Nevada Irrigation District

Memorandum

for the Engineering Committee Meeting of January 17, 2017

TO: Engineering Committee

FROM: Gary D. King, Engineering Manager
Neysa King, Watershed Resources Planner

DATE: November 10, 2016

SUBJECT: **Information – Review Grant related to Hemphill Project**

ENGINEERING

RECOMMENDATION:
The purpose of this item is to review a recent grant received from Fish and Wildlife related to the Hemphill diversion structure project.

BACKGROUND:
The intent of this item is to review a grant that was recently received a grant for Watershed Restoration & Delta Water Quality and Ecosystem Restoration Grant, Fiscal Year 2016-17.

The attached grant will provide additional studies that are not part of the current Kleinschmidt work. We have attached Kleinschmidt's next phase of work to this staff report.

BUDGETARY IMPACT:
No budget impact

GDK

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
1416 Ninth Street, 12th Floor
Sacramento, CA 95814
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

December 20, 2016

Mr. Gary King P.E.
Nevada Irrigation District
1036 W. Main Street
Grass Valley, CA 95945

NOTICE OF AWARD
Watershed Restoration & Delta Water Quality and Ecosystem Restoration Grant Programs, Fiscal Year 2016-17

Dear Mr. Gary King P.E.:

We are pleased to inform you that your proposal, Auburn Ravine-Hemphill Diversion Assessment Phase 2, has been selected by the California Department of Fish and Wildlife (CDFW) for funding through the Watershed Restoration & Delta Water Quality and Ecosystem Restoration Grant Programs Fiscal Year (FY) 2016-17 Proposal Solicitation. This letter serves as CDFW's award of up to $177,042 under the FY 2016-17 and FY 2017-18 State Budget Acts to support this important initiative to further watershed restoration and protection projects of statewide importance.

Please note: 1) you cannot incur any contract costs for work done prior to the execution date of the grant agreement – we anticipate grant agreements being executed no sooner than May 2017; 2) your agreement is not a valid legal document until you receive a fully executed copy, signed by both parties; and; 3) this agreement may be subject to revision or suspension due to continuing budgetary uncertainties, and may be contingent upon the passing of the FY 2017-18 Budget Act.

To expedite the grant process, please also provide the following forms to CDFW as soon as possible.

1. Drug-Free Workplace Certification (STD. 21)
   (http://www.documents.dgs.ca.gov/dgs/fmc/pdf/std021.pdf)

2. Payee Data Record form (STD. 204)
   http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=133955

3. 501(c)(3) Certification (for non-profit organizations)

4. An authorizing resolution from your governing body that confirms its approval of the projects and grant monies (if applicable).

Completed forms should be submitted to:

California Department of Fish and Wildlife
Attn: Keng Saefong, Watershed Restoration Grants Branch
1416 9th Street, Suite 1266
Sacramento, CA 95814

Information provided in your proposal as well as input from CDFW will be used to ensure programmatic compliance with CDFW policies and guidelines set forth by the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1). Your Project Grant Manager John Downs will soon contact you to discuss the process and next steps in implementing the project.

Finally, attached is a copy of CDFW's General Grant Provisions (Exhibit 1.a), which outlines our terms and conditions for entering into a grant agreement and will be attached to the final agreement.

Should you have questions regarding the process, you may contact Matt Wells at (916) 445-1285 or at Matt.Wells@wildlife.ca.gov.

Sincerely,

Helen R. Birss

Helen Birss, Branch Chief
Watershed Restoration Grants Branch

Attachment:

CC:

Tina Bartlett, Regional Manager
North Central Region

Attachment 2. Project Narrative with Instructions

NOTE: Limit 20 pages (excluding References), minimum font size 11. This document is intended to be used as a template for the Project Narrative; all sections are required. Complete each of the elements of the Project Narrative with clear, but detailed answers. This document must have sufficient detail to be used in a grant agreement statement of work (if funded). Text in italics should be removed before submission or use blank template provided at end of this document.

Project Title: Auburn Ravine-Hemphill Diversion Assessment Project Phase 2

Applicant name: Nevada Irrigation District

Project acreage restored, enhanced, or protected:

When implemented, this project will potentially remove an anadromous fish migration barrier on Auburn Ravine that will allow access to 6 miles of headwaters habitat that is further enhanced by seasonal instream water augmentation flows by Nevada Irrigation District.

Executive Summary/Abstract

Auburn Ravine is an important anadromous salmonid tributary to the Sacramento River, at the foothills of the Sierra Nevada. This project is Phase 2 in Nevada Irrigation District's ongoing efforts to support re-establishment of connectivity within this stream. Hemphill Diversion has been identified as a partial salmonid migration barrier on Auburn Ravine, and lies 3 miles upstream of a fish passage project NID successfully completed in 2011. This project proposes to undertake the necessary assessments, including sediment, hydraulic, and fisheries studies, to inform NID's ongoing efforts to develop alternatives for this site. We will also collect baseline water quality data about the site and identify all necessary permits associated with future implementation. By undertaking this planning effort immediately, NID will continue to advance the project schedule as we have already completed an options analysis for the Hemphill Diversion in 2016.

The intent of this project is to evaluate options and support an inter-disciplinary process by a Technical Advisory Group in NID's selection of preferred option, and to inform an Environmental Impact Report (EIR) that will be undertaken by the NID in the future. The proposed tasks will be initiated in 2017 and completed in 2020, and all relevant partners are poised to assist in the successful completion of these tasks. Auburn Ravine is part of a network of smaller tributary streams to the Feather River, and subsequently the Sacramento River, in the Northern Sierra Nevada Diversity Group as established in the Central Valley Steelhead Draft Recover Plan, NMFS. In restoration plans and recovery documents, federal, state and regional agencies have identified Auburn Ravine as having significant fish resources, and with the potential to support higher levels of production after an ecosystem restoration program such as this is implemented.

