California Stream Flow Enhancement Program Grant Application

Lower Owens River Flow Enhancement and Habitat Improvement Study

APPLICANT INFORMATION

Applicant Name: Inyo County

Address: Inyo County Water Department
P.O. Box 337
135 S. Jackson Street
Independence, CA 93526

Project Manager Name: Aaron Steinwand
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Authorized Signatory Representing Applicant Organization:
Name: Robert Harrington, Ph.D., R.G.
Title: Water Department Director

Federal Tax ID#: 96-6005445

Organization Type:

☒ Public Agency

LANDOWNER INFORMATION

Landowner Name: City of Los Angeles Department of Water and Power (LADWP)
☒ Municipal Utility

Contact Name: James Yannotta
Telephone: 760-872-1104 Email: james.yannotta@ladwp.com

Signatory Representing Landowner: James Yannotta
Telephone: 760-872-1104 Email: james.yannotta@ladwp.com

PROJECT INFORMATION

Project Name: Lower Owens River Flow Enhancement and Habitat Improvement Study

Funding Amount Requested from WCB: $352,000

Total Project Cost: $441,981

Month and Year WCB Funding Needed: June 2017
Proposed Start Date: June 2017
Estimated Completion: June 2019

Elected Representatives for Project
State Senate District(s): www.senate.ca.gov

District number	Name
8	Tom Berryhill

Assembly District(s): www.assembly.ca.gov

District number	Name
26	Devon Matthis

Project Type

☒ Planning, Scientific Studies, Monitoring, and Assessment

Project Eligibility and Summary

Projects must measurably enhance stream flows at a time and location necessary to provide fisheries or ecosystem/habitat benefits or improvements that enhance existing flow conditions and are greater than required applicable environmental mitigation measures or compliance obligations.

Provide a brief, clear description of the project and an explanation of how the project will meet the requirements of eligible project type(s).

Since December 2006, when a sustained water supply was dedicated to the Lower Owens River Project (LORP), hundreds of acres of diverse habitat have formed along the 62 mile long desert river. The exception is the Islands reach of the river north of Lone Pine and east of the Alabama Hills, where the waterway has aggraded and spread out of its channel. The Islands marsh obstructs and attenuates flow and is a prominent source of organic matter that exacerbates low oxygen conditions downstream, creating an impediment to managing flows in the lower reaches of the LORP and challenging the ability to meet habitat and water quality goals.

A grant from the Wildlife Conservation Board will allow a scientific investigation into the feasibility of reactivating natural channel(s) through the Islands area. The goal is to reestablish functional ecological flows and improve water quality for this warm-water fishery, and in the process diversify the associated riverine-riparian habitat. By addressing the flow and water quality issues through the Islands, improvements both upstream and downstream can be achieved and further implemented. The study would be conducted by outside experts in fluvial geomorphology, biology, and restoration engineering who will evaluate the feasibility of several management options, prepare engineering plans, complete a California Environmental Quality Act (CEQA) analysis, and obtain necessary permits. The final product would be a CEQA-approved plan for implementation of a flow enhancement project.

Mitigation Project

Mitigation cannot be funded under this program. Is any portion of the project a required mitigation or to be used for mitigation under CEQA, NEPA, CESA, ESA, CWA, Porter-Cologne, other pertinent laws and regulations, or a permit issued by any local, State, or federal agency?

☒ *Yes*
If yes, provide explanation.

The planning study requested under the Stream Enhancement Program occurs within the boundary of the LORP but planning and future implementation activities were explicitly excluded from that project and CEQA analysis. The LORP is a large-scale habitat restoration project in the Owens Valley implemented as part of the Inyo County/Los Angeles Long Term Water Agreement (Water Agreement) approved by the County and LA in October 1991. The Water Agreement settled years of litigation regarding the environmental impact of supplying water for export via the second Los Angeles aqueduct. Information and documents associated with the LORP can be found here: http://www.inyowater.org/projects/lorp/

Settlement of subsequent legal challenges over the adequacy of the CEQA analysis of the Water Agreement was contained in a 1997 Memorandum of Understanding (MOU) between the LADWP, Inyo County, California Department of Fish and Game (sic. Wildlife), California State Lands Commission, Sierra Club, and the Owens Valley Committee. The 1997 MOU expanded the activities included in the LORP and provided for continued oversight of the project by the parties. The goal of the LORP is:

> "… *the establishment of a healthy, functioning Lower Owens River riverine-riparian ecosystem, and the establishment of healthy functioning ecosystems in the other elements of the LORP, for the benefit of biodiversity and threatened and endangered species, while providing for the continuation of sustainable uses including recreation, livestock grazing, agriculture, and other activities."* (p.8, 1997 MOU)

The LORP was evaluated in an EIR/EIS finalized in 2004; flows were implemented in December 2006, see: http://www.inyowater.org/documents/governing-documents/ Because of the multiple elements and complexity of the ecosystem, the LORP relies heavily on an adaptive management strategy to accomplish goals and objectives established by the Agreement and 1997 MOU. Adaptive management provides for modifications to management if monitoring shows it necessary, but extensive channel modifications or active tule management were explicitly excluded from the LORP and CEQA analysis. Specifically, regarding channel modification and marsh (tule) management the LORP EIR states (Section 2.3.9 Other Management Actions pp. 2-25 & 26):

Channel Sediment (Muck) Management

With the exception of the initial channel clearing near the River Intake (see Section 2.3.6), the LORP does not include any actions to physically remove channel sediments (also called muck) or other organic debris from the river channel either prior to, or after, the establishment of baseflows and the release of seasonal habitat flows.

Tule Management

The wetted portion of the Lower Owens River (downstream of Mazourka Canyon Road) supports extensive and dense stands of bulrushes (Scirpus acutus) and cattails (Typha latifolia), collectively known as "tules." Tules provide habitat for fish and birds, and provide water quality benefits by removing nitrogen and phosphorus from the water. However, widespread tule growth decreases diversity and other habitat values for wildlife. Also, when tules die, they add organic matter to the bottom sediments, which could potentially degrade water quality by increasing biological oxygen demand. Excessive tule growth also reduces channel capacity.

Ecosystem Sciences (ESI), LORP consultant to Inyo and Los Angeles, in their LORP Technical Memo #9, indicate that with time, shade from new riparian canopy trees and deeper water resulting from increased flow would hinder tule growth. Active tule removal will only be conducted in rare instances, and would probably only be considered where there are significant constrictions along the river or at culverts. **Extensive removal or active management of tule stands to retard the expansion of tule growth or to increase open water habitat will not be considered unless funding for such work is obtained from sources other than LADWP or the County** [emphasis added]**.**

The requested planning and scientific study occurs within the LORP project area, but it is a separate project distinct from actions required by the mitigation project. Upon successful completion of this study, implementation of feasible options identified to enhance river flow, water quality, and habitat in the Islands reach also would be beyond the scope of the mitigation requirements of the LORP.

Coordination with the California Conservation Corps (CCC) and Certified Local Corps:

All applicants are required to consult with the CCC. Has consultation occurred?

☒ *Yes If yes, submit consultation form.*

(See Appendix A)

PROJECT DETAILS

PROJECT LOCATION (Figures 1 and 2)

Project location: Nearest City: Lone Pine County: Inyo
Street: Moffat Ranch Road Cross Street: U.S. Highway 395

APN's: 02313003; 02313005; 02313005; 02313006; 02313007; 02313008; 02602004; 02602002; 02602003; 02602004; 02602006; 02602007

In what sub-basin or watershed is the river located? Owens Valley

What is the name of the river this project will directly enhance? Owens River

To what stream is the project stream a tributary to? None.

Approximately 15% of the Lower Owens River flow is released to the Owens Lake Delta; the remainder is returned to the Los Angeles Aqueduct via a pumpback station located near Lone Pine.

PRIMARY REACH: Islands Reach of Lower Owens River
Total River Miles: 5.1 miles

- Upper End River Mile GPS Coordinates

Latitude: 36.690417"N
Longitude: 118.088953"W

- Lower End River Mile GPS Coordinates

Latitude: 36.646747"N
Longitude: 118.081561"W

SECONDARY REACH: Lower Owens River below study area
Total River Miles: 14.5 miles

- Upper End River Mile GPS Coordinates

Latitude: 36.646747"N
Longitude: 118.081561"W

- Lower End River Mile GPS Coordinates

Latitude: 36.550156"N
Longitude: 117.983639"W

POINT OF DIVERSION

There is one diversion point from the LAA to the Lower Owens River within the study area of the Islands reach—the Alabama Gates. The Alabama Gates are used by LADWP to clean sand out of the LAA or to evacuate water from the aqueduct for maintenance or water emergencies. Water flowing from the Gates can also be used to augment flows in the Lower Owens River—although not effectively. For augmentation, water is conveyed 0.23 miles from the Alabama Gates to the floodplain via a concrete channel. Once in the floodplain, water is conveyed a short distance down a sandy ditch before spreading out into the Islands marsh. Modifications to the ditch on the floodplain may be included in the options to enhance stream flow evaluated by this study.

- Alabama Gates GPS Coordinates

Latitude: 36.672831"N
Longitude: 118.097686"W

APPLICABILITY TO SOLICITATION PRIORITIES

1. *Stream flow enhancement is defined as "A change in the amount, timing and/or quality of the water flowing down a stream, or a portion of a stream, to benefit fish and wildlife." How will the proposed project enhance stream flows? Clearly illustrate the current condition of the stream, identify the problem(s) and what is required to solve the identified problem.*

The Lower Owens River extends from the LAA to Owens Lake. The majority of this section of river dried up in 1913 when water was diverted from the Owens River into the LAA and sent 233 miles south to the City of Los Angeles. A continuous 40 cubic-feet per second (CFS) flow was reestablished in this section of river in December 2006 under the LORP. The river is now regulated to require a minimum 40 cfs flow year-round from the river Intake to the Pumpback Station. (The distance from the Intake to the Pumpback Station is 53.1 river-miles. Below the Pumpback Station a 6-9 cfs flow continues into the Lower Owens Delta at Owens Lake.)

If the Sierra Nevada runoff forecast is at or above average, a 200 cfs pulse of water is released from the river intake (if the runoff forecast is less than normal a smaller pulse of water is released). This Seasonal Habitat Flow (SHF) was designed to move organic and mineral sediments downstream and to some extent lift muck onto the floodplain. The SHF was to entrain material that could not be mobilized under a constant 40 cfs baseflow. The Islands marsh which begins about 34.3 miles below the Intake absorbs much of the force of the SHF (Figure 3). In doing so, the river below the islands cannot receive the benefits of the pulse flow. There is not

enough force to strip off the organic layer from the riverbed below the Islands. As a result, the benthic anaerobic layer from the base of the Islands to the Pumpback Station is deepening. This is significant in that a large precipitation event in the watershed or an emergency release of water from the LAA at the Alabama Gates to the river can lead to large fish kills below the Islands. An example of this occurred on July 26, 2013, when approximately 800, mostly mature Large Mouth Bass, were found floating dead in the pond at the forebay of the Pumpback Station, the result of an emergency release of water from the LAA at the Alabama Gates into the Islands reach. The stench of sulfur dioxide that accompanied this fish kill could be detected on U.S. Highway 395. Dissolved oxygen measurements taken at that time found oxygen levels well below that which fish can survive.

Among scientists who are involved with the LORP, there is a general consensus of thought that by improving water conveyance through the Islands, by reestablishing an open channel, by allowing the SHF to exert its power below the Island, muck will be mobilized and downstream water quality conditions will improve. One desired result would be fewer future fish kills. Another potential benefit would be the possible conversion of some tule marsh to wet meadow and other underrepresented and desirable riparian habitats.

