

Yukon Placer Mining 2017 Development Overview

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Yukon Geological Survey

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INTRODUCTION

The Yukon placer mining industry benefited from another season of strong gold prices bolstered by a favourable Canada-U.S. exchange rate. The average gold price during the 2017 mining season was (CDN)\$1621.74, a reduction of 6% from 2016. The total number of sluicing operations was 156 and numerous exploration projects were conducted, including 19 Placer Module projects funded through the Yukon Mineral Exploration Program. The sustained gold price over the last few years is reflected in record claim and lease staking, with significant activity in the Coffee Creek and Little South Klondike areas. Regional production highlights include a strong season from the Indian and 60 Mile rivers, whereas the glaciated districts experienced a slight decline in production.

CLIMATE FOR MINING

Mining got off to a slightly slower start in 2017 due to unseasonably cooler temperatures in April and May across most districts. In Dawson City, the average low for the month of April was -6.7°C compared to -2.1°C in 2016. At mine sites in the Gustavus Range near Keno, sluicing did not commence until the middle of June. Through the month of July climate conditions were generally cooler and wetter in Burwash Landing and Carmacks. Burwash Landing recorded 22 days of precipitation in July amounting to 93 mm. The Klondike experienced warm and dry conditions throughout July and August resulting in a reduced rate of permafrost thaw caused by limited moisture. All districts were warm during the first half of August and Dawson City averaged 26.5°C during the first 13 days. The warm weather continued into fall with temperatures remaining favourable for mining until the middle of October. In Mayo, the average high during September was 14.2°C. Burwash Landing was very dry towards the end of the season with only 13.6 mm of precipitation recorded over a total of five days in September and October.

GOLD PRODUCTION AND VALUE SUMMARY

Yukon placer gold producers continued steady production and 67,810 crude ounces were reported from royalties for the period May 1st to November 30th, 2017 (Fig. 1). The value of the production is (CDN) \$88 million using an average fineness of 80% and average summer gold price of (CDN) \$1621.74 per fine ounce. In 2016 the value was (CDN) \$95.7 million based on the final royalty-based production figure of 69,625 crude ounces for the season. Final production figures for the 2017 season, when the winter royalty reporting has finished, are expected to be similar to 2016.

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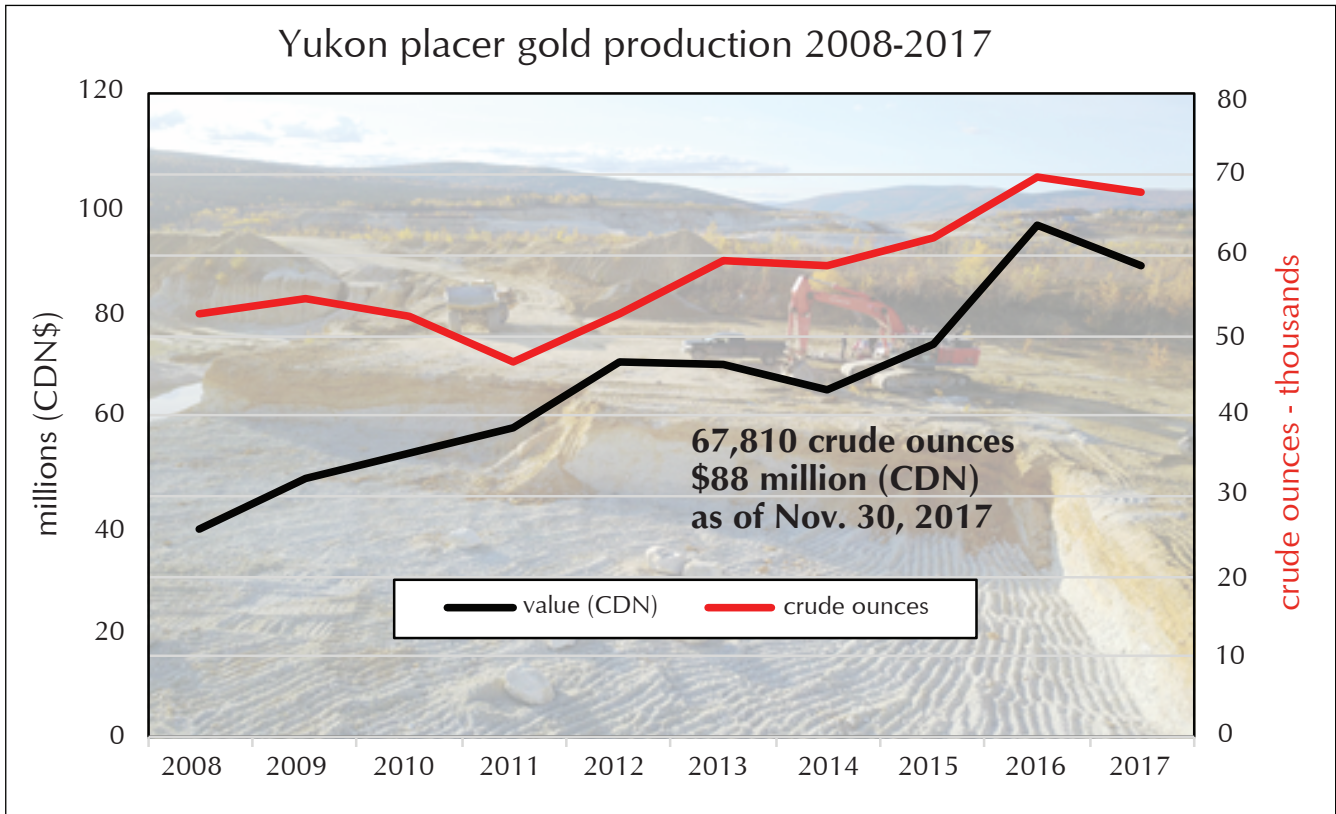


