

## **III.15 MINERAL RESOURCES**

This section provides a brief history of federal and state mineral resource development and explains how regulations governing that development impact the Desert Renewable Energy Conservation Plan (DRECP or Plan). Minerals in the Plan Area include geothermal resources, high-value resource mining such as gold and rare earth minerals, aggregate, sand and gravel, and oil and gas.

### **III.15.1 Statutory, Regulatory and Policy Setting**

#### **III.15.1.1 Federal**

Minerals management on public lands falls into three categories: locatable, leasable, and mineral materials (previously “salable minerals”). Laws, regulations, guidance, and Plan elements related to mineral resources and mining are explained in the following paragraphs.

#### **General Mining Law of 1872 (30 United States Code [U.S.C.] 21 et seq.)**

The General Mining Law, as amended, grants citizens (and those seeking citizenship) of the United States the right to enter public lands and reserve interests for the exploration and development of minerals, subject to this mining law. The law specifically includes minerals such as gold, silver, copper, lead, zinc, and uranium; nonmetallic minerals such as asbestos, barite, gypsum, and mica; and uncommon varieties of stone (43 Code of Federal Regulation [CFR] Group 3800).

This law sets forth rules and procedures for the exploration, location, and patenting of lode, placer, and mill site mining claims. Claimants must file notice of the original claim with the Bureau of Land Management (BLM), as well as either an annual notice of the intention to hold, an affidavit of assessment work, or a similar notice.

#### **Stock Raising Homestead Act of 1916 (43 U.S.C. 291-299)**

Patents issued under the Stock Raising Homestead Act reserved minerals to the United States and granted the right to prospect, mine, and remove specified minerals. Certain conditions exist to protect the patent applicant’s improvements.

#### **Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)**

The Mineral Leasing Act authorizes and governs the leasing of public lands for development of deposits of coal, oil, gas, and other hydrocarbons, sulfur, phosphate, potassium, and sodium. The BLM issues right-of-way grants for oil and natural gas gathering, distribution pipelines, and related facilities, as well as oil and natural gas transmission pipelines and related facilities (43 CFR Part 2880, and Subchapter C).

### **Materials Sales Act of 1947 (30 U.S.C. 601–604)**

The Materials Sales Act provides for materials disposal on public lands. The Secretary of the Department of the Interior (DOI) is authorized to develop and implement rules and regulations to dispose of mineral materials (including, but not limited to, common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay) and vegetative materials (including, but not limited to, yucca, manzanita, mesquite, cactus, and timber or other forest products) on public lands in the United States. These materials can be disposed of upon adequate payment to the DOI. The Secretary of the Interior has the authority and discretion to permit any federal, state, or territorial agency, unit, or subdivision, including municipalities, or any other association or corporation not organized for profit, to take and remove, without charge, materials and resources for uses other than commercial or industrial purposes or resale (43 CFR Group 3600).

### **Mineral Leasing Act for Acquired Lands of 1947 (30 U.S.C. 351 et seq.)**

The Mineral Leasing Act for Acquired Lands broadens provisions of the Mineral Leasing Act and the authority of the Secretary of the Interior to include oil and gas operations on federal lands.

### **Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.), and Amendments**

The Geothermal Steam Act authorizes and governs the lease and development of geothermal steam and related resources on either certain federally managed lands or on lands where a geothermal resource was reserved to the United States (43 CFR Group 3200).

### **Mining and Mineral Policy Act of 1970 (30 U.S.C. 21[a])**

The Mining and Mineral Policy Act fosters and encourages the private development of economically sound and stable domestic mining and mineral, metal, and mineral reclamation industries. The law also fosters the orderly and economic development of domestic mineral resources, reserves, and the reclamation of metals and minerals to satisfy industrial, security, environmental, mining, mineral, and metallurgical research, including the use and recycling of scrap to promote the efficient use of natural and reclaimable mineral resources. The law further promotes the study and development of methods for the disposal, control, and reclamation of mineral waste products, as well as the reclamation of mined lands to lessen the environmental impacts of mining's many aspects and activities.

### **Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)**

The Surface Mining Control and Reclamation Act establishes a program for the regulation of surface mining activities under the administration of DOI's Office of Surface Mining, Reclamation, and Enforcement.

The law sets forth minimum uniform requirements for all mining on federal lands, including both the exploration for resources and the reclamation of mined lands to mitigate the many above-ground effects from mining. Mine operators are required to minimize disturbances and adverse impacts on fish, wildlife, and other elements of the natural environment, and to enhance these resources where practical. Restoring land and water resources is a priority in the reclamation planning process.

### **Bureau of Land Management Manual 3031 (1985)—Energy and Mineral Resource Assessment**

The BLM's classification system determines the potential, or likelihood, of accumulated mineral resources in a given area. The *BLM Manual 3031—Energy and Mineral Resource Assessment*, outlines BLM's mineral potential classification system, which includes the following levels:

- **Zero:** The geologic environment, the inferred geologic processes, and the lack of mineral occurrences do not indicate potential for accumulation of mineral resources.
- **Low:** The geologic environment and the inferred geologic processes indicate a low potential for accumulation of mineral resources. Low-level potential is no longer evaluated by BLM.
- **Moderate:** The geologic environment, the inferred geologic processes, and the reported mineral occurrences or valid geochemical/geophysical anomalies indicate moderate potential for accumulation of mineral resources.
- **High:** The geologic environment, the inferred geologic processes, the reported mineral occurrences and/or valid geochemical/geophysical anomalies, and the known mines or deposits indicate high potential for accumulation of mineral resources. The “known mines and deposits” do not have to be within the area classified, but have to be within the same type of geologic environment.
- **Not Determined:** Mineral potential is not determined because of a lack of useful data. This notation does not require a level-of-certainty qualifier. This level is seldom used; when used, it is for a specific commodity only.

Levels of certainty are described below:

1. The available data are insufficient and/or cannot be considered as direct or indirect evidence to support or refute the possible existence of mineral resources within the respective area.
2. The available data provide indirect evidence to support or refute the possible existence of mineral resources.

3. The available data provide direct evidence, but are quantitatively minimal to support or refute the possible existence of mineral resources.
4. The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

### **Bureau of Land Management Minerals Guidance**

Surface management under 43 CFR Subpart 3809 has two primary purposes:

- a) Prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws. Anyone intending to develop mineral resources on public lands must prevent unnecessary or undue degradation of the land and reclaim disturbed areas. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility.
- b) Provide for maximum possible coordination with appropriate State agencies to avoid duplication and ensure that operators prevent unnecessary or undue degradation of public lands.

