

## **5.0 KNOWN OR POTENTIAL ADVERSE EFFECTS AND ISSUES, AND PROPOSED STUDIES**

This Section includes three sub-sections. Section 5.1 describes any known or potential adverse effects and issues associated with the Project. Section 5.2 presents the analysis performed by DWR to determine if the existing information presented in Section 4.0 (based on very extensive reference data) is sufficient to address the issues and to inform the development of requirements in the new license. Section 5.3 describes the studies proposed by DWR to gather additional information, if more information is needed. DWR's goals are: (1) to demonstrate that the extensive volume of existing information described in Section 4.0, together with the information to be developed by DWR's proposed studies, are sufficient to describe existing conditions (i.e., the Environmental Baseline), and (2) to assist FERC and others in the development of requirements for the new license.

### **5.1 KNOWN OR POTENTIAL ADVERSE EFFECTS AND ISSUES**

Identification of issues is a key step in the relicensing process because it raises specific concerns or questions that may need to be addressed. Once issues are identified, existing information in Section 4.0 can be assessed for adequacy, and studies needed to augment existing information can be identified.

The issues listed in this Section were developed by DWR based on its O&M of the Project for over 40 years, DWR's review of the existing information, and input from respondents to the Pre-PAD questionnaire that DWR sent to potential interested parties during preparation of the PAD. The questionnaire, which DWR mailed to over 150 separate individuals, agencies and organizations, requested that the party identify: (1) any existing, relevant and reasonably available information regarding the Project and resources potentially affected by the Project in the party's possession; (2) the name of any other party that may have existing, relevant and reasonably available information regarding the Project; (3) a description of any known or potential Project adverse impacts; (4) a description of any specific concerns related to environmental resources associated with the Project relicensing; and (5) a list of any potential studies or information needs the party believes are necessary. DWR received 14 responses to its Pre-PAD questionnaire. Of the respondents, only CDFW, FEMA and EPA identified issues, and only CDFW identified potential studies. The Pre-PAD questionnaire, a list of the parties that responded to the Pre-PAD questionnaire, and a copy of the responses are included in Appendix B.

Based on its own experience in operating the Project for over 40 years, DWR's review of the existing information, and responses to DWR's Pre-PAD questionnaire, DWR identified 33 potential issues. Table 5.1-1 presents the identified potential issues and existing information by resource area and the corresponding study plan recommendation, as necessary. In some instances, DWR combined or re-worded issues identified by respondents to the Pre-PAD questionnaire.

