Yukon placer mining 2019 development and exploration overview

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Yukon Geological Survey

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Introduction

The Yukon placer mining industry recorded strong production in 2019. This was largely due to favourable gold prices, coupled with a beneficial exchange rate, which resulted in high selling prices during most of the summer. The industry also benefited from an early start to the season due to warm early spring temperatures. Shifts in regional production values reflect movement of certain large operations to both new and historic locations. The shift reflects permitting challenges in the Indian River, as well as the need to discover and develop new deposits based on diminishing resources within specific claim holdings.

Climate for mining

The onset of the mining season began abruptly in 2019 when temperatures soared during the later half of March. The average high during this period in Dawson City was 9.4°C, whereas during the previous 10 years it averaged 0°C. Similarly, the average low during the later half of March was -4°C, when it normally has been closer to -18°C. Most of the snow disappeared during this warm spell and allowed ice breakup to commence in many of the creeks. Reports of sluicing and gold sales prior to the start of May were an encouraging start for some in the industry. End of season temperatures in Dawson were slightly cooler with the average high and low equalling 0.8°C and -6.2°C respectively for the month of October. Precipitation trends varied between the southwestern and central parts of Yukon. The Kluane district experienced a wet summer overall with 135 mm falling during the month of July. In contrast, central Yukon was considerably drier with only 17 mm falling in the Dawson City area and 9.4 mm falling in the Mayo area during the month of August. This created some challenges for mines operating in smaller, first-order drainages.

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Gold production and value summary

Placer gold production, according to export tax reporting at the time of publication, was 75,228 crude ounces and valued at $116M CDN (Fig. 1). The 2019 production value was nearly $27M CDN greater than that of 2018, largely owing to a favourable gold price that averaged more than $1900 CDN/fine ounce throughout much of the mining season. This was nearly $400 CDN/fine ounce more than the average 2018 gold price. When accounting for inflation, the 2019 production value is the highest value since 1988.

The 2019 season experienced regional shifts in production distribution due to major operations commencing mining at sites outside of the Indian River drainage. Indian River and its tributaries contributed 28% less placer gold in 2019 largely due to reductions on Quartz Creek and the main stem of the Indian River. A production increase occurred in the Klondike River drainage where a modern high of 16,234 crude ounces was extracted, and the glaciated districts of Clear Creek and Mayo doubled their production from 2018.

Development highlights

Indian River drainage

Despite the production drop from the Indian River drainage it still accounted for 34% of the overall production with 25,000 crude ounces of gold reported (Fig. 2). The majority of this gold was mined from the main stem of the Indian River, Dominion Creek, Quartz Creek, Eureka Creek and Sulphur Creek.

The largest placer gold producer in Yukon for 2019 was the Little Flake Mine on the Indian River (Fig. 3). One of their locations focused on mining the left limit of the Indian River where they processed 210 yd^3/hr on a 24 hr/day schedule. The gold was primarily extracted from the lower 1.5 m of gravel and upper 1 m of bedrock on low terrace surfaces against the hillside. The use of conveyor feeders facilitated production.

Fine Gold Resources focused on three locations with their largest cut located on the left limit of the Indian River upstream of Eureka Creek. The cut measured 122 × 1280 m (400 × 4200 ft), and up to 1.2 m (4 ft) of gravel on bedrock was sluiced. Their other two plants

