

Study 28 – Fire Study Work Plan

**FIRE STUDY WORK PLAN
LAKE ELSINORE ADVANCED PUMPING STORAGE PROJECT
(PROJECT NUMBER 14227-003)
RIVERSIDE COUNTY, CALIFORNIA**



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Amec Foster Wheeler Project No.: 1855400727

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ACRONYMS AND ABBREVIATIONS

FERC	Federal Energy and Regulatory Commission
FLA	Final License Application
FRAP	Fire and Resource Assessment Program
GSOB	Gold Spotted Oak Borer
kV	kilovolt
LEAPS	Lake Elsinore Advanced Pumping Storage
NCEP	National Centers for Environmental Prediction
NDFD	National Digital Forecast Database
Nevada Hydro	The Nevada Hydro Company
Nevada Hydro	The Nevada Hydro Company
NIFC	National Interagency Fire Center
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NWS	National Weather Service
ROD	Record of Decision
RWQCB	Santa Ana Regional Water Quality Control Board
USFS	United States Forest Service
USGS	United States Geological Survey
WFAS	Wildland Fire Assessment System

1.0 INTRODUCTION

The Lake Elsinore Advanced Pumped Storage (LEAPS) Project (Project No. 14227) is located in an area that has historically been impacted by wildfires, where wind patterns can potentially exacerbate wildfires, and where recent residential development has occurred along the border of the Cleveland National Forest. These conditions, particularly the recent residential development, indicate that there may be a greater fire risk associated with the staff alternative than was originally analyzed in the 2007 Final Environmental Impact Statement (EIS).

A fire study was requested by the United States Forest Service (USFS) and Decker Landowners to assess the potential impacts of the LEAPS Project on wildfire suppression activities.

This Draft Fire Study Work Plan has been prepared for The Nevada Hydro Company, Inc. (Nevada Hydro) to initiate the completion of a Fire Study (Study 28) requested by the Federal Energy Regulatory Commission (FERC) in a comment letter dated June 15, 2018 (FERC 2018). The purpose of this Draft Work Plan is to outline the methodologies employed while researching this topic and to summarize fire risk findings for this project. This work plan describes existing data sources and methods for interpretation that can be used to describe the existing fire risk at the LEAPS Project site.

2.0 PROJECT DESCRIPTION AND LOCATION

2.1 Objective

The overall objective of the Fire Study is to assess the potential fire risk associated with the proposed LEAPS Project. Specifically, the Fire Study will identify the extent of hazardous fuel loading, fire risk, and potential effects to firefighting efforts that could be affected by the LEAPS Project. This will give FERC and the USFS the opportunity to assess hazardous fuel loading and project infrastructure fire risk as a part of the project's environmental review and the information necessary to recommend design and mitigation measures to reduce biomass on proposed project lands and mitigate for impacts to fire suppression efforts.

2.2 Background

In 2004, the Elsinore Valley Municipal Water District and Nevada Hydro filed an application for an original license with FERC for the construction and operation of the LEAPS Project located in Riverside County, San Diego County, and Orange County. The LEAPS Project is an energy generation and storage project. As originally proposed, the it would occupy approximately 2,412 acres of Federal lands and would include a lined upper reservoir with a dam and dike, an underground powerhouse, and a 500-kilovolt (kV) transmission line linking two existing transmission lines to the north and south of the project area. A staff alternative – consisting of modifications to the original design as requested by FERC and USFS – was also considered in the 2007 Final EIS. The staff alternative included an alternate location for the upper reservoir, which would provide the same usable storage with a smaller total footprint, as well as an alternate alignment for the transmission line to avoid crossing private inholdings in the Cleveland National

Forest (thereby avoiding potential conflicts with fire suppression activities). FERC granted the proposed LEAPS Project a preliminary permit to study the staff alternative on October 24, 2012.

On June 1, 2017, Nevada Hydro filed a Notice of Intent (NOI) to file a license application and a draft license application for the LEAPS Project (Project No. 14227), which had been substantially re-designed to be similar to the staff alternative that was assessed in the 2007 Final EIS. In its NOI, Nevada Hydro requested that FERC's pre-filing licensing requirements (i.e., pre-filing scoping, comments and information, or study requests, the preparation of and comments on a proposed study plan, resolution of disputes over studies, and notice of the Applicant's intent to file a draft license application) be waived to allow it to proceed directly to filing a Final License Application (FLA). FERC staff approved Nevada Hydro's waiver request in September 2017, noting that stakeholders could comment on the adequacy of the FLA during FERC's post-filing procedures.

