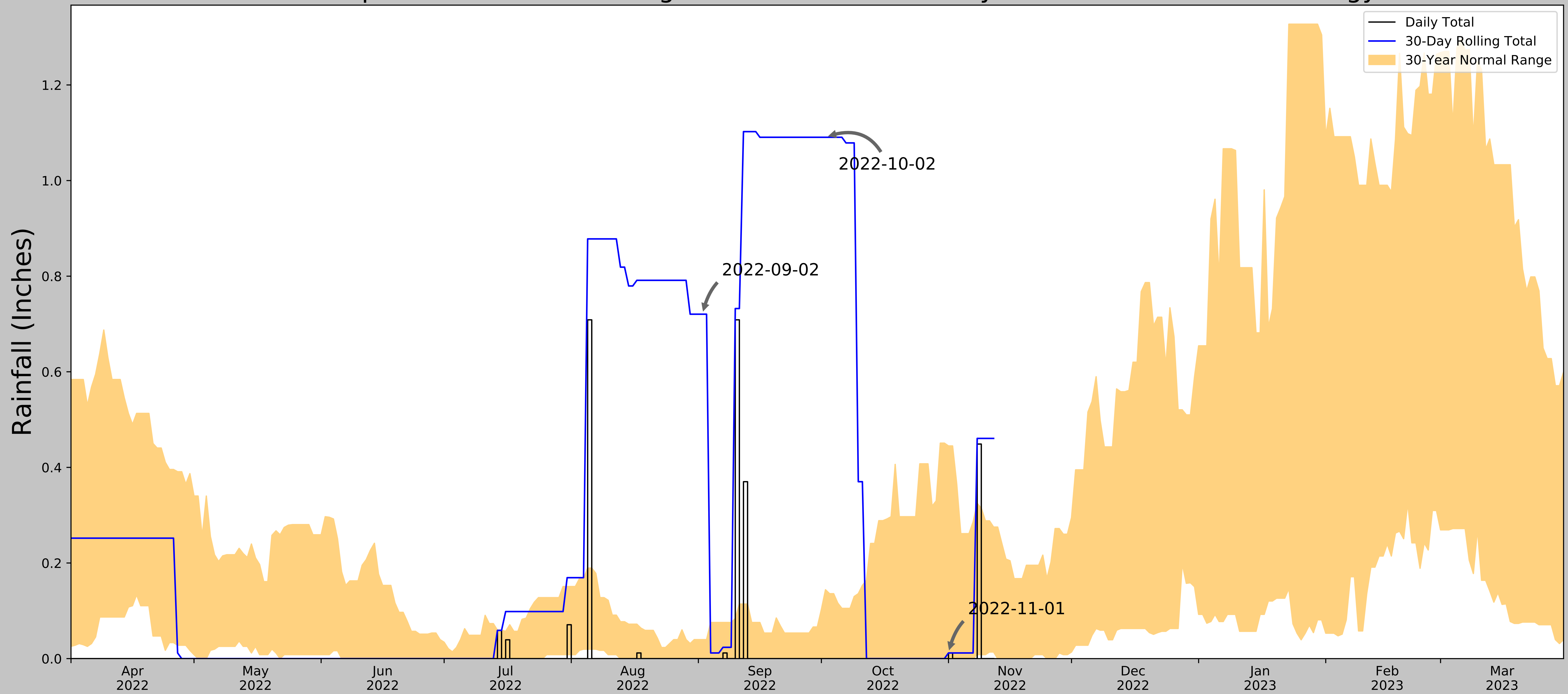
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	3.049	293.576	2.267	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.372505, -118.228118
Observation Date	2022-11-01
Elevation (ft)	8584.11
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

