Final

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Initial Study/Negative Declaration

Prepared for
County of Inyo
Department of Public Works
168 North Edwards Street
Independence, CA 93526

May 2021

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Initial Study for Proposed Commercial Airline Service at Bishop Airport

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PREFACE

Overview

This final Initial Study/Negative Declaration (IS/ND) was prepared by the Inyo County Department of Public Works. This Initial Study has been prepared to determine if the introduction of scheduled commercial air passenger service at Bishop Airport (BIH or Airport) may have significant effects on the environment, pursuant to the California Environmental Quality Act (CEQA) (Pub. Res. Code § 21000 *et seq*.) and in accordance with the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 *et seq*.) The introduction of commercial air passenger service at Bishop Airport is subject to discretionary approval by Inyo County and thus subject to CEQA. Inyo County will adopt this Negative Declaration if, based on the whole record, including the Initial Study and comments received, it determines that there is no substantial evidence that the project will have a significant effect on the environment (Cal. Code Regs., tit. 14, § 15074(b)).

Contents of the Final IS/ND

This final IS/ND was prepared pursuant to the CEQA Guidelines. This document includes comments received during the public review period, and responses to those comments prepared by Inyo County. Minor edits were made to the draft IS/ND as a result of comments received. The draft IS/ND is provided in this document.

Public Review Process

On March 2, 2021, Inyo County published, and released the draft IS/ND for a 41-day public review period. A Notice of Intent to Adopt a Negative Declaration was published on March 2, 2021 in the *Inyo Register* and March 4, 2021 in the *Mammoth Times*. Notice was also published on Inyo County's website[1] and the Town of Mammoth Lakes' website.[2] On March 4, 2021, Inyo County filed a Notice of Completion with the State Clearinghouse at the Governor's Office of Planning and Research, and the Draft IS/ND was distributed for review to State agencies. The draft IS/ND was distributed to the public electronically via the County's website. Hard copies of the draft IS/ND were available for review during the comment period at the Inyo County Department of Public Works (168 N. Edwards St., Independence, CA 93526) and for check out, from the Inyo County Free Library - Bishop Branch (210 Academy Ave., Bishop, CA 93514) and the Mono County Free Library - Mammoth Lakes Branch (400 Sierra Park Rd., Mammoth Lakes, CA 93546). Both the Inyo County Free Library and the Mono County Free Library were closed to the public; however, curbside pick-up was available by calling or emailing the library in advance.

[1] https://www.inyocounty.us/services/public-works, under Bishop Airport - Proposed Commercial Air Service NEPA/CEQA Review

[2] https://www.townofmammothlakes.ca.gov/

The 41-day comment period ended on Monday, April 12, 2021 at 5:00 p.m. Pacific Standard Time.

A Public Workshop was held to discuss the analyses presented in the Draft IS/ND and the separate Draft Environmental Assessment (EA) prepared for the Project under the National Environmental Quality Act (NEPA) and to answer questions from the public. The Public Workshop was held between 6:00 PM and 7:00 PM on April 1, 2021. The Public Workshop included a presentation followed by a question and answer period with the Study Team answering questions from attendees in real-time. A Public Hearing to receive formal verbal comments from the public on the Draft EA was held immediately after the Public Workshop between 7:00 PM and 8:00 PM. Registration to attend the Public Workshop and/or the Public Hearing was available at the following website: http://bit.ly/bishopairportregistration. More information on the Public Workshop/Public Hearing can be found at https://www.inyocounty.us/services/public-works.

Comments Received

This section provides comments received during the public review period for the draft IS/ND. Inyo County received four written comment letters. Minor edits to the draft IS/ND were made in response to the comments received. The commenters are listed below, followed by the comments and responses.

Comment Form No.	Commenter	Affiliation
01	Bruce Klein	General Public
02	Lorraine Masten	General Public
03	Yvonne Katzenstein	General Public
04	Grady Dutton	Mammoth Yosemite Airport, Town of Mammoth Lakes

01

230 Panorama Drive
Bishop, CA 93514

To:
Inyo County Public Works
Att: Ashley Helms, Deputy Public Works Director—Airports
168 N. Edwards Street
Independence, CA 93526

Re: Draft Environmental Assessment for Proposed Commercial Air Service at Bishop Airport

April 10, 2021

Dear Ms. Helms,

This letter is respectfully submitted in response to an invitation for public comment regarding correctness, completeness and adequacy of both the Initial Study (IS) and Draft Environmental Assessment (EA) for Proposed Commercial Air Service at Bishop Airport in Bishop, Inyo County, California. It is requested that the following comments be considered prior to possible adoption of a Negative Declaration and Finding of No Significant Impact.

The primary objective of these comments is to compel an Environmental Impact Report
(EIR) which exhaustively details the environment affected by the project and its consequences.
The IS and EA as written are inadequate, failing to thoroughly and forthrightly address the 01
spectrum of issues required. Rather, they have offered a standard NEPA template accomplishing
little else than "filling in the blanks." As such the IS and EA are incomplete and incorrect.

Cumulative project impacts will forever change the Eastern Sierra Region's quality of life
and threaten the health of its communities and ecosystems. The socioeconomic complexion of 02
Bishop itself, including child safety and environmental justice, will be inevitably and forever
altered.

Let's consider the enormous toxicity of jet fuel and its exhaust. Volumes of data document
jet toxin and noise impacts. Aircraft powering up and down the Valley morning through evening
up to ½ the year, toxic emissions absorbed by, and contaminating biological resources-- vegetation 03
soil, water and air--will indeed damage ecosystems, human health and disrupt reproduction of
avian, insect, mammal & reptilian wildlife, as well as that of cattle. Economically vital alfalfa
production will be affected.

The Eastern Sierra's geographic isolation has included isolation from aircraft noise. Large 04
aircraft of the type proposed will produce decibel levels that exceed what residents find acceptable.

Los Angeles Water & Power groundwater pumping has depressed regional water tables to
an extent that vegetative viability is interminably challenged. The desiccating effect of jet exhaust 05
upon vegetation cannot be limited to flight paths, but will drift trapped through the Owens Valley

(deepest valley in the lower forty-eight) and beyond, contributing to increased hazard, risk and resistance to control of wildfire.

Sunlight turns jet exhaust into sub-micrometer particulate (wired.com/2011: Richard Miake-Lye/Aerodyne Research). The county's NEPA documents lack clarity on how aircraft emissions impact local and regional air quality, from engines idling on runway asphalt and in the air. Unavoidably, Inyo will require an Environmental Impact Statement (EIR).

Jet fuel exposure, a well-known and highly toxic immunomodulator, causes a wide range of health problems (ncbi.nih.gov/pmc/articles) especially severe for people working on or near the asphalt where jet engines are running. Frequent jet fuel vapor inhalation causes destruction of bone marrow as well as finding its way into lungs where it coats alveoli, the sacs that collect air, making breathing difficult. Inyo's EIR *must* address these impacts to airfield workers or community members living under or nearby a flight path (within 1 mile).

Here are facts Inyoites must consider (SteadyHealth.com/Healthy Living articles/Surprising Effects of Jet Fuel Toxins/ Robert Rister; 2013—04-04):

- Jet fuel exhaust and fumes are toxic to children and their safety. Exposure during pregnancy results in lower birth weights and exposure during the first three years of life results in slower intellectual development and higher rates of ADD and ADHD, 05
- Jet Fuel exposure increases severity of influenza via production of immune-suppressive chemicals. In the age of Covid, why risk introducing these chemicals into Inyo's air?.
- People working around jet fuel are exposed to the bio-accumulative carcinogen naphthalene at a rate 1000-3000 times higher than the general public.
- Depending on exposure to varied fuel blends, jet fuels cause varying degrees of skin inflammation and irritation from severe to not-so-severe.
- Exposure to jet exhaust is more toxic than exposure to jet fuel, since heated fuel releases a greater variety of toxic compounds into the atmosphere.

Owens Valley communities have spoken clearly about the importance of clean air for optimal human and animal respiratory systems. Following the lengthy battle with Los Angeles Dept. of Water & Power (LADWP) over PM-10 particulate on Owens Dry Lake, it is ironic that Inyo County representatives slap-dashed their way through this abbreviated review process.

According to the World Health Organization, the most common causes of death due to air pollution are cardiovascular and respiratory diseases, including lung cancer. Plane exhaust kills more people than plane crashes. As we learned from the prolonged dry lake fight, so-called particulate matter about a hundred millionths of an inch wide is the main culprit in human health effects, becoming lodged deep in our lungs and entering the bloodstream. Inyo County must take a risk assessment approach for Bishop in its critically essential EIR.

In a region already being loved to death via visitation, where wilderness portals resemble Dodger Stadium entryways, commercial air service will elevate visitation to a level that can only be defined as industrial recreation. Ironic—visitors characterizing themselves as 06
environmentalists, arriving in aircraft contributing carbon to the atmosphere and climate change.

The EA should have discussed aircraft biofuels, which have proved viable. The fallacy is that the
regional economy is driven by tourism, when in fact the driver is the existence of the region's 06
public lands with tourism its beneficiary. Increased visitation will further degrade wilderness areas.

The Town of Mammoth Lakes in particular has in the past marketed itself as a welcome-
to-wellness destination. An eco--pragmatism that welcomes an exponential increase in Eastside
hydrocarbon production as wellness—the reality is that during the last gasp of Mammoth-
Yosemite's subsidized air service, enplanements saw large drops. Unexplained: visitors deplane
in Bishop, then what? Bus to Mammoth? Rent an all-wheel drive vehicle? The bulk of roundtrip
passengers will originate in Los Angeles. Arriving via freeway at LAX early for their flight, then 07
the bus or vehicle rental--perhaps enplanement reduction was backlash to nonexistent need?

Many previously out-of-state folks have located to the Eastern Sierra and fail to grasp that
Mammoth's an extension of seven SoCal counties. With scores of millions spent by state and feds
on a high standard four-laned State Route 14/ US Hwy 395 travel is the Eastern Sierra by vehicle
will remain the primary transportation preference.

Covid has resulted in lots more folks purchasing increasingly costly homes in the Eastern
Sierra, many able to work remotely. The expensive housing market, often the true rationale for
existence of ski resorts, has morphed into a bonanza for short -term rentals, further complicating
workforce housing. Of course, Mammoth has an excellent workforce housing program called the
City of Bishop, where affordable rentals for Bishop residents have become nonexistent. Many 08
families from elsewhere turn down employment in Bishop once they view real estate prices. The
prospect of visitors utilizing increasing numbers of short-term rentals while Inyo's own workforce,
often Hispanic residents, overpay for essentially unaffordable housing--an additional
socioeconomic negative impact.

Isn't proposed commercial air service a throw of the dice by Denver-based Mammoth
Mountain owner Alterra? One of the daily flights even originates there. These are the folks who
cancelled season ski pass discounts for senior citizen residents of Mammoth. Based upon all of the
above, it's reasonable to question the purpose and need of commercial air, especially when we 09
Inyoites will inevitably be asked to vote for a bond to increase property taxes 1.5-2% in order to
improve the airport terminal and infrastructure, purchase a crash truck, hire, train and sustain its
crew, etc. etc.

The Draft states that Inyo will join the public-private alliance to subsidize air service via a
Minimum Revenue Guarantee Contract. Has such contractual commitment been memorialized in
in resolution by Inyo's Board of Supervisors? Who specifically benefits in Inyo? Upon what basis 10
of fact? Where is detailed cost benefit analysis? Specifically, where will funds come from for
Inyo's share of financial air service subsidies?

The Draft identifies ESCOG's project support. It must be pointed out that this self-
appointed group fails to include participation by even one of the seven federally-recognized Tribal 11
governments in Inyo and Mono Counties. As former planner for Bishop Paiute, it can be
unreservedly stated these omissions are racist and deliberate. Similarly, the board of Inyo Mono

Advocates for Community Action, an organization of long-standing that assists underserved, low income populations in both counties, has not been consulted. 11

Previously, I've repeatedly requested notification from Inyo County regarding workshops and comment periods. None have been provided despite attendance at the January, 2020 that 12 included speaking and submission of written input at that time.

In conclusion, multiple issues must be completely addressed in an EIR.

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Thank you for the opportunity to comment upon this project.

Sincerely,

Bruce Allan Klein
buckklein@suddenlink.net

02

April, 12, 2021

Regarding Air Service In Bishop
To Whom It May Concern:

I was walking with a friend some years ago on East Line Street near the airport when a small private jet flew low overhead and landed at the Bishop Airport. My hands covered my ears, but there was no escaping from the horrible smell of jet fuel that fouled the air.

The jets that would be using the Bishop Airport should this use of our local airport be approved, are much larger, noisier, and stinker. Because of the high mountain ranges on both sides of the Owens Valley, a weather 01
pattern can occur that traps air in our valley for long periods of time. This inversion layer would keep the pollution from the jets down here where we breathe. Sensitive people such as those with asthma would suffer.

I object to the airport expansion. If it is decided to allow jets to land
here, that should only be allowed when they cannot land at the airport near 02
Mammoth Lakes due to dangerous weather conditions.

Sincerely,
Lorraine Masten
2678 Sierra Vista Way
Bishop, CA 93514

03

In regards to the proposal to allow commercial airline service at Bishop Airport, I have significant concerns about resulting impacts to the air quality in the town of Bishop and throughout the Owens Valley.

I have reviewed the Draft Environmental Assessment document and the Initial Study document sections concerning proposed impacts to our air quality. I am not in agreement with findings given there.

The Owens Valley is recognized as the deepest valley in North America. Its ~ 6-8 mile wide bottom runs parallel to and is enclosed by the Sierra Mountains to the West and the White Mountains to the East. Both of these ranges have peaks over 14,000 feet high, and form sharply rising barriers mostly 10,000 feet tall or more for about 100 miles length.

This geographic topography forms a geophysical ‘vessel’ capable of trapping anthropogenic atmospheric pollutants. With a desert climate providing sun energy (hν) most of the year, this valley is very capable of producing photochemical smog. Additionally the pattern of the jet-stream flow across this region often provides a natural ‘lid’ atop our valley confining air masses — including pollutants — therein. Thus, our air can be extra ‘cooked’ under these conditions to further promote photochemical alteration of trapped primary pollutants.

There are several pollutants of major health concern present in smog. Some are primary pollutants such as particles and sulfur dioxide. There are also pollutants that are products of photochemical alteration of primary pollutants. One of those is ozone (O3) and the other is nitrogen dioxide (NO2). 01

I reviewed the limited available dataset that contains measured concentrations of O3 in the ground level air near Bishop. I could find only one monitoring station where it was measured — the one located at the White Mountain Research Station. Those data record several occurrences of O3 rising higher than the federal and California standards. And these occurrences have been recorded prior to the input into our local atmosphere of exhaust from commercial airliners. Ozone is of concern since it has been shown to harm lungs — inflaming and damaging airways. Children are at greatest risk of harm since their lungs are developing. Older adults and people who are active outdoors are also at increased risk.

Also of concern are the secondary particulates that form in photochemical smog. These are normally represented by values of PM10 and PM2. They also can harm lungs. Beyond damage from their caustic chemicals is their ability to move deep into our airways. And in addition to the particulates formed in photochemical smog, the Owens Valley has a known source that contributes primary particles to our air. The Owens Lake dry bed has been a source of unhealthy PM10 and PM2 size particulates for many years. It’s contribution of particles to the air we Owens Valley residents breathe has been lowered due to surface mitigations made to the lakebed by LADWP. However, there still remain episodic contributions of these lakebed particulates to our air. Increasing the quantity and chemical nature of primary particulates due to large commercial aircraft as well as the resulting secondary particulates due to photochemical processes should be avoided.

Yvonne Katzenstein
April 12, 2021

From: Grady Dutton [mailto:gdutton@townofmammothlakes.ca.gov]
Sent: Monday, April 12, 2021 3:05 PM
To: BIHPart139EA@esaassoc.com; BIH_ISND@esaassoc.com
Cc: Ashley Helms; Michael Errante; Sandra Moberly; Dan Holler; Vince Maniaci; Sierra Shultz
Subject: Comments to Draft EA and Draft IS/ND for Proposed Commercial Service at Bishop Airport

Attention:

ESA
Sacramento, CA

And

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

Ashley,

Thank you for this opportunity to review and respond to your Draft EA and Draft IS/ND for

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

In accordance with your Notice of Availability, we are submitting our comments electronically by email to:

BIHPart139EA@esassoc.com and BIH_ISND@esassoc.com with copy to Inyo County.

We understand comments are due by today, April 12, at 5:00 PM. In preparation, we reviewed both the draft EA and the draft IS/ND as provided on Inyo County's web site. We also attended the Zoom public workshop and public hearing held on April 1, 2021.

We reviewed the information with the clear understanding that the project description went a long way toward defining the content and level of analysis. We did not comment on items outside that limited project description/scope of work. In discussing this with Town staff and considering community and other general comments we have heard informally over time, we will be sending a separate email to request additional detail. An example? We would like to better understand the rental care company's plans for both airports. As you can see, that is not an item that needs to be addressed in your analysis, but it is a subject of interest here in Town. We are planning to provide an overall airport update to our Town Council on April 21. We expect to ask Town Council if they have any specific questions, so that subsequent email will be provided after that presentation.

Formal EA and IS/ND Comment:

In an effort to clarify/provide additional information: In the EA, Section 1.2, Background, it states (***note bold/italics below***):

1.2 Background

Inyo County has identified an unmet demand for commercial air passenger service in the Eastern Sierra region of California. Currently, commercial air passenger service to the region is only offered at Mammoth Yosemite Airport (MMH). Commercial service at MMH is provided by United Airlines, Inc. through its partner SkyWest Airlines (operating as United Express). While commercial air passenger service to MMH has been successful overall, there have been challenges that have resulted in unmet demand. For example, unpredictable winter weather conditions leading to low visibility and unfavorable crosswinds have led to an average flight cancellation rate of 12 percent during the winter season since commercial service began in 2008 (see *Mammoth Yosemite Airport Aviation Activity Forecasts, March 2017* in Appendix D-1, *Bishop Airport Aviation* 01
Activity Forecast). As Mammoth Mountain is a popular ski resort, demand for commercial air passenger service is heaviest during the winter season. Cancellation of airline flights has a direct financial impact to local stakeholders, negatively affecting airline schedules, and frustrating airline passengers. ***The high rate of cancelled flights and lack of flight schedule reliability has affected demand for service and annual enplanements have declined since peaking in 2013.***

Comment: There are a number of factors that can and have affected annual enplanements at Mammoth Yosemite Airport. Rate of cancellation and lack of flight schedule are certainly two of those. It should be noted, however, that a critical factor that has significantly affected enplanements is the reduction in scheduled available seats offered. Mammoth Lakes Tourism has maintained detailed records of available seats, tickets sold and the corresponding load factor over time and they can be contacted for that information. Understand, however, that in 2013, MMH had over 30,000 enplanements on an available seat number of over 110,000. The high cost of subsidies and other factors, including the desire to significantly increase the resultant load factor, resulted in a reduced schedule and reduced route and seat offerings.

Thank you again for the opportunity to comment.

Grady Dutton
Airport Manager
Town of Mammoth Lakes

Responses to Comments

This section provides responses to the comments received during the public review period for the draft IS/ND.

Comment Letter 01 – Bruce Klein

Response 01

Under the California Environmental Quality Act (CEQA), preparation of an Environmental Impact Report (EIR) would be warranted if significant impacts had been identified in the IS. No significant impacts associated with the Proposed Project were identified; therefore, preparation of an EIR would not be warranted.

Response 02

The IS analyzed the potential for the Proposed Project to result in significant impacts to several environmental resource categories. There were no significant impacts identified for any of the environmental resource categories analyzed that would threaten the health of the local community or degrade regional quality of life.

Response 03

Commercial service aircraft operating above the Owens Valley beyond the immediate Airport area will likely be traveling at altitudes 3,000 feet above field elevation (AFE). This represents the nationwide average mixing height. Above the mixing height, pollutants are dispersed in the upper atmosphere and do not typically mix with ground level emissions, affecting local ground level concentrations of pollutants. Therefore, emissions from commercial service aircraft operating above the mixing height will have negligible effect on ground level concentrations of pollutants.

Response 04

A noise analysis was prepared in support of the IS (see Section XIII of the Environmental Checklist). The noise analysis included the preparation of Community Noise Exposure Level (CNEL) noise contours. The CNEL contours prepared as part of the noise analysis show that the CNEL 65 dB contour does not extend beyond the Airport property. BIH is located in unincorporated Inyo County. As discussed in the IS, Policy NOI-1.1 in the Public Safety Element of the Inyo County General Plan establishes acceptable noise limits for evaluating project compatibility related to noise. Policy NOI-1.4 addresses transportation-related noise and requires a noise impact analysis in areas where current or future noise levels from transportation sources exceeds Day-Night Average Sound Level (Ldn) 65 dB. The nearest noise sensitive land use to the Airport is located approximately 0.5 miles south of the Runway 30 end, well outside the CNEL 65 dB contours. Therefore, the Proposed Project would not produce a substantial temporary or permanent increase in ambient noise levels beyond the Airport in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies and any impact would be less than significant.

Response 05

The commenter raises several points related to air quality. An air quality analysis was prepared for the Proposed Project and is included as Appendix A to the IS. As discussed in the IS (see Section III of the Environmental Checklist), the Proposed Project would not include any construction or ground disturbance and includes only a minimal increase in aircraft operations at BIH and would not result in significant air quality impacts. Inyo County is in attainment for all criteria pollutants under the National Ambient Air Quality Standards (NAAQS) and while the County is in nonattainment for ozone (O3) and particulate matter 10 microns in diameter or less (PM10), BIH is located outside any area for which air quality management plans have been prepared. The Proposed Project would not conflict with or obstruct any air quality plan. In addition, the Proposed Project would not exceed the air quality significance thresholds adopted by the Great Basin Unified Air Pollution Control District (GBUAPCD), the air quality management district in which BIH is located and no net increase in any criteria pollutant for which the region is in nonattainment is anticipated as a result of the Proposed Project. The Proposed Project would also not expose sensitive receptors to excessive pollutant concentrations. The nearest sensitive receptors are residential uses located approximately 0.50 mile to the southwest of the Runway 30 end. However, operational emissions of all criteria air pollutants would not exceed significance thresholds and the Proposed Project includes no construction or other ground disturbance activities that would contribute to an increase in emission of criteria air pollutants. The Proposed Project would also not contribute to a significant increase in emissions from vehicular traffic compared to existing conditions. Accordingly, sensitive receptors in the vicinity of the Project Area would not be substantially more impacted than under existing conditions. Finally, the initiation of commercial air passenger service under the Proposed Project would not result in the production of any emissions at BIH characteristically different than those produced under existing conditions and the Proposed Project would not result in other emissions that would adversely affect a substantial number of people.

Response 06

In 2028, the Airport would see a maximum of six aircraft arrivals and departures per day during the winter season (December 15 through April 15) with fewer than 1,100 passengers and one arrival/departure per day during the summer and shoulder seasons (April 16 through December 14) with fewer than 150 passengers. This would not represent a substantial increase in the number of aircraft operations, nor would it constitute a substantial increase in aircraft passengers.

The use of bio-fuels is not a part of the Proposed Project. While there have been some tentative steps towards the use of bio-fuels in the aviation industry, this fuel source is still nascent and unlikely to become widespread within the planning horizon for the Proposed Project. Therefore, further discussion of bio-fuels would not be warranted.

Response 07

As discussed in the Background section of the IS, unpredictable winter weather conditions in the Mammoth Lakes area leading to low visibility and unfavorable crosswinds have contributed to an average flight cancellation rate of 12 percent during the winter season since commercial service began in 2008. The high rate of cancelled flights and lack of flight schedule reliability has affected service and subsequently, annual enplanements have declined.

While surface transportation services to and from Mammoth Lakes from BIH are not part of the Proposed Project, regional stakeholders have indicated that taxi and private shuttle service using vehicles such as passenger vans and sports utility vehicles (SUVs) would be utilized to transport visitors to Mammoth Lakes and the Mammoth Mountain resort area. Rental car service, which is currently provided at BIH by Enterprise Rent-a-Car but could be offered by other companies, will continue to be available to travelers. These vehicles would be parked at BIH in spaces reserved for rental vehicles. These connected actions, off-airport vehicle trips, were included in the environmental analyses conducted for the IS.

The commenter states that motor vehicle travel on US Highway 395 will remain the primary transportation preference for visitors to the Eastern Sierra. This is not inconsistent with the Proposed Project, which does not seek to replace existing automobile traffic generated by visitors but to meet unmet demand for commercial air passenger service in the Eastern Sierra region.

Response 08

The commenter states that the pandemic has generated an increase in the number of people purchasing homes in the Eastern Sierra region, reducing local housing stock. This activity is unrelated to the Proposed Project. As discussed in the IS (see Section XIV of the Environmental Checklist), employment at BIH would be anticipated to increase by 12 to 16 new employee positions (depending on season) in 2022, with a potential increase of an additional two employees by 2028. It is expected that the potential employment opportunities would be filled locally and would be anticipated to provide a direct and indirect economic benefit to the surrounding community. The increase in employment opportunities at the Airport, as well as an increase in tourist traffic in the local area due to the introduction of commercial air passenger service would likely induce some local economic growth with a corresponding change in the community tax base; however, any economic growth would be beneficial to the local economy and the Eastern Sierra region as whole.

Response 09

There are no plans for a bond measure to raise funds for Airport improvements. A previously planned expansion of the terminal is in process and a fully federally funded Aircraft Rescue and Fire Fighting (ARFF) vehicle has already been acquired. The ARFF vehicle will be staffed by existing Airport operations employees.

Response 10

Inyo County would participate in a Minimum Revenue Guarantee Contract. The contract would be memorialized by the Inyo County Board of Supervisors before the commencement of commercial air service.

Response 11

The issue raised by the commenter lies beyond the scope of this project. However, Inyo County did contact the Bishop Paiute Tribe as part of the CEQA process. Please see Appendix C to the IS for more information.

Response 12

Notice of release of the IS/ND for public review was published on the Inyo County website and in the Inyo Register on March 2, 2021 and in the Mammoth Times on March 4, 2021. A reminder email to review and comment on the IS/ND was sent during the public review period to all parties who provided their email address at the two scoping meetings held for the project in January 2020.

Comment Letter 02 – Lorraine Matsen

Response 01

As discussed in the Project Description in the IS, commercial air passenger service would begin with one arrival and one departure per day during the summer and shoulder seasons (April 16 through December 14) and three arrivals and three departures per day during the winter season (December 15 through April 15), gradually increasing to six arrivals/departures per day during the winter season by 2028. This does not represent a substantial increase in the number of aircraft operations at the Airport, nor would it produce a dramatic increase in emissions. An air quality analysis was prepared for the IS and is included as Appendix A. As discussed in the IS (see Section III of the Environmental Checklist), the air quality analysis determined that Proposed Project would not result in significant air quality impacts.

Response 02

Aircraft are currently diverted from Mammoth Yosemite Airport due to inclement weather (see Appendix D for more information on aircraft diversions). Approximately six charter flights a year are diverted to Bishop Airport from Mammoth Yosemite Airport. Under FAA regulations, it is not feasible for air carrier operations to be diverted to Bishop Airport. Issuance of a Part 139 Class I Operating Certificate is necessary to allow air carrier operations at Bishop Airport and the certification would not be sustainable without the revenue from scheduled commercial service.

Comment Letter 03 – Yvonne Katzenstein

Response 01

An extensive air quality analysis was completed for the IS and is included as Appendix A. As discussed in the IS (see Section III of the Environmental Checklist), the analysis, included not just aircraft emissions, but emissions from GSE used to serve commercial aircraft operations at BIH, as well as emissions from indirect off-airport vehicular travel. The results of the analysis indicate that the Proposed Project would not result in significant air quality impacts. While the County is in nonattainment for ozone (O_3) and particulate matter 10 microns in diameter or less (PM_{10}) under the California Ambient Air Quality Standards (CAAQS), BIH is located outside any area for which air quality management plans have been prepared. The Proposed Project would not conflict with or obstruct any air quality plan, nor would the Proposed Project exceed the air quality significance thresholds adopted by the Great Basin Unified Air Pollution Control District (GBUAPCD), the air quality management district in which BIH is located. No net increase in any criteria pollutant for which the region is in nonattainment is anticipated as a result of the Proposed Project.

Comment Letter 04 – Grady Dutton

Response 01

The Initial Study text has been revised to reflect the suggested addition as appropriate.

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NEGATIVE DECLARATION

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PROPOSED NEGATIVE DECLARATION
PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

PROJECT TITLE: Proposed Commercial Airline Service at Bishop Airport

LEAD AGENCY/PROJECT PROPONENT: County of Inyo, Department of Public Works

BRIEF PROJECT DESCRIPTION: The Proposed Project would introduce and operate commercial air passenger service at Bishop Airport in Inyo County. The Proposed Project would not require alteration of existing airfield facilities or disturbance of any ground on or off the Airport property. To allow for the introduction of commercial air passenger service at Bishop Airport, Inyo County seeks to obtain a Part 139 Airport Operating Certificate for Bishop Airport from the Federal Aviation Administration to accommodate scheduled or unscheduled commercial air passenger service. United Airlines, Inc. and its partner SkyWest Airlines, operating as United Express (henceforth referred to as SkyWest Airlines) have expressed interest in providing service to Bishop Airport. SkyWest Airlines seeks amendment of its operations specifications from the FAA which would allow it to offer commercial air passenger service at BIH beginning in July 2021. The Inyo County Board of Supervisors would issue approval of the Use and Licensing Agreement with SkyWest Airlines to begin commercial air passenger service at BIH.

PROJECT LOCATION: Bishop Airport is located approximately 1.5 miles east of the City of Bishop in unincorporated Inyo County. Inyo County is located in the Eastern Sierra region east of the Sierra Nevada mountains and west of the Nevada border. A map showing the location of Bishop Airport in a regional context is provided as Figure 1, on page 2 in the Initial Study.

INITIAL STUDY: An Initial Study the Proposed Project was prepared in accordance with the California Environmental Quality Act (CEQA)1 and its implementing guidelines2 to ascertain whether implementation of commercial air passenger service at Bishop Airport might have a significant effect on the environment. A copy of the Initial Study is attached to this proposed Negative Declaration and is incorporated by reference.

FINDING: Inyo County finds, on the basis of the whole record before it (including the Initial Study, and any comments received and responses thereto), that there is no substantial evidence that the Proposed Project may have a significant effect on the environment and that this Negative Declaration reflects Inyo County's independent judgment and analysis.

DATE: June 19, 2021

____

Ashley Helms,
Deputy Public Works Director – Airports,
Inyo County
Department of Public Works
168 N. Edwards St.
Independence, CA 93526

INITIAL STUDY

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Draft

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Initial Study/Negative Declaration

Prepared for
County of Inyo

February 2021

Draft

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Initial Study/Negative Declaration

Prepared for

County of Inyo
Department of Public Works
168 North Edwards Street
Independence, CA 93526

February 2021

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ESA

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PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT PROJECT

Draft Initial Study

Introduction

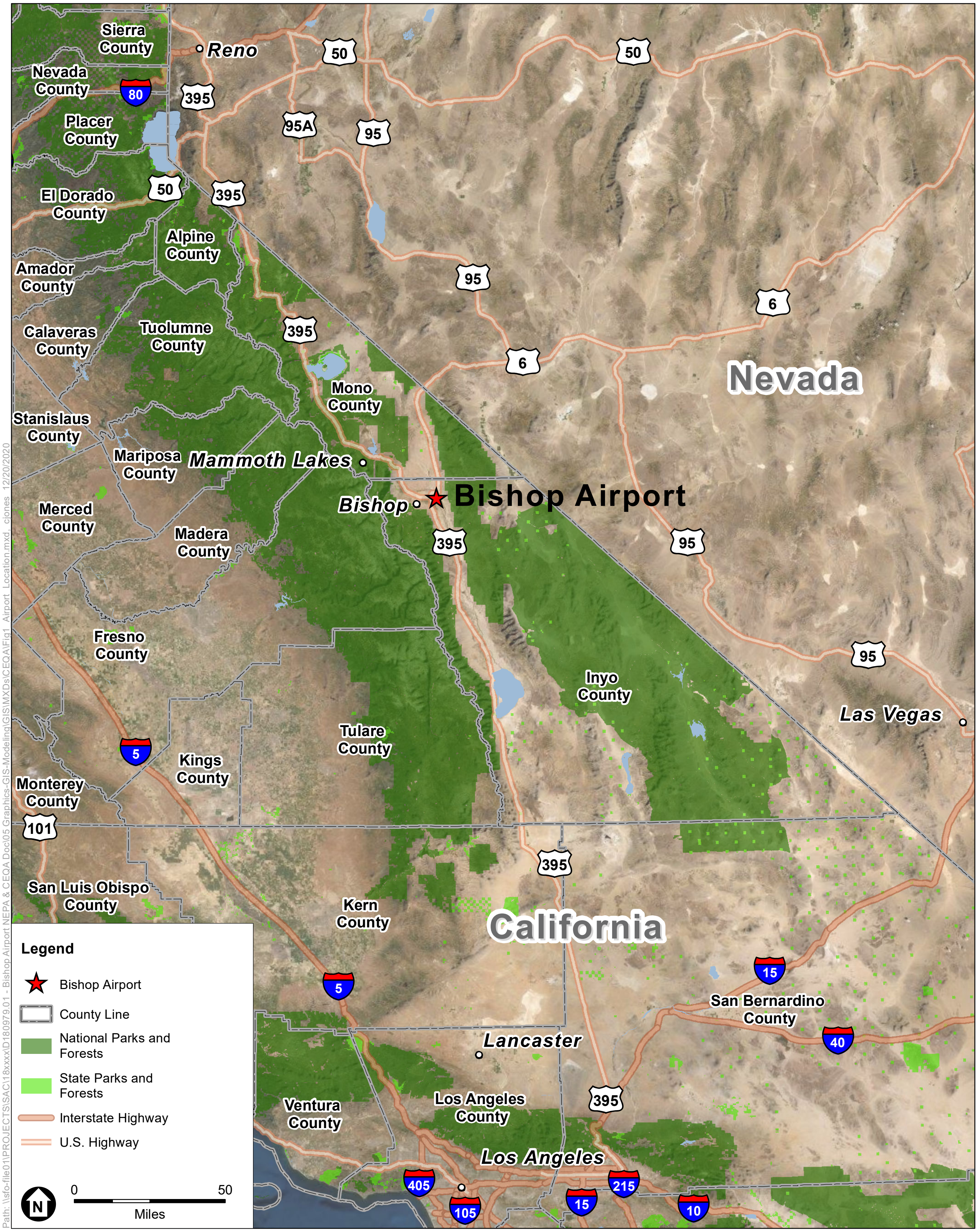
This Initial Study has been prepared pursuant to the California Environmental Quality Act (CEQA) to determine if the introduction of scheduled commercial air passenger service at Bishop Airport (BIH or Airport) may have significant effects on the environment. BIH is located approximately 1.5 miles east of the City of Bishop in unincorporated Inyo County. Inyo County is located in the Eastern Sierra region east of the Sierra Nevada mountains and west of the Nevada border. The Airport is owned and operated by Inyo County and is situated on three parcels leased from the City of Los Angeles Department of Water and Power (LADWP), constituting approximately 831-acres. The land surrounding the Airport is owned by the LADWP and consists primarily of undeveloped, open land leased to area ranches for cattle grazing. A small area of residential development and a cemetery are located south of the airport on Poleta Road. The location of the airport is shown on **Figure 1**. The airport and vicinity are depicted on **Figure 2**.

The introduction of commercial air passenger service at Bishop Airport is subject to discretionary approval by Inyo County and thus subject to CEQA. As owner and operator of the Airport, Inyo County is the lead agency under CEQA for purposes of this Initial Study. The following sections provide background information on the project as well a detailed project description.

Background

Inyo County has recognized an unmet demand for commercial air passenger service in the Eastern Sierra region. Currently, commercial service to the region is only offered at Mammoth Yosemite Airport (MMH), located approximately 45 miles northwest of BIH. Commercial service at MMH was introduced in December 2008 when Alaska Airlines began providing commercial air passenger service between Los Angeles International Airport (LAX) and MMH. Alaska Airlines ceased operating at MMH in 2018. However, United Airlines, Inc. and its partner SkyWest Airlines, operating as United Express (henceforth referred to as SkyWest Airlines) began and continues to provide commercial air passenger service at MMH.

While commercial air passenger service to MMH has been successful overall, there have been challenges that have resulted in unmet demand. For example, unpredictable winter weather

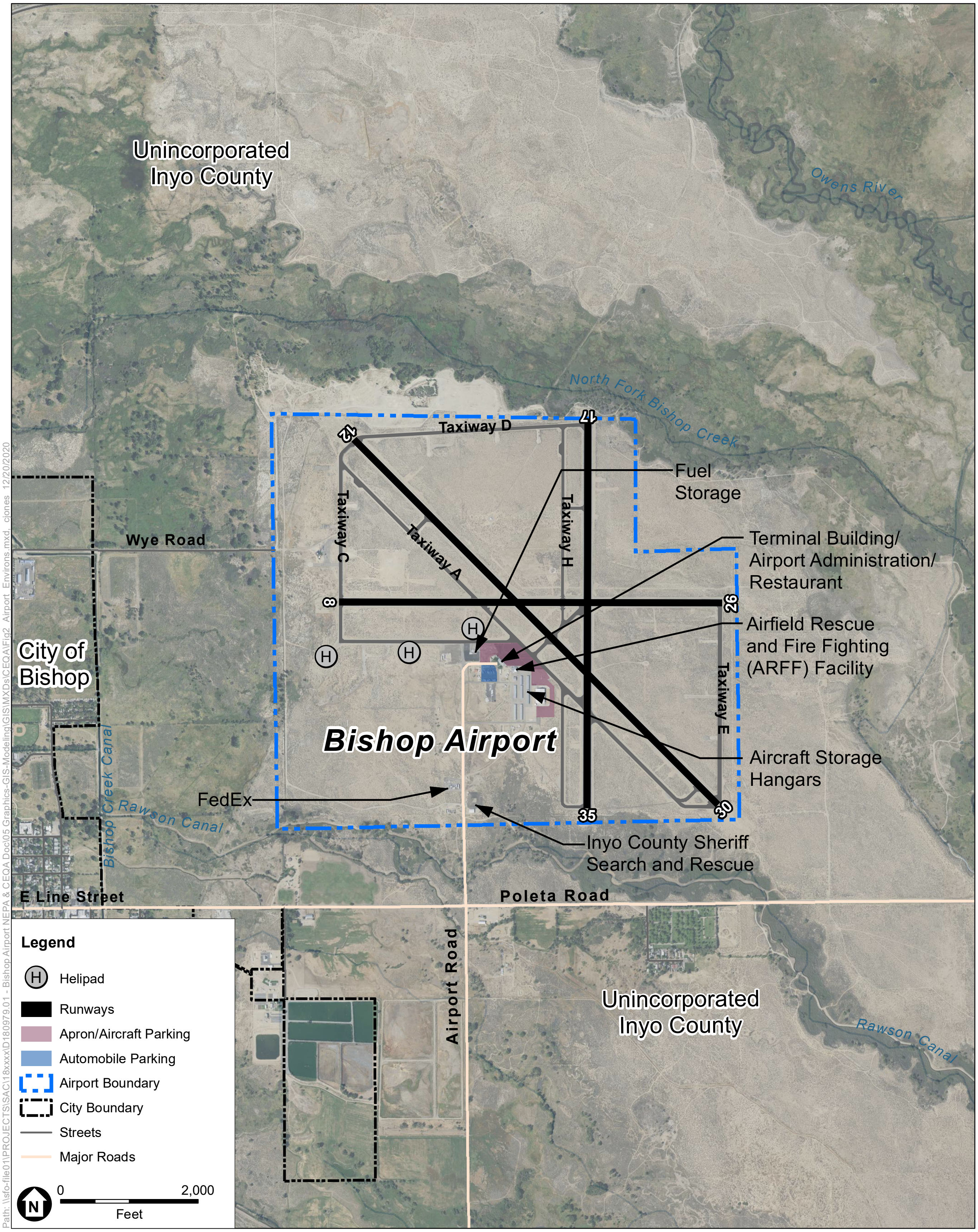


SOURCE: Esri; Inyo County Department of Public Works; ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 1
Airport Location
Bishop Airport

ESA



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

Proposed Commercial Airline Service at Bishop Airport

Figure 2
Airport Vicinity
Bishop Airport

ESA

conditions leading to low visibility and unfavorable crosswinds have contributed to an average flight cancellation rate of 12 percent during the winter season since commercial service began in 2008.[1] As Mammoth Mountain is a popular ski resort, demand for commercial air passenger service is highest during the winter season. The high rate of cancelled flights and lack of flight schedule reliability has affected service and annual enplanements have declined since peaking in 2013.[2]

Recognizing the unmet demand for service, Inyo County approached the Federal Aviation Administration (FAA) in 2014 about introducing commercial air passenger service at BIH. The Airport serves the majority of general aviation and military traffic in the Eastern Sierra region and because of its location in the Owens Valley, it has been less affected by the elevation and weather factors that have hampered service at MMH. In response, the FAA recommended that Inyo County coordinate with the Town of Mammoth Lakes to identify a regional solution to meeting unmet demand for commercial air passenger service. Beginning in 2015, Inyo County and the Town of Mammoth Lakes began coordinating on a regional solution with other regional stakeholders, including Mammoth Lakes Tourism (MLT) and Mammoth Mountain Ski Area (MMSA). These efforts have been focused on ensuring continuity of commercial air passenger service in the region. In January 2018, Inyo County and the Town of Mammoth Lakes adopted and signed a *Statement of Intent for Flexibility and Cooperation in the Development of Infrastructure and Programs in Support of the Provision of Reliable and Expanded Commercial Air Service* and delivered it to the FAA to help facilitate further development of commercial air passenger service in the region. The Eastern Sierra Council of Governments (ESCOG) has also supported efforts toward a regional solution to challenges facing commercial air passenger service. As part of its effort to reach a regional solution, ESCOG created the Mammoth Inyo Airport Working Group (MIAWG) to work on regional commercial air service strategies.

Bishop Airport

BIH is designated in the FAA's National Plan of Integrated Airport Systems (NPIAS) as a local, general aviation airport. The Airport currently serves general aviation activity, limited military activity, as well as charter and air cargo operations. Inyo County holds an easement on the land leased from the LADWP ensuring indefinite use of the property as an airport. The following sections describe the Airport's airside and landside facilities.

Airside Facilities

The Airport has three runways, Runway 12/30, Runway 17/35, and Runway 8/26. Runway 12/30, the Airport's primary runway, is 7,498 feet long by 100 feet wide. Commercial air passenger service will be accommodated on Runway 12/30. The runway is southeast/northwest oriented, paved with asphalt in excellent condition. Runways are designed to accommodate specific types of aircraft. The BIH Airport Layout Plan (ALP) identifies Airport Reference Code (ARC) C-II aircraft (e.g., Bombardier CRJ700) as the critical design aircraft for Runway 12/30. The ARC

[1] Town of Mammoth Lakes, Mammoth Yosemite Airport Aviation Activity Forecasts, March 2017.

[2] Other factors that have contributed to unmet demand include airline schedule adjustments due to inconvenient flight times, airport capacity during peak travel times, and elimination of routes with low passenger load factors.

includes two parts: Aircraft Approach Category (AAC) and Airplane Design Group (ADG). The Aircraft Approach Category is a grouping based on the speed at which aircraft approach a runway to land. Category C aircraft approach at a speed of 121 knots or more but less than 141 knots. The ADG is based on aircraft tail height and wingspan.[3]

The runway features nonprecision markings in good condition as well as medium intensity runway lights (MIRLs). Runway 12 features a 4-light Precision Approach Path Indicator (PAPI) with a 3.00-degree glide path on the left side of the runway and runway end identifier lights (REILs). Runway 30 features a 4-light PAPI with a 3.52-degree glide path on the left side of the runway and REILs. Runway 12 is served by two area navigation (RNAV) global positioning system (GPS) instrument approach procedures (RNAV (GPS) Y RWY 12 and RNAV (GPS) Z RWY 12). Runway 30 is served by an RNAV required navigation performance (RNP) instrument approach procedure (RNAV (RNP) RWY 30).

Runway 17/35 is north-south oriented, paved with asphalt in good condition, and features nonprecision markings in good condition as well as MIRLs. The runway is 5,600 feet long by 100 feet wide. Runway 17 features a 4-light PAPI with a 3.50-degree glide path on the left side of the runway and REILs. Runway 35 features a 4-light PAPI with a 3.00-degree glide path on the left side of the runway and REILs. Runway 17 is served by a localizer type directional aid (LDA) instrument approach procedure with distance measuring equipment (LDA RWY 17).

Runway 8/26 is east-west oriented and 5,567 feet long by 100 feet wide. In 2019, Inyo County requested and received a Categorical Exclusion for closure of Runway 8/26. The Runway 8 end will be converted to a taxiway and the Runway 26 end to helicopter parking. The runway is paved with asphalt in fair condition, and features nonprecision markings in good condition as well as MIRLs. Runway 8 features a 2-light PAPI with a 3.50-degree glide path on the left side of the runway. Runway 26 features a 2-light PAPI with a 3.00-degree glide path on the left side of the runway.

The traffic pattern off all runway ends is a standard left-hand pattern. Runways 12/30 and 17/35 are served by parallel taxiways (Taxiway A and Taxiway H, respectively). The Runway 17 end is connected to Runway 12/30 by Taxiway D. Runway 12/30 is connected to Runway 8/26 off the Runway 8 end by Taxiway C and off the Runway 26 end by Taxiway E. The Airport features two dedicated helipads south of the Runway 8 end and one helipad north of the Runway 8 end.

Landside Facilities

Landside facilities at the Airport include a terminal building and airport administration building, Federal Express (FedEx) Air cargo building, an aircraft parking apron and storage hangars, an aircraft rescue and firefighting (ARFF) building, aircraft fuel storage facilities, an airport restaurant, and vehicle parking areas. There is a planned expansion of the existing terminal, including a small automobile parking area. The terminal expansion is a separately planned project with independent utility and is not further evaluated in this Initial Study.

[3] Department of Transportation, Federal Aviation Administration, AC 150/5300-13A, *Airport Design,* February 2014.

FedEx Ground, the Inyo County Sheriff, and the Eastern Sierra Transit Authority (ESTA) also maintain facilities on Airport property.

Project Description

To allow for the introduction of commercial air passenger service at Bishop Airport, Inyo County seeks to obtain a Part 139 Airport Operating Certificate for Bishop Airport from the FAA to accommodate scheduled or unscheduled commercial air passenger service. SkyWest Airlines seeks amendment of its operations specifications which would allow it to offer commercial air passenger service at BIH beginning in July 2021. The Inyo County Board of Supervisors would issue approval of the Use and Licensing Agreement with SkyWest Airlines to begin commercial air passenger service at BIH.

Commercial Air Passenger Service

Commercial air passenger service would begin with one arrival and one departure per day during the summer and shoulder seasons (April 16 through December 14) and three arrivals and three departures per day during the winter season (December 15 through April 15). Service during the summer and shoulder seasons would consist of one flight daily between Los Angeles International Airport (LAX) and BIH. Service during the winter season would initially consist of one flight daily between Los Angeles International Airport (LAX) and BIH, Denver International Airport (DEN) and BIH, and San Francisco International Airport (SFO) and BIH. An additional flight to/from SFO is anticipated to be added during the 2024 winter season and an additional flight to/from San Diego International Airport (SAN) is anticipated to be added during the 2027 winter season. A second winter season flight to/from LAX is anticipated to be added in 2028.

Winter commercial air passenger service at MMH is subsidized through a Minimum Revenue Guarantee Contract managed through a public-private alliance between the Town of Mammoth Lakes, MMSA, and MLT, and largely funded through a Tourism Business Improvement District Tax. Similar to MMH, winter service at BIH would be subsidized through a Minimum Revenue Guarantee Contract with the same public-private alliance currently supporting airline operations at MMH. However, Inyo County would also join the alliance to help subsidize service at BIH.

Airport Preparation

The Proposed Project would not require alteration of existing airfield facilities or disturbance of any ground on or off the Airport property. Commercial service would be accommodated on the Airport’s main runway, Runway 12/30. To help facilitate Part 139 certification, the Airport will implement declared distances on Runway 12/30 to ensure that the Runway Safety Areas meet the FAA’s dimensional requirements for the runway’s critical design aircraft. Declared distances are the distances the airport owner declares available for an aircraft's takeoff run, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are Takeoff Run Available (TORA), Takeoff Distance Available (TODA), Accelerate-Stop Distance Available (ASDA), and Landing Distance Available (LDA). **Table 1** provides the dimensions for the declared distances to be implemented on Runway 12/30.

TABLE 1
DECLARED DISTANCES – RUNWAY 12/30

Runway	Type	Length (Feet)
12	TORA	7,498
12	TODA	7.498
12	ASDA	7,098
12	LDA	7,098
30	TORA	7,498
30	TODA	7,498
30	ASDA	6,743
30	LDA	6,743

NOTES:

TORA = Takeoff Run Available, the runway length declared available and suitable for the ground run of an aircraft taking off
TODA = Takeoff Distance Available, the TORA plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of TODA may need to be reduced because of obstacles in the departure area
ASDA = Accelerate-Stop Distance Available, the runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff
LDA = Landing Distance Available, the runway length declared available and suitable for landing an aircraft.

SOURCE: Bishop Airport Layout Plan, Inyo County Department of Public Works, May 2019; Department of Transportation, Federal Aviation Administration, AC 150/5300-13A, *Airport Design*, February 2014.

Ground Transportation

Private shuttle service using vehicles such as the Mercedes-Benz Sprinter passenger vans and sports utility vehicles (SUVs) would be introduced to BIH to transport visitors to Mammoth Lakes and the Mammoth Mountain resort area. Taxi service to and from Mammoth Lakes is currently available at BIH; however, this service is likely to expand to meet any increase in demand. Mammoth Lakes hotel shuttles and shuttle service provided by the MMSA currently serving MMH would not expand service to BIH. Enterprise Rent-a-Car, which currently provides rental car service to BIH, would continue to provide rental vehicles to travelers. These vehicles would be parked at BIH in spaces reserved for rental vehicles.

Operation and Employees

The Proposed Project would include employment opportunities associated with the introduction of commercial air passenger service and related services at BIH. Employment at BIH would be anticipated to increase by 12 to 16 new positions (depending on season) in 2022, with a potential increase of an additional two employees by 2028. New jobs arising from the Proposed Project may include baggage handlers, airfield personnel, Transportation Safety Administration (TSA) security screeners, airline customer service/ticketing counter personnel, and rental car agents.

ENVIRONMENTAL CHECKLIST

Initial Study

1. Project Title:	Proposed Commercial Airline Service at Bishop Airport
2. Lead Agency Name and Address:	County of Inyo, Department of Public Works
3. Contact Person and Phone Number:	Ashley Helms, Deputy Director of Public Works – Airports (760) 878-0200
4. Project Location:	Bishop Airport, Inyo County
5. Project Sponsor's Name and Address:	County of Inyo, Department of Public Works 168 North Edwards Street Independence, CA 93526
6. General Plan Designation(s):	Public Service Facilities (PF)
7. Zoning:	Public (P)

8. Description of Project:

The Proposed Project would introduce and operate commercial air passenger service at Bishop Airport in Inyo County. The Proposed Project would not require alteration of existing airfield facilities or disturbance of any ground on or off the Airport property.

9. Surrounding Land Uses and Setting.

Bishop Airport is located in a rural setting primarily surrounded by open space and agricultural land uses with a small area of residential development and a cemetery south of the Airport on Poleta Road. The Inyo County General Plan designates the majority of BIH property as (PF) Public Service Facilities with (LI) Light Industrial land use located in the southwestern corner of the Airport property. The Airport is within the Public (P) zoning district in the Inyo County Zoning Code. Lands surrounding the Airport are designated as Agriculture (A) in the Inyo County Plan and Open Space - 40 acre minimum (OS-40) in the Inyo County Zoning Code. While owned and operated by Inyo County, the Airport is located on property leased from the LADWP. Inyo County holds an easement on the land leased from the LADWP ensuring indefinite use of the property as an airport. The City of Bishop is located approximately one and a half miles west of the Airport.

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

The Federal Aviation Administration would issue an Airport Operating Certification for Bishop Airport under Title 14 Code of Federal Regulations (CFR) Part 139 to allow the Airport to provide scheduled or unscheduled commercial air service. The FAA would also address a request from SkyWest Airlines to amend its operations specifications to allow it to offer commercial air passenger service at BIH beginning in July 2021. Issuance of a Part 139 Airport Operating Certificate for Bishop Airport and amending the operations specifications for SkyWest Airlines are both federal actions subject to environmental review under the National Environmental Policy Act of 1969 (NEPA). The FAA is the lead federal agency to ensure the Proposed Project's compliance with NEPA.

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

The County of Inyo has consulted with California Native American tribes pursuant to Public Resources Code section 21080.3.1. The details of this consultation are provided in the *Tribal Cultural Resource*s sections of this Initial Study.

Environmental Factors Potentially Affected

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

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

DETERMINATION: (To be completed by the Lead Agency)
On the basis of this initial study:

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

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

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

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

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

Signature

2/25/2021

Date

Environmental Checklist

Aesthetics

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
I. AESTHETICS — Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☒	☐

Discussion

a–b) The Proposed Project would not include the construction of any buildings or other structures that would result in an obstruction of views of or damage to scenic resources or scenic vistas in the Airport area. Furthermore, because the number and frequency of aircraft operations is limited, with one arrival and one departure during the summer and shoulder seasons (April 16 through December 14) and by 2028 increasing to six arrivals and departures daily during the winter season (December 15 through April 15) and an additional operation during the summer and shoulder seasons, it is unlikely that aircraft in flight would detract from surrounding visual resources. Therefore, any impact on scenic vistas or scenic resources would be **less than significant**.

c) The Proposed Project would introduce commercial air passenger service to an already existing and active airport and would not require alteration of existing airfield facilities or disturbance of any ground on or off the Airport property. While the Proposed Project would result in an increase in flight operations and surface traffic, these activities would not substantially degrade the existing visual character or quality of public views of the site and its surroundings, and this impact would be **less than significant**.

d) The Proposed Project would not include construction of any structures or installation of any new airfield infrastructure that would result in increased emissions of light or creation of new sources of glare. Any new light generated by the Proposed Project would be the direct result of aircraft operations. Under the Proposed Project, only one arrival and departure would occur after sunset during the winter season (December 15th through April 15th). This operation includes an aircraft arrival at 5:00 P.M. and departure at 6:00 P.M. During the winter season, sunset occurs between roughly 4:30 P.M. and 6:00 P.M.

until the transition to Daylight Savings Time in early March. After the advent of Daylight Savings Time, all operations would take place during daylight hours until the beginning of the next winter season on December 15. The closest residential land uses are located approximately half a mile southwest of the Runway 35 end and approximately a mile and a half west of the Airport. Land use between the Airport and the nearest residential area is dedicated to open space and agricultural uses. Because of the distance between the nearest residential developments and the intermittent nature of this single aircraft operation, it is unlikely to cause a noticeable source of light emissions. Therefore, any impact associated with light emissions or glare would be **less than significant**.

Agriculture and Forestry Resources

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

Discussion

a–e The Inyo County General Plan designates the majority of BIH property as (PF) Public Service Facilities with (LI) Light Industrial land use located in the southwestern corner of the Airport property. The Airport is within the Public (P) zoning district in the Inyo County Zoning Code. Lands surrounding the Airport are designated as Agriculture (A) in the Inyo County Plan and Open Space - 40 acre minimum (OS-40) in the Inyo County Zoning Code.

The Proposed Project would introduce commercial air passenger service at Bishop Airport. The Proposed Project would not require alteration of existing airfield facilities or disturbance of any ground on or off Airport property. The Proposed Project would not result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance or forest land or conflict with existing zoning for agricultural land, forest land, or a Williamson Act contract. There would be **no impact** to agriculture and forestry resources.

Air Quality

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
III. AIR QUALITY — Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

Discussion

a) By 2028, the Proposed Project would include up to six commercial air passenger service arrivals and departures per day for four months per year (December 15 through April 15), and two arrivals and departures per day for eight months of the year (April 16 through December 14). Bishop Airport is located within the jurisdiction of the Great Basin Unified Air Pollution Control District (GBUAPCD) and Great Basin Valleys Air Basin. While there are four air quality plans in the GBUAPCD, none of them are applicable to the Airport. As the Proposed Project would not include any construction or ground disturbance and includes only a minimal increase in aircraft operations at BIH, no conflict with or obstruction of any air quality plan is anticipated and any impact would be **less than significant**.

b) The increase in daily operations at BIH associated with the Proposed Project would be minimal. Currently, neither Inyo County nor the GBUAPCD have established numerical significance thresholds for quantitatively determining air quality impacts. For the purposes of CEQA analysis, GBUAPCD uses the Mojave Desert Air Quality Management District (MDAQMD) standards as their regional significance thresholds. Inyo County is in nonattainment for ozone (VOC and NO_x as ozone precursors) and PM^{10} under the California Ambient Air Quality Standards (CAAQS). Excluding PM^{10}, the Air Basin is unclassified or in attainment for all criteria air pollutants under the National Ambient Air Quality Standards (NAAQS). Only portions of the Great Basin Valleys Air Basin, such as Owens Lake, are in nonattainment for PM^{10}. BIH is located outside these areas. An air quality analysis was prepared for the Proposed Project and is included as **Appendix A**. As shown in **Table 2**, the Proposed Project would not exceed MDAQMD significance thresholds for VOC, NO_x, or PM^{10}. Therefore, no net increase in any criteria pollutant for which the region is in nonattainment is anticipated, and any impact would be **less than significant**.

TABLE 2
PROPOSED PROJECT EMISSIONS INVENTORY (ANNUAL TONS) SUMMARY

	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2019 Existing Conditions						
	110.63	3.73	5.96	0.82	0.32	0.16
2022 Proposed Project						
Aircraft	112.23	3.77	8.32	1.13	0.12	0.12
Ground Support Equipment	0.12	0.04	0.10	0.00	0.00	0.00
Off-Airport Vehicular Travel	1.75	0.26	0.29	0.01	0.47	0.13
TOTAL	**114.10**	**4.07**	**8.71**	**1.14**	**0.59**	**0.25**
Net Change from Existing Conditions	3.47	0.34	2.75	0.32	0.27	0.09
MDAQMD Significance Threshold	100	25	25	25	15	12
Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**
2028 Proposed Project						
Aircraft	113.59	3.90	9.07	1.25	0.12	0.12
Ground Support Equipment	0.22	0.06	0.15	0.00	0.01	0.01
Off-Airport Vehicular Travel	1.86	0.29	0.23	0.01	0.72	0.19
TOTAL	**115.67**	**4.25**	**9.45**	**1.26**	**0.85**	**0.32**
Net Change from Existing Conditions	5.04	0.52	3.49	0.44	0.53	0.16
MDAQMD Significance Threshold	100	25	25	25	15	12
Significant Impact?	**No**	**No**	**No**	**No**	**No**	**No**

SOURCE: Environmental Science Associates, Inc., 2020.

c) The Proposed Project would not expose sensitive receptors to excessive pollutant concentrations. The nearest sensitive receptors are residential uses located approximately 0.50 mile to the southwest of the Runway 30 end. However, as shown in Table 2, operational emissions of all criteria air pollutants would not exceed significance thresholds. The Proposed Project includes no construction or other ground disturbance activities that would contribute to an increase in emission of criteria air pollutants. The additional daily aircraft operations associated with the Proposed Project do not represent a significant increase over existing conditions at BIH. Similarly, the Proposed Project would not contribute to a significant increase in emissions from vehicular traffic compared to existing conditions. Accordingly, sensitive receptors in the vicinity of the Project Area would not be substantially more impacted than under existing conditions, and any potential impact would be **less than significant**.

d) The initiation of commercial air passenger service under the Proposed Project would not result in the production of any emissions at BIH characteristically different than those produced under existing conditions. The Proposed Project would not avail itself of or include construction of stationary sources that would generate emissions, including objectionable odors. Other emissions of criteria pollutants (CO, SO_x, and $PM^{2.5}$) resulting from aircraft operations, ground support equipment, and/or vehicular traffic would not exceed established significance thresholds (see Table 2), and the Proposed Project would not result in other emissions that would adversely affect a substantial number of people. Therefore, any impact associated with other emissions such as those leading to odors would be **less than significant**.

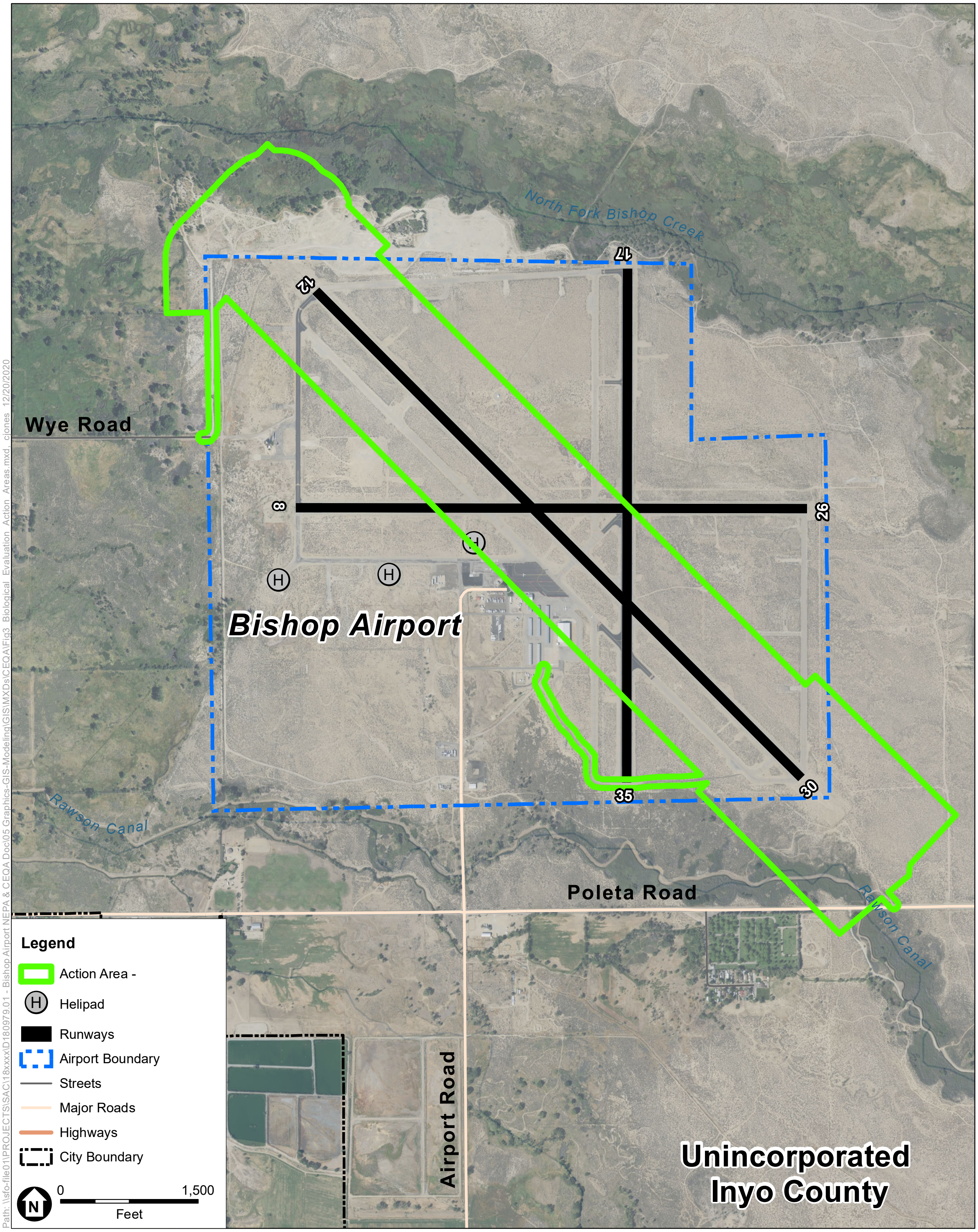
Biological Resources

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

Technical Analysis

In support of the NEPA EA prepared for this project, the FAA prepared a Biological Assessment (BA) to identify the potential effects of the Proposed Project on biological resources. The BA is included in **Appendix B**. An Action Area (AA) was delineated for use in preparing the BA and is depicted on **Figure 3**. The AA encompasses approximately 403 acres surrounding Runway 12/30, the runway safety areas (RSAs) beyond the runway ends, and a 500-foot buffer surrounding these facilities, as well as two roadways into the RSAs. These represent the areas that may be affected directly or indirectly by the Proposed Project.

As discussed in the BA, prior to conducting field visits, a literature search was performed in order to evaluate the potential presence of any protected species and/or their critical habitats within or adjacent to the AA. An official list of threatened and endangered species with potential to occur within the Proposed Project area was obtained by submitting the AA to the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Consultation (IPaC) System. In addition, the following database were queried to obtain additional information on state-listed species of concern:



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

Proposed Commercial Airline Service at Bishop Airport

Figure 3
Biological Assessment Action Area
Bishop Airport

- CDFW California Natural Diversity Database (CNDDB),
- Cornell Laboratory of Ornithology's eBird database, and the
- USFWS Environmental Conservation Online System (ECOS).

Environmental Setting

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), USFWS National Wetland Inventory (NWI), and field-verified by an ESA biologist. A number of field surveys were performed by the field biologist on June 7, 2019 and May 1, 2020. Results of the surveys, including photographs of the areas within the AA, are provided in Appendix B.