Figure 1. A chart illustrating both Yukon placer gold production and the production value in Canadian dollars for the past 15 years. The total crude ounces reported from royalties in 2017 dropped slightly to 67,810 crude ounces, but is expected to continue climbing as more gold is reported from the mining season.

PLACER CLAIMS AND LEASES

A measure of the momentum of the Yukon placer industry is reflected in staking and claims in good standing (Fig. 2). The total number of placer claims in good standing (as of September 2017) is 25219. This is the highest number of claims dating back to 1973, and likely in history. Claims in good standing have increased annually since 2004 when 16054 claims were active (Fig. 2). Interest in finding new ground is reflected by the number of placer leases in good standing. In 2017, 343 leases were active, which is the third highest number since 1990 when 345 placer leases were in good standing. In 2016, 368 placer leases were active. In 2017, 2269 placer claims were staked compared to the 43 year average of 1393 claims. This is the second highest number of claims staked in the last 30 years after 2016 when 2476 claims were staked.

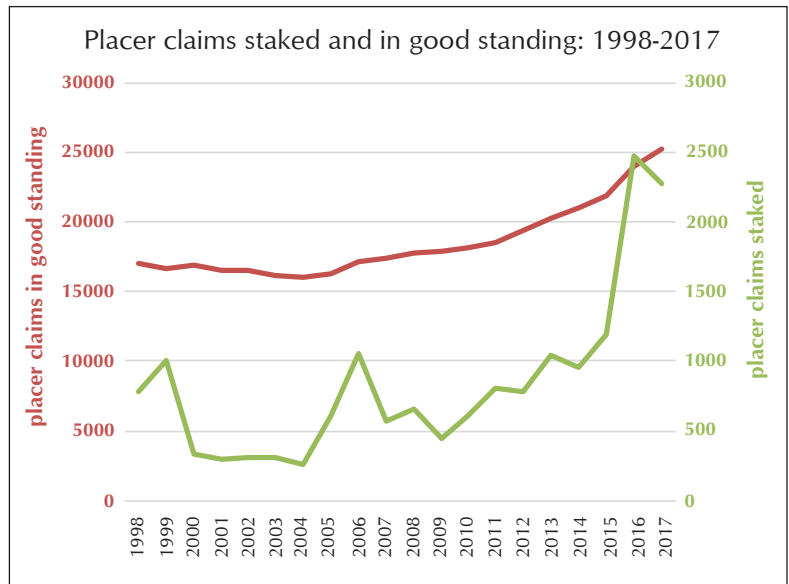


Figure 2. A chart showing placer claims in good standing and placer claims staked for the years 1998 to 2017. A noticeable upswing in both claims held and claims staked has occurred since 2009.

