

Merced Integrated Regional Water Management Implementation Grant Proposal

Attachment 6: Monitoring, Assessment, and Performance Measures



Attachment 6 consists of the following item:

✓ **Performance Measures**

The purpose of this attachment is to describe the monitoring, assessment, and performance measures that will be used to evaluate each proposed project. These measures will ensure that this proposal meets its intended goals, achieves measurable outcomes, and provides value to the Region and to the State of California.

Specific performance measures and monitoring approaches have been developed to assess project performance of each project in this proposal on an ongoing basis. The purpose of this attachment is to identify the monitoring systems to be used to verify project performance with respect to the project benefits and objectives identified. Data collection and analysis techniques to be used for each project are described below.

This attachment also discusses how monitoring data will be used to measure the performance of the proposal in meeting the overall goals and objectives of the Merced IRWM Plan. A Project Performance Measures Table has been prepared for each project that includes the following:

- Project goals
- Desired outcomes
- Targets – measureable targets that are feasible to meet during the life of the project
- Performance indicators – measures to evaluate change that is a direct result of the project being built
- Measurement tools and methods – to effectively track performance

The Project Performance Measures Tables are provided at the end of this Attachment.

Project Overview and Plan Objectives

Project performance measures are designed to assess each project's progress toward achieving its objectives. Specific project objectives that form the basis for the performance measures tables are summarized below.



Black Rascal Flood Control Project

The Black Rascal Flood Control Project will complete environmental documentation and identify the preferred project alternative to provide flood protection during a 200-year storm event on Black Rascal Creek and downstream areas. The area that will ultimately be protected from flooding is a disadvantaged community (DAC). In addition to flood control benefits, complete project implementation will also include habitat enhancements through creation of a deadpool in the reservoir and water supply reliability improvements by allowing the Merced Irrigation District to regulate flows. The grant request is only for environmental documentation and preliminary design of the project. Plan objectives are tied to program goals below.

Program Goals

The goals of the program are to identify a preferred project alternative and complete environmental documentation and preliminary design of a project that will achieve the following benefits upon implementation.

Manage flood lows for public safety: The communities impacted by this project are currently in an unprotected area and would receive 200-year flood protection. The preferred project would thus provide a significant public health and safety benefit to the DAC of Merced and the community of Franklin/Beachwood by allowing for management of flood flows that threaten the habitability of dwellings.

Meet demands for all uses: By increasing the capacity of the existing flood protection structure, an ancillary benefit of increased water storage would be created by the preferred project.

Protect Restore, and Improve Natural Resources: The preferred project will provide habitat enhancements through creation of a deadpool in the detention basin.

Address water related needs of DACs: The preferred project will provide flood protection to a DAC and improve surface and groundwater availability and quality for the community.

Planada Community Services District Water Conservation Project

The Planada Community Services District Water Conservation Project will provide water conservation benefits to the severely disadvantaged community of Planada. The proposed project would replace a dilapidated and undersized section of pipe in the delivery system, complete water meter installation for approximately a third of the DAC, and replace an existing standby generator. By completing water metering for the community, the District will be able to shift from the current flat rate charge to a volumetric charge. This shift, combined with the ability for the District to locate water leaks in real time, is anticipated to save approximately 20% over current water usage. The grant request is to complete design and construct the project. Plan objectives are tied to program goals below.

Program Goals

Meet demands for all uses: Through implementation of metering, and the associated demand reduction benefits generated, existing and future demands can be met in the area.



Maximize water use efficiency: The project proposes to upgrade a substandard portion of the distribution system, which currently experiences regular breaks and leaks, to meet state standards. It will also improve water use efficiency by implementing water meters, facilitating a shift to conservation pricing. Estimated benefits from implementing the water metering program in this project include a reduction of 20% in water use over current usage.

Address water related needs of DACs: The project would bring the water distribution system into compliance with state regulations. Upgrades to the distribution system would ensure that residents in the DAC receive consistent access to water, reducing the potential for backflow contamination. Water consumption in the District is also expected to decrease.

