



Economic Health Monitoring Program 2020 Report

Adaptive Management Framework for the Fish Habitat
Management System for Yukon Placer Mining

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Industry Snapshot

- Vector Research

Acronyms

EHM Economic Health Monitoring

FHMS Fish Habitat Management System for Yukon Placer Mining

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Introduction

The Fish Habitat Management System for Yukon Placer Mining (FHMS) is intended to balance the objectives of a sustainable Yukon placer mining industry with the conservation and protection of fish and fish habitat supporting fisheries. Within the FHMS there are three effects-monitoring programs and associated protocols including Economic Health, Water Quality Objectives, and Aquatic Health. All three programs help to verify the effectiveness of the FHMS in meeting its objectives.

The Economic Health Monitoring (EHM) Protocol was designed to measure and signal whether a viable placer industry is being maintained under the fish habitat management system. The EHM Protocol outlines a series of indicators which are used to measure whether or not the objective of a viable placer industry is being met. Viability refers to the placer mining industry's ability to exist and/or grow in the new regulatory environment. This information may be used, in combination with the results of the other effects-monitoring programs, to make changes to the FHMS through adaptive management. This report provides background information into the EHM program and presents the results of monitoring for 2020.

An Industry Snapshot has been prepared to describe the economic backdrop for the Yukon placer mining industry during the 2020 placer mining season in consideration of the COVID-19 pandemic.

Methods

Annual Economic Health Monitoring

To monitor and evaluate the occurrence of any changes in placer mining industry viability, the EHM Protocol was followed for the 2020 assessment period. Part 1 involved the monitoring of placer industry viability and was administered by the Government of Yukon Department of Energy Mines and Resources. Two categories of economic health indicators are used to assess the viability of Yukon's placer mining

industry. These include Type A Indicators, which are indicators potentially correlated with the FHMS; and Type B indicators which are indicators not attributable to the FHMS. Type A indicators are broken into A.1 and A.2, where A.1 indicators are based on secondary data sources. Type A.2 and Type B indicators are based on primary data collected through the panel survey.

During Part 1 of the EHM Protocol, Type A.1 indicator data was collected for 2020 and compared with the data from the previous assessment period (2019) to determine if there were any adverse changes that would trigger advancement to Part 2 of the EHM Protocol. Changes that would have constituted advancement to Part 2 include: more than 15% adverse change in two or more of the indicators or more than 10% adverse change in four or more of the of the indicators. Part 2 uses a panel survey to correlate adverse changes in industry viability if they detected. Advancement to Part 2. Part 2 of the EHM Protocol was not triggered or carried out in 2020.

The findings from the 2020 Part 1 viability assessment are presented in the Results section below.

EHM Protocol Part 1: Monitoring of placer industry viability

For Part 1, two categories of economic health indicators are used to assess the viability of Yukon's placer mining industry. These include Type A Indicators, which are indicators potentially correlated with the FHMS; and Type B indicators which are indicators not attributable to the FHMS. Type A indicators are broken into A.1 and A.2, where A.1 indicators are based on secondary data sources. Type A.2 and Type B indicators are based on primary data collected through the panel survey.

During Part 1 of the EHM Protocol, Type A.1 indicator data was collected for 2020 and compared with the data from the previous assessment period (2019) to determine if there were any adverse changes that would trigger advancement to Part 2 of the EHM Protocol. Changes that would constitute advancement to Part 2 include: more than 15% adverse change in two or more of the indicators or more than 10% adverse change in four or more of the of the indicators. The data and results of this analysis are presented in the Results section of this report.

COVID-19 Industry Snapshot

The Type I and Type II indicators for the Economic Health Monitoring Protocol for the 2020 mining season have not indicated a change in industry economic health sufficient to trigger the running of the 2020 Panel Survey. However, the COVID-19 pandemic has made for an unusual year. To ensure that the health of the Yukon placer mining industry is accurately monitored in consideration of the COVID-19 pandemic, this Industry Snapshot has been prepared to describe the economic backdrop for the Yukon placer mining industry during the 2020 placer mining season.

Results

EHM Protocol Part 1: Monitoring of placer industry viability

The data and results of the analysis for the Type A.1 viability indicators are presented in Table 1. Four of the A.1 indicators adversely changed between 2019 and 2020, however the change was not significant enough to result in an overall adverse effect in economic health that would have been demonstrated by a change in $\geq 15\%$ in two or more of the Top Four Indicators, or $\geq 10\%$ four or more of the eight Indicators.

