Nevada Irrigation District

Memorandum

for the Board of Directors Meeting of June 28, 2017

TO: **Members of the Board of Directors**

FROM: **Greg Jones, Assistant General Manager**

DATE: **June 22, 2017**

SUBJECT: **DWR Contract Negotiation & Preparation Authorization**

ADMINISTRATION

RECOMMENDED ACTION: Approve the resolution to authorize the General Manager to enter into and subject to negotiations with the Riverine Stewardship Program of the Department of Water Resources to support sediment and mercury removal at Combie Reservoir as recommended by the Engineering Committee on June 20, 2017.

BACKGROUND: In partnership with the Department of Water Resources Riverine Stewardship Program and the State of California, NID's Combie Reservoir Sediment and Mercury Removal Project has been appropriated at $6.13 million with the passing of the state budget for fiscal year 2017-18.

Project funding has been appropriated from the Proposition 13 Bay-Delta Multipurpose Water Management Program over a 3 year period. This project will help implement the Governor's Water Action Plan by restoring water storage capacity in an existing surface water reservoir, while meeting the co-equal goals for the Delta by removing mercury and associated downstream benefits to aquatic habitat. This project also achieves the goals of Proposition 13 by removing mercury contaminants from abandoned mines of the Bear River watershed.

This project will have lasting benefits that protect human health, water supply and storage capacity, and the environment, while supporting local industry through the development of an innovative technology to remove mercury from the Bear River. This project will recover mercury and aggregate material by dredging accumulated sediment from the reservoir, and treating the dredged material using a centrifuge to 'spin out' the mercury. There is a public and environmental necessity to remove both sediment and mercury, used widely used in the Sierra Nevada during the California Gold Rush, to restore and maintain water capacity while improving water quality. What is learned from this project will become valuable to federal and state regulators and help water managers and Native American Tribal efforts to address

mercury in our aquatic food chain. This technology will demonstrate an effective best management practice that addresses a century old problem while maintaining water storage capacity and improving water quality.

BUDGETARY IMPACT:

Unknown at this time. Estimate $1,000,000 over three years

ATTACHMENTS:

- BCP Budget Request 3860-008-BCP-2017-GB
- Combie Reservoir Sediment and Mercury Removal Project Overview Proposal
- Proposed Project Site Map

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RESOLUTION No. 2017-18

OF THE BOARD OF DIRECTORS OF THE NEVADA IRRIGATION DISTRICT

AGREEMENT WITH THE DEPARTMENT OF WATER RESOURCES

WHEREAS, the District will help implement part of the California Water Action Plan, including expanding water storage capacity, achieving co-equal goals for the Delta, providing safe water for communities, and restoring important ecosystems and habitats; and

WHEREAS, the Department of Water Resources has established the Delta Mercury Control Program (DMCP) to set mercury and methylmercury targets for fish tissue and water in the Delta; and

WHEREAS, the Bear River is a tributary to the Delta and contributes sediment loads that must be managed in the DMCP; and

WHEREAS, the State of California passed the 2017-18 Fiscal Year budget with an appropriation for the Delta Mine Drainage Impacts Abatement – Combie Reservoir, Budget Request Name 3860-008-BCP-2017-GB, herein referred to as the Combie Reservoir Sediment and Mercury Removal Project in the amount of $6.13 million; and

WHEREAS, the District has invested funds and has conducted a multi-year bench and pilot scale project to remove sediment and mercury from Combie Reservoir which is now ready for full scale implementation; and

WHEREAS, the project, in partnership with DWR's Riverine Stewardship Program, will assess the scaling of our new technology and methodologies to remove sediment and mercury from reservoirs and to determine its financial and technical feasibility in an effort to prove useful in similar 303(d) listed sites within the Bay Delta and other California watersheds;

NOW, THEREFORE BE IT RESOLVED, by the Board of Directors of the Nevada Irrigation District that the Board does hereby authorize the General Manager to enter into and subject to negotiations with the Riverine Stewardship Program of the Department of Water Resources to support sediment and mercury removal at Combie Reservoir. Further, NID will commit any and all revenue from the sale of aggregates or metals from the dredged materials to the project.

