Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs

Technical Proposal for WaterSMART Applied Science Grants for Fiscal Year 2023 (R23AS00446)

Applicant: Monterey County Water Resources Agency (MCWRA)
1441 Schilling Place
Salinas, CA 93901

Project Manager: Mr. Jason Demers
1441 Schilling Place
Salinas, CA 93901
demersjm@co.monterey.ca.us
831-755-4868

Table of Contents

1 Executive Summary 3
2 Technical Project Description 3
2.1.1 Applicant Category A 3
2.1.2 Detailed Project Description 4
2.1.3 Project Goals 5
3 Project Location 5
4 Data Management Practices 7
5 Evaluation Criteria 7
5.1 Evaluation Criterion A—Water Management Challenge(s) 7
5.2 Evaluation Criterion B—Project Benefits 10
5.3 Evaluation Criterion C—Project Implementation 11
5.3.1 Project Team 13
5.4 Evaluation Criterion D—Dissemination of Results 14
5.5 Evaluation Criterion E—Presidential and Department of the Interior Priorities 15
5.5.1 Climate Change 15
5.5.2 Disadvantaged or Underserved Communities 17
5.5.3 Tribal Benefits 19
6 Project Budget 19

1 Executive Summary

The Monterey County Water Resources Agency (MCWRA) is pleased to submit this application to the U.S. Department of Interior, Bureau of Reclamation, Water Resources and Planning Office for consideration on October 17, 2023. MCWRA will leverage recent improvements in reservoir modeling and forecasting technology to develop tools and procedures that will enhance water supply reliability at the Nacimiento and San Antonio Dams and Reservoirs. The proposed project will evaluate existing reservoir inflow and outflow forecasting models – including those supported by the National Oceanic and Atmospheric Association (NOAA) and the California Nevada River Forecast Center (CNRFC) – and management strategies and tools to improve inflow forecasting and operational decision making. Results from the evaluation will be used to design and develop a set of operational guidelines and supporting tools for improving the storage and release of winter inflows at both locations. As a result, MCWRA will be better equipped to maximize storage of winter inflow while minimizing downstream flood risk. MCWRA will initiate project work immediately following award in April 2024 and estimates completion by no later than September 2026. Note the proposed project will not be located on a Federal facility.

2 Technical Project Description

2.1.1 Applicant Category A

MCWRA qualifies as a Category A applicant for this opportunity. MCWRA is responsible for managing, protecting, and enhancing the water supply and water quality, as well as providing flood protection in Monterey County. MCWRA's predecessor, the Monterey County Flood Control and Water Conservation District, was created in 1947 through the Monterey County Flood Control and Water Conservation District Act. MCWRA was created in 1991, through the Monterey County Water Resources Agency Act, California Water Code, Appendix 52[1]. The Agency Act mandated MCWRA to control flood and storm waters, conserve such waters through storage and percolation, control groundwater extraction, protect water quality, reclaim water, exchange water, and construct, and operate hydroelectric power facilities. MCWRA's territory covers all of Monterey County, including the Salinas Valley Groundwater Basin. MCWRA's mission is to manage, protect, store, and conserve water resources in Monterey County for beneficial uses, including environmental uses, while minimizing damage from flooding, to create a safe and sustainable water supply for present and future generations. To fulfill this mission, MCWRA operates and manages numerous water-related facilities

[1] County of Monterey. (1991). *Monterey County Water Resources Agency Act, California Water Code, Appendix 52.* https://www.co.monterey.ca.us/home/showpublisheddocument/19488/636229413245970000

throughout the region and undertakes various improvement and maintenance projects to meet current and future needs. Included among its efforts are water storage facilities and hydroelectric facilities. MCWRA owns and operates the Nacimiento and San Antonio Dams on principal tributaries to the Salinas River along with associated reservoirs to sustainably manage water resources while minimizing impacts from flooding. Additionally, MCWRA develops groundwater management measures to protect groundwater from the intrusion of sea water.

2.1.2 Detailed Project Description

The proposed project will develop Forecast Informed Reservoir Operations (FIRO) decision support tools to improve flood control operations at Nacimiento and San Antonio Reservoirs. Traditionally, Water Control Plans (WCPs) use real-time observation and conditions to determine water reservoir levels. These reservoirs are engineered to meet project objectives when presented with specific design events[2]. FIRO is a water management strategy that utilizes data from watershed monitoring and accurate weather forecasting to help water management agencies decide when to retain or release water from the reservoirs based on anticipated conditions. More specifically, FIRO is a tool used by water managers to develop more adaptive WCPs that can help them meet certain project objectives and improve selected outcomes. As a result, more water can be conserved when little to no significant precipitation is forecasted. Pilot studies have also shown that FIRO can decrease the potential for uncontrolled releases by signaling the need for preemptive releases ahead of large approaching storms[3]. Optimizing reservoir operations in this fashion benefits the water supply and environmental flows while also improving flood risk and dam safety. MCWRA will evaluate existing forecasting models, including the National Weather Service (NWS) Hydrologic Ensemble Forecast Service (HEFS), and results from analogous projects, including in Lake Mendocino, the Prado Dam, the New Bullards Bar/Oroville Dams, and the Howard Hanson Dam, to define a solution that works best for the Salinas Valley[4]. To date, several FIRO pilot projects have successfully progressed past the design phase and are actively in various planning and implementation phases. For example, MCWRA will also rely on lessons learned from the Sonoma County FIRO implementation project, which utilizes NWS streamflow forecasts with short-medium range lead times to help

---

[2] Scripps (2022), *Integration of FIRO and Water Control Plans.* *Adaptive WCP Concepts - Hartman.pptx (ucsd.edu)*

[3] USACE (2021), *Research and Development Fact Sheet: Forecast Informed Reservoir Operations (FIRO).* *Microsoft Word - FIRO-USACE_Fact_Sheet-Jul2021.docx (dren.mil)*

[4] Scripps (2023), *Forecast Informed Reservoir Operations Project Descriptions.* *FIRO Projects – Center for Western Weather and Water Extremes (ucsd.edu)*

manage their water supply and flood control levels.[5] The Lake Mendocino FIRO project and others have created scientific standards and examples, proving the success and the replicability of MCWRA's proposed project.

Once a forecasting solution is defined, MCWRA will develop reservoir operations models to simulate and test existing and new, FIRO-based operations against historical conditions within Lake Nacimiento, Lake San Antonio, and the downstream reaches of the Salinas River to the City of Soledad. Test results will be used to further calibrate the FIRO alternative and optimize performance. Once calibrated, MCWRA will develop a Decision Support Tool (DST) or real-time operations model framework that incorporates regular updates of observed hydrology and hydrologic forecasts from the CNRFC to formulate recommended reservoir release schedules. Additionally, MCWRA will create an operations dashboard that provides forecasted information from the DST model to reservoir managers to inform release decisions. Finally, MCWRA will develop an implementation plan to integrate DST into standard operations and train staff to interpret results and use the operations dashboard effectively.

2.1.3 Project Goals

Through this project, MCWRA aims to develop tools and procedures to aid in forecast informed operations of the Nacimiento and San Antonio Reservoirs with a long-term goal of maximizing storage of winter inflow while minimizing downstream flood risk. Specifically, these results will help MCWRA:

- Evaluate existing forecast models and contribute to existing research on utilizing forecast models for reservoir management;
- Gain a better understanding of statistical risk associated with forecast based flood operations; and
- Develop a workplan and standard operating procedures to improve the agency's reservoir management and release decision making.

Ultimately, the anticipated improvements to MCWRA operations will improve water supply reliability for the Salinas Valley, particularly during extended dry periods, and maximize reservoir storage to improve groundwater recharge.