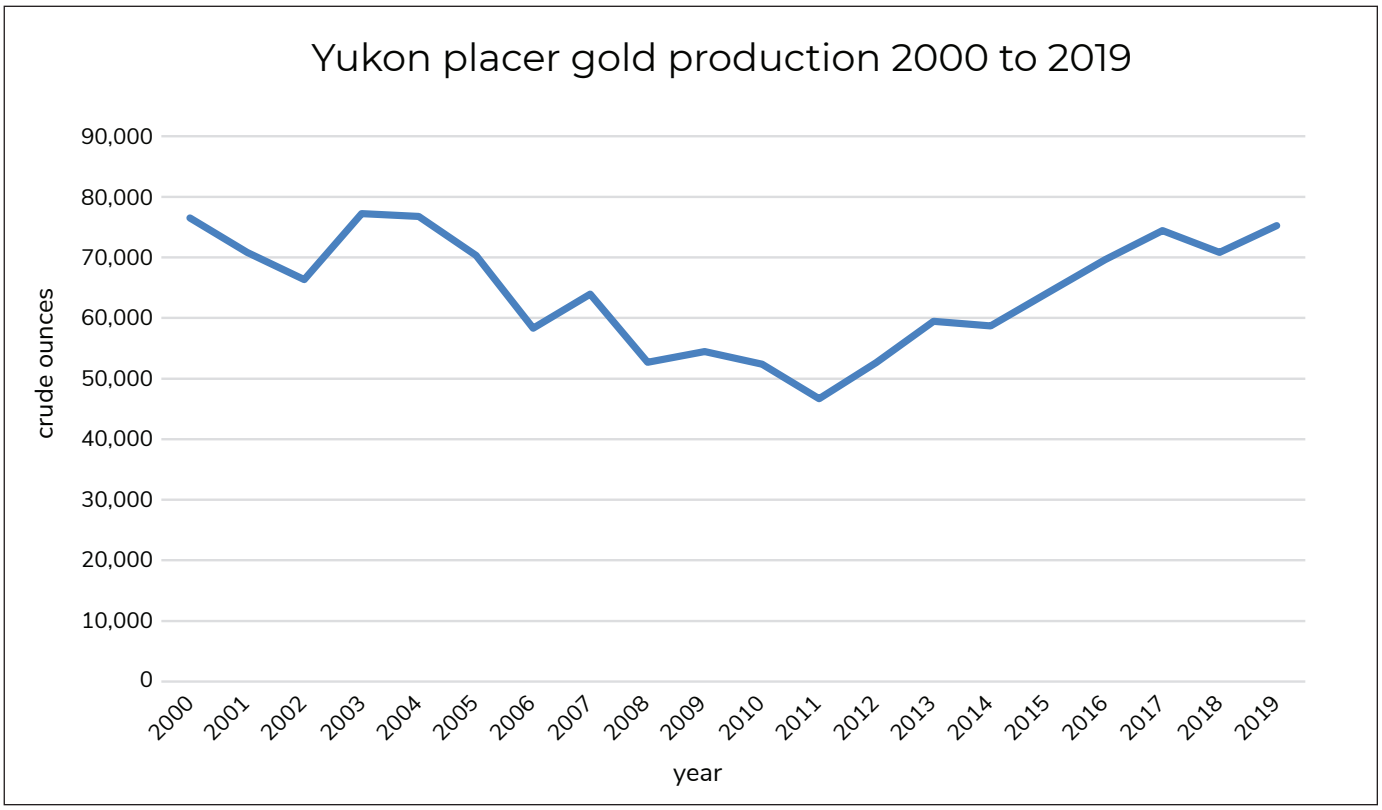

Figure 1. *Yukon placer gold production according to export tax reporting since the year 2000.*

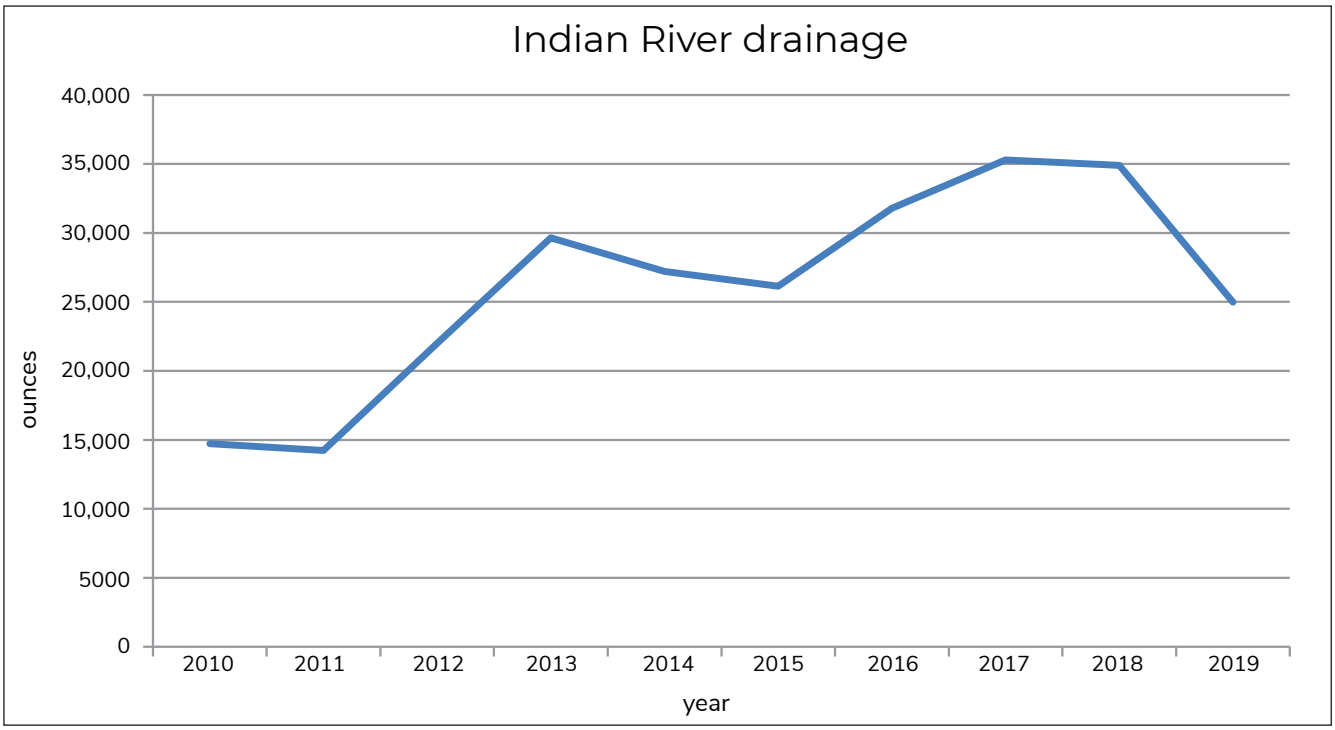

Figure 2. *Placer gold production from the Indian River drainage for the last ten years.*

Figure 3. *An aerial view of Little Flake Mines processing plant on the left limit of the Indian River below Eureka Creek.*

operated within Eureka Creek where they mined both valley bottom and bench material. This year, significant effort was dedicated towards reclamation whereby they levelled, contoured and top-coated mined areas dating back to the mid-1980s to early 2000s (Fig. 4). In total, 160 acres of previously mined ground was reclaimed in mid-Eureka Creek and near the mouth of the drainage.

