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# TR'ONDĚK–KLONDIKE

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## The Ongoing Tradition of Klondike Placer Mining



Tr'onděk–Klondike World Heritage Site Nomination  
Thematic Research  
Written by Michael Gates  
January 2016



# **TR'ONDĚK–KLONDIKE: The Ongoing Tradition of Klondike Placer Mining**

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## Introduction

The water melts high in the glacier-covered peaks throughout the North, gently sifting through thick moss beds, trickling downhill, washing against the hardened schists and granites, grinding and wearing them away, and carrying them along. The rivulets form brooks and the brooks join to form streams, then creeks and rivers that merge to form the watercourse known to the First Nations in various dialects as “the great river.” Today we know it as “the Yukon.” The waters of the Yukon, the third longest river in North America, originally rise in the mountains of British Columbia within sight of the Pacific Ocean, and travel 3,187 kilometres through British Columbia, Yukon, and Alaska before they mix with the salty waters of the great ocean.

Over eons, the mountains and hills were slowly weathered by countless cycles of freezing and thawing, endless blasting of wind, and perpetual washing and grinding by the myriad of streams. Intrusions and imperfections in the bedrock slowly broke down into their constituent parts and washed down into the clefts and valleys. Among these components was gold, clinging to fragments of the mother rock in which it was born, or separated into particles ranging from those almost too small to be seen with the naked eye to some the size of a clenched fist. Gold is 19 times heavier than water, so it tended to settle out in nooks and eddies while the current carried other materials away. And thus it was that gold gathered into stream beds throughout the North, waiting to be discovered.

People have coveted gold for millennia. This yellow metal has the power to transform its owner from a peasant to a king. Wars have been fought for it and with it. Nations have been conquered to get hold of it; others have been built on its glistening foundation. Men have gone mad in their quest for it. It lay hidden in stream beds and frozen into hillsides for millennia, waiting to be discovered. The First Nation people knew of this shiny metal and even collected it, but it was not useful to them like copper. It could not be eaten and it could not keep one warm; it was simply there. The salmon that inhabited these streams and the moose and caribou that populated the hillsides had value and provided sustenance and clothing for the people who lived in the land of the Yukon River.

These same landscapes were valued for something else completely when the European strangers came into the land in search of gold. Decades would pass before attention would be drawn to the tiny tributaries and streams of the small rivers that fed into the mighty Yukon from a region in Canada that would come to be known as “the Klondike.” Klondike is an anglicized version of the name, which in the Hän language tells of the function of this tributary as a salmon-spawning stream: “Tr'o” means hammer rock used to drive the salmon weir stakes into the riverbed at its mouth; and “ndëk” means river. Together, they form “Tr'ondëk.”<sup>1</sup> For thousands of years, the Tr'ondëk Hwëch'in (literally, the people who lived at the mouth of the Tr'ondëk) have seasonally occupied the riverbank at the river's mouth to take advantage of the

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<sup>1</sup> Helene Dobrowolsky, *Hammerstones: a history of the Tr'ondëk Hwëch'in* (Tr'ondëk Hwëch'in, 2<sup>nd</sup> ed., 2014), p. 128

abundant salmon run each summer. And they were there when the gold that changed their lives and created Yukon as it is known today was found nearby in 1896.

The Klondike region is nestled in the west central area of the Yukon Territory of Canada and centred at the confluence of the Klondike River with the Yukon. It encompasses an area of 5,000 square kilometres and includes the goldfields southeast of Dawson City and west toward the Fortymile and Sixtymile districts, near the international border with Alaska. Within this region lies the boundary of the proposed Tr'ondëk–Klondike World Heritage Site. The proposed site includes the Yukon River from Dawson City to the historic gold-mining town of Forty Mile, the Klondike River valley as far east as Bear Creek, and Bonanza Creek up to its headwaters.

The land through which the Klondike and Yukon rivers cut is rocky and covered with spruce. It is a land of extremes: from the highest point at the head of Bonanza Creek (1,063 metres ASL) to the lowest point at Forty Mile (295 metres ASL). Hundreds of metres of permafrost underlie the hilly ground, which remains frozen, unless disturbed, from one year to the next. Permafrost has been present in this region for hundreds of thousands of years. The mean temperature at Tr'ondëk–Klondike remains above freezing for only five months of the year, with the thermometer reaching  $-50^{\circ}\text{C}$  in the winter and often  $30^{\circ}\text{C}$  in the summer. Because of its proximity to the Arctic Circle, the region is bathed in continuous daylight in the summer and draped in darkness during the long nights of winter.

The nearest major metropolitan areas, Edmonton and Vancouver, are 1,900 kilometres distant in a direct line, but farther by land or water routes. During the nineteenth century, the nearest settlement was hundreds of kilometres away, and weeks or months distant in travel. When winter gripped Yukon in its icy embrace, the territory was shut off from the outside world. Travel through this northland and over the icy coastal passes in winter was virtually impossible. Communication with civilization was cut off for months at a time. The European-Americans who lived in this region were so isolated that they could just as easily have been living on Mars.

## **Chapter 1: PRE-GOLD RUSH TR'ONDËK–KLONDIKE: 1873–1896**

### **Early prospecting in Yukon**

The first party of gold-seekers arrived at Fort Yukon in 1873, after months of travel and deprivation, over a route that followed the serpentine rivers of interior British Columbia and the Northwest Territories. Among this group of determined travellers were Leroy Napoleon “Jack” McQuesten, Fred Hart, Al Mayo, and Arthur Harper. Following routes long used by traders of the Hudson’s Bay Company (HBC), they straggled into Fort Yukon, a former HBC post at the confluence of the Porcupine River with the Yukon, not having had even essentials such as flour to eat for two years.