REGIONAL PRODUCTION SUMMARIES

Regional production summaries (Fig. 3) provide an overview of the various informal placer districts in Yukon. Production is reported in crude ounces from royalty figures reported between May 1st and November 27th, 2017.

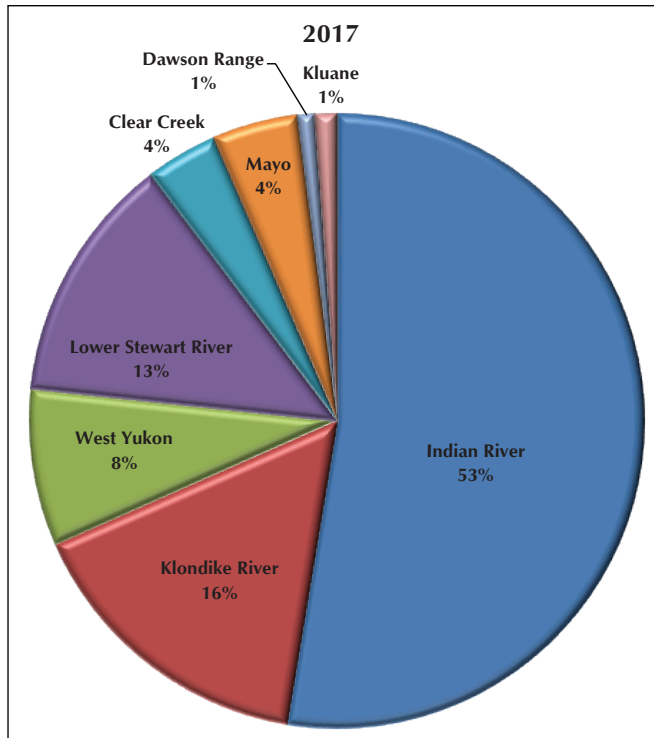


Figure 3. A pie chart illustrating production from the various regional placer districts in Yukon. Production from the Indian River drainage increased by 4% in 2017 whereas production from the glaciated districts decreased by 4%.

INDIAN RIVER

Production from the Indian River drainage, and Indian River specifically, increased in 2017. Total production from the drainage increased by 3496 crude ounces to a total of 35,291 crude ounces. A large part of this was due to more gold being mined from the Indian River which produced 13,914 crude ounces in 2017 compared to 8551 crude ounces in 2016 (Fig. 3). In 2017, mining specifically along the Indian River accounted for 20% of Yukon's total placer gold production.

Quartz Creek – Schmidt Mining

Schmidt Mining's project on the Quartz Creek bench continued as the top producing placer gold mine in Yukon. Progressive mining into the right limit bench has revealed a gravel section measuring 25 m (82 ft) in height (Fig. 4). Production was also reported from upper Quartz Creek on the right fork. Reclamation has been initiated farther downstream on the right limit bench near the mouth of Calder Creek and is expected to continue upstream as work on additional areas of the bench are completed.



Figure 4. Schmidt Mining's wash plant on the Quartz Creek bench with the right limit Pliocene section exposed in the background. The wash plant is capable of processing 200 loose yd³ per hour.

Dominion Creek – Adrian Hollis

Adrian Hollis continues to adopt innovative mining techniques along the middle reaches of Dominion Creek near the mouth of Jenson Creek. Much of the economic success at his mine is owed to reducing earth-hauling and water pumping costs (Fig. 5). Mr. Hollis employs a system of excavator-mounted conveyors equipped with hydraulic levelers and dump-box feeders. This system is capable of reducing stripping costs by approximately 5 times compared to traditional bulldozer pushing. The use of solar panels to power the dewatering pump in his cut also contributes to the mines overall economic efficiency.



