July 2010
REPORT

HYDROGEOLOGY AND NUMERICAL MODELING
MT. HOPE PROJECT
EUREKA COUNTY, NEVADA

EXECUTIVE SUMMARY

INTRODUCTION

Eureka Moly, LLC (EMLLC) is applying for permits to operate an open pit mine and mill at the Mt. Hope molybdenum deposit in Eureka County, Nevada. This base metal resource is world class and would become the largest primary molybdenum mine in the world. The project life is 44 years and includes conventional open pit mining methods, crushing, grinding, and flotation technologies. Roasting will be used to convert molybdenum disulfide into molybdenum trioxide. Approximately 11,300 acre-feet per year (7,000 gallons per minute) of groundwater is required to process the molybdenum ore.

The proposed Mt. Hope project is situated in Eureka County, Nevada on BLM lands, with some private land ownership. The project location is shown on **Figure ES-1**. The proposed Mt. Hope project ("Project") is located east of the Roberts Mountains, near the triple hydrographic basin divide between Diamond, Kobeh, and Pine Valleys. Proposed facilities include the open pit mine, ore and waste stockpiles, crushing plant, grinding mills and flotation facilities, roasters, tailings facilities, wellfield, roads, power lines, and pipeline corridors. A new 230-kV high-tension power line will supply the mine facility from an existing substation located north of Eureka. Proposed facilities are shown on **Figure ES-2**.

For purposes of this report and references to water rights, Eureka Moly, General Moly, and Kobeh Valley Ranch are used interchangeably, unless otherwise specified. References are also made to Idaho General Mines, Inc; General Moly, Inc. is a successor to Idaho General Mines, Inc., and absorbed all its assets in October 2008.

This study describes the existing hydrogeological conditions and uses numerical flow modeling to predict impacts that will result from groundwater withdrawals from the wellfield and open pit dewatering of the proposed Mt. Hope mine. Impacts are projected for three different scenarios:

- The No Action Alternative consists of continued agricultural pumping in Diamond Valley and Kobeh Valley and continued minor amounts of industrial and municipal pumping.
- The Cumulative Action Scenario consists of pumping described above, plus construction and operation of the Mt. Hope mine project, including Kobeh Valley Central Well Field (KVCWF) pumping, construction water supply pumping, and open pit dewatering.
- The Proposed Action Alternative exclusively examines the effect of the Mt. Hope project, which results from KVCWF pumping, construction water supply pumping, and open pit dewatering.

Substantial agricultural groundwater pumping and resulting overdraft has occurred in Diamond Valley. Diamond Valley is the terminus of a regional flow system which includes Kobeh Valley and the Mt. Hope area. Agricultural pumping from both Diamond Valley and Kobeh Valley are included as part of the Cumulative Action Scenario.

HYDROLOGIC SETTING

The mine site and proposed infrastructure are located within the Diamond Valley Regional Flow System (Harrill et al., 1968), which consists of Antelope, Diamond, Kobeh, and North and South Monitor Valleys, and Stevens Basin. These hydrographic basins are connected by surface and/or groundwater flow, and form an internally drained hydrologic system within the Great Basin Physiographic Province. Pine Valley to the north of Mt. Hope is part of the Humboldt River drainage. The Study Area is defined as the Kobeh, Antelope, and Diamond Valley hydrographic basins and the southern portion of Pine Valley, as shown on **Figure ES-1**. Groundwater flowing into Diamond Valley is eventually discharged to springs, lost to evapotranspiration (ET) from phreatophytic vegetation, consumed by pumping for agricultural, municipal, private, or industrial uses, or evaporated at the terminus of the flow system in the Diamond Valley playa.

The proposed Mt. Hope open-pit mine is located in a faulted and fractured metasedimentary complex that has been intruded by rhyolitic rocks. Surrounding country rocks are predominantly sedimentary rocks of the Ordovician Vinini Formation.

