UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BAKERSFIELD FIELD OFFICE

ENVIRONMENTAL ASSESSMENT

December 2020, Oil and Gas Lease Sale
Environmental Assessment DOI-BLM-CA-C060-2020-0120

Table of Contents

ACRONYMS AND ABBREVIATIONS

AB 32	California Global Warming Solutions Act of 2006, Assembly Bill 32
ACEC	Area of Critical Environmental Concern
ACOE	US Department of Defense, Army Corps of Engineers
APD	Application for Permit to Drill
AQRV	air quality related values
BFO	Bakersfield Field Office
BLM	US Department of the Interior, Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CalGEM	California Geologic Energy Management Division (formerly CDOGGR)
CARB	California Air Resources Board
CDOGGR	California Division of Oil, Gas, and Geothermal Resources
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CIAA	cumulative impact assessment area
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COA	Conditions of Approval
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSU	Controlled Surface Use
CWA	Clean Water Act
EA	environmental assessment
EIS	environmental impact statement
EOI	Expression of Interest
EPA	US Environmental Protection Agency
ERMA	extensive recreation management area
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GSA	Groundwater Sustainability Agencies
GSP	Groundwater Sustainability Plans
GWP	global warming potential
HAP	hazardous air pollutant
MLA	Mineral Leasing Act
MJ	megajoules
MMT	million metric tons
$MMTCO_2e$	million metric tons of CO_2 equivalent
MOA	Memorandum of Agreement
MT	metric tons
$MTCO_2e$	metric tons of CO_2 equivalent
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NOAA	National Oceanographic and Atmospheric Administration

NOx	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	US Department of Agriculture, Natural Resource Conservation Service
NSO	No Surface Occupancy
NSPS	New Source Performance Standards
PBO	Programmatic Biological Opinion
PFYC	Potential Fossil Yield Classification
$PM_{2.5}$	particulate matter smaller than 2.5 microns in diameter
PM_{10}	particulate matter smaller than 10 microns in diameter
ppm	parts per million
RFD	reasonably foreseeable development
RMP	resource management plan
RMZ	recreation management zone
ROD	Record of Decision
ROG	reactive organic gasses
RWQCB	Regional Water Quality Control Board
SB4	State Senate Bill 4 Oil and gas: well stimulation
SGMA	Sustainable Groundwater Management Act
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
SOP	Standard Operating Procedure
Split-estate	private surface with Federal subsurface minerals
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWQCB	State Water Quality Control Board
TAC	toxic air contaminant, also known as “air toxics”
TDS	total dissolved solids
US	United States
USC	United States Code
USFWS	US Department of the Interior, Fish and Wildlife Service
USGS	US Geological Survey
VOC	volatile organic compounds
VRP	visibility-reducing particles

CHAPTER 1. INTRODUCTION

BACKGROUND

California is a major source of oil production in the continental United States. This Environmental Assessment (EA) documents the Bureau of Land Management (BLM) Bakersfield Field Office (BFO) review of seven parcels (4,333.58 acres) nominated through Expressions of Interest (EOIs) for a proposed December 2020 Competitive Oil and Gas Lease Sale. All the Federal mineral estate proposed for leasing is within the jurisdiction of the BLM California, Bakersfield Field Office. All parcels are within Kern County, California. One parcel contains only split-estate (private surface with Federal subsurface minerals). Six parcels contain both split-estate and public lands (public surface with Federal subsurface minerals). Of the total acreage proposed for lease, 3,167.72 acres are split-estate and 1,165.86 acres are public lands. All parcels are either inside or within three miles of existing, administrative oil field boundaries; one parcel is within an existing oil field. In Appendix A, parcels are identified by number and described by legal location, acres, type (public and/or split-estate lands), proposed lease stipulations, and proximity to existing, administrative oil field boundaries.

The Secretary of the Interior is responsible under the *Mineral Leasing Act of 1920, as amended, Sec. 17,* for leasing and managing Federal oil and gas resources on public land and on split-estate lands. *Federal Onshore Oil and Gas Leasing Reform Act of 1987, Sec. 5102(a)(b)(1)(A) (FOOGLRA)* directs the BLM to conduct quarterly oil and gas lease sales within each state whenever eligible lands are available for leasing. Conducting a lease sale of the Federal mineral estate provides for a potential increase of energy reserves for the U.S., a steady source of substantial income, and at the same time, meets the requirements identified in the *2005 Energy Policy Act, Sec. 362(2),* the *Mineral Leasing Act of 1920, Sec. 17 (MLA).* BLM policy is to offer, as expeditiously as possible, those lands available for oil and gas exploration and possible development, consistent with the *Federal Land Policy and Management Act (FLPMA) of 1976, the National Environmental Policy Act (NEPA) of 1969*, and other applicable laws, regulations, and policies.

The review process for oil and gas leasing is described in detail in Title 43 Code of Federal Regulations (CFR) Part 3100 and BLM Manual 3100. In summary: the BLM offers lands for oil and gas lease to the highest qualified bidder in a competitive auction. The lease term is 10 years and may be extended for as long thereafter as oil and gas can be produced in paying quantities. The maximum lease size offered by the BLM is 2,560 acres (see FOOGRA of 1987 Sec. 5102(b)(1)(A)). The BLM conducts and documents an environmental analysis at the leasing stage unless an adequate analysis was included in an existing environmental document, such as an RMP, or other leasing documents.

PURPOSE AND NEED

The purpose of the BLM action is to analyze the potential environmental impacts of leasing parcels of Federal mineral estate proposed for leasing through the EOI process. The need for the BLM action is to respond to EOIs; the need to respond is established by the FOOGLRA, MLA, and FLPMA.

Decisions to be made based on this analysis include which of the EOI parcels would be offered for lease, which parcels would be deferred from the December 2020 lease sale, which parcels are not available for leasing, and what stipulations would be placed on the parcels offered for lease.

CONFORMANCE WITH BLM LAND USE PLANS

Oil and gas leasing and development on Federal mineral estate requires BLM environmental analysis in accordance with the NEPA at the Resource Management Plan (RMP), leasing, and project-specific development stages. Table 1 on the following pages outlines the environmental review stage, the review trigger, general outcome(s), and outcome(s) related to this analysis.

The seven parcels analyzed are within lands identified in the 2014 Approved RMP as open to oil and gas leasing. Specifically, the 2014 Approved RMP decision is Minerals Management-Decision (MM-D) 1.1.5: "Identify approximately 1,011,470 acres as open[1] to fluid mineral leasing, subject to major constraints (both CSU - Protected Species[2] and CSU - Sensitive Species[3])." Therefore, the proposed action is in conformance with the BFO 2014 Approved RMP.

[1] The acres under consideration for leasing in this EA were identified as open to fluid mineral leasing in the 1997 Caliente RMP (pages 33-34). The open to fluid mineral leasing identification was carried forward and analyzed through the RMP revision process. The 2014 ROD and RMP maintained the identification of open to fluid mineral leasing. The 2019 Final Supplemental EIS and ROD affirmed the 2014 ROD/Approved RMP and made no changes to the 2014 decisions.
[2] Protected species are those listed under the Federal Endangered Species Act (ESA).
[3] Sensitive species are those identified by the BLM California State Director according to the Bureau's Sensitive Species Policy December 2019.

Table 1: Environmental review stages associated with oil and gas activity on Federal mineral estate

Environmental review stage	Triggered by	General outcome(s)	Outcome(s) related to this analysis[4]
First level, resource management area-wide analysis of land use allocations	BLM responsibility to respond to new data, new and emerging issues, acquired lands, and changes to laws, regulations, and policies regarding management of affected public lands	Identification of areas as open or closed to fluid mineral leasing. Identification of appropriate stipulations for areas identified as open to fluid mineral leasing.	The 2012 Final Environmental Impact Statement (EIS) analyzes potential impacts of the Proposed RMP including fluid mineral leasing decisions, constraints on leasing in the form of stipulations[5], and activities related to oil and gas development, production, and restoration. The 2014 Record of Decision (ROD) and Approved RMP finalize fluid mineral leasing decisions (RMP sec. 2.14.1.1, pages 75-90). The 2014 ROD/Approved RMP includes standard engineering practices and standard operating practices (Appendix 3, pages 252-264).

[4] Description of land use planning history in the BLM BFO is included under Relationship to Statutes, Regulations, and Other Plans, National Environmental Policy Act.

[5] From the Planning for Fluid Mineral Resources Handbook (H-1624-1): The RMP/EIS serves as the primary vehicle for identifying and documenting the need for constraints on fluid mineral exploration and development activities. Constraints in the form of stipulations are conditions of lease issuance which provide protection for other resources values or land uses by establishing authority for substantial delay or site changes or the denial of operations within the terms of the lease contract… The plan or plan amendment must describe the resource condition objectives that have been established and the types of lease stipulations, conditions of approval, and levels of protection (setbacks, slopes, seasonal limits, and other constraints whether minor or major) that will be employed to accomplish these objectives. The need for stipulations and/or conditions of approval and to set protection levels should be supported by the analyses in the RMP. The resource condition objectives and associated stipulations, conditions of approval and protection levels should be described in the RMP.

Lease stipulations are in addition to standard lease terms. Standard lease terms are imbedded within Offer to Lease and Lease for Oil and Gas Form 3100-11. Lease stipulations are created through the Land Use Plan. As required by 43 CFR 3101.1-3, lease stipulations are added to each parcel identified for lease offer and become part of the lease. From Handbook 1624-1 – Planning for Fluid Mineral Resources, lease stipulations types include:

- *No Surface Occupancy (NSO)*: Use or occupancy of the land surface for fluid mineral exploration or development is prohibited in order to protect identified resource values. The minerals under NSO lands may potentially be developed by directionally or horizontally drilling from nearby lands that do not have the NSO limitation.
- *Controlled Surface Use (CSU)*: Use and occupancy is allowed (unless restricted by another stipulation) but identified resource values require special operational constraints that may modify lease rights.
- *Timing Limitation (TL)*: Prohibits surface use during a specified time period to protect identified resource values. (Seasonal Restriction)

Whether a constraint is considered “minor” or “major” depends circumstance of its application. For example, typically TLs are considered “minor” and NSOs are considered “major”.

			The 2019 Final Supplemental EIS analyzes the potential impacts of hydraulic fracturing. The 2019 ROD affirmed the 2014 ROD/Approved RMP and made no changes to the 2014 decisions.
Second level, parcel-scale analysis of potential impact from proposed leasing, including generalized analysis of potential future development based on reasonably foreseeable development scenario	BLM receipt of EOI	Identification of parcels within the area open to fluid mineral leasing as either: approved to offer for lease, deferred to future lease sale consideration, or not available to lease. For parcels approved to offer for lease, identification of stipulations to be applied.	A lease for oil and gas gives a lessee (holder of the lease) the right to drill and produce, subject to lease terms, stipulations, other reasonable measures[6], and approval of an APD (see next row in table regarding additional environmental analysis at development proposal stage).
Third level, site-specific analysis of potential impact from proposed project (including if project proposes well stimulation techniques)	BLM receipt of a development application such as a Notice of Staking (NOS), Application for Permit to Drill (APD), a Master Development Plan (MDP), a Sundry Notice of Intent (Sundry), or a request for right-of-way (ROW).	Development proposal is either: approved, approved with conditions, or denied. The BLM may require additional, reasonable mitigation measures as part of the development approval so long as the additional measures are consistent with the lease terms and stipulations.	

[6] The regulations at 43 CFR 3101.1-2 define the reasonable measures which the BLM can require of a lessee. Generally, the BLM cannot deny a lessee the right to drill once a lease is issued unless the action is in direct conflict with another existing law. While the BLM may not deny the lease once issued, the BLM may require a lessee to move its proposal to other parts of the leased property to protect public land resources.

RELATIONSHIP TO STATUTES, REGULATIONS AND OTHER PLANS

National Environmental Policy Act

This EA is tiered to the 2012 BFO Proposed RMP/Final EIS, the 2019 Final Supplemental EIS, and implements the 2019 ROD which affirmed the 2014 ROD/Approved RMP with respect to fluid minerals. A brief history of land use planning in the BFO follows:

- In 2008, the BLM published in the *Federal Register* a Notice of Intent to prepare a revision of the RMP for public lands and mineral estate within the BFO and to prepare an associated EIS.
- In 2011, the BLM published the Draft RMP/Draft EIS.
- In 2012, the BLM finalized the environmental review process with publication of the Proposed RMP/Final EIS.
- In 2014, the BLM signed and published the ROD in which it approved the RMP.
- In 2015, the 2014 ROD/Approved RMP and the 2012 Proposed RMP/Final EIS were challenged (Civ. No. 2:15-cv-04378-MWF/JEM [June 10, 2015]) in the U.S. District Court, Central District of California (Court).
- In 2016, the Court issued a decision finding the BLM failed to take a "hard look" at the potential environmental impacts of hydraulic fracturing in the 2012 Final EIS. The Court upheld the range of alternatives analyzed in the 2012 Final EIS and found the Reasonably Foreseeable Development Scenario (RFDS) acceptable. The Court determined that the BLM was obligated to analyze the environmental consequences resulting from the use of hydraulic fracturing.
- In 2017, the Court approved a Settlement Agreement that included a provision that the BLM would not hold a lease sale in the BFO until additional environmental analysis was complete.
- In 2018, the BLM published in the *Federal Register* a Notice of Intent to prepare a potential RMP amendment and to prepare an associated Supplemental EIS.
- In 2019, the BLM published a Draft Supplemental EIS, Final Supplemental EIS, and ROD. (Available at: https://eplanning.blm.gov/eplanning-ui/project/100601/510)
- After analyzing the effects of hydraulic fracturing, the 2019 ROD affirmed without modification the decisions of the 2014 ROD/Approved RMP. The 2019 Final Supplemental EIS provided the analysis for why no changes to the decisions of the 2014 ROD/Approved RMP were necessary.
- Completion of the additional environmental analysis fulfilled the Court requirement that the BLM undertake additional environmental review of the effects of hydraulic fracturing. With this accomplished, the BLM may consider a fluid mineral lease sale.

On July 16, 2020, the Council on Environmental Quality (CEQ) published in the *Federal Register* the final rule to update its regulations for Federal agencies to implement the NEPA. The updated regulations take effect September 14, 2020. As this environmental review was underway prior to the effective date of the new regulations, the BLM will process the environmental review under the prior regulations, which is specifically allowed for in 40 CFR 1506.13.

Oil and Gas Laws and Regulations

The Bakersfield Field Office contains extractable minerals including oil and gas. Oil and gas minerals are managed in accordance with the FOOGLRA, 2005 Energy Policy Act, Sec. 362(2), MLA, FLPMA, 43 CFR Part 3100, Onshore Orders 1, 2, 6, & 7, and the mineral management objectives in the 2014 BFO Approved RMP. The BLM requires lessees to comply with all Federal laws, regulations, and policies that govern each oil and gas lease; at the same time, the BLM recognizes existing leases grant lessees certain rights.

The BLM also requires lessees to adhere to all State and Local laws and regulations. In California, this BLM requirement includes adherence to State law Senate Bill No. 4 (SB4), which regulates well stimulation treatments (including hydraulic fracturing).

Federal Land Policy and Management Act

The FLPMA, as amended, directs the public lands be managed "on the basis of multiple-use and sustained yield"…"in manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values"… and "which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands…". The act further defines "public lands" as "any land and interest in land owned by the United States… and administered by the Secretary of Interior through the BLM."

Within its mandate for multiple use management on the public lands, the BLM identified oil and gas leasing and development as an appropriate land use in its 2014 Approved RMP. This proposed lease sale implements the 2014 ROD/Approved RMP, which are based upon the 2012 Proposed RMP/Final EIS and affirmed by the 2019 ROD and Final Supplemental EIS, and Congressional directives in FLPMA, allowing BLM to manage lands for multiple use and sustained yield, while protecting the quality of other public land resources. The BLM has the responsibility for managing the public lands and Federal mineral estate included in this proposed lease sale.

Clean Air Act

Clean Air Act (CAA) regulations are administered by the US Environmental Protection Agency (EPA) at the Federal level. The San Joaquin Valley Air Pollution Control District (SJVAPCD) has local air quality jurisdiction over the seven parcel locations. Under the Federal CAA National Ambient Air Quality Standards (NAAQS), the entire SJVAPCD area is classified as nonattainment for ozone and particulate matter smaller than 2.5 microns in diameter ($PM_{2.5}$). Section 176(c) of the CAA, as amended (42 USC 7401 et seq.) and regulations under 40 CFR part 93, subpart B, with respect to conformity of general Federal actions to the applicable State Implementation Plan (SIP) apply to projects within nonattainment and maintenance areas. Under those authorities "no department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan." Under CAA 176(c) and 40 CFR part 93 subpart B, a Federal agency must make a determination that a Federal action conforms to the applicable SIP before the action is taken. See Chapters 3 and 4 for additional discussion of conformity as it relates to the proposed action.

Endangered Species Act

The Endangered Species Act of 1973 (ESA) requires all Federal agencies shall, in consultation with and with assistance of the Secretary (delegated to United States Fish and Wildlife Service (USFWS)), insure that any action authorized, funded, or carried out by such agency in not likely to jeopardize the continued existence of any endangered species or threatened species or result in destruction or adverse modification of habitat of such species which is determined critical (ESA section 7(a)2). The ESA further declares that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purpose of the Act (ESA section 2 (c)1).

The BLM completed formal consultation with the USFWS for the RMP, including the fluid mineral management decisions. The USFWS issued a no jeopardy Programmatic Biological Opinion (PBO

08ESMF00-2012-F-0682) for the RMP on October 23, 2014. The 2014 Approved RMP PBO addresses fluid mineral leasing, stating:

> "All new oil, gas and geothermal leases issued under the RMP would contain CSU stipulations to protect listed species and critical habitat. These CSU stipulations may result in relocation of disturbance areas, timing restrictions on development or prohibitions of development in certain areas. Species-specific surveys and appropriate species-specific avoidance measures would be included prior to and during oil and gas development activities. Within the San Joaquin Valley, oil and gas development includes a habitat compensation requirement in areas where species habitat will be impacted." (page 49)

> "The effects of specific mineral lease development will be analyzed in appendages to this PBO or in the case oil and gas development on BLM lands in Kern county, has been analyzed in an existing Section 7 programmatic consultation (Service reference numbers 1-1-01-F-0063, 1-1-03-F-0295, OSESMF00-2013-F-0010)." (page 50)

The Section 7 programmatic consultation referenced on page 50 (Service reference numbers 1-1-01-F-0063, 1-1-03-F-0295, OSESMF00-2013-F-0010), was updated and replaced with the 2017 Oil and Gas Programmatic Biological Opinion (08ESMF00-2016-F-0683, "2017 PBO").

During preparation of the Supplemental EIS in 2018-2019, the BLM considered reinitiation of formal consultation with the USFWS for the RMP. The BLM determined none of the reinitiation criteria for the 2014 PBO[7] (page 54) were met and no further consultation was necessary.

The BLM determined the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in effects to endangered species, and the 2014 PBO meets the consultation requirement. The BLM acknowledges effects to endangered species may result after leasing, if and when a development proposal for the lease(s) is submitted. At development proposal submission time, the BLM would complete a site-specific ESA review. If the BLM site-specific ESA review determines the proposed development action may affect listed species, additional ESA compliance action would be completed. Additional ESA compliance actions might include new consultation with USFWS or coverage under an existing valid PBO, such as the 2017 PBO.

National Historic Preservation Act of 1966, as amended

Section 106 of the National Historic Preservation Act (NHPA) requires agencies make a reasonable and good faith effort to identify historic properties that may be affected by an agency's undertakings[8] and take those effects into account in making decisions. Under 36 CFR 800.14, the BLM may enter into

---

[7] As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

[8] 36 CFR 800.16(y) Undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.

programmatic and/or protocol agreements governing implementation of Section 106 for BLM programs. The applicable programmatic and protocol agreements for the proposed action to offer parcels for competitive oil and gas leasing are the: *National Programmatic Agreement Among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (2012)* and *State Protocol Agreement Among the California State Director of the Bureau of Land Management and the California State Preservation Officer and the Nevada State Historic Preservation Officer (2019).* Under the 2019 Protocol, fluid mineral leasing is identified as an undertaking for the purposes of NHPA review. The procedures for conducting fluid minerals leasing review are found in the *Supplemental Procedures for Fluid Mineral Leasing, Amendment to the State Protocol Agreement (2016)*. The supplemental procedures specifically address the appropriate identification efforts for Section 106 compliance under NHPA at the leasing stage. At the time of leasing, a Class I record search and tribal consultation are used to identify potential adverse effects to historic properties for consideration during the earliest phases of lease sale planning. Site-specific land disturbing activities are not authorized by a leasing decision.

If the proposed lease sale proceeds and leases are issued, the third phase of the oil and gas program may occur: submission of development proposals with site-specific, surface disturbing activities. If development proposals are received, the BLM would complete a site-specific NHPA review. The site-specific NHPA review would require a Class III physical survey where surface disturbance is proposed. As a result of the Class III survey, the BLM would make every reasonable effort to avoid effects to identified historic properties.

In addition, 36 CFR 800.8(a) encourages Federal agencies to coordinate compliance with Section 106 with steps taken to comply with the NEPA. This coordination includes consideration of Section 106 responsibilities as early as possible in the NEPA process, as well as planning public participation, analysis, and review to meet the purposes and requirements of both statutes in as timely and efficient manner as possible.

SCOPING AND ISSUES

On May 19, 2020, an interdisciplinary team (IDT) reviewed the parcels to determine if they are in areas open to leasing; potential issues and potential alternatives, including appropriate stipulations; whether new information is available since the land use plan was approved; if additional consultations with USFWS or Tribes are necessary; and if there are special resource conditions of which potential bidders should be made aware. Issues identified for further consideration and potential detailed analysis included socio-economic values, visual resources, recreation, air and atmospheric values, soil resources, water resources including floodplains, biological resources including riparian and wetlands, cultural resources, paleontological resources, livestock grazing, lands and realty, prime farmland, and oil and gas resources.

Although, the proposed action of leasing itself has no physical environmental effects and there exists inherent uncertainty as to whether parcels will be sold, issued, and developed; the BLM acknowledges that leasing could lead to development, therefore a reasonable level of development analysis is applicable to this environmental analysis. The following issue questions arise from consideration of potential development:

- How would the development of new oil and gas wells affect jobs, the local economy, and environmental justice populations?

- How would the construction of new oil and gas wells and infrastructure alter the visual landscape? Are the potential alterations within allowable parameters set forth in the 2014 ROD/Approved RMP?
- How would dispersed recreation opportunities be impacted by development of oil and gas leases? How would the oil and gas activities affect recreation opportunities in the Temblor Special Recreation Management Area?
- How would emissions generated by construction activities (e.g. generation of dust, burning of diesel, well drilling, well completion (including hydraulic fracturing)) and subsequent operation of the well impact air and atmospheric values?
- How would emissions generated by construction activities, subsequent operation of the well, and downstream use of the produced petroleum contribute to increases in GHGs (CO_2e) impact climate change?
- How would construction activities (e.g. grading, drilling) impact soil productivity and erodibility? How might ongoing operations affect soil chemistry and productivity?
- How would drilling through aquifers impact drinkable groundwater? How would construction and operations activities (potential for erosion, sediment carry, spills and leaks) impact surface water? How would the use of water for drilling and dust abatement impact availability of fresh water for other beneficial uses?
- How would potential construction activities (e.g. drill rig noise, vehicle traffic), ongoing operations (e.g. vehicle traffic) and habitat disturbance (e.g. vegetation clearing, fragmentation) impact federally listed and BLM sensitive species?
- How would oil and gas development affect known and unknown cultural resources? How would Tribes be considered and involved in future development decisions?
- How would drilling through soil horizons and rock layers impact potential fossil yield?
- How might oil and gas development affect livestock grazing operations on the same parcels?
- How would oil and gas development contribute to lands and realty actions?
- How would oil and gas development affect the availability of oil and gas resources? What role does potential development of the proposed lease parcels contribute to oil and gas development within the San Joaquin Valley and the state of California?

This EA documents the BFO environmental review of the proposed leasing action and includes disclosure of the affected environment, the anticipated impacts, and proposed mitigation of impacts.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

ALTERNATIVE 1: PROPOSED ACTION

The BLM proposes to conduct a competitive oil and gas lease sale of for seven parcels of Federal mineral estate (4,333.58 acres). In Appendix A, parcels are identified by number and described by legal location, acres, type (public and/or split-estate lands), proposed lease stipulations, and proximity to existing, administrative oil field boundaries.

Design Features

In addition to the standard lease stipulations and in accordance with 2014 Approved RMP, specifically, MM-D 1.1.5, the seven parcels would be subject to CSU - Protected Species and CSU - Sensitive Species. In addition, 40 acres of Parcel 1 would be subject to CSU - Known Cultural Resource and NSO - General stipulation. Parcels 5 and 6 would also be subject to an Idle Well stipulation. Appendix B includes the full text of the stipulations.

ALTERNATIVE 2: NO ACTION

Under the No Action Alternative, the BLM would not offer the seven parcels nominated and located in areas open to leasing under the 2014 Approved RMP, which contain approximately 4,333.58 acres, at the December 2020 lease sale. This would mean the EOIs would be rejected and no lease parcels would be offered at the December 2020 lease sale. Choosing the No Action alternative would not prevent future leasing in these areas consistent with land use planning decisions and subject to appropriate stipulations, identified in the land use plan.

ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS

Offering All Leases Subject to Standard Lease Terms and Conditions

Offering all nominated parcels with only the standard lease terms and conditions on the BLM's lease form was considered as a means to reduce constraints to oil and gas development on public lands. Such an alternative is not in conformance with the 2014 Approved RMP where the applicable RMP prescribes stipulations in accordance with FLMPA's Section 102(a)(8) mandate to manage the public lands to protect resource values. Therefore, this alternative was not analyzed in detail.

Offering All Leases Subject to NSO - General Stipulation

An alternative was considered that would offer all parcels located in areas open to leasing with the NSO - General stipulation. This alternative was not carried forward to detailed analysis because it is not in conformance with the 2014 Approved RMP and would only prohibit surface occupancy for oil and gas development; other non-oil and gas occupancy may not be similarly constrained. This alternative would unnecessarily limit oil and gas occupancy in areas where the 2014 Approved RMP has determined less restrictive stipulations would adequately mitigate the anticipated impacts under the BLM mandate of multiple-use and sustained yield.

Leasing of Eighth EOI Parcel

Through the EOI process, eight parcels were nominated for inclusion in the December 2020 Competitive Oil and Gas Lease Sale. After an initial review of the eight parcels, the BLM removed a portion of the eighth parcel (159.48 acres) from consideration because the portion is within the Palm Springs-South Coast Field Office and covered under a separate RMP. The other portion of the eighth parcel is within the BFO administrative area and was also eliminated from detailed analysis because the BLM was unable to

consult with the interested Native American Tribe. The Tribe is unavailable because of COVID-19 pandemic resource limitations. The EOI will be deferred for future consideration.

Removal of Buena Vista Unit due to Biological Resource Concerns

An alternative was considered that would eliminate the Buena Vista Unit parcels within the Lokern-Buena Vista Area of Critical Ecological Concern (ACEC) in order to reduce impacts to Biological Resources. This alternative was removed from further analysis because the Lokern-Buena Vista ACEC has the following special management direction (a) Identified as open for fluid mineral leasing, subject to major constraints (CSU-Protected Species and CSU-Sensitive Species stipulations); (b) Identified as closed to mineral materials disposals, except for administrative purposes. This alternative would unnecessarily limit oil and gas occupancy in areas where the 2014 Approved RMP determined that stipulations would adequately mitigate the anticipated impacts under the BLM mandate of multiple-use and sustained yield.

CHAPTER 3. AFFECTED ENVIRONMENT

This section describes the current environment and present conditions of various resources that may be affected by the project. Only those aspects of the affected environment that are potentially impacted are described in detail. The following are not present on any of the parcels: prime or unique farmlands, wild horse or burro populations, lands with wilderness characteristics, cave and karst resources, riparian and wetland resources, and forest resources.

SOCIAL AND ECONOMIC CONSIDERATIONS

Social and Economic Conditions

The population of Kern County continues to grow rapidly, to nearly 900,000 in 2018. The County population increased by 35 percent from 2000-2018, compared to just 16 percent statewide. In 2018, Kern County had a higher proportion of Hispanic/Latino residents (53 percent) than did California (39 percent). Per capita income was $40,400, compared to the statewide average of $67,400. About 22 percent of Kern County residents were living below the poverty level in 2018, compared to 14 percent of residents statewide. A higher proportion of County residents (17 percent) received income from the Supplemental Nutritional Assistance Program than did residents statewide (9 percent).

The structure of the Kern County economy differs from that of the State, with 26 percent of jobs in the non-services sector (farm and agricultural services, forestry, fishing & other; mining - including fossil fuels; construction; and manufacturing - including forest products), compared to 13 percent of jobs statewide. Similarly, the County has a much lower proportion of jobs in the services sector - 57 percent, compared to 75 percent statewide. The 2012 Proposed RMP/Final EIS concluded the Planning Area counties are a substantial source of oil in the state and the nation; in 2009, Planning Area counties provided 83 percent of state oil production. Extraction and drilling of oil and gas within Planning Area counties accounted for 0.5 and 1.1 percent of employment and labor income within these counties. Of the BLM contributions to the Planning Area economy, by far the greatest was jobs and income resulting from fluid minerals production, accounting for 61-68 percent of the jobs and 66-74 percent of the labor income (2012 Proposed RMP/Final EIS, Table 3.23-4).

Environmental Justice

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, programs, and policies. Executive Order 12898 requires Federal agencies to "identify and address the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

According to the CEQ Environmental Justice Guidelines for NEPA (1997), "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." As described above, Kern County qualifies as an environmental justice population given 53 percent of residents are Hispanic/Latino. This is consistent with the 2012 Proposed RMP/Final EIS, which found many Planning Area counties had shares of their population identified as Hispanic or of other minority groups that were greater than the state's share in 2010, so minority populations within the Planning Area met the CEQ's Environmental Justice criterion. Native Americans comprise 1.1 percent of the population in Kern

County, compared to 0.8 percent statewide. The Cultural Resources section describes sites and uses having value to Native Americans and how impacts will be assessed.

Low-income populations are those whose residents live at or below the poverty level in higher proportions than that of a reference or comparison area. As described above, the percentage of Kern County residents living below the poverty level (about 22 percent) is much higher than the percentage for the State of California (about 14 percent), thus Kern County is also an environmental justice population based on its low-income status. The 2012 Final EIS found the share of those living below the poverty line was greater than the state in many Planning Area counties, so low-income populations, as defined by CEQ, existed within the Planning Area.

VISUAL RESOURCE MANAGEMENT

Visual Resource Management (VRM) is applied to both public lands and Federal actions on split-estate. The BLM goal is for public lands to demonstrate a range of visual resource values that allow for development and provide opportunities for scenic appreciation. For all surface-disturbing projects or activities, regardless of size of potential impact, the BLM would incorporate visual design considerations, consistent with the Visual Resource Contrast Rating Manual H-8431-1, to meet VRM Class objectives of the area.

The seven parcels proposed for the lease sale occur in Class III and Class IV visual resource inventory areas. Class III is defined as partially retaining the existing character of the landscape but also allowing change to occur. Class IV are areas where the characteristic landscape has had major modifications and due to management activities, the level of change in the basic landscape elements (line, form, color, texture) activities is high. Furthermore, these management activities dominate the landscape and are the major focus of viewer's attention. Appendix F, VRM Classification Objectives, shows the parcels by VRM class and includes a map.

RECREATION

The parcels slated to be offered for lease are all in or adjacent to actively developed oil and gas areas. Recreational use in the vicinity typically includes sightseeing, off-highway vehicle use, wildlife watching, and other dispersed recreational activities. Parcel 6 includes 47.62 acres of public lands within Temblor North Recreation Management Zone (RMZ) of the Temblor Special Recreation Management Area (SRMA); refer to the 2014 ROD/Approved RMP for additional information on the Temblor SRMA, including resources, uses, and management of objectives (pages 107-109). The parcels to be offered under the Proposed Action support limited dispersed recreation.

AIR AND ATMOSPHERIC VALUES

Air Quality

The first comprehensive federal air pollution legislation was the Clean Air Act (CAA) of 1970. At the federal level, regulatory duties for the parcels of concern lie with the EPA, Region IX. At the state level, regulatory duties are delegated to the California Air Resources Board (CARB). CARB regulates air pollution from mobile (cars, trucks, and buses) and other sources. At the local level, oversight for air quality rests with air districts, such as the SJVAPCD. The local air districts are authorized to regulate mainly stationary emission sources (e.g. businesses and industrial facilities). State law makes CARB the lead agency for all purposes related to the SIP. Local air districts prepare SIP elements, including regulations and permitting programs, and submit them to CARB for review and approval. CARB

forwards SIP revisions to the EPA for approval and publication in the *Federal Register*. The BLM has air program responsibilities through its permitting programs, and CAA requirements to analyze all actions for conformity to air quality plans, such as the SIP.

The parcels proposed for lease are located within the San Joaquin Valley Air Basin. In 2016, SJVAPCD reported "the Valley's air quality is better than it has been at any other time on record. The ozone precursor emissions in the Valley are at historically low levels with approximately 80 percent reduction in NOx stationary source emissions since 1990…With over 85 percent of the Valley's remaining ozone and PM2.5 precursor emissions now coming from mobile sources under state and federal jurisdiction, the Valley cannot reach attainment even if all stationary sources were to be shut down." (SJVAPCD 2016).

Criteria Pollutants

Among the most important provisions of the CAA are the sections relating to the establishment of National and State Ambient Air Quality Standards (NAAQS), nonattainment areas, the development of state implementation plans (SIPs), and federal conformity.

The U.S. EPA has established NAAQS for seven criteria pollutants: ozone, respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide (SO_2). Criteria pollutants are defined as those pollutants for which the federal and state governments have established ambient air quality standards for concentrations to protect public health. One set of limits (primary standards) protects health; another set of limits (secondary standards) is intended to prevent environmental and property damage. A geographic area that meets or exceeds a primary standard is called an attainment area; areas that do not meet the primary standard are called nonattainment areas (https://www.epa.gov/clean-air-act-overview).

