

**Adaptive Management
Report 2019**

**Fish Habitat Management System for Yukon Placer
Mining**

May 2021 Draft v.2

Acronyms

AMF	Adaptive Management Framework
CSAS	Canadian Science Advisory Secretariat
DFO	Fisheries and Oceans Canada
EHM	Economic Health Monitoring
FHMS	Fish Habitat Management System
IMG	Intergovernmental Management Group
JPIC	Joint Placer Implementation Committee
RCA	Reference Condition Approach
TSS	total suspended solids
WQO	Water Quality Objective
WQOM	Water Quality Objective Monitoring
YPS	Yukon Placer Secretariat

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Executive Summary

Introduction

The Fish Habitat Management System for Yukon Placer Mining (FHMS) is the integrated regulatory system for managing the effects of placer mining on fish and fish habitat in certain watersheds in the Yukon. It was developed in partnership by Fisheries and Oceans Canada (DFO), Government of Yukon, and the Council of Yukon First Nations from 2003 through to implementation in 2008. It is currently administered by Government of Yukon and DFO.

The FHMS has two overarching management objectives including, a sustainable Yukon placer industry, and the conservation and protection of fish and fish habitat supporting fisheries (YPISC and YPWC, 2005; YPS 2008a). Components of the FHMS, including the operational requirements and standards for placer mining, were designed to help balance those objectives. In the context of the FHMS, adaptive management is a process of monitoring the effectiveness of the operational requirements and standards at achieving the two management objectives and informing changes over time.

The Adaptive Management Framework (AMF) guides the adaptive management process (YPS 2008a). It outlines how information gathered through three effects monitoring programs and Traditional Knowledge will be used to inform potential adjustments to the FHMS. The three effects monitoring protocols include Water Quality Objective Monitoring (WQOM), Aquatic Health Monitoring (AHM), and Economic Health Monitoring (EHM). Monitoring is completed and reported on annually. This report communicates the results of the 2019 monitoring programs and the subsequent evaluation and adjustment phases. The executive summary provides an overview on these topics and more comprehensive information is available in Appendices A-C.

Summary of 2019 Monitoring Results

Water Quality Objective Monitoring Program

Water quality objective monitoring for the AMF follows the Water Quality Objective Monitoring (WQOM) Protocol. The objective of the WQOM Protocol is to monitor and assess whether the water quality objectives established under the FHMS are being achieved and whether exceedances are due to placer mining activity or other causes. The performance measure is total suspended solids (TSS), monitoring is done to measure TSS in the watercourse and then compare the result to the TSS WQO established for that location (YPS, 2008a and 2008b).

In 2019, Hunker Creek, a historically and actively mined tributary of the Klondike River was chosen for an intensive study to better understand the effect that placer mining might have on a single watercourse. A total of 1333 water samples were collected at 13 Water Quality Objective monitoring sites on Hunker Creek from June 10 to September 24, 2019. Precipitation data was collected using four portable tipping bucket rain gauges.

On average, the observed TSS concentrations were below the WQO in Hunker Creek, at the habitat suitability classification level (low and moderate-low), and at the site level. The concentration of TSS was higher than the WQO in 46 of the 1333 samples (3%). Exceedances occurred at 10 of the 13 monitoring sites with the majority occurring at station KL_HU06 (20 of the 46 exceedances). Station KL_HU06 falls within an active placer mine and there is more placer mining upstream. For these reasons, additional monitoring at this sites is recommended.

A number of exceedances were observed during precipitation events in 2019. Precipitation can lead to surface runoff and cause sediment to enter the watercourse. Both undisturbed and disturbed (historic and active) areas can contribute to sediment loading via run-off. Additional monitoring is recommended to understand non-point sources of sediment in Hunker Creek.

See Appendix A for the comprehensive 2019 WQOM report.

Aquatic Health Monitoring Program

The Aquatic Health Monitoring (AHM) Program is intended to assess how effective the Fish Habitat Management System (FHMS) is in maintaining aquatic health in placer mined watersheds (YPS 2008a, 2008c). Information from aquatic health monitoring is then used alongside the other effects monitoring programs and Traditional Knowledge to make changes to the FHMS, if necessary, through adaptive management.

In 2018, the Canadian Science Advisory Secretariat (CSAS) undertook an evaluation of the suitability of the Yukon Regional Reference Model and provided guidance regarding the adequacy of the reference condition approach (RCA) for informing regulatory decisions for placer mining in the Yukon. Recommendations from this review were used to inform the Intergovernmental Management Group (IMG) in planning a study redesign and as a result Fisheries and Oceans Canada and Yukon government carried out targeted studies in 2019 to begin to answer several key questions that will be used to inform a revised approach to aquatic health monitoring.