Enhance public understanding of water management issues and needs: The water metering program will include a public outreach and education component, providing information to residents about water resources and conservation.

El Nido Recharge Project

The El Nido Recharge Project will improve an existing diversion structure, yielding multiple benefits to a DAC area with severe groundwater overdraft. The existing diversion structure on Mariposa Creek requires manual operation. As such, it cannot be operated during periods of high flows due to public health and safety concerns, and MID is unable to fully execute an existing water license from the State Water Resources Control Board and maximize water diversion to recharge. This project will modify the existing structure to include a new automated structure, allowing MID to increase use of the existing surface water right. A combination of direct and in-lieu recharge will be implemented, using an existing recharge basin in El Nido as well as adjacent agricultural lands for recharge. The project will also install monitoring wells within the El Nido area to monitor groundwater movement, contributing to the overall understanding of groundwater conditions in the region. Additional benefits to this project include reduction of downstream flood flows, reduction in groundwater overdraft, and an indirect benefit of groundwater recharge.

The grant request is for design and construction of the project. Plan objectives are tied to program goals below.

Program Goals

Manage flood flows for water supply: Flood flows or portion thereof, mainly during the fall and early spring (November through April) can be routed to El Nido to spread over land and delivered to the recharge basin to augment local water supplies and benefit El Nido, a DAC.

Correct groundwater overdraft conditions: Recharge from Mariposa Creek to El Nido will be maximized through two means: 1) application of diverted flows to 9,000 acres of agricultural land 2) application of diverted flows to an existing 21 acre recharge basin within the El Nido area. Delivery infrastructure at the recharge basin will be automated to receive flows from Mariposa Creek and from the Merced River during years of flood control releases from the New Exchequer Dam. Monitoring equipment will be constructed to quantify effective recharge and its anticipated destination in the aquifer.

Address water related needs of DACs: The project would benefit the DAC by improving groundwater levels as it provides relief to one of the worst groundwater overdraft areas in the region.



Effectively address climate change adaptation: The ability to store additional water in the subsurface will help in adapting to changes by capturing flows when they are available while still reducing flooding impacts associated with intense precipitation events.

Merced River Education and Enhancement Program

The Merced River Education and Enhancement Program includes three components that will collectively provide public education and no-cost recreation access to DACs in the Merced River watershed, with the additional benefit of climate change adaptation. The three components are as follows:

- **Lower Merced River Stewardship:** This task has six major subtasks associated with implementation of restoration activities, education efforts, and community building. These tasks include landowner outreach with demonstration-scale riparian restoration, school education, community outreach programs, agricultural workshops, creation of a streamlined permitting workgroup, and a life jacket loan and training program.
- **Merced Region Climate Change Program:** This task includes three interrelated efforts to assess and respond to climate change impacts in the region. The first component involves real-time streamflow measurement in the upper Merced watershed. The second task includes real-time water cycle measurement and an improved snowpack sensor, which together can aid in predicting water supplies. The final task would provide climate change education for interested individuals and organizations, providing education on the impacts of climate change in the upper basin on water supply in the MID service area.
- **Lower Merced River Recreational Boating Public Access:** This task will provide no-cost recreation access and public safety benefits to DACs by constructing an access point for safe launching to the River.

Plan objectives are tied to program goals below.

Program Goals

Address water-related needs of DACs: Currently, free, public access to the Lower Merced River is limited due to private property restrictions. This project will enhance the ability of residents of DACs to access the River for recreational opportunities. This is critical in an area with few public recreation opportunities.

Protect and enhance water-associated recreation opportunities: The boat launch element will significantly enhance public river access for boaters and help to minimize concerns associated with unmanaged access to the River.

Improve coordination of land use and water resources planning: This project includes a public education element that coordinates water and land use management regarding land use practices for agricultural and rural properties in the watershed. In addition, an invasive species program will help enhance riparian habitat by removing invasive species and re-planting native species.

Protect, restore, and improve natural resources: This project includes a riparian corridor restoration element that will identify, map, and remove invasive species along the River. The creation of the boat launch area will minimize damage to riparian areas due to unauthorized site access.