SIPs are prepared (and adopted) for Federal nonattainment areas. SIPs are implemented through a series of rules and regulations and are designed to result in compliance with the NAAQS by federally imposed deadlines. In California, CARB oversees compilation of the SIP and incorporates regulations and air quality plans developed by APCDs that include nonattainment areas. Regulations and commitments in SIPs are federally enforceable. APCD rules and regulations potentially applicable to specific projects may be developed on leases offered through the proposed action would be described in future project-specific assessments.

Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are regulated under Section 112 of the CAA. Section 112 requires EPA to regulate and control emissions of listed HAPs. The EPA does so through Federal National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, which control HAP emissions from specific emission sources. HAPs include air pollutants that could produce illness or increased mortality if exposures are too high. For example: carcinogens such as benzene and neurotoxins such as mercury are regulated as HAPs. The state of California also has regulations addressing inventory assessment and risk management of emissions of compounds of this kind, describing them as Toxic Air Contaminants (TACs) or Air Toxics.

Beginning in the 1990s, EPA studied oil exploration and production operations to determine if HAP emissions were substantial enough to require regulation under NESHAP. EPA found emissions from various processes and operations at oil and natural gas facilities typically include five HAPs: benzene, toluene, ethyl benzene, mixed xylenes, and n-hexane (https://www.epa.gov/stationary-sources-air-pollution/oil-and-natural-gas-production-facilities-national-emission). Oil and gas production rules and rule revisions were promulgated by the EPA in 1999, 2001, 2007, and 2012. Additional rulemaking data

was requested from industry by EPA in 2015 and 2016. Benzene, a compound found in many varieties of crude oil, was identified as the HAP of greatest potential concern. To date, only one type of oil exploration and production equipment (glycol dehydrator) has been identified as a substantial source of benzene or other HAP emissions requiring regulation.

General Conformity

As a Federal agency, the BLM is required to comply with applicable air quality laws, regulations, standards, and implementation plans (Section 118). The classification of any area as a Federal nonattainment or maintenance area brings an additional requirement for Federal agencies. Section 176(c) of the CAA, as amended (42 U.S.C. 7401 et seq.), and regulations under 40 CFR, part 93, subpart B, state "no department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan." This means that under the CAA 176(c) and 40 CFR, part 93, subpart B (conformity rules), Federal agencies must make a determination that proposed actions in Federal nonattainment areas conform to the applicable EPA approved implementation plans (if pertinent) before the action is taken. Geographic areas that meet NAAQS are exempt from determining conformity with SIPs. The parcels proposed for competitive leasing occur within a designated nonattainment area, therefore general conformity will be discussed in Chapter 4 and determinations will be made for any specific projects or development plans carried out.

Air Quality Related Values

Air Quality Related Values (AQRVs) are resources sensitive to air quality and include aesthetic values such as visibility as well as biological and terrestrial resources such as vegetation, soils, water, and wildlife. AQRVs on Federal lands are identified and managed within the respective jurisdictions of several land management agencies in designated Class I areas. Class I areas are afforded specific AQRV protection under the CAA. There are several Class I areas located in or adjacent to the analysis area, including Kings Canyon, Sequoia, and Yosemite National Parks, and the Ansel Adams, Domeland, and John Muir Wilderness areas. The nearest Class I area is the San Rafael Wilderness, approximately 30 miles west-southwest of the southernmost lease parcels.

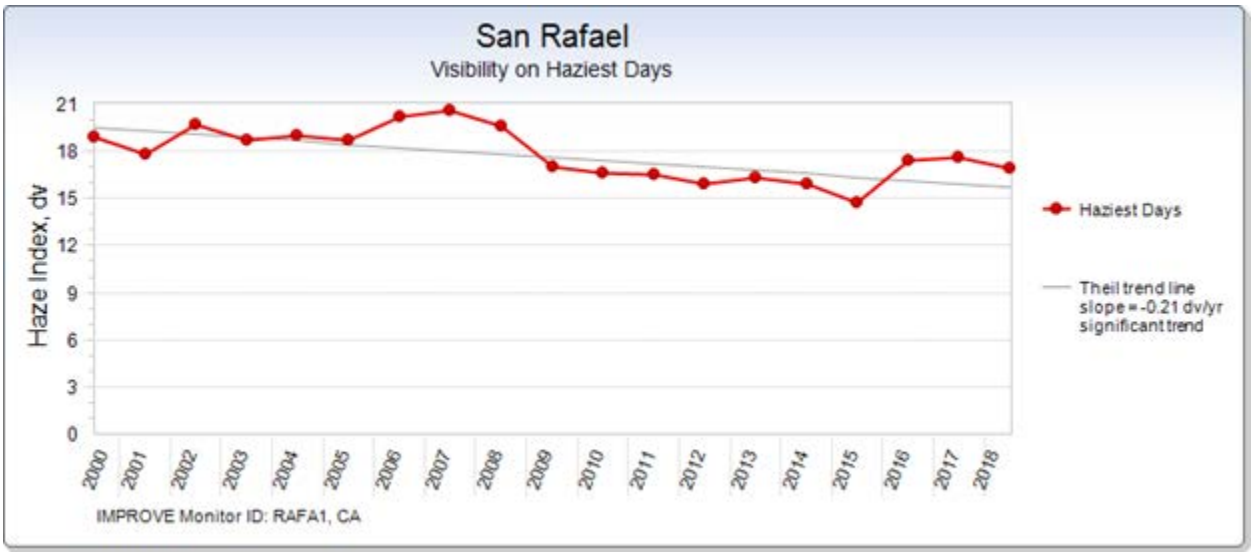
Air pollution can impact AQRVs through exposure to elevated atmospheric concentrations. Examples of air pollution impacts to AQRVs include: ozone (O_3) effects to vegetation; deposition of air pollutants, such as sulfur and nitrogen compounds, on the earth's surface through precipitation or dry deposition; and impairment of scenic views by pollutant particles in the atmosphere.

Atmospheric deposition occurs when gaseous and particulate air pollutants are deposited on the ground, water bodies, or vegetation. Pollutants may settle as dust or be washed from the atmosphere in rain, fog, or snow. When air pollutants such as sulfur and nitrogen are deposited into ecosystems, they may cause acidification or enrichment of soils and surface waters. Atmospheric nitrogen and sulfur deposition may affect water chemistry, resulting in impacts to aquatic vegetation, invertebrate communities, amphibians, and fish. Deposition can also cause chemical changes in soils that alter soil microorganisms, plants, and trees. Although nitrogen is an essential plant nutrient, excess nitrogen from atmospheric deposition can stress ecosystems by favoring some plant species and inhibiting the growth of others.

Impairment of scenic views can result from pollutant particles degrading the contrast, colors, and distance an observer is able to see. Visibility is a measure of how far and how well an observer can see a distant and varied scene and can be assessed in terms of the distance a person can distinguish a large dark object on the horizon. Visibility degradation is primarily due to anthropogenic nitrate,

sulfate, and particulate emissions as well as wildfires. Air pollutants affecting visibility can be transported hundreds of miles. Visibility is measured as the standard visual range in miles, and a deciview (dv) is a unit of measurement to quantify human perception of the change of visibility. A deciview value is derived from the natural logarithm of atmospheric light extinction coefficient. One (1) deciview is roughly the smallest change in visibility (haze) and is barely perceptible. Because visibility at any one location is highly variable throughout the year, visibility is characterized by three groupings: the clearest 20 percent days, average 20 percent days, and haziest 20 percent days. The San Rafael Wilderness includes the closest monitoring station for visibility. The figure below shows current visibility trends at the San Rafael Wilderness.

Figure 1 Air quality at San Rafael Wilderness



Source: IMPROVE 2018 http://vista.cira.colostate.edu/Improve/aqrv-summaries/

Despite Interstate 5, Highway 99, and other major thoroughfares as well as stationary sources including existing oil fields which are also located within 5 miles of the southern proposed lease parcels, the Haze Index at the San Rafael Wilderness shows a substantial improvement trend over the most recent 20-year monitoring period.

Climate and Meteorology

The Central Valley is one of the dominant features in the California landscape. The valley extends nearly 500 miles in length, while the width of the floor is approximately 45 miles. The San Joaquin Valley is surrounded by the Sierra Nevada Mountains to the east, the Pacific Coast range to the west, and the Tehachapi Mountains to the south. At the south end of the Valley, Bakersfield is approximately 400 feet in elevation.

California lies within the zone of prevailing westerlies and on the east side of the semi-permanent high-pressure area of the northeast Pacific Ocean. The basic flow in the free air above the State, therefore, is from the west or northwest during most of the year. Within the State, several mountain chains are responsible for deflecting these winds and wind direction is likely to be more a product of local terrain than it is of prevailing circulation. Isotherms run mostly north-south, parallel to the contours of the mountains, instead of east-west as is common in most parts of the temperate zone. The climate and geography of the Valley create optimal conditions for forming and trapping air pollution. The San

Joaquin Valley is particularly vulnerable to air pollution formation because of its topography, climate, and growing population. In addition, the Valley's hot summer temperatures promote the formation of harmful ground-level ozone, a major component of smog (www.valleyair.org).

The northern Central Valley has a hot Mediterranean climate while the southern portions in rain shadow zones are dry enough to be considered low-latitude desert. It is hot and dry during the summer and cool and damp in the winter, when frequent ground fog known regionally as "tule fog" can obscure visibility. Summer daytime temperatures are generally in the 90-degree F range, and heat waves may bring temperatures in excess of 104 ºF. The rainy season occurs mid-autumn to spring and the northern half of the Valley receives greater precipitation than the arid southern half. The region is seasonably dry, as are most parts of the West; normal annual precipitation in the Bakersfield area is 5.83 inches (http://www.wrcc.dri.edu/).

Climate Change

The global climate depends on the presence of greenhouse gases (GHGs) to naturally provide the "greenhouse effect." The greenhouse effect stems from water vapor, aerosols, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and other GHGs that trap heat radiated from the earth's surface. Globally, the presence of GHGs affects temperatures, precipitation, storm activity, sea levels, ocean currents, and wind patterns. Although GHGs have always been present, concentrations of CO_2 and other GHGs in the atmosphere have increased by more than 40 percent since the Industrial Revolution. Human activity since this time has increasingly contributed to emissions of six primary GHGs: CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Of the six primary GHGs, CO_2 is the most widely occurring accounting for 81 percent of US GHG emissions in 2018 (EPA, 2020A). Natural carbon cycling by the terrestrial biosphere occurs through photosynthesis (CO_2 uptake by plants) and respiration (CO_2 release by plants, animals, and microorganisms). Global ambient CO_2 concentrations have increased to an average of 407 parts per million (ppm) in 2018. The average of 407 ppm is estimated by the National Oceanographic and Atmospheric Administration (NOAA) to be the highest average concentration in the past 800,000 years (NOAA, 2020).

Following CO_2, Methane (CH_4) is the second most important anthropogenic GHG in the atmosphere, accounting for 9.5 percent of US GHG emissions in 2018 (EPA, 2020A). CH_4 is also produced biologically under anaerobic conditions in ruminant animals, wetlands, landfills, and wastewater treatment. In addition, fertilizer use, agriculture, and changes in land use are major sources of CH_4 as well as N_2O in the atmosphere (EPA, 2020A).

Each GHG has a global warming potential (GWP) calculated to reflect how long emissions remain in the atmosphere. The GWP indicates the relative climate forcing (difference in energy absorbed by the earth versus that reflected back into space) of a given mass of emissions over a specified period. GWP is measured on a scale where CO_2, the least climate forcing emission when compared to the other GHGs by unit of weight, is assigned a GWP of one (1). The other GHGs absorb more energy and thus cause more climate forcing. When quantifying GHG emissions, the GWP of each GHG pollutant is multiplied by the mass of that pollutant to arrive at a CO_2 equivalent mass (CO_2e).

Consistent with global practice, this environmental analysis will aggregate GHG emissions into CO_2e on a 100-year basis. CH_4 has a 100-year GWP of 28 (IPCC, 2014). This means one (1) pound of CH_4 causes the equivalent climate forcing of 28 pounds of CO_2 over a 100-year period. A 20-year GWP has also been published for CH_4 to reflect the approximately 20-year period CH_4 persists in the atmosphere. When

averaged over a standard 100-year analysis period, CH_4 emissions active for 20 years at the 20-year GWP have approximately the same CO_2e value as CH_4 calculated using the 100-year GWP. N_2O, the third most prevalent GHG and the only other one to which oil and gas operations make a substantial contribution, has a GWP of 265 (IPCC, 2014).

Global emissions of CO_2e reached an all-time high of 55.3 billion metric tons in 2018, a 1.8 billion metric ton increase over 2017 (UNEP, 2019). Anthropogenic activity in the U.S. resulted in emissions of approximately 6,677 million metric tons of CO_2 equivalent ($MMTCO_2e$) in 2018 (EPA, 2020A), or roughly 12 percent of the global emissions. Oil and gas production across the US resulted in about 255 $MMTCO_2e$ in 2018. This represented roughly 0.5 percent of total global emissions or roughly 3.8 percent of US emissions in 2018 (EPA, 2020A). For comparison, about 17 $MMTCO_2e$ of annual GHG emissions resulted from oil and gas extraction and processing before refining in California in 2017 (CARB, 2019). This represented roughly 0.03 percent of the global total emissions, roughly 0.3 percent of the US total emissions, and roughly 7 percent of US oil and gas production emissions. The largest amount of total GHG emissions related to oil and gas production does not come from wells, pipelines, or processing, but from burning petroleum-based fuels. For example, the EPA reported 1,821 MMT of direct CO_2e emissions from fossil fuel combustion for transportation, which is almost all petroleum based, in 2018, but only 73 MMT of CO_2e from petroleum systems (EPA, 2020A).

Applicable Federal, State, and Local Regulations to Reduce Impacts of Oil and Gas Production on Air Quality and Climate Change

On April 17, 2012, EPA issued Final Air Rules to reduce HAPs from the oil and natural gas industry. The 2012 Final Air Rules regulation requires process monitoring, and installation of emission controls if monitoring indicates glycol dehydrator benzene emissions greater that 0.9 megagram (1.1 ton) per year. Based on information from existing wells on BLM land in BFO, emission controls are unlikely to be required on the leases offered in the proposed action.

Beginning on August 23, 1011, and continuing through June 3, 2016, EPA proposed, revised, issued, reconsidered, and finalized, New Source Performance Standards (NSPS) for control of GHG, volatile organic compounds (VOC), and sulfur dioxide (SO_2) (40 CFR 60 Subpart OOOOa). Under the NSPS for control of GHG, the EPA identified seven operations and types of equipment common to oil and gas production sites as sources of emissions. The seven operations and types of equipment are subject to the applicable requirements of the NSPS regulations.

The EPA also requires reporting of GHGs from large emissions sources in the US through the Greenhouse Gas Reporting Program (GHGRP) (EPA, 2020). The reporting threshold under this rule is 25,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per well pad or other facility. Based on information on existing wells on BFO managed Federal mineral estate, and a review of data reported to EPA GHGRP, should future development of the parcels proposed for leasing occur, the development is not expected trigger reporting under GHGRP.

The California Legislature passed the California Global Warming Solutions Act of 2006 [Assembly Bill 32 (AB 32)], creating a comprehensive, multi-year program to reduce GHG emissions in California. AB 32 requires the reporting of GHGs by major sources, applicable to industrial facilities, fuel suppliers, and electricity reporters. In 2005 and 2015, California Governors issued Executive Orders establishing mid-term and long-term GHG reduction targets for California of 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050 (CARB, 2020A). Based on a review of information on current wells on BFO managed Federal mineral estate and a review of GHGRP data, should future development of the

parcels proposed for leasing occur, the development is not expected to substantially affect progress toward established GHG reduction targets. See Chapter 4 for more information.

In 2017, CARB promulgated Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities regulation (Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4, Subarticle 13) designed to reduce CH_4 emissions. Under this rule, oil and gas facilities on private, state, and federal land and offshore property are required to limit vented gas, as well as unintentional leaked or fugitive emissions. This regulation was intended to build upon existing Air Pollution Control District rules by covering CH_4-specific sources addressed by other existing rules. This regulation enforces standards for: separator and tank systems; circulation tanks for well stimulations including hydraulic fracturing; leak detection and repair; underground natural gas storage monitoring; natural gas compressors; and pneumatic devices and pumps. This regulation reached full implementation in January 2020 and should reduce VOC and GHG emission from wells or related facilities that may be proposed for installation on the offered leases.

SOIL RESOURCES

A soil map unit represents a delineated area dominated by one or more (complex) type of soil. Soils are identified and named according to taxonomic classification; soil types are based on defined properties and characteristics. The United States Department of Agriculture, Natural Resource Conservation Service (NRCS) soil surveys provide maps and detailed map unit descriptions useful for land management. These surveys and the NRCS websites provide data (e.g. slope, soil pH range, salinity, clay content, and hydrological group) used to evaluate soil erosion and reclamation potential. The erosion potential of a soil is directly related to the slopes on which it is found. Typically, soils found on steeper slopes have a higher erosion hazard than those found on gentler slopes. According to the NRCS (2004), all soils occurring on slopes greater than 40 percent have poor reclamation potential based upon their high erosion rates.

Projects disturbing one or more acres of soil are required to obtain coverage under the State Water Resources Control Board (SWRCB) General Permit for Discharges of Storm Water Associated with Construction Activity (SWRCB Order No. 2009-0009-DWQ). This permit is based on a project's overall risk and requires measures to prevent erosion and reduce sediment and other pollutants in their discharges.

Soils within the parcels proposed for leasing are described in two NRCS Soil Surveys: 1) Kern County, California, Southwest Part; and 2) Kern County, Northeastern Part and Southeastern Part of Tulare County, California. A total of 21 soil map units were identified on the parcels proposed for leasing. For discussion purposes, soils are described by lease parcel and grouped by geographic "unit".

Cienega Unit (Parcels 1-4) Nine soil map units occur on the parcels. Soils identified include Guijarral sandy loam, 2 to 9 percent slopes; Guijarral gravelly sandy loam, 2 to 5 percent slopes; Klipstein-Guijarral complex, 5 to 15 percent slopes; Cuyama sandy loam, 2 to 5 percent slopes; Littlesignal-Cochora association, 30 to 50 percent slopes; Little-Cochora association, 15 to 75 percent slopes; Xeric Torriorthents-Badland complex, 30 to 75 percent slopes; and Laval-Pleitito complex, 1 to 5 percent slopes.

Poso Unit (Parcel 5) Two soil map units occur on the parcel. Soils identified include Chanac-Pleito-Premier association, 20 to 60 percent slopes; and Premier-Haplodurids complex, 9 to 30 percent slopes (Map Unit 314).

Crocker Flat Unit (Parcel 6) Portions of six soil map units occur on the parcels. Soils identified include Kimberlina fine sandy loam, 2 to 5 percent slopes; Littlesignal-Cochora association, 30 to 50 percent slopes; Beam-Panoza-Hillbrick complex, 30 to 50 percent slopes; Pyxo-Cochora association, 15 to 30 percent slopes; Pyxo-Cochora-Badland association, 15 to 75 percent slopes; and Xeric Torriorthents-Badland complex, 30 to 75 percent slope.

Buena Vista Unit (Parcel 7) Four soil map units occur on the parcels. Soils identified include Guijarral complex, 2 to 9 percent slopes; Kimberlina fine sandy loam, 2 to 5 percent slopes; Elkhills-Pyxo association, 15 to 50 percent slopes, MLRA 15; and Sodic Hapocambids, thick, 9 to 30 percent slopes, MLRA 17.

WATER RESOURCES

The San Joaquin Valley is filled with thousands of feet of marine and continental sediments of Tertiary and Quaternary age derived from the surrounding Sierra Nevada Range and Coast Ranges, and their southern extensions. The sediment thickness increases from the valley margins toward the center. The sequence of sediments forming the basin is asymmetrical, with the thickest sediments occurring along the western side of the valley where up to 30,000 feet of sediments are found in the southwestern portion of Kern County (Kern County, 2020).

The major surface waters are from the Kern River and Poso Creek which drain the Sierra Nevada. The hills on the western side of the valley are much drier and while springs are present, little in the way of perennial streams are found. Intermittent streams flow during and after winter but are generally dry after June or July. Named intermittent stream Cienega Creek bisects two parcels and named intermittent stream Bitter Creek crosses the southwestern corner of a third parcel. In addition, multiple unnamed intermittent streams occur on all parcels. Both named and unnamed intermittent streams seldom have water but can be subject to intense flows and flooding during heavy rain events in the winter and spring.

The lower San Joaquin Valley is characterized by low rainfall. On average, the valley floor receives 8.32 inches of precipitation per year, most of which falls between November and April. Average temperatures are relatively high, and total evaporation exceeds total precipitation. The majority of rainfall occurs between January and March. Summers are characterized as dry, with high temperatures and low humidity (Kern County, 2020, https://kernplanning.com/SREIR2020-oil-gas-zoning-revisions/). Due to the hydrogeology of the western side of the Kern Sub-basin which includes marine sediments that readily dissolve into groundwater, water quality in this area is relatively poor compared to areas on the western side fed by the Sierra Nevada streams. The Corcoran Clay, or an equivalent clay barrier separating aquifers into deeper and shallower zones, is present in the eastern side of the basin and separates shallow and deep groundwater zones.

The Regional Water Quality Control Boards (RWQCB) and the SWRCB are the two lead state agencies responsible for implementation of the Sustainable Groundwater Management Act (SGMA). To comply with the act, local Groundwater Sustainability Agencies (GSAs) including the Kern County Subbasin, are developing Groundwater Sustainability Plans (GSPs) for managing and using groundwater without causing undesirable results such as substantial groundwater-level declines, groundwater-storage reductions, seawater intrusion, water-quality degradation, land subsidence, and surface-water depletions. Many municipal, agricultural, and some communities rely on groundwater for up to 100 percent of their water supply needs. The possible pollution of either shallow or deeper groundwater increases risks to water supplies for municipal, agricultural, and community use.

Groundwater and surface water are interconnected resources. Much of the flow from the Southern Sierra Nevada and Tehachapi Mountains flows into the Tulare Lake Hydrologic Basin in the southern San Joaquin Valley. Spatially, surface water distribution and groundwater basins differ. Proposed lease sale parcels occur within the Kern County Subbasin; bound on the north by the Kern County line, on the east and southeast by granitic bedrock of the Sierra Nevada foothills and Tehachapi Mountains, and on the southwest and west by the San Emigdio Mountains and Coast Ranges. While inorganic constituents occur naturally in groundwater. human activities alter (increase or decrease) inorganic compound levels. In the Kern area, one or more inorganic constituents were present at high concentrations in 23 percent of the primary aquifers and at moderate concentrations in 29 percent. Organic constituents are in products used in the home, business, industry, and agriculture. Organic constituents can enter the environment through normal usage, spills, or improper disposal. Within the Kern County Subbasin, concentrations of total dissolved solids (TDS) in groundwater indicated a mixing of oil-field water with groundwater has not substantially affected groundwater salinity in drinking water sources (Wright et al., 2019). TDS is primarily controlled by depth, recharge, stratigraphy, and in some places, by faulting and facies changes (Stephens et al., 2019). In the Lost Hills oil fields, the effect of the surface saline ponds is confined to the upper aquifer because of the clay layer (Corcoran clay) (Gillespie at al., 2019). Within the Kern County subbasin (Parcel 1-4, 6-7), Corcoran Clay is not found along the edges of the basin where these Parcels occur (Gillespie et al. 2019). Along the western edges of the Kern County subbasin the Corcoran clay does not block the movement of water between shallow and deeper groundwater.

Within the Kern County Subbasin, towns surround and are within the oil fields. These towns require water and often have deep wells tapping the aquifer. The 1982 Underground Injection Control Program Memorandum of Agreement (MOA) between California Division of Oil and Gas Resources (*now* CalGEM) and the EPA clearly states all State law will be followed. The State of California has changed many water quality and groundwater laws since 1982 and since Kern Subbasin is used for agriculture, communities, and municipalities, clean water for these uses is backed by state law. Data indicate that the older methods of saline ponds and newer methods of injection of saline water below the Corcoran clay have increased salinity in the vicinity of the injection wells in the deeper ground water (Ball et al., 2020, Gillespie et al., 2019). However, some areas are naturally high in salinity (Ball et al. 2020). Increased levels of radium from ponds was found associated with oil wells in this basin (McMahon et al., 2020).

The Clean Water Act (CWA) of 1977 provides the statutory basis for regulating discharges of pollutants into waters of the US and regulating water quality for surface waters. The CWA in California is administered by the EPA, the US Army Corps of Engineers (ACOE), the SWRCB, and RWQCB. Of the CWA, Sections 401, 402 and 404 pertain to development on public lands after leasing. The EPA delegates regulatory authority for Section 401of the CWA to the State; RWQCBs generally have the responsibility for reviewing and approving requests for Section 401 certifications. Section 402 of the CWA regulates discharge of stormwater runoff generated from industrial sites and large construction projects (disturbing five acres or more of land) through the National Pollutant Discharge Elimination System (NPDES) permitting process. Projects disturbing one or more acres of soil are required to obtain coverage under the SWRCB General Permit for Discharges of Storm Water Associated with Construction Activity (SWRCB Order No. 2009-0009-DWQ). This permit requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) and is based on a project's overall risk. A SWPPP requires measures to prevent erosion and reduce sediment and other pollutants discharges. Small linear underground/overhead projects (LUP) disturbing at least one acre but less than five must be covered by the Small LUP General Permit.

BIOLOGICAL RESOURCES

To facilitate discussion, the seven parcels in this proposal have been divided into four biological units. The biological units are groupings of adjacent parcels with similar ecological values. Unit names reflect some aspect of local geography. Information presented for each biological unit includes issue-based special status species occurrences. Special status species occurrences were determined by reviewing BLM survey, CalFlora, and California Natural Diversity Database records. BLM special status species are defined as: (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 (BLM, 2008). All Federal candidate species, proposed species, and delisted species in the five years following delisting will be conserved as BLM sensitive species. A list of federally listed and BLM sensitive species appears in Appendix C. Descriptions of common flora and fauna for proposed parcels can be located at: https://wildlife.ca.gov/Data/CWHR/Wildlife-Habitats. Wildlife habitats on proposed parcels consist of alkali desert scrub habitat, coastal scrub, barren, and annual grasslands. Parcels 5 is wholly Federal split-estate. Parcels 1-4 and 6-7 are a mix of BLM public lands and Federal split-estate.

The lease sale parcels are located within habitat management zones identified in the 2014 Bakersfield RMP. Parcels 1-4, and 7 occur within habitat corridors (green zone) where the emphasis is on maintaining connections between habitat reserves and in providing additional native habitat. Surface disturbance can go as high as 25 percent in green zones. Generally, existing land use meets these objectives; however, some privately-owned green and red zone lands have been developed and are no longer suitable habitat. Parcel 5 occurs within the reserve areas (red zone) where the emphasis is on managing lands primarily for listed plants and animals. Within the reserve areas, surface habitat disturbance is limited to 10 percent of the surface area of contiguous BLM managed surface acres.

Cienega Unit (Parcel 1-4)

The Cienega Unit consist of 3,357.24 acres located in the far most southern region of the San Joaquin Valley, south of Maricopa, Kern County, California. Parcel acreage includes a mix of public and private surface. California wildlife habitat relationships of this parcel include alkali desert scrub, coastal scrub, and annual grassland types.

Plant species that may occur in Cienega unit parcels include federally listed plant species such as the endangered Kern mallow, San Joaquin woolly threads, Bakersfield cactus, and California jewelflower. Designated BLM sensitive plant species that may be present include Heart-leaved saltbush, Lemmon's jewelflower, Horn's milk vetch, recurved larkspur, Temblor buckwheat, spiny-sepaled button celery, pale yellow layia, oil nest straw, and Tejon poppy.

Special status animal species that occur in the general area include blunt-nosed leopard lizard, giant kangaroo rat, short-nosed kangaroo rat, San Joaquin kit fox, San Joaquin antelope squirrel, LeConte's thrasher, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, California Condor, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat, pallid bat, and fringed myotis.

A full list of federally listed and BLM sensitive species for the Cienega Unit can be found in Appendix C Likelihood of Occurrence of Protected and Special Status Species.

Poso Unit (Parcel 5)

The Poso Unit is wholly Federal split-estate and consists of 160 acres located in the Sierra foothills on the east side of the San Joaquin Valley, north of Bakersfield, Kern County, California. California wildlife habitat relationships of this parcel include alkali desert scrub, barren, and annual grassland types. No public surface is found within this parcel.

Plant species with potential occurrence for the Poso Unit include the federally endangered Bakersfield cactus and California jewelflower. BLM sensitive plant species in this area include oil neststraw, striped adobe lily, Horn's milk vetch, and recurved larkspur.

Special status animal species that occur in the general area include San Joaquin kit fox, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat, and pallid bat.

A full list of federally listed and BLM sensitive species for the Poso Unit can be found in Appendix C Likelihood of Occurrence of Protected and Special Status Species.

Crocker Flat Unit (Parcel 6)

The Crocker Flat Unit consists of 538.06 acres located in the Temblor foothills, on the western side of the San Joaquin Valley, Kern County, California. California wildlife habitat relationships of this parcel include alkali desert scrub, coastal shrub, and annual grassland types. The Crocker Flat unit is a mix of public lands and Federal split-estate.

Plant species that occur in the area include the federally endangered San Joaquin woolly-threads and Kern mallow. The unit also has potential habitat for several BLM sensitive plant species from the Temblor region: Tejon poppy, recurved larkspur, Temblor buckwheat, pale-yellow layia, Munz's layia, oil nest straw, and Lemmon's jewelflower.

Special status animal species that occur in the general area include blunt-nosed leopard lizard, short-nosed kangaroo rat, San Joaquin kit fox, California condor, San Joaquin antelope squirrel, LeConte's thrasher, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat, pallid bat, and fringed myotis.

A full list of federally listed and BLM sensitive species for the Crocker Flat Unit can be found in Appendix C Likelihood of Occurrence of Protected and Special Status Species.

Buena Vista Unit (Parcel 7)

The Buena Vista Unit consists of 278.28 acres located on the western side of the San Joaquin Valley in Kern County, California at the northern end of the Buena Vista valley and adjacent to the Naval Petroleum Reserve. The Buena Vista unit is a mix of public lands and Federal split-estate. California wildlife habitat relationships of this parcel include alkali desert scrub and annual grassland types.

In addition, the unit is located within the BLM designated Lokern-Buena Vista Area of Critical Ecological Concern (ACEC). The goal of the Lokern-Buena Vista ACEC is to provide habitat for the suite of San Joaquin Valley listed species including ecologically functioning valley upland habitats. The Lokern-Buena Vista ACEC has the following special management direction (a) Identify as open for fluid mineral leasing, subject to major constraints (CSU-Protected Species and CSU-Sensitive Species stipulations); (b) Identify as closed to mineral materials disposals, except for administrative purposes; (c) Identify as an exclusion area for rights-of-way related to utility scale renewable energy projects; and (d) Prohibit campfires (2014 ROD/Approved RMP, page 132).

Federally listed plant species that may be in the area include San Joaquin woolly-threads and Kern mallow. BLM special status plants that may be in the area include Lost Hills crownscale, recurved larkspur, Horn's milk vetch, heart-leaved saltbush, Tejon poppy, pale yellow layia, and oil neststraw.

The federally listed San Joaquin kit fox, giant kangaroo rat, and blunt-nosed leopard lizard, and the state listed San Joaquin antelope squirrel are known to occur in the general area. BLM sensitive species that may occur in the area include short-nosed kangaroo rat, Leconte's thrasher, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat, and pallid bat.

A full list of Federally listed and BLM sensitive species for the Buena Vista Unit can be found in Appendix C Likelihood of Occurrence of Protected and Special Status Species.

CULTURAL RESOURCES

The NEPA and NHPA Section 106 requirements apply for leasing and for future proposed project occurring within the proposed lease parcels regardless of surface ownership. An important part of Section 106 review is the identification of cultural resources which could be affected by leasing and/or development on a lease. The BLM utilizes a classification system to describe the level and intensity of cultural resource identification, Class I consists of a literature and records review; Class II describes a sampling approach; and Class III requires the completion of an intensive field survey of the area of potential effects for a project (BLM Manual 8100, Section 8110).

If parcels are leased and development projects are proposed, a Class III survey would be conducted. Class III review includes intensive field survey of the area of potential effects and additional project specific tribal consultation to identify cultural resources that could be directly or indirectly affected. The 2016 Supplement also directs the BLM to make every reasonable effort to avoid effects to historic properties identified through survey and consultation.

The proposed lease parcels are located within the traditional ethnographic territories of the various tribes of the Yokuts Indians (Kroeber, 1925, page 474). These groups have long inhabited the shores and sloughs of Tulare and Buena Vista Lakes as well as the foothills of the Sierra Nevada Mountains. In addition to the rich lake environments, they also exploited specialized resources found in the foothills of the Temblor Mountains to the west and the Sierra foothills to the east. Native American heritage sites common to this region include bedrock mortar and millingstone food processing stations, lithic scatters and quarries, large village sites and smaller camps, as well as historic period settlements.

Members of these Native American tribes continue to reside in the San Joaquin Valley. Federally recognized tribes include the Tachi Yokuts of the Santa Rosa Rancheria, the Tule River Indian Tribe, and the Tejon Indian Tribe. Culturally important remains associated with Native American ancestral occupation of this region are scattered throughout the area. There are often considerable tribal heritage values associated with these remains. Traditional values are also associated with specific places in the landscape in the form of spiritual sites or special resource gathering locations. Federal regulations and policies require Tribes be consulted regarding potential impacts of Federal actions to places of cultural or religious importance (BLM Manual 1780 and 1780-H).