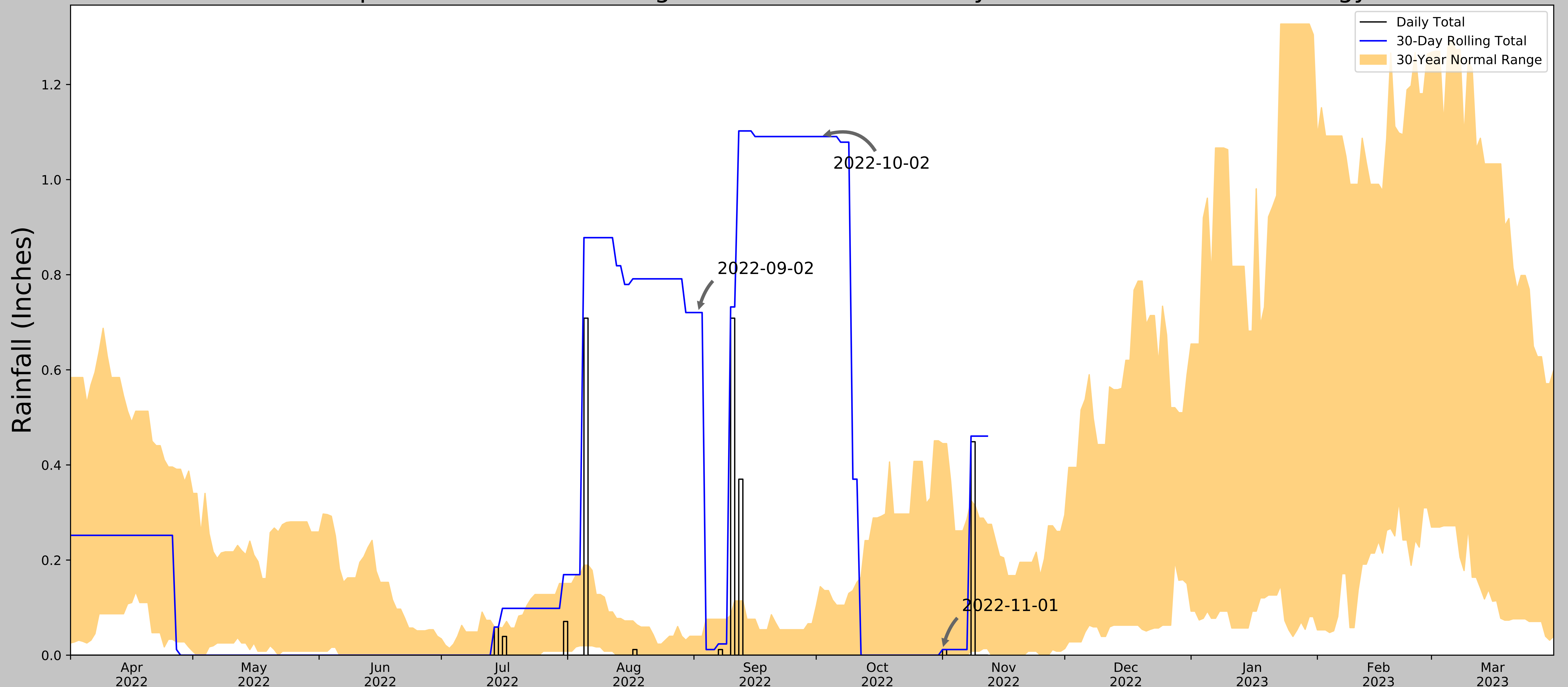
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	7.138	4482.076	35.205	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.320249, -118.235765
Observation Date	2022-11-01
Elevation (ft)	7941.5
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