3 Project Location

The project's geographic areas of focus are the Nacimiento and San Antonio Dams and Reservoirs – both owned and operated by MCWRA – and the Salinas River from its confluence with the reservoir watersheds to the Pacific Ocean. See Attachment A for a map of the project areas.

---

[5] Sonoma County (2020), *Lake Mendocino Forecast Informed Reservoir Operations: Final Viability Assessment.* https://cw3e.ucsd.edu/FIRO_docs/LakeMendocino_FIRO_FVA.pdf

The Nacimiento Dam and its reservoir (Nacimiento Reservoir) – see Exhibit 1 below – are located on the Nacimiento River in northern San Luis Obispo County, approximately 20 miles from the coast, in central California. The large earthfill dam, constructed in 1957, provides flood control, water conservation, water supply – including percolation into the Salinas Valley aquifer – hydropower, recreation, and groundwater recharge for agriculture in Monterey County and northern San Luis Obispo County. When the reservoir is full, the dam has a maximum storage capacity of 377,900 acre-feet (AF), is 18 miles long, and has 165 miles of shoreline.

Exhibit 1. Nacimiento Dam and Reservoir

The San Antonio Dam and its reservoir (San Antonio Reservoir) – see Exhibit 2 below – are located in southern Monterey County, approximately 16 miles northwest from Paso Robles, in central California. The earthfill dam, constructed in 1967, is a multi-use facility operated for flood control, water supply – including groundwater percolation – and recreation. When the reservoir is full, the dam has a maximum storage capacity of 335,000 AF, is 16 miles long, and has 100 miles of shoreline.

Exhibit 2. San Antonio Dam and Reservoir

MCWRA is responsible for managing the storage and release of water from the Nacimiento and San Antonio reservoirs. MCWRA uses surface releases from the reservoirs to recharge the groundwater aquifers throughout the Salinas Valley. Additionally, some of the reservoir release is re-diverted downstream at the Salinas River Diversion Facility (SRDF) for treatment to supplement recycled water for use in the Castroville Sea Water Intrusion Project (CSIP). CSIP was designed to supply irrigation water to farmers near the coast to reduce groundwater pumping and slow seawater intrusion. As multi-use facilities, MCWRA operates both sites to maximize the downstream benefits and with consideration to many factors including dam safety, flood protection, groundwater recharge, operation of the Salinas River Diversion Facility, water supply, fish migration, fish habitat requirements, agriculture, and recreation.

4 Data Management Practices

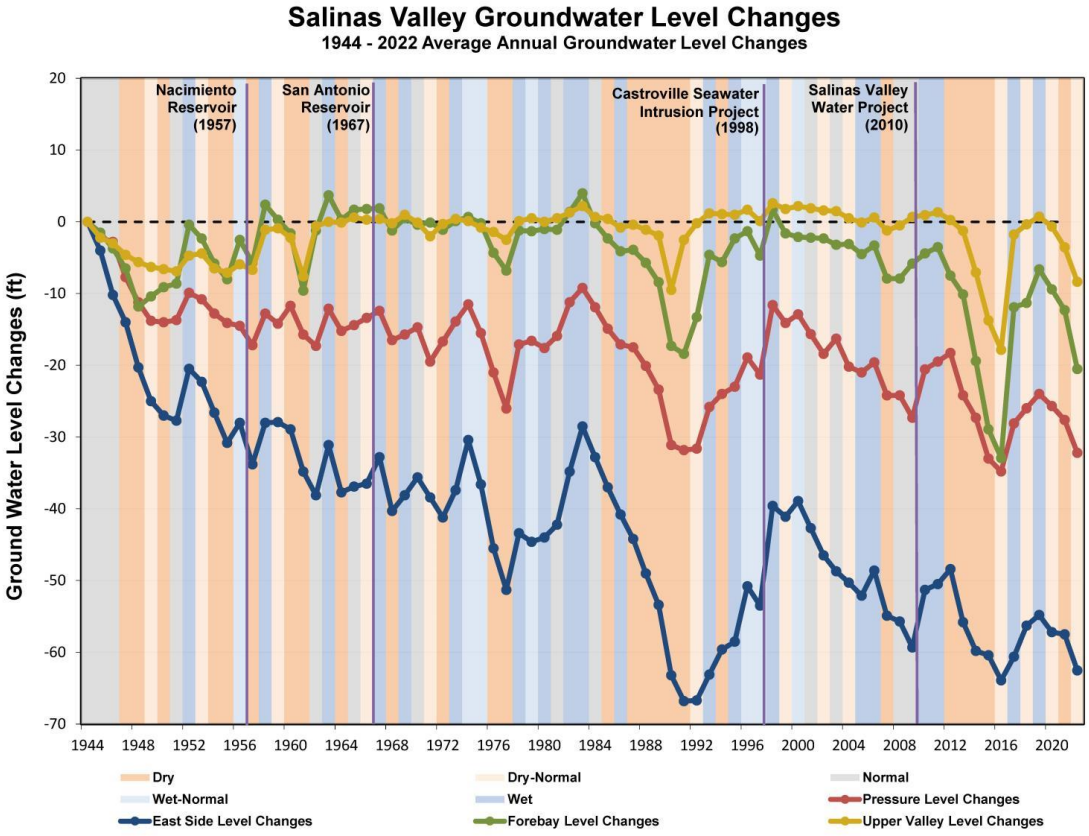
All data and technologies that MCWRA intends to leverage for this project are publicly available and compatible with Geographic Information Systems (GIS) platforms. As such, MCWRA does not anticipate the need to execute data sharing agreements.

5 Evaluation Criteria

5.1 Evaluation Criterion A—Water Management Challenge(s)

The thriving, agriculture-based economy of the Salinas Valley has prospered for decades **relying on a supply of available groundwater**. However, frequent overdrafting has depleted this resource over time. Over the last ten years, there has only been a positive change in groundwater levels a couple of times, see Exhibit 3. Historically, this positive change is only a couple of feet, whereas from 2012 to 2016 there was a drastic negative change in groundwater levels due to significant drought. As a result, conservation releases were not made due to the low reservoir levels.

Exhibit 3. Annual Groundwater Level Monitoring in the Salinas Valley.



Additionally, the more fresh groundwater removed from the Valley leads to increased risk of saltwater intrusion and contamination. The water year (WY) 2013-2015 extended drought period resulted in low seasonal inflow into both reservoirs. As a result, conservation releases for groundwater recharge or operation of the SDRF were not made from either reservoir during the 2014-2016 operational seasons.

The Salinas Valley is also home to one of California's **threatened steelhead (Oncorhynchus mykiss) populations**. While populations of steelhead have dwindled over the past century, the Salinas is the longest and largest river system south of San Francisco, CA supporting an active steelhead population. Specifically, low flows and the construction of dams on the Salinas, Nacimiento and San Antonio Rivers impede steelhead migration to spawning habitat. In 2005, Endangered Species Act (ESA) Section 7 Consultation with the National Marine Fisheries Service (NMFS) for the Salinas Valley Water Project (SVWP) resulted in specific rates and timing of flows for steelhead trout in the Salinas River. Unfortunately, most of the first 10 years of operations (2010-2019) under the Flow Prescription were predominantly dry – with extended drought conditions persisting from 2012-2016 – which limited both upstream and downstream

steelhead mitigation opportunities.[6] Compounding issues with low reservoir storage during that time resulted in minimum fisheries habitat releases from the reservoirs.