CONSISTENCY WITH AND IMPLEMENTATION OF STATE AND OTHER PLANS

2. *Describe how the project advances, is consistent with, or in conflict with any applicable local, regional, or statewide plans, such as the California Water Action Plan, the WCB Strategic Plan, the State Wildlife Action Plan, Recovery Plans, general plans, county plans, specific area plans, regional conservation plans, climate action plans, watershed management plans, etc. Identify the pertinent plan(s) and the date adopted by the applicable local/regional entity*

California Water Action Plan

Reductions in water deliveries to the City of Los Angeles will likely continue into the future due to a growing population and the effects of global climate change on the watersheds that supply the City. Last year, for the first time ever, the LAA was completely dry for part of the year. Water conservation in the Southland has mitigated to some degree reduced water deliveries, but the long-term outlook is for less predictable water deliveries.

The lack of a defined river channel through the Islands reach impedes water flow and impacts river management in both upper and lower reaches. Water releases at the LORP intake must be increased substantially in mid to late summer to meet mandated flows in the lower reaches to offset evapotranspiration losses. As a result, the Lower Owens River above the Islands experiences high flows when flows naturally would be declining; the river below the Islands experiences nearly constant flow year round. The impediment to flow through the Islands is most clearly evident

in stream hydrographs tracking the SHF pulse released during the spring to promote riparian habitat development (Figure 3). The flow loss rate (cfs/river mile) through the Islands due to infiltration, evaporation, and plant transpiration is approximately 2 to 3.5 times that on the rest of the LORP. Because of the Islands marsh, lower reaches do not realize the full benefit of the SHF. It is expected that reducing impediments to flow by modifying and directing flow in existing channels may reduce the loss rate and result in considerable water savings for the LORP.

One of the objectives of the Water Action Plan is aggressive ecosystem restoration and other steps that will restore fish populations and benefit wildlife. The desired outcome of our study would be to develop a shovel-ready plan to diversify riverine-riparian habitat and increase dissolved oxygen levels through the Islands and lower reaches to benefit the warm-water fishery. The County relies on recreational tourism for its economic health, and fishing is one of the largest components of local tourism, highly sought after by out-of-area visitors. The scenic Lower Owen River is increasingly becoming a warm water fishing destination, but this fishery's health is threatened by low dissolved oxygen levels following high flow events, especially during the summer when water is warm.

California Wildlife Conservation Board Strategic Plan

One future role that the WCB will be involved in is protection of valuable landscapes from conversion and fragmentation. This is in line with what we are striving for in the Islands reach; to restore a mosaic of habitat types by converting a tule bi-culture marsh back into what was diverse habitat.

Important to WCB is monitoring and adaptive management. Ongoing LORP mandated monitoring of vegetation, fishery, water flow and water quality, and a commitment to adaptive management to respond to adverse conditions, or to encourage helpful changes in the environment, is already in place. Science-based decision making is central to the management of the LORP.

Also demonstrated in the LORP is WCB's commitment to public use and recreation. The LORP, including the Islands, is on LADWP land and is largely open to the public for hiking, hunting, fishing, and nature study. We hope to gain new access to the river by opening up channel through the marshy Islands.

The WCB has invested in Inyo County by funding invasive species eradication projects in the LORP watershed. The Saltcedar Program has successfully eradicated more than a thousand acres of invasive tamarisk. The proposed study and anticipated implementation project to restore channelization and vegetation conditions through the Islands dovetails with the habitat restoration end-goals of the Saltcedar Program. The Saltcedar program is ongoing (Lower Owens River Basin

Saltcedar Control, Phase II Inyo County, Grant Agreement No. WC-1156TR; Project 10: 2011111).

Other Applicable Plans

With goals of restoring more diverse riverine-riparian habitat, improving water quality, and protecting T&E species, the implementation of a project that is derived by the proposed study should result in positive environmental effects that would comply with, and be consistent with, the general goals of the State Wildlife Action Plan, as well as LADWP's Owens Valley Land Management Plan (2010), LADWP's draft Habitat Conservation Plan (2015), the LORP Monitoring, Adaptive Management, and Reporting Plan (2008), the Water Agreement (1991), and the Inyo County General Plan (2002, update 2014).

DIVERSITY AND SIGNIFICANCE OF BENEFITS

3. *Considering anadromous fish; or special status, threatened, endangered or at risk species, what limiting factor(s) will be addressed by this project?*
    a. *Will these limiting factor(s) be eliminated or reduced?*
    b. *What future work will need to occur to eliminate the limiting factor(s) in this reach?*
        i. *Are there plans for future improvement within the project area?*
        ii. *Is there funding lined up for future efforts?*

The Owens River is an endorheic drainage basin, and anadromous fish are not present. However, several threatened and endangered species (T&E) occur or potentially occur within the project area. Although, the LORP does not include specific provisions to introduce, manage, enhance, or create sanctuaries for T&E species, it was expected to create and enhance natural habitats for specific indicator species. Five listed T&E species were included as indicator species in the LORP. The species include two state endangered birds (willow flycatcher, yellow-billed cuckoo), two state and federally endangered indigenous fish (Owens pupfish, Owens tui chub), and one state endangered plant (Owens Valley checkerbloom). Additionally, the Owens Valley vole is a state species of special concern and was included as an indicator species.

The requested funding will be used to study the potential habitat benefits and impacts of modifying channel and flow management in the Islands reach. As such, the factors limiting the existing habitat for the indicator species will be evaluated during this study. The primary limiting factor in the Islands reach presently is the lack of a defined channel for fish habitat and associated proliferation of tule marsh. Tule marsh is abundant along the Lower Owens River and is not a target habitat type for the LORP. While it is marginally suitable habitat for some indicator species, the establishment of extensive tule marsh in the Islands reach has displaced a

variety of vegetation types and has hindered progress towards creating more diverse riparian and wetland habitat. The effect the marsh expansion has had, and will have (if it continues), on T&E species has not been quantified. The Owens Valley checkerbloom and Owens Valley vole occur in alkali meadows. For these two species the on-going conversion of diverse riparian-riverine habitat to tule marsh is a detrimental or potentially detrimental impact.

One beneficial outcome of this study will be identification of channel modifications and/or flow management that could reduce the factors promoting the expansion of tule marsh.

At this point there is no additional funding for implementation of such possible management actions; however, the LORP is an ongoing project managed jointly by Inyo and Los Angeles. Both agencies have incentive to continue to research and implement river flow and land management activities to enhance the ecological benefits of the project.

4. *Will this project provide additional ecosystem benefits beyond stream flow enhancement? If so, describe what other ecological problems, beyond streamflow, the project will address.*

The proposed is a feasibility study of alternatives to enhance flow through the Islands reach. Evaluation of the options will include, and depend, on the assessment of the potential benefits to habitat within the reach. Specifically, improvements to water quality, fish habitat within the modified or reactivated channel, and improvements to the diversity of riparian habitat are central components of the proposed study.

The potential benefits of projects arising out this study are not limited to the Islands reach. River flows in sections of the river below the Islands reach fluctuate little due to attenuation of flow in the Islands even during increased flows conducted seasonally to promote development of riparian habitat. Presently, the ecological functions in those reaches more closely resemble a ditch than a well-managed river system. Additionally, the limitations posed by the marginal water quality restrict opportunities for adaptive flow management and augmentation below the Islands. It is anticipated that establishing channelized flow through the Islands may increase water depth, lower water temperature, reduce residence time in contact with organic sediments and, thus, improve water quality downstream. This will allow more flexibility in adaptively managing flows to promote riparian habitat development while still protecting the fishery.

The knowledge developed by this study will be essential for Inyo County and Los Angeles as well as the MOU parties and other interested stakeholders to make

informed adaptive management recommendations to improve the overall habitat within the LORP.

5. *Are the ecological benefits anticipated from the completed project part of or tied to other habitat protection or improvement efforts in the watershed?*

   ☒ *Yes*

   a. If so, briefly list and describe the projects recently implemented, underway, or planned that will help to achieve the habitat goals associated with enhancing instream flows. Please describe the relationship between this proposal and the habitat restoration activities addressing other limiting factors.

   b. If the proposal is similar to or related to other past or current projects in the region, what shortcomings of these projects will this proposal address?

The Islands reach of the Lower Owens River has negative impacts on both water quality and vegetation habitat not only in the reach itself but in the downstream reaches of the river. Fish kills due to lowered dissolved oxygen levels downstream of the Islands have been observed during the past 10 years. This grant would fund the critical first step in studying, planning, and completing CEQA to create a shovel-ready implementation project to repair the Islands section of the river. Once implemented, downstream section of the Lower Owens will reap the benefits of channelization and improved flow.

Inyo County just obtained a substantial grant to develop the Owens River Water Trail south of the Islands and east of Lone Pine (see also response to question #23). This water trail would provide enhanced fishing and boating opportunities for the reach of river north and south of Lone Pine. By improving the water quality exiting the Islands, benefits will be seen in the Water Trail section. The proposed study through the Island could provide valuable insight into other less extensive, but still significant, areas of the Lower Owens suffering from aggradation and tule invasion.

6. *Describe the benefits of meeting project objectives (including enhanced knowledge).*
   a. *How will ecological benefits of the project be realized?*
   b. *Quantify to the best of your ability the ecological benefits anticipated from successful completion of this project.*
   c. *How will the benefits of the project be maintained for 20+ years?*

Currently, the MOU parties agree that the Islands reach of the Lower Owens River is not meeting LORP project goals. The Islands limits our ability throughout the entire Lower Owens River to implement adaptive strategies to improve water quality and ecosystem health. However, there is no existing pathway or source of funding to conduct the most necessary step in improving the Islands reach. The principle

benefit of meeting project objectives will be to clearly define the best options for re-establishing the health of this section of the Lower Owens.

The final study will produce an implementation plan to address the Islands challenge, which will be supported by stakeholders and the public. Once the Islands plan is implemented, additional work can be conducted to further improve the Lower Owens River system. Additional benefits derived from the Islands study would be enhanced knowledge of the river's fluvial processes, and the ability to apply this knowledge to better manage other reaches of the river; including new options for managing river-wide flows.

The primary ecological benefits of the project would be to channelize approximately five river miles of the Lower Owens River, to reestablish habitat diversity through this section (approximately 250 acres), to improve water quality by decreasing river transit times, and to protect bass, carp, and trout fisheries from lowered dissolved oxygens levels during seasonal habitat flows.

The longevity of the proposed project's benefits are discussed in the two following sections in detail; the task of the proposed study will be to develop sustainable solutions for long-term channelization of flows through the Lower Owens River.

DURABILITY OF INVESTMENT

7. *What is the durability/permanency of the stream flow enhancement? What are the provisions to maintain the enhancement and for what period of time?*

Preferred solutions in the Islands reach are those that are able to be sustained by the fluvial process of the managed flow regime. Modifications to the channel and/or flow management will not be feasible if the system reverts back into marsh or requires expensive ongoing maintenance to operate. Developing the basic knowledge of the current processes in the Islands and evaluation of potential alternatives to enhance streamflow is essential for successful long-term management of the LORP.

The LORP is an essential and highly visible project implemented by Inyo County and Los Angeles under provisions of the Water Agreement. Both Inyo County and Los Angeles share costs and management obligations for the project. The responsibilities of each agency have been established through a series of legally binding court orders and agreements. Capital investments in studies and physical infrastructure agreed to by the County and Los Angeles that are conducted in the LORP become part of the ongoing management and implementation of the project.

8. *How will the completed project deliver sustainable outcomes into the future? Describe the long-term management that will assure the entire project's sustainability beyond the term of the grant agreement?*

As described above, the LORP is a highly visible and ongoing restoration project implemented in compliance with several layers of court enforceable agreements or stipulations, environmental analyses and permits. The Inyo Superior Court still retains jurisdiction over the Water Agreement, and it can only be discontinued or modified by agreement of Inyo County, Los Angeles, and the judge assigned to the case.

The purpose of the proposed study is to identify the alternative that will best enhance (establish) stream flows in the Islands portion of the LORP. The study will develop, model, and evaluate the benefits, sustainability, costs, and potential impacts of at least three alternatives. This knowledge is critical to designing a future project that will deliver sustainable positive benefits to the streamflow and habitat. Alternatives that would likely result in unsustainable benefits or expensive operation and maintenance cost would be considered infeasible and not implemented.

