

East Walker River Watershed Plan

March 2012



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1. Context

Watershed Approach

The natural unit for considering most water-related issues and problems is the watershed.

A watershed can be simply defined as the land contributing water to a stream or river above some particular point. Natural processes and human activities in a watershed influence the quantity and quality of water that flows to the point of interest. Despite the obvious connections between watersheds and the streams that flow from them, water problems are typically looked at and dealt with in an isolated manner. Many water problems have been treated within the narrow confines of political jurisdictions, property boundaries, technical specialties, or small geographic areas. Many water pollution problems, flood hazards, or water supply issues have only been examined within a short portion of the stream or within the stream channel itself. What happens upstream or upslope has been commonly ignored. The so-called watershed approach merely attempts to look at the broad picture of an entire watershed and how processes and activities within that watershed affect the water that arrives at the defining point. The watershed approach is simply a means of considering water problems (as well as the absence of problems) in a comprehensive manner.

A companion watershed assessment describes how the four hundred square-mile watershed influences the quantity and quality of water that flows into the East Walker River above the California/Nevada border.

California Watershed Programs and the East Walker River

Within California, the U.S. Environmental Protection Agency and the state Regional Water Quality Control Boards are the principal agencies charged with minimizing water pollution and maintaining or improving water quality. These entities have been largely successful at reducing water pollution that starts at a known point, such as a sewer outfall from a city or a waste pipe from a factory. As these so-called point sources have been brought under control, the agencies found that pollution from broader areas of land was still degrading water quality. Sediment from dirt roads and bare construction sites, pesticide runoff from farms, nutrients and bacteria from livestock operations, chemicals and oil residues from urban streets are all examples of so-called non-point-source water pollution. The agencies concerned with limiting water pollution have adopted the watershed approach to studying and controlling non-point-source pollution.

In 1997, the Governor's office directed state agencies that deal with natural resources (e.g., State Water Resources Control Board and Regional Water Quality Control Boards, Department of Fish and Game, Department of Conservation, and Department of Forestry and Fire Protection) to

coordinate activities on a watershed basis. In March 2000, California voters passed Proposition 13, the Costa-Machado Water Act, which included substantial grant funding for local watershed management activities. With funding from this source, Mono County in cooperation with the Mono County Collaborative Planning Team developed watershed assessments and plans for the West Walker River watershed, Mono Basin, and Upper Owens River watershed between 2005 and 2008.

After other attempts failed to obtain funding for an assessment of the East Walker River watershed in 2000 and 2006, the Eastern Sierra Land Trust received a grant for this purpose from the Sierra Nevada Conservancy in 2008. Because the project was supported by State of California funds, the geographical scope is limited to lands upstream of the California/Nevada border.

A watershed assessment for the East Walker River watershed was completed in 2012. The basic concept of a watershed assessment is to describe any known problems concerning water quantity and quality and attempt to connect those problems with conditions, processes, and activities within the watershed. Such linkages between problems and potential causes can provide the basis for subsequent planning and management that attempt to address the identified problems. The watershed plan reported here follows from and was based upon the East Walker River watershed assessment as well as the other watershed plans for Mono County. This plan intentionally borrows the format and some of the content from the plans of the other Mono County watersheds because the context is largely the same.

The assessment found that the East Walker River watershed is in comparatively good condition and suffers from few of the problems that plague most other parts of California and the West. The principal water quality issue, identified by Lahontan Regional Water Quality Control Board (Lahontan RWQCB) is coliform bacteria and nutrients entering Bridgeport Reservoir, which is currently being addressed by the Bridgeport Ranchers Organization and the Lahontan RWQCB. This plan only reports on that matter and does not attempt to interfere with the current program, other than to recommend the adoption of the fecal coliform standard used by the US Environmental Protection Agency, other states, and all other regions of California.

With this issue off the table, this watershed plan for the East Walker River watershed suggests a few approaches and measures for addressing some of the other water-related issues and problems identified in the assessment. The plan merely offers guidance and proposals. It has no authority itself, and all implementation of suggested policies and actions will rely on decisions of local jurisdictions, agencies, non-profit organizations, and private citizens. As recommended in the plans for the other three principal watersheds of Mono County, the Mono County Collaborative Planning Team would appear to be the best entity to oversee implementation and revision of this plan. However, that role has not been assumed yet with respect to the other watersheds.

2. Overview of Existing Planning

The Mono County General Plan is the primary document that guides County permitted land use on private property within the watershed. In addition to a broad set of county-wide policies, the General Plan also includes hierarchical goals, objectives, policies, and actions for each local planning area. Three planning areas designated by Mono County occur within the East Walker River watershed: Swauger Creek, Bridgeport Valley, and Bodie Hills. The goal for the Swauger Creek planning area is "Distribute and regulate residential land uses in a manner that minimizes impacts to natural resources, supports low impact recreational uses on wildlands, and preserves and enhances agricultural resources and wildland recreational and research values in area adjacent to rural residential uses." The goal for the Bridgeport Valley planning area is "Provide for orderly growth in the Bridgeport Valley in a manner that retains the small character, and protects the area's scenic, recreational, agricultural, and natural resources." The Bodie Hills planning area has a goal of "Protect and enhance ... resources that complement the Bodie Experience."

Eastern Sierra Land Trust has identified the East Walker River watershed has a priority area for protection due to the multiple resources located there. Great public benefit can be achieved by preserving the unique natural and agricultural resources such as wildlife habitat for rare and endangered species, prime grazing lands, highly scenic viewsheds, and important wetlands. By working with willing landowners, significant benefits for the public and private landowners can be attained through the use of conservation easements.

About four-fifths of the East Walker River watershed are public lands administered by the Bridgeport Ranger District of the Humboldt-Toiyabe National Forest and the Bishop Field Office of the Bureau of Land Management. About one percent of the watershed is California state land. Policies guiding the management of the federal lands are detailed in resource management plans of the two agencies (USDA-Forest Service, 1985 and USDI-Bureau of Land Management, 1993). These plans were augmented by other documents that are resource or geographically specific (e.g., USDA-Forest Service, 2004; USDA-Forest Service, 2009; USDI-Bureau of Land Management, 2011).