Additionally, increased population and urbanization in the Salinas Valley has resulted in **increased flood risk**. Specifically, increased impervious surfaces and channelization of streams have resulted in increased runoff and intensified flood flows. Also, increased development in floodplains, including houses, buildings, and agricultural fields, have placed more property and lives at risk for flooding. The flood control infrastructure in the region, including the Nacimiento and San Antonio Dams, are a critical component of the region's overall water management system. In the future, climate change is likely to further increase intense swings and the frequency between droughts and floods in the Salinas Valley.

Currently, MCWRA uses a variety of tools to monitor and manage water reservoir operations at both sites. Existing tools, including reservoir operational pools and an excel spreadsheet utilizing CNRFC forecasts, are used to forecast reservoir inflow and make operational decisions related to storage and release of winter inflows. Operational decisions are made with input from MCWRA Reservoir Operations, Dam Safety and Engineering, Hydrology, and Management personnel. Reservoir Operations staff use internally developed spreadsheets to visualize reservoir impacts of CNRFC forecasted inflow and proposed release strategies. Despite the existing resources used to develop effective WCPs, there are limitations to this approach.

First, there is **a lack of planning for adverse climate situations**. MCWRA's current WCP relies on observation of current weather and reservoir conditions. Specifically, the reservoirs are most closely monitored during winter inflow periods when inflow is expected to be the highest. In seasons where there are irregular climate phenomena (i.e., longer duration of wet and dry seasons), MCWRA's WCP has no accurate forecasting capabilities to help MCWRA anticipate flood risk and sufficiently release water to meet flooding and groundwater recharge goals. This is why MCWRA is required to meet more regularly with various internal departments to closely monitor current operating conditions.

Next, there are **limitations with current forecasting models**. NOAA studies have indicated that there are limitations to the climate models like the ones MCWRA are currently using[7]. The challenge is that weather models are less useful for predicting scenarios that have longer lead times. Specifically, there is little certainty in forecasting a probability of rainfall being less than or greater than historical averages beyond the 5 to 10 day period. While these forecasts can be reasonably accurate under certain conditions, they only provide a 5 day operational window to make reservoir decisions. MCWRA has begun evaluating ensemble forecasts for the extended period of 10 days; however, MCWRA lacks the expertise to interpret the best course of action based on the wide range of ensemble plots. Without improved forecasting capabilities, MCWRA

---

[6] MCWRA (2022), *Salinas Valley Water Project Flow Monitoring Report: 10-Year Review*

[7] NOAA (2023),*CNRFC, General Ensemble Theory for Streamflow Forecasts.* *CNRFC - HEFS - Ensemble Theory (noaa.gov)*

may continue to miss opportunities to maximize water storage and release in advance of drought.

Finally, an improved understanding of risk is inadequate **without processes and tools in place to drive sound, data-driven decisions**. Existing MCWRA decision making processes regarding reservoir storage and release are internally collaborative but lack structure and formality. As a result, if institutional experience were lost, unfamiliar staff would lack the necessary guidance needed to make informed decisions.

If MCWRA does not improve its understanding of statistical risk associated with forecast-based flood operations, then opportunities to maximize reservoir storage will continue to be missed resulting in less supply during drought conditions. Less supply, coupled with the continued drawdown of groundwater without the ability to replenish, will lead to increased saltwater intrusion and reduced supply of irrigation water for farmers throughout the Salinas Valley. Additionally, less supply will continue to severely impact the natural fish passage, spawning and rearing habitat.

5.2 Evaluation Criterion B—Project Benefits

The project need was identified following the extended drought period of WY 2013-2015. MCWRA was not equipped to forecast prolonged drought conditions across several years and, therefore, did not make the decision to reserve enough water within the two reservoirs to mitigate drought impacts to the Salinas Valley. As a result, reservoir levels remained low during this time and MCWRA was unable to release water for groundwater recharge or operation of the SDRF from 2014-2016.

This project will improve the long-term forecasting capabilities of MCWRA and help make progress towards mitigating future drought and flood conditions in the region. Both factors have contributed to the need for more efficient and effective management of inflows to maintain ecological and community water health. MCWRA will benefit from current and prior examples of FIRO integration in other parts of the region to improve data-based decision making.

Most of Salinas Valley users rely on ground water and MCWRA currently uses surface releases from the reservoirs to recharge the groundwater aquifers in the Salinas Valley and then re-diverts some reservoir release water downstream at the SRDF to be treated. In Southern California, the Orange County Water District has successfully utilized FIRO to improve groundwater recharge during wet years[8]. It is estimated that applying FIRO at Prado Dam could provide up to 20,000 AF of additional water for groundwater recharge in a wet year. Using models to simulate reservoir operations under FIRO conditions, the assessment at Prado Dam

[8] Orange County Water District (2019), *FIRO at Prado Dam, CA Fact Sheet*. FIRO Fact Sheet_v15-web2 (ucsd.edu)

found that temporarily storing water to higher elevations can enhance groundwater recharge[9]. The improvements in atmospheric river forecasts show high reliability at up to five days' lead time, which allows dam operators to make timely water releases and could enhance flood-risk management.

With successful operation of the SRDF, reservoir release water will be treated, and supplement water will be available for use in the Castroville Sea Water Intrusion Project (CSIP). The CSIP was designed to supply irrigation water to farmers near the coast to reduce groundwater pumping and slow seawater intrusion. Any additional water stored may also be used to meet downstream flow targets for South-Central California Coast Steelhead as specified in the Flow Prescription for Steelhead Trout in the Salinas River and incorporated in Agency held water rights. Using FIRO assessments, management options were evaluated and the Lake Mendocino Water Control Manual was revised. Upon implementation, the USBR found that, "the benefits of FIRO for dam operations, water supply, fisheries, recreation, and hydropower found that FIRO will lead to positive benefits in all these areas except hydropower, resulting in total estimated annual benefits of $9.4 million"[10]. While MCWRA does not anticipate meeting the same economic benefits, MCWRA hopes to learn from Lake Mendocino's model to achieve similar efficiency benefits.

The introduction of FIRO should increase MCWRA's understanding of statistical risk associated with forecasting-based flood operations and provide more accurate data for engineers and management to rely on when making release schedules and determining proper reservoir levels. Specifically, Hydrologic Ensemble Forecast Service (HEFS) modeling relies more on climatology as a weather model that reduces total uncertainty and "corrects for biases in forcing and flow at all forecast lead times"[11]. Additionally, a comprehensive review of current MCWRA operations and systems will increase understanding and awareness of existing WCP limitations. This is necessary for developing enhanced operational guidelines and support tools to improve-decision making, which should also decrease the breadth and frequency of internal meetings.

5.3 Evaluation Criterion C—Project Implementation

MCWRA has proposed a detailed workplan with estimated costs to begin implementation of the proposed project following award (Attachment B). The workplan will assist MCWRA to design and develop a DST to improve flood control operations at Lake Nacimiento and Lake San

---

[9] Ralph, F. M., Woodside, G., Anderson, M., Cleary-Rose, K., Haynes, A., Jasperse, J., Sweeten,J., Talbot, C.,Tyler, J.,Vermeeren, R. (2021), *Prado Dam Forecast Informed Reservoir Operations Preliminary Viability Assessment. UC San Diego.* https://escholarship.org/uc/item/13091539

[10] UCSD Scripps (2021), *New Report Confirms Benefits of Forecast-Informed Reservoir Operations at Lake Mendocino* New Report Confirms Benefits of Forecast-Informed Reservoir Operations at Lake Mendocino | Scripps Institution of Oceanography (ucsd.edu)

[11] NWS (2016), *Hydrologic Ensemble Forecast Service.* NWS - HEFS Presentation

Antonio and the regulation of releases to minimize flooding of regions of the Salinas River downstream. Specifically, the DST will utilize forecasted hydrology from CNRFC using the Hydrologic Ensemble Forecast Service (HEFS) to coordinate releases for both reservoirs based on forecasted inflows and downstream conditions. Note that MCWRA does not have existing federal operations curves for either site – that requires development of a preliminary viability assessment before implementation – and is able to begin the project immediately.

