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***MERCED RIVER INSTREAM & OFF-CHANNEL HABITAT REHABILITATION:  
SALMONID HABITAT RESILIENT TO CURRENT AND FUTURE CALIFORNIA  
DROUGHTS***

**Proposal submitted to: WaterSMART Drought Resiliency Program**

U.S. Department of the Interior  
Bureau of Reclamation  
Policy and Administration

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## TECHNICAL PROPOSAL AND EVALUATION CRITERIA

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### C.3.1.3. Task C—Projects that Provide Protection for Fish, Wildlife, and the Environment

The Merced River Drought Habitat Project (Merced Drought Project or the Project) seeks to mitigate and minimize potential drought-related impacts to the Merced River ecosystem and provide a sustainable environment for native anadromous fish (salmonids) that are most vulnerable to periods of deficient water supplies, using Chinook salmon as the focal species. Native rainbow trout (*O. Mykiss*) are present in the Merced River in the Project area and the Merced River in the area of the proposed Project has been designated as critical habitat for *O. Mykiss*. *The Project purpose is to provide benefits targeting native salmonids and the ecosystems they inhabit and use focusing on drought impacts and resiliency to those impacts.*

The Merced Drought Project will improve habitat, including restoring habitat function for key species and lifestages during drought conditions. Benefits to environmental conditions will:

1. \ Increase Available Habitat - The Project will increase the amount and diversity of salmonid habitat, identified as a factor limiting population recovery within the Central Valley (CV).
2. \ Re-establish floodplain and main channel connectivity, especially under low-flow conditions - Re-contouring perched and armored floodplains and scoured main channel under present and future hydrograph scenarios will improve activation and functionality of critical salmonid habitat, especially during drought conditions.
3. \ Reduce mined channel features that may attract non-native predators - Unnatural pools associated with armored banks may increase non-native fish predation on salmonids.
4. \ Improve channel temperatures – Armored and scoured CV river channels may heat more extensively than natural river channels. Recent gravel augmentation studies in several CV rivers have demonstrated significant improvement to water quality (i.e., cooler temperatures, higher dissolved oxygen, and reduced intergravel turbidity (Merz et al. 2004, Utz et al. 2013). The Project will improve water quality in the lower Merced River.
5. \ Increase Native Riparian Vegetation – Dredger tailings associated with mining along CV rivers provide little soil for riparian plants to recolonize (Stella et al. 2003). This is compounded by perched floodplains that rarely connect during drought conditions. Lack of native riparian plants elevate air, ground and water temperatures exacerbated by drought. Recent studies on California rivers have demonstrated that reestablishing floodplain soils and connectivity allows rapid colonization of native woody vegetation that can improve stream temperatures and habitat quality (Sellheim et al., 2016). Woody plant colonization will also support carbon sequestration, ameliorating future climate impacts.

### C.3.2. Project Eligibility

Funding requested for the Project is meant to implement a drought-resilient habitat restoration project. FOA funding would not be used for scientific research, water hauling, education and outreach, land fallowing, cover cropping, or reimbursement for economic losses resulting from drought. The Project is intended to provide long-term habitat benefits that are resilient to drought conditions, and has no irrigation or consumptive use application. This Project is not associated with a drought contingency plan.

### **C.3.3. Length of Projects**

If funded, the Merced Drought Project construction would be completed within 36 months of funding award.

## **Executive Summary**

This Project was specifically designed by a team of restoration ecologists, fisheries biologists, geomorphologists and engineers to address goals of the:

- T NOAA Central Valley Salmon and Steelhead Recovery Plan to implement floodplain and side channel projects that improve river function and increase habitat diversity in the Merced River; and
- T California Department of Fish and Wildlife Fisheries Restoration Grant Program (Grant No. D1440405) to restore anadromous salmonid habitat impacted by 2014 drought and enhance habitats that showed resiliency.

If awarded, FOA funding will be used to rehabilitate an estimated 0.5 acres of salmonid spawning habitat and 6 acres of riparian and upland habitat (~0.8 river miles). The design is focused on enhancing salmonid spawning, incubation and rearing habitat that is resilient to present and future drought scenarios. This includes rehabilitation and enhancement of channel, floodplain and riparian ecosystem processes and critical habitats for juvenile and adult salmonids and reduction of invasive piscivore habitats. Habitats will function at intervals, both within and among years at the current hydrologic regime and under the drought conditions.

The project construction window is 15 July to 15 October each year and will be completed within 3 full work seasons from acquisition of funding. This Project is not located on a Federal facility.