Under Subsection 3809.10, BLM also classifies mining operation use:

- Casual use: For which an operator does not need to notify BLM. Any casual use disturbance must be reclaimed by the operator. If operations do not qualify as casual use, an operator must submit a notice or plan of operations.
- Notice-level operations: For which operators conducting mineral exploration activities disturbing less than five acres and/or excavating less than 1,000 tons of material must submit a notice (except for certain suction dredging operations covered by Subsection 3809.31[b]).
- Plan-level operations: For which an operator conducting mining operations, large exploration operations or mining related activities within certain special-status lands must both submit a plan of operations and obtain BLM approval.

The BLM categorizes locatable, leasable, or salable (now known as mineral materials) minerals in the federal estate. Each classification is administered differently, each category having unique regulatory requirements for administration for acquisition, exploration, and development. Definitions for locatable, leasable, and mineral materials appear below:

**Locatable Minerals.** Locatable minerals include metallic minerals such as gold, silver, copper, lead, zinc, and uranium; nonmetallic minerals such as alunite, asbestos, barite, bentonite, gypsum, geodes/gem minerals, mica, and zeolites; and uncommon varieties of stone (43 CFR 3800). The BLM policy and guidance related to locatable minerals

includes: *BLM Manual 3800—Mining Claims under the General Mining Laws*, and *BLM Handbook H-3042-1—Solid Minerals Reclamation Handbook*.

Section 302 of the Federal Land Policy and Management Act of 1976 (FLPMA) recognizes the rights of locators to claims filed under the Mining Law of 1872, including the right of ingress and egress. This section also requires the Secretary of the Interior to take any action, through regulation or otherwise, to prevent unnecessary or undue degradation of the [public] lands (43 U.S.C.1732). The regulations contained in 43 CFR 3715, 43 CFR 3802 and 43 CFR 3809 balance these two mandates by requiring management of the surface disturbances caused by mineral exploration development and reclamation, including mining claim use and occupancy. Appropriation of a mineral deposit is made by the location of a mining claim. A mining claimant's rights under the mining laws are subject to, and validated by, a discovery of a valuable mineral deposit that has been made within the boundaries of the mining claim.

Exploration and development must both obey all applicable federal and state laws, regulations, and policies and be conducted within applicable approved land use plans. Restrictions and stipulations may apply to a proposed mining activity, based on review and analysis by the authorized officer.

**Leasable Minerals.** These minerals include fluid minerals such as oil, gas, coalbed methane, CO<sub>2</sub>, and geothermal resources, as well as solid minerals such as coal, sodium, and potash. Although not a leasable mineral, helium is included in this category because it is typically associated with CO<sub>2</sub> exploration and development (43 CFR 3100 and 43 CFR 3200). The BLM policy and guidance related to leasable minerals includes *BLM Manual Series 3100 Onshore Oil and Gas Leasing*, and further includes all associated handbooks, instruction memoranda, and orders.

Geothermal resources are renewable energy fluid minerals. The required BLM lease to develop them grants the right to access and development within lease area boundaries and in accordance with both the lease terms and applicable federal, state, and local laws, regulations, and ordinances. The lease also requires, unless otherwise stipulated, the commitment to allow surface land use under standard terms and conditions. In assessing lease restrictions, BLM mandates the least restrictive available constraint in meeting resource protection objectives.

For split estate minerals (where the United States owns the minerals but not the land surface), leasing is authorized in accordance with federal law, regulations, and policy guidance. Land surface owners are notified of applications and given the opportunity to comment before leases are issued.

**Mineral Materials.** Mineral materials include construction materials such as sand, gravel, cinders, decorative rock, and building stone (43 CFR 3600). The BLM policy and guidance related to mineral materials includes *BLM Handbook H-3242-1, Solid Minerals Reclamation Handbook* and *BLM Manual and Handbook 3600*.

Removal of mineral materials from BLM-administered lands requires either a sales contract or a free use permit. Disposal of mineral materials is discretionary and authorized in accordance with an approved land use plan and appropriate laws, regulations, and ordinances. The BLM's policy is to make mineral materials available to the public and local governmental agencies whenever possible and wherever environmentally acceptable. Mineral materials may not be developed on public lands if the development is not in the public interest or would unnecessarily degrade public lands or resources.

**Memorandum of Understanding between the Department of the Interior (Bureau of Land Management), Department of Agriculture (U. S. Forest Service), and the State of California Department of Conservation and State Mining and Geology Board**

The purpose of the Memorandum of Understanding of 1992 (MOU) is to coordinate surface mining and reclamation in accordance with California's Surface Mining and Reclamation Act of 1975, as amended. The MOU ensures (1) the application of adequate and appropriate reclamation throughout the State of California, (2) simplification of the administration of surface mining and reclamation practice requirements on federal lands and on combined federal and private lands, (3) coordination of activities governing reclamation, and (4) elimination of duplication among lead agencies and counties (as defined in the Surface Mining and Reclamation Act, Public Resources Code Section 2728) when implementing state and federal requirements. The MOU acknowledges that the federal government recognizes that the Surface Mining and Reclamation Act applies to public lands in California, and that counties act as the "lead agencies" responsible for regulating and protecting mineral resources classified by the State Geologist and the State Mining and Geology Board.

**Energy Policy Act of 2005**

The 2005 Energy Policy Act law regulates and promotes traditional energy production as well as both newer, more efficient energy technologies and conservation. It contains several provisions to make geothermal energy production on public lands more competitive with other types of generation.

### **III.15.1.2 State**

#### **Surface Mining and Reclamation Act of 1975**

The Surface Mining and Reclamation Act (SMARA) was enacted by the California Legislature to address several needs: to ensure a reliable and continuous supply of minerals, and to prevent or minimize the impacts of surface mining to public health, property, and the environment. The Department of Conservation, Office of Mine Reclamation, and the Mining and Geology Board are jointly charged with ensuring proper administration of SMARA's requirements. The State Mining and Geology Board promulgates regulations to clarify and interpret SMARA's provisions and also serves as a policy and appeals board. The Office of Mine Reclamation provides ongoing technical assistance for lead agencies and operators, maintains a database of mine locations and operational information statewide, and is responsible for compliance with mineral-related issues.

SMARA requirements apply to all surface mining operations or surface impacts incident to underground mining activities that disturb more than one acre or remove more than 1,000 cubic yards of material. This includes but is not limited to prospecting and exploratory activities, dredging and quarrying, streambed skimming, borrow pitting, and stockpiling mined materials (California Department of Conservation, Office of Mine Reclamation 2013).

#### **California Public Resources Code (PRC), Division 6, Part 2, Chapter 3 (Oil and Gas and Mineral Leases)**

California PRC, Division 6, Part 2, Chapter 3, pertains to oil, gas, and mineral leases and permits, including geothermal. The California State Lands Commission (CSLC), Mineral Resources Management Division, manages energy and mineral resources on more than 130 oil, gas, geothermal, and mineral leases covering more than 95,000 acres of state-owned lands (California State Lands Commission 2012).