The primary aquifer units in the Study Area are valley fill deposits of upper Tertiary and Quaternary age and Paleozoic carbonate rocks that are found in the mountain blocks and underlie the valley fill deposits within the structural basins.

The wellfield that will provide process water for operations is approximately 8 miles southwest of the mine site and is located in north-central Kobeh Valley. The primary source of water is within the valley fill deposits and, to a lesser extent the carbonate rocks. Pit dewatering, a necessity for open pit mine operations, will extract groundwater from both the Kobeh Valley and Diamond Valley watersheds because the open pit mine resides along the hydrographic basin boundaries. The open pit will be excavated in low permeability clastic sedimentary (predominantly shale) and intrusive rocks.

For the hydrographic basins in the Study Area, groundwater recharges the mountain blocks and alluvial fans surrounding the valley floor, flowing from these higher elevations toward the valley floors, where the depth to groundwater becomes shallow. In central portions of the basins where the water table is within 50 feet of land surface, phreatophytic vegetation occurs and is a major consumer of groundwater.

There are no perennial streams on the valley floor of Kobeh, Diamond, Monitor or Antelope Valleys. Slough Creek is an ephemeral drainage at the southeast side of the Kobeh Valley basin which occasionally provides surface flow through Devils Gate to Diamond Valley. Perennial flow occurs in some reaches of Pine Creek and in some streams in the Roberts Mountains.

Springs in Kobeh Valley occur mostly in the mountains with only a few occurring on the valley floor. Most springs in the Study Area are presently understood to be locally recharged. In Diamond Valley, significant geothermal and non-geothermal springs, including Shipley Hot Spring, discharge along the northwestern valley periphery. Springs along the southern portion of the Diamond Valley playa have ceased to flow during the past 2 to 3 decades, as a result of water level drawdown from agricultural pumping in south-central Diamond Valley. In Pine Valley, Tonkin Spring is a major spring resource, situated at the northwestern base of the Roberts Mountains. Several small springs occur in the vicinity of the proposed open pit; the largest discharge occurs from old mine workings.

CURRENT AND PROPOSED GROUNDWATER USE

The Nevada Division of Water Resources (NDWR) has established the perennial yield of Kobeh Valley as 16,000 acre-feet per year (AF/yr). The consumptive use in Kobeh Valley has historically been considerably less than the perennial yield. EMLLC has applied for 11,300 AF/yr of water rights for the project, through change applications for groundwater rights and groundwater applications that have been purchased in Kobeh Valley. These change applications seek to change the manner of use from agricultural to mining/milling and to change the points of diversion from agricultural lands scattered around Kobeh Valley to the proposed Kobeh Valley Central Wellfield. The existing agricultural rights in Kobeh Valley on which the change applications have been filed total approximately 16,131 AF/yr, although actual pumping under those existing rights has typically been less.

Applications for an additional 3,570 AF/yr of agricultural consumptive use water rights have been submitted and are pending in the State Engineer's office. The consumptive use associated with the mining and milling rights and the agricultural rights and applications would be approximately equal to the perennial yield for the basin of 16,000 AF/yr.

NDWR has established the perennial yield of Diamond Valley as approximately 30,000 AF/yr. Diamond Valley is substantially over-appropriated, as agricultural consumptive use totals approximately 55,000 AF/yr. Groundwater resources in Pine Valley and Antelope Valley are not currently fully appropriated.

Three sources of groundwater have been identified to supply the water needs of the project:

- Mine construction water will be supplied by wells located in the vicinity of proposed tailings facilities or west of the proposed south tailings facility in Kobeh Valley. Estimated water demand is 480 AF/yr for 1 year.
- Mine dewatering rate will be variable depending on local-scale hydraulic properties in the area of pit advancement. Estimated quantities of groundwater supplied from pit dewatering over time range from 94 to 742 AF/yr. All of this water will be consumed in mining and milling operations.
- The principal source of water for mining and milling operations will be from the KVCWF wellfield located in Kobeh Valley, about 8 miles from the proposed open pit. Principal source of groundwater will be from valley fill deposits, with some contribution from carbonate bedrock. Estimated water supply from the wellfield will be 10,560 to 11,300 AF/yr, depending on the quantity of dewatering contribution.

