

Comparison of Dredge Turbidity to Regional Values

The turbidity values found in the dredge studies fall within the range of turbidity values found for currently mined areas of the Fortymile River and many of its unmined tributaries. Figure 3 shows the ranges of turbidity values observed along the horizontal axis, and the number of samples which fall within each of those ranges. For example, 25 samples had turbidity between 1.0 and 1.5 NTU, 22 of which were in a dredged area. The highest turbidity value was from an unmined tributary to Uhler Creek; the lowest from a number of different tributaries to the North Fork. As seen on the figure, there is no appreciable difference in the distribution of turbidity values between mined and unmined areas.

CHEMICAL SURVEYS

Water-quality samples were collected at three points 200 feet behind each of the two operating suction dredges. One sample was collected on either side of the plume, and one in the center of the plume. The samples were passed through a filter with a nominal pore size of 0.45 micrometers and acidified to a pH less than about 2. Results are shown in the table below. Samples 1A, 1C, 2A, and 2C are from either side of the plume behind dredges 1 and 2, respectively. Samples 1B and 2B are from the center of each plume. All concentrations given are in micrograms per liter, except pH, which is expressed in standard units.

	Dredge 1			Dredge 2		
	1A	1B	1C	2A	2B	2C
pH	7.7	7.6	7.8	7.0	7.5	7.5
Arsenic	0.3	0.3	0.3	0.3	0.3	0.3
Iron	110.	110.	110.	100	97	100
Chromium	2	2	3	3	3	3
Cadmium	all less than 0.02 micrograms per liter					
Cobalt	0.07	0.07	0.06	0.06	0.05	0.05
Zinc	0.8	0.6	0.8	1.0	1.0	1.0
Lead	all less than 0.05 micrograms per liter					

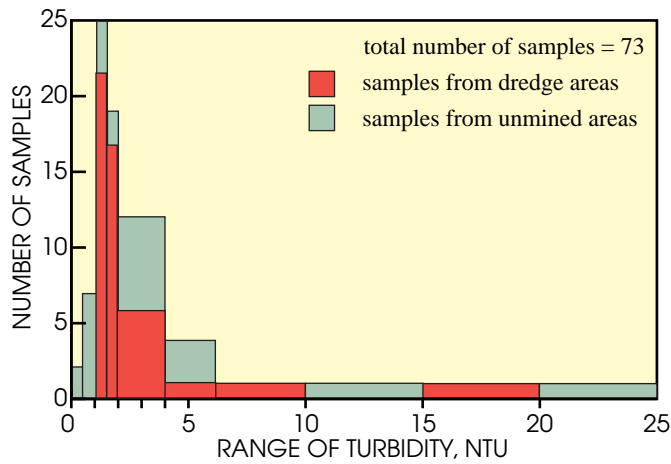


Figure 3. A comparison of turbidity values between mined and unmined areas shows that the suction dredge mining does not affect the turbidity of the Fortymile River system under the conditions studied. The highest turbidity values from the dredge areas are within 200 feet (60 m) of the back of the two operating dredges which were studied.

The data show similar water-quality values for samples collected within and on either side of the dredge plumes. Further, the values shown in the table are roughly equal to or lower than the regional average concentrations for each dissolved metal, based on the analyses of 25 samples collected throughout the area. Therefore, suction dredging appears to have no measurable effect on the chemistry of the Fortymile River within this study area. We have observed greater variations in the natural stream chemistry in the region than in the dredge areas. Preliminary results from three undisturbed sites suggest that the shallow ground water may be of poorer quality in some pyrite-rich outcrop areas. This water could be discharging to the surface water, leading to increased dissolved metal loads.

CONCLUSIONS

The data collected for this study help establish regional background geochemical values for the waters in the Fortymile River system. As seen in the chemical and turbidity data any

variations in water quality due to the suction dredging activity fall within the natural variations in water quality. This conclusion is further supported by the other water-quality data collected throughout the region, at the sites shown on figure 1.

Current and future work on the Fortymile River system is directed at understanding the natural variations in water chemistry throughout the area. The primary factors causing these variations are probably variations in bedrock geology and mineral content, as the surface waters come into contact with the bedrock throughout their flow history.

REFERENCES TO CONSULT

- The USGS website: <http://www.usgs.gov>
- Gough, L., Day, W., Crock, J., Gamble, B., and Henning, M., 1997, Placer-Gold Mining in Alaska— Cooperative studies on the effect of suction dredge operations on the Fortymile River: U.S. Geological Survey Fact Sheet FS-155-97.

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