PASSED AND ADOPTED by the Board of Directors of the Nevada Irrigation District at a regular meeting held on the 28th day of June 2017, by the following vote:

AYES:	Directors:
NOES:	None
ABSTAINING:	None
ABSENT:	None

_____
President

ATTEST:

_____
Board Secretary

Fiscal Year	Business Unit	Department	Priority No.
2017-18	3860	Water Resources	

Budget Request Name	Program	Subprogram
3860-008-BCP-2017-GB	**3230**	

Budget Request Description

Delta Mine Drainage Impacts Abatement – Combie Reservoir

Budget Request Summary

This proposal requests reversions of approximately $3.08 million and a new appropriation of $6.13 million from Proposition 13, Bay-Delta Multipurpose Water Management Program, Water Code Section 79196.5(e) over 3 years ($5.715 million in fiscal year (FY) 2017-18, $211,000 in FY 2018-19, and $204,000 in FY 2019-20) to develop facilities to remove and treat mercury laden sediment derived from abandoned gold mines at Combie Reservoir in the Nevada Irrigation District Service area (straddling the Nevada and Placer County line). The requested funding will support contracts and 1 existing position over 3 years. This request supports evaluation of an emerging technology that may be suitable for deployment in other locations where mercury contamination occurs. Proposition 13 limits these funds to projects that control drainage from abandoned mines that adversely affect water quality in the Bay-Delta.

Requires Legislation	Code Section(s) to be Added/Amended/Repealed	
☐ Yes ☒ No		
Does this BCP contain information technology (IT) components? ☐ Yes ☒ No *If yes, departmental Chief Information Officer must sign.*	Department CIO	Date

For IT requests, specify the project number, the most recent project approval document (FSR, SPR, S1BA, S2AA, S3SD, S4PRA), and the approval date.

Project No. Project Approval Document: Approval Date:

If proposal affects another department, does other department concur with proposal? ☐ Yes ☐ No

Attach comments of affected department, signed and dated by the department director or designee.

Prepared By	Date	Reviewed By	Date
Stefan Lorenzato	8/16/16		
Department Director	Date	Agency Secretary	Date

Department of Finance Use Only

Additional Review: ☐ Capital Outlay ☐ ITCU ☐ FSCU ☐ OSAE ☐ CALSTARS ☐ Dept. of Technology

BCP Type: ☐ Policy ☐ Workload Budget per Government Code 13308.05

PPBA		Date submitted to the Legislature
	Original Signed by Amanda Martin	1-10-17

BCP Fiscal Detail Sheet

BCP Title: Delta Mine Drainage Impacts Abatement – Combie Reservoir **BR Name: 3860-008-BCP-2017-GB**

Budget Request Summary

	FY17					
	CY	BY	BY+1	BY+2	BY+3	BY+4
Salaries and Wages						
Earnings - Permanent	0	80	80	80	0	0
Total Salaries and Wages	**$0**	**$80**	**$80**	**$80**	**$0**	**$0**
Total Staff Benefits	0	37	37	37	0	0
Total Personal Services	**$0**	**$117**	**$117**	**$117**	**$0**	**$0**
Operating Expenses and Equipment						
5301 - General Expense	0	94	89	84	0	0
5320 - Travel: In-State	0	2	2	1	0	0
5322 - Training	0	2	3	2	0	0
5340 - Consulting and Professional Services - External	0	5,500	0	0	0	0
Total Operating Expenses and Equipment	**$0**	**$5,598**	**$94**	**$87**	**$0**	**$0**
Total Budget Request	**$0**	**$5,715**	**$211**	**$204**	**$0**	**$0**

Fund Summary

Fund Source - State Operations						
6026 - Bay-Delta Multipurpose Water Management Subaccount	0	5,715	211	204	0	0
Total State Operations Expenditures	**$0**	**$5,715**	**$211**	**$204**	**$0**	**$0**
Fund Source -						
Total Expenditures	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Total All Funds	**$0**	**$5,715**	**$211**	**$204**	**$0**	**$0**

Program Summary

Program Funding						
3230 - Continuing Formulation of the California Water Plan	0	5,715	211	204	0	0
Total All Programs	**$0**	**$5,715**	**$211**	**$204**	**$0**	**$0**

Personal Services Details

Salaries and Wages	CY	BY	BY+1	BY+2	BY+3	BY+4
0762 - Environmental Scientist	0	69	69	69	0	0
0764 - Sr Envirnal Scientist (Supvry)	0	11	11	11	0	0
Total Salaries and Wages	**$0**	**$80**	**$80**	**$80**	**$0**	**$0**
Staff Benefits						
5150350 - Health Insurance	0	18	18	18	0	0
5150600 - Retirement - General	0	19	19	19	0	0
Total Staff Benefits	**$0**	**$37**	**$37**	**$37**	**$0**	**$0**
Total Personal Services	**$0**	**$117**	**$117**	**$117**	**$0**	**$0**