3. Overview of Issues and Problems

The watershed assessment found that the East Walker River watershed has remarkably good water quality and few water problems of “significance.” Lahontan RWQCB and the Bridgeport Ranchers Organization are working together to address the coliform and nutrient issues in the Bridgeport Valley and reservoir and have made good progress. The context chosen here for judging the East Walker River watershed is in comparison to the more developed parts of California and the United States. The hydrologic regime and qualities of water within the East Walker River watershed are certainly not pristine or identical to conditions prior to settlement by EuroAmericans in 1860s. However, conditions are not greatly impaired either. The Clean Water Act of 1972 had a general goal for the nation’s waters to become “fishable and swimmable”. By those criteria, the streams and lakes of the East Walker River watershed are in good shape. Nevertheless, some conditions could be improved. This plan suggests how to make some incremental improvements.

A primary challenge is to maintain the current high quality of waters in the East Walker River watershed. The simple fact that the great majority of the watershed is relatively undisturbed accounts for the good condition of the streams and lakes in the watershed. Wherever the level of disturbance of channels, riparian areas, and uplands increases from natural conditions, water quality and aquatic habitat may suffer. Bridgeport Valley is the most developed part of the watershed, and consequently, the East Walker River as it passes through the valley has the greatest departures from natural conditions. A century of agricultural use of the valley floor and diversion from the river have greatly altered the vegetation, soils, and hydrology of the valley. Roads within the riparian zone probably are the greatest human impact upstream of the Bridgeport Valley. The capacity of the watershed to support further changes in land use without significant degradation is unknown, but experience in other areas suggests that all reasonable measures that keep surface runoff, sediment, and pollutants on or near the site of disturbance or at least out of streams minimizes the contribution of that change in land use to degradation of water resources and aquatic habitat.

Problems Linked to Potential Causes

Water Quantity

Additional water is needed downstream to reduce the salinity of Walker Lake. The current legal cases involving water allocation throughout the Walker Lake basin could possibly result in some constraints on consumptive use within Bridgeport Valley or allow irrigators to lease or sell some of their water for the benefit of Walker Lake. Although the issue is summarized within the assessment, guesses about the eventual direction of federal policy and court decisions are well beyond the scope of this plan.

Water supply is not known to be limiting for uses within the Bridgeport Valley, except during exceptionally dry years.

Water Quality

Bridgeport Reservoir is the focal point of water quality concerns in the East Walker River watershed. It has been eutrophic (highly productive of algae and bacteria in summer because of high nutrient levels) for decades and sometimes has high counts of coliform bacteria, which are indicators of potential contamination by pathogenic bacteria. The cattle grazing in the Bridgeport Valley during summer are the presumed source of coliform bacteria, nitrogen compounds, and phosphorus compounds. Coliform levels in some water samples obtained from Buckeye and Robinson Creeks within the pasturelands of Bridgeport Valley have also exceeded regional water-quality objectives. In theory, reducing the amount of cattle feces in contact with water draining into the creeks and Bridgeport Reservoir would alleviate the problem. The practicalities of such reduction are logistically difficult and expensive given the extensive water spreading infrastructure throughout the valley than enables the high level of seasonal forage production. Nevertheless, the ranches of the valley are working on the problem in association with the Lahontan Regional Water Quality Control Board and U.C. Davis. Rangeland Water Quality Management Plans specific to each ranch and the general terms of a conditional agricultural waiver guide the process. The waiver has been in place since 2007 and should be renewed in April 2012 (California Regional Water Quality Control Board--Lahontan Region, 2012).

There is likely to be some microbial contamination of streams caused by careless disposal of human and pet wastes. There is some uncertainty about the long-term effectiveness of household septic systems.

The East Walker River is on the 303(d) list for sedimentation/siltation and turbidity. Much of the current sediment load is assumed to result from the 1988 release of sediment from Bridgeport Reservoir and from natural channel processes as the channel readjusts following the 1997 flood. This problem should abate over time, and there are no obvious management actions that could readily solve the problem. In upper parts of the watershed, localized accelerated erosion and sedimentation appears to be related to roads, trails, and OHV use but is unlikely to significantly impact streams because it is not transported far from the site of erosion. A few sites where channels are being impacted by road crossings are known to the Humboldt-Toiyabe National Forest (2004).

Mercury and other metals associated with historic mining and ore-processing have been found in some water samples from streams draining out of the Bodie Hills. The problems do not appear to be severe, and there are no practical solutions to the historic contamination.

Vegetation Change

The risk of catastrophic wildfire is linked to the accumulation of dead fuels and increases in density of forests, woodlands, and shrublands in the absence of a natural fire regime.

Riparian habitat has been locally impacted by the construction and presence of roads, trails, buildings, and recreational facilities (primarily campgrounds) within the riparian zone.

Wetlands have been drained, filled, and converted to other land uses with a continuing decline in wetland habitat and values. Irrigation within Bridgeport Valley has also created or maintained some wetlands.

Potential Watershed Problems and Risks

Extensive clearing of vegetation and leaf litter for fire safety may lead to accelerated erosion.

Areas of wetlands remain at risk of drainage and conversion to other land uses.

Knowledge and Information Gaps

There are insufficient water quality data to evaluate trends and unequivocally identify most sources of contaminants. However, an adequate water quality monitoring program is unlikely to be cost-effective.

The details of bacterial transport and nutrient cycling, retention, and release on the agricultural lands of the Bridgeport Valley are not understood sufficiently to design best management practices without long-term experimentation and adaptive management.

Stream-groundwater interactions in the Bridgeport Valley are not understood well enough to predict the effects of increased groundwater pumping.

The sediment budget of the East Walker River watershed is not understood.

The long-term reliability of septic systems with respect to avoiding contamination of nearby wells and streams is unknown.

The hydrologic and ecologic effects of climatic variability and potential trends in climate within the East Walker River watershed are unknown, but contingency planning seems prudent.

4. General Principles of this Watershed Plan

This watershed plan for the East Walker River watershed is largely based on the following concepts and principles to address issues identified in the assessment:

- encourage the continuation of the agricultural waiver program in the Bridgeport Valley as a means of developing agricultural "Best Management Practices" to limit the off-site transport of fecal bacteria and nutrients
- recommend the adoption of the fecal coliform standard used by the US Environmental Protection Agency, other states, and all other regions of California.
- limit livestock access to stream channels and riparian areas
- implement non-agricultural "Best Management Practices" to keep surface water, sediment, and pollutants on-site during and after some change in land use, earth-moving, or construction activity
- detain stormwater runoff on site to maximize infiltration
- minimize further disturbance of vegetation and soils, particularly near channels
- avoid disturbance of stream channels and associated riparian areas and remove existing disturbances of riparian areas and channels
- guide land-use changes away from streams and riparian areas
- maintain and encourage native riparian vegetation
- maintain and enhance existing wetlands
- reduce threat of catastrophic wildfire through fuels management
- construct any new mines so as to prevent off-site migration of pollutants

Most watershed management practices in the East Walker River watershed that relate directly to some water quality characteristic will need to occur under a cloud of uncertainty. In an ideal situation, contaminants of concern would be carefully monitored, a practice to reduce the contamination would be implemented, and continued monitoring would indicate whether the practice was successful and whether it should be modified in an "adaptive management" strategy. Unfortunately, the cost of intense water-quality monitoring sufficient to reliably demonstrate trends is often prohibitive. Funds for an adequate monitoring program may be better spent on an implementation program that common sense suggests will reduce the negative effects of an activity, even if the reductions cannot be quantified. Nevertheless, there are particular situations where the effectiveness of some set of practices does need to be quantified. An example is the ongoing conditional agricultural waiver program (California Regional Water Quality Control Board--Lahontan Region, 2012). There is also great potential for bioassessment techniques to indicate general trends in the condition of a waterway.