A timeline of events associated with the mine water supply and pit dewatering is shown on **Figure ES-3**. The timeline references historical pumping in Diamond Valley and Project events together with numerical flow modeling key periods.

GROUNDWATER MODELING

Two groundwater flow models were developed concurrently: a large regional-scale model, "Regional Model", and a smaller embedded local-scale model, "Local Model", for the vicinity of the mine pit. The Regional Model domain encompasses the Study Area and the Local Model utilizes telescopic mesh refinement (TMR) to separately simulate the smaller area for the proposed mine pit and facilities. Regional and Local model domains are shown on **Figure ES-4**. The refined Local Model grid allows a more detailed simulation of pit dewatering and subsequent development of a pit lake. The Regional Model and Local Model are "coupled" to allow accurate representation of groundwater stresses between the two model domains. Together, the two models are used to predict:

- Regional groundwater level drawdown effects due to construction water pumping, KVCWF mine supply pumping, and pit-dewatering; and
- Local mine area groundwater impacts due to pit-dewatering and pit-lake development.

Model simulations were conducted for projection of drawdown impacts for the No Action Alternative, Cumulative Action Scenario, and Proposed Action Alternative. The Regional Model and Local Model were coupled to evaluate regional-scale impacts from pit dewatering.

SUMMARY OF FINDINGS

Figure ES-5 shows the projected maximum extent of the 10-foot drawdown contour for the Proposed Action Alternative, and includes identified springs, water rights, and wells included within the 10-foot drawdown contour. The contour is a composite of the maximum lateral extent of projected 10-foot drawdown occurring over time.

No measurable detrimental effects would be expected to occur to Diamond Valley from wellfield or mine dewatering pumping. The subsurface outflow from Kobeh Valley to Diamond Valley would not be meaningfully affected, with an estimated reduction in flow of approximately 25 AF/yr at Mine Year 44. Water level drawdown in the agricultural center that could result from wellfield and pit dewatering pumping is not detectable, compared to a total pumping drawdown of up to 70 to 100 feet caused by continued agricultural pumping.

The following are key findings:

- The amount of proposed water use is 11,300 AF/yr and would be less than the perennial yield of the Kobeh Valley basin (16,000 AF/yr)
- Projected drawdown in the KVCWF area at the end of process water supply pumping will be up to 130 feet, and generally ranges from 30 to 100 feet.
- Projected reduction in ET in central Kobeh Valley will be about 4,300 AF/yr due to drawdown in areas of shrub, salt-grass and meadow communities
- Projected drawdown in Diamond Valley resulting from KVCWF pumping is negligible
- KVCWF pumping is projected to reduce groundwater outflow from Kobeh to Diamond Valley by 25 AF/yr at end of the project life
- Pumping from the KVCWF is projected to cause land subsidence in the range of less than 1 foot to 3 feet
- Local Model simulations indicate that inflow to the pit would average 330 AF/yr during dewatering and will be less during pit infill
- A pit lake is projected to form in the mine pit after pit excavation operations cease. Water levels in the lake would rise slowly, approaching equilibrium approximately 1,220 years after mining ceases

- Groundwater levels are projected to remain above the level of the pit lake throughout the model simulation period, which would prevent movement of water from the lake into the aquifer. Thus, for existing climatic conditions, the pit lake is projected to behave as a hydrologic sink with evaporation consuming all precipitation and groundwater inflow to the lake.