CLIMATE CHANGE CONSIDERATIONS

9. *Describe the extent to which climate change considerations are adequately taken into account in the proposed project, including how future climate conditions might affect the project's long term benefits. Using the latest regional scenarios, predictions and trends, describe how the project objectives may be vulnerable to impacts (fire, drought, species and habitat loss, etc.) from climate change. What design, siting, or other measures are you incorporating into the project to reduce these vulnerabilities?*

This study and planning effort is not affected by climate change. The proposed project will acquire knowledge that could increase the flexibility to manage the LORP in the future to accommodate the impact of climate change on the Owens Valley groundwater dependent ecosystems. LORP flows are governed by the Agreement, MOU, and court-ordered obligations; these guaranteed flows buffer the project from runoff variation induced by climate change. However, the current flow regime includes a schedule for annual increased SHF releases based on forecasted runoff in the Owens River watershed. Climate change is predicted to result in warmer temperatures and potentially reduced runoff from the Sierra Nevada which could affect the water balance of the river (increased evapotranspiration) and frequency and magnitude of SHF releases. The LORP recognized that unanticipated events or processes arising from the complexity of the environment would require adjusting management during the project to accomplish habitat goals. The current configuration of the marsh and channels in the Islands and water quality concerns (dissolved oxygen) limit the ability to implement necessary measures that could

benefit the river-riparian and fishery habitat, especially downstream. For example, one factor limiting management flexibility is air and water temperature during the release of SHF in the spring. Warmer temperatures result in lower dissolved oxygen in the water which endangers fish. Ideally, the habitat flows are released to coincide with seed fly of willow and cottonwood trees to promote recruitment of riparian trees. The timing of the habitat flow, however, is constrained by water temperatures cool enough and dissolved oxygen levels sufficient to prevent fish kills. If climate change results in higher temperatures in the future, it could place additional constraints on releasing flows to maximize benefits to the ecosystem. Improvements to the transit time and water quality degradation through the Islands could potentially offset this negative consequence of climate change.

10. *Will the project reduce effects of climate change?*

This project is a study and planning effort that will not reduce the effects of climate change.

APPROACH/FEASIBILITY

11. *Has the applicant completed the environmental documents (including CEQA, which is required prior to WCB approval of funding for implementation) and obtained the necessary State, federal and local permits for the projects? If not, give the current status and expected completion date(s).*

The proposed project is a scientific study of potential stream course optimization through the Islands reach of the LORP. The study is statutorily exempt from CEQA in that it is a Feasibility and Planning Studies (CEQA Guidelines §15262). No new infrastructure for water quality monitoring will be installed. The site topographic/hydrologic/biologic surveys will not result in disturbance to the land or biology of the project area.

The proposed planning study includes completion of CEQA for the implementation project that may be recommended by this study. An Initial Study will be completed. It is expected that a Mitigated Negative Declaration will be required to move into the implementation phase. It is expected that LADWP, the landowner, will be the lead agency.

12. *What would happen to the project if no funds were available from the WCB? What project opportunities or benefits could be lost if the project is not implemented in the near future?*

Without efforts to establish flow within channels, the marsh expansion and impediment to flow and water quality in the Islands reach will likely continue. If no funding were provided by the WCB, the proposed study would not occur. As described in the LORP EIR, conducting the study or any implementation project to address stream flow and tule management is dependent on obtaining outside funding. Delays in obtaining funding to conduct the study and implement flow modifications will increase the difficulty and expense of addressing the problem in the Island reach in the future.

LADWP and the County have been actively seeking a grant to fund this investigation ever since all the participants at the LORP summit (July 2014) indicated that a study to consider improving flow through the islands be a priority. The WCB Stream Flow Enhancement Program is the first grant opportunity we have identified that seems a perfect fit for our study project.

California Natural Resources Agency in late July 2016 recommended Inyo County receive a $500,000 grant through their River Park Ways Program. The funding will be used to create a canoe and kayak trail on a 6.3 mile section of the Lower Owens River just east of Lone Pine. The project provides for new recreational opportunity, and importantly, provides habitat and water quality benefits. Implementation of the project includes excavating up 0.7 miles of tule occluded channel. Contact Carol Carter at the California Natural Resources Agency 916-651-7588; carol.carter@resources.ca.gov.

13. *Is the landowner willing to allow the construction of the project and agreeable to the proposed maintenance plan for the project on a long-term basis.*

The proposed project is to conduct a study and the Water Agreement permits Inyo County access to LADWP-owned lands for monitoring and inspection to carry out provisions of the Agreement. LADWP supports this feasibility study (see support letter).

14. *Willing Seller: Projects that involve acquisition of water, water rights and/or property must involve a willing seller. If your project includes acquisition, please describe the status and expected conclusion of landowner negotiations.*

This item is not applicable to the proposed project.

SCIENTIFIC MERIT – SCIENTIFIC BASIS

15. *Describe the scientific basis of the proposed project illustrating how the best available science will be utilized and how, if relevant, the project will address key scientific uncertainties and fill information gaps. How will the data collected be managed and made publicly available?*

For more than ten years, Inyo County and LADWP have investigated the river scientifically; both through the regular monitoring prescribed in the LORP management plan and carried out by LADWP and Inyo County scientific staff, and through outside studies. However, our staffs do not have expertise in flow modeling, geomorphic studies, or channel engineering; disciplines required for our proposed study.

We regularly hire outside consultants to fill in gaps. Most recently, LADWP hired hydrologic consultants to produce a general flow model for the Lower Owens River. Their report and model will provide important background to research consultants who will be looking in detail at the Islands reach (see: http://www.inyowater.org/wp/wp-content/uploads/2014/05/LORPReport_4May2012.pdf). The work we accomplish under the proposed study will further help inform future adaptive management in the LORP.

The LORP is a highly visible project that attracts scientists who want to be involved with the effort. Both LADWP and Inyo County have considerable experience hiring talented scientists and providing the support they need to be successful. Both agencies will participate in a RFP process to select the best scientific team to complete the *Lower Owens River Flow Enhancement and Habitat Improvement Study.*

Study results and reporting will be published on our website and shared with interested parties. Summaries of the study progress will be included in our LORP Annual Report, which receives agency and public review. Relevant data will also be uploaded to EcoAtlas to be compliant with upcoming information sharing requirements.

16. *Identify any new or innovative technology or practices that will be used, and explain rationales for their use.*

The Bishop office of CDFW is experimenting with tule control using a unique tule harvesting boat. CDFW is acquiring a Truxor 5000DL, which has the capability of efficiently clearing tules from considerable lengths of river. If this new vehicle proves capable, future LORP adaptive management might include contracting with the Department for channel clearing work. Contact Steve Parmenter, *787 N. Main St., Ste. 220, Bishop, CA 93514, (760) 872-1171, Steve.parmenter@wildlife.ca.gov*.

Another method of channel clearing to be explored is channel excavation by explosives. Explosives have been used successfully in Klamath Marsh National Wildlife Refuge (KMWR) in Oregon to clear lengths of channel and produce ponds. The advantages of explosives are that channel excavation can take place with minimal equipment and minimal vehicle impacts to the floodplain. Their use in KMWR proved to be cost effective.

MONITORING, ASSESSMENT AND REPORTING

17. *For projects involving restoration, construction or land acquisition, describe your 20-year management and monitoring plans. As appropriate for meeting project and program objectives, WCB advocates including the costs for gauging or metering equipment necessary to capture flow results.*

    - *Who will be responsible for implementing ongoing management and monitoring?*
    - *Beyond the proposed estimated completion date, who will be responsible or what options will the applicant pursue for funding the projects long-term monitoring and management?*

This question is not yet applicable to the proposed study. Future implementation projects will comply with provisions of the MOU, court orders, and Water Agreement requiring the public reporting of LORP flow data. These obligations for Inyo County and LADWP are ongoing and permanent—both agencies cooperatively monitor and report on the LORP. The river hydrology and biology is currently monitored under the prescriptions found in the LORP Monitoring, Adaptive Management and Reporting Plan. The plan can be found here: http://www.inyowater.org/wp/wp-content/uploads/2014/04/LORP_MonitoringAdaptiveManagmentPlan_042808_Print_Small.pdf

18. *Describe in detail how the proposed study will be monitored and assessed to determine project success.*

As this is a study, success will be based on successfully completing the scope of work, and developing a shovel-ready project that can be supported by stakeholders.

Inyo County Water Department project managers will oversee the consultant's work, and will bring in stakeholders at important junctures in the study to inform them of key findings and to review certain draft material. By keeping agencies, organizations, and individuals who have an interest in improving the Islands reach informed, we end up with a future project that has full community support.

a. *Describe your plans for compiling baseline data.*

Much baseline data already exists. Thousands of water quality measurements associated with 23 investigations and observations have been made on the Lower Owens River between 1988 and late 2016. These include muck volume studies, fish kill investigations, bacterial analysis, many laboratory water quality studies, transient water quality studies, comprehensive water quality sampling; construction water quality monitoring; water quality technical memorandum; LORP FEIR water quality analysis, and water quality trend studies. Also available are a collection of flow studies that include, flooding extent monitoring, seasonal habitat flow monitoring,

base flow monitoring, and alternative hydrograph studies. Upstream of the Islands are three continuous flow measuring stations, and an additional flow station is located downstream. We have vegetation maps for the area that were developed in 2005, 2009, and 2014. We conduct a Rapid Area Survey the length of the river every August and publish the results in the fall. Past reports can be found here: http://www.inyowater.org/projects/lorp/

b. *Describe your plans for implementing adaptive management strategies, if necessary.*

The LORP is adaptively managed currently. An appendix to the LORP Adaptive Management and Reporting Plan would be produced to describe triggers for adaptive management in the Islands reach and what that management might entail. The LORP management plan can be found here: http://www.inyowater.org/wp/wp-content/uploads/2014/04/LORP_MonitoringAdaptiveManagmentPlan_042808_Print_Small.pdf

c. *How will enhancements to flow be monitored and reported?*

Four permanent continuous flow monitoring stations are located along the length of the Lower Owens River. These stations record flow 24 hours a day, 365 days a year. Flows are reported real time via the internet (see: http://wsoweb.ladwp.com/Aqueduct/realtime/owensrealtime.htm). Seasonal habitat flows are released in years when runoff is forecast to be at or above normal. These controlled flows are used as a diagnostic tool to judge river conditions.

d. *How will benefits to fish and/or wildlife be documented and monitored?*

The County and LADWP conduct creel censuses approximately every two years. It is likely that CDFW will electrofish before, durning, and after implementation to document the effect of channel clearing. In addition LADWP and Inyo County staff conduct extensive vegetation studies throughout the LORP and in the vicinity of the Islands in particular.

e. *How will improvements to water quality be documented and monitored?*

That will be determined by the study, but a schedule for water quality monitoring will be developed and comparisons to the existing background data can be made.

f. *How often will reports be issued giving an analysis of the data?*

Summaries of data will be published in the LORP Annual Report. Flow data is available real-time https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-water/a-w-losangelesaqueduct/a-w-laa-laaqueductconditionsreports.

g. *Who is responsible for analyzing the data and issuing reports?*

Inyo County, LADWP, and the LORP MOU scientific consultants (ESI Inc., Boise ID.). CDFW comments on adaptive management recommendations each year.

h. *Provide key contact information if another agency, program, or individual will be collecting, storing, and evaluating the flow, biological and water quality data.*

California Department of Fish and Wildlife will likely be involved in an adjunct fishery study, and perhaps habitat evaluation. Contact Heidi Calvert, *787 N. Main St., Ste. 220, Bishop, CA 93514, (760) 872-1171, Heidi.Calvert@wildlife.ca.gov*

DATA MANAGEMENT AND ACCESS

19. *Refer to Section 3.5, Data Management, of the Solicitation for specific requirements related to data management activities (e.g., geospatial data, water quality data, wetland and riparian restoration data).*

Describe how data and other information generated by the project will be handled, stored, and shared (i.e., disseminated to the public, participants, stakeholders, and the State), taking into account the specific requirements stipulated in Section 3.5, Data Management, of the Solicitation. Environmental data collected under these grant programs must be made visible, accessible, and independently understandable to general users in a timely manner, except where limited by law, regulation, policy or security requirements. Unless otherwise stipulated, all data collected and created through WCB-funded grant projects are a required deliverable and will become the property of WCB.