The U.S. Environmental Protection Agency (2005) has a draft handbook in circulation for developing watershed plans. This handbook is likely to become the standard protocol for addressing nonpoint source pollution through a watershed approach. The draft relies heavily on

the “Total Maximum Daily Load (TMDL)” procedure with respect to particular pollutants that impair a waterbody for certain beneficial uses. The draft handbook summarizes development of a TMDL as follows: “For each impaired waterbody, a state or tribe must develop an accounting of loads that would result in the waterbody’s meeting water quality standards. This is called a Total Maximum Daily Load (TMDL). A TMDL is the amount, or load, of a specific pollutant that a waterbody can assimilate and still meet the water quality standards. The “load” is allocated among the current pollutant sources (point, nonpoint, and background sources), a margin of safety, and sometimes future growth” (U.S. Environmental Protection Agency, 2005).

Although the TMDL approach to non-point source pollution appears to be an effective means of improving water quality in many parts of the nation, we do not believe this approach would be cost-effective within the East Walker River watershed. Without expenditure of considerable funds for research on the quantity and source of contaminants of concern, the ability to assign responsibility for quantifiable reductions of those contaminants would seem impractical, if not impossible. The funds necessary for the research effort would seem better spent implementing Best Management Practices, even though the quantitative effectiveness of those practices would remain unknown. Nevertheless, a Total Maximum Daily Load study and implementation plan for the reservoir has been pending for several years (and was anticipated when the proposal for our project was submitted). If a TMDL study and plan is eventually released, the results of that effort should form the basis for this aspect of future watershed planning.

5. Main Issues and Potential Solutions

The following section is a brief outline of some of the issues identified in the assessment followed by a list of concepts and options that could address that particular problem. This initial list is intended to provoke discussion of these issues and potential solutions and is certainly not exhaustive. This list should be updated periodically with additions and amendments.

Water for irrigation vs. water for Walker Lake

Current and future litigation and perhaps legislation will determine that tradeoff

Recovery of Lahontan cutthroat trout

Continue with current recovery program of U.S. Fish and Wildlife Service, California Dept. of Fish and Game, and Humboldt-Toiyabe National Forest

Excessive nutrients in agricultural runoff

Continue the agricultural waiver program of the Lahontan RWQCB and Bridgeport Ranchers Organization

Encourage BMPs that minimize livestock waste concentrations near streams

Fence off riparian pastures and limit access of livestock to stream channels

Agricultural fecal contamination

Continue the agricultural waiver program of the Lahontan RWQCB and Bridgeport Ranchers Organization

Recommend the adoption of the fecal coliform standard used by the US Environmental Protection Agency, other states, and all other regions of California.

Encourage BMPs that minimize livestock waste concentrations near streams

Fence off riparian pastures and limit access of livestock to stream channels

Conversion of wetlands

Emphasize importance of wetlands in Mono County General Plan

Develop and implement a tracking system between Mono County, Lahontan RWQCB, and U.S. Army Corps of Engineers to ensure compliance with existing regulations

Use the BLM-initiated land-tenure adjustment program to trade privately-owned wetland parcels for publicly-owned parcels that could be developed with minimal environmental consequences

Excessive sediment in lower East Walker River

Estimate a sediment budget for the watershed below the dam

If budget indicates that disturbances along the road and river channel are a significant source, then road rehabilitation and other riparian restoration measures are needed

If budget indicates that in-stream sediment is a legacy of the 1988 reservoir release, wait

Excessive sediment in other tributaries

Reroute roads away from riparian zones; close rarely used roads; stabilize fords, culverts, and bridges to reduce impact of road-related erosion

Implement low impact development guidelines

Degradation of riparian habitat

Move roads, trails, and facilities out of riparian zone

Implement low impact development guidelines

Fence off riparian pastures and limit access of livestock to stream channels

Human fecal contamination

Build additional outhouses and RV dump sites in high-use areas

Educate traveling public about sanitation principles similar to wilderness users

Threat of catastrophic wildfire

Continue and greatly expand the fuels management program of the Humboldt-Toiyabe National Forest

Follow the recommendations of The Nature Conservancy and Bureau of Land Management study for vegetation management in the Bodie Hills

Continue and expand the community-based fire-safe program

Adopt recommendations of Mono County's 2006-2007 wildfire hazard study project

Potential problems of the future (maintain awareness of the possibilities)

Erosion from OHV use in channels and riparian areas

Future mining

Future round of small-hydro proposals

Failure of poorly located and/or poorly maintained septic systems

6. Recommended Policies and Programs

The main recommendations of this plan are presented in the following format:

Broad goals

Desired future condition

Operational goals / objectives

Potential actions

Potential funding sources

Potential impediments to actions

Recommended implementation program

Goal: Reduce agricultural fecal coliform and nutrient pollution

Desired future condition: less bacteria and nutrients in Bridgeport Reservoir and its tributaries

Operational goals: reduce livestock waste concentrations near streams, divert and detain surface water that has been in contact with livestock waste

Potential actions: Continue the agricultural waiver program of the Lahontan RWQCB and Bridgeport Ranchers Organization, recommend the adoption of the fecal coliform standard used by the US Environmental Protection Agency, other states, and all other regions of California, encourage BMPs that minimize livestock waste concentrations near streams, continue to fence off riparian pastures and limit access of livestock to stream channels

Potential funding source: out-of-pocket for ranchers; beneficiaries of water in Bridgeport reservoir; clean water State Revolving Fund

Potential conflicts: reduced viability of ranching operations, potential for conversion of portions of Bridgeport Valley to other land uses, high costs of implementing BMPs

Existing program: agricultural waiver program of the Lahontan RWQCB and Bridgeport Ranchers Organization