The BLM notified the Tachi Yokuts of the Santa Rosa Rancheria, the Tule River Indian Tribe, and the Tejon Indian Tribe of the proposed lease sale through certified mail and email. Certified mail letters and

emails were sent on May 22, 2020. This notification included a request for any information regarding places of importance to Native American tribes with the potential to be directly or indirectly affected by leasing and potential future development resulting from the proposed lease sale. A contact record is described in Chapter 5. Designated representatives of the Tule River Indian Tribe and the Santa Rosa Rancheria, but not the Tejon Indian Tribe contacted the BLM with requests for informal consultation and additional information. No specific places of importance to tribes were identified through these initial notifications and information requests.

During Anglo Mexican and American historical period occupation of the region and into modern times, the proposed lease parcels have been part of large-scale oil production development or livestock and agricultural operations. Oil exploration became commercially productive in the area as early as the 1890s (Rintoul, 1976). Historical period sites occurring in the area primarily include facilities associated with the early phases of this agricultural and oil field development.

The Class I records review showed the seven proposed lease parcels have had varying levels of previous Class III survey coverage, with two being entirely surveyed.

Table 2: Pre-existing Class III survey coverage of parcels proposed for leasing

Parcel	Total Area (acres)	Acres Surveyed	Acres Not Surveyed	Percent of parcel surveyed
1	992	171*	821	17
2	988	350	638	35
3	648	596	79	87
4	724	636	87	87
5	157	157	0	100
6	540	523	18	97
7	568	568*	0	100

*Parcels 1 and 7, contain known cultural sites. The sites consist of one stone tool material scatter and of two historic period oil field remains.

PALEONTOLOGICAL RESOURCES

Every geologic unit can be assigned a Potential Fossil Yield Classification (PFYC) class based on the probability and abundance of known vertebrate fossils and scientifically important invertebrate and plant fossils (BLM Instructional Memorandum No. 2007-009). The PFYC scheme ranges from very low (PFYC 1) to very high (PFYC 5) depending on the potential fossil yield (BLM Instructional Memorandum No. 2016-0124). Unknown fossil potential is assigned to geologic units that do not have a clear PFYC assignment (PFYC U). Typically, project specific paleontological resource assessment and compliance is required or recommended for earthwork occurring within PFYC classes 3, 4, 5, or U geological formations (BLM Manual 8270 and Handbook 8270-H; BLM Instructional Memorandum No. 2009-011).

All the proposed lease parcels contain geologic formations which have high potential for the presence of important fossil remains as defined by the PFYC system. There are no known paleontological localities recorded within any of the parcels.

Table 3: Proposed lease parcel geological formations, PFYC Classification and fossil types

Proposed Lease Parcel	Geological Formations	PFYC Classification	Fossil Types
Parcel 1	Temblor Formation	4	Oligocene to mid Miocene; Marine invertebrates, fish scales and teeth, shark teeth
	Tulare Formation	4	Pleistocene; Freshwater microfossils, mollusks and fish, several species of Pleistocene small and large mammals- horse, dog, saber- toothed cat, river dolphin, camels, ground sloths
	Alluvium- Pleistocene age sediments	2	Pleistocene; Snails, fish, birds, small and large mammals
	Unknown	U	Unknown
Parcel 2	Temblor Formation	4	Oligocene to mid Miocene; Freshwater microfossils, mollusks and fish, several species of Pleistocene small and large mammals- horse, dog, saber- toothed cat, river dolphin, camels, ground sloths
	Monterey Formation	4	Miocene; Fish, sharks, rays, sea birds, marine mammals, marine micro fossils
	Alluvium- Pleistocene Age sediments	2	Pleistocene; Snails, fish, birds, small and large mammals
Parcel 3	Temblor Formation	4	Oligocene to mid Miocene; Oligocene to mid Miocene; Marine invertebrates, fish scales and teeth, shark teeth
	Monterey Formation	4	Miocene; Fish, sharks, rays, sea birds, marine mammals, marine micro fossils
	Alluvium - Pleistocene Age sediments	2	Pleistocene; Snails, fish, birds, small and large mammals
Parcel 4	Temblor Formation	4	Oligocene to mid Miocene; Marine invertebrates, fish scales and teeth, shark teeth
	Monterey Formation	4	Miocene; Fish, sharks, rays, sea birds, marine mammals, marine micro fossils
	Alluvium - Pleistocene Age sediments	2	Pleistocene; Snails, fish, birds, small and large mammals
Parcel 5	Kern River Formation	5	Miocene to early Pliocene or Pleistocene; small and large mammals and reptiles- mice, badgers, horse, turtles, lizards and freshwater fish and amphibians
Parcel 6	Tulare Formation	4	Pleistocene; Freshwater microfossils, mollusks and fish, several species of Pleistocene small and large mammals- horse, dog, saber- toothed cat, river dolphin, camels, ground sloths
Parcel 7	Tulare Formation	4	Pleistocene; Freshwater microfossils, mollusks and fish, several species of Pleistocene small and large mammals- horse, dog, saber- toothed cat, river dolphin, camels, ground sloths
	Alluvium - Pleistocene Age sediments	2	Pleistocene; Snails, fish, birds, small and large mammals

LIVESTOCK GRAZING

The public lands in proposed lease parcels 1-4, 6, and 7 are also leased by the BLM for livestock grazing in accordance with the Taylor Grazing Act *(43 U.S.C., Sec. 315)*, the FLPMA, and the regulations for grazing administration at 43 CFR 4100.

The public lands in proposed lease parcels 1 and 2 include portions of the 1,902-acre grazing allotment #00107 (Cienega Canyon). The lands in this allotment are authorized by grazing lease #0403784 for grazing of cattle annually during December through May in conjunction with intermingled private surface land as resource conditions allow.

The public lands in proposed lease parcels 2-4 include portions of the 2,723-acre grazing allotment #00057 (Santiago Creek) falling within the Lower Bitter Creek and North East pastures. The lands in these pastures are authorized by grazing lease #0404093 for grazing of cattle annually during December through May in conjunction with intermingled private surface land as resource conditions allow.

The public lands in proposed lease parcels 6 include portions of the 36,411-acre grazing allotment #00015 (North Temblor) falling within portions of five different pastures. The lands in the Beef, Crocker Canyon Little Sylvia Holding, Santa Fe, and Sylvia pastures are all authorized by grazing lease #0400143 for grazing of cattle annually in conjunction with intermingled private surface land as resource conditions allow. The Santa Fe pasture is also part of a 4-pasture rest rotation grazing scheme on the allotment in which the pasture is rested from any grazing use during November through October every fourth year.

The public lands in proposed lease parcel 7 include portions of the 5,273-acre #00016 (Oil Field) allotment and the 480-acre #00019 (Buena Vista Creek) allotment. The lands in these allotments are authorized by grazing leases #0403480 and #0403781 respectively for annual sheep grazing December through May in conjunction with intermingled private surface land as resource conditions allow.

The affected allotments have various rangeland related infrastructure in place which is used and maintained to support livestock grazing operations. This infrastructure includes corrals, fences, gates, cattleguards, water pipelines, water tanks and reservoirs, watering troughs, and roads.

LANDS

The lands proposed for competitive lease sale include a combination of split-estate mineral parcels and public land (full fee estate, that is surface and mineral estate) parcels. For the split-estate parcels, the US owns minerals in the land as well as surface entry rights that ‘float’ over the entire parcel.

Parcels 1 through 4 are located in the Maricopa area. Parcels 1-4 have both public land and split-estate land on each parcel. Based on BLM review of aerial imagery, Western Mineral road appears to go near each parcel then dirt roads appear to go through each parcel. On the split-estate portions of each parcels the BLM has no legal access, and a road right-of-way may be required when leaving the Federal surface.

Parcel 5 is located on split-estate land near Poso Creek, 10 miles northeast of Bakersfield. Grasslands Drive appears to go through the parcel. The parcel is surrounded by private lands; however, the BLM has legal access to the parcel through Grasslands Drive. Parcel 5 includes 17 wells in idle status; thus, the parcel would be offered with a stipulation that addresses the infrastructure on the parcel and the requirements that must be met prior to operations. Full text of the idle well stipulation is available in Appendix B.

Parcel 6 has public and split-estate land. The parcel is in the Temblor Mountains, four miles southwest of Derby Acres. There appears to be a dirt road to the parcel that leads from Crocker Springs Road; however, on the split-estate portion of the parcel the BLM has no legal access, and a road right-of-way may be required when leaving the Federal surface. Parcel 6 includes three wells in idle status; thus, the parcel would be offered with a stipulation that addresses the infrastructure on the parcel and the requirements that must be met prior to operations.

Parcel 7 has both public land and split-estate land. The parcel is located in the Buena Vista Valley, three miles northeast of Derby Acres. There appear to be dirt roads to the parcel; however, on the split-estate portions of the parcel the BLM has no legal access, and a road right-of-way may be required when leaving the Federal surface.

OIL AND GAS RESOURCES

The San Joaquin Valley is one of the oldest oil districts in the United States and has been extensively developed in the anticlinal trends along the east and west sides of the San Joaquin Valley since the 1870's. There are over 75 oil and gas fields in the San Joaquin Valley, including 22 giant fields (more than 100 million barrels of oil each) and four super giants (more than 1 billion barrels each). At the end of 2014, cumulative production in the San Joaquin Valley area was about 15.2 billion barrels of oil. (http://sjvgeology.org/oil/index.html). In recent years, the San Joaquin Valley has accounted for about 85-90 percent of California's development completions. The San Joaquin Valley is expected to continue to be the primary source of oil in California's oil and gas development.

Between 2005 and 2009, there were a total of 11,530 wells drilled in CalGEM Inland District, which is mainly Kern County. In the same 5 years, there were a total of 1,153 Federal wells drilled throughout California. Approximately 90 percent of those wells were in Kern County.

The total acres of Federal mineral estate in the parcels proposed for this lease sale is 4,333.58 acres, slightly less than 1 percent of the total acres of Federal mineral estate in the San Joaquin Valley (approximately 440,000 acres) and less than 0.5 percent of the total acres of Federal mineral estate managed as open for fluid mineral leasing by the BFO (approximately 1,011,470 acres). The geology of the seven parcels is classified as "high potential" for occurrence of hydrocarbons.

Exploration and Drilling

Oil and gas resources occur in subterranean reservoirs. Parcels 1 thru 4 consist of the Carneros sandstone; Parcel 5 and 7 consist of the Etchegoin sandstone, and Parcel 7 consist of Stevens sandstone. Most reservoirs in the San Joaquin Valley area are sandstones, which have adequate porosity and permeability for the migration of oil and gas. Some reservoirs in the area are fractured siliceous organic shales of the Monterey formation, where the Monterey formation is both the source and reservoir rock. Compression and diagenesis severely degrade reservoir quality at depths exceeding 12,000 feet to the extent that only dry gas is produced from greater depths.

Development Drilling

Some examples of development wells include step-out or field extension wells, enhanced oil recovery wells, or other infield wells. A step-out well is a type of exploratory well drilled adjacent to or near a proven well to ascertain the limits of the reservoir. An enhanced oil recovery well is an oil recovery enhancement method using sophisticated techniques that alter the original properties of oil. Its purpose is not only to restore formation pressure, but to improve oil displacement or fluid flow in the reservoir.

Hydraulic fracturing
Hydraulic fracturing is a completion technique to stimulate oil and gas well production. Fracturing fluid is pumped under high pressure down the wellbore and into the reservoir rock to create fractures (i.e., cracks) in order to increase the immediate production rate and total recovery of oil and natural gas over the economic life of the well. In a typical hydraulic fracturing completion, approximately 99.5 percent of the injected fluid consists of water and sand.

A typical, hydraulically fractured well in California is different from hydraulically fractured wells elsewhere in the country. Dissimilarities include the volume of fluid used and disposed of to complete the fracture as well as the duration of the fracture procedure. A further difference is the ability of hydraulic fracturing technology to make new areas economically viable for development. Elsewhere in the country, the economic viability of development depends on use of hydraulic fracturing technology. In California, by contrast, the use of hydraulic fracturing technology improves economic viability of certain wells but has yet to lead to previously undeveloped oil and gas reservoirs being heavily developed. In other words, hydraulic fracturing technology has not noticeably altered the development landscape of California's oil fields. For further discussion of the regional differences in hydraulic fracturing technology use, refer to the 2019 Final Supplemental EIS.

Approval to conduct hydraulic fracturing procedures on wells in California is subject to strict and comprehensive permitting requirements because of SB4, passed in 2013. SB4 applies to wells on Federal leases as well as non-Federal leases.

Directional drilling from adjacent land to a Federal lease
On occasion, it may be desirable or necessary to drill a well from a surface location not directly above the drilling target. This is known as directional drilling. The BLM has the authority to regulate drilling from adjacent, non-Federal land by requiring a drilling application if Federal minerals are involved. Such directional drilling is subject to applicable environmental laws, including the NEPA, NHPA, and ESA.

Additional considerations for split-estate
For split-estate parcels considered in this EA, the lessee and/or operator would be responsible for adhering to the BLM requirements and for reaching an agreement with the private surface landowner regarding access, surface disturbance and reclamation. The BLM has split-estate guidance (Instruction Memorandum No. 2003-131) and Instruction Memorandum No. 2009-184, Courtesy Notification of Surface Owners When Split-Estate Lands are Included in an Oil and Gas Notice of Competitive Lease Sale. This Instruction Memorandum establishes a BLM requirement to notify surface owners as a courtesy when the mineral resources underlying their lands are to be offered for competitive sale. Parties filing an Expression of Interest (EOI) in lands they would like to be offered at a competitive oil and gas lease sale are required to provide the BLM with names and addresses, including the Assessor Parcel Number of any surface owners where split-estate lands are included in their EOI.

CHAPTER 4. ENVIRONMENTAL EFFECTS

ANALYSIS ASSUMPTIONS

The 2012 Final EIS impact analyses addressed direct, indirect, and cumulative impacts of potential implementation of fluid mineral management decisions in the 2012 Proposed RMP. At the leasing stage, the BLM cannot be certain whether or not the parcels will actually be sold (an offer to lease does not guarantee a purchaser), if leases will be issued (if a lease is sold, it may not be issued by the BLM), if parcels will be developed, or what that development will look like (development on lease is proposed and analyzed by the BLM in subsequent environmental analysis). Although, the proposed action of leasing itself has no physical environmental effects and there exists inherent uncertainty as to whether parcels will be sold, issued, and developed; it is reasonably foreseeable that leasing could lead to development, thus a reasonable level of development analysis is included in this environmental analysis.

Number of New Wells (Exploratory or Development) Assumption

Anticipated exploration and development based on the Reasonably Foreseeable Development (RFD) Scenario in the 2012 Final EIS/Proposed RMP, the 2014 Approved RMP, and the 2019 Final Supplemental EIS, predicts (up to) 40 new wells on new leases per year and (up to) 4 of those new wells to be hydraulically fractured, or (up to) 10 percent (4/40 = 10 percent) (2012 Final EIS, page 985; 2019 Final Supplemental EIS, page 44). These figures assume the BLM would hold four lease sales per year, which is a requirement of the FOOGLRA. The step down to the analysis assumption used in this document is: (up to) 40 new wells on new leases per year / (up to) 4 lease sales per year = 10 new wells on new leases per lease sale. Of the (up to) 10 new wells on new leases per lease sale, (up to) 10 percent would be expected to be completed using the hydraulic fracturing process; this results in an estimate of (up to) 1 hydraulically fractured well on a new lease per lease sale. In summary, the assumption used for this EA is 10 wells per year would be drilled as a result of the proposed lease sale, comprised of 1 well that is hydraulically fractured and 9 wells that are not.

Associated Surface Disturbance Estimate Assumption

Of the 1,011,470 number of acres open to fluid mineral leasing, the proposed action is to offer 4,333.58 for lease. The acres of disturbance assumption is based on analysis in the 2019 Final Supplemental EIS (Table 4.1, page 45). The table below details the surface disturbance causing activity, including differentiation between well pad size for non-hydraulically fractured wells and a hydraulically fractured well.

Table 5: Estimate of surface disturbance resulting from nine non-hydraulically fractured wells and one hydraulically fractured well

Surface Disturbance Causing Activity	Total Disturbance per well (acres)	Number of New Wells of Type	Total Disturbance (acres)
New Pad	0.2-0.4	9	1.8-3.6
New Pad (hydraulically fractured well)	4	1	4
Linear disturbance (includes roads, pipelines, and powerlines)	1.1	10	11

The sum of the total disturbance acres for 10 wells ranges from 16.8-18.6 acres. The upper end of the range, 18.6 acres, will be used for disclosure of potential environmental effects resulting from the proposed lease sale.

PROPOSED ACTION ALTERNATIVE – IMPACTS

Social and Economic Considerations

Analysis Methodology

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in economic impacts, the BLM acknowledges that change in economic conditions may result as an indirect effect of development subsequent to leasing, if and when the lease(s) is developed. If a parcel is leased, subsequent proposed projects or development would be subject to a separate NEPA analysis.

Social and Economic Conditions

As stated in the Analysis Assumptions, the BLM assumes that 10 wells per year would be drilled as a result of the proposed lease sale, one well that is hydraulically fractured and nine that are not. Due to the very small amount of development expected on these lands, it is not likely that there will be any measurable impact to the local economy. However, changes in social conditions could result from the offer to lease parcels, given that social conflict is present, as reflected by the support for and opposition to oil and gas development and hydraulic fracking expressed by members of the public during scoping for such projects and the challenge to the 2014 ROD/Approved RMP and subsequent 2019 ROD and Supplemental EIS. Given that public scoping for this EA has not taken place, social conflict and any other social effects will be described in the Final EA following the public comment period.

Environmental Justice

The 2019 Final Supplemental EIS on hydraulic fracturing concluded "due to the limited changes specifically associated with hydraulic fracturing (for which 0 to 40 wells on new leases are anticipated for the life of the 2014 RMP) in terms of employment, air quality, traffic congestion, noise, environmental justice, population, and housing, a negligible change would be expected as compared to the analysis conducted as part of the 2012 Final EIS."

The only environmental justice impact from the Proposed Action (Alternative B) described in the 2012 Proposed Resource Management Plan & Final Environmental Impact Statement was "The closure of individual active allotments under this alternative has the potential to disparately effect environmental justice populations if lessees are minorities or low income."

As described in the Biological Resources section, four units are included in the parcels to be leased. The Cienega Unit (Parcels 1-4) consists of 3,357 acres located in the far most southern region of the San Joaquin Valley, south of Maricopa. The Poso Unit (Parcel 5) is 160 acres located in the Sierra Foothills on the east side of the San Joaquin Valley north of Bakersfield. The Crocker Flat Unit (Parcel 6) is 538 acres located in the Temblor foothills on the western side of the San Joaquin Valley. The Buena Vista Unit (Parcel 7) is 278 acres located on the western side of the San Joaquin Valley, on the northern end of the Buena Vista Valley adjacent to the Naval Petroleum Reserve.

Potential site-specific impacts on environmental justice populations would be considered and mitigated as needed on a project basis at the development application stage. Although only a small amount of development would result, there could be localized impacts that are disproportionate to low-income or minority populations. Potential environmental justice populations would be identified at the census block group or other appropriate scale and potential impacts to identified populations assessed. Additional outreach to ensure identified environmental justice populations have the opportunity to be meaningfully engaged would be considered at that time.

Visual Resources

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in visual resource impacts, however, in phased leasing, such as oil and gas, the BLM acknowledges visual resource impacts may occur if the lease is developed.

Impacts from potential future oil and gas development may include changes to the basic landscape elements of form, line, color, and texture. These changes would result from installation of new structures (e.g. oil wells, power lines, tanks etc.) and earthwork associated with construction of well pads, roads, and other developments. Parcels 1 through 6 occur in VRM Class III and Class IV management areas. Parcel 7 occurs only in VRM Class IV.

In VRM Class III, the level of change to the characteristic landscape can be moderate and management activities may attract attention but should not dominate a casual observer's view. For example, facilities such as oil storage tanks taller than 8 feet would provide vertical and horizontal visual contrast in form and line to the characteristic landscape.

In the areas identified for management for VRM Class IV, the level of change to the characteristic landscape can be high and management activities may dominate the view and be the major focus of viewer attention. For example, facilities such as a water tanks that rise above 10 feet would provide a strong vertical or horizontal visual contrast in form and line characteristic landscape that have a slight rolling form and line. In VRM Class IV areas, the management priority places other resource values above the scenic aspects of the environment. For all parcels, the VRM Class management objectives would be met through incorporating design features or requirement of mitigation measures during the development approval process, therefore at most, negligible adverse visual impacts from subsequent development are expected as a result of the proposed action.

To minimize and mitigate potential future development impacts to visual resources, the BLM would require through conditions of approval (COAs) implementation of BLM Best Management Practices for Visual Resource Management in Oil and Gas Development (VRM for Fluid Minerals Best Management Practices, June 2007). These BMPs include but are not limited to proper site selection, minimizing disturbance, selecting colors that blend with the background, and reclaiming areas not in active use. The process for implementing BMPs begins when an APD is submitted. The APD triggers evaluation of site-specific visual resource impacts which results in a contrast rating. The contrast rating would identify what types of mitigation are needed to minimize visual contrast. Recommended mitigation measures would be incorporated into the APD COAs as a means to meet the VRM Class management objectives.

Recreation

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in recreation impacts, the BLM acknowledges recreation impacts may result as an indirect effect of development subsequent to leasing, if and when the lease(s) is developed.

For split-estate lands or public land parcels that are small or land-locked by private or state land, recreation opportunities would be limited or non-existent due to access restrictions. Recreational use on larger blocks of public land and on smaller blocks of public land with public access could be impacted by oil and gas operations. The quality of the recreational experience could be diminished by noise and changes in scenic quality arising from oil and gas operations. Recreational activities on split-estate lands would be at the discretion and under the control of the private landowner. In addition to facilitating

mineral extraction, new oil and gas roads could provide better access to the lease areas for recreational opportunities.

Air and Atmospheric Values

Air and Atmospheric Values Analysis Methodology

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in emissions that affect air quality or climate change, the BLM acknowledges emissions may result as an indirect effect of development subsequent to leasing, if and when the lease(s) is developed. This EA incorporates an analysis of potential contributions of the proposed action to criteria pollutant, hazardous air pollutant, and greenhouse gas (GHG) emissions, and includes a general discussion of potential impacts to climate. If parcels are leased and development is proposed, detailed emissions estimates would be considered in a subsequent site-specific environmental analysis.

Analysis Area Assumption

The SJVAPCD and the co-located San Joaquin Valley Air Basin is the Air Quality Analysis area. This area is appropriate because the parcels proposed for lease are located within the San Joaquin Valley Air Basin; an air basin generally has similar meteorological and geographic conditions throughout; and emission sources usually have the most substantial impacts within their home air basin. Also, a large body of air monitoring, pollutant modeling, air quality analysis, and emission inventory data has been compiled and published by the SJVAPCD for the San Joaquin Valley Air Basin. This information informs and facilitates robust analysis of potential impacts of future development on the proposed leases.

Air Pollutant Emissions Assumptions

At the leasing stage, there is a degree of speculation and uncertainty regarding the amount of air pollutant emissions (including GHGs) that could occur since specific development details are not known. These specific development details include: the type of petroleum product; depth of geologic reservoir being accessed; drilling and completion methodology; equipment and vehicle make, model, engine size; project acreage; and construction plans, among others. Knowing these variables would be required to generate more accurate emissions estimates as these factors determine the intensity, duration, and characteristics of associated pollutants. In lieu of having these variables, generic project assumptions will be substituted for analysis in this environmental document.

Criteria Pollutant Emissions

Criteria pollutant emissions (Table 6, below) are estimated based on the RFD scenario described in the 2019 Final Supplemental EIS, which is incorporated by reference. SIP rules and regulations would apply to many of the activities that may occur as a result of the proposed lease sale. For example, subsequent lease development activities would be required to comply with current and future SJVAPCD, CARB, and EPA Rules and Regulations, such as the newly implemented CARB GHG Emission Standards for Crude Oil and Natural Gas Facilities. As new air plans are developed, or existing plans are updated, development activities would be conducted in compliance with those plans as well. In accordance with the BLM fluid mineral lease requirements, a Federal oil and gas lessee and/or operator is responsible for obtaining required air permits and compliance with permit and emissions reporting requirements of air regulatory agencies; therefore, the analysis in this environmental document assumes compliance with these requirements.

Greenhouse Gas Emissions

Climate change is a global, long-range issue with substantial impacts, however, methods to correlate specific projects or emission sources to specific impacts have not been sufficiently developed to use in assessing administrative actions such as lease sales. No GHG emissions would result directly from the

proposed action, which is administrative in nature; however, the BLM recognizes GHG emissions are a potential indirect effect of fluid mineral development proposals subsequent to leasing. Thus, this analysis uses estimated GHG emissions that may result from the lease sale as a surrogate for assessing impacts and compares those emissions to the California statewide GHG inventory to provide context.

The BLM concludes the SJVAPCD requirement to quantify GHG emissions and to implement SJVAPCD Best Performance Standards to reduce GHG emissions would occur at the development proposal stage and would be analyzed in a site-specific environmental analysis. Therefore, this analysis will provide a general discussion of the potential range of GHG emissions made possible by the lease sale.

General Conformity

In general, the BLM ensures conformity by requiring lease holders to comply with applicable Federal, State, and local regulations, including SIP regulations. The requirement to comply with all Federal, State, and local regulations will also apply to all development that may be carried out on any parcels leased through the proposed action. Since the proposed action to lease parcels for fluid mineral development does not represent a project and would not authorize regulated emissions, a more detailed conformity determination is not meaningful at the leasing stage. Appropriately, a conformity determination would be made when wells or other specific projects are proposed on the new leases. Single-well and 10-well estimated annual RFD emissions (Table 6, below) are less than the lowest related *de minimis* threshold presented in 40 CFR 93.153(b)(1), for example, VOC or NOx at 25 tons per year in a severe nonattainment area like SJVAPCD. These emission estimates, or updated site-specific estimates based on development plan applications, could be used to determine conformance of proposed development actions on leased parcels at the time specific development applications are submitted for approval.

Impacts to Air Quality

Criteria Pollutant Emissions

For this analysis, an estimate of the range of annual criteria pollutant emissions that could be expected as a consequence of leasing and potential development in Table 6. The top value of the Year 10 range assumes all RFD wells (including hydraulically fractured wells) are developed, go into production, and remain in production until the end of the 10-year lease period with no decrease in emissions. This is a higher than expected estimate because production and emissions from a single well typically decrease substantially after the first year. As such, the top of the year 10 range represents a higher than expected estimate of maximum potential annual criteria air pollutant emissions from this lease sale during the lease period. The low value of the Year 10 range is representative of either a lease sale held but no leases are sold, or where no development occurs on leases sold.

Table 6: RFD Estimated Range of Annual Criteria Pollutant Emissions

Criteria Pollutant	Emissions per Conventional (C) Well	Emissions from 9 C wells	Emissions per HF Well	Emissions from 1 HF well	Year 1 Total	Year 10 Range
	Tons per year					
NO_X	0.55	4.91	0.69	0.69	5.59	0 to 55.90
CO	0.18	1.64	0.23	0.23	1.86	0 to 18.63
VOC/ROG	1.84	16.54	0.05	0.05	16.59	0 to 165.90
SO_2	0.10	0.92	0.001	0.001	0.92	0 to 9.24
PM_{10}	0.09	0.79	0.02	0.02	0.81	0 to 8.08

$PM_{2.5}$	0.09	0.79	0.02	0.02	0.81	0 to 8.08
Source for emissions per well: Bakersfield Hydraulic Fracturing SEIS 8/2019. CO estimated based on data in the report, all other emission factors quoted directly						

To provide context for these maximum estimated emissions, Table 7 compares them to projected 2020 emissions in tons per year for the analysis area.

Table 7: Comparison of RFD Maximum Emissions to Projected 2020 Emissions in the Analysis Area

Criteria Pollutant	**Year 10 Maximum from Table 6**	**SJVAPCD[(a)]**		**SJVAPCD Tons over 10 Years for further comparison with Year 10 Maximum from Table 6**
	Cumulative annual tons after 10 years at maximum potential development	Tons per day (average)	Tons per Year	
NO_X	55.9	315.6	115,194	1,151,940
CO	18.6	988.3	360,730	3,607,300
VOC/ROG	165.9	344.7	125,816	1,258,160
SO_2	9.2	27.9	10,184	101,840
PM_{10}	8.1	309.7	113,041	1,130,410
$PM_{2.5}$	8.1	101.6	37,084	370,840
Total Emissions	265.8	2,087.8	762,047	7,620,470

(a) California Air Resources Board Almanac Emissions Projection Data - 2020 Estimated Annual Average Emissions San Joaquin Valley APCD. https://www.arb.ca.gov/app/emsinv/emseic1_query.php . Accessed July 8, 2020.

For each pollutant, the maximum expected cumulative year 10 annual emissions from the proposed action are less than half of the average daily emissions projected for the analysis area.

For example:

344.7 = for VOC/ROG projected tons per day in the SJVAPCD
172.4 = half of 344.7 VOC/ROG projected tons per day in the SJVAPCD
165.9 = VOC/ROG projected emissions in Year 10 Maximum from Table 6

165.9 is less than 172.4, therefore the VOC/ROG Year 10 Maximum from Table 6 is less than half of VOC/ROG projected tons per day in the SJVAPCD.

Based on this analysis, maximum expected RFD emissions would represent about 0.03 percent of total emission in the analysis area (265.8 total emissions Year 10 Maximum from Table 6/ 762,047 total emissions SJVAPCD = 0.03 percent).

Hazardous Air Pollutant Emissions

Well development and oil production may result in HAP emissions. as described in Chapter 3. The identity and amounts of HAP compounds emitted depend on the HAP content of the produced oil as well as the production techniques and materials employed.

Information on HAPs present at well sites during hydraulic fracturing is available due the disclosure requirements of SB4. The BLM reviewed data disclosed to FracFocus (https://fracfocus.org/data-download) on substances used in hydraulic fracturing since the beginning of 2015.

As described in the 2019 Bakersfield SEIS, hydraulic fracturing in California typically takes one to two days. This means exposure to materials used during a hydraulic fracturing process would be short-term exposures. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) established a list of hazardous substances, including HAPs and set a short-term release reportable quantity for each listed substance (https://www.epa.gov/epcra/consolidated-list-lists). Volumes of listed hazardous substances below the reportable quantity are considered unlikely to cause a substantial short-term impact.

Information on HAPs present at well sites during hydraulic fracturing processes in California is available due the disclosure requirements of SB4. The BLM reviewed data disclosed to FracFocus (https://fracfocus.org/data-download) on substances used in hydraulic fracturing since the beginning of 2015.

The FracFocus data indicates the following HAPs were used in amounts below their CERCLA reportable quantity: acrylamide, acrylic acid, acrylonitrile, ethylene glycol, ethylene oxide, formaldehyde, methanol, and propylene oxide. Whether or not these HAPs were released to the environment was not disclosed. The FracFocus data indicate these eight HAPs do not have potential to cause a substantial impact because they were used in amounts below their CERCLA reportable quantity.

In FracFocus, Naphthalene, an additional HAP, was reported in amounts that could exceed its reportable quantity of 100 pounds. Naphthalene is a solid at ambient temperatures, and in the past was used as moth balls. Naphthalene has potential for health effects after long-term exposure, but no reported effects associated with short-term exposure. Naphthalene occurs naturally in crude oil. Based on this information, naphthalene would not be expected to cause a substantial impact if released during a two-day well stimulation process.

Diethanolamine and hydrochloric acid, the two remaining HAPs disclosed to FracFocus, are both miscible in water, which means they do not separate from water under ambient conditions. This means diethanolamine and hydrochloric acid are unlikely to be released from water-based well stimulation fluids. EPA recognized this phenomenon in guidance issued for Toxic Release Inventory reporting (EPA, 2019). The EPA guidance states solutions of hydrochloric acid which do not become airborne are not required to be reported in the Toxic Release Inventory. Likewise, EPA guidance issued in 2016 states airborne exposure to diethanolamine may occur when it is used in open, high-energy processes such as machining or metallurgy (EPA, 2016). The guidance describes the potential for public exposure to both of these substances in daily life. Water solutions of hydrochloric acid, also called muriatic acid, are used for many purposes including swimming pool maintenance. Diethanolamine is used as an ingredient in the preparation of personal care products (EPA, 2016). Based on EPA guidance, diethanolamine and hydrochloric acid are not expected to cause airborne impacts when stored under ambient conditions or used in a well stimulation process.

Benzene, the HAP identified by the EPA as having enough potential for impact to require regulation under the NESHAP Maximum Achievable Control Technology (MACT) standard for oil and gas production facilities, was not reported by operators in the records reviewed by BLM. Benzene and related compounds such as ethyl benzene, toluene, and xylene are common petroleum constituents.

The EPA identified the following additional HAPs emitted from oil and gas operations: toluene, n-hexane, benzene, xylenes (mixed), ethylene glycol, methanol, ethyl benzene, and 2,2,4-trimethylpentane. (EPA, 2012). These HAPs, as well as carbonyl sulfide, were considered by EPA during development of the NESHAP standard for oil and gas production facilities. However, only benzene emissions from glycol dehydrators were determined necessary to include in the regulation.

Glycol dehydrators, the emission source type identified by EPA as requiring regulation, are used to removed water from natural gas and natural gas liquids. The two fields nearest to the main lease parcels, Cienaga Canyon and Midway-Sunset, both produce natural gas associated with oil (CalGEM, 2018). If glycol dehydrators are installed during subsequent lease development, they would be required to meet applicable requirements of the oil and gas production NESHAP rule (40 CFR 63, subpart HH). Use of compliant glycol dehydrators in compliance with the NESHAP rule at the lease sites would not be expected to cause substantial impacts.

Natural Gas

"Natural gas," if encountered in drilling, may be flared and/or vented from wells. Venting or flaring is regulated under State and local rules. The gas is likely to contain GHGs and VOCs that could also be emitted from reserve pits, produced water disposal facilities, and/or tanks at the site. California law prohibits wasteful venting or flaring of natural gas. If a large natural gas resource were to be discovered on a lease, and existing systems were not adequate, new pipelines to transport natural gas, or new centralized collection, distribution and/or gas processing facilities may be needed in order to manage the gas as required by State and local rules.