For Acquisition and Implementation projects, the data management activities described in this section shall cover the monitoring activities described in the Monitoring and Reporting Plan (Solicitation Section 3.4).

Inyo County is a public agency and all reports and data resulting from the study will be public documents. Reports and data will be made available in hardcopy and digital forms by Inyo County. Reports and data will be posted on the Inyo County Water Department website. Relevant datasets and study results will be uploaded to the EcoAtlas user community (http://www.ecoatlas.org).

PROJECT TEAM QUALIFICATIONS

20. *Describe your organization's qualifications, experience, and capacity to perform the proposed tasks to complete this project as proposed. Provide specific examples of similar projects completed to date.*

Inyo County Water Department staff available to assist consultants includes two hydrologists, a soil scientist/science coordinator, a vegetation scientist, GIS science associate, and a project manager. Inyo County staff includes three Ph.D. scientists and a scientist with a M.S. degree. LADWP staff also includes Ph.D. and M.S. level scientists intimately familiar with Owens Valley riparian and groundwater dependent ecosystems.

Inyo County and LADWP staffs have a history of working cooperatively to develop studies. These investigations include:

Robert Harrington, Aaron Steinwand, and Greg James. 2001. Development of hydrologic and vadose zone models to improve management of groundwater pumping in the Owens Valley. California Department of Water Resources.

Robert Harrington, Aaron Steinwand, Paula Hubbard, and David Martin. 2000. Evapotranspiration from groundwater dependent plant communities: Comparison of micrometeorological and vegetation-based measurements. Inyo County/City of Los Angeles Cooperative Study. Los Angeles Department of Water and Power.

Aaron Steinwand, Randy Jackson, and Saeed Jorat, 2000. Inyo County/City of Los Angeles Cooperative Study: Shallow and deep groundwater geochemistry and source of spring and seep water in the Owens Valley. Conducted in cooperation with Montgomery-Watson-Harza, consultant to Los Angeles Department of Water and Power.

John F. Mustard, Steve Hamburg, John A. Grant, Sara J. Manning, Aaron Steinwand, and Chris Howard. 1997. The dynamics of a semi-arid region in response to climate and water-use policy. NASA Office of Mission to Planet Earth, Land Cover and Land Use Change section.

SCHEDULE AND DELIVERABLES

21. *Describe in detail how the project will be carried out (i.e. provide a work plan). Illustrate the schedule demonstrating the sequence and timing of project tasks, milestones, and deliverables. Provide sufficient detail to illustrate that the project is technically feasible and provide sufficient detail illustrating how each element of the project will be implemented.*

LOWER OWENS RIVER FLOW ENHANCEMENT & HABITAT IMPROVEMENT WORK PLAN OUTLINE (Schedule: see Table 1)

Project Objectives

- Assess current condition of river hydraulics and hydroecology of the Islands reach of the Lower Owens River using available data.
- Estimate future condition of the Islands reach ecohydrology under current river management.
- Develop and evaluate options for modifying river channel(s) and river management to enhance stream flow and improve fish and wildlife habitat.
- Recommend a preferred option
- Prepare final construction plans and implementation cost estimate for option selected by Inyo County and Los Angeles.

- Complete CEQA and acquire permits.

Outline of Project Scope of Work

Task 1: Baseline water quality monitoring program

a. Purchase water quality monitoring devices
b. Calibrate and install monitoring devices
c. Operate instruments throughout project except during routine equipment service
d. Deliverable: monitoring data made available online after retrieval and QA/QC. Final report at conclusion of the baseline monitoring project.

Task 2: Select consultants (hydrology, ecosystem and CEQA compliance)

a. Develop and advertise request for proposals
b. Solicit and review proposals
c. Select and contract with consultants

Task 3: Analysis of existing conditions

a. Acquire available information on the current setting of the Islands reach with assistance from Los Angeles and Inyo
b. Perform initial reconnaissance and field hydrologic data collection
c. CDFW conducts fish census through electrofishing
d. Develop topographic and hydraulic models
e. Using the models, assess current river management on groundwater hydrology, vegetation/habitat, and water quality
f. Identify data gaps that must be addressed before proceeding
g. Deliverables: draft and final reports of the existing conditions, model results and projected future conditions under current river management.

Task 4: Development and evaluation of alternative stream channels and flow management

a. Obtain stakeholder input using existing Technical Group, Inyo County Water Commission, MOU party, and/or Inyo Board (if necessary) meetings. Consultants will attend as needed.
b. Develop three alternatives in consultation with Inyo and Los Angeles
    i. Initial options to consider: 1) single west channel combined with Alabama gates conveyance, 2) single east channel, 3) gated diversion structure to manage water into east or west channels.
c. Assess construction feasibility
    i. Costs
    ii. Maintenance requirements
    iii. Construction disturbance and potential impact

d. Using hydraulic model, assess the stream hydraulics, sediment transport, and water quality of the alternatives
    i. Enhancements to stream flow
    ii. Channel connectivity at selected flow rates
    iii. Sediment transport
    iv. Water quality impact
e. Assess the resultant riparian/wetland habitat for the three alternatives
f. Present results to Inyo and Los Angeles and conduct public presentation of the results.
g. Deliverable: Prepare draft and final reports of the assessment of the alternatives including recommended alternative.

Task 5: Prepare preliminary design plans of channel modifications and infrastructure for the recommended alternative

a. Designs include
    i. Channel layout
    ii. Construction access and best management practices
    iii. Proposed longitudinal profiles and cross sections
b. Refine hydraulic model for selected alternative if necessary
c. Deliverable: Draft and final preliminary design reports with resulting hydrologic and habitat conditions for viable options

Task 6: Final Design

a. Incorporate comments on preliminary designs from Inyo and Los Angeles
b. Prepare final design plans
    i. Additional information to preliminary designs
    ii. Post construction revegetation plan, stormwater prevention plan
c. Deliverable: Final stamped plans, specifications and cost estimate

Task 7: CEQA preparation

a. Hydrologic, biological, and engineering consultants will provide support to Inyo County and CEQA preparer to complete CEQA and acquire permits.

BUDGET - Appendix B.

22. *Provide a complete line item budget for the proposed project. Provide a complete list of all partners contributing toward the project and include: 1) all sources of cash; 2) landowner's contribution; and 3) in-kind services. If in-kind services are to be used as part of the matching requirement, please explain the type of service that will be provided, the number of hours the service will be provided, and the hourly rate associated with the service. Also, be sure to identify any funding that is available for long-term operation and maintenance costs. Submit budget electronically using the attached budget templates.*

    See Appendix B

LEVERAGES OTHER STATE FUNDS

23. *Are other STATE funds being leveraged? Describe below and use budget template to illustrate.*

No other state funds are included in this study budget; however, the County of Inyo was recently selected by John Laird, CA Secretary of Natural Resources, to receive a $500,000 River Parkways grant from The CA Natural Resources Agency to develop an Owens River Water Trail (ORWT). The ORWT is 6.3 mile long canoe and kayak trail on the Lower Owens River just east of the town of Lone Pine and south of the Islands reach. The project has as its goals accessible river recreation, and equally important, flow improvements and habitat restoration. The project will excavate 0.7 miles of tule occluded channel and open a continuous flow throughout this reach. This project is relevant in that the Lower Owens River Flow Enhancement and Habitat Improvement Study area, the Islands, is only 5.2 mile upstream. The water trail is located in an river reach that has historically had water quality problems, in part due to additions of organic material originating in the Islands reach. For information on this grant award contact grant administrator Carol Carter at (916) 653-2812. The grant application can be found here: http://www.inyowater.org/wp/wp-content/uploads/2012/10/OWENS-RIVER-WATER-TRAIL-FULL-APPLICATION-20150901.pdf

NON-STATE COST-SHARE FUNDS

24. *Does this proposal provide non state (i.e. federal, local, private cost share (either In-kind or cash)? Use budget template available on https://wcb.ca.gov/ to illustrate (provide evidence of match via letters of commitment, contact name and phone number, etc).*

No non state cost share is available to fund the study portion of this project. We will solicit match funds from state and federal agencies to help fund project implementation.

25. *In-kind Services*

In-kind services or contributions include volunteer time and materials, bargain sales, and land donations. Please describe and estimate value of current and future in-kind contributions.

Likely contributing to the review of the study will be an array of scientists who have a longstanding interest in the LORP.

COMMUNITY SUPPORT AND COLLABORATION (See Appendix C)

26. *Does the project demonstrate broad-based public and institutional support, at the local, regional, or larger scale? Describe efforts to include stakeholders in project planning, design, outreach/education, implementation, monitoring, maintenance, etc*.

The LORP holds great public interest. Our annual LORP report meeting, open to the public, attracts a diverse array of people, including agency personnel, ranchers, conservationists, recreationists, the interested public, and the news media. The meeting is teleconferenced, making the presentations and discussion available to out-of-area scientists and other participants.

A three-day LORP Summit was held on July 29-31, 2014 to discuss progress and challenges associated with the Project, Attendees included LADWP, Inyo County, Sierra Club, Owens Valley Committee (OVC), California Department of Fish and Wildlife (CDFW), and LORP area ranchers. The California State Lands Commission, also a signatory to the MOU participated. Considerable discussion developed around conditions in the Islands area and what to do to improve this stretch of the river. The group visited both the west and east side of the growing marsh, and a separate trip was made to the Island's eastside channel to assess whether directing the river down this waterway was feasible. Much of what was seen on the tour reinforced the view that tules were a dominating force in the project area. There was general consensus among the parties that tules were limiting the habitat development of the riverine riparian system, and that methods to control tules should be further investigated. The Summit group all agreed that it would be worthwhile to investigate options to improve flow through the area. LADWP and Inyo County agreed, and offered to seek funding to complete a study.

27. *Which public agencies, non-profit organizations, elected officials, and other entities and individuals support the project and why?*

Letters supporting this application can be found in Appendix C. The authors and their particular interests includes:

- LA Department of Water and Power—to improve the river hydrograph

- California Department of Fish and Wildlife—to identify impacts and receive guidance
- Sierra Club (conservation and outings group)—to improve water quality and diversify habitat
- Owens Valley Committee (conservation organization)—to improve flow and diversify habitat
- Friends of the Inyo (conservation/service organization)—to improve water quality and diversify habitat
- Scott Kemp, rancher in the Islands area—to improve flow and restore diverse habitat
- Duncan T. Patten, Hydrogeologist (LORP advisor)—to restore an effective hydrograph

DISADVANTAGED COMMUNITIES

28. *Will the project provide benefits to one or more disadvantaged communities, as described in CWC section 79505.5? Please refer to Section 3.10 of the Solicitation for guidance on how to determine if the project is located within and/or will benefit a Disadvantaged Community.*

The entire study area is within a Severely Disadvantaged Community Block Group and Tract, and adjacent to a Severely Disadvantaged Community Place.

By improving water quality and associated fisheries health, increasing habitat diversity, and potentially increased access, fixing the Islands could generate positive economic impact; potentially helping to generate jobs through growing tourism.

WATER RIGHTS AND HYDROGEOMORPHIC FACTORS

29. EXISTING WATER RIGHTS ASSOCIATED WITH THE PROPOSED PROJECT.

APPLICATION OR STATEMENT NO.†	WATER RIGHT TYPE	PRIMARY OWNER	DIVERSION SEASON	DIVERSION AMOUNT*	DIVERSION RATE*
S001749	Statement of Diversion and Use	City of Los Angeles Department of Water and Power			900 cfs

30. PROPOSED CHANGES TO EXISTING WATER RIGHTS. *Would implementation of your project require changes to any of the water rights listed above?*

The proposed study and planning project will not require changes to any water rights. Future projects considered for implementation of the proposed study also should not require changes to any water rights.

