

Manila Lode summary/observations:

- 5-acre site North of the town of Montezuma
- Historic Toledo Tunnel and Mill Site/with perennially-flowing draining adit across 2 waste piles
- Adit and piles are upgradient of Montezuma Rd. and discharge to a wetland along the Snake River
- (Site is before you get to the road on right hand side of Montezuma Rd that we took to get to Morgan Mine)
- The dsn Snake River sample location is below the Sts. John Creek discharge
- The wagon road from Montezuma to Chihuahua ran below the tunnel, and the Toledo Mill was located on the opposite side of the wagon road on the Manila Lode site. This historic wagon road, which is across the bottom pile, now serves as a recreational trail for hikers and bikers.
- The Toledo Tunnel was a 3,150-foot-long tunnel that carried ore from mine sites in adjacent Peru Gulch, particularly the Jumbo Mine. The ore was processed at the Toledo Mill and ceased operation in 1915. Fine-grained sediments generated by this milling operation can still be found on the parcel.

TU completed 2 sampling events:

- Two 30-pt composite samples (one from each pile) in October 2018;
- Nine water samples were collected in June 2019

Soil screening indicates As, Pb, Mn, T, and U are above Residential/Industrial RSLs and BLM recreational. Acidic/Low pH

Soil Results (mg/kg)

As	Pb	
Top Pile	47	20,000*
Bottom Pile	20	2,000

All above concentrations are above BLM recreational user and EPA RSLs

*Above EPA calculated recreational risk level for Hiker/Camper/ATV

They also did an EPA-like 'SLERA' (screening level eco risk) using the soil results, which was correctly presented, EXCEPT there is no background comparison, which is rather a key component when looking at eco risk and metals. Otherwise, the conclusions are general enough and appropriate. However, I have a few suggestions related to the referencing they used, uncertainties with this type of evaluation, and the fact that there is no mention of the expected receptors and possible use by wildlife at the site. There is no mention of T&E (boreal toad/others may be in this area)

Water Results

- Ups Snake River vs Dns Snake River = no increases observed
- Adit water is pH neutral and not elevated in most of signature metals;
- Cd, Cu, Mn, and Zn are elevated above WQS in water discharge below the bottom pile and in wetlands; piles are the key driver for increased metals

There is discussion of a seep at the side of the bottom pile. The seep appears to be the expression from underground workings (TU observed an open shaft above this seep).

Memo concludes:

Soil results, particularly at the Upper Pile, can pose a threat to environmental and human health and "a site clean-up would depend on priorities from future site users, but each alternative should focus on reducing physical exposure to the tailings and waste rock on site and reducing the opportunity for water to interact with (and leach through) these piles".

Water results indicate the site is impacting downstream water quality and wetlands based on the numerous elevated metals. These impacts are of particular concern to the aquatic community of the downstream wetlands and the recreational and residential users.

Memo indicates that the opportunities for restoration range from removal of impactful tailings materials to drainage and sediment controls to re-routing adit flows into lined drainage channels away from tailings materials

Potential Design Recommendations

- Grading and capping the tailings material with clean fill would ensure that rainwater, snowmelt or adit water will no longer interact with the mobile, exposed tailings at the site.
- Prior to capping the piles, soil pH could be raised by incorporating crushed limestone (or carbonate equivalent) into the tailings material so that the underlying material will not encourage metal solubility to the same degree as it currently does.
- Once applied, the clean fill can be amended to encourage plant growth. The success of plant communities on site will improve site stabilization and further reduce exposure factors.
- Routing the Toledo Tunnel adit flow away from the Manila tailings will remove the consistent, year-round opportunity that this adit water has to interact with mine tailings.
- Groundwater controls installed at on-site slope-breaks to eliminate the opportunity for shallow groundwater that has interacted with Manila tailings to exit the site and potentially impact the wetlands. Groundwater could be captured in shallow channels at these breaks and be routed into the constructed into the Toledo Tunnel adit channel.