Figure 5. A view looking down on Adrian Hollis' 130 ft excavator-mounted conveyor on Dominion Creek. He has led the evolution of this tool and shares his expertise with other miners on new builds. Photo courtesy of A. Hollis.

Gold Run Creek – T.D. Oilfields

T.D. Oilfields mined on lower Gold Run Creek focusing on previously mined ground and virgin side pay. Their work in the middle of the valley reworked dredged ground and targeted bedrock lows where pockets of virgin gravel were missed by dredging (Fig. 6).

Eureka Creek – Fine Gold Resources

Fine Gold Resources operated four wash plants in the Eureka Creek drainage and one on the Indian River. Two of the plants serviced cuts on the left limit Pliocene bench, one of the largest targets in the Klondike (Fig. 7). A third plant operated on the upper reaches of the left fork at the base of Eureka Dome where angular gold is being shed off a nearby source. Mining along the Indian River targeted low-level terrace gravel buried by thick accumulations of resedimented loess (silt).

Indian River – Little Flake Mine

Parker Schnabel had a successful year mining two locations on the upper Indian River near the mouth of Australia

Creek (Fig. 8). They completed a stripping program near the mouth of Wounded Moose Creek on the left limit of the Indian River and employed a crew of 18.

Australia Creek – Fry Exploration and Mining

Fry Exploration and Mining, in collaboration with Bill Harris, continued work on their extensive group of claims and leases in the Australia Creek drainage (Fig. 9). The 2017 program consisted of resistivity geophysics and road building along the north side of the valley near the old ditch. This will provide access to the lower claim blocks and allow test mining to commence in 2018.

Indian River– M2 Gold Mines

M2 Gold Mines completed mining in the vicinity of their camp on the Indian River. This included a significant and timely reclamation effort (Fig. 10) that earned them the 2017 Robert E. Leckie award. Work also consisted of constructing a new road to their downstream claims. The camp will be moved in early 2018.



Figure 6. T.D. Oilfields reworking former dredged ground on lower Gold Run Creek. The seagull on the hood of the haul truck was a permanent partner at the mine this year, enjoying heated flooring and a free lunch.



Figure 7. An aerial view looking down the right fork of Eureka Creek. Fine Gold Resources pit is excavated into the left limit Pliocene bench deposit and processed with a trommel in the adjacent valley bottom. The bench deposit underlies the continuous gently sloping surface that extends into the distance.



Figure 8. A view of the shaker deck plant and cut at the Little Flake Mine near the mouth of Dominion Creek.



Figure 9. A view looking up Australia Creek. Prominent benches are visible on the right side of the valley and make up just one of the many extensive targets in the valley.



Figure 10. M2 Gold Mines completing their last cut on the flats upstream from camp on the lower Indian River. Reclamation is evident in the foreground and was completed for the entire flat towards the end of the season.

KLONDIKE RIVER

Production from the Klondike River and its tributaries continued to be steady with 10,589 crude ounces reported. The largest contributions were from Hunker, Bonanza and Last Chance creeks (Fig. 3).

Gold Hill – Dulac Mining

Dulac Mining moved operations onto Gold Hill from All Gold Creek in 2017. Work focused on mining the downstream-end of the hill where remains of the Pliocene paleo-channel are preserved (Fig. 11). The White Channel gravel is 33 m (108 ft) thick on the bench and the lower 3 m (10 ft) is processed as pay. The pay gravel has a light green colour and dense consistency due to a significant component of reworked decomposed bedrock. According to Dulac Mining the vast majority of the pay is contained right on the bedrock surface, therefore the sluice section may decrease in 2018 to avoid unnecessary processing costs.



Figure 11. Dulac Mining on the north side of Gold Hill. Pay is excavated from the base of the steep cut in the background and delivered to the plant with the haul truck.

Dome Road – Slinky Placer Mine and Treadstone Services

Two operations, Slinky Placer Mine and Treadstone Services, worked side-by-side on the Klondike River bench off the Dome Road. The intermediate-level terrace is younger than the White Channel terraces and contains an early Pleistocene record of interglacial and glacial river sedimentation (Fig. 12). The pay gravel varies between 0.4 and 2 m (1.3 to 6.6 ft) in thickness and lies on a channelized bedrock surface with undulations up to 2 m (6 ft). The pay gravel is overlain by 2 m (6.6 ft) of river sandy silt and 5.7 m (18.7 ft) of glacial outwash gravel.