Air Quality Related Values

As shown in Table 8, maximum RFD emissions of SO_2 and NO_x, the particles and precursors associated with acidification and enrichment of soil and surface waters, would make up a miniscule fraction of the SJVAPCD emission totals. Their impacts would be expected to be indistinguishable from the impacts of existing sources. Based on this data, impacts from potential development would not be expected to be discernable from background levels.

Table 8: Comparison of RFD maximum acid deposition emissions to projected 2020 Emissions in the analysis area

Criteria Pollutant	**Year 10 Maximum from Table 6** Cumulative tons over 10 years at maximum potential development	**SJVAPCD[(a)]** Projected Tons per Year	**Year 10 Maximum as percentage of SJVAPCD[(a)]** (Year 10 Max / SJVAPCD*100 percent)
NO_X	55.9	115,194	0.05 percent
SO_2	9.2	10,184	0.09 percent
(a) California Air Resources Board Almanac Emissions Projection Data - 2020 Estimated Annual Average Emissions San Joaquin Valley APCD. https://www.arb.ca.gov/app/emsinv/emseic1_query.php . Accessed July 8, 2020.			

As shown in Table 9, maximum RFD emissions of visibility-reducing particles (VRP) and precursors (NO_x, SO_2, and $PM_{2.5}$) would be a very small fraction of SJVAPCD's projected total VRP and precursor emissions. Based on this data, impacts from potential development would not be expected to be substantial.

Class I areas in the analysis area including Kings Canyon, Sequoia, and Yosemite National Parks as well as the Ansel Adams, Domeland, and John Muir Wilderness are located along or adjacent to the eastern boundary of the analysis area, while the proposed lease parcels are located near the western boundary. This means most of the VRP and criteria pollutant emission sources in the SJVAPCD, including urban areas, large industrial facilities, and major highways, lie between the proposed leases and those Class I areas. Given their potential, miniscule emissions, and greater distance from the Class 1 areas, the proposed leases would be expected to have no discernable effect on air quality or AQRVs at those Class I areas. Further support for the conclusion is shown in Figure 1, where visibility at the relatively close San Rafael Wilderness Class I area has improved over the most recent 20-year monitoring period despite of the existing oil and gas emission sources, which are also located within five miles of the closest proposed lease parcels.

Table 9: Comparison of RFD maximum emissions of visibility-reducing particles (VRP) and precursors (NO_x, SO_2, and $PM_{2.5}$) to projected 2020 emissions in the analysis area

Criteria Pollutant	**Year 10 Maximum from Table 6** Cumulative tons in year 10 at maximum potential development	**SJVAPCD[(a)]** Projected Tons per Year	**Year 10 Maximum as percentage of SJVAPCD[(a)]** (Year 10 Max / SJVAPCD*100 percent)
NO_X	55.9	115,194	0.05 percent
SO_2	9.2	10,184	0.09 percent
$PM_{2.5}$	8.1	37,084	0.02 percent
(a) California Air Resources Board Almanac Emissions Projection Data - 2020 Estimated Annual Average Emissions San Joaquin Valley APCD. https://www.arb.ca.gov/app/emsinv/emseic1_query.php . Accessed July 8, 2020.			

Climate Change

Greenhouse Gas Emissions

The primary sources of greenhouse gases associated with oil and gas development are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHGs are produced and emitted by various sources during phases of oil and gas exploration, well development, production, and site abandonment. Emissions from oil and gas operations can be organized into the following classifications:

Direct Emissions

- Combustion Sources – includes stationary devices (boilers, heaters, internal combustion engines, flares, burners) and mobile sources (barges, railcars, and trucks for material transport; vehicles for personnel transport; forklifts, construction equipment, etc.)
- Process Emissions and Vented Sources – includes process emissions from glycol dehydrators, stacks, vents, ducts; maintenance/turnaround; and non-routine activities such as pressure relief valves, emergency shut-down devices, etc.
- Fugitive Sources – includes fugitive emissions from valves, flanges, pumps, connectors, etc., and other non-point sources from wastewater treatment

Operations at leased well sites would be required to comply with BLM orders, guidance, and lease conditions as well as all applicable Federal, State, and local regulations.

Indirect Emissions

- Emissions associated with production-related off-site operations, such as generation of electricity, hot water or steam, for on-site power, heat and cooling as well as compression, pumping, or other transportation and refining of the produced oil.
- Wells are generally drilled and developed using onsite mobile energy source counted under direct emissions.

While BLM can generally address the potential indirect emissions generated off lease, BLM has no jurisdiction to regulate operations that take place away from the lease site

End-use Emissions

- Emissions associated with use of petroleum produced from wells on the leases offered for sale.

BLM has no jurisdiction over the preparation or use of products made from crude oil produced on public lands, but their use is arguably a consequence of the lease sale and as such, are generally addressed below.

Table 10 presents an estimate of the range of GHG pollutant emissions that could be expected as a consequence of the proposed leasing action. This estimate is based on the assumption that 10 wells per year would be drilled as a result of the proposed lease sale, comprised of 1 hydraulically fractured well and 9 non-hydraulically fractured wells. Annual production was estimated based on the California Geologic Energy Management Division (CalGEM) 2018 Annual Wells and Production by County report (https://www.conservation.ca.gov/calgem/pubs_stats/annual_reports/Pages/annual_reports.aspx) and standard heat content and unit conversion factors to convert barrels per year into megajoules (MJ) per year. Direct emissions are estimated using the average carbon intensity of crude oil in grams per MJ from the Midway-Sunset and Cienaga Canyon fields as published by CARB (CARB, 2019A). Indirect and End Use emissions were calculated using GHG emission factors developed by CARB as part of the CA-GREET 3.0 model for estimating life-cycle carbon emission as part of the Low Carbon Fuel Standard (CARB, 2018). Although this model was developed to estimate GHG emissions from the point of view of fuel use, the emission factors developed for the model are appropriate for estimating life cycle emissions for crude oil production.

Table 10: RFD Estimated Range of Lifecycle GHG Emissions

		9 Conventional Wells	**1 Hydraulically Fractured Well**	**Year 1**	**Year 10 Range**
Estimated Annual Production (MJ)		164,946,377	52,711,856	Total GHG $MTCO_2e$	Total GHG $MMTCO_2e$
Lifecycle GHG Emissions	**Emission Factors[(a)]**	GHG ($MTCO_2e$)	GHG ($MTCO_2e$)		
Direct Emissions: Production plus Transport	17.56 g CO_2e/MJ	2,896	926	3,822	0 to 0.048
Indirect Emissions: Refining and Product Transport	15.1 g CO_2e/MJ	2,491	796	3,287	0 to 0.033
End Use Emissions - as gasoline	73.94 g CO_2e/MJ	12,199	3,899	16,098	0 to 0.161
			Total	23,207	0 to 0.232

(a) Source: CARB 2018, CA-GREET 3.0 Model, August 13, 2018

Table 10 conversion factors:

- 1,000,000 g CO_2e = 1 $MTCO_2e$
- 1,000,000 $MTCO_2e$ = 1 $MMTCO_2e$

Table 10 example calculation for Production plus Transport for Conventional wells GHG $MTCO_2e$:

$$\underset{\text{estimated annual production}}{164{,}946{,}377\ \text{MJ}} \times \frac{17.56\ \text{g}\ CO_2e}{\text{MJ}} \times \frac{MTCO_2e}{1{,}000{,}000\ \text{g}\ CO_2e} = 2{,}896\ \text{GHG}\ MTCO_2e$$

Table 10 example calculation for Production plus Transport for Conventional wells over 10 years at maximum potential development of the proposed leases:

$$\underset{\text{Direct GHG}\ MTCO_2e}{3{,}822\ \text{Year 1}} \times 10\ \text{Years} \times \frac{MMTCO_2e}{1{,}000{,}000\ MTCO_2e} = 0.038\ \text{GHG}\ MMTCO_2e$$

There are currently no established thresholds of significance for GHG. But statewide GHG emission inventories have been published by CARB. To provide context for these maximum estimated emissions, the annual statewide GHG inventory for 2017 published by CARB was 424 $MMTCO_2e$ (https://www.arb.ca.gov/app/ghg/2000_2017/ghg_sector_data.php). As shown in Table 10, the cumulative year 10 maximum estimated lifecycle GHG emissions related to the proposed action is 0.232 $MMTCO_2e$ and would represent 0.05 percent of the 2017 statewide inventory.

> 0.232 $MMTCO_2e$ in year 10 at maximum potential development of the proposed leases / 424 $MMTCO_2e$ in California in 2017 = 0.00057 or rounded to 0.05 percent

The potential for an increase of 0.232 $MMTCO_2e$ GHG emissions would not cause a substantial change to the cumulative impact of California's GHG emissions on the global climate.

Soil Resources

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in soil resource impacts, the BLM acknowledges soil resource impacts may result as an indirect effect of development subsequent to leasing, if and when the lease(s) is developed.

Development as a result of leasing may impact soils through topsoil removal, mixing, grading, filling, and compaction; all of which reduce soil quality. Additional impacts may include the potential for accelerated erosion following well pad and/or access road construction on slopes and/or other unstable geography. Erosion may present potential water quality issues from increased sediment and/or nutrient transport. Soils exceeding 40 percent slopes were identified on parcels 1, 2, 3, 4, and 6. Acres of soils exceeding 40 percent slope and percentage of total parcel acreage are presented in Table 11 below. Because the potential hazard of erosion increases as slope increases, the risk of erosion on and adjacent to lease parcels is of greatest concern on these five parcels.

Table 11: By parcel, acres of soils exceeding 40 percent slope and percentage of total parcel acreage the acres exceeding 40 percent slope represent.

Parcel	Acres of parcel exceeding 40 percent slope (acres)	Percent of total parcel acreage exceeding 40 percent slope (percent)
1	43	4
2	253	26

3	167	27
4	154	21
6	55	10

Potential site-specific impacts would be considered and mitigated on a project basis by implementing BMPs at the development application stage. Examples of BMPs include:

- Minimizing new or additional disturbance by siting wells and access roads in areas of previous or existing disturbance to the maximum extent possible.
- Restricting vehicle and equipment use to the minimum necessary area and time to minimize soil compaction.
- Applying basic erosion control practices such as minimizing slope gradient, clearing smaller areas of vegetation, and vigilant scheduling of any excavation to avoid rainfall periods. In addition, implementing State approved Management Measures (MM's), or EPA's *Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites* (http://cfpub.epa.gov/npdes/stormwater/oilgas.cfm).
- Designing roads in accordance with the BLM standards (Manual 9113).
- Identifying and protecting biological soil crusts; and when soil crusts are present, conserving and stockpiling those soils to encourage interim restoration after drilling.
- Regardless of crust presence or absence, topsoil conservation and replacement are generally implemented to minimize impacts to soil and habitat, thereby increasing the efficiency and success of interim and final site reclamation.

Oilfield construction projects disturbing 1.0 acre of soil or more are subject to the SWRCB notification and General Permit requirements for Construction. Development associated with the proposed lease sale would be subject to compliance with these regulatory requirements. Compliance with SWRCB permit requirements such as BMPs would be expected to reduce impacts to soil resources on a landscape level by minimizing the potential for sedimentation, soil erosion, and soil loss.

Potential impacts to soils also include the possibility of fluid spills (such as diesel, lubricants, oil, and produced water) and associated contamination, which could cause reduction or loss in site productivity. Some of these impacts can be minimized or avoided through proper design, construction, and maintenance, as well as by implementing BMPs. In California, oil and gas operators are required to comply with state spill reporting requirements, per the California Office of Emergency Services (OES) and CalGEM. In addition, Federal lessees are required to comply with BLM spill reporting and clean up requirements. Soil contamination resulting from an undesirable event will be removed and/or mitigated upon discovery; clean up may follow the *Guidelines for Clean-up of Heavy Crude on Federal Leases*.

Based on robust BMPs and the regulatory environment, impacts to soils resulting from potential development of parcels proposed for leasing are expected to be negligible; that is, not affecting overall long-term soil function following reclamation.

Floodplains

Parcels 1-6 are within Zone X; an area outside the 500-year flood and protected by levee from 100-year flood. Parcel 7 is within Zone A; areas of 100-year floods.

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in floodplain impacts, the BLM acknowledges floodplain impacts may result as an indirect effect of

development subsequent to leasing, if and when the lease(s) is developed. The likelihood for indirect effects is highest for parcel 7 because the parcel is within areas of 100-year floods. As stated previously, additional site-specific environmental analysis would be conducted in the event a development proposal is submitted. COAs would be attached to the BLM permit approvals and where necessary, would require measures to minimize the risk of flood damage to oil and gas facilities/wells and to minimize the risk of floods causing oil spills or other contaminations to water bodies.

Water Resources

This section describes the impacts on water resources that would result from implementation of development related activities for the seven parcels and COAs including BMPs that would reduce potential impacts, if necessary. This section was informed, in part, by the Hydrology and Water Quality Sections in Kern County SREIR 2020 (Kern County, 2020, https://kernplanning.com/SREIR2020-oil-gas-zoning-revisions/).

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in water resource impacts, the BLM acknowledges water resource impacts may result as an indirect effect of development subsequent to leasing, if and when the lease(s) is developed. As stated previously, additional site-specific environmental analysis would be conducted in the event a development proposal is submitted. COAs would be attached to the BLM permit approvals and where necessary.

Groundwater

The parcels along the west side of the valley do not have, the Corcoran clay or similar barrier to movement of water into the deep groundwater. This means that brine, accidental spills of oily brine, accidental spills of oil or solvents can all mobilize into the groundwater. Since many of the small rural towns use well water, pollution of the groundwater could have detrimental effects on drinking water (Gillespie et al., 2019, McMahon et al., 2019). The groundwater quality is already poor (Burton et al., 2012). Similar issues can occur on parcel 5, which is north of Oildale along highway 65. Although the potential effects on drinking water are different here due to the influx of clean water from rivers draining the Sierra Nevada (Wright et al. 2019), precautions must be taken not to introduce chemicals into the drinking water portion of the aquifer.

Aquifer layers are affected by seasonal local groundwater withdrawals (Everett et al. 2020), Water levels typically decline in the summer due to increased water use and groundwater withdrawal, and they recover in the winter in correlation with decreased withdrawal and increased recharge from precipitation. Monitoring groundwater levels would help understand when the project is substantially withdrawing water from the aquifer. Minimizing groundwater use, reusing water, can help minimize the effects. An example of a mitigation measure or Best Management Practice to protect groundwater comes from the Draft Environmental Impact Report (Kern County, 2020):

> All drilling operations must either use a closed loop system to avoid discharges of drilling muds and fluids or obtain coverage by [SWRCB] for drilling ponds. Any surface ponds or sumps must be cleared of fluids and muds in accordance with the [SWRCB] general order, and applicable Water Discharge Requirements and [CalGEM] regulations. Compliance with applicable laws, regulations and standards will reduce potential surface water quality impacts from contact with drilling muds or fluids during drilling and construction to less than substantial levels. In the western part of the Kern Sub-basin this will protect groundwater. In the eastern part of the basin drinking water supplies will be protected.

In the eastern and western sides of the Kern Subbasin, a substantial amount of the water used for operations of the oil wells comes from produced water (Kern County, 2020). In 2012, in the eastern Kern sub-basin oilfields 100,734 acre-feet of water was produced, and 357 acre-feet of well water was used. In the western side of the basin, 131,341 acre-feet of produced water was used, and 8,358 acre-feet of well water was used (Kern County, 2020). Therefore, the potential to overdraft the aquifer can be substantially reduced by the use of the produced water.

However, (up to) one hydraulically fractured well may be expected as a result of this lease sale. Hydraulic fracturing has the potential to affect groundwater basins through leaks and spills of fluids from storage containers, transportation incidents, flow lines, leaks from impoundments and migration of fractures outside of the target producing formation. Ground water consumption (use) may also occur as a result of hydraulic fracturing. Data for California indicate, on average, hydraulic fracturing consumes about 100,000 gallons (0.31 acre-feet) of water per well (CALGEM 2015a, 2016, 2018c). In addition, drilling would require 4,200 gallons per day (CALGEM 2015b); and wells take an average of 23 days to drill (DEIR Kern County 2020), which would consume an additional 100,000 gallons. Therefore, water consumption per hydraulically fractured well is assumed to be about 200,000 gallons (0.61 acre-feet). This projected use would constitute approximately 0.00003 percent of Kern County's annual water consumption, which is about 2,420,000 acre-feet per year (USGS, 2020).

Acre-feet per hydraulically fractured well calculation:

$$\text{200,000 gallons estimated for one hydraulically fractured well} \times \frac{\text{1 acre-foot}}{\text{325,851 gallons}} = \text{0.61 acre-feet for one hydraulically fractured well}$$

Acre-feet per hydraulically fractured well compared to Kern County-wide annual water use:

> 0.61 acre-feet for one hydraulically fractured well / 2,420,000 acre-feet per year Kern County-wide annual water use = 0.000000252, rounded and multiplied by 100 percent = 0.00003 percent

Since the Kern Subbasin aquifer contains municipal/community wells and oil wells, the development of 10 wells (including the potential for up to one hydraulically fractured well) may have an additional effect, however any effect would be difficult to distinguish from existing effects. The deep area of the aquifer with naturally occurring saline water is north of the proposed parcels. The deep aquifer is approved for saline injections as is the Poso Creek area, which includes parcel 5.

The potential to harm groundwater on the western side of the Kern Sub-basin from surface spills is due to the lack of a clay layer like the Corcoran Clay. Parcel 5 (Poso Unit) impacts are expected to be minimized by applying protective Oil & Gas Guideline stipulations such as those in Appendix D to minimize the risk of contamination from accidental releases, in addition to fulfilling all laws, regulations, State and Federal Clean Water Acts, and BLM policies.

Furthermore, BLM authorizations for oil field construction projects 1.0 acre or larger in size would be subject to compliance with California SWRCB Order No. 2010-0014-DWQ requirements to prevent or reduce non-point source pollution, and RWQCB requirements related to surface and groundwater protection.

Surface Water Quality

Along the western edges of the Kern County subbasin the Corcoran clay does not protect groundwater pollution from moving into deeper groundwater areas (Gillespie et al., 2019, McMahon et al., 2019).

Cienega and Bitter Creeks are perennial waters higher in the watershed. These streams provide water for shrubs around them. As they move lower in the watershed they start to dry in summer. Cienega creek seasonally flows through BLM lands close to parcel 1 and 2 within the Cienega unit. Bitter creek flows through BLM lands in the southwestern corner of parcel 3 within the Cienega unit. There are also multiple unnamed, intermittent creeks crossing both Federal and private lands on all the proposed lease sale parcels. These unnamed, intermittent creeks seldom have water but can be subject to intense flows and flooding during heavy rain events. Although they may flow episodically, they can carry water into the valley and cause erosion if they are separated from their floodplains. The protection of the floodplain and the streams are important to protect water quality. Both named and unnamed intermittent streams seldom have water but can be subject to intense flows and flooding during heavy rain events. Therefore, spills should be cleaned up quickly so that chemicals will not seep into the ground water that these streams feed when flowing.

Since ephemeral and intermittent streams flow, they can transport chemicals and other inadvertent spills of chemicals or oil or other contaminants. Therefore, the risk of contamination from surface activities has the potential to seep into the ground and through successive years of flows into the groundwater. However, having spills cleaned up immediately upon discovery including in ephemeral and intermittent water courses can prevent this.

Stormwater and runoff impacts from construction activities related to well drilling, reworking, and lugging and abandonment would modify soils and vegetation during the clearance and grading of well and related structural pads, access roads, utility infrastructure for pipeline subsurface or surface installation. Construction period activities that disturb soils and surface vegetation could mobilize sediment, debris, and other site constituents that may be transported to surface water or percolate into groundwater due to storm event runoff, potentially causing exceedances of water quality standards if not controlled. Exceedance of water quality standards may be considered a substantial impact depending on the duration and extent of the exceedance event.

Construction or Industrial General Permit adopted by the SWRCB require strict compliance with water quality standards through the implementation of BMPs and other measures. To the extent some oil and gas activities are exempt from either the Construction General Permit (e.g., due to the small area of land disturbance) or the Industrial General Permit, BMPs may still be utilized to prevent or minimize pollutants from becoming entrained in stormwater. The American Petroleum Institute (API) and other sources of applicable industry engineering standards publishes and regularly updates oil and gas industry standards and criteria for stormwater and runoff management. Substantial impacts to water quality standards or WDRs could occur without the implementation of mitigation measures or best management practices.

Example of best management practices for the construction phase follow (Kern County 2020). The Draft Environmental Impact Report (Kern County 2020) contains many Mitigation Measures that could be used to minimize effects, such as:

a. Erosion Control -
    1 Scheduling of construction activities to avoid rain events.
    2 Limiting vegetation removal to the maximum extent practicable.
b. Sediment Control -
    1 Secure stockpiling of soil.
    2 Installation of a stabilized construction entrance/exit and stabilization of disturbed areas.
c. Non-stormwater Control -

1. Proper fueling and maintenance of equipment and vehicles.
2. Proper concrete handling techniques.

d. Waste and Material Management -
    1. Properly managing construction materials, designating construction staging areas in or around the Project site.
    2. Stockpiling and disposing of demolition debris, concrete, and soil properly.
    3. Aggressive control of litter. The Applicant shall comply with all applicable federal, state, regional and local agency water quality protection laws and regulations, and commonly utilized industry standards, including (where applicable) obtaining coverage under the stormwater construction general permit and industrial general permit issued by the State Water Resources Control Board and complying with industry stormwater management standards for construction and operational activities.
    4. Proper disposal of demolition debris, concrete, and soil.
    5. Proper protections for fueling and maintenance of equipment and vehicles.

e. Post-Construction Stabilization -
    1. Ensuring the stabilization of all disturbed soils per revegetation or application of a soil binder.

Oil-bearing formations within the Kern Sub-basin include a mixture of usually saline or other poor-quality groundwater and hydrocarbons. Production wells extract a mixture of water and hydrocarbons that is separated in surface facilities, typically a series of tanks where lighter oil and gas compounds are isolated and skimmed from the heavier water. Residual water generated by the hydrocarbon separation process is generally referred to as “produced water”. As oilfields mature in the basin the ratio of produced water to extracted hydrocarbon resources has tended to increase, in part because the volume of the hydrocarbon deposits remaining in the subsurface formations has been reduced by prior extraction, and also due to the injection of steam or water to mobilize heavier, more viscous deposits for pumping to the surface (Kern County, 2020). Some of this produced water is reinjected and some is used for other purposes thereby helping to reduce water demands.

Potential development of (up to) 10 wells (including (up to) one hydraulically fractured well) may result in surface disturbance from the construction of well pads, access roads, pipelines, and powerlines, which can result in degradation of surface water quality from point source pollution such as spills, increased soil losses, and increased gully erosion, and nonpoint source pollution such as runoff. In addition, surface water quality could be impacted by leaks or spills into water bodies due to transportation, storage, and use of hazardous materials, including fuels, hydraulic fracturing chemicals, and produced water. Effects could also occur through leaks or spills onto upland surfaces where contaminants migrate to surface water. Having spill kits and other means to absorb contaminants on site could help minimize these effects. The use of produced water for other oilfield activities, such as discharge for dust suppression, would require additional permitting and approvals to avoid impacts to biological, water, and other resources. The extent to which oilfield operators can feasibly increase produced water reuse and decrease municipal and industrial demand is uncertain.

Consistent with Lease Notice 1, surface disturbing activities are restricted within 500 feet of surface water to protect the water resources. As a result, direct effects to Bitter Creek, Cienega creek, or other intermittent streams are not expected from potential development because the BLM would recommend avoiding direct surface disturbance in such areas. For example, the building of a roads in these areas would have a large effect and would not be recommended. If the road had to cross a creek then BMPs should be followed to minimize the effects. The road should not parallel the creek within 500 feet, or this could lead a large amount of erosion. Such erosion may be picked up during rains and degrade downslope

water quality. The other streams occurring on or near the parcels are ephemeral or intermittent, and therefore surface water impacts are expected to be minimized through BMPs (Kern County, 2020). By protecting floodplains and streams (both perennial and intermittent lower elevations), the potential impacts to surface waters would be minimized.

Impacts to surface water resources from hydraulic fracturing are likewise expected to be minor due to the Federal, State, and local regulations governing discharges in protected waterways as defined by regulation (BLM 2012; Kern County, 2020). Well locations and related infrastructure (roads, tanks, powerlines, etc.) would be sited to avoid direct impact or alteration of waterways (under the BLM standard lease stipulations, a proposed well can be offset up to 200 meters), and every effort would be made to avoid features requiring the discharge of dredge or fill materials into waters of the US. Furthermore, if a "blue line" drainage cannot be avoided, California Department of Fish and Wildlife (CDFW) notification would be required, and CDFW may require the applicant to apply for a Lake and Streambed Alteration Agreement (Section 1600) and Department of Water Resources will require a 401 permit. Potential impacts to water quality from erosion, increased sediment, and hydraulic fracturing activities would be minimized by implementing basic principles of erosion control, reductions of disturbance of streams or floodplains, and application of lease stipulations consistent with the basin plan.

Since direct and indirect effects would be avoided or minimized through application of stipulations, BMPs, and the measures above, the BLM concludes the lease sale would result in, at most, minor negative effects. This conclusion depends on adherence to stipulations and BMPs, as well as no spill occurrences. If a spill occurs, and is not cleaned up immediately when found, possible major impact to surface water resources could occur.

Biological Resources

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in biological resource impacts, the BLM acknowledges biological resource impacts may result as an indirect effect of development subsequent to leasing, if and when the lease(s) is developed. The number of new wells on new leases is estimated to be (up to) 10 wells (including (up to) one hydraulic fracturing well) may be developed on the offered lease parcels. Development of the 10 wells and associated road and facilities are estimated to potentially disturb up to 18.6 surface acres.

Measures to minimize impacts, such as those contained in Appendix H would reduce the amount of habitat and species impacted. In addition, CSU Sensitive Species and CSU Protected Species stipulations (Appendix B) would be applied to all parcels. These stipulations reserve to the BLM the right to delay processing; move, modify, or seasonally restrict activities; or prohibit surface disturbing activities on all or a portion of the lease to protect biological resources. All lease parcels are within the reserve area and habitat corridor system for the San Joaquin Valley species.

For habitat disturbance authorized under the 2017 PBO, compensation in the form of additional habitat protected, would be required. The rates of compensation under the 2017 PBO are 1.1:1 acre (compensation acre to temporary impact acre) to 3:1 acres (compensation acres to permanent impact acre). The BLM and USFWS meet annually to review the effectiveness of project design criteria, mitigation and compensation associated with the BLM administered oil and gas leases. Based on these meetings, changes may be made to the BLM program. To date, changes to the program have not been deemed necessary since application of the protective measures have adequately minimized and avoided impacts to listed species.

In general, the occurrence, abundance, and distribution of federally listed wildlife are most strongly affected by habitat type, quality, and accessibility. For this analysis, most impacts to habitat resources and functions are assumed to occur in proportion to the amount of surface disturbance.

Effects to Special Status Species: (Federally Listed and Proposed Species, Critical Habitat, and BLM Sensitive Species)

Eight Federally listed threatened and endangered species and 12 BLM designated sensitive plant species (Appendix C) have potential to occur and may be affected by oil and gas development on proposed parcels. A discussion of BLM formal consultation with USFWS under Section 7 of the ESA as applicable to this project is provided in Chapter 1 under Relationship to Statutes, Regulations and Other Plans, Endangered Species Act.

In addition to site-specific NEPA and ESA review, all new oil and gas leases would be subject to the CSU – Protected Species and CSU – Sensitive Species stipulations (Appendix B). These CSU stipulations reserve to the BLM the right to delay processing; move, modify or seasonally restrict activities; or prohibit surface disturbing activities on all or a portion of the lease to protect biological resources. Leasing of lands under these constraints will provide protection for protected species and special status species.

Potential impacts to special status fish and wildlife species may include direct mortality and reduction or extirpation of a population; habitat loss, modification, fragmentation or disturbance; and interference with movement pattern. These impacts can reduce numbers of one or more species, potentially to the point of local extirpation; disrupt community composition and function through changes in the distribution, relative abundance, and habitat use of various species (e.g., reduced prey abundance affects predator abundance); and make populations and communities hypersensitive to other perturbations. For example, increased habitat fragmentation and artificial roosts can make species more vulnerable to disturbance by reducing patch size, increasing the amount of edge, and increasing accessibility to predators or (in the case juvenile desert tortoise) direct predation of juveniles by ravens and crows.

Potential direct impacts to special status plants and important plant communities include the physical disruption or removal of rooted vegetation or disruption of habitat in the immediate vicinity of rooted plants. Direct impacts also may include disruption of a plant community that results in the reduction of total numbers of plant species (species richness) within an area, and/or reduction or loss of total area, diversity, structure, and/or function of a community. Potential indirect impacts include disruption or reduction of pollinator populations; disruption of hydrological; loss of habitat suitable for colonization due to surface disturbance; and disturbance to vegetation from herbicide use and drift. Roads generate weedy habitat along their edges, as well as avenues for weed invasion into unoccupied territory. Dust generated by construction activities and travel along dirt roads can affect nearby plants by depressing photosynthesis, disrupting pollination, and reducing reproductive success. Oil or other chemical spills could contaminate soils as to render them temporarily unsuitable for plant growth until cleanup measures were fully implemented. If cleanup measures were less successful, longer term impacts could be expected.

Although the impacts described above can occur because of oil and gas development, it is estimated that effects would be limited to up to 10 wells with up to 18.6 acres of habitat disturbance. This potential disturbance (permanent and temporary) of habitat amounts to 0.04 percent across the parcels' landscape. This would have a localized, moderate effect on habitat in the immediate vicinity of the well and access road, but a negligible to minor impact on habitat within the Southern San Joaquin Valley. In addition, the 2012 Bakersfield RMP and 2017 O&G Programmatic BOs' provisions will insure that the continued

existence of any special status species are not jeopardized. These estimates of habitat alteration are within the range expected and analyzed in the Bakersfield 2014 RMP, 2012 Final EIS, and 2017 Biological Opinion.

There will be no effect to designated critical habitat as none of the parcels include designated or proposed critical habitat.

Relationship to San Joaquin Valley Endangered Species Recovery

The conservation and recovery strategy outlined in the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) defines a system of reserves and corridors. In the Bakersfield RMP, the BLM committed to managing all BLM lands within these reserves and corridors as part of the conservation and recovery system. These lands are managed to maintain 90 percent of the habitat in reserves and 75 percent of the habitat in the corridors. Restoration is undertaken on lands that do not meet the habitat maintenance goal before new development is authorized. The BLM also requires mitigation and compensation for development activities. Disturbance of habitat is compensated at a rate of 1.1 acre for every acre temporarily disturbed, and 3 acres for every acre permanently disturbed. In addition, disturbance to public land requires an additional replacement factor of 1 acre for every acre disturbed and disturbance within the Western Kern County Kit Fox Core Area requires a 4:1 compensation ratio. Species surveys, avoidance of habitat features and implementation of measures to minimize take are also standard requirements. These requirements were put in place to implement the Recovery Plan and to meet the BLM's obligation under Sections 7(a)1 and 2(c) of the Endangered Species Act to conserve listed species.

BLM's program for the management of reserve and corridor lands has been reviewed and approved by the USFWS as part the Bakersfield RMP Biological Opinion 08ESMF00-2012-F-0682 and more recently in the 2017 Oil and Gas Programmatic Biological Opinion 08ESMF00-2016-F-0683. In these Biological Opinions, the Service concluded that the BLM's program was not likely to jeopardize the continued existence of a listed species and follows Section 7(a)2 of the Endangered Species Act.

Of the lands offered in this sale, 4,055.3 acres are within habitat corridors (green zone). The RFD estimates that up to ten wells with 18.6 acres of habitat disturbance could result from this lease sale. Any disturbance would be subject to the survey, avoidance, mitigation, compensation, and replacement requirements and CSU Sensitive Species and CSU Protected Species stipulations described above. Any disturbance within habitat corridors would be subject to the 75 percent habitat maintenance objective. Given these restrictions, the limited amount of habitat that will be disturbed (10 acres), and the localized nature of the impact (immediate vicinity of up to 10 wells and access roads), indirect effects associated with this lease sale are expected to be compatible with the Recovery Plan and conservation and recovery strategy.

Of the lands offered in this sale, 278.28 acres are within reserves areas (red zone). The RFD estimates that up to ten wells with 18.6 acres of habitat disturbance could result from this lease sale. Any disturbance would be subject to the survey, avoidance, mitigation, compensation and replacement requirements and CSU Sensitive Species and CSU Protected Species stipulations described above. Any disturbance within corridors would be subject to the 90 percent habitat maintenance objective. Given these restrictions, the limited amount of habitat that will be disturbed, and the localized nature of the impact (immediate vicinity of up to 10 wells and access roads), indirect effects associated with this lease sale are expected to be compatible with the Recovery Plan and conservation and recovery strategy.

Species Specific Impacts

Appendix C lists the Federally listed, state listed and BLM sensitive species with the potential to occur on the offered lease parcels.

Federally and State Listed Species

Bakersfield cactus. Bakersfield cactus may occur within the Poso Unit, Cinega Unit, and be potentially impacted by development. The species is easily identified at all times of the year; thus populations should be easily identified and avoided; therefore any impacts would be avoided. This is currently required by the O&G Programmatic BO and would likely be required in any separate consultation.

Kern mallow. There is a possibility that Kern mallow could be encountered in the Cienega, Crocker Flat, and Buena Vista Units. Under the Oil and Gas Programmatic B.O., populations are to be avoided, to the greatest extent possible, otherwise, measures, such as delaying surface disturbance until after seed set, collection of seed, reseeding, and stockpiling of topsoil, may be required to minimize impacts.