Figure 4. *Aerial view of the mouth of Eureka Creek where Fine Gold Resources undertook a substantial reclamation project that involved surface grading and top-coating of legacy placer mine workings.*

Yukon Heliski continued mining on Sulphur Creek's right limit and while doing so entered into a unique value-added reclamation partnership with RESOLVE, a solutions-based non-profit organization from Washington, D.C. RESOLVE's Salmon Gold project facilitated a connection between Yukon Heliski, and Tiffany & Co. and Apple, which enabled these multinational companies to source responsibly-mined gold. Apple and Tiffany & Co. contributed funds to a stream channel reclamation project in an area considered mined-out on Sulphur Creek and supported a general waste clean-up initiative. The channel design included a meandering coarse aggregate base, graded, stabilized and top-coated embankments having vegetation features (Fig. 5). Within days, dozens of Arctic Grayling were observed occupying this new reach of Sulphur Creek.

Farther downstream on Sulphur Creek, Favron Enterprises opened up a 700,000 ft^2 cut on the right limit after moving their operation from Dago Hill. The total depth to bedrock was 10.6 m (35 ft) and the plant operated 24 hrs/day. Progressive reclamation occurred throughout the season.

Figure 5. *A view of the new Sulphur Creek channel being constructed on Yukon Heliski's ground in partnership with RESOLVE, Tiffany & Co., and Apple. Photo courtesy of Pete Wright.*

Klondike River drainage

Mining in the Klondike River drainage reached a modern high and 16,234 crude ounces of gold was reported, which is 5000 crude ounces more than 2018 (Fig. 6). The significant boost largely came from Hunker Creek where production increased to 8000 crude ounces for the season.

The largest producer in the Klondike River drainage was Tamarack Inc. on Paradise Hill. The left limit high-level Pliocene terrace deposit has a long history of development dating back to the gold rush. Tamarack Inc. is mining Paradise gravel, a pre-White Channel gravel, which outcrops adjacent to the White Channel deposit. This year they discovered a zone containing very little muck overburden and were able to process the entire column of Paradise gravel (Fig. 7). The decomposed nature of the gravel requires a long wash in a trommel to break down the clay effectively.

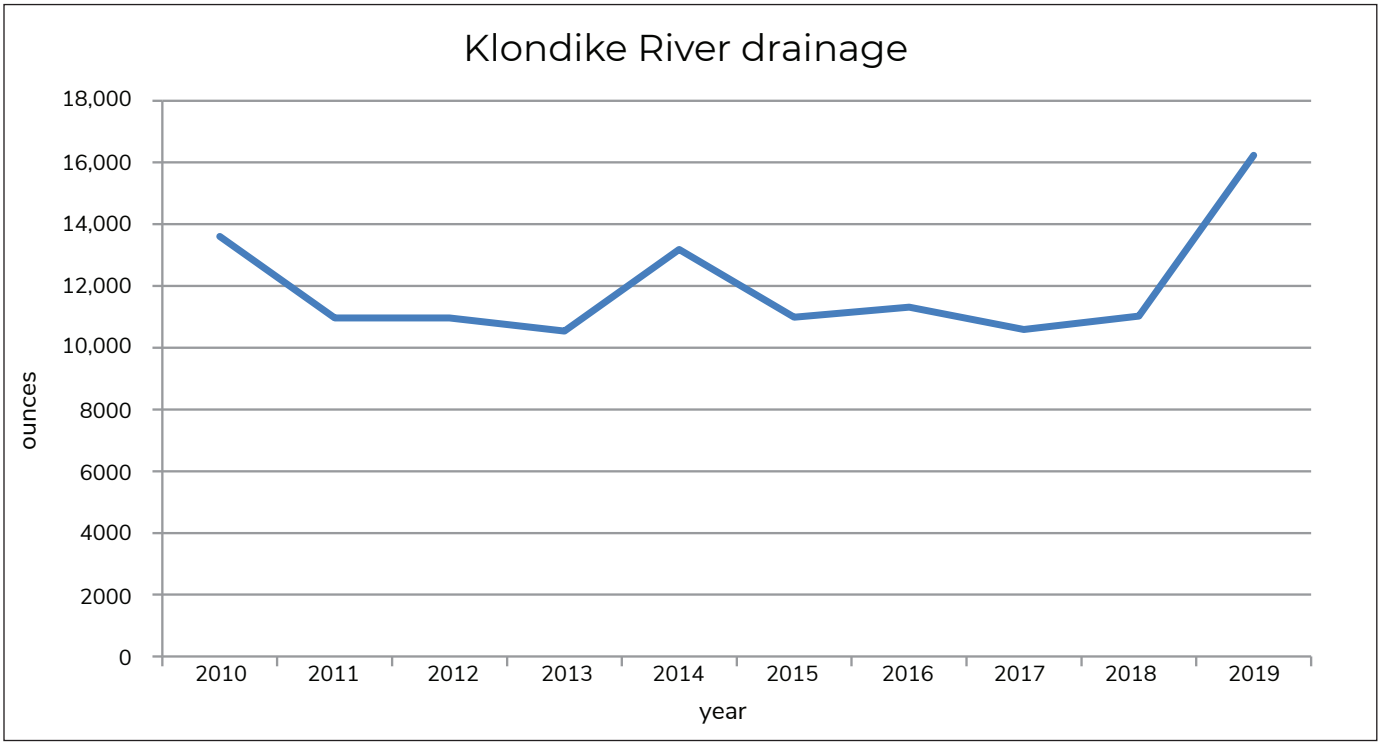

Figure 6. *Placer gold production from the Klondike River drainage for the last ten years.*