Data for two of the indicators was unavailable. These include the total fuel consumption, and the number of active water licenses for placer mines washing (sluicing) more than 40,000 cubic yards of material per year. The reasons for these gaps in the information were investigated by Vector Research in 2019. With regard to estimates of total fuel consumption, there has been a change in the Government of Yukon department responsible for this information as well as the policy for calculating and sharing this information. As such, estimates of total fuel consumption is not available at this time. The viability of the number of active water licenses for placer mines washing (sluicing) more than 40,000 cubic yards of material per year as an indicator for the EHM Protocol is under review.

Historic EHM Protocol Part 1 Type A Indicator data is presented in Appendix B1.

Table 1: Data and results for the Type A.1 Viability Indicator analysis. The decision rule, yearly data, and percent (%) change for 2019-2020 is provided for each indicator.

	Type A.1 Viability Indicator	Potential adverse change if the indicator goes...	2019	2020	% change 2019 to 2020
Top Four Indicators	Active licenses	down	160	150	-6% (adverse change)
	Gold royalty collected	down	\$30,167	\$30,700	2% (no adverse change)
	Number of person days of employment	down	97,293	93,250	-4% (adverse change)
	Level of non-compliance (# of "inspectors directions")	up	2	3	50% (adverse change)
Bottom Four Indicators	Total placer claims staked in reporting period - Sept to Oct	down	2,406	705	-71% (adverse change)
	Total fuel consumption	down	Not available		
	Number of claims in good standing per type of stream classification	down	27,068	27,350	1% (no adverse change)
	Number of water licenses (>40,000 cubic yards washed per year)	down	Indicator under review		

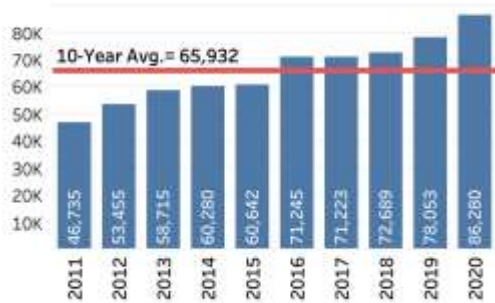
EHM Protocol Part 2: Panel Survey

The results of Part 1 did not trigger advancement to Part 2 of the EHM Protocol.

COVID-19 Industry Snapshot

An Industry Snapshot has been prepared to describe the economic backdrop for the Yukon placer mining industry during the 2020 placer mining season.

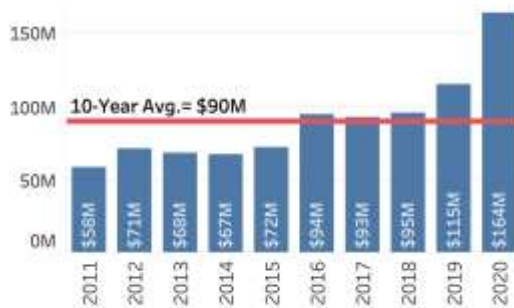
Placer Gold - Production (crude oz.)



Source: Yukon Energy, Mines and Resources.

- Placer gold production in Yukon reached 86,280 crude ounces in the 2020 mining season.
- Placer gold production in 2020 (86,280 crude ounces) was 11% higher than in 2019 (78,053 crude ounces).
- Placer gold production in 2020 (86,280 crude ounces) was 31% higher than the 2011 to 2020 ten-year average (65,932 crude ounces).

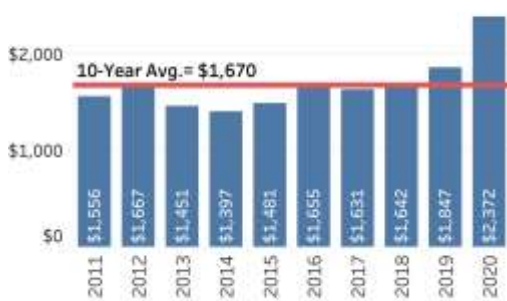
Placer Gold - Value (\$CDN, millions)



Source: Yukon Energy, Mines and Resources.

- The value of placer gold production in Yukon was \$164 million Canadian dollars in the 2020 mining season.
- The value of placer gold production in 2020 (\$164M) was 42% higher than in 2019 (\$115M).
- The value of placer gold production in 2020 (\$164M) was 82% higher than the 2011 to 2020 ten-year average (\$90M).

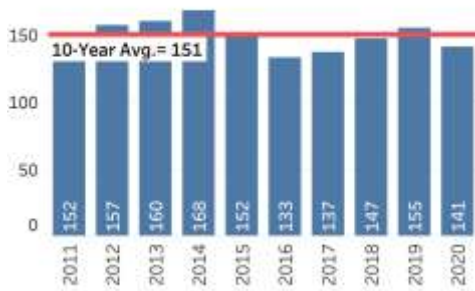
Gold Price (\$CDN)



Source: World Gold Council.