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
<b>AIR QUALITY AND NOISE</b>			
Effects of Project O&M on air quality	Area designation maps for criteria pollutants; Cal EPA 2014 County Development Code; San Bernardino County 2008 Study of net GHG emissions at a new reservoir; Pelletier et al 2009 Assessment of GHG emissions at freshwater reservoirs; United Nations 2008	None. Existing information is adequate to address effects of continued Project O&M, and DWR does not propose any new construction.	None
Effects of Project O&M on noise	County Development Code; San Bernardino County 2008	None. Existing information is adequate to address effects of continued Project O&M, and DWR does not propose any new construction.	None
<b>GEOLOGY AND SOILS</b>			
Effects of Project Operations-related changes in streamflows and stream channel geomorphology, including sediment and large woody material transport, in the West Fork Mojave River	Natural inflows released from Cedar Springs Dam to West Fork Mojave River per 1982 agreement with MWA	None. Existing information is adequate.	None
Effects of Project O&M on sediment and large woody material distribution and recruitment in the West Fork Mojave River due to sediment and large woody material capture in Silverwood Lake	Natural inflows released from Cedar Springs Dam to West Fork Mojave River per 1982 agreement with MWA	None. Existing information is adequate.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
Effects of Project O&M and recreation on soil erosion, slope failures, and shoreline erosion at Project reservoirs	Results of Research and Shoreline Geologic Inspection for Silverwood Lake, Project Geology report No. 57-11-26, November 8, 2011.	None. Existing information is adequate.	None
<b>WATER RESOURCES</b>			
Effects of Project O&M on the quantity and timing of streamflow in Project-affected reaches	Quantity of reservoir flows routinely monitored. DWR Monthly Operations Data 2010 through 2015	None. Existing information is adequate. DWR records flows in streams and through Project facilities, and reservoir stage. DWR does not propose any new construction or changes in existing operations.	None
Effects of Project O&M and recreation use on water quality, including water temperature	Quantity and quality of reservoir flows routinely monitored. DWR published Monthly Operations Data 2010 through 2015; DWR Water Data Library 2010 through 2015; Metropolitan Annual Reports 2010 through 2015	None. Existing information is adequate. DWR collects water quality information routinely.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
<b>FISH AND AQUATIC RESOURCES</b>			
<p>Effects of Project O&amp;M on fish, including special-status species of fish (Arroyo chub and Sacramento hitch) and BMI in Silverwood Lake<sup>1</sup></p>	<p>Natural inflows released from Cedar Springs Dam to West Fork Mojave River per 1982 agreement with MWA. DWR follows agreements with USFS (1971) and CDFW (2003) restricting lake level fluctuations to protect spawning habitat. For special-status fish species, records of Sacramento hitch in Silverwood Lake date back to 1988 and possibly earlier, and recent CDFW surveys indicate presence in each sample year from 1999 through 2010. Arroyo chub has not been documented in the Project vicinity.</p>	<p>None. Existing information is adequate. The Project does not store or use any natural inflow (i.e., inflows to Silverwood Lake). Existing and recent information regarding fishes in Silverwood Lake is available.</p>	<p>None</p>
<p>Effects of Project O&amp;M on AIS introduction into Silverwood Lake and the Mojave River downstream of Cedar Springs Dam<sup>1</sup></p>	<p>DWR has determined that 15 AIS are known to occur or have the potential to occur in the Project vicinity (USGS 2015a, Cal-IPC 2015a, DBW 2015, CDFW 2015a) DWR currently employs an Aquatic Pesticides Application Plan, a Quagga and Zebra Mussel Early Detection Monitoring Program, a Quagga and Zebra Mussel Vector Management Plan, and a Quagga and Zebra Mussel Rapid Response Plan (DWR 2010)</p>	<p>Information regarding the occurrence of AIS in Silverwood Lake will inform the potential for the Project to introduce these species downstream into the West Fork Mojave River.</p>	<p>Aquatic Invasive Species Study</p>
<p>Effects of Project O&amp;M and recreation on the diversity, quantity and composition of fish species in Silverwood Lake<sup>1</sup></p>	<p>CDFW conducts annual trout stocking and has conducted creel surveys in Silverwood Lake since 2000 to assess fish species abundance.</p>	<p>None. Existing information is adequate. Existing and recent information regarding fishes in Silverwood Lake is available.</p>	<p>None</p>