Figure 7. *A view of the Paradise Hill cut showing a thin layer of White Channel gravel overlying the orange oxidized Paradise gravel. Virtually no muck overburden is present at this location.*

Northern Shoveler continued mining White Channel gravel at Lovett Hill this year. The cut was located on the right limit side of the pay streak and consisted of 22 m (72 ft) of Klondike Wash gravel overlying 48 m (157 ft) of White Channel gravel (Fig. 8). Only the lower 7.5 m (25 ft) of White Channel gravel were processed for pay. The operation is stripping intensive and benefits from short haul distances that are relatively level, which reduces wear on the trucks. A second cut was started on the left limit side of the pay streak, which is thought to be higher grade than the right limit margin.

Figure 8. *A view of the Lovett Hill cut in 2019 showing the orange bedrock surface near the excavator. Undocumented underground old-timer workings from 1917 (based on a preserved newspaper) were discovered in the vicinity of the cut.*

West Yukon

Production from drainages west of the Yukon River continued to be dominated by production from the Sixty Mile River. This year, 8493 crude ounces of gold were reported, almost 2000 crude ounces more than in 2018 (Fig. 9). Production reporting from a number of Fortymile River tributaries, including Moose, Bruin and Browns creeks, occurred this year.

The largest operation is M2 Gold Mines located near the mouth of 12 Mile Creek. They primarily mined adjacent to the Sixty Mile River and completed a 700 m (2300 ft) diversion near camp. A 14-person crew were employed, operating two shifts daily. A new belt feeder that was added to the trommel increased feed rate from 140 yd^3/hr to 180 yd^3/hr.

No Name Resources Inc. started sluicing on Ten Mile Creek on April 26 this year, thanks to warm spring temperatures. They mined at a variety of locations and finished the season on the high-level Pliocene bench located on the left limit just upstream from camp (Fig. 10). The gravel deposit is thinnest near the rim of the bench and thickens into the face to a maximum of 13.5 m (44 ft). Their cut measured 44 m (144 ft) in width and the lower 3.5 m (11.5 ft) of boulder gravel was processed in their trommel. They identified lower grade gold concentrations above the main pay unit that average about half the value.

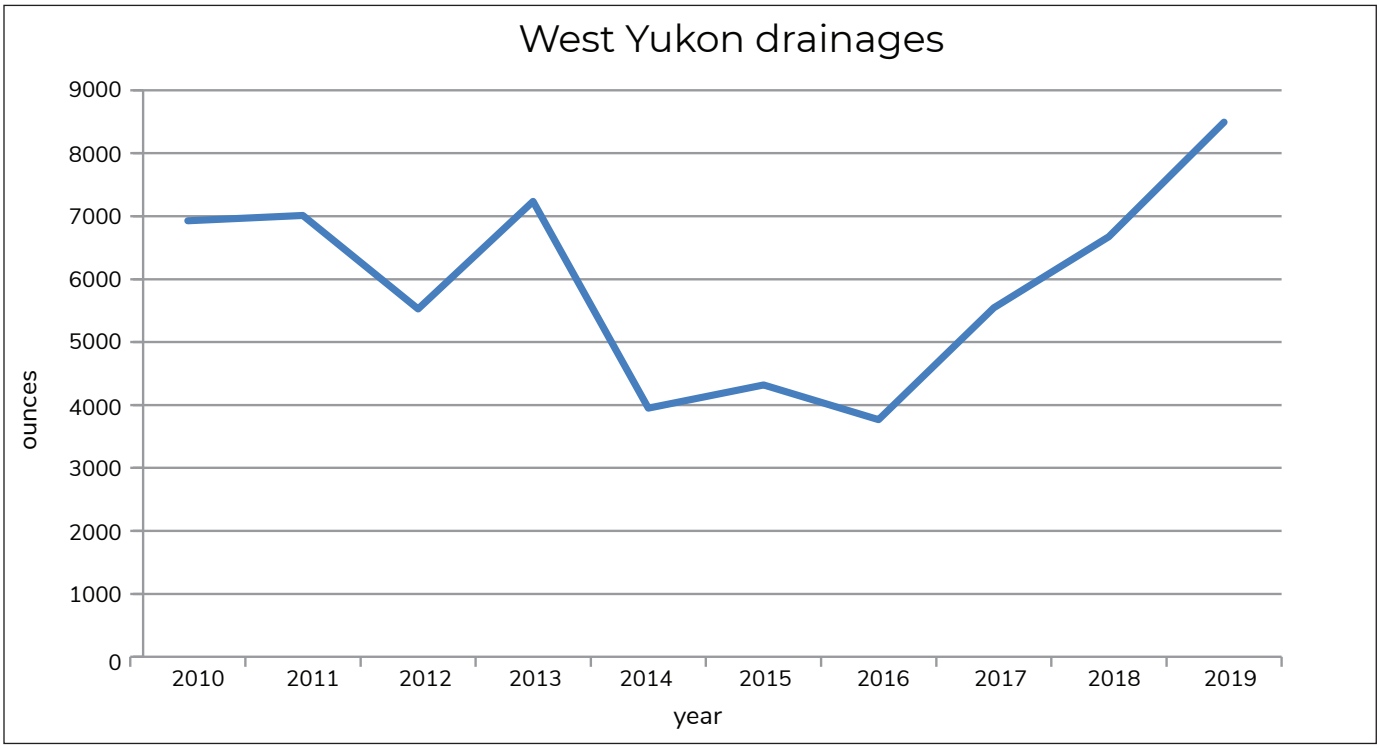

Figure 9. *Placer gold production from the West Yukon drainages for the last ten years.*