Goal: Reduce anthropogenic sediment load of streams

Desired future condition: bedload and suspended sediment load of streams approximates natural background levels

Operational goals: erosion from road surfaces and shoulders is reduced; erosion from grading, construction, and other soil disturbance is keep on site and out of channels

Potential actions: remove and rehabilitate roads in riparian areas, remove nonessential stream crossings by roads and restore former crossing sites, restore degraded riparian areas, require sediment containment BMPs for all grading and building permits

Potential funding source: USFS and BLM road engineering budgets, private construction funds

Potential conflicts: inadequate funding and massive backlog of Forest Service and BLM road maintenance needs, increased costs of construction

Possible program: emphasize road impact reduction on Humboldt-Toiyabe National Forest and BLM lands in Bodie Hills, strengthen erosion control requirements in county general plan, improve erosion control BMP technology transfer within public works and building departments associated with grading and building permits, create a county staff position of low-impact development specialist to assist builders and property owners

Goal: Maintain and improve riparian habitat
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Desired future condition: intact and fully functional riparian corridors along streams

Operational goals: remove or minimize sources of riparian disturbance and degradation

Potential actions: remove and rehabilitate roads in riparian areas, remove nonessential stream crossings by roads and restore former crossing sites, remove campgrounds and other facilities from riparian zones, restore degraded riparian areas, add riparian conservation to Mono County general plan and MEA

Potential funding source: USFS road engineering and recreation budgets, Caltrans, grants from state and federal programs for riparian restoration, East Walker River Trustee Council (if funds have not yet been exhausted)

Potential conflicts: inadequate funding for road and campground removal and rehabilitation, recreational users that enjoy streamside campsites, trails, and roads

Possible program: emphasize importance of streams and riparian areas in all public planning (e.g., next revision of Humboldt-Toiyabe National Forest land and resource land management plan, Mono County General Plan, BLM resource area plan); adopt policies to protect and restore riparian areas; riparian rehabilitation where appropriate by Caltrans on State Routes 182 and 270; move roads, trails, campgrounds out of riparian areas; maintain adequate setbacks from streams in county general plan; encourage fencing of riparian pastures and limit access of livestock to stream channels

Goal: Reduce threat of catastrophic wildfire

Desired future condition: fuel loads approximate to pre-1850 levels, defensible fuel breaks around communities

Operational goals: remove excessive fuels from forests, especially near communities

Potential actions: expand and accelerate recent fuel management program of Humboldt-Toiyabe National Forest

Potential funding source: USFS fire management budget, BLM fire management budget, new Congressional appropriations for fuel management

Potential conflicts: very high financial costs, aversion to smoke from prescribed burning, aversion to mechanical treatments, potential increase in erosion

Possible program: continue and expand fuel management programs of Humboldt-Toiyabe National Forest, Bureau of Land Management, and California Department of Forestry and Fire Protection; continue and expand the community-based fire-safe program; adopt recommendations of Mono County's 2006-2007 wildfire hazard study project; implement Bureau of Land Management's vegetation management program in the Bodie Hills

Goal: Maintain & improve aquatic habitat of streams

Desired future condition: hydrological and ecological processes and properties of in-stream habitat are fully functional

Operational goals: increase low flows impacted by diversion, restore riparian vegetation where degraded

Potential actions: remove nonessential stream crossings by roads and restore former crossing sites, remove campgrounds and other facilities from riparian zones, emphasize management and protection program for critical aquatic refuges

Potential funding source: Humboldt-Toiyabe National Forest roads and fisheries budgets

Potential conflicts: inadequate funding for road and campground removal and rehabilitation

Possible program: emphasize importance of streams and riparian areas in all public planning (e.g., next revision of Humboldt-Toiyabe National Forest land and resource land management plan, Mono County general plan, BLM resource area plan); adopt policies to protect and restore riparian areas; move roads, trails, campgrounds out of riparian areas; maintain adequate setbacks

from streams in county general plan; encourage fencing of riparian pastures and limit access of livestock to stream channels

Goal: Maintain existing wetlands

Desired future condition: extent and functions of wetlands have not declined from current status

Operational goals: avoid filling, drainage, and other degradation of wetlands

Potential actions: do not permit development of wetlands (except as provided under USACE nation-wide permit for single-family lots smaller than half acre); guide development away from wetland margins through careful review of development proposals, educate public, property owners, and real estate / building community about values of wetlands in Mono County; suggest conservation easements on wetland parcels and explore opportunities for land trades with less-sensitive property in public domain

Potential funding source: Mono County general fund, grants for conservation easements through Eastern Sierra Land Trust, BLM land-tenure adjustment program for land trades

Potential conflicts: developers and property owners wishing to build in wetlands

Possible program: strengthen wetland protection policies in Mono County general plan, identify privately owned parcels containing wetlands with potential for development and proactively suggest alternatives to development, create a tracking system to coordinate roles of the county with Lahontan RWQCB and USACE

Goal: Reduce human fecal coliform pollution

Desired future condition: less human fecal coliform in streams

Operational goals: reduce surface disposal of human waste, reduce surface dumping of RV holding tanks

Potential actions: construct and maintain more outhouses at staging areas and trailheads, especially along State Route 182; move existing outhouses out of riparian zones; construct and maintain more RV dump stations and advertise those locations

Potential funding source: Humboldt-Toiyabe National Forest recreation budget, dedicated portion of campground revenues, East Walker River Trustee Council (had proposed funding a toilet along SR 182 in 2008)

Potential conflicts: high costs of constructing and servicing more outhouses

Applicable Best Management Practices

Most of the techniques for minimizing impacts from human activity on water quality can be lumped into the catch-all term of "Best Management Practices", often abbreviated as BMP. There is an extensive literature of Best Management Practices to minimize erosion and sediment delivery, retain stormwater runoff, reduce nutrient pollution, reduce pesticide pollution, conserve water, maintain aquatic and riparian habitat, restore streams, etc. Ranchers in the Bridgeport Valley are also developing some innovative BMPs at the present time.