San Joaquin woollythreads. There is potential for woollythreads to be found within the Cienega, Crocker Flat, and Buena Vista Units. To the greatest extent possible, the BLM would require populations to be avoided. Otherwise, measures, such as delaying surface disturbance until after seed set, collection of seed, reseeding, and stockpiling of topsoil, may be required to minimize impacts. This is currently required by the O&G Programmatic BO and would likely be required in any separate consultation.

California jewelflower. There is potential for California Jewelflower to be found within the Cienega Units. Under the Oil and Gas Programmatic BO, any populations discovered will be avoided by a 50-foot buffer. Jewelflower plants can be identified during flowering season, typically February to March. Since the populations would be avoided, the impacts would be avoided or would be negligible to populations and at the landscape scale.

California condor. Condors could potentially occur on the Crocker Flat unit. The Crocker Flat unit is considered to potentially provide foraging habitat for Condors therefore potential impacts to California condors may include ingesting oilfield materials, including oil, vehicle coolant, chemicals, and trash. Condors can collide with structures and power lines. Habituation to humans can increase the likelihood of human-condor interactions. Noise from activities can disrupt roosting and nesting behavior, and place chicks at risk. Condors can become coated with oil from well cellars, leaks, and spills or become entangled in equipment or fences. Oilfield roads provide access for hunting and other recreation, which produces trash that condors ingest. The BLM Oil & Gas guidelines (Appendix D) and the sample provisions from the Oil and Gas PBO (Appendix H) have implementation guidelines designed to eliminate or minimize hazards to California condors such as measures include restricting activities to certain time periods; having trash, hoses, cords, liquids, and other debris placed in closed containers or covered when workers are not present to prevent condor access; constructing barriers or landing deterrents around productive wells if condors are documented using the area. Compliance with these measures are expected to minimize impacts to an extent of negligible.

Blunt-nosed leopard lizard. Blunt-nosed leopard lizards may occur within all units except the Poso unit. Potential impacts to blunt-nosed leopard lizards include direct mortality, loss or alteration of habitat, and harassment. Blunt-nosed leopard lizards are active during the day, which enhances the threat of some impacts, such as vehicle strikes. Project activities could destroy burrows used by blunt-nosed leopard lizards. Lizards can become entrapped or buried inside destroyed burrows as well. Discharge of wastewater could drown lizards using drainages. Lizards can become entrapped or drown in oil or tarry substances. Improperly covered well cellars, buried valve boxes, buckets and vertical pipe sections can act as pitfall traps and entrap lizards. The BLM would require pre-construction surveys and

implementation of mitigation measures to reduce the potential for these impacts. Example measures include, installing flashing around the project footprint, protocol level survey prior to habitat disturbance and burrow destruction, escorting vehicles through blunt- nosed leopard lizard activity areas, and scheduling activities for time periods when blunt-nosed leopard lizards are not active. Such measures are currently required by the O&G Programmatic BO and would likely be required in any separate consultation. The BLM lease operating standards (e.g. wastewater discharge policies, proper maintenance of equipment and facilities, etc.) will also reduce the potential for these impacts.

Giant kangaroo rat. Giant kangaroo rats may occur within the Cienega, Crocker Flat, and Buena Vista Units. Potential impacts to this species include direct mortality, loss of burrow systems, loss or alteration of habitat, and harassment. The construction and maintenance of wells pads, access roads, pipelines, and other oil field structures may trap or bury kangaroo rats in their burrows. Kangaroo rats can also drown or become entrapped in spilled oil or tarry substances. Kangaroo rats may be killed by vehicles. Burrows can be damaged or destroyed by project activities. Some habitat may be lost or altered. Studies conducted by Spiegel (1996) indicated that kangaroo rat abundance was lower in oilfield-developed sites compared to undeveloped sites. This was attributed to lower carrying capacity due to habitat alteration and fragmentation. However, the amount of oilfield habitat disturbance was much greater (in excess of 70 percent) than is expected to result from the leasing of these parcels (less than 1 percent surface disturbance).

Because giant kangaroo rats have the potential to occur in some units, the BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for impacts. Examples include, trapping to temporarily remove animals from the construction site, and designing project footprints to avoid burrows when possible. Such measures are currently required by the O&G Programmatic BO and would likely be required in any separate consultation. Pre-construction surveys and implementation of mitigation measures that are part of the Oil and Gas Programmatic Biological Opinion will reduce the potential for impacts. Giant kangaroo rats are mostly active at night and most vehicle traffic is expected during daylight hours. This combination will reduce the chances of a vehicle strike. Giant kangaroo rats would be avoided, and the low amount of habitat disturbance would have negligible effects to any kangaroo rat species inhabiting the area.

San Joaquin kit fox. San Joaquin kit fox may occur within all units. Potential impacts to San Joaquin kit fox include direct mortality from vehicle strikes, accidental entombment, drowning or entrapment in spilled oil or sumps, entrapment in pipes, and entrapment in old well cellars. Construction of well pads, roads, pipelines, and facilities result in alteration and fragmentation of habitat, loss of den sites and features, and loss of habitat to support prey species. Oil fields are often places of continual human disturbance from well drilling, maintenance, and monitoring, operation of production facilities, transportation of produced oil, and associated industrial activities. There is also exposure to oil field chemicals around production facilities and from unintentional events (e.g., spills, well head and pipeline leaks, well blow-outs). However, the incidence of these causes of mortality, sickness, and habitat loss are avoided and ameliorated by the implementation of biological surveys prior to new authorizations, take avoidance, project mitigation, terms and conditions of biological opinions, best management practices, spill avoidance and cleanup measures, and habitat restoration of disturbed sites. For example, new well pads, roads and pipelines locations and routes are surveyed for kit fox dens and these projects may be moved to a distance approved by the FWS and CDFG to preserve the den site and minimize disturbance to foxes that may be present. The projects may be relocated onto previously disturbed sites to minimize habitat alteration. Facilities are inspected to ensure that oil leaks are remediated, well cellars are covered, and sumps are covered or removed. Speed limits are posted and enforced under company health and safety standards. Employee training of endangered species features, habitat, avoidance and mitigation

measures, required conservation measures, and reporting are included in employee and contractor project orientation.

Studies of San Joaquin kit fox in oil field landscapes in western Kern County have evaluated the effects of oil and gas land uses on this species. Spiegel (1996) compared several life history traits of San Joaquin kit fox (e.g., den characteristics, diet, spatial ecology and habitat use, reproduction, mortality, relative abundance, and prey relative abundance) in undeveloped, moderately developed and intensively developed oil fields. The moderately developed site was had variable amounts of disturbance from 0 percent to 50 percent disturbance, with the intensively disturbed site having >70 percent disturbance. This study, conducted between 1989 and 1993, found that the abundance of San Joaquin kit fox was 50 percent higher in undeveloped areas compared to the moderate development and high intensity oilfield sites. The relative abundance and biomass of prey species was also greater in the undeveloped site. Within the oil field sites, prey species were more diverse than in the undeveloped site. Kangaroo rats were more frequently used in undeveloped sites but rabbits/hares, pocket mice, deer mice, and house mice were used more frequently in the developed sites. The diets were reflective of prey availability of the different areas. Atypical dens (pipes, culverts, woodpiles) accounted for 50 percent of the den sites in the developed sites, while only 15 percent were atypical dens in the undeveloped site. Dens in developed sites were usually <5 meters from a human-related disturbance. Habitat features associated with den locations were typical of those most available. Activities associated with oil field production did not appear to affect kit fox survivorship or reproduction. Reproductive success and litter sizes did not differ between developed and the undeveloped sites. However, the cumulative survivorship of young foxes was higher in the undeveloped area. Predation accounted for 88.9 percent of deaths during this study, with only one death attributable to oil-related activities. The mortality risk to kit foxes from exposure to oil in the developed area was considered minimal. There was a lack of vehicle-related mortality during the study which was attributed to reduced speed limits in the developed area. This study also found that foxes in the developed areas were able to maintain smaller home ranges than foxes from the undeveloped site, presumably due to the availability of human-derived food sources widely dispersed throughout the oilfield. Disturbed sites were used in proportion to that available which was attributed to the presence of prey adapted to disturbed sites. Denning ranges and high activity areas in the developed site contained disturbed habitat in amounts greater to that available, which was likely related to the extensive use of pipe dens. This study concluded that the opportunistic nature of kit foxes allows them to persist in oil-developed areas, provided that adequate foraging resources and denning opportunities exist. The most substantial effect of oil development on kit fox populations appears to be lower carrying capacity for populations of both foxes and their prey from reduction of habitat (about 28 percent vegetative cover) and fragmentation of habitat caused by oil field-related construction and maintenance activities.

A more extensive and longer-term kit fox study in an oil field landscape was conducted at the Naval Petroleum Reserves, California (NPRC) from 1980 to 1985. At this study, a site was considered developed if disturbance was >15 percent; the undeveloped sites averaged 7.8 percent disturbance and the developed sites averaged 25.8 percent disturbance. Cypher et. al. (2000) found that kit fox capture rates were higher in the undeveloped areas than in the developed area, but these rates exhibited similar trends and were related. Survival rates were higher in developed areas during 1980 -1986, but rates declined in both areas during that period. Deaths attributed to various causes were similar in developed and undeveloped areas. Juvenile survival rates were similar in developed and undeveloped areas as were the causes of deaths. Of 712 dead foxes, 43 died from oilfield-related causes; of these 35 hit by vehicles, 1 accidentally entombed, 3 drowned in spilled oil, 1 drowned in an oil sump, 2 entrapped in pipes, and 2 died entrapped in a well cellar. Reproductive success among adult and juvenile kit fox and litter size did not differ between developed and undeveloped areas. The abundance of rabbits and hares (leporids) was always lower in the undeveloped areas while the mean capture of all rodents and kangaroo rats was higher

in the undeveloped areas. In both the developed and undeveloped areas, the kit fox use of leporids declined while the use of kangaroo rats increased. The use of leporids was higher in developed areas with the use of kangaroo rats higher in undeveloped areas. Predators were the primary cause of mortality at NPRC. Vehicles did not appear to be a substantial source of mortality due to the relatively low percentage of occurrence. Oil field activities did not appear to substantially affect the population dynamics of kit foxes at NPRC. Fox abundance was usually lower in developed areas, but trends in developed and undeveloped areas were similar, indicating that the same factors were influencing population dynamics in both areas. Relatively few foxes died on NPRC as a direct result of oil field activities. Most of these animals were accidentally hit by vehicles, but the frequency is probably similar to that on roads off-site and was possibly lower due to reduced speed limits. The exposure to toxic chemicals was detected among some kit foxes, but levels and occurrence rates were not considered to negatively impact the population. Hematological values did not differ between foxes in developed and undeveloped areas. Individual foxes used an average of 11.8 dens each year and over 1,000 dens were located on NPRC, so den availability is probably not a limiting factor. Den use patterns were similar among developed and undeveloped areas. Space-use patterns of foxes were not affected by oilfield activities. Nightly movements and home range patterns were similar in developed and undeveloped areas. Disturbances associated with oil field activities did not appear to affect kit foxes which were observed around facilities and frequently man-made structures as dens. Dens were frequently located near disturbances (roads, pipelines, disturbed habitat). This study concluded that in general, kit foxes appear to be tolerant of human activity and exhibit an ability to coexist with humans, even in areas of intense disturbance. The most substantial impact to foxes from oilfield activities probably is habitat loss associated with facility construction and concomitant reduction in carrying capacity. Based on results from NPRC and elsewhere, kit foxes can adapt to oil field activities and persist in areas of oil development.

Both studies indicated that while many of the kit fox population and life history characteristics were similar between areas developed for oil and gas and those undeveloped, there were fewer foxes or captures in the developed areas. This is likely due to reduced carrying capacity that is the result of habitat alteration and fragmentation. Both oil and gas developed study sites were at levels of disturbance far in excess of what is projected to result from this lease sale. Considering the small amount of habitat disturbance projected to occur because of leasing these parcels and the site-specific NEPA analysis and ESA compliance measures, the risk of impacts to an individual San Joaquin kit fox is very unlikely. The BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for these impacts. Example measures include monitoring of potential dens prior to excavation, complete avoidance of natal dens during the pupping season, speed limits, trash containment and removal, and checking pipes and culverts prior to moving. Such measures are currently required by the O&G Programmatic BO and would likely be required in any separate consultation. Thus, with implementation of avoidance and mitigation measures required at the site-specific project stage, little impact is likely to occur to individual kit foxes and no effects would be likely at the population level as a result from the oil and gas activities on these leases.

Kit fox habitat is compensated at a rate of 1.1 acre for every acre temporarily disturbed, and 3 acres for every acre permanently disturbed. In addition, disturbance to BLM surface requires an additional replacement factor of 1 acre for every acre disturbed and disturbance within the Western Kern County Kit Fox Core Area requires a 4:1 compensation ratio. Species surveys, standard kit fox mitigation measures, avoidance of habitat features are also standard requirements. The habitat loss of 18.6 acres is not expected to conflict with recovery plan goals. In addition, individual projects are expected to be relatively small (less than one acre on average) compared to the home range of a kit fox (average 1,144 acres) and widely dispersed over space and time.

San Joaquin antelope squirrel. San Joaquin antelope squirrel is a state-listed threatened species. San Joaquin antelope squirrel have the potential to occur in all units except the Poso Unit. Impacts to the San Joaquin antelope squirrel would be like those described for the giant kangaroo rat. Antelope squirrels are, however, more widely distributed and are more likely to occur on or near a project site than giant kangaroo rats. The BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for these impacts. Example measures include monitoring for antelope squirrel activity patterns, avoidance of potential burrows, hand removal of shrubs to increase visibility, checking below vehicles and equipment, and destruction of potential burrows only when animals are observed to be away from the burrow. Such measures are currently recommended to operators as part of the O&G Programmatic BO. These measures are currently being reviewed by the California Department of Fish and Game (CDF&G). Compliance with these measures will minimize impacts to antelope squirrel.

BLM Sensitive Animal Species

Burrowing Owl. The burrowing owl has the potential to occur in all units. Potential impacts to burrowing owls include loss of burrows, entrapment in burrows, and collision with vehicles. Burrowing owl burrows would be treated like potential kit fox dens. Such dens would be monitored for use before destruction or plugging, allowing detection of burrowing owl use. If owl use if detected and the burrow cannot be avoided, burrow destruction or plugging would occur only after the owl has vacated the site. As a result, some burrows sites may be lost, but individual owls should avoid becoming entrapped inside burrows.

LeConte's thrasher. LeConte's thrasher has the potential to occur in the Cienega, and Crocker Flat Units. Light and moderate oil field development that maintains saltbush between wells and facilities, and tall saltbush along drainages provides suitable habitat for LeConte's thrasher. Measures to retain saltbush stringers and minimize the removal of saltbush are typically included in BLM oil authorizations. Such measures are currently required under the O&G Programmatic BO. The combination of the development limits within reserve and corridors, and saltbush conservation measures are expected to maintain LeConte's thrasher habitat.

White-tailed kite, Golden eagle and Swainson's hawk. These raptor species may have forage within all units. Potential impacts include temporary displacement by human activities associated with oil field construction. These species are opportunistic in their foraging and would likely make use of some other foraging area. The potential small amount of habitat loss would have a negligible impact on the amount of foraging habitat available for these species in the general area. Adequate foraging areas occur outside of this project area.

San Joaquin pocket mouse and Tulare grasshopper mouse. The San Joaquin pocket mouse and the Tulare grasshopper mouse have the potential to occur on all units. Impacts to these species would be like those described for the giant kangaroo rat. Burrows of small mammals would be avoided to the extent practicable, but some impacts to these two species would likely occur. Considering the small amount of habitat expected to be disturbed during the construction of one well, the site-specific impacts would be minor and the impacts to populations would be negligible.

Short-nosed kangaroo rat. Impacts to short-nosed kangaroo rats would be similar to those described for the giant kangaroo rat. Short-nosed kangaroo rats are also widely distributed, and like the antelope squirrel, are more likely to occur on or near a project site than giant kangaroo rats. Short-nosed kangaroo

rats have the potential to occur in the in the flat areas in the lower elevations of all the Cienega, Crocker Flat, and Buena Vista Units.

Western mastiff, Pallid bat and Fringed myotis. The western mastiff bat and pallid bat has the potential to occur in all units. The fringed myotis has the potential to occur in the Poso and Crocker Flat Units. Impacts to these bat species are not expected as roost sites (rocky grottos, caves, cliffs, buildings, mines) are not expected to be impacted by development activities and little foraging habitat would be altered.

BLM Sensitive Plant Species.
Sixteen BLM sensitive plant species were identified as having the potential to occur in lease parcels. An objective of the BLM sensitive species policy is to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA. As such, populations are not always easy to identify, especially given the high yearly variation in precipitation and the annual plants' response. Because of this, a single year's survey may not adequately identify existing population boundaries and, thus, development may inadvertently destroy existing, but unidentified sensitive plant habitat and populations (i.e., seed banks). Impacts would be dependent on the location of the disturbance relative to populations of the species in question. The construction of roads, well pads, and similar development could destroy plants or disrupt continuity between populations. New weedy species could be introduced, and weeds would benefit from the additional moisture generated by runoff from roads and pads. To minimize impacts to BLM sensitive species, 2014 ROD/Approved RMP BMPs of time-appropriate biological surveys prior to any disturbance would identify what sensitive species are present. Results of these surveys would guide mitigation measures that would consider the type of impact, the rareness of the species, the population size and distribution, and the species' response to disturbance.

Indirect Effects to Biological Resources as a result of Climate Change
Since the level of greenhouse gas associated with the proposed action is not expected to detectably influence climate change, indirect effects to biological resources are not expected. The effects to biological resources from climate change are discussed instead under cumulative effects.

Cultural Resources

Cultural Resources Analysis Methodology
In accordance with the *Supplemental Procedures for Fluid Mineral Leasing, Amendment to the State Protocol Agreement* (2016), the environmental analysis for cultural resources is limited to the proposed action of leasing and does not consider or approve project specific ground disturbing activities. If a parcel is leased, subsequent proposed projects or development would be subject to a separate NEPA analysis and compliance with Section 106 of the NHPA.

Cultural Resources Impact Analysis
The Class I record review showed the seven proposed lease parcels have had varying levels of previous Class III survey coverage, with none being entirely surveyed. Two of the proposed parcels, parcels 1 and 7, contain known cultural sites. These sites consist of one stone tool material scatter and two historic period oil field remains.

As noted above, Class III intensive field surveys have not been completed for portions of the proposed lease parcels. If oil and gas development actions or associated realty actions are proposed for the leased parcels, the areas of potential effect would be defined and assessments of potential impacts upon cultural resources would be undertaken. The BLM has discretional control over mitigation stipulations and/or

avoidance measures imposed on a project. Although a lessee has a right to propose lease development, the BLM may require development activities to be moved to avoid cultural resources. Should development uncover unknown subsurface cultural remains, the lessee would be required to halt all work until the site could be evaluated and proper avoidance or mitigation measures identified. In cases where Native American heritage sites may be impacted, tribal coordination and consultation regarding the development of appropriate mitigation measures would be conducted.

In the 2014 RMP, the BLM established stipulations specific to the protection of cultural resources during fluid mineral leasing. Those stipulations can be found in Appendix B. Based on the cultural resource identification process specified in the Protocol Supplement for Fluid Mineral Leasing (described in Chapter 3 Cultural Resources), the application of special lease stipulation MM-D-1.1.6 to a portion of parcel 1, and the requirement for subsequent projects to adhere to NHPA and NEPA review processes prior to development, the proposed lease sale would result in no adverse effect to historic properties.

Paleontological Resources

Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in paleontological resource impacts, the BLM acknowledges paleontological resource impacts may result subsequent to leasing, if and when the lease(s) is developed. Several Federal authorities, including the NEPA and FLPMA, require assessment of potential impacts to important paleontological resources resulting from federally authorized actions. For locations where PFYC 4, 5 or U formations are present, a site-specific paleontological resource assessment would be required prior to development to determine if there is a potential for impact to these formations. If there is a potential for impacts, a Paleontological Resource Mitigation Plan would be prepared and it may include construction monitoring, specimen collection, preparation, and curation. If important paleontological remains are discovered during field surveys or project construction, all work would be halted until plans for avoidance or mitigation could be addressed (BLM Manual 8270 and Handbook 8270-H; BLM IM No. 2009-011).

All the proposed parcels are underlain by paleontologically sensitive, PFYC Class 4, 5, or U, geologic formations. As a result, direct impacts to paleontological resources could occur if and when lease development activities were proposed.

For projects located on BLM surface land within the proposed lease parcels, underlain by PFYC 4, 5, and U formations, the completion of a sensitivity assessment and, if an impact is likely, implementation of a Paleontological Resource Mitigation Plan, would be required. With the implementation of a Paleontological Resource Mitigation Plan, impacts to paleontological resources are mitigated.

Under requirements of the Mineral Leasing Act, paleontological compliance for projects occurring on private surface/split-estate land, is subject to the discretion of the surface owner. If the BLM has determined a split-estate project has the potential for impacts, the surface landowner would be contacted and advised compliance is recommended. The surface owner then indicates their decision to proceed or waive this requirement. Due to the potential for the absence of paleontological resource mitigation requirements for projects occurring on private/split-estate lands with surface landowner waiver, there would be potential impacts to paleontological resources in these cases. This may be offset by the completion of appropriate mitigation for Federal surface land projects located within the same sensitive geologic formations.

Livestock Grazing

There are no substantial direct or indirect impacts anticipated to livestock grazing operations or opportunities from leasing the parcels for oil and gas development because such grazing use could occur

concurrently with development activities. Should development activities on the surface lands leased under this action be proposed, subsequent site-specific NEPA documentation would address potential impacts to affected livestock grazing operations and opportunities. For example, if the oil and gas lessee proposes development in the same footprint as a cattle trough, the BLM may request the oil and gas lessee to consider an alternate site that does not conflict with the trough. Alternatively, the BLM may work with the grazing operator to consider a new location for the trough if the characteristics of the geologic formation or surface conditions are prohibitive to the oil and gas operator relocating their project. Overall, application of appropriate BLM BMPs/SOPs and resulting COAs on development activities is expected to protect the rangeland resources upon which the livestock grazing operations depend. Affected Federal grazing lessees would be notified of proposed development activities and be afforded the opportunity to provide input into expected impacts and development of potential mitigation measures.

Lands

Leasing Federal mineral estate for oil/gas exploration and production does not typically impact land uses in this area because the chances of finding viable new formations are so scarce. However, leasing can sometimes cause conflicts with other surface uses taking place. This is especially possible if the leased lands are split-estate, where the surface estate is privately owned, and the mineral estate is federally owned and managed by the BLM. Surface owners may not be aware of Federal ownership of the mineral estate or may not be of the implications of Federal ownership.

The surface owners potentially affected by the proposed lease sale would be notified the Federal mineral estate underneath their surface is proposed for oil and gas competitive leasing the same time the EA is posted for 30-day public comments.

For split-estate parcels, the BLM requires the lessee/operator to make a good faith effort to obtain an agreement with the private surface owner prior to accessing the leased land issued through competitive bid. Where the lessee/operator is unable to reach an agreement with the private surface owner, the lessee/operator can file a surface owner protection bond. The bond should be in an amount sufficient to protect against damages to the surface as allowed in the statute that reserved the mineral rights to the Federal government (Instruction Memorandum 2003-131). However, the minimum amount of the surface owner protection bond is $1,000.00. More information regarding the rights and responsibilities of the landowner, the BLM, and the mineral lessee is covered in a pamphlet available at (www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/split_estate.html)

Along with ownership of the minerals, the Federal government retains the right to use any part of the surface for exploration or development. This is referred to as “surface entry rights” and can cause distress for private surface owners who do not wish to see new roads and well pads on their land. Adjacent private lands can also be impacted when new road access to the leased areas is necessary. Although the responsibility for obtaining access to leased areas is the lessee’s responsibility and not the BLM’s. Leasing could cause an indirect impact to adjacent lands due to the need for road access.

Oil and Gas Resources

The proposed action to offer parcels for competitive lease would have a beneficial effect on mineral exploration and development. Land development would generate jobs and revenues to the State and county. In addition, royalties and rentals from competitive sales are a dependable source of income for the Federal and State governments. The impacts from this sale may be small, including an unknown (but probably relatively small) amount of new oil reserves, due to the small amount of acreage offered.

However, the sale would provide industry increased opportunity for fluid mineral exploration and potentially increased development opportunities.

In most instances, applying the CSU – Protected Species and CSU – Sensitive Species stipulations would not prevent surface occupancy for the entire lease. That is, an alternative site or other mitigation or compensation measure would probably be available that would still allow the lessee to drill and develop the lease.

CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) defines cumulative effects as: "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

The CEQ suggests cumulative impact analyses should focus on meaningful impacts, and not exhaustively analyze all possible cumulative impacts (CEQ 1997b). Therefore, the analysis in this EA tiers to the analysis in the 2012 Proposed RMP/Final EIS and 2019 Final Supplemental EIS, and focuses on past, present, and future actions anticipated to have environmental impacts similar to the incremental impacts identified for implementing the proposed action. The analysis includes identified projects or actions in the geographic area of analysis (i.e., the Cumulative Impact Assessment Area [CIAA]) that relate to the identified issues.

Methods of Analysis

To focus the scope of cumulative impact analysis, cumulative issues were considered in the context of baseline conditions (Chapter 3 – Affected Environment), the incremental impacts on individual resources described in this chapter (Chapter 4), the actions and decisions described in the reasonable foreseeable future projects, and the following factors as modified from the CEQ's Considering Cumulative Effects Under the National Environmental Policy Act (CEQ 1997b):

- Are reasonably foreseeable future actions anticipated to have environmental impacts similar to the incremental impacts identified for the proposed action?
- Have any recent or ongoing NEPA analyses of similar actions in the geographic area identified important adverse or beneficial cumulative impact issues?
- Has the impact to the resource been historically important, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources?

The cumulative impact analysis was further bound by considering the following factors:

- *Timeframe* – Timeframes are based on the duration of the direct and indirect effects of the proposed action.
- *Geographic area* – The geographic area of analysis, or the CIAA, covers different geographic areas depending on the specific resource being evaluated.

The reasonably foreseeable actions or projects considered in assessing cumulative effects include:

- Leasing, exploration, and development of oil and gas resources both as described in the

Reasonably Foreseeable Development Scenario (2012 Proposed RMP/Final EIS, Appendix M) for federal mineral estate and that occurring on private mineral estate in the CIAA;
- Recovery Plans and/or Habitat Conservation Plans (USFWS and California Department of Fish and Game)
- Continued issuance and renewal of land use authorizations including rights-of-way.

Proposed Action Alternative – Cumulative Impacts

In the Bakersfield Resource Management Plan and EIS, approved December 2014, the BLM analyzed the overall effects of oil and gas activities in the area. The analyses and conclusions contained in those documents are still valid and, to date, impacts from oil and gas leasing and development are under the level of cumulative impacts projected/analyzed in those documents.

Cumulative Impacts to Social and Economic Conditions

The 2012 Proposed RMP/Final EIS concluded most oil and gas activity in the Planning Area took place in Kern County, where 75 percent of state production and 8 percent of national production occurred in 2009. Kern County contains environmental justice populations based on both their minority and low-income status, so it is likely cumulative impacts on those populations have already occurred. Therefore, although the proposed action will only add a small increment of additional development, there is potential for it to add to a cumulative, disproportionate impact on environmental justice populations. Following completion of the environmental justice impact analysis at the development application stage described in the previous section, the BLM would assess whether cumulative impacts would result.

Cumulative Impacts to Visual Resources

This alternative is not anticipated to result in more than negligible adverse direct or indirect effects to visual resources; therefore, there are no cumulative effects to visual resources.

Cumulative Impacts to Recreation

This alternative is not anticipated to result in more than negligible adverse direct or indirect effects to recreation; therefore, there are no cumulative effects to recreation.

Cumulative Impacts to Air and Atmospheric Values

Cumulative Impacts to Air Quality

The cumulative impact analysis area for air resources occurs in EPA Region IX and includes the San Joaquin Valley Air Basin. This area also includes the San Joaquin Valley, CA – Extreme 8-hr Ozone Nonattainment Area, the San Joaquin Valley, CA – $PM_{2.5}$ Nonattainment Area, and the San Joaquin Valley, CA PM_{10} Maintenance Areas. The air analysis considers potential impacts over the life of lease parcels, which is 10 years.

As shown in Table 7, maximum expected air emissions from the proposed leases would make up only 0.03 percent of total emissions in the SJVAPCD. This indicates that the environmental impacts of the cumulative emissions would not be substantially different than those of the existing emissions alone. In addition, any actual emission sources installed as a result of the proposed lease sale would be spread over a large area, meaning that the emission would not substantially increase ambient pollutant concentrations at any one location in the analysis area. The emissions from expected development of the leases levels will be compared with applicable de minimis levels, will comply with SIP regulations, and will go through the applicable permitting process, and so will be within the attainment demonstration levels in the SIPs. This means they are not likely to result in or contribute to a new exceedances or substantial changes to existing exceedances of the NAAQS. Furthermore, since existing and new stationary source emissions

would need to be permitted by the SJVAPCD, any actual emissions would be assessed in accordance with established emission budgets during the permitting process and operated in accordance with SIP regulations. If compared to a larger analysis area, such as the entire state, the emissions from the proposed actions would be smaller in relation to the existing total, and therefore even less likely to cause a new exceedance or a substantial change to an existing exceedance. By using project emissions as a comparison, this analysis demonstrated that potential maximum emissions from the proposed action will have no substantial effect on air quality when considered in light of expected future development. 2020 is the latest year for which CARB projections are available.

Cumulative Impacts to Climate Change
Climate change is a global, long-term phenomenon, and specific environmental effects of local GHG emissions can only be observed as local manifestations of that global phenomenon. Stated another way, all the effects of GHG emissions are cumulative effects. Lifecycle cumulative GHG emissions estimates considering all direct, indirect, and end use emissions are presented in Table 10. Comparison of the maximum total emissions that could result from the proposed action with state-wide emissions shows that they are not large enough to make a discernable difference in statewide or global climate effects and therefore expected development of the leases would not be substantial. If larger developments are proposed for any of the offered leases, BLM will considered adding lease requirements to implement SJVAPCD Best Performance Standards (BPS) for Stationary Sources. Under SJVAPCD guidance, facilities implementing BPS would be determined to have a less than cumulatively substantial impact GHG impact. Thus, the analysis of estimated GHG emission and the comparison of those emissions to the California statewide GHG inventory to assess significance in the direct and indirect effects section suffice for cumulative impact analysis.

Oil exploration and production activities respond to demand for fuel. As the many State and local actions currently implemented and proposed to reduce fossil fuel use for energy and transportation come into effect, it is expected that production activities and volumes of oil produced will decline. This would be expected to reduce emissions that could result from this action even further and so keep them from becoming substantial to air quality or climate change in the future.

Cumulative Impacts to Soil Resources
This alternative is not anticipated to result in more than negligible adverse direct or indirect effects; therefore, there are no cumulative effects to Soil Resources.

Cumulative Impacts to Water Resources
The ongoing production of oil and gas in Kern County, with the mitigation measures and other substantive and procedural requirements included in the proposed revisions to the County's oil and gas ordinances included in all future projects, will reduce potential cumulative impacts to hydrology and water. An exception would be effects of water withdrawals on groundwater elevations and aquifer volumes. Project Area aquifers are historically over drafted, and groundwater storage and elevations have been reduced to historically low levels in many Kern Subbasin locations during the current drought (Kern County, 2020). Although groundwater mitigation measures (Kern County, 2020) encourage the reuse of produced water, the extent to which oilfield operators can increase produced water reuse and decrease municipal and industrial demand is uncertain. However, a substantial amount of the water used in the oil fields is from produced water, thus reducing their dependence on ground water. In addition, some of the produced water can be used for a variety of other purposes, further reducing groundwater use.

Cumulative Impacts to Biological Resources

The cumulative impacts analysis area for biological resources is the southern San Joaquin Valley. Loss, degradation, and fragmentation of habitat have resulted in population declines for many San Joaquin Valley species. Development for agriculture, energy production, and urban areas, and recreational activities such as off-highway vehicles, has resulted in loss of habitat. Development at key locations, roads, trails, and water canals have fragmented habitat. Incompatible land uses, such as trash dumping, and heavy grazing has degraded habitat. Invasion of non-native weeds, and increases in predators, such as ravens and red fox, also contribute to habitat degradation. Large landscape fires have replaced mature shrub communities with non-native grasslands that can persist for one or more decades. Climate models predict that, because of climate change, Southern California will tend to be hotter and drier in the future, with an increase in the frequency and duration of drought (Christensen et al., 2007). The conservation and recovery strategy for San Joaquin Valley species is a system of reserves and corridors. In the Bakersfield RMP, the BLM committed to managing all BLM lands within reserves and corridors as part of the conservation and recovery system. These lands are managed to maintain 90 percent of the habitat in reserves and 75 percent of the habitat in the corridors. Restoration is undertaken on lands that do not meet the habitat maintenance goal before new development is authorized.

The 2012 RFD estimates between 100 and 265 acres of surface disturbance would occur annually as a result of existing and new federal oil and gas leases. Only a portion of the disturbance would be within listed species habitat. Zero acres have been leased since 2012. Approximately 25 to 35 percent of the surface disturbance would be short term and would be reclaimed within two to three years.

Beginning in about the early 1990's, compensation has been required for most new development. For every acre permanently disturbed, three acres must be set aside, and for every acre temporarily disturbed 1.1 acres must be set aside. In addition, if the land being disturbed is part of the conservation and recovery system, an additional acre must be set-aside to replace the conserved acre. This increases the ratio to 4:1 or 2.1:1 for lands that are already part of the reserve and corridor system. This compensation requirement helped to establish large mitigation banks, such as Coles Levee, Semitropic Ridge, and Kern Water Bank. Numerous other entities have also secured or pledged lands in various locations to the reserve and corridor system. Energy companies and conservation organizations have added reserve and corridor lands to the system in such areas as Lokern, Kettleman Hills, Buena Vista Valley and Buena Vista Hills. Future development is likely to require compensation and more lands are likely to be added to the reserve and corridor system.