This proposal will continue a comprehensive planning effort to analyze existing watershed information about Auburn Ravine, including: sediment transport and streamflow data, water quality, fisheries data, recovery planning for Threatened & Endangered species, and consultation and coordination with federal, state and local partners in the development and selection of the preferred alternative. Planning is anticipated to be complete in 2020, at which time NID will be prepared to begin implementation to potentially remove the migration barrier that will open 6-miles of headwater habitat for these anadromous species.

Introduction and Purpose

The purpose of this project is to complete the second phase of studies to evaluate existing conditions as part of the planning process to inform the possible **removal of an anadromous fish passage barrier on Auburn Ravine** where Nevada Irrigation District (NID) operates a diversion structure at the Hemphill site.

This structure has been indicated as a partial impediment to fish passage upstream of NID's facility. The intent of this project is to evaluate options and support an inter-disciplinary process by a Technical Advisory Group in NID's selection of preferred option, and to inform an Environmental Impact Report (EIR) that will be undertaken by the NID in the future. The Options Analysis will include a comprehensive planning effort to analyze existing watershed information in Auburn Ravine, including: sediment transport and streamflow data, water quality, fisheries data, recovery planning for Threatened & Endangered species, and consultation and coordination with federal, state and local partners in the development and selection of the preferred alternative.

Introduction and Need

This project will directly benefit the **California Department of Fish and Wildlife's 2016 Prop 1 Watershed Restoration Grant Program priority objectives of "Protecting and Restoring Anadromous Fish Habitat."** Auburn Ravine is part of a network of smaller tributary streams to the Feather River, and subsequently the Sacramento River, in the Northern Sierra Nevada Diversity Group as established in the Central Valley Steelhead Draft Recover Plan, NMFS. In restoration plans and recovery documents, federal, state and regional agencies have identified Auburn Ravine as having significant fish resources and with the potential to support higher levels of production after an ecosystem restoration program such as this is implemented.

Based on recent fisheries studies completed by the California Department of Fish and Wildlife and a former assessment by Placer County, National Marine Fisheries Service (NMFS), and others, Auburn Ravine supports two anadromous species: steelhead trout and chinook salmon. Steelhead trout are listed as threatened under the provisions of the Federal Endangered Species Act (FESA). Chinook salmon in the Central Valley are listed "species" under the provisions of the FESA and the California Endangered Species Act (CESA). Both of these salmonids are important factors in ecosystem restoration because their habitat, water temperature, and water quality requirements are more restrictive than other native fish species that occur in these watersheds. The Northern Sierra Diversity Group of Steelhead is prioritized in the Recovery Plan, and specifically Auburn Ravine is listed as a potential extant population within this region (*National Marine Fisheries Service. 2009. Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley*

Steelhead. Sacramento Protected Resources Division. October 2009). Many of the Recovery Plan Actions listed on pg. 161 would be advanced through the proposed assessment.

Streamflows in Auburn Ravine are augmented by current water management practices that provide much higher quantity and quality of anadromous fish habitat than would have occurred historically. Auburn Ravine has significantly higher than normal flows annually April through October, and generally cooler water temperatures because of out of basin water transfers into the stream for downstream diversion and use by Nevada Irrigation District (NID) and southern Sutter County. This situation has resulted in Auburn Ravine being recognized as providing greater salmonid habitat in the Sacramento Valley region than it may have provided historically without this water management strategy in place. For this reason, **NID and project partners are investing in assessing and where possible remediating migration barriers on Auburn Ravine. These colder streams will potentially play an increasingly important role for Central and Sacramento Valley anadromous fisheries in the future due to climate change impacts on air and water temperatures.**

Furthermore, Proposition 1 funding is intended for projects that implement three broad objectives of the California Water Action Plan (CWAP):

- More reliable water supplies
- The restoration of important species and habitat
- A more resilient, sustainably managed water resources system (water quality, water supply, flood protection, and environment) that can better withstand unseen and inevitable pressures in the future

By providing multiple benefits, this proposal directly addresses the primary objective of restoring important species and habitats in the CWAP, and co-benefits of such actions may contribute to other CWAP objectives. Our emphasis is on ecosystem restoration (multi-benefit ecosystem and watershed protection and restoration projects). In watersheds around the State, fish and wildlife no longer have access to habitat or enough cold, clean water at key times of the year. In response to these ecological challenges, as well as in anticipation of the effects of climate change, activities to protect and restore the resiliency of ecosystems will help support fish and wildlife populations while sustaining natural ecosystem functions.

This project will have the following benefits when fully implemented:

- *Manage Headwaters for Multiple Benefits:* by protecting and restoring degraded stream ecosystems to assist in natural water management and improved habitat
- *Habitat Restoration, Conservation, and Enhancement:* Implementation of projects to protect, restore, or enhance water dependent (streams, rivers, lakes, and wetlands) habitats (spawning, rearing, migrating) for fish and wildlife.

Project History / Need for CDFW Funds

Auburn Ravine is the focus of ongoing efforts by Nevada Irrigation District and partners to expand anadromous salmonid habitat in the Sacramento Valley area by removing migration barriers using geomorphic design to create self-sustaining streams. The Hemphill Project is phase 2 of this ongoing effort, and lies 3 miles upstream of a fish passage improvement project NID and partners completed in Nov. 2011 on Auburn Ravine near the Highway 65 crossing. The first project successfully rehabilitated passage by restructuring the stream channel into a chute and pool configuration to improve fish passage.