What motivated these men to travel such distances was the firm conviction that they would find buried within the gravels of the creeks and tributaries free, or placer, gold. Gold had been found in the bottoms and bars of streams all along the mountainous spine of the west coast, first in California, then in the Cariboo region of British Columbia, and then still more in the Stikine District farther north. Logic seemed to dictate that prospecting even farther to the north would yield similar finds.

Upon arriving on the Yukon River, these men took up a lifestyle patterned around exploring the tributaries of the Yukon River in the summer and trading for furs in the winter. McQuesten established Fort Reliance, just a few kilometres below the mouth of the Klondike River, but it would be more than two decades before a party travelling down one of the Klondike’s tiny feeder streams stumbled upon the richest deposits in the Yukon Basin. Harper later gained the reputation of having tested the gravel of every stream that subsequently produced gold without finding any himself. Instead, he and Hart, Mayo and McQuesten became traders, the essential supply link for the growing numbers of prospectors that slowly trickled into the north.

Until the Chilkoot Pass was opened to prospectors in 1880, the stream of gold-seekers along the Yukon River was very small. The only means of reaching this mighty river was to follow an arduous route in the footsteps of Harper, Hart, McQuesten and Mayo, or to travel up the Yukon River at its mouth, from St. Michael. The first prospectors crossing the coastal mountains from the Alaskan panhandle in 1880 tested the bars of the upper Yukon River, retreating to the coast before freeze-up in the fall. Most of their time was spent travelling, especially doing the back-breaking work of tracking or poling their handcrafted river boats upstream against the strong current on their return trip. The first party to reach Fort Reliance via this new gateway arrived at the tiny trading post in 1882. Among them was another man whose name would later resonate in the history books: Joseph Ladue.

By remaining in the North during the long hard winter, these men gained the advantage of a longer prospecting season. But being inside for the winter meant that they became dependent upon traders for provisions, which were sold on terms of long credit called “grubstake.” Food and essential supplies were provided to the men with the understanding that they would repay their debt when gold was found. The traders found it in their best interests to share details of the latest finds, realizing that in this way men would locate and mine the rich deposits they were certain lay hidden in one of the Yukon’s countless

tributaries. All the while, Harper and the others wrote letters offering glowing accounts of the opportunities that were open to those bold enough to venture into this wild and remote region. The optimism of these traders carried the prospectors through years of slim digging. Thus the traders became the hub of exploration where supplies and information could be obtained. Of these traders, McQuesten would ultimately become king.

Initially prospecting was limited to the bars of the Yukon River, which were readily accessible and thawed rapidly in the spring. Cassiar Bar, on the upper Yukon, became the first significant discovery. Then four men recovered \$35,000 in gold from Steamboat Bar on the Stewart River in 1885. The following year, McQuesten and Harper decided to bring in 50 tonnes of mining supplies and shift their trade to focus on the growing number of miners. The traders established the practice of setting up shop where the mining activity was greatest: in the winter of 1886, they built a post at the mouth of the Stewart River in a small settlement of prospectors. This establishment was short-lived, as coarse gold was found the same year up the Fortymile River, which was located about 40 miles (64 kilometres) below Fort Reliance.

To keep close to the action, the traders shifted their operation to the mouth of the Fortymile River the following summer. A rag-tag cluster of log cabins developed into Forty Mile, the first permanent mining town in the Yukon Basin.

The pace of prospecting picked up, and the stream of prospectors coming in from Juneau, Alaska, slowly but steadily increased. First, the tributaries of the Fortymile River were explored and mined – places named Bonanza Bar, Franklin Gulch, Troublesome Point and Nugget Gulch. The Fortymile District became a steady and reliable producer of gold, and some of the prospectors settled on their claims to mine them from one year to the next. Techniques were devised to allow mining to continue through the winter, thus extending the mining season to a year-round operation, reducing idle time and increasing productivity.

In 1891, gold was found on Miller Creek in the adjacent Sixtymile district, with discoveries in neighbouring Glacier and Bedrock Creeks. Business had grown enough that a second trader, John J. Healy, and the North American Transportation and Trading Company (NAT&T Co.) established the trading post of Fort Cudahy on the opposite side of the Fortymile River, to compete with McQuesten's store at Forty Mile. Healy's new company offered better prices to the miners, but also expected prompt payment of bills.

In 1893, the prominence of Forty Mile was eclipsed when gold was discovered down river, establishing the new town of Circle City. Forty Mile did not wither or die, however, and by 1894, it offered a variety of services: two bakeries, two restaurants, two blacksmiths, a barber shop, a theatre, a tinsmith, a hardware business and a sawmill. There were two churches: one Anglican, represented by Bishop William Bompas, and the other Roman Catholic, represented by a number of highly mobile Jesuits, most notably Father Francis P. Munroe and Father Charles Judge. Father Judge quickly became an institution when Dawson City was founded.

Two members of the North-West Mounted Police arrived in Forty Mile that summer. One remained over the winter and was joined by a complete detachment of 22 men the following summer. William Ogilvie, a government surveyor, was assigned to survey the boundary between Canada and Alaska. By this time,

some non-Indigenous women had joined the community, including the wife of Bishop Bompas and the wife of trader John J. Healy. Mrs. Emilie Tremblay was one of a few women brave enough to join their husbands mining on the nearby creeks.

The Euro-American population, which two decades before consisted of a handful of hardy souls, had expanded to 1,600 in the Yukon Basin by 1896. The future looked promising for the growing number of prospectors spread throughout the region, and gold production slowly but steadily increased. Miller Creek became the most productive creek in the region until it was eclipsed by the Klondike. One Miller Creek claim consistently produced \$50,000 in gold between 1894 and 1896. At the time, the raw, unrefined gold assayed at about \$16 an ounce, but the precise value varied from one stream to the next. In later years, the production of the region approached half a million dollars. One miner on Miller Creek returned to San Francisco taking \$55,000 in gold with him. A year later, ships arrived in San Francisco and Seattle with miners from the Klondike carrying similar amounts of gold, and sparking a stampede that became known as the Klondike Gold Rush.