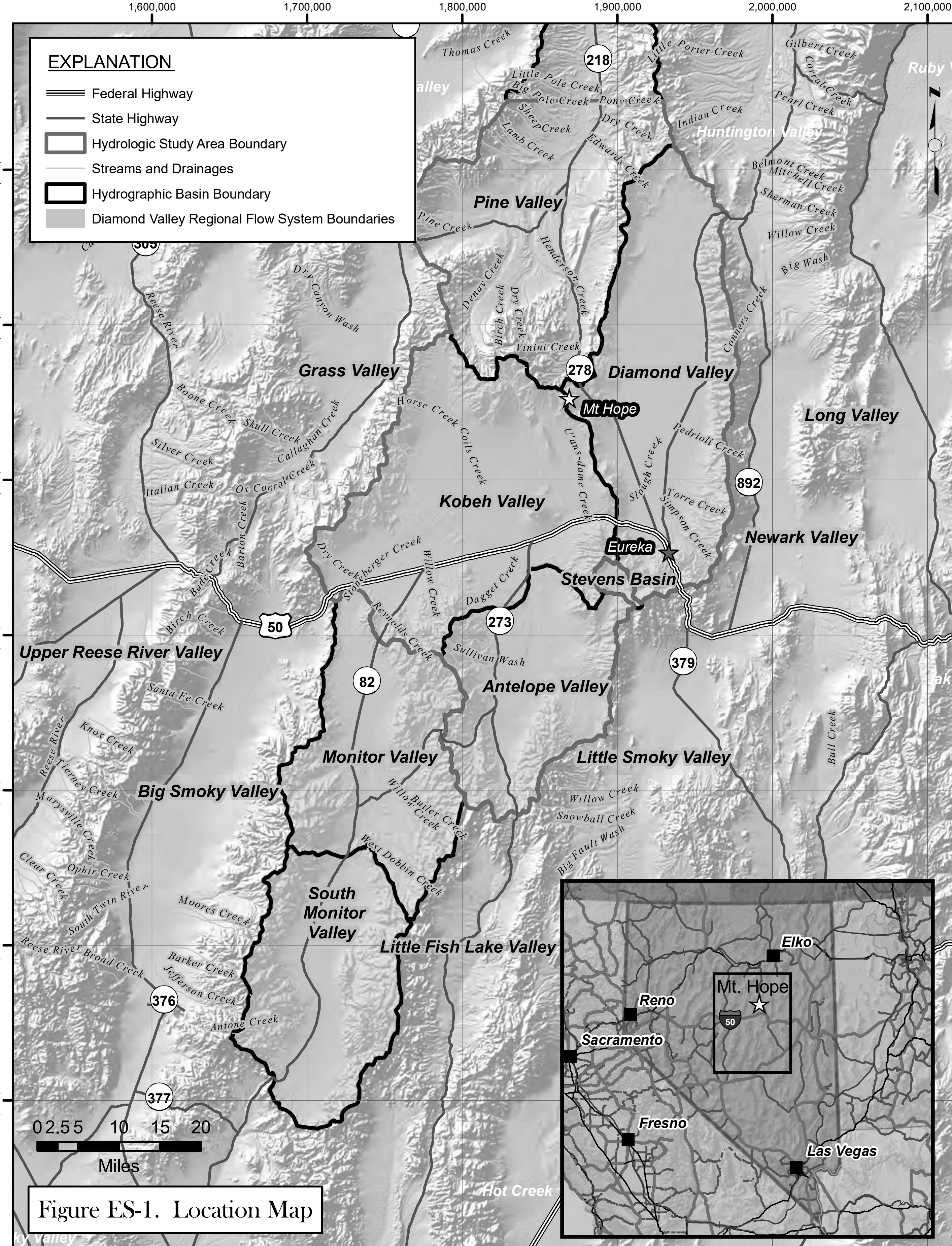