Multiple funding sources were used in Phase 1 for the Auburn Ravine Fish Passage Enhancement Project. NID contributed in excess of $781,000, CALFED $304,000, Placer County $50,000, Bella Vista Foundation $55,000, and Granite Bay Flycasters $10,000. By January 2013, in the first full fall migration season, more than 270 salmon were counted in the one-mile stretch of Auburn Ravine above the NID fish passage project. Project partners and local groups in Auburn and Lincoln were delighted with these results.

Additionally, NID has successfully completed numerous projects using District and public funding to achieve its mission of reliable water supply while acting as watershed stewards in the region. Pertinent projects include: pipeline and reservoir improvement projects; fish passage projects; mercury and sediment demonstration projects; regional water conservation and supply security projects; ongoing public education and conservation program; Forest Management Plan development; and hydroelectric FERC relicensing. These projects are further described on the NID website. NID has developed the internal capacity to successfully complete a wide variety of management practices on the ground, in addition to the ability to contract with technical experts as needed to achieve positive results.

At this time, NID is seeking funding for next steps in Phase 2 after completion of an Options Analysis in 2015. NID funded this recent assessment and design work that was part of an engineering analysis in 2014-2015 to evaluate options to the existing instream diversion structure. In this analysis, the NID Board of Directors identified two alternatives for further study, both of which would potentially eliminate the need for the seasonal diversion dam. NID is seeking assistance for specific studies that have been identified to inform final design, environmental review, and permitting which is to be completed in 2019. At that time NID will seek implementation funding which may be possible through CDFW, National Fish and Wildlife Foundation, or others. Project implementation is expected to begin in 2019.

If CDFW Prop 1 funding is not awarded, NID will continue to work on this priority project, however the pace of the project will be slowed. NID is committed to developing and implementing an alternative that addresses the water management and aquatic habitat goals for the Hemphill site, and the District has invested over $100,000 to date in realizing this goal. Grant funding will aid in continuing the momentum that has been achieved so far.

Goals and Objectives

The goal of this project is to collect geomorphic and fisheries data necessary to advance ongoing efforts to design an alternative that will reestablish year-round connectivity in Auburn Ravine for anadromous salmonids in the Sacramento Valley region.

Objective 1: Oversee Project and Convene Technical Advisory Group to Participate in Planning Process

NID will negotiate and administer the Grant Agreement and all contracts to successfully complete this project. NID will provide ongoing project leadership and management, including convening an inter-disciplinary team of local experts, local, state and federal agencies, and other organizations to act in an advisory capacity for this planning process. The Technical Advisory Group will receive regular updates as contracts are negotiated, work plans designed, and field work initiated. Models, reports and data summaries will be circulated for review and feedback. The Group will meet to review options, inform plans and to identify next steps as the project proceeds towards implementation.

Objective 2: Hydraulic Analysis of Project Area and Pertinent Reaches of Auburn Ravine

In order to evaluate the site and instream conditions and potential response, various alternative configurations of the dam and diversion need to be modeled and evaluated. Working with the Technical Advisory Group, NID will continue work with technical consultants (potentially Kleinschmidt Associates or other to be determined) to develop a study plan, compile site information and hydrologic data, input flow requirements, calibrate the Hydraulic Model (HEC-RAS or other 2D model) and present a report of the results of various options based on modifications to the input variables.

Objective 3: Complete a Sediment Transport Study of Project Area and Adjacent Reaches of Auburn Ravine

Using the same project area as defined in Objective 1, NID will lead the development of a Sediment Transport study, and will engage appropriate technical support as needed to complete this task (potentially with Kleinschmidt Group, or other consultants to be determined). Baseline sediment samples will be taken to characterize the site and adjacent stream reaches, and then the Hydraulic Model will be coupled with a Sediment Transport Model to demonstrate how alternative options and/or diversion configurations may alter channel structure, movement of sediment, and system configuration.

Objective 4: Collect Pre-project Baseline Water Quality Data to Document Baseline Conditions

Prior to initiation of the project, baseline water quality monitoring will be used to document existing conditions, and to establish a pre- and post-project relationship of potential variation associated with the alternative that is selected. Water quality data will be collected to meet State requirements, and will be submitted to the Surface Water Ambient Monitoring Program (SWAMP) and CEDEN databases as required. Water quality, fisheries data and other instream data will be provided to CEDEN and EcoAtlas as appropriate.

Objective 5: Conduct Two Seasons of Salmon and Steelhead Adult and Redd Surveys Above and Below Hemphill Diversion site in Auburn Ravine

Information regarding steelhead presence and habitat utilization in Auburn Ravine is generally lacking. In the past, CDFG electrofishing survey results in 2005 indicate that Auburn Ravine may constitute a probable steelhead spawning area given the presence of very small juveniles during spring (NMFS, 2009). Auburn Ravine, both upstream and downstream of the Auburn Tunnel Outlet, may represent a yearround rearing area for juvenile steelhead, given the presence of both Young of Year and larger juveniles during November, December, and April (County of Placer, 2009). Compared to the historical flow regime, current management practices produce higher flows year-round and more consistent flows during the spring and summer months in Auburn Ravine. Most of the instream flow in Auburn Ravine is water imported from the Yuba River, Bear River, and American River watersheds to meet domestic and agricultural needs in western Placer County and southeastern Sutter County. Current water management practices in Auburn Ravine likely provide cold water habitat for salmonids during time periods which historically lacked cold water habitat (Sierra Business Council 2003).