#### **California Public Resources Code (PRC), Division 6, Part 2, Chapter 2, Article 5.5 (Geothermal Resources) and California Code of Regulations Title 2, Division 3, Chapter 1, Article 4.1 (State Lands Commission Geothermal Resources)**

These codes provide the CSLC with the statutory authority to manage geothermal resources on state-owned lands. The California State Lands Commission, Mineral Resources Management Division, manages the energy and mineral resources of more than 160 oil, gas, geothermal, and mineral leases. Its goal is to ensure public safety, protect the environment, and maximize revenue.

The geothermal program's objective is to manage the orderly and efficient development of geothermal resources on state-owned lands. Geothermal leases are issued to companies

that drill wells to extract geothermal fluids—either dry steam or hypersaline brine that flashes to steam. Geothermal prospecting permits may also be issued to allow exploration for geothermal resources on unleased state lands.

### **III.15.1.3 County**

#### **County of Riverside General Plan—Land Use Element**

1. The Land Use Element in the County of Riverside General Plan contains goals to protect mineral resources. The Open Space-Mineral Resource land use designation allows both mineral extraction and processing facilities with SMARA classifications. Areas held in reserve for future mining activities also fall under this designation. Ancillary structures or uses that assist extracting, processing, or preserving minerals may also be permitted. Building structure size, siting, and design are determined on a case-by-case basis (County of Riverside 2003).

#### **County of San Bernardino General Plan—Conservation Element**

1. The Conservation Element of the County of San Bernardino General Plan contains a goal and policies pertaining to mineral resources. The goal is to protect the current and future extraction of mineral resources important to the county's economy while minimizing impacts to the public and the environment (County of San Bernardino 2007).

#### **County of San Diego General Plan—Conservation and Open Space Element**

1. The Conservation and Open Space Element of the County of San Diego General Plan contains goals to protect mineral resources. The goal is for long-term mineral materials production to adequately meet local county demand while maintaining permitted reserves equivalent to a 50-year supply. SMARA standards for land use, public health, and the environment apply to both operation and reclamation methods and techniques (County of San Diego 2011).

#### **Imperial County General Plan—Geothermal/Alternative Energy, Transmission Element, and SMARA**

The Geothermal/Alternative Energy and Transmission Element of the Imperial County General Plan addresses current geothermal development technology and county, state, and federal policies regarding the exploration, development, and transmission of geothermal energy. This element provides a comprehensive knowledge of resources, a workable development technology, legal requirements, policy (county, state, and federal), and

implementation measures. This element provides the framework for the review and approval of geothermal projects in Imperial County (Imperial County 2006).

### **Inyo County General Plan—Conservation/Open Space Element**

1. The Conservation/Open Space Element of the Inyo County General Plan contains goals and policies relevant to mineral and energy resources. The goal is to protect the current and future extraction of mineral resources important to the county's economy while minimizing impacts on the public and the environment (Inyo County 2001). County policies mandate SMARA compliance, and state that the county shall ensure that all mining projects comply with the requirements of SMARA, county ordinances, and any other applicable regulations. All mining operations are required to prepare and implement reclamation plans that mitigate environmental impacts and guarantee proposed reclamation requirements (Inyo County 2001).

### **Kern County General Plan—Energy Element and Land Use, Open Space, and Conservation Element**

The Kern County General Plan Energy Element includes a Geothermal Development section. The goal of the Geothermal Development section is to “provide for safe and orderly development of Kern County’s geothermal resources, including direct-use applications of low- and moderate-temperature resources, and electrical generation from high-temperature resources, if they are found to exist” (Kern County 2009).

The Geothermal Development section policies follow:

1. The County should support efforts for geothermal exploration in Kern County to determine whether high-temperature resources exist.
2. The County should permit geothermal development, which does not lead to either significant degradation of the environment or public health and safety hazards.
3. The County should encourage direct use of low-temperature geothermal resources for heating, cooling, and other direct-use applications.
4. The County should seek state and federal grants and programs that encourage the wise development of geothermal resources.
5. The County should promote energy development in the upper Kern River Valley, including geothermal and hydroelectric energy development, which does not have significant adverse environmental impacts.
6. The Kern County General Plan Land Use, Open Space, and Conservation Element includes a SMARA item for non-jurisdictional land that states: “Seek

Memorandums of Understanding with other governmental entities when the land use proposed requires a discretionary application or coordination through the County Planning Agency as required by State or federal law.” These applications include permit(s) subject to the Surface Mine and Reclamation Act (SMARA) of 1975 (Kern County 2009).

### **Los Angeles County General Plan—Land Use Element**

1. The Land Use Element of the Los Angeles County General Plan contains a goal and policies relevant to mineral resources. Within identified mineral resource areas, proposed development other than open space, passive recreation, agriculture, extraction or surface mining shall be reviewed to ensure compatibility with existing or potential mineral resource production (Los Angeles County 1980).

## **III.15.2 Mineral Resources Within the Plan Area**

### **III.15.2.1 Geothermal Resources**

Geothermal energy is natural heat from the interior of the earth. Sources of geothermal energy include artesian hot springs and wells that tap groundwater or dry rock at elevated temperatures from high-flow gradients in the subsurface.

Geothermal resources are classified according to temperature. High-temperature resources are above 302°F (150°C). Moderate-temperature resources are between 194°F and 302°F (90°C and 150°C). Low-temperature resources are below 194°F (90°C). Only resources with temperatures high enough to produce steam have been developed commercially for power generation. Low- and moderate-temperature geothermal water can be used for ground-source heat pumps for applications such as heating buildings, and in industrial processes, greenhouses, aquaculture, and resorts.

Known geothermal resource areas (KGRAs) are areas where knowledge of the geology and supporting information suggest that a geothermal resource exists and warrants additional investment for leasing and exploration. KGRAs within the Plan Area are shown in Figure III.15-1. The Coso Hot Springs KGRA is in the Owens River Valley ecoregion subarea, within the area managed by the Ridgecrest field office. The Randsburg KGRA is located within the Mojave and Silurian Valley and West Mojave and Eastern Slopes ecoregion subareas. The majority of KGRAs are located within the Imperial and Borrego Valley ecoregion subarea, managed by the El Centro field office.

Table III.15-1 shows KGRAs, geothermal resource areas, and geothermal lease-area acres for ecoregion subareas with geothermal resources.