Habitat

The areas surrounding Runway 12/30 within the AA consist primarily 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 the removal of low-growing vegetation. The area to the northwest of the AA was previously used for gravel mining, but is largely abandoned, except for occasional off-highway vehicle use. The 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 primarily of low-growing ruderal grassland and common shrub species.

Wetland habitats at the extreme northwestern and southeastern ends of the AA were identified through research using the USFWS NWI database and the field survey conducted in May 2020. The AA contains potential habitat for wetland and stream species along North Fork Bishop Creek and Rawson Canal. North Fork Bishop Creek is described as a perennial stream, located approximately 1,600 feet from the end of Runway 12 (northwest side of the Airport property). Rawson Canal is a perennial stream located on the southeastern end of Runway 30, approximately 500 feet from the Airport property limits. Both streams are located within the Crowley Lake Watershed and empty into the Owens River.

The USFWS NWI identifies the presence of freshwater forested/shrub riparian habitat slightly within and immediately surrounding the AA. 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, close to North Fork Bishop Creek. In addition, small areas of willow trees and rose thicket are located to the south along Rawson Canal. Areas of willow and rose are located no closer than 815 feet to the north of Runway 12. Marginal riparian habitat is also located 830 feet south of Runway 30 along Rawson Canal. More details on the upland and wetland habitats within the AA are provided in Appendix B.

Vegetation Communities

Plant communities within the AA were identified using aerial photography and information collected during field surveys conducted by verified biologists on June 7, 2019 and May 1, 2020. As discussed, the AA includes upland and wetland vegetation communities. The shrub/scrub habitat within the AA consists primarily of low-growing ruderal grassland and common shrub species, such as rubber rabbitbrush (*Ericameria nauseosa*), with interspersed greasewood (*Sarcobatus vermiculatus*), and saltbush (*Atriplex spp.*).

Field visits within the AA confirmed that the wetland areas located in the northwest and southeastern parts of the RSAs beyond the Runway 12/30 ends areas consist of the following community vegetation types: Fremont cottonwood-willow riparian forest (*Populus fremontii-Salix gooddingii- S. lasiolepis S. laevigata Alliance*); Willow riparian woodland (*Salix gooddingii- S. lasiolepis Salix laevigata Alliance*); and Saltgrass meadow (*Distichlis spicata Alliance*). A formal delineation of potentially jurisdictional waters of the U.S. or state within the AA has not been conducted. More detailed descriptions of upland and wetland habitats within the AA can be found in Appendix B.

Special-Status Species

The federal and state-listed species with potential to occur in the AA are identified in **Table 3**. The species described in this section are based on the official list of threatened and endangered species provided by USFWS on September 30, 2020, field visits performed in 2019 and 2020, and research using the following sites: CDFW California Natural Diversity Database (CNDDB), Cornell Laboratory of Ornithology's eBird database, and the USFWS Environmental Conservation Online System (ECOS).

TABLE 3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA

Common and Scientific Name	Legal Status Federal	Legal Status State	Habitat Preference	Potential to Occur in the Action Area
Mammals				
Owens Valley Vole (*Microtus californicus vallicola)*	--	SSC	Grassy banks near water sources, upland meadows, and unused agricultural fields.	Low
Birds				
Western Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis)*	T	E	Woodland habitat with dense cover and water nearby, including low scrubby vegetation, dense thickets, and abandoned farmland.	Low
Southwestern Willow Flycatcher[a] (*Empidonax traillii extimus)*	E	E	Dense riparian tree and shrub communities near rivers, swamps, and other wetlands.	Possible
Yellow-breasted Chat (*Icteria virens*)	--	SSC	Dense shrubbery, including abandoned farm fields, forest openings and edges, swamps, and edges of streams and ponds.	Possible

TABLE 3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA

Common and Scientific Name	Legal Status Federal	Legal Status State	Habitat Preference	Potential to Occur in the Action Area
Burrowing Owl (*Athene cunicularia)*	--	SSC	Open dry areas with low vegetation, including grasslands, rangelands, agricultural areas, and deserts.	Possible
Yellow Warbler (*Setophaga petechia)*	--	SSC	Thickets and other disturbed habitats, particularly along streams and wetlands often among willows.	Possible
Northern Harrier (*Circus hudsonius)*	--	SSC	Undisturbed tracts of wetlands and grasslands with low, thick vegetation.	Possible
Fish				
Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi)*	T	--	Pristine, cool mountain streams to alkaline waters, high stream temperatures, and low dissolved oxygen.	Low
Owens Pupfish (*Cyprinodon radiosus)*	E	E	Spring pools, sloughs, irrigation ditches, swamps, and flooded pastures.	Low
Owens Tui Chub (*Gila bicolor ssp. Snyder)*	E	E	Standing waters and low gradient reaches of the Owens River and larger tributaries extending from the River's source.	Low
Plants				
Fish Slough Milk-vetch (*Astragalus lentiginosus var. piscinensis)*	T	--	Alkaline flats paralleling desert wetland ecosystems in Inyo and Mono counties, California.	Low

NOTES:

[a] The Southwestern Willow Flycatcher is a federally-listed bird species protected under the ESA. The species was not included in the official USFWS list of endangered or threatened species, but is included in the BA because habitat capable of supporting Southwestern Willow Flycatcher was found during site visits within the AA.

Species list was based on USFWS official species list in addition to research of historical information and survey efforts in 2019 and 2020. Potential to occur within the AA may also be influenced by occurrences in adjacent similar habitat. The USFWS has only designated Critical Habitat for Owens Tui Chub and Fish Slough Milk-vetch. Critical Habitat for the Western Yellow-billed Cuckoo is proposed and under review.

It is important to note that the Species of Special Concern is an administrative designation and carries no formal legal status. The intent of the designation is to focus attention on animals at possible conservation risk.

Status Codes:
E = Listed as Endangered
T = Listed as Threatened
SCS = Species of Special Concern
-- = No Status

SOURCES: U.S. Fish and Wildlife Service, Information, Planning, and Consultation (IPaC) System, April 29, 2020; California Department of Fish and Wildlife, State and Federally Listed Endangered and threatened Animals of California, July 17, 2020; California Department of Fish and Wildlife, Special Animals List, July 2020; California Department of Fish and Wildlife, Inland Deserts Region, https://wildlife.ca.gov/Regions/6 (Accessed August 4, 2020).

Discussion

a) The BA prepared for the Proposed Project assessed the potential for the presence of listed and special status species and habitat in the Airport environs. A shown in Table 3, the

USFWS identified a total of five federally listed threatened, endangered, or candidate species with potential to occur within the AA. Search of the CDFW database identified a total of nine state listed species or species of special concern with potential to occur in the AA. Four of these species are also federally listed. The following sections discuss the potential for these species to be directly or indirectly adversely affected by the Proposed Project.

Western 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. In addition, the bird species has not been detected during site visits conducted at the Airport. As the species is unlikely to be found in the Airport environs, potential impacts on the Western Yellow-billed Cuckoo or its habitat would be **less than significant**.

Lahontan Cutthroat Trout

The Lahontan Cutthroat Trout inhabits a wide range of habitats including cold, high-elevation mountain streams in California to lower-elevation desert lakes with high alkalinity. Their range extends from the Sierra Nevada Mountains northeast into Nevada and Oregon. Although the trout once occupied a vast range, it has since been extirpated from nearly 95% of its native habitat in California. Furthermore, the historic range of the Lahontan Cutthroat Trout includes Lake Tahoe and the Carson, Truckee, and Walker River basins that occur well north of the Airport.[4] The Cutthroat Trout species is not likely to occur in the Crowley Lake watershed, where the Airport is located. As the species is unlikely to be found in the Airport environs, potential impacts on the Lahontan Cutthroat Trout or its habitat would be **less than significant**.

4 U.S. Fish and Wildlife Service, Lahontan cutthroat trout. https://www.fws.gov/oregonfwo/articles.cfm?id=149489441#:~:text=Lahontan%20cutthroat%20trout%201%20Historical%20Status%20and%20Current,Reasons%20for%20Decline.%20...%205%20Conservation%20Measures.%20 (Accessed July 31, 2020).

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.[5] 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. As the species is unlikely to be found in the Airport environs, potential impacts on the Owens Pupfish or its habitat would be **less than significant**.

Owens Tui Chub

Critical Habitat for Owens Tui Chub does not exist on or adjacent to the AA. 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. The Owens River Gorge is located about seven miles northwest of the AA and represents the closest population of this fish species. Additional populations have been established in cooperation with land owners 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.[6] 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 AA. As the species is unlikely to be found in the Airport environs, potential impacts on the Owens Tui Chub or its habitat would be **less than significant**.

Fish Slough Milk-vetch

The Fish Slough Milk-vetch is largely dependent on desert spring-fed wetland ecosystems that consist of highly alkali soils. As previously mentioned, the Fish Slough ACEC includes a unique biome that supports a large diversity of fish and plant species.

5 California Department of Fish and Wildlife Service, Owens pupfish (Cyprinodon radiosus). https://wildlife.ca.gov/Regions/6/Desert-Fishes/Owens-pupfish (Accessed July 31, 2020).

6 California Department of Fish and Wildlife, Species Accounts – Fish. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=87529&inline (Accessed July 31, 2020).

One of those plants is the Fish Slough Milk-vetch, which is listed by the USFWS as a species of concern that could be present in the AA. After reviewing the California Native Plant Society (CNPS) Calflora, the Fish Slough Milk-vetch has been positively identified in Inyo County.[7] However, the closest population is approximately five miles from the AA and there are no historical records of its presence on Airport property. Furthermore, it has not been detected from field surveys conducted at the Airport. As the species is unlikely to be found in the Airport environs, potential impacts on the Fish Slough Milk-vetch or its habitat would be **less than significant**.

Southwestern Willow Flycatcher

The Southwestern Willow Flycatcher (*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.[8] 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 vicinity of the Proposed Project, with a focus on records between the days of June 15 and July 20 of each year, the "nonmigrant 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 2020 on eBird; however, these observations were not during the non-migrant period. The most recent observations during the non-migrant period were in 2013 (eBird) and 2003 (CNDDB), with the closest sightings approximately six miles northwest of BIH along Horton Creek. Observation history from CNDDB and eBird are included in Appendix B. A separate search on USFWS ECOS database indicates that there is no Southwestern Willow Flycatcher critical habitat within or in close proximity to the AA. The Southwestern Willow Flycatcher 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 Southwestern Willow Flycatcher at riparian locations along the North Fork Bishop Creek and Rawson Canal by providing opportunities to forage within or near the AA on occasion. However, on-site species-specific surveys conducted for the Southwestern Willow Flycatcher did not confirm the presence of Southwestern Willow Flycatcher within or near the AA. More information on the Southwestern Willow Flycatcher surveys can be found in Appendix B. As surveys failed to confirm the presence of the Southwestern Willow Flycatcher in the Airport environs and the Proposed Project would not include construction or ground disturbance activity that would affect potential Southwestern Willow Flycatcher habitat, any impacts on the Southwestern

7 California Native Plant Society, Calflora. https://www.calflora.org/entry/observ.html?track=m#srch=t&cols=0,3,61,35,37,13,54,32,41&lpcli=t&taxon=Astragalus+lentiginosus+var.+piscinensis&chk=t&cch=t&inat=r&cc=INY (Accessed July 31, 2020).

8 Paxton, E.H., 2000, Molecular genetic structuring and demographic history of the Willow Flycatcher: Flagstaff, Arizona, Northern Arizona University, MS thesis, 43 p.

Willow Flycatcher or its habitat would be **less than significant**.

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. As the species is unlikely to be found in the Airport environs, potential impacts on the Owens Valley Vole or its habitat would be **less than significant**.

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. 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 fairly 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 AA 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 AA along North Fork Bishop Creek. However, as the Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property that would impact habitat for this species, potential impacts on the Yellow-breasted Chat or its habitat would be **less than significant**.

Burrowing Owl

The search on Cornell eBird showed burrowing owls observed within five miles of the Airport during 2018. However, there were no burrows observed within the AA during the surveys conducted in 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. As the species is unlikely to be found in the Airport environs, potential impacts on the burrowing owl or its habitat would be **less than significant**.

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. 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 AA 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 AA along North Fork Bishop Creek. However, as the Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property that would impact habitat for this species, potential impacts on the Yellow Warbler or its habitat would be **less than significant**.

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, 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 AA. Regardless, as the Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property that would impact habitat for this species, potential impacts on the Northern Harrier or its habitat would be **less than significant**.

b-c) The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Therefore, there would be **no impact** on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or the USFWS. Similarly, there would be **no impact** on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

d) Based on the BA prepared for the Proposed Project, the potential for finding special status species on the airport property is limited based on the highly disturbed and developed nature of the airfield. Introduction of commercial air passenger service to BIH will result in a relatively minor increase in aircraft operations at an already active airport during the breeding and nesting season of federal and state listed bird species. Bird strikes due to aircraft operations has not been identified as a problem at BIH. The proposed low frequency of commercial airline operations and the expected adherence to existing flight paths are unlikely to negatively affect migratory bird species. Therefore, the Proposed Project is not anticipated to disrupt any established migratory wildlife corridor or access by wildlife to any site and any impact would be **less than significant**.

e) While Inyo County has not established a tree preservation policy or ordinance, the Inyo County General Plan has established several policies addressing the protection of biological resources. These policies are focused on protecting biological diversity and healthy ecosystems throughout the County as well as providing balance between resource management and recreational use of County lands. The Proposed Project does not include activities, such as construction or ground disturbance, that would interfere with the County's biological resources policies. Accordingly, the Proposed Project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance and any impact would be **less than significant**.

f) The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Therefore, there would be **no impact** to habitat or natural areas subject to the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Cultural Resources

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES — Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☐	☒

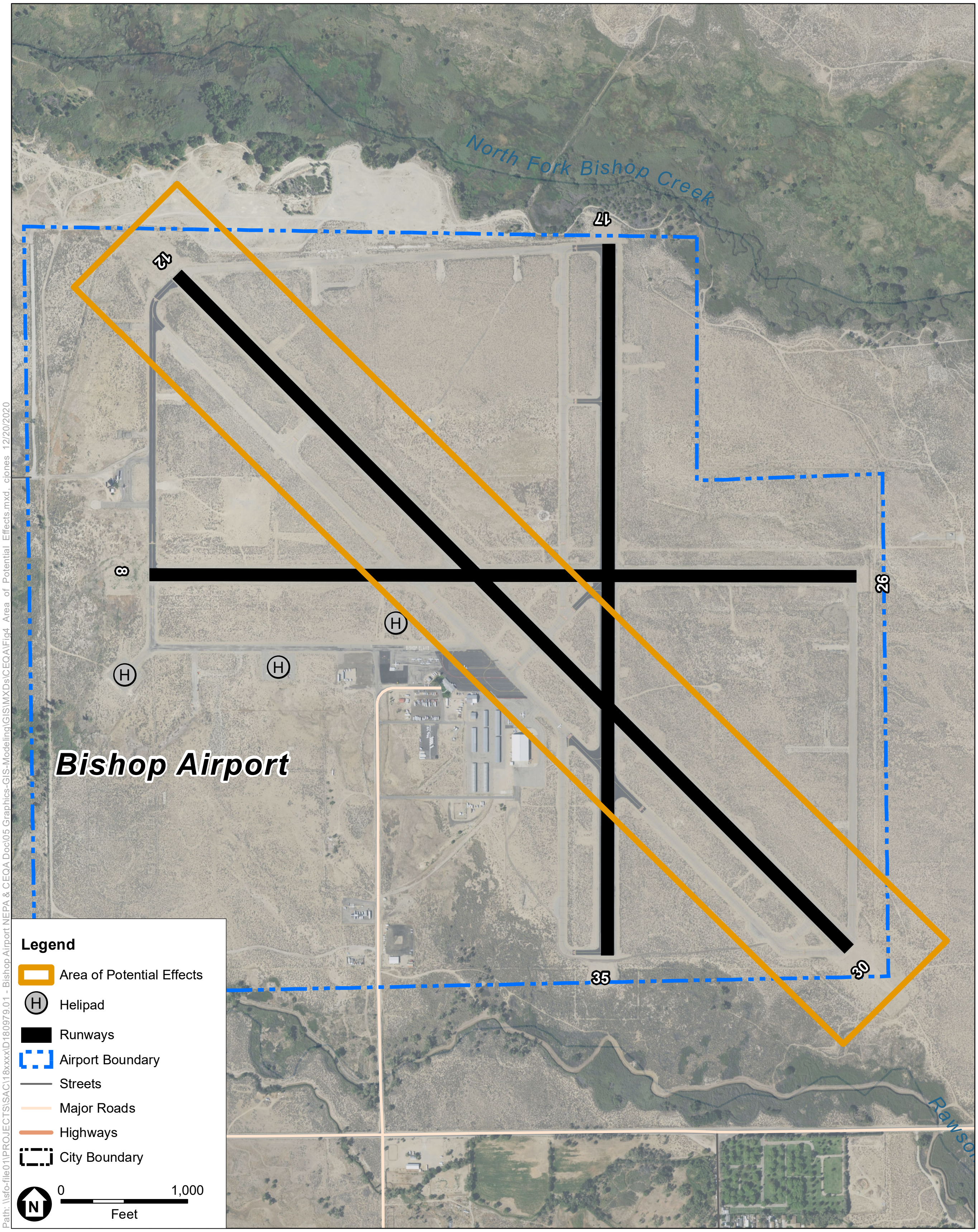
Technical Analysis

To identify whether historic and/or archaeological resources were present within the Airport environs, an historical/archaeological resources records search was conducted at the Eastern Information Center of the California Historic Resources Information System in September 2020. The records search was conducted in support of the proposed project's compliance with the requirements of Section 106 of the National Historic Preservation Act (54 U.S.C. §§ 300101-307108 (1966)) and to meet the requirements of both NEPA and CEQA. In furtherance of the Section 106, an Area of Potential Effects (APE) was delineated for the Proposed Project. The APE is shown on **Figure 4**. The APE for the Proposed Project includes Runway 12/30 with a 500-foot buffer that incorporates Taxiway A, and accounts for existing arrival and departure procedures to Runway 12/30.

The records search indicated that 14 cultural resources studies have been conducted within a ¼-mile radius of BIH property. Three cultural resources were identified within or intersected by the APE. One of these resources, a tribal archaeological resource, is listed on the National Register of Historic Properties (NRHP), is intersected by the APE. Due to the sensitivity of the site, the precise location will not be disclosed in this document. The other two resources identified within the APE do not meet the requirements for eligibility on the NRHP.

The FAA, as lead agency on the NEPA EA being prepared for the Proposed Project, consulted verbally with California State Historic Preservation Office (SHPO) representative on November 5, 2020. The FAA described the Proposed Project, the APE, and the results of the CHRIS records search. Based on this information, the FAA has determined that the Proposed Project would not alter, directly or indirectly, any of the characteristics of the single NRHP listed property intersected by the APE as defined in 36 CFR § 800.5. Therefore, the Proposed Project would have "no potential to cause effects" (36 CFR § 800.3(a)(1). The SHPO indicated agreement that the Proposed Action would not affect historic properties and formal consultation under Section 106 of the NHPA was not warranted.

Pursuant to Public Resources Code section 21080.3.1, Inyo County consulted with California Native American tribes regarding the Proposed Project. Letters describing and providing formal



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

Proposed Commercial Airline Service at Bishop Airport

Figure 4
Area of Potential Effects
Bishop Airport

ESA

notification of the Proposed Project was sent to eight tribes: the Big Pine Paiute Tribe of the Owens Valley, the Bishop Paiute Tribe, the Fort Independence Indian Community of Paiutes, the Lone Pine Paiute-Shoshone Tribe, the Timbisha Shoshone Tribe, the Twenty-Nine Palms Band of Mission Indians, the Cabazon Band of the Mission Indians, and the Torez Martinez Desert Cahuilla Indians. The letters requested a written response within 30 days if consultation with the tribes was desired. Responses were received from two tribes: the Cabazon Band of the Mission Indians and the Bishop Paiute Tribe. In an email dated October 28, 2020, the Cabazon Band of the Mission Indians indicated that they have no cultural resources that may be impacted by the Proposed Project and further consultation was not required. In an email dated October 24, 2020, the Bishop Paiute Tribe requested further consultation. The records of tribal consultation are provided in **Appendix C**.

Discussion

a –b) Because the Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property, there is no potential to affect either above-ground historical resources or archaeological resources; therefore, there would be **no impact** to historical resources and archaeological resources, as a result of the Proposed Project.

b) There is one archaeological site listed on the NRHP situated off the Airport property but within the APE. Due to the sensitivity of the site, the precise location relative to BIH is not disclosed in this document. However, the Proposed Project is unlikely to adversely impact any archaeological resource, as the introduction and ongoing operation of commercial airline service at BIH would not involve any construction or ground disturbance. The Proposed Project would not result in any adverse change to the significance of any archaeological resource and there would be **no impact**.

c) The Proposed Project does not include any activity that would result in ground disturbance on or off the Airport property. The Proposed Project would result in **no impact** to human remains.

Energy

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. ENERGY — Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

Discussion

a) The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Therefore, there is no potential for wasteful, inefficient, or unnecessary consumption of energy resources associated with construction. Consumption of energy resources associated with the Proposed Project during operations would be limited to the resources necessary to accommodate and service commercial air passengers and aircraft. Electrical power at the airport is provided by Southern California Edison. The Proposed Project is unlikely to result in anything more than a minimal increase in the demand for electricity at the Airport associated with the operation of commercial air passenger service.

Vehicular travel by employees and visitors to the Airport may also increase energy demand. **Table 4** provides a summary of estimated fuel consumption under existing conditions and the Proposed Project in 2022 and 2028. Gasoline consumption is estimated to increase by 23,389 gallons under the Proposed Project in 2022 and 37,833 gallons of gasoline in 2028 due to the additional vehicle miles travelled (VMT) per year. Diesel consumption is estimated to decrease by 497 gallons under the Proposed Project in 2022 and 2,024 gallons in 2028 due to steady VMT per year for diesel consuming trucks and improving emission factors over time. Natural gas consumption associated with propane fueled trucks would similarly have steady VMT per year; however, consumption would increase by 81 gallons in 2022 and decrease by 308 gallons in 2028 due to variable emission factors.

TABLE 4
ENERGY CONSUMPTION FROM EMPLOYEE AND VISITOR VEHICULAR TRAVEL

Combined Employee and Visitor Scenario	Total Gasoline Consumption (gallons/year)	Total Diesel Consumption (gallons/year)	Total Natural Gas Consumption (gallons/year)
2019 Existing Conditions			
	17,765	14,755	1,733
2022 Proposed Action			
	41,153	14,258	1,815

TABLE 4
ENERGY CONSUMPTION FROM EMPLOYEE AND VISITOR VEHICULAR TRAVEL

Combined Employee and Visitor Scenario	Total Gasoline Consumption (gallons/year)	Total Diesel Consumption (gallons/year)	Total Natural Gas Consumption (gallons/year)
2028 Proposed Action			
	41,153	14,258	1,815

SOURCE: Environmental Science Associates, Inc., 2020.

The potential minor increase in demand associated with the Proposed Project would not be anticipated to exceed existing or future energy supplies. Operation of commercial air passenger service would be conducted in accordance with applicable County and FAA standards and regulations, ensuring that energy resources would not be consumed in a wasteful, inefficient, or unnecessary manner. The impact would be **less than significant**.

b) Operations resulting from the Proposed Project would be consistent with other existing aviation operations at the Airport, would be conducted in accordance with applicable federal, state, and local regulations, and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The impact would be **less than significant**.

Geology and Soils

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

Discussion

a) The Proposed Project would introduce commercial air passenger service at Bishop Airport in Inyo County. The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. The Proposed Project would not directly or indirectly result in potential substantial adverse effects associated with the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides. There would be **no impact** related to these significance criteria.

b) The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. There would be **no impacts** related to substantial soil erosion or the loss of topsoil.

c–d) Bishop Airport is not located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Proposed Project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. There would be **no impact** related to these significance criteria.

e) The Proposed Project does not include or require development of new septic or wastewater disposal systems. The Proposed Project would utilize the existing on-site septic systems at the Airport, which is operated in compliance with County regulations. Accordingly, any impact associated with the Proposed Project related to soils incapable of adequately supporting the use of septic tanks or wastewater disposal systems would be **less than significant**.

f) The Proposed Project would introduce commercial air passenger service at Bishop Airport in Inyo County. The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. The Proposed Project has no potential to indirectly destroy a unique paleontological resource or site or unique geologic feature, and there would be **no impact**.

Greenhouse Gas Emissions

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

Discussion

a) By 2028, the Proposed Project would include up to six commercial air passenger service arrivals and departures per day for four months per year (December 15 through April 15), and two arrivals and departures per day for eight months of the year (April 16 through December 14). The Proposed Project would also result in minor increases in surface traffic on local roadways and regional highways from passengers being transported to and from the Airport via private vehicles, taxis, rideshares, or shuttle service. However, this represents a minimal uptick in aircraft operations and surface traffic under both 2022 and 2028 Proposed Project conditions when compared to existing conditions. In 2022, the Proposed Project would produce an increase of 1,490 metric tons (MT) of carbon dioxide equivalent (CO_2e) greenhouse gas (GHG) emissions compared to existing conditions. By 2028, the Proposed Project would produce an additional 2,175 MT of CO_2e compared to existing conditions. For the purposes of CEQA analysis, GBUAPCD uses the MDAQMD standards as their regional significance thresholds. The Project's GHG emissions would be well below MDAQMD's annual GHG threshold of 100,000 tons CO_2e (equal to 90,718 MT CO_2e). Consequently, the impact would be **less than significant**.

b) The State of California has enacted several laws and the governor has signed at least three executive orders regarding GHGs. Assembly Bill (AB) 32 (the Global Warming Solutions Act), passed by the California legislature on August 31, 2006, requires the State's global warming emissions to be reduced to 1990 levels by 2020. The reduction will be accomplished through an enforceable statewide cap on GHG emissions that was phased in starting in 2012. Per AB 32, the California Air Resources Board (CARB) must develop a Scoping Plan to describe the approach California will take to reduce GHGs to meet these goals and must update the Plan every five years. Senate Bill (SB) 32 expanded upon AB 32 to require statewide GHG emissions to be reduced to 40 percent below 1990 levels by 2030.

The additional daily operations resulting from the Proposed Project would not represent a significant increase in operations or vehicular traffic and resultant emissions. The aircraft operations would be consistent with aviation operations occurring at a public use airport. Therefore, the Proposed Project is not anticipated to conflict with any applicable plans, policies, or regulations adopted for the purpose of reducing the emissions of greenhouse gases such as AB32, SB32, and CARB's Climate Change Scoping Plan. Therefore, the impact would be **less than significant**.

Hazards and Hazardous Materials

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

Discussion

a–b) The Proposed Project would introduce commercial air passenger service at Bishop Airport. There are no anticipated changes in handling, use, or disposal of hazardous materials as a result of the Proposed Project. The Airport would continue to handle and dispose of hazardous materials in accordance with applicable federal, state, and local laws and regulations. The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Consequently, the Proposed Project would not be anticipated to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. The impact would be **less than significant**.

c) There are no schools within one-quarter mile of the Airport. The closest school to the Airport is Bishop High School, located approximately 2.5 miles west of the Airport in the city of Bishop. As discussed previously, there are no anticipated changes in the handling, use, or disposal of hazardous materials as a result of the Proposed Project. The Airport would continue to handle and dispose of hazardous materials in accordance with applicable federal, state, and local laws and regulations. In addition, the minor increase in flight operations and surface traffic that would result from the Proposed Project would not be anticipated to generate hazardous emissions. Therefore, the Proposed Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school and any impact would be **less than significant**.

d) Bishop Airport is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.[9] There would be **no impact** related to this significance criterion.

e) The Proposed Project would establish commercial passenger service operations at an existing public use airport. The noise analysis prepared for the Proposed Project indicates that the CNEL 65 dB contour would be limited to Airport property, primarily on the runways and in their immediate environs. Furthermore, existing land use in areas around the Airport is predominantly agricultural and used for cattle grazing. There is no development along the Runway 12/30 extended centerline above which aircraft arriving and departing the Airport would be operating. Accordingly, the introduction of commercial air passenger service would not result in a safety hazard or excessive noise exposure for people residing or working in the project area, and this impact would be **less than significant**.

f) The Proposed Project would introduce commercial air passenger service at Bishop Airport. The Proposed Project would not include alteration of existing Airport facilities or infrastructure. The Proposed Project would not interfere with an adopted emergency response plan or emergency evacuation plan, and this impact would be **less than significant**.

g) Wildlands are areas in which there is no development except for basic infrastructure such as roads and power lines.[10] Activity associated with the Proposed Project would be limited to an already existing and active airport. Aircraft associated with the Proposed Project would operate on already published aircraft procedures and would be flying in well-established flight corridors over areas already experiencing aircraft overflight. Furthermore, the Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Accordingly, the Proposed Project would not expose people or structures, either

9 Department of Toxic Substances Control (DTSC), 2020. EnviroStor database search for Bishop Airport. Available at < https://www.envirostor.dtsc.ca.gov/public/map/>. Accessed June 29, 2020.

10 U.S. Department of Agriculture, U.S. Forest Service, Glossary of Wildland Fire Terminology, October 2006. Available at < https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fswdev3_009827.pdf>. Accessed December 18, 2020.

directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires and any impact would be **less than significant**.

Hydrology and Water Quality

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY — Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in substantial erosion or siltation on- or off-site;	☐	☐	☐	☒
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☐	☒
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
iv) impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Discussion

a) The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property and no additional impervious surfaces would be developed. There is potential for groundwater pollution from stormwater infiltration to underground aquifers. Data collected from 2019 and 2020 on the closest water well (T490) monitored by the LADWP indicates that groundwater levels can range from approximately seven to 14 feet below the surface. Given the proximity of groundwater to the surface, trace amounts of pollution from oil, gasoline, and antifreeze that have spilled on impermeable surfaces could be carried to underground aquifers as stormwater pollution during heavy precipitation events. However, the nearest surface waters are located over 1,000 feet from both ends of Runway 12/30 and the Airport is located in an arid region that receives limited rainfall (on average annual rainfall is approximately five inches). It is not anticipated that BIH would receive large enough amounts of precipitation to create enough stormwater runoff to have an appreciable effect on groundwater quality. Furthermore, Airport staff would continue to employ best practices to avoid, reduce, or prevent spills that could result in stormwater pollution within the GSA. Commercial air operations would be subject to the existing water quality standards and waste discharge requirements applicable to current operations at the Airport and would not result in violation of any standards or degradation of surface or ground water quality. The impact would be **less than significant**.

b) The Proposed Project would not make undue demands on existing groundwater supplies. The Airport has two groundwater wells within the property boundary, one for domestic water use and one for fire suppression. There is no municipal water service at the Airport. Recharge to the groundwater system in the GSA is primarily from precipitation in the Owen's River valley and from runoff from the nearby Sierra Nevada Mountains. The California Department of Water Resources identifies the water basin as low priority for purposes of developing a Groundwater Sustainability Plan under the State's Sustainable Groundwater Management Act (Div. 6 Water Code Part 2.74). According to LADWP's 2020 Annual Owens Valley Report, the groundwater levels in the Owens Valley rose by an average of 1.3 feet as a result of the wetter than normal runoff condition in the 2019 through 2020 season. The primary sources of discharge are pumping wells, evapotranspiration, and underflow to the Owens Lake dry lakebed. The existing wells on Airport currently being used for domestic water use and fire suppression would meet any additional demand for water generated by the Proposed Project and any impact would be **less than significant**.

c) The Proposed Project would only result in operational changes and not alter any existing facilities or infrastructure. No new additional impervious surfaces would be constructed, and there would be **no impact** related to this significance criterion.

d) The Proposed Project would not introduce any new construction in a flood hazard, tsunami, or seiche zones, and there would be **no impact** related to this significance criterion.

e) The introduction of commercial air operations would be subject to the existing water quality standards and would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. The USEPA requires water quality assessments of each state's waterbodies. The current water quality assessment for California was approved by the USEPA in April 2018. According to the Water Quality Atlas provided by California Environmental Protection Agency, none of the waterbodies in the vicinity of the GSA appear on the CWA Section 303d list of impaired waters. Bishop Creek Canal is the only waterbody listed in the Water Quality Atlas and is designated as a "Category 2 stream—water quality information is insufficient to determine an appropriate recommendation." Accordingly, the impact would **be less than significant**.

Land Use and Planning

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XI. LAND USE AND PLANNING — Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion

a) The Proposed Project would introduce commercial air passenger service at Bishop Airport. The Proposed Project would not include any kind of physical development that would physically divide an established community. There would be **no impact** related to this significance criterion.

b) The introduction and ongoing operation of commercial air passenger service at Bishop Airport is not in conflict with any existing land use plan, policy, or regulation. The Proposed Project is consistent with the Inyo County General Plan, including General Plan Policy AVI-1.5, which encourages the establishment of air carrier service at Bishop Airport. Commercial passenger service at BIH would also be consistent with the Owens Valley Land Management Plan which establishes land use policies for lands owned and administered by the Los Angeles Department of Water and Power in Inyo County and allows such uses on lands associated with business leases provided it results in significant public benefit. There would be **no impact** related to this significance criterion.

Mineral Resources

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

Discussion

a–b) The Proposed Project would introduce commercial air passenger service at Bishop Airport. The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. The Proposed Project would have **no impact** on mineral resources.

Noise

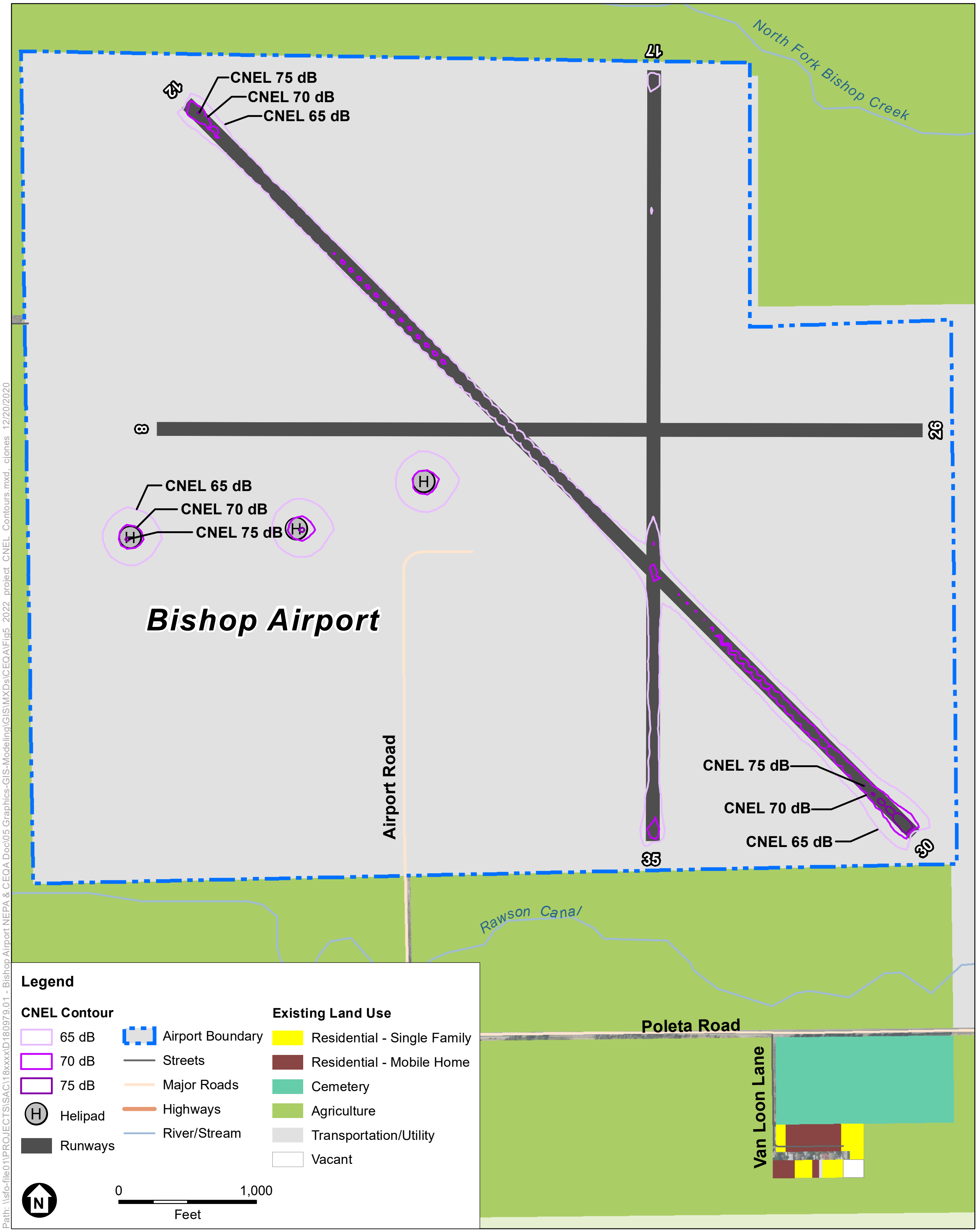
Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XIII. NOISE — Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Discussion

a) The Proposed Project would introduce commercial air passenger service at Bishop Airport. An analysis of the noise produced by the proposed increase in aircraft operations included in the Proposed Project has been conducted using the FAA's Aviation Environmental Design Tool version 3c (AEDT 3c), the latest version of the model available. As part of the noise analysis community noise equivalent level (CNEL) contours have been generated to depict potential aviation noise exposure resulting from the Proposed Project.[11] **Figure 5** depicts the CNEL contours for 2022 and **Figure 6** depicts the CNEL contours for 2028. The modeled CNEL contours produced for both Proposed Project 2022 and 2028 scenarios indicate that the CNEL 65 dB contour would not extend beyond BIH property in either modeled future year. A technical report describing the noise modeling process in greater detail is included as **Appendix D**.

The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Accordingly, no noise associated with construction or ground disturbance activities would be produced by the Proposed Project. The Proposed Project would result in minor increases in surface traffic on local roadways and regional highways from passengers being transported to and from the Airport via private vehicles, taxis, rideshares, or shuttle service. Vehicular traffic has the potential to produce noise increases; however, any increase in surface traffic produced by the Proposed Project would be minor and infrequent, expected to occur before and after the arrival and departure of commercial aircraft at the Airport.

[11] Community Noise Exposure Level (CNEL) is a noise metric that describes cumulative noise exposure from all events over a 24-hour period, with a 5-dB "penalty" applied to evening hours (between 7 PM and 10 PM), and a 10-dB "penalty" applied to nighttime hours (between 10 PM and 7 AM).

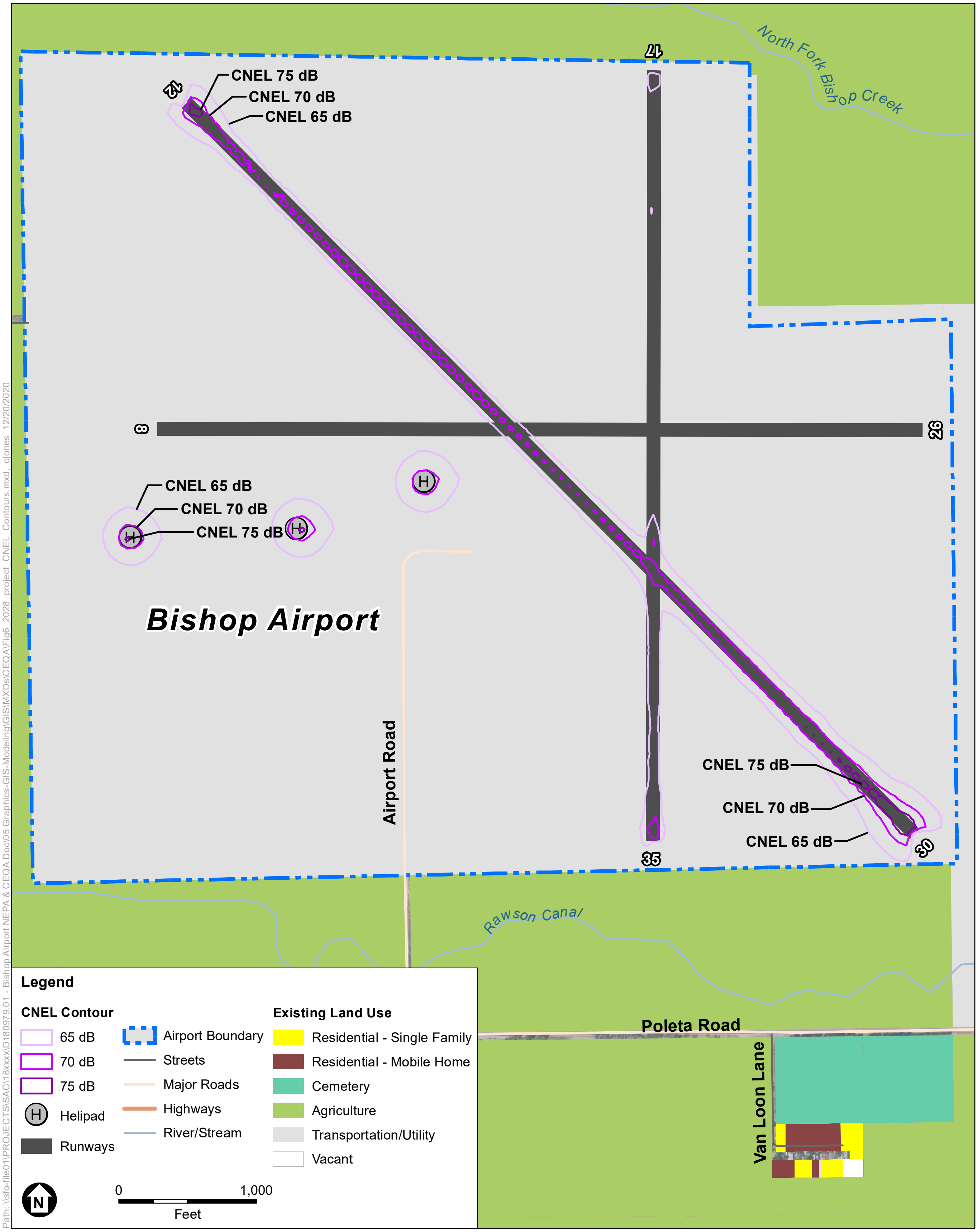


SOURCE: AEDT 3c, August 2020; Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 5
2022 Proposed Project CNEL Contours and Generalized Land Uses
Bishop Airport

ESA



SOURCE: AEDT 3c, August 2020; Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 6
2028 Proposed Project CNEL Contours and Generalized Land Uses
Bishop Airport

ESA

BIH is located in unincorporated Inyo County. Policy NOI-1.1 in the Public Safety Element of the Inyo County General Plan establishes acceptable noise limits for evaluating project compatibility related to noise. Policy NOI-1.4 addresses transportation-related noise and requires a noise impact analysis in areas where current or future noise levels from transportation sources exceeds Day-Night Average Sound Level (Ldn) 65 dB.[12],[13] As shown on Figures 5 and 6, the CNEL 65 dB contours do not extend beyond the Airport property line. The nearest noise sensitive land use is located approximately 0.5 miles south of the Runway 30 end, well outside the CNEL 65 dB contours. Therefore, the Proposed Project would not produce a substantial temporary or permanent increase in ambient noise levels beyond the Airport in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies and any impact would be **less than significant**.

b) Aircraft operations associated with the Proposed Project would not be anticipated to produce significant amounts of noise or vibration beyond Airport property. Furthermore, the Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property. Accordingly, the Proposed Project would not produce construction-related groundborne vibration or groundborne noise. The Proposed Project would result in minor increases in surface traffic on local roadways and regional highways from passengers being transported to and from the Airport via private vehicles, taxis, rideshares, or shuttle service. However, beyond standard passenger vehicles (sedans and SUVs), the largest vehicle anticipated to be employed in service at BIH would be similar to the Mercedes-Benz Sprinter van. This type of vehicle would not be anticipated to produce substantial amounts of groundborne vibration or groundborne noise. Therefore, any impact associated with the generation of groundborne vibration or groundborne noise would be **less than significant**.

c) Figures 5 and 6 depict the CNEL contours for 2022 and 2028, respectively, that were modeled for the Proposed Project as part of the noise analysis (see Appendix D). As shown on Figures 5 and 6, the CNEL 65 dB contours do not extend beyond the Airport property line. The nearest residential land use is located approximately 0.5 miles south of the Runway 30 end, well outside the CNEL 65 dB contours. Furthermore, the CNEL 65 dB contour is primarily limited to the runway and runway environs, outside of areas where people will be working on Airport property. Accordingly, the Proposed Project would not expose people residing or working in the project area to excessive noise levels and any impact would be **less than significant**.

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12 Day-Night Average Sound Level (LDN or DNL) is a noise metric that describes cumulative noise exposure from all events over a 24-hour period, with a 10 dB “penalty” applied to nighttime hours (between 10pm and 7am).

13 Inyo County, Goals and Policies Report for the Inyo County General Plan, December 2001. <https://www.inyocounty.us/sites/default/files/2020-02/GP%20Goals%20and%20Policy%20Report%2012.2001.pdf>. Accessed December 15, 2020.

Population and Housing

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

Discussion

a) The Proposed Project does not include the construction of new homes, roads, or other infrastructure that would induce unplanned growth in the areas around the Airport. The Proposed Project would include employment opportunities associated with the introduction of commercial air passenger service and related services at BIH. Employment at BIH would be anticipated to increase by 12 to 16 new positions (depending on season) in 2022, with a potential increase of an additional two employees by 2028. It is anticipated that new employment opportunities would be filled by local residents. The increase in employment opportunities at the Airport, as well as an increase in tourist traffic in the local area due to the introduction of commercial air passenger service would likely induce some local economic growth with a corresponding change in the community tax base; however, any economic growth would be unlikely to induce substantial unplanned population growth in the area, either directly or indirectly, and this impact would be **less than significant**.

b) The Proposed Project would not include any physical development that would result in the displacement of people or housing. There would be **no impact** related to this significance criterion.

Public Services

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. PUBLIC SERVICES —				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Discussion

a) The Proposed Project would introduce commercial air passenger service at Bishop Airport and would not include or require the development of new or physically altered governmental facilities the construction of which would cause significant environmental impacts associated with any public service. Existing on-Airport fire service as well as local fire and police service would be adequate to address any needs for these services associated with the Proposed Project. A new fire truck, replacing the current on-Airport fire truck, will be put into service at the Airport prior to the commencement of commercial air passenger service. Accordingly, any impacts to these services would be **less than significant**. The Proposed Project would not include or require schools, park, or other facilities. Therefore, there would be **no impacts** to these services.

Recreation

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

Discussion

a) The Proposed Project would not introduce new population or activities that increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. This impact would be **less than significant**.

b) The Proposed Project would not include recreational facilities or require the construction or expansion of recreational facilities. There would be **no impact** under this significance criterion.

Transportation

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION — Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

Discussion

a) Vehicular traffic associated with the Proposed Project would operate on roads in the City of Bishop and unincorporated Inyo County, as well as on a state highway (Highway 395) under the jurisdiction of Caltrans. Typically, agencies with authority over transportation facilities will adopt a level of service (LOS) threshold in their policy documents for purposes of evaluating how well a road is operating. While the City of Bishop has not adopted a level of service (LOS) standard for its roadway network, the Inyo County General Plan Circulation Element identifies LOS "C" as its minimum acceptable LOS, as does Caltrans on right of way under its control, including Highway 395. Per the Inyo County Regional Transportation Plan, Highway 395 through Bishop and up to the Mono County line was operating at LOS A in 2010 and is anticipated to continue operating at LOS A through 2035. The Proposed Project would see minor, seasonal increases in motor vehicle traffic on area roads due to the introduction of additional trips associated with increased employment at the Airport, passenger pick-ups and drop-offs, rental car trips, and shuttle service providing transportation to and from the resort areas at Mammoth Mountain. In 2022, the Proposed Project would be anticipated to contribute an additional estimated 93 daily vehicle trips during the winter season. This represents approximately 16 employee vehicle trips a day and approximately 77 passenger vehicle trips a day (26 vehicle trips associated with visitor arrivals and departures three times a day). In 2028, the Proposed Project would be anticipated to contribute 176 daily vehicle trips during the winter season. This represents approximately 20 employee vehicle trips a day and approximately 156 passenger vehicle trips a day (26 vehicle trips associated with visitor arrivals and departures six times a day). As there would be fewer aircraft operations during the summer and shoulder seasons, there would be fewer corresponding vehicle trips during these periods.

The most direct route to and from the Airport and the surrounding road network is along East Line Street/Poleta Road. East Line Street connects to Highway 395, the main thoroughfare through the City of Bishop and the primary highway that runs the length of the Eastern Sierra region. According to the 2019 Inyo County Regional Transportation

Plan, in 2016 the annual average daily traffic volume at the intersections of Highway 395 and SR 168 (West Line Street) was 15,600 vehicles. Assuming this level of traffic volume held steady through the planning horizon and all vehicles to and from the Airport passed through this intersection, the contribution of traffic to/from the Airport associated with the Proposed Action would be minor, representing less than one percent of traffic volume at this intersection. It is unlikely that the minimal traffic contributed by the Proposed Action would increase traffic volumes on East Line Street or Highway 395 to such a degree that a substantial reduction in level of service would result. Accordingly, while the Proposed Project would result in an increase in surface traffic, these activities would not conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities, and this impact would be **less than significant**.

b) CEQA Guidelines section 15064.3, *Determining the Significance of Transportation Impacts*, describes specific considerations for evaluating a project's transportation impacts and states that, generally, vehicle miles traveled (VMT), which refers to the amount and distance of automobile travel attributable to a project, is the most appropriate measure of transportation impacts. Section 15064.3, subdivision (b) (2) states that transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. As discussed above, the Proposed Project would result in minor increases in surface traffic on local roadways and regional highways from passengers being transported to and from the Airport via private vehicles, taxis, rideshares, or shuttle service. It can be assumed that the majority of the winter season traffic would be travelling between the Airport and the Mammoth Mountain resort area. However, while this may produce a minor increase in traffic from the introduction of commercial air passenger service at BIH, it can be assumed that there will be an overall reduction in VMT as visitors who might otherwise drive into the Eastern Sierra region may choose to fly. As previously stated, unpredictable conditions have led to an average flight cancellation rate of 12 percent at MMH during the winter season since commercial service began in 2008. As a consequence, many visitors from the cities currently served by air service (e.g., Los Angeles or San Francisco) who would otherwise fly to Mammoth must instead drive. By introducing more reliable commercial air passenger service at BIH, demand for commercial air passenger service will be largely satisfied and fewer visitors to the Eastern Sierra region will choose to do so by automobile. Furthermore, residents of the Eastern Sierra region who currently choose to drive to Reno or Los Angeles in order to access air transportation would have the option to for fly directly from Bishop rather than driving. Los Angeles International Airport is located approximately 271 miles southwest of Bishop and Reno International Airport is located approximately 201 miles to the northeast. Consequently, the proposed project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b). This impact would be **less than significant**.

c) The Proposed Project would only result in operational changes and not alter any existing facilities or infrastructure. There would be **no impact** related to this significance criterion.

d) The Proposed Project would only result in operational changes at the Airport and would not introduce any physical elements which could potentially degrade the adequacy of existing emergency access. There would be **no impact** related to this significance criterion.

Tribal Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XVIII. TRIBAL CULTURAL RESOURCES —				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources. Code Section 5020.1(k), or	☐	☐	☐	☒
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

Discussion

a) There is an existing archaeological site of tribal cultural significance listed on the NRHP situated within one quarter-mile of the Airport property. Due to the sensitivity of the site, the precise location relative to BIH is not disclosed in this document. However, the resource is not located on Airport property and as the Proposed Project includes no physical development, including any kind of ground disturbance on or off the Airport property, there is no potential for adverse change in the significance of any tribal cultural resource. The Proposed Project would have **no impact** on tribal cultural resources.

Utilities and Service Systems

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. UTILITIES AND SERVICE SYSTEMS — Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion

a) The Proposed Project does not include construction of new structures, alteration of existing structures, or disturbance of any ground on or off the Airport property that would require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities. There would be **no impact** related to this significance criterion.

b) The Airport has two groundwater wells within the property boundary, one for domestic water use and one for fire suppression. There is no municipal water service at the Airport. The Proposed Project could result in a minor increase in the demand for water at the Airport associated with the operation of commercial airline service. However, the existing wells on Airport property would meet any additional demand for water generated by the Proposed Project. According to LADWP's 2020 Annual Owens Valley Report, the groundwater levels in the Owens Valley rose by an average of 1.3 feet as a result of the wetter than normal runoff condition in the 2019 through 2020 season. This groundwater recharge would ensure that future demand for water would be met at the Airport. Furthermore, operation of commercial air service would be conducted in accordance with applicable County and FAA standards and regulations, ensuring that water resources would not be consumed in a wasteful, inefficient, or unnecessary manner. Any impacts to water supply would be **less than significant**.

c) The Proposed Project would occur on an Airport with the existing septic systems. The Proposed Project would not require new wastewater treatment infrastructure nor result in an exceedance of existing wastewater treatment capacity. The impact would be **less than significant**.

d - e) Solid waste at the Airport is handled via two on-site dumpsters, emptied once a week by Preferred Septic & Disposal with which the Airport has a three-year contract that commenced on March 1, 2020. One additional on-site dumpster, emptied by Bishop Waste, serves the restaurant located in the terminal building. Solid waste produced by Airport activities is transported to the closest disposal site at Bishop-Sunland Landfill located approximately four miles southwest of the Airport off of Sunland Reservation Road. The local landfill is operated by Inyo County on land leased from LADWP. According to the CalRecycle Solid Waste Information System, the Bishop-Sunland Landfill has a maximum permitted capacity of 160 tons of solid waste per day and a cease operation date of 2064. The landfill has a capacity of 6 million cubic yards with a remaining capacity of 3.3 million cubic yards. The Proposed Project is likely to result in a minor increase in solid waste due to the introduction of airline passengers, airline and support employees, and ground transportation services (e.g., rental cars, shuttle vans, taxis). However, because any increase in solid waste would be minimal, there is no likelihood of exceeding existing waste processing capacity, including the capacity of the Bishop-Sunland Landfill. The Proposed Project would not be anticipated to generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. Accordingly, solid waste disposal at the Airport would comply with all regulatory requirements and any impact to solid waste infrastructure or capacity would be **less than significant**.

Wildfire

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
XX. WILDFIRE — If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

Discussion

a–d) State Responsibility Areas are recognized by the Board of Forestry and Fire Protection as areas where Cal Fire is the primary emergency response agency responsible for fire suppression and prevention. Bishop Airport is located in a State Responsibility Area.[14] However, the Proposed Project would be conducted in accordance with FAA and local safety requirements. The Proposed Project would not exacerbate wildfire risks through installation or maintenance of associated infrastructure or result in increased exposure of people or structures to significant risks. The impact would be **less than significant**.

[14] California State Board of Forestry and Fire Protection, 2020. *State Responsibility Area Viewer*. Available: https://bof.fire.ca.gov/projects-and-programs/state-responsibility-area-viewer/. Accessed June 29, 2020.

Mandatory Findings of Significance

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

Discussion

a) The Proposed Project is an operational change at an existing airport and does not include any new construction or alteration of the physical environment. No degradation of natural habitat, species viability, or any example of California history or prehistory is anticipated. The impact would be **less than significant**.

b) The Proposed Project does not include any physical alteration of the environment which could contribute the any cumulative impacts connected to other past, present, and reasonably foreseeable future projects. The impact would be **less than significant**.

c) The Proposed Project does not include any physical alteration of the existing environment. Therefore, no environmental effects which could potentially have adverse direct or indirect effect on human beings is anticipated. The impact would be **less than significant**.

Appendix A
Air Quality and Climate Technical Analysis

ESA

A-1 Air Quality and Climate Analysis Technical Memorandum

Draft

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Air Quality and Climate Analysis

Prepared for
Inyo County Department of Public Works

February 2021

Draft

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PROPOSED COMMERCIAL AIRLINE SERVICE 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 2019 Existing Condition and future years of 2022 and 2028 at Bishop Airport (BIH). This air quality and climate analysis was prepared as a part of the Environmental Assessment (EA) for the proposed commercial airline service. The FAA's Aviation Environmental Design Tool version 3c (AEDT 3c) was used to develop aircraft and ground support equipment (GSE) emissions. The EMFAC2017 web database with application of the SAFE rule for future years of 2022 and 2028 was used to calculate the roadway emissions.

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 vicinity of BIH, 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 this analysis.

Exhibit 4-1 of FAA Order 1050.1F 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.

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 PM_{10} SIP, and the Mammoth Lakes Air Quality Management Plan (AQMP). None of these air quality plans are applicable to the proposed action. While the GBUAPCD has not adopted numerical thresholds, it has adopted daily thresholds for criteria air pollutants from the Mojave Desert Air Quality Management District (MDAQMD) for its regional thresholds of significance.

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).

There are currently no accepted methods of determining significance for aviation project-related GHGs given the small percentage of emissions contributed. Consistent with FAA Order 1050.1F, a projection of the GHG emissions was estimated. GHGs include carbon dioxide (CO_2), methane (CH_4), NO_2, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). 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.

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/nonattainment statuses for the GBUAPCD are 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 three 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)	Unclassified/Attainment	Nonattainment
Ozone (2015 8-Hour)	Unclassified/Attainment	
CO (1-Hour and 8-Hour)	Unclassified/Attainment	Attainment
NO_2 (1-Hour)	Unclassified/Attainment	Attainment
NO_2 (Annual)	Unclassified/Attainment	
SO_2 (1-Hour)	Unclassified/Attainment	Attainment
SO_2 (24-Hour and Annual)	Unclassified/Attainment	
PM_{10} (24-Hour)	Unclassified/ Nonattainment (Coso Junction, Mono Basin, Mammoth Lake, and Owens Valley portions)[a]	Nonattainment
$PM_{2.5}$ (2012 Annual)	Unclassified/Attainment	Attainment
$PM_{2.5}$ (2006 24-Hour)	Unclassified/Attainment	
Lead	Unclassified/Attainment	Attainment

SOURCE: EPA, 2020. CARB, 2020.
NOTES:
[a] **The project area is not within any of these portions designated as nonattainment by the NAAQS standard**

TABLE 2-2
AIR QUALITY MONITORING DATA SUMMARY (2017-2019)

Pollutant	Monitoring Data by Year		
	2017	2018	2019
Ozone (O_3)			
Highest 1 Hour Average (ppm)	0.077	0.083	0.069
Days over National Standard	0	0	0
Highest 8 Hour Average (ppm)	0.071	0.075	0.064
Days over National Standard (0.070 ppm)	1	6	0
Sulfur Dioxide (SO_2)			
Highest 1 Hour Average (ppb)	1.1	0.6	0.9
Days over National Standard (75 ppb)	0	0	0
Highest 24 Hour Average (ppb)	0.3	0.4	0.2
Days over National Standard (140 ppb)	0	0	0
Carbon Monoxide (CO)			
Highest 1 Hour Average (ppm)	0.3	1.4	1.6
Days over Federal Standard (35 ppm)	0	0	0
Highest 8 Hour Average (ppm)	0.2	1.3	1.2
Days over National Standard (9.0 ppm)	0	0	0
Particulate Matter ≤ 10 Microns (PM_{10})			
Highest 24 Hour Average (μg/m^3) [a]	215	422	742
Estimated Days over National Standard (150 μg/m^3)	2	2	3
Particulate Matter ≤ 2.5 Microns ($PM_{2.5}$)			
Highest 24 Hour Average (μg/m^3) [a]	21	33.8	98.9
Estimated Days over National Standard (35 μg/m^3)	--	--	--

SOURCES: EPA. Outdoor Air Quality Data; Monitor Values Report. 2020.
NOTES:
ppm = parts per million
ppb = parts per billion
μg/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 general aviation facility. 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 units (APUs) and GSE were not included because existing aircraft operations are dominated by small general aviation aircraft (piston-engine and turboprops) that do not use GSE or APUs. GSE and APU use are mostly associated with commercial service aircraft. Therefore, the bulk of air pollutants emissions generated from the Airport are produced by aircraft operations and off-airport vehicular travel.

The existing condition (2019) 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 3c[1] and the EMFAC2017 web database for motor vehicles.

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

Source	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Aircraft	109.54	3.58	5.69	0.82	0.10	0.10
Off-Airport Vehicular Travel	1.10	0.15	0.27	<0.01	0.22	0.06
Total	**110.63**	**3.73**	**5.96**	**0.82**	**0.32**	**0.16**

SOURCE: Environmental Science Associates, August 2020.

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

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 2019. Using AEDT 3c, 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 EMFAC2017 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 (2019) GREENHOUSE GAS EMISSIONS
(METRIC TONS PER YEAR)

Source		Carbon Dioxide Equivalent (CO_2e) (metric tons)
Aircraft		2,690.73
Off-Airport Vehicular Travel		238.25
	2019 Total	**2,928.98**

SOURCE: Environmental Science Associates, 2020.

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

Operational emissions of criteria air pollutants were estimated for the No Action Alternative and the Proposed Action for two future conditions: 2022 and 2028. The Proposed Action 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 3c. The air quality analysis includes emissions estimates for Airport operations that are anticipated to result from the 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 in the Proposed Action alternatives, the values in **Table 3-1** were used as inputs to AEDT. Equipment types, equipment counts, and usage, were provided by the Applicant. AEDT equipment types were then assumed based on expert knowledge. For each AEDT equipment type, AEDT default horsepower and load factor values were used.

TABLE 3-1
GROUND SUPPORT EQUIPMENT DETAILS USED IN AEDT MODELING

Equipment Type	Total Equipment Count	AEDT Equipment Type (Assumed)	Horsepower	Load Factor	Notes	Usage (Hours per Year)
De-Ice Truck	1	"Gasoline - FMC LMD, Dual engine - Deicer"	270	0.95	Highest-horsepower de-ice truck in AEDT. Default horsepower and load factor. AEDT does not provide a diesel de-ice truck, so the AEDT gasoline truck was selected.	24 hours per year in 2022 40 hours per year in 2028
Air Startup Compressor	1	Diesel - ACE 300/400 - Air Start	850	0.9	Highest-horsepower air startup compressor in AEDT, assumed diesel. Default horsepower and load factor.	13 hours per year
Pre-Conditioned Air Unit	1	Diesel - ACE 802 - Air Conditioner	300	0.75	Highest-horsepower air conditioner in AEDT. Default horsepower and load factor.	1.35 hours per landing = 816.75 hours in 2022 and 1310.85 hours in 2028
Ground Power Unit	1	Diesel - TLD, 400 Hz AC - Ground Power Unit	194	0.75	Highest-horsepower ground power unit in AEDT. Assumed diesel. Default horsepower and load factor.	0.5 hours per landing = 302.5 hours in 2022 and 485.5 hours in 2028

SOURCE: Environmental Science Associates, 2020.

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 passenger vehicles from restaurant patrons and hangar lessees. Trip generation for all scenarios was provided by the Applicant and is summarized in **Table 3-2**. 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 20 miles. Aggregate emission factors for employees and visitors were then computed for each scenario using the EMFAC2017 web database with application of the SAFE rule for light duty gasoline vehicles. Employee emissions were calculated using the following EMFAC2017 vehicle type codes: HHDT, LDA, LDT1, LDT2, LHDT1, LHDT2, MDV, MHDT, OBUS, and UBUS.[2] Visitor emissions include the following EMFAC2017 vehicle type codes: 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 3-2
TRIP GENERATION SUMMARY

Scenario (Year)	Trips/Day	Trips/Year
Employee Trips		
Existing (2019)	182	48,256
No Action (2022)	182	48,256
No Action (2028)	182	48,256
Proposed Action (2022)	198	53,136
Proposed Action (2028)	202	53,624
Visitor Trips		
Existing (2019)	38	11,856
No Action (2022)	38	11,856
No Action (2028)	40	12,480
Proposed Action (2022)	115	41,975
Proposed Action (2028)	196	71,540

SOURCE: Inyo County Public Works, 2020.

3.3 No Action Alternative

Table 3-3 summarizes air quality emissions for the No Action Alternative in 2022 and 2028. The No Action Alternatives do not include emissions from APU or GSE use because operations would consist of small general aviation aircraft that do not use GSE or APUs.

TABLE 3-3
NO ACTION ALTERNATIVE EMISSIONS INVENTORY (TONS PER YEAR) SUMMARY

	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2022 No Action Alternative						
Aircraft	109.54	3.58	5.69	0.82	0.10	0.10
Off-Airport Vehicular Travel	0.82	0.13	0.20	<0.01	0.22	0.06
Total	**110.36**	**3.71**	**5.89**	**0.82**	**0.32**	**0.16**
2028 No Action Alternative						
Aircraft	109.84	3.59	5.71	0.82	0.10	0.10
Off-Airport Vehicular Travel	0.57	0.10	0.13	<0.01	0.22	0.06

[2] Additional information about the EMFAC2017 vehicle type codes can be found in the EMFAC2017 Handbook for Project-level Analyses, https://ww3.arb.ca.gov/msei/downloads/emfac2017-volume-ii-pl-handbook.pdf

Total	**110.41**	**3.69**	**5.84**	**0.82**	**0.32**	**0.16**

SOURCE: Environmental Science Associates, 2020.
NOTE: Numbers may not add, due to rounding.

3.4 Proposed Action Alternative

Table 3-4 summarizes air quality emissions for the Proposed Action in 2022 and 2028. The Proposed Action includes emissions from GSE used to serve commercial aircraft operations at BIH. The Proposed Action does not include emissions from APUs because parked aircraft would utilize diesel-powered pre-conditioned air units and ground power units instead of APUs to power the aircraft cabin. Therefore, the Proposed Action emissions inventory includes aircraft operations, GSE, and off-airport vehicular travel in 2022 and 2028.