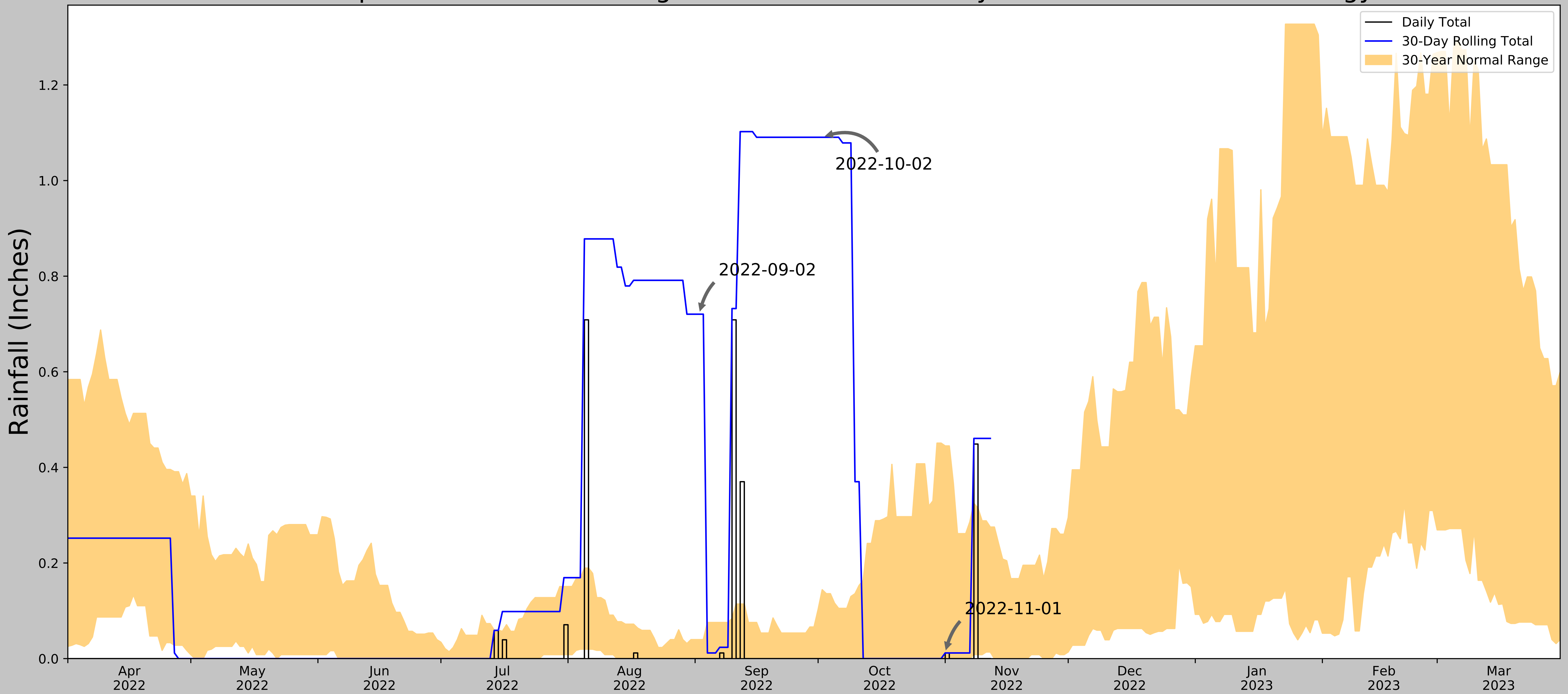
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	7.583	3839.466	32.527	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	37.342933, -118.48791
Observation Date	2022-11-01
Elevation (ft)	4895.7
Drought Index (PDSI)	Severe drought (2022-10)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-01	0.0	0.444882	0.011811	Normal	2	3	6
2022-10-02	0.0	0.144094	1.090551	Wet	3	2	6
2022-09-02	0.0	0.039764	0.720472	Wet	3	1	3
Result							Wetter than Normal - 15

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
BISHOP AP	37.3711, -118.3581	4102.034	7.39	793.666	9.191	11349	90
BISHOP 1.7 NW	37.3878, -118.4141	4181.102	3.284	79.068	1.737	2	0
DYER 5S	37.6064, -118.0	4899.935	25.49	797.901	31.809	2	0

Appendix C
Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP1

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): FLOODPLAIN Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion (LRR): ______ Lat: 37.3824 Long: -118.3781 Datum: ______

Soil Map Unit Name: INYO-POLETA COMPLEX NWI classification: PSSF

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

SNOW MELT AND STREAM RUNOFF LIKELY PONDS HERE BUT SOIL ISN'T SATURATED FOR A LONG ENOUGH DURATION OF GROWING SEASON FOR HYDRIC INDICATORS

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 6X6 m)			
1. Populus tremuloides	1	Yes	FACU
2.			
3.			
4.			
	1 = Total Cover		
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Ericameria nauseosa	1	Yes	UPL
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 6x6 m)			
1. Carex sp	0.001	No	FAC
2. Distichlis spicata	35	Yes	FAC
3. Lepidium latifolium	0.001		FAC
4.			
5.			
6.			
7.			
8.			
	35.002 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species		x 2 = 0
FAC species	3	x 3 = 9
FACU species	1	x 4 = 4
UPL species	1	x 5 = 5
Column Totals:	5 (A)	18 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Carex sp. unidentifiable this time of year, in landscape position within wetland boundary, since most Carex sp are wetland plants this species was assigned FAC to be conservative