**Table III.15-1  
Known Geothermal Resource Area and Lease Area Acres by Ecoregion Subarea**

<b>Ecoregion Subarea</b>	<b>Acres</b>
<b>Imperial and Borrego Valley</b>	
Superstition Mountains Lease Resource Area	9,000
Truckhaven Geothermal Lease Area	40,800*
West Chocolate Mountains Lease Resource Area	60,000
<b>Mojave and Silurian Valley – Geothermal Resource Area</b>	7,000
<b>Owens River Valley – Haiwee Geothermal Lease Area</b>	10,000
<b>West Mojave and Eastern Slopes – Geothermal Resource Area</b>	4,000
<b>Total</b>	<b>132,000</b>

**Notes:** Several geothermal leases in the Truckhaven area were cancelled in late 2013. Acres may not reflect all cancelled leases. The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** BLM 2013

Existing geothermal plants within the KGRAs and surrounding areas appear in Table III.15-2.

**Table III.15-2  
Geothermal Plants Within the Plan Area**

<b>Geothermal Plants</b>	<b>MW Production</b>
Coso Hot Springs KGRA – 4 generating plants (on the Naval Air Weapons Station China Lake)	270 MW
Salton Sea KGRA – 10 generating plants (CE Turbo, Elmore, Leathers, Vulcan, Del Ranch, and Salton Sea 1-5) 2 plants under development (Hudson Ranch II and ORNI 18)	327 MW 100 MW
South Brawley KGRA – 1 generating plant (Mesquite)	50 MW
North Brawley – 1 generating plant (North Brawley)	30 MW
Heber KGRA – 3 generating plants (Heber 1 and 2, Heber South)	100 MW
Niland – 2 generating plants (Niland and Hudson Ranch I)	100 MW
East Mesa KGRA – 6 generating plants (GEM Resources II, GEM Resources III, Ormesa I, Ormesa IE, Ormesa IH, and Ormesa II)	75 MW

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** California Energy Commission 2013

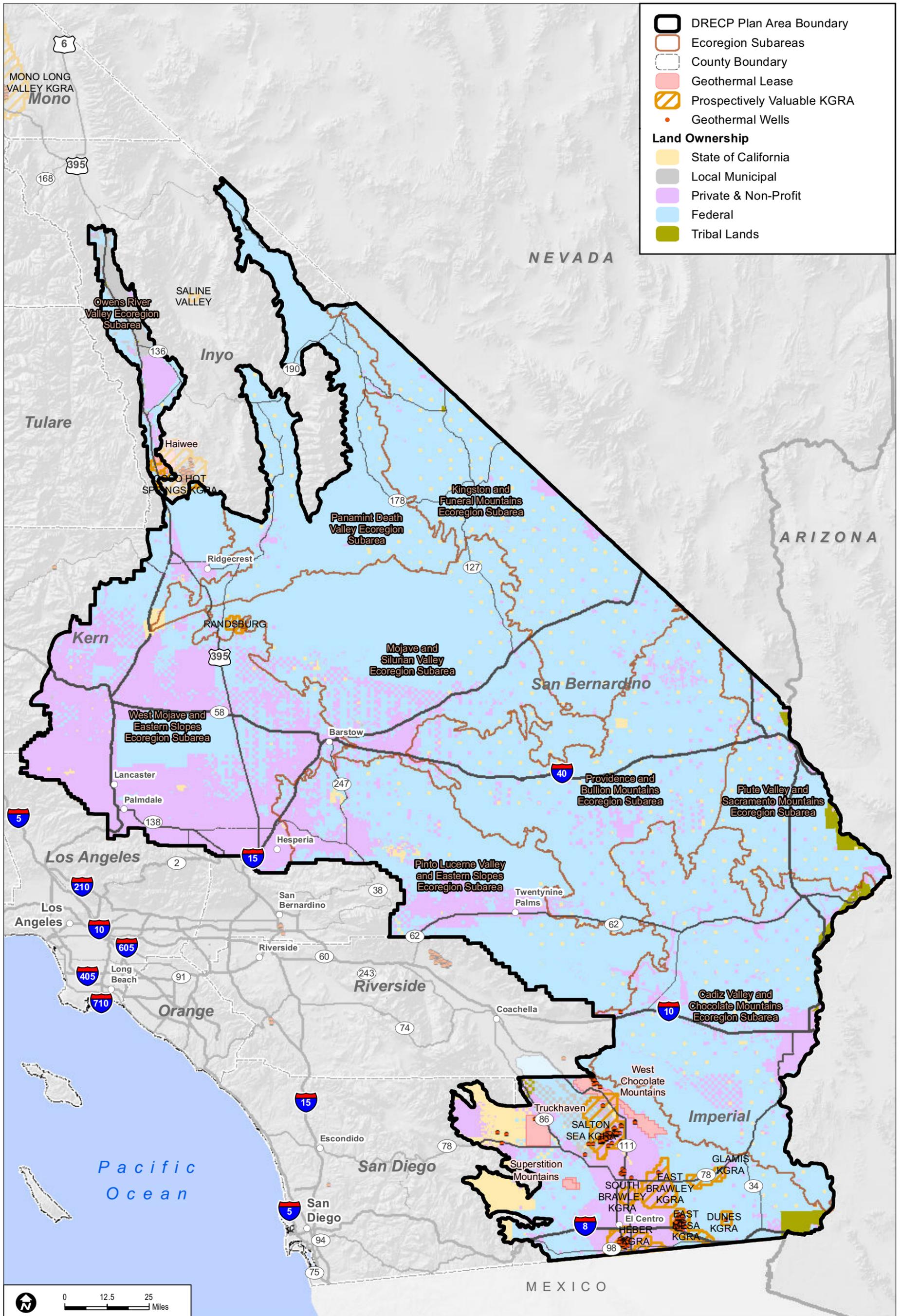
Geothermal prospects within and surrounding the KGRAs and their likely capacities are listed in Table III.15-3 and shown on Figure III.15-1.

**Table III.15-3  
 Geothermal Prospects Within the Plan Area**

Geothermal Prospect Area	Prospect Likely Capacity
Coso Hot Springs	355 MW
Dunes	11 MW
East Brawley	129 MW
East Mesa	148 MW
Glamis	6 MW
Heber	142 MW
Mesquite/South Brawley	62 MW
Mount Signal	19 MW
Niland	76 MW
North Brawley	135 MW
Randsburg	48 MW
Salton Sea	1,750 MW
Superstition Mountain	10 MW
Truckhaven	25 MW
Westmorland	50 MW

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** California Energy Commission 2013



**Legend**

- DRECP Plan Area Boundary
- Ecoregion Subareas
- County Boundary
- Geothermal Lease
- Prospectively Valuable KGRA
- Geothermal Wells

**Land Ownership**

- State of California
- Local Municipal
- Private & Non-Profit
- Federal
- Tribal Lands



Sources: ESRI (2014); CEC (2013); BLM (2013); CDFW (2013); USFWS (2013)

**FIGURE III.15-1**  
**Geothermal Resources within the Plan Area**

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### III.15.2.3 High-Potential Mineral Areas

High-potential mineral areas are lands with existing and/or historic mining activity and a reasonable probability of future mineral resource development. Within the Plan Area, specific geographic areas have been defined as areas with the potential for recoverable high-priority and high-potential mineral resources, including rare earth element areas, as identified in BLM’s California Geology, Energy, and Mineral Resource GIS Data (2013). These areas are described for each ecoregion subarea in Appendix R1 (Figure R1.15-1 through Figure R1.15-10). The acreage of high-potential mineral development for each ecoregion subarea is shown in Table III.15-4.