A recent Monitoring Report by Michael Healy, California Department of Fish and Wildlife, found that Auburn Ravine is unlikely to support adult winter- and spring-run Chinook salmon upstream migration and spawning (CDFW, 2014). The stream most likely provides non-natal rearing habitat, which is common in many smaller tributaries of the Sacramento River. Some migration of Chinook from the Feather River released fish may be occurring, but further study is recommended to determine presence, timing and use by salmonids. Significantly, the rotary screw trap study completed by Healy found different life stages of rainbow trout/steelhead in Auburn Ravine. As Auburn Ravine is designated as critical habitat for Central Valley steelhead, further monitoring is warranted, and efforts to open the stream to anadromy by removal of flashboards and other instream migration barriers is a priority.

This project will further document the salmonid fisheries in Auburn Ravine in order to more effectively achieve the goals of habitat enhancement as recommended in the NMFS Recovery Plan for Sacramento Valley salmonids. Healy's report recommends that follow-up sampling continue, and NID is proposing instream surveys of adults and redd counts in the fall 2017-2018, and fall 2018-2019.

To complete Objective 5, NID will contract with local consulting aquatic biologists to conduct redd and adult salmon and steelhead surveys. Under this task, qualified and permitted aquatic/fisheries biologists will conduct adult and redd surveys to determine numbers of spawning anadromous fish upstream and downstream of the Hemphill Diversion Dam in Auburn Ravine. Surveys and fish estimates will be conducted in accordance with the following protocols / publications: "Protocols for Monitoring the Response of Anadromous Salmon and Steelhead to Watershed Restoration in California" and "Discrimination of Chinook Salmon, Coho Salmon, and Steelhead Redds and Evaluation of the Use of Redd Data for Estimating Escapement in Several Unregulated Streams in Northern California, North America."

The surveys will be divided into two reaches, upstream and downstream of the Hemphill Diversion, with each reach able to be covered by a two person crew in one day (total of four surveyors per day). Based on local experts and previous studies with extensive knowledge of Auburn Ravine, we estimate the survey season will likely start in mid-October and continue into early February. Surveys will be conducted every other week during the survey season, with a total of ten surveys per season. Surveys will be conducted for two consecutive seasons, with

the first surveys beginning in the fall of 2017 and continuing into February 2018. The second survey season will start in the Fall of 2018 and continue into February 2019.

Site Description

The Nevada Irrigation District operates a water diversion facility that includes the Hemphill Diversion Dam on Auburn Ravine. The current concrete diversion dam is located within a low gradient pool-riffle reach of Auburn Ravine. The dam crest is 64 feet wide and 11 feet long, with 6-foot tall concrete abutments. The concrete dam crest is approximately 8 feet above the downstream channel. The face of the dam and channel banks extending 30 feet downstream of the crest have been armored with a mixture of rock and concrete slurry to control scour. Large rock has been placed along the toe of the slurry mixture. On the banks downstream of the concrete slurry, there is rock slope protection (RSP). During the irrigation season, flashboards are added to the top of the dam. The total height of the flashboards is 3.0 feet. The resulting headwater elevation provides sufficient depth at the headgate to obtain the desired diversion rate. The flashboards are generally in-place between April 15 and November 1.

During the high winter flows, the flashboards are not in-place and it may be possible for a few adult salmonids to migrate over the dam. Once the flashboards are in-place, the dam is a barrier to adult and juvenile resident and anadromous salmonids.

Upstream of the dam there is a broad active floodplain along the north side of the channel and a smaller floodplain along the south bank. The channel becomes more incised downstream of the dam and it is uncertain if high flows can access the flood plain. Overbank flows upstream of the dam in 2005/2006 return to the channel along the right (north) bank, causing extensive bank erosion. As a result, NID armored approximately 50 feet of the right bank downstream of the dam with 1- to 2-ton riprap.

Based on recent fisheries studies completed by CDFW and former assessments by Placer County, NMFS, and others, Auburn Ravine supports two anadromous species, steelhead trout and chinook salmon. Steelhead trout are listed as threatened under the provisions of the Federal Endangered Species Act (FESA). Chinook salmon in the Central Valley have four life history strategies (runs) and two of these runs are listed "species" under the provisions of the FESA and the California Endangered Species Act (CESA), while one (fall chinook) is a Federal Candidate species. These species are important factors in ecosystem restoration because their habitat, water temperature, and water quality requirements are more restrictive than other native fish species that occur in these watersheds.

Auburn Ravine flows through a combination of oak woodlands, pines and chaparral. The site lies within the alluvial plane as the ravine drops down into the Sacramento Valley. Grasslands are common in this region, and the soils are mostly decomposed granite. Access is provided via easement on a dirt road to the site off Virginiatown Rd., approximately 2 miles East of the City of Lincoln.

The Hemphill Canal was built by NID in 1935 and a wooden diversion structure was constructed in Auburn Ravine to divert flows into the canal. In 1969, the existing concrete head works of the Hemphill Canal were built and the existing concrete diversion dam was built in 1981. The typical maximum diversion rate is approximately 20 cfs.

Background and Conceptual Models

Auburn Ravine provides limited benefit to Sacramento River populations of anadromous salmonids due to instream migrations barriers and impediments, including Hemphill Diversion. This project seeks to gather needed baseline data regarding stream hydrology, sediment transport, and utilization by target salmonid species to inform future enhancement actions at the project site.