Habitat loss, fragmentation and degradation are likely to continue as a threat to species conservation and recovery in the San Joaquin Valley. However, the requirement for compensation and replacement acres will help secure lands for the reserve and corridor system. As habitat is incrementally disturbed, habitat will also be incrementally conserved, helping to prevent substantial habitat losses. This will allow the conservation and recovery strategy for the San Joaquin Valley species to be implemented and offset impacts from development. The cumulative effect of compensating and replacing habitat as development occurs will slow the rate of habitat loss, degradation, and fragmentations.

The result of a changing climate in the southern San Joaquin Valley may result in conditions that are like those currently experienced during a series of drought years when very little rain falls in the region. During current drought conditions, herbaceous vegetation cover and production decreases, while the amount of bare ground increases. In some locations, individual plants and stands of perennial shrubs become dormant or even die due to increased stress.

A more arid environment would have varied effects on the San Joaquin Valley suite of species. Currently, during a series of extremely low rainfall years when annual plant production is reduced or

absent and food resources become scarce, populations of blunt-nosed leopard lizards and small mammals, including giant kangaroo rat, Tipton kangaroo rat, and San Joaquin antelope squirrel, tend to decline (Germano and Williams, 2005, Rathbun, 1998, Williams et al., 1993). The decline continues until more widespread germination of annual plants resumes (Germano and Williams, 2005, Rathbun, 1998, Williams et al., 1993). In the predicted more arid climate, during years with a low to average rainfall, herbaceous plant production would be reduced, and grass cover would be sparser and less persistent than what currently occurs during average rainfall years. Lower stature and more sparse annual vegetation may partially benefit small mammals and lizards of the San Joaquin Valley since persistent non-native plant cover reduces habitat suitability for these species (Germano et al., 2001). Population levels of these species will reflect the benefits of a more open structure versus the liabilities of decreased food resources.

Since San Joaquin Valley animal species have evolved under desert conditions, they may be better able to persist in a more arid climate than non-arid adapted species. During drought conditions, populations decline but do not completely disappear. Populations recover once rainfall sufficient for germination occurs. So long as future drought periods do not exceed the time that source animals can persist, the San Joaquin Valley suite of species is expected to persist. A more arid climate may also promote a more open and sparse vegetation pattern favored by these species. The non-native grasses and filaree that have invaded the region over the past two hundred years may become less persistent and dense, favoring a habitat structure the San Joaquin Valley species prefer.

Cumulative Impacts to Cultural Resources

Due to disturbance associated with potential development occurring with the proposed lease parcels, there is the potential for impacts to cultural resources as a result of the proposed action, This can contribute to cumulative impacts of oil and gas development occurring within the San Joaquin Valley oilfields generally. Due to federal requirements for project specific NHPA review and compliance for federally permitted projects, these impacts can be eliminated or reduced through this process of resource identification, avoidance through project design or resource treatment measures. Currently, similar requirements under the California Environmental Quality Act (CEQA) are in place for non-federal fluid mineral projects in Kern County. As a result, the potential for cumulative impacts to cultural resources is substantially reduced.

Cumulative Impacts to Paleontological Resources

Due to the potential absence of paleontological resource mitigation requirements for projects occurring on private/split-estate lands due to surface landowner waiver, there is also a potential for cumulative impacts. This may be offset by the completion of appropriate mitigation for Federal surface land projects which are located within the same sensitive geologic formations.

Cumulative Impacts to Livestock Grazing

This alternative is not anticipated to result in more than negligible adverse direct or indirect effects; therefore, there are no cumulative effects to Livestock Grazing.

Cumulative Impacts to Lands

This alternative is not anticipated to result in more than negligible adverse direct or indirect effects; therefore, there are no cumulative effects to Lands.

Cumulative Impacts to Minerals

Only a small portion of the land in the project area is managed by the BLM (less than 10 percent). Of the mineral estate managed by the BLM in the project area, nearly all of the mineral estate with the greatest prospect for oil and gas (i.e., within the boundaries of existing producing areas) is leased. In addition,

virtually all of the private minerals within the project area where there is likelihood for development is leased. Opportunities for development on private and public minerals persist, as evidenced by nearly 20,000 wells drilled in Kern County in the past 10 years. Since the 2014 ROD/Approved RMP was completed, permitting requirements have become increasingly stringent. The more stringent requirements have focused around air quality and endangered species habitat. The small amount of development projected for this sale, although positive for oil and gas development, is negligible from a cumulative impact viewpoint.

For a more complete discussion of the types of activities associated with exploration, drilling, and production, in addition to the environmental consequences to Minerals and the cumulative impacts on Minerals see the 2012 Proposed RMP/Final EIS (Appendix G, page 880; Appendix L, page 944, and Appendix M, page 984) and 2019 Final Supplemental EIS to which this analysis is tiered. The EISs include RFD scenarios and address impacts, both general and cumulative.

NO ACTION ALTERNATIVE – DIRECT, INDIRECT AND CUMULATIVE IMPACTS

Should the No Action alternative be selected, these lands would not be leased for oil and gas at the present time. They would remain available for competitive leasing in the future, should circumstances change to make that option worth re-considering. If these parcels are not leased, then foreseeable future resources and uses, as well as their current rates of change, would remain as described in the Affected Environment. Cumulative impacts of management activities with the no action alternative on public lands would remain as they exist presently and as described in the Affected Environment section of this document.

Social and Economic – No additional impacts would occur.
Visual Resources – No additional impacts would occur.
Recreation – No additional impacts would occur.
Air, Soil, and Water – There would be no additional impacts to air, soil, and water since these parcels would not be offered for lease. Under the no action alternative, the San Joaquin Valley Air Basin would continue to be in nonattainment of Federal and state air quality standards for ozone and $PM_{2.5}$.
Biological Resources – No additional impacts would occur.
Cultural Resources – No impacts would occur.
Livestock Grazing – No impacts would occur.
Lands and Farmland – No additional impacts would occur.
Paleontological Resources- No impacts would occur.
Oil and Gas – The no action alternative would represent a fundamental change in the decisions of the 2014 ROD/Approved RMP and would not comply with MLA, *Federal Oil and Gas Royalty Management Act of 1976 (Public Law 94-579),* the *Energy Policy Act of 2005*, and current regulations and policies to manage lands for multiple uses. Failure to make these lands available for leasing and subsequent development would also result in the loss of potential additional reserves of oil and/or gas. Without additional data, calculating the amount and value of lost reserves would be speculative.

CHAPTER 5. CONSULTATION AND PUBLIC INVOLVEMENT

NATIVE AMERICAN CONSULTATION

On May 22, 2020, certified letters and emails containing a description of the oil and gas lease sale and maps showing parcel locations were sent to federally recognized tribes known to have ancestral ties to the lease parcel areas. The BLM received receipt confirmation for all the addressees of this letter and read receipts of the associated email correspondence. In this letter, the BLM requested information and invited the initiation of formal Government-to-Government Consultation regarding potential tribal concerns and information for sites of traditional cultural or religious value which may lie within the sale parcels. The mailing list is provided below.

Designated representatives of the Tule River Indian Tribe and the Santa Rosa Rancheria contacted the BLM with requests for informal consultation and additional information. The BLM did not receive any requests for the initiation of formal Government-to-Government Consultation as a result of this initial notification. Tribal coordination and consultation will be ongoing through the EA review process. No comments were provided for inclusion in this draft document.

Name	Title	Tribe
Mr. Neil Peyron	Chairman	Tule River Indian Reservation
Ms. Kerri Vera	Director, Environmental Program	Tule River Indian Reservation
Mr. Leo Sisco	Chairman	Santa Rosa Rancheria
Ms. Shana Powers	Director, Cultural Resource Program	Santa Rosa Rancheria
Mr. Octavio Escobedo	Chairman	Tejon Indian Tribe
Ms. Colin Rambo	Cultural Resource Specialist, THPO Technician	Tejon Indian Tribe
Ms. Stephanie Smith	Environmental Program	Tejon Indian Tribe

PUBLIC INVOLVEMENT

This EA will be published to the BLM ePlanning website for a period of 30 days to allow the public to comment. Copies of the EA will also be mailed to Kern County Planning Department where the parcels are located.

As required by BLM leasing policy, where parcels are split-estate, a notification letter soliciting EA review and comments will be sent to the appropriate surface owner based on the surface owner information provided by the party submitting the EOI.

National Historic Preservation Act

For the purposes of public notification and review, as required under Section 106 of the NHPA, a description of this project will be posted on the project BLM ePlanning website. The description will include a statement indicating this action has been determined to result in no effect to historic properties as defined in the 2019 Protocol. As required under the 2019 Protocol, this determination will be posted for a minimum period of 15 days. For this EA, this decision will remain posted for public review for the duration of the public review process before it is finalized.

LIST OF PREPARERS

ID Team Member	Title	Organization
Stewart Allen	Socioeconomic Specialist	BLM
Sarah Bullock	Supervisory Wildlife Biologist	BLM
Jeromy Caldwell	Assistant Field Manager (Resources) For Recreation	BLM
Clara Chase	Wildlife Biologist	BLM
Nora DeDios	Realty Specialist, Project Lead	BLM
Karen Doran	Rangeland Management Specialist	BLM
Frank Giles	Air Resource Specialist	BLM
Nina Hemphill	Aquatic Resource Specialist	BLM
Andrew Johnson	Ecologist	BLM
Sandra McGinnis	Planning and Environmental Coordinator	BLM
Mark Massar	Wildlife Biologist	BLM
Jeff Prude	Petroleum Engineer	BLM
Maria Soto	Realty Specialist	BLM
Carly Summers	Supervisory Natural Resources Specialist	BLM
Tamara Whitley	Archaeologist, Cultural and Paleontological Resources	BLM

CHAPTER 6. REFERENCES

VISUAL RESOURCE MANAGEMENT

Visual Resource Management Contrast Rating Manual H-8431-1

Visual Resource Management for Fluid Minerals Best Management practices (June 2007)

AIR AND ATMOSPHERIC VALUES

CalGEM, 2018; 2017 Annual Report of California Oil and Gas Production Statistics (preliminary). ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2017/2017_Preliminary_Annual_Report.pdf

CARB, Almanac Emissions Projection Year: 2020, District: San Joaquin Valley APCD ;https://www.arb.ca.gov/app/emsinv/emssumcat.php

EPA, 2012; *Residual Risk Assessment for the Oil and Gas Production and Natural Gas Transmission and Storage Source Categories*. Office of Air Quality Planning and Standards, Research Triangle Park, NC.

EPA, 2016; Diethanolamine, 111-42-2 https://www.epa.gov/sites/production/files/2016-09/documents/diethanolamine.pdf

EPA, 2019; Toxic Release Inventory Guidance for Reporting Hydrochloric Acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size) EPA 745-B-19-017 https://ofmpub.epa.gov/apex/guideme_ext/guideme/file/tri%20guidance%20for%20hydrochloric%20acid%20-%20revised%20february%202019.pdf

http://www.wrcc.dri.edu/monitor/cal-mon/frames_version.html

.

SJVAPCD 2016. 2016 Plan for the 2008 8-Hour Ozone Standard. June 16, 2016

CLIMATE CHANGE

CARB, 2019; California Air Resources Board. 2019 Edition, California Greenhouse Gas Emissions for 2000 to 2017 and 2000–2017 GHG Emissions Trends Report Data. https://ww2.arb.ca.gov/ghg-inventory-data

CARB. 2020. California Air Resources Board Home page section – Our Progress. https://ww2.arb.ca.gov/ Accessed July 6, 2020.

CARB, 2020A; California Air Resources Board (CARB), 2020. Climate Change Programs. Retrieved from: http://www.arb.ca.gov/cc/cc.htm.

EPA, 2020; United States Environmental Protection Agency. Greenhouse Gas Reporting Program (GHGRP) website. Accessed 7/6/2020. https://www.epa.gov/ghgreporting

EPA, 2020A; Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018. EPA 430-R-20-002. https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf

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, 151 pp. https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf

NOAA, 2020; Climate Change: Atmospheric Carbon Dioxide. February 20 https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide#:~:text=The%20global%20average%20atmospheric%20carbon,least%20the%20past%20800%2C000%20years.

SJVAPCD, 2009; Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA. https://www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdf

UNEP, 2019; Emissions Gap Report 2019. United Nations Environment Programme. https://www.unenvironment.org/resources/emissions-gap-report-2019

Kern County. 2015. Draft Environmental Impact Report. Revisions to the Kern County Zoning Ordinance– 2015 (C), Focused on Oil and Gas Local Permitting. Kern County Planning and Community Development Department Bakersfield, California. Accessed October 24, 2018. https://kernplanning.com/environmental-doc/environmental-impact-report-revisions-kern-county-zoning-ordinance-2015-c-focused-oil-gas-local-permitting/.

SOILS

SJVAPCD b. CEQA GHG Guidance, June 30, 2009. Microsoft PowerPoint Presentation.
Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/ accessed [5/7/09].

United States Department of Agriculture, Natural Resources Conservation Service. 2009. Soil survey of Kern County, California, southwest part. Accessible online at: http://soils.usda.gov/survey/printed_surveys/.

United States Geological Survey (USGS). 2018a. California Water Use 2010. Page last modified on January 30, 2018. Accessed October 15, 2018. https://ca.water.usgs.gov/water_use/2010-california-water-use.html.

U.S. Global Change Research Program. June 2009. Global Climate Change Impacts in the United States ("GCRP Report"). http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts.

Zahniser, Angela (date unknown), Characterization of Greenhouse Gas Emissions involved in Oil and Gas Exploration and Production Operations, Review for the California Air Resources Board.

WATER RESOURCES

California Department of Conservation: California Geologic Energy Management (CalGEM). 2015a. Well Stimulation Treatment Report, January 1, 2014 to September 30, 2015. Accessed October 15, 2018. http://www.conservation.ca.gov/dog/Pages/WST.aspx.

_____. 2015b. Final SB4 Environmental Impact Report (SB4 FEIR). Accessed October 24, 2018. http://www.conservation.ca.gov/dog/Pages/SB4_Final_EIR_TOC.aspx.

_____. 2016. Well Stimulation Treatment Report, July 1, 2015 to June 30, 2016. Accessed October 15, 2018. http://www.conservation.ca.gov/dog/Pages/WST.aspx.

_____. 2018. Well Stimulation Treatment Annual Report. July 30, 2018. Accessed October 24, 2018. ftp://ftp.consrv.ca.gov/pub/oil/WST_Annual_Reports/SB%204%207.30.18%20FINAL%20WST%20Annual%20Report.pdf.

California Department of Water Resources (DWR), 1996. California's Groundwater – Bulletin 118: San Joaquin Valley Groundwater Basin. Available at: http://www.water.ca.gov/groundwater/bulletin118/tulare_lake.cfm

California Department of Water Resources (DWR), 2003. California's Groundwater – Bulletin 118, Update 2003: Tulare Lake Hydrologic Region. Available at: http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118_7-tl.pdf

California Regional Water Quality Control Board – Central Valley Region (CRWQCB – CVR), 2004. Water Quality Control Plan for the Tulare Lake Basin, Second Edition. Available at: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/tlbp.pdf

CalGEM, 2018; 2017 Annual Report of California Oil and Gas Production Statistics (preliminary). ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2017/2017_Preliminary_Annual_Report.pdf

Ball, L.B., Davis, T.A., Minsley, B.J., Gillespie, J.M. and Landon, M.K., Probabilistic categorical groundwater salinity mapping from airborne electromagnetic data adjacent to California's Lost Hills and Belridge oil fields. *Water Resources Research*, p.e2019WR026273.

Burton, C.A., J.L. Shelton, and K. Belitz. 2012. Status and Understanding of Groundwater Quality in the Southern San Joaquin Valley Study Units, 2005 – 2006: California GAMA Priority Basin Project. U.S. Geological Survey Scientific Report 2011-5218.

Everett, R.R., Kjos, A., Brown, A.A., Gillespie, J.M. and McMahon, P.B., 2020. *Multiple-well monitoring site adjacent to the Lost Hills oil field, Kern County, California* (No. 2019-1114). US Geological Survey.

Gillespie, J.M., Davis, T.A., Stephens, M.J., Ball, L.B. and Landon, M.K., 2019. Groundwater salinity and the effects of produced water disposal in the Lost Hills–Belridge oil fields, Kern County, California. *Environmental Geosciences*, *26*(3), pp.73-96.

Kern County 2020 https://kernplanning.com/SREIR2020-oil-gas-zoning-revisions/).

DEIR Kern County 2020 Kern County. 2015. Draft Environmental Impact Report. Revisions to the Kern County Zoning Ordinance– 2015 (C), Focused on Oil and Gas Local Permitting. Kern County Planning and Community Development Department Bakersfield, California. Accessed August 13, 2020 https://kernplanning.com/SREIR2020-oil-gas-zoning-revisions/

McMahon, P.B., Vengosh, A., Davis, T.A., Landon, M.K., Tyne, R.L., Wright, M.T., Kulongoski, J.T., Hunt, A.G., Barry, P.H., Kondash, A.J. and Wang, Z., 2019. Occurrence and sources of radium in groundwater associated with oil fields in the southern San Joaquin Valley, California. *Environmental science & technology*, *53*(16), pp.9398-9406.

Stephens, M.J., Shimabukuro, D.H., Gillespie, J.M. and Chang, W., 2019. Groundwater salinity mapping using geophysical log analysis within the Fruitvale and Rosedale Ranch oil fields, Kern County, California, USA. *Hydrogeology Journal*, *27*(2), pp.731-746.

United States Geological Survey (USGS). 2020. California Water Use 2015. Accessed August 13, 2020. https://waterdata.usgs.gov/ca/nwis/water_use/

Wright, M.T., McMahon, P.B., Landon, M.K. and Kulongoski, J.T., 2019. Groundwater quality of a public supply aquifer in proximity to oil development, Fruitvale oil field, Bakersfield, California. *Applied Geochemistry*, *106*, pp.82-95.

BIOLOGICAL RESOURCES

Programmatic Biological Opinion on Oil and Gas Activities on BLM lands in the San Joaquin Valley dated December 22, 2017 (08ESMF00-2016—F-0683).

Buck-Diaz, J., S. Batiuk, and J.M. Evans. 2012. Vegetation Alliances and Associations with the Great Valley Ecoregion, California. California Native Plant Society, Vegetation Program. April 2012. Sacramento, California.

Bureau of Land Management (BLM). 2012. Proposed Resource Management Plan and Final Environmental Impact Statement. Department of the Interior. Bakersfield Field Office, Bakersfield, California.

BLM. 2008. BLM Manual 6840: Special Status Species Management. Department of the Interior. Washington, DC.

California Natural Diversity Database, Government Version. June 2020. California Department of Fish and Game. Sacramento, California.

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 12 June 2020].

California Wildlife Habitat Relationships. GIS Species Range Maps. CWHR Version 9.0 Software (2014) https://wildlife.ca.gov/Data/CWHR

Cayan, D., A.L. Luers, M. Hanemann, G. Franco, and B. Croes. 2006. Scenarios of Climate Change in California: An Overview. California Energy Commission, PIER Energy-Related Environmental Research. CEC-500-2005-186-SF.

http://www.energy.ca.gov/2005publications/CEC-500-2005-186/CEC-500-2005-186-SF.PDF

Christensen, J.H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, I. Held, R. Jones, R.K. Kolli, W.-T. Kwon, R. Laprise, V. Magaña Rueda, L. Mearns, C.G. Menéndez, J. Räisänen, A. Rinke, A. Sarr and P. Whetton, 2007. Regional Climate Projections. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Consortium of California Herbaria 2010. *Data provided by the participants of the Consortium of California Herbaria (*http://ucjeps.berkeley.edu/consortium/).

Cypher, B. L., G. D. Warrick, M.R.M. Otten, T.P. O'Farrell, W.H. Berry, C.E. Harris, T.T. Kato, P.M. McCue, J.H. Scrivner, B.W. Zoellick. 2000. Population dynamics of San Joaquin kit fox at the Naval Petroleum reserves in California. Wildlife Monographs 145, 1-43.

Germano, D. J. and D. F. Williams. 2005. Population ecology of blunt-nosed leopard lizards in high elevation foothill habitat. Journal of Herpetology, 39(1):1-18.

Germano, D.J., G.B. Rathbun and L.R. Saslaw. 2001. Managing exotic grasses and conserving declining species. Wildlife Society Bulletin, 29(2):551-559.

Hall, E.R. and K.R. Kelson. 1959. The mammals of North America, volumes I and II. The Ronald Press Company, New York. 1083 pp.

Hickman, J.C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley and Los Angeles. xvii + 1400 pp.

Rathbun, G. B. 1998. Rodent trapping summary: Carrizo Plain Natural Area. Prepared for California Department of Fish and Game. Unpubl. Annual Rep.

Spiegel, L. K., 1996. Studies of San Joaquin kit fox in undeveloped and oil-developed areas. California Energy Commission, Sacramento, California. 131 pp.

Taylor, D.W., and W.B. Davilla. 1986. Status survey of three plants endemic to the San Joaquin Valley. Prepared for California Department of Fish and Game. Sacramento, California.

U.S. Fish and Wildlife Service. 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.

U.S. Fish and Wildlife Service. 1996. Recovery Plan for the California Condor. Region 1, Portland, OR. 62pp.

Verner, J. and A. Boss, technical coordinators. 1980. California Wildlife and their Habitats: Western Sierra Nevada. Gen. Tech. Rep. PSW-37. Pacific Southwest Forest and Range Exp. Station, USDA Forest Service, Berkeley. 439 pp.

Williams, D. F. 2001. Checklist of California Mammals. California State University, Stanislaus. Turlock, CA. http://arnica.csustan.edu/esrpp/calilist.htm

Williams, D. F., D. J. Germano, and W. Tordoff III. 1993. Population studies of endangered kangaroo rats and blunt-nosed leopard lizards in the Carrizo Plain Natural Area, California. California Department of Fish and Game, Nongame Bird and Mammal Sec., Rep. 93-01:1-114.

Zeiner, D. C., Laudenslayer, W. F., Mayer, K. E., White, M, editors. 1990. California's Wildlife, Volume I, Amphibian and Reptiles. California Department of Fish and Game. Sacramento, CA. 272 pp.

Zeiner, D. C., Laudenslayer, W. F., Mayer, K. E., White, M, editors. 1990. California's Wildlife, Volume II, Birds. California Department of Fish and Game. Sacramento, CA. 731 pp.

Zeiner, D. C., Laudenslayer, W. F., Mayer, K. E., White, M, editors. 1990. California's Wildlife, Volume III, Mammals. California Department of Fish and Game. Sacramento, CA. 407 pp.

CULTURAL RESOURCES

Bureau of Land Management (BLM). 2019. *State Protocol Agreement Among the California State Director of the Bureau of Land Management and the California State Historic Preservation Officer and the Nevada State Historic Preservation Officer Regarding the Manner in which the Bureau of Land Management Will Meet its Responsibilities under the National Historic Preservation Act and the National Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.*

Bureau of Land Management (BLM). 2016. *Supplemental Procedures for Fluid Mineral Leasing, Amendment to the State Protocol Agreement* (2016).

Bureau of Land Management (BLM).2016. Manual 8100 The Foundation for Managing Cultural Resources.

Kroeber, Alfred, 1925 - Handbook of the Indians of California, A. L. Kroeber, (2019). *Government Documents and Publications*. 8.

Rintoul, William, Spudding In: Recollections of Pioneer Days in the California Oil Fields, 1976, California Historical Society References for PALEONTOLGICAL Resources

Bureau of Land Management (BLM) 2007. Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands. Instruction Memorandum No. 2008-009, released October 15, 2007.

Bureau of Land Management (BLM), 2016. Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands Instruction Memorandum No. 2016-124, released July 20, 2016.

Bureau of Land Management (BLM) Manual 8270 on Paleontological Resource Management (1998).

Bureau of Land Management (BLM) Manual 8270-H, Handbook on Paleontological Resource Management (1998).

Bureau of Land Management (BLM) Instructional Memorandum No. 2009-011 Guidelines for Assessment and Mitigation of Potential Impacts to Paleontological Resources (2008)

TRIBAL CONSULTATION

Bureau of Land Management (BLM) Manual 1780, Tribal Relations (2016)

Bureau of Land Management, BLM Handbook 1780-1 Improving and Sustaining BLM-Tribal Relations 1780 (2016)

APPENDICES

APPENDIX A – DESCRIPTION OF LEASE SALE PARCELS

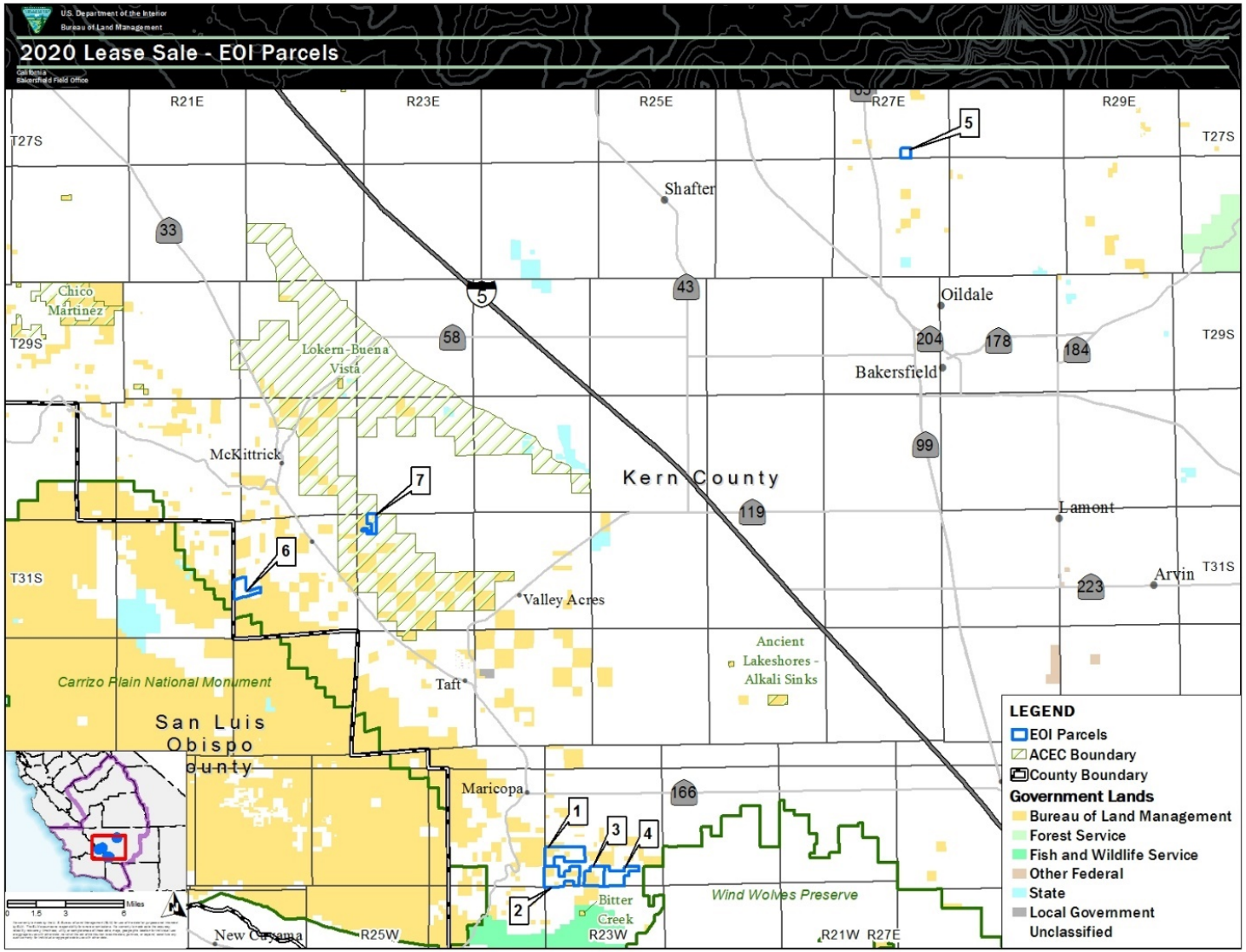
The following public domain lands located within the Bakersfield Field Office administrative boundary, are subject to filings in the manner specified in the applicable portions of the regulations at 43 CFR, Subpart 3120. These parcel numbers will be different from those on the actual Lease Sale Notice, and officially parcelized for the day of the lease sale.

Appendix A, Table 1 December 2020 Oil and Gas Competitive Lease Sale Parcels

No.	Township (T) Range (R)	Section Legal Description	Acres	Type	Proposed Lease Stipulations*	Existing Oilfield Proximity
1	T. 11N., R. 23W.	Sec. 29; NE¼, E½NW¼, NW¼NW¼, SW¼NW¼, N½S½; Sec. 30; E½NE¼, SW¼NE¼, NW¼NE¼, Lots 1 and 2 of NW¼, Lots 1 and 2 of SW¼.	1157.24	Public and Split-Estate Land	CSU - Protected Species CSU - Sensitive Species *Portion of Section 30:* CSU - Known Cultural Resources NSO - No Surface Occupancy	Within two miles of the Midway-Sunset and Cienaga Canyon oil field boundaries
2	T. 11N., R. 23W.	Sec. 31; W½NE¼, Lots 1 & 2 of NW¼, Lots 1 & 2 of SW¼, N½SE¼, SW¼SE¼, SE¼SE¼; Sec. 32; NW¼NE¼, SW¼NE¼, NE¼NW¼, S½NW¼, N½SW¼, NW¼SE¼, SW¼SE¼.	920.00	Public and Split-Estate Land	CSU - Protected Species CSU - Sensitive Species	Within three miles of the Midway-Sunset and Cienaga Canyon oil field boundaries
3	T. 11N., R. 23W.	Sec. 33; E½E½, W½NE¼, NE¼NW¼, S½NW¼, SW¼, W½SE¼.	600.00	Public and Split-Estate Land	CSU - Protected Species CSU - Sensitive Species	Within two miles of the Midway-Sunset and Cienaga Canyon oil field boundaries
4	T. 11N., R. 23W.	Sec. 34; S½NE¼, W½NW¼, SE¼NW¼, S½; Sec. 35; NW¼NE¼, N½NW¼, SW¼NW¼.	680.00	Public and Split-Estate Land	CSU - Protected Species CSU - Sensitive Species	Within two miles of the Midway-Sunset and Cienaga Canyon oil field boundaries

5	T. 27S., R. 27E.	Sec. 34; SE¼	160.00	Split-Estate Land	CSU - Protected Species CSU - Sensitive Species Idle Well Stipulation	Within Kern Front oil field boundary
6	T. 31S., R. 22E.	Sec. 19; Lots 2 thru 9; S½ of Lot 10, S½SE¼.	538.06	Public and Split-Estate Land	CSU - Protected Species CSU - Sensitive Species Idle Well Stipulation	Within two miles of the Midway-Sunset oil field boundary
7	T. 31S., R. 23E.	Sec. 6; Lots 1 and 2 of NE¼, N½S½ Lot 1 of SW¼, E½SE¼, S½SW¼SE¼.	278.28	Public and Split-Estate Land	CSU - Protected Species CSU - Sensitive Species CSU - Known Cultural Resources	Within one mile of the Asphalto oil field boundary

*Unless noted otherwise, stipulation applies to entire lease. These stipulations are in addition to the standard lease terms and conditions printed on Form 3100-11, October 2008 Offer to Lease and Lease for Oil and Gas.


U.S. Department of the Interior
Bureau of Land Management
2020 Lease Sale - EOI Parcels
California - Bakersfield Field Office
R21E
R23E
R25E
R27E
R29E
T27S
T29S
T31S
Shafter
Oildale
Bakersfield
Chico Martinez
Lokern-Buena Vista
McKittrick
Kern County
Lamont
Arvin
Valley Acres
Ancient Lakeshores - Alkali Sinks
Carrizo Plain National Monument
Taft
San Luis Obispo County
Maricopa
Wind Wolves Preserve
Bitter Creek
New Cuyama
R25W
R23W
R21W
R27E
33
43
58
5
204
178
184
99
119
223
166
1
2
3
4
5
6
7
LEGEND
EOI Parcels
ACEC Boundary
County Boundary
Government Lands
Bureau of Land Management
Forest Service
Fish and Wildlife Service
Other Federal
State
Local Government
Unclassified

APPENDIX B – FULL TEXT OF LEASE STIPULATIONS

Stipulations are conditions of lease issuance which provide protection for other resources values or land uses by establishing authority for substantial delay or site changes or the denial of operations within the terms of the lease contract. In addition to lease stipulations, the authorized officer has the authority to relocate, control timing, and impose other mitigation measures under Section 6 of the Standard Lease Forms (BLM Oil and Gas Lease Form 3100-11). The 2012 Proposed RMP/Final EIS analyzed the need for various constraint (stipulation) protection levels. The 2014 ROD/Approved RMP finalized stipulations for fluid mineral exploration and development activities in the BFO. The 2019 Draft and Final Supplemental EIS considered the need for new or altered stipulations and determined no additional stipulations nor modification of the existing stipulations was necessary to address potential environmental impacts. The 2019 ROD affirmed the 2014 ROD/Approved RMP.

In addition to identifying the stipulations, the 2014 ROD/Approved RMP explains the conditions under which waivers, exceptions, or modifications of lease stipulations may be granted. A waiver is a permanent exemption to a lease stipulation. An exception is a onetime exemption to a lease stipulation which is determined on a case-by-case basis. A modification is a change to the provisions of a lease stipulation, either temporarily or for the term of the lease (see MS 3103). All circumstances for granting a waiver, exception, or modification are documented in the 2014 ROD/Approved RMP and are related below for the stipulations identified for the proposed lease parcels. A summary of which stipulations are recommended for each parcel is presented in Appendix A.