**Table III.15-4  
 Acres of High Potential Minerals Within the Plan Area**

<b>Ecoregion Subarea</b>	<b>Total Acres</b>
Cadiz Valley and Chocolate Mountains	214,000
Imperial and Borrego Valley	143,000
Kingston and Funeral Mountains	80,000
Mojave and Silurian Valley	77,000
Owens River Valley	400
Panamint Death Valley	42,000
Pinto Lucerne Valley and Eastern Slopes	66,000
Piute Valley and Sacramento Mountains	34,000
Providence and Bullion Mountains	147,000
West Mojave and Eastern Slopes	31,000
<b>Total</b>	<b>835,000</b>

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** BLM California Geology, Energy, Mineral Resource GIS Data 2013

### III.15.2.4 High-Priority Mineral and Energy Locations

Plan Area lands also have existing high-priority mineral or energy locations. These areas are shown in Table III.15-5 and in Figure III.15-2 (also see Figure R1.15-1 through Figure R1.15-10 in Appendix R1, which identify mineral resources in ecoregion subareas).

**Table III.15-5  
 Existing High-Priority Mineral or Energy Locations Within the Plan Area**

<b>Ecoregion Subarea/Mineral or Energy Site</b>	<b>Acres</b>
Cadiz Valley and Chocolate Mountains <i>Cadiz Evaporites</i>	2,600
Imperial Borrego Valley <i>Mesquite Gold Mine – including 650 acres of State Land lease</i>	9,000
Kingston and Funeral Mountains <i>Molycorp Rare Earth Element (Mountain Pass Deposit/Mine)</i>	10,500
Mojave and Silurian Valley	2,900
Owens River Valley <i>U.S. Borax Trona Mine – State Land lease</i>	15,700
Panamint Death Valley <i>Briggs Mine (Etna)</i> <i>Searles Dry Lake Evaporites</i>	75,000
Providence and Bullion Mountains <i>Bristol Dry Lake Evaporites</i> <i>Hector Clay Mine</i> <i>Castle Mountains Mine</i>	21,000
<b>Total</b>	<b>133,800</b>

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** BLM California Geology, Energy, Mineral Resource GIS Data 2013



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### III.15.2.5 Rare Earth Element Areas

Rare earth elements are the 15 elements with atomic numbers 57 through 71, from lanthanum to lutetium (“lanthanides”), plus yttrium (39), which is chemically similar to the lanthanide elements and is therefore typically included with the other rare earth elements. Industrial demand for these elements is relatively small in terms of tons extracted; these elements are essential, however, for a diverse and expanding array of high-technology applications. Rare earth elements containing magnets, metal alloys for batteries and lightweight structures, as well as phosphors are essential for many current and emerging alternative energy technologies including electric vehicles, energy-efficient lighting, and wind power. Rare earth elements are also critical for a number of key defense systems and other advanced applications (Long et al. 2010).

The Mountain Pass Deposit and Mine and Music Valley areas are two high-profile rare earth element sites within the Plan Area:

- The **Mountain Pass Deposit and Mine** is in the northeastern corner of San Bernardino County. The Mountain Pass igneous complex contains a carbonatite body, called the Sulphide Queen, which comprises the bulk of the rare element resources in the area. The Sulphide Queen is the largest known mass of high-grade rare earth element ore in the United States. The Mountain Pass Deposit and Mine was actively mined by Molycorp through 2002, when its permit expired (Long et al. 2010). Molycorp began construction in 2011 to expand and modernize the Mountain Pass Mine facility, also known as Project Phoenix. Active mining of earth elements has recommenced at the facility (Molycorp 2014).
- The **Music Valley** area consists of xenotime deposits, of probable Precambrian age, within the Pinto Gneiss. The Music Valley area is a reported deposit with no current exploration activity. Small-scale exploration of these deposits was conducted during the 1950s to determine levels of radioactivity (Long et al. 2010). The California State Lands Commission is currently processing a mineral prospecting permit to explore for rare earth elements on a State school land section in Music Valley. The Music Valley area was studied by the California Division of Mines and Geology; results were published in 1964. Evans found that the Music Valley area contained U-Thor deposit which was intruded by Palms Granite and Gold Park Gabbro-Dierite and was considered to be of the Precambrian age (Evans 1964). UC Santa Barbara is currently studying the rare earth element origin in metamorphic rocks of Music Valley.

Rare earth element areas within the Plan Area are presented in Table III.15-6 by ecoregion subarea, and illustrated in Figure III.15-3.

**Table III.15-6  
Rare Earth Element Acres Within the Plan Area by Ecoregion Subarea**

Ecoregion Subarea	Total Acres
Cadiz Valley and Chocolate Mountains	2,000
Kingston and Funeral Mountains	25,000
Panamint Death Valley	2,000
Pinto Lucerne Valley and Eastern Slopes	12,000
<b>Total</b>	<b>40,000</b>

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** BLM 2013

### III.15.2.6 Locatable, Leasable, and Mineral Materials

A detailed description of locatable, leasable, and mineral materials is presented in Section III.15.1.1 above. Locatable, leasable (including geothermal), and mineral material areas found within the Plan Area are presented in Table III.15-7 by ecoregion subarea, and on Figure III.15-4.

