

## **Mountain Counties tour highlights Bear River Watershed**

By Roberta Long  
MCWRA writer

The Bear River is not the longest river, nor is its watershed the largest, but it encapsulates many conditions found throughout the northern Sierra Nevada Mountains. Situated between the Yuba River to the north and the American River to the south, the Bear River is only 65 miles long from its source in Nevada County to where it flows into the Feather River, and on to the Sacramento River and the Delta.

As state and federal officials and regulators strive to manage California's water supply and quality now and in the future, **Mountain Counties Water Resources Association (MCWRA)** is providing a series of day tours to acquaint them with first-hand knowledge of the source waters that provide for the needs of two-thirds of Californians.

"It's important that our state and federal decision makers have good information to help them make sound informed decisions," said Mountain Counties Executive Director John Kingsbury. "These tours are part of the association's broad educational effort to focus attention on our regional water interests and the need to enhance and protect the Sierra Nevada landscape for water supply and water quality for all of California. Water is critical to the environment, economy, and our way of life not only in this region, but to the entire state. On-going water management will leave a lasting legacy for future generations." Kingsbury said.

Mountain Counties Water Resources Association advocates for the water interests of its members in all or a portion of 15 counties stretching from southern Lassen to northern Fresno. On June 7, MCWRA joined with Nevada Irrigation District (NID) and the Sierra Fund to host 45 decision makers from the State Water Resources Control Board, Department of Water Resources, Bay Delta Conservation Plan, Delta Stewardship Council, Department of Conservation, U.S. Department of Food and Agriculture, plus federal, state and local elected officials and legislative representatives, visited sites along the Bear River.

Their tour took them to the viewpoint of the headwaters of the Bear River, Lake Spaulding, Bear River Meadows, the South Yuba Canal, and the PGE fish release location. It included the Nevada Irrigation District facilities at Rollins Dam, the Rollins Power House, the Orchard Springs Campground at Rollins Lake, and the PG&E Bear River Canal. Participants also observed an innovative approach for removing mercury from reservoir sediment at NID's Lake Combie.

NID General Manager Rem Scherzinger set the stage for the tour by describing the services that this independent special district provides within its 287,000-acre boundaries, as well as, the district's role in watershed management. NID is operated by and for the people who own the land. The expansive geographic area that makes the district one of the largest in the State of California.

### **History of the Bear River**

Elizabeth "Izzy" Martin, chief executive officer of The Sierra Fund, reviewed the history of development of the Bear River. Evidence that people lived in the area more than 6,000 years ago has been found. The Bear River Nisenan lived in villages along the river around 3,000 years ago. They used fire to manage their landscape.

European gold seekers began hydraulic mining, using large jets of water to wash down hillsides beginning in the early 1850s. Mercury was imported from coastal mines to adhere to

and capture tiny flakes of gold that would otherwise flow downstream. Other demands, such as agriculture, soon competed for Bear River water.

The Bear River watershed is now one of the most heavily managed watersheds in California. Water flows are regulated for a combination of domestic and municipal consumption, agricultural irrigation and hydropower.

The Sierra Fund, headquartered in Nevada City, has created a campaign called "Get the Mercury Out," to increase public investment in restoring California's watersheds.

### **Water and power**

NID Assistant General Manager Tim Crough said that if it were not for NID and PG&E canal systems, the Bear River would be dry. Eons ago, glacial activity created the Yuba Gap, diverting the Bear River to the north into the South Yuba. To bring water into the Bear River, NID and PG&E draw water from high lakes and other rivers.

Bear River water flows are currently managed by Nevada Irrigation District and PG&E. Nevada Irrigation District was formed in 1921 and acquired a system of canals and dams and water rights.

NID and PG&E have worked as joint partners for 50 years to manage the Bear River watershed. Another partner in the watershed is Placer County Water Agency (PCWA); NID and PCWA interact with one another to manage their sections of the Bear watershed.