First, MCWRA will gather background information and data to determine the right technology solution. Specifically, MCWRA will:

- Coordinate internally understand current operations and system constraints that affect flood control releases;
- Obtain and evaluate existing tools used to support flood control operations;
- Define overall project objectives that will inform the development of a DST;
- Obtain observed flows and other pertinent data from CNRFC to inform water balance calculations of the Salinas River System; and
- Work with the CNRFC to obtain hindcasts and simulated local natural flows for Lake Nacimiento, Lake San Antonio, and the downstream reaches of the Salinas River.

Next, MCWRA will formulate models to simulate historical conditions within the project area. Specifically, MCWRA will:

- Design a reservoir operations model to include Lake Nacimiento, Lake San Antonio, and downstream reaches of the Salinas River to the City of Soledad;
- Develop flood control operations alternatives based on existing operations according to current protocols and practices and FIRO, risk-based operations that utilize ensemble streamflow predictions from CNRFC; and
- Execute model simulations formulated for the two alternatives that simulate reservoir operations for a historical scenario based on hindcasts from the CNRFC.

Results from the modeling task will be used to further calibrate the FIRO alternative to satisfy the project objectives defined during data gathering activities. Once the model is complete, MCWRA will develop a real-time operations model framework that incorporates regular updates of observed hydrology and hydrologic forecasts from the CNRFC to formulate recommended reservoir release schedules. Additionally, MCWRA will develop an operations dashboard that provides forecasted information from the DST model to reservoir managers to inform release decisions. MCWRA will also assess the utility of other decision support tools that evaluate different forecast parameters such as precipitation, temperature, integrated vapor transport and/or water vapor flux.

Finally, MCWRA will develop a DST implementation plan to update existing operating procedures and train staff. Specifically, MCWRA will:

- Develop a plan to integrate the DST into MCWRA's current decision-making process, and assess needs and estimate costs for long-term support, maintenance, and refinement of the DST to support operators;

- Assess computational needs and requirements to host the DST and evaluate hosting options, including using existing networks used by MCWRA or hosting the DST on an off-site network such as a cloud-based service and/or other resources;
- Provide a one-day training workshop on the DST to MCWRA staff, and provide support for the DST through the explanation of results to operators on an as-needed basis and troubleshooting any issues of the DST for one season; and
- Develop virtual operations that will simulate real time reservoir and downstream conditions as if the FIRO alternative were fully implemented.

Note that MCWRA has discussed the project and outlined the workplan and goals with the Scripps Institution of Oceanography at UC San Diego. MCWRA has incorporated feedback on the project and has worked with Scripps experts to gain a strong understanding of the academic literature and processes behind implementation of FIRO to MCWRA's operations. MCWRA has also discussed this project with Monterey County's Office of Emergency Services (OES) and the local NOAA Flood Watch Group. Both groups are in support of the project and expect impacts as MCWRA anticipates the successful implementation of FIRO to reduce flooding in the area.
The project results will directly benefit MCWRA operations. Direct impact and changes are anticipated to occur within the MCWRA's operation system. The long-term goal of the project is to help MCWRA make more informed decisions regarding water storage and release. MCWRA anticipates performing analysis on system performance over the course of the first two years following the implementation of FIRO. This analysis will help MCWRA determine if this strategy should be fully adopted into their Operations and Policy manual. This tool will be especially useful given the changing weather system due to climate change.
While MCWRA's operational tools are held closely and will not be publicly available, MCWRA anticipates publishing its general findings and methodology via academic publication through collaboration and cooperation with Scripps.

5.3.1 Project Team

The Project Team will include current MCWRA staff members Jason Demers, Peter Kwiek, and Joey Klein. Jason will provide general project oversight and direction, and Peter will act as the project manager with technical support and collaboration from Joey Klein and Chris Calderon.

- **Jason Demers** has been employed by MCWRA since 2002, presently as a Senior Water Resources Engineer. Jason has a Bachelor of Science degree in Environmental Studies. Much of his 21 year career with MCWRA was spent working on reservoir operations to meet water conservation, environmental, and flood prevention and management needs. Jason also spent 12 years working on the direct operation and maintenance of the MCWRA flood warning system and now provides oversight to the program within the MCWRA Operations division. Jason has successfully managed grant funded projects including the ongoing development of the Salinas River Operations Habitat Conservation

Plan (HCP). The HCP is currently funded by $750,000 from a Proposition 1 Integrated Regional Water Management Grant as well as two Cooperative Endangered Species Conservation Fund Section 6 grants for $1,000,000 each.

- **Peter Kwiek** has been employed by MCWRA for over 22 years, presently as an Associate Water Resources Hydrologist in the Reservoir Operations group. Peter has a Master of Science degree in Earth Sciences and is a registered Professional Geologist. Peter has many years of experience working on ground and surface water issues in the Salinas River basin and Monterey County. In addition to day-to-day reservoir operations, Peter is currently the project manager for the Salinas River Lagoon Community Engagement and Planning Project, a community engagement project funded by a grant from the National Fish and Wildlife Foundation.
- **Joey Klein** has been employed by MCWRA since 2020, first as a Water Resources Technician and presently as a Water Resources Hydrologist. Joey holds Bachelor of Science and Master of Science degrees in Environmental Science. He has experience maintaining infrastructure for MCWRA's ALERT real-time flood warning system; maintaining and processing data from weather stations, conducting stream surveys in coastal ranges; analyzing reservoir operations; and assisting with implementation of a $144,000 grant from the Department of Water Resources to upgrade the ALERT flood warning system (completed in 2023).
- **Chris Calderon** has been a Water Resources Technician with MCWRA since 2022. He holds a Bachelor of Science degree in Environmental Engineering and has experience in field data collection, data analysis, ArcGIS, and water balance modeling. Chris has worked on MCWRA's ALERT flood warning system, groundwater level and water quality data collection, and reservoir operations programs.

5.4 Evaluation Criterion D—Dissemination of Results

Initial results will be disseminated internally between the project team and other MCWRA personnel. Operational and organized team meetings for this project will convene on a regular basis to share progress and lessons learned throughout implementation. Upon project completion, communication outside of MCWRA will be prioritized to enable interested stakeholders to learn more about the proposed scope of work and how FIRO could be applied in other areas. MCWRA's existing website will serve as a public-facing and easily accessible location for publishing project results, including the basis of design (BOD) and annual reports. Additionally, MCWRA will present results during existing committee meetings, Monterey County Board meetings, and practitioner conferences so that others (e.g., other water resource agencies, local communities, etc.) can build from lessons learned to design their own FIRO projects. As a result, more areas throughout the western region of the United States will have

the knowledge needed to improve their own reservoir operations planning to further mitigate the impacts of future drought conditions, reduce their risk of flooding, and ensure the natural functions of their ecosystems can flourish.