Some examples directly relevant to Mono County include:

- Erosion and nutrient control (Tahoe Regional Planning Agency, 1988)
- Erosion control (Sierra Business Council, 2006)
- Grazing and pasture management (Montana Department of Natural Resources and Conservation, 1999 and U.S.D.A.—Natural Resources Conservation Service, 2003)
- Road construction and maintenance (Sommarstrom, 2001; Caltrans, 2002 and 2003)
- Landscaping (Cobourn, et al., 2001)
- Construction, development, commercial (California Stormwater Quality Association, 2003)

Although BMPs tend to be very specific and detailed practices, a list of eight principles was distilled by the author of the road maintenance manual for northwestern California (Sommarstrom, 2001):

1. Prevention of erosion is better and cheaper than trying to control erosion.
2. Treat the cause – not the symptom – of erosion.
3. Disconnect the road [or other disturbance] from the stream channel.
4. Protect the riparian zone.
5. Keep existing vegetation wherever possible.
6. Direct runoff away from bare soil or disturbed areas.
7. Keep runoff velocities low.
8. Each solution should not create more problems than it is solving.

Opportunities for Governmental Agencies and Citizens Groups

Mono County Collaborative Planning Team

- Revive wetlands subcommittee as a means of coordinating implementation and revision of this watershed plan as well as those created for other watersheds in the county
- Encourage member agencies to participate in Land Tenure Adjustment Process
- In 1999, the collaborative planning team organized a technical advisory committee to develop a strategy for communities, owners of isolated private parcels, and the land

management agencies to alter land ownership patterns to allow communities to grow and reduce the number of isolated inholdings within public lands.

Mono County

- Revise General Plan to emphasize ecological values of streams, riparian areas, and wetlands
- Consider county ordinance on water supplies for new development relying on legal logic similar to county's mining ordinance (new development must guarantee replacement water supplies if any damage occurs to existing water users)
- Consider county ordinance on riparian protection
- In cooperation with Lahontan RWQCB and U.S. Army Corps of Engineers, create a tracking system for privately-owned wetlands subject to development
- Create a county position of low-impact development specialist to assist builders and property owners (anyone seeking a grading or building permit gets x hours of design assistance to reduce the impacts of their project)
- Plan for additional growth of Bridgeport north along State Route 182

Humboldt-Toiyabe National Forest

- Remove roads, trails, and campgrounds from riparian areas
- Remove nonessential stream crossings by roads and rehabilitate the affected areas
- Maintain the critical aquatic refuges
- Continue and expand fuel management program
- Build and maintain additional outhouses and RV dump stations

Bureau of Land Management

- Implement proposed vegetation management program in Bodie Hills
- Continue to manage recreational use and vehicle access in Bodie Hills

Natural Resources Conservation Service

- Assist ranchers with funding and implementation of Best Management Practices to limit nutrient pollution from livestock waste
- Fund conservation easements to preserve agricultural lands

Regional Water Quality Control Board – Lahontan

- Continue agricultural waiver program
- Adopt fecal coliform standards that conform to national standards established by the United States Environmental Protection Agency (USEPA) and in use in other areas of California,

- In cooperation with Mono County and U.S. Army Corps of Engineers, create a tracking system for privately-owned wetlands subject to development
- Reevaluate the 303d listings for the East Walker River and tributaries, particularly the causes/sources

California Department of Fish and Game

- Continue recovery efforts for Lahontan cutthroat trout
- Continue BMPs on state-owned lands

California Department of Transportation

- Consider riparian rehabilitation along portions of State Routes 182 and 270

Sierra Nevada Conservancy

- Provide funds for conservation easements on private parcels with wetlands and riparian areas

Walker River Irrigation District

- Study options to manage reservoir for nutrient retention

East Walker River Trustee Council

- Provide funds for riparian restoration projects

Eastern Sierra Land Trust

- Continue to encourage private land owners to place conservation easements on property with special resource values
- Continue to act as locally-based easement holder and steward
- Create a program for conserving wetlands
- Investigate opportunities created by SB 436 for mitigation of development projects, with respect to geographic limitations

Friends of the Inyo

- Continue restoration projects on Humboldt-Toiyabe National Forest and BLM lands

California Native Plant Society

- Continue to educate public about values of native plants

Public Education and Outreach

Providing educational materials to residents, businesses, the construction industry, and visitors is critical to generating support for watershed programs and encouraging personal responsibility for healthy streams and lakes. If homeowners, landscaping contractors, and heavy equipment operators understand that their actions can keep soil in place and out of streams, most are likely to conduct their activities in ways to avoid damaging waterways. Similarly, if pet owners, anglers, and RV drivers understand that proper waste disposal can reduce pollution in streams, most are likely to adopt better waste disposal practices.

The following list of potential educational materials and programs illustrates some of the opportunities to involve private citizens in protecting and improving water quality and aquatic habitat.

Detailed information about Best Management Practices and low-impact development should be available on the county's website as well as in printed form to be distributed with building and grading permit applications. A portion of Mono County's website linked to Community Development, Building, and Public Works Departments could be an online source for watershed and BMP materials. A good model is the website of the Marin County Stormwater Pollution Prevention Program (<http://www.mcstoppp.org>). Links to NRCS publications about agricultural BMPs would also be useful.

A simple educational brochure modeled upon the 2003 publication "Keeping water on the land longer" (U.S. Bureau of Land Management, et al., 2003) could be useful to include with building and grading permit applications.

Pamphlets and brochures on topics such as "what you can do for Mono County's streams", "Mono County's wetlands", "soil erosion and you", "keep exotic plants out of Mono County", and "reducing use of fertilizers and pesticides for healthy streams" could be prepared and distributed to reach a wide audience. The brochure on landscaping with native plants (circa 2002) could serve as a good model.

A public school education program similar to that currently underway in Inyo County and operational within Mono County in 2004 through the Eastern Sierra Watershed Program (<http://www.esice-eswp.org>) should be reintroduced if funding can be found.

Monitoring and Quantitative Targets

In an ideal world (or watershed), comprehensive monitoring that provides detailed information about physical, chemical, and biological characteristics of the watershed and its water bodies would be highly desirable. Detailed quantitative information and monitoring programs are now required for watershed plans funded with federal Clean Water Act section 319 funds or

California Proposition 50 (and presumably future state programs) funds (California Water Code section 79078). Unfortunately, such information is generally available only at extraordinary expense, and we must therefore function with uncertainty and incomplete knowledge about our watershed. Except in research settings or under legal orders, quantitative information about the condition of a watershed or waterbody tends to be intermittent, opportunistic, limited in spatial or temporal scale, and of unknown quality. Nevertheless, the occasional spot measurements and observations can provide indications about the state of a watershed or stream and are typically all we have as a basis for decisions and actions (as well as the basis for the watershed assessment accompanying this plan).