TABLE 3-4
PROPOSED ACTION ALTERNATIVE EMISSIONS INVENTORY (TONS PER YEAR) SUMMARY

	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
2022 Proposed Action						
Aircraft	112.23	3.77	8.32	1.13	0.12	0.12
GSE	0.12	0.04	0.10	0.00	0.00	0.00
Off-Airport Vehicular Travel	1.75	0.26	0.29	0.01	0.47	0.13
Total	**114.10**	**4.07**	**8.71**	**1.14**	**0.59**	**0.25**
2028 Proposed Action						
Aircraft	113.59	3.90	9.07	1.25	0.12	0.12
GSE	0.22	0.06	0.15	0.00	0.01	0.01
Off-Airport Vehicular Travel	1.86	0.29	0.23	0.01	0.72	0.19
Total	**115.67**	**4.25**	**9.45**	**1.26**	**0.85**	**0.32**

SOURCE: Environmental Science Associates, 2020.
NOTE: Numbers may not add, due to rounding.

3.5 Mitigation, Avoidance, or Minimization Measures

The Proposed Action 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 landside sources (area and mobile) and airside sources (aircraft operations and GSE). GHG emissions inventories were prepared for the Proposed Action and No Action Alternative. Operational emissions were estimated for two future conditions: 2022 and 2028. 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 Action, 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).[3] 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 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." [4]

4.2 Methodology

Fossil fuel combustion is the primary source of GHG emissions at the Airport. Consistent with FAA 1050.1F Desk Reference a projection of the GHG emissions was estimated. The GHG evaluations for the No Action Alternative and the Proposed Action 2022 and 2028 were performed primarily using the FAA's AEDT 3c model and the EMFAC2017 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 EMFAC2017 web database was used to determine the emission factors for each scenario.

[3] 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.

[4] 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).

4.3 No Action Alternative

The GHG emissions associated with the No Action Alternative include aircraft operations and ground transportation activities. **Table 4-1** presents estimated levels of GHG emissions at BIH in 2022 and 2028 for the No Action Alternative.

TABLE 4-1
NO ACTION ALTERNATIVE
GREENHOUSE GAS EMISSIONS INVENTORY

Operational Year	Emission Source	Estimated GHG Emissions Inventory in CO_{2e} (MT/year) No Action
2022	Aircraft	2,690.73
	Off-Airport Vehicular Travel	217.89
	Total	**2,908.62**
2028	Aircraft	2,698.10
	Off-Airport Vehicular Travel	181.67
	Total	**2,879.77**

SOURCE: ESA Airports, September 2020.

NOTES: CO_{2e} = carbon dioxide equivalent

4.4 Proposed Action Alternative

GHG emissions in the Proposed Action would result from fuel burn associated with aircraft operations, GSE, and motor vehicles. **Table 4-2** presents estimated levels of GHG emissions at BIH in 2022 and 2028 for the Proposed Action Alternative.

TABLE 4-2
PROPOSED ACTION ALTERNATIVE
GREENHOUSE GAS EMISSIONS INVENTORY

Operational Year	Emission Source	Estimated GHG Emissions Inventory in CO_{2e} (MT/year) No Action
2022	Aircraft*	3,985.81
	Off-Airport Vehicular Travel	433.19
	Total	**4,419.00**
2028	Aircraft*	4,571.73
	Off-Airport Vehicular Travel	532.50
	Total	**5,104.23**

SOURCE: ESA Airports, September 2020.

NOTES:
CO_{2e} = carbon dioxide equivalent
* Includes emissions from GSE

As shown in **Table 4-1** and **Table 4-2**, there would be an increase in GHG emissions at BIH in 2022 and 2028 if the Proposed Action 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 negligible change the Proposed Action 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 Action.

4.5 Mitigation, Avoidance, or Minimization Measures

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

A-2 AEDT Results Output

Criteria Pollutant Emissions in Short Tons per Year – 2022 No Action

Emissions Source	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	Criteria Pollutant Emissions (Tons per year)					
Aircraft	109.54	3.58	5.69	0.82	0.10	0.10
Total Emissions	**109.54**	**3.58**	**5.69**	**0.82**	**0.10**	**0.10**

SOURCE: Environmental Science Associates, 2020.

Criteria Pollutant Emissions in Short Tons per Year – 2028 No Action

Emissions Source	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	Criteria Pollutant Emissions (Tons per year)					
Aircraft	109.84	3.59	5.71	0.82	0.10	0.10
Total Emissions	**109.84**	**3.59**	**5.71**	**0.82**	**0.10**	**0.10**

SOURCE: Environmental Science Associates, 2020.

Criteria Pollutant Emissions in Short Tons per Year – 2022 With Project

Emissions Source	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	Criteria Pollutant Emissions (Tons per year)					
Aircraft	112.23	3.77	8.32	1.13	0.12	0.12
GSE	0.12	0.04	0.10	0.00	0.00	0.00
Total Emissions	**112.35**	**3.80**	**8.42**	**1.13**	**0.12**	**0.12**

SOURCE: Environmental Science Associates, 2020.

Criteria Pollutant Emissions in Short Tons per Year – 2028 With Project

Emissions Source	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	Criteria Pollutant Emissions (Tons per year)					
Aircraft	113.59	3.90	9.07	1.25	0.12	0.12
GSE	0.22	0.06	0.15	0.00	0.01	0.01
Total Emissions	**113.82**	**3.96**	**9.22**	**1.25**	**0.13**	**0.13**

SOURCE: Environmental Science Associates, 2020.

Change in Criteria Pollutant Emissions in Short Tons per Year – 2022

Emissions Source	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	Criteria Pollutant Emissions (Tons per year)					
Aircraft	2.689	0.183	2.629	0.312	0.014	0.014
GSE	0.121	0.038	0.102	0.001	0.003	0.003
Total Emissions	**2.810**	**0.221**	**2.730**	**0.313**	**0.018**	**0.018**

SOURCE: Environmental Science Associates, 2020.

Change in Criteria Pollutant Emissions in Short Tons per Year – 2028

Emissions Source	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
	Criteria Pollutant Emissions (Tons per year)					
Aircraft	3.755	0.303	3.365	0.423	0.021	0.021
GSE	0.224	0.062	0.148	0.001	0.006	0.006
Total Emissions	**3.979**	**0.364**	**3.514**	**0.424**	**0.027**	**0.027**

SOURCE: Environmental Science Associates, 2020.

Greenhouse Gas Emissions in Metric Tons per Year – All 2022 and 2028 Scenarios

Metric Tons per Year	Proposed Project	No Action	Increase
2022	3,985.81	2,690.73	**1,295.08**
2028	4,571.73	2,698.10	**1,873.63**

SOURCE: Environmental Science Associates, 2020.

A-3 Mobile Emissions Summary

				Operational Mobile Emissions													
				Criteria Pollutant Emissions (tons/year)										GHG Emissions (metric tons/year)			
Scenario	Year	Trips/Day	Trips/Year	ROG	NOx	CO	SOx	PM10 Rd Dust	PM10	PM10 Total	PM2_5 Rd Dust	PM2_5	PM2_5 Total	CO2	CH4	N2O	CO2e
Employee Trips																	
Existing	2019	182	48,256	0.130	0.252	0.913	0.002	0.154	0.029	0.183	0.038	0.013	0.051	200.160	0.010	0.013	204.164
No Action	2022	182	48,256	0.106	0.184	0.686	0.002	0.154	0.028	0.181	0.038	0.012	0.050	183.615	0.007	0.011	187.030
No Action	2028	182	48,256	0.081	0.122	0.476	0.002	0.154	0.027	0.181	0.038	0.011	0.049	152.524	0.004	0.009	155.164
		Winter															
Proposed Action	2022	198	53,136	0.114	0.197	0.735	0.002	0.165	0.030	0.194	0.040	0.013	0.053	196.750	0.008	0.012	200.409
Proposed Action	2028	202	53,624	0.088	0.133	0.518	0.002	0.168	0.029	0.197	0.041	0.012	0.054	166.163	0.005	0.009	169.039
Visitor Trips																	
Existing	2019	38	11,856	0.024	0.019	0.181	0.000	0.031	0.005	0.036	0.008	0.002	0.010	33.623	0.002	0.001	34.082
No Action	2022	38	11,856	0.019	0.013	0.135	0.000	0.031	0.005	0.036	0.008	0.002	0.010	30.506	0.001	0.001	30.861
No Action	2028	40	12,480	0.015	0.007	0.098	0.000	0.033	0.005	0.038	0.008	0.002	0.010	26.248	0.001	0.001	26.505
		Winter															
Proposed Action	2022	115	41,975	0.144	0.096	1.018	0.003	0.236	0.037	0.273	0.058	0.015	0.074	230.102	0.010	0.008	232.781
Proposed Action	2028	196	71,540	0.202	0.094	1.345	0.004	0.453	0.070	0.522	0.111	0.029	0.140	359.920	0.012	0.011	363.456
Combined Employee + Visitor Trips																	
Existing	2019	220	60,112	0.154	0.271	1.094	0.003	0.185	0.034	0.219	0.045	0.015	0.061	233.784	0.012	0.014	238.246
No Action	2022	220	60,112	0.125	0.196	0.821	0.002	0.185	0.032	0.218	0.045	0.014	0.060	214.122	0.009	0.012	217.891
No Action	2028	222	60,736	0.095	0.129	0.574	0.002	0.187	0.032	0.219	0.046	0.014	0.059	178.772	0.005	0.009	181.669
		Winter															
Proposed Action	2022	313	95,111	0.257	0.293	1.753	0.005	0.401	0.066	0.468	0.098	0.028	0.127	426.853	0.018	0.020	433.190
Proposed Action	2028	398	125,164	0.290	0.228	1.864	0.006	0.620	0.099	0.719	0.152	0.041	0.194	526.083	0.016	0.020	532.495

SOURCE: Environmental Science Associates, 2020.

A-4 EMFAC2017 Results Output

Source: EMFAC2017 (v1.0.3) Emissions Inventory
Region Type: Air Basin
Region: Great Basin Valleys
Calendar Year: 2019, 2022, 2028
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	Trips	NOx_RUNEX	NOx_IDLEX	NOx_STREX	NOx_TOTEX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_TOTEX	PM2.5_PMTW	PM2.5_PMBW	PM2.5_TOTAL
Great Basin Valleys	2019	HHDT	Aggregate	Aggregate	Gasoline	0.36	21.32	7.22	0.0001659	-	0.0000060	0.0001719	0.0000001	-	0.0000000	0.0000002	0.0000001	0.0000006	0.0000009
Great Basin Valleys	2019	HHDT	Aggregate	Aggregate	Diesel	915.38	139,992.46	11,187.94	0.6367561	0.1140725	0.0199984	0.7708270	0.0110597	0.0003622	-	0.0114219	0.0013845	0.0040704	0.0168768
Great Basin Valleys	2019	LDA	Aggregate	Aggregate	Gasoline	48,381.76	1,932,329.43	226,281.38	0.1645158	-	0.0661522	0.2306680	0.0035706	-	0.0005290	0.0040996	0.0042601	0.0335480	0.0419076
Great Basin Valleys	2019	LDA	Aggregate	Aggregate	Diesel	501.86	20,393.23	2,344.39	0.0048057	-	-	0.0048057	0.0003590	-	-	0.0003590	0.0000450	0.0003541	0.0007580
Great Basin Valleys	2019	LDA	Aggregate	Aggregate	Electricity	497.41	19,849.58	2,509.03	-	-	-	-	-	-	-	-	0.0000438	0.0003446	0.0003884
Great Basin Valleys	2019	LDT1	Aggregate	Aggregate	Gasoline	6,945.04	237,109.15	30,646.72	0.0640301	-	0.0153037	0.0793338	0.0007504	-	0.0001249	0.0008753	0.0005227	0.0041165	0.0055145
Great Basin Valleys	2019	LDT1	Aggregate	Aggregate	Diesel	5.97	98.71	20.73	0.0001725	-	-	0.0001725	0.0000146	-	-	0.0000146	0.0000002	0.0000017	0.0000165
Great Basin Valleys	2019	LDT1	Aggregate	Aggregate	Electricity	4.56	194.97	23.52	-	-	-	-	-	-	-	-	0.0000004	0.0000034	0.0000038
Great Basin Valleys	2019	LDT2	Aggregate	Aggregate	Gasoline	21,431.62	797,643.49	98,323.71	0.1558767	-	0.0527759	0.2086526	0.0015369	-	0.0002385	0.0017754	0.0017585	0.0138482	0.0173821
Great Basin Valleys	2019	LDT2	Aggregate	Aggregate	Diesel	97.07	4,420.89	480.80	0.0002947	-	-	0.0002947	0.0000241	-	-	0.0000241	0.0000097	0.0000768	0.0001106
Great Basin Valleys	2019	LDT2	Aggregate	Aggregate	Electricity	70.10	2,515.50	357.89	-	-	-	-	-	-	-	-	0.0000055	0.0000437	0.0000492
Great Basin Valleys	2019	LHDT1	Aggregate	Aggregate	Gasoline	2,479.90	80,550.45	36,946.85	0.0538295	0.0001119	0.0237031	0.0776445	0.0003177	-	0.0000328	0.0003505	0.0001776	0.0029088	0.0034369
Great Basin Valleys	2019	LHDT1	Aggregate	Aggregate	Diesel	2,476.19	87,952.66	31,147.32	0.3720472	0.0068663	-	0.3789135	0.0036432	0.0000728	-	0.0037160	0.0002909	0.0031761	0.0071830
Great Basin Valleys	2019	LHDT2	Aggregate	Aggregate	Gasoline	258.18	9,260.57	3,846.56	0.0041293	0.0000117	0.0024531	0.0065941	0.0000251	-	0.0000020	0.0000271	0.0000204	0.0003902	0.0004376
Great Basin Valleys	2019	LHDT2	Aggregate	Aggregate	Diesel	749.29	28,217.43	9,425.10	0.0826305	0.0020664	-	0.0846969	0.0009580	0.0000219	-	0.0009800	0.0000933	0.0011888	0.0022621
Great Basin Valleys	2019	MCY	Aggregate	Aggregate	Gasoline	3,278.89	23,969.31	6,557.78	0.0331738	-	0.0020565	0.0352303	0.0000497	-	0.0000272	0.0000769	0.0000264	0.0001332	0.0002365
Great Basin Valleys	2019	MDV	Aggregate	Aggregate	Gasoline	17,175.76	596,961.48	77,580.17	0.1453108	-	0.0501866	0.1954974	0.0012325	-	0.0002316	0.0014641	0.0013161	0.0103641	0.0131443
Great Basin Valleys	2019	MDV	Aggregate	Aggregate	Diesel	307.80	13,263.05	1,488.61	0.0016294	-	-	0.0016294	0.0001065	-	-	0.0001065	0.0000292	0.0002303	0.0003660
Great Basin Valleys	2019	MDV	Aggregate	Aggregate	Electricity	12.09	446.28	62.29	-	-	-	-	-	-	-	-	0.0000010	0.0000077	0.0000087
Great Basin Valleys	2019	MH	Aggregate	Aggregate	Gasoline	571.60	4,616.27	57.18	0.0046483	-	0.0000206	0.0046689	0.0000121	-	0.0000000	0.0000121	0.0000153	0.0002842	0.0003116
Great Basin Valleys	2019	MH	Aggregate	Aggregate	Diesel	169.16	1,616.15	16.92	0.0099454	-	-	0.0099454	0.0002493	-	-	0.0002493	0.0000071	0.0000995	0.0003559
Great Basin Valleys	2019	MHDT	Aggregate	Aggregate	Gasoline	157.60	7,138.40	3,153.34	0.0088289	0.0000149	0.0014803	0.0103241	0.0000148	-	0.0000033	0.0000181	0.0000236	0.0004395	0.0004812
Great Basin Valleys	2019	MHDT	Aggregate	Aggregate	Diesel	299.12	16,838.57	2,563.99	0.0850379	0.0059001	0.0030675	0.0940054	0.0021771	0.0000218	-	0.0021990	0.0000557	0.0010368	0.0032915
Great Basin Valleys	2019	OBUS	Aggregate	Aggregate	Gasoline	46.48	2,296.18	929.95	0.0019492	0.0000033	0.0003615	0.0023140	0.0000021	-	0.0000002	0.0000024	0.0000076	0.0001414	0.0001514
Great Basin Valleys	2019	OBUS	Aggregate	Aggregate	Diesel	44.34	3,517.83	433.62	0.0163494	0.0013229	0.0006794	0.0183517	0.0004054	0.0000068	-	0.0004122	0.0000116	0.0002166	0.0006404
Great Basin Valleys	2019	SBUS	Aggregate	Aggregate	Gasoline	10.60	521.41	42.40	0.0001115	0.0000108	0.0000257	0.0001481	0.0000004	-	0.0000000	0.0000004	0.0000011	0.0001835	0.0001850
Great Basin Valleys	2019	SBUS	Aggregate	Aggregate	Diesel	63.47	2,015.42	732.47	0.0162814	0.0031801	0.0004420	0.0199035	0.0000938	0.0000037	-	0.0000975	0.0000067	0.0007091	0.0008133
Great Basin Valleys	2019	UBUS	Aggregate	Aggregate	Gasoline	30.48	3,068.72	121.92	0.0005359	-	0.0000766	0.0006126	0.0000037	-	0.0000000	0.0000037	0.0000076	0.0001435	0.0001548
Great Basin Valleys	2019	UBUS	Aggregate	Aggregate	Diesel	10.97	888.05	43.89	0.0019524	-	-	0.0019524	0.0000055	-	-	0.0000055	0.0000045	0.0000438	0.0000537
Great Basin Valleys	2019	UBUS	Aggregate	Aggregate	Electricity	0.27	5.98	1.08	-	-	-	-	-	-	-	-	0.0000000	0.0000003	0.0000003
Great Basin Valleys	2019	UBUS	Aggregate	Aggregate	Natural Gas	17.06	1,658.96	68.23	0.0028684	-	-	0.0028684	0.0000080	-	-	0.0000080	0.0000106	0.0000754	0.0000940
Great Basin Valleys	2022	HHDT	Aggregate	Aggregate	Gasoline	0.14	33.70	2.89	0.0000953	-	0.0000002	0.0000955	0.0000000	-	0.0000000	0.0000000	0.0000002	0.0000010	0.0000012
Great Basin Valleys	2022	HHDT	Aggregate	Aggregate	Diesel	967.24	146,141.50	12,025.17	0.4670979	0.1239051	0.0272824	0.6182855	0.0051722	0.0000713	-	0.0052435	0.0014459	0.0042510	0.0109403
Great Basin Valleys	2022	LDA	Aggregate	Aggregate	Gasoline	51,973.74	2,023,564.04	244,166.20	0.1072739	-	0.0571392	0.1644131	0.0032617	-	0.0004961	0.0037578	0.0044612	0.0351319	0.0433509
Great Basin Valleys	2022	LDA	Aggregate	Aggregate	Diesel	586.28	22,986.73	2,745.58	0.0031797	-	-	0.0031797	0.0002616	-	-	0.0002616	0.0000507	0.0003991	0.0007114
Great Basin Valleys	2022	LDA	Aggregate	Aggregate	Electricity	923.70	38,891.52	4,621.90	-	-	-	-	-	-	-	-	0.0000857	0.0006752	0.0007610
Great Basin Valleys	2022	LDT1	Aggregate	Aggregate	Gasoline	7,026.01	236,633.95	31,275.90	0.0410240	-	0.0123462	0.0533702	0.0005791	-	0.0001000	0.0006791	0.0005217	0.0041083	0.0053091
Great Basin Valleys	2022	LDT1	Aggregate	Aggregate	Diesel	4.53	69.67	15.38	0.0001053	-	-	0.0001053	0.0000088	-	-	0.0000088	0.0000002	0.0000012	0.0000101
Great Basin Valleys	2022	LDT1	Aggregate	Aggregate	Electricity	30.94	1,398.19	158.38	-	-	-	-	-	-	-	-	0.0000031	0.0000243	0.0000274
Great Basin Valleys	2022	LDT2	Aggregate	Aggregate	Gasoline	21,916.20	783,811.20	100,428.64	0.1027312	-	0.0424142	0.1451454	0.0013310	-	0.0002148	0.0015458	0.0017280	0.0136081	0.0168819
Great Basin Valleys	2022	LDT2	Aggregate	Aggregate	Diesel	131.69	5,561.89	643.73	0.0002840	-	-	0.0002840	0.0000270	-	-	0.0000270	0.0000123	0.0000966	0.0001359
Great Basin Valleys	2022	LDT2	Aggregate	Aggregate	Electricity	166.21	5,558.90	840.16	-	-	-	-	-	-	-	-	0.0000123	0.0000965	0.0001088
Great Basin Valleys	2022	LHDT1	Aggregate	Aggregate	Gasoline	2,279.42	71,296.25	33,960.03	0.0388472	0.0000994	0.0211014	0.0600481	0.0002413	-	0.0000226	0.0002639	0.0001572	0.0025746	0.0029957
Great Basin Valleys	2022	LHDT1	Aggregate	Aggregate	Diesel	2,323.67	77,126.92	29,228.90	0.2699570	0.0060945	-	0.2760515	0.0028616	0.0000675	-	0.0029290	0.0002551	0.0027852	0.0059693
Great Basin Valleys	2022	LHDT2	Aggregate	Aggregate	Gasoline	247.84	8,573.48	3,692.52	0.0028007	0.0000107	0.0022492	0.0050606	0.0000207	-	0.0000016	0.0000223	0.0000189	0.0003612	0.0004024
Great Basin Valleys	2022	LHDT2	Aggregate	Aggregate	Diesel	743.09	25,959.59	9,347.14	0.0616319	0.0019145	-	0.0635464	0.0008171	0.0000217	-	0.0008388	0.0000858	0.0010937	0.0020183
Great Basin Valleys	2022	MCY	Aggregate	Aggregate	Gasoline	3,373.20	22,972.91	6,746.39	0.0314312	-	0.0021222	0.0335534	0.0000494	-	0.0000249	0.0000743	0.0000253	0.0001276	0.0002272
Great Basin Valleys	2022	MDV	Aggregate	Aggregate	Gasoline	16,703.60	554,072.88	75,193.35	0.0880621	-	0.0384408	0.1265028	0.0009891	-	0.0001884	0.0011775	0.0012215	0.0096195	0.0120185
Great Basin Valleys	2022	MDV	Aggregate	Aggregate	Diesel	371.08	14,649.38	1,772.88	0.0012329	-	-	0.0012329	0.0000937	-	-	0.0000937	0.0000323	0.0002543	0.0003803
Great Basin Valleys	2022	MDV	Aggregate	Aggregate	Electricity	82.35	2,858.74	421.37	-	-	-	-	-	-	-	-	0.0000063	0.0000496	0.0000559
Great Basin Valleys	2022	MH	Aggregate	Aggregate	Gasoline	479.36	3,816.01	47.96	0.0029045	-	0.0000179	0.0029224	0.0000082	-	0.0000000	0.0000082	0.0000126	0.0002350	0.0002558
Great Basin Valleys	2022	MH	Aggregate	Aggregate	Diesel	168.75	1,482.32	16.88	0.0084395	-	-	0.0084395	0.0002034	-	-	0.0002034	0.0000065	0.0000913	0.0003012
Great Basin Valleys	2022	MHDT	Aggregate	Aggregate	Gasoline	156.39	7,786.15	3,129.07	0.0052718	0.0000150	0.0013937	0.0066806	0.0000123	-	0.0000021	0.0000144	0.0000257	0.0004794	0.0005196
Great Basin Valleys	2022	MHDT	Aggregate	Aggregate	Diesel	301.66	17,087.40	2,591.15	0.0510298	0.0046334	0.0045814	0.0602446	0.0006312	0.0000102	-	0.0006414	0.0000565	0.0010522	0.0017501
Great Basin Valleys	2022	OBUS	Aggregate	Aggregate	Gasoline	45.15	2,078.47	903.30	0.0013392	0.0000032	0.0003387	0.0016811	0.0000022	-	0.0000003	0.0000025	0.0000069	0.0001280	0.0001374
Great Basin Valleys	2022	OBUS	Aggregate	Aggregate	Diesel	56.34	4,567.62	533.39	0.0105111	0.0008079	0.0012096	0.0125287	0.0000912	0.0000012	-	0.0000924	0.0000151	0.0002813	0.0003887

Great Basin Valleys	2022	SBUS	Aggregate	Aggregate	Gasoline	13.83	655.61	55.32	0.0001282	0.0000141	0.0000342	0.0001766	0.0000006	-	0.0000000	0.0000006	0.0000014	0.0002307	0.0002327
Great Basin Valleys	2022	SBUS	Aggregate	Aggregate	Diesel	65.45	2,062.95	755.31	0.0153774	0.0030943	0.0005705	0.0190422	0.0000905	0.0000032	-	0.0000938	0.0000068	0.0007259	0.0008265
Great Basin Valleys	2022	UBUS	Aggregate	Aggregate	Gasoline	30.82	3,103.28	123.29	0.0005222	-	0.0000750	0.0005972	0.0000046	-	0.0000000	0.0000047	0.0000077	0.0001451	0.0001575
Great Basin Valleys	2022	UBUS	Aggregate	Aggregate	Diesel	14.32	1,173.43	57.26	0.0006691	-	-	0.0006691	0.0000070	-	-	0.0000070	0.0000055	0.0000607	0.0000732
Great Basin Valleys	2022	UBUS	Aggregate	Aggregate	Electricity	0.27	5.98	1.08	-	-	-	-	-	-	-	-	0.0000000	0.0000003	0.0000003
Great Basin Valleys	2022	UBUS	Aggregate	Aggregate	Natural Gas	14.03	1,401.85	56.11	0.0006375	-	-	0.0006375	0.0000057	-	-	0.0000057	0.0000097	0.0000598	0.0000753
Great Basin Valleys	2028	HHDT	Aggregate	Aggregate	Gasoline	0.40	67.22	8.06	0.0002093	-	0.0000001	0.0002094	0.0000001	-	0.0000000	0.0000001	0.0000004	0.0000020	0.0000024
Great Basin Valleys	2028	HHDT	Aggregate	Aggregate	Diesel	1,015.05	157,846.05	12,910.58	0.3940471	0.1278443	0.0322023	0.5540938	0.0046355	0.0000544	-	0.0046899	0.0015628	0.0045945	0.0108471
Great Basin Valleys	2028	LDA	Aggregate	Aggregate	Gasoline	58,824.17	2,128,047.45	276,338.30	0.0625867	-	0.0463398	0.1089265	0.0025628	-	0.0004321	0.0029950	0.0046915	0.0369459	0.0446324
Great Basin Valleys	2028	LDA	Aggregate	Aggregate	Diesel	703.56	25,810.84	3,318.69	0.0011386	-	-	0.0011386	0.0001000	-	-	0.0001000	0.0000569	0.0004481	0.0006050
Great Basin Valleys	2028	LDA	Aggregate	Aggregate	Electricity	2,277.61	94,629.40	11,221.88	-	-	-	-	-	-	-	-	0.0002086	0.0016429	0.0018515
Great Basin Valleys	2028	LDT1	Aggregate	Aggregate	Gasoline	7,348.61	237,223.67	33,087.93	0.0180598	-	0.0084025	0.0264624	0.0003654	-	0.0000680	0.0004333	0.0005230	0.0041185	0.0050749
Great Basin Valleys	2028	LDT1	Aggregate	Aggregate	Diesel	2.03	38.41	7.51	0.0000279	-	-	0.0000279	0.0000014	-	-	0.0000014	0.0000001	0.0000007	0.0000021
Great Basin Valleys	2028	LDT1	Aggregate	Aggregate	Electricity	122.59	5,281.27	611.37	-	-	-	-	-	-	-	-	0.0000116	0.0000917	0.0001033
Great Basin Valleys	2028	LDT2	Aggregate	Aggregate	Gasoline	23,012.11	761,682.47	105,064.96	0.0506475	-	0.0290997	0.0797471	0.0009976	-	0.0001788	0.0011765	0.0016792	0.0132239	0.0160796
Great Basin Valleys	2028	LDT2	Aggregate	Aggregate	Diesel	187.56	6,904.40	895.32	0.0002639	-	-	0.0002639	0.0000306	-	-	0.0000306	0.0000152	0.0001199	0.0001657
Great Basin Valleys	2028	LDT2	Aggregate	Aggregate	Electricity	494.58	14,425.59	2,447.55	-	-	-	-	-	-	-	-	0.0000318	0.0002504	0.0002823
Great Basin Valleys	2028	LHDT1	Aggregate	Aggregate	Gasoline	1,992.96	59,480.58	29,692.16	0.0204388	0.0000774	0.0161727	0.0366888	0.0001783	-	0.0000171	0.0001954	0.0001311	0.0021479	0.0024745
Great Basin Valleys	2028	LHDT1	Aggregate	Aggregate	Diesel	2,001.87	61,441.56	25,181.06	0.1274131	0.0044046	-	0.1318177	0.0016341	0.0000574	-	0.0016914	0.0002032	0.0022188	0.0041133
Great Basin Valleys	2028	LHDT2	Aggregate	Aggregate	Gasoline	234.20	7,684.36	3,489.16	0.0012849	0.0000088	0.0017830	0.0030766	0.0000167	-	0.0000012	0.0000179	0.0000169	0.0003237	0.0003586
Great Basin Valleys	2028	LHDT2	Aggregate	Aggregate	Diesel	715.54	22,504.54	9,000.65	0.0321731	0.0015243	-	0.0336974	0.0006041	0.0000211	-	0.0006252	0.0000744	0.0009481	0.0016477
Great Basin Valleys	2028	MCY	Aggregate	Aggregate	Gasoline	3,488.95	21,510.04	6,977.90	0.0289559	-	0.0021864	0.0311424	0.0000486	-	0.0000210	0.0000696	0.0000237	0.0001195	0.0002128
Great Basin Valleys	2028	MDV	Aggregate	Aggregate	Gasoline	15,993.06	495,943.32	71,850.69	0.0382694	-	0.0232770	0.0615464	0.0006562	-	0.0001308	0.0007870	0.0010934	0.0086103	0.0104906
Great Basin Valleys	2028	MDV	Aggregate	Aggregate	Diesel	462.35	15,983.92	2,171.47	0.0006131	-	-	0.0006131	0.0000541	-	-	0.0000541	0.0000352	0.0002775	0.0003669
Great Basin Valleys	2028	MDV	Aggregate	Aggregate	Electricity	326.86	9,746.15	1,629.64	-	-	-	-	-	-	-	-	0.0000215	0.0001692	0.0001907
Great Basin Valleys	2028	MH	Aggregate	Aggregate	Gasoline	345.44	2,842.12	34.56	0.0011286	-	0.0000139	0.0011426	0.0000045	-	0.0000000	0.0000045	0.0000094	0.0001750	0.0001889
Great Basin Valleys	2028	MH	Aggregate	Aggregate	Diesel	163.44	1,296.23	16.34	0.0062413	-	-	0.0062413	0.0001346	-	-	0.0001346	0.0000057	0.0000798	0.0002201
Great Basin Valleys	2028	MHDT	Aggregate	Aggregate	Gasoline	175.68	8,994.23	3,515.03	0.0022100	0.0000171	0.0013997	0.0036268	0.0000127	-	0.0000016	0.0000143	0.0000297	0.0005538	0.0005978
Great Basin Valleys	2028	MHDT	Aggregate	Aggregate	Diesel	337.38	17,909.94	2,941.02	0.0368625	0.0034033	0.0065328	0.0467986	0.0002075	0.0000030	-	0.0002105	0.0000592	0.0011028	0.0013725
Great Basin Valleys	2028	OBUS	Aggregate	Aggregate	Gasoline	42.29	1,828.38	846.12	0.0005721	0.0000030	0.0003099	0.0008851	0.0000023	-	0.0000002	0.0000025	0.0000060	0.0001126	0.0001211
Great Basin Valleys	2028	OBUS	Aggregate	Aggregate	Diesel	89.10	6,367.54	821.56	0.0120222	0.0008571	0.0020169	0.0148963	0.0000574	0.0000003	-	0.0000577	0.0000211	0.0003921	0.0004708
Great Basin Valleys	2028	SBUS	Aggregate	Aggregate	Gasoline	20.41	904.10	81.64	0.0001511	0.0000208	0.0000498	0.0002218	0.0000010	-	0.0000000	0.0000011	0.0000020	0.0003181	0.0003212
Great Basin Valleys	2028	SBUS	Aggregate	Aggregate	Diesel	67.07	2,106.09	774.03	0.0119353	0.0026413	0.0008732	0.0154499	0.0000771	0.0000021	-	0.0000792	0.0000070	0.0007410	0.0008272
Great Basin Valleys	2028	UBUS	Aggregate	Aggregate	Gasoline	31.37	3,158.46	125.48	0.0003355	-	0.0000575	0.0003930	0.0000071	-	0.0000001	0.0000072	0.0000078	0.0001477	0.0001627
Great Basin Valleys	2028	UBUS	Aggregate	Aggregate	Diesel	27.73	2,502.60	110.92	0.0016359	-	-	0.0016359	0.0000169	-	-	0.0000169	0.0000151	0.0001153	0.0001473
Great Basin Valleys	2028	UBUS	Aggregate	Aggregate	Natural Gas	1.39	124.77	5.58	0.0000409	-	-	0.0000409	0.0000003	-	-	0.0000003	0.0000004	0.0000077	0.0000084

NOTES:

HHDT = Heavy Duty Diesel Trucks
LDA = Passenger Cars
LDT1 = Light-Duty Trucks (GVWR <6000 lbs. and ETW <= 3750 lbs)
LDT2 = Light-Duty Trucks (GVWR <6000 lbs. and ETW 3751-5750 lbs)
LHDT1 = Light-Heavy-Duty Trucks (GVWR 8501-10000 lbs)
LHDT2 = Light-Heavy-Duty Trucks (GVWR 10001-14000 lbs)
MCY = Motorcycles
MDV = Medium-Duty Trucks (GVWR 6000-8500 lbs)
MH = Motor Homes
MHDT = Medium-Heavy Duty Trucks
OBUS = Other Buses
SBUS = School Buses
UBUS = Urban Buses

SOURCE: EMFAC2017 (v1.0.3) Emissions Inventory

PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_TOTEX	PM10_PMTW	PM10_PMBW	PM10_TOTAL	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CO2_TOTEX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	CH4_TOTEX	N2O_RUNEX	N2O_IDLEX	N2O_STREX	N2O_TOTEX	ROG_RUNEX	ROG_IDLEX
0.0000001	-	0.0000001	0.0000002	0.0000005	0.0000015	0.0000021	0.0493899	-	0.0006837	0.0500736	0.0000059	-	0.0000000	0.0000059	0.0000046	-	0.0000001	0.0000047	0.0000440	-
0.0115598	0.0003786	-	0.0119384	0.0055379	0.0094976	0.0269739	223.7058865	21.3510398	-	245.0569263	0.0009219	0.0004333	-	0.0013552	0.0351635	0.0033561	-	0.0385195	0.0198481	0.0093285
0.0038829	-	0.0005753	0.0044582	0.0170402	0.0782786	0.0997769	630.6274557	-	15.2113568	645.8388125	0.0100297	-	0.0201558	0.0301855	0.0148121	-	0.0078111	0.0226232	0.0429487	-
0.0003752	-	-	0.0003752	0.0001798	0.0008261	0.0013812	5.1368370	-	-	5.1368370	0.0000318	-	-	0.0000318	0.0008074	-	-	0.0008074	0.0006843	-
-	-	-	-	0.0001750	0.0008041	0.0009791	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0008159	-	0.0001357	0.0009516	0.0020909	0.0096053	0.0126478	91.8065689	-	2.5127508	94.3193197	0.0032535	-	0.0047090	0.0079625	0.0040567	-	0.0012967	0.0053534	0.0153783	-
0.0000152	-	-	0.0000152	0.0000009	0.0000040	0.0000201	0.0523010	-	-	0.0523010	0.0000009	-	-	0.0000009	0.0000082	-	-	0.0000082	0.0000191	-
-	-	-	-	0.0000017	0.0000079	0.0000096	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0016712	-	0.0002593	0.0019305	0.0070340	0.0323125	0.0412770	339.5200393	-	8.8312923	348.3513316	0.0065428	-	0.0125906	0.0191334	0.0104360	-	0.0047206	0.0151566	0.0293887	-
0.0000252	-	-	0.0000252	0.0000390	0.0001791	0.0002433	1.4973892	-	-	1.4973892	0.0000042	-	-	0.0000042	0.0002354	-	-	0.0002354	0.0000908	-
-	-	-	-	0.0000222	0.0001019	0.0001241	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0003445	-	0.0000354	0.0003799	0.0007103	0.0067872	0.0078775	92.9304017	0.3394181	0.8517776	94.1215974	0.0031647	0.0003259	0.0015397	0.0050303	0.0027679	0.0000078	0.0016750	0.0044508	0.0179699	0.0012795
0.0038079	0.0000761	-	0.0038841	0.0011634	0.0074110	0.0124584	56.6809255	0.3851247	-	57.0660502	0.0009596	0.0000139	-	0.0009736	0.0089095	0.0000605	-	0.0089700	0.0206607	0.0002996
0.0000273	-	0.0000021	0.0000294	0.0000817	0.0009104	0.0010215	12.1289813	0.0406016	0.0957818	12.2653647	0.0001749	0.0000360	0.0001350	0.0003460	0.0002385	0.0000009	0.0001813	0.0004207	0.0008635	0.0001339
0.0010014	0.0000229	-	0.0010243	0.0003733	0.0027739	0.0041714	20.3302306	0.1862876	-	20.5165182	0.0002589	0.0000042	-	0.0002631	0.0031956	0.0000293	-	0.0032249	0.0055733	0.0000907
0.0000529	-	0.0000287	0.0000816	0.0001057	0.0003107	0.0004980	5.9238874	-	0.4897164	6.4136038	0.0099972	-	0.0022582	0.0122554	0.0018604	-	0.0001134	0.0019738	0.0709371	-
0.0013375	-	0.0002510	0.0015885	0.0052643	0.0241829	0.0310357	306.8015502	-	8.5986161	315.4001663	0.0068076	-	0.0122457	0.0190533	0.0092713	-	0.0040636	0.0133349	0.0359110	-
0.0001113	-	-	0.0001113	0.0001170	0.0005373	0.0007655	6.0248364	-	-	6.0248364	0.0000126	-	-	0.0000126	0.0009470	-	-	0.0009470	0.0002704	-
-	-	-	-	0.0000039	0.0000181	0.0000220	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0000131	-	0.0000000	0.0000131	0.0000611	0.0006632	0.0007374	9.5005770	-	0.0018124	9.5023894	0.0001718	-	0.0000024	0.0001741	0.0002341	-	0.0000018	0.0002359	0.0008385	-
0.0002605	-	-	0.0002605	0.0000285	0.0002322	0.0005212	1.9026114	-	-	1.9026114	0.0000118	-	-	0.0000118	0.0002991	-	-	0.0002991	0.0002547	-
0.0000160	-	0.0000036	0.0000196	0.0000944	0.0010256	0.0011397	14.3660440	0.0953097	0.1525433	14.6138970	0.0003195	0.0000408	0.0001671	0.0005274	0.0003736	0.0000010	0.0000928	0.0004674	0.0017183	0.0001727
0.0022756	0.0000228	-	0.0022984	0.0002227	0.0024193	0.0049404	20.5476634	0.5029189	-	21.0505823	0.0002398	0.0000040	-	0.0002437	0.0032298	0.0000791	-	0.0033089	0.0051619	0.0000855
0.0000023	-	0.0000003	0.0000026	0.0000304	0.0003299	0.0003629	4.6809318	0.0198595	0.0290018	4.7297931	0.0000593	0.0000099	0.0000349	0.0001041	0.0000897	0.0000003	0.0000273	0.0001173	0.0002938	0.0000381
0.0004238	0.0000071	-	0.0004308	0.0000465	0.0005054	0.0009828	4.9256900	0.1473503	-	5.0730403	0.0000488	0.0000036	-	0.0000524	0.0007742	0.0000232	-	0.0007974	0.0010513	0.0000767
0.0000004	-	0.0000000	0.0000004	0.0000046	0.0004281	0.0004331	0.5122800	0.0310805	0.0024451	0.5458057	0.0000025	0.0000290	0.0000030	0.0000346	0.0000092	0.0000011	0.0000025	0.0000128	0.0000115	0.0001242
0.0000980	0.0000038	-	0.0001019	0.0000267	0.0016547	0.0017832	2.6136688	0.2674071	-	2.8810760	0.0000114	0.0000010	-	0.0000123	0.0004108	0.0000420	-	0.0004529	0.0002452	0.0000205
0.0000040	-	0.0000000	0.0000040	0.0000303	0.0003349	0.0003692	4.8885450	-	0.0068179	4.8953629	0.0000153	-	0.0000076	0.0000229	0.0000533	-	0.0000078	0.0000611	0.0000466	-
0.0000057	-	-	0.0000057	0.0000179	0.0001021	0.0001257	1.1767028	-	-	1.1767028	0.0000456	-	-	0.0000456	0.0001850	-	-	0.0001850	0.0000269	-
-	-	-	-	0.0000001	0.0000007	0.0000009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0000084	-	-	0.0000084	0.0000423	0.0001760	0.0002267	2.9898747	-	-	2.9898747	0.0093348	-	-	0.0093348	0.0006095	-	-	0.0006095	0.0004222	-
0.0000000	-	0.0000000	0.0000000	0.0000007	0.0000023	0.0000031	0.0685380	-	0.0001580	0.0686960	0.0000020	-	0.0000000	0.0000020	0.0000044	-	0.0000000	0.0000044	0.0000083	-
0.0054061	0.0000745	-	0.0054806	0.0057836	0.0099189	0.0211831	217.9385760	23.9857089	-	241.9242849	0.0003054	0.0004503	-	0.0007557	0.0342569	0.0037702	-	0.0380271	0.0065745	0.0096946
0.0035473	-	0.0005395	0.0040868	0.0178448	0.0819745	0.1039061	609.3636021	-	15.1086484	624.4722505	0.0065219	-	0.0167631	0.0232850	0.0113792	-	0.0074929	0.0188721	0.0261663	-
0.0002734	-	-	0.0002734	0.0002027	0.0009312	0.0014073	5.3660873	-	-	5.3660873	0.0000255	-	-	0.0000255	0.0008435	-	-	0.0008435	0.0005493	-
-	-	-	-	0.0003430	0.0015755	0.0019185	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0006298	-	0.0001087	0.0007385	0.0020868	0.0095860	0.0124113	85.0865653	-	2.3658243	87.4523895	0.0020762	-	0.0036863	0.0057626	0.0028180	-	0.0011659	0.0039839	0.0094962	-
0.0000092	-	-	0.0000092	0.0000006	0.0000028	0.0000126	0.0355853	-	-	0.0355853	0.0000005	-	-	0.0000005	0.0000056	-	-	0.0000056	0.0000117	-
-	-	-	-	0.0000123	0.0000566	0.0000690	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0014475	-	0.0002336	0.0016812	0.0069120	0.0317521	0.0403453	304.2418289	-	8.2576691	312.4994980	0.0044862	-	0.0105266	0.0150128	0.0074780	-	0.0041697	0.0116477	0.0193725	-
0.0000283	-	-	0.0000283	0.0000490	0.0002253	0.0003026	1.7503428	-	-	1.7503428	0.0000051	-	-	0.0000051	0.0002751	-	-	0.0002751	0.0001097	-
-	-	-	-	0.0000490	0.0002252	0.0002742	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0002624	-	0.0000246	0.0002870	0.0006287	0.0060075	0.0069232	80.5703071	0.3084838	0.7493778	81.6281687	0.0021465	0.0002948	0.0011861	0.0036273	0.0020089	0.0000072	0.0015127	0.0035288	0.0114262	0.0011342
0.0029909	0.0000705	-	0.0030615	0.0010202	0.0064988	0.0105804	48.5550183	0.3559569	-	48.9109752	0.0007926	0.0000131	-	0.0008057	0.0076322	0.0000560	-	0.0076881	0.0170649	0.0002811
0.0000225	-	0.0000017	0.0000242	0.0000756	0.0008428	0.0009426	10.9691397	0.0383767	0.0897836	11.0973000	0.0001085	0.0000336	0.0001118	0.0002539	0.0001689	0.0000008	0.0001696	0.0003393	0.0005188	0.0001225
0.0008541	0.0000227	-	0.0008767	0.0003434	0.0025519	0.0037721	18.2291715	0.1816403	-	18.4108117	0.0002276	0.0000042	-	0.0002317	0.0028654	0.0000286	-	0.0028939	0.0048990	0.0000899
0.0000527	-	0.0000263	0.0000790	0.0001013	0.0002978	0.0004781	5.6512507	-	0.4969338	6.1481845	0.0093286	-	0.0022697	0.0115983	0.0017664	-	0.0001170	0.0018834	0.0653076	-
0.0010754	-	0.0002048	0.0012803	0.0048861	0.0224455	0.0286118	262.8231724	-	7.6886333	270.5118058	0.0039783	-	0.0095968	0.0135750	0.0062544	-	0.0034141	0.0096686	0.0178855	-
0.0000979	-	-	0.0000979	0.0001292	0.0005934	0.0008206	6.1881288	-	-	6.1881288	0.0000119	-	-	0.0000119	0.0009727	-	-	0.0009727	0.0002566	-
-	-	-	-	0.0000252	0.0001158	0.0001410	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0000089	-	0.0000000	0.0000089	0.0000505	0.0005483	0.0006076	7.6646092	-	0.0014558	7.6660650	0.0001003	-	0.0000019	0.0001021	0.0001556	-	0.0000017	0.0001573	0.0004629	-
0.0002126	-	-	0.0002126	0.0000261	0.0002130	0.0004517	1.7153414	-	-	1.7153414	0.0000104	-	-	0.0000104	0.0002696	-	-	0.0002696	0.0002242	-
0.0000134	-	0.0000023	0.0000157	0.0001030	0.0011187	0.0012374	15.0559410	0.0923129	0.1401440	15.2883979	0.0001719	0.0000441	0.0001463	0.0003623	0.0002451	0.0000012	0.0000993	0.0003456	0.0008755	0.0001745
0.0006597	0.0000106	-	0.0006704	0.0002260	0.0024550	0.0033515	19.6354819	0.4825195	-	20.1180014	0.0000685	0.0000026	-	0.0000711	0.0030864	0.0000758	-	0.0031623	0.0014756	0.0000558
0.0000024	-	0.0000003	0.0000027	0.0000275	0.0002986	0.0003288	4.1026476	0.0189346	0.0273527	4.1489349	0.0000409	0.0000097	0.0000317	0.0000823	0.0000638	0.0000003	0.0000262	0.0000902	0.0002031	0.0000371
0.0000953	0.0000012	-	0.0000966	0.0000604	0.0006563	0.0008132	5.8548712	0.1463481	-	6.0012193	0.0000101	0.0000023	-	0.0000124	0.0009203	0.0000230	-	0.0009433	0.0002177	0.0000503

0.0000006	-	0.0000000	0.0000007	0.0000058	0.0005383	0.0005447	0.6246241	0.0394235	0.0031041	0.6671517	0.0000026	0.0000378	0.0000038	0.0000442	0.0000111	0.0000014	0.0000033	0.0000158	0.0000118	0.0001622
0.0000946	0.0000034	-	0.0000980	0.0000273	0.0016937	0.0018190	2.6222291	0.2725601	-	2.8947893	0.0000113	0.0000010	-	0.0000123	0.0004122	0.0000428	-	0.0004550	0.0002435	0.0000205
0.0000051	-	0.0000001	0.0000051	0.0000306	0.0003387	0.0003744	4.8309833	-	0.0067244	4.8377076	0.0000146	-	0.0000076	0.0000222	0.0000521	-	0.0000077	0.0000598	0.0000443	-
0.0000073	-	-	0.0000073	0.0000220	0.0001416	0.0001709	1.4471141	-	-	1.4471141	0.0000553	-	-	0.0000553	0.0002275	-	-	0.0002275	0.0000295	-
-	-	-	-	0.0000001	0.0000007	0.0000009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0000060	-	-	0.0000060	0.0000389	0.0001396	0.0001844	2.6451061	-	-	2.6451061	0.0076247	-	-	0.0076247	0.0005392	-	-	0.0005392	0.0001229	-
0.0000001	-	0.0000000	0.0000001	0.0000015	0.0000046	0.0000061	0.1269996	-	0.0003681	0.1273677	0.0000046	-	0.0000000	0.0000046	0.0000093	-	0.0000000	0.0000093	0.0000201	-
0.0048451	0.0000569	-	0.0049019	0.0062510	0.0107205	0.0218734	198.4560247	23.3408472	-	221.7968719	0.0001845	0.0004933	-	0.0006778	0.0311945	0.0036689	-	0.0348634	0.0039724	0.0106206
0.0027873	-	0.0004700	0.0032573	0.0187662	0.0862071	0.1082305	545.3404984	-	14.4762138	559.8167122	0.0034070	-	0.0121033	0.0155103	0.0084732	-	0.0068157	0.0152889	0.0122344	-
0.0001045	-	-	0.0001045	0.0002276	0.0010456	0.0013777	5.1507612	-	-	5.1507612	0.0000144	-	-	0.0000144	0.0008096	-	-	0.0008096	0.0003103	-
-	-	-	-	0.0008345	0.0038334	0.0046679	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0003974	-	0.0000739	0.0004713	0.0020920	0.0096099	0.0121732	72.9578543	-	2.1237185	75.0815728	0.0008941	-	0.0022734	0.0031675	0.0015454	-	0.0009618	0.0025072	0.0038644	-
0.0000015	-	-	0.0000015	0.0000003	0.0000016	0.0000034	0.0167048	-	-	0.0167048	0.0000001	-	-	0.0000001	0.0000026	-	-	0.0000026	0.0000026	-
-	-	-	-	0.0000466	0.0002139	0.0002605	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0010850	-	0.0001945	0.0012795	0.0067169	0.0308557	0.0388521	243.9327145	-	7.1869395	251.1196540	0.0023406	-	0.0074132	0.0097538	0.0044483	-	0.0033006	0.0077488	0.0095272	-
0.0000320	-	-	0.0000320	0.0000609	0.0002797	0.0003726	1.8720698	-	-	1.8720698	0.0000062	-	-	0.0000062	0.0002943	-	-	0.0002943	0.0001326	-
-	-	-	-	0.0001272	0.0005844	0.0007116	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0001940	-	0.0000186	0.0002126	0.0005245	0.0050119	0.0057490	62.4799081	0.2574545	0.6291116	63.3664742	0.0010305	0.0002372	0.0008368	0.0021044	0.0010830	0.0000060	0.0012068	0.0022958	0.0052975	0.0008837
0.0017079	0.0000599	-	0.0017679	0.0008127	0.0051771	0.0077577	35.7058238	0.2899579	-	35.9957817	0.0005337	0.0000112	-	0.0005449	0.0056125	0.0000456	-	0.0056580	0.0114895	0.0002422
0.0000182	-	0.0000013	0.0000195	0.0000678	0.0007554	0.0008427	9.0778123	0.0342096	0.0795443	9.1915661	0.0000450	0.0000285	0.0000756	0.0001492	0.0000869	0.0000007	0.0001431	0.0002307	0.0001970	0.0001004
0.0006314	0.0000220	-	0.0006535	0.0002977	0.0022123	0.0031634	14.5848215	0.1649518	-	14.7497733	0.0001770	0.0000040	-	0.0001810	0.0022925	0.0000259	-	0.0023185	0.0038101	0.0000866
0.0000521	-	0.0000223	0.0000744	0.0000948	0.0002788	0.0004481	5.2579285	-	0.4998648	5.7577932	0.0084237	-	0.0022506	0.0106743	0.0016321	-	0.0001209	0.0017530	0.0578888	-
0.0007137	-	0.0001422	0.0008559	0.0043735	0.0200906	0.0253200	195.0545589	-	6.1104962	201.1650551	0.0017899	-	0.0059164	0.0077063	0.0032550	-	0.0024181	0.0056731	0.0075070	-
0.0000566	-	-	0.0000566	0.0001410	0.0006475	0.0008451	5.7533124	-	-	5.7533124	0.0000089	-	-	0.0000089	0.0009043	-	-	0.0009043	0.0001907	-
-	-	-	-	0.0000859	0.0003948	0.0004808	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.0000049	-	0.0000000	0.0000049	0.0000376	0.0004083	0.0004508	5.2332451	-	0.0009628	5.2342079	0.0000349	-	0.0000012	0.0000361	0.0000733	-	0.0000015	0.0000747	0.0001438	-
0.0001407	-	-	0.0001407	0.0000229	0.0001862	0.0003498	1.4113529	-	-	1.4113529	0.0000081	-	-	0.0000081	0.0002218	-	-	0.0002218	0.0001738	-
0.0000138	-	0.0000018	0.0000155	0.0001190	0.0012922	0.0014268	15.7744817	0.0963787	0.1387296	16.0095900	0.0000658	0.0000532	0.0001397	0.0002587	0.0001370	0.0000015	0.0001174	0.0002559	0.0003019	0.0001999
0.0002169	0.0000031	-	0.0002200	0.0002369	0.0025732	0.0030301	18.2577909	0.4696010	-	18.7273919	0.0000156	0.0000020	-	0.0000176	0.0028699	0.0000738	-	0.0029437	0.0003362	0.0000421
0.0000025	-	0.0000002	0.0000027	0.0000242	0.0002627	0.0002896	3.2546404	0.0166059	0.0235527	3.2947989	0.0000160	0.0000093	0.0000276	0.0000529	0.0000329	0.0000003	0.0000250	0.0000582	0.0000732	0.0000349
0.0000600	0.0000003	-	0.0000603	0.0000842	0.0009149	0.0010594	7.0731735	0.1740064	-	7.2471799	0.0000037	0.0000026	-	0.0000063	0.0011118	0.0000274	-	0.0011392	0.0000793	0.0000561
0.0000011	-	0.0000000	0.0000012	0.0000080	0.0007423	0.0007514	0.8043218	0.0546223	0.0043134	0.8632574	0.0000029	0.0000553	0.0000055	0.0000637	0.0000139	0.0000021	0.0000048	0.0000208	0.0000127	0.0002394
0.0000806	0.0000022	-	0.0000828	0.0000279	0.0017291	0.0018397	2.5180573	0.2669165	-	2.7849738	0.0000100	0.0000009	-	0.0000109	0.0003958	0.0000420	-	0.0004378	0.0002151	0.0000204
0.0000077	-	0.0000001	0.0000078	0.0000312	0.0003447	0.0003837	4.2342850	-	0.0059698	4.2402548	0.0000118	-	0.0000061	0.0000179	0.0000368	-	0.0000068	0.0000435	0.0000350	-
0.0000176	-	-	0.0000176	0.0000604	0.0002690	0.0003471	3.3129887	-	-	3.3129887	0.0001452	-	-	0.0001452	0.0005208	-	-	0.0005208	0.0000480	-
0.0000003	-	-	0.0000003	0.0000017	0.0000179	0.0000199	0.1849531	-	-	0.1849531	0.0004376	-	-	0.0004376	0.0000377	-	-	0.0000377	0.0000063	-

ROG_STREX	ROG_TOTEX	ROG_DIURN	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	ROG_TOTAL	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_TOTEX	TOG_DIURN	TOG_HOTSOAK	TOG_RUNLOSS	TOG_RESTLOSS	TOG_TOTAL	CO_RUNEX	CO_IDLEX	CO_STREX
0.0000000	0.0000441	0.0000001	0.0000070	0.0000344	0.0000001	0.0000856	0.0000549	-	0.0000000	0.0000549	0.0000001	0.0000070	0.0000344	0.0000001	0.0000964	0.0020335	-	0.0000176
-	0.0291766	-	-	-	-	0.0291766	0.0225956	0.0106198	-	0.0332154	-	-	-	-	0.0332154	0.0767347	0.1076263	-
0.0985239	0.1414726	0.0187087	0.0415380	0.0816370	0.0145451	0.2979014	0.0625097	-	0.1078686	0.1703783	0.0187087	0.0415380	0.0816370	0.0145451	0.3268070	2.0512431	-	0.7280502
-	0.0006843	-	-	-	-	0.0006843	0.0007791	-	-	0.0007791	-	-	-	-	0.0007791	0.0080337	-	-
-	-	0.0000106	0.0000135	-	0.0000046	0.0000287	-	-	-	-	0.0000106	0.0000135	-	0.0000046	0.0000287	-	-	-
0.0263392	0.0417175	0.0078484	0.0143144	0.0576665	0.0055233	0.1270701	0.0222871	-	0.0288363	0.0511234	0.0078484	0.0143144	0.0576665	0.0055233	0.1364760	0.5987685	-	0.1210761
-	0.0000191	-	-	-	-	0.0000191	0.0000218	-	-	0.0000218	-	-	-	-	0.0000218	0.0001449	-	-
-	-	0.0000001	0.0000001	-	0.0000000	0.0000003	-	-	-	-	0.0000001	0.0000001	-	0.0000000	0.0000003	-	-	-
0.0652206	0.0946093	0.0119482	0.0249537	0.0998379	0.0094499	0.2407990	0.0426310	-	0.0714058	0.1140368	0.0119482	0.0249537	0.0998379	0.0094499	0.2602265	1.2690167	-	0.4170092
-	0.0000908	-	-	-	-	0.0000908	0.0001034	-	-	0.0001034	-	-	-	-	0.0001034	0.0007906	-	-
-	-	0.0000015	0.0000019	-	0.0000006	0.0000040	-	-	-	-	0.0000015	0.0000019	-	0.0000006	0.0000040	-	-	-
0.0086678	0.0279171	0.0002907	0.0113532	0.1025355	0.0001306	0.1422271	0.0250825	0.0018604	0.0094785	0.0364214	0.0002907	0.0113532	0.1025355	0.0001306	0.1507314	0.3436819	0.0100833	0.1031206
-	0.0209603	-	-	-	-	0.0209603	0.0235208	0.0003411	-	0.0238619	-	-	-	-	0.0238619	0.0955208	0.0024832	-
0.0007035	0.0017009	0.0000198	0.0007793	0.0072978	0.0000091	0.0098069	0.0012600	0.0001954	0.0007702	0.0022256	0.0000198	0.0007793	0.0072978	0.0000091	0.0103316	0.0166714	0.0010616	0.0094924
-	0.0056640	-	-	-	-	0.0056640	0.0063448	0.0001032	-	0.0064480	-	-	-	-	0.0064480	0.0259142	0.0007514	-
0.0177572	0.0886943	0.0077137	0.0063441	0.0206558	0.0047487	0.1281566	0.0856856	-	0.0193064	0.1049920	0.0077137	0.0063441	0.0206558	0.0047487	0.1444542	0.6635387	-	0.0759538
0.0672432	0.1031543	0.0111276	0.0227720	0.0853078	0.0091310	0.2314927	0.0485201	-	0.0735903	0.1221104	0.0111276	0.0227720	0.0853078	0.0091310	0.2504488	1.2758868	-	0.4426702
-	0.0002704	-	-	-	-	0.0002704	0.0003079	-	-	0.0003079	-	-	-	-	0.0003079	0.0042082	-	-
-	-	0.0000003	0.0000003	-	0.0000001	0.0000007	-	-	-	-	0.0000003	0.0000003	-	0.0000001	0.0000007	-	-	-
0.0000114	0.0008500	0.0001136	0.0000086	0.0002416	0.0000373	0.0012512	0.0012053	-	0.0000125	0.0012178	0.0001136	0.0000086	0.0002416	0.0000373	0.0016190	0.0236133	-	0.0002588
-	0.0002547	-	-	-	-	0.0002547	0.0002899	-	-	0.0002899	-	-	-	-	0.0002899	0.0009457	-	-
0.0010205	0.0029115	0.0000186	0.0007519	0.0052553	0.0000087	0.0089460	0.0024742	0.0002514	0.0011163	0.0038418	0.0000186	0.0007519	0.0052553	0.0000087	0.0098764	0.0396812	0.0026931	0.0225325
-	0.0052475	-	-	-	-	0.0052475	0.0058765	0.0000974	-	0.0059739	-	-	-	-	0.0059739	0.0133151	0.0011120	-
0.0001833	0.0005153	0.0000026	0.0000407	0.0006118	0.0000011	0.0011715	0.0004288	0.0000556	0.0002007	0.0006851	0.0000026	0.0000407	0.0006118	0.0000011	0.0013413	0.0065516	0.0002952	0.0041680
-	0.0011279	-	-	-	-	0.0011279	0.0011968	0.0000873	-	0.0012841	-	-	-	-	0.0012841	0.0030674	0.0006864	-
0.0000165	0.0001522	0.0000003	0.0000025	0.0000274	0.0000001	0.0001826	0.0000168	0.0001813	0.0000181	0.0002161	0.0000003	0.0000025	0.0000274	0.0000001	0.0002465	0.0002215	0.0009602	0.0004764
-	0.0002657	-	-	-	-	0.0002657	0.0002791	0.0000234	-	0.0003025	-	-	-	-	0.0003025	0.0006426	0.0003466	-
0.0000307	0.0000773	0.0000005	0.0000047	0.0000237	0.0000003	0.0001065	0.0000681	-	0.0000336	0.0001017	0.0000005	0.0000047	0.0000237	0.0000003	0.0001308	0.0007006	-	0.0005749
-	0.0000269	-	-	-	-	0.0000269	0.0000752	-	-	0.0000752	-	-	-	-	0.0000752	0.0002063	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	0.0004222	-	-	-	-	0.0004222	0.0098552	-	-	0.0098552	-	-	-	-	0.0098552	0.0582734	-	-
0.0000000	0.0000083	0.0000000	0.0000001	0.0000003	0.0000000	0.0000087	0.0000121	-	0.0000000	0.0000121	0.0000000	0.0000001	0.0000003	0.0000000	0.0000125	0.0008246	-	0.0000316
-	0.0162691	-	-	-	-	0.0162691	0.0074846	0.0110366	-	0.0185212	-	-	-	-	0.0185212	0.0381872	0.1355979	-
0.0774387	0.1036050	0.0152537	0.0354741	0.0728358	0.0123094	0.2394780	0.0381479	-	0.0847849	0.1229328	0.0152537	0.0354741	0.0728358	0.0123094	0.2588058	1.5582819	-	0.7102711
-	0.0005493	-	-	-	-	0.0005493	0.0006253	-	-	0.0006253	-	-	-	-	0.0006253	0.0075062	-	-
-	-	0.0000196	0.0000249	-	0.0000084	0.0000530	-	-	-	-	0.0000196	0.0000249	-	0.0000084	0.0000530	-	-	-
0.0199277	0.0294239	0.0063481	0.0119152	0.0479865	0.0046006	0.1002743	0.0138458	-	0.0218181	0.0356639	0.0063481	0.0119152	0.0479865	0.0046006	0.1065143	0.4038506	-	0.1047796
-	0.0000117	-	-	-	-	0.0000117	0.0000133	-	-	0.0000133	-	-	-	-	0.0000133	0.0000887	-	-
-	-	0.0000007	0.0000009	-	0.0000003	0.0000018	-	-	-	-	0.0000007	0.0000009	-	0.0000003	0.0000018	-	-	-
0.0528760	0.0722485	0.0111694	0.0232212	0.0959183	0.0091781	0.2117356	0.0282517	-	0.0578923	0.0861439	0.0111694	0.0232212	0.0959183	0.0091781	0.2256310	0.9285050	-	0.3807955
-	0.0001097	-	-	-	-	0.0001097	0.0001249	-	-	0.0001249	-	-	-	-	0.0001249	0.0010154	-	-
-	-	0.0000035	0.0000045	-	0.0000015	0.0000095	-	-	-	-	0.0000035	0.0000045	-	0.0000015	0.0000095	-	-	-
0.0063734	0.0189338	0.0002503	0.0100024	0.0975477	0.0001147	0.1268489	0.0166731	0.0016550	0.0069781	0.0253062	0.0002503	0.0100024	0.0975477	0.0001147	0.1332213	0.2166324	0.0093064	0.0897776
-	0.0173460	-	-	-	-	0.0173460	0.0194273	0.0003201	-	0.0197473	-	-	-	-	0.0197473	0.0799793	0.0023302	-
0.0005726	0.0012139	0.0000167	0.0006779	0.0059459	0.0000081	0.0078625	0.0007571	0.0001787	0.0006270	0.0015627	0.0000167	0.0006779	0.0059459	0.0000081	0.0082113	0.0099295	0.0010237	0.0081150
-	0.0049889	-	-	-	-	0.0049889	0.0055772	0.0001024	-	0.0056796	-	-	-	-	0.0056796	0.0232477	0.0007452	-
0.0178209	0.0831285	0.0079966	0.0063997	0.0190186	0.0048677	0.1214111	0.0797899	-	0.0193823	0.0991722	0.0079966	0.0063997	0.0190186	0.0048677	0.1374548	0.5919843	-	0.0788320
0.0509012	0.0687868	0.0100466	0.0208335	0.0803362	0.0085695	0.1885726	0.0259827	-	0.0557280	0.0817106	0.0100466	0.0208335	0.0803362	0.0085695	0.2014965	0.7765215	-	0.3675894
-	0.0002566	-	-	-	-	0.0002566	0.0002922	-	-	0.0002922	-	-	-	-	0.0002922	0.0044259	-	-
-	-	0.0000017	0.0000023	-	0.0000007	0.0000048	-	-	-	-	0.0000017	0.0000023	-	0.0000007	0.0000048	-	-	-
0.0000083	0.0004712	0.0000840	0.0000067	0.0001849	0.0000287	0.0007755	0.0006755	-	0.0000091	0.0006846	0.0000840	0.0000067	0.0001849	0.0000287	0.0009889	0.0122973	-	0.0001955
-	0.0002242	-	-	-	-	0.0002242	0.0002552	-	-	0.0002552	-	-	-	-	0.0002552	0.0008199	-	-
0.0008239	0.0018739	0.0000120	0.0005093	0.0038227	0.0000058	0.0062237	0.0012775	0.0002547	0.0009021	0.0024342	0.0000120	0.0005093	0.0038227	0.0000058	0.0067841	0.0199745	0.0027152	0.0192125
-	0.0015314	-	-	-	-	0.0015314	0.0016799	0.0000635	-	0.0017434	-	-	-	-	0.0017434	0.0049388	0.0011722	-
0.0001654	0.0004055	0.0000027	0.0000423	0.0006594	0.0000011	0.0011111	0.0002964	0.0000541	0.0001811	0.0005315	0.0000027	0.0000423	0.0006594	0.0000011	0.0012371	0.0044863	0.0002869	0.0038139
-	0.0002680	-	-	-	-	0.0002680	0.0002478	0.0000573	-	0.0003051	-	-	-	-	0.0003051	0.0010384	0.0006962	-