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-15	10 YR 4/1	85	N/A	0			LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (**LRR C**)
__ 1 cm Muck (A9) (**LRR D**)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)
__ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

__ 1 cm Muck (A9) (**LRR C**)
__ 2 cm Muck (A10) (**LRR B**)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No ✓

Remarks:

15% COBBLE WITHIN SOIL PROFILE

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (**Nonriverine**)
__ Sediment Deposits (B2) (**Nonriverine**)
__ Drift Deposits (B3) (**Nonriverine**)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water-Stained Leaves (B9)
__ Salt Crust (B11)
__ Biotic Crust (B12)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water Marks (B1) (**Riverine**)
__ Sediment Deposits (B2) (**Riverine**)
__ Drift Deposits (B3) (**Riverine**)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ______

Water Table Present? Yes ____ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP2

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): SEASONAL POND Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): ______ Lat: 37.3819 Long: -118.3786 Datum: ______

Soil Map Unit Name: INYO-POLETA COMPLEX NWI classification: PUBFh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

SNOW MELT AND STREAM RUNOFF LIKELY PONDS HERE BUT SOIL ISN'T SATURATED FOR A LONG ENOUGH DURATION OF GROWING SEASON FOR HYDRIC INDICATORS

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10X10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus fremontii	2	Yes	FAC
2.			
3.			
4.			
	2 = Total Cover		
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Salix exigua	4	Yes	FACW
2.			
3.			
4.			
5.			
	4 = Total Cover		
Herb Stratum (Plot size: 6x6 m)			
1. Carex sp	4	Yes	FAC
2. Rumex crispus	1	No	FAC
3. Stipa speciosa	10	Yes	FACU
4. Glycyrrhiza lepidota	.1	No	FAC
5.			
6.			
7.			
8.			
	15.1 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Carex sp. unidentifiable this time of year, in landscape position within wetland boundary, since most Carex sp are wetland plants this species was assigned FAC to be conservative

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	10 YR 3/1	90	NA	0			LS	
1-10	10 YR 5/4	70	7.5 YR 5/8	5	C	M	LS	FE SOFT MASSES, 15% COBBLE
10-14	2.5 Y 5/4	80	NA	0			S	
14+	5Y 5/3	95	7.5 YR 5/8	7	C	M	SICL	REDOX FT DISTINCT

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
✓ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
✓ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

INUNDATION VISABLE ON 6/2020 AERIAL IMAGERY

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP3

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): DRAINAGE CHANNEL Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR): C Lat: 37.3816 Long: -118.3783 Datum: ______

Soil Map Unit Name: DEHY-DEHY CALCAREOUS COMPLEX NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes ✓** **No ___**

Remarks:

POINT IS PHYSICALLY IN-CHANNEL, PSSC MAPPED IN UPLAND 8 m EAST OF CURRENT CHANNEL

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 6X6 m)			
1. Populus fremontii	1	Yes	FACU
2.			
3.			
4.			
	1 = Total Cover		
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Salix exigua	8	Yes	FACW
2. Rosa woodsii	2	No	FAC
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 6x6 m)			
1. Carex sp.	0.01	Yes	FAC
2. Erigeron canadensis	0.01	Yes	FAC
3. Stipa speciosa	0.01	Yes	FACU
4. Distichlis spicata	0.01	Yes	FAC
5.			
6.			
7.			
8.			
	0.04 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓** **No ___**

Remarks:

Carex sp. unidentifiable this time of year, in landscape position within wetland boundary, since most Carex sp are wetland plants this species was assigned FAC to be conservative

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-24	10 YR 2/1	60	2.5 y 3/1	58		M	SIL	
			7.5 YR 5/6	2	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP4

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): UPLAND Local relief (concave, convex, none): none Slope (%): 0-3