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
Effects of Project O&M on fish spawning and habitat, including the dewatering of fish spawning habitat in Silverwood Lake <sup>1</sup>	DWR follows agreements with USFS (1971) and CDFW (2003) restricting lake level fluctuations to protect spawning habitat.	None. Existing information is adequate. Existing and recent information regarding fishes in Silverwood Lake is available, and the scheduled releases into the West Fork Mojave River are determined by other parties under agreements with DWR.	None
Effects of Project entrainment into the San Bernardino Tunnel of eggs and larval fish on Silverwood Lake angling opportunity <sup>1</sup>	Entrainment surveys were conducted in the Devil Canyon Afterbay by CDFW in 1998. CDFW annually stocks trout and has conducted creel surveys in Silverwood Lake since 2000	None; existing information is adequate. Existing and recent information regarding fishes in Silverwood Lake is available.	None
Effects of Project O&M and recreation on western pond turtle <sup>1</sup>	CDFW 2005 Aspen Environmental Group 2006 and Helix 2014 document western pond turtle in the Project vicinity.	None. Existing information is adequate.	DWR will collect incidental observations of western pond turtle during all relicensing studies.
Effects of Project O&M on western spadefoot and two-striped garter snake <sup>1</sup>	There are seven CNDDDB records of two-striped garter snake in the Project vicinity outside of the Project boundary, all associated with streams, including multiple records from Grass Valley Creek (CDFW 2015). A two-striped garter snake was observed during surveys for the Horsethief Creek Bridge Replacement Project (Aspen Environmental Group 2005). Western spadefoot has not been documented in the Project vicinity (USFWS 2005) (HELIX 2014).	None. Existing information, with incidental observations during relicensing studies, is adequate.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
<b>WILDLIFE AND BOTANICAL RESOURCES WETLANDS, RIPARIAN AND LITTORAL HABITATS</b>			
Effects of Project O&M and recreation on special-status plants, wetlands and riparian habitats <sup>1</sup>	Environmental Science Associates (2014) surveyed the margin of Silverwood Lake.	Information regarding the current occurrence of special-status plants, wetlands, and riparian habitats within the proposed Project boundary is needed.	Botanical Resources Study
Effects of Project O&M and recreation on the spread of NNIP <sup>1</sup>	Environmental Science Associates (2014) surveyed the margin of Silverwood Lake. DWR has been monitoring and treating NNIP in the vicinity of Devil Canyon Powerplant (DWR 2001b, Herzog 2004).	Information regarding the current occurrence of non-native invasive plants within the proposed Project boundary is needed.	Non-Native Invasive Plants Study
Effects of Project O&M and recreation on special-status wildlife <sup>1</sup>	CNDDDB (2015), WHR, CDFW (2015) document special-status species in the Project vicinity.	Information regarding the current distribution of special-status wildlife within the proposed Project boundary is needed.	Special-Status Terrestrial Wildlife Species Study
<b>FEDERAL ENDANGERED SPECIES ACT LISTED AND CANDIDATE THREATENED AND ENDANGERED SPECIES</b>			
Effects of Project O&M and recreation on the ESA-listed arroyo toad <sup>1</sup>	Surveys and habitat evaluations for arroyo toad have been performed within Silverwood Lake SRA and immediately north of the Project outside the Project boundary (Brown et al. 2003, Hitchcock and Fisher 2004, Aspen Environmental Group 2006, USFWS 2009, 76 FR 7245, Helix 2014).	None. Existing information is adequate. Natural inflows to Silverwood Lake are released to the West Fork Mojave River to meet existing downstream water rights and agreements, which dictate water release schedules. Populations of arroyo toad are not known to occur in the Silverwood Lake SRA.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
Effects of Project O&M and recreation on the ESA-listed Mohave tui chub	Mohave tui chub occurred historically in the Project area. However, the species has since been extirpated and is not known to still occur in the Mojave River or its tributaries (USFWS 2009, Cal Fish and Wildlife 2015).	None. Existing information is adequate to indicate that the species does not occur in any areas affected by Project O&M.	None
Effects of Project O&M and recreation on the ESA-listed CRLF <sup>1</sup>	Surveys and habitat evaluations for CRLF have been performed immediately north of the Project (Aspen Environmental Group 2006, HELIX 2014).	None. Existing information is adequate. There are no known populations of CRLF in the Project area and populations that occurred historically have likely been extirpated. Silverwood Lake does not provide habitats suitable for CRLF.	None
Effects of Project O&M and recreation on the ESA-listed SMYLF <sup>1</sup>	Surveys and habitat evaluations have been performed by USGS and others within the Mojave River drainage (Backlin et al. 2003, Aspen Environmental Group 2006, Backlin and Yee 2013, HELIX 2014).	None. Existing information is adequate. There are no known populations of SMYLF in the Project area and populations that occurred historically have likely been extirpated. Extensive surveys for SMYLF by USGS in the Mojave River drainage have not detected this species, and Silverwood Lake does not provide habitats suitable for SMYLF because of the presence of predatory fish.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
Effects of Project O&M and recreation on the ESA-listed California condor	California condor has not been documented to occur in the Project area, and there are no known Project impacts to this species.	None. Existing information is adequate to develop appropriate O&M measures to minimize potential to affect California condor. Although the wild population of the species is slowly increasing, the Project is far removed from release sites, known nests, and roosting sites.	None
Effects of Project O&M and recreation on the ESA-listed coastal California gnatcatcher	Coastal California gnatcatcher has not been documented to occur in the Project area. Existing vegetation maps (USFS 2014) indicate limited potential habitat (i.e., coastal sage scrub and occasionally chaparral) within the Project boundary. Almost all records of this species are at elevations below 2,000 feet. There are no known Project impacts to this species.	None. Existing information is adequate to develop appropriate O&M measures to minimize potential to affect coastal California gnatcatcher.	None
Effects of Project O&M and recreation on the ESA-listed southwestern willow flycatcher and least Bell's vireo <sup>1</sup>	Surveys and habitat evaluations have been performed immediately north of the Project outside of the Project boundary (Aspen Environmental Group 2006, HELIX 2014).	Information regarding the current distribution and suitability of riparian habitats within the proposed Project boundary for breeding southwestern willow flycatcher and least Bell's vireo is needed.	ESA-Listed Bird Species - Southwestern Willow Flycatcher and Least Bell's Vireo Riparian Habitat Evaluations and Surveys Study