Analysis of Problem

A. Budget Request Summary

This proposal requests reversions of approximately $3.08 million and a new appropriation $6.13 million from Proposition 13, Bay-Delta Multipurpose Water Management Program, Water Code Section 79196.5(e) over 3 years ($5.715 million in fiscal year (FY) 2017-18, $211,000 in FY 2018-19, and $204,000 in FY 2019-20) to develop facilities to remove and treat sediment from Combie Reservoir in the Nevada Irrigation District Service area (straddling the Nevada and Placer County line). The sediments contain mercury which will adversely affect Delta water quality should they escape the reservoir. This project will process the sediments over a 3-year period and remove approximately 150kg (330 lbs.) of mercury. The project will demonstrate field scale application of a centrifuge process that could be applied to other sediments containing high quantities of mercury. This request includes funds to support 1 existing position over 3 years to undertake assessment and characterization of the mercury removal process, and to manage contracts related to the project.

Of the requested funding a total of $200,000 will be used for program delivery ($75,000 in 2017-18, $50,000 in 2018-19, and $75,000 in 2019-20).

Chapter 9, Article 3 of Proposition 13 provides funding for the Bay-Delta Multipurpose Water Management Program and includes a provision to support construction of facilities to control drainage from abandoned mines that adversely affect water quality in the Bay-Delta. The proposition assigns the responsibility to carry out these projects to the Department of Water Resources (DWR). DWR has been managing funds to support other projects implementing this provision of Proposition 13. This Combie Reservoir project satisfies the requirements of the Bond Act and sufficient funds remain in this portion of the Proposition 13 authorizations to support this project.

THE FOLLOWING REVERSIONS ARE REQUESTED:

$2,732,838: Fund 6026 – Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Prop 13) – Water Supply, Reliability, and Infrastructure Program, Ch.9, Section 79196.5(e) (3860-001-6026, Program 3230) – Budget Act of 2015 (Chs. 10 and 11, Stats. 2015)

$350,000: Fund 6026 – Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Prop 13) – Water Supply, Reliability, and Infrastructure Program, Ch.9, Section 79196.5(e) (3860-001-6026, Program 3230) – Budget Act of 2016 (Ch.23, Stats. 2016)

B. Background/History

Mercury is naturally occurring in some geologic formations in the Coast Range, but is a pollutant throughout the Sierra Nevada Mountains, where it was used to process mining ore for gold recovery. Mercury contamination is now wide-spread in the Central Valley and Sierra watersheds in sediments derived from historic mining.

Once in the environment, mercury undergoes various chemical transitions and can occur in a number of chemical states. Generally problems arise as elemental mercury is transformed into methyl-mercury, a form that is readily taken up by zooplankton and animals, where it exerts toxic effects. The transformation to methyl-mercury occurs as sediments laden with mercury descend from river reaches where gold mining occurred to warm water valley floor and delta reaches. Evidence shows that methylation is accelerated as mercury is exposed to the wetting and drying sequences of agricultural lands on the valley floor and in the Delta. Rapid biomagnification has been demonstrated that results in delta fish containing mercury at concentrations that are adverse for human consumption. Warnings to limit eating delta fish have been in place for years. Warnings also exist for Combie Reservoir.

Combie Reservoir, the site of the proposed project, sits upstream of the Delta on the Bear River, below many historic mining operations and above the warm water valley floor reaches. Combie Reservoir is

listed on the State's 303(d) list of impaired waters due to the mercury in the sediment and water. Prior to 2003 some dredging occurred as a means to maintain reservoir capacity. But with the detection of mercury in the sediments and being released by the dredging operations, the Regional Water Quality Control Board restricted the dredging. Since that time options for managing the mercury and sediment have been evaluated. Combie represents a common condition in the Bear River, American River, Calaveras River, and Yuba River watersheds. Perfecting the methods proposed in this project provides a path to clean up other contaminated sediments in these watersheds and elsewhere, and to reduce the threats of mercury poisoning in the mountains and the valley and Delta.

A dredging spoil treatment system was developed and bench tested to ensure efficacy of the process. Bench testing indicates the potential for 93 percent removal of mercury from dredged sediments. The pilot project process includes a suction dredge with special cutting head designed to limit turbidity, a mixing tank to maintain the slurry by agitation, a coarse material filter, sand removal, and several steps of turbidity removal, leaving clear water and pressed silt and clay. Salvageable aggregate will be sold. Mercury and gold will be extracted. Gold will be sold to offset operational costs. Mercury will be disposed of if it cannot be recycled.