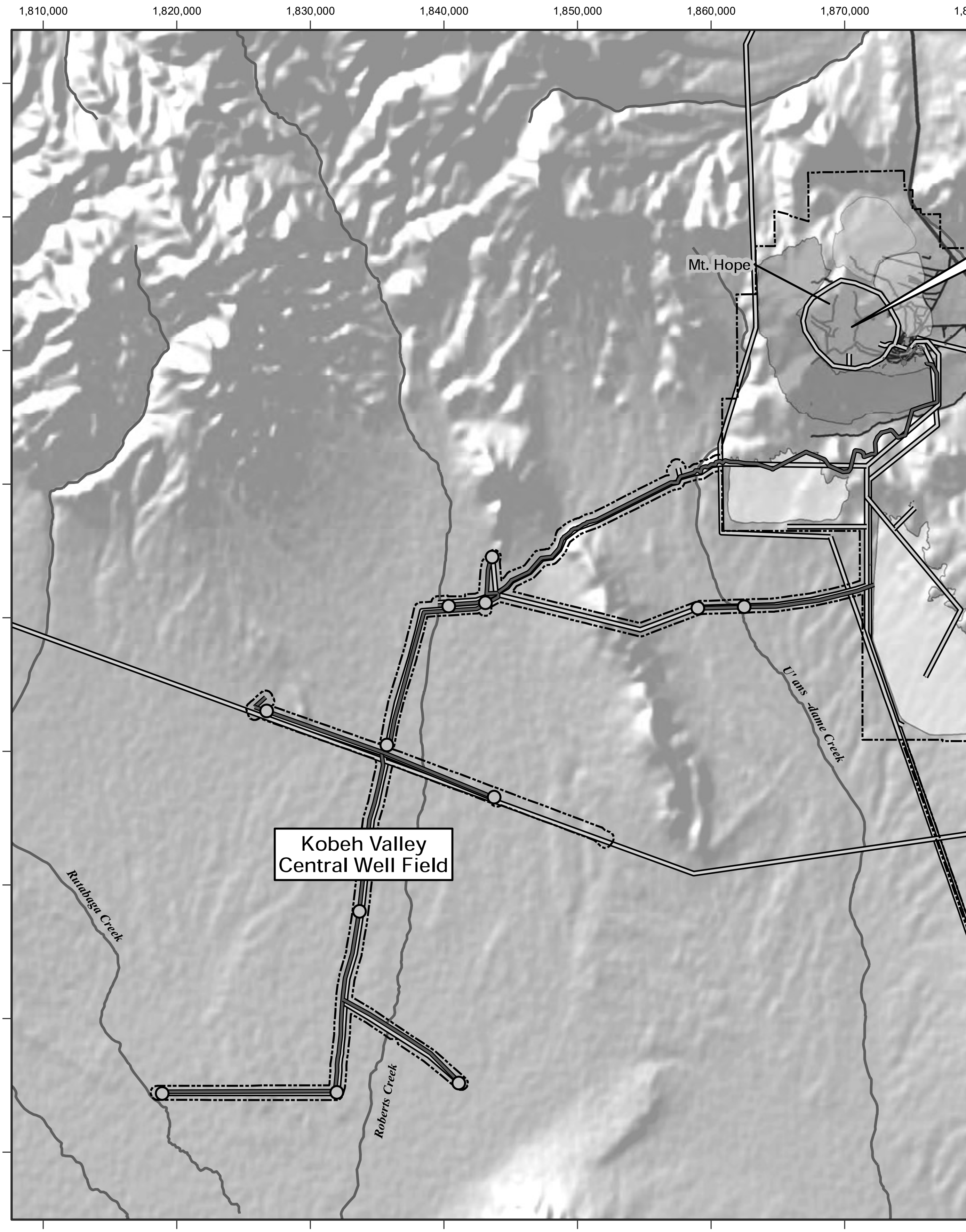