**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
Effects of Project O&M and recreation on San Bernardino Merriam's kangaroo rat	San Bernardino Merriam's kangaroo rat has not been documented to occur in the Project area and is potentially present (because of proximity to known habitat, 73 FR 61936) only in that part of the Project area associated with the Devil Canyon Powerplant. There are no known Project impacts to San Bernardino Merriam's kangaroo rat.	None. Existing information is adequate to develop appropriate O&M measures to minimize potential to affect San Bernardino Merriam's kangaroo rat. The Devil Canyon Powerplant area is a developed site, devoid of natural habitat.	None
Effects of Project O&M and recreation on ESA-listed plants <sup>1</sup>	Surveys and habitat evaluations have been performed immediately north of the Project outside of the Project boundary (Aspen Environmental Group 2006, HELIX 2014).	Information regarding the current distribution and suitability of habitats within the proposed Project boundary for ESA-listed plants is needed.	ESA-Listed Plants Study
<b>RECREATION AND LAND USE</b>			
Adequacy of number and types of Project recreational facilities to meet demands and needs over the next license period	State of California recreation planning documents and visitor use information (DPR 2015; DPR 2014; DPR 2013; DPR 2010; DPR 2006) Silverwood Lake trout survey (CDFW 2013); Forest Service land management plan document (USFS 2005c;) and San Bernardino County land use plan documents (San Bernardino County 2007a; San Bernardino County 2007b)	None. Existing information is adequate. DWR collects recreation use information for Project facilities and existing capacity analyses show ample room to accommodate growth over the next license term.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
Adequacy of condition of Project recreation facilities to meet demands and needs over the next license period	State of California recreation planning documents (DPR 2015; DPR 2014; DPR 2013), DWR Creel Surveys (DWR 2015c), and Silverwood Lake trout survey (CDFW 2013)	While DWR believes that all Silverwood Lake SRA facilities are in "good" condition, a comprehensive and detailed condition assessment does not exist. A condition assessment can be built upon updates and inventories in the DWR-submitted recreation plan update in 2016.	Recreation Facility Condition Assessment Study
Effects of Project O&M and recreation on wildfire risks and management	Forest Service land management plan document (USFS 2005a); Silverwood Lake SRA fire restrictions (DPR 2015a); CAL FIRE background information (CAL FIRE 2012); and California fire prevention fee (State of California 2012)	None. Existing information is adequate to characterize risks and management needs.	None
Effects of Project O&M and recreation on access (including angler access) and transportation resources	State of California recreation planning documents and visitor use information (DPR 2015; DPR 2014; DPR 2013; DPR 2010; DPR 2006); and Forest Service land management plan document (USFS 2005c)	None. Existing information is adequate to characterize effects of continuing O&M based on current conditions and use profiles of the same resources under current conditions.	None; however, the condition assessment study will evaluate heavily used dispersed access areas along Silverwood Lake to help inform use patterns.
<b>AESTHETIC RESOURCES</b>			
Effects of Project O&M on aesthetic resources	Forest Service land management plan documents (; USFS 2005a; USFS 2005b; USFS 2005c; USFS 2005d, USFS 2005e; SWP architectural motif memorandum (DWR 1984); and San Bernardino County land use plan documents (San Bernardino County 2007a; San Bernardino County 2007b)	None. Existing information is adequate to characterize effects of continuing O&M based on current conditions as a reflection of future conditions for aesthetic resources.	None