### **The mining**

Little can be said about the search for the motherlode, the much dreamed of hard-rock source of the gold that lay buried in stream bottoms throughout the region. Nobody has yet discovered the origin of Klondike gold. The first quartz claim worked in the Klondike region was believed to have been located opposite the mouth of the Klondike River, but no gold was ever found there. Instead, the riches of the Klondike region come from the placer gold buried in stream bottoms and ancient gravel.

The principle for recovering placer is quite simple. Because of its density, gold quickly settles to the bottom from pay dirt when it is mixed with water and agitated. Water is an essential ingredient in the process of separating gold from other materials, and the gold pan is the fundamental tool for testing the prospects of any particular creek. A gold pan comes in a variety of shapes, but in Yukon, it was a circular flat-bottomed metal pan with sloping sides. Gravel was mixed in this pan with water and agitated; the material lying on top was gently washed over the lip of the pan until only the gold remained. The process was described by Ladue in this way:

*The miner lifts a little of the finer gravel or sand in his pan. He then fills the latter with water and gives it a few rapid whirls and shakes. This tends to bring the gold to the bottom on account of its greater specific gravity. The pan is then shaken and held in such a way that the sand and gravel are gradually washed out, care being taken as the process nears completion to avoid letting out the finer and heavier parts that have settled to the bottom. Finally, all that is left in the pan is gold and some black sand which almost invariably accompanies it. This black sand is pulverized magnetic iron ore.<sup>2</sup>*

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<sup>2</sup> Harry Dewindt, *Through the Gold-Fields of Alaska to Bering Strait* (Chatto and Windus, 1899), pp. 111–112

Gold is given different names depending upon the granular size. Flour or dust are normally the finest particles recovered. Flakes consist of larger granules up to three millimetres in size. Still larger particles are called nuggets and range from a few grams to a few hundred grams. (Normally gold is measured in troy ounces, which are slightly more than thirty-one grams each.) These nuggets are variable in shape and are often incorporated with quartz inclusions. Their purity and appearance varies according to the creek from which they are mined.

Once promising quantities of gold, or “colours,” are found in a creek bottom, other simple devices such as the rocker are used to capture the gold more efficiently. The rocker is a hand-made box-like device, which is rocked back and forth like a child’s cradle. While rocking it with one hand, the prospector scoops water over the top of gravel that has been shovelled into a hopper on top of the box. The finer particles are washed through the mesh in the bottom of the hopper and are trapped below on a canvas apron or in tiny riffles. These are periodically emptied in a “clean-up” and the gold is panned out.

A miner uses a sluice box for serious mining. Sluices are wooden troughs no more than 30 centimetres wide and 3.5 metres long, inclined at a slope of one in twelve. The bottom can be lined with a variety of designs of riffles, all of which are intended to capture gold in the eddies they create. The sluice box is a standard component in any mining operation. Normally, there are one or more hoppers along a sluice box depending upon its length, into which the pay dirt, or gold-bearing gravel, is shovelled. Large volumes of water wash this material through the sluice box, where the gold is trapped in the riffles.

All gold mining in the Klondike region was made more complicated by permafrost, a condition found throughout northern Canada, Alaska and Russia. Before digging out the overburden and shovelling the pay dirt into a sluice box, it must first be thawed. The simplest means of doing this was to strip the covering material to expose the frozen ground to sunlight, and repeat the process daily as the top few centimetres thawed naturally. This process was slow and tedious, and was employed primarily in mining river bars exposed by low water.

A more practical means of accelerating the thawing process was to set fires to thaw the ground. This technique was first tested in 1882, but it was not until a decade later that it was perfected. The result was known as drift mining. This innovation improved the efficiency of mining by making it possible to work through the long, cold winters. When the overburden was from five to seven metres deep, fires would be set on select locations. As the ground thawed, it was quickly shovelled out before it could freeze back. Another fire would be set and the process repeated until a shaft was sunk into the permanently frozen ground. Since the ground was as hard as granite, cribbing was not necessary – although in deeper excavations, log cribbing of the walls became common practice. Fires would be set against the mine face, and the miners would not re-enter the excavation until the fire had subsided and the deadly fumes had cleared from the hole.

When the shaft eventually reached bedrock, horizontal tunnels (drifts) were sent out at right angles to the incline of the creek until an old buried river channel was intercepted. The gold was concentrated in these channels known as the “pay streak.” Large galleries were excavated there, leaving frozen pillars of gravel

to support the ceiling. The excavated material was dragged along the drifts to the bottom of the shafts in rectangular wooden buckets, where it was hoisted to the surface using a hand-powered, homemade windlass. The pay dirt was stockpiled during the winter, then shovelled into a sluice box in the spring using the melt water run-off. This may have been hard work, but the frozen underground diggings could be considerably warmer than the frigid arctic air at the surface. Drift mining was not commonly employed during the summer months because the natural convection was not as effective in warmer weather, and deadly gases could accumulate at the bottom of the shaft. The galleries were also more likely to thaw and collapse during the warmer weather.

In the summers, when drift mining could not be employed, and where bedrock was not too deep, open-pit mining was used to remove the overburden and get down to the paying deposits. Water was a constant problem, and miners had to find a way to remove the water from the bottom of the excavation. Using the natural incline of the valley, they would build a dam at the upper end of their claim to collect the water, and redirect it through ditches or wooden flumes around the excavation. Excess water in the excavation could be removed by constructing a bedrock drain at the lower end, which allowed the water to flow out following the natural incline of the terrain. The pay dirt usually lay close to bedrock. Once the bedrock was reached, the overlying pay dirt was shovelled into a sluice box where gold would be captured. Other less common techniques were used at the time, such as sluicing with wing dams and water wheels.