## Background Data

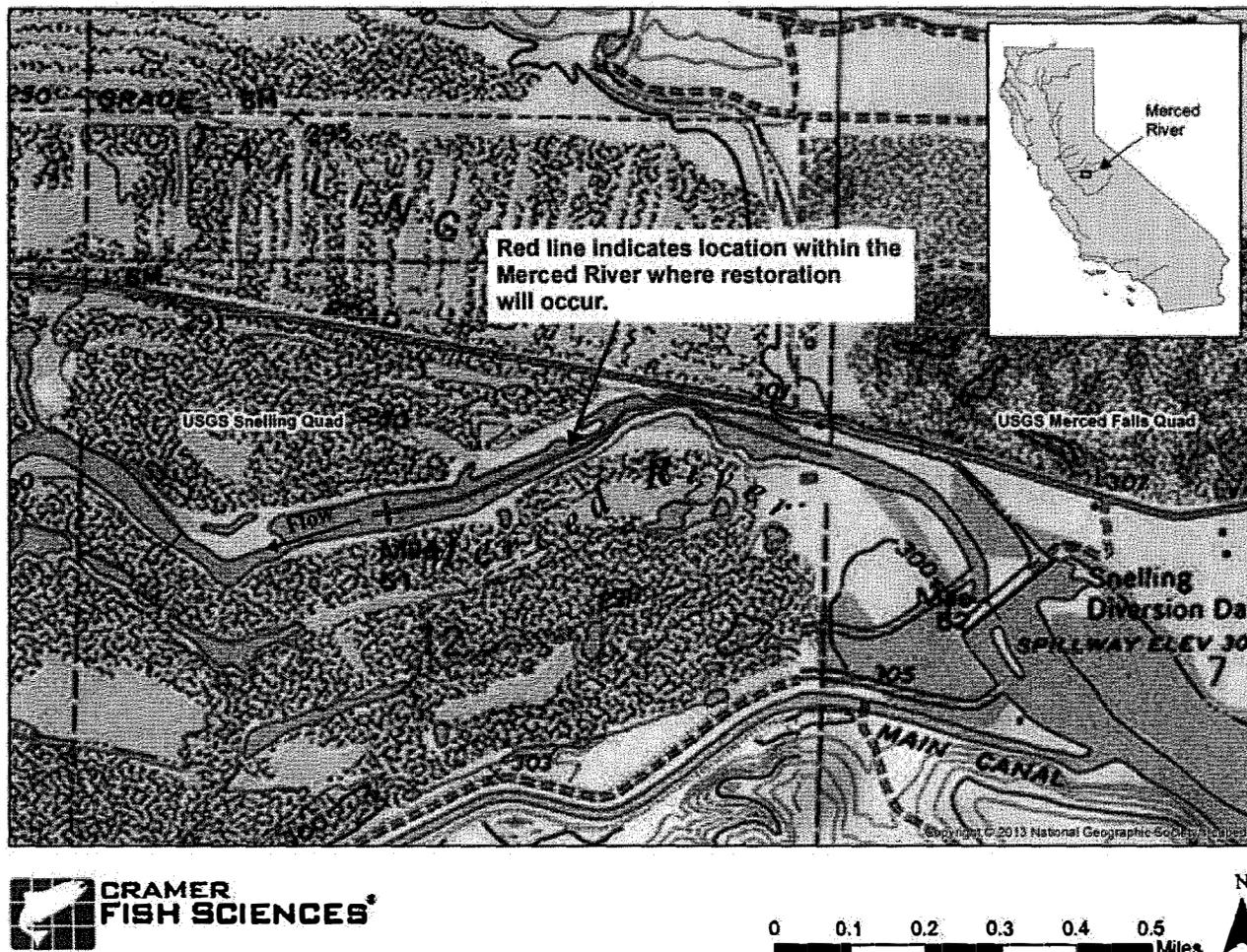


Figure 1. Location of Merced Drought Project located in Merced County California, and direction from nearest town) of the proposed Project. Upstream limit of project boundary: 37.51611 N, 120.38444 W; Downstream limit of project boundary: 37.51694 N, 120.37472 W

The proposed Merced Drought Project is located approximately 3 miles east of Snelling, California on Road J16 in Merced County (Figure 1), in a section of the lower Merced River (LMR) known as the Dredger Tailings Reach (DTR).

The LMR is a tributary to the San Joaquin River and maintains the most southern extant population of Chinook salmon in the world. The property proposed for restoration is located approximately 51 river miles from the confluence of the San Joaquin and Merced rivers, and contains an estimated 44.5 acres of mined river channel and associated floodplain owned by Merced Irrigation District (MID). It is adjacent to the Calaveras Trout Farm and downstream from the California Department of Fish and Wildlife’s Merced River Hatchery. The property was obtained by MID in 1969. These parcels, along with several other parcels in the area, were purchased in association with the construction of the Merced River

Hydroelectric Project. The property subject to the proposed restoration serve no operational purposes to MID at this time.

The California Department of Fish and Wildlife (CDFW) has determined that the stretch of river between Crocker-Huffman Dam and the confluence with the San Joaquin River is of considerable importance for maintenance and restoration of salmonids (CDFW 1998) and the location of the Project site is identified within the Central Valley Salmon and Steelhead Recovery Plan under the Southern Sierra Nevada Diversity Group Recovery Actions (NOAA 2014). This area was chosen because it is known to have supported native salmonid spawning and rearing in the past and because the substrate and floodplain are suitable for habitat improvement, especially as it relates to future drought scenarios. Further, the Project area is also the upstream limit of anadromy for salmonids and thus plays a critical role in modulating river-based population dynamics.

The DTR is a heavily impacted area of the LMR because of the presence of dredger tailings from historical gold-mining activities. Beyond the areas of tailings, most of the land use is rural agricultural. The LMR has been historically mined for gold and aggregate, and mining continues on the floodplain today. As a result, the LMR has two major salmonid habitat deficiencies: suitable gravel for reproduction and functional floodplain for rearing. Furthermore, channel incision and subsequent pool development have potentially exacerbated non-native predator impacts to juvenile salmonids. Under drought conditions, these deficiencies are further magnified.