Figure ES-1. Location Map



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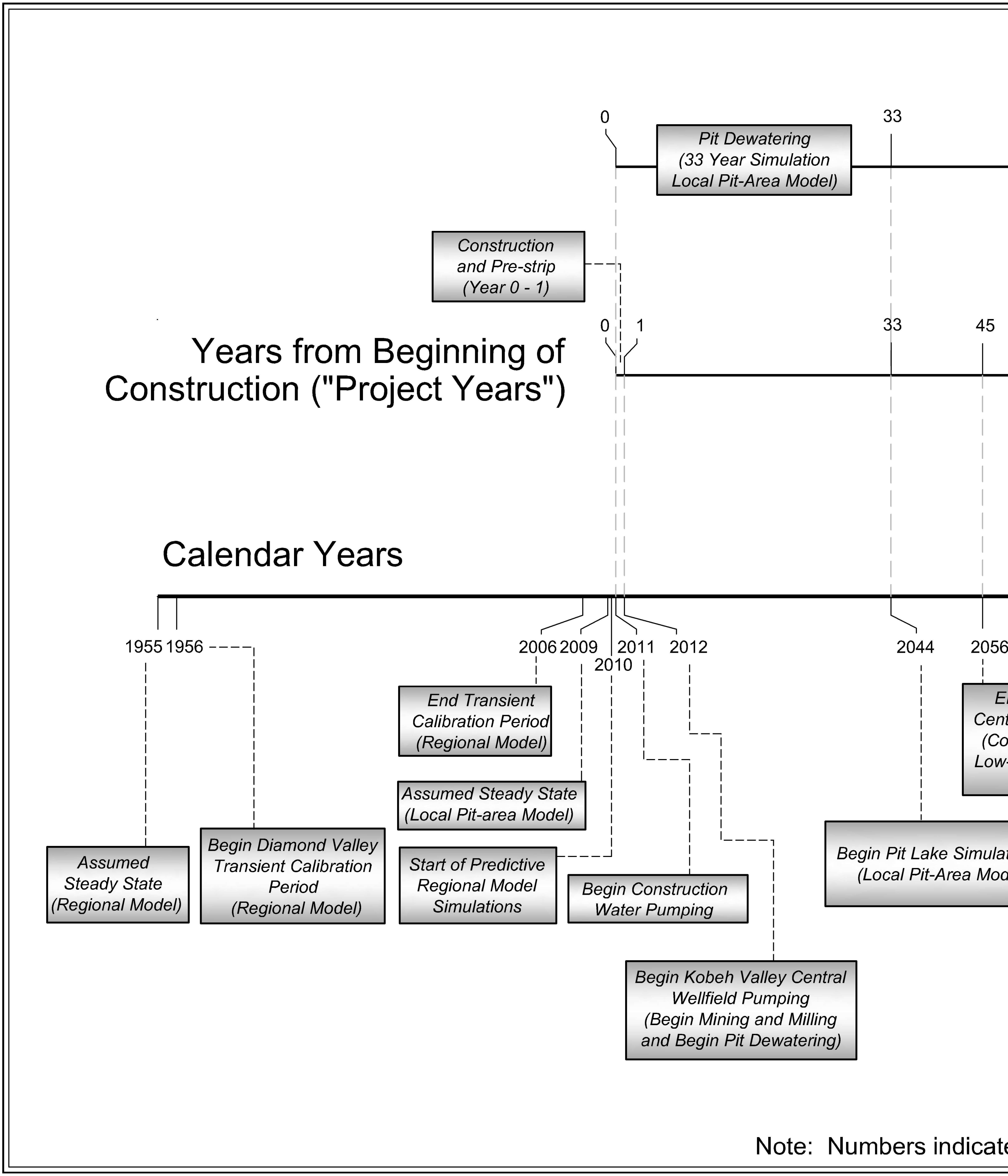