**Table 5.1-1. Identified Potential Issues, Existing Information, and DWR Proposed Studies (continued)**

Identified Issues	Pertinent Existing Information	Identified Data Gap	DWR's Proposed Study to Close Data Gap
<b>CULTURAL RESOURCES</b>			
Effects of Project O&M and recreation on historic properties and unevaluated cultural resources	Ninety various cultural resources investigation reports, site records, historic maps, and other data on file at DWR, the SCCIC, Los Angeles County Library, and various on-line repositories	Information regarding cultural resources potentially affected by the Project is needed.	Cultural Resources Study
<b>TRIBAL RESOURCES</b>			
Effects of Project O&M and recreation on Tribal Cultural Resources	Ninety various cultural resources investigation reports, site records, historic maps, and other data on file at DWR, the SCCIC, Los Angeles County Library, and various on-line repositories	Information regarding Tribal Cultural Resources potentially affected by the Project is needed.	Tribal Resources Study

Note:  
<sup>1</sup>CDFW identified this as a preliminary issue with related information needs and/or potential study.

- Key:
- AIS = aquatic invasive species
  - BMI = benthic macroinvertebrates
  - Cal EPA = California Environmental Protection Agency
  - CAL FIRE = California Department of Forestry and Fire Protection
  - Cal-IPC = California Invasive Plant Council
  - CDFW = California Department of Fish and Wildlife
  - CNDDDB = California Natural Diversity Database
  - CRLF = California red-legged frog
  - DBW = California State Parks, Division of Boating and Waterways
  - DPR = California Department of Parks and Recreation
  - DWR = California Department of Water Resources
  - ESA = Endangered Species Act
  - MWA = Mojave Water Agency
  - NNIP = non-native invasive plants
  - O&M = Operations and Maintenance
  - PAD = Pre-Application Document
  - SCCIC = South Central Coastal Information Center
  - SMYLF = southern mountain yellow-legged frog
  - USFS = U.S. Department of Agriculture, Forest Service
  - USFWS = U.S. Department of the Interior, Fish and Wildlife Service
  - USGS = U.S. Geological Survey
  - WHR = California Wildlife Habitat Relationships

## 5.2 DATA GAP ANALYSIS

For each issue, DWR determined whether existing information presented in Section 4.0 is adequate to define the Environmental Baseline and for DWR, FERC and relicensing participants to assess Project effects and develop recommendations for possible conditions of a new license. Where the existing information is not adequate, DWR identified additional information needed and developed a study plan outline, which is discussed in Section 5.3, to gather the information. Table 5.1-1 presents the identified potential issues and existing information by resource area and the corresponding study plan recommendation as necessary.

In general, DWR found that, in most cases, existing information is adequate to address the issues. This is attributable to two facts. First, the Project is a pass-through of SWP water with few issues. More specifically, of the three Project reservoirs, only Silverwood Lake is located in the lower portions of the West Fork Mojave River drainage, and in that case, natural inflow to Silverwood Lake is passed through to the West Fork Mojave River. Project recreation is associated with Silverwood Lake and facilities are in good condition with recent ADA improvements. The Project recreation facilities are operated and maintained by DPR as a SRA. Second, in most cases, existing information is adequate because DWR and others, such as CDFW and DPR, have collected and continue to collect extensive resource information under the existing license.