Reduction in magnitude and duration of peak winter and spring runoff also decreases coarse sediment transport. Historic mining operations further depleted coarse sediment supplies, generating cobble terraces that disconnect floodplains from the main river channel and juvenile salmonid predator habitat (CDFG 1993). Unnaturally high and coarse floodplains effectively disconnect from the entrenched channel, reduce juvenile salmonid rearing habitat, preventing floodplains from supporting a healthy riparian ecosystem, and exacerbating temperature issues.

The LMR watershed is located between Crocker-Huffman Diversion Dam and Shaffer Bridge. This section of river has been extensively affected by local water withdrawals, agricultural water returns and land use activities, most notably dredger mining for gold in the 1800s. The major water withdrawals are associated with the Cowell Agreement water users and riparian water users who divert up to approximately 94,000 ac-ft of water annually from this section of river at varying flow rates, and have maintained seven main channel diversions since the mid-1800s. There are numerous agricultural return flows in this section of river as well. For instance, Ingalsbe Slough, which is used as a return flow for some of the diversions of the Cowell Agreement water users, enters the LMR approximately 2 miles upstream of Shaffer Bridge.

Watershed ownership is roughly 25% private, 15% state, and 60% federal. Most of the land adjacent to the LMR downstream of the Crocker-Huffman Diversion Dam is privately owned, predominantly used by agriculture. The crops grown within the river corridor are typical of the types of crops grown throughout Merced County and include field crops such as oats, wheat and sorghum, fruits and nuts such as apricots, cherries, almonds, walnuts, figs, mandarin oranges, navel oranges, and prunes, and vegetables such as corn, lima beans and potatoes. Other agricultural land uses, such as dairies and poultry farms, are also distributed throughout the corridor.

## Project Description

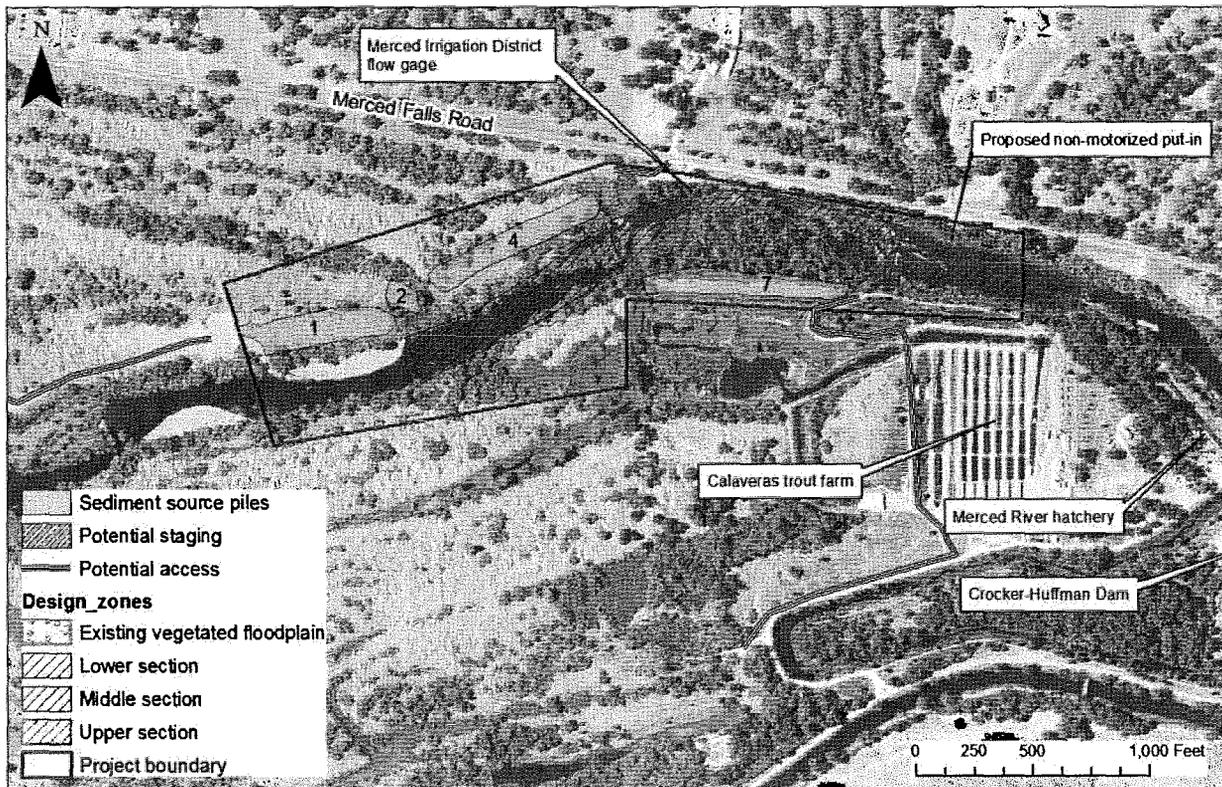


Figure 2. General Location of the Merced River Drought Project, located on the Lower Merced River, Merced County California.