- The sharp increase in the value of gold produced in the 2020 mining season is in large part due to a 28% increase in the \$CDN price of gold between the 2019 and 2020 mining seasons (from \$1,847 to \$2,372).
- The \$CDN price of gold in 2020 (\$2,372) was 42% above the 2011 to 2020 ten-year average (\$1,847).

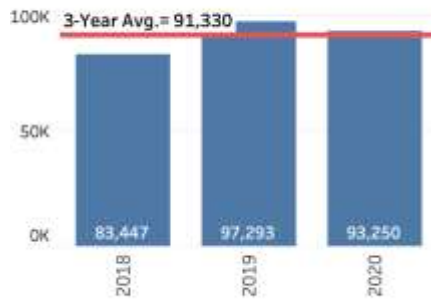
Diesel Fuel Price - Dawson City (cents/litre)



Source: Yukon Bureau of Statistics.

- Diesel fuel is a key input in the production of placer gold, accounting for approximately 30% of placer mine operating costs.
- The price of diesel fuel averaged \$1.41 per litre in 2020 in Dawson City where most of the Yukon's placer gold is produced.
- The price of diesel fuel in 2020 (\$1.41) was 9% lower than in 2019 (\$1.55).
- The price of diesel fuel in 2020 (\$1.41) was 6% lower than the 2011 to 2020 ten-year average (\$1.51).

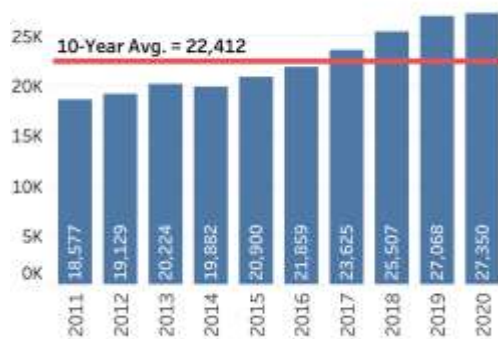
Placer Mining Employment (person days)



Source: Yukon Workers Compensation, Health and Safety Board.

- The Yukon's placer mining industry provided a total of 93,250 person days of employment in the 2020 mining season.
- The number of person days of employment in 2020 (93,250) was 4% lower than in 2019 (97,293).
- On the basis of limited data, the number of person days of employment in 2020 (93,250) was 2% higher than the 2018 to 2020 three-year average (91,330).

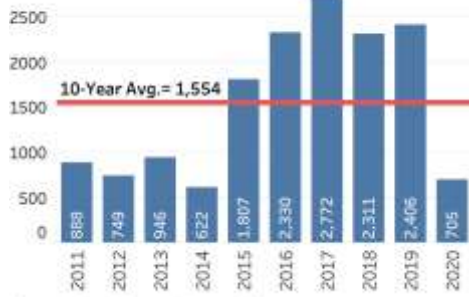
Placer Claims in Good Standing



Source: Yukon Energy, Mines and Resources.

- The number of placer claims in good standing was 27,350 in 2020.
- The number of placer claims in good standing in 2020 (27,350) was 1% higher than in 2019 (27,068); the very small change is likely due in part to the waiving by the Yukon Government of assessment requirements for the 2020 season in response to the COVID-19 pandemic.
- The number of placer claims in good standing in 2020 (27,350) was 22% higher than the 2011 to 2020 ten-year average (22,412).

Placer Claims Staked



Source: Yukon Energy, Mines and Resources.

- A total of 705 placer claims were staked in the 2020 mining season.
- The number of placer claims staked in 2020 (705) was 71% lower than in 2019 (2,406).
- The number of placer claims staked was 55% lower than the 2011 to 2020 ten-year average (1,554).

In summary, the volume of gold produced increased by 11% compared to the previous season, reaching its highest level since 1989. The value of gold produced increased sharply in 2020, rising 42% from \$CDN115 million in 2019 to \$CDN164 million in 2020. The sharp increase in the value of gold produced was in large part due to a 28% increase in the price of gold between the 2019 and 2020 mining seasons (rising from \$CDN1,847 to \$CDN2,372).

Gold production was also assisted by lower diesel fuel prices which were down by 6% compared to 2019 levels in the Dawson City area. Labour mobility into does not seem to have been much affected by the COVID-19 pandemic as the number of person days of employment in 2020 (93,250) was only 4% below the 2019 level (97,293).

A significant drop (-55%) in the number of claims staked might suggest less ground could be available in the Yukon to mine for gold in the future. However, the slight increase (1%) in the number of claims in good standing suggests otherwise, with 27,350 placer claims in good standing at the end of the 2020 mining season, well above the 10-year average of 22,412.