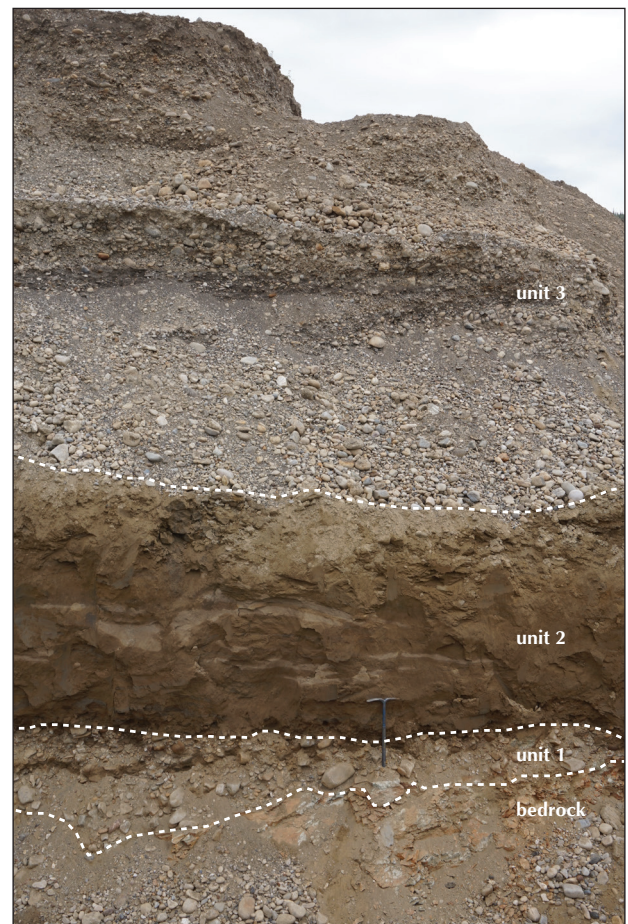


Figure 12. The 2017 cut on the Klondike River bench at the Slinky Mine reveals a thin, coarse pay gravel on a highly fractured bedrock (unit 1). It is overlain by a bed of sandy silt (unit 2) and Klondike River glacial outwash gravel (unit 3).

LOWER STEWART RIVER

Production from tributaries to the lower Stewart River remained steady. The total production, largely from Henderson, Black Hills, Kirkman, Maisey May and Scroggie, was 8726 crude ounces, down only 448 ounces from 2016 (Fig. 3).

Russian Gulch – Atlantia Gold Corporation

Atlantia Gold Corporation mined a small tributary of upper Henderson Creek. Deposits in narrow, unglaciated valleys are generally thin and accessible for smaller operators. In Russian Gulch the gravel unit is 2.4 m thick (8 ft) and is overlain by 2.4 m (8 ft) of colluvium (Fig. 13). The gold is distributed evenly across the valley floor and contained in coarse, poorly sorted gravel, consistent with high-energy flows.

Kirkman Creek - Fell Hawk Placers and Sager

Fell Hawk Placers and M. Sager were both active on Kirkman Creek in 2017. Testing occurred on an extensive right limit bench and valley bottom mining focused along the right limit where 33,500 year old floodplain sediments were targeted under a blanket of loess (silt) that has washed off the hill slopes into the valley bottom (Fig. 14).

WEST YUKON-FORTY MILE, SIXTY MILE AND MOOSEHORN

Production from the West Yukon placer creeks increased in 2017 due to expanded production from M2 Gold Mines operation on the Sixty Mile River. The total production was 5545 crude ounces for the district, up from 3767 crude ounces in 2016 (Fig. 3). Other significant contributions to the gold production of this area occurred in California and Cheryl creeks.



Figure 13. A view of Atlantia Gold Corporations mine on Russian Gulch. Pay gravel from the full width of the valley bottom is being processed for placer gold.