5.5 Evaluation Criterion E—Presidential and Department of the Interior Priorities

5.5.1 Climate Change

Improving seasonal forecasting will help to address some of the climate change concerns Monterey County is facing and expecting to face in the coming years. Monterey County is exposed to many natural hazards, such as storms, rising sea levels, and high tides. Within this century, climate change models have shown that this area could see up to 66 inches in the rise of sea levels.[12] The likelihood of extreme flooding events is expected to rise, see Exhibit 4 for a map of where a 100-year flood will impact in Monterey County and what an additional 55 inches of sea level rise will look like. Improved forecasting will help MCWRA to selectively retain or release water from the Nacimiento and San Antonio reservoirs which is likely to be impacted by warming caused by climate change as it will alter evaporation levels in the reservoirs.[13] Warming will also impact sea levels, which will in turn result in the salination of the coastal aquifers. The full extent that climate change can impact salination of coastal aquifers is currently unknown, but changes in precipitation in the project area because of climate change will have a direct impact on water supplies.[14] Maximizing reservoir storage will help communities respond to and recover from drought as the improved seasonal forecasting will allow earlier water supply capture when needed and can improve the reliability of the water in the project area.

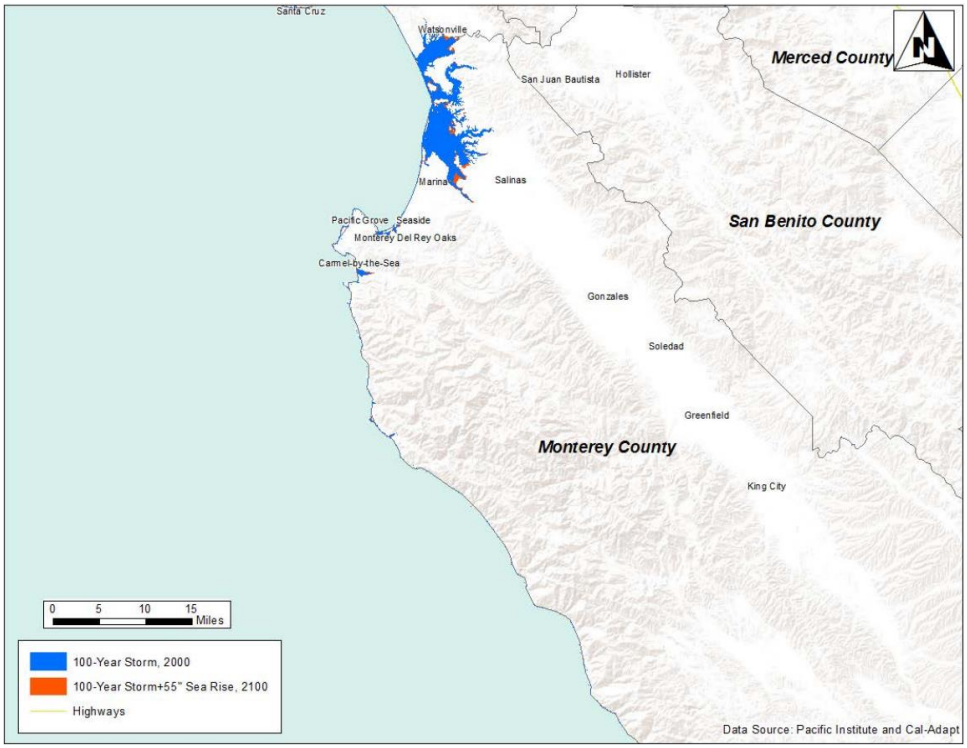
---

[12] Maizlish, N., English, D., Chan, J., Dervin, K., & English, P. (2017). *Climate change and health profile report: Monterey County, Sacramento, CA: Office of Health Equity, California Department of Public Health. (pp. 10).* Monterey CHPR (ca.gov)

[13] County of Monterey Planning and Building Inspection Department. (2008). *Draft Environmental Impact Report: Monterey County 2007 General Plan.* (pp. 41). Microsoft Word - Sec_04-16_Climate.doc (monterey.ca.us)

[14] County of Monterey Planning and Building Inspection Department. (2008). *Draft Environmental Impact Report: Monterey County 2007 General Plan.* (pp. 41). Microsoft Word - Sec_04-16_Climate.doc (monterey.ca.us)

Exhibit 4. Monterey County 100-year flood (2000) baseline inundation areas and 55 inches of additional sea level rise (2100).[15]



Weather and water forecasting will allow MCWRA to identify available water supplies and what is needed to better supply communities in the project area. This project is expected to drive better decision making to hopefully result in better storage options, which will build long-term resilience to drought. There is no anticipated end date at which the project would stop providing benefits to the Salinas Valley region. The long-term benefits are dependent on how impactful and effective the project is likely to be. It is also possible for the benefits to change after the initial implementation of this project due to climate change. There could be an increased value of benefits as the climate changes as this project could help MCWRA better forecast the future climate change impacts.

The proposed project contributes to climate change resiliency as it will allow the MCWRA to better manage reservoir inflow. The threatened steelhead populations, mentioned above, would also benefit from greater availability of water to support steelhead migration opportunities. Overall, the MCWRA will be able to help communities respond to and recover from drought and reduce flood risks through improved forecasting as there will be more data to make more precise decisions on when to retain or release water from the Nacimiento and San Antonio reservoirs.

---

[15] Maizlish, N., English, D., Chan, J., Dervin, K., & English, P. (2017). *Climate change and health profile report: Monterey County, Sacramento, CA: Office of Health Equity, California Department of Public Health. (pp. 11).* Monterey CHPR (ca.gov)

In December 2022 and January 2023, there were winter storms that hit with damage estimating to be at least $30 million to public infrastructure.[16] This damage was caused by the major flooding, mudslides, and hazardous conditions that affected the region, specifically the heavy rains and flooding that have continued to be a problem to Monterey County residents. Over 15,000 people were estimated to be impacted by the County's emergency notifications, with 109 residents in temporary shelters.[17] These types of storms are expected to continue and grow in frequency and intensity due to the changing climate. By improving the forecasting capabilities of MCWRA, the County could anticipate some of these flooding events and retain or release water as needed to better assist with the flooding that has continued to affect this region.

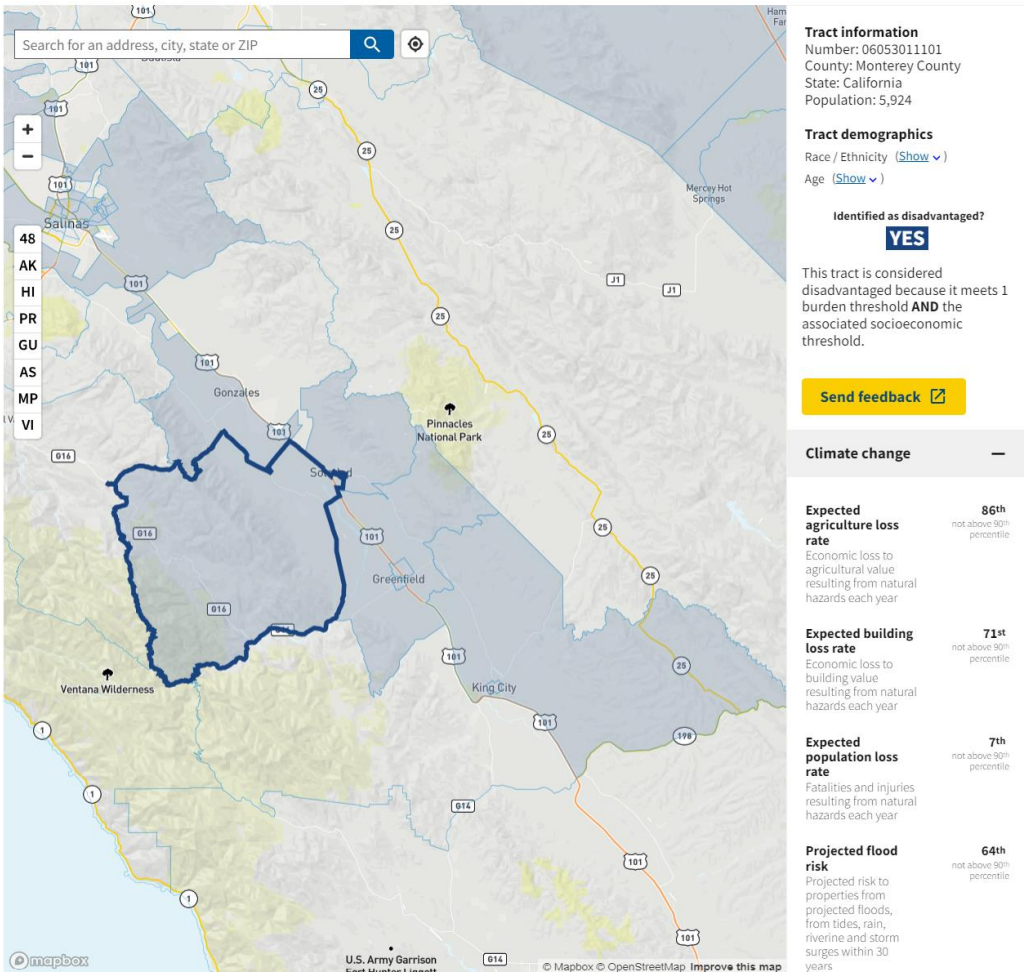
5.5.2 Disadvantaged or Underserved Communities