Subregion (LRR): ______ Lat: 37.3815 Long: -118.3785 Datum: ______

Soil Map Unit Name: DEHY-DEHY CALCAREOUS COMPLEX NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Ericameria nauseosa	6	Yes	UPL
2. Atriplex polycarpa	8	Yes	FACU
3.			
4.			
5.			
= Total Cover	14		
Herb Stratum (Plot size: 6x6 m)			
1. Stipa speciosa	8	Yes	FACU
2. Distichlis spicata	5	Yes	FAC
3. Glycyrrhiza lepidota	.05	No	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	13.05		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	2	x 3 = 6
FACU species	2	x 4 = 8
UPL species	1	x 5 = 5
Column Totals:	5 (A)	19 (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 3/2	100	N/A	0			SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP5

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): RIPARIAN Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion (LRR): ______ Lat: 37.3829 Long: -118.3757 Datum: ______

Soil Map Unit Name: XEROFLUVENTS NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?	✓	
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ✓ No ___

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 1X1 m)			
1. Salix exigua	35	Yes	FACW
2. Rosa woodsii	20	Yes	FAC
3.			
4.			
5.			
	55 = Total Cover		
Herb Stratum (Plot size: 1X1 m)			
1. Lepidium latifolium	0.1	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0.1 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

SOIL

Sampling Point: DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	2.5Y 3/1	85	7.5YR 5/8	3	C	M	SL	
7+	2.5Y 5/2	60	NA	0			S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

2009 aerial imagery shows inundation, 2020 aerial imagery shows saturation

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP6

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): convex Slope (%): 5-7

Subregion (LRR): ______ Lat: 37.3826 Long: -118.3759 Datum: ______

Soil Map Unit Name: INYO-POLETA COMPLEX NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Ericameria nauseosa	25	Yes	UPL
2. Salsola tragus	15	Yes	FACU
3.			
4.			
5.			
= Total Cover	40		
Herb Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	0		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	1	x 4 = 4
UPL species	1	x 5 = 5
Column Totals:	2 (A)	9 (B)

Prevalence Index = B/A = 4.5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	2.5Y 4/3	95	N/A	0			SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP7

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): RIPARIAN Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion (LRR): ______ Lat: 37.3832 Long: -118.3727 Datum: ______

Soil Map Unit Name: XEROFLUVENTS NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 10X10 m)			
1. Salix exigua	3	Yes	FACW
2. Rosa woodsii	6	Yes	FAC
3. Populus fremontii	0.1	No	FAC
4. Ericameria nauseosa	1	No	UPL
5.			
= Total Cover	10.1		
Herb Stratum (Plot size: 1X1 m)			
1. Lepidium latifolium	0.1	No	FAC
2. Baccharis glutinosa	0.1	No	FACW
3. Erigeron canadensis	0.5	Yes	FACU
4.			
5.			
6.			
7.			
8.			
= Total Cover	0.7		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 99 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

SOIL

Sampling Point: DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 3/2	99	7.5YR 4/6	5	C	M	SIL	
12+	7.5YR 5/2	65	7.5YR 4/6	5	C	M	S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

2006 aerial imagery shows inundation

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP8

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): UPLAND Local relief (concave, convex, none): concave Slope (%): 0-3

Subregion (LRR): ______ Lat: 37.3793 Long: -118.3787 Datum: ______

Soil Map Unit Name: DEHY-DEHY CALCAREOUS COMPLEX NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Ericameria nauseosa	1.5	Yes	UPL
2. Salix exigua	5	Yes	FACW
3.			
4.			
5.			
	6.5	= Total Cover	
Herb Stratum (Plot size: 6x6 m)			
1. Malvella leprosa	40	Yes	FACU
2. Distichlis spicata	0.1	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	40.1	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	1	x 2 = 2
FAC species	1	x 3 = 3
FACU species	1	x 4 = 4
UPL species	1	x 5 = 5
Column Totals:	4 (A)	14 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks:

SOIL

Sampling Point: DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 3/1	99	N/A	0			SIL	
4-12+	2.5Y 3/1	99	2.5Y 5/1	1	D	M	SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP9

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): RIPARIAN Local relief (concave, convex, none): none Slope (%): 5-7

Subregion (LRR): ______ Lat: 37.3623 Long: -118.3527 Datum: ______

Soil Map Unit Name: TORRIFLUVENTS-FLUVAQUENT NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ______
Hydric Soil Present?	Yes ✓	No ______
Wetland Hydrology Present?	Yes ✓	No ______