**Table III.15-7  
Locatable, Leasable, and Mineral Material Acres  
Within the Plan Area by Ecoregion Subarea**

Ecoregion Subarea	Locatable Acres	Leasable Acres	Mineral Material Acres
<i>Cadiz Valley and Chocolate Mountains</i>			
Existing Development	48,000	39,000	100
Foreseeable Development	36,000		6,000
<i>Imperial and Borrego Valley</i>			
Existing Development	47,000		20,000
Foreseeable Development			16,000
<i>Kingston and Funeral Mountains</i>			
Existing Development	63,000		4,000
Foreseeable Development	56,000		5,000
<i>Mojave and Silurian Valley</i>			
Existing Development	9,000		Less than 100
Foreseeable Development	300		200
<i>Owens River Valley</i>			
Existing Development			2,000
Foreseeable Development	3,000		

**Table III.15-7  
 Locatable, Leasable, and Mineral Material Acres  
 Within the Plan Area by Ecoregion Subarea**

<b>Ecoregion Subarea</b>	<b>Locatable Acres</b>	<b>Leasable Acres</b>	<b>Mineral Material Acres</b>
<i>Panamint Death Valley</i>			
Existing Development	6,000		3,000
Foreseeable Development	500		
<i>Pinto Lucerne Valley and Eastern Slopes</i>			
Existing Development	3,000		
Foreseeable Development			
<i>Piute Valley and Sacramento Mountains</i>			
Existing Development	58,000		700
Foreseeable Development	73,000		43,000
<i>Providence and Bullion Mountains</i>			
Existing Development	60,000	32,000	400
Foreseeable Development	67,000		8,000
<i>West Mojave and Eastern Slopes</i>			
Existing Development	5,000		4,000
Foreseeable Development	300		
<b>Total</b>	<b>363,000</b>	<b>88,000</b>	<b>111,000</b>

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** BLM 2013

### **III.15.2.7 Oil and Gas Resources**

Based on review of mining data and BLM information, there are no oil and gas resources within the Plan Area.

### **III.15.3 Mineral Resources in the Natural Community Conservation Plan Affected Environment**

The affected environment for the Natural Community Conservation Plan (NCCP) is the same as described previously for the entire Plan Area. While there are Department of Defense (DOD) lands and tribal lands within the Plan Area, the Plan does not analyze effects on these lands so they are not included in the description of the affected environment.

### **III.15.4 Mineral Resources in the General Conservation Plan Affected Environment**

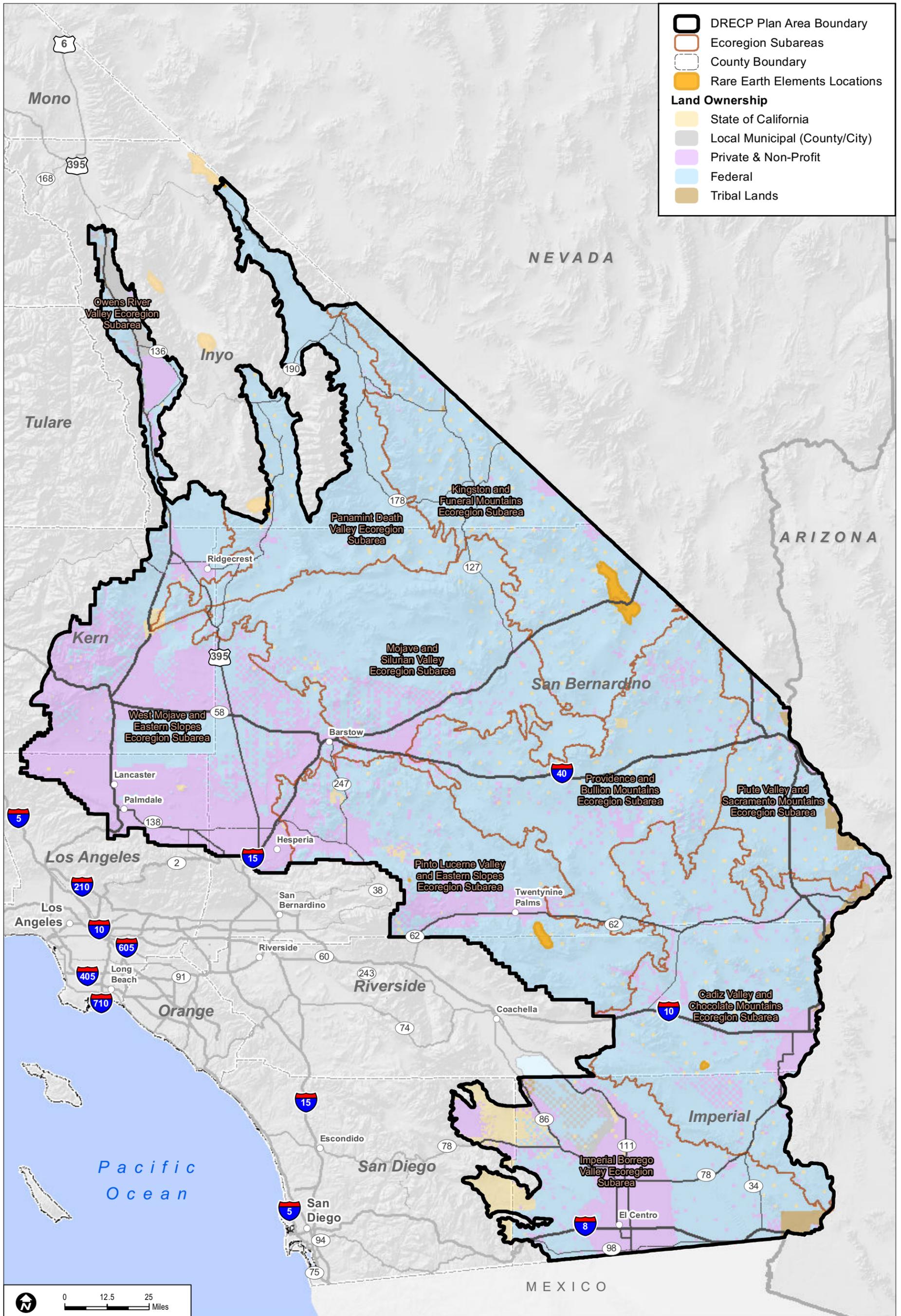
The affected environment for the General Conservation Plan (GCP) includes a subset of the lands covered by Plan-wide analysis and the NCCP. In addition to excluding DOD and tribal lands, the GCP lands exclude all other federal lands (e.g., BLM-administered public lands, national parks). The mineral resources on nonfederal lands have not been specifically identified, but are illustrated in Figure III.15-1 (showing geothermal resources and federal/nonfederal lands), Figure III.15-2 (showing high-priority mineral areas), and Figure III.15-3 (showing rare earth mineral locations).

### **III.15.5 Mineral Resources Outside of Plan Area**

#### **III.15.5.1 Transmission**

Required transmission facilities outside the Plan Area generally fall into four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. Information gathered from four large transmission projects in these areas forms the basis of the following discussion on mineral resources and transmission. This section describes the mineral and oil resources in these areas, including a specific listing of resources within 1,000-feet of either side of the project routes analyzed. The descriptions and analyses are based upon:

- Maps and data from the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.
- The U.S. Geological Survey Mineral Resource Data System.
- The BLM's Legacy Rehost System (LR2000), Land and Mineral Reports.
- Aerial imagery from the California Geological Survey (CGS), previously known as the California Division of Mines and Geology.