0.0000212	0.0001952	0.0000004	0.0000036	0.0000383	0.0000002	0.0002378	0.0000173	0.0002366	0.0000232	0.0002771	0.0000004	0.0000036	0.0000383	0.0000002	0.0003197	0.0002205	0.0012533	0.0006081
-	0.0002641	-	-	-	-	0.0002641	0.0002772	0.0000234	-	0.0003006	-	-	-	-	0.0003006	0.0006565	0.0003953	-
0.0000307	0.0000750	0.0000007	0.0000063	0.0000350	0.0000004	0.0001172	0.0000646	-	0.0000336	0.0000982	0.0000007	0.0000063	0.0000350	0.0000004	0.0001405	0.0007112	-	0.0005721
-	0.0000295	-	-	-	-	0.0000295	0.0000877	-	-	0.0000877	-	-	-	-	0.0000877	0.0001854	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	0.0001229	-	-	-	-	0.0001229	0.0077968	-	-	0.0077968	-	-	-	-	0.0077968	0.0579499	-	-
0.0000000	0.0000201	0.0000000	0.0000002	0.0000013	0.0000000	0.0000216	0.0000293	-	0.0000000	0.0000293	0.0000000	0.0000002	0.0000013	0.0000000	0.0000308	0.0019668	-	0.0000544
-	0.0145930	-	-	-	-	0.0145930	0.0045223	0.0120908	-	0.0166131	-	-	-	-	0.0166131	0.0338620	0.1559210	-
0.0518205	0.0640549	0.0116751	0.0283770	0.0680147	0.0098035	0.1819251	0.0178524	-	0.0567369	0.0745893	0.0116751	0.0283770	0.0680147	0.0098035	0.1924596	1.1373329	-	0.6499462
-	0.0003103	-	-	-	-	0.0003103	0.0003533	-	-	0.0003533	-	-	-	-	0.0003533	0.0063461	-	-
-	-	0.0000483	0.0000605	-	0.0000207	0.0001295	-	-	-	-	0.0000483	0.0000605	-	0.0000207	0.0001295	-	-	-
0.0114203	0.0152848	0.0041321	0.0080411	0.0334546	0.0031846	0.0640972	0.0056390	-	0.0125038	0.0181428	0.0041321	0.0080411	0.0334546	0.0031846	0.0669552	0.2120384	-	0.0855437
-	0.0000026	-	-	-	-	0.0000026	0.0000030	-	-	0.0000030	-	-	-	-	0.0000030	0.0000255	-	-
-	-	0.0000026	0.0000033	-	0.0000011	0.0000070	-	-	-	-	0.0000026	0.0000033	-	0.0000011	0.0000070	-	-	-
0.0354608	0.0449880	0.0099726	0.0198281	0.0881185	0.0086363	0.1715434	0.0139021	-	0.0388251	0.0527272	0.0099726	0.0198281	0.0881185	0.0086363	0.1792826	0.5932589	-	0.3308216
-	0.0001326	-	-	-	-	0.0001326	0.0001509	-	-	0.0001509	-	-	-	-	0.0001509	0.0013360	-	-
-	-	0.0000105	0.0000132	-	0.0000045	0.0000281	-	-	-	-	0.0000105	0.0000132	-	0.0000045	0.0000281	-	-	-
0.0045590	0.0107402	0.0001910	0.0083242	0.0986874	0.0000903	0.1180330	0.0077300	0.0012894	0.0049916	0.0140111	0.0001910	0.0083242	0.0986874	0.0000903	0.1213039	0.1082174	0.0081780	0.0733488
-	0.0117317	-	-	-	-	0.0117317	0.0130801	0.0002757	-	0.0133558	-	-	-	-	0.0133558	0.0547533	0.0020075	-
0.0003732	0.0006706	0.0000118	0.0005002	0.0040761	0.0000064	0.0052651	0.0002874	0.0001465	0.0004087	0.0008426	0.0000118	0.0005002	0.0040761	0.0000064	0.0054370	0.0038565	0.0009728	0.0064759
-	0.0038967	-	-	-	-	0.0038967	0.0043375	0.0000986	-	0.0044361	-	-	-	-	0.0044361	0.0183912	0.0007176	-
0.0175961	0.0754849	0.0081539	0.0061119	0.0144717	0.0047994	0.1090219	0.0718300	-	0.0191501	0.0909801	0.0081539	0.0061119	0.0144717	0.0047994	0.1245171	0.5006046	-	0.0831748
0.0297918	0.0372988	0.0086203	0.0167985	0.0706148	0.0076609	0.1409934	0.0109542	-	0.0326183	0.0435725	0.0086203	0.0167985	0.0706148	0.0076609	0.1472670	0.4135344	-	0.2514917
-	0.0001907	-	-	-	-	0.0001907	0.0002170	-	-	0.0002170	-	-	-	-	0.0002170	0.0042260	-	-
-	-	0.0000069	0.0000088	-	0.0000030	0.0000187	-	-	-	-	0.0000069	0.0000088	-	0.0000030	0.0000187	-	-	-
0.0000051	0.0001489	0.0000426	0.0000036	0.0000899	0.0000160	0.0003010	0.0002098	-	0.0000056	0.0002154	0.0000426	0.0000036	0.0000899	0.0000160	0.0003675	0.0032834	-	0.0001152
-	0.0001738	-	-	-	-	0.0001738	0.0001978	-	-	0.0001978	-	-	-	-	0.0001978	0.0006129	-	-
0.0007223	0.0012240	0.0000075	0.0003726	0.0026032	0.0000041	0.0042114	0.0004405	0.0002917	0.0007908	0.0015230	0.0000075	0.0003726	0.0026032	0.0000041	0.0045103	0.0065188	0.0030967	0.0159445
-	0.0003783	-	-	-	-	0.0003783	0.0003828	0.0000479	-	0.0004307	-	-	-	-	0.0004307	0.0024026	0.0014721	-
0.0001425	0.0002506	0.0000021	0.0000372	0.0006078	0.0000009	0.0008986	0.0001068	0.0000509	0.0001560	0.0003137	0.0000021	0.0000372	0.0006078	0.0000009	0.0009618	0.0015301	0.0002699	0.0031034
-	0.0001354	-	-	-	-	0.0001354	0.0000902	0.0000639	-	0.0001542	-	-	-	-	0.0001542	0.0009167	0.0009454	-
0.0000304	0.0002825	0.0000008	0.0000070	0.0000669	0.0000004	0.0003576	0.0000185	0.0003493	0.0000333	0.0004012	0.0000008	0.0000070	0.0000669	0.0000004	0.0004762	0.0002353	0.0018502	0.0008569
-	0.0002355	-	-	-	-	0.0002355	0.0002448	0.0000232	-	0.0002681	-	-	-	-	0.0002681	0.0006266	0.0005044	-
0.0000244	0.0000594	0.0000005	0.0000042	0.0000211	0.0000003	0.0000855	0.0000511	-	0.0000267	0.0000778	0.0000005	0.0000042	0.0000211	0.0000003	0.0001038	0.0006536	-	0.0005763
-	0.0000480	-	-	-	-	0.0000480	0.0001983	-	-	0.0001983	-	-	-	-	0.0001983	0.0004481	-	-
-	0.0000063	-	-	-	-	0.0000063	0.0004467	-	-	0.0004467	-	-	-	-	0.0004467	0.0030457	-	-

CO_TOTEX	SOx_RUNEX	SOx_IDLEX	SOx_STREX	SOx_TOTEX	Fuel Consumption
0.0020510	0.0000005	-	0.0000000	0.0000005	0.0052854
0.1843609	0.0021135	0.0002017	-	0.0023152	21.8402159
2.7792933	0.0062406	-	0.0001505	0.0063911	68.1703550
0.0080337	0.0000486	-	-	0.0000486	0.4578105
-	-	-	-	-	-
0.7198445	0.0009085	-	0.0000249	0.0009334	9.9557063
0.0001449	0.0000005	-	-	0.0000005	0.0046612
-	-	-	-	-	-
1.6860258	0.0033598	-	0.0000874	0.0034472	36.7695987
0.0007906	0.0000142	-	-	0.0000142	0.1334519
-	-	-	-	-	-
0.4568858	0.0009196	0.0000034	0.0000084	0.0009314	9.9348360
0.0980040	0.0005358	0.0000036	-	0.0005395	5.0858993
0.0272253	0.0001200	0.0000004	0.0000009	0.0001214	1.2946485
0.0266656	0.0001922	0.0000018	-	0.0001940	1.8284943
0.7394926	0.0000586	-	0.0000048	0.0000635	0.6769764
1.7185570	0.0030361	-	0.0000851	0.0031211	33.2914977
0.0042082	0.0000570	-	-	0.0000570	0.5369517
-	-	-	-	-	-
0.0238721	0.0000940	-	0.0000000	0.0000940	1.0030076
0.0009457	0.0000180	-	-	0.0000180	0.1695665
0.0649068	0.0001422	0.0000009	0.0000015	0.0001446	1.5425436
0.0144271	0.0001941	0.0000048	-	0.0001989	1.8760917
0.0110148	0.0000463	0.0000002	0.0000003	0.0000468	0.4992448
0.0037538	0.0000465	0.0000014	-	0.0000479	0.4521247
0.0016582	0.0000051	0.0000003	0.0000000	0.0000054	0.0576115
0.0009892	0.0000247	0.0000025	-	0.0000272	0.2567702
0.0012755	0.0000484	-	0.0000001	0.0000484	0.5167212
0.0002063	0.0000111	-	-	0.0000111	0.1048713
-	-	-	-	-	-
0.0582734	-	-	-	-	0.3455839
0.0008561	0.0000007	-	0.0000000	0.0000007	0.0072511
0.1737851	0.0020590	0.0002266	-	0.0022856	21.5610254
2.2685530	0.0060301	-	0.0001495	0.0061797	65.9150460
0.0075062	0.0000507	-	-	0.0000507	0.4782420
-	-	-	-	-	-
0.5086302	0.0008420	-	0.0000234	0.0008654	9.2308798
0.0000887	0.0000003	-	-	0.0000003	0.0031715
-	-	-	-	-	-
1.3093005	0.0030107	-	0.0000817	0.0030924	32.9853228
0.0010154	0.0000165	-	-	0.0000165	0.1559959
-	-	-	-	-	-
0.3157164	0.0007973	0.0000031	0.0000074	0.0008078	8.6161146
0.0823096	0.0004590	0.0000034	-	0.0004624	4.3590943
0.0190682	0.0001085	0.0000004	0.0000009	0.0001098	1.1713556
0.0239929	0.0001723	0.0000017	-	0.0001740	1.6408273
0.6708163	0.0000559	-	0.0000049	0.0000608	0.6489606
1.1441109	0.0026008	-	0.0000761	0.0026769	28.5533874
0.0044259	0.0000585	-	-	0.0000585	0.5515048
-	-	-	-	-	-
0.0124928	0.0000758	-	0.0000000	0.0000759	0.8091777
0.0008199	0.0000162	-	-	0.0000162	0.1528764
0.0419022	0.0001490	0.0000009	0.0000014	0.0001513	1.6137394
0.0061110	0.0001855	0.0000046	-	0.0001901	1.7929773
0.0085871	0.0000406	0.0000002	0.0000003	0.0000411	0.4379334
0.0017346	0.0000553	0.0000014	-	0.0000567	0.5348468

0.0020818	0.0000062	0.0000004	0.0000000	0.0000066	0.0704200
0.0010518	0.0000248	0.0000026	-	0.0000273	0.2579924
0.0012833	0.0000478	-	0.0000001	0.0000479	0.5106355
0.0001854	0.0000137	-	-	0.0000137	0.1289712
-	-	-	-	-	-
0.0579499	-	-	-	-	0.3057339
0.0020213	0.0000013	-	0.0000000	0.0000013	0.0134441
0.1897831	0.0018749	0.0002205	-	0.0020954	19.7672094
1.7872790	0.0053966	-	0.0001433	0.0055398	59.0904468
0.0063461	0.0000487	-	-	0.0000487	0.4590514
-	-	-	-	-	-
0.2975821	0.0007220	-	0.0000210	0.0007430	7.9251005
0.0000255	0.0000002	-	-	0.0000002	0.0014888
-	-	-	-	-	-
0.9240806	0.0024139	-	0.0000711	0.0024850	26.5064837
0.0013360	0.0000177	-	-	0.0000177	0.1668445
-	-	-	-	-	-
0.1897442	0.0006183	0.0000025	0.0000062	0.0006271	6.6885343
0.0567608	0.0003375	0.0000027	-	0.0003403	3.2080531
0.0113052	0.0000898	0.0000003	0.0000008	0.0000910	0.9701992
0.0191087	0.0001379	0.0000016	-	0.0001394	1.3145445
0.5837794	0.0000520	-	0.0000049	0.0000570	0.6077535
0.6650261	0.0019302	-	0.0000605	0.0019907	21.2336158
0.0042260	0.0000544	-	-	0.0000544	0.5127526
-	-	-	-	-	-
0.0033986	0.0000518	-	0.0000000	0.0000518	0.5524874
0.0006129	0.0000133	-	-	0.0000133	0.1257840
0.0255601	0.0001561	0.0000010	0.0000014	0.0001584	1.6898635
0.0038747	0.0001725	0.0000044	-	0.0001769	1.6690419
0.0049034	0.0000322	0.0000002	0.0000002	0.0000326	0.3477766
0.0018621	0.0000668	0.0000016	-	0.0000685	0.6458906
0.0029424	0.0000080	0.0000005	0.0000000	0.0000085	0.0911196
0.0011310	0.0000238	0.0000025	-	0.0000263	0.2482053
0.0012299	0.0000419	-	0.0000001	0.0000420	0.4475725
0.0004481	0.0000313	-	-	0.0000313	0.2952636
0.0030457	-	-	-	-	0.0213778

Appendix B
Biological Assessment

ESA

PROPOSED COMMERCIAL AIR SERVICE AT BISHOP AIRPORT

Biological Assessment

Prepared for
Inyo County Department of Public Works

October 2020

PROPOSED COMMERCIAL AIR SERVICE AT BISHOP AIRPORT

Biological Assessment

Prepared for
Inyo County Department of Public Works

October 2020

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Biological Assessment

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PROPOSED COMMERCIAL AIR SERVICE AT BISHOP AIRPORT

Biological Assessment

1. Introduction

This Biological Assessment (BA) has been prepared in support of Proposed Commercial Air Service (Proposed Action) at Bishop Airport (BIH). To implement the Proposed Action, the Federal Aviation Administration (FAA) must undertake certain federal actions subject to review under the National Environmental Policy Act (NEPA)(42 U.S.C. § 4321 *et seq*). Accordingly, an Environmental Assessment (EA) is being prepared by Inyo County to evaluate potential environmental impacts associated with the Proposed Action. The FAA is the lead agency for NEPA compliance. 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 Action 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 Proposed Action

Bishop 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 and is situated on land leased from the Los Angeles Department of Water and Power (LADWP). BIH is designated in the FAA's National Plan of Integrated Airport Systems as a local, general aviation airport. The Airport currently serves general aviation activity and limited military activity, as well as charter and air cargo operations. Commercial air service is not currently offered at BIH. However, the County has identified an unmet demand for commercial air passenger service in the Eastern Sierra region. To serve this unmet demand, the County (Airport Sponsor) is seeking to obtain a Class I Operating Certificate for Bishop Airport under 14 Code of Federal Regulations (CFR) Part 139 to allow for scheduled or unscheduled commercial air service. United Airlines, Inc. and its partner SkyWest Airlines (operating as United Express) seek to amend SkyWest's Operations Specifications to allow the introduction of scheduled commercial air passenger service at the Airport.

The proposed commercial air passenger service would initially commence with one daily arrival and departure between BIH and Los Angeles International Airport (LAX) during the 2021 summer and shoulder seasons (April 15 through December 14) and three daily arrivals and departures between BIH and LAX, Denver International Airport (DEN), and San Francisco International Airport (SFO) during the winter season (December 15 through April 14). An additional flight to/from SFO is anticipated to be added during the 2024 winter season and a daily flight to/from San Diego International Airport (SAN) is anticipated to be added during the 2027 winter season. A second winter season flight to/from LAX is anticipated to be added in 2028. Commercial air passenger service would initially be provided with Bombardier CRJ700 aircraft, an aircraft with 70 seats, which will eventually be replaced by Embraer E175 aircraft, an aircraft with 76 seats. There would be no additional construction or ground disturbance associated with the introduction of commercial air service at BIH.

1.2 Location

Bishop Airport is located in unincorporated Inyo County, approximately 1.5 miles east of the City of Bishop and approximately 45 miles southeast of the town of Mammoth Lakes. The Airport has three runways: Runway 12/30, Runway 17/35, and Runway 8/26. Runway 8/26 is planned for eventual closure, with conversion of the Runway 8 end to a taxiway and the Runway 26 end to helicopter parking. Runway 12/30, the Airport's primary runway, is the only runway proposed to accommodate commercial service. The location of the Airport is shown on **Figure 1**. The Airport and vicinity are depicted on **Figure 2**.

1.3 Need for the Proposed Action

The purpose of the Proposed Action is to initiate commercial air passenger service at Bishop Airport. To facilitate the introduction of commercial air passenger service at BIH, Inyo County, the Airport's sponsor, seeks issuance of a Class I Operating Certificate pursuant to 14 CFR Part 139 from the FAA. United Airlines, Inc. and its partner SkyWest Airlines (operating as United Express) seek to amend SkyWest's Operations Specifications to allow the introduction of scheduled commercial air passenger service at BIH. The need for the Proposed Action is to serve unmet demand for commercial air passenger service in the Eastern Sierra region.

2. Identification of Action Area

An Action Area (AA) was developed to evaluate potential impacts to biological resources that could result from the implementation of the Proposed Action. The AA includes all areas to be directly affected by the Proposed Action as well as indirect impacts that could affect surrounding habitats. Runway 12/30 is the only runway proposed to accommodate for commercial service activity.

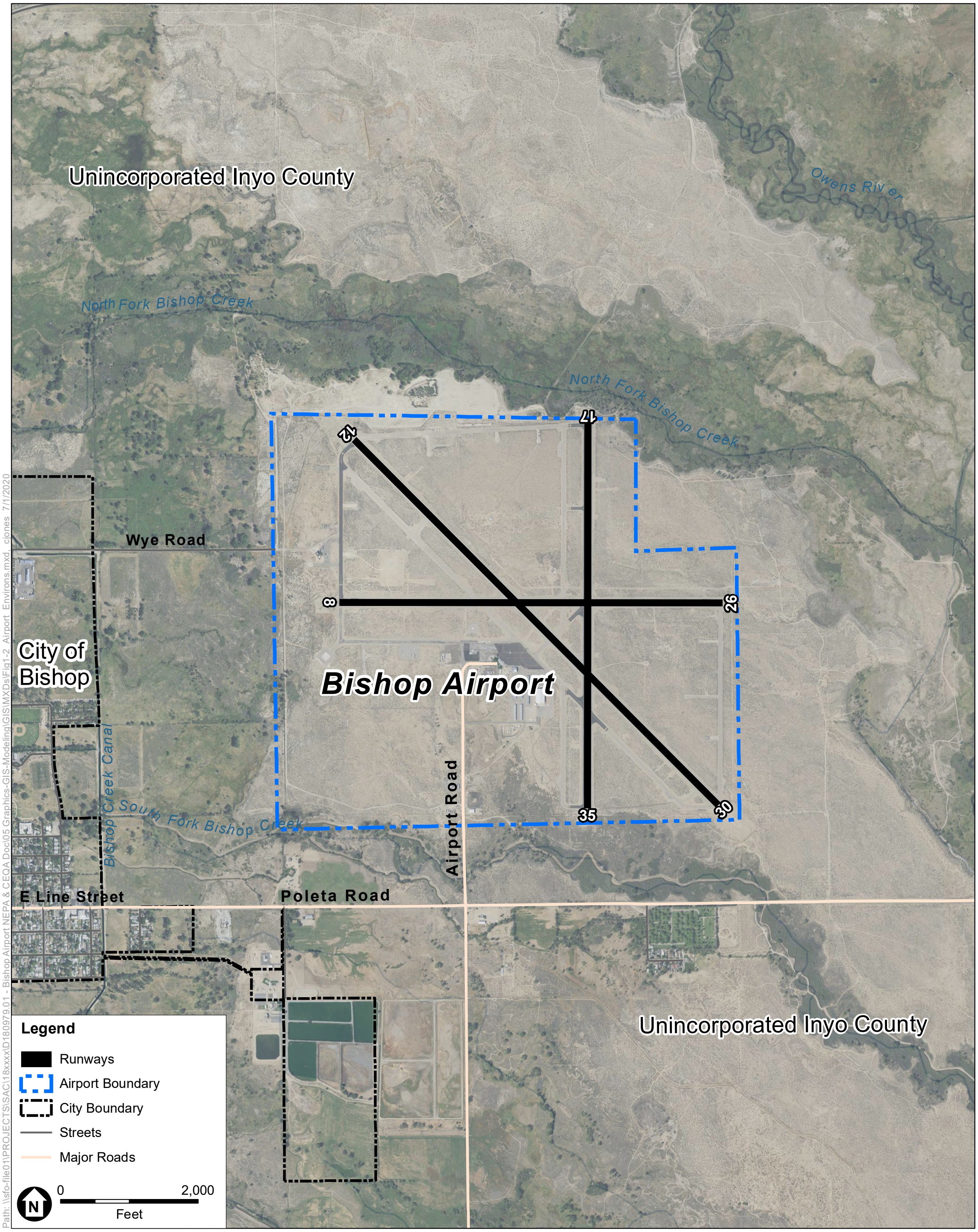
The AA includes a 500-foot buffer surrounding Runway 12/30, including the designated Runway Safety Area (RSA) that extends 800-feet beyond Runway 12/30 in both directions, to determine the presence of nesting birds.[1] In addition, the existing RSA unpaved access roads were also included within the AA (please refer to **Figure 3, Action Area)**.

[1] CDFW, Appendix I - CDFW's Conservation Measures for Biological Resources That May Be Affected by Program-level Actions. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=73979 (Accessed: September 21, 2020).

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

Proposed Commercial Air Service at Bishop Airport

Figure 1
Airport Location
Bishop Airport

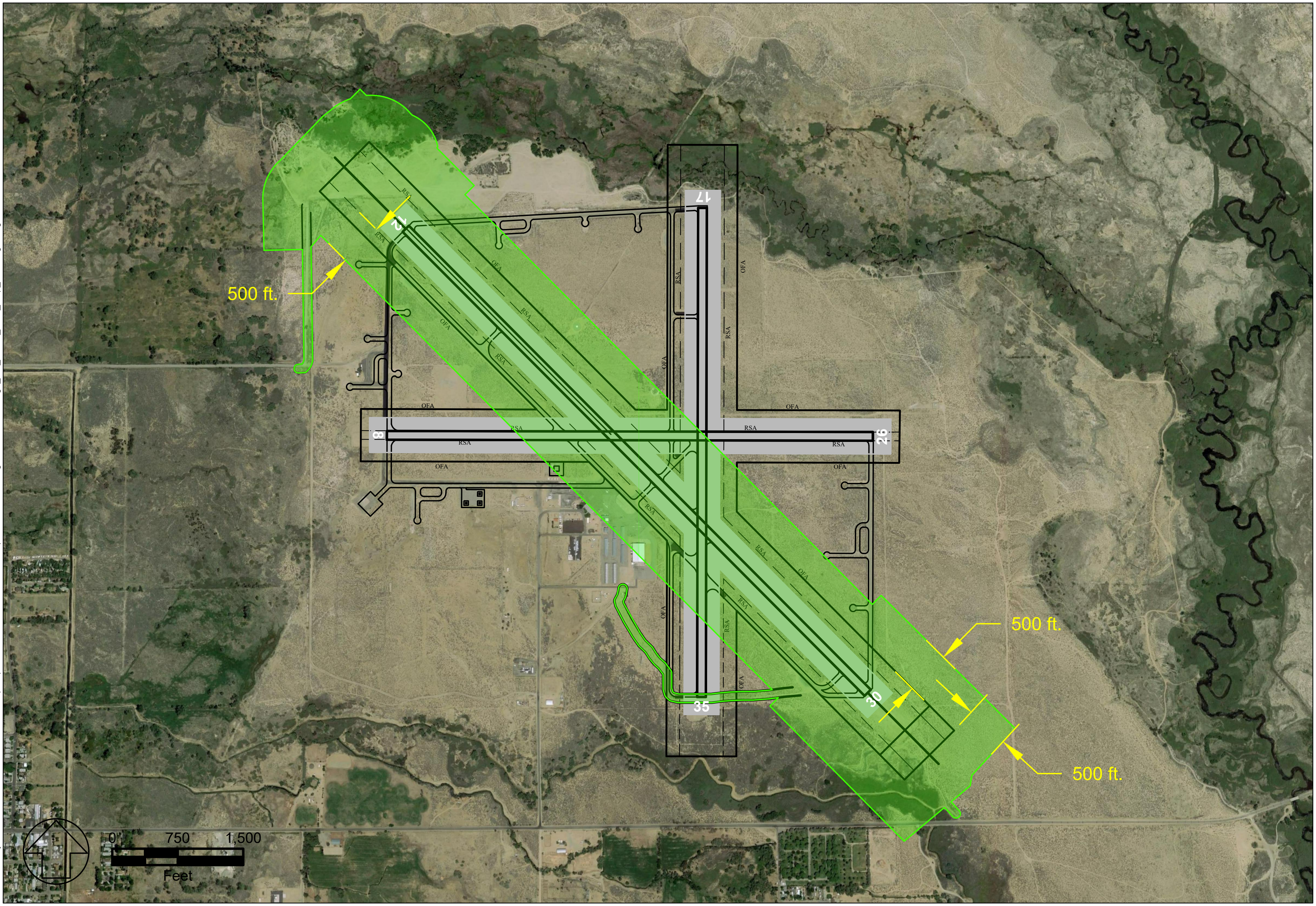


SOURCE: Esri; Inyo County Department of Public Works; ESA, 2020.

Proposed Commercial Air Service at Bishop Airport

Figure 2
Airport Vicinity
Bishop Airport

ESA



Proposed Commercial Air Service at Bishop Airport

Figure 3
Biological Assessment
Action Area

ESA

3. Existing Conditions

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 an ESA biologist. A number of field surveys were performed by the field biologist on June 7, 2019 and May 1, 2020. **Appendix A** includes results of the field surveys and a photo log of habitat located within the AA. Additional site surveys were conducted within the AA, however, these "specific-species" surveys are discussed further, in **Section 5.2**.

3.1 Upland Habitat

The area surrounding Runway 12/30 within the AA consist primarily 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 AA was previously used for gravel mining, but is largely abandoned, except for occasional off-highway vehicle use. The 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 primarily of low-growing ruderal grassland and common shrub species. The upland vegetation communities within the AA are described below.

Disturbed/developed

Airport infrastructure (buildings, runways, taxiways, etc.) 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.

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, cryptantha, and short-podded mustard.

3.2 Wetland Habitat

Wetland habitats at the extreme northwestern and southeastern ends of the AA were identified through research using the USFWS NWI database and the field survey conducted in May 2020.[2] The AA contains potential habitat for wetland and stream species along North Fork Bishop Creek and Rawson Canal. North Fork Bishop Creek is described as a perennial stream, located approximately 1,600 feet from the end of Runway 12 (northwest side of the Airport property). Rawson Canal is a perennial stream located on the southeastern end of Runway 30, approximately 500 feet from the Airport property limits. Both streams are located within the Crowley Lake Watershed and empty into the Owens River.

The USFWS NWI identifies the presence of freshwater forested/shrub riparian habitat slightly within and immediately surrounding the AA. 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, close to North Fork Bishop Creek. In addition, small areas of willow trees and rose thicket are located to the south along Rawson Canal. Areas of willow and rose are located no closer than 815 feet to the north of Runway 12. Marginal riparian habitat is also located 830 feet south of Runway 30 along Rawson Canal. The wetland vegetation communities within and in close proximity to the AA 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 Action Area. Stands are almost uniformly comprised of sandbar willow, with interspersed Wood's rose (*Rosa woodsii*). Due to the high density of sandbar willow, very little herbaceous cover is present. Breaks in this community near North Fork Bishop Creek 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 northwestern edge of the AA, 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*). Many cottonwood trees are re-sprouting after recent trimming activities by the LADWP. Herbaceous cover associated with this community is highly variable, but includes stands of perennial pepperweed (*Lepidium latifolium*), saltgrass (*Distichlis spicata*), and areas of reeds (*Juncus* sp.).

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

Small areas of willow riparian woodland are present in the northeast portion of the AA, at its closest proximity to North Fork Bishop Creek. Black willow, red willow, and arroyo willow are

[2] U.S. Fish and Wildlife Service, National Wetlands Inventory. https://www.fws.gov/wetlands/data/Mapper.html (Accessed: August 3, 2020).

dominant or co-dominant in this vegetation community. Areas of sandbar willow and Wood's rose occur in the shrub layer, with an herbaceous layer including Indian hemp dogbane (*Apocynum cannabinum*), saltgrass, and reeds.

Saltgrass meadow (*Distichlis spicata* Alliance)

An open saltgrass meadow is located in the AA several hundred feet northwest of the end of Runway 12. Additional component species of this community include common spike rush (*Eleocharis macrostachya*), scratchgrass (*Muhlenbergia asperifolia*), and reeds (*Juncus* sp.). The driest portions of this meadow include small areas of rabbitbrush, while the wettest include cattail and alkali bulrush (*Bolboschoenus maritimus*).[3]

4. 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 Information, Planning, and Consultation (IPaC) System webpage. Prior to conducting field visits, a literature search was performed in order 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 of the following sites:

- CDFW California Natural Diversity Database (CNDDB),
- Cornell Laboratory of Ornithology's eBird database, and the
- USFWS Environmental Conservation Online System (ECOS).

The potential for occurrence of federal and state listed species are included in **Tables 1 and 2**, and is based on literature review and field investigations conducted on June 7, 2019 and May 1, 2020. **Appendix A** includes the results from two separate site surveys conducted by a field biologist. **Appendix B** includes the official USFWS federal list of threatened and endangered species, including designated critical habitat for the AA. **Appendix C** includes the state CDFW list of animal species of special concern.

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[3] Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation, Second Edition*. California Native Plant Society, Sacramento, CA.

5. Listed Species and Critical Habitat in the Action Area

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

Based on the list of species provided by USFWS on September 30, 2020, there are a total of five threatened, endangered, or candidate species with potential to occur within the AA. The list of species provided by USFWS include:

- Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*);
- Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*);
- Owens Pupfish (*Cyprinodon radiosus*);
- Owens Tui Chub (*Gila bicolor ssp. Snyderi*); and,
- Fish Slough Milk-vetch (*Astragalus lentiginosus var. piscinensis*).

The USFWS has only designated Critical Habitat for Owens Tui Chub and Fish Slough Milk-vetch, but this Critical Habitat does not exist on or adjacent to the AA. Critical Habitat for the Western Yellow-billed Cuckoo is proposed and under review, but the closest proposed location is over 100 miles south of the AA. All federally listed species included in this BA are depicted in **Table 1**.

5.1.1 Western 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. The bird species has also not been detected from site visits conducted at the Airport. Therefore, the Proposed Action will have “*no effect*” on the Western Yellow-billed Cuckoo or its habitat.

TABLE 1
FEDERALLY LISTED SPECIES POTENTIALLY OCCURRING 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	**Possible**	Dense riparian tree and shrub communities near rivers, swamps, and other wetlands.
Fishes				
Lahontan Cutthroat Trout	*Oncorhynchus clarkii henshawi*	T	**Low**	Pristine, cool mountain streams to alkaline waters, high stream temperatures, and low dissolved oxygen.
Owens Pupfish	*Cyprinodon radiosus*	E	**Low**	Spring pools, sloughs, irrigation ditches, swamps, and flooded pastures.
Owens Tui Chub	*Gila bicolor ssp. snyderi*	E	**Low**	Standing waters and low gradient reaches of the Owens River and larger tributaries extending from the River's source.
Flowering Plants				
Fish Slough Milk-vetch	*Astragalus lentiginosus var. piscinensis*	T	**Low**	Alkaline flats paralleling desert wetland ecosystems in Inyo and Mono counties, California.

SOURCES:
U.S. Fish and Wildlife Service, Information, Planning, and Consultation (IPaC) System, April 29, 2020.
Cornell Lab of Ornithology, The Cornell Lab - All About Birds, https://www.birds.cornell.edu/home (Accessed August 4, 2020).

NOTES:
[a] The Southwestern Willow Flycatcher is a federally-listed bird species protected under the ESA. The species was not included in the official USFWS list of endangered or threatened species, but is included in the BA because habitat capable of supporting SWFL was found during site visits within the AA.

Species were evaluated for their potential to occur within the AA and, therefore, their potential to be impacted by the Proposed Action. Potential to occur was based on a combination of biological database research, historical information, and survey efforts in 2019 and 2020. Potential to occur within the AA may also be influenced by occurrences in adjacent similar habitat, and this potential has been noted as appropriate.

Status Codes:
E = Listed as Endangered
T = Listed as Threatened

5.1.2 Lahontan Cutthroat Trout

The Lahontan Cutthroat Trout inhabits a wide range of habitats including cold, high-elevation mountain streams in California to lower-elevation desert lakes with high alkalinity. Their range extends from the Sierra Nevada Mountains northeast into Nevada and Oregon. Although the trout once occupied a vast range, it has since been extirpated from nearly 95% of its native habitat in California. Furthermore, the historic range of the Lahontan Cutthroat Trout includes Lake Tahoe and the Carson, Truckee, and Walker River basins that occur well north of the Airport.[4] The

[4] U.S. Fish and Wildlife Service, Lahontan cutthroat trout. https://www.fws.gov/oregonfwo/articles.cfm?id=149489441#:~:text=Lahontan%20cutthroat%20trout%201%20Historical%20Status%20and%20Current,Reasons%20for%20Decline.%20...%205%20Conservation%20Measures.%20 (Accessed July 31, 2020).

Cutthroat Trout species is not likely to occur in the Crowley Lake watershed—where the Airport is located. Therefore, the Proposed Action will have "*no effect*" on the Lahontan Cutthroat Trout or its habitat.

5.1.3 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.[5] 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 Action will have "*no effect*" on the Owens Pupfish or its habitat.

5.1.4 Owens Tui Chub

Critical Habitat for Owens Tui Chub does not exist on or adjacent to the AA. 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. The Owens River Gorge is located about seven miles northwest of the AA and represents the closest population of this fish species. Additional populations have been established in cooperation with land owners 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.[6] 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 AA. Therefore, the Proposed Action will have "*no effect*" on the Owens Tui Chub or its habitat.

5.1.5 Fish Slough Milk-vetch

The Fish Slough Milk-vetch is largely dependent on desert spring-fed wetland ecosystems that consist of highly alkali soils. As previously mentioned, the Fish Slough ACEC includes a unique biome that supports a large diversity of fish and plant species. One of those plants is the Fish Slough Milk-vetch, which is listed by the USFWS as a species of concern that could be present in the AA. After reviewing the California Native Plant Society (CNPS) Calflora, the Fish Slough

5 California Department of Fish and Wildlife Service, Owens pupfish (Cyprinodon radiosus). https://wildlife.ca.gov/Regions/6/Desert-Fishes/Owens-pupfish (Accessed July 31, 2020).

6 California Department of Fish and Wildlife, Species Accounts – Fish. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=87529&inline (Accessed July 31, 2020).

Milk-vetch has been positively identified in Inyo County.[7] However, the closest population is approximately five miles from the AA and there are no historical records of its presence on Airport property. Furthermore, it has not been detected from field surveys conducted at the Airport. Therefore, the Proposed Action will have "*no effect*" on the Fish Slough Milk-vetch or its habitat.

5.2 Review of Federally Listed Species Identified During Field Visits to Potentially Occur in the Study Area

The official USFWS federal list of threatened and endangered species does not include the Southwestern Willow Flycatcher (SWFL), which is a federally listed bird species. Site visits identified habitat suitable for the SWFL within and immediately surrounding the AA. Therefore, this BA includes results from species-specific surveys conducted to determine the presence of the SWFL within and immediately surrounding the AA.

5.2.1 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.[8] 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 vicinity of the Proposed Action, 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 2020 on eBird; however, these observations were not during the non-migrant period. The most recent observations during the non-migrant period were in 2013 (eBird) and 2003 (CNDDB), with the closest sightings approximately six miles northwest of BIH along Horton Creek. Observation history from CNDDB and eBird are included in **Appendix E**. A separate search on USFWS ECOS database indicates that there is no SWFL critical habitat within or in close proximity to the AA.

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 AA on occasion. However, on-site species-specific surveys, addressed below, did not confirm the presence of SWFL within or near the AA.

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[7] California Native Plant Society, Calflora. https://www.calflora.org/entry/observ.html?track=m#srch=t&cols=0,3,61,35,37,13,54,32,41&lpcli=t&taxon=Astragalus+lentiginosus+var.+piscinensis&chk=t&cch=t&inat=r&cc=INY (Accessed July 31, 2020).

[8] Paxton, E.H., 2000, Molecular genetic structuring and demographic history of the Willow Flycatcher: Flagstaff, Arizona, Northern Arizona University, MS thesis, 43 p.

5.2.2 Species-Specific Survey Methodology

Based on the field observations conducted in 2019 and 2020, potential Willow Flycatcher breeding habitat was observed within the AA. Based upon the field observations, species-specific surveys were conducted within potential breeding habitat located within the AA. Surveys were performed in accordance with USFWS's required protocol, found in *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* (provided in **Appendix D**).

A USFWS-permitted biologist (TE-92799B-2) conducted the species-specific survey on May 29, June 04, June 16, July 02, and July 10, 2020. Per the protocol requirements:

- One (1) survey was performed during *Survey Period 1* (May 15-May 31),
- Two (2) surveys were performed during *Survey Period 2* (June 01-June 24), and
- Two surveys were performed during *Survey Period 3* (June 25-July 17).

Surveys were not conducted within five days of one another. Surveys were conducted from one hour before sunrise to no later than 10:30 AM. The surveyor broadcast recorded SWFL "fitz-bew" and "britt" call notes (acquired from *xeno-canto.org*, recorded by Bill Haas in 2007), using a cellular phone speaker at maximum volume. The surveyor played calls approximately every 30 meters in suitable habitat. The surveyor listened for approximately 10 seconds, played calls for approximately 30 seconds, and then listened for approximately one minute, before proceeding to the next playback location. All suitable riparian habitats located within the AA were surveyed.

5.2.2.1 Species-Specific Results

No Willow Flycatchers were detected at any point during any of the five species-specific surveys. After playing territorial Willow Flycatcher calls according to USFWS-required methods, and receiving no response, it can be concluded that no Willow Flycatchers are utilizing the AA as breeding or foraging habitat. Therefore, it is not anticipated that the Proposed Action will directly or indirectly impact SWFLs.

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

Nine state listed special-status species were identified with the potential to occur in the AA or in its immediate surroundings through field visits on May 1, 2020 and June 7, 2019, and research using the following sites: CDFW CNDDB, Cornell Laboratory of Ornithology's eBird database, and the USFWS ECOS. The state listed special-status species include the following:

- Owens Valley vole (*Microtus californicus vallicola)*;
- Yellow-breasted Chat (*Icteria virens)*;
- Burrowing Owl (*Athene cunicularia*);
- Yellow Warbler (*Setophaga petechia*);
- Northern Harrier (*Circus hudsonius*);
- Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*);
- SWFL (*Empidonax traillii extimus*);
- Owens Pupfish (*Cyprinodon radiosus*); and,

- Owens Tui Chub (*Gila bicolor ssp. Snyderi*).

The state listed species of concern are included in **Table 2**. A full list of the special species of concern listed by the CDFW is included in **Appendix C**. A discussion of state listed species of concern (not already discussed in **Sections 5.1 and 5.2**) are included below.

5.3.1 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.

5.3.2 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.

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 fairly 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 AA 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 AA along North Fork Bishop Creek.

5.3.3 Burrowing Owl

The search on Cornell eBird showed burrowing owls observed within five miles of the Airport during 2018. However, there were no burrows observed within the AA during the surveys conducted in 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.

TABLE 2
STATE LISTED SPECIES POTENTIALLY OCCURRING IN 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	**Possible**	Dense shrubbery, including abandoned farm fields, forest openings and edges, swamps, and edges of streams and ponds.
Burrowing Owl	*Athene cunicularia*	SSC	**Possible**	Open dry areas with low vegetation, including grasslands, rangelands, agricultural areas, and deserts.
Yellow Warbler	*Setophaga petechia*	SSC	**Possible**	Thickets and other disturbed habitats, particularly along streams and wetlands often among willows.
Northern Harrier	*Circus hudsonius*	SSC	**Possible**	Undisturbed tracts of wetlands and grasslands with low, thick vegetation.
Western Yellow-Billed Cuckoo	*Coccyzus americanuso ccidentalis*	E	**Low**	Woodland habitat with dense cover and water nearby, including low scrubby vegetation, dense thickets, and abandoned farmland.
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E	**Possible**	Dense riparian tree and shrub communities near rivers, swamps, and other wetlands.
Fishes				
Owens Pupfish	*Cyprinodon radiosus*	E	**Low**	Spring pools, sloughs, irrigation ditches, swamps, and flooded pastures.
Owens Tui Chub	*Gila bicolor ssp. snyderi*	E	**Low**	Standing waters and low gradient reaches of the Owens River and larger tributaries extending from the River's source.

SOURCES:
California Department of Fish and Wildlife, State and Federally Listed Endangered and threatened Animals of California, July 17,2020.
California Department of Fish and Wildlife, Special Animals List, July 2020.
Inland Deserts Region. California Department of Fish and Wildlife. https://wildlife.ca.gov/Regions/6 (Accessed August 4, 2020).
Cornell Lab of Ornithology, The Cornell Lab - All About Birds, https://www.birds.cornell.edu/home (Accessed August 4, 2020).

NOTE: Species were evaluated for their potential to occur within the AA and, therefore, their potential to be impacted by the Proposed Action. Potential to occur was based on a combination of biological database research, historical information, and survey efforts in 2019 and 2020. Potential to occur within the AA may also be influenced by occurrences in adjacent similar habitat, and this potential has been noted as appropriate.

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

5.3.4 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. 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 AA 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 AA along North Fork Bishop Creek.

5.3.5 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, 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 AA.

6. 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 **Table 3** 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 AA. This list is included in this BA for information purposes—species specific surveys were not conducted except for the SWFL.

7. Effects of the Proposed Action

As discussed in **Section 1.1**, Inyo County has identified an unmet demand for commercial air passenger service in the Eastern Sierra region. To address this unmet demand, the County has expressed interest in introducing commercial air passenger service to BIH. The effects of introducing commercial aircraft, as proposed by the Action, would not result in ground impacts within the AA since there are no associated excavation, modification or construction activities currently proposed.

The absence of ground impacts indicate that the Proposed Action is unlikely to result in a noticeable effect on biological resources within or immediately surrounding the AA. The Proposed Action would only increase aircraft operations by one arrival and one departure during the breeding and nesting season when birds are most active. Most of the increase in operations will occur in the winter months (up to six per day by 2028), when there are fewer breeding birds and birds are less active. Therefore, it is unlikely that commercial air service will have a noticeable effect due to the proposed schedule and frequency of aircraft operations at BIH. In addition, the Proposed Action does not include the introduction of new arrival or departure procedures to the Airport. Commercial service aircraft will be departing and arriving using existing flight procedures.

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

Common Name	Scientific Name	USFWS Listing	Potential Occurrence within Action Area	Habitat Preference
Birds				
Bald Eagle	*Haliaeetus leucocephalus*	P	Low	Lakes and reservoirs with lots of fish and surrounding forests.
Golden Eagle	*Aquila chrysaetos*	P	Low	Open and semi-open areas with native vegetation, primarily in mountains, canyons, cliffs and bluffs.
Tricolored Blackbird	*Agelaius tricolor*	NL	Low	Wetlands with cattails, bulrushes, and willows.
Olive-sided Flycatcher	*Contopus cooperi*	NL	Low	Boreal forest and in western coniferous forests.
Willow Flycatcher	*Empidonax traillii*	NL	Possible	Areas with willows or other shrubs near standing or running water.
Lewis's Woodpecker	*Melanerpes lewis*	NL	Low	Open ponderosa pine forests and burned forests with a high density of standing dead trees (snags).
Long-billed Curlew	*Numenius americanus*	NL	Low	Sparse, short grasses, including shortgrass and mixed-grass prairies and agricultural fields.
Marbled Godwit	*Limosa fedoa*	NL	Low	Shortgrass prairies near wetlands.
Green-tailed Towhee	*Pipilo chlorurus*	NL	Low	Dense, shrubby habitat, sometimes with scattered trees or cacti.
Pinyon Jay	*Gymnorhinus cyanocephalus*	NL	Low	Pinyon-juniper woodlands, sagebrush, scrub oak, chaparral, and ponderosa pine forests.
Sage Thrasher	*Oreoscoptes montanus*	NL	Possible	Shrubsteppe habitats in open landscapes of the interior West.
Sagebrush Sparrow	*Artemisiospiza nevadensis*	NL	Possible	Shrubsteppe habitats consisting of shrubs up to about 6 feet tall, especially big sagebrush as well as saltbush, rabbitbrush, shadscale, and bitterbrush.
Brewer's Sparrow	*Spizella breweri*	NL	Possible	Exclusively in the sagebrush ecosystem when breeding.
Virginia's Warbler	*Vermivora virginiae*	NL	Low	Open pinyon-juniper and oak woodlands often on steep slopes with shrubby ravines.
Willet	*Tringa semipalmata*	NL	Low	Open beaches, bayshores, marshes, mudflats, and rocky coastal zones.
Lesser Yellowlegs	*Tringa flavipes*	NL	Low	Fresh and brackish wetlands, including mudflats, marshes, lake and pond edges, and wet meadows.

SOURCES: .
U.S. Fish and Wildlife Service, Information, Planning, and Consultation (IPaC) System, April 29, 2020.
Cornell Lab of Ornithology, The Cornell Lab - All About Birds, https://www.birds.cornell.edu/home (Accessed August 4, 2020).

NOTE: Species were evaluated for their potential to occur within the Action Area and their potential to be impacted by the Proposed Action. Potential to occur was based on the presence of habitat within the AA. Potential to occur within the AA may also be influenced by occurrences in adjacent similar habitat, and this potential has been considered.

Status Codes:
E = Listed as Endangered
T = Listed as Threatened
P = Protected under MBTANL = Not Listed

8. Conclusions

The Proposed Action does not include any ground disturbance within or immediately surrounding the AA that may affect habitat or threatened or endangered species and there is no designated critical habitat present. The Proposed Action is expected to produce "*no effect*" on federally listed fish, plant, and avian species within or immediately surrounding the AA. Furthermore, the Proposed Action will have no effect on state species of special concern identified during site surveys, including the Northern Harrier, Yellow Warbler, and Yellow-breasted Chat. **Table 4** summarizes the findings of this BA.

TABLE 4
FEDERAL AND STATE LISTED SPECIES POTENTIAL OCCURRENCE AND EFFECT SUMMARY

Common Name	Scientific Name	Protected Status	Potential Occurrence within Action Area	Recommended Effect Summary
Mammals				
Owens Valley Vole	*Microtus californicus vallicola*	SSC	**Low**	**No Effect.** Action does not include suitable habitat within AA and there are no proposed ground impacts.
Birds				
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	FT/SE	**Low**	**No Effect.** Field surveys did not confirm the presence of species or enough suitable habitat.
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	FE/SE	**Possible**	**No Effect.** Field surveys did not confirm the presence of this species on seven total visits between 2019 and 2020 and there are no proposed alterations to habitat that could potentially support the species.
Burrowing Owl	*Athene cunicularia*	SSC	**Possible**	**No Effect.** Field surveys did not confirm the presence of burrows or suitable habitat to support the species.
Yellow-breasted Chat	*Icteria virens*	SSC	**Possible**	**No Effect.** Although field surveys confirm the presence of this species on two separate occasions, there are no proposed alterations to habitat where the species was observed.
Yellow Warbler	*Setophaga petechia*	SSC	**Possible**	**No Effect.** Although field surveys confirm the presence of this species on two separate occasions, there are no proposed alterations to habitat where the species was observed.
Northern Harrier	*Circus hudsonius*	SSC	**Possible**	**No Effect.** Although field surveys observed this species, there are no proposed alterations to habitat where the species was observed.
Fishes				
Lahontan Cutthroat Trout	*Oncorhynchus clarkii henshawi*	FT	**Low**	**No Effect.** Action within USFWS's Consultation Area, but there are no proposed ground or water impacts.
Owens Pupfish	*Cyprinodon radiosus*	FE/SE	**Low**	**No Effect.** Action within USFWS's Consultation Area, but there are no proposed ground or water impacts.
Owens Tui Chub	*Gila bicolor ssp. snyderi*	FE/SE	**Low**	**No Effect.** Action within USFWS's Consultation Area, but there are no proposed ground or water impacts.
Flowering Plants				
Fish Slough Milk-vetch	*Astragalus lentiginosus var. piscinensis*	FT	**Low**	**No Effect.** Action within USFWS's Consultation Area, but there are no proposed ground impacts.

SOURCES: Environmental Science Associates, 2020.

NOTE: Species were evaluated for their potential to occur within the AA and their potential to be impacted by the Proposed Action. Potential to occur was based on a combination of biological database research, and survey efforts in 2019 and 2020. Potential to occur within the AA may also be influenced by occurrences in adjacent similar habitat, and this potential has been noted as appropriate.

Status Codes:
FE = Listed as Federally Endangered
FT = Listed as Federally Threatened
SE = Listed as State Endangered
ST = Listed as State Threatened
SSC = Species of Special Concern

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APPENDIX A

Biological Resource Surveys

ESA 50 YEARS 1969-2019

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memorandum

date July 17, 2020

to Ashley Helms

from Karl Fairchild, Chris Jones, and Susan Shaw

subject Results of a Biological Resources Field Survey for Proposed Commercial Air Service at Bishop Airport

This memorandum summarizes the results of a field survey conducted by Environmental Science Associates' (ESA) biologist Karl Fairchild (biologist) at the Bishop Airport (Airport) on May 1, 2020, and which updates a similar field survey conducted June 7, 2019. The survey documented existing vegetation and habitat, and searched for biological resources on the Airport property, located within the Owens River Valley, and within a draft study area (see **Figure 1**), which encompassed areas of potential direct and indirect effects from the Type Certification change project. In addition to surveying for the general presence of biological resources, the survey examined the potential for use by the southwestern willow flycatcher (*Empidonax traillii extimus*, SWFL), including habitat.

Background

Bishop Airport is designated in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) as a local, general aviation airport. The Airport currently serves general aviation activity and limited military activity, as well as charter and air cargo operations. BIH currently has no scheduled commercial air service. Inyo County, the Airport Sponsor, has expressed interest in obtaining an Airport Operating Certification for Bishop Airport under Title 14 Code of Federal Regulations (CFR) Part 139 to allow for scheduled or unscheduled commercial air service. United Airlines, Inc. and its partner (SkyWest Airlines operating as United Express) are interested in introducing commercial air passenger service to BIH. United Airlines has submitted a request to the FAA to amend its operations specifications to allow the airline to provide scheduled air service to BIH. Commercial aircraft operations are expected to consist of three arrivals and three departures per day during winter months and one arrival and one departure per day during summer months, with commercial service provided by regional jet aircraft (such as the Bombardier CRJ700) or narrow-body mainline jet aircraft (such as the Airbus A319 or the Boeing 737). Runway 12/30, which runs in a southeast/northwest direction, is the only runway proposed for commercial aircraft use.

The scope of this biological resources survey is to provide the County of Inyo with an assessment of the potential for SWFL and other sensitive biological resources to be present within the draft study area for the Part 139 certification. US Fish and Wildlife Service protocol-level surveys for SWFL and other sensitive species were not conducted during this analysis.

Methods

Prior to visiting the Airport, the biologist conducted a search of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB), Cornell Laboratory of Ornithology's eBird database, and the US Fish and Wildlife Service's Environmental Conservation Online System (ECOS) to search for recent occurrences of SWFL, other sensitive species, and habitats to support these species on or in the vicinity of the Airport.

The biologist conducted the biological resources survey on May 1, 2020. The survey consisted of driving the on the Airport property and surrounding publicly accessible areas with County of Inyo representative Ashley Helms, stopping to examine areas of interest as they were encountered. The biologist documented general habitat conditions and if suitable habitat for SWFL or other species existed on site. Suitable habitat for SWFL consists of dense, streamside willow (*Salix* sp.)[1] thickets with multi-layered canopy. Other habitat searched for includes suitable habitat for burrowing owl (*Athene cunicularia*), and Owens Valley vole (*Microtus californicus vallicola*). Suitable habitat for burrowing owl consists of open fields with good visibility, friable soils, and existing burrows from California ground squirrels (*Otospermophilus beecheyi*) or similar species[2]. The Owens Valley vole requires wet meadows and lush grassy areas with friable soils.[3]

Results

Three special-status species were identified with the potential to occur on the Airport property or in its immediate surroundings through the CNDDB search: SWFL, burrowing owl and Owens Valley vole, though all records of the latter were historical (50+ years old). The eBird search showed willow flycatchers (not identified to subspecies) present within 5 miles of the Airport during 2020, and burrowing owls observed within 5 miles of the Airport during 2018. The ECOS search determined that no SWFL critical habitat exists in the Owens River Valley.

The area surrounding the runways and within the draft study area consisted of developed areas, low-growing ruderal grassland, and areas of short rabbitbrush (*Ericameria* sp.). This area is routinely graded and maintained by the Airport Operations staff. This habitat is not suitable for SWFL, and is also not suitable for the Owens Valley vole. However, this area shows some habitat characteristics suitable for burrowing owl; **Appendix 1** depicts habitat conditions observed in the draft study area.

Riparian habitat north and south of the Airport were surveyed for potential SWFL habitat. Areas of willow and rose (*Rosa* sp.) are found to the north of the northern end of Runway 12/30, along North Fork Bishop Creek. In addition, small areas of willow and rose thicket are located to the south along Rawson Canal. Areas of willow and rose are located no closer than 815 feet to the north of Runway 12/30. Marginally suitable habitat is also located 830 feet south of Runway 12/30 along Rawson Canal.

Discussion

Based on the survey results, it is unlikely that commercial aircraft operations at Bishop Airport will affect the SWFL, due to the lack of suitable habitat present on site. While some potential habitat exists in the surrounding area, it is unlikely to be affected by the change in aircraft operations because of the slight increase in aircraft

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[1] Sogge, M. K., D. Ahlers, and S. J. Sferra. 2010, A natural history summary and survey protocol for the southwestern willow flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 p.

[2] California Department of Fish and Wildlife. 2012. Staff Report on Burrowing Owl Mitigation. State of California.

[3] Hall E. 1959. The Mammals of North America Volumes 1 & 2. Wiley-Interscience Publication

operations, particularly during nesting season (one aircraft operation per day) and no flight track changes are anticipated.

The unpaved portions of the Airport property are generally suitable for burrowing owls, though areas of rabbitbrush may obstruct visibility of surroundings, creating a less suitable condition. Additionally, no ground squirrels or burrows were observed in the area, and the most suitable areas for burrowing owl are frequently graded as part of ongoing airport operations and maintenance. Nevertheless, it is recommended that burrowing owl surveys be performed in accordance with CDFW protocols prior to any new ground-disturbing activities.

In addition, the Airport grounds are unlikely to support the Owens Valley vole, due to a lack of wetlands or lush grassy areas. While CNDDB records for this species indicate its presence near the southeast corner of the airport, all records are historical.

Memorandum documented by:

Karl Fairchild

Karl Fairchild
Senior Biologist

APPENDIX 1: PHOTO LOG

Photo 1: Photo depicts predominant habitat conditions at the Bishop Airport, photo looking east.

Photo 2: Photo depicts marginally suitable habitat for SWFL, found approximately 1100 feet north of Runway 12/30, photo looking northwest.

Photo 3: Photo depicts marginally suitable habitat for SWFL, found approximately 1000 feet south of Runway 12/30, photo looking west.

Photo 4: Example photo of disturbed/developed habitat within the airport. Photo looking north.

Photo 5: Example photo of rubber rabbitbrush scrub within the airport. Photo looking north.

Photo 6: Overview of north end of Action Area. Abandoned gravel mine is in the foreground; Fremont cottonwood forest is visible in the background. Photo looking northeast.


Photo 7: Example photo of sandbar willow thicket along Rawson Canal. Photo looking west.


Photo 8: Example photo of sandbar willow thicket in northwest corner of the Action Area. Photo looking north.

Photo 9: Example photo of Fremont cottonwood/willow riparian forest in the northwest corner of the Action Area. Photo looking southeast.

Photo 10: Example photo of willow riparian forest in the northwest corner of the Action Area. Photo looking north.

Photo 11: Example photo of saltgrass meadow in the northwest corner of the Action Area. Photo looking west.

ESA 50 YEARS 1969-2019

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memorandum

date August 15, 2019

to Ashley Helms

from Karl Fairchild, Patrick Tennant, and Autumn Ward

subject Results of a Biological Resources Field Survey for Proposed Commercial Air Service at Bishop Airport

This memorandum summarizes the results of a field survey conducted by Environmental Science Associates' (ESA) biologist Karl Fairchild (biologist) at the Bishop Airport (Airport) on June 7, 2019. The survey documented existing vegetation and habitat, and searched for biological resources on the Airport property, located within the Owens River Valley, and within a draft study area (see Figure 1), which encompassed areas of potential direct and indirect effects from the Proposed Project. In addition to surveying for the general presence of biological resources, the survey examined the potential for the southwestern willow flycatcher (*Empidonax traillii extimus*, SWFL) habitat.

Background

The County of Inyo proposes to accommodate the unmet demand for commercial passenger service at the Airport. The commercial aircraft operations are expected to consist of three arrivals and three departures per day during winter months and one arrival and one departure per day during summer months, with commercial service provided by regional jet aircraft (such as the Bombardier CRJ700) or narrow-body jet aircraft (such as the Airbus A319 or the Boeing 737). Runway 12/30, which runs in a southeast/northwest direction, is the primary runway that would be used for the commercial aircraft operations. Runway 17/35, which runs in a north/south direction, may also be used for commercial aircraft operations, when wind and weather conditions do not permit the use of Runway 12/30 (see Figure 1).

The scope of this biological resources survey is to provide the County of Inyo with an assessment of the potential for SWFL and other sensitive biological resources to be present within the draft study area. US Fish and Wildlife Service protocol-level surveys for SWFL and other sensitive species were not conducted during this analysis.

Methods

Prior to visiting the Airport, the biologist conducted a search of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB), Cornell Laboratory of Ornithology's eBird database, and the US Fish and Wildlife Service's Environmental Conservation Online System (ECOS) to search for recent occurrences of SWFL, other sensitive species, and habitats to support these species on or in the vicinity of the Airport.

The biologist conducted the biological resources survey on June 7, 2019. The survey consisted of driving the on the Airport property and surrounding publicly accessible areas with County of Inyo representative Ashley Helms, stopping to examine areas of interest as they were encountered. The biologist documented general habitat conditions and if suitable habitat for SWFL or other species existed on site. Suitable habitat for SWFL consists of dense, streamside willow (*Salix* sp.)[1] thickets with multi-layered canopy. Other habitat searched for includes suitable habitat for burrowing owl (*Athene cunicularia*), which consists of open fields with good visibility, friable soils, and existing burrows from California ground squirrels (*Otospermophilus beecheyi*) or similar species[2]. The Owens Valley vole (*Microtus californicus vallicola*) requires wet meadows and lush grassy areas with friable soils.[3]

Results

Three special-status species were identified with the potential to occur on the Airport property or in its immediate surroundings through the CNDDB search: SWFL, burrowing owl and Owens Valley vole. The eBird search showed willow flycatchers (not identified to subspecies) present within 5 miles of the Airport during 2019, and burrowing owls observed within 5 miles of the Airport during 2018. The ECOS search determined that no SWFL critical habitat exists in the Owens River Valley.

The area surrounding the runways and within the draft study area consisted of developed areas, low-growing ruderal grassland, and areas of short rabbitbrush (*Ericameria* sp.). This area is routinely graded and maintained by the Airport Operations staff. This habitat is not suitable for SWFL, and is also not suitable for the Owens Valley vole. However, this area shows some habitat characteristics suitable for burrowing owl; the Appendix 1: Photo Log depicts habitat conditions observed in the draft study area.

Riparian habitat north and south of the Airport were surveyed for potential SWFL habitat. Areas of willow and rose (*Rosa* sp.) are found to the north of the northern ends of Runways 12/30 and 17/35, along North Fork Bishop Creek. In addition, small areas of willow and rose thicket are located to the south along Rawson Canal. Areas of willow and rose are located no closer than 815 feet to the north of Runway 12/30 and no closer than 305 feet to the northwest of Runway 17/35. An area with greater potential for use by willow flycatchers is located approximately 730 feet northeast of Runway 17/35. Marginally suitable habitat is located 600 feet south of Runway 17/35 along Rawson Canal, and 830 feet southwest of Runway 12/30.

Discussion

Based on the survey results, it is unlikely that commercial aircraft operations at Bishop Airport will affect the SWFL, due to the lack of suitable habitat present on site. While some potential habitat exists in the surrounding area, it is unlikely to be affected by the change in aircraft operations because of the slight increase in aircraft operations, particularly during nesting season (one aircraft operation per day) and no flight track changes are anticipated.

The unpaved portions of the Airport property are generally suitable for burrowing owls, though areas of rabbitbrush may obstruct visibility of surroundings, creating a less suitable condition. Additionally, no ground squirrels or burrows were observed in the area, and the most suitable areas for burrowing owl are frequently

[1] Sogge, M. K., D. Ahlers, and S. J. Sferra. 2010, A natural history summary and survey protocol for the southwestern willow flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 p.

[2] California Department of Fish and Wildlife. 2012. Staff Report on Burrowing Owl Mitigation. State of California.

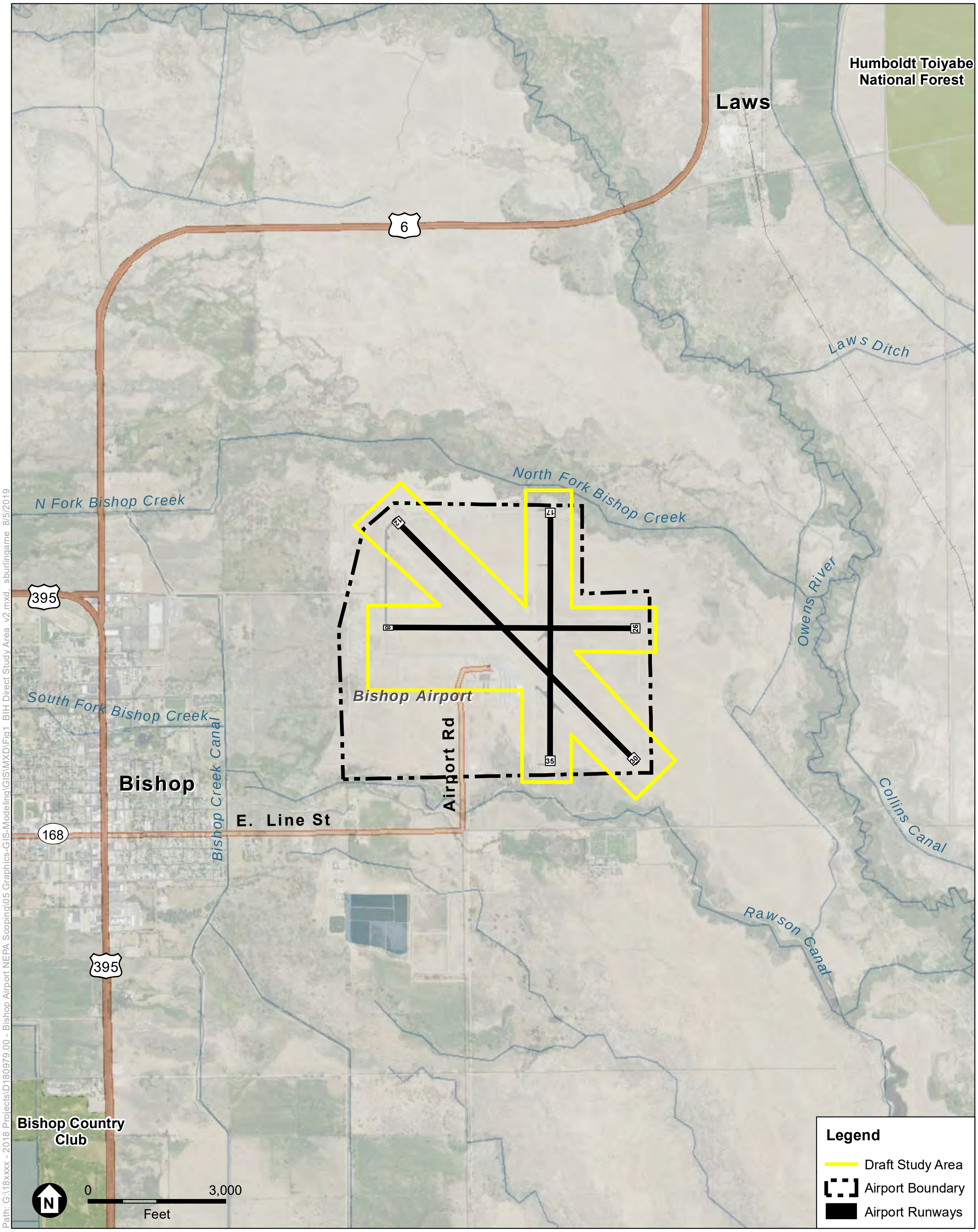
[3] Hall E. 1959. The Mammals of North America Volumes 1 & 2. Wiley-Interscience Publication

graded as part of ongoing airport operations and maintenance. Nevertheless, it is recommended that burrowing owl surveys be performed in accordance with CDFW protocols prior to any new ground-disturbing activities.