Establish and maintain effective communication among water resource stakeholders in the Region: Project elements will develop a communications toolbox that includes communication materials on water resource issues, best practices for communicating projections of changing water availability due to climate change, the development of an interactive website that will provide framing of climate issues, and at least one public workshop to share the climate communications toolbox with stakeholders. The boat launch element will involve collaboration with natural resource agencies to provide educational materials and other information for recreational boaters.

Enhance public understanding of water management issues and needs: Communications tools developed as part of this project will enhance public understanding of the impacts of climate change on water resources. This project also includes school education and community outreach programs, and agricultural workshops to educate the diverse water users in this watershed on management issues.

Effectively address climate change adaptation and/or mitigation in water resource management: This project will improve available information on streamflow timing and magnitude, addressing both seasonal and interannual variability due to climate change. Tools developed in this project will provide a scientific basis for predicting the effects of climate variability and change on upper-watershed hydrology and implications for lower watershed resources.

Project Performance Measures

By implementing the tools and methods summarized in the Project Performance Measures Tables below, each project proponent will effectively track progress toward achieving project objectives. The information and data collected will be fed back into the project's management structure to adapt the project to better meet its overall objectives. Only by consistent monitoring and analyzing project performance feedback data can project success be measured and assessed, and project implementation be adjusted to maximize benefits. Monitoring will also provide a clear reporting mechanism for the public, decision-makers, and regional stakeholders to determine the planned versus actual value of each project.

Each project proponent will have the primary responsibility for developing a project-specific monitoring plan for their project, and for collecting the data and performing the monitoring activities described below. The project-specific monitoring plans will be prepared for each project following funding agreement execution, and will be submitted to the Department of Water Resources (DWR) as part of the funding administration documentation. Each monitoring plan will include protocols and methodologies to ensure consistency and accountability by the designated party collecting the data and performing monitoring activities. Data generated from project implementation will be provided to the Merced IRWM Region and applicable statewide databases and will be disseminated to stakeholders and the public consistent with the data management protocols laid out in the Merced IRWM Plan.

The following Project Performance Measures Tables for the projects included in this proposal present the following information:

- Project goals
- Desired outcomes
- Targets – measureable targets that are feasible to meet during the life of the project
- Performance indicators – measures to evaluate change that is a direct result of the project being built



- Measurement tools and methods – to effectively track performance

The information included in the Project Performance Measures Tables will provide a basis for the project-specific monitoring plans to be developed, should the proposal receive IRWM grant funding.

Tables 6-1 through **6-4** summarize performance measures for each project included in this proposal.



Table 6-1: Performance Measures Table
Black Rascal Flood Control Project

Objectives	Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
1. Identify preferred alternative to address flooding on Black Rascal Creek	<ul style="list-style-type: none"> Complete applicable environmental documentation (CEQA / NEPA) to identify the preferred alternative capable of providing 200-year flood protection 	<ul style="list-style-type: none"> Completed environmental documentation and identification of preferred alternative capable of providing 200-year flood protection 	<ul style="list-style-type: none"> CEQA / NEPA certification 	<ul style="list-style-type: none"> Successful certification of CEQA/NEPA documents that identify a preferred alternative capable of providing 200-year flood protection 	<ul style="list-style-type: none"> Confirmation of certified CEQA/NEPA documentation identifying the preferred alternative capable of providing 200-year flood protection
2. Complete preliminary design preferred alternative to address flooding on Black Rascal Creek	<ul style="list-style-type: none"> Complete preliminary design of Black Rascal Creek flooding solution capable of providing 200-year flood protection 	<ul style="list-style-type: none"> Concept design for the preferred alternative capable of providing 200-year flood protection 	<ul style="list-style-type: none"> Concept design showing layout of major facilities, design criteria and some detail for each of the disciplines 	<ul style="list-style-type: none"> Percent design completed 	<ul style="list-style-type: none"> Track percent design completed



Table 6-2: Performance Measures Table
Planada Community Services District Water Conservation Project