Stipulation No. 1 CSU - Protected Species (All Parcels)

All or a portion of this lease is within the range of one or more plant or animal species that are either listed as threatened or endangered by the USFWS. A list of such species will be provided at the time of leasing and updated as necessary over the term of the lease. To determine whether species on this list or their habitat are present, a preliminary environmental review will be conducted for all surface disturbing activities. Presence of habitat or species may result in the proposed action being moved, modified, or delayed to mitigate project effects. Offset compensation that would satisfactorily offset the loss of habitat may be required. Prohibition of all surface disturbing activities on the lease will only occur as needed to avoid jeopardizing the continued existence of a listed or proposed species, or when the proposed action is inconsistent with the recovery needs of a species as identified in an approved USFWS Recovery Plan through consultation with USFWS. Furthermore, processing times for proposed actions may be delayed beyond established standards to accommodate species surveys, and consultation or conferencing with the USFWS. This stipulation shall not be waived; however, it may be modified, or an exception may be granted as follows:

Exception: The Authorized Officer may grant an exception if an environmental review determines the action as proposed or conditioned would have no effect on listed or proposed species.

Modification: The Authorized Officer may modify this stipulation to reflect new information with regard to the range of listed or proposed species through the expansion or reduction of lands subject to this stipulation for a specific species.

Waiver: None.

Objective: To minimize or eliminate adverse effects associated with fluid mineral development on federally proposed and listed species.

by the USFWS.

Stipulation No. 2 CSU - Sensitive Species (All Parcels)

All or a portion of this lease is within the range of one or more plant or animal species that are either Federal candidates for listing as threatened or endangered (Federal candidate), are listed by the State of California as threatened or endangered (state listed), or are designated by the BLM as sensitive (BLM sensitive). A list of species will be provided at the time of leasing and updated as necessary over the term of the lease. To determine whether species on this list or their habitat are present, a preliminary environmental review will be conducted for all surface disturbing activities. Presence of habitat or species may result in the proposed action being moved more than 200 meters (656 feet) but not more than a quarter-mile or off the lease and prohibition of activities during seasonal use period. Furthermore, processing times for proposed actions may be delayed beyond established standards to accommodate species surveys, and coordination with the USFWS and California Department of Fish and Game. This stipulation shall not be waived; however, it may be granted exception or modified as follows:

Exception: The Authorized Officer may grant an exception if an environmental review determines the action as proposed or conditioned would have no effect on Federal candidate, state listed, and BLM sensitive species.

Modification: The Authorized Officer may modify the stipulation to reflect new information with regard to Federal candidate, state listed, or BLM sensitive species lists. Furthermore, the authorized officer may modify the maximum distance that a potential location could be moved to extend farther than the stated quarter-mile to maintain the sensitive species protection goals.

Waiver: None.

Objective: To minimize or eliminate adverse effects associated with fluid mineral development on Federal candidate, state listed, and BLM sensitive species.

Stipulation No. 3 CSU - Known Cultural Resources (Portion of Parcel 1)

All or a portion of the lease contains National Register-listed or unevaluated cultural properties that may be adversely affected by fluid mineral development. A list of affected parcels or portions of the lease will be provided at the time of leasing. To identify the possibility of adverse impacts resulting from fluid mineral development, a preliminary cultural resource review/survey will be conducted for all surface disturbing activities. Identification of adverse impacts may result in the proposed action being moved or modified. Surface-disturbing activities would be prohibited on the portion of the lease where National Register-listed properties, eligible properties, or others that are being treated as y eligible for listing on the National Register occur. This stipulation may be modified, waived, or granted exception as follows:

Exception: The Authorized Officer may grant an exception, with concurrence from the California State Historic Preservation Office and Native American tribes, if a subsequent formal eligibility evaluation indicates the cultural property is ineligible.

Modification: The Authorized Officer may modify the stipulation to reflect new information from formal eligibility evaluations for cultural properties through the expansion or reduction of land where surface disturbing activities would be prohibited.

Waiver: The Authorized Officer may grant a waiver to the stipulation should the results of formal eligibility evaluation determine all cultural properties ineligible for listing on the National Register.

Objective: To minimize or eliminate adverse effects associated with fluid mineral development on known National Register-listed or eligible properties.

Stipulation No. 4 NSO - General (Portion of Parcel 1)

Establish the major constraint of "NSO" – General" **"** that prohibits surface disturbance on the entire lease for the purpose of minimizing or eliminating adverse effects on unique or significant natural and cultural resources that are incompatible with fluid mineral development with the following stipulation language:

All or a portion of this lease has been identified by the current RMP (e.g., ACECs and areas of ecological importance with this stipulation prescribed) as containing unique or significant natural or cultural values. No new surface disturbing activity is allowed on the lease. This stipulation may be granted exception, modified, or waived as follows:

Exception: The Authorized Officer may grant an exception if after discussion with an appropriate agency (e.g., CDFW, SHPO, and USFWS) it decides that an environmental review determines the action as proposed or conditioned would not impair the values present because of temporary conditions.

Modification: The Authorized Officer may modify this stipulation to allow surface use on a portion or even all of the lease if an environmental review determines the action as proposed or conditioned would not impair the values present.

Waiver: The Authorized Officer may grant a waiver if an environmental review determines the values for which the NSO was applied no longer exist.

Objective: To minimize or eliminate adverse effects on unique or significant natural and cultural resources that are incompatible with fluid mineral development.

Stipulation No. 5 Idle Wells (Parcel 5)

1. This parcel contains 17 existing wells. Not all the wells have pumping equipment on them. All the existing gathering lines are still in place. There are production facilities located within the confines of this parcel. The permits on the existing facility have expired. The successful bidder must plan to permit the existing facilities OR install BLM approved facilities for processing of production. If the existing facilities are permitted, they must comply with all BLM rules, regulations, and policies. The use of these facilities is transferred with the issuance of a lease for this parcel.

2. Prior to any operations, a BLM oil and gas bond in the amount to be determined by the Bakersfield Field Office must be filed.

3. All or part of the lands contained in this parcel may be subject to drainage by the wells listed below, all of which are located adjacent to this parcel in T. 27S., R. 28E., MDB&M Kern County, California.

Well No.	Lease Name	Operator	Section	Township	Range
53	Mitchel	TO BE DETERMINED	34	27S	27E

56	Mitchel	TO BE DETERMINED	34	27S	27E
63	Mitchel	TO BE DETERMINED	34	27S	27E
64	Mitchel	TO BE DETERMINED	34	27S	27E
65	Mitchel	TO BE DETERMINED	34	27S	27E
66	Mitchel	TO BE DETERMINED	34	27S	27E
67	Mitchel	TO BE DETERMINED	34	27S	27E
73	Mitchel	TO BE DETERMINED	34	27S	27E
74	Mitchel	TO BE DETERMINED	34	27S	27E
75	Mitchel	TO BE DETERMINED	34	27S	27E
76	Mitchel	TO BE DETERMINED	34	27S	27E
77	Mitchel	TO BE DETERMINED	34	27S	27E
83	Mitchel	TO BE DETERMINED	34	27S	27E
84	Mitchel	TO BE DETERMINED	34	27S	27E
85	Mitchel	TO BE DETERMINED	34	27S	27E
87	Mitchel	TO BE DETERMINED	34	27S	27E
88	Mitchel	TO BE DETERMINED	34	27S	27E

The lessee shall, within **6** months of lease issuance, submit for approval by the authorized officer:

(a) Plans for protecting the lease from drainage. Please Note: There may be wells on Federal parcel that may serve as protective wells once they are returned to production. If the lessee is unable or unwilling to return the existing wells to production, or no adequate well exist, then the plan must include either (1) an Application for Permit to Drill (APD) for the necessary protective well/s or (2) a proposal for inclusion in an agreement for the affected portion/s of the lease. Any agreement should provide for an appropriate share of the production from the offending well/s to be allocated to the lease; or

(b) Engineering, geologic, and economic data to demonstrate to the authorized officer's satisfaction that no drainage has or is occurring and/or that either the existing or a new protective well would have little or no chance of encountering and/or producing oil or gas in quantities sufficient to yield a reasonable rate of return in excess of the costs of drilling, completing, and operating the well.

If no plan, agreement, or data is submitted and drainage is determined to be occurring, compensatory royalty will be assessed. Compensatory royalty will be assessed effective the first day following expiration of the 6-month period and shall continue until a protective well has been drilled and placed in continued production status or until the offending well/s ceases production whichever occurs first.

Stipulation No. 6 Idle Wells (Parcel 6)

1. This Parcel contains 3 existing wells. There are no are production facilities or infrastructures located within the confines of this parcel. The successful bidder must plan to permit and install new facilities for processing of production. The facilities must comply with all BLM rules, regulations, and policies.

2. Prior to any operations, a BLM oil and gas bond in the amount to be determined by the Bakersfield Field Office must be filed.

3. Prior to any operations, a surface use agreement with the surface owner will be filed with the BLM.

4. The following table reflects the well number and location.

Well No.	Lease Name	Operator	Section	Township	Range
1-19	BLM	TO BE DETERMINED	19	31S	22E
2-19	BLM	TO BE DETERMINED	19	31S	22E
4-19	BLM	TO BE DETERMINED	19	31S	22E

The lessee shall, within **6** months of lease issuance, submit for approval by the authorized officer:

(a) Plans for protecting the lease from drainage. Please Note: There may be wells on Federal parcel that may serve as protective wells once they are returned to production. If the lessee is unable or unwilling to return the existing wells to production, or no adequate well exist, then the plan must include (1) an Application for Permit to Drill (APD) for the necessary protective well/s or (2) a proposal for inclusion in an agreement for the affected portion/s of the lease. Any agreement should provide for an appropriate share of the production from the offending well/s to be allocated to the lease; or

(b) Engineering, geologic, and economic data to demonstrate to the authorized officer's satisfaction that no drainage has or is occurring and/or that either the existing or a new protective well would have little or no chance of encountering and/or producing oil or gas in quantities sufficient to yield a reasonable rate of return to exiss of the costs of drilling, completing, and operating the well.

(c) If no plan, agreement, or data is submitted and drainage is determined to be occurring, compensatory royalty will be assessed. Compensatory royalty will be assessed effective the first day following expiration of the 6-month period and shall continue until a protective well has been drilled and placed in continued production status or until the offending well/s ceases production whichever occurs first.

APPENDIX C – LIKELIHOOD OF OCCURRENCE OF PROTECTED AND SPECIAL STATUS SPECIES

Appendix C, Biology Table 1. Federal listed, State listed and BLM Sensitive animal species

Species	Status	Cienega (Parcels 1-4)	Poso (Parcel 5)	Crocker Flat (Parcel 6)	Buena Vista (Parcel 7)
California condor	FE, SE			L	
Blunt-nosed leopard lizard	FE, SE			M	H
Giant kangaroo rat	FE, SE	M		M	H
San Joaquin kit fox	FE, ST	M	L	H	H
San Joaquin antelope squirrel	BLM SS, ST	H		L	H
Short-nosed kangaroo rat	BLM SS	M		M	M
LeConte's thrasher	BLM SS	M		M	
Burrowing owl	BLM SS	M	M	M	M
White-tailed kit	BLM SS	M	M	M	M
Golden eagle	BLM SS	M	M	M	M
Swainson's hawk	BLM SS	M	M	M	M
San Joaquin pocket mouse	BLM SS	M	M	M	M
Tulare grasshopper mouse	BLM SS	M	M	M	M
Pallid bat	BLM SS	M	L	M	L
Western mastiff bat	BLM SS	M	L	M	L
Fringed myotis	BLM SS		L	L	

Status
FE – Federally Endangered
FT – Federally Threatened
SE – State Endangered
ST – State Threatened
BLM Sensitive – BLM California Sensitive Species

Likelihood of Occurrence
Low- (L)
Medium- (M)
High- (H)

The likelihood of occurrence is based on species review data from the Biogeographical Information and Observation System (BIOS), and California Natural Diversity Data Base (CNDDB) mapping on the wildlife.ca.gov website (August, 19, 2020).

Appendix C, Biology Table 2. Federally listed and BLM Sensitive Plants

Species	Status	Cienega (Parcels 1-4)	Poso (Parcel 5)	Crocker Flat (Parcel 6)	Buena Vista (Parcel 7)
Horn's Milk Vetch (Astragalus hornii)	BLM SS	L	L		M
Heart-Leaved Saltbush (Atriplex cordulta var. cardulata)	BLM SS	L			L
Lost Hills Crownscale (Atriplex coronate var. vallicola)	BLM SS				M
California Jewelflower (Caulanthus californicus)	FE	L	L		
Lemmon's Jewelflower (Caulanthus coulteri var. lemmonii)	BLM SS	M		L	
Recurved Larkspur (Delphinium recurvatum)	BLM SS	M	L	L	L
Kern Mallow (Eremalche kernensis)	FE	M		M	M
Temblor Buckwheat (Eriogonum temblorense)	BLM SS	L		L	
Spiny Sepaled Button Celary (Erynigium spinosepalum)	BLM SS	L			
Tejon Poppy (Eschscholzia lemmonnii spp. kernensis)	BLM SS	M		M	L
Striped Adobe Lily (Fritillaria striata)	BLM SS		L		
Pale Yellow Layia (Layia heterotricha)	BLM SS	M		L	L
Munz's Layia (Layia munzii)	BLM SS			L	
San Joaquin Woolythreads (Monolopia congdonii)	FE	L		L	H
Bakersfield Cactus (Opuntia basilaris var. treleasei)	FE	L	L		
Oil Nest Straw (Stylocline citroleum)	BLM SS		M	L	

Status
FE – Federally Endangered
FT – Federally Threatened
SE – State Endangered
ST – State Threatened
BLM Sensitive – BLM California Sensitive Species

Likelihood of Occurrence
Low- (L)
Medium- (M)
High- (H)

The likelihood of occurrence is based on species review data from the Biogeographical Information and Observation System (BIOS), California Natural Diversity Data Base (CNDDB), and CalFlora.org mapping and occurrence websites (August, 20, 2020).

APPENDIX D – OIL AND GAS STANDARD OPERATING PROCEDURES, IMPLEMENTATION GUIDELINES AND CONDITIONS OF APPROVAL

Leasing fluid mineral resources does not confer on the lessee the right to conduct any ground disturbing activities related to exploring for or developing the sources until a subsequent environmental analysis of the actual proposed operations for the site is conducted. There are various stages of fluid minerals resource development within a lease, such as exploration, development, production, and reclamation/closeout. These activities all require additional BLM authorization. All proposed drilling or production operations for fluid minerals production proposed to be conducted on an existing lease must be approved before surface disturbance is allowed. Surface disturbance is proposed in APDs, ROWs, and Sundry Notices. During BLM NEPA review of these applications, site specific appropriate mitigation/environmental protection measures are developed and approved prior to conducting ground disturbing activities.

This sequential approval process (leasing, operations plan approval, etc.) allows BLM to consider application of restrictions at the appropriate action level. Restrictions are formulated at the proper stage when site specific information is available. This ensures that restrictions are not applied prematurely to avoid "potential" effects that might unnecessarily identify areas as being off-limits to leasing.

Implementation Guidelines

- All oil field activities that occur on land where the BLM has an interest, whether mineral or surface estate, should be conducted with the least impact practicable to sensitive resources.
- Wells that are not commercially developed should be reclaimed to natural contours and revegetated as soon as appropriate; i.e., restoration methods should consider timing of planting, acceptable species and evaluation criteria, and should be tailored to area-specific resource conditions and be compatible with the monument proclamation.
- Applications for permit to drill (APDs), sundry notices (leasehold activities requiring surface disturbance), and final abandonment notices will be reviewed using the existing NEPA approval process.
- Timely plugging and abandonment of depleted wells will be required. This includes plugging the wellbore with cement, removing all materials and equipment, and recontouring/revegetation as specified in the conditions of approval.
- Design roads, well pads, and facilities for exploratory wells to impact and fragment the least acreage practicable. New facilities shall be designed to maintain natural drainage and runoff patterns, reduce visual impacts, and reduce hazards to wildlife, especially California condors. Noncommercial wells shall be restored as soon as appropriate using BLM restoration methods.
- Good housekeeping requirements will be enforced (i.e., operators will be required to maintain a neat and orderly appearance of sites, remove junk and trash, and otherwise minimize landscape intrusions).
- Sufficiently impervious secondary containment, such as containment dikes, containment walls, and drip pans, should be constructed and maintained around all qualifying petroleum facilities, including tank batters and separation and treating areas consistent with the Environmental Protection Agency's Spill Prevention, Control, and Countermeasure regulations (40 CFR 112).
- Chemical containers should not be stored on bare ground or exposed to the sun and moisture. Labels must be readable. Chemical containers should be maintained in good condition and placed within secondary containment in case of a spill or high velocity puncture. The secondary containment must preclude entry from wildlife.

- Pipelines should be placed within existing disturbed rights-of-way, such as road shoulders, whenever possible.
- Roads shall be designed to an appropriate standard no high than necessary to accommodate their intended functions.
- New wells and roads should be located in areas where cut and fill shall be minimized to the extent practicable.
- Operators will be encouraged or required to place multiple wells on a single pad where feasible in order to minimize unnecessary disturbance.
- Operators shall be required to maintain clean well locations and to remove trash, junk, and other materials not in current use.

Conditions of Approval

Conditions of Approval (COAs) are site-specific requirements included in an approved Application for a Permit to Drill (APD) or Sundry Notice that may limit or amend the specific actions proposed by the operator. COAs minimize, mitigate, or prevent impacts to public lands or other resources. Best Management Practices may be incorporated as a COA.

The standard fluid minerals lease is used to provide an overall framework for regulation of operations. This timeframe is built upon by adding stipulations to the lease and, later if operations are proposed, by adding site appropriate COAs. These additional protection and mitigation measures are developed and applied during BLM's review and approval of individual APDs, rights-of-way, Sundry Notices, etc. The measures are developed and assessed in a site-specific NEPA document and are made conditions of approval of any subsequent operational approvals.

Leasing with Standard Lease Stipulation

The Standard Lease stipulation includes the terms and conditions that are the national standards printed on Bureau of Land Management lease form (Form 3100-11, October 2008 Offer to Lease and Lease for Oil and Gas).

Under standard terms, a proposed exploration and development operation can be modified by the operator and Bureau to minimize impacts of the project's operation design. Modifications are limited to moving the proposed operation less than 200 meters and delaying the project less than 60 days in one lease year.

Leasing with Controlled Surface Use and No Surface Use Stipulations

Special stipulations may be proposed for use to protect unique resources or values where it may be necessary to modify surface activities beyond authorities contained under the standard lease terms (43 CFR 3103.1-3). CSU stipulations allow the BLM, in consultation with the applicant, to extend modification of development proposals beyond the standard 200 meters and 60-day conditions. By reserving the additional leeway in siting facilities, the BLM and applicant can generally use the combination of increased siting and timing flexibility to modify development proposals to entirely avoid or substantially minimize surface-disturbing effects associated with lease development. The CSU stipulation thus allows BLM to offer for lease parcels known to or suspected to contain unique resources or values and resolve any potential conflicts at the time when the lessee is prepared to design development proposals. NSO stipulations allow the BLM to protect unique resources or values by prohibiting surface-disturbing activities on the parcel, while still allowing for development of the fluid minerals. CSU and NSO stipulations also advise prospective lessees that they are considering the purchase of a lease in areas known or suspected to contain unique resources or values and advises them of

potential constraints and development options available. Historically, the BLM in cooperation with the lessee has been able to find sufficient flexibility in designing lease development proposals, even in the most sensitive of locations, to facilitate development without adversely affecting either the resource values of concern or the oil and gas lease. Application of CSU and NSO stipulations supersede any inconsistent provisions of the standard lease form.

Standard Engineering Practices

Recognized engineering practices for the routine operation of oil and gas exploration and development are known as COAs. These standard procedures are described in the Federal Onshore Orders and further clarified in 43 CFR.

Standard regulations may be supplemented with additional COAs. The additional COAs address sensitive issues within the area managed by the BFO. Critical issues underlying the Federal regulations and supplemental COAs are the protection of usable aquifers, mineral zones including hydrocarbons, surface environmental issues, site safety and well control, and site reclamation.

Bureau inspection and monitoring of oil field activity on public lands is discussed within the phases of oil and gas development:

- Drilling a New Well
- Temporary Abandonment of a Producing Well (Idle Well)
- Plugging and Abandonment of a Well
- Surface Reclamation

No special COAs are added for routine producing operations.

Drilling a New Well

After an Application for Permit to Drill (APD) has been received by the Bakersfield Office of the Bureau of Land Management (BLM), a review of engineering design as well as potential effects to sensitive resources is undertaken. Special conditions would be noted on the application at this review stage of an oil and gas project by either the operator or the BLM. Modified proposals would be developed cooperatively with the applicant to ensure that the modified project still meets the applicant's objective. Any special conditions would be attached to the APD by the BLM and the applicant would be informed within seven days of receipt of the APD. In addition to Bureau-wide regulations, the Bakersfield Field Office has developed procedures - these may include but are not limited to:
Steam Injectors. All steam injection wells within a 300' radius of a new location must be shut-in a minimum of 3 days prior to the spudding of a new well.

Conductor Pipe. A minimum of 50' of conductor pipe is to be set and cemented to surface. The conductor pipe must be equivalent to or exceed the properties of A-25 grade line pipe.

Diverter. Prior to spud, a diverter system will be installed on the conductor pipe and function tested. The test will be recorded in the drilling log. The diverter system, at a minimum, will consist of an annular type preventer (minimum working pressure 1000 psi); 2" (minimum ID) kill line, and 6" (minimum ID) diverter line with no internal restrictions or turns. A full opening hydraulically-controlled valve will be installed in the diverter line which will automatically open when the annular preventer is closed. The accumulator system will have sufficient capacity to close the annular preventer and open the hydraulically-controlled valve.

Remote controls for the diverter system will be located on the rig floor and readily accessible to the driller. Remote controls will be capable of closing the annular preventer and opening the hydraulically-controlled valve. Master controls will be located at the accumulator and will be capable of closing and opening the annular preventer and opening the hydraulically-controlled valve. The diverter system will be function-tested daily and the test recorded in the drilling log.

General Casing and Cementing. A Subsequent Report (Form 3160-5) detailing the size, weight, and grade of the casing; the amount and type of cement, including additives; and a copy of the service company's materials ticket and job log will be submitted to the BLM within five (5) business days following the cementing of the casing string. Each casing string (except conductor pipe) will be pressure tested, prior to drilling out the casing shoe, to 0.22 psi/ft of casing string length or 1000 psi, whichever is greater, but not to exceed 70% of the internal yield pressure of the casing. The casing pressure test will be recorded in the drilling log. The wait-on-cement (WOC) time for each casing string will be adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

Drilling Fluids. Sufficient quantities of drilling fluid (mud and water) will be maintained at the well site, at all times, for the purpose of controlling steam kicks.

Temporary Abandonment of a Producing Well (Idle Well)

Economic conditions often depress the California market for the typical heavy oil produced in the area managed by the Bakersfield Field Office. When the producing market is depressed, an operator may decide to shut-in his uneconomic, producing wells and wait for conditions to improve. The highly viscous nature of most Kern County crude oil, typical low well head pressures, and the relatively low corrosive properties of the fluids (low sulfur crude) make the known dangers of shutting in a well for long periods and then bringing it back on-line less of a mechanical problem here in this Field Office Area than in other producing regions of the country. As a result, by 1990, a large number of wells were remaining idle for longer and longer periods. Monitoring and correction of the problem have been successfully undertaken by the California Division of Oil, Gas, and Geothermal Resources and the local BLM Field Office. The following additional conditions *may* be required as applicable prior to the temporary abandonment (TA) of a producing oil/gas well, service well, or an injection well.

Zone Isolation. The requirement to isolate the producing interval (General Requirement #4) is waived. This waiver is based on the information submitted with the application and the geologic data in Volume # 1 California Oil and Gas Fields, Central California, (Buena Vista Oil Field) which indicates the absence of usable water aquifers above the producing horizon in (section in which well is located).

Mechanical Integrity of Casing. The mechanical integrity of the casing may be determined using the ADA pressure test method.

Fluid Surveys. A fluid level survey will be performed at 2-5 year intervals during the period the well is temporarily abandoned. A copy of the survey will be submitted to the BLM with the TA well request (Sundry Notice Form 3160-5).

Monitoring of Wellhead Pressures and Temperatures. Wellhead pressure and temperature will be continuously monitored throughout the period the well is temporarily abandoned. Any pressure/temperature change will be promptly reported to the BLM.

Isolation of the Producing Interval. The producing interval will be isolated by setting a plug in the casing within 100' above the producing interval if a rising fluid level, an increasing wellhead pressure, or an increasing wellhead temperature is detected. The plug can be either a retrievable or drillable-type bridge plug or a cement plug of at least 100' in length.

Plugging and Abandonment of a Well

No additional conditions are typically attached to the abandonment of a well in California. Onshore Orders describe the plugging procedure. While final abandonment will normally be witnessed by the BLM, no final site marker is currently required by the Bakersfield field office.

Surface Reclamation

Conditions for the recovery of an oil well site are unique to each area's ecosystem and habitat. The following examples of Conditions of Approval have been developed for use within the area managed by the Bakersfield Field Office. The applicability of any or all of these COAs will be determined based on site-specific conditions.

General. The operator (or Lessee) will prepare a seedbed by: a) scarifying the disturbed area, (b) distributing topsoil uniformly, or c) disking the topsoil, as directed by the BLM Authorized Officer (use one as appropriate).

The operator will recontour the disturbed area and obliterate all earthwork by removing embankments, backfilling excavations, and grading to re-establish the approximate original contours of the land in the area of operation.

The operator will uniformly spread topsoil over all unoccupied disturbed area (outside the ditch line, fence line, and work area). Spreading will not be done when the ground or topsoil is frozen or wet. The operator will seed all disturbed area, using an agreed upon method suitable for the location. Seeding will be repeated if a satisfactory stand is not obtained as determined by the BLM Authorized Officer upon evaluation after the first growing season.

The operator will arrange to have a biologist available to assist the construction workers in the identification and avoidance of endangered species.

Producing Wells. Site reclamation for producing wells will be accomplished for portions of the site not required for continued operation of the well. The following measures are typical reclamation requirements, and any or all of these may be required on a site by site basis:

Reclamation of drilling fluid pit (mud pit). Polluting substances, contaminated materials moved offsite or buried.

Site fencing.

Berm removal and site grading.

Cut and fill slope vegetation.

Non-producing Wells. Rehabilitation on the entire site will be required and will commence as soon as practical, dependent upon prevailing weather conditions. Cut and fill slopes will be reduced and graded to blend to the adjacent terrain.

Drilling fluids held within pits may be allowed to dry. Fluids that will not dry must be removed. All polluting substances or contaminated materials such as oil, oil-saturated soils, and gravels will be buried with a minimum of 2 feet of clean soil as cover, or be removed to an approved site.

Drainages will be re-established and temporary measures will be required to prevent erosion to the site until vegetation is established.

After final grading and before replacement of topsoil, the entire surface of the site will be scarified to eliminate slippage surfaces and to promote root penetration. Topsoil will then be spread over the site to achieve an approximate uniform, stable thickness consistent with the established contours.

Permanent Well Abandonment. The surface management agency is responsible for establishing and approving methods for surface rehabilitation and determining when this rehabilitation has been satisfactorily accomplished. At this point, a Subsequent (Final) Report of Abandonment will be approved.

APPENDIX E – LANDS DEFERRED

Land Description	Acres	Counties	Status
T. 4N., R. 17W., Section 19, Lots 1 thru 4;	159.48	Los Angeles & Ventura	Split-Estate

APPENDIX F – VISUAL RESOURCE MANAGEMENT

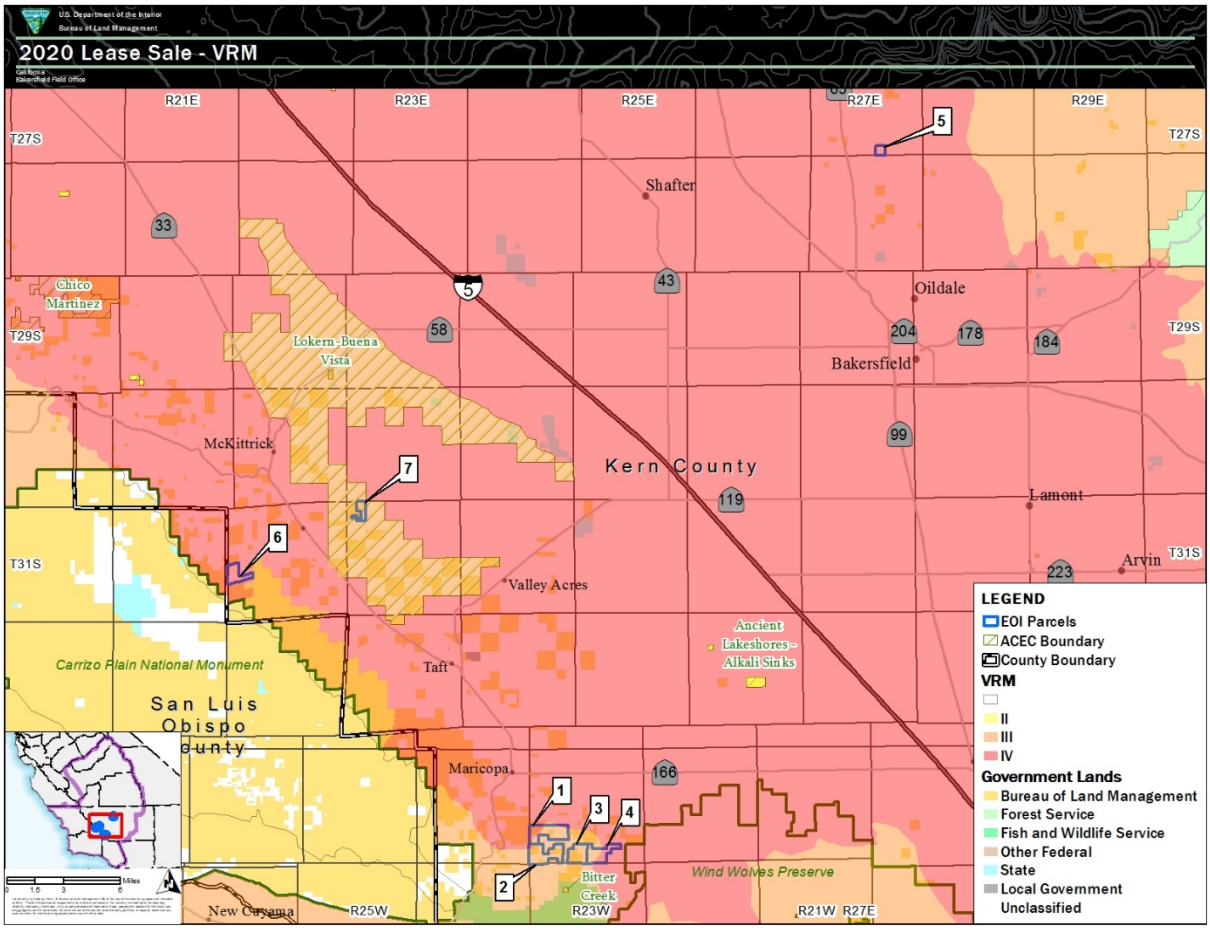
VRM Classification Objectives

VRM Classes	Objective	Change Allowed (Level)	Relationship to Casual Observer
Class I	Preserve the existing character of the landscape. Provide for natural ecological changes; however it does not preclude very limited management activity	Very Low	Activities must not attract attention.
Class II	Retain the existing character of the landscape. The level of change to the characteristic landscape should be low.	Low	Activities may be seen, but should not dominate the view
Class III	Partially retain the existing character of landscape. The level of change to the characteristic landscape should be moderate.	Moderate	Activities may attract attention, but should not dominate the view.
Class IV	Provide for management activities, which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.	High	Activities may attract attention, may dominate the view.

Lease Sale Parcels Breakdown:
Parcels within VRM Class III 2877.739974 (1, 2, 3, 4, 7)
Parcels within VRM Class IV 1400.722847 (1, 2, 4, 5, 6)

Parcel	VRM	Acres	Total
1	CLASS 3	688.3	986.04
	CLASS 4	297.74	
2	CLASS 3	953.91	981.67
	CLASS 4	27.76	
3	CLASS 3	621.25	621.25
4	CLASS 3	333.17	723.25
	CLASS 4	390.09	
5	CLASS 4	157.03	157.03
6	CLASS 4	528.13	528.13
7	CLASS 3	281.09	281.09

Map of VRM


U.S. Department of the Interior
Bureau of Land Management
2020 Lease Sale - VRM
California
Bakersfield Field Office
R21E
R23E
R25E
R27E
R29E
T27S
T29S
T31S
Shafter
Oildale
Bakersfield
Chico Martinez
Lokern-Buena Vista
McKittrick
Kern County
Lamont
Arvin
Valley Acres
Taft
Maricopa
Ancient Lakeshores - Alkali Sinks
Carrizo Plain National Monument
San Luis Obispo County
New Cuyama
Bitter Creek
Wind Wolves Preserve
R25W
R23W
R21W
R27E
1
2
3
4
5
6
7
LEGEND
EOI Parcels
ACEC Boundary
County Boundary
VRM
II
III
IV
Government Lands
Bureau of Land Management
Forest Service
Fish and Wildlife Service
Other Federal
State
Local Government
Unclassified

APPENDIX G ~SAMPLE~ SAN JOAQUIN VALLEY OIL AND GAS PROGRAMMATIC OPINION APPLICABLE PROVISIONS

San Joaquin Valley Oil and Gas Programmatic Opinion
Applicable Provisions

General Conservation Measures

Habitat disturbance will be minimized and conducted in a manner that reduces, as much as possible, the potential for take of individuals of a federally-listed species. The extent of disturbance will be reduced to the smallest possible area, considering the existing travel network, topography, placement of facilities, location of burrows, nesting sites, dens, public health and safety, and other limiting factors.

To the extent possible, recently disturbed areas will be used for stockpiling excavated materials, storage of equipment, digging of slurry and borrow pits, locations of trailers, parking of vehicles, and other surface-disturbing actions.