Consistent with the 2018 AHM report, results from the 2019 monitoring program were not compared to the 2013 Yukon Regional Reference Model. Instead, the interim assessment approach used in 2018 has been used for the 2019 samples, which relies on characterization of physical habitat, degree of placer mining development, evaluation of several invertebrate community metrics and a qualitative description of the invertebrate community in comparison to local reference sites. Detailed results and an overall site assessment for each site are provided in this report.

Watersheds sampled in 2019 included: Alsek River, Big Creek, Indian River, Klondike River, Mayo River, and White River. Site visits were carried out from July 18 to August 11, 2019. A total of 39 sites were sampled among the 6 watersheds. Sampling was carried out at 9 reference sites and 30 test sites. For sites that were sampled in 2019, all available years of data were included in the analysis to evaluate trends over time.

Several targeted studies were carried out as part of the 2019 AHM program to answer key questions to inform the study redesign. The targeted studies for 2019 were as follows:

- Replicate study to better characterize within site variability in benthic invertebrate community composition to evaluate the need to incorporate site replication into the study design.
- Analysis of substrate composition to evaluate the potential effects of sample size on variability of mean substrate diameter.
- In-situ sediment sampling to explore benthic invertebrate community response to selected sediment parameters.
- Hunker Creek study to evaluate how sediment inputs from placer mining activity affect the benthic invertebrate community along the length of Hunker Creek.

Further analysis is planned for several of the targeted studies during the 2020/2021 Adaptive Management Cycle. Additional field data to support the targeted studies may also be required to answer key questions that were identified.

For more information, please see the comprehensive report for AHM in Appendix B.

Economic Health Monitoring Program

The Economic Health Monitoring (EHM) Protocol describes the way in which trends in economic health are monitored and assessed. The EHM program collects economic health indicator data and evaluates where there are changes in the industries viability year to year and whether these changes are attributed to the FHMS (YPS, 2008d). In 2019, no decline in economic health was detected for any of the viability indicators. Data for two of the “bottom” (lower weighted) indicators was unavailable at the time of monitoring.

The EHM Panel Survey was conducted for the 2019 placer mining season. The panel survey includes questions designed to determine whether an adverse trend can be attributed to factors unrelated to the FHMS. According to the protocol, the survey is administered if an adverse change is detected using the indicators. While no such adverse trends have been detected by the viability indicator assessment that would trigger advancement to the panel survey, it has been conducted on an annual basis

since 2008. For more information, please see the comprehensive report for economic health monitoring in Appendix C.

Traditional Knowledge

The use of Traditional Knowledge is an essential part of the FHMS and is considered during adaptive management processes (YPS, 2008a). In the past, First Nation governments were invited each year to share Traditional Knowledge that may be significant to the management of placer mining activity in their traditional territories. However, no Traditional Knowledge was shared in response to the annual invitations. Reasons for this were documented in the Implementation Status Review and relate to the collection process, ownership, storage, and use of this information (YPS, 2019). In response to the Implementation Status Review recommendations, a formal invitation to share Traditional Knowledge has not gone out for the 2019 monitoring year, although First Nation governments are welcome to share Traditional Knowledge at any time. Discussions regarding the approach to Traditional Knowledge in the AMF are ongoing.

Evaluation and Adjustment Results

Through the annual adaptive management process, the results of the monitoring programs and Traditional Knowledge are evaluated together to determine if the management objectives of conserving and protecting fish and fish habitat and maintaining a viable placer mining industry are being achieved for the FHMS. However, several obstacles have hindered the AMF process for the FHMS. These issues were identified in recent reviews of the management approach (e.g. YPS 2019, DFO 2019). To address these concerns, multiple projects are being lead by Government of Yukon, DFO, and the IMG (e.g. Aquatic Health targeted studies). The IMG is reviewing the AMF and determining how to make improvements to the program. This project was initiated in 2019 and is anticipated to take several years, during which, the evaluation and adjustment process prescribed in the AMF will not be used to make management decisions. Effects monitoring would continue on an annual basis in order to detect and address concerns, and management decisions may be made using alternative approaches. Compliance monitoring would not be impacted, and would continue following existing protocols.

Literature Cited

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2019 Adaptive Management Report for the Fish Habitat
Management System for Yukon Placer Mining

Appendix A: 2019 Water Quality Objective Monitoring Report



2019 Adaptive Management Report for the Fish Habitat
Management System for Yukon Placer Mining

Appendix B: 2019 Aquatic Health Monitoring Report



2019 Adaptive Management Report for the Fish Habitat
Management System for Yukon Placer Mining

Appendix C: 2019 Economic Health Monitoring Report