The proposed Project consists of re-grading and rehabilitating ~6 acres of dredger tailings on the historic floodplain and ~0.5 acres of salmonid spawning habitat (Figure 2). Over a 2-year period, the floodplain will be graded and floodplain material (~65,000 yd<sup>3</sup>) will be screened to appropriate size classes (1/4 to 5 in of round river rock) and ~45,000 yd<sup>3</sup> of this material placed within the spawning channel. The strategy for replenishment is based on an understanding of the existing channel bed topography (Stillwater Sciences 2004a; CFS, unpublished data) and average grain size distribution of sediments available from the dredger tailings (URS 2004b), and is intended to re-create channel bedforms favorable to spawning salmonids. Gravel will be placed in configurations designed by incorporating the Spawning Habitat Integrated Rehabilitation Approach (SHIRA) developed by the University of California, Davis (Wheaton et al. 2004a, b; Pasternack 2008; Sawyer et al. 2008), and general rearing habitat components at each site, for two consecutive years. The SHIRA approach incorporates a 2-D hydraulic model with a sediment mobility index and a habitat suitability model. The result is a design to enhance spawning habitat based on the unique hydraulic and sediment conditions at each site for the quantity of gravel placed. Similar methods are used to reduce habitats conducive to invasive predatory fish.

Gravel will be screened from dredger tailings adjacent to the LMR. The volume and texture of dredger tailings has been analyzed and discussed previously; see URS (2004a) and Stillwater Sciences (2005). For the purposes of the Project, tailings will be sorted to exclude top soil, fines, and large cobble. The

resulting mixture will be highly beneficial for aquatic habitat purposes, and will not contribute to reductions in LMR water quality. An onsite gravel processing plant will be established where dredger tailing material will be processed and sorted by contractors. This processing plant, associated equipment, and temporary gravel stockpiles will have an approximate footprint of 200 ft x 200 ft and will be removed following restoration work. Smooth, river rock of the appropriate size will be transported (i.e., by steam-cleaned tractor-trailer transfer trucks with a capacity of 7-20 tons) and staged onsite. Gravel will be deposited in-stream and manipulated by a rubber-tired front-end loader. This equipment will travel from the staging area to the enhancement site using private roads and easement areas associated with the restoration site footprint (Figure 2). To mitigate for potential negative effects on anadromous fish, in-stream gravel placement activities will occur during late summer, when controlled flow releases from New Exchequer Dam and salmonid use are at a minimum. Construction will require approximately 12 weeks annually, with in-stream construction work requiring 30-60 days annually.

The gravel processing will be done under a grading permit from Merced County, issued to the contractors. Areas on the north and south banks (see Figure 5) will be re-graded from 1 – 20 ft (0.3 – 6.1 m) in elevation, and in the process form windrows of three different bed material types. Separate rows will consist of: 1) 5 – 10 in cobbles that will be used to build up the base layer of each riffle and fill deep holes in the channel profile; 2) 1/4 – 5 in (0.6 – 12.7 cm) of gravel that will be placed 2 – 3 ft (0.6 – 0.9 m) deep at each riffle site; and, 3) fines less than 1/4 in (0.6 cm). Materials less than 1/4 in (0.6 cm), including organic materials such as humus will be used to provide a soil matrix for re-vegetation of upland riparian plant communities. All gravel to be used for this Project will be obtained from within the MRR project area so that none would be transported over county or state roads.

## Evaluation Criteria

### Evaluation Criterion A – Environmental/Wildlife Benefits

Merced River salmonid populations occur at the southernmost extent of their range in California's Central Valley and are among numerous native fish species undergoing widespread decline (Moyle et al. 2008). The anadromous form of Central Valley *O. mykiss* are listed as threatened (NOAA 2004). Fall-run Chinook salmon was identified as a Species of Concern in 2004. Both species have been adversely impacted by the CVP and are targeted under the CVPIA doubling goals. The Merced Drought Project will enhance and restore approximately 0.8 miles of the LMR including 0.5 acres of salmonid spawning habitat and 6 acres of seasonal and permanent rearing habitat. The Project design goals are as follows:

- j Augment, rehabilitate, and enhance productive LMR juvenile salmonid rearing and adult spawning habitat that is resilient to drought conditions;
- j Enhance juvenile salmonid access to historic floodplain habitat;
- j Reduce main channel habitats potentially conducive to invasive fish species;
- j Create additional flooding capacity, improving flood management in wet years;
- j Address goals of existing recovery plans and work synergistically with existing restoration efforts; and
- j Improve community opportunities to participate in, learn about, and support salmonid habitat restoration that is resilient to present and future drought conditions.

In particular, spawning habitat was designed to function during base flows observed in past dry and critically dry water years for the LMR. Similarly, seasonal rearing habitat was designed to function

during critically low flows during the typical salmonid rearing period. Finally, main channel habitat is designed to reduce holding areas for invasive fish predators that may be especially detrimental to juvenile salmonid survival during critically low flow periods.

*Effectiveness Monitoring* - Generally, assessment of restoration actions should include three types of monitoring: implementation; effectiveness; and validation (MacDonald et al. 1991; Kershner 1997; Mulder et al. 1999). Time scales, project aspects, and objectives addressed will vary among types of monitoring, but the basic questions and time frames are included in **Error! Reference source not found.**

For the Merced River Drought Project, we will include implementation monitoring. Effectiveness and validation monitoring will occur outside of this grant application. Success of implementation will be carefully tracked using physical parameters and the effectiveness of the project will be assessed with a variety of physical and biological parameters important for salmonid spawning and rearing habitat. Table 1 provides a summary of specific questions and objectives and the methods we will use to address each. Methods sections of each monitoring objective will provide additional detail. Monitoring results will serve to validate basic assumptions about recovering floodplain and side channel habitat and improving habitat function under drought conditions. The monitoring program is designed to determine and document project outcomes, and serve to inform fisheries scientists with a regional-level understanding of ecosystem dynamics in the Sacramento-San Joaquin watersheds.