As shown in the Climate and Economic Justice Screening Tool (CEJST), see Exhibit 5, most of the disadvantaged communities in the Monterey County area reside in the Salinas, Soledad, Greenfield, and King City communities. These communities are designated as Disadvantaged by the White House Council on Environmental Quality. In upper areas of the County, there are multiple census tracts that are identified as disadvantaged communities and these communities have a higher projected flood risk, with some of the census tracts being above the 60th percentile for flood risk and above the 80th percentile for expected agriculture loss, including Census Tract 06053011101. Most of these disadvantaged communities are above the 50th percentile for projected flood risk. This census tract was also identified as an area that will likely have more extreme flooding events. Of the approximately 290,000 residents within the project benefit area, approximately 39% of the population - 100,370 people - are low-income.

[16] Cronk, R. (2023). *Storm damage estimates exceed $30M in Monterey County*. *Storm damage estimates exceed $30M in Monterey County - The King City Rustler | Your Local News Source in King City, California*

[17] Cronk, R. (2023). *Storm damage estimates exceed $30M in Monterey County*. *Storm damage estimates exceed $30M in Monterey County - The King City Rustler | Your Local News Source in King City, California*

Exhibit 5. Climate and Economic Justice Screening Tool screenshot of the Salinas Valley Basin with Census Tract number 06053011101 highlighted.[18]



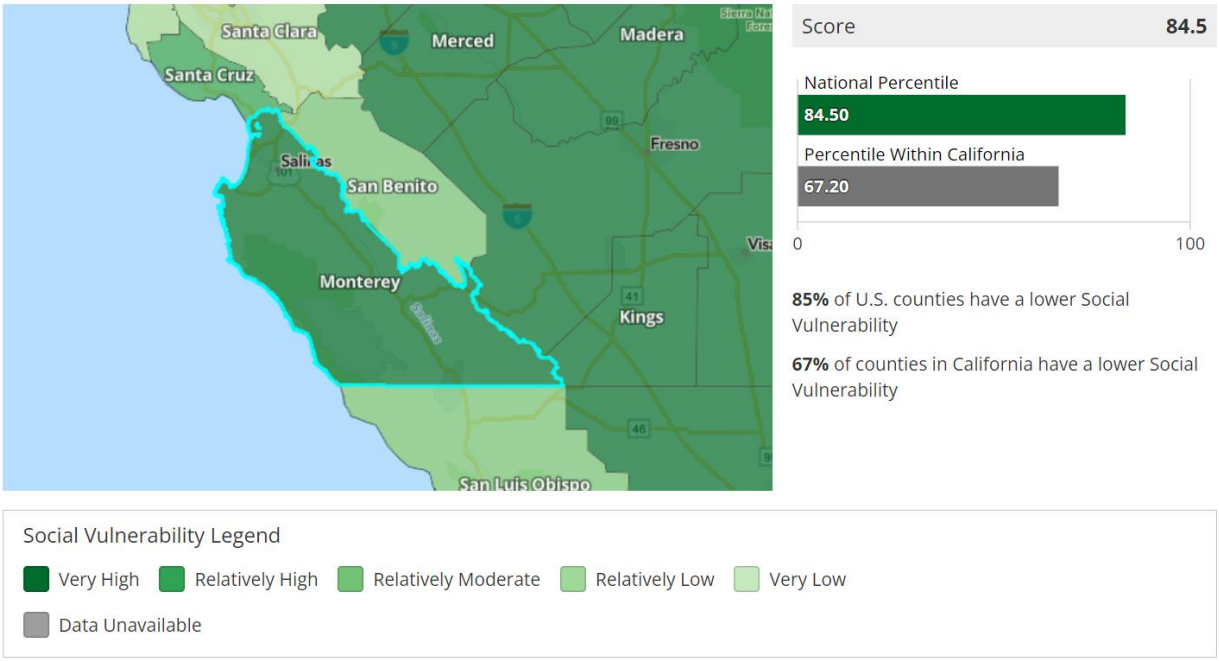
By improving existing forecasting abilities, MCWRA anticipates a direct positive impact on disadvantaged communities in the Monterey County Salinas Valley. Specifically, MCWRA will be better equipped to maximize reservoir water storage and improve water supply reliability. The agricultural sector in Monterey County will remain productive and robust with an improved weather and water forecasting system.

Monterey County ranks "Very High" in the Center for Disease Control and Prevention (CDC), Social Vulnerability Index (SVI), as seen in Exhibit 6. Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human caused threats. The SVI groups sixteen census-derived factors into four themes that summarize the extent to which the area is

[18] United States Environmental Protection Agency (2023 version), *EJ Screen.* https://www.epa.gov/ejscreen

socially vulnerable to disaster. The factors include economic data as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall, the SVI combines all the variables to provide a comprehensive analysis to determine the SVI score of Monterey County to be 84.50. This means that in the United States, 85% of counties are less vulnerable than Monterey County. The proposed project will help to improve water supply reliability, maximize reservoir storage, and lower flood risk, all of which will benefit disadvantaged communities in Monterey County.

Exhibit 6. Social Vulnerability of Monterey County, CA shown as having a Very High susceptibility, 85%, to adverse impacts of natural hazards in comparison to the rest of the United States.[19]



5.5.3 Tribal Benefits

Currently, no federally recognized Tribal Nations reside within the project area and; therefore, the project is not expected to impact tribal lands or interests.

6 Project Budget

Table 1 below represents the high-level costs associated with this project. Given the project satisfies multiple water management objectives (i.e., water supply reliability, drought management activities, conjunctive use of ground and surface water, and ability to meet

[19] Centers for Disease Control and Prevention/ Agency for Toxic Substances and Disease Registry/ Geospatial Research, Analysis, and Services Program. CDC/ATSDR Social Vulnerability Index (2020). *Database California.* https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html

endangered species requirements) and is expected to result in primarily ecological benefits, MCWRA is seeking a 75 percent Federal cost-share contribution. The detailed Budget Narrative is available in FIRO_Budget_Detail_and_Narrative.xlsx that was uploaded separately into Grants.gov.