Objectives	Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
1. Meet demands for all uses	<ul style="list-style-type: none"> Install 400 water meters to currently unmetered customers Upgrade 2,900 linear feet of dilapidated water distribution pipeline 	<ul style="list-style-type: none"> Reduce water usage Bring system into compliance with State standards 	<ul style="list-style-type: none"> Decrease water consumption by 20% 	<ul style="list-style-type: none"> 400 water meters installed 20% decrease in annual water consumption 	<ul style="list-style-type: none"> Confirmation of water meter installation Comparison of water delivered before and after project implementation
2. Maximize water use efficiency					
3. Address water related needs of DACs		<ul style="list-style-type: none"> Residents in the DAC receive consistent access to water, reducing the potential for backflow contamination 	<ul style="list-style-type: none"> Fewer service complaints/maintenance calls Linear feet of water main replaced 	<ul style="list-style-type: none"> Reduction in service complaints/maintenance calls for in service area 2,900 linear feet of water main replaced 	<ul style="list-style-type: none"> Comparison of customer service logs before and after project implementation. As-built drawings showing meters installed and feet of main replaced
4. Enhance public understanding of water management issues and needs	<ul style="list-style-type: none"> Water metering program includes a public education component 	<ul style="list-style-type: none"> Residents are educated on water conservation practices 	<ul style="list-style-type: none"> All residents in service area provided with conservation messages / materials 20% decrease in water consumption 	<ul style="list-style-type: none"> Mailers on water conservation sent Decrease in water consumption 	<ul style="list-style-type: none"> Track number of mailers distributed Measure water consumption before and after project implementation based on production records



Table 6-3: Performance Measures Table
El Nido Recharge Project

Objectives	Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
1. Manage flood flows for water supply	<ul style="list-style-type: none"> Install automation to allow flood flows to be diverted to the recharge basin 	<ul style="list-style-type: none"> Increase surface water supply in the recharge basin 	<ul style="list-style-type: none"> Increase surface water supply generated from diverted overland flood flows by 4,489 acre-feet per year on average 	<ul style="list-style-type: none"> Acre-feet per year of flood flows diverted 	<ul style="list-style-type: none"> Measure flows diverted for recharge using a flow meter
2. Correct groundwater overdraft conditions	<ul style="list-style-type: none"> Apply diverted flows from Mariposa Creek to El Nido 	<ul style="list-style-type: none"> Increase groundwater recharge through agricultural surface water use (in-lieu recharge) Increase diversion to the existing recharge basin in El Nido 	<ul style="list-style-type: none"> Reduction in rate of decline of groundwater levels 	<ul style="list-style-type: none"> Groundwater levels near El Nido 	<ul style="list-style-type: none"> Measure groundwater levels in El Nido general area before and after project implementation
3. Address water-related needs of DACs	<ul style="list-style-type: none"> Improve groundwater levels for DACs in the area 	<ul style="list-style-type: none"> Provide increased groundwater recharge to offset groundwater overdraft in the region 	<ul style="list-style-type: none"> Reduction in rate of decline of groundwater levels 	<ul style="list-style-type: none"> Groundwater levels near El Nido 	<ul style="list-style-type: none"> Measure groundwater levels in El Nido general area before and after project implementation
4. Effectively address climate change adaptation	<ul style="list-style-type: none"> Store additional water in the groundwater basin at El Nido 	<ul style="list-style-type: none"> Create the ability to store additional water in the subsurface through the addition of automation capabilities, allowing flows to be captured when they are available and flooding to be minimized 	<ul style="list-style-type: none"> 4,489 acre feet per year on average of additional water stored 	<ul style="list-style-type: none"> Volume of water stored 	<ul style="list-style-type: none"> Groundwater level monitoring adjacent to the project Metering / measuring volume of flows diverted for recharge



Table 6-4: Performance Measures Table
Merced River Education and Enhancement Project