Figure 10. *Aerial view looking upstream of the right limit Pliocene bench on Ten Mile Creek and No Name Resources mine operation.*

Lower Stewart

Production from the lower Stewart River placer region increased to 9742 crude ounces from 6118 crude ounces in 2018 (Fig. 11). Production is spread out among a number of drainages including Henderson, Barker, Kirkman, Scroggie, Maisy May and Black Hills creeks.

The largest producer in the region is H.C. Mining on Henderson Creek, and they boosted their efficiency by incorporating two new conveyors to deliver pay to their wash plant. As a result, only two personnel are needed to work the cut during each shift. Their largest cut in 2019 measured 61 × 426 m (200 × 1400 ft) and the bottom 1 m (3 ft) of gravel including the mixing zone and weathered bedrock was processed as pay.

Seven crew worked for Schmidt Mining on Barker Creek in 2019 and tackled several placer settings. Part of the Dixie bench, a Pliocene high-level terrace, and a low-level bench were mined. Towards the end of the season, the valley-bottom cut intersected a very coarse, blocky bedrock, which contained some of the better grades they have encountered on the creek.

Ace Mining continued their operation on lower Scroggie Creek near its confluence with Walhalla Creek. Mining was affected by a change in the configuration of the valley, from steeper and narrower to flatter and wider in shape as they progress upstream. As a result, the overburden increases in thickness and permafrost is more pervasive. Fortunately they were able to stay on the pay streak and with a stripping plan will be able to manage the change. The acquisition of an Elrus conveyor feeder reduced production costs; the feed rate increased by 40 yd^3/hr and 300 fewer sluicing hours were required to achieve the similar volume as 2018.

Clear Creek and Mayo

Production from both Clear Creek and the Mayo district more than doubled in 2019 due to increased activity on Big and Granite creeks (Fig. 12). The combined production from both areas is 11,430 crude ounces, which is the highest since 1997.

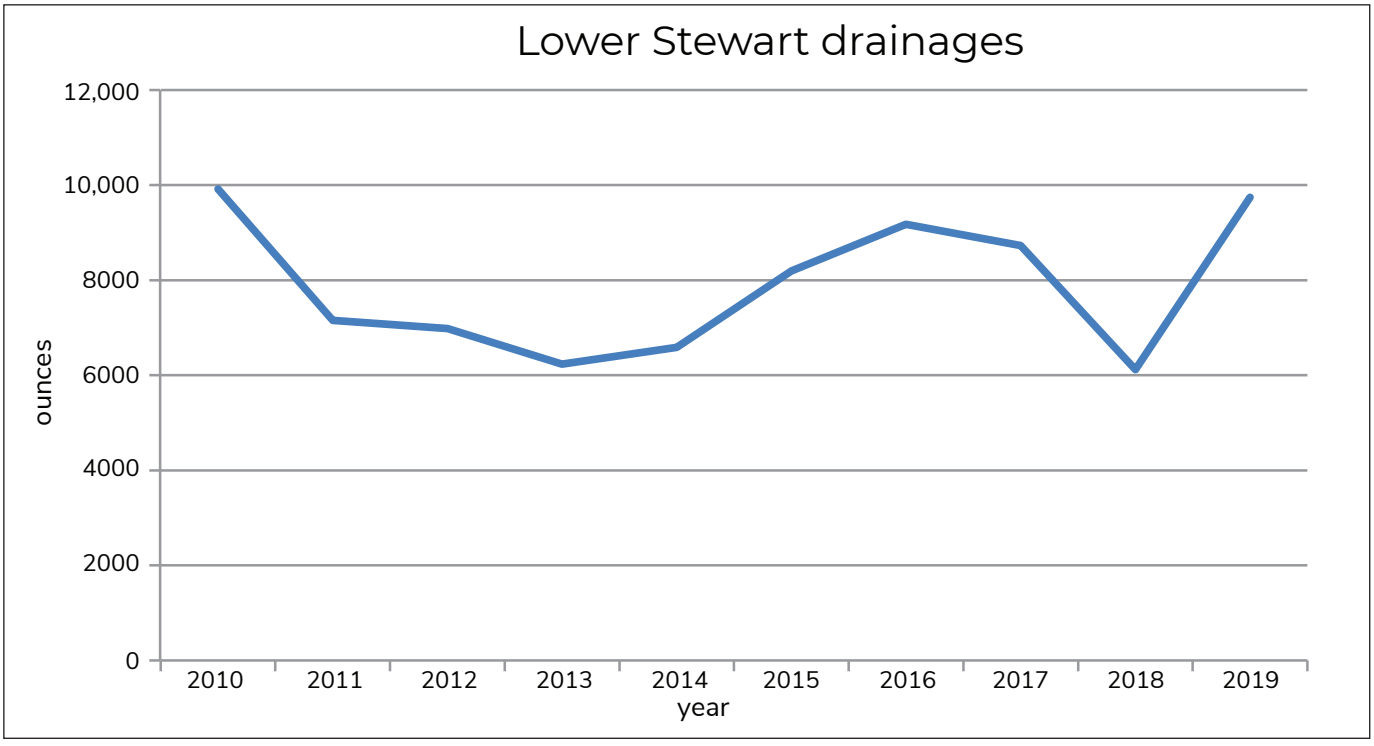

Figure 11. *Placer gold production from the Lower Stewart drainages for the last ten years.*