Table 1. Monitoring types for restoration projects (Stillwater Sciences 2006).

Type of Monitoring	Question Addressed	Time Frame
Implementation	Was the project installed as planned?	1-6 months
Effectiveness	Was the project effective at meeting restoration objectives?	1 year to decades
Validation	Are the basic assumptions behind the project conceptual model valid?	5-10 years

**Evaluation Criterion B – Drought Planning and Preparedness**

**Appendix 1 - Excerpts of Applicable Drought Plans** is comprised of three drought plans and the entire plan can be found in the links provided below.

1. H Sacramento and San Joaquin Basins Climate Impact Assessment, Reclamations  
<http://www.usbr.gov/WaterSMART/wcra/docs/ssjbia/ssjbia.pdf>
2. H California Drought Contingency Plan  
[http://www.water.ca.gov/waterconditions/docs/Final CA Drought Contingency Plan-11-18-2010a.pdf](http://www.water.ca.gov/waterconditions/docs/Final_CA_Drought_Contingency_Plan-11-18-2010a.pdf)
3. Central Valley Project and State Water Project Drought Operations Plan  
<http://www.water.ca.gov/waterconditions/docs/2014-Operations-Plan.pdf>
4. Merced Integrated Regional Water Management – Drought Impacts & Water Conservation

[http://www.mercedirwmp.org/files/Att2\\_DG\\_Impact\\_1of1.pdf](http://www.mercedirwmp.org/files/Att2_DG_Impact_1of1.pdf)

Highlighted portions in the excerpts represent specific sections that are applicable to this grant proposal. Of primary interest is page 36 of 53 where the **Bureau of Reclamation** states that they are interested in minimizing effects to listed fish. Approving this grant proposal will help restore habitats in the Merced River to the benefit of listed fish.

All of the drought plans and documents were developed and approved through a collaborative stakeholder process as documented in the plans themselves. The Merced Integrated Regional Water Management (Merced IRWM) program is a collaborative effort to identify water management issues, needs, objectives, actions, and priorities to meet the long-term water needs of the Merced Region east of the San Joaquin River. The plan has been adopted by the City of Atwater, City of Livingston, City of Merced, East Merced Resource Conservation District, Merced County, Merced Irrigation District, and Planada Community Services District.

The California Drought Contingency Plan does include ESA species impacts and analysis such as Salmonid migration, and floodplain processes, see page 9 of 63 in Appendix 1. The proposed restoration will aid in mitigation for ESA fish species.

### **Evaluation Criterion C – Severity of Actual or Potential Drought Impacts to be Addressed by the Project**

The Merced River system and its associated habitats have been affected by European-American activities for more than a century, beginning with extensive gold mining in the 1850s. Since that time, riparian and instream habitats have been modified or converted for uses such as agriculture, gold and aggregate mining, water impoundments, water diversions, levees, and more recently, urban development. These major actions and other events have led to the deterioration of riparian and aquatic habitat conditions on the LMR.

Despite extensive habitat modification, Chinook salmon and native rainbow trout populations are still present in the LMR below Crocker-Huffman Diversion Dam; this area presents great potential to significantly improve these populations and the habitats they rely upon.

Appropriate coarse sediments for spawning and functional floodplains for rearing are two primary LMR habitat deficiencies. These deficiencies, coupled with a degraded and oversized channel, create less than optimal habitat for salmonid reproduction and rearing, especially under present and future drought conditions. Interrupting these natural processes has resulted in limited gravel recruitment and immobility or compaction of the gravel that remains available for salmonid spawning and disconnection of the floodplain from the active channel that historically would have provided rearing habitat for juvenile fish. Compacted and armored substrates reduce intergravel permeability, which significantly impact water quality and temperature for incubating salmonid embryos during low flow periods (Merz et al. 2004).

Chinook salmon are the most abundant native salmonid within the LMR and are an example of a keystone species (Merz and Moyle 2006). Management actions that enhance salmonid health and production will confer benefits to overall LMR health and production. Healthier and more diverse populations are better able to withstand adverse and variable conditions such as those caused by climate change (Schindler et al. 2010).

Large-scale and long-term gravel augmentation has been recommended to increase Chinook salmon spawning and incubation habitat (Stillwater Sciences 2001). Reduction of the magnitude and duration of peak winter and spring runoff flows due to flow regulation has also decreased the ability of the river to transport coarse sediment entering lower sections of the LMR; this is exacerbated during periods of drought.

Juvenile fall-run Chinook salmon emerge in early to mid-winter and are immediately

susceptible to the influence of flow (Allen and Hassler 1986; Moyle et al. 2007). Displacement and dispersal to lower velocity habitats shortly follows, assuming such refugia are present. Sidechannel and floodplain habitats serve to dissipate flow and may also serve as an area of high invertebrate prey productivity and a refuge from large-bodied predators, providing favorable habitat for newly emerged fish (Grosholz and Gallo 2006). This off-channel rearing habitat is particularly important in rivers such as the Merced where mining activities have created habitat for non-native piscivorous fish. However, the unnaturally high and coarse floodplain is currently disconnected from the entrenched channel under most flow conditions. This reduces rearing habitat for salmonids and prevents the floodplain from developing and supporting a healthy riparian system.