In addition, the Airport grounds are unlikely to support the Owens Valley vole, due to a lack of wetlands or lush grassy areas. While CNDDB records for this species indicate its presence near the southeast corner of the airport, all records are historical.

Memorandum documented by:

Karl Fairchild
Associate Biologist III



SOURCE: Esri; ESA, 2019

BIH NEPA Scoping

Figure 1
Direct Study Area
Bishop Airport

ESA

DRAFT FOR DELIBERATIVE PURPOSES

APPENDIX 1: PHOTO LOG

Photo 1: Photo depicts predominant habitat conditions at the Bishop Airport, photo looking east.

Photo 2: Photo depicts marginally suitable habitat for SWFL, found approximately 320 feet north of Runway 17/35, photo looking north.

Photo 3: Photo depicts moderate-quality habitat for SWFL, found approximately 800 feet northeast of Runway 17/35, photo looking northeast.

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

In Reply Refer To: September 30, 2020
Consultation Code: 08ENVD00-2020-SLI-0661
Event Code: 08ENVD00-2020-E-01840
Project Name: Proposed Commercial Airline Service at Bishop Airport

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

To Whom It May Concern:

The attached species list indicates threatened, endangered, proposed, and candidate species and designated or proposed 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 of 1973, as amended (ESA, 16 U.S.C. 1531 *et seq*.), for projects that are authorized, funded, or carried out by a Federal agency. Candidate species have no protection under the ESA but are included for consideration because they could be listed prior to the completion of your project. Consideration of these species during project planning may assist species conservation efforts and may prevent the need for future listing actions. For additional information regarding species that may be found in the proposed project area, visit http://www.fws.gov/nevada/es/ipac.html.

The purpose of the ESA 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 ESA 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 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. Guidelines for preparing a Biological Assessment can be found at: http://www.fws.gov/midwest/endangered/section7/ba_guide.html.

If a Federal action 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.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this species list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally listed, proposed, 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 ESA, 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 attached list.

The Nevada Fish and Wildlife Office (NFWO) no longer provides species of concern lists. Most of these species for which we have concern are also on the Animal and Plant At-Risk Tracking List for Nevada (At-Risk list) maintained by the State of Nevada's Natural Heritage Program (Heritage). Instead of maintaining our own list, we adopted Heritage's At-Risk list and are partnering with them to provide distribution data and information on the conservation needs for at-risk species to agencies or project proponents. The mission of Heritage is to continually evaluate the conservation priorities of native plants, animals, and their habitats, particularly those most vulnerable to extinction or in serious decline. In addition, in order to avoid future conflicts, we ask that you consider these at-risk species early in your project planning and explore management alternatives that provide for their long-term conservation.

For a list of at-risk species by county, visit Heritage's website (http://heritage.nv.gov). For a specific list of at-risk species that may occur in the project area, you can obtain a data request form from the website (http://heritage.nv.gov/get_data) or by contacting the Administrator of Heritage at 901 South Stewart Street, Suite 5002, Carson City, Nevada 89701-5245, (775) 684-2900. Please indicate on the form that your request is being obtained as part of your coordination with the Service under the ESA. During your project analysis, if you obtain new information or data for any Nevada sensitive species, we request that you provide the information to Heritage at the above address.

Furthermore, certain species of fish and wildlife are classified as protected by the State of Nevada (http://www.leg.state.nv.us/NAC/NAC-503.html). You must first obtain the appropriate license, permit, or written authorization from the Nevada Department of Wildlife (NDOW) to take, or possess any parts of protected fish and wildlife species. Please visit http://www.ndow.org or contact NDOW in northern Nevada (775) 688-1500, in southern Nevada (702) 486-5127, or in eastern Nevada (775) 777-2300.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq*.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the Service's wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

The Service's Pacific Southwest Region developed the *Interim Guidelines for the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities* (Interim Guidelines). This document provides energy facility developers with a tool for assessing the risk of potential impacts to wildlife resources and delineates how best to design and operate a bird- and bat-friendly wind facility. These Interim Guidelines are available upon request from the NFWO. The intent of a Bird and Bat Conservation Strategy is to conserve wildlife resources while supporting project developers through: (1) establishing project development in an adaptive management framework; (2) identifying proper siting and project design strategies; (3) designing and implementing pre-construction surveys; (4) implementing appropriate conservation measures for each development phase; (5) designing and implementing appropriate post-construction monitoring strategies; (6) using post-construction studies to better understand the dynamics of mortality reduction (*e.g.*, changes in blade cut-in speed, assessments of blade “feathering” success, and studies on the effects of visual and acoustic deterrents) including efforts tied into Before-After/Control-Impact analysis; and (7) conducting a thorough risk assessment and validation leading to adjustments in management and mitigation actions.

The template and recommendations set forth in the Interim Guidelines were based upon the Avian Powerline Interaction Committee's Avian Protection Plan template (http://www.aplic.org/) developed for electric utilities and modified accordingly to address the unique concerns of wind energy facilities. These recommendations are also consistent with the Service's wind energy guidelines. We recommend contacting us as early as possible in the planning process to discuss the need and process for developing a site-specific Bird and Bat Conservation Strategy.

The Service has also developed guidance regarding wind power development in relation to prairie grouse leks (sage-grouse are included in this). This document can be found at: http://www.fws.gov/southwest/es/Oklahoma/documents/te_species/wind%20power/prairie%20grouse%20lek%205%20mile%20public.pdf.

Migratory Birds are a Service Trust Resource. Based on the Service's conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act of 1918, as amended (MBTA; 16 U.S.C. 703 *et seq*.), we recommend that any land clearing or other surface disturbance associated with proposed actions within the project area be timed to avoid potential destruction of bird nests or young, or birds that breed in the area. Such destruction may be in violation of the MBTA. Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed. Therefore, we recommend land clearing be conducted outside the avian breeding season. If this is not feasible, we recommend a qualified biologist survey the area prior to land clearing. If nests are located, or if other evidence of nesting (*i.e.*, mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) should be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.

Guidance for minimizing impacts to migratory birds for projects involving communications towers (*e.g.*, cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

If wetlands, springs, or streams are are known to occur in the project area or are present in the vicinity of the project area, we ask that you be aware of potential impacts project activities may have on these habitats. Discharge of fill material into wetlands or waters of the United States is regulated by the U.S. Army Corps of Engineers (ACOE) pursuant to section 404 of the Clean Water Act of 1972, as amended. We recommend you contact the ACOE's Regulatory Section regarding the possible need for a permit. For projects located in northern Nevada (Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, and Washoe Counties) contact the Reno Regulatory Office at 300 Booth Street, Room 3060, Reno, Nevada 89509, (775) 784-5304; in southern Nevada (Clark, Lincoln, Nye, and White Pine Counties) contact the St. George Regulatory Office at 321 North Mall Drive, Suite L-101, St. George, Utah 84790-7314, (435) 986-3979; or in California along the eastern Sierra contact the Sacramento Regulatory Office at 650 Capitol Mall, Suite 5-200, Sacramento, California 95814, (916) 557-5250.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

The table below outlines lead FWS field offices by county and land ownership/project type. Please refer to this table when you are ready to coordinate (including requests for section 7 consultation) with the field office corresponding to your project, and send any documentation regarding your project to that corresponding office. Therefore, the lead FWS field office may not be the office listed above in the letterhead.

Lead FWS offices by County and Ownership/Program

County	Ownership/Program	Species	Office Lead*

Alameda	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
Alameda	All ownerships but tidal/estuarine	All	SFWO
Alpine	Humboldt Toiyabe National Forest	All	RFWO
Alpine	Lake Tahoe Basin Management Unit	All	RFWO
Alpine	Stanislaus National Forest	All	SFWO
Alpine	El Dorado National Forest	All	SFWO
Colusa	Mendocino National Forest	All	AFWO
Colusa	Other	All	By jurisdiction (see map)
Contra Costa	Legal Delta (Excluding ECCHCP)	All	BDFWO
Contra Costa	Antioch Dunes NWR	All	BDFWO
Contra Costa	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
Contra Costa	All ownerships but tidal/estuarine	All	SFWO
Del Norte	All	All	AFWO
El Dorado	El Dorado National Forest	All	SFWO
El Dorado	LakeTahoe Basin Management Unit		RFWO
Glenn	Mendocino National Forest	All	AFWO
Glenn	Other	All	By jurisdiction (see map)
Humboldt	All except Shasta Trinity National Forest	All	AFWO

Humboldt	Shasta Trinity National Forest	All	YFWO
Lake	Mendocino National Forest	All	AFWO
Lake	Other	All	By jurisdiction (see map)
Lassen	Modoc National Forest	All	KFWO
Lassen	Lassen National Forest	All	SFWO
Lassen	Toiyabe National Forest	All	RFWO
Lassen	BLM Surprise and Eagle Lake Resource Areas	All	RFWO
Lassen	BLM Alturas Resource Area	All	KFWO
Lassen	Lassen Volcanic National Park	All (includes Eagle Lake trout on all ownerships)	SFWO
Lassen	All other ownerships	All	By jurisdiction (see map)
Marin	Tidal wetlands/marsh adjacent to Bays	Salt marsh species, delta smelt	BDFWO
Marin	All ownerships but tidal/estuarine	All	SFWO
Mendocino	Russian River watershed	All	SFWO
Mendocino	All except Russian River watershed	All	AFWO
Modoc	Modoc National Forest	All	KFWO
Modoc	BLM Alturas Resource Area	All	KFWO
Modoc	Klamath Basin National Wildlife Refuge Complex	All	KFWO
Modoc	BLM Surprise and Eagle Lake Resource Areas	All	RFWO

Modoc	All other ownerships	All	By jurisdiction (See map)
Mono	Inyo National Forest	All	RFWO
Mono	Humboldt Toiyabe National Forest	All	RFWO
Napa	All ownerships but tidal/estuarine	All	SFWO
Napa	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
Nevada	Humboldt Toiyabe National Forest	All	RFWO
Nevada	All other ownerships	All	By jurisdiction (See map)
Placer	Lake Tahoe Basin Management Unit	All	RFWO
Placer	All other ownerships	All	SFWO
Sacramento	Legal Delta	Delta Smelt	BDFWO
Sacramento	Other	All	By jurisdiction (see map)
San Francisco	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
San Francisco	All ownerships but tidal/estuarine	All	SFWO
San Mateo	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
San Mateo	All ownerships but tidal/estuarine	All	SFWO
San Joaquin	Legal Delta excluding San Joaquin HCP	All	BDFWO

San Joaquin	Other	All	SFWO
Santa Clara	Tidal wetlands/marsh adjacent to San Francisco Bay	Salt marsh species, delta smelt	BDFWO
Santa Clara	All ownerships but tidal/estuarine	All	SFWO
Shasta	Shasta Trinity National Forest except Hat Creek Ranger District (administered by Lassen National Forest)	All	YFWO
Shasta	Hat Creek Ranger District	All	SFWO
Shasta	Bureau of Reclamation (Central Valley Project)	All	BDFWO
Shasta	Whiskeytown National Recreation Area	All	YFWO
Shasta	BLM Alturas Resource Area	All	KFWO
Shasta	Caltrans	By jurisdiction	SFWO/AFWO
Shasta	Ahjumawi Lava Springs State Park	Shasta crayfish	SFWO
Shasta	All other ownerships	All	By jurisdiction (see map)
Shasta	Natural Resource Damage Assessment, all lands	All	SFWO/BDFWO
Sierra	Humboldt Toiyabe National Forest	All	RFWO
Sierra	All other ownerships	All	SFWO
Siskiyou	Klamath National Forest (except Ukonom District)	All	YFWO
Siskiyou	Six Rivers National Forest and Ukonom District	All	AFWO
Siskiyou	Shasta Trinity National Forest	All	YFWO

Siskiyou	Lassen National Forest	All	SFWO
Siskiyou	Modoc National Forest	All	KFWO
Siskiyou	Lava Beds National Volcanic Monument	All	KFWO
Siskiyou	BLM Alturas Resource Area	All	KFWO
Siskiyou	Klamath Basin National Wildlife Refuge Complex	All	KFWO
Siskiyou	All other ownerships	All	By jurisdiction (see map)
Solano	Suisun Marsh	All	BDFWO
Solano	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
Solano	All ownerships but tidal/estuarine	All	SFWO
Solano	Other	All	By jurisdiction (see map)
Sonoma	Tidal wetlands/marsh adjacent to San Pablo Bay	Salt marsh species, delta smelt	BDFWO
Sonoma	All ownerships but tidal/estuarine	All	SFWO
Tehama	Mendocino National Forest	All	AFWO
Tehama	Shasta Trinity National Forest except Hat Creek Ranger District (administered by Lassen National Forest)	All	YFWO
Tehama	All other ownerships	All	By jurisdiction (see map)
Trinity	BLM	All	AFWO
Trinity	Six Rivers National Forest	All	AFWO
Trinity	Shasta Trinity National Forest	All	YFWO

Trinity	Mendocino National Forest	All	AFWO
Trinity	BIA (Tribal Trust Lands)	All	AFWO
Trinity	County Government	All	AFWO
Trinity	All other ownerships	All	By jurisdiction (See map)
Yolo	Yolo Bypass	All	BDFWO
Yolo	Other	All	By jurisdiction (see map)
All	FERC-ESA	All	By jurisdiction (see map)
All	FERC-ESA	Shasta crayfish	SFWO
All	FERC-Relicensing (non-ESA)	All	BDFWO

***Office Leads:**

AFWO=Arcata Fish and Wildlife Office

BDFWO=Bay Delta Fish and Wildlife Office

KFWO=Klamath Falls Fish and Wildlife Office

RFWO=Reno Fish and Wildlife Office

YFWO=Yreka Fish and Wildlife 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

Consultation Code: 08ENVD00-2020-SLI-0661

Event Code: 08ENVD00-2020-E-01840

Project Name: Proposed Commercial Airline Service at Bishop Airport

Project Type: Federal Grant / Loan Related

Project Description: This project would see the FAA issue a Class I Airport Operating Certification to Bishop Airport under14 CFR Part 139 (Part 139 Certification). This would allow Bishop Airport to accommodate scheduled or unscheduled commercial air passenger service.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.37266033051206N118.36411244726534W

Counties: Inyo, CA

Endangered Species Act Species

There is a total of 5 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
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Lahontan Cutthroat Trout *Oncorhynchus clarkii henshawi* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3964 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/233/office/14320.pdf	Threatened
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 is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7289	Endangered

Flowering Plants

NAME	STATUS
Fish Slough Milk-vetch *Astragalus lentiginosus var. piscinensis* There is **final** critical habitat for this species. Your location is outside 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
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. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Brewer's Sparrow *Spizella breweri* 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/9291	Breeds May 15 to Aug 10

NAME	BREEDING SEASON
Golden Eagle *Aquila chrysaetos* 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/1680	Breeds Dec 1 to Aug 31
Green-tailed Towhee *Pipilo chlorurus* 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/9444	Breeds May 1 to Aug 10
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
Long-billed Curlew *Numenius americanus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5511	Breeds Apr 1 to Jul 31
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
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
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
Sagebrush Sparrow *Artemisiospiza nevadensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Jul 31

NAME	BREEDING SEASON
Tricolored Blackbird *Agelaius tricolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 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
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
Willow Flycatcher *Empidonax traillii* 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/3482	Breeds May 20 to Aug 31

Probability Of Presence Summary

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

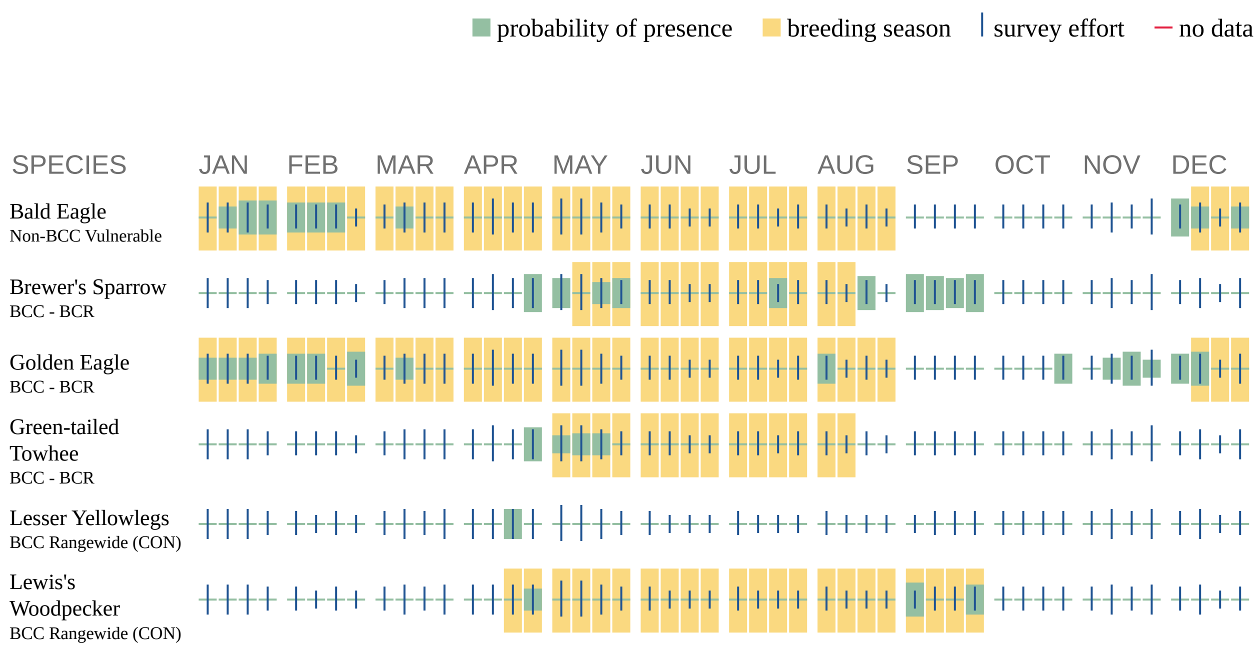
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

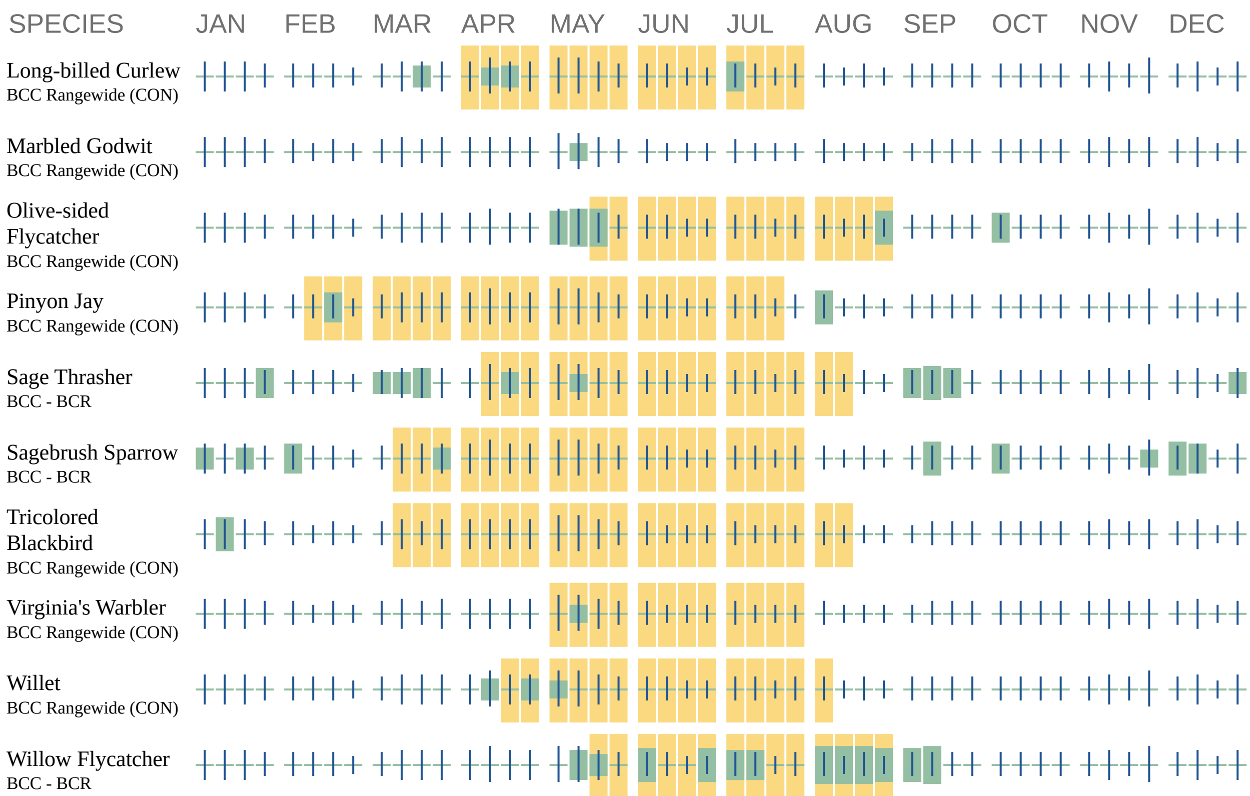
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

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.





Additional information can be found using the following links:

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

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 and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) 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 AKN Phenology 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, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird 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.

FRESHWATER EMERGENT WETLAND

- PEM1C

FRESHWATER FORESTED/SHRUB WETLAND

- PFOC
- PSSC
- PSSF

FRESHWATER POND

- PUBFh

RIVERINE

- R4SBCx

APPENDIX C

California Department of Fish and Wildlife Special Animals List

SPECIAL ANIMALS LIST

July 2020

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). July 2020. 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 Nongame Wildlife 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:
    - Moyle, P. B. 2002. Inland fishes of California. University of California Press.
    - Nelson, J.S., E.J. Crossman, H. Espinosa-Perez, L.T. Findley, C.R. Gilbert, R.N. Lea, and J. D. Williams. 2004. Common and scientific names of fishes from the United States, Canada, and Mexico. American Fisheries Society, Special Publication 29, Bethesda, Maryland. 386 pp.
    - 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.

- 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. Available at: https://www.depts.ttu.edu/nsrl/publications/downloads/OP327.pdf.

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 available from the Sacramento Fish and Wildlife Office or from 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. Available at: https://www.fs.fed.us/rm/pubs_other/rmrs_2008_jelks_h001.pdf
    - 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. Available at: https://doi.org/10.1577/1548-8446(2000)025%3C0006:MEADFS%3E2.0.CO;2
- **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 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 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 ring-tailed cat. The white-tailed kite and the golden eagle are tracked in the CNDDB; the trumpeter swan, northern elephant seal, and ring-tailed cat are not. 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.

- **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.

- **National Marine Fisheries Service (NMFS) Species of Concern:** The Office of Protected Resources (OPR) is a headquarters program office of the National Marine Fisheries Service (also referred to as NOAA Fisheries), under the U.S. Department of Commerce, with responsibility for protecting marine mammals and endangered marine life. OPR works to conserve, protect, and recover species under the federal ESA and the MMPA. Established by NMFS effective April 15, 2004, NMFS Species of Concern are those species about which NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. "Species of Concern" status does not carry any procedural or substantive protections under the ESA, but is meant to draw proactive attention and conservation action to these species.
- **U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern:** The goal of the Birds of Conservation Concern 2008 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.
- **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.

- **Western Bat Working Group (WBWG):** The WBWG is composed of agencies, organizations, and individuals interested in bat research, management, and conservation from 13 western states and provinces. The goals of the group are to (1) facilitate communication among interested parties and reduce risks of species decline or extinction; (2) provide a mechanism by which current information on bat ecology, distribution, and research techniques can be readily accessed; and (3) develop a forum to discuss conservation strategies, provide technical assistance, and encourage education programs. Species are ranked as High, Medium, or Low Priority in each of 10 regions in western North America. Because California includes multiple regions where a species may have different WBWG Priority ranks, the CNNDB includes categories for Medium-High and Low-Medium Priority. The CNDDB tracks bat species that are at least Low-Medium Priority in California.

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 - Near Threatened	IUCN_NT
IUCN - Vulnerable	IUCN_VU
IUCN - Least Concern	IUCN_LC
IUCN - Data Deficient	IUCN_DD
IUCN - Conservation Dependent	IUCN_CD
Marine Mammal Commission - Species of Special Concern	MMC_SSC
National Marine Fisheries Service - Species of Concern	NMFS_SC
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

(914 taxa)

Last updated July 22, 2020

The remainder of this document contains the CNDDB's Special Animals List, current as of the date on the title page of this document. For additional information on how CNDDB determines what species to track please see the CNDDB webpage.

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		Yes	
Gonidea angulata	western ridged mussel		G3	S1S2	None	None		Yes	
Margaritifera falcata	western pearlshell		G4G5	S1S2	None	None		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?
Algamorda newcombiana	Newcomb's littorine snail		G5	S1S2	None	None		No	
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	S1S2	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	
Eremarionta morongoana	Morongo (=Colorado) desertsnail		G1G3	S1	None	None	IUCN:NT	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	S1S2	None	None	USFS:S	Yes	
Fontelicella sp.	Deep Springs fontelicella		G1	S1	None	None		Yes	
Glyptostoma gabrielense	San Gabriel chestnut		G2	S2	None	None		Yes	
Haliotis corrugata	pink abalone		G3?	S2?	None	None	NMFS:SC	No	
Haliotis cracherodii	black abalone		G3	S1S2	Endangered	None	IUCN:CR	Yes	
Haliotis fulgens	green abalone		G3G4	S2	None	None	NMFS:SC	No	
Haliotis kamtschatkana	pinto abalone		G3G4	S2	None	None	IUCN:EN NMFS:SC	No	
Haliotis sorenseni	white abalone		G1	S1	Endangered	None		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	
Helminthoglypta arrosa pomoensis	Pomo bronze shoulderband		G2G3T1	S1	None	None	IUCN:DD	Yes	
Helminthoglypta ayresiana sanctaecrucis	Ayer's snail		G1G2T1T2	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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		No	
Helminthoglypta greggi	Mohave shoulderband		G1	S1	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	
Helminthoglypta sequoicola consors	redwood shoulderband		G2T1	S1	None	None	IUCN:DD	Yes	
Helminthoglypta stiversiana williamsi	Williams' bronze shoulderband		G2G3T1	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		No	
Helminthoglypta traskii traskii	Trask shoulderband		G1G2T1	S1	None	None		Yes	
Helminthoglypta uvasana	Grapevine shoulderband		G1	S1	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Helminthoglypta vasquezi	Vasquez shoulderband		G1	S1	None	None		Yes	
Helminthoglypta walkeriana	Morro shoulderband (=banded dune) snail		G1	S1S2	Endangered	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	USFS:S	Yes	
Juga chacei	Chace juga		G1	S1	None	None	USFS:S	Yes	
Juga occata	scalloped juga		G1	S1	None	None	USFS:S	Yes	
Juga orickensis	redwood juga		G2	S1S2	None	None		Yes	
Lanx alta	highcap lanx		G2G3	S1S2	None	None		Yes	
Lanx klamathensis	scale lanx		G1	S1	None	None		No	
Lanx patelloides	kneecap lanx		G2?	S2	None	None	USFS:S	Yes	
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 gabbi	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Monadenia churchi	Klamath sideband		G2G3	S2	None	None		Yes	
Monadenia circumcarinata	keeled sideband		G1	S1	None	None	BLM:S IUCN:VU	Yes	
Monadenia cristulata	crested sideband		G1?	S1S2	None	None		Yes	
Monadenia fidelis leonina	A terrestrial snail		G4G5T1T2	S1S2	None	None		Yes	
Monadenia fidelis pronotis	rocky coast Pacific sideband		G4G5T1	S1	None	None		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		No	
Monadenia mormonum buttoni	Button's Sierra sideband		G2T1	S1S2	None	None		Yes	
Monadenia mormonum hirsuta	hirsute Sierra sideband		G2T1	S1	None	None	BLM:S	Yes	
Monadenia troglodytes troglodytes	Shasta sideband		G1G2T1T2	S1S2	None	None	IUCN:DD USFS:S	Yes	
Monadenia troglodytes wintu	Wintu sideband		G1G2T1T2	S1S2	None	None	IUCN:DD USFS:S	Yes	
Monadenia tuolumneana	Tuolumne sideband		G1	S1	None	None	BLM:S	Yes	
Monadenia yosemitensis	Yosemite Mariposa sideband		G1	S1S2	None	None		Yes	
Noyo intersessa	Ten Mile shoulderband		G2	S2	None	None		Yes	
Pomatiopsis binneyi	robust walker		G1	S1	None	None		Yes	
Pomatiopsis californica	Pacific walker		G1	S1	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pomatiopsis chacei	marsh walker		G1	S1	None	None		No	
Pristiloma shepardae	Shepard's snail		G1	S1	None	None		Yes	
Pristinicola hemphilli	pristine pyrg		G3	S1	None	None	USFS:S	Yes	
Prophysaon coeruleum	blue-gray taildropper slug		G3G4	S1S2	None	None		No	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	
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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	
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		G1	S1	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Xerarionta redimita	wreathed cactussnail		G1G2	S1	None	None	IUCN:VU	Yes	
Xerarionta tryoni	Bicolor cactussnail		G1	S1	None	None	IUCN:VU	No	

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	S1S2	None	None		Yes	
Aphrastochthonius similis	Carlow's Cave pseudoscorpion		G1G2	S1S2	None	None		No	
Archeolarca aalbui	Aalbu's Cave pseudoscorpion		G1G2	S1S2	None	None		No	
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	
Calicina breva	Stanislaus 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 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	
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		G1	S1	None	None	IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Microcina edgewoodensis	Edgewood Park micro-blind harvestman		G1	S1	None	None		Yes	
Microcina homi	Hom's micro-blind harvestman		G1	S1	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		G1	S1	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	
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		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	IUCN:CD	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	S1S2	Endangered	None	IUCN:EN	Yes	
Branchinecta lynchi	vernal pool fairy shrimp		G3	S3	Threatened	None	IUCN:VU	Yes	
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	S1S2	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	S3S4	Endangered	None	IUCN:EN	Yes	

CRUSTACEA, Order Anomopoda (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		G1	S1	None	None		Yes	
Caecidotea tomalensis	Tomales isopod		G2	S2S3	None	None		Yes	
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	S1S2	None	None	IUCN:VU	Yes	
Stygobromus hyporheicus	Hypoheic 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 imperialis	Empire Cave amphipod		G1	S1	None	None		Yes	
Stygobromus lacicolus	Lake Tahoe amphipod		G1	S1	None	None		Yes	
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:VU	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	
Macrobaenetes valgum	Coachella giant sand treader cricket		G1G2	S1S2	None	None	IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pristoceuthophilus sp.	Samwell Cave cricket		G1G3	S1S3	None	None	IUCN:VU	No	
Psychomastax deserticola	desert monkey grasshopper		G1G2	S1S2	None	None	IUCN:VU	Yes	
Stenopelmatus cahuilaensis	Coachella Valley jerusalem cricket		G1G2	S1S2	None	None	IUCN:VU	Yes	
Tetrix sierrana	Sierra pygmy grasshopper		G1G2	S1S2	None	None	IUCN:VU	Yes	
Trimerotropis infantilis	Zayante band-winged grasshopper		G1	S1	Endangered	None	IUCN:EN	Yes	
Trimerotropis occidentiloides	Santa Monica grasshopper		G1G2	S1S2	None	None	IUCN:EN	Yes	
Trimerotropis occulens	Lompoc grasshopper		G1G2	S1S2	None	None	IUCN:EN	Yes	

INSECTA, Order Heteroptera (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	Candidate	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 shoshone	Amargosa naucorid bug		G1G3	S1S2	None	None		Yes	
Saldula usingeri	Wilbur Springs shorebug		G1	S1	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	S1	None	None		Yes	
Anthicus sacramento	Sacramento anthicid beetle		G1	S1	None	None	IUCN:EN	Yes	
Atractelmis wawona	Wawona riffle beetle		G3	S1S2	None	None		Yes	
Chaetarthria leechi	Leech's chaetarthrian water scavenger beetle		G1?	S1?	None	None		Yes	
Cicindela gabbii	western tidal-flat tiger beetle		G2G4	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 latesignata	western beach tiger beetle		G2G4T1T2	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 ssp.	San Joaquin tiger beetle		G5T1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	
Desmocerus californicus dimorphus	valley elderberry longhorn beetle		G3T2	S2	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	
Hydrochara rickseckeri	Ricksecker's water scavenger beetle		G2?	S2?	None	None		Yes	
Hydroporus leechi	Leech's skyline diving beetle		G1?	S1?	None	None		Yes	
Hydroporus simplex	simple hydroporus diving beetle		G1?	S1?	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Hygrotus curvipes	curved-foot hygrotus diving beetle		G1	S1	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	
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	S1S2	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	S1S2	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		G1T1	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	
Paleoxenus dohrni	Dohrn's elegant eucnemid beetle		G3?	S3?	None	None		No	
Polyphylla anteronivea	Saline Valley snow-front June beetle		G1	S1	None	None		Yes	
Polyphylla barbata	Mount Hermon (=barbate) June beetle		G1	S1	Endangered	None		Yes	
Polyphylla erratica	Death Valley June beetle		G1G2	S1S2	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		No	
Trachykele hartmani	serpentine cypress wood-boring beetle		G1	S1	None	None		Yes	
Trichinorhipis knulli	Knull's metallic wood-boring beetle		G1	S1	None	None		No	
Trigonoscuta brunnotesselata	brown tassel trigonoscuta weevil		G1G2	S1S2	None	None		Yes	
Trigonoscuta dorothea dorothea	Dorothy's El Segundo Dune weevil		G1T1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Trigonoscuta rothi algodones	Algodones dune weevil		G1G2	S1S2	None	None		No	
Trigonoscuta rothi imperialis	Imperial dune weevil		G1G2	S1S2	None	None		No	
Trigonoscuta rothi punctata	Punctate dune weevil		G1G2	S1S2	None	None		No	
Trigonoscuta rothi rothi	Roth's dune weevil		G1G2	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	S1	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	S1	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	
Efferia antiochi	Antioch efferian robberfly		G1G2	S1S2	None	None		Yes	
Efferia macroxipha	Glamis robberfly		G1G2	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	Valley mydas fly		G1	S1	None	None		No	

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	S1	None	None		Yes	
Callophrys comstocki	desert green hairstreak		G3G4	S1S2	None	None		No	
Callophrys mossii bayensis	San Bruno elfin butterfly		G4T1	S1	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 thornei	Thorne's hairstreak		G1	S1	None	None	BLM:S	Yes	Yes
Carolella busckana	Busck's gallmoth		G1G3	SH	None	None		Yes	
Carterocephalus palaemon magnus	Sonoma arctic skipper		G5T5	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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 pop. 1	monarch - California overwintering population		G4T2T3	S2S3	None	None	USFS:S	Yes	
Euchloe hyantis andrewsi	Andrew's marble butterfly		G3G4T1	S1	None	None		Yes	
Eucosma hennei	Henne's eucosman moth		G1	S1	None	None		Yes	
Euphilotes battoides allyni	El Segundo blue butterfly		G5T1	S1	Endangered	None		Yes	
Euphilotes battoides comstocki	Comstock's blue butterfly		G5T2	S2	None	None		Yes	
Euphilotes baueri	Bauer's dotted-blue		G2G4	S1S2	None	None	USFS:S	No	
Euphilotes enoptes smithi	Smith's blue butterfly		G5T1T2	S1S2	Endangered	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		G5T2T3	S1S2	None	None	USFS:S	Yes	
Euphydryas editha quino	quino checkerspot butterfly		G5T1T2	S1S2	Endangered	None		Yes	
Euphyes vestris harbisoni	dun skipper		G5T1T2	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	
Lycaena hermes	Hermes copper butterfly		G1	S1	Candidate	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		G3G4T1	S1	None	None		Yes	
Plebejus icarioides albihalos	White Mountains icarioides blue butterfly		G5T2T3	S2?	None	None		Yes	
Plebejus icarioides missionensis	Mission blue butterfly		G5T1	S1	Endangered	None		Yes	
Plebejus icarioides moroensis	Morro Bay blue butterfly		G5T2	S2	None	None		Yes	
Plebejus icarioides parapheres	Point Reyes blue butterfly		G5T1T2	S1S2	None	None		Yes	
Plebejus idas lotis	lotis blue butterfly		G5TH	SH	Endangered	None		Yes	
Plebejus saepiolus albomontanus	White Mountains saepiolus blue butterfly		G5T2	S1S2	None	None		Yes	
Plebejus saepiolus aureolus	San Gabriel Mountains blue butterfly		G5T1	S1	None	None	USFS:S	Yes	
Plebulina emigdionis	San Emigdio blue butterfly		G1G2	S1S2	None	None	USFS:S	Yes	
Polites mardon	mardon skipper		G2G3	S1	None	None	USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Polites sabuleti albamontana	White Mountains sandhill skipper		G5T2	S2	None	None		No	
Pseudocopaeodes eunus eunus	alkali skipper		G3G4T2	S2	None	None		No	
Pseudocopaeodes eunus obscurus	Carson wandering skipper		G3G4T1	S1	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	SH	None	None		Yes	
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	S1S2	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	S1	None	None		Yes	
Ashmeadiella chumashae	Channel Islands leaf-cutter bee		G2?	S2?	None	None		Yes	
Bombus caliginosus	obscure bumble bee		G4?	S1S2	None	None	IUCN:VU	Yes	
Bombus crotchii	Crotch bumble bee		G3G4	S1S2	None	Candidate Endangered		Yes	
Bombus franklini	Franklin's bumble bee		G1	S1	None	Candidate Endangered	IUCN:CR	Yes	
Bombus morrisoni	Morrison bumble bee		G4G5	S1S2	None	None	IUCN:VU	Yes	
Bombus occidentalis	western bumble bee		G2G3	S1	None	Candidate Endangered	USFS:S	Yes	
Bombus suckleyi	Suckley's cuckoo bumble bee		GU	S1	None	Candidate Endangered		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	S1	None	None		Yes	
Chrysis tularensis	Tulare cuckoo wasp		G1G2	S1S2	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	S1	None	None		Yes	
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	S1	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		No	
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		No	
Perdita scitula antiochensis	Antioch andrenid bee		G1T1	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Perdita stephanomeriae	a miner bee		GNR	S1S2	None	None		No	
Philanthus nasalis	Antioch specid wasp		G1	S1	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		G1G2Q	S1S2	None	None	CDFW:SSC	Yes	
Entosphenus lethophagus	Pit-Klamath brook lamprey		G3G4	S3	None	None	AFS:VU CDFW:SSC	Yes	
Entosphenus similis	Klamath River lamprey		G3G4Q	S3	None	None	AFS:TH CDFW:SSC USFS:S	Yes	
Entosphenus tridentatus	Pacific lamprey		G4	S4	None	None	AFS:VU BLM:S CDFW:SSC 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		G4	S3	None	None	AFS:VU CDFW:SSC	No	
Lampetra hubbsi	Kern brook lamprey		G1G2	S1S2	None	None	AFS:TH CDFW:SSC IUCN:NT USFS:S	Yes	
Lampetra richardsoni	western brook lamprey		G4G5	S3S4	None	None	CDFW:SSC 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	green sturgeon	southern DPS	G3	S1S2	Threatened	None	AFS:VU CDFW:SSC IUCN:NT NMFS:SC	Yes	Yes
Acipenser transmontanus	white sturgeon		G4	S2	None	None	AFS:EN CDFW:SSC IUCN:LC	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		G4T4	S3	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Oncorhynchus clarkii henshawi	Lahontan cutthroat trout		G4T3	S2	Threatened	None	AFS:TH	Yes	
Oncorhynchus clarkii seleniris	Paiute cutthroat trout		G4T1T2	S1S2	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		G4T2Q	S2?	Threatened	Threatened	AFS:TH	Yes	Yes
Oncorhynchus kisutch pop. 4	coho salmon - central California coast ESU		G4	S2?	Endangered	Endangered	AFS:EN	Yes	Yes
Oncorhynchus mykiss aguabonita	California golden trout		G5T1	S1	None	None	AFS:TH CDFW:SSC USFS:S	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oncorhynchus mykiss aquilarum	Eagle Lake rainbow trout		G5T1Q	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	None	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	S2S3	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus mykiss irideus pop. 36	summer-run steelhead trout		G5T4Q	S2	None	Candidate Endangered	CDFW:SSC	Yes	Yes
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS		G5T2T3Q	S2S3	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		G5T1	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Oncorhynchus mykiss whitei	Little Kern golden trout		G5T2	S2	Threatened	None	AFS:EN	Yes	
Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU		G5	S2	None	None	AFS:VU CDFW:SSC NMFS:SC USFS:S	No	Yes
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		G5	S1	Threatened	None	AFS:TH	Yes	Yes
Oncorhynchus tshawytscha pop. 30	chinook salmon - upper Klamath and Trinity Rivers ESU		G5	S1S2	Candidate	Candidate Endangered	CDFW:SSC USFS:S	Yes	
Oncorhynchus tshawytscha pop. 6	chinook salmon - Central Valley spring-run ESU		G5	S1	Threatened	Threatened	AFS:TH	Yes	Yes
Oncorhynchus tshawytscha pop. 7	chinook salmon - Sacramento River winter-run ESU		G5	S1	Endangered	Endangered	AFS:EN	Yes	
Prosopium williamsoni	mountain whitefish		G5	S3	None	None	CDFW:SSC	Yes	
Salvelinus confluentus	bull trout		G4	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:EN	Yes	
Spirinchus thaleichthys	longfin smelt		G5	S1	Candidate	Threatened		Yes	Yes
Thaleichthys pacificus	eulachon	southern DPS	G5	S3	Threatened	None		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	Yes	
Gila elegans	bonytail		G1	SH	Endangered	Endangered	AFS:EN IUCN:EN	Yes	
Gila orcuttii	arroyo chub		G2	S2	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Lavinia exilicauda chi	Clear Lake hitch		G4T1	S1	None	Threatened	AFS:VU USFS:S	Yes	
Lavinia exilicauda exilicauda	Sacramento hitch		G4T2T4	S2S4	None	None	CDFW:SSC	No	
Lavinia exilicauda harengus	Pajaro/Salinas hitch		G4T2T4	S2S4	None	None	CDFW:SSC	Yes	
Lavinia symmetricus mitrulus	Pit roach		G4T2	S2	None	None	AFS:VU CDFW:SSC	Yes	
Lavinia symmetricus navarroensis	Navarro roach		G4T1T2	S2S3	None	None	CDFW:SSC	Yes	
Lavinia symmetricus parvipinnis	Gualala roach		G4T1T2	S2S3	None	None	CDFW:SSC	Yes	
Lavinia symmetricus ssp. 1	San Joaquin roach		G4T3Q	S3	None	None	CDFW:SSC	Yes	Yes
Lavinia symmetricus ssp. 2	Tomales roach		G4T2T3	S2	None	None	CDFW:SSC	Yes	
Lavinia symmetricus ssp. 3	Red Hills roach		G4T1	S1	None	None	AFS:VU BLM:S CDFW:SSC	Yes	
Lavinia symmetricus ssp. 4	Clear Lake - Russian River roach		G4T2T3	S2S3	None	None	CDFW:SSC	No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lavinia symmetricus subditus	Monterey roach		G4T2T3	S2S3	None	None	CDFW:SSC	Yes	
Mylopharodon conocephalus	hardhead		G3	S3	None	None	CDFW:SSC USFS:S	Yes	
Pogonichthys macrolepidotus	Sacramento splittail		GNR	S3	None	None	AFS:VU CDFW:SSC IUCN:EN	Yes	
Ptychocheilus lucius	Colorado pikeminnow		G1	SX	Endangered	Endangered	CDFW:FP IUCN:VU	Yes	
Rhinichthys osculus ssp. 1	Amargosa Canyon speckled dace		G5T1Q	S1	None	None	AFS:TH BLM:S CDFW:SSC	Yes	Yes
Rhinichthys osculus ssp. 2	Owens speckled dace		G5T1T2Q	S1S2	None	None	AFS:TH BLM:S CDFW:SSC	Yes	Yes
Rhinichthys osculus ssp. 3	Santa Ana speckled dace		G5T1	S1	None	None	AFS:TH CDFW:SSC USFS:S	Yes	
Rhinichthys osculus ssp. 5	Long Valley speckled dace		G5T1	S1	None	None	AFS:EN CDFW:SSC	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	
Siphateles bicolor ssp. 1	Eagle Lake tui chub		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?
Siphateles bicolor ssp. 2	High Rock Spring tui chub		G4TX	SX	None	None		Yes	
Siphateles bicolor ssp. 3	Pit River tui chub		G4T1T3	S1S3	None	None		No	
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		G3G4	S3	None	None	CDFW:SSC	Yes	
Catostomus latipinnis	flannelmouth sucker		G3G4	S1	None	None		Yes	
Catostomus microps	Modoc sucker		G2	S2	Delisted	Endangered	AFS:EN CDFW:FP IUCN:EN	Yes	
Catostomus occidentalis lacusanserinus	Goose Lake sucker		G5T2Q	S1	None	None	AFS:VU CDFW:SSC USFS:S	Yes	
Catostomus platyrhynchus	mountain sucker		G5	S3	None	None	CDFW:SSC	Yes	
Catostomus rimiculus ssp. 1	Jenny Creek sucker		G5T2Q	S1	None	None	AFS:VU	No	
Catostomus santaanae	Santa Ana sucker		G1	S1	Threatened	None	AFS:TH IUCN:VU	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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:EN	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	
Cyprinodon radiosus	Owens pupfish		G1	S1	Endangered	Endangered	AFS:EN CDFW:FP IUCN:EN	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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 santaannae	Santa Ana (=Shay Creek) threespine stickleback		G5T1Q	S1	None	None	AFS:EN	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	G2G3	S1	None	None	AFS:TH CDFW:SSC	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		G5T2T3	S2S3	None	None	CDFW:SSC	Yes	
Hysterocarpus traskii pomo	Russian River tule perch		G5T4	S4	None	None	AFS:VU CDFW:SSC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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 CDFW:SSC IUCN:VU	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:VU	Yes	
Cottus gulosus	riffle sculpin		G5	S3S4	None	None	CDFW:SSC	No	
Cottus klamathensis klamathensis	Upper Klamath marbled sculpin		G4T1T2	S1S2	None	None	CDFW:SSC	Yes	
Cottus klamathensis macrops	bigeye marbled sculpin		G4T3	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		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	California tiger salamander		G2G3	S2S3	Threatened	Threatened	CDFW:WL IUCN:VU	Yes	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		G3	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		G4	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		G4	S3S4	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	
Batrachoseps diabolicus	Hell Hollow slender salamander		G2	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		G2G3	S2	None	None	IUCN:DD USFS:S	No	
Batrachoseps kawia	Sequoia slender salamander		G1G2	S2	None	None	IUCN:DD	No	
Batrachoseps luciae	Santa Lucia slender salamander		G2G3	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		G4	S3S4	None	None	IUCN:LC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Batrachoseps regius	Kings River slender salamander		G2	S2S3	None	None	IUCN:VU USFS:S	Yes	
Batrachoseps relictus	relictual slender salamander		G1	S1	None	None	CDFW:SSC IUCN:DD USFS:S	Yes	Yes
Batrachoseps robustus	Kern Plateau salamander		G3	S3	None	None	IUCN:NT	Yes	
Batrachoseps simatus	Kern Canyon slender salamander		G2G3	S2S3	None	Threatened	IUCN:VU USFS:S	Yes	
Batrachoseps stebbinsi	Tehachapi slender salamander		G2	S2S3	None	Threatened	BLM:S IUCN:VU	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		G1G2	S3	None	Threatened	BLM:S IUCN:VU USFS:S	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		G3	S3	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	S2S3	Endangered	None	CDFW:SSC IUCN:EN	Yes	Yes
Anaxyrus canorus	Yosemite toad		G2G3	S2S3	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	foothill yellow-legged frog		G3	S3	None	Endangered	BLM:S CDFW:SSC IUCN:NT USFS:S	Yes	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:VU	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:VU	Yes	

GEKKONIDAE (geckos)

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Coleonyx switaki	barefoot gecko		G4	S1	None	Threatened	BLM:S IUCN:LC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Coleonyx variegatus abbotti	San Diego banded gecko		G5T3T4	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	S3S4	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	
Phrynosoma mcallii	flat-tailed horned lizard		G3	S2	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	
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	
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	None	CDFW:SSC	Yes	Yes
Anniella campi	Southern Sierra legless lizard		G1G2	S1S2	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	S3	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 IUCN:NT	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	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		GNR	S2S3	None	None	CDFW:SSC	Yes	
Diadophis punctatus similis	San Diego ringneck snake		G5T2T3	S2?	None	None	USFS:S	Yes	
Masticophis flagellum ruddocki	San Joaquin coachwhip		G5T2T3	S2?	None	None	CDFW:SSC	Yes	
Masticophis fuliginosus	Baja California coachwhip		G5	S1S2	None	None	CDFW:SSC	Yes	
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	S2S3	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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
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 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	G5T2	S2S3	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		G4T3	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?
Oceanodroma furcata	fork-tailed storm-petrel	Nesting colony	G5	S1	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	

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

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Botaurus lentiginosus	American bittern		G4	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 USFWS:BCC	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	S2?	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	
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 & wintering	G5	S3	None	None	BLM:S CDF:S CDFW:FP CDFW:WL IUCN:LC USFWS:BCC	Yes	
Buteo regalis	ferruginous hawk	Wintering	G4	S3S4	None	None	CDFW:WL IUCN:LC USFWS:BCC	Yes	
Buteo swainsoni	Swainson's hawk	Nesting	G5	S3	None	Threatened	BLM:S IUCN:LC USFWS:BCC	Yes	
Circus hudsonius	northern harrier	Nesting	G5	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?
Elanus leucurus	white-tailed kite	Nesting	G5	S3S4	None	None	BLM:S CDFW:FP IUCN:LC	Yes	
Haliaeetus leucocephalus	bald eagle	Nesting & wintering	G5	S3	Delisted	Endangered	BLM:S CDF:S CDFW:FP IUCN:LC USFS:S USFWS:BCC	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 USFWS:BCC	Yes	
Falco peregrinus anatum	American peregrine falcon	Nesting	G4T4	S3S4	Delisted	Delisted	CDF:S CDFW:FP USFWS:BCC	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Laterallus jamaicensis coturniculus	California black rail		G3G4T1	S1	None	Threatened	BLM:S CDFW:FP IUCN:NT NABCI:RWL USFWS:BCC	Yes	Yes
Rallus obsoletus levipes	light-footed Ridgway's rail		G5T1T2	S1	Endangered	Endangered	CDFW:FP NABCI:RWL	Yes	Yes
Rallus obsoletus obsoletus	California Ridgway's rail		G5T1	S1	Endangered	Endangered	CDFW:FP NABCI:RWL	Yes	Yes
Rallus obsoletus yumanensis	Yuma Ridgway's rail		G5T3	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	G5T4	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 alexandrinus nivosus	western snowy plover	Nesting	G3T3	S2S3	Threatened	None	CDFW:SSC NABCI:RWL USFWS:BCC	Yes	Yes

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

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 USFWS:BCC	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	G4	S2	None	None	CDFW:SSC IUCN:LC	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 USFWS:BCC	Yes	Yes
Larus californicus	California gull	Nesting colony	G5	S4	None	None	CDFW:WL IUCN:LC	Yes	
Leucophaeus atricilla	laughing gull	Nesting colony	G5	S1	None	None	CDFW:WL IUCN:LC	No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	S2	None	None	CDFW:WL IUCN:NT	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	G3G4	S1	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	Yes	
Ptychoramphus aleuticus	Cassin's auklet	Nesting colony	G4	S2S4	None	None	CDFW:SSC IUCN:LC USFWS:BCC	No	
Synthliboramphus scrippsi	Scripps's murrelet	Nesting colony	G3	S2	Candidate	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 USFWS:BCC	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	Yes	
Asio otus	long-eared owl	Nesting	G5	S3?	None	None	CDFW:SSC IUCN:LC	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 USFWS:BCC	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		G3T3	S2S3	Threatened	Threatened	CDF:S IUCN:NT NABCI:YWL	No	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Strix occidentalis occidentalis	California spotted owl		G3G4T2T3	S3	None	None	BLM:S CDFW:SSC IUCN:NT 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	No	
Cypseloides niger	black swift	Nesting	G4	S2	None	None	CDFW:SSC IUCN:LC 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	G5	S1S2	None	None	IUCN:LC 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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Melanerpes lewis	Lewis' woodpecker	Nesting	G4	S4	None	None	IUCN:LC NABCI:YWL USFWS:BCC	Yes	
Melanerpes uropygialis	Gila woodpecker		G5	S1	None	Endangered	BLM:S IUCN:LC USFWS:BCC	Yes	
Picoides arcticus	black-backed woodpecker	Nesting	G5	S2	None	None		Yes	
Sphyrapicus ruber	red-breasted sapsucker	Nesting	G5	S4	None	None		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	S4	None	None	CDFW:SSC IUCN:NT NABCI:YWL USFWS:BCC	Yes	
Empidonax traillii	willow flycatcher	Nesting	G5	S1S2	None	Endangered	IUCN:LC USFS:S USFWS:BCC	Yes	Yes
Empidonax traillii brewsteri	little willow flycatcher	Nesting	G5T3T4	S1S2	None	Endangered	USFWS:BCC	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:LC USFWS:BCC	Yes	
Lanius ludovicianus anthonyi	Island loggerhead shrike		G4T1	S1	None	None	CDFW:SSC NABCI:RWL	No	
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike		G4T1Q	S1	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 IUCN:NT USFWS:BCC	Yes	Yes
Vireo bellii pusillus	least Bell's vireo	Nesting	G5T2	S2	Endangered	Endangered	IUCN:NT NABCI:YWL	Yes	Yes
Vireo huttoni unitti	Catalina Hutton's vireo		G5T2?	S2?	None	None	CDFW:SSC	No	
Vireo vicinior	gray vireo	Nesting	G4	S2	None	None	BLM:S CDFW:SSC IUCN:LC NABCI:YWL USFS:S USFWS:BCC	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		G5T3Q	S3Q	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:LC 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?
Baeolophus inornatus	oak titmouse	Nesting	G4	S4	None	None	IUCN:LC NABCI:YWL USFWS:BCC	Yes	
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	S3	None	None	CDFW:SSC USFS:S USFWS:BCC	Yes	Yes
Cistothorus palustris clarkae	Clark's marsh wren		G5T2T3	S2S3	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		G4G5T2Q	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		G4G5	S3	None	None	BLM:S CDFW:SSC IUCN:VU NABCI:RWL USFWS:BCC	Yes	
Toxostoma crissale	Crissal thrasher		G5	S3	None	None	BLM:S CDFW:SSC IUCN:LC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	S2S3	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 USFWS:BCC	Yes	Yes
Artemisiospiza belli clementeae	San Clemente sage sparrow		G5T1Q	S1	Threatened	None	CDFW:SSC NABCI:YWL USFWS:BCC	Yes	Yes
Junco hyemalis caniceps	gray-headed junco	Nesting	G5T5	S1	None	None	CDFW:WL	Yes	
Melospiza melodia	song sparrow ("Modesto" population)		G5	S3?	None	None	CDFW:SSC	Yes	
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 USFWS:BCC	Yes	
Melospiza melodia pusillula	Alameda song sparrow		G5T2?	S2S3	None	None	CDFW:SSC USFWS:BCC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Melospiza melodia samuelis	San Pablo song sparrow		G5T2	S2	None	None	CDFW:SSC USFWS:BCC	Yes	
Melozone aberti	Abert's towhee		G3G4	S3	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	S2S3	None	None	CDFW:SSC	No	
Passerculus sandwichensis beldingi	Belding's savannah sparrow		G5T3	S3	None	Endangered		Yes	
Passerculus sandwichensis rostratus	large-billed savannah sparrow	Wintering	G5T2T3Q	S2	None	None	CDFW:SSC	No	
Pipilo maculatus clementae	San Clemente spotted towhee		G5T1	S1S2	None	None	CDFW:SSC USFWS:BCC	No	
Pooecetes gramineus affinis	Oregon vesper sparrow	Wintering	G5T3?	S3?	None	None	CDFW:SSC NABCI:RWL USFWS:BCC	No	
Spizella breweri	Brewer's sparrow	Nesting	G5	S4	None	None	IUCN:LC USFWS:BCC	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	G2G3	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
Oreothlypis luciae	Lucy's warbler	Nesting	G5	S2S3	None	None	BLM:S CDFW:SSC IUCN:LC USFWS:BCC	Yes	
Oreothlypis 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 USFWS:BCC	Yes	Yes
Setophaga petechia sonorana	Sonoran yellow warbler	Nesting	G5T2T3	S2	None	None	CDFW:SSC USFWS:BCC	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	S3S4	None	None	IUCN:LC NABCI:YWL USFWS:BCC	Yes	

Mammals

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		G5THQ	SH	None	None		Yes	
Scapanus latimanus parvus	Alameda Island mole		G5THQ	SH	None	None	CDFW:SSC	Yes	

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	S1	None	None		No	

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		G4	S1	None	None	CDFW:SSC IUCN:NT WBWG:H	Yes	
Leptonycteris yerbabuenae	lesser long-nosed bat		G4	S1	Delisted	None	CDFW:SSC IUCN:VU WBWG:H	Yes	Yes
Macrotus californicus	California leaf-nosed bat		G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC WBWG:H	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		G5	S3	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S WBWG:H	Yes	
Corynorhinus townsendii	Townsend's big-eared bat		G3G4	S2	None	None	BLM:S CDFW:SSC IUCN:LC USFS:S WBWG:H	Yes	
Euderma maculatum	spotted bat		G4	S3	None	None	BLM:S CDFW:SSC IUCN:LC WBWG:H	Yes	
Lasionycteris noctivagans	silver-haired bat		G5	S3S4	None	None	IUCN:LC WBWG:M	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Lasiurus blossevillii	western red bat		G5	S3	None	None	CDFW:SSC IUCN:LC WBWG:H	Yes	
Lasiurus cinereus	hoary bat		G5	S4	None	None	IUCN:LC WBWG:M	Yes	
Lasiurus xanthinus	western yellow bat		G5	S3	None	None	CDFW:SSC IUCN:LC WBWG:H	Yes	
Myotis ciliolabrum	western small-footed myotis		G5	S3	None	None	BLM:S IUCN:LC WBWG:M	Yes	
Myotis evotis	long-eared myotis		G5	S3	None	None	BLM:S IUCN:LC WBWG:M	Yes	
Myotis lucifugus	little brown bat	San Bernardino Mountains population	G3	S2S3	None	None	IUCN:LC WBWG:M	No	
Myotis occultus	Arizona Myotis		G4	S1	None	None	CDFW:SSC IUCN:LC WBWG:M	Yes	
Myotis thysanodes	fringed myotis		G4	S3	None	None	BLM:S IUCN:LC USFS:S WBWG:H	Yes	
Myotis velifer	cave myotis		G5	S1	None	None	BLM:S CDFW:SSC IUCN:LC WBWG:M	Yes	
Myotis volans	long-legged myotis		G5	S3	None	None	IUCN:LC WBWG:H	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Myotis yumanensis	Yuma myotis		G5	S4	None	None	BLM:S IUCN:LC WBWG:LM	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		G5T4	S3S4	None	None	BLM:S CDFW:SSC WBWG:H	Yes	
Nyctinomops femorosaccus	pocketed free-tailed bat		G4	S3	None	None	CDFW:SSC IUCN:LC WBWG:M	Yes	
Nyctinomops macrotis	big free-tailed bat		G5	S3	None	None	CDFW:SSC IUCN:LC WBWG:MH	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		G5T2T4	S2S4	None	None	IUCN:NT	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	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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	CDFW:SSC	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	

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	

APLODONTIDAE (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 antelope squirrel		G2	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		G3	S3	None	None	IUCN:LC	No	
Neotamias panamintinus acrus	Kingston Mountain chipmunk		G4T1T2	S1S2	None	None		Yes	
Neotamias speciosus callipeplus	Mount Pinos chipmunk		G4T1T2	S2	None	None	USFS:S	Yes	
Neotamias speciosus speciosus	lodgepole chipmunk		G4T2T3	S2S3	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:VU	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		G5T34	S3S4	None	None	CDFW:SSC	Yes	Yes
Dipodomys californicus eximius	Marysville California kangaroo rat		G4T1	S1	None	None	CDFW:SSC	Yes	
Dipodomys heermanni arenae	Lompoc kangaroo rat		G3G4T1T2	S1S2	None	None		No	
Dipodomys heermanni berkeleyensis	Berkeley kangaroo rat		G3G4T1	S1	None	None		Yes	
Dipodomys heermanni dixoni	Merced kangaroo rat		G3G4T2T3	S2S3	None	None		Yes	
Dipodomys heermanni goldmani	Salinas kangaroo rat		G3G4T2T3	S2S3	None	None		No	
Dipodomys heermanni heermanni	Heermann's kangaroo rat		G3G4T2	S2	None	None		No	
Dipodomys heermanni morroensis	Morro Bay kangaroo rat		G3G4TH	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?	S1S2	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	Endangered	Threatened	IUCN:EN	Yes	
Dipodomys venustus elephantinus	big-eared kangaroo rat		G4T2	S2	None	None	CDFW:SSC	Yes	
Dipodomys venustus sanctiluciae	Santa Lucia Mountain kangaroo rat		G4TNR	SNR	None	None		No	
Dipodomys venustus venustus	Santa Cruz kangaroo rat		G4T1	S1	None	None		Yes	
Perognathus alticola alticola	white-eared pocket mouse		G1G2TH	SH	None	None	BLM:S CDFW:SSC IUCN:EN USFS:S	Yes	Yes
Perognathus alticola inexpectatus	Tehachapi pocket mouse		G1G2T1T2	S1S2	None	None	CDFW:SSC IUCN:EN USFS:S	Yes	Yes
Perognathus inornatus	San Joaquin pocket mouse		G2G3	S2S3	None	None	BLM:S IUCN:LC	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Perognathus inornatus psammophilus	Salinas pocket mouse		G4T2?	S1	None	None	CDFW:SSC	Yes	
Perognathus longimembris bangsi	Palm Springs pocket mouse		G5T2	S2	None	None	BLM:S CDFW:SSC	Yes	
Perognathus longimembris brevinasus	Los Angeles pocket mouse		G5T1T2	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	S1	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	
Perognathus mollipilosus xanthonotus	yellow-eared pocket mouse		G5T2T3	S1S2	None	None	BLM:S	Yes	

MURIDAE (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	S1	None	None		No	
Microtus californicus mohavensis	Mohave river vole		G5T1	S1	None	None	CDFW:SSC	Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
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		G5T1T2	S1S2	None	None	CDFW:SSC	Yes	
Microtus californicus vallicola	Owens Valley vole		G5T3	S3	None	None	BLM:S CDFW:SSC	Yes	
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 IUCN:DD	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	S1	None	None		Yes	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Reithrodontomys megalotis santacruzae	Santa Cruz harvest mouse		G5T1Q	S1	None	None		Yes	Yes
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	S1S3	None	None	CDFW:SSC	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		G4	S1	Endangered	Endangered	IUCN:LC	Yes	
Urocyon littoralis	island fox	Mapped by subspecies	G1	S1	None	Threatened	IUCN:CR	No	Yes
Urocyon littoralis catalinae	Santa Catalina Island fox		G1T1	S1	Threatened	Threatened	IUCN:CR	Yes	Yes
Urocyon littoralis clementae	San Clemente Island fox		G1T1	S1	None	Threatened	IUCN:CR	Yes	Yes
Urocyon littoralis dickeyi	San Nicolas Island fox		G1T1	S1	None	Threatened	IUCN:CR	Yes	Yes
Urocyon littoralis littoralis	San Miguel Island fox		G1T1	S1	Delisted	Threatened	IUCN:CR	Yes	Yes

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Urocyon littoralis santacruzae	Santa Cruz Island fox		G1T1	S1	Delisted	Threatened	IUCN:CR	Yes	Yes
Urocyon littoralis santarosae	Santa Rosa Island fox		G1T1	S1	Delisted	Threatened	IUCN:CR	Yes	Yes
Vulpes macrotis mutica	San Joaquin kit fox		G4T2	S2	Endangered	Threatened		Yes	
Vulpes vulpes necator	Sierra Nevada red fox		G5T1T2	S1	Candidate	Threatened	USFS:S	Yes	
Vulpes vulpes patwin	Sacramento Valley red fox		G5T2	S2	None	None		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	S2	Threatened	None	CDFW:FP IUCN:EN MMC:SSC	Yes	Yes
Gulo gulo	California wolverine		G4	S1	Proposed Threatened	Threatened	CDFW:FP IUCN:NT USFS:S	Yes	
Lontra canadensis sonora	southwestern river otter		G5T1	S1	None	None	CDFW:SSC	Yes	Yes
Martes caurina	Pacific marten		G5	S3	None	None	IUCN:LC USFS:S	Yes	
Martes caurina humboldtensis	Humboldt marten		G5T1	S1	None	Endangered	CDFW:SSC USFS:S	Yes	
Martes caurina sierrae	Sierra marten		G5T3	S3	None	None	USFS:S	Yes	
Mustela frenata inyoensis	Inyo long-tailed weasel		G5T2Q	S2	None	None		No	
Mustela frenata xanthogenys	San Joaquin long-tailed weasel		G5T2T3	S2S3	None	None		No	

Scientific Name	Common Name	Comments	Global Rank	State Rank	ESA	CESA	Other Status	Records in CNDDB?	End Notes?
Pekania pennanti	fisher - West Coast DPS		G5T2T3Q	S2S3	Endangered	Threatened	BLM:S CDFW:SSC USFS:S	Yes	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	

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:NT	Yes	
Callorhinus ursinus	northern fur-seal		G3	S1	None	None	IUCN:VU	Yes	
Eumetopias jubatus	Steller (=northern) sea-lion		G3	S2	Delisted	None	IUCN:EN MMC:SSC	Yes	

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	S1	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 coeruleum

Blue-gray taildropper slug

1) May be a 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.