Natural drainage patterns will be maintained to the maximum extent possible. Large draws and drainages with saltbush will be avoided to the maximum extent possible. If a drainage cannot be avoided, the BLM will be contacted for further guidance.

Work area boundaries will be delineated with flagging, temporary fencing, or other markers to minimize surface disturbance associated with vehicle straying,

Existing roads and routes of travel authorized as open or administrative use only will be used to the maximum extent possible. Cross-country travel by vehicles is prohibited unless specifically authorized by the BLM for the project or as required during an emergency response.

The use of reduced-impact methods such as helicopters or all-terrain vehicles (ATVs) will be considered for projects that require cross-country travel (for example project survey staking, power pole installation, maintenance and replacement, geophone placement and retrieval, etc.).

Project employees will be directed to exercise caution when commuting within listed species habitats. In order to minimize wildlife casualties, the daytime speed limit on unpaved roads not maintained by the county will be a maximum of 20 MPH. If conditions warrant, the maximum speed may be lowered to 10 MPH, for example along a narrow road in highly sensitive habitat; this determination will be made by the monitoring biologist. The maximum speed will be posted in the project area. Unless specified for reducing impacts to blunt-nosed leopard lizards, actions between dusk and dawn, when some federally-listed species are active and vulnerable to vehicle or equipment-induced injury or mortality, will be minimized. However, if nighttime actions are required or specified, then a 10 MPH speed limit will be required on unpaved roads not maintained by the county.

All vehicle operators will check for wildlife under vehicles and equipment prior to operation. If wildlife are observed, vehicles and equipment will not be moved until observed wildlife egresses.

All personnel operating on the federal lease will be provided written guidance governing vehicle use restrictions, speed limits on unpaved roads, and fire prevention hazards.

Trash and food items, including wrappers, cans, bottles, and food scraps, will be contained in closed, wildlife proof containers and removed weekly or more frequently.

Firearms will be prohibited from project sites.

All pets will not be permitted on project sites.

Prior to the initiation of project activities, a worker education program will be conducted by a monitoring biologist for all employees working in federally-listed species habitats. If, at a later time, new employees are set to work on the project site, such as company executives, administrative staff, or company guests, are not required to receive the worker education program as their time in the project area will be of a short duration. If visitors elect not to receive the program, then they will be escorted by a worker who has received the education program. If the visitors opt to receive the worker education program, then they will not be required to be escorted by another worker, unless species specific provisions apply, such as active season blunt-nosed leopard lizard measures. The education program will include:

a) Identification of federally listed species and their habitats;
b) Biological mitigation measures, stipulations, and notification requirements;
c) An explanation of the status of the species, its protection under the Endangered Species Act, and penalties for failure of compliance;
d) A sign-in sheet with the name and signature of the monitoring biologist who presented and the names and signatures of the education program attendees;
    i. The sign-in sheet will be maintained by the company as a record of completion and a copy will be turned in with the 60 day compliance report. The sign-in sheet will also be available upon request by the Service/BLM.
e) A fact sheet conveying the above information for distribution to the education program participants and anyone else who may enter the project site.

All excavated, steep-walled trenches will have exit ramps maintained at intervals no greater than 500 feet and at a slope no greater than 1:1. Trenches will be checked in the morning before beginning work and at the end of each day. Before trenches are filled, they will be thoroughly inspected for animals. If an animal does not exit the trench within a reasonable period of time, the BLM will be contacted for further guidance. All instances of a federally-listed species discovered within a trench will be tallied and reported.

All excavated, steep-walled holes will have exit ramps maintained at a slope no greater than 1:1. Alternatively, holes may be covered completely with a cover that is able to support a human walking across it. Holes will be checked in the morning before beginning work and at the end of each day. Before holes are filled, they will be thoroughly inspected for animals. If an animal does not exit the hole within a reasonable period of time, the BLM will be contacted for further guidance. All instances of a federally-listed species discovered within a hole will be tallied and reported.

Well cellars will be covered and kept drained. Grating or flooring shall be installed and maintained in good condition so as to exclude people and animals. Cellars should be protected from as much runoff water as practical. Except where necessary to allow for mechanical function, all gaps and openings shall not be greater than one inch in any direction.

All releases of potentially hazardous materials, including produced fluids, will be contained closest to the source site as possible. The released materials will be cleaned up immediately and disposed of properly. If a release of potentially hazardous materials, including produced fluids, occurs within federally-listed species habitat, the monitoring biologist will be contacted immediately and will assist with clean up and containment. The Service and/or BLM will be notified of the release of potentially hazardous materials and the remedial action taken by the operator as soon as possible, but not later than 24 hours after the release occurs or is discovered. Within 48 hours of being notified of a release that may affect federally-

listed species, the BLM will issue additional clean-up provisions to the operator. Within 60 days of completing clean-up activities, a compliance report will be submitted by the monitoring biologist to the BLM.

Federally-listed species and other animals shall be protected from the hazards posed by sumps. All exposed oil sumps shall be screened or eliminated (California Laws for Conservation of Oil and Gas 1995). The operator will prevent avian and terrestrial animal access to fluids pits that contain or have the potential for containing salinity sufficient to cause harm, surfactants, or Resource Conservation and Recovery Act-exempt hazardous substances. All screening of sumps shall meet the following specifications: be not greater than one inch nominal mesh, be of sufficient strength to restrain entry of wildlife, and be supported in such a manner so as to prevent contact with the sump fluid. Oil sumps shall be filled with earth after proper removal of harmful materials.

The operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, scree, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock.

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will properly dispose of fluids within the containment system that do not meet applicable state or U.S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers.

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

If the above guidance cannot be followed, the BLM will be contacted for further instruction. If new guidance becomes available, the BLM will notify company representatives.

Disturbance levels

Surface disturbance on BLM lands in reserve areas (Red Zones) will not exceed 10% of any 640-acre section, aliquot section, or aggregate of adjacent aliquot sections.

Surface disturbance on BLM lands in habitat corridors (Green Zones) will not exceed 25% of any 640-acre section, aliquot section, or aggregate of adjacent aliquot sections.

Projects that will disturb greater that 10% or 25% of any 640 acre section, aliquot section, or aggregate of adjacent aliquot sections in red and green zones, respectively, would be subject to a separate section 7 consultation.

Survey Requirements

San Joaquin Kit Fox, Blunt-Nosed Leopard Lizard, Giant Kangaroo Rat, and Tipton Kangaroo Rat

Reconnaissance level surveys will be conducted by a monitoring biologist to document federally-listed species sign and habitat features. The surveys will pre-date the project initiation date by no more than three years or, in the case of emergency activities, immediately following containment of the release. The reconnaissance level survey area will consist of the area within the project boundary, including access routes and approved cross-country travel routes, plus an additional appropriate survey area beyond the project boundary. The additional appropriate survey area may be based on factors such as surrounding land uses, past survey results, etc. and will be a minimum of 250 feet unless a reasonable justification can be made (for instance the proximity of large scale permanent disturbance such as an orchard or similar circumstance). Reconnaissance level surveys will include daytime line transect surveys which will be conducted by walking the survey area at approximately 30 to 90 foot intervals. Transect width will be adjusted based on factors such as vegetation height and topography. The surveys will not be intended to determine species presence or absence on a particular site, although any federally-listed species observed shall be noted during these surveys. The surveys shall identify whether or not habitat for any federally-listed species exists within or in the vicinity of the project footprint. Based on the results of reconnaissance level surveys as well as information such as known distribution and historical range, additional surveys may be required to confirm presence/absence; see Species Specific Survey, Monitoring, Reporting, and Mitigation Requirements.

Pre-project surveys will be conducted by a monitoring biologist to determine if there has been any change since the reconnaissance level survey in the potential for federally-listed species by identifying wildlife sign, important habitat features, and other indicators of habitat use. The pre-project surveys will occur no less than fourteen days and no more than thirty days prior to the project initiation start date. The pre-project survey area will consist of the area within the project boundary, including access routes and approved cross-country travel routes, plus an additional appropriate survey area beyond the project boundary. The additional appropriate survey area may be based on factors such as surrounding land uses, past survey results, etc. and will be a minimum of 250 feet unless a reasonable justification can be made (for instance the proximity of large scale permanent disturbance such as an orchard or similar circumstance). Pre-project surveys will include daytime line transect surveys which will be conducted by walking the survey area at approximately 30 to 90 foot intervals. Transect width will be adjusted based on factors such as vegetation height, and topography.

Under certain circumstances, the reconnaissance level survey and pre-project survey may be one survey. This scenario could arise if the project is in an area where no additional, species-specific surveys (such as blunt-nosed leopard lizard or Kern mallow) are required, or if an acceptable earlier survey can be submitted (for example a plant survey that was completed in a year where conditions were suitable for germination and the survey was done in sufficient detail).

If new reconnaissance or protocol level survey standards or new measures for minimizing take or impact are published, the BLM will coordinate with the Service to determine if those will be implemented in addition to or in place of the requirements outlined in this program.

Kern Mallow, California Jewelflower, San Joaquin Woolly-Threads, and Bakersfield Cactus

For annual species, a botanist will survey during the growing season when reference populations are flowering. Surveys will occur in the area within the project boundary, including proposed cross-country travel routes, plus an additional appropriate survey area beyond the project boundary. Surveys during low precipitation years will be expected to underestimate the size and extent of the populations; this is because, for annual species, the population resides mostly in the seedbank and many years is not expressed above ground. To implement minimization measures, it is best to survey the entire lease during productive years for the species. Additional surveys may be necessary to define population boundaries. Surveys for Bakersfield cactus may be done at any time of the year.

State Listed and Federally Proposed and Candidate Plant Species.
Survey in the area to be disturbed by the project and a 50-foot buffer, if season is appropriate. If extant populations or high potential habitat is known to occur in the project area, the BLM may require surveys during the appropriate season. At the Service/BLM's discretion, existing information may be used to conclude that the site is not occupied and surveys are not required.

Measures for Minimizing Take

San Joaquin Kit Fox

1) The following exclusion zones are based on the 2011 USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. At the Service/BLM's discretion, the exclusion zone radius may be altered based on publication of new guidance, sensitivity of the den site, proximity of existing disturbance, or other factors.
    a) For potential and atypical dens, an exclusion zone with a minimum radius of 50 feet as measured outward from the entrance or cluster of entrances will be maintained. Atypical dens may include pipes, culverts, and similar structures with a diameter of approximately 4-inches or greater. Removal of atypical dens that cannot be seen through will follow the monitoring and plugging procedure described for natural dens.
    b) For known dens, an exclusion zone with a minimum radius of 100 feet as measured outward from the entrance or cluster of entrances will be maintained.
    c) For natal/pupping dens both occupied and unoccupied, the Service and BLM must be contacted.
    d) Actions within exclusion zones will be limited to essential vehicle and equipment operation on authorized roads and to foot traffic. Actions within exclusion zones will be confined to daylight hours unless, at the discretion of the Service/BLM, operations at other times of day would be beneficial to listed species. At the Service/BLM's discretion, other actions may be allowed.
2) If, in the opinion of the monitoring biologist, a kit fox den exclusion zone cannot be maintained, but the den can be avoided during construction, then the empty den may be temporarily plugged by or under the supervision of an approved biologist with one-way doors or materials such as sandbags, rocks, etc. until construction has concluded. If this option is utilized, at the end of construction, the temporary plug will be removed by or under the supervision of an approved biologist.
    a) Occupied natal/pupping dens will not be plugged until the pups and adults have vacated and then only after the Service and BLM have granted permission.
    b) Prior to temporary plugging of any den using methods other than one-way doors, the den will be monitored for a minimum of five consecutive nights to determine its current status. Activity at the den will be monitored by placing tracking medium or an infra-red beam camera at the entrance.
        i) If no kit fox activity is observed during this period, the den will be plugged immediately upon the conclusion of monitoring to preclude subsequent use.

ii) Only when the den is determined to be unoccupied may the den be temporarily plugged by or under the supervision of an approved biologist.

(1) Use of the den can be discouraged during this period by installing one-way doors or partially plugging its entrance(s) with materials such as sandbags, soil, or rocks in such a manner that any resident animal can escape easily.

(2) If the animal is still present after five or more consecutive nights of discouraging use and monitoring, an approved biologist will contact the Service/BLM to obtain further guidance.

3) If, in the opinion of the monitoring biologist, a kit fox den exclusion zone cannot be maintained, and the den cannot be avoided during construction, then limited destruction may be allowed. The following guidance on den destruction is based on the 2011 USFWS Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. At the Service and BLM's discretion, den destruction guidelines may be altered based on publication of new guidance or other circumstances.

a) Occupied natal/pupping dens will not be destroyed until the pups and adults have vacated and then only after the Service and BLM have granted permission.

b) Prior to destruction of any den, the den will be monitored for a minimum of five consecutive nights to determine its current status. Activity at the den will be monitored by placing tracking medium or an infra-red beam camera at the entrance.

i) If no kit fox activity is observed during this period, the den will be destroyed by or under the supervision of an approved biologist immediately to preclude subsequent use.

ii) If kit fox activity is observed at the den during this period, the den will be monitored for a minimum of five additional consecutive nights from the time of the observation to allow any resident animal to move to another den during its normal activities. Only when the den is determined to be unoccupied may the den be excavated by or under the supervision of an approved biologist.

(1) Use of the den can be discouraged during this period by installing one-way doors or partially plugging its entrance(s) with materials such as sandbags, soil, or rocks in such a manner that any resident animal can escape easily.

(2) If the animal is still present after five or more consecutive nights of discouraging use and monitoring, the approved biologist will contact the Service and BLM to obtain permission to excavate the den when it is temporarily vacant, for example during the animal's normal foraging activities.

4) All construction pipes, culverts, or similar structures with a diameter of approximately four (4) inches or greater that are stored on the lease for one or more overnight periods will be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service/BLM has been contacted and further guidance has been received. Any kit fox found will be allowed to escape unimpeded.

5) If kit fox dens must be destroyed during project activities, BLM may require the installation of artificial dens as mitigation.

Blunt-Nosed Leopard Lizard.

1) For the purposes of this program, potential blunt-nosed leopard lizard burrows are burrows in suitable

habitat that measure 1.5 inches or more in at least one dimension and that cannot be confirmed as collapsed.

2) Blunt-nosed leopard lizard species specific survey requirements:

   a) If project activities can avoid all burrows by 50 feet, then additional blunt-nosed leopard lizard surveys will not be required.

   b) If project activities will take place within 50 feet of existing burrow entrances and in the judgment of the monitoring biologist, the combination of soil hardness and activity impact is not expected to collapse those burrows, then those project activities may take place under the supervision of the monitoring biologist and additional blunt-nosed leopard lizard surveys will not be required.

      i) Activities authorized by the monitoring biologist within 50 feet of burrow entrances will be documented and included in all reports, including the compliance report.

   c) If project activities will or are likely to result in burrow impacts, protocol-level surveys will be required. Protocol-level surveys must be conducted using the May 2004 CDFW *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard*. The protocol-level survey area will consist of the area within the project boundary, including cross-country travel routes, plus an additional appropriate survey area beyond the project boundary. The additional appropriate survey area may be based on factors such as surrounding land uses, past survey results, etc. and will be a minimum of 250 feet unless a reasonable justification can be made (for instance the proximity of large scale permanent disturbance such as an orchard or similar circumstance).

      i) If protocol-level surveys for blunt-nosed leopard lizard are negative and are accepted by the BLM:

         a. Project activities may proceed until the negative survey expires.

         b. A negative survey result will be valid until April 1st of the following year unless a blunt-nosed leopard lizard is observed within 1000 feet of the project area. If a blunt-nosed leopard lizard is observed within 1000 feet of the project area, BLM will be contacted for further guidance.

         c. Alternatively, an exclusion barrier may be constructed around the project area where burrows will be impacted. A properly maintained exclusion barrier extends the valid period of the negative protocol-level survey result until the exclusion barrier is removed or to April 1st, whichever is later.

      ii) If surveys are positive for blunt-nosed leopard lizard or if the species is known to occur within the project area:

         a. An exclusion barrier such as flashing or other approved fencing material may be installed around the burrow disturbance area. Protocol-level surveys will be conducted within the exclusion barrier and all blunt-nosed leopard lizards will be allowed to egress or will be removed until a negative survey result is achieved within the burrow disturbance area. This negative survey result will be valid until the exclusion barrier is removed.

         b. Additional avoidance and minimization measures such as active season avoidance measures (see below for active season avoidance measures) and an onsite biological monitor during all surface disturbing activities will be required.

3) Exclusion barrier guidelines:

a) The exclusion barrier will be 36-inches or more above ground, preclude burrowing underneath the fence, and reinforced with materials such as rebar or fence posts. Wood stakes will not be used on the outside of the barrier as animals can use them to climb up and in to the exclosure.

b) Exclusion barrier installation will occur under the supervision of an approved biologist and in a manner that avoids all burrows by a distance determined by the approved biologist. If a burrow is inadvertently destroyed by trenching during installation, the burrow will be carefully hand excavated to ensure no blunt-nosed leopard lizards are entrapped within the collapsed burrow.

c) Exit ramps made from materials such as silt fencing, wood, or soil will be constructed inside the barrier exclosure so that blunt-nosed leopard lizards can exit to outside the barrier.

d) Prior to burrow disturbance, protocol level surveys will be completed within the barrier exclosure. Unless additional days are deemed necessary by the approved biologist, surveys may conclude when protocol level surveys have reached a negative result.

    i) All blunt-nosed leopard lizards observed within the barrier exclosure will be allowed to exit or will be removed by a trapping biologist from the barrier exclosure prior to project activities using one of the methods below.

        a. A portion of the fence may be removed or a ramp may be erected so that the lizard can exit the barrier exclosure. An approved biologist will monitor the location of the lizard to ensure it has moved outside the barrier exclosure. The barrier fence will be immediately replaced to prevent any lizard from re-entering the barrier exclosure.

        b. Blunt-nosed leopard lizards may be noosed by a trapping biologist. An approved biologist will maintain visual contact of the individual lizard or burrow entrance until the lizard can be captured for removal by the trapping biologist. Noosed lizards will be released outside the barrier exclosure into adjacent habitat 75-150 feet away.

        c. If an observed lizard is not immediately removed via partial fence removal, ramp erection, or capture, surveys for blunt-nosed leopard lizards will continue until the lizard has egressed or been successfully removed from the barrier exclosure. If the lizard is not observed within 12 days of survey, the Service and BLM will be contacted for further guidance.

    ii) Burrows inside the barrier exclosure may be destroyed after the survey, monitoring, and blunt-nosed leopard lizard removal requirements described above have been met.

    iii) Burrow excavation is required if blunt-nosed leopard lizards are observed within the exclusion barrier. Burrows will be carefully dug out by or under the supervision of an approved biologist and in a manner that avoids direct mortality. After verifying that no lizards are present, the burrow will be immediately destroyed.

        a. If a blunt-nosed leopard lizard is encountered during excavations, it will be allowed to egress unharmed, and the BLM and Service will be contacted within 24 hours by phone and by email for further guidance.

        b. If eggs are found within a burrow, the BLM and Service will be contacted within 24 hours by phone and by email for further guidance. The eggs will be transported to an approved facility or individual and cared for in a manner that results in a high likelihood of successful hatching and release into adjacent undisturbed habitat.

e) Barriers will be properly maintained until they are no longer necessary. Maintenance may include patching small holes, repairing tears, replacing degraded segments, and keeping underground portions buried.

f) An approved biologist will determine when the exclusion barrier should be removed, for instance: after the burrows have been destroyed or after construction is complete or kept in place during project operations and maintenance to reduce the potential take of blunt-nosed leopard lizards. An approved biologist will determine if adding additional exclosure fencing, such as along the access route, would reduce the potential take of lizards. The exclosure will be removed and disposed of properly when no longer necessary or functional.

4) In areas where blunt-nosed leopard lizards are known or likely to occur or where surveys are positive, the following blunt-nosed leopard lizard active season avoidance measures will be implemented when appropriate. This includes during construction and subsequent operations and maintenance (O&M) activities.

a) The monitoring biologist or FCR will notify BLM that active season measures are being implemented. Initial notification may be by phone message or email.

b) The monitoring biologist will be onsite for project activities during appropriate temperatures for blunt-nosed leopard lizard activity.

c) When possible, project activities will be conducted at night or during blunt-nosed leopard lizard inactivity periods.

d) The Service/BLM may require the monitoring biologist to escort all traffic through any area where blunt-nosed leopard lizards have been observed.

e) All personnel will be advised to reduce speeds to 10 mph on sections of the access/egress route with potential to support blunt-nosed leopard lizards.

f) If a blunt-nosed leopard lizard is observed, the BLM will be provided with the GPS coordinates of the sighting within 48 hours. Written documentation, including GPS coordinates of lizard observations, will be included in all reports.

g) The monitoring biologist will complete daily compliance reports. Daily compliance reports will be summarized in a weekly compliance report; the weekly compliance report will be sent to BLM. The weekly report will describe actions taken to avoid blunt-nosed leopard lizard impacts. The weekly report may be submitted by email to BLM.

h) When the monitoring biologist determines that temperature patterns at the project site no longer support blunt-nosed leopard lizard activity for the season and receives agreement from BLM, active season measures may be discontinued.

i) A report will be submitted to BLM within 60 days of the decision to discontinue active season measures. If 60 days is an insufficient time period for completion of the compliance report, a formal extension of a reasonable timeframe can be requested. Extension requests can be submitted by email.

j) The Service/BLM may require a written blunt-nosed leopard lizard active season Operations and Maintenance Plan (O&M Plan). The O&M Plan would outline the practices and mitigation measures that would be implemented to avoid impacts to blunt-nosed leopard lizards from O&M activities.

5) Should a blunt-nosed leopard lizard be encountered during construction activities during the inactive season, it will be held in captivity by a permitted facility or individual and released into adjacent undisturbed habitat at the earliest period of suitable weather within the active season. The BLM and Service will be notified of the discovery within 24 hours by phone and by email.

6) In the event of an emergency and subsequent clean-up in an area where blunt-nosed leopard lizards are known or likely to occur, an approved biologist will be contacted within 24 hours to conduct emergency excavation of affected burrows and potential burrows as soon as the emergency has been contained. Under the supervision of an approved biologist, a monitoring biologist may excavate affected burrow and potential burrows. If an affected lizard is discovered, the Service and/or BLM will be contacted for guidance.

7) At the Service/BLM's discretion, existing information may be used to conclude that blunt-nosed leopard lizards have been locally extirpated from the project area or are otherwise unlikely to occur within the project area at the time of project activities. In these areas, truncated surveys, burrow excavation, or other acceptable methodologies may be required to document that no blunt-nosed leopard lizards are present or have become reestablished in the area. If blunt-nosed leopard lizards become reestablished or have a reasonable likelihood of becoming reestablished, then the full protocol survey and protective measures above will be required.

    a) A locally extirpated determination will be based on substantial evidence with concurrence from the BLM and Service. Substantial evidence may include multiple years of negative protocol level survey reports, past and current distribution information, scientific research, and/or species expert statements. The evidence will be submitted to the BLM, and if the BLM agrees the evidence is substantial, the BLM will submit the information to the Service. If the Service concurs with the BLM decision, then blunt-nosed leopard lizards will be treated as locally extirpated and subject to the modified requirements outlined above for subsequent project activities in the project area.

Giant Kangaroo Rat and Tipton Kangaroo Rat

1) Maintain an exclusion zone around active burrows and precincts with a minimum radius of 50 feet as measured outward from the burrow entrance or cluster of entrances. Actions within exclusion zones will be limited to essential vehicle and equipment operation on authorized roads and to foot traffic. Actions within exclusion zones will be confined to daylight hours unless, at the discretion of the Service/BLM, operations at other times of day would be beneficial to listed species. At the Service/BLM's discretion, the exclusion zone radius may be altered based on publication of new guidance, sensitivity of the site, proximity of existing disturbance, or other factors.

2) If project activities will take place within 50 feet of existing burrow and precinct entrances and in the judgment of the monitoring biologist, the combination of soil hardness and activity impact is not expected to collapse those burrows, then those project activities may take place under the supervision of the monitoring biologist.

    a) Activities authorized by the monitoring biologist within 50 feet of burrow and precinct entrances will be documented and included in all reports, including the compliance report.

3) If the minimum exclusion zone cannot be maintained and the monitoring biologist believes activities will collapse burrows then a trapping biologist may be required to implement a trap and release program at the Service/BLM's discretion. Project specific guidance on trapping, temporary holding, release location, and release method will be provided by the Service/BLM prior to the start of trapping.

Kern Mallow, California Jewelflower, San Joaquin Woolly-Threads and Hoover's Woolly-Star.

4) Maintain an exclusion zone around populations with a minimum radius of 50 feet as measured outward from the individual plant, cluster of plants, or mapped population boundaries. Actions within exclusion zones will be limited to essential vehicle and equipment operation on authorized roads and to foot traffic. The locations of federally-listed plants will be avoided and temporarily fenced or prominently flagged by or under the supervision of a botanist to prevent inadvertent encroachment by vehicles and equipment during the activity. If the minimum exclusion zone cannot be maintained, the Service/BLM will be contacted for further guidance.

5) If populations cannot be avoided, surface disturbance should be scheduled after seed set and prior to germination. This period is generally from May to September, but varies relative to yearly temperature and precipitation patterns.

6) Collection of seed by a biologist with proper plant collecting permits, with reseeding undertaken at the site following the activity during appropriate seasonal time-frames and weather conditions favorable for germination and growth, may also be required.

7) In areas where soils will be disturbed by earthmoving equipment, the topsoil will be stockpiled. If the site is to be reclaimed within one year, the topsoil will be replaced. If reclamation will occur later than one year, any topsoil removed will be used as part of restoration measures on nearby suitable areas. Topsoil will not be stockpiled for longer than the beginning of the next growing season. The disturbance, stockpiling, and/or use of topsoil will be reported in the compliance report (see IV. C. General Project Reporting Requirement).

8) Impacts to populations of federally-listed plants may be considered minimized when:

   a) The lease has had accurate surveys for federally-listed plants; and

   b) The population boundaries are well-defined (mapped); and

   c) The previous measures for minimizing impacts have been implemented.

9) Plants that are considered waifs or an incidental occurrence and a small population size (less than 10 individuals) may be disturbed at the Service/BLMs discretion.

Project Reporting

1) In order to conduct the project inspection for the compliance report, the monitoring biologist will be contacted immediately following well completion, approved Sundry operations (facility construction, reconstruction, alteration, or abandonment), ROW and TUP actions, and emergency clean-up activities. **If there will be a substantial delay between authorized activities** (such as a delay between the installation of a pipeline and bringing the pipeline online) **additional interim compliance reports may be required**.

2) Within 60 days of completion of any approved project, emergency activity, or Operations and Maintenance (O&M) Plan active season, a brief compliance report will be provided to the designated BLM contact. If 60 days is an insufficient time period for completion of the compliance report, a formal extension can be requested. Extension requests may be submitted by email.

3) The compliance report must include, if applicable:

   a) Final acreage of temporary and permanent habitat disturbance based on the project inspection;

   b) Pre- and post-project photographs of impacted areas;

   c) Aerial maps and shapefiles (such as .shp, KML, etc.) displaying the locations of temporary and permanent habitat disturbance and restoration treatments;

d) All observations of federally-listed species or BLM Special Status species, including GPS coordinates, shapefiles, and/or mapped locations, and the approximate time and date of observation;

e) All observed impacts to federally-listed species or BLM Special Status species, including removal of plants, burrow collapse or destruction, den excavation or plugging, discovery within a steep-walled hole or trench, and take. Include a brief description of measures taken to avoid den or burrow collapse, or include a brief description of den or burrow excavation activities and an approximate number of dens and burrows impacted;

f) A description of restoration treatments conducted or planned to facilitate re-colonization by vegetation and wildlife. Include a description of if and how topsoil was disturbed, stockpiled, and/or used in restoration of the project area or other nearby sites;

g) A brief description of significant actions taken to comply with the provisions of the BLM authorization;

h) Location of compensation lands (such as a map, legal description, or assessor's parcel number);

i) An overall evaluation of compliance with the provisions and suggestions for changes or improvements to the provisions such as follow-up actions;

j) A copy of the worker education program sign-in sheet(s) with names and signatures of all attendees (see General Project Requirements);

k) Any other information deemed useful or relevant by the monitoring biologist.

4) All reports must:

a) Be signed and submitted by the monitoring biologist conducting the work in the field, or

b) Be reviewed and signed by the monitoring biologist conducting the work in the field, or

c) Include, as an attachment, the original report prepared and signed by the monitoring biologist conducting the work in the field.

An email report submitted to the BLM by the monitoring biologist conducting the work in the field may be accepted as signature.

5) Additional reporting requirements such as weekly or monthly compliance reports may be stipulated at the time of project authorization or may be required at the discretion of the BLM.

Compensation and Replacement

1) Allocation of compensation lands and method of allocation will be approved by the BLM prior to project approval. A preliminary estimate of compensation acres will be provided to the applicant by the BLM based on the authorized action, and final compensation acreage will be adjusted upon completion of construction. Allocation of suitable compensation lands can be accomplished in one of four ways:

a) Project applicant purchases suitable mitigation credits at a Service-approved mitigation bank prior to project approval.

b) Project applicant may, with Service and BLM approval, record a conservation easement, in a form approved by the Service prior to recording and granted to an entity acceptable to the Service, over privately-owned lands prior to project approval.

c) Project applicant may purchase lands deemed acceptable by the BLM and Service and may:

i) Transfer the lands to the BLM, Service, or CDFW and provide evidence to the BLM that the land was transferred prior to project approval.

ii) Place a conservation easement, in a form approved by the Service prior to recording and granted to an entity acceptable to the Service, on the lands and maintain the lands as a privately-owned mitigation site, and prior to project approval, provide the following to the BLM as evidence:

(1) Copies of all executed and recorded conservation easements;

(2) Written confirmation from the approved endowment manager of receipt of the full endowment and all required reports.

iii) Transfer the lands to an entity acceptable to the BLM and Service that can effectively manage federally-listed species and their habitats, encumber the lands with a conservation easement in a form acceptable to the Service, and prior to project approval, provide the following to the BLM as evidence of the completed transfer:

(1) Written documentation of the land transfer;

(2) Copies of all executed and recorded conservation easements;

(3) Written confirmation from the approved endowment manager of receipt of the full endowment and all required reports.

2) General compensation and replacement requirements

a) Acres of habitat used for compensation or replacement must meet requirements (a) and (b) or (a), (b), and (c) outlined below. Additionally, the land must implement the habitat protection strategy outlined in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USDI-FWS 1998).

i) If a project impacts lands in a reserve area (Red Zone), the compensation land must also be in a reserve area (Red Zone). If the project occurs in habitat corridor (Green Zone), compensation can be in habitat corridor (Green Zone) or reserve area (Red Zone). If a project impacts lands outside of the reserve area (Red Zone) and habitat corridor (Green Zone) strategy, the compensation land must be in either a reserve area (Red Zone) or habitat corridor (Green Zone). In all cases, compensation or replacement land must be of equal or greater habitat value as the land impacted.

ii) The land must possess the same species as the impacted acres. For example, impacts to a kit fox natal den must be compensated with land that supports breeding populations of kit foxes. Lands used for compensation for project impacts to Kern mallow, San Joaquin woolly-threads, blunt-nosed leopard lizards, giant kangaroo rats, and Tipton kangaroo rats must be known by the Service to contain these species.

iii) If a parcel of land outside the reserve areas (Red Zone) and habitat corridor (Green Zone) strategy is determined by the Service and BLM to meet the standards for inclusion in the zonal strategy, then it can be added to the strategy and used as compensation land.

b) Compensation is required for impacts to potential federally-listed species habitat.

i) For permanent impacts, compensation will be 3:1. Permanent impacts cause high-intensity or longer-term disturbances, such as those that result from soil excavation, topsoil removal, removing or crushing shrubs, destroying cryptogrammic crust, or off-road driving that results in significant topsoil impacts. Once operators compensate for permanent disturbance within a

project area, they will not be required to compensate for the same acreage again if the area is included in a future project proposal, and the operator can demonstrate or provide documentation the area was previously compensated for at the permanent rate.

ii) For temporary impacts, compensation will be 1.1:1. Only low-intensity or short-term disturbances, such as those that result from brief off-road travel during dry soil conditions, will be considered temporary.

c) Compensation lands will be required for emergency actions that cause impacts to habitat. As soon as possible but not later than 24 hours after the emergency occurs, the BLM will be provided written notification of the estimated acreage of the disturbance. Disturbance impacts will be presumed to be temporary unless upon subsequent visitation it is determined that restoration has been unsuccessful. Within 48 hours of notification receipt, the BLM will issue clean-up provisions to the operator, including an estimation of compensation acres required. The compliance report will include the final disturbance calculation, ownership of the proposed compensation lands, and location of the proposed compensation lands.

d) Compensation lands will be required for all unauthorized impacts to habitat. The compensation ratio will be commensurate with impact type (temporary or permanent).

e) Replacement acres will be required at a 1:1 ratio for impacts that occur on BLM surface within reserve areas (Red Zones) or habitat corridors (Green Zones). This will be in addition to the temporary or permanent compensation ratio.

f) Compensation for actions on Protected Lands will be required as a XX:1 ratio. Protected Lands include all lands reserved for conservation purposes (i.e. lands managed for endangered species habitat such as other Federal lands, State Ecological Reserves, conservation banks, and private surfaces with conservation easements).

g) The following is a list of compensation lands that have been approved for use in the past; the list serves as an example of areas that could be considered for future project impacts (Appendix 3: Map 2017 Oil & Gas Programmatic Biological Assessment – Example Conservation Areas): Lokern Natural Lands Area, Buena Vista Valley, Semitropic Ridge, Allensworth, Kettleman Hills, Kern Water Bank, Coles Levee Ecosystem Preserve, or any Specialty Preserve agreed to by the BLM and the Service. Habitat corridor areas and small specialty preserves determined by the BLM, Service, and CDFW to be important for species conservation and recovery will be acceptable as compensation habitat so long as they meet the in kind compensation requirement