Flumes and ditches were constructed to transport water to the mine where it was needed for sluicing. In one Fortymile operation, a flume was constructed to direct water from Franklin Gulch to Troublesome Point, where it was used for the first hydraulic mining in the region. Hydraulic mining sprayed water under pressure over gold-bearing gravel, thus washing away the overburden. It was a simple way to eliminate costly hand-removal of overburden. Some miners directed the natural flow of the stream into the frozen overburden in a process called ground sluicing. As the material was washed away, the gold tended to accumulate naturally in the bottom of the waterway.

The mining during this period took place on the tributaries of the Fortymile and Sixtymile rivers without the aid of steam equipment. The extent of the excavation and the impact on the landscape was very small. The most noticeable impact on the Tr'ondëk–Klondike region's landscape was that of the growth of Forty Mile at the confluence of the Yukon and Fortymile rivers. Perhaps the greatest impact upon the landscape was caused by the increased demand for wood, both lumber and firewood. By the spring of 1896, the North-West Mounted Police were starting to search for stands of timber as far as 100 kilometres away to fulfill their continuing need for firewood.

In the days before the Klondike Gold Rush, no steam equipment was used in the mines to excavate, hoist, pump or saw. All of that work was accomplished through back-breaking physical labour. The hours were long and the work was hard, but labourers were paid up to \$10 a day, considered a good wage at the time. When a miner's claim proved profitable, he could hire others to do the work. No longer was everyone in the goldfields an independent miner; many were now labourers working for claim holders.

## Early social and material life



### Prospectors at Forty Mile, 1894

Photographer: Veazie Wilson

Source: Gates collection

*The miners are a rough, hardy race, made up, it would seem, of representatives of nearly every nation on earth. Some are typical frontiersmen, dressed in buckskin, who are never at home except on the outskirts of civilization. Others were of doubtful character, and it is said are seldom known by their rightful names. The remote gulches of the Yukon country seem to offer safe asylums for men who are “wanted” in other districts. Despite the varied character of its inhabitants, this remote community is orderly and but few disturbances have been known. Summary punishment would follow any break of the peace. Morality, as understood in more refined communities, is conspicuous in its absence.*

*My companions, rough and uncouth as men could well be, had been absent from civilization at least a year and a half, and some of them for three years. Their hair and beards had grown long, and their faces were tanned and weather-beaten by constant exposure. Their garments, then in the last stages of serviceability, had been made by those who wore them, from any material that chanced to be available, from buckskin and fur to flour-sacks, and had been repaired without regard to color or texture.... One not accustomed to the vicissitudes of exploration, coming suddenly on such a scene, would certainly believe he had stumbled on a band of the most desperate outlaws.<sup>3</sup>*

The early Euro-Americans who came into Yukon arrived in a region beyond the reach of nationalism and sovereignty. There was no government, and there were no boundaries yet established when the first

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<sup>3</sup> Israel C. Russell, “A Journey up the Yukon River,” *Journal of the American Geographical Society*, 27:2 (*American Geographical Society*, 1895), pp. 152–153, 158–159

prospectors arrived. It is hard to decide whether these men were seeking adventure and new frontiers, or escaping the confines of civilization.

There were few class distinctions among these men when they came to find gold. They were prospectors and they were traders. They were highly informal and extremely independent; mutual trust and honesty were their social currency. Cheating was rare, as it would quickly ruin a man's reputation. These men would share their humble homes and their food, even though provisions were in short supply, knowing they might find themselves in similar need at any time.

They had no formal constitution, nor was there any formal body to enforce one. Implementing the rules established in the camps of previous gold rushes, they managed their affairs under an anarchistic democracy familiarly called "the miners' committee." The committee was used sparingly and, in a limited number of circumstances, as an informal method of establishing rules of conduct and resolving issues of conflict, for these men were generally committed to peaceful coexistence. At various times, miners' committees dealt with civil and criminal matters, and established mining procedures for each vicinity. These committees also dealt with community matters, such as the administering of the estates of the deceased and, later, the registering of land titles in the town of Forty Mile.

If a man had a grievance, a miners' committee meeting was convened to resolve it. When a meeting was called, every member who participated had a vote. A moderator was chosen to conduct the meeting. Both prosecutor and defence were chosen: each had an opportunity to question and cross-examine the witnesses, and, in the end, summations were given. A motion was put before the committee, and it was passed or defeated. The sentence was carried out immediately. In serious cases, such as theft, the guilty party was banished from Yukon, which, if the sentence was passed in the winter, meant serious hardship for the person banished, as he was compelled to depart immediately. One decision of a miners' committee, a case of self-defence in Circle, in which the accused was found not guilty, was even sent to Washington where the decision was confirmed.

All of the men endured similar hardships under similar conditions. They were beyond conventional and reliable supply networks. If one of the tiny craft that navigated the Yukon River did not reach them, as was often the case, they might face a starvation winter; many did starve. They might augment their diet with berries and wild fish and game, but most relied upon the traders for their provisions. Scurvy, consumption and other diseases of poor nutrition were common. Many went without fresh foods for years at a time. The quality of the provisions, when they were available, left much to be desired. The bacon was yellow, the fruit green, the flour mouldy, the rice lumpy, and the beans contaminated with rocks and gravel.