Fishes

ACIPENSERIDAE (sturgeon)

Acipenser medirostris

green sturgeon

1) Federal listing includes all spawning populations south of the Eel River.
2) The NMFS Species of Concern designation refers to the northern DPS which includes spawning populations north of the Eel River (inclusive).

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. 36

summer-run steelhead trout

1) Summer-run steelhead are part of both the Klamath Mountains Province DPS and the Northern California DPS.
2) CESA candidacy is for northern California summer-run steelhead

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. 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.

Oncorhynchus tshawytscha pop. 6

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.

OSMERIDAE (smelt)

Spirinchus thaleichthys

longfin smelt

1) Federal candidate status is for the San Francisco Bay-Delta DPS of the longfin smelt.

CYPRINIDAE (minnows and carp)

Lavinia symmetricus ssp. 1

San Joaquin roach

1) Current taxonomy considers this taxon to be a population of Lavinia symmetricus symmetricus, the Sacramento-San Joaquin roach.

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. 2

Owens speckled dace

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

GASTEROSTEIDAE (sticklebacks)

Gasterosteus aculeatus microcephalus

resident threespine stickleback

1) USFS Sensitive designation refers to the full species.

Gasterosteus aculeatus santaannae

Santa Ana (=Shay Creek) 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

AMBYSTOMATIDAE (mole salamanders)

Ambystoma californiense

California tiger salamander

1) Central Valley DPS federally listed as threatened. Santa Barbara County DPS and Sonoma County DPS are federally listed as endangered.

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.

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 boylii

foothill yellow-legged frog

1) CESA listing status varies by clade as follows: Southwest/South Coast, West/Central Coast, and East/Southern Sierra clades are endangered; northeast/Northern Sierra and Feather River clades are threatened; listing of the Northwest/North Coast clade is not warranted.

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) Original federal endangered listing, effective 20020702, was for the southern DPS (populations in the San Gabriel, San Jacinto, and San Bernardino Mountains).
2) Federal endangered listing of the northern DPS (populations occurring north of the Tehachapi Mountains in the Sierra Nevada) became effective 20140630.
3) Rana muscosa has been 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.

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 ful 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 alexandrinus 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.

Charadrius montanus

mountain plover

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

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.

APLODONTIDAE (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.

MURIDAE (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

island fox

1) State listing is at the full species level and includes all subspecies on all islands. Federal listing does not include San Nicolas or San Clemente island subspecies.

Urocyon littoralis catalinae

Santa Catalina Island fox

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

Urocyon littoralis clementae

San Clemente Island fox

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

Urocyon littoralis dickeyi

San Nicolas Island fox

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

Urocyon littoralis littoralis

San Miguel Island fox

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

Urocyon littoralis santacruzae

Santa Cruz Island fox

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

Urocyon littoralis santarosae

Santa Rosa Island fox

1) The IUCN Critically Endangered designation 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.

Pekania pennanti

fisher - West Coast DPS

1) Formerly considered a subspecies, Pacific fisher (Martes pennanti pacifica); this subspecies concept is no longer considered valid.
2) 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). Federal endangered status applies only to the Southern Sierra Nevada DPS.
3) CESA threatened status applies only to the Southern Sierra Nevada ESU, defined as south of the Merced 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 D

Southwest Willow Flycatcher Survey Methodology

USGS
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Prepared in cooperation with the Bureau of Reclamation and the U.S. Fish and Wildlife Service

A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher

Chapter 10 of
Section A, Biological Science
Book 2, Collection of Environmental Data

Techniques and Methods 2A-10

U.S. Department of the Interior
U.S. Geological Survey

Cover: Southwestern Willow Flycatcher. Photograph taken by Susan Sferra, U.S. Fish and Wildlife Service.

A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher

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U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2010

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Conversion Factors

Multiply	By	To obtain
centimeter (cm)	0.3937	inch (in.)
gram (g)	0.03527	ounce, avoirdupois (oz)
hectare (ha)	2.471	acre
kilometer (km)	0.6214	mile (mi)
meter (m)	3.281	foot (ft)
millimeter (mm)	0.03937	inch (in.)

Abbreviations and Acronyms

GPS	Global Positioning System
NDVI	Normalized Difference Vegetation Index
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher

By Mark K. Sogge, U.S. Geological Survey; Darrell Ahlers, Bureau of Reclamation; and Susan J. Sferra, U.S. Fish and Wildlife Service

Background

The Southwestern Willow Flycatcher (*Empidonax traillii extimus*) has been the subject of substantial research, monitoring, and management activity since it was listed as an endangered species in 1995. When proposed for listing in 1993, relatively little was known about the flycatcher's natural history, and there were only 30 known breeding sites supporting an estimated 111 territories rangewide (Sogge and others, 2003a). Since that time, thousands of presence/absences surveys have been conducted throughout the historical range of the flycatcher, and many studies of its natural history and ecology have been completed. As a result, the ecology of the flycatcher is much better understood than it was just over a decade ago. In addition, we have learned that the current status of the flycatcher is better than originally thought: as of 2007, the population was estimated at approximately 1,300 territories distributed among approximately 280 breeding sites (Durst and others, 2008a).

Concern about the Southwestern Willow Flycatcher on a rangewide scale was brought to focus by Unitt (1987), who described declines in flycatcher abundance and distribution throughout the Southwest. *E. t. extimus* populations declined during the 20th century, primarily because of habitat loss and modification from activities, such as dam construction and operation, groundwater pumping, water diversions, and flood control. In 1991, the U.S. Fish and Wildlife Service (USFWS) designated the Southwestern Willow Flycatcher as a candidate category 1 species (U.S. Fish and Wildlife Service, 1991). In July 1993, the USFWS proposed to list *E. t. extimus* as an endangered species and to designate critical habitat under the Act (U.S. Fish and Wildlife Service, 1993). A final rule listing *E. t. extimus* as endangered was published in February 1995 (U.S. Fish and Wildlife Service, 1995); critical habitat was designated in 1997 (U.S. Fish and Wildlife Service, 1997). The USFWS Service released a Recovery Plan for the Southwestern Willow Flycatcher in 2002 (U.S. Fish and Wildlife Service, 2002), and re-designated critical habitat in 2005 (U.S. Fish and Wildlife Service, 2005).

In addition to its federal status, the Southwestern Willow Flycatcher is listed as an endangered species or species of concern in Arizona (Arizona Game and Fish Department, 2006), New Mexico (New Mexico Department of Game and Fish, 1996), California (California Department of Fish and Game, 1991), and Utah (Utah Division of Wildlife Resources, 1997).

Sound management and conservation of an endangered species like the Southwestern Willow Flycatcher requires current, detailed information on its abundance and distribution. This requires, among other things, identifying where flycatchers are and are not breeding, and annual monitoring of as many breeding areas as possible. Such efforts require effective, standardized survey protocols and consistent reporting, at both local and regional levels. However, the Willow Flycatcher is a difficult species to identify and survey for. Moreover, inconsistent or ineffective surveys are of limited value, can produce misleading information (including "false positives" and "false negatives"), hinder regional and rangewide analyses, and waste limited resources.

We developed this document to provide a standardized survey protocol and a source of basic ecological and status information on the flycatcher. The first section summarizes the current state of knowledge regarding Southwestern Willow Flycatcher natural history, based on a wide array of published and unpublished literature. Emphasis is given to information relevant to flycatcher conservation and management, and to conducting and interpreting surveys. The second section details a standard survey protocol that provides for consistent data collection, reporting, and interpretation. This protocol document builds on and supersedes previous versions, the most recent of which was Sogge and others (1997a). In this update, we incorporate over a decade of new science and survey results, and refine the survey methodology to clarify key points. Further, we update the standard survey data sheets and provide guidelines on how to fill in the requested information. Amidst these revisions, the basic approach of the survey protocol has remained unchanged—multiple surveys at each survey area within the same breeding season, the use of the call-playback technique using flycatcher vocalizations to increase the probability of detection, and verification of species identity through its diagnostic song.

Section 1. Natural History

Breeding Range and Taxonomy

The Willow Flycatcher is a widespread species that breeds across much of the conterminous United States (Sedgwick, 2000). Four subspecies commonly are recognized in North America, with each occupying a distinct breeding range (fig. 1): *E. t. adastus*, ranging across the northern Rocky Mountains and Great Basin; *E. t. brewsteri*, found west of the Sierra Nevada and Cascade Mountains along the Pacific Slope; *E. t. extimus*, the Southwestern Willow Flycatcher, which breeds across the Southwest; and *E. t. traillii*, ranging east of the northern Rocky Mountains. Although the overall subspecies' ranges are distinct, Sedgwick (2001) and Paxton (2008) noted interbreeding/gradation zones in the boundary area between *E. t. extimus* and *E. t. adastus*.

The breeding range of the Southwestern Willow Flycatcher includes southern California, Arizona, New Mexico, southwestern Colorado, and extreme southern portions of Nevada and Utah: specific range boundaries are delineated in the subspecies' recovery plan (U.S. Fish and Wildlife Service, 2002). Unitt (1987) included western Texas in the subspecies' range, but recent breeding records from western Texas are lacking. Records of probable breeding Southwestern Willow Flycatchers in Mexico are few and restricted to extreme northern Baja California and Sonora (Unitt, 1987; Wilbur, 1987). Although recent data are lacking, the USFWS does include parts of northern Mexico in its description of *E. t. extimus* breeding range (U.S. Fish and Wildlife Service, 2002).

Although they appear very similar to most observers, experienced taxonomist or those using specialized equipment (for example, an electronic colorimeter) can differentiate among the subspecies by subtle differences in color and morphology (for example, Unitt, 1987; Paxton, 2008). Despite the subtle level of differences, the taxonomic status of *E. t. extimus* has been critically reviewed and confirmed multiple times based on morphological, genetic, and song data (Hubbard, 1987; Unitt, 1987; Browning, 1993; Paxton, 2000; Sedgwick, 2001).

The Southwestern Willow Flycatcher was described by Phillips (1948) from a specimen collected along the San Pedro River in southeastern Arizona. The Southwestern Willow Flycatcher generally is paler than other Willow Flycatcher subspecies, although this difference is indistinguishable without considerable experience and training, and study skins as comparative reference material. The southwestern subspecies differs in morphology (primarily wing formula) but not overall size. The plumage and color differences between the Willow Flycatcher subspecies are so subtle that they should not be used to characterize birds observed in the field (Unitt, 1987; Hubbard, 1999; U.S. Fish and Wildlife Service, 2002).

Migration and Winter Range, Habitat, and Ecology

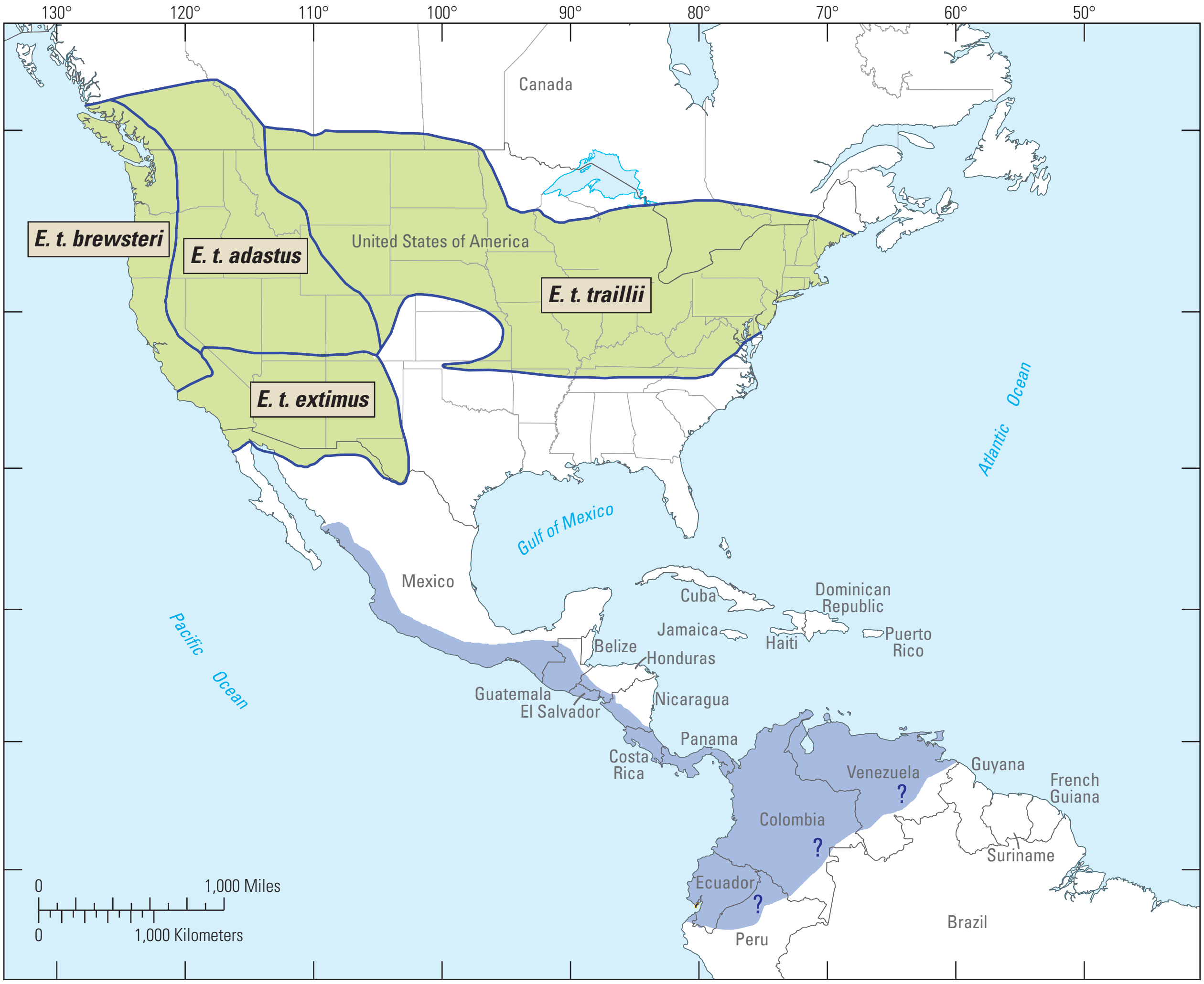
All Willow Flycatcher subspecies breed in North America but winter in the subtropical and tropical regions of southern Mexico, Central America, and northern South America (Sedgwick, 2000; Koronkiewicz, 2002; fig. 1). Most wintering birds are found in the Pacific slope lowlands in Mexico and Central America, and Caribbean slope lowlands in Mexico and Guatemala.

Because all Willow Flycatcher subspecies look very similar, determining specific wintering sites for the southwestern race has been challenging. However, recent genetic analysis of wintering birds (Paxton, 2008) suggests that the four subspecies occupy finite areas of the wintering grounds, but with overlapping ranges. The Southwestern Willow Flycatcher appears to be largely restricted to the center of the winter range (in the vicinity of Costa Rica), although Paxton (2008) suggests more research is needed to address this question.

On the wintering grounds, flycatchers primarily are found in habitats that have four main components: (1) standing or slow moving water and/or saturated soils, (2) patches or stringers of trees, (3) woody shrubs, and (4) open areas (Koronkiewicz and Whitfield, 1999; Koronkiewicz and Sogge, 2000; Lynn and others, 2003; Nishida and Whitfield, 2007; Schuetz and others, 2007). Based on surveys to date, the presence of water or saturated soils is almost universal, although tree heights and configurations, the presence of woody shrubs, and the amount of open space surrounding winter territories can vary considerably (Schuetz and others, 2007).

Male and female flycatchers hold separate, individual non-breeding territories, and defend those territories throughout the winter by using song, calls, and aggression displays. Fidelity to wintering territories and sites is high, as is survivorship over the wintering period (Koronkiewicz and others, 2006b; Sogge and others, 2007).

Willow Flycatchers travel approximately 1,500–8,000 km each way between wintering and breeding areas. During migration, flycatchers use a wider array of forest and shrub habitats than they do for breeding, although riparian vegetation may still be a preferred migration habitat type (Finch and others, 2000). Migration requires high energy expenditures, exposure to predators, and successful foraging in unfamiliar areas. Therefore, migration is the period of highest mortality within the annual cycle of the flycatcher (Paxton and others, 2007). Willow Flycatchers of all subspecies sing during northward migration, perhaps to establish temporary territories for short-term defense of food resources.



Basemap modified from U.S. Geological Survey and other agency digital data, various scales. Projection Mercator, World Geodetic System1984 datum.

EXPLANATION

Approximate range distribution of the Willow Flycatcher (*Empidonax traillii*)—Adapted from Unitt (1987), Browning (1993), and Paxton (2008)

Breeding range, including boundaries of the Willow Flycatcher subspecies

? Wintering range—Question marks reflect uncertainty of the location of the eastern boundary of the winter range

Figure 1. Approximate ranges of the Willow Flycatcher (*Empidonax traillii*) during breeding and non-breeding seasons.

Southwestern Willow Flycatchers typically arrive on breeding grounds between early May and early June (Ellis and others, 2008; Moore and Ahlers, 2009). Because arrival dates vary annually and geographically, northbound migrant Willow Flycatchers of multiple subspecies pass through areas where Southwestern Willow Flycatchers have already begun nesting. Similarly, southbound migrants in late July and August may occur where Southwestern Willow Flycatchers are still breeding (Unitt, 1987). This can make it challenging for an observer to differentiate local breeders from migrants. Other than timing, we still know relatively little about Southwestern Willow Flycatcher migratory behavior, pathways, or habitat use.

Breeding Habitat

Breeding Southwestern Willow Flycatchers are riparian obligates, typically nesting in relatively dense riparian vegetation where surface water is present or soil moisture is high enough to maintain the appropriate vegetation characteristics (Sogge and Marshall, 2000; U.S. Fish and Wildlife Service, 2002; Ahlers and Moore, 2009). However, hydrological conditions in the Southwest can be highly variable within a season and between years, so water availability at a site may range from flooded to dry over the course of a breeding season or from year to year.

The Southwestern Willow Flycatcher breeds in dense riparian habitats across a wide elevational range, from near sea level in California to more than 2,600 m in Arizona and southwestern Colorado (Durst and others, 2008a). Vegetation characteristics of Southwestern Willow Flycatcher breeding habitat generally include dense tree or shrub cover that is ≥ 3 m tall (with or without a higher overstory layer), dense twig structure, and high levels of live green foliage (Allison and others, 2003); many patches with tall canopy vegetation also include dense midstory vegetation in the 2–5 m range. Beyond these generalities, the flycatcher shows adaptability in habitat selection, as demonstrated by variability in dominant plant species (both native and exotic), size and shape of breeding patch, and canopy height and structure (U.S. Fish and Wildlife Service, 2002).

Southwestern Willow Flycatcher breeding habitat can be quantified and characterized in a number of ways, depending on the level of detail needed and habitat traits of interest. For many sites, detailed floristic composition, plant structure, patch size, and even characteristics such as Normalized Difference Vegetation Index (NDVI) have been described in agency reports and scientific journal articles (Allison and others, 2003; Hatten and Paradzick, 2003; Koronkiewicz and others, 2006a; Hatten and Sogge, 2007; Moore, 2007; Schuetz and Whitfield, 2007; Ellis and others, 2008). For purposes of this survey protocol, we take a relatively simple approach and broadly describe and classify breeding sites based on plant species composition and habitat structure. Clearly, these are not the only important components, but they are conspicuous to human perception and easily observed and recorded. Thus, they have proven useful in conceptualizing, selecting and evaluating suitable survey habitat, and in predicting where breeding flycatchers are likely to be found.

Breeding habitat types commonly used by Southwestern Willow Flycatchers are described below. The general categories are based on the composition of the tree/shrub vegetation at the site—native broadleaf, exotic, and mixed native/exotic. In the field, breeding habitats occur along a continuum of plant species composition (from nearly monotypic to mixed species) and vegetation structure (from simple, single stratum patches to complex, multiple strata patches). The images in figures 2–7 illustrate some of the variation in flycatcher breeding habitat, and other examples can be found in numerous publications and agency reports, and on the USGS photo gallery web site (http://sbsc.wr.usgs.gov/SBSCgallery/). The intent of the descriptions and photographs is to provide a general guide for identifying suitable habitat in which to conduct surveys.

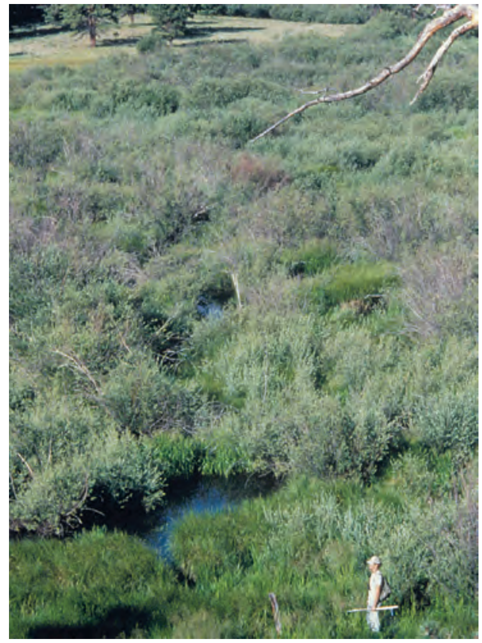
Native broadleaf.—Southwestern Willow Flycatchers breed across a great elevational range, and the characteristics of their native broadleaf breeding sites varies between high elevation sites and those at low and mid-elevation sites.

High elevation sites (fig. 2) range from nearly monotypic dense stands of willow to mixed stands of native broadleaf trees and shrubs, 2–7 m in height with no distinct overstory layer; often associated with sedges, rushes, nettles, and other herbaceous wetland plants; usually very dense structure in lower 2 m; live foliage density is high from the ground to the canopy. Vegetation surrounding the patch can range from open meadow, to agricultural lands, to pines or upland shrub.

At low and mid-elevations (fig. 3), flycatcher breeding sites can be composed of single species (often Goodding's willow (*Salix gooddingii*), *S. exigua*, or other willow species) or mixtures of native broadleaf trees and shrubs including (but not limited to) cottonwood, willows, boxelder (*Acer negundo*), ash (*Fraxinus* spp.), alder (*Alnus* spp.), and buttonbush (*Cephalanthus* spp.), height from 3 to 15 m; characterized by trees of different size classes; often a distinct overstory of cottonwood, willow or other broadleaf tree, with recognizable subcanopy layers and a dense understory of mixed species; exotic/introduced species may be a rare component, particularly in the understory.

Monotypic exotic.—(fig. 4) Breeding sites also can include nearly monotypic, dense stands of exotics such as saltcedar (*Tamarix* spp.) or Russian olive (*Elaeagnus angustifolia*), 4–10 m in height forming a nearly continuous, closed canopy (with no distinct overstory layer); lower 2 m commonly very difficult to penetrate due to dense branches, however, live foliage density may be relatively low 1–2 m above ground, but increases higher in the canopy; canopy density uniformly high.

Aerial view of Little Colorado River near Greer, Arizona. Photograph by USGS, 1995.



Little Colorado River near Greer, Arizona. Photograph courtesy of Arizona Game and Fish Department, 1996.

Parkview Fish Hatchery, New Mexico. Photograph by USGS, 2000.

Rio Grande State Wildlife Area, Colorado. Photograph by USGS, 2002.

Tierra Azul, New Mexico. Photograph by USGS, 2005.

McIntyre Springs, Colorado. Photograph by USGS, 2002.

Figure 2. Examples of Southwestern Willow Flycatcher breeding habitat in native broadleaf vegetation at high-elevation sites.

Hassayampa River, Arizona. Photograph by USGS, 2003.

Santa Ynez River, California, Photograph by USGS, 1996.

San Luis Rey River, California. Photograph by USGS, 2005.

Kern River, California. Photograph by USGS, 1995.

Bosque del Apache, Rio Grande, New Mexico. Photograph courtesy of Bureau of Reclamation, 2008.

Kern River, California. Photograph by USGS, 1995.

Figure 3. Examples of Southwestern Willow Flycatcher breeding habitat in native broadleaf vegetation at low and mid-elevation sites.

Aerial view of Topock Marsh, Colorado River, Arizona. Photograph by USGS, 1996.

Topock Marsh, Colorado River, Arizona. Photograph by USGS, 1996.

Rio Grande, New Mexico. Photograph by USGS, 2005.

Salt River, Arizona. Photograph courtesy of Bureau of Reclamation, 1996.

Orrilla Verde, Rio Grande, New Mexico. Photograph by USGS, 2006.

Aerial view of Salt River, Arizona. Photograph by USGS, 1996.

Figure 4. Examples of Southwestern Willow Flycatcher breeding habitat in exotic vegetation.

Mixed native/exotic—(fig. 5) These sites include dense mixtures of native broadleaf trees and shrubs (such as those listed above) mixed with exotic/introduced species, such as saltcedar or Russian olive; exotics are often primarily in the understory, but may be a component of overstory; the native and exotic components may be dispersed throughout the habitat or concentrated as a distinct patch within a larger matrix of habitat; overall, a particular site may be dominated primarily by natives or exotics, or be a more-or-less equal mixture.

Regardless of the plant species composition or height, occupied sites almost always have dense vegetation in the patch interior (fig. 6). These dense patches are often interspersed with small openings, open water, or shorter/sparser vegetation, creating a mosaic that is not uniformly dense.

Gila River, Arizona. Photograph by USGS, 2002.

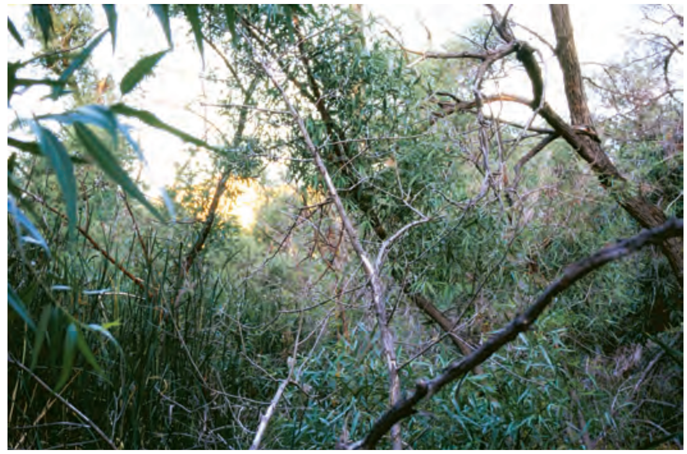
Roosevelt Lake, Arizona. Photograph by USGS, 1999.

Verde River River, Arizona. Photograph by USGS, 2002.

Virgin River, Utah. Photograph by USGS, 1997.

Figure 5. Examples of Southwestern Willow Flycatcher breeding habitat in mixed native/exotic vegetation.

Gila River, Arizona. Photograph by USGS, 2002.



Kern River, California. Photograph by USGS, 1999.

Rio Grande, New Mexico. Photograph by USGS, 2007.

Salt River, Arizona. Photograph by USGS, 1999.

Rio Grande, New Mexico. Photograph by USGS, 2007.

Rio Grande, New Mexico. Photograph by USGS, 2005.

Figure 6. Examples of dense vegetation structure within breeding habitats of Southwestern Willow Flycatcher.

Riparian patches used by breeding flycatchers vary in size and shape, ranging from a relatively contiguous stand of uniform vegetation to an irregularly shaped mosaic of dense vegetation with open areas. Southwestern Willow Flycatchers have nested in patches as small as 0.8 ha (for example, in the Grand Canyon) and as large as several hundred hectares (for example, at Roosevelt Lake, Ariz., or Elephant Butte Reservoir, New Mex.). They have only rarely been found nesting in isolated, narrow, linear riparian habitats that are less than 10 m wide, although they will use such linear habitats during migration.

Flycatcher territories and nests typically are adjacent to open water, cienegas, marshy seeps, or saturated soil, and within riparian areas rooted in standing water. However, in the Southwest, hydrological conditions at a site can vary remarkably within a season, between years, and among nearby sites (fig. 7). Surface water or saturated soil may only be present early in the breeding season (that is, May and part of June), especially in dry years. Similarly, vegetation at a patch may be immersed in standing water during a wet year, but be hundreds of meters from surface water in dry years (Ahlers and Moore, 2009). This is particularly true of reservoir sites, such as the Kern River at Lake Isabella, Calif., Tonto Creek and Salt River at Roosevelt Lake, and the Rio Grande near Elephant Butte Reservoir. Natural or human-caused river channel modifications and altered subsurface flows (for example, from agricultural runoff), can lead to a total absence of water or visibly saturated soil at a site for several years.

Other potentially important aspects of Southwestern Willow Flycatcher habitat include distribution and isolation of vegetation patches, hydrology, food base (arthropods), parasites, predators, environmental factors (for example temperature, humidity), and interspecific competition (U.S. Fish and Wildlife Service, 2002). Population dynamics

Rio Grande at San Marcial, New Mexico, with dry substrate. Photograph by USGS, 2007.

Rio Grande at San Marcial, New Mexico, with flowing water beneath the territories. Photograph by USGS, 2007.

Tonto Creek inflow to Roosevelt Lake, Arizona, during a dry year. Photograph by USGS, 2004.

Tonto Creek inflow to Roosevelt Lake, Arizona, during high-water year. Photograph by USGS, 2005.

Figure 7. Examples of the variable hydrologic conditions at breeding habitats of Southwestern Willow Flycatcher.

factors, such as demography (for example, survivorship rates, fecundity), distribution of breeding groups across the landscape, flycatcher dispersal patterns, migration routes, the tendency for adults and surviving young to return to their previous year breeding site, and conspecific sociality also influence where flycatchers are found and what habitats they use (U.S. Fish and Wildlife Service, 2002).

It is critically important to recognize that the ultimate measure of habitat suitability is not simply whether or not a site is occupied. Habitat suitability occurs along a gradient from high to poor to unsuitable; the best habitats are those in which flycatcher reproductive success and survivorship result in a stable or growing population. Some occupied habitats may be acting as population sources, while others may be functioning as population sinks (Pulliam, 1988). Therefore, it can take extensive research to determine the quality of any given habitat patch. Furthermore, productivity and survival rates can vary widely among years (Paxton and others, 2007; Ellis and others, 2008; Ahlers and Moore, 2009), so conclusions based on short-term datasets or data extrapolated from one area to another may be erroneous. It also is important to note that not all unoccupied habitat is unsuitable; some sites with suitable habitat may be geographically isolated or newly established, such that they are not yet colonized by breeding flycatchers. There also may simply not be enough flycatchers in a given area to fill all available habitat in particular locations (U.S. Fish and Wildlife Service, 2002). A better understanding of which habitats or sites are sinks or sources can be especially helpful in site conservation and restoration planning.

As described earlier, migrant Willow Flycatchers may occur in riparian habitats that are structurally unsuitable for breeding (for example, too sparse, smaller patch size, etc.), and in non-riparian habitats. Such migration stopover areas, even though not used for breeding, may be critically important resources affecting local and regional flycatcher productivity and survival (U.S. Fish and Wildlife Service, 2002, 2005).

Breeding Chronology and Biology

Unless otherwise noted, the information that follows and upon which the generalized breeding season chronology (fig. 8) is based comes from Unitt (1987), Whitfield (1990), Maynard (1995), Sogge and others (2003b), Paxton and others (2007), Schuetz and Whitfield (2007), and Ellis and others (2008). Extreme or record dates for any stage of the breeding cycle may vary by 1–2 weeks from the dates presented, depending on the geographic area, extreme weather events, yearly variation and other factors. Higher elevation areas, in particular, have delayed chronology (Ahlers and White, 2000).

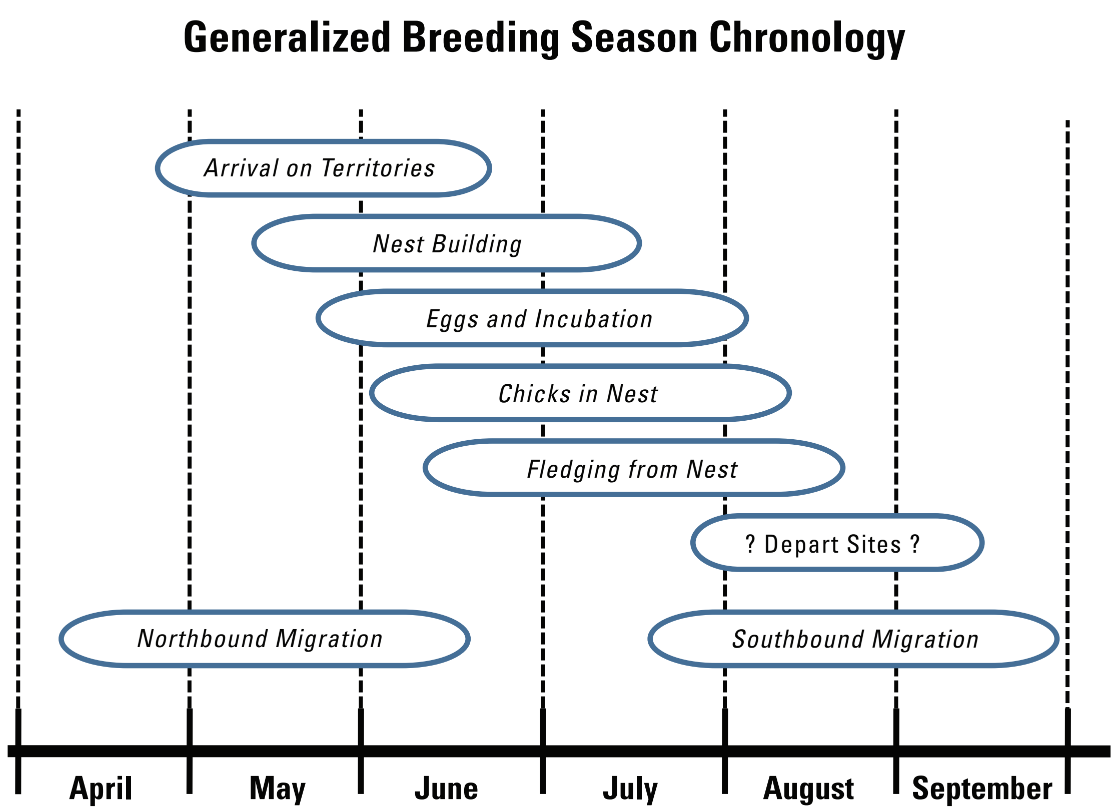


Figure 8. Generalized migration and breeding chronology for the Willow Flycatcher in the Southwest. Extreme or record dates may occur slightly earlier or later than indicated.

Both sexes can breed beginning in their second year. Male Southwestern Willow Flycatchers generally arrive at breeding areas first; older males typically arrive before younger ones. Although females usually arrive a few weeks after males, some older females are present at sites before late-arriving males. Adult flycatchers will sometimes wander extensively through large riparian sites before and after breeding, possibly as a way to evaluate potential breeding habitat (Cardinal and others, 2006).

Males establish and defend their territories through singing and aggressive interactions. Females settle on established territories, and may choose a territory more for its habitat characteristics than for the traits of its territorial male. Territory size tends to be larger when a male first arrives, then gets smaller after a female pairs with the male (Cardinal and others, 2006). Similarly, male song rate is very high early in the season, then declines after pairing (Yard and Brown, 2003). Not all males are successful in attracting mates in a given year, and as a result unpaired territorial males occur at many breeding sites. Unpaired males are usually a small percentage of any local population, but can comprise as much as 15–25 percent of the territories in some populations (Munzer and others, 2005; Ahlers and Moore, 2009).

Although the Willow Flycatcher as a species is considered predominantly monogamous during the breeding season (Sedgwick, 2000), some Southwestern Willow Flycatcher populations have a relatively high degree of polygyny whereby one male can have more than one breeding female in its territory. Polygynous males generally have two females in their territory, but up to four have been recorded (Davidson and Allison, 2003; Pearson and others, 2006). Polygyny rates can vary between sites, and among years at a given site. At some sites, polygynous males have much higher productivity than monogamous males (Paxton and others, 2007).

Nest building within the territory usually begins within a week or two after pair formation. Egg laying begins as early as mid-May, but more often starts in late May to mid-June. Chicks can be present in nests from late May through early August. Young typically fledge from nests from mid-June through mid-August; later fledglings are often products of re-nesting attempts. Breeding adults generally depart from their territories in early to mid-August, but may stay later if they fledged young late in the season. Males that fail to attract or retain mates, and males or pairs that are subject to significant disturbance, such as repeated nest parasitism or predation may leave territories by early July. Fledglings probably leave the breeding areas a week or two after adults, but few details are known.

Southwestern Willow Flycatcher territory size varies widely, probably due to differences in population density, habitat quality (including vegetation density and food availability), and nesting stage. Studies have reported estimated territory sizes ranging from 0.06 to 2.3 ha (Sogge and others, 1995; Whitfield and Enos, 1996; Bureau of Reclamation, 2009). At Roosevelt Lake, Ariz., measurements of home ranges, which include the defended territory and sometimes adjacent use areas, averaged 0.4 ha for actively breeding males; home range can be much larger for pre- and post-breeding males (Paxton and others, 2007). During incubation and nestling phases territory size, or at least the activity centers of pairs, can be very small. Flycatchers may increase their activity area after young are fledged, and use non-riparian habitats adjacent to the breeding area (Cardinal and others, 2006). This variability among sites, individual territories, and over time illustrates the challenge of defining a minimum habitat patch size for breeding flycatchers, or estimating the number of territories based simply on the size of a given breeding site.

At some breeding sites, non-territorial adult “floaters” will be present among the territorial population. Floaters are quieter and less aggressive than territorial adults, and therefore are harder to detect and frequently overlooked. Most floaters are young males, and float for only a single year. At Roosevelt Lake, floaters typically accounted for 3–8 percent of the known adult population, although the rate was much higher in drought years when habitat quality was lower (Paxton and others, 2007). The presence of floaters in a population may indicate that there is not enough high quality habitat to support all potentially territorial individuals present in a given breeding season.

Nests and Eggs

Historically, 75–80 percent of reported Southwestern Willow Flycatcher nests were placed in willows (Phillips, 1948; Phillips and others, 1964; Hubbard, 1987; Unitt, 1987). Southwestern Willow Flycatchers still commonly place their nests in native plants, but will often build nests in exotics, such as saltcedar and Russian olive (Sogge and Marshall, 2000; Stoleson and Finch, 2003; Durst and others, 2008a). In Arizona, most nests are in saltcedar or willows (Paradzick and Woodward, 2003; McLeod and others, 2007). In a unique situation in San Diego County, Calif., the flycatcher nests in coast live oak (*Quercus agrifolia*) along the San Luis Rey River (Haas, 2003), where oak became the dominant plant species adjacent to the river following willow removal in the 1950s. In another unusual situation, flycatchers in the Cliff-Gila Valley in New Mex. nest in tall boxelder (Stoleson and Finch, 2003). Southwestern Willow Flycatcher nests also have been found in buttonbush, black twinberry (*Lonicera involucrata*), Fremont cottonwood (*Populus fremontii*), alder (*Alnus* spp.), blackberry (*Rubus ursinus*), baccharis (*Baccharis* spp.), and stinging nettle (*Urtica* spp.). Overall, flycatcher nest site selection appears to be driven more by plant structure than by species composition.

Southwestern Willow Flycatchers build open cup nests approximately 8 cm high and 8 cm wide (outside dimensions), exclusive of any dangling material at the bottom. Females build the nest with little or no assistance from the males. Nests typically are placed in the fork of a branch with the nest cup supported by several small-diameter vertical stems. Nest height is highly variable and depends on the available plant structure within the territory; nests have been found from 0.6 m to approximately 20 m above ground. In any given habitat type or nest substrate, nests can be placed wherever suitable twig structure and vegetative cover are present.

Egg laying generally begins from mid-May through mid-June, depending on the geographic area and elevation. Willow Flycatcher eggs are buffy or light tan, approximately 18 mm long and 14 mm wide, with brown markings in a wreath at the blunt end. Clutch size is usually three or four eggs for first nests. Only the female develops a brood patch and incubates the eggs. Incubation lasts 12–13 days from the date the last egg is laid, and all eggs typically hatch within 24–48 hours of each other.

Flycatcher chicks are altricial and weigh only about 1–2 g at hatching, but grow rapidly and are ready to leave the nest at 12–15 days of age (Sedgwick, 2000; Paxton and Owen, 2002). The female provides most or all initial care of the young, although the role of the male increases with the age and size of nestlings. After Willow Flycatchers fledge at 12–15 days of age, they stay close to the nest and each other for 3–5 days, and adults continue feeding the fledged young for approximately 2 weeks. Recently fledged birds may repeatedly return to and leave the nest during this period (Spencer and others, 1996). Both male and female adults feed the fledged young, which give frequent, loud “*peep*” calls.

Southwestern Willow Flycatchers readily re-nest following an unsuccessful nesting attempt, although rarely more than once (Ellis and others, 2008). They also will sometimes nest again (double brood) following a successful nesting attempt, although this is more uncommon than re-nesting and varies between sites and years. From 2002 to 2008 at Elephant Butte Reservoir, approximately 13 percent of the pairs produced two successful nests per year (Ahlers and Moore, 2009). The productivity gains from pairs having successful second nests are important drivers of positive population growth (Paxton and others, 2007; Moore and Ahlers, 2009).

Replacement nests are built in the same territory, either in the same plant or at a distance of as much as 20 m from the previous nest. Reuse of old nests is uncommon, but does occur (Yard and Brown, 1999; Darrell Ahlers, Bureau of Reclamation, unpub. data, 2009). Replacement nest building and egg laying can occur (uncommonly) as late as the end of July or early August. Pairs may attempt a third nest if the second fails. However, clutch size, and therefore potential productivity, decreases with each nest attempt (Whitfield and Strong, 1995; Ellis and others, 2008).

Food and Foraging

The breeding season diet of Southwestern Willow Flycatchers is relatively well documented (DeLay and others, 2002; Drost and others, 2003; Durst, 2004; Wiesenborn and Heydon, 2007; Durst and others, 2008b). Breeding flycatchers are exclusively insectivorous, and consume a wide range of prey taxa ranging in size from small leafhoppers (Homoptera) to large dragonflies (Odonata). Major prey taxa include bugs (Hemiptera), bees and wasps (Hymenoptera), flies (Diptera), and leafhoppers; however, diet can vary widely between years and among different habitat types. There is no known differences in diet by sex, but there are differences between adult and nestling diet in the proportions of some arthropod groups. Differences in the composition of arthropods in flycatcher diet have been documented between native and exotic habitats, and between years within particular breeding sites; however, flycatchers appear able to tolerate substantial variation in relative prey abundance, except in extreme situations such as severe droughts (Durst and others, 2008b).

Willow Flycatchers of all subspecies forage primarily by sallying from a perch to perform aerial hawking and gleaning (Sedgwick, 2000; Durst, 2004). Males and females forage with similar maneuvers, although males may forage higher in the tree canopy than females. Foraging frequently takes place at external edges or internal openings within a habitat patch, or at the top of the upper canopy.

Site Fidelity and Survivorship

Based on studies of banded birds, most adult Southwestern Willow Flycatchers that survive from one year to the next will return to the same river drainage, often in proximity to the same breeding site (U.S. Fish and Wildlife Service, 2002; McLeod and others, 2007; Paxton and others, 2007). However, it is common for individual flycatchers to return to different sites within a breeding area, and even to move between breeding areas, from one year to the next. Some of this movement may be related to breeding success and habitat quality. At Roosevelt Lake, those birds that moved to different sites within a breeding area had on average higher productivity in the year following the move than in the year before the move (Paxton and others, 2007). At Roosevelt Lake and on the San Pedro and Gila Rivers, movement out of breeding patches also increased with the relative age of a patch, which may indicate a preference for younger riparian vegetation structure.

In addition to movements within a breeding site, long-distance movements within and between drainages have been observed (Paxton and others, 2007), at distances up to approximately 450 km. Dispersal of first-year flycatchers is more extensive than adult birds, as typical for most bird species.

Survivorship within the breeding season can be very high, averaging 97 percent at Roosevelt Lake (Paxton and others, 2007). Between-year survivorship of adults can be highly variable, but appears to be similar to that of most small passerine birds studied, with estimates generally ranging from approximately 55 to 65 percent (Stoleson and others, 2000; McLeod and others, 2007; Paxton and others, 2007; Schuetz and Whitfield, 2007). Males and females have similar survivorship rates.

Estimated survivorship of young birds (from hatching to the next breeding season) is highly variable, depending in part on how the estimates are generated (Stoleson and others, 2000). Generally reported as between 15 and 40 percent, juvenile survivorship typically is lower than adult survivorship (Whitfield and Strong, 1995; Stoleson and others, 2000; McLeod and others, 2007). Early fledging young have higher survivorship than those that leave the nest later in the season (Whitfield and Strong, 1995; Paxton and others, 2007). Most flycatchers survive for only 1–2 adult years, and mean life expectancy in Arizona was estimated to be 1.9 years following fledging. However, some individuals live much longer. The maximum reported ages of banded Southwestern Willow Flycatchers are 9–11 years (Sedgwick, 2000; Paxton and others, 2007).

Overall, the Southwestern Willow Flycatcher population appears to persist as one or more widely dispersed metapopulations (Busch and others, 2000; U.S. Fish and Wildlife Service, 2002), with movement of individuals, and thus genetic exchange, occurring across the landscape. However, the amount of movement and interchange is lower among sites that are farther apart or more isolated. Some sites serve as population sources while others may be sinks; some sites will be ephemeral over periods of years or decades. Flycatcher movement and dispersal among sites is important for initial site colonization and subsequent recolonization.

There are few general predictors for the persistence of breeding sites. Relatively large populations, such as the Kern River Preserve, San Pedro River, Elephant Butte Reservoir, and the Gila River have persisted for 10 or more years. However, such large sites can be subject to major changes in population numbers, and even potential extirpation, due to changes in local hydrology, site inundation, drought, etc. (Moore, 2005; Paxton and others, 2007). Although some small populations may be ephemeral and last only a few years (Durst and others, 2008a), others have remained occupied for much longer periods (Kus and others, 2003). Breeding populations also may reappear at unoccupied sites following 1–5 year absences. Suitable flycatcher habitat also can develop—and poor quality habitat can improve—relatively quickly in some sites, under favorable hydrological conditions. For example, at Roosevelt Lake and the San Pedro River (AZ), the age of riparian vegetation when first colonized was as young as 3 years (Paxton and others, 2007). In the same study, flycatchers moved back into older habitat patches when nearby younger, occupied habitat was inundated or scoured away.

Overall, the vegetation and flycatcher occupancy of a habitat patch or river drainage are often dynamic; few if any sites remain static over time. The amount of suitable flycatcher habitat can substantially increase or decrease in just a few years, at local and regional scales. Flycatchers can respond quickly to habitat changes, colonizing new sites if available and abandoning others. Therefore, one cannot assume that local, regional, or rangewide flycatcher population numbers will remain stable over time.

Threats to the Flycatcher and Habitat

The greatest historical factor in the decline of the Southwestern Willow Flycatcher is the extensive loss, fragmentation, and modification of riparian breeding habitat (U.S. Fish and Wildlife Service, 2002). Large-scale losses of southwestern wetlands have occurred, particularly the cottonwood-willow riparian habitats historically used by the Southwestern Willow Flycatcher (Unitt, 1987; General Accounting Office, 1988; Dahl, 1990; State of Arizona, 1990). Changes in the riparian plant community have frequently reduced, degraded, and eliminated nesting habitat for the flycatcher, curtailing its distribution and abundance.

Habitat losses and changes have occurred and continue to occur because of urban, recreational, and agricultural development, water diversion and impoundment, channelization, livestock grazing, and replacement of native habitats by introduced plant species (Marshall and Stoleson, 2000; U.S. Fish and Wildlife Service, 2002). Hydrological changes, natural or man-made, can greatly reduce the quality and extent of flycatcher habitat. Although riparian areas are often not considered as fire-prone, several Southwestern Willow Flycatcher breeding sites were destroyed by fire over the past decade (U.S. Fish and Wildlife Service, 2002), and others are at risk to similar catastrophic loss. Fire danger in these riparian systems may be exacerbated by increases in exotic vegetation, such as saltcedar, diversions or reductions of surface water, increased recreational activity, and drawdown of local water tables.

Although the degradation of many river systems and associated riparian habitat is a key cause of their absence, Southwestern Willow Flycatchers do not require free-running rivers or “pristine” riparian habitats. Most of the largest

Southwestern Willow Flycatcher populations in the last decade were found in reservoir drawdown zones, such as at Roosevelt Lake and Elephant Butte Reservoir. Many breeding populations are found on regulated rivers (Graf and others, 2002). In addition, the vegetation at many smaller flycatcher breeding sites is supported by artificial water sources such as irrigation canals, sewage outflow, or agricultural drainages (U.S. Fish and Wildlife Service, 2002). Although rising water levels could be detrimental to breeding flycatchers within a reservoir drawdown zone, reservoir fluctuations can simulate river dynamics with cycles of destruction and establishment of riparian vegetation, depositing rich sediments and flushing salt accumulations in the soil (Paxton and others, 2007). Therefore, managed and manipulated rivers and reservoirs have the potential to play a positive role by providing flycatcher breeding habitat. However, because rivers and reservoirs are not managed solely to create and maintain flycatcher habitat, the persistence of riparian vegetation in these systems—and any flycatchers breeding therein—is not assured.

Although the historic degradation and loss of native riparian negatively affected the Southwestern Willow Flycatcher, this species does not show an inherent preference for native vegetation. Instead, breeding habitat selection is based primarily on vegetation structure, density, size, and other stand characteristics, and presence of water or saturated soils (U.S. Fish and Wildlife Service, 2002). In fact, approximately 25 percent of known territories are found in habitat composed of 50 percent or greater exotic vegetative component—primarily saltcedar (Durst and others, 2008a). Saltcedar also can be an important habitat component in sites dominated by native vegetation (U.S. Fish and Wildlife Service, 2002, 2005). Despite suggestions that flycatchers breeding in saltcedar are suffering negative consequences and that removal of saltcedar is therefore a benefit (DeLoach and others, 2000; Dudley and DeLoach, 2004), there is increasing and substantial evidence that this is not the case. For example, Paxton and others (2007) found that flycatchers did not suffer any detectable negative consequences from breeding in saltcedar. This is consistent with the findings of Owen and others (2005) and Sogge and others (2006). Therefore, the rapid or large-scale loss of saltcedar in occupied flycatcher habitats, without rapid replacement of suitable native vegetation, could result in reduction or degradation of flycatcher habitat (U.S. Fish and Wildlife Service, 2002; Sogge and others, 2008).

In evaluating Southwestern Willow Flycatcher use of either native or exotic habitat, it is important to recognize that throughout the Southwest, there are many saltcedar-dominated and native-dominated habitats in which flycatchers do not breed (U.S. Fish and Wildlife Service, 2002; Sogge and others, 2006). Therefore, the use of any riparian patch—native or exotic—as breeding habitat will be site specific and will depend on the spatial, structural, and ecological characteristics of that particular patch and the potential for flycatchers to colonize and maintain populations within it.

Drought can have substantial negative effects on breeding flycatchers and their breeding habitat by reducing riparian vegetation vigor and density, and reducing prey availability (Durst, 2004; Paxton and others, 2007; Bureau of Reclamation, 2009). For example, the extreme drought of 2002 caused near complete reproductive failure of the large flycatcher population at Roosevelt Lake; among approximately 150 breeding territories, only two nests successfully fledged young in that year (Ellis and others, 2008). If future climate change produces more frequent or more sustained droughts, as predicted by many climate change models (for example, Seager and others, 2007), southwestern riparian habitats could be reduced in extent or quality. This scenario would present a challenge to the long-term sustainability of Southwestern Willow Flycatcher populations.

Brood parasitism by the Brown-headed Cowbird (*Molothrus ater*) was initially considered another significant threat to the Southwestern Willow Flycatcher (Whitfield, 1990; Harris, 1991; U.S. Fish and Wildlife Service, 1993, 1995; Whitfield and Strong, 1995; Sferra and others, 1997). Cowbirds lay their eggs in the nest of other species (the “hosts”), which raise the young cowbirds—often at the expense of reduced survivorship of their own young. Southwestern Willow Flycatchers seldom fledge any flycatcher young from nests that are parasitized by cowbirds (Whitfield and Sogge, 1999). Although parasitism negatively impacts some Southwestern Willow Flycatcher populations, especially at small and isolated breeding sites, it is highly variable and no longer considered among the primary rangewide threats to flycatcher conservation (U.S. Fish and Wildlife Service, 2002). Cowbird abundance, and therefore parasitism, tends to be a function of habitat type and quality, and the availability of suitable hosts, not specific to the flycatcher. Therefore, large-scale cowbirds control may not always be warranted unless certain impact thresholds are met (U.S. Fish and Wildlife Service, 2002; Rothstein and others, 2003; Siegle and Ahlers, 2004).

Section 2. Survey Protocol

The fundamental principles of the methodology described in this version have remained the same since the original Tibbitts and others (1994) and subsequent Sogge and others (1997a) protocols: the use of vocalization play-back, repeated site visits, and confirmation of flycatcher identity via the species-characteristic song. This newest protocol incorporates guidelines of the 2000 USFWS addendum, and includes changes based on our improved understanding of Willow Flycatcher biology and the significance of potential threats, and the availability of new survey technologies.

Several factors work together to make Southwestern Willow Flycatcher surveys challenging. Difficulties include the flycatcher's physical similarities with other species and subspecies; accessing the dense habitat they occupy; time constraints based on their breeding period; and vocalization patterns. Given these challenges, no methodology can assure 100-percent detection rates. However, the survey protocol described herein has proven to be an effective tool for locating flycatchers, and flycatchers generally are detectable when the protocol is carefully followed. Since 1995, hundreds of sites have been surveyed and thousands of flycatchers detected using the two previous versions of the survey protocol.

The Willow Flycatcher is 1 of 10 regularly occurring *Empidonax* flycatchers found in North America, all of which look very much alike. Like all *Empidonax*, Willow Flycatchers are nondescript in appearance, making them difficult to see in dense breeding habitat. Although the Willow Flycatcher has a characteristic *fitz-bew* song that distinguishes it from other birds (including other *Empidonax*), Willow Flycatchers are not equally vocal at all times of the day or during all parts of the breeding season. Because Southwestern Willow Flycatchers are rare and require relatively dense riparian habitat, they may occur only in a small area within a larger riparian system, thus decreasing detectability during general bird surveys. Migrating Willow Flycatchers (of all subspecies) often sing during their migration through the Southwest, and could therefore be confused with local breeders. In addition, Southwestern Willow Flycatchers are in breeding areas for only 3–4 months of the year. Surveys conducted too early or late in the year would fail to find flycatchers even at sites where they breed.

These life history characteristics and demographic factors influence how Southwestern Willow Flycatcher surveys should be conducted and form the basis upon which this protocol was developed. This protocol is based on the use of repeated call-playback surveys during pre-determined periods of the breeding season, to confirm presence or to derive a high degree of confidence regarding their absence at a site. Such species-specific survey techniques are necessary to collect reliable presence/absence information for rare species (Bibby and others, 1992).

The primary objective of this protocol is to provide a standardized survey technique to detect Southwestern Willow Flycatchers, determine breeding status, and facilitate consistent and standardized data reporting. The survey technique will, at a minimum, help determine presence or absence of the species in the surveyed habitat for that breeding season. Ultimately, the quality of the survey that is conducted will depend on the preparation, training, and in-the-field diligence of the individual surveyor.

This protocol is designed for use by persons who are non-specialists with *Empidonax* flycatchers or who are not expert birders. However, surveyors must have sufficient knowledge, training, and experience with bird identification and surveys to distinguish the Willow Flycatcher from other non-*Empidonax* species, and be able to recognize the Willow Flycatcher's primary song. A surveyor's dedication and attitude, willingness to work early hours in dense, rugged and wet habitats, and their ability to remain alert and aware of important cues also are important. Surveys conducted improperly or by unqualified, inexperienced, or complacent personnel may lead to inaccurate results and unwarranted conclusions.

Surveys conducted by qualified personnel in a consistent and standardized manner will enable continued monitoring of general population trends at and between sites, and between years. Annual or periodic surveys in cooperation with State and Federal agencies should aid resource managers in gathering basic information on flycatcher status and distribution at various spatial scales. Identifying occupied and unoccupied sites will assist resource managers in assessing potential impacts of proposed projects, avoiding impacts to occupied habitat, identifying suitable habitat characteristics, developing effective restoration management plans, and assessing species recovery.

The earlier versions of this protocol (Tibbitts and others, 1994; Sogge and others, 1997a) were used extensively and successfully for many years. Hundreds of flycatcher surveys conducted throughout the Southwest since 1994 revealed much about the usefulness and application of this survey technique. Three important lessons were: (1) the call-playback technique works and detects flycatchers that would have otherwise been overlooked; (2) multiple surveys at each site are important; and (3) with appropriate effort, general biologists without extensive experience with *Empidonax* can find and verify Willow Flycatcher breeding sites.

This revised protocol is still based on call-playback techniques and detection of singing individuals. However, it includes changes in the timing and number of surveys to increase the probability of detecting flycatchers and to help determine if they are breeders or migrants. It also incorporates the basic premise of the USFWS 2000 addendum to the 1997 protocol by requiring a minimum of five surveys in all "project-related" sites. A detailed description of surveys and timing is discussed in section, "[Timing and Number of Visits](#)." Changes in the survey data sheets make them easier to use and submit, and allow reporting all site visits within a single year on one form. The new survey forms also are formatted such that the data on the respective forms can be easily incorporated into the flycatcher range-wide database.

This protocol is intended to determine if a habitat patch contains territorial Southwestern Willow Flycatchers, and is not designed establish the exact distribution and abundance of flycatchers at a site. Determining precise flycatcher numbers and locations requires many more visits and additional time observing the behavior of individual birds. This survey protocol also does not address issues and techniques associated with nest monitoring or other flycatcher research activities. Those efforts are beyond the scope usually needed for most survey purposes, and require advanced levels of experience and skills to gather useful data and avoid potential negative effects to the flycatcher. If nest monitoring is a required component of your study, refer to Rourke and others (1999) for appropriate nest monitoring techniques (available for download at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/reports.asp).

Biologists who are not expert birders or specialists with regard to *Empidonax* flycatchers can effectively use this protocol. However, users should attend a U.S. Fish and Wildlife Service-approved Southwestern Willow Flycatcher survey training workshop, and have knowledge and experience with bird identification, surveys, and ecology sufficient to effectively apply this protocol.

Permits

Federal endangered species recovery permits are required for surveys in all USFWS regions where the Southwestern Willow Flycatcher breeds (application forms can be downloaded at http://www.fws.gov/forms/3-200-55.pdf). State permits also may be required before you can survey within any of the States throughout the Southwestern Willow Flycatcher's range: be certain to check with the appropriate State wildlife agency in your area. It usually takes several months to receive permits, so apply early to avoid delays in starting your surveys. You also must obtain permission from government agencies and private landowners prior to conducting any surveys on their lands.

Pre-Survey Preparation

The degree of effort invested in pre-survey preparation will have a direct effect on the quality and efficiency of the surveys conducted. Pre-survey preparation is often overlooked, but can prove to be one of the more important aspects in achieving high-quality survey results.

Surveyors should study calls, songs, drawings, photographs, and videos of Willow Flycatchers. Several web sites describe life history requirements, and provide photographs and vocalizations. It is especially critical for surveyors to be familiar with Willow Flycatcher vocalizations before going in the field. Although the *fitz-bew* song is the basis of verifying detections using this protocol, Willow Flycatchers use many other vocalizations that are valuable in locating birds and breeding sites. We strongly encourage that all surveyors learn as many vocalizations as possible and refer to the on-line "Willow Flycatcher Vocalizations; a Guide for Surveyors" (available at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/wiflvocl.asp). Several commercial bird song recordings include Willow Flycatcher vocalizations, but these recordings typically have only a few vocalizations and the dialects may differ from those heard in the Southwest.

If possible, visit known Willow Flycatcher breeding sites to become familiar with flycatcher appearance, behavior, vocalizations, and habitat. Such visits are usually part of the standardized flycatcher survey workshops. All visits should be coordinated with USFWS, State wildlife agencies, and the property manager/owner, and must avoid disturbance to territorial flycatchers. While visiting these sites, carefully observe the habitat characteristics to develop a mental image of the key features of suitable habitat.

Surveyors must be able to identify, by sight and vocalizations, other species likely to be found in survey areas that may be confused with Southwestern Willow Flycatchers. These include Bell's Vireo (*Vireo bellii*), Western Wood-pewee (*Contopus sordidulus*), young or female Vermillion Flycatchers (*Pyrocephalus rubinus*), and other *Empidonax* flycatchers. At a distance, partial song or call notes of Bell's Vireo, Ash-throated Flycatchers (*Myiarchus cinerascens*) and some swallows can sound considerably like a *fitz-bew*. Surveyors also should be able to identify Brown-headed Cowbirds by sight and vocalizations. It is worthwhile to make one or more pre-survey trips to the survey sites or other similar areas to become familiar with the local bird fauna. You might consider obtaining a species list relative to your area and become familiar with those species by site and sound.

Prior to conducting any presence/absence surveys in your respective State or USFWS Region, contact the respective flycatcher coordinators to discuss the proposed survey sites and determine if the sites have been surveyed in prior years. If possible, obtain copies of previous survey forms and maintain consistency with naming conventions and site boundaries. Study the forms to determine if flycatchers have been previously detected in the site, record locations of any previous detections, and read the comments provided by prior surveyors. While surveying, be sure to pay special attention to any patches where flycatchers have previously been detected.

Familiarity with the survey site prior to the first surveys is the best way to be prepared for the conditions you will experience. Determine the best access routes to your sites and always have a back-up plan available in the event of unforeseen conditions (for example, locked gates, weather, etc.). Know the local property boundaries and where the potential hazards may be, including deep water, barbed wire fencing, and difficult terrain. Be prepared to work hard and remain focused and diligent in a wide range of physically demanding conditions. At many sites, these include heat, cold, wading through flowing or stagnant water, muddy or swampy conditions, crawling through dense thickets (often on hands and knees), and exposure to snakes, skunks, and biting insects.

It is imperative that all surveyors exercise the adage “safety first.” Be aware of safety hazards and how to avoid them, and do not allow the need to conduct surveys to supersede common sense and safety. Inform your coworkers where you will be surveying and when you anticipate returning. Always take plenty of water and know how to effectively use your equipment, especially compass, Global Positioning System (GPS), and maps.

Equipment

The following equipment is necessary to conduct the surveys:

1. **USGS topographic maps of the area**: A marked copy is required to be attached to survey data sheets submitted at the end of the season. Be sure to always delineate the survey area and clearly mark any flycatcher detections. If the survey area differed between visits; delineate each survey individually.
2. **Standardized survey form**: Always bring more copies than you think you need.
3. **Lightweight audio player**: Be sure the player has adequate volume to carry well; use portable speakers if necessary. Several digital devices, such as CD players and MP3 players, are currently available and can be connected to external amplified speakers for broadcasting the flycatcher vocalizations. However, not all are equally functional or effective in field conditions; durability, reliability, and ease of use are particularly important. Talk to experienced surveyors for recommendations on particular models and useful features.
4. **Extra player and batteries**: In the field, dirt, water, dust, and heat often cause equipment failure, and having backup equipment helps avoid aborting a survey due to equipment loss or failure.
5. **Clipboard and permanent (waterproof) ink pen**: We recommend recording survey results directly on the survey data form, to assure that you collect and record all required data and any field notes of interest.
6. **Aerial photographs**: Aerial photographs can significantly improve your surveys by allowing you to accurately target your efforts, thus saving time and energy in the field. Previously, aerial images were often expensive and difficult to obtain. However, it is now easy to get free or low-cost images from sources, such as Google© Earth. Even moderate resolution images generally are better than none. For higher resolution aerial photographs, check with local planning offices and/or State/Federal land-management agencies for availability. Take color photocopies, not the original aerial photographs, with you in the field. Aerial photographs also are very useful when submitting your survey results but cannot be substituted in lieu of the required topographic map.
7. **Binoculars and bird field guide**: Although this protocol relies primarily on song detections to verify flycatcher presence, good quality binoculars are still a crucial field tool to help distinguish between possible Southwestern Willow Flycatchers and other species. Use a pair with 7–10 power magnification that can provide crisp images in poor lighting conditions. A good field guide also is essential for the same reason.
8. **GPS unit**: A GPS unit is needed for determining survey coordinates and verifying the location of survey plots on topographic maps. All flycatcher detections should be stored as waypoints and coordinates recorded on the survey form. A wide variety of fairly inexpensive GPS units are currently available. Most commercially available units will provide accuracy within 10 m, which is sufficient for navigating and marking locations.
9. **Compass**: Surveyors should carry a compass to help them while navigating larger habitat patches. This is an important safety back-up device, because GPS units can fail or lose power. Most GPS units have a feature to provide an accurate bearing to stored waypoints (for example, previous flycatcher detections, your parked vehicle, etc.); however, many units do not accurately display the direction in which the surveyor is traveling slowly through dense vegetation. A compass set to the proper bearing provides a more reliable method to navigate the survey site and relocate previously marked locations.