NID began producing power in 1966 with two powerhouses through its Yuba-Bear Power Project. The district currently has seven power plants that generate sufficient electricity to supply 60,000 homes. The generation capacity of 83,545 MW produces an average 375 million kW hours of energy annually.

PG&E's Power Generation Department Partnership Coordinator Dave Ward said, "The water released from NID's and PG&E's reservoirs provides a number of important uses. Aquatic, wildlife, and riparian resources all benefit from the constant releases from the reservoirs. The projects also provide recreation benefits at the various reservoirs for fishing, swimming, boating and camping. The consumptive water delivered to the people of Nevada and Placer counties makes it possible for agriculture and communities to flourish."

### **Diversified storage options**

Consulting geologist Marie Davis described the different types of storage available in the Sierra Nevada watersheds. She remarked that storing winter water to survive the dry season is critical to meeting the summer water needs of 38 million people. Providing dry season water for recreation and the ecosystems in and around the rivers and streams is also necessary. She listed four major storage mechanisms to capture winter water for dry season delivery.

1) "Snow pack. Storms blow Pacific moisture up mountain slopes of the Sierra Nevada, where it cools and falls. Where forest vegetation density is managed to allow snow to hit the soil and yet be shadowed from direct sunlight, moisture can seep into the ground and begin a slow journey to creeks and rivers, and ultimately through populated and farmed areas on its way back to the ocean."

2) "Forest soils. Over 15,000 square miles of deep forest soil on Sierra slopes serve as a sponge, slowly releasing winter moisture to the creeks and rivers. Forest soils are estimated to hold about as much water as the snowpack. Without the water-holding capacity of soil, melting snow or falling rain would run in floods over bare rock with significant energy, removing what's in its path and not remaining for later use." *Editor's note: When the forest soils become dry for lack of winter rain or snow, or due to early runoff, the supply of water during the summer*

*for domestic and municipal use, irrigation, hydropower and recreation is lost from that slow-releasing storage system. Protecting the soil reservoir, through forest and water management, is increasingly important as our climate changes.*

3) “Constructed dams and reservoirs. During the middle of the last century, many dams were constructed in California’s major mountain drainages to capture winter water for later release. Few dams have been constructed since, as California’s population has doubled.

4) “Groundwater basins. Sedimentary lowlands store water delivered by rivers and rain over many wet seasons and can be tapped by wells for use.” *Editor’s note: Underground water in the Sierra Nevada mountains and foothills is not captured in soil, sand or gravel. Underneath a layer of soils in this region are large rocks. Water flows through the spaces between the rocks. The differing configurations and depths of the fractured rocks make it impractical to measure and rely on any amount of water from that source for public water supplies. In the mountains and foothills, the only reliable source of water is surface water.*

Davis said that creative management of each is necessary to provide California with a diversified set of storage options to provide the state with reliable water supplies during our inevitable dry periods. “Forest vegetation can be managed for optimal snow pack absorption and to reduce the risks of catastrophic fire, which burns the soils and leads to the erosion of the soil sponge. Consideration can be given to raising existing dams to capture more runoff or to where new dams might provide enough benefit to be worth the environmental and financial price tags. Groundwater storage can be banked for dry years by switching from well use to surface water in wet years, where feasible.”

### **Historical ditches still serve**

Barbara Balen, former Tuolumne Utilities District director, and former U.S. Forest Service, Calaveras District Archeologist, talked about her work on projects evaluating Sierra Nevada ditch systems. The Mountain Counties water purveyors still operate thousands of miles of ditch systems that were initially built 150 years ago. NID alone has over 450 miles of canals and PCWA operates and maintains 165 miles of canals. Some of them have been lined, repaired or replaced with pipe. All of them require constant maintenance.

Balen and others studied the beneficial uses of retaining and operating the ditches. They concluded the historic ditches are infrastructure assets, maintain property values, contribute hydro-energy generation, provide remote storage, fire protection, encourage heritage tourism, and contribute water delivery during power outages. In addition, the ditch systems connect flora and fauna migration paths.