**Evaluation Criterion D – Project Implementation**

The Project was designed by a restoration team consisting of fisheries ecologists, geomorphologists, hydrologists and licensed engineers (Cramer Fish Sciences and ESA) through funding from MID and the Merced River Instream and Off-Channel Habitat Rehabilitation Project funds awarded through the California Department of Fish and Game FRGP Drought Proposal solicitation (#FRGP F&D PSN 2014/2015).

See Table 2 for estimated project timeline.

**Table 2. Merced Drought Project Implementation Schedule**

<b>Task</b>	<b>Estimated Start</b>	<b>Estimated Completion</b>
<b>Project Design</b>	1-Aug-15	1-Mar-17
<b>Permitting/Environmental Assessment</b> Obtain required permits (see permit section) and perform required environmental reviews	1-Jul-17	1-Jun-18
<b>Construction</b>		
Mobilization	1-Jul-18	15-Nov-19
Excavation and Screening	15 July each year	1-Nov-19
In Channel Work	15 July to 15 October each year	
Floodplain finishing		1-Nov-19
Erosion Control Maintenance	15-Jul-18	15-Nov-19
<b>Project Administration and Construction Management</b>	1-Jul-17	15-Nov-19

## Evaluation Criterion E – Nexus to Reclamation

Central Valley Project Improvement Act of 1992 - On October 30, 1992, Public Law 102-575, the Reclamation Projects Authorization and Adjustment Act of 1992, was signed into law by the President of the United States. This legislation included Title 34, the Central Valley Project improvement Act (CVPIA or Act). The CVPIA amends previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. The Department of the Interior, Bureau of Reclamation and Fish and Wildlife Service, in collaboration with State and local governments, Tribes, non-governmental organizations, and stakeholders, implement activities to meet the Act's purposes. The CVPIA also contributes to the State's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin River Delta Estuary.

A current focus of the CVPIA Program is on fish and wildlife restoration, water management, and conservation activities, authorized in Sections 3406 and 3408 of the Act. Additionally, Sections 3404 and 3405 focus on water transfers and contract renewals, and the management of these activities are related to the resource goals.

The Act directs Interior to, “implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991....” The target established by this section of the Act is known as the “fish-doubling goal”, which pertains to numerous fish species believed to have been impacted by CVP construction and operation, including those within the LMR. We have worked collaboratively with USFWS, CDFW and Merced County to support CVPIA-funded restoration of salmonid habitat within the LMR.

We have a past working relationship with Reclamation. Reclamation has been a willing buyer of MID water, and MID a willing seller. Under the San Joaquin River Agreement, between 1999 and 2012, MID and others provided water to help support meeting a pulse flow of up to 110,000 acre-feet of supplemental water for a 31-day period in the San Joaquin River at Vernalis, California, during April and May for ecological resources as prescribed in the Vernalis Adaptive Management Plan (VAMP). MID also provides a fall flow of 12,500 acre-feet during the month of October.

## Performance Measures

The MID team is developing a monitoring plan to determine whether project objectives will be met. This monitoring program will define the current state of the system before restoration and determine if the implemented project has the desired effect on system health; particularly as it relates to drought performance. The monitoring program consists of four conceptual approaches to monitoring: 1) pre-project site description, 2) implementation, 3) effectiveness, and 4) validation. Effectiveness and validation will be performed outside of this grant application/Project. Pre-project monitoring helps identify the baseline for the project including the identification of deficiencies in ecosystem health and for detecting change over time. Implementation monitoring will determine if the project was installed per the design standards. Hydrology, topography/bathymetry, sediment budget and vegetation will be assessed. The effectiveness monitoring will determine if the Project was effective in meeting target physical and biological objectives. A range of physical and biological traits will be tracked before and after restoration to assess ecosystem function. Pre-project monitoring is essential for effectiveness

monitoring because it establishes an objective baseline of ecosystem function with which to evaluate change caused by the project implementation. Finally, we will conduct validation monitoring to confirm the underlying assumptions of the restoration work and determine if the Project recovers productive habitat that promotes salmonid spawning, incubation success and juvenile salmonid health, especially under drought conditions. The monitoring efforts described in this plan will improve our understanding of restored ecosystem function and the potential of restoring off-channel rearing habitat to enhance salmonid populations within streams impacted by regulation, historic placer mining and stressed by drought conditions.

## **ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE**

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The MID team has extensive experience implementing restoration projects within the Project area including successful completion of all permits required for in channel and floodplain restoration work.

To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with our application, we provide answers to the following list of questions focusing on National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements.

Below we explain potential impacts from the Project to the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat). This includes a brief description of earth-disturbing work and work that may affect air, water, or animal habitat in the Project area. We also explain potential impacts of such work on the surrounding environment and steps that could be taken to minimize the impacts.