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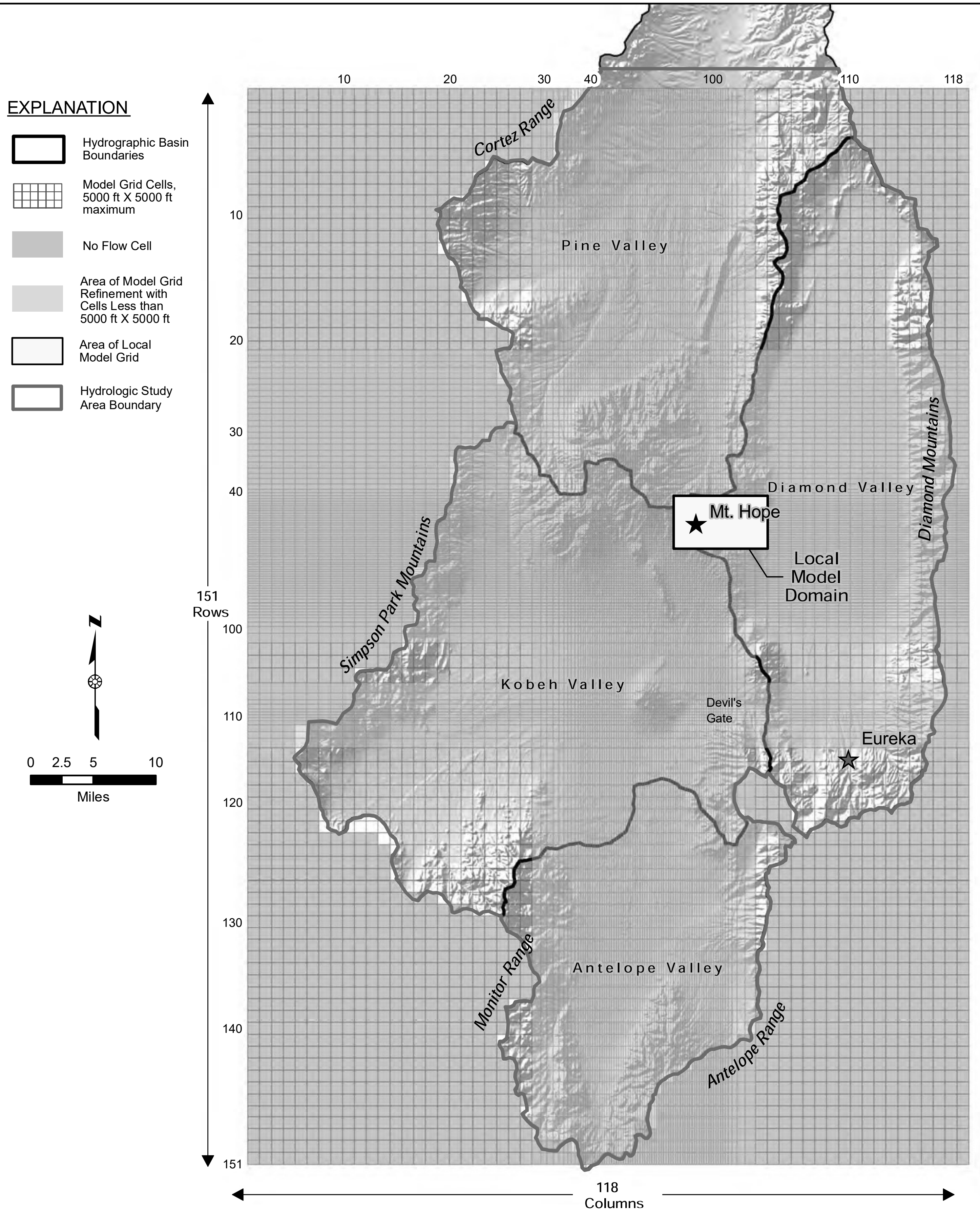