If the food supply was at times questionable, the supply of material goods was tenuous. The first prospectors who came into the Yukon valley searching for gold endured extreme hardships for want of even the simplest goods. The early prospectors wintered over in crude log huts without stove or stovepipe, in temperatures that remained below freezing for months on end. Warmed by fire pits in the centre of their cabins, with smoke vented through a hole in the sod-covered roofs, these pioneers suffered from heat one moment and shivered from the cold the next. For weeks on end, they lived in darkness and their eyes stung

from the smoke as they huddled near the flames. By the time the town of Forty Mile was settled, they were fabricating large “Russian furnaces” in their cabins constructed from stone and clay. These dramatically improved comfort for the miners, many of whom still used blocks of ice as window glass, or bottles, if they were available.

Huddled in their lonely isolation, they honed their storytelling skills to perfection to while away the long winter months. Gambling was a popular practice, but cheating was not accepted. Later, as the population increased and communities like Forty Mile were established, more division of labour occurred. Some men worked for miners on their claims; others worked as clerks in the trading posts or as labourers on the riverboats, which arrived in greater numbers and more frequently as the numbers of miners increased. Professional gamblers and small theatre companies came to entertain the miners. A small number of European women began to come into the region, particularly after 1892, though many of the men found the Indigenous women’s practical knowledge and skills of survival of more desirable.

Witnessing the changes that came with increasing gold production and population, the early pioneers feared the loss of their tradition of equality and brotherhood. Sixty-nine of them banded together in December of 1894 to combat this and to institutionalize their values, forming a fraternal organization called the Yukon Order of Pioneers (YOOP). By restricting membership to those who had come into Yukon before 1888, they wanted to show to the world that the old-time prospectors were men of “Truth, Honour and Integrity.” Their motto: “Do as you would be done by.” The code required that they share in times of need and exchange information about new discoveries. The YOOP would continue to play an important role in cementing the moral and social standing of these early pioneers in the emerging Yukon society of the twentieth century.

Once the Euro-American gold-seekers started to arrive in significant numbers, the First Nation people were introduced to a cash economy and the lure of gold. Two indigenous men from down the Yukon River, Pitka and Cherosky, are credited with finding gold in the Circle area, though they did not profit from their discovery. Keish (Skookum Jim Mason) and Kaa Goox (Tagish Charley) were also familiar with the fundamentals of prospecting for gold, having done so with George Carmack in the Hootalinqua region the summer of 1888.<sup>4</sup> They had little success then, but greater success in 1896 and, unlike Pitka and Cherosky, they were able to hold claims and benefit greatly from them. While a small number of First Nation men were able to stake claims in the early days, little is known of their success at mining or holding their claims.

Especially on the remote branches of tributaries of the rivers that fed the Yukon, the isolation was profound and the mail service extremely limited. Letters would be sent, and replies might not arrive for 18 months. Reading material was so in demand that a trademark on a pick handle became fairly eloquent in that solitude. When two Alaskans received a bundle of outdated newspapers from Seattle, miners from all around, eager for the latest news no matter how out-of-date, converged upon their cabin. But the isolation,

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<sup>4</sup> Kaa Goox is known by the Carcross/Tagish First Nation today as Dawson Charley. Because Dawson City did not exist at the time of the gold discovery, in 1896 he would have been known in reference to where he came from, or as Tagish Charley.

the remoteness and the obscurity of this tiny encroachment into the Yukon Basin changed with dramatic suddenness because of a chance discovery on a tiny tributary of the Klondike River.

## Discovery

There are pivotal events in history around which the course of human affairs is shaped; the discovery of gold in the Klondike valley was one of these. But rather than it being a single event, the Klondike Gold Rush was the culmination of a search that spanned a quarter-century.

It was fueled by the optimism of a small band of traders – Harper, McQuesten, Mayo, and Ladue – who were certain that great riches lay somewhere below the frozen moss of the Yukon. It was supported by the grubstake policy of long credit, and it was facilitated by the scattered trading posts along the Yukon River, where both goods and information were exchanged. In the trading posts, word was spread of new and promising prospects, and men were sent out to test new gravel.

Thus it was during the summer of 1896 that Ladue had a visit from Nova Scotian Robert Henderson, a miner who had been prospecting in the region of the Indian River. He had returned for supplies to Ladue's trading post at Ogilvie (which was named after government surveyor William Ogilvie), on an island near the mouth of the Sixtymile River. Henderson brought word of promising new prospects. He had found gold, he said, on a tributary of the Klondike River that he had optimistically named Gold Bottom. When Henderson left Ogilvie, Ladue started directing anyone who visited his trading post to that area. Henderson floated down the Yukon until he reached the mouth of the Klondike, where he encountered Carmack, whom he invited to visit Gold Bottom Creek. But when Carmack, his brother-in-law Skookum Jim, Jim's nephew Tagish Charley reached Henderson's new diggings, he refused to share supplies with the three men, who were running short on provisions. The three hungry men turned back when Skookum Jim had the good fortune to shoot a moose. While resting and waiting for the others, he found gold lying in a thick blanket on the bottom of the stream.

In his own words, Carmack described the moment they tested the gravel:

*I took the shovel and dug up some of the loose bed-rock. In turning over some of the flat pieces, I could see the raw gold laying thick between the flaky slabs, like cheese sandwiches. Putting some of the broken bed-rock into the pan I washed it down and got about a quarter of an ounce in that pan, mostly coarse gold .... We did a war dance around that gold pan. It was a combination war dance, composed of a Scotch hornpipe, Indian fox trot, syncopated Irish jig and a sort of Siwash Hula-Hula.<sup>5</sup>*

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<sup>5</sup> George Carmack, "My Experiences in the Yukon" (Pamphlet, private publication, 1931), pp. 12–13

For two days, they tested the creek, panning in one place and testing another until they were satisfied that they had found the best spot along the stream, and there they staked the claims that would make them rich and the Klondike famous.

