Multiple Benefits as a Result of Mine and Mine Waste Reclamation

Reclaiming the Sierra 2015 Issue Paper  
Version 1 – October 29, 2014

This issue paper has been developed by The Sierra Fund and partners to frame the Multiple Benefits / E3 Gold track of the Reclaiming the Sierra 2015 conference. This and the three other issue papers associated with the three other event tracks are working documents intended to frame the issues that will be addressed at the conference. As a result, they will be revised and updated leading up to the conference.

**Background**

A great deal of gold and mercury remain in California’s gold country, some of it mobilized during the heyday of gold mining and now trapped behind the dams below these old mines. These metals are mixed with in with huge amounts of gravel, sand, silt, and anything else flowing down the river during a rain storm. The gold comes to rest when the water stops moving – when it gets to the reservoir. Almost every major river and creek in the Sierra Nevada was dammed as part of the mining era.

These materials are filling up the reservoirs – the operational, productive water storage capacity part of the reservoir – and reducing water storage and water management options for many water suppliers. The Sierra Fund’s Mining Toxins Work Group and its partners are exploring methods to identify the best available technologies and practices needed to remove this sediment from the reservoirs and treat it to remove mercury, returning only clean water back to the river.

We have identified two related issues to explore in this paper and as part of our 2015 Reclaiming the Sierra Conference:

1. **Multiple Benefits**: The potential for restoring reservoir capacity and improving water quality by removing sediments trapped behind the dams, processing them to remove...
contaminants, and selling or using the products from this activity including gravel, sand and gold. This activity has so many benefits – improved water quality, improved storage for precious water, improved wildlife habitat and other major environmental benefits.

2. **E3 Gold**: Creating a specialty market for gold produced as a by-product of this reservoir restoration activity (and other mine reclamation activities) to incentivize this market segment, and tell the story of reclamation through sales campaigns for jewelry and electronics products.

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**Multiple Benefits**

*Restore Reservoir Water Storage Capacity, Improve Water Quality, Enhance Wildlife Habitat, Provide Environmental Benefits, and Get Gold, too.*

The Sierra Fund is exploring the potential technology, science, policy, legal and practical sides to the challenges currently faced by those that need to remove sediment from behind reservoirs choked with debris. Every dam in the state has a finite and predicted lifetime before it completely silts up. Some have a hundred years before they become a lovely meadow. Some are already becoming dysfunctional due to siltation. A recent study by the US Geological Survey and University of California estimated that approximately 1.7 to 2 million acre feet of water has been displaced by silt in California’s reservoirs.

Removing sediment from reservoirs has been a routine practice in some areas, while other reservoirs have not been treated this way. In some areas, routine dredging for capacity has been stopped because of water quality concerns where the mercury entrained in the sediments behind the reservoir are disturbed and mobilized by dredging.

The Nevada Irrigation District is implementing a pilot project at Combie Reservoir to dredge their reservoir to increase water storage capacity and improve water management. In addition to restored water storage capacity they will yield products of gravel, sand, silt, as well as mercury and gold. The amount of mercury and gold they capture could help answer the question of how much gold might be recovered by dredging reservoirs. NID currently estimates that they will recover from $90,000 to $1 million in gold as a by-product of regular reservoir maintenance. There will also be sales of gravel, sand and silt.

Based on this estimate and anecdotal information, it is possible that hundreds of thousands of ounces of gold could be recovered from California reservoirs as part of remediation and reclamation efforts. The result of this activity on a large scale could be an increase in water storage capacity, an increase in water quality, and marketable products including in some cases sand, gravel, and gold.

A significant capital investment would be required to retrofit existing dams that have this problem to include a treatment center and a portable dredge and barge operation in order to maintain the storage capacity. While the sale of gold from this source will not cover the cost of the reservoir maintenance, it
could help offset some of these costs. When marketed, this gold has the potential to help tell the story of the Gold Rush, and to develop a consumer base that demands gold only from this source.

**Action Steps**

a) The State of California needs to study the current status of the State’s water storage reservoirs in terms of siltation and its impact on the reservoirs’ operational capacity.

b) The State needs to evaluate potential methods for restoring capacity where this is possible in reservoirs that are filled with silt. These methods must meet rigorous standards of environmental protection and restoration.

c) The State should prioritize funding for pilot projects that have these multiple benefits: increased water storage, improved water quality, production of useful or marketable materials to help offset some reservoir maintenance costs.