31. INITIATION OF NEW WATER RIGHTS. *Would implementation of your project involve the initiation of new water right(s)?*

No, the proposed study and planning project will not require initiation of any new water rights. Future projects considered for implementation of the proposed study also should not require initiation of any new water rights.

32. WATER LEASES. *Would implementation of your project involve a water lease?*

No, the proposed study and planning project will not involve water leases. Future projects considered for implementation of the proposed study also should not involve water leases.

33. FOREBEARANCE AGREEMENTS. *A forbearance agreement is a formal arrangement between an individual or organization and a water right holder that specifies how a water diversion will be managed for instream use. These agreements do not change the terms of the water right, but specify conditions under which a water right holder will forgo diversion to allow water to be left instream. Will implementation of your project involve a forbearance agreement?*

No, the proposed study and planning project will not involve water leases. Future projects considered for implementation of the proposed study also should not involve water leases.

34. OTHER VOLUNTARY AGREEMENTS. *Would implementation of your project involve other formal, voluntary agreements with outside parties or organizations with regard to the operation of existing or pending water rights?*

No, the proposed study and planning project will not involve additional agreements with outside parties with regard to water rights. Future projects considered for implementation of the proposed study also should not involve water rights.

35. TRANSFER OF WATER RIGHT. *Would implementation of your project involve a transfer of water or water rights?*

No, the proposed study and planning project will not involve transfer of water or water rights. Future projects considered for implementation of the proposed study also should not involve transfer of water rights.

36. WATER RIGHT COMPLIANCE ISSUES AND ENFORCEMENT PROCEEDINGS. *Are there any pending water right compliance issues or enforcement proceedings associated with any of the water rights listed above?*

No, there are no pending water right compliance or enforcement proceedings associated with this proposed project.

37. STREAMFLOW EFFECTS. *Quantitatively and qualitatively explain how the water rights changes described above will measurably enhance streamflow, and explain the significance of these effects. Please make sure your answer speaks to the geographic scope, timing, duration, and quantity of the enhancement.*

Water rights will not change, so there will be no effect.

38. EFFECTS ON OTHER WATER RIGHTS. *Please describe how your project will affect water availability for water rights located upstream and downstream of your project.*

The proposed study and planning project will not affect water availability for water rights upstream or downstream of the Lower Owens River.

HYDROGEOMORPHIC FACTORS

39. EFFECTS OF PROJECT ON STREAM HYDROGRAPH. *Will the hydrograph of any stream be altered as a result of the proposed project? If yes, please clearly describe how the hydrograph will be altered.*

No. The proposed study and planning project will not affect the hydrograph of any stream. However, future projects that may be implemented based on the results this proposed study may affect the hydrograph of the Lower Owens River through the affected reach and possibly downstream as well by ameliorating the impediments to flow in the Islands reach.

40. EFFECTS OF PROJECT ON GEOMORPHOLOGY. *Is the anticipated stream flow enhancement significant enough to alter the geomorphology of affected stream channels and floodplains? If yes, please describe how these alterations would affect fish and wildlife.*

No. The proposed study and planning project will not affect stream geomorphology. However, future projects that may be implemented based on the results this proposed study will affect the geomorphology of the Lower Owens River in the Islands reach. The effects on geomorphology are a subject of the proposed study with the primary goal of improving water quality and associated vegetation habitat.

-----END OF APPLICATION-----

TABLE AND FIGURES

SCHEDULE: Lower Owens River Flow Enhancement and Habitat Improvement Study

TASK	2017 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Jan	Feb	Mar	Apr	May	Jun
Execute Grant Agreement																									
Task 1: Water quality monitoring																									
Purchase monitoring instruments																									
Calibrate and deploy instruments																									
Operate instruments																									
Final water quality report																									
Task 2: Contract with consultants																									
Develop and distribute RFP																									
Receive proposals																									
Select Consultants and finalize contract																									
Task 3: Analysis of existing conditions																									
Assemble existing information																									
Perform initial reconnaissance																									
Develop topographic model																									
Develop hydraulic model																									
Model and assess existing conditions																									
Finalize report on existing conditions																									
Task 4: Develop and evaluate options																									
Conduct meetings with stakeholders																									
Prepare descriptions of three options																									
Feasibility Assessment																									
Conduct hydraulic/ecohydrolygic assessment																									
Finalize Report with recommended option																									
Task 5: Preliminary design of select option																									
Task 6: Final Design																									
Task 7: CEQA and permit acquisition																									
Conclude contracts and grant agreement																									

Project Main Task
Sub Task

Table 1. Study work plan schedule

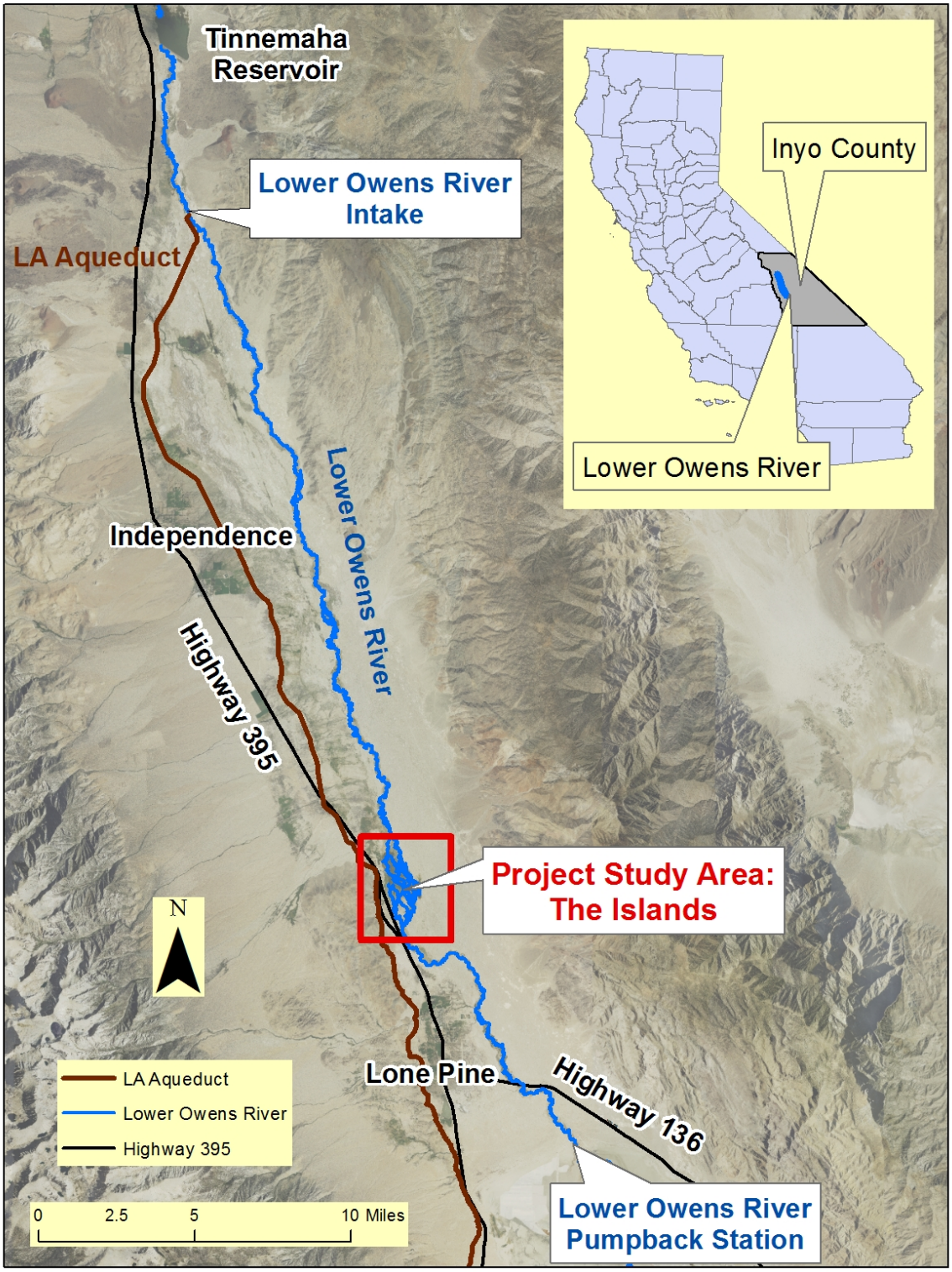


Figure 1. Lower Owens River Flow Enhancement and Habitat Improvement Study project location map.

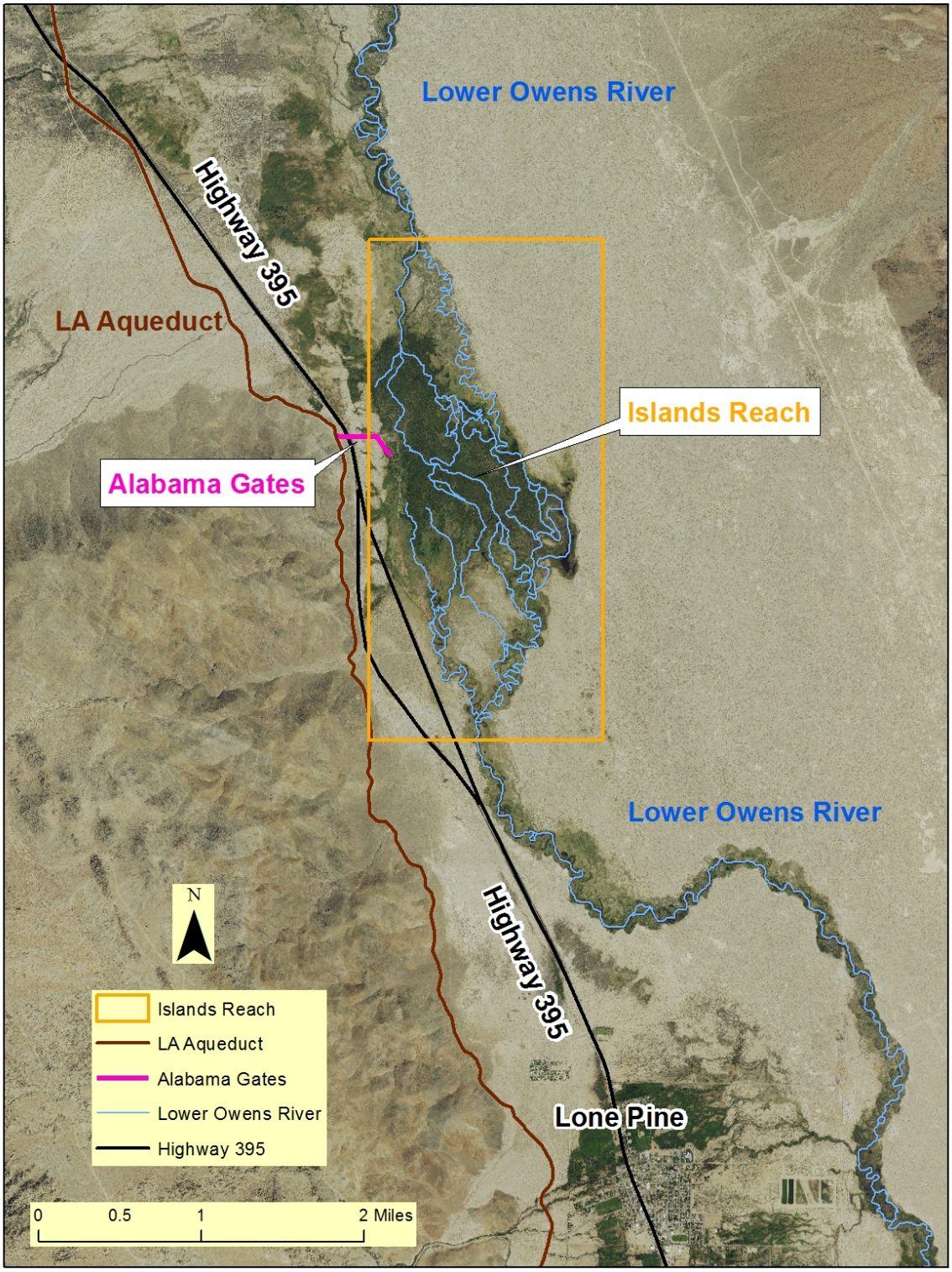


Figure 2. Detailed project area of Islands Reach of the Lower Owens River.