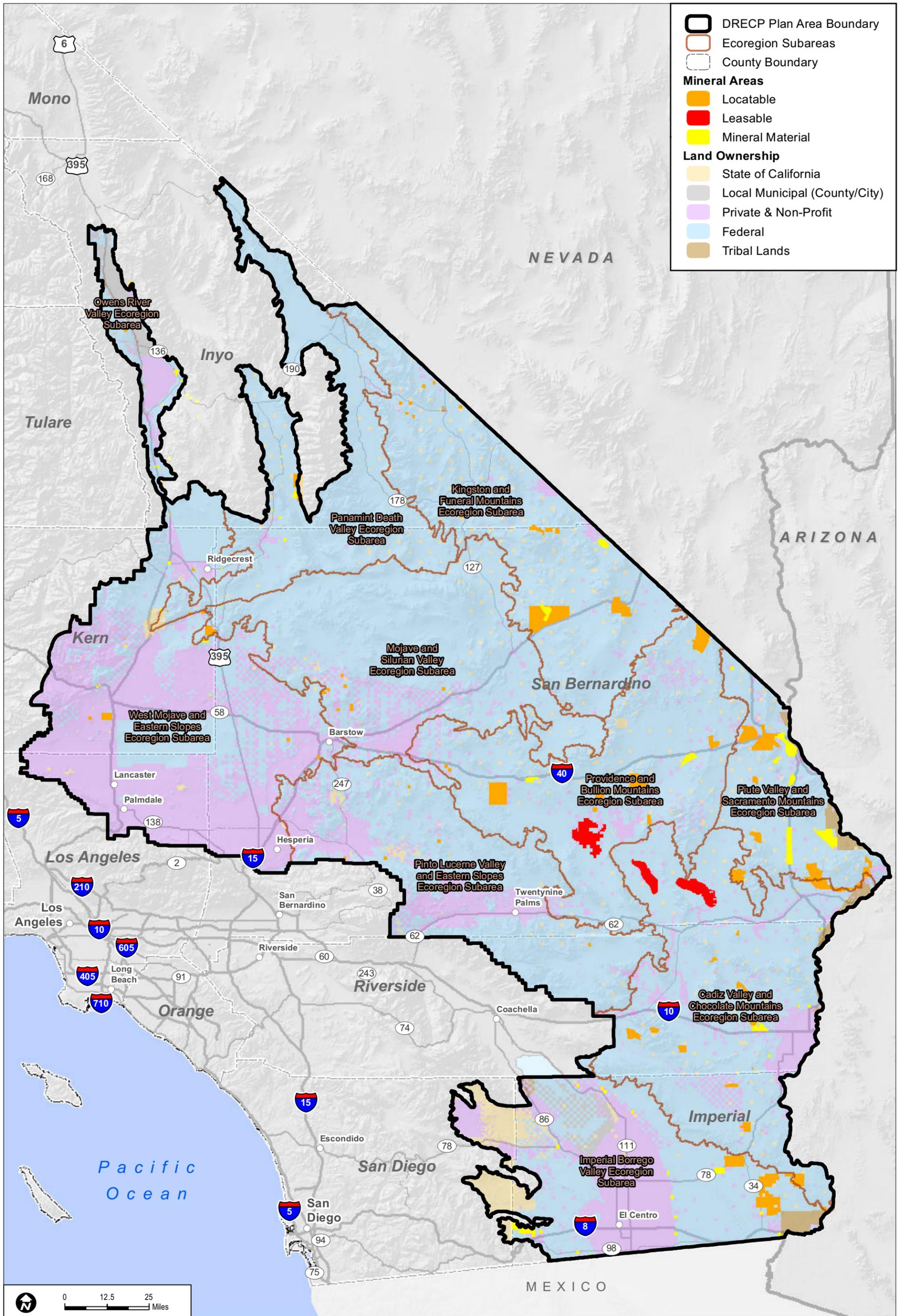


Sources: ESRI (2014); CEC (2013); BLM (2013); CDFW (2013); USFWS (2013)

FIGURE III.15-3

Rare Earth Element Locations within the Plan Area

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Sources: ESRI (2014); CEC (2013); BLM (2013); CDFW (2013); USFWS (2013)

FIGURE III.15-4

Locatable, Leasable, and Mineral Material Areas within the Plan Area

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Table III.15-8 presents an overview of the types and numbers of mineral resources along the transmission corridors outside the Plan Area.

**Table III.15-8  
 Mineral Resources Outside the Plan Area**

Corridor	Regional Mineral Resources	Number of Mineral Resources Along Corridor	Regional Oil Resources	Oil Fields Along Corridor
San Diego	Sand, gravel, gold, phosphorous, tungsten, crushed stone	14	3 wildcat oil wells	None
Los Angeles	Sand, gravel, rock products, clay, gold, copper, tungsten	10	30 active oil and/or gas fields in operation and many small abandoned oil/gas fields in the LA area	1 – Montebello
North Palm Springs–Riverside	Sand, gravel, gold	4	None	None
Central Valley	Sand, gravel	2 (plus 6 small gravel operations)	Coalinga, Coalinga East Extension, Jacalitos, Gujarral Hills, Pleasant Valley, Kettleman Hills, Pyramid Hills	4 – Coalinga, Coalinga East, Gujarral Hills, Pleasant Valley

Sources: CPUC and BLM 2008; CPUC and USFS 2010; CPUC 2001; CPUC and BLM 2006

### **III.15.5.1.1 San Diego Area**

This transmission corridor extends from Ocotillo, in southwestern Imperial County, to San Diego, and roughly follows the existing Sunrise Powerlink corridor westward.

There are metallic and nonmetallic mineral deposits in both San Diego and Imperial counties. The principal minerals in San Diego County are sand, gravel, and crushed and broken stone. Lesser mineral commodities also produced in San Diego County include dimension stone, clay, gem, and other minerals and salts. Imperial County produces a variety of mineral commodities: primarily gypsum, gravel, gold, manganese, pumice, and crushed stone. There are varying amounts of metallic mineral deposits in both counties, primarily in mountainous bedrock areas. Gold, copper, and tungsten are primary metallic minerals (ores) mined in these counties.

Records for mining claims on BLM land were reviewed using land and mineral reports in BLM's Legacy Rehost System (LR2000). No mining claims were found within the San Diego-area corridor. GIS data from the U.S. Geological Survey (USGS) Mineral Resource Data System (MRDS) for Imperial and San Diego counties were reviewed, and mining potential was identified along the Sunrise Powerlink transmission route. These locations were further confirmed and verified through aerial photos.

Fourteen sites on private lands with either mineral occurrences or past or current mining activities were identified in the San Diego area transmission corridor: two sand and gravel quarries; seven gold mines (three producers and four prospects); one occurrence of gold, phosphorous, and tungsten; one past producer of tungsten; and one crushed stone producer. A review of California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) online maps indicates no oil or gas fields in the San Diego area. The San Diego County map shows three drilled wildcat oil wells in the Ocotillo Wells area north of Highway 78 and the Ocotillo Wells Airport. Review of online DOGGR maps shows several geothermal fields in Imperial County near the San Diego area (California Public Utilities Commission [CPUC] and BLM 2008).