Figure 14. Merrit Sager's wash plant on Kirkman Creek. A test cut into the bank in the background exposed pay gravel buried by silty overburden. The silt buried the floodplain margins between 33,000 and 25,000 years ago at a time heading into cooler conditions associated with the last glacial climate. The silt originates as wind-blown dust (loess) off the nearby Yukon River floodplain. The section is 10.7 m (35 ft) in height.

Sixty Mile – M2 Gold Mines and K-1 Mining

M2 Gold Mines completed their second year of mining on the left limit bench of the Sixty Mile River near the mouth of 12 Mile Creek. A larger trommel wash plant was brought in and enabled production to increase. Development also occurred adjacent to the modern floodplain. Farther upstream, K-1 Mining moved their operation back into the Sixty Mile River valley from Glacier Creek (Fig. 15). Mining focused on reworking previously dredged ground and working two left limit bench locations.

10 Mile Creek - Johnson

Cam Johnson mined on the 10 Mile Creek left limit bench in 2017. This is a Pliocene bench equivalent to the White Channel gravel bench in the Klondike (Fig. 16). The total gravel thickness is 10.6 m (35 ft) and consists of two gravel units of similar thickness. Similar to the White Channel gravel, the upper unit



Figure 15. Exposure of a left limit bench deposit in the 60 Mile River valley near the mouth of Glacier Creek on K-1 Mining's property. The section is 5 m (16 ft) in height and the lower 1 m (3 ft) of light-coloured decomposed gravel is the target pay. Flow directions within the gravel indicate a flow out of Glacier Creek.

is sandier and better sorted whereas the lower unit is coarser and generally poorly sorted. The pay channel is contained in the lower gravel on the bedrock surface and is approximately 1.5 m (5 ft) thick. Gold grades marginal to the pay channel drop off abruptly and therefore close attention must be given to identifying both the sluice section and the lateral extent of the pay.

Moosehorn Range – Moosehorn Exploration

Moosehorn Explorations focused mining efforts on Kenyon Creek in an area that had been bulldozer mined in 1975 (Fig. 17). The high altitude site is underlain by decomposed intrusive bedrock resulting in a very sandy (grus) gravel. Minimal silt is present within the gravel and therefore limited washing is required when processing.



Figure 16. An aerial view looking down 10 Mile Creek of Cam Johnson’s mine and recent cuts on the left limit bench.



Figure 17. A view looking up Kenyon Creek towards the summit of the Moosehorn Range. Placers are being mined by Moosehorn Exploration very close to their bedrock or eluvial source.

CLEAR CREEK AND MAYO

Production from Clear Creek climbed by 18% in 2017 mainly due to increased production reporting from Storm Structures on Barlow Creek and Scott and Son Mining on the middle reaches of Clear Creek (Fig. 3). In the Mayo district, placer gold production declined by 1000 crude ounces largely due to less reporting from Granite and Thunder creeks.

Clear Creek - Scott and Son Mining

Gordon Scott, a third generation miner/geologist on Clear Creek, re-mined ground that was formerly worked in the 1980s (Fig. 18). Bedrock ridges that crosscut the valley have helped sort the placer gold. Nuggets are found near the bedrock highs and the gold becomes progressively finer downstream. The original floodplain gravel was 2 m (6 ft) thick and the best pay is located on the right limit, below an extensive bench.

Granite - Davies

Jim Davies contracted Earth and Iron Inc. to assist with stripping and hauling on his Granite Creek claims. This unusual deposit consists of a placer gold-rich alpine till. In 2017, mining advanced upstream on the right limit to a location immediately upstream of the alpine end from the last glaciation (Fig. 19). A total of 1.8 m (6 ft) of till and 2.5 m (8 ft) of oxidized bedrock was being processed. Additional work consisted of geophysical exploration on the left limit below the alpine end moraine.

DAWSON RANGE

Production from the Dawson Range, including Mount Nansen and the Freegold Mountain placer camps, decreased from 1699 crude ounces in 2016 to 608 crude ounces in 2017 (Fig. 3). A significant percentage of this decrease is related to closure of the Back Creek mine.