In April 2016, NID completed the Hemphill Diversion Structure Alternatives Analysis (prepared for NID by Kleinschmidt Group, Pittsfield, Maine). This analysis identifies and assesses conceptual alternatives for continuing to provide water to the Hemphill canal with or without the Hemphill diversion structure. Options ranged from a "do nothing" alternative to complete removal of the Hemphill diversion structure, and include mechanical or pumping and non-mechanical options. In this assessment, no detailed consideration as given to environmental issues, such as sediment transport or fisheries, which will affect any design and/or option that is selected. This information is not yet accessible, and we are seeking grant support to complete these studies.

Auburn Ravine is part of a network of smaller tributary streams to the Feather River, and subsequently the Sacramento River, in the Northern Sierra Nevada Diversity Group as established in the Central Valley Steelhead Draft Recover Plan, NMFS. In restoration plans and recovery documents, federal, state and regional agencies have identified Auburn Ravine as having significant fish resources and with the potential to support higher levels of production after an ecosystem restoration program is implemented. Compared to the historical flow regime, current management practices produce higher flows year-round and more consistent flows during the spring and summer months. Most of the instream flow in Auburn Ravine is water imported from the Yuba River, Bear River, and American River watersheds to meet domestic and agricultural needs in western Placer County and southeastern Sutter County (Sierra Business Council 2003).

Fish Passage Criteria

Prior to the 2016 assessment, initial fish passage alternatives developed for the Hemphill Site were limited to use of the "hydraulic design approach." Under the hydraulic design approach, a fish passage facility is designed to provide passage for specific age/size classes of a fish species at all flows from the low to high fish passage design flow. Past experience in this flashy watershed indicate that a passage structure is both a costly alternative, and one that has a relatively high failure potential. For this reason, new alternatives are being considered that would potentially remove instream structures to allow for natural flow and migration.

At this time we propose assessment activities to collect baseline information to further evaluate the two favored options that include removing instream structures to create a preferred stream reach, and more self-sustaining project at this site. The recently completed Options Analysis undertaken by NID and technical consultants will be instrumental in this process of designing and implementing a project to address passage requirements at various lifestages for both chinook salmon and steelhead trout.

Conceptual Model- a phased approach to promote adaptive management

A. Phased Strategy for Success

This project has adopted a phased approach that was initiated by NID with a downstream gaging station fish passage project on Auburn Ravine at the Highway 65 crossing. NID will now collect the information to inform and select the best available approach to modifying the Hemphill Dam Diversion Structure. By phasing this work, NID is better positioned to develop a working understanding of how the stream operates and behaves based on pre-, during and post-project data collection of sediment, stream flow, water quality and fisheries parameters.

This project proposes to collect necessary sediment and hydraulic data about stream flows and geomorphology in Auburn Ravine in order to better characterize the site and the conditions of the aquatic ecosystem. The fisheries guidelines provide by state and federal resource agencies will be used in modeling to evaluate the spectrum of options to be considered. Additionally, two years of salmonid surveys and redd counts will be completed to further document actual presence and use by salmonids both at the site and in adjacent reaches.

This methodology is based on the premise that additional information about stream hydrology and sedimentation will inform project design to reduce immediate and long-term impacts on the aquatic ecosystem during construction with increased long-term success.

B. Stakeholder Involvement and Collaboration

NID will convene an inter-disciplinary Technical Advisory Group to participate in planning and design selection during this project. Placer County, the City of Lincoln, California Department of Fish and Wildlife, the Department of Water Resources, U.S. Fish and Wildlife Service, National Marine Fisheries Service and local organizations will be involved as NID develops the site characterization, and physical and biotic descriptions of Auburn Ravine in the study area. This team-based approach will ensure that the best available science and expertise is included in the project development process. Contractors will be selected based on the experience, expertise and the innovation they demonstrate.

C. Adaptive Management and Monitoring

NID will employ adaptive management to address the inherent uncertainty of implementing projects in active aquatic environments with multiple benefits associated with fisheries improvements and provision of secure water supply. NID will regularly inspect the facility for performance and change throughout the year, and after highflow events. An Adaptive Management Plan will be incorporated into the longterm Maintenance and Monitoring Plan that is developed after an alternative is selected and implementation begins.

D. System-wide Watershed and Population Monitoring of Salmonids

NID will work with state and federal resource management agencies as they monitor the status of the Sacramento Valley Chinook and Central Valley Steelhead populations. NID will continue to provide support to more fully understand the significance and importance of Auburn Ravine and other tributary streams in the goal of recovery of these species. This project will further inform managers about the suitability of Auburn Ravine as natal and non-natal habitat, and

address the next steps identified by the most recent fisheries studies completed by California Department of Fish and Wildlife (2014).

Approach and Statement of Work

This project will collect baseline data and provide a forum for the selection and preliminary design of an alternative to the current dam and diversion structure on Auburn Ravine at the Hemphill site. A Technical Advisory Group will be convened to review and participate in the options analysis, and to support NID as it proceeds with selection and planning required to initiate the environmental permitting process.

NID has the expertise and the experience necessary to function as fiscal lead and project manager, with staff and equipment needed to complete this project. Founded in 1921, NID has been operating for almost 90 years as an independent special district operated by and for the people who own land within its 287,000-acre boundaries. NID provides service in an expansive geographic area that makes the district one of the largest in the State of California. The district is organized primarily to supply water for irrigation, municipal, domestic and industrial purposes. NID water is available in wide areas of Nevada and Placer counties; the district also has storage and distribution facilities in Sierra and Yuba counties. NID collects water on 70,000 acres of high mountain watershed, and owns and operates an extensive reservoir and canal system. With this comes a network of water treatment plants and distribution pipelines. The district produces hydroelectric energy and provides outdoor public recreation. As a local public agency, NID operates under the California Water Code. NID board meetings are conducted in public and the district's records are open to public inspection during normal business hours.