The following equipment also is recommended:

10. **Camera:** These are very helpful for habitat photographs, especially at sites where flycatchers are found. Small digital cameras are easily portable and relatively inexpensive.
11. **Survey flagging:** Used for marking survey sites or areas where flycatcher are detected. Check with the local land owner or management agency before flagging sites. Use flagging conservatively so as to not attract people or predators.
12. **Field vest:** A multi-pocket field vest can be very useful for carrying field equipment and personal items. We recommend muted earth-tone colors.

13. **Cell phone and/or portable radio**: In addition to providing an increased level of safety, cell phones or portable radios may be used by surveyors to assist each other in identifying territories and pairs in dense habitats, or where birds are difficult to hear.

In addition to the necessary equipment mentioned above, personal items, such as food, extra water or electrolyte drink, sunscreen, insect repellent, mosquito net, first-aid kit, whistle, and a light jacket, also should be considered. Being prepared for unforeseen difficulties, and remaining as comfortable as conditions allow while surveying are important factors to conducting thorough and effective surveys.

All survey results (both negative and positive) should be recorded directly on data forms when possible. These data forms have been designed to prompt surveyors to record key information that is crucial to interpretation of survey results and characterization of study sites. Even if no flycatchers are detected or habitat appears unsuitable, this is valuable information and should be recorded. Knowing where flycatchers are not breeding can be as important as knowing where they are; therefore, negative data are important. Standardized data forms are provided in appendix 1, or can be downloaded online. Always check for updated forms prior to each year's surveys.

Willow Flycatcher surveys are targeted at this species and require a great deal of focused effort. Surveyors must be constantly alert and concentrate on detecting a variety of flycatcher cues and responses. Therefore, field work, such as generalized bird surveys (for example, point counts or walking transects) or other distracting tasks, should not be conducted in conjunction with Willow Flycatcher surveys. Avoid bringing pets or additional people who are not needed for the survey. Dress in muted earth-tone colors, and avoid wearing bright clothing.

Willow Flycatcher Identification

The Southwestern Willow Flycatcher is a small bird, approximately 15 cm long and weighing about 11–12 g. Sexes look alike and cannot be distinguished by plumage. The upper parts are brownish-olive; a white throat contrasts with the pale olive breast, and the belly is pale yellow. Two white wing bars are visible (juveniles have buffy wing bars) and the eye ring is faint or absent. The upper mandible is dark and the lower mandible light. The tail is not strongly forked. When perched, the Willow Flycatcher often flicks its tail upward. As a group, the *Empidonax* flycatchers are very difficult to distinguish from one another by appearance. The Willow Flycatcher also looks very similar to several other passerine species you may encounter in the field.

Given that Willow Flycatchers look similar to other *Empidonax* flycatchers that may be present at survey sites, the most certain way to verify Willow Flycatchers in the field is by their vocalization. For the purpose of this protocol, identification of Willow Flycatchers cannot be made by sight alone; vocalizations are a critical identification criterion, and specifically the primary song *fitz-bew*. Willow Flycatchers have a variety of vocalizations (see Stein, 1963; Sedgwick, 2000), but two are most commonly heard during surveys or in response to call-playback:

1. ***Fitz-bew***. This is the Willow Flycatcher's characteristic primary song. Note that *fitz-bews* are not unique to the southwestern subspecies; all Willow Flycatchers sing this characteristics song. Male Willow Flycatchers may sing almost continuously for hours, with song rates as high as one song every few seconds. Song volume, pitch, and frequency may change as the season progresses. During prolonged singing bouts, *fitz-bews* are often separated by short *britt* notes. *Fitz-bews* are most often given by a male, but studies have shown female Willow Flycatchers also sing, sometimes quite loudly and persistently (although generally less than males). Flycatchers often sing from the top of vegetation, but also will vocalize while perched or moving about in dense vegetation.

2. ***Whitt***. This is a call often used by nesting pairs on their territory, and commonly is heard even during periods when the flycatchers are not singing (*fitz-bewing*). The *whitt* call appears to be a contact call between sexes, as well as an alarm call, particularly when responding to disturbance near the nest. *Whitt* calls can be extremely useful for locating Willow Flycatchers later in the season when *fitz-bewing* may be infrequent, but are easily overlooked by inexperienced surveyors. When flycatcher pairs have active nests and particularly once young have hatched, *whitts* may be the most noticeable vocalization. However, many species of birds *whitt*, and a *whitt* is not a diagnostic characteristic for Willow Flycatchers. For example, the "*whitt*" of the Black-headed Grosbeak (*Pheucticus melanocephalus*) and Yellow-breasted Chat (*Icteria virens*) are often confused with that of the flycatcher.

The *fitz-bew* and *whitt* calls are the primary vocalizations used to locate Willow Flycatchers. However, other less common Willow Flycatcher vocalizations can be very useful in alerting surveyors to the presence of flycatchers. These include twittering vocalizations typically given during interactions between flycatchers and sometimes between flycatchers and other birds, bill snapping, *britt*'s, and *wheeo*'s. Because these sounds can be valuable in locating territories (Shook and others, 2003), they should be studied prior to going in the field. Willow Flycatcher vocalization recordings are available from Federal and State agency contacts and online at http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/. Standardized recordings of Southwestern Willow Flycatchers also are available online at http://www.naturesongs.com/tyrrcert.html#tyrr. Specifically, only *fitz-bews* and *britts* should be used for conducting surveys, to provide more robust comparative results among sites and years.

Willow Flycatcher song rates are highest early in the breeding season (late May–early June), and typically decline after eggs hatch. However, in areas with many territorial flycatchers or where an unpaired flycatcher is still trying to attract a mate, or where re-nesting occurs, singing rates may remain high well into July. Isolated pairs can be much quieter and harder to detect than pairs with adjacent territorial flycatchers. At some sites, pre-dawn singing (0330–0500 hours) appears to continue strongly at least through mid-July (Sogge and others, 1995). Singing rates may increase again later in the season, possibly coinciding with re-nesting attempts (Yard and Brown, 2003). The social dynamics of adjacent territories can strongly influence vocalization rates. A single "*fitz-bew*" from one flycatcher may elicit multiple responses from adjacent territories. When these interactions occur, it is a good opportunity to distinguish among territories and provides the surveyor with an estimate of territory numbers in the immediate area.

There are some periods during which Willow Flycatchers do not sing and even the use of call-playback sometimes fails to elicit any response. This can be particularly true late in the breeding season. Early and repeated surveys are the best way to maximize the odds of detecting a singing flycatcher and determining its breeding status.

Timing and Number of Visits

No survey protocol can guarantee that a Southwestern Willow Flycatcher, if present, will be detected on any single visit. However, performing repeated surveys during the early to mid-nesting season increases the likelihood of detecting flycatchers and aids in determining their breeding status. A single survey, or surveys conducted too early or late in the breeding cycle, do not provide definitive data and are of limited value.

For purposes of this survey protocol, we have divided the Southwestern Willow Flycatcher breeding season into three basic survey periods, and specified a minimum number of survey visits for each period (fig. 9). Although the Sogge and others (1997a) protocol recommended a minimum of one survey in each period, we now recommend a differing number of visits for general surveys versus project-related studies.

General surveys are conducted for the sole purpose of determining whether Willow Flycatchers are present or absent from a respective site, when there is no foreseeable direct or indirect impact to their habitat from a known potential project or change in site management. In such cases, a minimum of one survey visit is required in each of the three survey periods.

Project-related surveys are conducted to determine the presence or absence of Willow Flycatchers within a site when there is a potential or foreseeable impact to their habitat due to a potential project or change in site management. Additional surveys are required for project-related studies in order to derive a greater degree of confidence regarding the presence or absence of Willow Flycatchers.

All successive surveys must be at least 5 days apart; surveys conducted more closely are not considered to be separate surveys. Although a minimum of three or five surveys are required for general and project-related purposes, respectively, if the habitat patches are large, contiguous and extremely dense, additional surveys are strongly encouraged to ensure full coverage of the site.

If you are uncertain whether three general surveys or five project-related surveys are required for your respective study, contact your USFWS flycatcher coordinator. As noted earlier, this survey protocol will help determine if territorial flycatchers are present and their approximate locations; if your project requires fine-scale estimates of flycatcher numbers or distribution at a site, you may need to conduct more intensive efforts that include additional surveys, nest searches, and nest monitoring.

Survey Period 1: May 15–31.—For both general and project-related surveys: a minimum of one survey is required. The timing of this survey is intended to coincide with the period of high singing rates in newly arrived males, which tends to begin in early to mid-May. This is one of the most reliable times to detect flycatchers that have established their territories, so there is substantial value to conducting period 1 surveys even though not all territorial males may yet have arrived. Migrant Willow Flycatchers of multiple subspecies will likely be present and singing during this period. Because both migrant and resident Willow Flycatchers are present during this period, and relatively more abundant then in subsequent surveys, it is an excellent opportunity to hone your survey and detection skills and gain confidence in your abilities. Detections of flycatchers during period 1 also provide insight on areas to pay particular attention to during the next survey period.

Survey Period 2: June 1–24.—For general surveys: a minimum of one survey is required. For project-related surveys, a minimum of two surveys are required. Note that this differs from the minimum of one survey that was recommended in this period under the previous protocol (Sogge and others, 1997a). During this period, the earliest arriving males may already be paired and singing less, but later arriving males should still be singing strongly. Period 2 surveys can provide insight about the status of any flycatchers detected during survey period 1. For example, if a flycatcher is detected during survey period 1 but not survey period 2, the first detection may have been a migrant. Conversely, detecting a flycatcher at the same site during periods 1 and 2 increases the likelihood that the bird is not a migrant, although it does not necessarily confirm it. Survey period 2 also is the earliest time during which you are likely to find nesting activity by resident birds at most sites. Special care should be taken during this period to watch for activity that will verify whether the flycatchers that are present are attempting to breed. A little extra time and diligence should be spent at all locations where flycatchers were detected during survey period 1.

Survey Visit Timing, Numbers, and Detection Interpretation

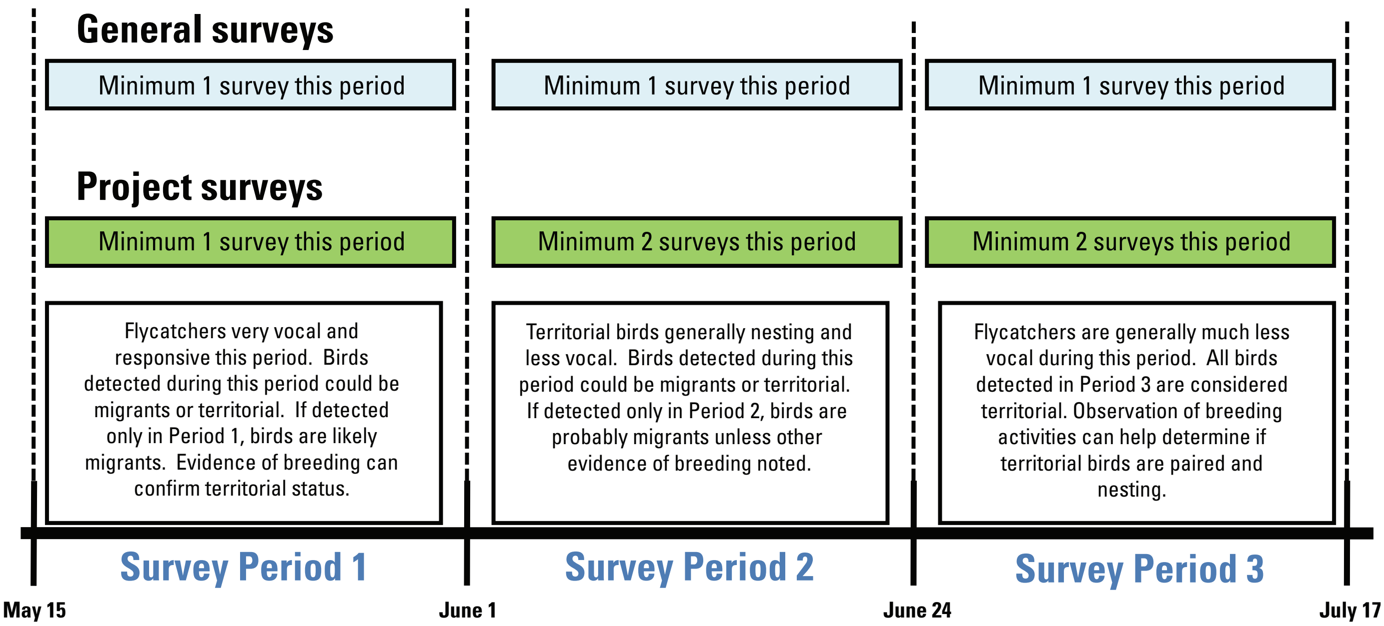


Figure 9. Recommended numbers and timing of visits during each survey period for general surveys and project surveys. General surveys are those conducted when there is no foreseeable direct or indirect impact to their habitat from a known potential project or change in site management. Project-related surveys are conducted when there is a potential or foreseeable impact to their habitat due to a potential project or change in site management.

Survey Period 3: June 25–July 17.—For general surveys, a minimum of one survey is required. For project-related surveys, a minimum of two surveys are required. Virtually all Southwestern Willow Flycatchers should have arrived on their territories by this time. Flycatcher singing rates probably have lessened, and most paired flycatchers will have initiated or even completed their first round of nesting activity. Migrant Willow Flycatchers should no longer be passing through the Southwest; therefore, any flycatchers that you detect are likely to be either territorial or nonbreeding floaters. Surveyors should determine if flycatchers detected during surveys in periods 1 or 2 are still present, and watch closely for nesting activity. Flycatchers that have completed a first nesting attempt may resume vigorous singing during this period. Extra time and diligence should be spent at all locations where flycatchers were detected during survey periods 1 or 2.

At high elevation sites (above 2,000 m), Southwestern Willow Flycatcher arrival and initiation of breeding activities may occur in early June, and possibly later in some years due to weather or migration patterns. Therefore, flycatcher breeding chronology may be delayed by 1 or 2 weeks at such sites, and surveys should be conducted in the latter part of each period.

It may not require multiple surveys to verify Southwestern Willow Flycatcher presence or breeding status. If, for example, Willow Flycatchers are observed carrying nest material during survey periods 1 or 2, this is conclusive verification they are breeders as opposed to migrants, regardless of what is found during period 3. However, it requires a minimum of three surveys for general studies and five surveys for project-related studies to determine with relative confidence that Southwestern Willow Flycatchers probably are not breeding at a site in that year, based on lack of detections.

We strongly encourage additional follow-up surveys to sites where territorial Southwestern Willow Flycatchers are verified or suspected. Extra surveys provide greater confidence about presence or absence of flycatchers at a site, as well as help in estimating the number of breeding territories or pairs, and determining breeding status and the outcome of breeding efforts. Pre-survey visits the evening before the survey or post-survey follow-up later in the morning can help confirm breeding status when surveyors are not under time constraints. However, avoid returning to a site so often as to damage the habitat, establish or enlarge trails, or cause undue disturbance to the flycatchers.

Survey Methods

The survey methods described below fulfill the primary objectives of documenting the presence or absence of Willow Flycatchers, and determining their status as territorial versus migrant. This protocol primarily is a call-playback technique, a proven method for eliciting response from nearby Willow Flycatchers (Seutin, 1987; Craig and others, 1992), both territorial and migrants. The premise of the call-playback technique is to simulate a territorial intrusion by another Willow Flycatcher, which generally will elicit a defensive response by the territorial bird, increasing its detectability. At each site, surveyors should broadcast a series of recorded Willow Flycatcher *fitz-bews* and *britts*, and look and listen for responses. In addition to maximizing the likelihood of detecting nearby flycatchers, this method also allows for positive identification by comparing the responding bird's vocalizations to the known Willow Flycatcher recording.

Documenting Presence / Absence—Begin surveys as soon as there is enough light to safely walk (about 1 hour before sunrise) and end by about 0900–1030 hours, depending on the temperature, wind, rain, background noise, and other environmental factors. Use your best professional judgment whether to conduct surveys that day based on local field conditions. If the detectability of flycatchers is being reduced by environmental factors, surveys planned for that day should be postponed until conditions improve. If observers are camped in or near potential Willow Flycatcher habitat, afternoons and evenings can be spent doing site reconnaissance and planning a survey strategy for the following morning. If camped immediately adjacent to survey sites, surveyors can awaken early and listen for flycatchers singing during the predawn period (0330–0500 hours), when territorial males often sing loudly.

Conduct surveys from within rather than from the perimeter of the sites, while limiting the breaking of vegetation or damaging the habitat. If surveys cannot be conducted from within the habitat, walk along the perimeter and enter the patch at intervals to broadcast the vocalizations and listen for responses. Flycatchers often respond most strongly if the recording is played from within the habitat and territory, rather than from the periphery. In addition, it can be surprisingly difficult to hear singing Willow Flycatchers that are even a short distance away amidst the noise generated by other singing and calling birds, roads, noisy streams, and other extraneous sounds. Therefore, it is preferable to survey from within the habitat, but always move carefully to avoid disturbing habitat or nests. Surveying from the periphery should not be conducted only for the sake of convenience, but is allowable for narrow linear reaches or when absolutely necessary due to safety considerations.

Because flycatchers may be clustered within only a portion of a habitat patch, it is critical to survey all suitable habitat within the patch. Small linear sites may be thoroughly covered by a single transect through the patch. For larger sites, choose a systematic survey path that assures complete patch coverage throughout the length and breadth of the site. This may require multiple straight transects, serpentine, zig-zag, or criss-cross routes. Aerial photographs and previous survey forms are valuable tools to help plan and conduct surveys, and to assure complete coverage. Always move carefully through the habitat to avoid disturbing vegetation or nests.

Initially approach each site and stand quietly for 1–2 minutes or longer, listening for spontaneously singing flycatchers. A period of quiet listening is important because it helps acclimate surveyors to background noises that can be quite loud due to roads, aircraft, machinery, waterways, and other sounds. It also allows surveyors to recognize and shift attention away from the songs and calls of other bird species, letting them focus on listening for flycatchers. Although it happens rarely, some singing Willow Flycatchers will actually stop vocalizing and approach quietly in response to a broadcast song, perhaps in an effort to locate what they perceive as an intruding male. Therefore, playing a recording before listening for singing individuals has at least some potential of reducing detectability.

If you do not hear singing flycatchers during the initial listening period, broadcast the Willow Flycatcher song recording for 10–15 seconds; then listen for approximately 1 minute for a response. Repeat this procedure (including a 10-second quiet pre-broadcast listening period) every 20–30 m throughout each survey site, more often if background noise is loud. The recording should be played at about the volume of natural bird calls, and not so loud as to cause distortion of the broadcast. We recommend that the playback recording include a series of *fitz-bews* interspersed with several *britts*.

Response to the broadcast call could take several forms. Early in the breeding season (approximately May–mid-June), a responding Willow Flycatcher will usually move toward the observer and *fitz-bew* or *whitt* from within or at the top of vegetation. Territorial Willow Flycatchers almost always vocalize strongly when a recording is played in their territory early in the season. If there are several flycatchers present in an area, some or all may start singing after hearing the recording or the first responding individual. Flycatchers can often hear the recording from far away but will not usually move outside of their territory, so listen for distant responses. Also, stay alert and listen for flycatchers vocalizing behind you that may not have responded when you were first in their territory. Another common flycatcher response is alarm calls (*whitts*) or interaction twitters from within nearby vegetation, particularly once nesting has begun. Willow Flycatchers will often sing after a period of *whitting* in response to a recording, so surveyors hearing *whitts* should remain in the area and quietly listen for *fitz-bews* for several minutes. Because some flycatchers may initially respond by approaching quietly, particularly during periods 2 and 3, it is critical to watch carefully for responding birds.

If you detect flycatchers that appear particularly agitated, it is possible that you are in close proximity to their nest. Agitated flycatchers may swoop down at the surveyor, snap their beaks, and otherwise appear distressed. Exercise extreme caution so as to not accidently disturb the nest, and move slowly away from the immediate area.

For the purpose of this protocol, detection of a *fitz-bew* song is essential to identify a bird as a Willow Flycatcher. Similar appearing species (including other *Empidonax* flycatchers) occur as migrants, and even breeders, at potential Willow Flycatcher sites. A few of these other species may even approach a broadcast Willow Flycatcher song and respond with vocalizations. In order to standardize interpretation of survey results and assure a high degree of confidence in surveys conducted by biologists of varying experience and skill, positive identification must be based on detection of the Willow Flycatcher's most unique characteristic—its song. It is important to remember that the *whitt* call is not unique to Willow Flycatchers, and therefore cannot serve as the basis of a positive identification. However, *whitts* are extremely useful for locating flycatchers and identifying areas needing follow-up visits. Loud, strong *whitting* may indicate a nearby nest, dictating that surveyors exercise extra caution moving through the area.

Whenever a verified or suspected Willow Flycatcher is detected, be careful not to overplay the song recording. Excessive playing could divert the bird from normal breeding activities or attract the attention of predators and brood parasites. Wildlife management agencies may consider overplaying the recording as "harassment" of the flycatcher, and this is not needed to verify species identification. Although flycatchers usually sing repeatedly once prompted, even a single *fitz-bew* is sufficient for verification. If you have played a recording several times and a bird has approached but has not *fitz-bewed*, do not continue playing the recording. If a potential Willow Flycatcher responds, approaches or *whitts* but does not sing, it is best to carefully back away and wait quietly. If it is a Willow Flycatcher, it probably will sing within a short time (5–10 minutes). Another option is to return to the same site early the following morning to listen for or attempt to elicit singing again. If you are still uncertain, record the location with your GPS, record comments on the survey form, and follow-up on the detection during subsequent surveys. If possible, request the assistance of an experienced surveyor to determine positive identification.

If more habitat remains to be surveyed, continue onward once a flycatcher is detected and verified. In doing so, move 30–40 m past the current detection before again playing the recording, and try to avoid double-counting flycatchers that have already responded. Willow Flycatchers, particularly unpaired males, may follow the broadcast song for 50 m or more.

Looking For and Recording Color Bands.—Several research projects have involved the capture and banding of Willow Flycatchers at breeding sites across the Southwest. In such projects, flycatchers are banded with one or more small colored leg bands, including a federal numbered band. As a result, surveyors may find color-banded individuals at their survey sites, and identification and reporting of the band combination can provide important data on flycatcher movements, survivorship, and site fidelity.

To look for bands, move to get a good view of the flycatcher's legs. This may be difficult in dense vegetation, but flycatchers commonly perch on more exposed branches at the edges of their territory or habitat patch. If bands are seen, carefully note the band colors. If there is more than one band on a leg, differentiate the top (farthest up the leg) from the bottom (closest to the foot), and those on the bird's left leg versus the right leg. If you are unsure of the color, do not guess. Instead, record the color as unknown. Incorrect color-band data are worse than incomplete data, so only record colors of which you are certain. The fact that a banded bird was seen, even without being certain of its color combination, is very important information. Record the color-band information on the survey form, and report the sighting to the appropriate State or Federal contact as soon as you return from the survey that day.

Determining the Number of Territories and Pairs.— Accurately determining the number of breeding territories and pairs can be more difficult than determining simple presence or absence. Flycatcher habitat is usually so dense that visual detections are difficult, and seeing more than one bird at a time is often impossible. Flycatchers sing from multiple song perches within their territories, and may be mistaken for more than one flycatcher. A flycatcher responding to or following a surveyor playing a recording may move considerable distances in a patch and thus be counted more than once. Territorial male flycatchers often sing strongly, but so do many migrants and some females, particularly in response to call-playback (Seutin, 1987; Unitt, 1987; Sogge and others, 1997b). Rangewide, many territorial male flycatchers are unmated, particularly those in small breeding groups. For these reasons, each singing flycatcher may not represent a territory or a mated pair. Following the established survey protocol and carefully observing flycatcher behavior can help determine if you have detected migrants, territorial birds, breeders, unmated birds, or pairs.

Given sufficient time, effort and observation, it is usually possible to approximate the number of territories and pairs. First, listen carefully for simultaneously singing flycatchers. Note the general location of each bird—especially concurrently singing individuals—on aerial photographs, map, or a site sketch. Spend some time watching each flycatcher to determine approximate boundaries of its territory, and how it interacts with other flycatchers. If one or more singing birds stay primarily in mutually exclusive areas, they can be considered as separate territories. To determine if a flycatcher is paired, watch for interactions within a territory. Refer to the section, "Determining Breeding Status" for signs of pairing and breeding activity. Do not report a territorial male as a pair unless you observe one or more of the signs listed below. In some cases, it may be possible only to estimate the number of singing individuals. In other cases, it may take multiple site visits to differentiate territories or pairs.

Determining Breeding Status.—One way to determine if the flycatchers found at a particular site are migrants or territorial is to find out if they are still present during the "non-migrant" period, which generally is from about June 15 to July 20 (Unitt, 1987). A Willow Flycatcher found during this time probably is a territorial bird, although there is a small chance it could be a non-territorial floater (Paxton and others, 2007). If the management question is simply whether the site is a potential breeding area, documenting the presence of a territorial flycatcher during the non-migrant period may meet all survey objectives, and the site may not need to be resurveyed during the remainder of that breeding season.

However, in some cases, surveyors will be interested in knowing not only if territorial Southwestern Willow Flycatchers are present at a site, but also whether breeding or nesting efforts are taking place. Some males maintain territories well into July yet never succeed in attracting a mate, so unpaired males are not uncommon (McLeod and others, 2007; Ellis and others, 2008; Ahlers and Moore, 2009). Thus, an assumption that each singing male represents a breeding pair may not be well founded, especially in small populations. If it is important to determine whether a pair is present and breeding in that territory, move a short distance away from where the bird was sighted, find a good vantage point, and sit or lie quietly to watch for evidence of breeding. Signs of breeding activity include:

a. observation of another unchallenged Willow Flycatcher in the immediate vicinity (indicates possible pair);
b. *whitt* calls between nearby flycatchers (indicates possible pair);
c. interaction twitter calls between nearby flycatchers (indicates possible pair);
d. countersinging or physical aggression against another flycatcher or bird species (suggests territorial defense);
e. physical aggression against cowbirds (suggests nest defense);
f. observation of Willow Flycatchers copulating (verifies attempted breeding);
g. flycatcher carrying nest material (verifies nesting attempt, but not nest outcome);
h. flycatcher carrying food or fecal sac (verifies nest with young, but not nest outcome);
i. locating an active nest (verifies nesting). Recall that general survey permits do not authorize nest searching or monitoring, and see section, "Special Considerations";
j. observation of adult flycatchers feeding fledged young (verifies successful nesting).

You may be able to detect flycatcher nesting activity, especially once the chicks are being fed. Adults feed chicks at rates of as many as 30 times per hour, and the repeated trips to the nest tree or bush are often quite evident. Be sure to note on the flycatcher survey form any breeding activity that is observed, including detailed descriptions of the number of birds, and specific activities observed. Also note the location of breeding activities on an aerial photograph, map, or sketch of the area.

The number of flycatchers found at a site also can provide a clue as to whether they are migrants or territorial birds. Early season detections of single, isolated Willow Flycatchers often turn out to be migrants. However, discovery of a number of Willow Flycatchers at one site usually leads to verification that at least some of them remain as local breeders. This underscores the importance of completing a thorough survey of each site to be confident of the approximate number of flycatchers present.

In some cases, regardless of the time and diligence of your efforts, it will be difficult to determine the actual breeding status of a territorial male. In these instances, use your best professional judgment, or request the assistance of an experienced surveyor or an agency flycatcher coordinator to interpret your observations regarding breeding status.

Reporting Results.—There is little value in conducting formal surveys if the data are not recorded and submitted. Fill in all appropriate information on the Willow Flycatcher survey form while still in the field, and mark the location of detections on a copy of the USGS topographic map. Make a habit of reviewing the form before you leave any site—trying to remember specific information and recording it later can lead to missing and inaccurate data. Note the location of the sighting on an aerial photograph or sketch of the site. Attaching photographs of the habitat also is useful. Whenever a Willow Flycatcher territory or nest site is confirmed, notify the USFWS or appropriate State wildlife agency as soon as you return from the field. The immediate reporting of flycatcher detections or nests may differ among USFWS regions and States—discuss these reporting procedures with your respective State and USFWS flycatcher coordinators.

Complete a survey form (appendix 1) for each site surveyed, whether or not flycatchers are detected. "Negative data" (that is, a lack of detections) are important to document the absence of Willow Flycatchers and help determine what areas have already been surveyed. Make and retain a copy of each survey form, and submit the original or a legible copy. Electronic copies of the survey forms also are acceptable and are available online (http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/). All survey forms must be submitted to the USFWS and the appropriate State wildlife agency by the specified deadline identified in your permits. Timely submission of survey data is a permit requirement, and will ensure the information is included in annual statewide and regional reports.

Special Considerations

To avoid adverse impacts to Willow Flycatchers, follow these guidelines when performing all surveys:

1. Obtain all necessary Federal, State, and agency permits and permissions prior to conducting any surveys. Failure to do so leaves you liable for violation of the Endangered Species Act, various State laws, and prosecution for trespass.
2. Do not play the recording more than necessary or needlessly elicit vocal responses once Willow Flycatchers have been located and verified. This may distract territorial birds from caring for eggs or young, or defending their territory. If flycatchers are vocalizing upon arrival at the site, and your objective is to determine their presence or absence at a particular site—there is no need to play the recording. Excessive playing of the recording also may attract the attention of predators or brood parasites. Stop playing the survey recording as soon as you have confirmed the presence of a Willow Flycatcher, and do not play the recording again until you have moved 30–40 m to the next survey location.
3. Proceed cautiously while moving through Willow Flycatcher habitat. Continuously check the area around you to avoid disturbance to nests of Willow Flycatchers and other species. Do not break understory vegetation, even dead branches, to create a path through the surveyed habitat.
4. Do not approach known or suspected nests. Nest searches and monitoring require specific State and Federal permits, have their own specialized methodologies (Rourke and others, 1999), and are not intended to be a part of this survey protocol.
5. If you find yourself close to a known or suspected nest, move away slowly to avoid startling the birds or force-fledging the young. Avoid physical contact with the nest or nest tree, to prevent physical disturbance and leaving a scent. Do not leave the nest area by the same route that you approached. This leaves a “dead end” trail that could guide a potential predator to the nest/nest tree. If nest monitoring is a component of the study, but you are not specifically permitted to monitor the nest, store a waypoint with your GPS, affix flagging to a nearby tree at least 10 m away, and record the compass bearing to the nest on the flagging. Report your findings to an agency flycatcher coordinator or a biologist who is permitted to monitor nests.
6. If you use flagging to mark an area where flycatchers are found, use it conservatively and make certain the flagging is not near an active nest. Check with the property owner or land-management agency before flagging to be sure that similar flagging is not being used for other purposes in the area. Unless conducting specific and authorized/permitted nest monitoring, flagging should be placed no closer than 10 m to any nest. Keep flagging inconspicuous from general public view to avoid attracting people or animals to an occupied site, and remove it at the end of the breeding season.
7. Watch for and note the presence of potential nest predators, particularly birds, such as Common Ravens (*Corvus corax*), American Crows (*Corvus brachyrhynchos*), jays, and magpies. If such predators are in the immediate vicinity, wait for them to leave before playing the recording.
8. Although cowbird parasitism is no longer considered among the primary threats to flycatcher conservation it remains useful to note high concentrations of cowbirds in the comment section of the survey form. While conducting surveys, avoid broadcasting the flycatcher vocalizations if cowbirds are nearby, especially if you believe you may be close to an active flycatcher territory. The intent of not broadcasting flycatcher vocalizations is to reduce the potential for attracting cowbirds to a flycatcher territory or making flycatcher nests more detectable to cowbirds.
9. Non-indigenous plants and animals can pose a significant threat to flycatcher habitat and may be unintentionally spread by field personnel, including those conducting flycatcher surveys. Simple avoidance and sanitation measures can help prevent the spread of these organisms to other environments. To avoid being a carrier of non-indigenous plants or animals from one field site to another visually inspect and clean your clothing, gear, and vehicles before moving to a different field site. A detailed description on how to prevent and control the spread of these species is available by visiting the Hazard Analysis and Critical Control Point Planning for Natural Resource Management web site (http://www.haccp-nrm.org). One species of particular interest is the tamarisk leaf-beetle (*Diorhabda* spp.). If you observe defoliation of saltcedar while conducting flycatcher surveys and believe that *Diorhabda* beetles may be responsible, notify your USFWS coordinator immediately. Other non-native species of concern in survey locations are the quagga mussel (*Dreissena rostriformis bugensis*), cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens*), giant salvinia (*Salvinia molesta*), water milfoil (*Myriophyllum spicatum*), parrot’s feather (*M. aquaticum*), and amphibian chytrid fungus (*Batrachochytrium dendrobatidis*).

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Appendix 1. Willow Flycatcher Survey and Detection Form

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name____ State______ County _________________________

USGS Quad Name ____ Elevation ______________________ (meters)

Creek, River, Wetland, or Lake Name____

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? Yes___ No____

Survey Coordinates: Start: E__________________ N______________________ UTM Datum_______(See instructions)

Stop: E__________________ N______________________ UTM Zone ________

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

***** Fill in additional site information on back of this page *****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s)	Date Start Stop Total hrs ___						# Birds	Sex	UTM E	UTM N
Survey # 2 Observer(s)	Date Start Stop Total hrs ___						# Birds	Sex	UTM E	UTM N
Survey # 3 Observer(s)	Date Start Stop Total hrs ___						# Birds	Sex	UTM E	UTM N
Survey # 4 Observer(s)	Date Start Stop Total hrs ___						# Birds	Sex	UTM E	UTM N
Survey # 5 Observer(s)	Date Start Stop Total hrs ___						# Birds	Sex	UTM E	UTM N

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs________					Were any Willow Flycatchers color-banded? Yes___ No ___ If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual _____________________________________ Date Report Completed________ ____________________

US Fish and Wildlife Service Permit #_______________________State Wildlife Agency Permit #______________________

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual ____Phone # ___________________________
Affiliation ____ E-mail ____________________________
Site Name____Date Report Completed _______________

Did you verify that this site name is consistent with that used in previous years? Yes ____ No _____ Not Applicable ___
If site name is different, what name(s) was used in the past?____
If site was surveyed last year, did you survey the same general area this year? Yes ____ No ____ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes ____ No ____ If no, summarize below.

Management Authority for Survey Area : Federal____ Municipal/County ____ State ____ Tribal ____ Private ____
Name of Management Entity or Owner (e.g., Tonto National Forest) ____

Length of area surveyed: ___________ (meters)

Vegetation Characteristics: Mark the category that best describes the predominant tree/shrub foliar layer at this site (check one):

_____ Native broadleaf plants (entirely or almost entirely, > 90% native, includes high-elevation willow)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
____

Average height of canopy (Do not include a range): ________________________________ (meters)

Attach copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections.
Attach sketch or aerial photo showing site location, patch shape, survey route, location of any WIFLs or WIFL nests detected.
Attach photos of the interior of the patch, exterior of the patch, and overall site; describe any unique habitat features.

Comments (attach additional sheets if necessary)
____
____
____
____
____
____

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM N	UTM E	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Appendix 2. Willow Flycatcher Survey Continuation Sheet / Territory Summary Table

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher Survey Continuation Sheet

(For reporting additional detections and territories; append to Survey and Detection form)

Reporting Individual ____________________ Phone # ____________
Affiliation ____________________ E-mail ____________
Site Name ____________________ Date Report Completed ____________

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Comments ____________________

Appendix 3. Instructions for Completing the Willow Flycatcher Survey and Detection Form and the Survey Continuation Sheet

These instructions are provided as guidance for completing the standard survey form. It is particularly important to provide the correct type and format of information for each field. Complete and submit your survey forms to both the appropriate State Willow Flycatcher coordinator and the U.S. Fish and Wildlife Service (USFWS) by September 1 of the survey year. You also may complete forms digitally (Microsoft© Word or Excel) and submit them via email with attached or embedded topographic maps and photographs.

Page 1 of Survey Form

Site Name. Standardized site names are provided by the flycatcher survey coordinators for each State and should be consistent with the naming of other sites that might be in the area. If the site is new, work with your State or USFWS flycatcher coordinator to determine suitable site names before the beginning of the survey season. If the site was previously surveyed, use the site name from previous years (which can be obtained from the State or USFWS flycatcher coordinator). If you are uncertain if the site was previously surveyed, contact your State or USFWS flycatcher coordinator.

USGS Quad Name. Provide the full quad name, as shown on the appropriate standard 7.5-minute topographic maps.

Creek, River, Wetland, or Lake Name. Give the name of the riparian feature, such as the lake or watercourse, where the survey is being conducted.

Survey Coordinates. Provide the start and end points of the survey, which will indicate the linear, straight-line extent of survey area, based on Universal Transverse Mercator coordinates (UTMs). California surveyors only: provide latitude/longitude geographic coordinates instead of UTMs in the UTM fields and identify them as such. If the start and end points of the survey changed significantly among visits, enter separate coordinates for each survey in the comments section on the back of the survey sheet. Note that we do not need the coordinates for the detailed path taken by the surveyor(s).

Datum. Indicate the datum in which the coordinates are expressed: NAD27, WGS84, or NAD83. The datum can be found in the settings of most GPS units. Note that Arizona prefers NAD27 and New Mexico prefers NAD83.

Zone. Provide the appropriate UTM zone for the site, which is displayed along with the coordinates by most GPS units. Zones for California are 10, 11, or 12. The zone for Arizona is 12. Zones for New Mexico are 12 or 13.

Survey #. Survey 1 – 5. See the protocol for an explanation of the number of required visits for each survey period. **Note:** A survey is defined as a complete protocol-based survey that occurs over no more than 1 day. If a site is so large as to require more than a single day to survey, consider splitting the site into multiple subsites and use separate survey forms for each. Casual site visits, pre-season or supplemental visits, or follow-up visits to check on the status of a territory should not be listed in this column, but should be documented in the Comments section on page 2 or in the survey continuation sheet.

Date. Indicate the date that the survey was conducted, using the format mm/dd/yyyy.

Start and **Stop.** Start and stop time of the survey, given in 24-hour format (e.g., 1600 hours rather than 4:00 p.m.).

Total hours. The duration of time (in hours) spent surveying the site, rounded to the nearest tenth (0.1) hour. For single-observer surveys, or when multiple observers stay together throughout the survey, total the number of hours from survey start to end. If two or more observers surveyed sections of the site concurrently and independently, sum the number of hours each observer spent surveying the site.

Number of Adult WIFLs. The total number of individual adult Willow Flycatchers detected during this particular survey. Do not count nestlings or recently fledged birds.

Number of Pairs. The number of breeding pairs. Do not assume that any bird is paired; designation of birds as paired should be based only on direct evidence of breeding behaviors described in the protocol. If there is strong evidence that the detected bird is unpaired, enter “0”. If it is unknown whether a territorial bird is paired, enter “–”. Note that the estimated number of pairs can change over the course of a season.

Number of Territories. Provide your best estimate of the number of territories, defined as a discrete area defended by a resident single bird or pair. This is usually evidenced by the presence of a singing male, and possibly one or more mates. Note that the estimated number of territories may change over the course of a season.

Nest(s) Found? Yes or No. If yes, indicate the number of nests. Renests are included in this total.

Comments about this survey. Describe bird behavior, evidence of pairs or breeding, evidence of nest building, evidence of nestlings/fledglings, nesting, vocalizations (e.g., interaction twitter calls, *whitts, britts, wheeos, fitz-bews*/countersinging), potential threats (e.g., livestock, cowbirds, saltcedar leaf beetles [*Diorhabda* spp.] etc.). If *Diorhabda* beetles are observed, contact your USFWS and State flycatcher coordinator immediately. Please be aware that permits are needed for nest monitoring.

GPS Coordinates for WIFL Detections. Provide the number of birds (e.g., unpaired, paired, or groups of birds) and corresponding UTMs. If known, provide the sex of individuals.

Overall Site Summary. For each of these columns, provide your best estimate of the overall total for the season. Do not simply total the numbers in each column. In some cases where consistent numbers were detected on each survey, the overall summary is easy to determine. In cases where numbers varied substantially among the different surveys, use professional judgment and logic to estimate the most likely number of adults, pairs, and territories that were consistently present. Be careful not to double count individuals. Record only territorial adult Southwestern Willow Flycatchers, do not include migrants, nestlings, or fledglings in the overall summary. In complex cases, consult with your State or USFWS flycatcher coordinator.

Total Survey Hours. The sum of all hours spent surveying the site.

Were any WIFLs color-banded? Circle or highlight "Yes" or "No". If yes, report the sighting and color combination (if known) in the comments section on back of form, and contact your USFWS coordinator within 48 hours after returning from the survey. Note that identifying colors of bands is difficult and might require follow-up visits by experienced surveyors.

Reporting Individual. Indicate the full first and last name of the reporting individual.

Date Report Completed. Provide the date the form was completed in mm/dd/yyyy format.

U.S. Fish and Wildlife Service Permit #. List the full number of the required federal permit under which the survey was completed.

State Wildlife Agency Permit #. If a State permit is required by the State in which the survey was completed, provide the full number of the State permit. State permits are required for Arizona and California. State permits are recommended for New Mexico.

Page 2 of Survey Form

Affiliation. Provide the full name of the agency or other affiliation (which is usually the employer) of the reporting individual.

Phone Number. Self-explanatory; include the area code.

E-mail. Self-explanatory.

Was this site surveyed in a previous year? Indicate "Yes", "No", or "Unknown."

Did you verify that this site name is consistent with that used in previous years? Indicate "Yes" or "No". This can be determined by checking survey forms from previous years or consulting with agency flycatcher coordinators.

If site name is different, what name(s) was used in the past? Enter the full site name that was used in previous years.

If site was surveyed last year, did you survey the same general area this year? Indicate "Yes" or "No". If no, indicate the reason and how the survey varied in the Comments section.

Did you survey the same general area during each visit to this site this year? If no, indicate the reason in the Comments section and delineate the differing route of each survey on the topographical map.

Management Authority for Survey Area. Mark the appropriate management authority.

Name of Management Entity or Owner (e.g., Tonto National Forest). Provide the name of the organization or person(s) responsible for management of the survey site.

Length of area surveyed. Estimate the linear straight-line distance of the length of the area surveyed, in kilometers. This is not an estimate of the total distance walked throughout the survey site. Do not provide a range of distances.

Vegetation Characteristics: Mark only one of the categories that best describes the predominant tree/shrub foliar layer at the site.

<u>Native broadleaf</u> habitat is composed of entirely or almost entirely (i.e., > 90%) native broadleaf plants.

<u>Mostly native</u> habitat is composed of 50–90% native plants with some (i.e., 10–50%) non-native plants.

<u>Mostly exotic</u> habitat is composed of 50–90% non-native plants with some (i.e., 10–50%) native plants.

<u>Exotic/introduced</u> habitat is composed entirely or almost entirely (i.e., > 90%) of non-native plants.

Identify the 2–3 predominant tree/shrub species in order of dominance. Identify by scientific name.

Average height of canopy. Provide the best estimate of the average height of the top of the canopy throughout the patch. Although canopy height can vary, give only a single (not a range) overall height estimate.

Attach the following: (1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections; (2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests; (3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments. Include the flycatcher territory number and GPS location. You also may include a compact disc of photographs.

Comments. Include any information that supports estimates of total territory numbers and breeding status. You may provide additional information on bird behavior, banded birds, evidence of pairs or breeding, nesting, potential threats (e.g., livestock, cowbirds, saltcedar leaf beetles [*Diorhabda* spp.] etc.), and changes in survey length and route throughout the season. Attach additional pages or use the continuation sheet if needed.

Table. If Willow Flycatchers are detected, complete the table at the bottom of the form. Identify flycatchers by territory number and include the dates detected, UTMs, whether or not pairs were detected, and whether or not nests were located. Also describe the observation. For example, the surveyor might have observed and heard a bird *fitz-bew* from an exposed perch, heard and observed two birds interacting and eliciting a twitter call, heard a bird *fitz-bew* while observing another carrying nesting material, heard birds from territory 1 and 2 countersinging, etc. This information provides supporting information for territory and breeding status. Use the continuation sheet if needed.

Appendix 4. Example of a Completed Willow Flycatcher Survey and Detection Form (with map)

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: **DL-08** State: **New Mexico** County: **Socorro**

USGS Quad Name: **Paraje Well** Elevation: **1,356** (meters)

Creek, River, or Lake Name: **Rio Grande**

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? Yes **X** ***No*** ____

Survey Coordinates: Start: E **306,009** N **3,715,506** UTM Datum: **NAD 83** (See instructions)

Stop: E **304,339** N **3,711,922** UTM Zone: **13**

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date:	5	0	5	N	Suitable breeding habitat dispersed throughout site. WIFLs were very vocal, and covering large areas. No obvious signs of pairing were observed. Approximately 10 head of cattle were found within this site.	# Birds	Sex	UTM E	UTM N
Observer(s):	5/24/2009						1	M	305,276	3,714,926
D. Savage	Start:						1	M	305,131	3,714,628
	5:45						1	M	305,191	3,714,778
	Stop:						1	M	305,394	3,715,009
	10:15						1	M	305,084	3,714,732
	Total hrs:									
	4.5									
Survey # 2	Date:	11	4	7	Y (3)	Portions of site are flooded, 1-2 ft deep. Two males found during 1st survey appear unpaired. Three pairs confirmed based on nesting, and another pair suspected based on vocal interactions and nonaggressive behavior with another flycatcher. Two additional territories (1 pair and 1 unpaired male) found during this survey.	# Birds	Sex	UTM E	UTM N
Observer(s):	6/10/2009						1	M	305,276	3,714,926
S. Kennedy	Start:						1	M	305,131	3,714,628
	6:00						2	M/F	305,191	714,778
	Stop:						2	M/F	305,394	3,715,009
	10:15						2	M/F	305,084	3,714,732
	Total hrs:						2	M/F	305,001	3,714,640
	4.3						1	M	305,010	3,714,524
Survey # 3	Date:	12	5	7	Y (4)	Portions of site still flooded. All territories found in Survey 2 are still active. The two males found during Surveys #1 and #2, still believed to be unpaired. All other territories are believed to be paired. Several cows observed in vicinity of active territories.	# Birds	Sex	UTM E	UTM N
Observer(s):	6/21/2009						1	M	305,276	3,714,926
S. Kennedy	Start:						1	M	305,131	3,714,628
	5:30						2	M/F	305,191	3,714,778
	Stop:						2	M/F	305,394	3,715,009
	10:00						2	M/F	305,084	3,714,732
	Total hrs:						2	M/F	305,001	3,714,640
	4.5						2	M/F	305,010	3,714,524
Survey # 4	Date:	12	5	7	Y (4)	Site is no longer flooded, but saturated soils persist throughout most of site. No change in territory numbers or status. All SWFL pairs very quiet - only a few whits and fitz-bews. Light rain over night, vegetation was saturated early in the morning. Lots of mosquitos!	# Birds	Sex	UTM E	UTM N
Observer(s):	7/1/2009						1	M	305,276	3,714,926
D. Moore	Start:						1	M	305,131	3,714,628
	6:00						2	M/F	305,191	3,714,778
	Stop:						2	M/F	305,394	3,715,009
	10:00						2	M/F	305,084	3,714,732
	Total hrs:						2	M/F	305,001	3,714,640
	4.0						2	M/F	305,010	3,714,524
Survey # 5	Date:	11	5	6	Y (4)	Site beginning to dry out, some portions still muddy. One of the unpaired males could not be detected. It was hard to hear SWFLs due to breezy conditions early in the morning.	# Birds	Sex	UTM E	UTM N
Observer(s):	7/10/2009						1	M	305,131	3,714,628
D. Moore	Start:						2	M/F	305,191	3,714,778
	5:30						2	M/F	305,394	3,715,009
	Stop:						2	M/F	305,084	3,714,732
	10:00						2	M/F	305,001	3,714,640
	Total hrs:						2	M/F	305,010	3,714,524
	4.5									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	12	5	7	4	Were any WIFLs color-banded? Yes ____ No **X**
Total survey hrs: 21.8					If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: **Darrell Ahlers** Date Report Completed: **8/20/2009**

US Fish & Wildlife Service Permit #: **TE819475-2** State Wildlife Agency Permit #: **N/A**

<u>Submit</u> form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual **Darrell Ahlers** Phone # **(303) 445-2233**
Affiliation **Bureau of Reclamation** E-mail dahlers@usbr.gov
Site Name **DL-08** Date report Completed **8/20/2009**
Was this site surveyed in a previous year? Yes__x__ No____ Unknown____
Did you verify that this site name is consistent with that used in previous yrs? Yes **x** No ____ Not Applicable ____
If name is different, what name(s) was used in the past? **Not applicable**
If site was surveyed last year, did you survey the same general area this year? Yes **x** No ____ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes **x** No ____ If no, summarize below.

Management Authority for Survey Area: Federal **X** Municipal/County ____ State ____ Tribal ____ Private ____
Name of Management Entity or Owner (e.g., Tonto National Forest) **Bureau of Reclamation**

Length of area surveyed: **2.5** (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix Gooddingii, Populus spp., Tamarix spp.

Average height of canopy (Do not include a range): **6** (meters)

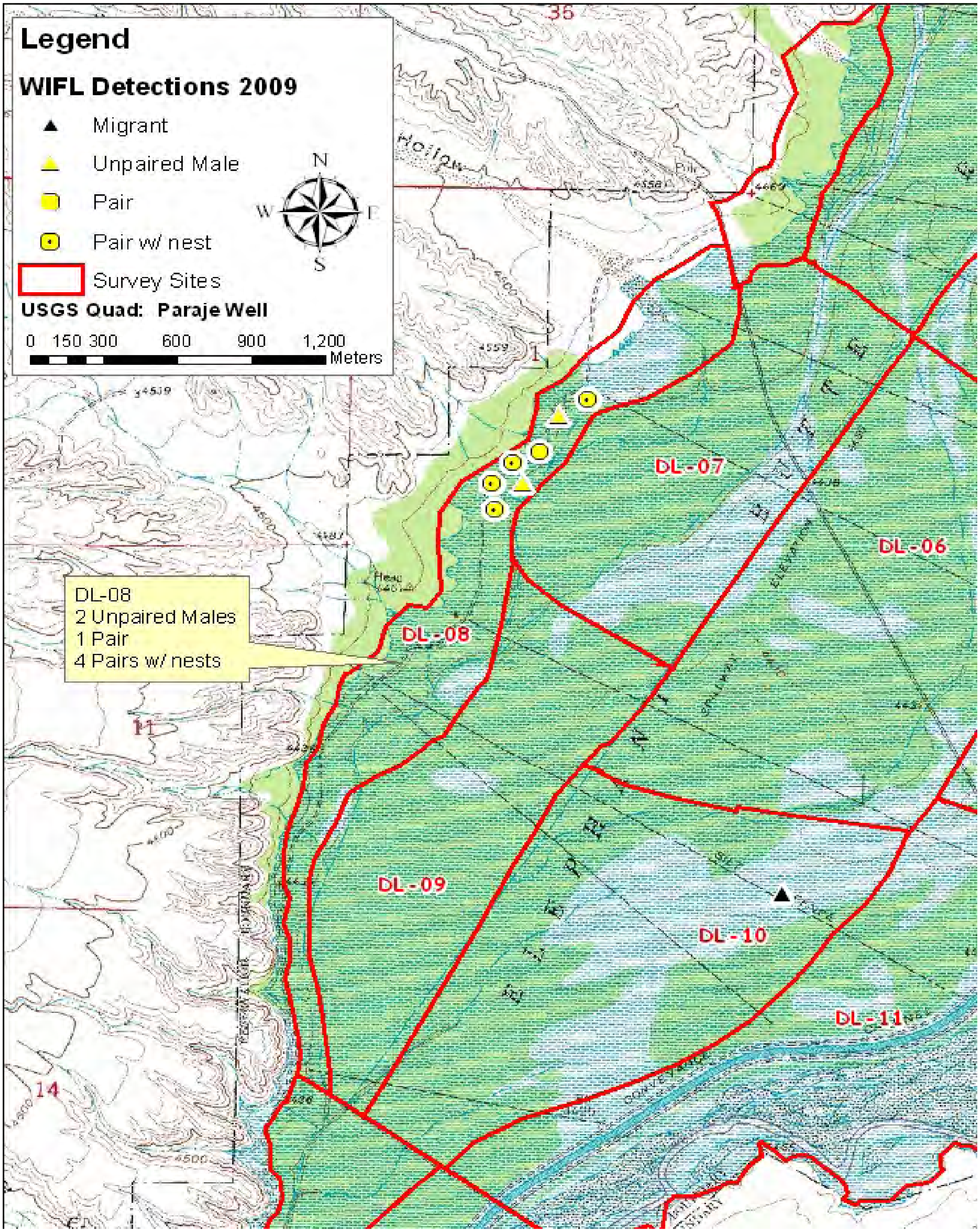
Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features.
Attach additional sheets if necessary.
Great habitat with saturated or flooded soils throughout most of the site on 1st survey. Site began to dry by the end of the breeding season. SWFL territories are dominated by Gooddings willow, however Tamarix spp. tends to be increasing in density compared to previous years. Site is supported by flows from the Low Flow Conveyance Channel.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)
1 (Unpaired male)	5/24, 6/10,6/21,7/1	305,276	3,714,926	N	N	extended presence at site from 5/24 through 7/1, no evidence of pairing
2 (Unpaired male)	5/24, 6/10,6/21,7/1, 7/10	305,131	3,714,628	N	N	extended presence at site from 5/24 through 7/10, no evidence of pairing
3 (Pair)	5/24, 6/10,6/21,7/1, 7/10	305,191	3,714,778	Y	Y	Pair confirmed based on vocalizations and observation of unchallenged WIFL
4 (Pair w/nest)	5/24, 6/10,6/21,7/1, 7/10	305,394	3,715,009	Y	Y	Confirmed breeding status with nest
5 (Pair w/nest)	5/24, 6/10,6/21,7/1, 7/10	305,084	3,714,732	Y	Y	Confirmed breeding status with nest
6 (Pair w/nest)	6/10,6/21,7/1, 7/10	305,001	3,714,640	Y	Y	Confirmed breeding status with nest
7 (Pair w/nest)	6/10,6/21,7/1, 7/10	305,010	3,714,524	Y	N	Confirmed breeding status with nest

Attach additional sheets if necessary


Legend
WIFL Detections 2009
Migrant
Unpaired Male
Pair
Pair w/ nest
Survey Sites
USGS Quad: Paraje Well
0 150 300 600 900 1,200
Meters
N
S
E
W
DL-08
2 Unpaired Males
1 Pair
4 Pairs w/ nests
DL - 06
DL - 07
DL - 08
DL - 09
DL - 10
DL - 11

Publishing support provided by the U.S. Geological Survey
Publishing Network, Tacoma Publishing Service Center

For more information concerning the research in this report, contact
Mark Sogge
U.S. Geological Survey
2255 Gemini Drive,
Flagstaff, AZ 86001

USGS

Sogge and others—**A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher**—Techniques and Methods 2A-10

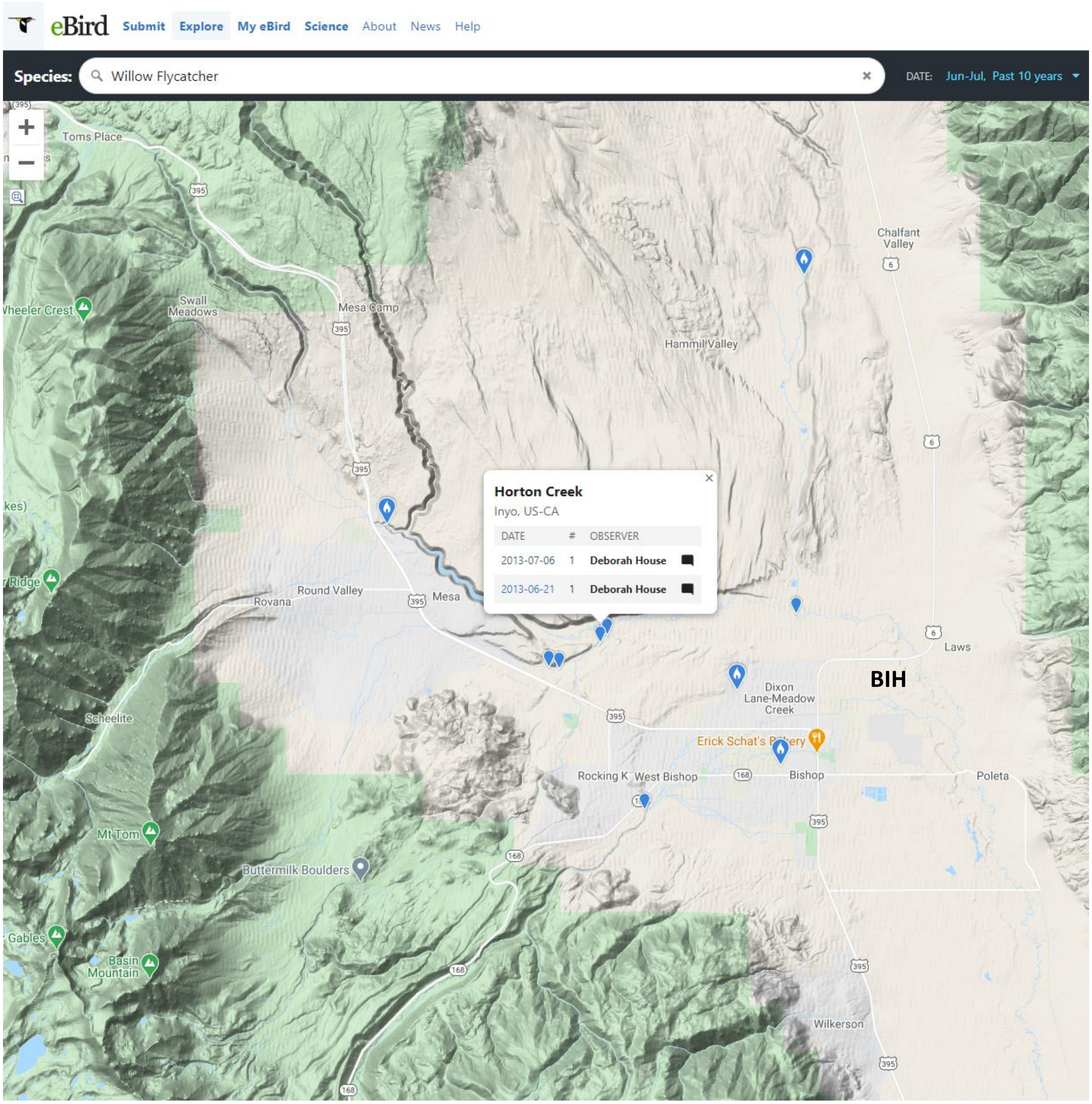
APPENDIX E

Southwest Willow Flycatcher Observation History

Appendix E-1

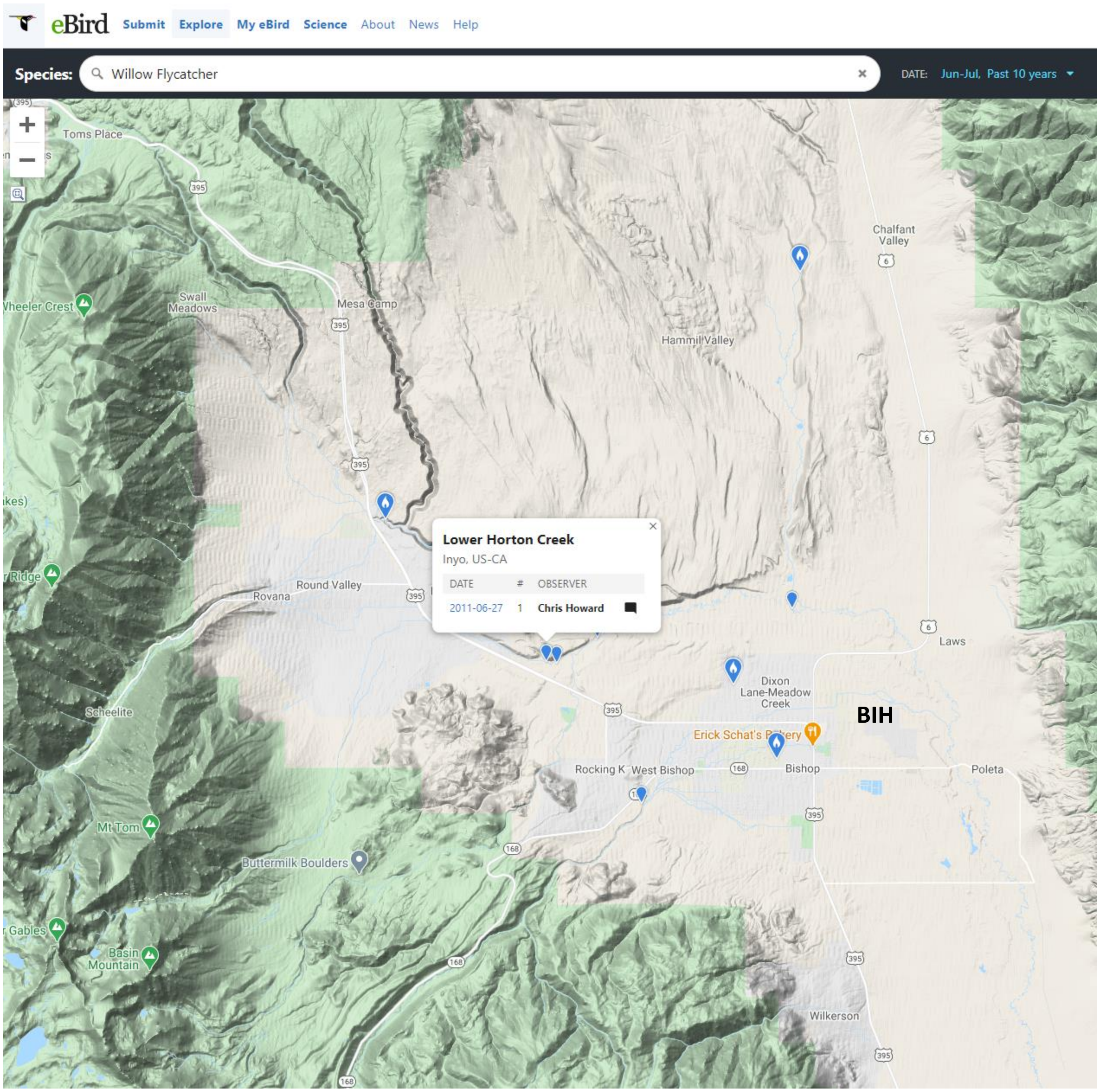
Cornell Laboratory of Ornithology's eBird Database Search Results

Cornell Laboratory of Ornithology's eBird Database Search Results



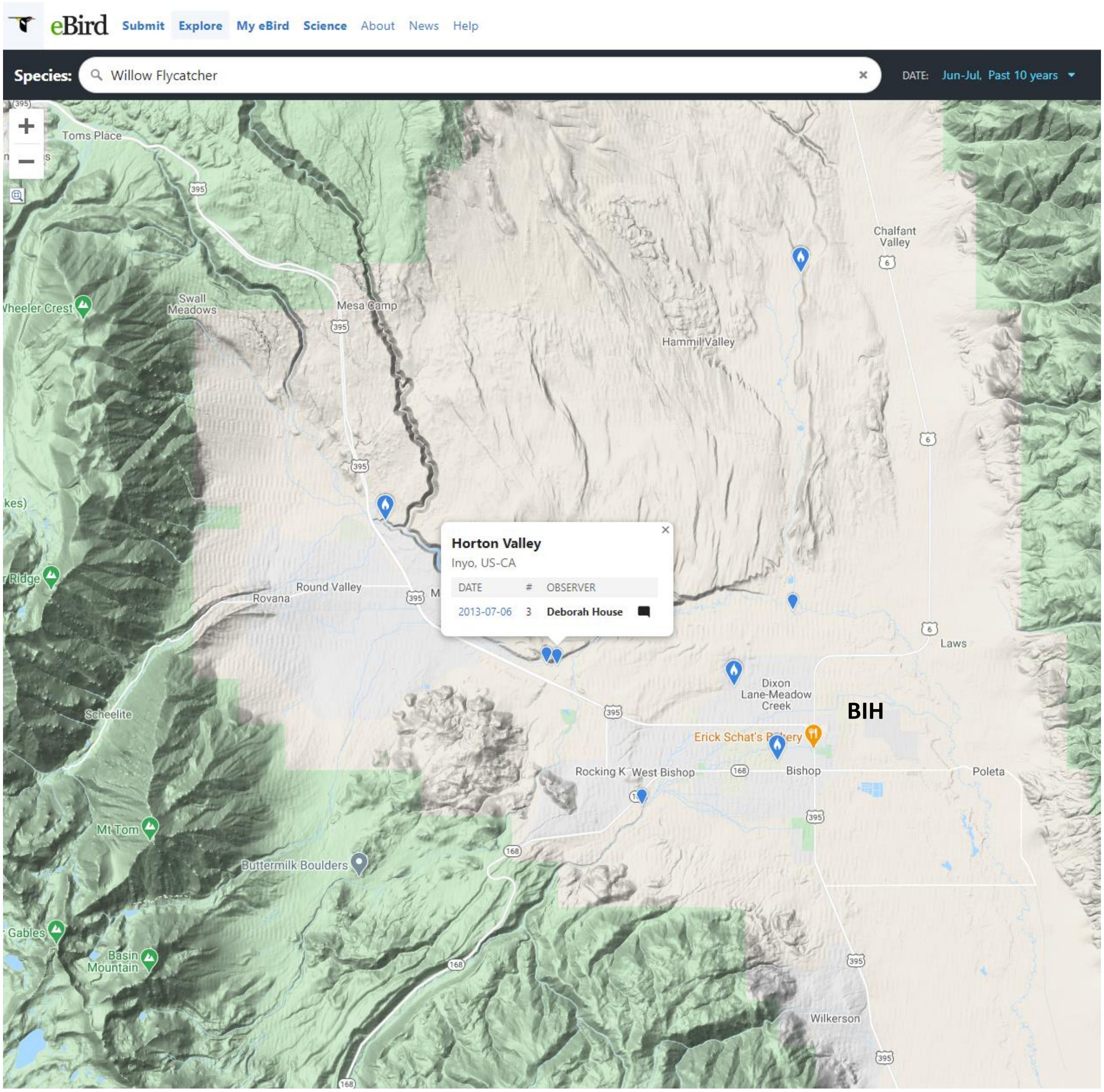
SOURCE:
Cornell Laboratory of Ornithology, eBird database, https://ebird.org/, (Accessed: October 5, 2020)

NOTES:
This figure depicts the closest sightings of Willow Flycatchers in the last ten years between the days of June 15 and July 20 (i.e., the "non-migrant period"), where individuals observed are presumed to be *E. t. extimus.* The sightings shown above are depicted near Horton Creek, approximately 6 miles northwest of the Airport. Other sightings identified in the figure were not recorded during the "non-migrant period."