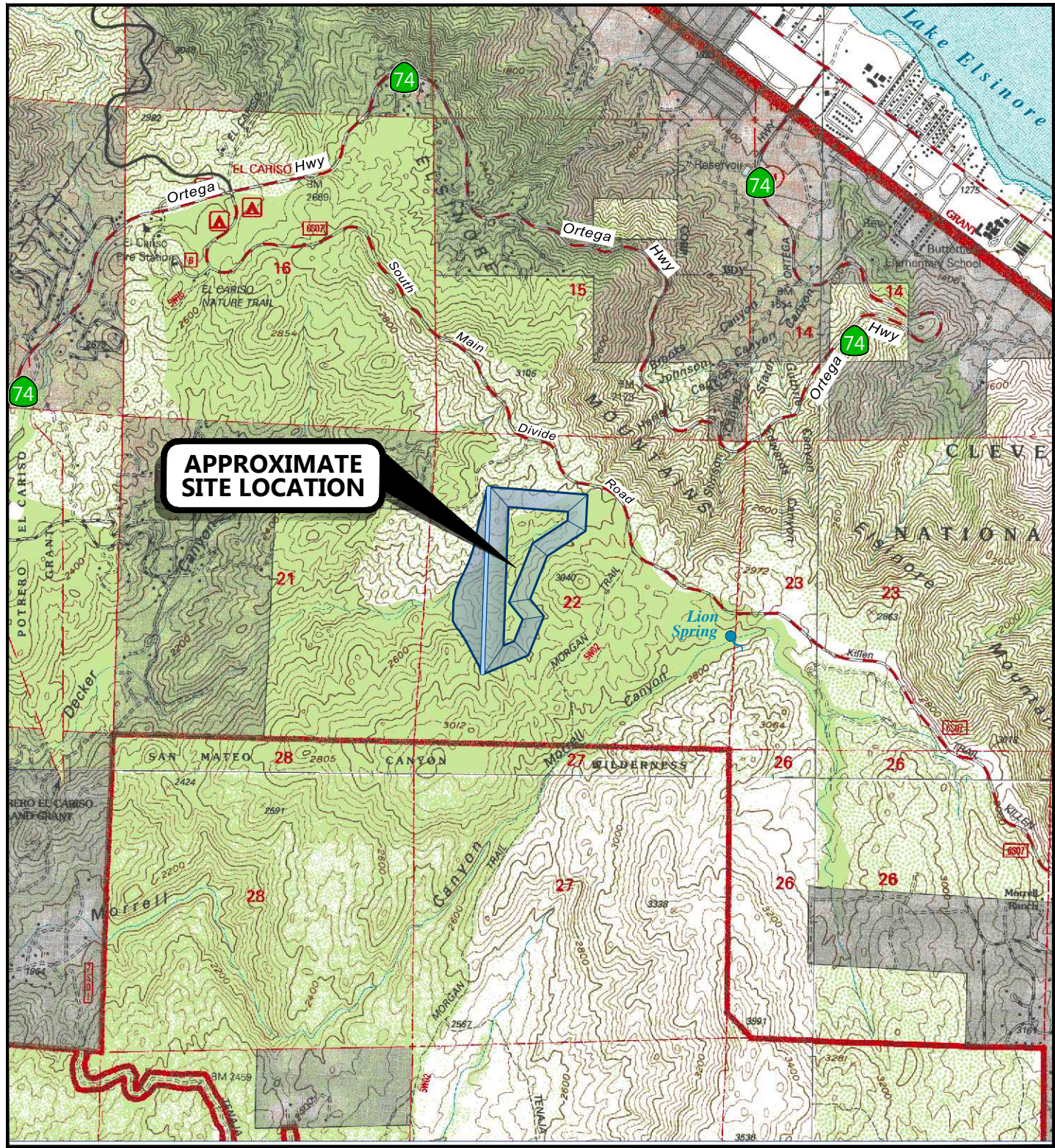
The project presented in the FLA proposes similar facilities and alignments as the staff alternative for Project No. 11858 considered by FERC in the 2007 Final EIS, with a few distinctions. Nevada Hydro is now proposing to develop two separate primary transmission lines. The alignment of the primary transmission lines is similar to the alignment reviewed in the 2007 Final EIS; however, the Case Springs substation has been sited in the Cleveland National Forest, rather than Camp Pendleton. The new substation location was chosen in consultation with USFS after the Record of Decision (ROD) for the 2007 Final EIS for Project No. 11858 was issued.

After Nevada Hydro filed a FLA in October 2017, study requests were filed by Federal and state agencies, Native American tribes, and non-governmental organizations, including USFS, USFWS, California Department of Fish and Wildlife (CDFW), Santa Ana Regional Water Quality Control Board (RWQCB), Temecula Band of the Luiseño Mission Indians, the Decker Canyon Property Owners, EHOFF II Lakeside, LLC, the City of Lake Elsinore, and the Center of Biological Diversity (with San Bernardino Valley Audubon Society, Endangered Habitats League, Audubon California, and Sierra Club). Among the numerous study requests, FERC is requiring that Nevada Hydro complete a fire study.