### ***III.15.5.1.2 Los Angeles Area***

Transmission corridors extend from Palmdale to the Los Angeles Basin, roughly following segments 6, 7, and 11 of the Tehachapi Renewable Transmission Project (TRTP).

There are metallic and nonmetallic mineral deposits within the Los Angeles area. Metallic mineral deposits are primarily in mountainous areas of exposed igneous and metamorphic bedrock. The nonmetallic mineral resources including sand, clay, gravel, rock products, and petroleum are important state mineral resources that are actively mined in the Los Angeles area.

Both metallic and nonmetallic mineral resources are located in and around the Los Angeles area. Mineral resources in nearby Kern County include limestone and dolomite deposits, which are used primarily to make cement. In Los Angeles County the principal mineral commodities are sand, gravel, and crushed and broken stone. There are metallic mineral deposits in both counties, primarily in mountainous bedrock areas, though there are no active metallic mines in or around the Plan Area.

Ten sites with either minerals or past or current mining activities are located along the TRTP corridor. These sites include three metallic mineral (ore) mines, one mapped ore site, two ore prospects, three sand and gravel quarries, and one crushed/broken stone quarry. Eight of the ten sites are inactive: one ore site, two ore prospects, three past ore (gold) producers, a past gravel quarry, and a past crushed/broken rock quarry. The quarries have been reclaimed and are occupied today by buildings and parking lots. None are listed as

active mines by CGS. The two active sites are sand and gravel quarries in the Irwindale area, the Duarte and Irwindale Pits. The Irwindale Pit contains three adjacent pits (commonly known as Irwindale Pits #1, #2, and #3) owned by the United Rock Products Corporation; two are currently operational.

The Los Angeles Basin contains numerous oil and gas fields; there are more than 30 operational oil and/or gas fields as well as many small abandoned oil/gas fields. California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) online maps show several active and abandoned oil or gas fields in the Plan Area vicinity, including the adjacent Montebello oil field (CPUC and USFS 2010).

### ***III.15.5.1.3 North Palm Springs–Riverside Area***

There are both metallic and nonmetallic mineral deposits in the North Palm Springs–Riverside area. Metallic mineral deposits are primarily in mountainous areas of exposed bedrock. There are no active metallic mineral mines in the vicinity. Sand, clay, gravel, and rock products are important mineral resources in California and still actively mined in the area. The MRDS identified four mineral resource sites within the proposed Devers–Palo Verde No. 2 transmission ROW: two sand and gravel operations and one gold prospect in the Coachella Valley area, and one gold mine on the Palo Verde Mesa. Only the Indio Pit, a sand and gravel quarry in the Indio Hills area, is still operational (CPUC and BLM 2006).

### ***III.15.5.1.4 Central Valley***

The Central Valley transmission corridor extends from Rosamond in the North Mojave Desert to Tracy, roughly following the existing Path 15 and 26 corridors. Mineral resources in the Central Valley area, including petroleum, gypsum, and sand and gravel, have been mined at several locations. The region is also at the center of controversial recent proposals to extract oil from the underlying Monterey Shale Formation through hydraulic fracturing, known as fracking (Sommer 2012; Clean Water Action 2013).

#### ***III.15.5.1.4.1 Petroleum***

There are oil and natural gas deposits in the southern part of the Central Valley area near Coalinga. Exploration for petroleum began in the 1890s near Oil City, about 10 miles north of Coalinga. Since that time, several major oil fields have been developed in the western hills of the Coast Ranges (CPUC 2001). In 2012, annual production in large fields in the area included Midway Sunset (29.3 million barrels), Belridge South (23.6 million barrels), Cymric (13.6 million barrels), Lost Hills (11.0 million barrels), and Coalinga (5.5 million barrels) (CEC 2012; DOGGR 2012).

In 2012, production in other oil fields in the project vicinity included Jacalitos (139,000 barrels), Kettleman City (68 barrels), Pyramid Hills (58,000 barrels), Kettleman Middle Dome (58,000 barrels), Kettleman North Dome (26,000 barrels), and Coalinga East Extension (8,000 barrels) (DOGGR 2012).

While natural gas fields do not produce as much as oil fields, there are several active fields in the area. Natural gas withdrawals in 2012 totaled 2,969,299 Mcf in DOGGR District 4 (Kern, Tulare, and Inyo counties) and 1,747,856 Mcf in District 5 (including Fresno, Stanislaus, Madera, Merced, San Benito counties, as well as other counties east to the Nevada border) (DOGGR 2012).

#### **III.15.5.1.4.2 Sand and Gravel**

Isolated, limited deposits of sand and gravel have been extracted at several small quarry operations within the Central Valley area. These operations are generally in the valleys draining the Diablo Range and are removing recent alluvial deposits from the valley floors. There are operations on Los Banos Creek, Little Panoche Creek, Panoche Creek, Cantua Creek, and at Los Gatos Creek north of the Coalinga Airport. A large pit operation is at the Folsom gravel pit on Los Gatos Creek, one mile north of Coalinga. Most developed and potential sources of aggregate within the Central Valley area have difficulty meeting strict federal specifications for aggregate materials. That is why the Folsom deposits, which do meet the standards, have been extensively developed. Potential aggregate fill and select fine sands sources were previously identified for development in tandem with the Los Banos Grandes Reservoir project. (CPUC 2001). A feasibility report was prepared in 1990, but the proposed project has not been constructed as of 2014.

#### **III.15.5.1.4.3 Gypsum**

Quaternary deposits of impure gypsum have been mined near Los Banos and at other isolated locations along the west side of the San Joaquin Valley. These materials are used in agriculture as fertilizers or soil amendments. No known commercially viable gypsum extraction areas are within the Central Valley area. (CPUC 2001).

### **III.15.5.2 Bureau of Land Management Land Use Plan Amendment Decisions**

Mineral resources found on BLM Land Use Plan Amendment (LUPA) lands within the CDCA boundary but outside the Plan Area are shown in Table III.15-9 below.

**Table III.15-9  
 Mineral Resource Acres for the BLM LUPA Outside the  
 Plan Area—Affected Environment**

<b>Mineral Resource</b>	<b>Total Acres</b>
Known Geothermal Resource Areas	12,000
High-Potential Mineral Areas	174,000
High-Priority Mineral and Energy Locations	2,000
Rare Earth Element Areas	20,000
Locatable Mineral Areas	10,000
Leasable Mineral Areas	
Mineral Material Areas	8,000

**Note:** The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

**Source:** BLM 2013

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