## 5.3 DWR'S PROPOSED STUDIES

Given the very limited issues and the wealth of existing information, DWR identified nine studies needed to develop information to augment existing information:

- Aquatic Invasive Species Study
- Botanical Resources Study
- Non-Native Invasive Plant Study
- Special-Status Terrestrial Wildlife Species Study
- ESA-Listed Plants Study
- ESA-Listed Bird Species - Southwestern Willow Flycatcher and Least Bell's Vireo Riparian Habitat Evaluation Study
- Recreation Facilities Condition Assessment Study
- Cultural Resources Study
- Tribal Resources Study

For each proposed study, DWR prepared and included in Appendix J a study plan outline. Each outline includes three sections: (1) a summary of existing information and

additional information to be developed by the study; (2) a description of the study area, methods and analysis; and (3) a statement documenting that the methodology is consistent with generally accepted scientific practices.

Some considerations that apply to each of DWR's proposed study plan outlines are listed below; these are not repeated in each outline.

- Personal safety is the most important consideration of each fieldwork team. Fieldwork will only occur in safely accessible areas and under conditions deemed safe by the field crews.
- The purpose of the study is to gather the information needed to augment existing information.
- If FERC approves DWR's request to utilize the TLP, all studies will begin as early as January 2017.
- The study does not include the development of requirements for the new license, which will be addressed outside the study process.
- Each study focuses on the resource addressed by the study within the proposed Project boundary, but the study area is specific to that resource.
- If required for the performance of the study, DWR will make a good faith effort to obtain permission to access private property well in advance of initiating the study. DWR will only enter private property if such permission has been provided by the landowner.
- DWR will acquire all necessary agency permits and approvals prior to beginning fieldwork for a study that requires them.
- Field crews may make variances to the study plan in the field to accommodate actual field conditions and unforeseen problems.
- DWR's field crews conducting relicensing studies will record incidental records of aquatic, botanical and wildlife species observed during the performance of a study, paying particular attention to ESA-listed, special-status species, non-native invasive species and other pertinent information. All incidental observations will be reported in DWR's DLA and FLA.

To facilitate review of the study plan outlines, DWR has included detailed maps of the Project area in Appendix K.

Some respondents to DWR's Pre-PAD questionnaire identified issues or proposed studies that DWR did not adopt and considers unnecessary. Each of these is discussed below, including the reason why DWR did not adopt the suggestion.

- CDFW identified as a preliminary issue and as a potential study of bird collisions with Project transmission lines, especially with regard to special-status and watch-list species, bald eagle and osprey. Since the proposed Project does not include any transmission lines, this issue and associated proposed study do not have a nexus to the Project and, therefore, no studies are proposed by DWR.
- CDFW identified as a preliminary issue and as a potential study the impacts of passing water from the two Devil Canyon Afterbays on fishes in reservoirs that receive SWP water deliveries from the afterbays. As described in Section 3.2.3.7, SWP water deliveries from the Devil Canyon Afterbay and Second Afterbay is a SWP function, not a function of the Project, with all water withdrawn through one or more of the following non-Project facilities: the Inland Feeder, Azusa Pipeline, Rialto Pipeline, San Bernardino Pipeline, and Santa Ana Pipeline. The effect of these non-Project deliveries on downstream reservoirs is outside the scope of the relicensing. Therefore, this issue and associated proposed study do not have a nexus to the Project and, therefore, no studies are proposed by DWR.
- FEMA identified National Flood Insurance Program floodplain building management requirements. Since DWR does not propose any changes to the Project that would affect floodplains or flood risk to the surrounding area, this preliminary issue does not have a nexus to the Project and, therefore, no studies are proposed by DWR.