Proposition 13 provided $17 million to address the adverse impacts of mine drainage on the Delta (Water Code Section 79196.5(e)). Primary among those impacts are the problems caused by mercury pollution and the potential for mercury poisoning. DWR is charged with managing the mine waste funds. A number of projects have been supported to this point. Most have focused on mercury issues, but progress has been limited chiefly due to the complexity of mercury chemistry and the limited ways it can be separated from sediments. Water Code Section 79196(b) allows funds not expended on dissolved oxygen control in the San Joaquin River (another focus of the Bay-Delta Multipurpose Water Management Program) to be reallocated by DWR to controlling drainage from abandoned mines that adversely affects the Delta. A balance of approximately $11 million exists in the dissolved oxygen control allocation. This request includes reallocating $6.13 million from the dissolved oxygen balance to the mine drainage work.

Allocations for the mine drainage element of the Bay-Delta Multipurpose Water Management Subaccount began in FY 2001-02. An agreement was established between DWR and the California Department of Fish and Wildlife (CDFW) (then Fish and Game) to support projects vetted and selected for funding by the Ecosystem Restoration Program (ERP). A $12.8M contract between the two agencies was executed in FY 2008-09 to support expenditures on the projects selected by DFW. Relatively few projects have been able to adhere to the requirements of the funding to provide facilities to control drainage from abandoned mines. Those that have been advanced have had difficulty securing permits and permissions. The net effect is that expenditures under the contract have been slow and fund availability has been extended to accommodate the difficulties. Currently the contract supports three projects in process. The current balance committed in the contract is about $8M. State operations costs over the life of the allocation have averaged about $100,000 per year, approximately 0.5 positions per year.

Workload History

Workload Measure	PY - 4	PY - 3	PY - 2	PY - 1	PY	CY
Projects in process under CDFW agreement: ERP selection process (Note these are all multi-year projects.)	4	4	3	3	3	3

C. State Level Considerations

The California Water Action Plan (CWAP) states three broad objectives: more reliable water supplies, restoration of species and habitats, and more resilient and sustainably managed water, all of which are addressed by this project. Reliability is addressed by reducing potential mercury pollution in the water supply and restoring local storage capacity to enable flexibility in water delivery, especially under drought conditions. The project addresses species and habitat improvement by removing mercury from

the food web and contributing aggregate to be used in enhancing spawning grounds. It addresses resiliency by proving the viability of a new technology for mercury removal from sediment that could prove useful in other similar contaminated sites. The project contributes to specific CWAP actions; 2- Increase Regional Self Reliance and Integrated Water Management, 3 – Achieve the Co-Equal Goals for the Delta, 4 – Protect and Restore Important Ecosystems, and 5 – Manage and Prepare for Dry Periods.

Mercury is a pollutant of great concern. It is included in the California Toxics Rule, a list of water quality standards developed by the State and approved by the US Environmental Protection Agency. The State Water Resources Control Board sets standards and promulgates the 303(d) list of impaired waters. Included on that list for mercury pollution is Combie Lake, the Bear River, the Feather River, the Yolo Bypass, and the Delta; all waters affected by this project. Total Maximum Daily Load regulations have been developed for mercury control in rivers and streams and in the Delta.

Proposition 13 acknowledges the importance of the adverse impacts of mine drainage by specifically calling out funds to support projects to reduce the impacts of mine drainage on the Delta. Similar emphasis on curtailing the effects of mercury and other mine wastes are included in Proposition 1, Water Quality, Supply, & Infrastructure Improvement Fund of 2014..

The other benefits of the project also derive value from State-level interests. The California Water Plan emphasizes the need for integrated water portfolios and the ability to have flexible management options available for water supply deliveries. By improving water quality and restoring storage capacity this project rebuilds management flexibility curtailed by sediment buildup in Combie Reservoir. The Water Plan also stresses the need to advance the use of emerging technologies to help satisfy our water management needs. This project proves the viability of a new mercury removal technology and will clarify the operational constraints and optimizations to allow its deployment elsewhere.

