FISH RESOURCES & HABITAT

Published on August 25, 2020

When the DEIS was released by the U.S. Forest Service in August of 2020, our company was called Midas Gold. Since then, we have changed our name to better reflect our values and our project. Today, we are proud to be Perpetua Resources.

Table 1 provides a comparison of current conditions to each Alternative based on simulated temperatures and comparison to lethal thresholds, migratory-blockage thresholds, watershed condition indicators and Idaho Department of Environmental Quality water quality standards.

MINE IMPACTS/PROTECTIVE MEASURES

- **Alternative 1:** Changes to stream flow, groundwater-surface water interactions, open stream diversion channels, discharges from surfaces of pit lakes, removal of the Yellow Pine pit (YPP) lake and loss of stream shading due to vegetation removal increase stream temperatures. Recovery of vegetation following riparian planting at closure improves temperature over time, but not to baseline conditions in most of the project area.
- **Alternative 2:** This Alternative improves on Alternative 1 by diverting low-flows in piped conveyances rather than open diversion channels during operations. This Alternative also routes Meadow Creek around Hangar Flats pit lake, rather than through it, to improve water quality concentrations (which results in warmer daily maximums because the stream has less buffering capacity). Additional liner placed in lower Meadow Creek and peak flow shaving to fill Hangar Flats pit lake faster mitigates stream flow losses and improves temperature. Treating water at the contact water treatment plant sometimes reduces stream temperatures in the summer but could increase temperatures in the winter unless engineering controls are employed to lower temperatures. Alternative 2 also includes an analysis of stream temperature changes associated with discharge from the Contact Water Treatment Plant. In the summer and fall, the discharge often has little impact on water temperature in the East Fork of the South Fork of the Salmon River, though sometimes the discharge cools the water by 1.5 ^{0}C to 2 ^{0}C. In the winter, the discharge could increase stream temperatures by 4 ^{0}C, but engineering controls leveraging cold air temperatures can be used to lower temperatures prior to discharge and meet permit limits. Regarding the temperature increase in the winter, the DEIS says “The increased water temperatures would be closer to optimum for incubation

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and emergence for Chinook salmon and bull trout than they are at baseline. This world have a positive effect on these species, potentially increasing survivorship."

- **Alternative 3:** This Alternative results in stream temperatures that are warmer than Alternative 1, especially in the upper EFSFSR (above Meadow Creek). Because Meadow Creek temperatures remain at baseline conditions and temperatures at the confluence with the EFSFSR are higher than baseline, warmer temperatures propagate downstream in the EFSFSR.
- **Alternative 4:** This Alternative results in stream temperatures that are similar to Alternative 1.
- **Alternative 5:** This Alternative results in stream temperatures that are similar to baseline.

RECLAMATION/RESTORATION/MITIGATION

- **Alternative 1:** Mitigation measures for this Alternative include planting 7-foot riparian buffers along restored stream channels with wetland plantings extending out to the edge of the floodplain. Stream restoration designs provide habitat and accessibility but can result in warmer stream temperatures until vegetation is fully established. Liners placed 5 feet below the stream bed and out to the edge of the floodplain provide interactions with the shallow groundwater zone, but this cooling effect is not accounted for in the temperature modeling. Vegetation planted beyond the 7-foot riparian planting zone along restored reaches and growth of vegetation along other reaches are not accounted for the temperature modeling.
- **Alternative 2:** Similar to Alternative 1 with the addition of a contact water treatment plant and routing low stream flows in piped diversions. Pulling water from deeper layers of Hangar Flats pit lake and contact water treatment ponds would result in lower temperatures in the summer. In the winter, passive methods leveraging cold air temperatures could be used to lower the temperature of the contact water treatment plant effluent to near-ambient conditions. These additional measures are not accounted for in the temperature modeling.
- **Alternative 3:** Mitigation measures are similar to Alternative 1, but disturbance extends up the EFSFSR above Meadow Creek.
- **Alternative 4:** Similar to Alternative 1.
- **Alternative 5:** Similar to baseline conditions.

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TABLE 1: CURRENT CONDITIONS COMPARED TO ALTERNATIVES

METRIC	BASELINE (ALT. 5 IS SIMILAR)	ALT. 1 (ALT. 4 IS SIMILAR)	ALT. 2	ALT. 3
LETHAL TEMPERATURES AND MIGRATORY BLOCKAGES				
21 degrees C daily average*, summer maximum period	No reaches exceed	No reaches exceed when compares to daily average*	No reaches exceed	No reaches exceed
WATERSHED CONDITION INDICATORS (WCIs)				
Temperature WCI FR = Functioning at Risk; FUR = Functioning at Unacceptable Risk	EFSFSR: FR Meadow Creek: FR	EFSFSR: FUR Meadow Creek: FUR during operations; FR post closure	EFSFSR: FUR Meadow Creek: FR during operations; FR post closure	EFSFSR: warmer than Alt. 1 Meadow Creek: similar to baseline
Six integrated WCIs across the project area	FR	FR	FR	FR
IDEQ Temperature Standards				
22 degrees C Coldwater daily maximum, summer maximum period	All reaches comply	All reaches are within 0.3 degrees C. by EOY22;	All reaches except Meadow Creek comply by EOY18;	Meadow Cr. (M.C.) complies during every mine year; EFSFSR upstream of M.C. is within 0.4 degrees C. by EOY112; EFSFSR between M.C. & Sugar Cr.

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METRIC	BASELINE (ALT. 5 IS SIMILAR)	ALT. 1 (ALT. 4 IS SIMILAR)	ALT. 2	ALT. 3
22 degrees C. (cont.)		All reaches comply by EOY52	Meadow Cr. is within 0.5 degrees C. by EOY52	is within 0.4 degrees C. by EOY52
19 degrees C daily average, summer maximum period	All reaches comply	All reaches are always within 0.2 degrees C.	All reaches always comply	All reaches are always within 0.2 degrees C.
13 degrees C. Salmonid Spawning & Bull trout daily maximum, summer maximum period	Only Fiddle Creek complies	Fiddle Creek no longer complies	Fiddle Creek no longer complies	Fiddle Creek no longer complies
9 degrees C. Salmonid Spawning & Bull trout daily average, fall maximum period	Only Fiddle Creek & the EFSFSR upstream of Meadow Creek comply	Fiddle Creek & the EFSFSR upstream of Meadow Creek are within 0.2 degrees C. of this criterion by EOY52	EFSFSR upstream of Meadow Cr. is within 0.1 degrees C. of this criterion during each mine year; Fiddle Cr. within 0.2 degrees C. of this criterion by EOY112	EFSFSR upstream of Meadow Cr. is within 0.6 degrees C. of this criterion by EOY52; Fiddle Cr. within 0.2 degrees C. of this criterion by EOY52

Alt. = Alternative
*Meadow Creek exceeds 0.25 degrees C. in EOY18 if compared to summer constant (the midpoint between the mean & maximum)
C. = Celsius
EFSFSR = East Fork of the South Fork of the Salmon River
EOY = End of Year
FR = Functioning at Risk
FUR + Functioning at Unacceptable Risk
IDEQ = Idaho Department of Environmental Quality
WCI Watershed Condition Indicator

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