Considering the high degree of variability in the hydrologic systems of the East Walker River watershed, episodic nature of events that may alternatively exacerbate or ameliorate certain water quality problems, and high cost of an adequate monitoring program, we strongly believe that quantitative targets for water quality improvements are unreasonable, illogical, and ultimately counterproductive with respect to the waste of funds that could go toward treating the underlying problem instead. There are, of course, exceptions and counter-examples to this opinion, but we contend that the quest for rigorous quantitative targets be thoroughly evaluated with respect to costs and benefits.

The fundamental goal in designing a monitoring program is to relate the monitoring to the goals or objectives – that is, the results of the monitoring should indicate whether or not the objective is being accomplished (e.g., MacDonald, et al., 1991; U.S. Environmental Protection Agency, 2005). Although we would really like to know whether the activities proposed in this plan will measurably reduce the concentration of some contaminant or at least limit further degradation, measurements and analyses necessary for that determination probably won't occur because of lack of funds. So, in our realistic watershed, what sort of monitoring can be accomplished at minimal cost? Perhaps, the best we can expect is to monitor the implementation of BMPs and other actions intended to address a water quality problem or other watershed issue. So-called implementation monitoring is considered the most cost-effective means of reducing nonpoint source pollution because it shows whether the BMP program is actually being carried out (MacDonald, et al., 1991). The effectiveness of a particular BMP must then be taken on faith because of the physical processes involved or from tests reported in scientific literature. The logical vehicle for conducting implementation monitoring of this plan is the Mono County Collaborative Planning Team and its member agencies.

As part of the agricultural waiver program, the Bridgeport Ranchers Organization will presumably continue its monitoring program through at least 2017 (California Regional Water Quality Control Board--Lahontan Region, 2012).

Some sporadic water quality monitoring may also occur for various purposes independently of this plan. Hopefully, the Mono County Collaborative Planning Team can take advantage of such

measurements as general indicators of water quality trends, even though such measurements are unlikely to be collected at temporal or spatial scales adequate to be definitive of trends over time.

Funding

The funding environment for projects such as those outlined here has deteriorated markedly in the period since the proposal was submitted and the work plan was adopted. Unfortunately, prospects for funding in the next few years don't look very promising. In light of that reality, attempting to plan for funding of projects in the near future will be challenging.

One new potential opportunity for funding some watershed improvement projects in the East Walker River watershed is the Inyo Mono Regional Water Management Group. This association of agencies and non-governmental organizations implements the California Department of Water Resources' Integrated Regional Water Management Program in the eastern Sierra Nevada.

The Inyo-Mono Group was successful in obtaining state funds for a variety of water infrastructure projects around the region in the current funding cycle. There is the possibility that future funding opportunities could have broader objectives that might include watershed improvement. Given the current budget climate for California, this possibility is speculative for the time being.

7. Summary and Conclusions

Mono County and other member agencies of the Mono County Collaborative Planning Team have the opportunity to maintain and improve water quality, aquatic habitat, and riparian habitat in the East Walker River watershed by carefully managing development of land and water resources throughout the area. Because this watershed plan has no statutory authority or interest group behind it, the Mono County Collaborative Planning Team (as the most logical coordinating entity) and its member agencies need to adopt, revise, and implement this plan if it is to have any value.

The primary water-quality issues in the East Walker River watershed involve nutrient cycling and bacterial contamination within Bridgeport Reservoir and the surrounding Bridgeport Valley. Potential sources of nutrient loading to the reservoir have been identified by the Lahontan Regional Water Quality Control Board as internal loading from lake-bottom sediments, livestock waste, fertilizers, on-site septic system discharges, municipal sewage treatment plant discharges, solid waste disposal, and geothermal springs.

Beyond the Bridgeport Valley/Reservoir nutrient issues, the few indicators available suggest that water quality is quite high compared to most other regions of California. The most recent sampling of water quality in the East Walker River (in 2007 and 2008; as reported by the University of Nevada - Reno in 2010) showed little cause for concern among the water quality parameters measured. Therefore, the main goal for most of the East Walker River watershed should be to maintain currently good quality and avoid deterioration.

Given the higher-priority water-quality problems elsewhere in California, one cannot realistically recommend a costly monitoring program within the East Walker River watershed. Instead, the focus for the watershed should be to continue existing land and water management practices that do not degrade water quality and seek to implement less-damaging practices where there is probable cause that water quality could be negatively impacted. Quantifying changes in water quality within the watershed, while desirable in concept, does not appear to be a reasonable allocation of public funds for the foreseeable future.

Although this plan for the East Walker River watershed contains a variety of recommendations and ideas to sustain and improve the health of streams, most of the proposals are linked by a simple guiding principle of avoiding damage and disturbance of soils and vegetation close to water.

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Marin County Stormwater Pollution Prevention Program: <http://www.mcstoppp.org>

County road maintenance manual for water quality and habitat protection:
<http://www.5counties.org/Projects/FinalGeneralProjectPages/RoadsManual800.htm>

California Stormwater Quality Association: <http://www.casqa.org> and <http://www.cabmphandbooks.com/>

Appendix 2. Excerpted Text from 2007 Agricultural Waiver Program for Bridgeport Valley

Because this program addresses the principal water quality issue in the East Walker River watershed, inclusion of most of the board's order seemed worthwhile.

(source: California Regional Water Quality Control Board--Lahontan Region, 2007. Copied from:http://www.waterboards.ca.gov/rwqcb6/board_decisions/adopted_orders/2007/docs/r6t_2007_0019_grazingwaiverwdr.pdf)

The NPS Policy further refines the requirements of CWC Section 13242, requiring that Waiver enrollees prepare and execute an implementation plan and monitoring plan that does the following:

- States the purpose of the plan such that NPS pollution is addressed in a manner that ultimately achieves and maintains water quality objectives and beneficial uses, including any applicable antidegradation requirements.
- Includes a description of the MPs and other program elements that are expected to be implemented to ensure attainment of the implementation program's stated purpose(s), the process to be used to select or develop MPs, and the process to be used to ensure and verify proper MP implementation.
- Includes a time schedule to achieve water quality requirements, and corresponding quantifiable milestones designed to measure progress toward reaching the specified requirements. The Porter-Cologne Act (CWC §13242[b] and § 13263[c]), the NPS Program Plan, and the NPS Policy recognize that there are instances where it will take time to achieve water quality requirements. The effort may involve all or some of various processes, including: identification of
 - 'measurable long term and interim water quality goals; a timeline for achieving these goals; identification and implementation of pollution control MPs; provision for maintenance of the implementation actions; provision for additional actions if initial actions are inadequate; and, in the case of third-party organizations, identification of a responsible third-party to lead the efforts.
- Includes sufficient feedback mechanisms (monitoring) so that the Water Board, Dischargers, and the public can determine whether the program is achieving its stated purpose(s), or whether additional or different MPs or other actions are required. It will describe the measures, protocols, and associated frequencies that will be used to verify the degree to which the MPs are being properly implemented and are achieving the program's objectives, and/or to provide feedback for use in adaptive management. These efforts are necessary to determine whether the program is on time and on track in achieving its goals.