Current tenure of capital improvement programs includes $250 million dollars, with an average of $12 million per year. NID has 175 employees, and 22,000 agriculture and treated water customers. NID operates seven water treatment plants and seven hydroelectric power plants. In addition, the district maintains and manages 10 reservoirs with 280 acre-feet of storage. The district also maintains and manages 400 miles of canals and 300 miles of pipelines.

Task 1, Grant Administration will be completed by Dr. Gary King, P.E. and NID staff as the Project Management and Administering Party for this Grant Agreement. NID will prepare quarterly invoices and progress reports to be submitted to CDFW, in addition to draft, final, and annual reports as described in the Scope of Work. NID will secure contracts with all contactors and oversee completion and compliance with all agreements.

Task 2, NID will convene the Technical Advisory Group, and ensure all data is collected pursuant to required protocols, and submitted to state and federal databases and clearinghouses. NID will keep all financial records in auditable form for the specified period of time.

Task 3, Hydraulic Analysis and Modeling will be developed and completed by Kleinschmidt Group, under the supervision of NID Managing Engineer, Dr. King.

Task 4, Sediment Transport Study, will be developed and completed by Kleinschmidt Group or other consultants to be determined by NID Managing Engineer, Dr. King. This component is to be further delineated as the Options Analysis and Hydraulic Model are refined.

Task 5, Baseline Water Quality Monitoring, will be completed by Kleinschmidt Group or other qualified consultants, under the supervision of NID Managing Engineer, Dr. King.

Task 6, Fisheries Surveys, will be completed by Kleinschmidt Group under the supervision of NID Managing Engineer, Dr. King.

Task 3,4, and 5 Detail: Hydraulic Analysis, Sediment Transport Study, and Water Quality Monitoring

Flow data from gages and field measurements will be complied with a sediment transport study to fully characterize Auburn Ravine. Sediment analysis will include sampling the impounded area behind the dam to evaluate the extent and volume of sediment present. Physical and chemical sampling of sediment will be completed to define soil characteristics and movement if the dam is removed. Additional analyses will be conducted to determine chemical characteristics of the sediment, and to determine if it contains mercury or other constituents of concern. The potential project area has been thoroughly characterized by Kleinschmidt Group as part of the 2016

Task 6 Detail: Fisheries Survey, Data Analysis and Reporting Summary

NID will contract with local consultants to conduct redd and adult salmon and steelhead surveys. Various local organizations have worked in Auburn Ravine and other foothill streams for decades. Under this task, qualified and permitted aquatic/fisheries biologists will conduct adult and redd surveys to determine numbers of spawning anadromous fish upstream and downstream of the Hemphill Diversion Dam in Auburn Ravine.

Surveys and fish estimates will be conducted in accordance with the following protocols / publications: "Protocols for Monitoring the Response of Anadromous Salmon and Steelhead to Watershed Restoration in California" and "Discrimination of Chinook Salmon, Coho Salmon, and Steelhead Redds and Evaluation of the Use of Redd Data for Estimating Escapement in Several Unregulated Streams in Northern California, North American."

The surveys will be divided into two reaches, upstream and downstream of the Hemphill Diversion, with each reach able to be covered by a two person crew in one day (total of four surveyors per day). Based on past surveys and best methods, conducting critical riffle, temperature and PhabSim surveys and modeling, we estimate the survey season will likely start in mid-October and continue into early February. Surveys will be conducted every other week during the survey season, with a total of ten surveys per season. Surveys will be conducted for two consecutive seasons, with the first surveys beginning in the fall of 2017 and continuing into February 2018. The second survey season will start in the Fall of 2018 and continue into February 2019.

Target Species and Lifestages

For the Hemphill Diversion Dam, the target species for upstream passage are Chinook salmon and rainbow/steelhead trout. Because juvenile Chinook salmon begin migrating downstream towards the ocean shortly after emerging from the gravels, only the adult lifestage of Chinook salmon requires upstream passage. For rainbow trout, upstream passage should be provided for juveniles and adults, including both the adult resident (rainbow trout) and adult anadromous (steelhead) life histories of the species. Potential entrainment of juvenile salmonids and opportunities to exclude or block at facility inlets will be incorporated into the design process.

Conclusion

This project will advance the goal of re-establishing connectivity in Auburn Ravine for anadromous salmonids in the Sacramento Valley region. The proposed assessment and review process will provide biological and environmental information needed to guide NID and the Technical Advisory Group in selecting an alternative for this site. The final project report for this grant will summarize the results of the Hydraulic and Sediment Analyses for the preferred alternative(s), fisheries surveys, and include a scope of work and schedule for future project implementation. NID is committed to completing this phase of the Auburn Ravine restoration effort to improve anadromous salmonid habitat while upgrading current facilities and diversion structures. After these efforts are undertaken, a plan for achieving the project goals will be complete and NID will be prepared to seek grant funding to match its own investment to realize the project in a timely manner.