2.3 Location

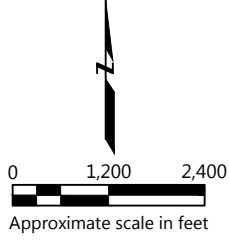
The LEAPS Project is located within an approximately 2,412-acre site located in Riverside County, San Diego County, and Orange County.

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APPROXIMATE SITE LOCATION

REFERENCE:
 U.S.G.S. 7.5 Minute Quadrangle Maps LAKE ELSINORE, ALBERHILL, SITTON PEAK, & WILDOMAR, California, 1997.



SITE LOCATION MAP
 Lake Elsinore Advanced Pumped Storage Project
 The Nevada Hydro Company, Inc.
 Riverside County, California

Notes:

1. All locations are approximate.
2. Dam configuration is conceptual and subject to change.

By: jrw	Date: 07/26/2018	Project No. 1855400727
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Figure **1**

3.0 METHODOLOGY

Our proposed approach and methods for obtaining the information required to perform the fire assessment are outlined in this section, as requested in the June 15, 2018 letter from FERC.

3.1 Assess Available Data

Publicly-available data will be accessed and utilized to provide a complete characterization of the area in and around the LEAPS Project. Additionally, the CAL FIRE Southern Region Riverside Unit as well as Station #10 (Elsinore) will be contacted to gather data regarding response times, available equipment, water sources, etc. Below the discussion of each topic is a bulleted list of agencies or sources for data to be utilized.

3.1.1 Climate

National Oceanic and Atmospheric Administration (NOAA) 1981-2010 Climate Normals will be used describe the existing climate at the Project site (NOAA 2018). This data will provide an overall context for other fire risk factors that will be evaluated in the Fire Study. Further, existing Nature Conservancy climate models (e.g., ClimateWizard) will be used to compare long-term average climate data between 1961-1990 to long-term modeled climate data in 2040-2069, and to assess long-term climate conditions as they relate to fire risk.

MONTH	PRECIP (IN)	AVG LOW TMP (°F)	AVG TMP (°F)	AVG HIGH TMP (°F)
January	3.04	39.3	52.6	65.9
February	2.91	40.9	54.2	67.5
March	1.77	43.4	57.9	72.3
April	0.62	46.8	62.0	77.3
May	0.14	52.4	68.1	83.9
June	0.02	56.6	73.8	91.1
July	0.21	61.9	79.8	97.7
August	0.01	62.7	80.8	98.9
September	0.24	59.1	76.4	93.6
October	0.61	52.3	67.8	83.3
November	0.86	43.5	58.4	73.3
December	2.01	38.2	51.8	65.3

) 1981-2010 Climate Normals (Elsinore Station, El Toro Station)

) ClimateWizard

3.1.2 Topography

Topography influences the movement of air, directing a wildfire's course. Slope is a key topographic feature in fire behavior. The topography of surrounding the LEAPs Project site is highly varied and consists of mountainous regions, large valleys, and high elevation plateaus. Useful sources of topographical data (e.g., U.S. Geological Survey [USGS] topographic maps, geotechnical studies, etc.) will be reviewed to identify areas – in particular, those beneath the transmission line – that are at risk for extreme fire behavior (e.g., canyons, ravines, etc.).

-) USGS Topographic Maps (USGS 1997a, 1997b, 1997c)
-) Available geotechnical studies prepared for the LEAPS Project

3.1.3 Vegetation

Region 5 of the USFS encompasses the entire State of California and provides a variety of publicly available spatial data pertaining to vegetation and fuels for the South Coast (USFS 2018a). This data is provided via the USFS Geodata Clearinghouse (USFS 2018b). CAL FIRE's Fire and Resource Assessment Program (FRAP) also provides a variety of publicly available fuels and fire hazard related mapping and Geographic Information Systems (GIS) data (CAL FIRE 2012) for the State of California. Relevant fuels and vegetation data that will be assessed in the Fire Study includes, but is not limited to the following:

USFS

-) Existing Vegetation: Region 5 South Coast (CalVeg)
-) CAL Veg Ecoregions
-) Ecological Sections: Potential Natural Vegetation
-) Western Bark Beetle Strategy Data
-) Hazardous Fuels Treatment Reduction Areas

CAL Fire FRAP Mapping

-) Surface Fuels
-) Fuel Rank
-) Tree Mortality Mapper
-) California Fire Hazard Reduction Projects

A desktop review of vegetation mapping, surface fuels data, fuels reduction projects, and tree mortality data will be combined with on-site vegetation mapping (conducted at the Project site under separate studies requested by FERC), available fuels models, and descriptions from local fire personnel to form an accurate description of existing fuel types and fuel loads surrounding the LEAPS Project site.