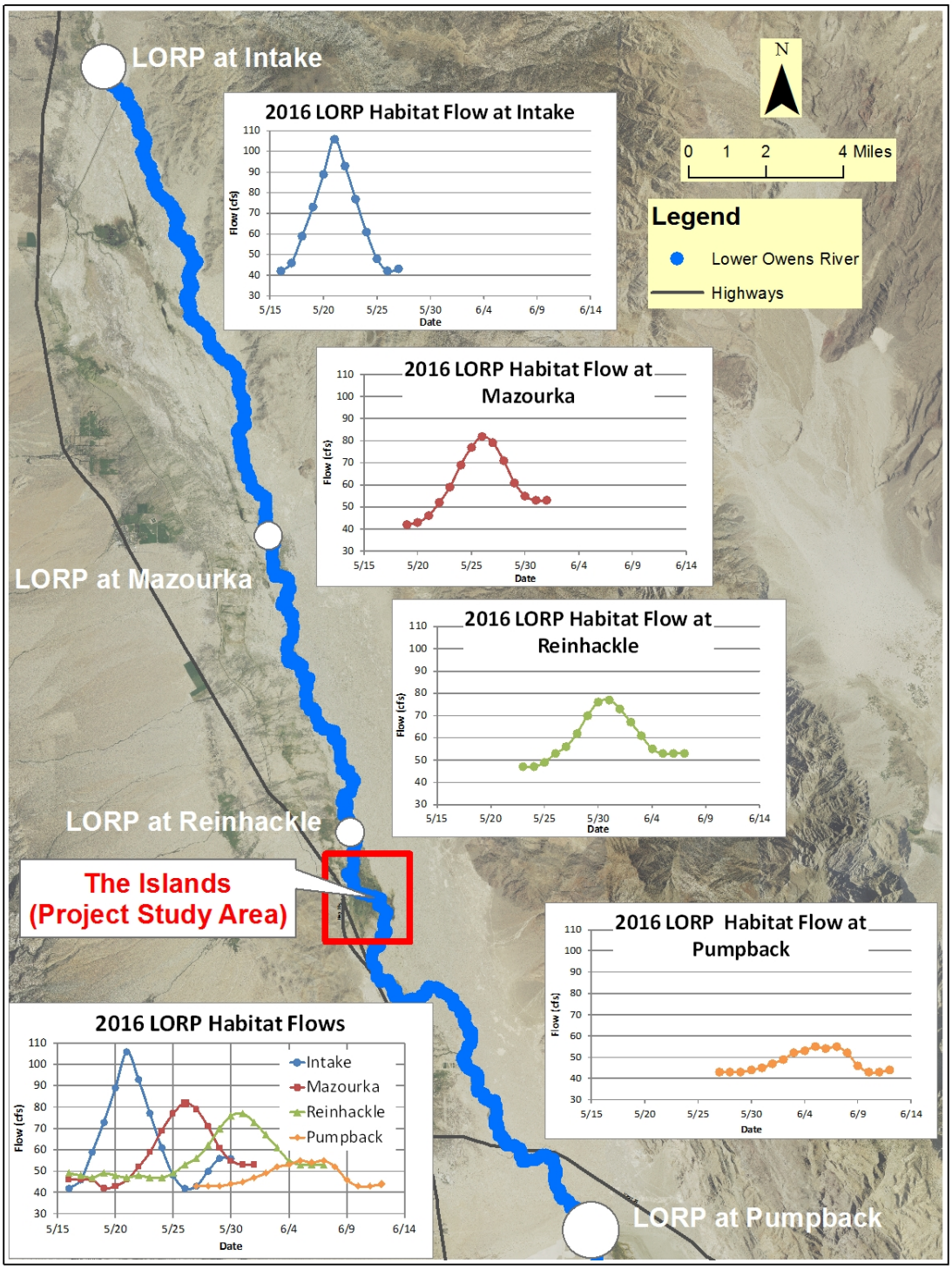


Figure 3. Attenuation of the 2016 LORP SHF. The Islands reach is enclosed in the red box. Based on these data, the estimated loss rate (cfs/river mile) in the Islands reach is approximately 2-3.5 times greater than other reaches (the range in values arises from the assumed loss rate from the Islands to the pumpback station which was estimated from measurements between the other stations.)

PROJECT AREA PHOTO

Figure 4. Islands panorama taken from the Alabama Gates looking east across the Islands marsh. The Alabama Gates spillway is in the lower center. The Inyo Mountains are in the distance.

APPENDICES

Appendix A—CCC Consultation

Appendix B—Budget

Appendix C—Letters of Support

APPENDIX A—CCC CONSULTATION

Name of Applicant: County of Inyo

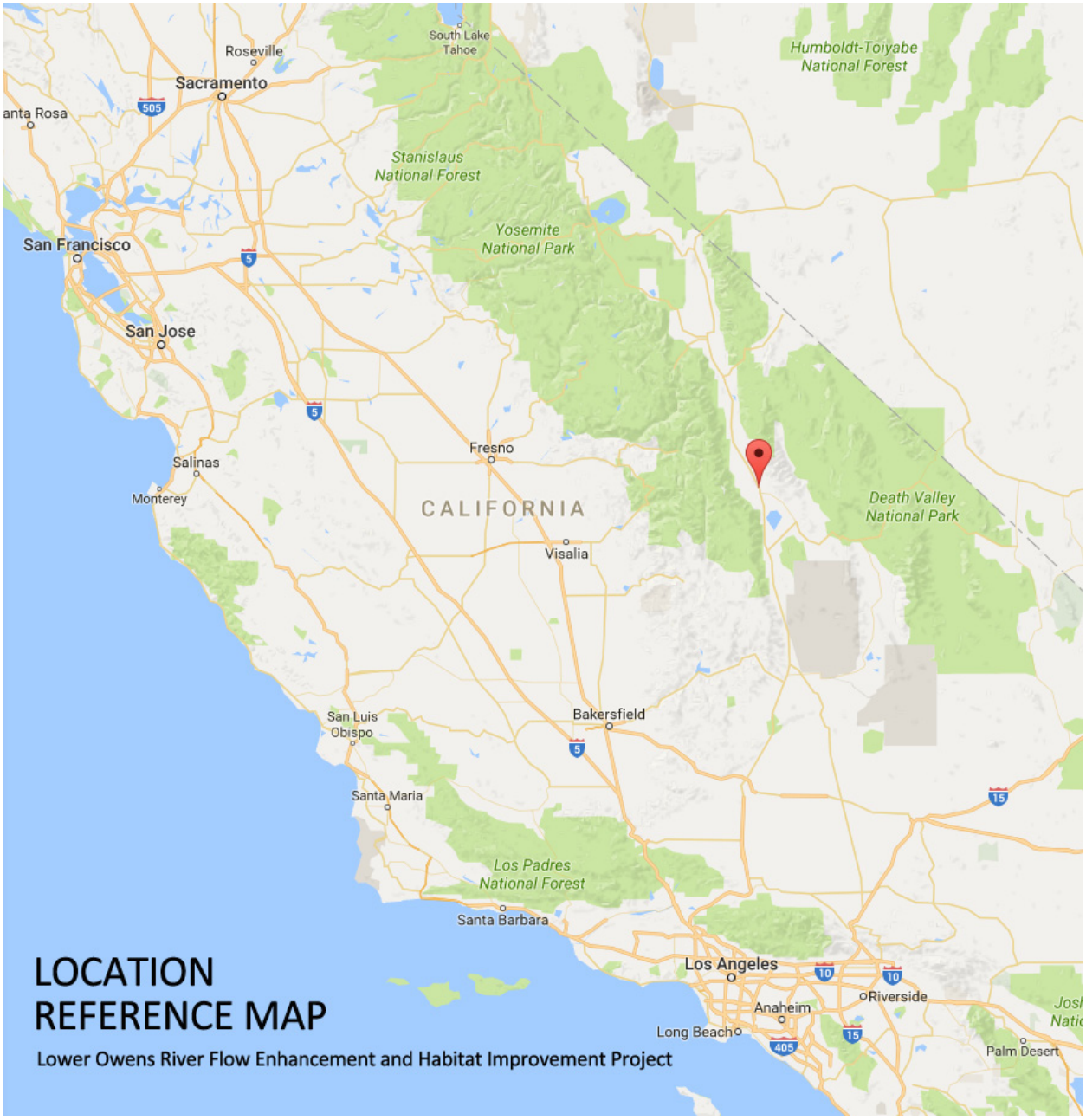
Project Title: Lower Owens River Flow Enhancement and Habitat Improvement Project

Department/Conservancy to which you are applying for funding: California Wildlife Conservation Board

Project Description: The County of Inyo's grant application under the WCB's, California Streamflow Enhancement Program seeks funds to use for a planning and scientific study to investigate the feasibility of opening up the Lower Owens River channel through the 'Islands' area of the Lower Owens River to improve water quality for fish and to restore diverse riparian habitat.

With the December 2006 return of a sustained water supply to the lower Owens River, under the Lower Owens River Project, the majority of the river-riparian corridor has generally responded favorably. Hundreds of acres of diverse habitat have formed along 62 miles of waterway. The exception is the "Islands" reach of the project east of Alabama Gates, where the river has aggraded and spread out of its channel. Historically, this area hosted a complex of river-riparian strip, treed upland "islands", and dry and wet meadows. Today, with the new water regime, the flow is no longer confined within the banks of a channel and now spreads out by diffuse flow through low diversity cattail/bullrush marsh. The result is that the original varied vegetation communities and habitat has transitioned into more than 500 acres of low-diversity tule marsh, which continues to expand both upstream and downstream.