The Project will operate construction equipment (e.g., rubber-tired front-end loaders, end-dump haulers, etc.) in the Project area. These operations will temporarily increase dust and ambient noise levels in the vicinity of the sites. Gravel processing will occur onsite to reduce transport activities. Construction equipment will be properly equipped and maintained to reduce noise levels. The types of construction equipment used for this project will typically generate noise levels 80 – 90 decibels above the reference noise at a distance of 50 ft. The Project will not expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. All changes in noise levels will occur for a limited duration, in a mostly rural and relatively unpopulated area. However, the impact is still considered significant because there will be increases in noise levels at the Project site, and there is limited housing and recreational use within 1 mi of the Project area. The impact will be mitigated to a less than significant level with implementation of the mitigation measures outlined below. The Project has the potential to increase vibration and noise levels in the immediate Project area, but will not expose people to excessive vibration or noise levels. Any changes in vibration and noise will occur for a limited duration in a rural, relatively unpopulated area, and will occur within established standards for noise. Any potential impacts will be mitigated by the measures outlined below. The Project will not support a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, because construction activities associated with the Project will only occur during a limited period of time. Any increases above the ambient noise level will be mitigated by the measures outlined below.

We will implement the following dust reduction measures during material movement from construction staging area to sites where gravel augmentation will occur to reduce construction-related emissions:

- wet materials to limit visible dust emissions using water;
- provide at least 6 in (15.2 cm) of freeboard space from the top of the container; or,
- cover the container.

Implement the following dust reduction measure during gravel placement to reduce construction-related emissions:

- limit or promptly remove any of mud or dirt on construction equipment and vehicles at the end of each workday, or once every 24 hours.

### Potential Listed Species

Species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the Project area are listed below. We also describe potential affects by any activities associated with the proposed Project.

Potential listed species within the area include:

Conservancy Fairy Shrimp *Branchinecta conservatio*  
 Vernal Pool Fairy Shrimp *Branchinecta lynchi*  
 Vernal Pool Tadpole Shrimp *Lepidurus packardii*  
 Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*  
 California Tiger Salamander *Ambystoma californiense*  
 California Red-legged Frog *Rana aurora draytonii*  
 Osprey *Pandion haliaetus*  
 Northern harrier *Circus cyaneus*  
 Yellow-breasted Chat (nesting) *Icteria virens*  
 Tri-color Blackbird *Agelaius tricolor*  
 Western Red Bat *Lasiurus blossevillii*  
 Pallid Bat *Antrozous pallidus*  
 American Badger *Taxidea taxus*  
 San Joaquin Kit Fox *Vulpes macrotis mutica*  
 Chinook Salmon *Oncorhynchus tshawytscha*  
 Central Valley Steelhead *O. mykiss*  
 Hardhead *Mylopharodon conocephalus*

Potentially adverse impacts to biological resources would be those associated with gravel excavation, processing, movement from staging area to river, and river placement. Gravel will be processed (sorted) onsite and placed at specific sites in the adjacent LMR to augment natural gravel recruitment processes; no gravel will be transported offsite. Temporary impacts to wildlife species may occur due to temporary loss of riparian habitat and daytime disturbances due to construction activities. Impacts to blue elderberry shrubs, which provides critical habitat for valley elderberry longhorn beetle will be reduced to less than significant by implementing avoidance and protective measures outlined in this document and per the July 1999 USFWS conservation guidelines. Impacts to other sensitive wildlife species will be reduced to less than significant by conducting pre-construction

surveys. If sensitive species are observed, agency recommended avoidance and conservation measures will be implemented. Moreover, all gravel extraction areas and temporary access routes will avoid any disturbance of trees or dense vegetation.

The proposed Project will improve spawning habitat for salmonids by placing gravel in the river mainstem and reconnecting the floodplain to the river. This Project will temporarily increase sediment loads into the river, potentially reducing dissolved oxygen; however all work will occur during periods of low salmonid use. This proposed Project aims to improve habitat for spawning and rearing salmonids. Although there may be temporary impacts resulting from increased sediment mobilization, the long-term goals of the project will significantly improve LMR habitat.

### **Wetland occurrence and potential impacts within the project footprint**

Three types of potential jurisdictional wetlands and other waters of the U.S. were identified in the Project area during a preliminary wetland delineation field investigation: emergent marsh, seasonal wetlands and non-wetland waters of the U.S. Gravel augmentation will occur in approximately 1 ac of the LMR to improve habitat for native fish. All non-riverine wetland habitats will be avoided and will not be impacted during the construction activities, and additional wetland habitats will be created as part of the floodplain recovery. This Project will result in a net gain in river habitat (~6 ac), which is expected to be seasonally inundated.

There were no previously recorded cultural resources identified within the Project area of potential effect (APE), and thus impacts are not anticipated. Additionally, compliance with Section 106 of the National Historic Preservation Act (NHPA) is necessary. Even with these measures undertaken, it is possible that during construction activities unknown cultural resources could be unearthed. If any objects of cultural significance are unearthed during the construction process, work will be halted until a qualified archeologist can assess the significance of the new find. If human remains are unearthed during the construction process, the Project team will comply with the California Health and Safety Code Section 7050.5, which states that no further disturbance shall occur until the County Coroner has investigated the situation following the Public Resource Code Section 5097.98.

This proposed Project does not have a disproportionately high and adverse effect on low income or minority populations in Merced County.

The proposed Project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

To reduce the possibility of the proposed Project contributing to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area, we are developing an Invasive Species Risk Assessment Planning (ISRAP) Program. This will include the conduction of a risk assessment of potential pathways and plans to reduce any identified risks.

## REQUIRED PERMITS OR APPROVALS

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Below, we have identified permits/authorizations that may be required to implement the proposed Project. Because this proposal is in the Project Design category, it does not cover permit acquisition. MID will pursue future funding to complete the regulatory process for this restoration Project.