In the gold rush that followed, some beneficiaries of circumstance, directed to this stream by Ladue's optimistic forecast, staked fortunes. But old-timers, unconvinced that the lay of the land was right for finding gold, hesitated and lost the opportunity. Some staked next to fabulous fortunes and found nothing but gravel and disappointment. Others staked their claims, then sold them for a winter grubstake. The stories of fabulous wealth and opportunities won and lost were the beginning of the legend of the Klondike.

Controversy would swirl around who should be given credit for being the true discoverer of the gold that was found in Rabbit Creek. Some said the credit should go to Henderson, who was denied a share of the good fortune by Carmack's betrayal of the miners' creed. It could be argued that Henderson was punished for his unkind words and rebuff of Carmack's First Nation in-laws. Some gave the honour of discovery to a third man by virtue of his prospecting there before the gold rush. His name was William Readford, and his report led Ladue to send Henderson searching for gold in the Indian River. In fact, with Ladue directing men to this region to test the gravel and creek bottoms, mere providence would determine which fortunate soul would bend down to pan the gold that lay so thick below the crystal waters. Carmack, Skookum Jim, and Tagish Charley drew the lucky number.

Rabbit Creek was quickly renamed Bonanza, and its main tributary Eldorado, but it would take months of back-breaking labour tunnelling through the frozen muck to find the elusive paystreak and prove that these two streams were truly worthy of their new names. Within a year, the news of the discovery would stun the world and trigger the last great gold rush of the nineteenth century.



**Claim No. 2 Below Discovery, Bonanza Creek, early 1897**  
Source: *Early Days in the Yukon* by William Ogilvie (1913)

## **Chapter 2: THE GOLD RUSH: 1896–1906**

### **Early Mining in the Klondike (1896–97)**

The new discovery in the Klondike valley did not at first change the way that miners and prospectors operated. No one knew how rich the ground might be, nor how true the announcement of the new discovery was. Nevertheless, the effect of the news upon the miners of Forty Mile was electric. Suddenly, boats attained a premium price, which most were desperate to pay; real estate, on the other hand, plummeted in value because nobody wanted to live in a town so far from the new strike. By winter, sled dogs, rather than boats, were achieving a value far in excess of their worth. The race to stake a claim on the newly named creek was frantic.

Eventually, most of the veterans of the Yukon valley made their way to the new gold find to search for open ground to stake. Some “cheechakos” (inexperienced newcomers) who happened to pass by at the right moment had already staked claims on prime creek bottom. By November 20, 1896, 338 claims were filed with Inspector Charles Constantine of the North-West Mounted Police at Forty Mile. William Stanley filed Claim No. 500 the 500<sup>th</sup> claim in the new mining district on January 6, 1897; by June 14, just before the new tide of prospectors arrived from the outside, 584 claims had been staked and recorded.

At first, it was not clear just how much gold lay buried in the gravel of Bonanza and Eldorado Creeks. Portions of claims were sold off for the money to buy a winter’s grubstake. Interests in various claims were exchanged between miners to hedge their bets. The master of this exchange process was a dour giant of a man from Nova Scotia named “Big” Alex McDonald. McDonald was soon known as the “King of the Klondike” for having the remarkable ability to pick claims that contained plenty of gold. One group of four miners hedged their bets by keeping Claims No. 14 and 15 Eldorado, but giving up No. 16 and No. 17 to keep their options open for staking on another creek. Claim No. 16 was picked up by Thomas Lippy, a YMCA fitness instructor from Seattle. It proved to be the richest claim of all, and it made him a fortune. But no one knew these things during the frenetic staking that took place between August and October of 1896.

Using the techniques they had employed in the Fortymile district, the new claim holders settled into the tedious work of testing their new properties. Lumber was whipsawn by hand. Materials could be obtained from Joe Ladue’s sawmill in the embryonic community at the mouth of the Klondike River, but the cost of transportation was high. Thus most of the construction taking place was limited by the manpower and hand tools available to fashion the necessary mining apparatus. At first, few elaborate devices were constructed, but perhaps the most sophisticated was a water wheel constructed of logs and handsawn planks to raise water on Skookum Jim’s Bonanza Creek claim.



**Digging frozen gravel underground on Bonanza Creek**

Photographer: H. J. Goetzman

Source: Gates Collection

Louis Rhodes could not find anyone to buy his claim for \$250, so he started digging through the frozen ground until he hit bedrock five metres down. There he discovered the old creek channel and the gravel shining with gold. In early November, Clarence Berry hit the pay streak on No. 6, Eldorado. On No. 15, the Scouse brothers found gravel pay dirt with nuggets like raisins in a pudding. As the winter progressed, men up and down the creeks realized that they had been transformed by circumstance into men of wealth and substance.

Just gazing at the Bonanza Creek valley then, one would not realize that the ground was worth millions. All one could see were widely scattered mounds of gravel, newly released from its frozen matrix. Men burned their way through the frozen muck much as they had done before on any other stream. Smoke could be seen rising from tiny holes in the ground on some claims, while at others, men laboured over handmade wooden windlasses to haul the pay dirt to the surface. These mounds of pay dirt would grow all winter, awaiting the spring thaw to let the running water work its magic and release the golden treasure from the icy muck. Some claim holders were able to pay their workers by washing out their wages each day from carefully selected pans of the rich dirt. Small log cabins dotted the valley bottom as the miners hunkered down in preparation for the looming winter. The landscape remained relatively unchanged by these crude

scratchings in the ground, which would be snow-encased for months to come. The previous season, Rabbit Creek had been just another tiny tributary like thousands of others dotting the landscape. The permafrost in the valley bottom lay undisturbed beneath a thick blanket of moss and muskeg; the hillsides were dotted with spindly black spruce. The most noticeable change at first was that within a year, the hillsides of Bonanza and Eldorado were stripped clean of trees to fuel the demand for construction materials and firewood.