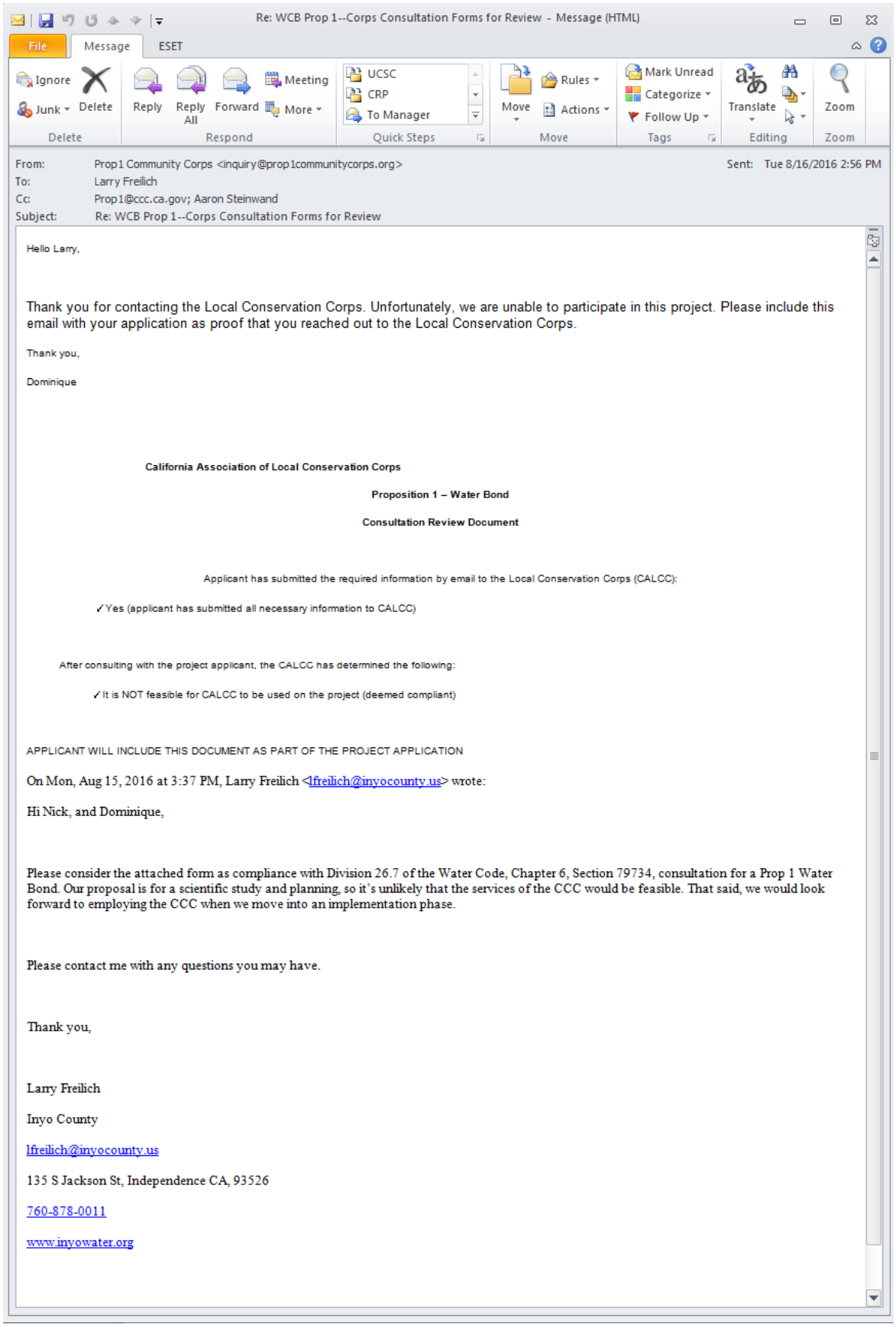
The grant will fund a scientific investigation to examine the feasibility of opening a channel or channels to reestablish an open water river through the Islands area. If the initial study determines the project feasible, the funds would be used to develop an engineering plan, complete a California Environmental Quality Act (CEQA) analysis, and obtain permits. The end product would be a project plan and CEQA, ready for implementation of a flow enhancement project that would be funded under a future grant.



Project Implementation estimated start and end dates: It is estimated that the scientific investigation, engineering study, and all planning documents, would be completed within two years of the receipt of funding (estimated December 2018). Implementation would commence as soon as construction funding was secured.

To be completed by Applicant:
Is this application solely for planning, acquisition or a scientific study with no field work?

- ✓ Yes (application is exempt from the requirement to consult with the Corps.



Re: WCB Prop 1--Corps Consultation Forms for Review - Message (HTML)

File Message ESET

Ignore Junk Delete | Reply Reply All Forward Meeting More | UCSC CRP To Manager | Move Rules Actions | Mark Unread Categorize Follow Up | Translate | Zoom

Delete Respond Quick Steps Move Tags Editing Zoom

From: Prop1 Community Corps <inquiry@prop1communitycorps.org>
Sent: Tue 8/16/2016 2:56 PM
To: Larry Freilich
Cc: Prop1@ccc.ca.gov; Aaron Steinwand
Subject: Re: WCB Prop 1--Corps Consultation Forms for Review

Hello Larry,

Thank you for contacting the Local Conservation Corps. Unfortunately, we are unable to participate in this project. Please include this email with your application as proof that you reached out to the Local Conservation Corps.

Thank you,

Dominique

California Association of Local Conservation Corps

Proposition 1 – Water Bond

Consultation Review Document

Applicant has submitted the required information by email to the Local Conservation Corps (CALCC):

✓Yes (applicant has submitted all necessary information to CALCC)

After consulting with the project applicant, the CALCC has determined the following:

✓It is NOT feasible for CALCC to be used on the project (deemed compliant)

APPLICANT WILL INCLUDE THIS DOCUMENT AS PART OF THE PROJECT APPLICATION

On Mon, Aug 15, 2016 at 3:37 PM, Larry Freilich <lfreilich@inyocounty.us> wrote:

Hi Nick, and Dominique,

Please consider the attached form as compliance with Division 26.7 of the Water Code, Chapter 6, Section 79734, consultation for a Prop 1 Water Bond. Our proposal is for a scientific study and planning, so it's unlikely that the services of the CCC would be feasible. That said, we would look forward to employing the CCC when we move into an implementation phase.

Please contact me with any questions you may have.

Thank you,

Larry Freilich

Inyo County

lfreilich@inyocounty.us

135 S Jackson St, Independence CA, 93526

760-878-0011

www.inyowater.org

APPENDIX B—PROJECT BUDGET

Lower Owens River Flow Enhancement and Habitat Improvement Study

A. PERSONNEL SERVICES						
Study Project Staff	**Hours**	**Rate/hr**	**Amount Request**	**Applicant Amount of Cost Share**	**Other Source/ Amount of Cost Share**	**Total Project Cost**
ICWD Mit Manager (Grant Management, Technical Review, Hiring)	**346**	$ 62	$ -	$ 21,500	$ -	$ 21,500
ICWD Senior Scientist (Field Studies, Technical Review, Writing)	**346**	$ 68	$ -	$ 23,694	$ -	$ 23,694
ICWD Hydrologist (Project Planning, Technical Review, Writing)	**346**	$ 53	$ -	$ 18,279	$ -	$ 18,279
ICWD Vegetation Scientist	**180**	$ 58	$ -	$ 10,440		$ 10,440
ICWD Department Director (Oversite)	**40**	$ 91	$ -	$ 3,625	$ -	$ 3,625
ICWD Andministrative Analyst (Grant Management, Contract Admin.)	**80**	$ 48	$ -	$ 3,869	$ -	$ 3,869
IC Planning Department Director (CEQA, Permitting)	**60**	$ 79	$ 4,717	$ 4,717	$ -	$ 9,433
IC Public Works Director (CEQA, Permitting, Construction Planning)	**40**	$ 93	$ 3,721	$ 3,721	$ -	$ 7,442
TOTAL PERSONNEL SERVICES			**$ 8,437**	**$ 89,845**	**$ -**	**$ 98,282**
B. OPERATING EXPENSES: GENERAL (Permits)						
Permit Fees--CDFW--Streambed Alteration Agreement (Section 1600)			$ 5,500	$ -	$ -	$ 5,500
Permit Fees--RWQCB--401 Water Quality Certification or Waste Discharge Requirement			$ 7,500	$ -	$ -	$ 7,500
Permit Fees--ACOE--Clean Water Act, Section 404 Permit			$ 100	$ -	$ -	$ 100
Permit Fees--County--Construction Grading Permit			$ -	$ 600	$ -	$ 600
Permit Fees--SOHP--Cultural ResourcesSubmission of Findings			$ 110	$ -	$ -	$ 110
TOTAL OPERATING EXPENSES (PERMITS)			$ 13,210	$ 600	$ -	$ 13,810
C. INDIRECT						
Indirect Cost Charge Rate	0		$ -	$ -	$ -	$ -
Indirect Cost Item[1]	0		$ -	$ -	$ -	$ -
TOTAL INDIRECT			$ -	$ -	$ -	$0
D. OPERATING EXPENSES: SUBCONTRACTORS						
Hydraulic Consultants--Collect Available Information			$ 10,084			$ 10,084
Hydraulic Consultants--Site Reconnaissance and Topographic/Hydrographic Survey			$ 22,479			$ 22,479
Hydraulic Consultants--Existing Conditions Analysis			$ 24,767			$ 24,767
Hydraulic Consultants--Alternatives Development and Evaluation			$ 31,178			$ 31,178
Hydraulic Consultants--Preliminary Design of Selected Alternative			$ 48,175			$ 48,175
Hydraulic Consultants--Construction Documents			$ 60,823			$ 60,823
Hydraulic Consultants--CEQA Support			$ 9,191			$ 9,191
Hydraulic Consultants--Project Management and Coordination			$ 13,142			$ 13,142
Hydraulic Consultants Subtotal			$ 219,839			
Biological Consultants			$ 35,000	$ -	$ -	$ 35,000
CDFW Fisheries Biologists (electrofishing 3 sessions)			$ 6,500			$ 6,500
CEQA Preparer			$ 55,000	$ -	$ -	$ 55,000
TOTAL SUBCONTRACTORS			$ 316,339	$ -	$ -	$ 316,339
E. OPERATING EXPENSES: EQUIPMENT						
Equipment	**Units**	**Cost/Unit**				
InSitu smarTroll Multiparameter (Handheld)	1	$ 3,150	$ 3,150	$ -	$ -	$ 3,150
InSitu Aqua Troll 600 Multiparamater Sonde (Deployable)	2	$ 5,200	$ 10,400	$ -	$ -	$ 10,400
TOTAL EQUIPMENT			$ 13,550	$ -	$ -	$ 13,550
F. SUBTOTALS						
SUBTOTAL A + B (Personnel Services + Operating Expenses: General)			$ 21,647	$ 90,445	$ -	$ 112,092
SUBTOTAL C (Indirect)			$ -	$ -	$ -	$0
SUBTOTAL D (Operating Expenses: Subcontractors)			$ 316,339	$ -	$ -	$ 316,339
SUBTOTAL E (Operating Expenses: Equipment)			$ 13,550	$ -	$ -	$ 13,550
G. GRAND TOTAL						
			$ 351,536	$ 90,445	$ -	$ 441,981

APPENDIX B—COST SHARE

Lower Owens River Flow Enhancement and Habitat Improvement Study

Entity Name (Name of Grant Program if applicable)	Cash 1	Anticipated award date	In-kind 1	Date Cash Expires	Status S, U (secured, unsecured)	Total
WCB Prop 1 (See Project Budget)		N/A	N/A	N/A	N/A	
Applicant		N/A	$ 90,445	N/A	Secured	$ 90,445
Other State Agency(ies) (insert additional rows as needed)		$0	$0	$0	$0	$0
Federal Agency(ies) (insert additional rows as needed)		$0	$0	$0	$0	$0
Other sources including Project Partners		$0	$0	$0	$0	$0
Total Project Cost		**N/A**	**$ 90,445**	**N/A**		**$ 90,445**

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

APPENDIX B—PROJECT SUMMARY

PROJECT TYPE	PROPOSAL TITLE	DESCRIPTION	APPLICANT	WATERSHED	PRIMARY STREAM	COUNTY	CDFW Region	REQUESTED GRANT FUNDS	MATCH FUNDS (COST SHARE)	TOTAL PROJECT COST
Study and Planning	*Lower Owens River Flow Enhancement and Habitat Improvement Study*	A scientific study and planning to investigate modifying the Lower Owens River channel through the 'Islands' reach of the Lower Owens River to identify and evaluate alternatives to enhance stream flow and improve water quality for the warm-water fishery and to restore diverse riparian-riverine habitat. Includes a hydrogeologic and biological study, engineering plans, CEQA, and permits.	Inyo County Water Department	Owens River	Owens River	Inyo	Inland Desert, Region 6	$351,536	$90,445	$441,981

APPENDIX C—LETTERS OF SUPPORT

August 29, 2016

Dr. Robert Harrington
Inyo County Water Department
135 South Jackson Street
P.O. Box 337
Independence, CA 93526

Dear Dr. Harrington:

Subject: Letter of Support for Feasibility Study for the Lower Owens River Flow Enhancement and Habitat Improvement Project

The Los Angeles Department of Water and Power (LADWP) would like to extend support for a feasibility study for Inyo County Water Department's (ICWD) Lower Owens River Flow Enhancement and Habitat Improvement Project (Project). LADWP understands that ICWD is submitting a grant application for the Project to the California Wildlife Conservation Board (WCB) Streamflow Enhancement Program for funds for planning and scientific study in the Islands area of the Lower Owens River Project (LORP). The Islands is a well-established wetland complex that has expanded since the implementation of the LORP in 2006. The feasibility study will evaluate the concept of opening a channel (or channels) in the Islands to reestablish flow through that section of the LORP.