### **Maintaining a healthy watershed**

Sierra Nevada Conservancy Executive Officer Jim Branham emphasized, “The Delta is not the primary source of California’s water, the Sierra Nevada is. Any plans to address California’s water future that do not include the upper watershed are fatally flawed.”

He cautioned that the Sierra Nevada watersheds are at risk of catastrophic fire, and said, “We need to invest in actions to reduce that risk and to restore watershed health. Increasing temperatures will only make matters worse.”

The consequences of not investing, he said, “include degraded water quality, loss of storage capacity due to sedimentation, loss of habitat, and increased air pollution and greenhouse gas emissions, not to mention putting communities at risk.”

The Sierra Nevada Conservancy was created by the legislature in 2004 under the State Department of Natural Resources. The Conservancy provides funding for local projects and offers technical assistance and other support for collaborative projects in partnership with local government, nonprofit organizations and Tribal entities.

### **NID provides valuable agricultural water**

NID director John Drew is an organic farmer. On 40 acres near Chicago Park at 2,400 feet elevation, he grows mixed vegetables and melons. He ran for the board to make sure that agriculture receives the water it needs.

NID supplies an average of 145,000 acre feet of raw water per year, 90 percent of which is used for local agriculture during the six-month season from April 15 through Oct. 14. Irrigation water fills ponds and reservoirs for stock watering, fire suppression and recreation. It is important in preserving open space and greenbelt areas.

Looking at a warming climate, Drew said that to supply future needs will require more water storage, conservation and increasing use of improved irrigation technology. "If we run out of water, we'll have to leave," he said.

### **Combie Reservoir mercury remediation project**

NID was faced with a situation that is not unfamiliar in the Mountain Counties. One of its reservoirs, the long and narrow Combie Reservoir, provides irrigation-water for western Placer County, supplies drinking water for the community of Lake of the Pines, and other services. Since its creation in 1928, Combie Reservoir has received a continuous supply of sediment that decreases the volume of water in the lake. Until 2002, NID leased the upper portion of the reservoir to an aggregate company who removed the sediment with dredges. After 2002, dredging was no longer allowed since the lake was placed on the Clean Water Act section 303(d) list as "impaired" due to high levels of mercury. Dredging disturbs the mercury in the sediment, possibly leading to the formation of methylmercury.

Methylmercury. Methylmercury gets into the food chain, including fish. The California Office of Environmental Health Hazard Assessments has issued advisories for fishers and their families that elevated exposures to methylmercury affects the nervous system in humans, animals and birds. Pregnant women and children are particularly sensitive.

To address the situation, NID adopted the Combie Reservoir Sediment and Mercury Removal-A Water Supply Maintenance Project in 2009. With equipment especially designed for the project, sediment will be pulled up and piped ashore to a multi-processing system that separates the solid materials and purifies the water for return to the reservoir. The United States Geologic Surveys will monitor water quality and fish tissue during the project. Once the project starts, it is expected to take three to five years initially, with maintenance dredging approximately every 10 years. In addition to restoring storage capacity and insuring more reliability, the project will provide marketable products from recovered materials, such as gold, clay, sand, and rock. NID expects sales of gold, and high-quality sand and gravel to offset the costs of operation.

General Manager Rem Scherzinger said that, if this project is successful, it can be a model for similar projects throughout the Sierra Nevada.

Kingsbury said, "I am extremely pleased and thankful that we have so much interest in our tours. As the Federal government, the Governor and his administration work to solve the water crisis in California, we must be mindful that the water challenges are significant for this region. The potential for redirected impacts to this region are very real and it is critical that we help our state and federal decision makers fully understand that this region is part of the

solution to the water crisis. Investment and proper management in the Sierra Nevada will lead to improving water supply reliability and water quality for all of California.

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