3.1.4 Fire Season and Fuels Moisture

Regional wildfire danger statistics will be derived from the Wildland Fire Assessment System (WFAS) – originally developed by the Fire Behavior unit at the Fire Sciences Laboratory in Missoula, Montana – to define the historical fire season start and end dates, as well as the historic causes of wildfire ignition. The WFAS also provides access to the National Fuels Moisture Database (USFS 2018c), which provides publicly available historical fuel moisture data from a vast network of sampling locations across the country. Additionally, CAL FIRE has a log of historical wildfire activity statistics for the entire state, Redbooks, for each year dating back to 1943 (CAL FIRE 2018). Through the National Fuels Moisture Database, graphs and tables of the fuel moisture for the LEAPS Project area can be viewed on a bimonthly basis and compared across years to develop an accurate summary of historical and projected future fuel moisture fluctuations.

-) WFAS
-) National Fuel Moisture Database
-) Historical Wildfire Activity Statistics (Redbooks)
-) Data from CAL FIRE Southern Region Riverside Unit and Station #10 (Elsinore), as available

3.1.5 Wildfire Danger

Readily accessible Federal, state, and interagency sources will be evaluated in order to summarize wildfire history and wildfire danger in the region. As the foundation of the National Weather Service (NWS) Digital Services Program, the National Digital Forecast Database (NDFD) consists of gridded forecasts of sensible weather elements (e.g., maximum temperature, cloud cover, wind speed, relative humidity, etc.), which can be used to make a determination regarding the level of wildfire danger (i.e., “low”, “moderate”, “high”, “very high”, and “extreme”). The NDFD contains a matrix of digital forecasts as reported by NWS field offices working in collaboration with the National Centers for Environmental Prediction (NCEP).

Since 2007, WFAS has been producing wildfire danger forecasts using data from the National Digital Forecast Database (USFS 2018c). However, overall wildfire danger throughout a region is extremely localized given the varying microclimates, fuels, and topographies that occur over large land areas. Additionally, while the WFAS maintains data on observed wildfire danger across the country, uniform reporting has not yet been achieved. Although some stations report data regularly, other stations report more sporadically, therefore it is not possible to compare wildfire danger ratings at one station or within one particularly region over large expanses of time.

In order to give the most accurate representation of wildfire danger severity, the WFAS will be reviewed for the reporting stations located closest to the LEAPS Project site. Data from stations near the LEAPS Project site will then be compiled and analyzed to give an effective summary of wildfire danger levels for the area on an annual and monthly basis. In addition, this data will also be compared with wildfire activity statistics, provided in the Redbooks, on a regional, county, and

monthly basis in order to provide a summary of the wildfire history for the area surrounding the LEAPS Project site.

CAL Fire's existing mapping of fire hazard severity zones, and fire threat for the State of California will also be taken into consideration when developing summary of wildfire danger levels in the area. CAL Fire defines fire threat as a combination of two factors: 1) fire frequency, or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined to create threat classes ranging from low to extreme. Fire threat will be used to estimate the potential for impacts on various assets and values susceptible to fire. Impacts are more likely to occur and/or be of increased severity for the higher threat classes (CAL FIRE 2012).

USFS

-) Spatial Wildfire Occurrence Data for United States 1992-2015
-) MTBS Burn Area Boundaries

CAL Fire FRAP Mapping

-) Fire Hazard Severity Zones
-) Fire Threat
-) California Fire Hazard Reduction Projects
-) Fire Perimeters

3.1.6 Wildfire Preparedness and Response

The Fire Study will identify existing fire safety measures in the Project area (i.e., local fire plans, fire drills, public training, fire detection systems), control methods, and evacuation/escape procedures. The CAL FIRE Southern Region Riverside Unit as well as Station #10 (Elsinore) will be contacted to gather data regarding response times, available equipment, and water sources as well as to solicit concerns associated with potential impacts to fire suppression efforts (e.g., impacts to aircraft). The Fire Study will describe how the LEAPS Project could support wildfire suppression efforts and service as a basis for the preparation of a Memorandum of Understanding to formalize responsibilities and procedures during a wildfire, including the potential availability of upper reservoir water for firefighting.

3.2 COMPILATION AND REPORTING OF RESULTS

Data obtained during this Fire Study will be presented in a report for submittal to Nevada Hydro, Inc. This report will contain a discussion of objectives, methods used, investigation findings, and a brief QA/QC evaluation. Documentation of data will be summarized in tables and on figures, as appropriate.

4.0 REFERENCES

- CAL FIRE. 2018. Wildland Fire Activity Statistics (Redbooks). Available at: http://www.fire.ca.gov/fire_protection/fire_protection_fire_info_redbooks.
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- USGS. 1997b. 7.5-minute Series (Topographic) Quadrangle, Lake Elsinore, California.
- USGS. 1997c. 7.5-minute Series (Topographic) Quadrangle, Sitto Peak, California.