SOURCE:
Cornell Laboratory of Ornithology, eBird database, https://ebird.org/, (Accessed: October 5, 2020)

NOTES:
This figure depicts the closest sightings of Willow Flycatchers in the last ten years between the days of June 15 and July 20 (i.e., the "non-migrant period"), where individuals observed are presumed to be *E. t. extimus.* The sightings shown above are depicted near Horton Creek, approximately 6 miles northwest of the Airport. Other sightings identified in the figure were not recorded during the "non-migrant period."



SOURCE:
Cornell Laboratory of Ornithology, eBird database, https://ebird.org/, (Accessed: October 5, 2020)

NOTES:
This figure depicts the closest sightings of Willow Flycatchers in the last ten years between the days of June 15 and July 20 (i.e., the "non-migrant period"), where individuals observed are presumed to be *E. t. extimus.* The sightings shown above are depicted near Horton Creek, approximately 6 miles northwest of the Airport. Other sightings identified in the figure were not recorded during the "non-migrant period."

Appendix E-2

California Department of Fish and Wildlife California Natural Diversity Database

California Department of Fish and Wildlife California Natural Diversity Database Search Results

SciName	ComName	TaxonGroup	ElmCode	FedList	CalList	GRank	SRank
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	Endangered	Endangered	G5T2	S1
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	Endangered	Endangered	G5T2	S1

OthrStatus	OccNumber	EOndx	Mapndx	ElmDate	SiteDate	Sensitive
NABCI_RWL-Red Watch List	52	66321	66239	20030625	20030625	N
NABCI_RWL-Red Watch List	66	79300	1749	19170713	20050714	N

OccRank	Presence	Accuracy	AccuracyOrder	Trend	OccType	County
A-Excellent	Presumed Extant	Specific bounded area	20	Unknown	Natural/Native occurrence	Inyo
U-Unknown	Presumed Extant	Circular feature with a 1600 meter radius (1 mile)	90	Unknown	Natural/Native occurrence	Inyo

OwnerMgt	LastUpdate	KeyQuad	UTMZone	UTME	UTMN
LADWP	3/1/2010 0:00	Fish Slough (3711844)	11	367423	4139701
UNKNOWN	3/23/2010 0:00	Laws (3711843)	11	380083	4139783

Quad	Elevation	Latitude	Longitude	UTM	PLSS
Fish Slough (3711844) | Rovana (3711845)	4370	37.39461	-118.49775	Zone-11 N4139701 E367423	T06S, R32E, Sec. 30, SE (M)
Laws (3711843)	4100	37.39707	-118.35478	Zone-11 N4139783 E380083	T06S, R33E, Sec. 28 (M)

Location	LocDetails	Ecological	ThreatList	Threat	General
HORTON CRK FROM PLEASANT VALLEY DAM RD W ABOUT 0.2 MI, & E OF PLEASANT VLY DAM RD ABOUT 0.25 MI S OF JCT WITH THE CRK.	MAPPED TO PROVIDED COORDINATES. 2000 GENETIC STUDY BY PAXTON INDICATES THAT WILLOW FLYCATCHERS IN THE OWENS VALLEY AREA SHOULD BE CLASSIFIED AS SUBSPECIES EXTIMUS.	NATIVE RIPARIAN FOREST DOM BY SALIX GOODINGII & SALIX EXIGUA WITH A WELL-DEVELOPED UNDERSTORY. WATER IS PRESENT YEAR-ROUND AT THIS SITE. MAINTAINED AS OPEN SPACE FOR WATERSHED PROTECTION; LIVESTOCK GRAZING & RECREATION ALLOWED.	Improper burning regime	POTENTIAL THREAT OF HUMAN-CAUSED WILDFIRE.	NW: 1 PAIR ON 8 JUL 2001, 1 PAIR ON 30 JUN 2002, & A SINGLE BIRD ON 25 JUN 2003. NE: SINGLE BIRD ON 8 JUL 2001, SINGLE BIRD ON 17 MAY & 30 JUN 2002, & A PAIR ON 25 JUN 2003. S: 2 BIRDS ON 11 MAY 2002, WITH ONLY 1 SUBSEQUENTLY ON 30 JUN.
VICINITY OF LAWS AND THE OWENS RIVER, OWENS VALLEY.	MVZ LOCATIONS DESCRIBED AS "LAWS" & "FARRINGTON RANCH, LAWS." 1986 SURVEY OF OWENS RIVER INCLUDED T6S R33E SEC 28. 2005 LOCATION JUST SOUTH OF HWY 6 ABOUT 0.1 MI WEST OF JUNCTION WITH SILVER CANYON RD (COORDS PROVIDED).	RIPARIAN HABITAT BORDERING THE OWENS RIVER. DOMINATED BY SANDBAR WILLOW, ARROYO WILLOW & WOOD ROSE. SUITABLE HABITAT FOR SMALL # OF BREEDING BIRDS. SOME FORMERLY GOOD HABITAT BURNED - UNSUITABLE. RAILROAD DEVELOPMENT PROPOSED IN 2005.		DEVELOPMENT AND FIRE.	MVZ SPECIMENS COLLECTED ON 5 JUL 1917 (#27968 - ALSO IN BLM80S), 10 JUL 1917 (#27969 - ALSO IN BLM80S) & 13 JUL 1917 (#27970). NONE DETECTED IN 1986. WIFL MIGRANT DETECTED MAY 2005. SUBSPECIES EXTIMUS OCCURS IN OWENS VALLEY (PAXTON 2000).

SOURCE:
California Department of Fish and Wildlife, California Natural Diversity Database (CNDDB) search results through August 2020, August 12, 2020.

NOTES:
Results are sorted for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*; SWFL), which includes two sightings in Inyo County, California. The closest SWFL sighting to the Airport was recorded in 2003 near Horton Creek.

Appendix C
Tribal Consultation

ESA

BOARD OF SUPERVISORS
COUNTY OF INYO
P. O. DRAWER N • INDEPENDENCE, CALIFORNIA 93526
TELEPHONE (760) 878-0373
email: dellis@inyocounty.us

October 22, 2020

Gloriana M. Bailey, Tribal Administrator
Bishop Paiute Tribe50
Tu Su Lane
Bishop, CA 93514

RE: Assembly Bill 52 Consultation (Per Public Resources Code 21080.3.1)

Dear Tribal Administrator Bailey,

The Bishop Airport is owned and operated by Inyo County and is situated on land leased from the Los Angeles Department of Water and Power (LADWP). The Airport currently serves general aviation activity and limited military activity, as well as charter and air cargo operations. Commercial air service is not currently offered at BIH. However, the County has identified an unmet demand for commercial air passenger service in the Eastern Sierra region. To serve this unmet demand, the County is seeking to obtain a Class I Operating Certificate for Bishop Airport under 14 Code of Federal Regulations (CFR) Part 139 to allow for scheduled or unscheduled commercial air service. United Airlines, Inc. and its partner SkyWest Airlines (operating as United Express) seek to amend SkyWest's Operations Specifications to allow the introduction of scheduled commercial air passenger service at the Airport.

The proposed commercial air passenger service is anticipated to begin in mid-2021 with one daily arrival and departure between BIH and Los Angeles International Airport (LAX) during the summer and shoulder seasons (April 15 through December 14) and three daily arrivals and departures between BIH and LAX, Denver International Airport (DEN), and San Francisco International Airport (SFO) during the winter season (December 15 through April 14). An additional flight to/from SFO is anticipated to be added during the 2024 winter season and a daily flight to/from San Diego International Airport (SAN) is anticipated to be added during the 2027 winter season. A second winter season flight to/from LAX is anticipated to be added in 2028. Commercial air passenger service would initially be provided with Bombardier CRJ700 aircraft, an aircraft with 70 seats, which will eventually be replaced by Embraer E175 aircraft, an aircraft with 76 seats. There would be no additional construction or ground disturbance associated with the introduction of commercial air service at BIH.

Attachments 1 and 2 to this letter show the general project location and the General Study Area for the project. This project is subject to a review under the California Environmental Quality Act (CEQA).

As specified by Public Resources Code 21080.3.1 the County is hereby inviting local Tribes to consultation prior to the release of the CEQA environmental document. Also pursuant to Public

Resources Code 21080.3.1, the Tribes must request consultation within 30-days of receipt of this correspondence.

If you wish to initiate the consultation process or would like more information, please contact:

Cathreen Richards, Planning Director
PO Drawer L,
Independence, CA 93526
760-878-0263
crichards@inyocounty.us

Sincerely,

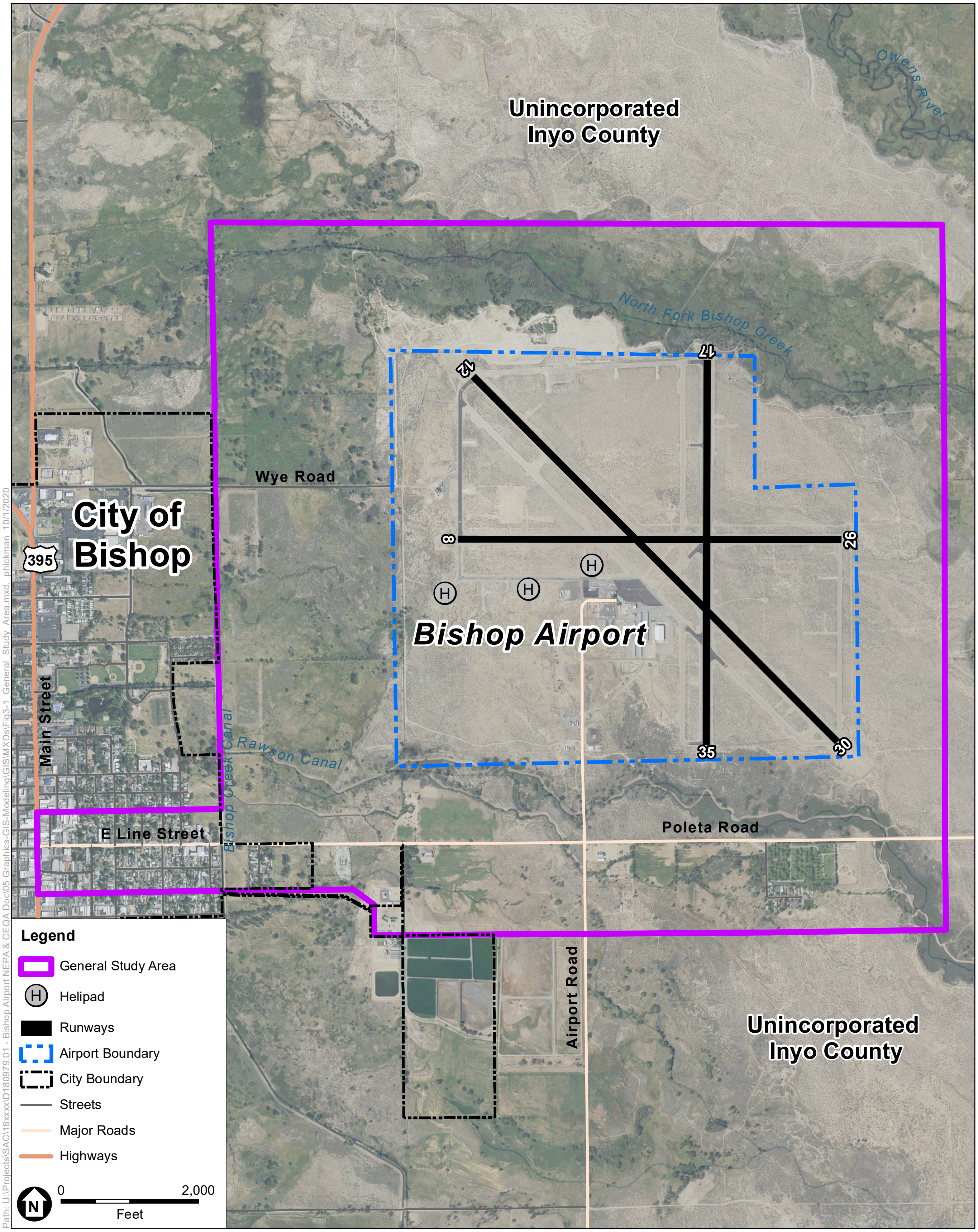
Matt Kingsley, Chairperson
Inyo County Board of Supervisors

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

Proposed Commercial Airline Service at Bishop Airport

Figure 1
Airport Location
Bishop Airport

ESA



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

Proposed Commercial Airline Service at Bishop Airport

Figure 2
General Study Area
Bishop Airport

ESA

From: Gloriana Bailey [mailto:Gloriana.Bailey@bishoppaiute.org]
Sent: Saturday, October 24, 2020 2:08 PM
To: Cathreen Richards
Cc: Monty Bengochia
Subject: Bishop Paiute Tribe

CAUTION: This email originated from outside of the Inyo County Network. DO NOT click links or open attachments unless you recognize and trust the sender. Contact Information Services with questions or concerns.

Good afternoon, Cathreen – the Bishop Paiute Tribe is responding to the letter dated October 8, 2020 (attached) re: AB5 Consultation – Bishop Airport. The Bishop Paiute Tribe is interested is consultation for this project.

Also, please note, we have a change in leadership at the Tribal Council level. Tilford P. Denver, Tribal Chairman, tilford.denver@bishoppaiute.org

Jeff Romero, Vice-Chairman jeff.romero@bishoppaiute.org

Steven Orihuela, Secretary/Treasurer steven.orihuela@bishoppaiute.org

Allen Summers, Sr., Council Member allen.summers@bishoppaiute.org

Joyce White, Council Member joyce.white@bishoppaiute.org

Thank you and let me know, if you have any questions.

We look forward to hearing from you.

Gloriana M. Bailey, MBA
Tribal Administrator
Bishop Paiute Tribe
50 Tu Su Lane
Bishop, CA 93514
760-873-3584 Ext. 1300

From: Cathreen Richards
Sent: Tuesday, October 27, 2020 8:57 AM
To: 'Gloriana Bailey'; Rick Pucci; Dan Totheroh
Cc: Monty Bengochia; Ashley Helms; Michael Errante
Subject: RE: Bishop Paiute Tribe

Good morning, Gloriana,

I hope all is well with you.

What dates would you like us to look at for scheduling a consultation? I will be happy to work with our folks in getting it arranged.

Thank you, very much, for the leadership updates, I will correct our list.

Best,

Cathreen

From: Cathreen Richards <crichards@inyocounty.us>
Sent: Wednesday, December 2, 2020 9:50 AM
To: Gloriana Bailey; Rick Pucci; Dan Totheroh
Cc: Monty Bengochia; Ashley Helms; Michael Errante
Subject: RE: Bishop Paiute Tribe

Good morning, Gloriana,

Have you had a chance to look at your schedules for this consultation request?

We would be happy to set it up as a virtual meeting with Zoom, if you are concerned about social distancing and Covid.

Please let me know at your earliest convenience,

Cathreen Richards, Planning Director
Inyo County Planning Department
PO Drawer L, Independence, CA 93526
Phone: 760-878-0447
Email: crichards@inyocounty.us

From: Cathreen Richards <crichards@inyocounty.us>
Sent: Thursday, February 25, 2021 11:55 AM
To: gloriana.bailey@bishoppaiute.org; Monty Bengochia (Monty.Bengochia@bishoppaiute.org)
Cc: Ashley Helms; Michael Errante; Rick Pucci; Dan Totheroh
Subject: Bishop Airport Consultation

Good afternoon Gloriana,

I am writing to let you know that an Initial Study and Draft Mitigated Negative Declaration of Environmental Impact for the Bishop Airport is going to be submitted to the State CEQA Clearinghouse on March 2nd.

We have surpassed the required time for consultation under AB52, but would still be happy to consult with the Tribe. Also, any cultural resources information that the Tribe can offer regarding the project would be of great help.

Thank you,

Cathreen Richards, Planning Director
Inyo County Planning Department
PO Drawer L, Independence, CA 93526
Phone: 760-878-0447
Email: crichards@inyocounty.us

Appendix D
Noise Technical Report

ESA

Draft

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Noise Technical Report

Prepared for

County of Inyo Department of Public Works

February 2021

Draft

PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Noise Technical Report

Prepared for

County of Inyo Department of Public Works

February 2021

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

ESA

Bend	**Orlando**	**San Jose**
Camarillo	**Pasadena**	**Santa Monica**
Delray Beach	**Petaluma**	**Sarasota**
Destin	**Portland**	**Seattle**
Irvine	**Sacramento**	**Tampa**
Los Angeles	**San Diego**	
Oakland	**San Francisco**	

D180979.01

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PROPOSED COMMERCIAL AIRLINE SERVICE AT BISHOP AIRPORT

Noise Technical Report

1. Introduction

Inyo County has identified an unmet demand for commercial air passenger service in the Eastern Sierra region. To meet this demand, the County has expressed interest in obtaining a Class I Airport Operating Certification for Bishop Airport (BIH or Airport) under Title 14 Code of Federal Regulations (CFR) Part 139 (Part 139 Certification). By obtaining Part 139 Certification, BIH will be able to accommodate scheduled or unscheduled commercial air passenger service. United Airlines, Inc. and its partner SkyWest Airlines, operating as United Express (henceforth referred to as SkyWest Airlines) are interested in introducing commercial air passenger service to BIH. SkyWest Airlines has submitted a request to the FAA to amend its Operations Specifications, pursuant to 14 CFR Part 121, to allow the airline to provide scheduled commercial air passenger service to BIH.

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 3c (AEDT 3c). AEDT 3c was used to develop CNEL 65 dB, 70 dB, and 75 dB contours for this analysis. The contours and 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.

Five modeling scenarios were evaluated:

- 2019 Existing Conditions
- 2022 No Action Alternative
- 2022 Proposed Action Alternative
- 2028 No Action Alternative
- 2028 Proposed Action Alternative

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. 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 TAF indicated constant aircraft activities at BIH without the introduction of commercial airline service. The number of annual operations would be 26,000 operations, consisting of 7,000 local general aviation operations, 16,000 itinerant general aviation operations, and 3,000 military operations. The Aviation Activity Forecast presented forecast data incorporating the transition of commercial airline operations from Mammoth Yosemite Airport (MMH) to BIH.[1] The forecast and the United Airlines Letter of Support associated with the transition can be found in Appendix A of the Draft 2020 Aviation Activity Forecast provided in **Appendix D-1**. The forecast prepared for BIH varies from the TAF, indicating 1,000 more operations in 2028 than is forecast in the TAF. The total operations for 2022 and 2028 used for the analysis were derived from a schedule of operations provided by the County of Inyo, and a summary of these operations is provided in **Table 1**.

TABLE 1
AIRCRAFT OPERATION SUMMARY

Study Year	Scenario	Itinerant				Local		Total
		Air Carrier	Air Taxi[1]	General Aviation[2]	Military[2]	General Aviation[2]	Military[2]	
2019	Existing Conditions	0	6	16,000	3,000	7,000	0	26,006
2022	No Action	0	6	16,000	3,000	7,000	0	26,006
	Proposed Action[3]	1,210	6	16,000	3,000	7,000	0	27,216
2028	No Action	0	6	16,000	3,000	7,000	0	26,006
	Proposed Action[3]	1,942	6	16,000	3,000	7,000	0	27,948

NOTES:
1 BIH Aviation Activity Forecast document indicated there would be approximately 6 operations diverted from MMH due to the weather. These are charter aircraft operations.
2 FAA TAF
3 In June 2020, the County of Inyo provided the 2022 and 2028 proposed aircraft operations with aircraft types, schedule, and destination. These operations varied slightly from those in the BIH Aviation Activity Forecast.

SOURCE: BIH Aviation Activity Forecast, 2019; FAA TAF, 2020; County of Inyo, 2020.

The 26,000 operations included in the TAF remain constant in the estimated activity for BIH. Therefore, the number of aircraft operations under 2019 Existing Conditions and the 2022 No Action Alternative and 2028 No Action Alternative scenarios would remain unchanged. Proposed

[1] *Draft Aviation Activity Forecast Bishop Airport*, Inyo County Department of Public Works, March 2020.

Action operations in 2022 and 2028 would include scheduled air carrier operations. **Table 2** presents the proposed operations by season and aircraft type.

TABLE 2
PROPOSED ACTION AIRCRAFT OPERATIONS

Season[1]	Aircraft Type[2]	Destination[2]	Distance (NM)[3]	Annual Operations[4]
2022				
Winter	C-II	SFO	192	240
Winter	Bombardier CRJ-700	DEN	660	240
Winter	Bombardier CRJ-700	LAX	206	240
Summer and Shoulder	Bombardier CRJ-700	LAX	206	490
		Grand Total of 2022 Proposed Operations		1,210
2028				
Winter	C-III[6]	SFO	192	484
Winter	Embraer 175-LR	DEN	660	242
Winter	Embraer 175-LR	LAX	206	484
Winter	Embraer 175-LR	SAN	284	242
Summer and Shoulder	Bombardier CRJ-700	LAX	206	490
		Grand Total of 2028 Proposed Operations		1,942

NOTES:
1 Winter season is between December 17 and April 15, a total of 120 days. The summer and shoulder seasons represent the remainder of the year, a total of 245 days.
2 BIH provided ESA with the estimated aircraft operations, aircraft types, schedule, and destinations proposed by the airlines.
3 Distances between BIH and destination airports were derived from Great Circle Mapper.
4 2028 is a leap year. The winter season is 121 days and the summer and shoulder season period is 245 days.
5 For example the Bombardier CRJ-700.
6 Aircraft Reference Code for Embraer 175-LR is C-III.
SOURCE: County of Inyo, 2020.

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 cargo, air ambulance, civilian helicopter operations, and military operations. In addition, representative based aircraft types were included in the 2020 Existing Conditions fleet mix. 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. 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 2019 Existing Conditions as well as the future No Action Alternative scenarios, all aircraft were assigned to Stage Length 1. For the Proposed Action, scheduled operations to Denver would be Stage Length 2.

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 3**.

TABLE 3
TIME OF DAY PERCENTAGES

Aircraft/Operation Categories	Day	Evening	Night
Civilian Helicopters	90%	10%	0%
General Aviation Fixed Wing Aircraft and Military Helicopters	90%	7%	3%

NOTES:

Aircraft operations by cargo carriers and military fixed wing occur 100% during the daytime.
Civilian general aviation and helicopter and military helicopter operations occur during all time periods.
All future air carrier operations will all occur during daytime periods,

SOURCE: County of Inyo, 2020.

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 4** shows the runway use percentages, by aircraft operations, used for all noise analysis scenarios.

TABLE 4
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%
Touch-and-Go							
Day Only	18%	40%	10%	30%	1%	1%	100%

NOTES:

Proposed commercial operations by CRJ-700 and EMB-175, as well as operations by C-130 would only occur on Runway 12/30.

SOURCE: County of Inyo, 2020; Environmental Science Associates, 2020.

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.

2.7 Flight Track and Flight Track Use Percentages

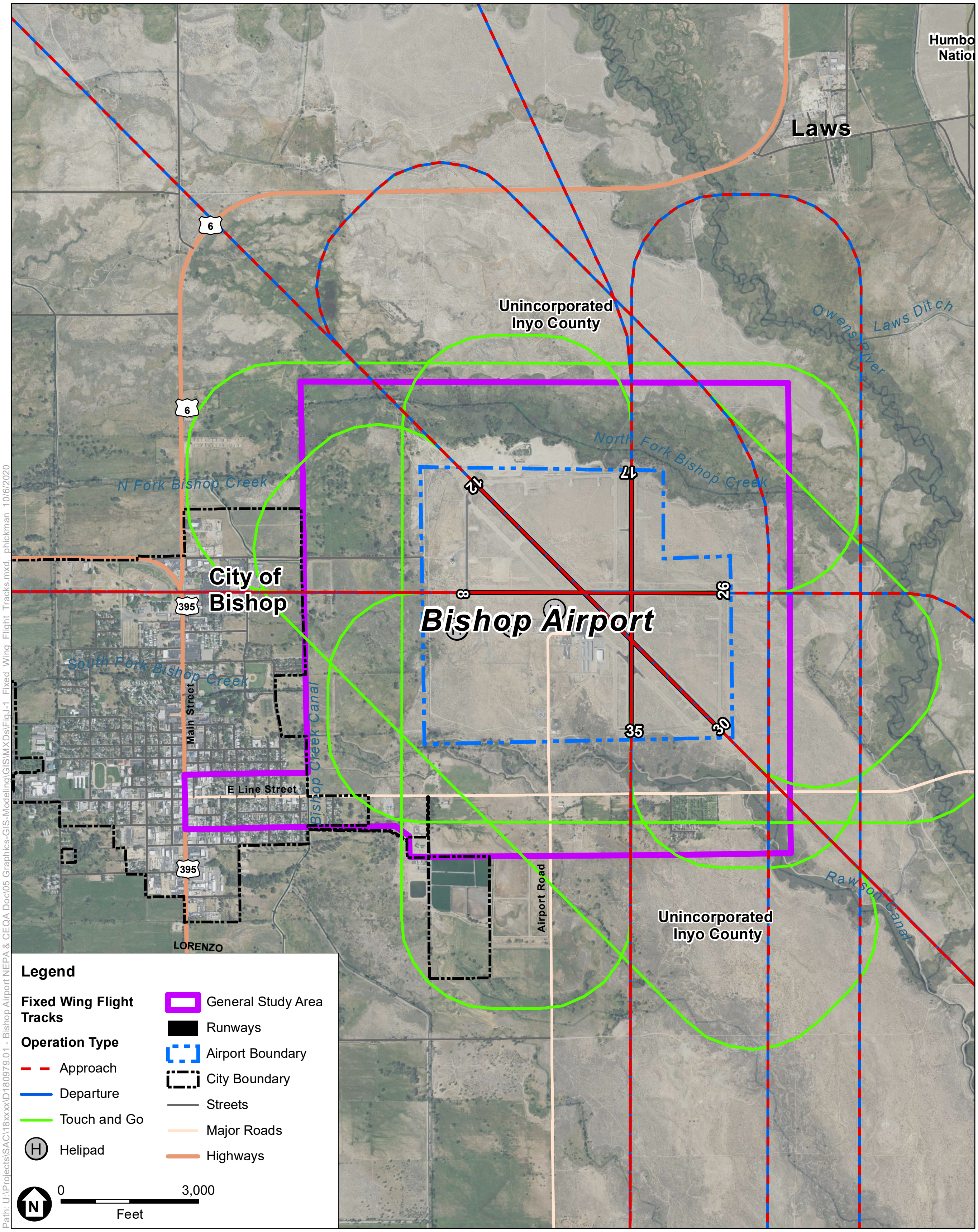
To determine noise levels on the ground, it is not only important to know how many operations are occurring and on what runways, but also to know where the aircraft are flying beyond the runways as they ingress and egress the airport. Flight track and flight track use percentages are a key element in the development of the CNEL contours. Flight tracks were developed based on a review of published flight procedures,[2] 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.[3] No changes in aircraft arrival or departure flight procedures in the terminal or enroute environments are expected for the Proposed Action Alternative; therefore, the same flight tracks were modeled for both the No Action and Proposed Action Alternatives.

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. Unless destinations were known, the flight track use percentages were 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**.

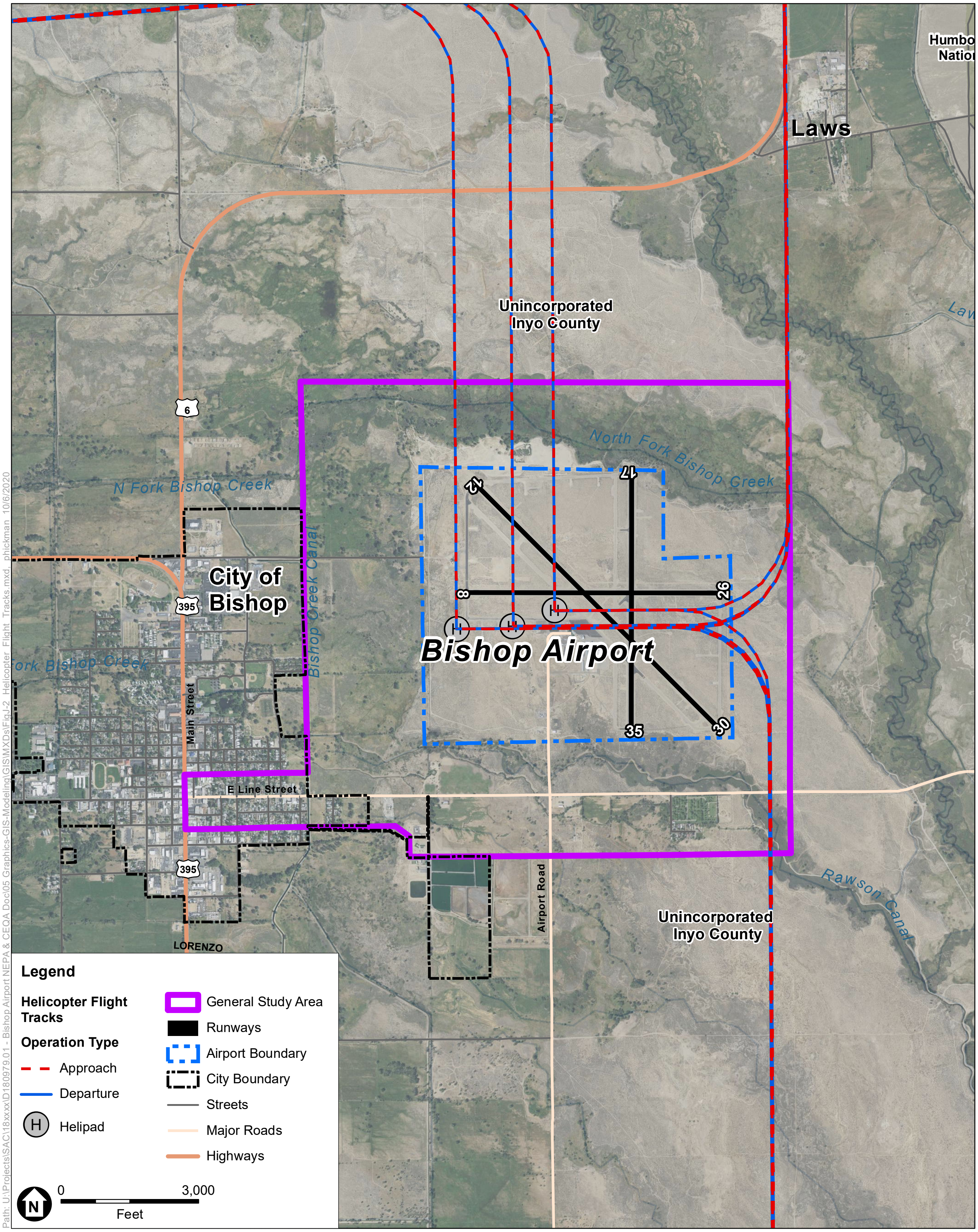
[3] A complete set of approach and departure procedure plates at BIH can be found at http://www.airnav.com/airport/KBIH



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

Figure 1
Modeled Fixed Wing Flight Tracks
Bishop Airport

ESA



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

Proposed Commercial Airline Service at Bishop Airport

Figure 2
Modeled Helicopter Flight Tracks
Bishop Airport

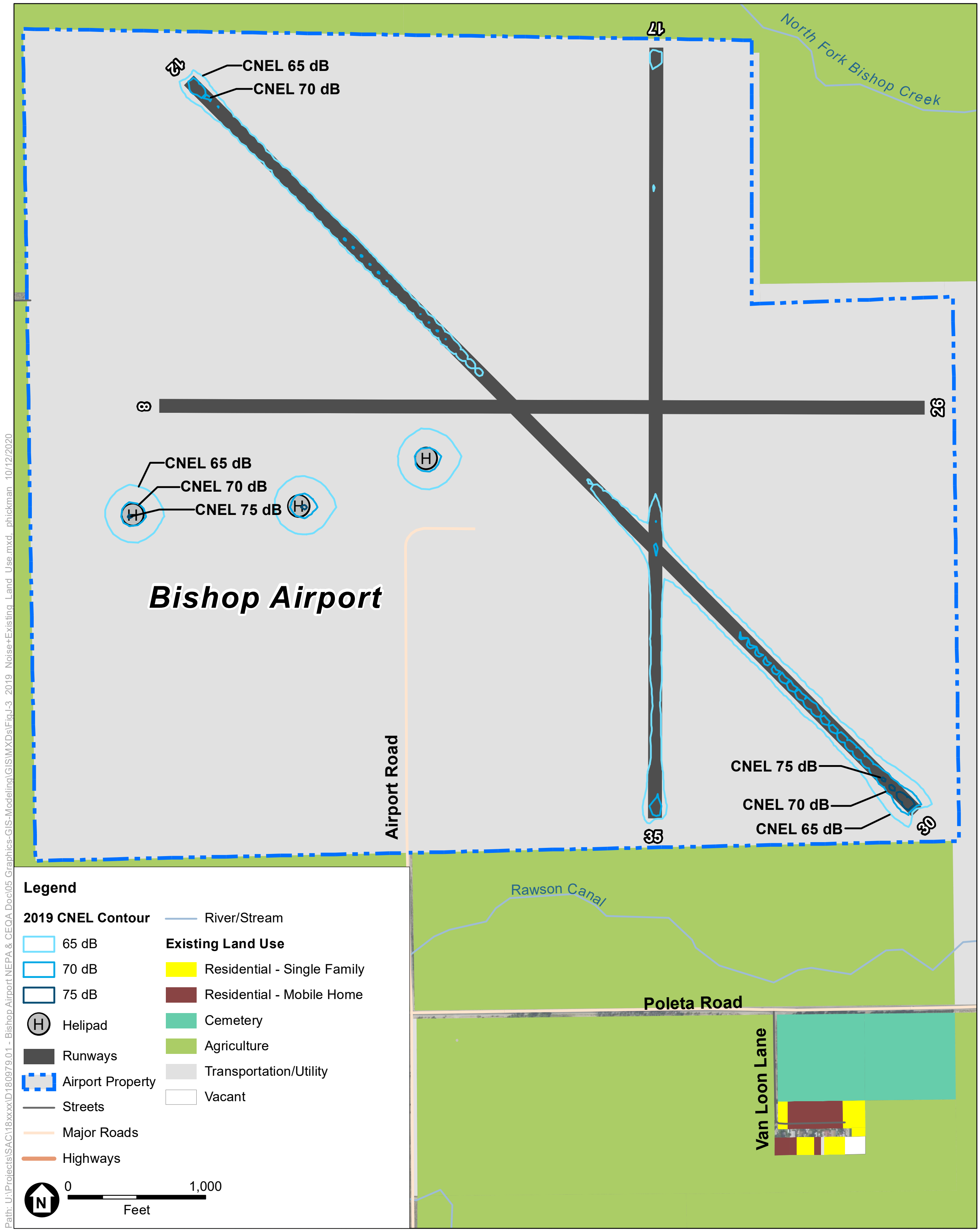
ESA

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 2019 Existing Conditions, the 2022 and 2028 No Action Alternatives, and the 2022 and 2028 Proposed Action Alternatives are shown in **Figures 3, 4, 5, 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 5** 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.



SOURCE: Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 3
2019 CNEL Contours and Generalized Existing Land Uses
Bishop Airport

ESA

SOURCE: Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

ESA

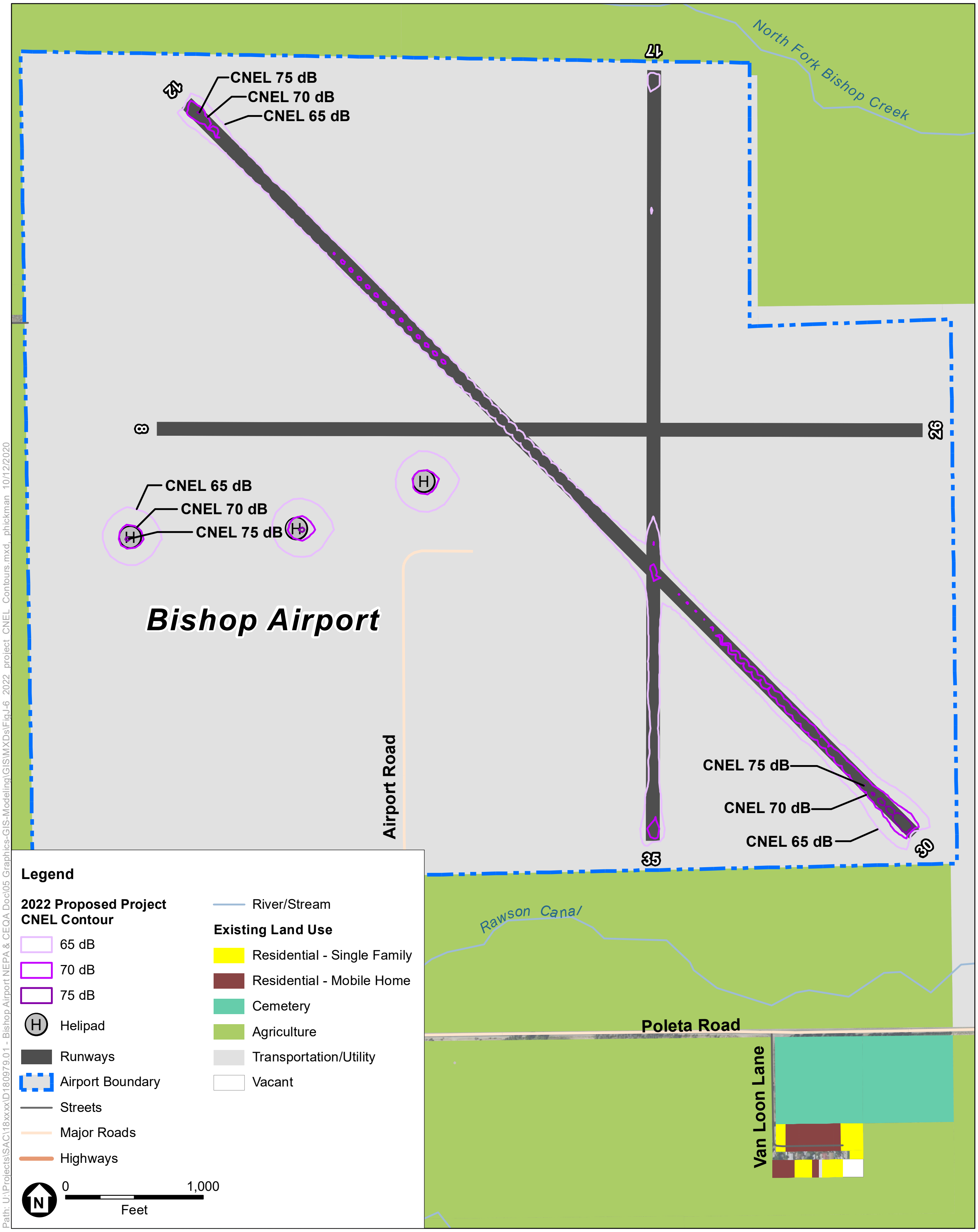
Figure 4
2022 No Action CNEL Contours and Generalized Existing Land Uses
Bishop Airport

SOURCE: Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 5
2028 No Action CNEL Contours and Generalized Existing Land Uses
Bishop Airport

ESA



SOURCE: AEDT 3c, August 2020; Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 6
2022 Proposed Action CNEL Contours and Generalized Existing Land Uses
Bishop Airport

ESA

SOURCE: AEDT 3c, August 2020; Esri; Inyo County Department of Public Works; County of Inyo Assessor, July 2020 (existing land use); ESA, 2020.

Proposed Commercial Airline Service at Bishop Airport

Figure 7
2028 Proposed Action CNEL Contours and Generalized Existing Land Uses
Bishop Airport

ESA

TABLE 5
CNEL NOISE CONTOUR AREAS (ACRES)

Noise Contour	Existing Conditions 2019	Proposed Action 2022	Proposed Action 2028	No Action 2022	No Action 2028
CNEL 65 or greater	34.2	39.3	50.9	34.2	34.2
CNEL 70 or greater	4.5	5.8	11.3	4.5	4.5
CNEL 75 or greater	0.3	0.4	1.1	0.3	0.3

SOURCE: Environmental Science Associates, 2020.

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

Digitally signed by Camille Garibaldi
Date: 2020.09.28 13:06:08 -07'00'

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 Commercial Airline Service at Bishop Airport Draft Environmental Assessment.

TABLE B1 – 2019, 2022, AND 2028 BASELINE ANNUAL AVERAGE DAY AIRCRAFT OPERATIONS

			Arrival			Departure			Touch-and-Go			
Airframe	**Engine**	**Engine Mod Code**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Total**
Cessna 172 Skyhawk	IO360	NONE	13.3927	1.0417	0.4464	13.3927	1.0417	0.4464	13.9808	1.0874	0.4660	45.2959
Cessna 208 Caravan	PT6A14	NONE	1.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000
Cessna 552 T-47A	1PW037	JT15D-5	0.0767	0.0000	0.0000	0.0767	0.0000	0.0000	0.0000	0.0000	0.0000	0.1534
Embraer ERJ135-LR	6AL017	NONE	0.0082	0.0000	0.0000	0.0082	0.0000	0.0000	0.0000	0.0000	0.0000	0.0164
Lockheed C-130 Hercules	250B17	NONE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.4795	0.0000	0.0000	1.4795
Pilatus PC-12	PT67B	NONE	2.0000	0.0000	0.0000	2.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.0000
Raytheon Beech 99	PT6A60	NONE	2.0000	0.0000	0.0000	2.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.0000
Raytheon Beech Baron 58	TIO540	NONE	1.4881	0.1157	0.0496	1.4881	0.1157	0.0496	1.5534	0.1208	0.0518	5.0329
Aerospatiale SA-350D Astar (AS-350)	TPE3	NONE	1.0899	0.1211	0.0000	1.0899	0.1211	0.0000	0.0000	0.0000	0.0000	2.4219
Bell 206 JetRanger	250B17	NONE	0.4401	0.0342	0.0147	0.4401	0.0342	0.0147	0.0000	0.0000	0.0000	0.9781
Bell UH-1 Iroquois	T400	NONE	0.4401	0.0342	0.0147	0.4401	0.0342	0.0147	0.0000	0.0000	0.0000	0.9781
Boeing CH-46 Sea Knight	T588F	NONE	0.0247	0.0019	0.0008	0.0247	0.0019	0.0008	0.0000	0.0000	0.0000	0.0548
Kaman SH-2 Seasprite	T588F	NONE	0.0592	0.0066	0.0000	0.0592	0.0066	0.0000	0.0000	0.0000	0.0000	0.1315
Sikorsky CH-53 Sea Stallion	T646B	NONE	0.4377	0.0340	0.0146	0.4377	0.0340	0.0146	0.0000	0.0000	0.0000	0.9726
Sikorsky CH-53 Sea Stallion	T64415	NONE	1.1836	0.0921	0.0395	1.1836	0.0921	0.0395	0.0000	0.0000	0.0000	2.6301
Sikorsky S-64-F	T64100	NONE	0.0592	0.0066	0.0000	0.0592	0.0066	0.0000	0.0000	0.0000	0.0000	0.1315
Sikorsky UH-60 Black Hawk	T70070	NONE	0.4377	0.0340	0.0146	0.4377	0.0340	0.0146	0.0000	0.0000	0.0000	0.9726
Grand Total			**24.1378**	**1.5222**	**0.5948**	**24.1378**	**1.5222**	**0.5948**	**17.0137**	**1.2082**	**0.5178**	**71.2493**

NOTES:
Baseline operations remain unchanged for 2019, 2022, and 2028.

SOURCE: County of Inyo, 2020; Environmental Science Associates, 2020.

TABLE B2 – 2022 AND 2028 PROPOSED PROJECT ANNUAL AVERAGE DAY AIRCRAFT OPERATIONS

			Arrival			Departure			Touch-and-Go			
Airframe	**Engine**	**Engine Mod Code**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**	**Total**
2022												
Bombardier CRJ-700	5GE083	NONE	1.6575	0.0000	0.0000	1.6575	0.0000	0.0000	0.0000	0.0000	0.0000	3.3151
Grand Total			**1.6575**	**0.0000**	**0.0000**	**1.6575**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**3.3151**
2028												
Bombardier CRJ-700	5GE083	NONE	0.6712	0.0000	0.0000	0.6712	0.0000	0.0000	0.0000	0.0000	0.0000	1.3425
Embraer ERJ175-LR	8GE108	NONE	1.9890	0.0000	0.0000	1.9890	0.0000	0.0000	0.0000	0.0000	0.0000	3.9781
Grand Total			**2.6603**	**0.0000**	**0.0000**	**2.6603**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.3205**

SOURCE: County of Inyo, 2020; Environmental Science Associates, 2020.

TABLE B3 - RUNWAY USE

Arrival				Departure				Touch-and-Go			
Runway	Day	Evening	Night	Runway	Day	Evening	Night	Runway	Day	Evening	Night
12	40%	55%	70%	**12**	18%	25%	30%	**12**	50%	0%	0%
30	18%	25%	30%	**30**	40%	55%	70%	**30**	50%	0%	0%
17	30%	15%	0%	**17**	10%	5%	0%	**17**	0%	0%	0%
35	10%	5%	0%	**35**	30%	15%	0%	**35**	0%	0%	0%
08	1%	0%	0%	**08**	1%	0%	0%	**08**	0%	0%	0%
26	1%	0%	0%	**26**	1%	0%	0%	**26**	0%	0%	0%
Total	100%	100%	100%	**Total**	100%	100%	100%	**Total**	100%	100%	100%

Helipad	Day	Evening	Night	Runway	Day	Evening	Night	Runway	Day	Evening	Night
H01	33.34%	33.34%	33.34%	**H01**	33.34%	33.34%	33.34%				
H02	33.33%	33.33%	33.33%	**H02**	33.33%	33.33%	33.33%				
H03	33.33%	33.33%	33.33%	**H03**	33.33%	33.33%	33.33%				

NOTES:
Runway utilization remains unchanged with or without the proposed project.
Air carrier, air taxi, and military aircraft operate exclusively on Runway 12/30 and share the same runway use percentages for day, evening, and night.
Touch-and-Go runway use represents C-130. General Aviation aircraft touch-and-go operations use departure day runway use.

SOURCE: County of Inyo, 2020; Environmental Science Associates, 2020.

TABLE B4 - FLIGHT TRACK USE

Arrival			Departure			Touch-and-Go		
Runway	**Track**	**Track Use %**	**Runway**	**Track**	**Track Use %**	**Runway**	**Track**	**Track Use %**
12	12A01	50%	**12**	12D01	50%	**12**	12T01	100%
	12A02	50%		12D02	50%	**30**	30T01	100%
30	30A01	50%	**30**	30D01	50%	**17**	17T01	100%
	30A02	50%		30D02	50%	**35**	35T01	100%
17	17A01	50%	**17**	17D01	50%	**08**	08T01	100%
	17A02	50%		17D02	50%	**26**	26T01	100%
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 utilizations are the same for the No Action and Proposed Action Alternatives.
Aircraft operations with known destinations were assigned to specific direction to the north or to the south.

SOURCE: County of Inyo, 2020; Environmental Science Associates, 2020.

Attachment J-3
Bishop Airport
Approach Charts

APP CRS	Rwy ldg	7498
301°	TDZE	**4111**
	Apt Elev	**4124**

RNAV (RNP) RWY 30

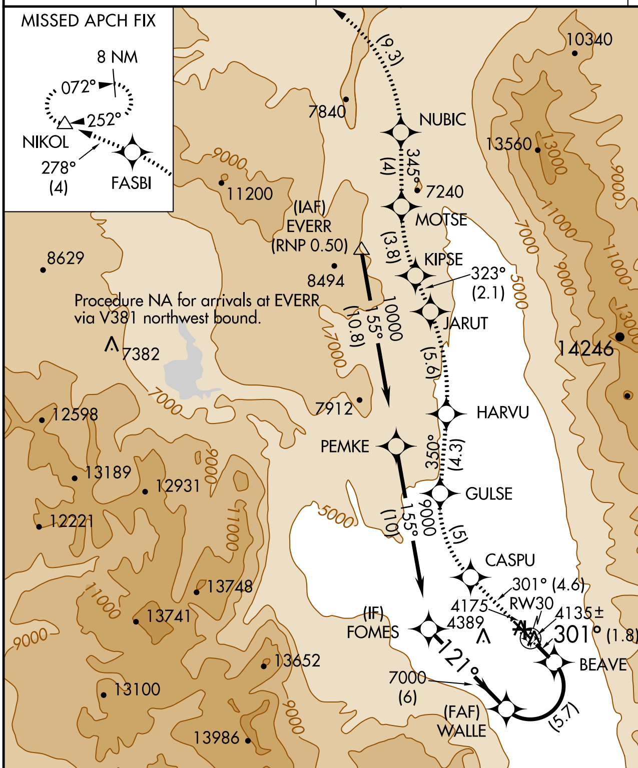
BISHOP (BIH)

RNP AR APCH, RF required.

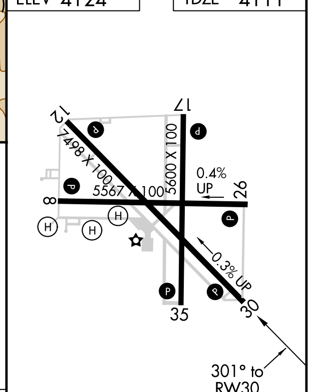
T, A NA — For uncompensated Baro-VNAV systems, procedure NA below -12°C or above 54°C.

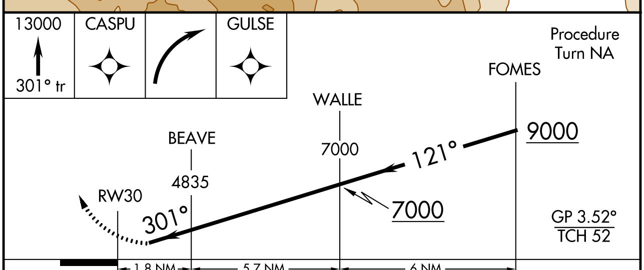
MISSED APPROACH: Climb to 13000 via 301° track to CASPU, right turn to GULSE, 350° track to HARVU, left turn to JARUT, 323° track to KIPSE, right turn to MOTSE, 345° track to NUBIC, left turn to FASBI, 278° track to NIKOL and hold.

ASOS	OAKLAND CENTER	UNICOM
119.025	**125.75 284.65**	**123.0** (CTAF) L



ELEV 4124	TDZE 4111





CATEGORY	A	B	C	D
RNP 0.30 DA	4476-1 365 (400-1)			NA

AUTHORIZATION REQUIRED

MIRL Rwys 8-26, 12-30, and 17-35 L
REIL Rwys 12, 17, 30 and 35

SW-2, 28 JAN 2021 to 25 FEB 2021

SW-2, 28 JAN 2021 to 25 FEB 2021

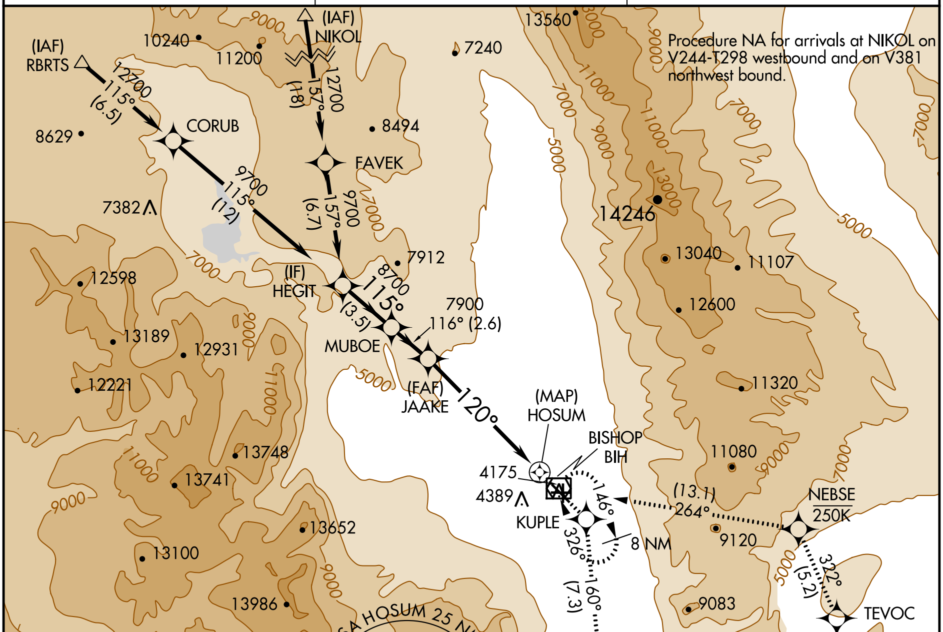
APP CRS	Rwy ldg	7498
120°	TDZE	4123
	Apt Elev	4124

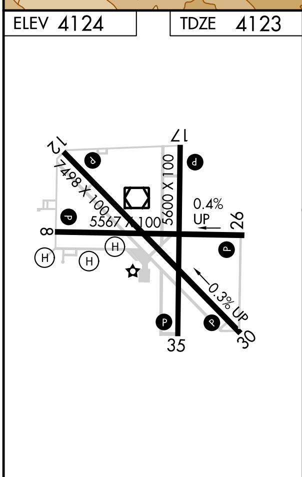
RNAV (GPS) Y RWY 12
BISHOP (BIH)

RNP APCH.

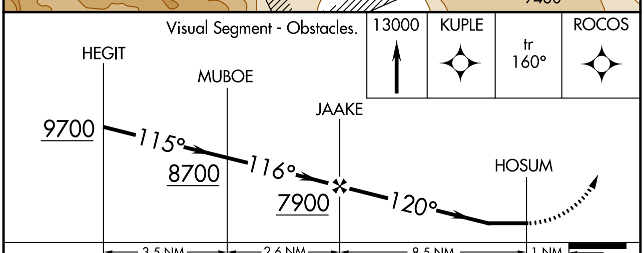
MISSED APPROACH: (Do not exceed 250 KIAS until NEBSE) Climb to 13000 direct KUPLE and on track 160° to ROCOS and on track 115° to PULIE and on track 051° to WEBAT and on track 341° to TEVOC and on track 322° to NEBSE and on track 264° to BIH VOR/DME and hold.

ASOS	OAKLAND CENTER	UNICOM
119.025	**125.75 284.65**	**123.0** (CTAF) L





MIRL Rwys 8-26, 12-30, and 17-35 L
REIL Rwys 12, 17, 30 and 35



CATEGORY	A	B	C	D
LNAV MDA	6600-1¼ 2477 (2500-1¼)	6600-1½ 2477 (2500-1½)	6600-3 2477 (2500-3)	NA

SW-2, 28 JAN 2021 to 25 FEB 2021

SW-2, 28 JAN 2021 to 25 FEB 2021

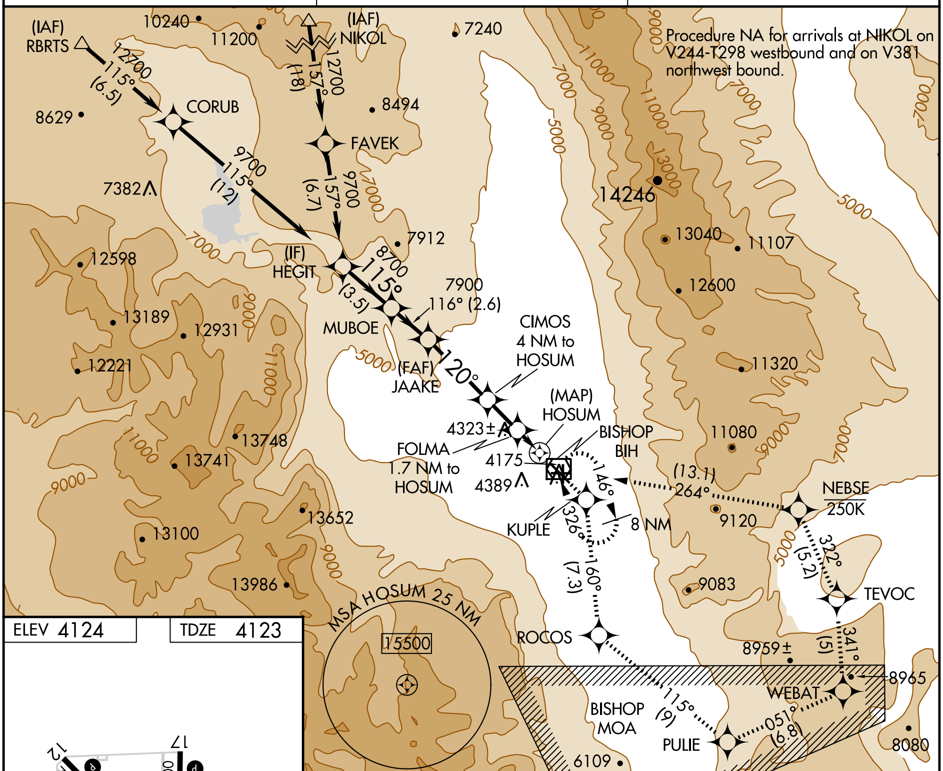
APP CRS	Rwy ldg	7498
120°	TDZE	4123
	Apt Elev	4124

RNAV (GPS) Z RWY 12
BISHOP (BIH)

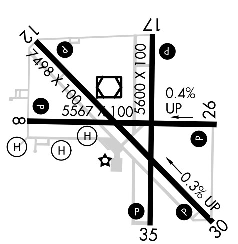
T A DME/DME RNP-0.3 NA
Missed approach requires minimum climb of 325 feet per NM to 11000; if unable, see RNAV (GPS) Y RWY 12.

MISSED APPROACH: (Do not exceed 250 KIAS until NEBSE) Climb to 13000 direct KUPLE and on track 160° to ROCOS and on track 115° to PULIE and on track 051° to WEBAT and on track 341° to TEVOC and on track 322° to NEBSE and on track 264° to BIH VOR/DME and hold.

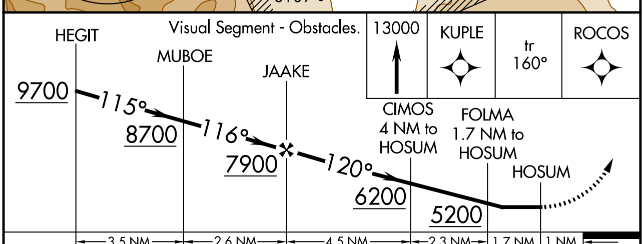
ASOS	OAKLAND CENTER	UNICOM
119.025	**125.75 284.65**	**123.0** (CTAF) L



ELEV 4124 TDZE 4123



MIRL Rwys 8-26, 12-30, and 17-35 L
REIL Rwys 12, 17, 30 and 35



CATEGORY	A	B	C	D
LNAV MDA	4580-1¼ 457 (500-1¼)			NA
CIRCLING	6420-1¼ 2296 (2300-1¼)	6420-1½ 2296 (2300-1½)	6420-3 2296 (2300-3)	NA

SW-2, 28 JAN 2021 to 25 FEB 2021
SW-2, 28 JAN 2021 to 25 FEB 2021

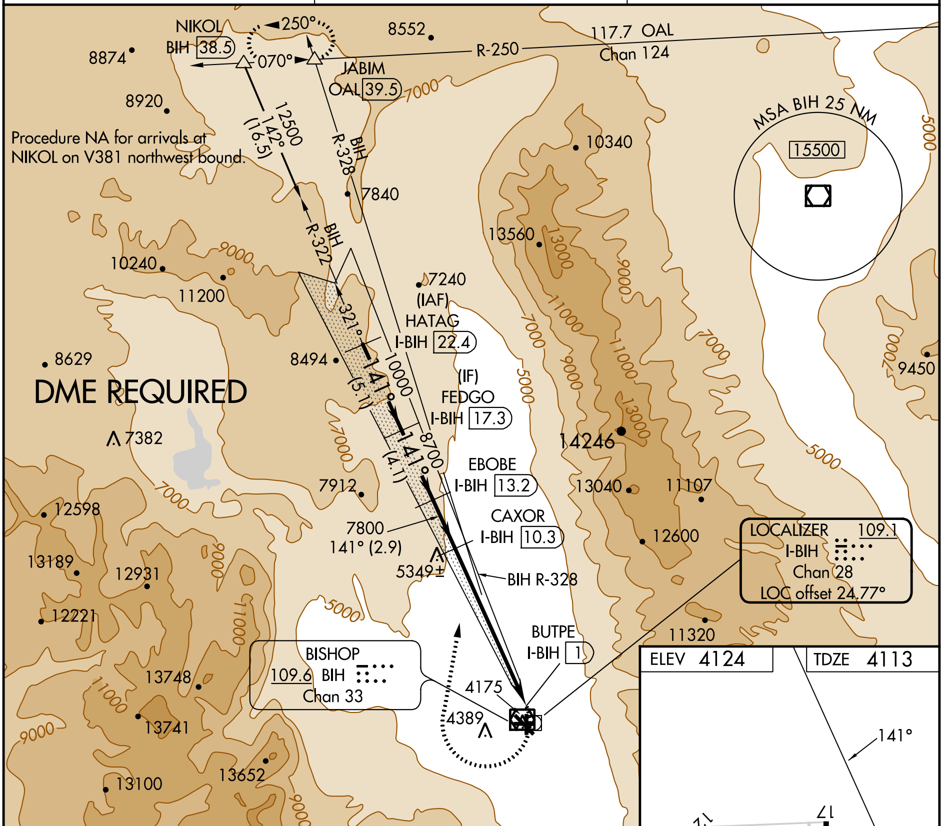
LDA RWY 17
BISHOP (BIH)

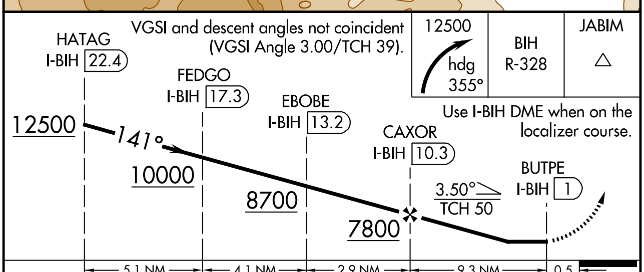
LOC/DME I-BIH 109.1 Chan 28	APP CRS 141°	Rwy ldg 5600 TDZE 4113 Apt Elev 4124

DME required.

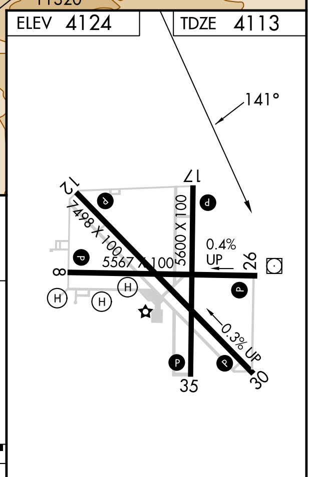
MISSED APPROACH: Climbing right turn to 12500 on heading 355° and on BIH VOR/DME R-328 to JABIM INT/OAL 39.5 DME and hold.

ASOS	OAKLAND CENTER	UNICOM
119.025	125.75 284.65	123.0 (CTAF) L





CATEGORY	A	B	C	D
S-17	6340-1¼ 2227 (2300-1¼)	6340-1½ 2227 (2300-1½)	6340-3 2227 (2300-3)	



MIRL Rwys 8-26, 12-30, and 17-35 L
REIL Rwys 12, 17, 30 and 35