**E3 Gold**

*Explore the potential for the development of a marketable gold product that tells the story of watershed reclamation*

The Sierra Fund defines E3 Gold as a finished gold product or milled gold product that has been ethically produced in an environmentally beneficial and economically viable way.

- **Ethically** produced means that the gold was produced with an ethic of restoration, that the land, water, and habitats are not harmed in the process; and that the workers were protected by the appropriate labor laws in California.

- **Environmentally** beneficial gold production means that E3 gold was obtained as a by-product of legacy mining restoration efforts under the appropriate regulatory permits in California.

- **Economically** viable means that the sale of the gold benefited the local community from which it originated by sustaining local jobs and opportunities instead of extracting wealth and sending it elsewhere.

We want to establish transparent and science-based ways to certify the product and then establish consumer demand for it. We hope to reinvest some of the proceeds from sale of the product in efforts to heal the watersheds and original peoples of the areas that were historically mined and never cleaned up.
Multiple Benefits: Production of E3 Gold will result in a reduction of legacy pollution, and new green jobs tailored to the skills and needs of the Sierra Nevada’s rural communities, which continue to suffer high unemployment rates. Restoring water capacity in our existing reservoirs is an even more urgent priority given the drought. Restoration of the scars left by historic mines will help the region address the climate change stresses that are already being experienced, since every rainstorm transports more mercury-laced mine debris downstream into our water storage reservoirs. Elimination of pollution sources will reduce the source of mercury to the food chain, so eventually the high levels of mercury we see in locally caught fish will decline enough for women and children to be able to eat them again. Finally, establishing a market for California’s E3 Gold will pave the way for national and international demand for gold produced from reclamation that will transform mining worldwide.

How to Clarify the Brand?
E3 gold should be transparent, unified, accountable, and proceed commercially based on who has the rights to sell the gold. Consumers have to trust the source in order to have confidence in their purchase.

Simply defined, E3 Gold is only produced as a result of a reclamation activity. It does not apply to “new mining operations” – only to gold or other precious metals or materials that are directly produced as a result of watershed restoration and environmentally sensitive reservoir maintenance activities.

Certification of the product is one method of ensuring that consumers are getting the product that they are paying for. However, certification is an expensive, complex, divisive, and controversial process and written standards may be adequate without actually changing the existing regulations.

An alternative to certification would be to impose a business model on those gold producers who want to be certified E3 that requires them to meet standards beyond standard California statutes. One path could be to create a standard for E3 products that are not enacted as legal statute but instead augment existing California Surface Mining Act regulations with principles and add ethical sourcing (such as requirements that the community supports the reclamation activity) and high environment standards (no cyanide or mercury, no water quality or quantity impacts). These principles would focus on the chain of custody and the environmental claims, and ensure that the proceeds go toward well-defined cultural and environmental restoration priorities.

Recycled Gold ≠ E3 Gold: Recycled gold does not meet the test for E3 gold because it is not traceable or transparent. And while consumers understand recycling, nothing is being preserved, protected, or restored with recycled gold, nor has it been shown to reduce the demand for new mining.

What can be done to successfully market this product?
The majority of gold used in the U.S. (80% or more) is for jewelry, about 12% for electronics, with gold stored by financial institutions accounting for the rest. The jewelry industry is masterful at using jewelry to tell stories, and it would not be hard to link the “conflict-free diamond” consumer to the “E3 gold” consumer.
In addition, in California there are unique opportunities with the computer technology industry that uses gold. The electronics industry ironically is located at the center of the world for mercury contamination, and is ideally suited to help us clean it up.

**Action Steps:**

a) Monitor the amount of gold and mercury recovered in Combie Project, to provide increasingly solid data points to answer the question of how much gold might be recovered through a regular management program of dredging reservoirs.

b) Conduct additional research on how much gold is available through reservoir maintenance and mine reclamation projects in California’s gold country.

c) Conduct market research to get a better handle on the opportunities and challenges in the various market segments for gold (mining, smelting, refining, jewelry, electronics). Reach out to the electronics industry to learn about their current sourcing practices.

d) Define job creation benefits and include these as part of the E3 Gold story.