Feasibility

NID currently has all necessary easements and agreements in place for site maintenance and access, and to support the recent field surveys and data collection completed in 2016. The proposed tasks will be facilitated with these existing agreements. This project is a follow-up effort in a multi-phased approach to treating migration barriers in Auburn Ravine. NID has many successful decades of project management, implementation and engineering experience, and is currently administering an $8.1 million Proposition 84 Drought Grant from the Department of Water Resources for the Consumnes, American, Bear, Yuba (CABY) Integrated Regional Watershed Planning group. In this program, NID is responsible for both project related tasks and overall grant reporting and invoicing. Other pertinent projects include: pipeline and reservoir improvement projects, fish passage projects, mercury and sediment removal demonstration projects, ongoing public education and conservation program, Forest Management Plan development, and hydroelectric FERC relicensing. NID has the expertise and experience necessary to function as the fiscal lead and project manager, with staff and equipment needed to complete this project. NID is an independent special district operated by and for the people who own land within its 287,000-acre boundaries. Current tenure of capital improvement programs includes $250 million, with an average of $12 million per year.

Participants in the project include NID (the landowner), local, state and federal agencies, and NGOs, including Friends of Auburn Ravine and Auburn Ravine Preservation Committee. As the Grantee, NID will authorize all work, establish contracts, provide information as needed throughout project administration, and fund its share of grant-related activities. The contract

with the California Dept. of Fish and Wildlife will be administered by NID staff who will provide regular progress reports, invoices, grant reports and oversight for the successful completion of all deliverables associated with this grant agreement. Specifically:

- Gary King, Chief Engineer will negotiate contracts, and provide ongoing involvement and oversight of all NID related activities; and NID staff, including engineers and the Watershed Resources Planner, will supervise all contractors and process all invoices necessary to provide accurate reporting and records as required for the receipt and disbursement of public funding;
- Kleinschmidt and Assoc., and other consultants, will be complete technical tasks as needed, with the oversight of NID staff at all times.

Climate Change Considerations

NID is undertaking watershed planning that includes the Auburn Ravine-Hemphill Diversion studies in response to current conditions and California's recent drought, which may be due to climate change. One of the predicted effects of climate change is drought, and warming temperatures that will result in more precipitation as rain, and less as snow. This trend will likely result in increasing system stressors on anadromous fisheries in the Sierra Nevada foothills, including Chinook salmon and Steelhead trout in the Sacramento River watershed, and water management will continue to play a crucial role in the future of anadromous fisheries in the state.

Augmented water flows are significant to both current conditions and the long-term management of Auburn Ravine. Annually, Auburn Ravine has significantly higher than normal streamflow in April through October, and generally cooler water temperatures because of out of basin water transfers into the stream for downstream diversion and use by Nevada Irrigation District (NID) and southern Sutter County. This situation has resulted in Auburn Ravine being recognized as providing greater salmonid habitat in the Sacramento Valley region than it may have provided historically without this water management strategy in place. For this reason, NID and project partners are investing in assessing and remediating the migration barrier as colder streams will potentially play an increasingly important role for Central and Sacramento Valley anadromous fisheries from now on due to climate change impacts on air and water temperatures. Additionally, NID is currently working on upper montane meadow restoration to add incremental seasonal precipitation retention to counteract the rapid run-off resulting from rain versus snow precipitation.

Schedule & Deliverables

This project will provide the following multiple benefits to the Sacramento Valley Region in Placer County:

1. Climate change response actions: Project will open additional upstream habitat for anadromous salmonids in Auburn Ravine and re-establish connectivity of upper watershed stream reaches.

2. Drought Preparedness: Project will reconfigure instream structure to achieve goals for water reliability and fisheries enhancement.

3. Water quality: Project will collect baseline water quality data to document current conditions in Auburn Ravine.

4. Expand environmental stewardship: Project will advance partnership efforts to improve aquatic and salmonid habitats in Auburn Ravine by involving Nevada Irrigation District, Placer County, local, state and federal resource agencies, and NGOs in this process via the Technical Advisory Group.

5. Increase habitat for T&E species: Project will aid in the National Marine Fisheries Services' Recovery Plan implementation for Sacramento Valley chinook salmon and Central Valley steelhead; and the Department of Fish and Wildlife's priorities for the region.

6. Reduce species survival stressors: Project will remove anadromous passage barriers and address existing diversion structure to eliminate entrainment potential for juvenile salmonids.

In summary, this project will provide measurable, long-term benefits to the Auburn Ravine aquatic ecosystem, and will advance management strategies in this tributary to the Sacramento River. This information will assist state and federal resource agencies as they implement programs to benefit Central Valley Steelhead, and potentially chinook salmon. NID will design and reconfigure the existing footprint to achieve the goals of water supply security and fisheries enhancement. Also, this project will support the expansion of potential salmonid habitat to cooler, tributary streams of the Sacramento River, which are projected to become increasingly important as water and air temperatures rise in California. To achieve these objectives, we will complete the following tasks:

Task No.	Task Title	Deliverables and Key Project Milestones	Estimated Completion Dates
1	Project Management and Administration	1.1 Quarterly Progress Reports 1.2 Quarterly Invoices 1.3 Executed Subcontracts	1.1 Due within thirty (30) days following each quarterly month following Grant execution, beginning July 30, 2017. 1.2 Due within thirty (30) days following each month (or) quarterly month (or) semi-annual month following Agreement execution. 1.3 Due with Quarterly Progress Reports, beginning July 2017.