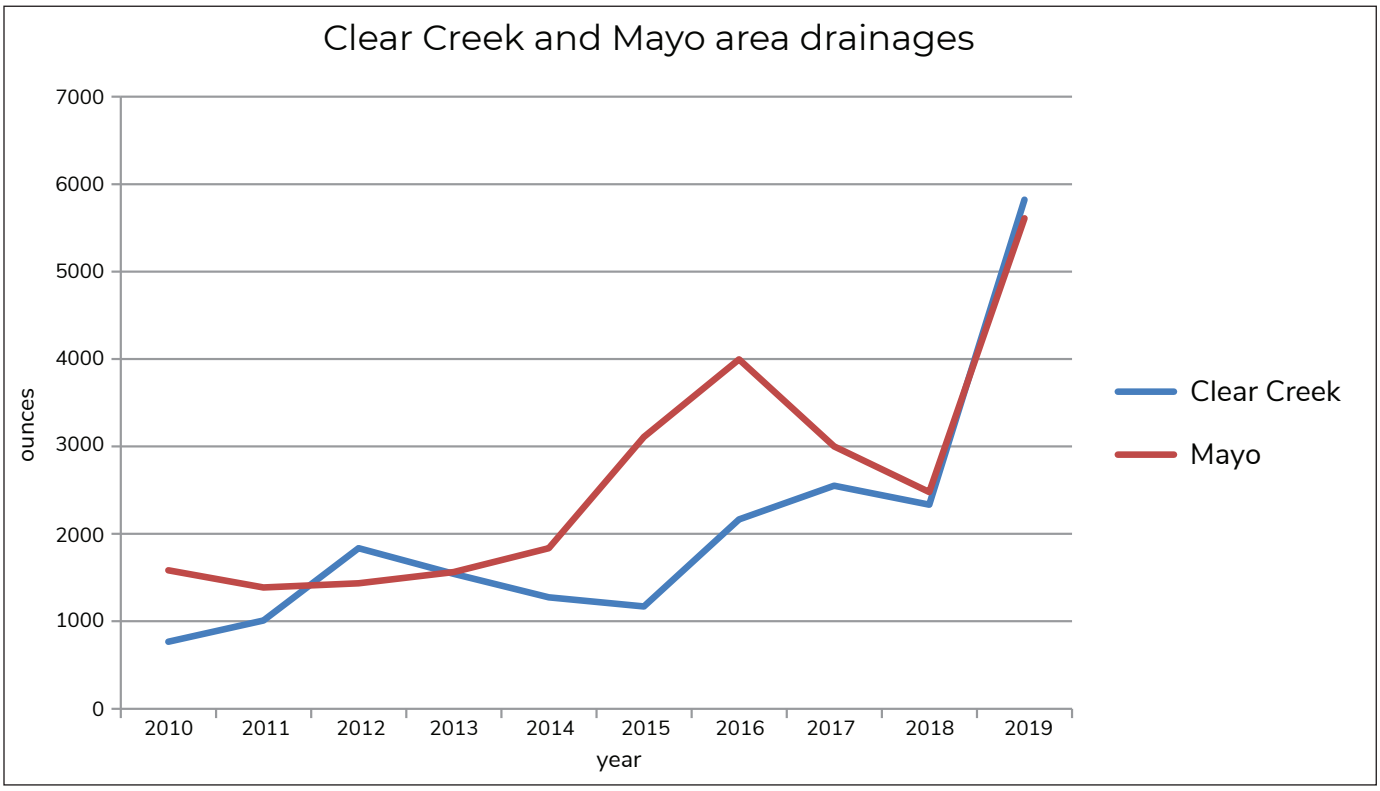

Figure 12. *Placer gold production for the Clear Creek and Mayo area drainages for the last ten years.*

Schmidt Mining moved their primary plant to Big Creek in 2019 to commence full production (Fig. 13). Two shifts managed the operation in the relatively shallow ground that averaged 4.5 to 6 m (15 to 20 ft) to bedrock. Prospecting near camp resulted in the discovery of a former ice-marginal meltwater channel related to an early Pleistocene alpine glacier originating from the headwaters of Big Creek. Testing of the deposit will resume early next season.

Yukon Exploration Green Gold Inc. made the Big Creek discovery in 2014 while conducting an exploration program that benefited from Yukon Mineral Exploration Program (YMEP) funding. The YMEP investment amounted to $35,000 and has now resulted in more than a 200:1 return based on the development work, additional exploration expenses, and recent production.

Figure 13. *A view looking downstream on Big Creek of Schmidt Mining's operation.*

Earth and Iron ramped up operations on Granite Creek in 2019 focusing on placer gold-bearing till immediately beyond the last glaciation end moraine. The till is buried under lower grade morainal sediments. A second cut was exploited closer to the baseline where modern fluvial deposits overlie gold-bearing till. Operations benefited from the opening of the Keystone Creek road, which eliminated steep grades associated with the Mount Hinton route.