Is the Sampled Area within a Wetland? Yes ✓ No ______

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 1X1 m)			
1. Salix exigua	15	Yes	FACW
2. Rosa woodsii	45	Yes	FAC
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: 1X1 m)			
1. Lepidium latifolium	0.1	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0.1 = Total Cover		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species		x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ______

Remarks:

SOIL

Sampling Point: DP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	98	NA	0	C	M	SL	
4-10	10YR 3/1	99	NA	0			SL	
10+	2.5Y 5/2	85	NA	0			LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ✓ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Surface horizon sapric material, high organic C content

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ✓ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

2009 aerial imagery shows inundation, 2020 aerial imagery shows saturation

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: BIH-RSA City/County: BISHOP/INYO Sampling Date: 11/1/2022

Applicant/Owner: ______ State: CA Sampling Point: DP10

Investigator(s): N. LAMAS & A. SCHWYTER Section, Township, Range: ______

Landform (hillslope, terrace, etc.): UPLAND Local relief (concave, convex, none): convex Slope (%): 3-5

Subregion (LRR): ______ Lat: 37.3624 Long: -118.3526 Datum: ______

Soil Map Unit Name: INYO-POLETA COMPLEX NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: 6x6 m)			
1. Ericameria nauseosa	5	Yes	UPL
2. Atriplex polycarpa	8	Yes	FACU
3. Salix exigua	0.5	No	FACW
4.			
5.			
= Total Cover	13.5		
Herb Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	0		
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
= Total Cover	0		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	1	x 2 = 2
FAC species	0	x 3 = 0
FACU species	1	x 4 = 4
UPL species	1	x 5 = 5
Column Totals:	3 (A)	11 (B)

Prevalence Index = B/A = 3.666666666

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

SOIL

Sampling Point: DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	90	NA	0			LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix D
ORM Aquatic Resources Spreadsheet

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
ED-1	CALIFORNIA	R4	RIVERINE	Area	0.1448	ACRE	ISOLATE	37.38154	-118.37833	
FEW-1	CALIFORNIA	PEM	DEPRESS	Area	1.2712	ACRE	RPWWD	37.38335	-118.37288	
FFSW-1	CALIFORNIA	PSS	DEPRESS	Area	2.7866	ACRE	RPWWD	37.38300	-118.37580	
FFSW-2	CALIFORNIA	PSS	DEPRESS	Area	0.1581	ACRE	RPWWD	37.38323	-118.37450	
FFSW-3	CALIFORNIA	PSS	DEPRESS	Area	1.797	ACRE	RPWWD	37.36231	-118.35447	
FFSW-4	CALIFORNIA	PSS	DEPRESS	Area	2.8211	ACRE	ISOLATE	37.36279900	-118.35626900	
Rawson Canal	CALIFORNIA	R4SB	RIVERINE	Linear	950	FOOT	RPW	37.36248300	-118.35452000	

Appendix E
Representative Site Photographs

Photo 1: Data point 1, Upland. November 1, 2022

Photo 2: Data point 2, Dry Pond. November 1, 2022

Photo 3: Data point 3, ED-1. November 1, 2022

Photo 4: Data point 4, Rubber rabbitbrush scrub upland. November 1, 2022

SOURCE: ESA, 2022

Appendix E
Representative Site Photos 1 thru 4

Photo 5: Data point 5, FFSW-1. November 1, 2022

Photo 6: Data point 6, Disturbed/developed upland. November 1, 2022

Photo 7: Data point 7, FEW-1. November 1, 2022

Photo 8: FFSW-2. November 1, 2022

SOURCE: ESA, 2022

Appendix E
Representative Site Photos 5 thru 8

Photo 9: Rawson Canal, looking east. November 1, 2022

Photo 10: Data point 9, FFSW-4 looking northwest. November 1, 2022

Photo 11: Data point 10, Rubber rabbitbrush scrub upland. November 1, 2022

Photo 12: FFSW-3 looking southwest towards E Line Street, inaccessible. November 1, 2022

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SOURCE: ESA, 2022

Appendix E
Representative Site Photos 9 thru 12

ESA