The City of Los Angeles (City) is the property owner of the land where this study will occur and LADWP jointly manages the LORP with the County of Inyo (County). As such, LADWP is in support of investigating the practical feasibility of channel excavation in the Islands to improve water conveyance. The study should identify possible options for conducting this work as well as long term environmental benefits and impacts that would result from implementation. Additionally, a thorough cost analysis should be conducted for a preferred alternative, if determined.

All of this information is necessary before the City and County can move forward with supporting and implementing such a project to ensure that it will be compatible with LORP goals and accompanying legal guidance. LADWP's support for the feasibility study at this time in no way commits the City to implement, operate, or maintain a preferred alternative.

Please include this letter of support in your grant application to WCB. If you have any further questions, please contact Ms. Lori Dermody, Watershed Resources Supervisor, at (760) 873-0408.

Sincerely,

FOR

James G. Yannotta
Manager of Aqueduct

LD:bs
c: Mr. Larry Freilich
Ms. Lori S. Dermody

California Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
787 North Main Street Suite 220
Bishop, CA 93514
(760) 872-1171
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., *Governor*
CHARLTON H. BONHAM, *Director*

August 29, 2016

Larry Freilich
Inyo County Water Department
135 South Jackson Street, Box 337
Independence, CA 93526

Subject: Letter of Support for the Lower Owens River Flow Enhancement and Habitat Improvement Study

Dear Mr. Freilich:

The California Department of Fish and Wildlife (CDFW) is a party to the 1997 Memorandum of Understanding to the 1991 Environmental Impact Report mandated by the Inyo-LA Long Term Water Agreement. Therefore, CDFW is one of the parties responsible for implementing and monitoring the Lower Owens River Project, the largest river restoration in the western United States.

CDFW supports Inyo County's grant application for the Lower Owens River Flow Enhancement and Habitat Improvement Study. Fish and wildlife resources may be impacted by future management actions; this study will help identify impacts to those resources, and guide future management decisions.

CDFW will enter into a Streambed Alteration Agreement with Inyo County prior to any substantial alterations to riverine habitats. The Streambed Alteration Agreement will minimize and mitigate any adverse impacts to fish and wildlife resources resulting from project activities. Inyo County has already begun consultations with CDFW personnel regarding this project. Inyo County has obtained and met the required mitigation measures of previous Streambed Alteration Agreements mandated by restoration and enhancement projects in the Owens Valley.

If you have any questions regarding this matter, please contact Nick Buckmaster at (760) 872-1110 or Nick.Buckmaster@wildlife.ca.gov.

Sincerely,

Heidi Calvert

Heidi Calvert
Senior Environmental Scientist (Supervisor)

cc: Chron
Nick Buckmaster, CDFW

Conserving California's Wildlife Since 1870

Range of Light Group
Toiyabe Chapter, Sierra Club
Counties of Inyo and Mono, California
P.O. Box 1973, Mammoth Lakes, CA, 93546
Rangeoflight.sc@gmail.com

August 30, 2016

Dr. Bob Harrington
Director, Inyo County Water Department
P.O. Box 337
135 South Jackson Street
Independence, California 93526

Subject: Letter of Support for the Lower Owens River Flow Enhancement and Habitat Improvement Project Grant

Dear Dr. Harrington,

The Sierra Club Range of Light Group strongly supports the County of Inyo's grant application to the California Wildlife Conservation Board for the Lower Owens River Flow Enhancement and Habitat Improvement Project. This grant would provide funding for a much needed study of the possibility of modifying the Lower Owens River channel through the 'Islands' area of the Lower Owens River to improve water quality and fish habitat and to bring about a more diverse riparian environment

The Sierra Club is a party to the 1997 Memorandum of Understanding that sets forth elements and goals of the Lower Owens River Project. This is a very important project that Sierra Club has worked to get implemented and to monitor its progress. With the 2006 re-watering of the Lower Owens River, the Islands area has become essentially a large tule and cattail marsh, at the expense of meadow and riparian woodland habitats and with negative consequences to water quality in the lower reaches downstream. If a feasible way to improve flows through the Islands can be identified by this study, we believe that a better flow regime could potentially be implemented to better achieve the overall goals of the project.

If you have any questions about our support for this application, please contact me at 760-920-2211 or m.bagley@verizon.net.

Sincerely,

Mark Bagley
Sierra Club 1997 Owens Valley MOU Representative
and Owens River Watershed Conservation Chair,
Range of Light Group, Sierra Club

Owens Valley Committee
P. O. Box 77
Bishop, CA 93515
August 27, 2016

Dr. Bob Harrington
Director, Inyo County Water Department
P.O. Box 337
135 South Jackson St
Independence, California, 93526

Re: Lower Owens River Flow Enhancement and Habitat Improvement Project Grant

Dear Dr. Harrington,

The Owens Valley Committee (OVC) supports the County of Inyo's application to the California Wildlife Conservation Board to examine the possibility of improving the flow of water through the Islands area of the Lower Owens River near the Alabama Gates.

OVC is a party to the Memorandum of Understanding that prescribes elements of the Lower Owens River Project (LORP), a compensatory mitigation measure set forth in the 1991 Inyo-Los Angeles Environmental Impact Report. The LORP was intended to compensate for the destruction of seeps, springs and wetlands throughout the Owens Valley caused by the Los Angeles Department of Water and Power's pumping of groundwater to supply the second aqueduct. In order to provide acceptable mitigation, the LORP needs to create a diversity of habitats that support native species under a regime of controlled flows. Under natural circumstances, large volumes of water would seasonally clean the channel, or create new channels. Now, with a managed Lower Owens River, it is vital that the river be assisted in improving flow in order to improve water quality and move debris through the river channel.

The Islands area of the LORP is challenging, and requires analysis in order to determine a path for water to move through what is now essentially a marsh, and to devise an engineering plan to accomplish the creation of a channel. The Islands area lies between two strands of the active Owens Valley fault zone. Movement along the fault zone causes the Islands area to subside, lowering the gradient of the Owens River in the Islands. Any analysis to determine the feasibility of modifying the river channel in order to improve flow should take this into account. Any firm hired to conduct the study should have demonstrated expertise in fluvial processes or subcontract with a fluvial geomorphologist.

This Flow Enhancement project is an exciting opportunity that will help achieve the goals of the LORP, and will further the restoration of the River. This project, in concert with channel clearing efforts such as the Owens River Water Trail, will help to incrementally create a

healthy river and riparian zone, thus improving the Lower Owens River. The Owens Valley Committee urges the California Wildlife Conservation Board to fund this investigation as a prelude to implementing flow enhancement in the Lower Owens River.

Sincerely,

Mary A. Roper

President

FRIENDS OF THE INYO
PRESERVATION • EXPLORATION • STEWARDSHIP

August 24, 2016

Dr. Bob Harrington
Director
Inyo County Water Department
PO Box 336
Independence, CA 93526

Dear Dr. Harrington,

Friends of the Inyo wishes to state our support for Inyo County's ***Lower Owens River Flow Enhancement and Habitat Improvement Project*** grant application to the California Water Resources Conservation Board Streamflow Enhancement Program seeking funding for a scientific study of the "Islands" section of the Lower Owens River near Lone Pine. This area has been impacted in unforeseen negative ways by the 2006 rewatering of the Lower Owens River's 62 miles of channel. Goals of the rewatering such as riparian habitat creation, fisheries development, water quality, grazing and recreation are not fully met. Problems today include degradation of water quality and the expansion of tule growth that clogs channels and floods adjacent riparian forests and meadows leading to their eventual loss.

Friends of the Inyo, a local non-profit organization formed in 1986, has been partnering with Inyo County on a reach of the river immediately downstream from the Islands reach. Our efforts have been to help partially open and maintain a Water Trail for recreational uses by people of all abilities. We feel that the Islands reach of the river immediately upstream from the Water Trail work impacts water quality, fisheries, and recreation. Study is needed to better understand the specific causes of the problems and to design solutions. Such study is beyond the scope of either Inyo County or the landowner, the Los Angeles Department of Water and Power.

Sincerely,

Laura Beardsley
Executive Direction

819 N. Barlow Lane Bishop, CA 93514 760.873.6500 FriendsoftheInyo.org

Aug 30, 2016

Dr. Bob Harrington

Director, Inyo Co. Water Dept.

Dear Dr. Harrington,

The S & M Kemp Ranch, as a lessee of the Island reach of the Lower Owens River, is in full support for the application to the Calif Resources Conservation Board for funding for the Lower Owens River Flow Enhancement and Habitat improvement project.

Our family has leased the Island area from LADWP for almost sixty years for cattle grazing. We have seen approximately four hundred acres of meadow become reeds and tules due to beaver invasion and increased flows of the river. Hopefully a study can determine where and how this area can be channelized and where and how we can have a river again.

Sincerely, Scott Kemp

Scott Kemp

Duncan T. Patten
Hydroecologist
8945 Trooper Trail
Bozeman, MT 59715-2005

Office (406) 582-0594
Home (406) 582-0486
e-mail: dtpatten@mcn.net

August 29, 2016

Inyo County Water Department
Dr. Robert Harrington, Director
P.O. Box 337
Independence, CA 93526

Dear Dr. Harrington:

Re: Proposal Titled: Lower Owens River Flow Enhancement and Habitat Improvement Study

As you know, I attended the Lower Owens River Project (LORP) Summit a year or so ago and have extensively studied many of the eastern Sierra river/riparian ecosystems. My experience in that area and many decades studying aridland riparian systems encourages me to write in support of your proposal to investigate the feasibility of reactivating natural channels through the Islands to reestablish functional flows to the lower reaches of the Lower Owens River. As I understand, the primary concept of reestablishing functional flows is to improve the downstream conditions of the Lower Owens using appropriate hydrology for enhancing riparian/riverine habitat. The LORP was designed to enhance the reach of the Lower Owens River from the intake gates for the Los Angeles Aqueduct nearly to Owens Dry Lake where water that remains in the river channel after being released from the intake area into the river channel is pumped back to the Los Angeles Aqueduct. The lower portions of this reach apparently do not achieve these goals.

The adaptive management program developed for enhancement of the Lower Owens River has designed several flow release hydrographs that are meant to enhance the downstream riparian/riverine system. A very important component of these hydrographs is release of what is termed "flushing flows" which are meant to mimic natural high spring flows. Release of these flushing flows recognizes the accepted ecohydrological concept that maintenance of a natural hydrograph is essential to maintenance of a healthy riverine system.

Using the adaptive management concept that "one learns by doing", we now know that the LORP program's hydrographs, although often simulating "natural flows", are not maintaining these "natural flows" through the whole reach of the LORP, that is, from the intake gates nearly to Owens Dry Lake. Consequently, several reaches in the Lower Owens are not functioning expected. The Islands marsh area is the primary component of the Lower Owens river system that is altering the flows, both hydrologically and chemically. Flows passing through this marsh area are altered in volume and flow pattern, as well as chemically, entering the lower reaches with higher organic content which is detrimental to the fish population.

There are several approaches to correcting the problems created by the Islands. One would be to release much higher volumes of water during the flushing flows. These would, over time, create functional

channels through the Islands allowing flow-through of the "natural hydrograph". The other would be to create channels through or around the Islands thus mimicking what extremely high spring flows might create. The first approach is unlikely as there is seldom enough water to create within the LORP "extreme high spring flows", except when "nature" might provide them during an unusually high snowpack year. Consequently, the second approach of creating the bypass channels to allow appropriate downstream hydrographs for a proper functioning riparian/riverine system becomes the most logical approach.

To undertake this second approach correctly, it is essential to understand the consequences of several options for "creating channels". This proposal plans on doing feasibility studies and will work towards engineering plans for the "created channels", should the study show these to be the correct alternative to solve the problem.

Knowing the activities of LORP, and the need for better hydrographs to produce the hoped for outcomes throughout the full reach of LORP, I greatly support this effort and anticipate it will find the appropriate approach to solving the downstream problems created by the Islands.

Sincerely,

Duncan T. Patten, PhD
Riparian, Wetland, and Watershed Hydroecologist