### ***Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act***

The U.S. Army Corps of Engineers is authorized to issue permits for discharges of dredged or fill material into waters of the United States. Applications will be made for a Nationwide Permit 27 for the restoration of wetland and riverine habitats and a Nationwide Permit 33 for the construction of temporary access routes.

### ***Section 401 of the Clean Water Act***

State water quality standards cannot be violated by the discharge of fill or dredged material into waters of the U.S. The State Water Quality Control Board, through the

Central Valley Regional Water Quality Control Board, is responsible for issuing water quality certifications, or waivers thereof, pursuant to Section 401 of the Clean Water Act.

### ***Federal Endangered Species Act (ESA)***

Section 7 of the ESA requires all Federal agencies to consult with the USFWS and National Marine Fisheries Service (NOAA Fisheries) to ensure that their actions do not jeopardize the continued existence of endangered or threatened species or result in the destruction or modification of the critical habitat of these species. The Secretary of Commerce, acting through NOAA Fisheries, is involved with projects that may affect marine or anadromous fish species listed under ESA. All other species listed under the ESA are under USFWS jurisdiction.

### ***California Endangered Species Act, California Fish and Game Code 2081 and 2090***

The California Endangered Species Act (CESA) gives CDFW the ability to authorize, by means of an incidental take permit, incidental take of state-listed threatened, endangered or candidate species if certain conditions are met. For CDFW projects, routine internal coordination occurs whenever CDFW proposes a project that may impact a state-listed species of plant or animal. The CDFW strives to ensure that no threatened or endangered species would be adversely affected by their projects, even for projects otherwise exempt from the California Environmental Quality Act (CEQA). When CDFW proposes to undertake a project that has the potential for take of a state-listed species, if the project is part of the management of that species, i.e., for the protection, propagation, or enhancement of the species and its habitat, CDFW is not required to get a CESA Incidental Take Permit per California Code of Regulations, Title 14, Section 783.1.

### ***The essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act of 1996***

The EFH provisions require private and public entities to consult with NOAA Fisheries

on project actions that may adversely affect the habitats of the west coast salmon fisheries and other fisheries managed in federal waters.

***Fish and Game Code Section 1600 et. seq., Streambed Alteration Agreement***

California Department of Fish and Game has regulatory authority regarding activities occurring in streams and/or lakes that could adversely affect any fish or wildlife resource, pursuant to Fish and Game Code Section 1600 et seq. Authorization is required for proposed projects prior to any activities that could substantially divert, obstruct, result in deposition of any debris or waste, or change the natural flow of the river, stream, or lake, or use material from a stream or lake.

***California State Reclamation Board Encroachment Permit***

The Reclamation Board issues permits to maintain the integrity and safety of flood control project levees and floodways that were constructed per flood control plans adopted by the Board of the State Legislature.

***State Lands Commission Land Use Lease***

The State Lands Commission has jurisdiction and management control over those public lands received by the state upon its admission to the United States in 1850 that generally

include all ungranted tidelands and submerged lands and beds of navigable rivers, streams, lakes, bays estuaries, inlets, and straits.

***National Historic Preservation Act, Section 106***

Projects must coordinate with the State Historic Preservation Office and the Advisory Council on Historic Preservation regarding the effects that a project may have on properties listed, or eligible for listing, on the National Register of Historic Places. Section 106 also requires Federal agencies to evaluate the effects of Federal undertakings on historical, archaeological, and cultural resources.  
San Joaquin Valley Air Pollution Control District

The San Joaquin Valley Air Pollution Control District requires that all portable equipment registrations be obtained for all project equipment.

The following Executive Orders and Legislative Acts have been reviewed as they apply to the Proposed Action, and the following permits/authorizations are required to implement the proposed action:

***National Environmental Policy Act***

The National Environmental Policy Act provides a commitment that agencies would consider environmental effects of their actions. This EA/IS provides information regarding the No-Action Alternative, the Proposed Action, and their environmental impacts. If, after certain key permits are obtained and the final EA/IS is released, the Proposed Action is found to have no significant environmental effects, a "finding of no significant impact" would be filed.

***Floodplain Management - Executive Order 11988***

Executive Order 11988 requires that all agencies take action to reduce the risk of flood

loss, to restore and preserve the natural and beneficial values served by floodplains, and to minimize the impact of floods on human safety, health, and welfare. The project is within the 100-year floodplain. The Proposed Action supports the preservation and enhancement of the natural and beneficial values of floodplains, and is anticipated to be in compliance with Executive Order 11988.

***Protection of Wetlands - Executive Order 11990***

Executive Order 11990 requires agencies to follow avoidance, mitigation, and preservation procedures with public input before proposing new construction of wetlands.

***Environmental Justice in Minority and Low-income Populations-Executive Order 13007-Executive Order 12898***

Executive Order 12898 requires agencies to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. The Proposed Action will need to consider the environmental, social, and economic impacts on minority and low-income populations to be in compliance with Executive Order 12898.

***Indian Trust Assets, Indian Sacred Sites on Federal Land-Executive Order 13007, and American Indian Religious Freedom Act of 1978***

These laws are designed to protect Indian Trust Assets, accommodate access and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites, and protect and preserve the observance of traditional Native American religions, respectively. The Proposed restoration activities and their associated mitigation measures could not violate these protections.

## **LETTERS OF PROJECT SUPPORT**

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NA

## **OFFICIAL RESOLUTION**

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Attached as Appendix 2