Improvement in species and habitat in the project area and downstream largely focus on anadromous fish. While the Bear River is not considered a salmon and steelhead watershed, the fact that it drains into the Feather River connects the project area to the joint State/Federal Central Valley Chinook Salmon and Steelhead Recovery Plan. This plan contains actions that include:

- State and local agencies using their authorities to develop and implement programs and projects that focus on retaining, restoring and creating active floodplain and riparian corridors within their jurisdiction.
- Implementation of pollution control programs and projects to ensure that the water quality criteria established in the Central Valley Water Quality Control Plan (Basin Plan) are met in the Feather River for all potential pollutants. (Note that the lower Feather River is listed as impaired due to mercury.)

The project addresses these concerns by potentially contributing gravel for improved spawning of salmon and steelhead and by reducing exposure to mercury.

The Delta Mercury Control Program (DMCP) has been established by DWR in response to the Total Maximum Daily Load (TMDL) program managed by the State Water Resources Control Board. The TMDL program, and therefore the DMCP have set mercury and methylmercury targets for fish tissue and water in the Delta. The Bear River and Combie Reservoir are tributary to the Delta and contribute to the loads that must be managed in the DMCP.

DWR has established Integrated Regional Water Management (IRWM) as its primary strategy for assisting local government with comprehensive water planning. Grant funds have been distributed to regional IRWM planning groups to develop plans, identify and rank projects, and promote construction-ready efforts. The Cosumnes, American, Bear, and Yuba (CABY) river watersheds joined efforts to form the CABY IRWM region. CABY has developed a plan pursuant to DWR guidelines and ranked the Combie Reservoir project as a Tier 1 Water Quality project, meaning it is ready for construction, pending only sufficient funding. DWR has reviewed and approved the CABY plan.

D. Justification

The project is designed to remove mercury from the Bay-Delta ecosystem by dredging Combie Reservoir and processing the dredge material to strip off and dispose of mercury. The process has been developed through the bench testing scale and is ready for full pilot implementation. The project requires a partnership between DWR and Nevada Irrigation District (NID). NID has developed the bench test program. This partnership will extend that program to the pilot testing stage where DWR will assist with characterization and assessment of the approach to determine its applicability more broadly throughout the Bay Delta watershed.

$5.5 million of the funds requested will go to NID to dredge and process the sediments of Combie Reservoir. The budget for this work is presented in table 1, below.

Table 1. Mercury Processing Budget – Combie Reservoir

Task	FY17-18	FY18-19	FY19-20	
Project Management	236,000	235,000	235,000	
Field sampling & testing	226,000	226,000	226,000	
Education & Outreach	40,000	30,000	30,000	
Permitting	100,000	10,000	10,000	
Site Prep/construction	350,000	153,000	374,000	
Dredge & Pump	262,000	444,000	444,000	
Mercury removal	774,000	1,319,000	1,319,000	
Clean sediment disposal	165,000	319,000	319,000	
Subtotal	2,153,000	2,736,000	2,957,000	
Mercury Removal subtotal				7,846,000
Aggregate revenues				(225,000)
Metals recovery revenues				(1,000,000)
Grand Total				6,621,000

NID will be responsible for securing the balance of Project costs above the $5.5 million projected from DWR, either using their own funds or securing grant support. The balance of funding in this request, $630,000, will support 1 position (0.9 Environmental Scientist and 0.1 Senior Environmental Scientist (Supervisor)) over 3 years to assess and characterize the mercury removal process. This work will entail several components as described below.

Analysis of Problem

DWR staff will be involved in the following activities.

Task Title	Description	Hours Year 1	Hours Year 2	Hours Year 3
Baseline Assessment:	Characterization report that describes existing conditions, background, and history of sediment dynamics in the Bear River Watershed, and identifies potential other locations in the Bay-Delta watershed that appear suitable for application of this process.	300	300	
Project tracking	In concert with NID staff, regularly extract information from the Project Management documents and develop summaries of key process steps and milestones	200	200	200
Process Protocol - Manual	In concert with NID staff, develop a detailed description of the process in sufficient detail to serve as an implementation guide for other sites. Record key site specific considerations and general process details. Develop check lists, operating specifications, milestones, rates schedules, and calendars as appropriate.	550	700	800
Project Coordination	Meet regularly with NID to plan and track project progress. Develop coordinated outreach and education plan.	250	250	300
Outreach	Design and conduct outreach efforts in concert with NID staff. Outreach will consider other watersheds where there is a potential for deploying the process and target key decision makers who should be aware of the technology.	175	250	250
Contract Development	Draft, review, process and execute a contract to provide $5.5 million to NID for the project	160		
Contract Management		120	120	180
Annual Hours		1,755	1,820	1,730