Conclusion

The FHMS did not adversely affected the viability of Yukon's placer mining industry in 2020. This was demonstrated through the monitoring and analysis of the placer viability indicators following Part 1 of the EHM Protocol. For this reason, no further action related to the FHMS is required at this time.

Fish Habitat Management System for Yukon Placer Mining
Economic Health Monitoring Program 2019 Report.

Appendix B1: Part 1 'Type A' Indicators 2007-2020



TABLE: EHMP Part 1 'Type A' Indicators 2007-2020. Blank indicates that data was not available for the indicator that year.

Year	Top Four Indicator Data												Bottom Four Indicator Data											TOP AND BOTTOM FOUR INDICATOR ANALYSIS: Was there an adverse change of ≥10% in four or more of the eight Indicators?	RESULT: Was there an adverse change to economic viability for the year of study?			
	active licenses			gold royalty collected			number of person days of employment			Level of non-compliance (# of "inspectors directions")			TOP FOUR INDICATOR ANALYSIS: Was there an adverse change of ≥15% in two or more of the Top Four Indicators?			Total placer claims staked in reporting period - Sept to Oct			Total fuel consumption			Number of claims in good standing per type of stream classification				Number of water licenses (>40,000 cubic yards washed per year)		
	Annual Data	Annual Change	Was Change Adverse?	Annual Data	Annual Change	Was Change Adverse?	Annual Data	Annual Change	Was Change Adverse?	Annual Data	Annual Change	Was Change Adverse?		Annual Data	Annual Change	Was Change Adverse?	Annual Data	Annual Change	Was Change Adverse?	Annual Data	Annual Change	Was Change Adverse?	Annual Data	Annual Change	Was Change Adverse?			
2007	171	-	-	\$ 24,021	-	-	33,000	-	-	6	-	-	n/a	461	-	-	9,265,160	-	-	-	-	-	100	-	-	n/a	n/a	
2008	192	12%	no	\$ 20,876	13%	yes	34,750	5%	no	7	17%	yes	no	709	54%	no	7,530,898	-	19%	yes	17,945	-	-	108	8%	no	no	no
2009	145	-24%	yes	\$ 20,428	-2%	yes	35,000	1%	no	4	-43%	no	no	770	9%	no	8,171,747	9%	no	17,738	-1%	yes	11	-90%	yes	no	no	
2010	140	-3%	yes	\$ 19,807	-3%	yes	37,250	6%	no	12	200%	yes	no	580	-25%	yes	9,052,420	11%	no	17,922	1%	no	57	418%	no	no	no	
2011	135	-4%	yes	\$ 17,534	-	yes	43,500	17%	no	21	75%	yes	no	888	53%	no	9,427,324	4%	no	18,577	4%	no	10	-82%	yes	no	no	
2012	135	0%	no	\$ 18,573	6%	no	46,250	6%	no	11	-48%	no	no	749	-16%	yes	9,965,241	6%	no	19,129	3%	no	10	0%	no	no	no	
2013	142	5%	no	\$ 21,729	17%	no	48,750	5%	no	6	-45%	no	no	946	26%	no	10,133,428	2%	no	20,224	6%	no	42	320%	no	no	no	
2014	171	20%	no	\$ 22,726	5%	no	48,500	-1%	yes	3	-50%	no	no	622	-34%	yes	11,570,501	14%	no	19,882	-2%	yes	-	-	-	no	no	
2015	160	-6%	yes	\$ 22,728	0%	no	-	-	-	11	267%	yes	no	1,807	191%	no	-	-	-	20,900	5%	no	-	-	-	no	no	
2016	159	-1%	yes	\$ 26,695	17%	no	-	-	-	14	27%	yes	no	2,330	29%	no	-	-	-	21,859	5%	no	-	-	-	no	no	
2017	156	-2%	yes	\$ 26,665	0%	no	-	-	-	7	-50%	no	no	2,772	19%	no	-	-	-	23,625	8%	no	-	-	-	no	no	
2018	160	3%	no	\$ 27,207	2%	no	83,447	-	-	6	-14%	no	no	2,311	-17%	yes	-	-	-	25,507	8%	no	-	-	-	no	no	
2019	160	0%	no	\$ 30,167	11%	no	97,293	17%	no	2	-67%	no	no	2,406	4%	no	-	-	-	27,068	6%	no	-	-	-	no	no	
2020	150	-6%	Yes	\$ 30,700	2%	no	93,250	-4%	Yes	3	50%	Yes	no	705	-71%	yes	-	-	-	27,350	1%	no	-	-	-	no	no	