Table 1. Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	**AMOUNT**
Non-Federal Entities	
*MCWRA Labor (includes Fringe Benefits and Indirect Charges)	$ 145,605
Non-Federal Subtotal	$ 145,605
REQUESTED RECLAMATION FUNDING	$ 400,000
TOTAL PROJECT COST	$ 545,605

Monterey County Water Resources AgencyA

Enhancing Predictive Tools and Operational Strategies for theA Nacimiento AndA San Antonio Dams and ReservoirsA WaterSMART Applied Science GrantsA ApplicationA

Letters of SupportA

The Monterey County Water Resources Agency has received Letters of Support from the following project partners:

- Monterey County Board of Supervisors
- National Weather Service
- Salinas Valley Basin Groundwater Sustainability Agency
- National Oceanic and Atmospheric Administration, National Marine Fisheries Services

County of Monterey

Board of Supervisors

October 6, 2023

Jason Demers
Senior Engineer
Monterey County Water Resources Agency
P.O. Box 930
Salinas, CA 93902

Re: Support for the Monterey County Water Resources Agency's Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs Project: WaterSMART Applied Science Grant for FY 2023

Dear Mr. Demers:

On behalf of the Board of Supervisors for the County of Monterey, I am pleased to convey our support for the grant proposal by the Monterey County Water Resources Agency (MCWRA) for Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs. We strongly support this effort to develop decision support tools and operational strategies with the goal of enhancing water storage and flood control operations at Nacimiento and San Antonio Reservoirs.

MCWRA is proposing to develop Forecast Informed Reservoir Operations (FIRO) based operational tools. These tools will fully utilize the best available forecasting provided by the California Nevada River Forecast Center (CNRFC) using the Hydrologic Ensemble Forecast Service (HEFS) to develop a coordinated forecast and operations approach for Nacimiento and San Antonio Reservoirs. FIRO is a reservoir operations strategy that incorporates enhanced watershed monitoring and forecasting to help operators make more informed water storage and release decisions. This strategy is especially valuable in places like California where our already highly variable weather is expected to be further impacted by our changing climate.

FIRO has been successfully implemented, or is in development, at several dams and reservoirs operated by the U.S. Army Corps of Engineers, the California Department of Water Resources, and other agencies. FIRO projects include Lake Mendocino and Lake Sonoma in the Russian River watershed, Prado and Seven Oaks Dams in the Santa Ana River watershed, New Bullards Bar Reservoir and Lake Oroville in the Yuba-Feather River system, and Howard Hanson Dam on the Green River in Washington.

Development of FIRO based decision support tools for Nacimiento and San Antonio Reservoirs would support the goal of MCWRA water managers and dam operators to safely maximize storage of winter inflows while minimizing downstream flooding risks. Maximizing the amount of stored water in the reservoirs increases the amount of water that could be available when needed to support groundwater recharge in the Salinas Valley Groundwater Basin, which benefits disadvantaged communities along the

Salinas River and provides resources for fish and wildlife habitat and migration, including for the threatened South-Central California Coast Steelhead. An increase in available water for diversion at the Salinas River Diversion Facility could decrease groundwater pumping in the coastal portion of the Salinas Valley Groundwater Basin that is impaired by seawater intrusion, in turn slowing the advance of seawater intrusion which impairs the drinking water supplies of the disadvantaged communities around Salinas and Castroville.

We strongly support the effort of MCWRA to develop enhanced prediction tools and operational strategies to support their ongoing flood control and water conservation operations with improved safety and efficiency.

Sincerely,

LUIS A. ALEJO
Chair, Monterey County Board of Supervisors

October 4, 2023

Jason Demers
Senior Engineer
Monterey County Water Resources Agency
P.O. Box 930
Salinas, CA 93902

Re: Support for the Monterey County Water Resources Agency's Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs Project: WaterSMART Applied Science Grant for FY 2023

Dear Mr. Demers,

On behalf of the National Weather Service, I am pleased to support the Monterey County Water Resources Agency's proposal for Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs. As the Service Hydrologist for the National Weather Service Forecast Office in Monterey, Ca, with weather/hydrological forecast and Watch/Warning responsibilities in Monterey County, I support this effort to develop decision support tools and operational strategies with the goal of enhancing water storage and flood control operations at Nacimiento and San Antonio Reservoirs.

Monterey County Water Resources Agency (MCWRA) is proposing to develop Forecast Informed Reservoir Operations (FIRO) based operational tools. These tools will fully utilize the best available forecasting provided by the California Nevada River Forecast Center (CNRFC) using the Hydrologic Ensemble Forecast Service (HEFS) to develop a coordinated forecast and operations approach for Nacimiento and San Antonio Reservoirs. FIRO is a reservoir operations strategy that incorporates enhanced watershed monitoring and forecasting to help operators make more informed water storage and release decisions. This strategy is especially valuable in places like California where our already highly variable weather is expected to be further impacted by our changing climate.

FIRO has been successfully implemented or is in development at several dams and reservoirs operated by the U.S. Army Corps of Engineers, the California Department of Water Resources, and other agencies. FIRO projects include Lake Mendocino and Lake Sonoma in the Russian River watershed, Prado and Seven Oaks Dams in the Santa Ana River watershed, New Bullards Bar Reservoir and Lake Oroville in the Yuba-Feather River system, and Howard Hanson Dam on the Green River in Washington.

Development of FIRO based decision support tools for Nacimiento and San Antonio Reservoirs would support the goal of MCWRA water managers and dam operators to safely maximize storage of winter inflows while minimizing downstream flooding risks. Maximizing the amount of stored water in the reservoirs increases the amount of water that could be available when needed to support groundwater recharge in the Salinas Valley Groundwater Basin, which benefits Disadvantaged Communities along the Salinas River and provides resources for fish and wildlife habitat and migration, including for the threatened South-Central California Coast Steelhead. An increase in available water for diversion at the Salinas River Diversion Facility could decrease groundwater pumping in the coastal portion of the Salinas Valley Groundwater Basin that is impaired by seawater intrusion, in turn slowing the advance of seawater intrusion which impairs the drinking water supplies of the disadvantaged communities around Salinas and Castroville.

I fully support the effort of MCWRA to develop enhanced prediction tools and operational strategies to support their ongoing flood control and water conservation operations with improved safety and efficiency.

Sincerely,

Carolina Walbrun

Carolina Walbrun
Service Hydrologist
National Weather Service
San Francisco/Monterey Bay Area, CA
831-656-1710

Salinas Valley Basin
Groundwater Sustainability Agency

P.O Box 1350
Carmel Valley, CA 93924
(831) 471-7512, ext. 203
www.svbgsa.org

October 4, 2023

Jason Demers
Senior Engineer
Monterey County Water Resources Agency
P.O. Box 930
Salinas, CA 93902

Re: Support for the Monterey County Water Resources Agency's Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs Project: WaterSMART Applied Science Grant for FY 2023

Dear Mr. Demers,

On behalf of Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA), I am pleased to support the Monterey County Water Resources Agency's proposal for Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs. As a partner agency working with Monterey County Water Resources Agency to manage the Salinas Valley's water resources, I support this effort to develop decision support tools and operational strategies with the goal of enhancing water storage and flood control operations at Nacimiento and San Antonio Reservoirs.

Monterey County Water Resources Agency (MCWRA) is proposing to develop Forecast Informed Reservoir Operations (FIRO) based operational tools. These tools will fully utilize the best available forecasting provided by the California Nevada River Forecast Center (CNRFC) using the Hydrologic Ensemble Forecast Service (HEFS) to develop a coordinated forecast and operations approach for Nacimiento and San Antonio Reservoirs. FIRO is a reservoir operations strategy that incorporates enhanced watershed monitoring and forecasting to help operators make more informed water storage and release decisions. This strategy is especially valuable in places like California where our already highly variable weather is expected to be further impacted by our changing climate.