E. Outcomes and Accountability

- **Mercury tissue burdens.** Mercury concentrations in zooplankton and fish in Combie Reservoir will be lower after the project.
- **Mercury removal.** Approximately 200-350 pounds of mercury will be removed from dredged materials and recycled or disposed.
- **Mercury-laden sediment transport reduced.** Sediment available to be transported to the Delta will be reduced by between 60,000 and 120,000 cubic yards. The associated mercury that would have been deposited in the Delta will be removed from the system.
- **Reduced mercury exposure in people.** The reduced mercury transport to the Delta provides a concomitant reduction in mercury exposure and adverse impacts to people and fish and wildlife in the Delta.
- **Improved Water Quality.** Removal of sediments will reduce mercury contamination in Combie Reservoir and diminish turbidity problems associated with the sediments.
- **Improved water supply management flexibility.** Increased reservoir storage capacity will contribute to improved drought water supply management, and the possibility of mixing Combie water with other lower quality waters to provide high quality water supplies.

- **Pilot Demonstration.** Clear demonstration of mercury removal methods and identification and articulation of operational requirements that allow the methods to be used to reduce mercury adverse impacts at other sites high in sediment mercury contamination.
- **Detailed Accounting.** Detailed cost accounting that depicts cost effectiveness and which will be applied to determine cost efficiencies at other potential cleanup sites.

Projected Outcomes

Workload Measure	BY	BY+1	BY+2	BY+3	BY+4
Tissue Burdens	No change	Reduction	Reduction	Reduction	Reduction
Mercury Removal	Negligible	70-170 lbs.	70-160 lbs.	NA	NA
Sediment Transport	NA	30,000 - 60,000 yd^3	30,000 – 60,000 yd^3		
Reduced exposure	NA	Slight	Slight	Diminishing exposure	Diminishing exposure
Improved Water Quality	Slight	Reduced Mercury	Reduced Mercury	Slight improvements	Slight improvements
Improved Water Supply				Increase flexibility	Increased flexibility
Pilot Demonstration	Annual Report	Annual Report	Annual Report	Final Report	
Detailed Accounting	Semi-annual	Semi-annual	Semi-annual		

F. Analysis of All Feasible Alternatives

1. Fully fund this proposal as described

Pro: – Full funding provides the quickest risk reduction and benefit realization. Exposure to mercury is quantitatively reduced and the persistence of mercury in the watershed at levels that pose risk is also likely reduced. The ability to determine the merits of the methodology and its applicability and utility in other contaminated sites will be readily achieved, potentially expediting mercury pollution reduction throughout the Sierra Nevada watershed.

Con: – This is the most costly alternative.

2. Partial funding of the proposal

Pro: – The benefits to the State and partners will be realized at a reduced cost.

Con: – Partial funding, provided it is of sufficient magnitude, puts the project on a longer timeframe, requiring additional years to complete the sediment removal and treatment. Ultimately the benefits to the State and partners will be realized. The costs of producing those benefits become less efficient, since the dredging operations cannot work year round and both mobilization and demobilization expenses will be incurred each year of operation.

3. Do not fund the proposal

Pro: – No impact to budget.

Con: – Not funding the project provides no benefits to the State or other project partners. The impacts of mercury contamination continue and exposure of people to high concentrations of mercury from fish they catch and eat continues unabated, potentially costing the State in terms of health costs to treat symptoms and disease. Not funding the project provides only minor fiscal rewards from avoiding bond service charges.

G. Implementation Plan

Combie Reservoir Pilot Project Calendar

	BY		BY+1		BY+2	
	2016	2017	2017	2018	2018	2019
Contract Development						
Baseline Assessment						
Project Tracking						
Process Protocol - Manual						
Project Coordination						
Outreach						
Contract Management						

H. Supplemental Information

Local Cost Share: NID has invested approximately $1.2 million to date in the bench testing of the mercury removal process. NID will continue to support the project with cost share and funds derived from the sale of aggregate and precious metals, primarily gold, recovered during the mercury processing steps of the treatment process.

Outreach/analysis: Several entities are tracking mercury management work. Outreach to those forums is expected to trigger additional interest in the methods and potentially draw in additional partners. The careful characterization of the methods should also provide a platform for additional future collaborative projects, potentially saving the State ongoing costs of dealing with legacy mercury contamination.

I. Recommendation

DWR recommends Alternative 1, to fully fund this request.