Bardusan Placers worked at the mouth of Thunder Gulch where they excavated into a coarse fluvial fan deposit that overlies gold-bearing till near bedrock (Fig. 14). Throughout the summer, the five-person crew excavated the 23 m (75 ft)-deep cut near the confluence with Lightning Creek. The till deposit is 4 m (13 ft) thick and contains boulders up to 1.5 m (5 ft) in length. Sluicing requires the use of a Derocker wash plant to handle the large rocks. Plans to mine farther up Thunder Gulch later in the season were put on hold due to low water levels this summer.

Ken Wilson continued to mine on Minto Creek near the mouth of Highet Creek. The 8 person crew is mining fluvial terraces that were buried under a last glaciation deltaic sand deposit. Surface fluvial lag deposits are the target pay material and the grade is improving as they progress toward the mouth of Highet Creek. In 2019, a new 120 yd^3/hr plant that screens to ½" and has an oscillating sluice box was utilized. Water is 100% recycled in their mining process, and progressive reclamation occurs.

Placer mining activity was boosted in the Dawson Range with increased production from Canadian and Nansen creeks. The total production, according to export tax reporting, increased from 782 to 1626 crude ounces for the area (Fig. 15).

536214 Yukon Inc. continued to mine Discovery Creek, a tributary to Nansen Creek, in 2019. The operation has excavated a cut 20 m (65 ft) to bedrock through a thick cover of aeolian sand and fluvial gravel. Extensive old-timer workings were discovered on a left limit bench that is yielding coarse gold.

Figure 14. *An aerial view of the mouth of Thunder Gulch showing Bardusan Placer Ltd.'s mine operation with Lightning Creek in the foreground.*

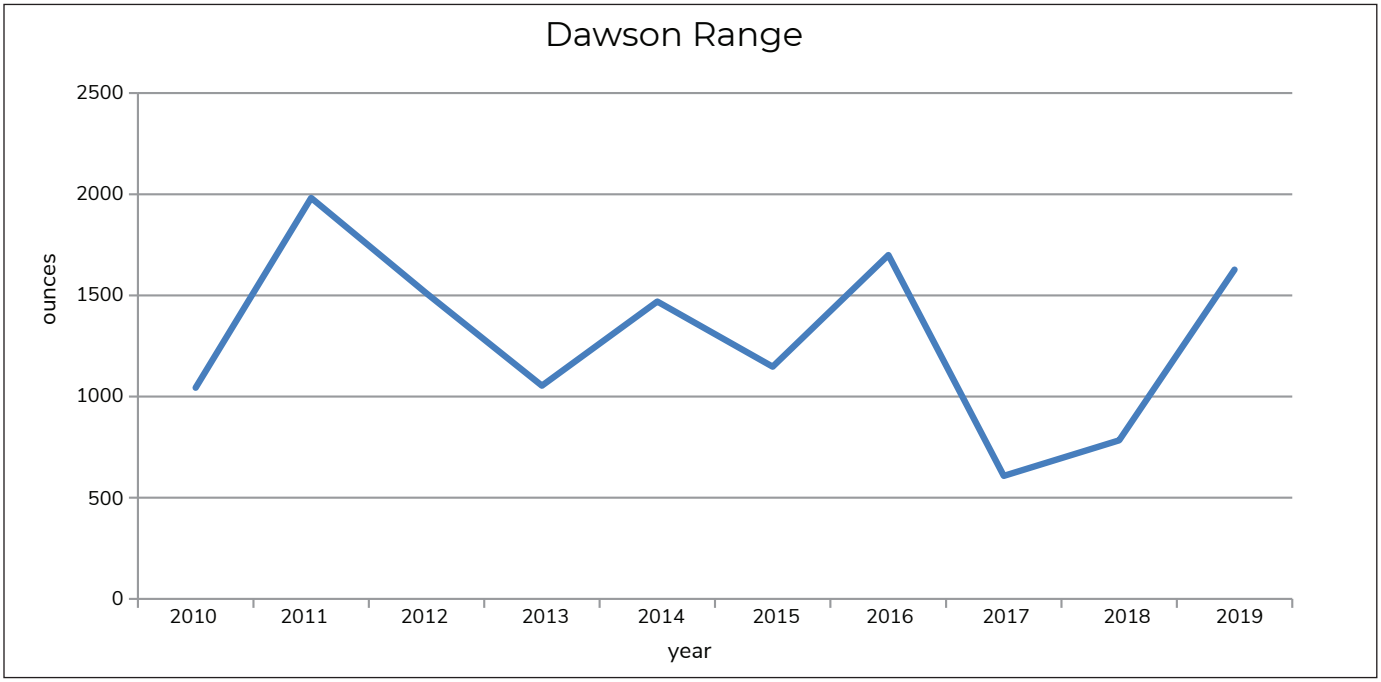

Figure 15. *Placer gold production from the Dawson Range for the last ten years.*

Derek Dodge opened up a deep channel cut in Seymour Creek in 2019. He had started this cut in 2016 and partially sluiced the top of pay before letting it flood due to ground water volumes. The pay unit is a poorly sorted, rounded, boulder gravel that was likely emplaced during erosion of the channel by outwash off the Reid ice sheet 120,000 years ago. Coarse magnetite pebbles and cobbles can be found unevenly distributed within the pay gravel. The base of the channel is 30 m (100 ft) in width but is expected to increase upstream. The depth of the channel is approximately 27 m (90 ft).