Cells shaded solid green are modeled as no-flow boundaries

Figure ES-4. Location of Regional Model and Local Model Domain

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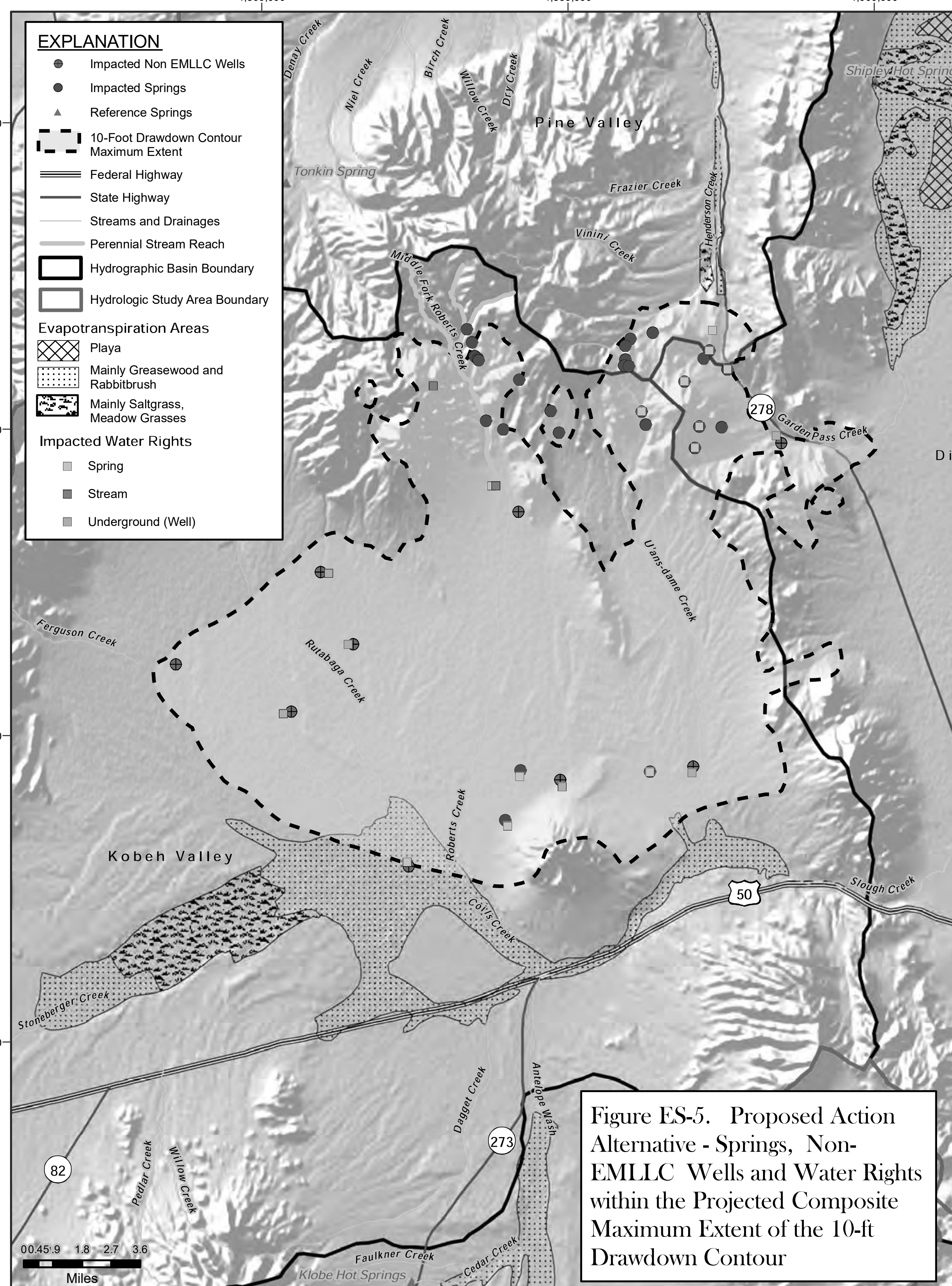

Figure ES-5. Proposed Action Alternative - Springs, Non-EMLLC Wells and Water Rights within the Projected Composite Maximum Extent of the 10-ft Drawdown Contour

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