Combie Reservoir Sediment and Mercury Removal Project

FY 2017/18

This project has lasting benefits that protect human health, water supply, and the environment, while supporting local industry through the development of an innovative remediation technology to remove mercury from the Bear River. The Combie Reservoir Sediment and Mercury Removal Project will recover about 150kg of mercury while producing 100,000 tons of aggregate material by dredging accumulated sediment from the reservoir, and treating the dredged material using a centrifuge to 'spin out' the mercury. There is a public and environmental necessity to remove both sediment and mercury (used extensively in the Sierra Nevada region during the California Gold Rush) to restore and maintain water capacity while improving water quality, because mercury-laden sediment continue to fill the reservoir over time, and mercury continues to methylate and contaminate the aquatic food chain. What is learned from this project will become valuable science to federal and state regulators, help local water managers, and advance the regional Native American Tribal efforts to address "Mercury in our Water, our Fish and our People," because this technology will demonstrate an effective best management practice that addresses a century old problem while maintaining water storage capacity, improving water quality and providing valuable raw materials for multiple public benefits.

Proposal

Nevada Irrigation District (NID) is requesting a Proposition 13 appropriation of $6M to the Dept. of Water Resources' (DWR) Riverine Stewardship Program to restore water storage capacity in Combie Reservoir, and to remediate abandoned mine waste by removing and treating accumulated mercury contaminated sediment. NID's Sediment and Mercury Removal Project at Combie Reservoir, in Nevada County, is shovel ready with demonstrated success.

Project Benefits

This project will implement the Governor's Water Action Plan by restoring water storage capacity in an existing surface water reservoir, while meeting the co-equal goals for the Delta by removing mercury and associated downstream benefits to aquatic habitat. This project also achieves the goals of Proposition 13 by removing mercury contaminants from abandoned mines in the Bear River watershed, in the Sierra Nevada. Project implementation will include evaluating and characterizing the potential beneficial uses of clean sand and gravel (end product of the treatment process) for potential downstream ecological benefits. NID will work with project partners and agencies to develop opportunities to support gravel augmentation for aquatic habitat restoration efforts. Furthermore, NID will continue to develop partnerships with local resource agencies, tribal representatives and non-governmental organizations to maximize future opportunities and benefits. Full implementation will result in:

- *200,000 tons of mercury-contaminated sediment removed and treated for mercury*
- *330 pounds of mercury extracted*
- *100,000 to 150,000 tons of clean aggregate (sand) recovered*
- *125 acre feet of operational water storage space restored*
- *20 acres of reservoir habitat enhanced and restored*
- *Measure benefits of removing elemental mercury on Bay-Delta ecosystem*
- *Evaluation of downstream habitat for aquatic habitat improvements*

Demonstrated Success

In 2014-2015, NID obtained a Prop 84 grant to demonstrate the sediment and mercury removal process. During this time, six separate trial runs demonstrated the process to over 100 individuals, resource agencies, and dignitaries. Demonstrations resulted in the removal of approximately 23g of mercury from 50 tons of sediment.