Ryanwood Exploration undertook the largest placer exploration project in Yukon on Shovel Creek in the Dawson Range. This project is heli-portable and utilizes a light footprint approach including a track mounted rotary air-blast drill, argos, resistivity geophysics and LiDAR to delineate the pay streak (Fig. 16). A late season shafting program and 199 drill holes were completed in 2019. The depth to bedrock is relatively shallow with an average depth of 3.0 to 4.5 m (10–15 ft). More than 9 km of ground have been delineated in two drainages.

Figure 16. *Shawn Ryan holding the old-timer shovel his crew discovered while exploring Shovel Creek in the Dawson Range.*

Kluane

Placer production increased in the Kluane Range district partially due to new mining activity on Fourth of July Creek. Production increased from 449 crude ounces in 2018 to 1485 crude ounces in 2019 and is expected to increase as winter mining continues on Gladstone Creek (Fig. 17).

FTG Placers leased Fourth of July Creek claims from Sidhu Trucking in 2019 and commenced mining on June 13. A crew of seven people completed approximately 1000 hrs of sluicing that focused on running right limit side pay (Fig. 18). Most areas mined on the right limit excavated down to a false bedrock of yellow gravel that was overlain by a boulder gravel in erosion contact with the underlying unit. Pay is extracted from the boulder gravel, possibly from an alpine glacial source, which is overlain by non-gold bearing glacial deposits originating from up-valley ice flow during the last glaciation.

Steve Johnson operated on Burwash Creek in 2019 and primarily focused on running tailings from previous operations near camp. Additional testing was completed on a right limit bench deposit that was previously exploited by old timers. The right limit of Burwash Creek appears to contain significant prospects that were buried by colluviation and landslides of glacial sediment off the north-facing permafrost-rich slope. This has caused Burwash Creek to hug the left limit of the valley and is locally forced to cut canyons into bedrock.

Figure 18. *A view looking upstream on Fourth of July Creek of FTG Placers operation. Active excavation is visible on the left hand side of the valley bottom (right limit).*

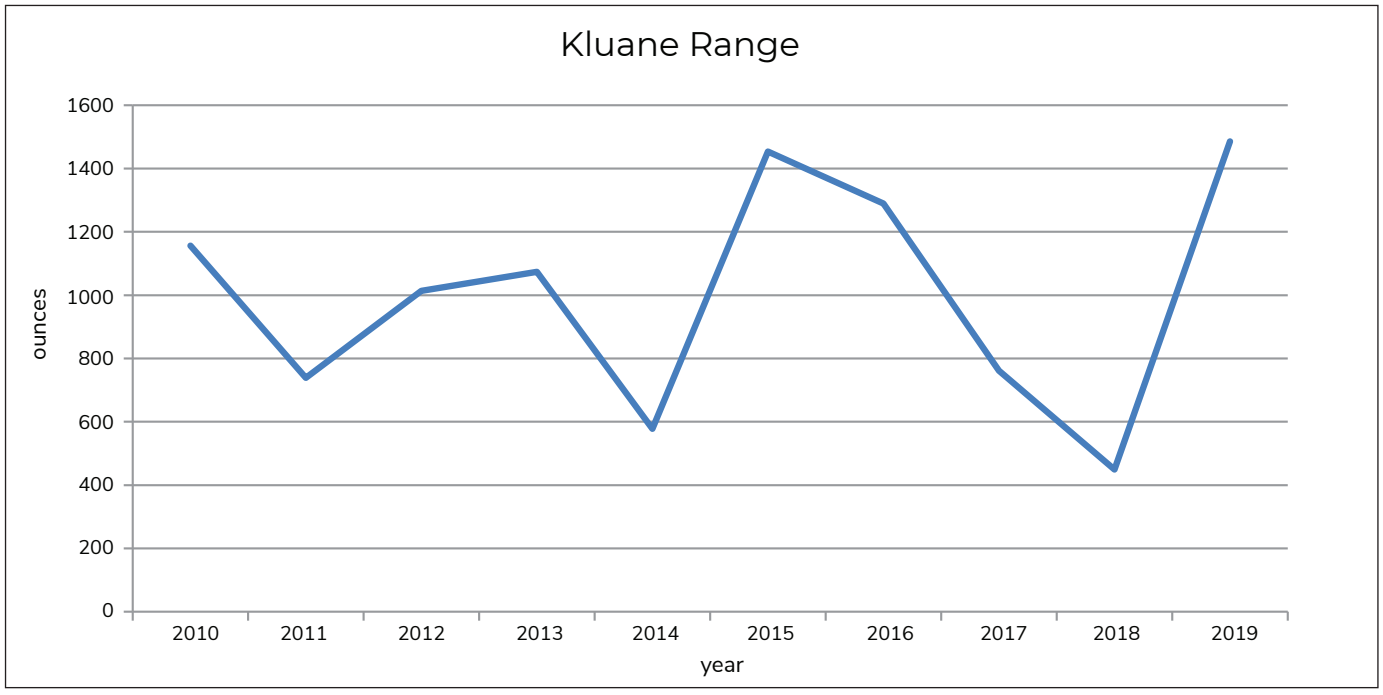

Figure 17. *Placer gold production from the Kluane Range for the last ten years.*