Task No.	Task Title	Deliverables and Key Project Milestones	Estimated Completion Dates
2	Technical Advisory Committee	2.1 NID to convene the TAC committee 2.2 NID will call and facilitate meetings of the TAC on as needed basis to ensure timely review of project studies and reports, and incorporation of feedback into revision process	2.1 July 2017, as needed throughout duration of project
3	Hydraulic Model	3.1 Draft Report 3.2 Final Report	3.1 Dec. 2018 3.2 June 2019
4	Sediment Transport Study	4.1 Draft Report 4.2 Final Report	4.1 Dec. 2018 4.2 June 2019
5	Baseline Water Quality Monitoring	5.1 Draft Report 5.2 Final Report	5.1 Dec. 2018 5.2 March 30, 2019
6	Adult Salmonid and redd surveys	6.1 Fall spawning surveys Oct.-Feb. for two years 2017-18 to quantify redds and adults in Auburn Ravine	6.1 Draft report June 2018 6.2 Final report Sept. 2018
7	Draft and Final Project Report	7.1 Draft Final Report 7.2 Final Report	7.1 Dec. 2019 7.2 Feb. 2020
8	Project Close-Out	8.1 Project Close-Out Report 8.2 Final Invoice	8.1 March 30, 2020 8.2 April 30, 2020

Community Support and Collaboration

This project is widely supported by the public and local, state and federal agencies and regional institutions as a critical effort in opening potential upstream anadromous habitat in Auburn Ravine. As NID continues the planning phase, relevant stakeholders including local, state and federal agencies, NGOs and other groups will be engaged as the project design and scoping

proceed. All required permits will be secured and as part of CEQA compliance, and public notice and involvement will be included in outreach efforts. NID has committed over $100,000 to date to initiate Phase 2 on Auburn Ravine.

NID will continue to work with Placer County, California Department of Fish and Wildlife, National Marine Fisheries Service, U.S. Fish and Wildlife Service and local organizations (e.g. Placer County Land Trust, and others) to evaluate baseline information, and project design. Additionally, outreach to landowners in the surrounding area will be sustained as planning continues. The first fish passage project completed in Nov. 2011 included engagement of stakeholders, and meeting records and contact information is still maintained at NID. NID will convene an Advisory Group as part of ongoing planning activities, and opportunities to engage the public will include education about ongoing conservation and restoration efforts, fisheries updates, and plans to enhance Auburn Ravine for aquatic communities and human uses.

Data Management and Access

All project data would be stored on NID's computer server, which is backup up nightly. All data, with required metadata, would be submitted to DFW with each quarterly report, and would be entered onto CEDEN, where applicable. In addition, the project data will be entered into EcoAtlas to promote future coordination.

References (not included in the page limit)

CDFG. 2003. Part IX: Fish passage evaluation at stream crossings. *California Salmonid Stream Habitat Restoration Manual.* California Department of Fish and Game.

CDFW. 2014. Michael Healy Memo: Completion of the 2013 Auburn Ravine Rotary Screw Trap Monitoring Report. Rancho Cordova, CA. 20 pgs.

Jones & Stoke. 2004. Salmonid Spawning Habitat Surveys for Placer County Streams. 2004. 75 pages.

NMFS. 2001. Guidelines for salmonid passage at stream crossings. National Marine Fisheries Service SW Region. 14 pages.

National Marine Fisheries Service. 2009. Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead. Sacramento Protected Resources Division. October 2009.

National Marine Fisheries Service. 2014. Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead. California Central Valley Area Office. July 2014.

The Mines Group. 2005. Auburn Ravine gaging station site selection and fish passage modifications conceptual design report. Prepared for Placer County Planning Department. 46 pages.

County of Placer. 2009. Auburn Ravine and Coon Creek Ecosystem Restoration Plan.

Fish Survey references and protocols:

Duffy, W. G. 2005. Protocols for Monitoring the Response of Anadromous Salmon and Steelhead to Watershed Restoration in California. California Cooperative Fish Research Unit, Humboldt State University, Arcata. Prepared for California State Department of Fish and Game's salmon and steelhead trout restoration account agreement no. P0210565.

Gallagher, S. P. and Gallagher, C. M. 2005. Discrimination of Chinook Salmon, Coho Salmon, and Steelhead Redds and Evaluation of the Use of Redd Data for Estimating Escapement in Several Unregulated Streams in Northern California, North American Journal of Fisheries Management, 25:1, 284-300.

Cost Share Table

Project Title Auburn Ravine-Hemphill Diversion Assessment Phase 2
Applicant Nevada Irrigation District

Insert Entity Name and Name of Grant Program, if applicable	Cash [1]	Status S, U (secured, unsecured)	Date Awarded /Anticipated Award Date	Date Cash Expires	In-kind [1]	Brief summary of how cost share resources will be applied to project (where applicable, link to tasks identified in the Project Narrative, e.g., Task 3 – project construction activities at site 1a).	Total
CDFW Prop 1 (See Project Budget)	$ 177,042	N/A	N/A	N/A	N/A	N/A	$ 177,042
Applicant	$ 118,085	secured	N/A	N/A	N/A	NID will pay for NID staff time associated with the completion of Tasks 1 Proj Mgmt, 2 TAC, 7 Reporting, and 8 close-out; and parts of Tasks 5 and 6 and the indirect charges on Personnel	$ 118,085
Other State Agency(ies) *(insert additional rows as needed)*	$ -				$ -		$ -
Federal Agency(ies) *(insert additional rows as needed)*	$ -				$ -		$ -
Other sources including Project Partners *(insert additional rows as needed)*	$ -				$ -		$ -
Total Project Cost	$ 295,127	N/A	N/A	N/A	$ -	N/A	**$ 295,127**

[1] **If awarded cost share must be used to support the proposed project, must be spent during the grant term, and must be secured prior to grant award.**