This Waiver is consistent with Resolution 68-16 because it requires implementation of management practices in an iterative manner to arrive at the best practicable treatment or control of the discharge to protect beneficial uses and to attain the highest water quality possible. The waiver requires compliance with an interim fecal coliform objective of 200 colonies per 100 ml (the federal standard for protecting water contact recreation) in accordance with a time schedule. Further, the waiver, in allowing for existing operators to continue in business and apply management practices in an iterative manner to achieve improvements to water quality, is consistent with the maximum benefit to the people of the state. The waiver sets forth conditions that require Dischargers to implement additional management practices to assure protection of beneficial uses of waters of the state and maintain the highest water quality consistent with maximum benefit to the people of the State.

Because of water quality impairments from elevated fecal coliform concentrations, the Water Board is establishing a time schedule for compliance in the Waiver. Ranch Water Quality Management Plans must be developed and implemented to reduce fecal coliform concentrations in surface waters downstream of grazing operations. The Water Board staff anticipates that implementation of these plans will reduce fecal coliform levels. Since the management practices will be implemented over the term of this waiver (5 years), improvements to water quality will be incremental. The interim goal is to achieve a thirty-day average log-normalized fecal coliform concentrations downstream of grazing operations in the Bridgeport Valley of no more than 200 fecal coliform/100 mL within four grazing seasons after execution of the Waiver. This interim goal meets the federal standard for water contact recreation and is protective of beneficial uses. Because the waiver expires in five years and compliance with the fecal coliform water quality objective of 20 colonies per 100 ml is not reasonable within this time frame, an interim milestone is needed to track measurable progress towards the objective. Water Board staff find it reasonable to set an interim goal of 200 colonies per 100 ml because the existing fecal coliform concentrations either meet the goal or are within three times the goal and there are additional management practices that can be applied by the Dischargers. The water quality objective for fecal coliform is anticipated to be met after the term of this waiver through continued improvement and implementation of management practices.

The adoption of the Waiver is in the public interest because 1) it includes conditions that are intended to reduce and prevent pollution and nuisance and protect beneficial uses of the waters of the State, 2) it contains more specific conditions for protection of water quality compared to other regulatory options, 3) it provides a more efficient and more timely mechanism of complying with water quality objectives than other regulatory options, 4) it provides for an efficient and effective use of limited Water Board resources, 5) it provides flexibility for Dischargers by providing an option of complying through a third-party entity and allows for less costly and more effective cooperative monitoring, 6) it enhances beneficial uses of water and enhances sustainability of ranching operations in the Bridgeport Valley, and 7) the Water Board does not currently regulate discharges of waste from ranching operations in the Bridgeport

Valley--this Waiver will result in regulation of non-point source discharges from these operations, and will result in measurable water quality improvements in accordance with the time schedule in the Waiver. The Water Board has notified the Dischargers and all known interested agencies and persons of its intent to issue a Waiver of Waste Discharge Requirements for the Project.

a. By December 15, 2007, the Discharger is required to submit a Ranch Water Quality Management Plan for review and acceptance by Water Board staff. Elements of this Plan must include:

i. A scaled facility map including, as applicable: property perimeter, buildings, roads, fences, land use designations (crops, grazed areas, woodlands, paddocks, irrigation control structures, confined areas, feeding areas, water troughs, exclusion areas both permanent and seasonal etc.), topography, creeks, and livestock crossings.

ii. A description of water quality management practices currently in place (e.g. off-stream watering, vegetative buffer strips, hardened stream crossings, wetland treatment areas, exclusion fencing) and their locations.

iii. An assessment of the current facility conditions including potential water quality problem areas and proposed corrective management practices for the upcoming grazing season.

iv. Ranch Water Quality Management Plan objectives, including improvements in practices to reduce, and/or maintain fecal coliform concentrations in local surface waters so that it ultimately achieves requirements of the Water Quality Control Plan for the Lahontan Region, including water quality objectives and beneficial uses for Bridgeport Valley tributary streams.

b. The Ranch Water Quality Management Plan must include a description of all management practices currently implemented within the ranch facility and an implementation schedule for the listed sites below(i. through vii.). In selecting what management practices to use at each pasture, the Discharger must take into consideration existing water quality, vegetation, terrain, type of livestock and general facility operation procedures. A list of possible management practices may be found in the Natural Resource Conservation Service Field Office Technical Guide.

i. Reducing to the maximum extent practicable, delivery of pathogens from ranching lands to surface waters. The plan is to consider control of animal access to surface waters, placement of animal crossings to minimize pathogen runoff into surface waters, and development of vegetative filter strip buffers to treat sheet flow runoff.

- ii. Newly selected water quality management practices (e.g. buffer strips, fences) at all identified points of discharge.
 - iii. Grazing management structural improvements.
 - iv. Changes in livestock management methods (e.g. herding, riparian rotation).
 - v. Road erosion control and prevention actions.
 - vi. Actions to avoid or reduce management-related increases in erosion of unstable areas.
 - vii. Manure management and disposal operations to prevent runoff containing wastes from entering surface waters, if applicable.
- c. The Ranch Water Quality Management Plan shall also include a plan for compliance inspection and reporting that demonstrates the proposed management practices are being implemented.

The Discharger must implement the Ranch Water Quality Management Plan as accepted by the Water Board beginning at the start of the 2008 grazing season. The Discharger must have a copy of the Plan at the ranch office. The Discharger must annually report on the implementation of the Ranch Water Quality Management Plan (unless exempted) and modify the Plan where necessary to achieve improved water quality.

By December 15, 2011, the Discharger must submit an annual report showing fecal coliform concentrations downstream of operations meeting less than 200 fecal coliform/100mL.

Appendix 3. Approaches to Reducing Eutrophic Conditions in Bridgeport Reservoir

(excerpted from Horne and others, 2003).