Figure 18. Gordon Scott's mine on Clear Creek where he is reworking previously mined ground.



Figure 19. Jim Davies mine on Granite Creek near Keno City. Three Caterpillar 740 haul trucks are used to haul pay to their derocker wash plant.

Seymour - Dodge

Derek Dodge focused operations immediately downstream from the confluence of Bow and Seymour creeks on the right limit of the valley (Fig. 20). Gravel deposits are shallow in this area and consist of two units. The lower unit and primary pay gravel is 1.7 m (6 ft) thick and is interpreted as a periglacial stream gravel. The former floodplain surface of unit 1 is preserved in the section as a paleosol formed in silt-rich gravel with vertically oriented clasts. The paleosol is a highly compact layer that acts as a false-bedrock surface for the modern gravel overlying it. The modern creek gravel is in erosional contact with the paleosol surface and is 1.8 m (6 ft) thick. Placer gold is primarily contained in the lower gravel and in fractures within the bedrock. Some gold is found on the false bedrock surface. Two populations of gold are reported from the cut, including a coarser fraction from Seymour Creek and a finer, well-travelled fraction from Bow Creek.

Summit – McKay and Pishon Gold

Pishon Gold partnered with Bill and Sandy McKay on their Summit Creek property in the upper Nansen Creek valley. This mine is located immediately below Rockhaven Resources Klaza project (Fig. 21). Placer gold is being mined from a transitional (proluvial) deposit between an eluvial and alluvial setting. The gold has a rough character and is clearly derived from nearby sources. An innovative processing plant equipped with a sand screw that feeds the sluice is being used. This device provides greater feed-rate control and improved recovery of fine gold. A second sand screw is placed after the sluice box to remove sediment from the tailings water. The fines are stacked with a conveyor and made available for road top-coating and reclamation.



Figure 20. A view of the cut at Derek Dodge's Seymour Creek mine. The contact between the lower, glacial-age gravel (unit 1), and upper, modern gravel (unit 2) is highlighted with the dashed line. The paleosol is situated at the top of unit 1.

Coffee Creek – Ryanwood Exploration

Ryanwood Exploration began exploration on their extensive Coffee Creek area claims and leases. The 2017 program focused on resistivity geophysics, heli-portable RAB drilling, developing their sample processing strategy and camp construction (Fig. 22). Results from their Shovel Creek property were favourable and warrant a second phase of drilling prior to more comprehensive testing.



Figure 22. Groundtruth Exploration's heli-portable rotary air-blast drill being used to explore a tributary to Coffee Creek.



Figure 21. A view of Bill McKay's wash plant and mine site on Summit Creek.

KLUANE

Placer gold production from the Kluane district in southwestern Yukon declined from 1289 crude ounces in 2016 to 761 crude ounces in 2017 (Fig. 3). Fewer ounces were reported from Gladstone Creek, and limited production was reported from Burwash and Rabbit creeks.

Gladstone – Tic Exploration

Tic Exploration was once again the most productive placer mine in the Kluane district. Operations focused near the mouth Cyr Creek and immediately below the bedrock canyon on Gladstone Creek (Fig. 23). Gold is primarily targeted on a false-bedrock of compact till in poorly to

moderately sorted boulder-rich gravel. Elevated pay zones are present in the gravel column and it requires persistent gold panning to identify the sluice section.

Bliss – Jabberwocky Exploration

Jabberwocky Exploration opened a small mine on Bliss Creek, a tributary on the Talbot Arm of Kluane Lake (Fig. 24). In 2016 Jabberwocky Exploration started mining at the top end of the canyon targeting relatively thin gravel on granodiorite bedrock of the active channel. Gravel thickness varies with undulations in the bedrock and the gold is primarily fine with a purity of 850.



Figure 23. A view of Tic Explorations mine on the left limit of Gladstone Creek. Most mining takes place on low-level gravel bench deposits that lie on a false-bedrock of compact till.



Figure 24. Coarse gravel deposits being mined in Bliss Creek, a tributary to Kluane Lake. The measuring stick is 2 m in length.