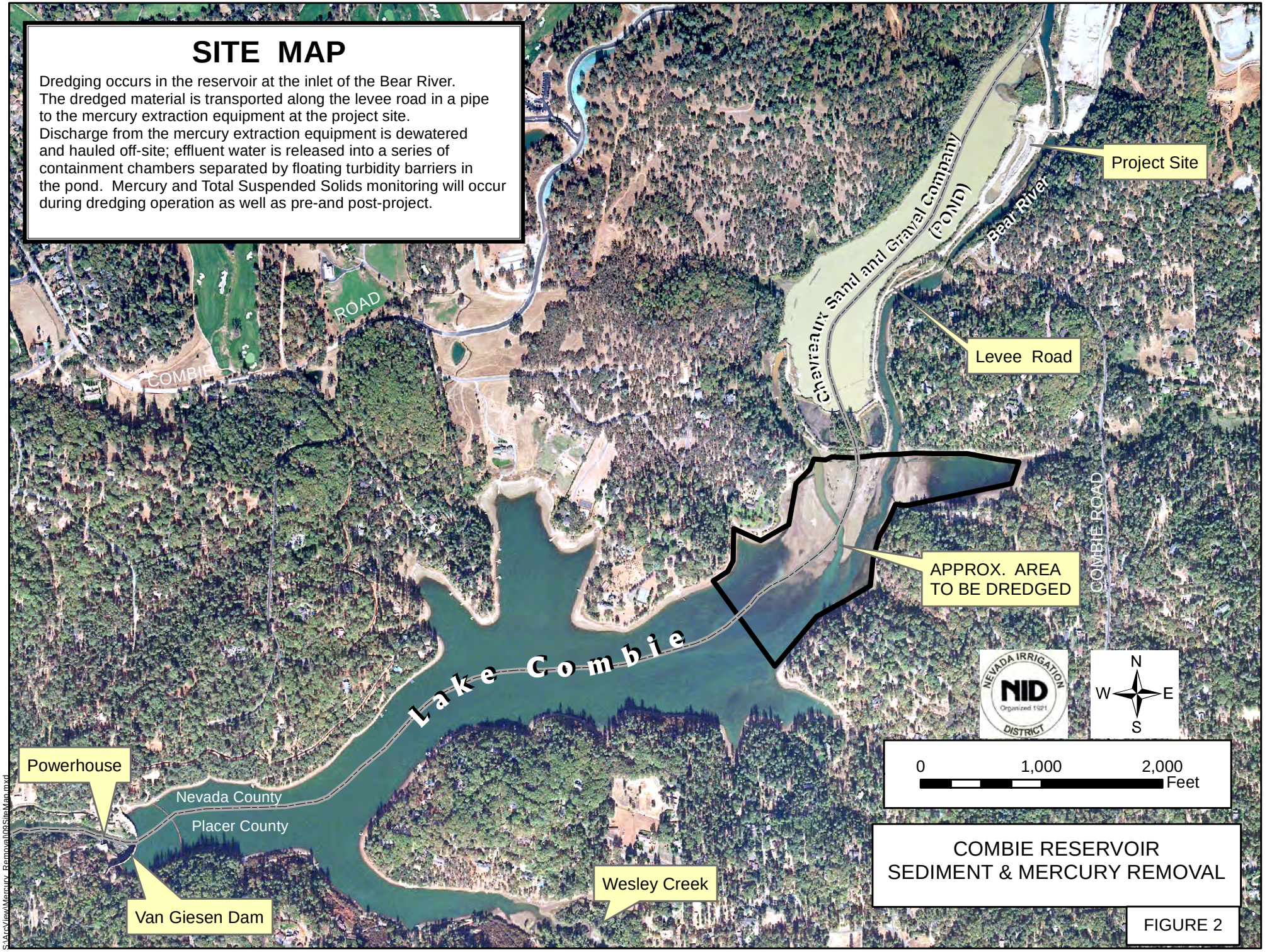
Implementation Phase

Full implementation will result in cleanup of sediment and mercury in the water system. It will also provide an example for assessing and cleaning up similar reservoir deposits that are threats to water quality and water supply across the Sierra Nevada where legacy mining is found downstream of abandoned mines. The Combie Sediment and Mercury Removal Project was developed with the help of Dr. Charlie Alpers (USGS), Rick Humphreys (SWRCB Abandoned Mine Specialist) and Dr. Carrie Monohan (Science Director at The Sierra Fund and Consulting Scientist to NID).

Timing

This project is timely in addressing the Governor's Water Action Plan by re-establishing water storage capacity in anticipation continued drought conditions. The forecast of these conditions warrants prompt attention and the advancement of this project for Fiscal Year 2017/18. According to DWR staff, Prop 13 funds could be made available to implement this project through a BCP request in August 2016 for the 2017/18 Fiscal Year. We are requesting to have the Secretary direct DWR's Riverine Stewardship Program to prepare a budget change proposal to this end. Once funding is allocated, DWR can administer these funds to the project directly.

Project Video: http://nidwater.com/conservation/mercury-removal-project/


SITE MAP
Dredging occurs in the reservoir at the inlet of the Bear River.
The dredged material is transported along the levee road in a pipe
to the mercury extraction equipment at the project site.
Discharge from the mercury extraction equipment is dewatered
and hauled off-site; effluent water is released into a series of
containment chambers separated by floating turbidity barriers in
the pond. Mercury and Total Suspended Solids monitoring will occur
during dredging operation as well as pre-and post-project.
Project Site
Bear River
Chevreaux Sand and Gravel Company (POND)
Levee Road
COMBIE ROAD
APPROX. AREA
TO BE DREDGED
Lake Combie
COMBIE
ROAD
Powerhouse
Nevada County
Placer County
Van Giesen Dam
Wesley Creek
NEVADA IRRIGATION
NID
Organized 1921
DISTRICT
N
W
E
S
0
1,000
2,000
Feet
COMBIE RESERVOIR
SEDIMENT & MERCURY REMOVAL
FIGURE 2
S:\ArcView\Mercury_Removal\09SiteMap.mxd