There are several solutions to reduce excess eutrophication at Bridgeport Reservoir. Any solutions, however, must be considered in conjunction with the Total Maximum Daily Load (TMDL) process. Reductions in external nutrient loads from livestock grazing in the watershed, either through reducing the number of livestock or the implementation of Best Management Practices (BMPs), is the first obvious, theoretical solution to restoring beneficial uses at Bridgeport Reservoir. However, this approach presents several implementation challenges, and may not reduce pollutant loads sufficiently. Even if it is effective at reducing nutrient loads, it may not result in improved water quality for years or decades, due to the amount of internal nutrient regeneration from the reservoir sediments. Another solution to reducing external nutrient loads would be to install a nutrient-filtering wetlands between the pastures and the reservoir. If effective, this would probably allow at least some continued cattle ranching above the constructed wetland.

Another direct and long-term solution would be to relocate the reservoir off-stream, with water storage capacity similar to the current reservoir, but with spring filling and late summer releases only. Properly designed, such an off-line water storage system would be less eutrophic and easier to manage than the current system. This solution would prevent summer nutrient inputs (i.e. during the grazing season) from entering standing waters. A similar solution would be to convert the reservoir on the same site to an offline system using a bypass.

A balance of external pollutant source control and active lake management is probably the only way to achieve the restoration of beneficial uses in both the short- and long-term, and in a sustainable fashion. For example, a hypolimnetic pure oxygen addition system installed in Bridgeport Reservoir would provide immediate and long-term improvements to water quality. It would ensure that the hypolimnion remains oxygenated throughout the summer, preventing fish kills and internal nutrient regeneration. In combination with measures to reduce external nutrient loads, over time the amount of artificial oxygenation required could be reduced, or even eliminated, such that this approach may provide immediate results and be sustainable over the long-term. Biomanipulation, where submerged aquatic vegetation and the zooplankter *Daphnia*, and the planktivore:piscivore fish ratio are managed to produce clear water holds promise for restoring shallow portions of the Bridgeport Reservoir. For the first few years, biomanipulation would require additional active management, such as oxygenation, to address internal nutrient regeneration in the deep portions of the reservoir.

Bridgeport Reservoir is small and is one of only two obstructions that now block the historical migration of Walker Lake cutthroat trout. Therefore, moving the reservoir offvi line, combined with a constructed wetland to reduce cattle/horse waste effects, is the best and most sustainable

long-term ecological solution to the current problems at Bridgeport Reservoir. With this optimal solution, cattle ranching could continue at a reasonable rate, river fish would not be threatened by anoxia and other health threats, and lake fishing opportunities would be preserved at the new off-line reservoir. Each part of this proposed optimal solution has been successfully carried out in California, but the parts have not been combined as suggested for Bridgeport Reservoir. These options are still possible at Bridgeport Reservoir. However, some options “outside the box” should also be considered. The entire range of conventional, new ecological engineering and unconventional options are presented as recommendations below. It is hoped that these recommendations will be considered in terms of the long-term management of the entire watershed including the irrigated stock grazed lands, the open range, the wilder areas, the Walker River, and terminal Walker Lake, as well as Bridgeport Reservoir. The recommendations are based on the work in the years 1989 and 2000, and do not include information from the 2001 research which is expected to either reinforce or possibly modify some of the conclusion presented in this report. The year 2000 recommendations are:

A. With the current stock operations upstream and current reservoir location and hydraulic operation

- Construct a series of specifically designed nutrient/pathogen removal wetlands between the irrigated stock grazing fields and the reservoir. The TMDL targets for nutrients and pathogens would set the size of these wetlands which, if used alone, would have to meet specific nutrient and pathogen outflow targets (see next report).
- Re-designate the beneficial uses in the reservoir to less stringent target concentrations for nutrients, pathogens, algae, and dissolved oxygen. The new beneficial use targets would balance the current reservoir’s benefit to the trophy trout population below the reservoir with the potential harm to fish caused by the lower water quality standards.
- Enact biomanipulation by increasing the piscivore:planktivore ratio and removing carp.
- Monitor to evaluate progress towards TMDL compliance

B. With current stock operation upstream and reservoir location but modified reservoir operations

- Install a hypolimnetic oxygenation system in the deepest part of the reservoir to meet dissolved oxygen standards and prevent nutrient and toxicant emissions from the anoxic sediments. This option would reduce ammonia, phosphorus and algae.
- Operate reservoir with a maximum depth of 5 m at the dam between June and August (may eliminate needed for oxygenation system). This option would substantially reduce water storage capacity and boating and fishing opportunities in the reservoir.
- Construct a more limited nutrient and pathogen removal wetland series between stock grazing and the reservoir (assumes oxygenation system is operated).
- Enact a biomanipulation as in #A.

C. With current stock operations and hydraulic operation but with new dam location

- Move reservoir to an off-line location with better water quality and quantity management possibilities.
- Regrade current reservoir and construct a bypass for most flow, especially in spring and summer.
- Construct nutrient and pathogen removal wetlands in the old upper reservoir bed.

D. With current reservoir hydraulic operations and location but altered upstream stock operations

- Remove or drastically reduce upstream irrigated stock grazing operations.
- Enact a biomanipulation as in #A.

Appendix 4. Proposed Schedule (by Implementing Entity)

Agricultural Community

2015-2025: continue/improve implementation of BMPs for nutrients

2012-2025: consider new agricultural conservation easements

County of Mono

2012-2015: create tracking system for privately-owned wetlands

2012-2020: consider county ordinance on riparian protection

2015-2020: create position of low-impact development advisor

Walker River Irrigation District

2015-2025: study options to manage reservoir for nutrient retention

CA Department of Transportation

2013-2020: contribute funds toward further conservation easements thru EEMP

2015-2020: rebuild stream crossings where necessary to minimize erosion

CA Department of Fish and Game

2015-2020: improve management of rec. access to EWR below reservoir

CA Regional Water Quality Control Board -- Lahontan

2012-2014: complete TMDL for Bridgeport Reservoir

CA Sierra Nevada Conservancy

2012-2025: provide funding of conservation easements for wetland parcels and agricultural lands

Natural Resources Conservation Service

2012-2025: assist ranchers with funds & BMPs to limit nutrient pollution and preserve agricultural lands

US Bureau of Land Management

2012-2013: complete land trade with ESLT on Green Creek parcel

2012-2020: remove roads, trails, and camping areas from riparian areas

2012-2020: rehabilitate stream crossings by roads

2012-2030: implement vegetation management program in Bodie Hills

2015-2020: consider stream restoration activities in Bodie Hills

US Humboldt-Toiyabe National Forest

2012-2013: complete land trade with ESLT on Sweetwater parcel

2012-2020: remove roads, trails, and campgrounds from riparian areas

2012-2020: rehabilitate stream crossings by roads

2012-2020: continue and expand fuel management program

2015-2025: build and maintain additional outhouses and RV dump stations