During this long, crazy winter, there was little for the miners to do but work on their claims, visit their neighbours, and admire their growing stockpiles of frozen dirt. There was a shortage of food as many stampeded to Rabbit Creek from other creeks with small stocks of supplies. In the cold, dark and isolation, they could write letters, but it would be months before replies were received. They may have had mounds of gold-laden dirt piled beside their cabins, but they had nothing to spend it on as the traders had nothing but the limited range of supplies that were available to a small mining camp. It could be said that gold was the least valuable commodity on the creeks that winter because it could not be eaten or provide warmth.

With the mad scramble to put a stake in the ground, conflict and confusion arose on the creeks. At first, the miners turned to the traditional use of the miners' meetings to resolve disputes, especially before the North-West Mounted Police relocated to the new diggings and contained the chaos. A few of the unsavoury characters on the creeks are said to have died or simply disappeared before the police arrived. But the Mounties saw to it that the lawless conditions that reigned later in Skagway, Alaska, at the height of their gold rush, never occurred in the Klondike as they maintained a firm hand on justice. To resolve the disputes over the distribution and delineation of claims on Bonanza and Eldorado Creeks, the miners turned to Canadian government surveyor William Ogilvie, whose judgement and integrity were unquestioned. Over the winter months, Ogilvie slowly unravelled the tangled maze of claims to everyone's satisfaction.

So the men worked and waited for spring. They watched their winter stockpiles or "dumps" of pay dirt grow. They could only guess how rich they would be when the spring clean-up was complete.

### **Early development of Dawson City**

While the miners scrambled to find good ground in the newly discovered creeks, Ladue did what traders did at times like these: he travelled to the scene of the action and set up his business along the banks of the Yukon River near the mouth of the Klondike. Up to this point, the only camp along the bank of the river below the mouth of the Klondike was that of George Carmack and his family. Tr'ochëk, the First Nation encampment, was a cluster of structures on the piece of land on the opposite side of the mouth of the Klondike River. Ladue quickly marked the boundaries of a 65-hectare plot of land in the moose pasture below the mouth of the Klondike, and named it Dawson City after famed Canadian geologist George Mercer Dawson. Henceforth, this new town became the transportation hub and transfer point for supplies between the world "Outside" of the North and the goldfields. The government also selected a large plot next to the confluence, and Harper laid claim to the neighbouring ground. The first cabin, a tiny one-room log cabin with two windows and a door facing the river, was completed by Ladue on September 1, 1896.

He promptly returned to his trading post at Ogilvie, where he packed up his sawmill and floated it down to Dawson City. The mill was set up and operating within days. By September 10, a constantly changing population of 80–90 men were camped at the mouth of the Klondike.

By October, the population of the tiny settlement had swelled to 500. But there was very little happening. Many of the newcomers spent their winter in tents either on their claims or amid the sprawl of tents in the new townsite. Within a few months, there was a scattering of 30 one-room cabins around Ladue's establishment. Ladue was operating the only saloon, selling whiskey at 50 cents a shot, when he had it to sell. Until the discovery of the Klondike, the largest settlement in the Yukon Basin was Circle City, Alaska. But in the new year, as accounts of the new strike became more credible, the Alaskan town emptied and everyone made their way to Dawson over the Yukon River ice. Dozens of people arrived from Circle daily, and by spring the population of Dawson had reached 1,500. During the winter Mrs. H.H. Ferguson had been the only woman in the tiny settlement, but now Ethel Berry and Salome Lippy were with their husbands on their claims as they mined some of the richest ground on Eldorado Creek. As the Circle crowd started to arrive, yet more women joined the growing throng at the mouth of the Klondike.

The community was short of everything, but worst of all was the lack of sufficient food. Fortunately, a party of cattlemen with a herd belonging to Willis Thorp, a butcher from Juneau, Alaska, arrived at the Klondike before freeze-up. They spared the town from severe hardship and made a tidy profit for themselves in the exchange. Flour soared in price to a dollar per pound, if anybody was selling, and wild game was hunted out in the Klondike region. One man reported living off a supply of navy beans and popcorn that winter. Goods of any kind were hard to come by. Another man offered \$25 for a shovel, but no one would sell. Any new commodity arriving in Dawson could be sold at an extravagant price.

When the ice broke downriver in the spring of 1897, and the first river-steamers arrived with supplies, Dawson was filled with whiskey and gambling equipment brought in from Circle, and everything about Dawson City accelerated at a remarkable pace. Buildings were constructed with stunning speed and real estate along the waterfront skyrocketed in value. Shrouded in silence, cold and darkness for months, things were different after break-up. The sound of saws and hammers filled the air. Dogs howled, and music and raucous noise spilled out of the buildings springing up along the waterfront. It had become a town of canvas and log, with a row of two-storey log buildings going up along the muddy street facing the river. Canvas signs proclaiming saloons, theatres, restaurants and hotels were plastered across the façades or hung across the streets. Behind them was a row of squalid cribs containing prostitutes in what became known as "Paradise Alley." Cabins sprouted on the hillsides surrounding Dawson. In the span of a few months, Dawson City was like other mining boom towns, only it was more rich, large and exotic than anything that had come before.

As soon as the ice broke up in the upper Yukon River in 1897, another wave of miners came, mainly of men from Juneau, Alaska. Three hundred boats filled with supplies arrived in the first wave. Soon a thousand tents were packed together along the waterfront so tightly that it was barely possible to walk between them. What had been a somnolent little cluster of tents and cabins during the winter grew into a bustling town with the long days of summer. It was hard to gauge the precise number of people in Dawson

City that summer, as the settlement kept growing and the crowd was highly mobile. Men moved into town, out to the goldfields and back again with regularity. It is likely everyone was too caught up in the excitement to attempt a detailed census. Estimates put the population of Dawson City and the surrounding goldfields at 5,000 and growing daily.