FIRO has been successfully implemented or is in development at several dams and reservoirs operated by the U.S. Army Corps of Engineers, the California Department of Water Resources, and other agencies. FIRO projects include Lake Mendocino and Lake Sonoma in the Russian River watershed, Prado and Seven Oaks Dams in the Santa Ana River watershed, New Bullards Bar Reservoir and Lake Oroville in the Yuba-Feather River system, and Howard Hanson Dam on the Green River in Washington.

Development of FIRO based decision support tools for Nacimiento and San Antonio Reservoirs would support the goal of MCWRA water managers and dam operators to safely maximize storage of winter inflows while minimizing downstream flooding risks. Maximizing the amount of stored water in the reservoirs increases the amount of water that could be available when

Salinas Valley Basin
Groundwater Sustainability Agency

P.O Box 1350
Carmel Valley, CA 93924
(831) 471-7512, ext. 203
www.svbgsa.org

needed to support groundwater recharge in the Salinas Valley Groundwater Basin, which benefits Disadvantaged Communities along the Salinas River and provides resources for fish and wildlife habitat and migration, including for the threatened South-Central California Coast Steelhead. An increase in available water for diversion at the Salinas River Diversion Facility could decrease groundwater pumping in the coastal portion of the Salinas Valley Groundwater Basin that is impaired by seawater intrusion, in turn slowing the advance of seawater intrusion which impairs the drinking water supplies of the disadvantaged communities around Salinas and Castroville.

I fully support the effort of MCWRA to develop enhanced prediction tools and operational strategies to support their ongoing flood control and water conservation operations with improved safety and efficiency.

Sincerely,

Sarah Hardgrave

Sarah Hardgrave
Deputy General Manager

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

October 11, 2023

Jason Demers
Senior Engineer
Monterey County Water Resources Agency
P.O. Box 930
Salinas, California 93902

Re: NOAA's NMFS' Letter of Support for the Monterey County Water Resources Agency's Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs Project: WaterSMART Applied Science Grant for FY 2023

Dear Mr. Demers:

NOAA's National Marine Fisheries Service (NMFS) is submitting this letter of support for the Monterey County Water Resources Agency's (MCWRA) Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs Project. MCWRA is applying for a Bureau of Reclamation WaterSMART Applied Science Grant for FY 2023 to develop decision support tools and operational strategies with the goal of enhancing water storage and flood control operations at their Nacimiento and San Antonio reservoirs.

MCWRA is proposing to develop Forecast Informed Reservoir Operations (FIRO) based operational tools that incorporate enhanced watershed monitoring and forecasting to help MCWRA operators make more informed water storage and release decisions. These tools will fully utilize the best available forecasting provided by the California Nevada River Forecast Center using the Hydrologic Ensemble Forecast Service to develop a coordinated forecast and operations approach for Nacimiento and San Antonio reservoirs. The project will enable MCWRA water managers and dam operators to safely maximize storage of winter inflows while minimizing downstream flooding risks.

Maximizing the amount of stored water in the reservoirs increases the amount of water that could be available for steelhead in the Salinas River watershed and could support and enhance fisheries objectives. Suitable migration flows in the Salinas River are essential to the conservation and recovery of steelhead in the watershed. A critical recovery action identified in the South-Central California Coast (S-CCC) Steelhead Recovery Plan (NMFS 2013) regarding the two reservoirs is to develop and implement operating criteria to ensure the pattern and magnitude of water extractions and water releases provide the essential habitat functions to support the life history and habitat requirements of steelhead.

Assuming there will be clear fisheries objectives, MCWRA's project is expected to benefit threatened S-CCC Distinct Population Segment steelhead (*Oncorhynchus mykiss*) and critical habitat in the Salinas River watershed—a population identified as the highest priority for

recovery of S-CCC steelhead (NMFS 2013). Moreover, NMFS has experience working with FIRO in the Russian River watershed in Sonoma County where improved reservoir storage management has resulted in higher minimum instream flow requirements for salmonids and more reliable flows for salmonid migration. Based on this experience, we expect FIRO based decision support tools will allow for improved operating criteria of MCWRA's reservoirs and support and enhance fisheries objectives in the Salinas River watershed. Therefore, NMFS supports MCWRA's project.

Please direct questions regarding this letter to William Stevens at (707) 575-6066, or at William.Stevens@noaa.gov.

Sincerely,

Amanda Ingham
Central Coast Branch Supervisor
North-Central Coastal Office

Literature Cited

NMFS (National Marine Fisheries Service). 2013. South-Central California Coast Steelhead Recovery Plan. West Coast Region, California Coastal Area Office, Long Beach, California. Available at: https://www.fisheries.noaa.gov/resource/document/final-recovery-plan-south-central-california-steelhead

Monterey County Water Resources AgencyA

Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and ReservoirsA WaterSMART Applied Science Grants ApplicationA

Environmental and Cultural Resources ComplianceA

See below the Monterey County Water Resources Agency's (MCWRA) responses (in red) to questions in Section H.1 of the Notice of Funding Opportunity

1. Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.
    a. MCWRA does not anticipate the project will have an environmental impact with the implementation of the project. This includes impacts to the following: soil (dust), air, water (quality and quantity), and animal habitat.
2. Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?
    a. Yes, MCWRA is aware of species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area; however, the proposed project would not have a direct impact.
3. Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States"? If so, please describe and estimate any impacts the proposed project may have.
    a. No wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States".
4. When was the water delivery system constructed?
    a. Not applicable
5. Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.
    a. No, the proposed project will not result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)
6. Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.
    a. No buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places

7. Are there any known archeological sites in the proposed project area?
    a. No archeological sites in the proposed project area
8. Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?
    a. No, the proposed project will not have a disproportionately high and adverse effect on low income or minority populations
9. Will the proposed project limit access to, and ceremonial use of, Indian sacred sites or result in other impacts on tribal lands?
    a. No, the proposed project will not limit access to, and ceremonial use of, Indian sacred sites or result in other impacts on tribal lands
10. Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?
    a. No, the proposed project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area

Monterey County Water Resources AgencyA

Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and ReservoirsA
WaterSMART Applied Science Grants ApplicationA

Required Permits of ApprovalsA

The Monterey County Water Resources Agency does not anticipate requiring any permits or approvals for the implementation of this project.

Monterey County Water Resources AgencyA

Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and ReservoirsA WaterSMART Applied Science Grants ApplicationA

Overlap or Duplication of EffortA

The Monterey County Water Resources Agency can confirm there is no overlap between the proposed project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel. The proposed project is also not duplicative of any proposal or project that has been or will be submitted for funding consideration to any other potential funding source, both federal and non-federal.

Monterey County Water Resources Agency

Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs
WaterSMART Applied Science Grants Application
Conflict of Interest Disclosure Statement

The Monterey County Water Resources Agency can confirm there are no actual or potential conflicts of interest at the time of submission.

Monterey County Water Resources Agency

Enhancing Predictive Tools and Operational Strategies for the Nacimiento and San Antonio Dams and Reservoirs
WaterSMART Applied Science Grants Application
Uniform Audit Reporting Statement

Confirming the Monterey County Water Resources Agency was required to submit a Single Audit report for the most recently closed fiscal year – see the County's Report for the Year Ended June 30, 2022 within this document.

The County's Employer Identification Number is 94-6000524. The most recent report is available through the Federal Audit Clearinghouse website.