Objectives	Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
1. Address water-related needs of DACs	<ul style="list-style-type: none"> Construct a boat launch and associated recreational facilities (i.e. picnic table, public toilet, parking) 	<ul style="list-style-type: none"> Free, public recreational opportunity, benefitting area DACs, along the Lower Merced River 	<ul style="list-style-type: none"> Completion of river access facilities 	<ul style="list-style-type: none"> Completion of construction of boat launch, dirt parking area, 2-unit vault toilet, picnic unit, interpretive and educational display, and trash receptacles Number of recreational users on a representative weekend 	<ul style="list-style-type: none"> As-built drawings Track number of recreational visitors to the boat launch area on a representative weekend
2. Protect and enhance water-associated recreation opportunities					
3. Improve coordination of land use and water resources planning	<ul style="list-style-type: none"> Create a public education program on the effect of land use practices on water resources 	<ul style="list-style-type: none"> Education for rural and agricultural users on best management practices to benefit the watershed 	<ul style="list-style-type: none"> Educational outreach to rural landowners 	<ul style="list-style-type: none"> Number of rural landowners to whom educational outreach materials were provided 	<ul style="list-style-type: none"> Staff logs of outreach efforts



Objectives	Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
4. Protect, restore, and improve natural resources	<ul style="list-style-type: none"> Remove invasive species from the riparian corridor Construction of boat launch to minimize unauthorized river access 	<ul style="list-style-type: none"> Training of staff/volunteers on identification of invasive species Identification, mapping, and removal of invasive species in the riparian corridor Minimization of habitat destruction resulting from unauthorized river access 	<ul style="list-style-type: none"> Removal of invasive species from riparian habitat 	<ul style="list-style-type: none"> Estimate of square footage of invasive species cleared Number of staff/volunteers trained on invasive species identification Completion of construction of boat launch, dirt parking area, 2-unit vault toilet, picnic unit, interpretive and educational display, and trash receptacles Reduction in pounds of trash collected 	<ul style="list-style-type: none"> Mapping and records of areas where invasive species have been cleared Training logs Construction completion documentation / as-built drawings
5. Establish and maintain effective communication among water resource stakeholders in the Region	<ul style="list-style-type: none"> Create a communications toolbox for water resource issues Conduct a public workshop to share the communications toolbox Create an education program for schools and other interested organizations 	<ul style="list-style-type: none"> Education of watershed residents on water resources issues, particularly related to climate change effects on the watershed 	<ul style="list-style-type: none"> Frequently referenced web site that is easily accessed by the general public Distribution of communications/educational materials to stakeholders throughout watershed At least 10 presentations/ outreach opportunities to schools and public events 	<ul style="list-style-type: none"> Increasing number of website hits Communications log of materials distributed Number of recreational users at boat launch on a representative weekend (users will be exposed to an interactive/educational display) At least 5 outreach events per year 	<ul style="list-style-type: none"> Number of website hits Log/number of residents to whom communications materials were distributed Log of attendees at public workshop Count of number of recreational visitors to the boat launch area on a representative weekend Staff log of outreach events
6. Enhance public understanding of water management issues and needs					



Objectives	Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
<p>7. Effectively address climate change adaptation and/or mitigation in water resource management</p>	<ul style="list-style-type: none"> • Upgrade existing snow depth and soil moisture monitoring sites • Provide more accurate measurements of snowpack, snowmelt, and the partitioning of snowmelt into runoff, infiltration, and evapotranspiration • Adapt a watershed model using improved input parameters from these and related data networks on the South Fork of the Merced • Upgrade existing stream stage measurements and discharge estimates on Big Sandy Creek by constructing a V-notch weir to enable making accurate flow measurements in a high-elevation headwater catchment 	<ul style="list-style-type: none"> • Development of a scientific basis for predicting the effects of climate variability and change on watershed hydrology and water resources. • Improved understanding of upper-basin streamflow, along with snow and soil moisture conditions, to enable significant improvements in runoff forecasting in both dry and wet years • Improved information on snow accumulation and melt water storage and flux through soils, evapotranspiration, and streamflow; addressing both seasonal to interannual variability and climate warming. 	<ul style="list-style-type: none"> • Real-time stream and snow depth measurements collected 	<ul style="list-style-type: none"> • Accurate streamflow and snow depth measurements collected 	<ul style="list-style-type: none"> • Review of monitoring data to confirm frequency • Periodic field checking to confirm accuracy of monitoring data