Word of the discovery had been trickling out of the North in letters, and proof went in the leather pokes of miners bold enough to attempt the outward journey during the vicious winter storms of the coastal mountains. The town of Juneau was emptied because of the excitement over the reports they had been receiving. The same happened in Seattle, as eager adventurers packed the ships heading north. But the steady flow of gold-seekers became a torrent after the arrival of two ships, the *Excelsior* and the *Portland*, from San Francisco and Seattle in mid-July of 1897. Feeding on the newspaper reports of the great gold strike, the city, the continent – even the world – went mad in the rush to get to the Klondike.

Thousands made their way north, eager to get in on the excitement. “A gold rush is like a war,” wrote Yukon Commissioner George Black. “You feel it in your blood. It is exciting – intoxicating. It reveals as in a flash the monotony of ordered days and ordered ways.”<sup>6</sup> It was as though the entire continent, which had been suffering from a devastating economic depression for years, suddenly came awake. The eager vanguard of this stampede made its way into the Klondike region throughout the winter of 1897–98, and the population continued to climb to 7,000; but with break-up in the spring of 1898, a wave of humanity flooded into the region and the population exploded threefold. By the time the bubble burst, some 30,000 souls were milling about in the gold rush community on the banks of the Yukon and scattered through the surrounding goldfields.

By 1898, the Klondike was a case study in extremes. Dawson City was nestled in the wilderness nearly 2,000 kilometres from civilization, yet it became the most modern and cosmopolitan of cities. It was a land of great fortune and bounty for some, and failure and hardship for others. Some lived on champagne, others ate beans, beans and more beans. Amid the excitement and aura of gold, men and women were suffering from scurvy, malnutrition and consumption. Typhoid fever reached epidemic proportions, a product of poor sanitation and lack of clean drinking water. Father Judge, the Jesuit priest, established a hospital at the north end of Dawson, and when that burned down, he raised more money and built it again. Amid all the people obsessed with gold, he was one of the few more concerned with the spiritual and physical welfare of newcomers in the growing city. Father Judge worked ceaselessly to care for the needy and gave them the coat off his back. The only one he did not care for was himself: exhausted by his humanitarian efforts, he was stricken with pneumonia and died in January of 1899. He was the only person in Dawson who had sacrificed himself to the needs of others for no earthly reward. For this he is remembered as “the Saint of Dawson.”

Anybody and everybody seeking adventure came to the Klondike. They were clerks and farmers, streetcar conductors, lawyers and teachers. Dawson became an American city on Canadian soil with Canadian rules:

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<sup>6</sup> George Black, ““Striking Gold in the Klondyke...was my Greatest Hour,” *Gold Stripe*, Vol 1, Wednesday, December 25, 1918

as many as 85 percent of those who reached their destination were Yankees. There were actors, journalists, artists, merchant and capitalists – all rubbing shoulders in the circus-like atmosphere that had one main criterion for admission: the stamina and determination to travel thousands of kilometres through the harshest of weather and the remotest of landscapes to reach it.

For one short season, from the summer of 1898 until the summer of the following year, Dawson City was a whirl of activity. It was full of personalities, but it also had a personality all its own, according to acclaimed author Pierre Berton:

*Dawson City was livelier, richer and better equipped than many larger Canadian and American communities. It had a telephone service, running water, steam heat and electricity. It had dozens of hotels, many of them better appointed than those on the Pacific coast. It had motion-picture theatres operating at a time when the projected motion-picture was just three years old. It had restaurants where string orchestras played the largo from Cavalleria Rusticana for men in tailcoats who ate pâté de foie gras and drank vintage wines. It had fashions from Paris. It had dramatic societies, glee clubs, and vaudeville companies. It had three hospitals, seventy physicians and uncounted platoons of lawyers. Above all, it had people.<sup>7</sup>*

The very reason Dawson City existed lay firmly in the neighbouring goldfields. Mining was what stirred the economic engine of the Klondike; it supplied the gold that purchased the goods and services provided by the rapidly growing boomtown. Between 1896 and 1897, the production of gold increased eightfold. The gold produced in 1897 had a net worth of nearly \$2 million, nearly equivalent to \$50 million in modern terms. That amount quadrupled the following year, and by 1900, gold production reached 33 million grams, an astounding 7,500 percent increase in production since the discovery four years earlier. In fact, in the ensuing century, the individual placer miner came to be an iconic symbol of the industry driving the economy of the Yukon Territory.

Services for the mining industry were quickly established. Sawmills provided lumber, and hardware and mining equipment were imported for sale. There were several machine shops, blacksmiths and boilermakers. Transportation companies blossomed. There were three brickyards, eight warehouses, two planing mills, and numerous general merchants, grocers and butchers. With the abundance of raw gold, seven manufacturing jewellers were kept busy. Several coal mines fueled the demand for energy. There were a dozen first-class hotels and 40 restaurants and cafés. Theatres, dance halls and saloons helped the miners while away their time – and spend their money.

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<sup>7</sup> Pierre Berton, Klondike: The Last Great Gold Rush 1896–1899. (McClelland and Stewart, Revised edition, 1973), pp. 354–355



**Dawson City rapidly grew into a thriving gold rush town**

From: *Harper's Weekly*

Source: Gates Collection

The community was still a rough and tumble society. Booze, gambling and prostitution were big business. Liquor would continue to be a major source of revenue long after the other vices were curtailed. The North-West Mounted Police kept a firm hand on the community. Unlike in Alaskan towns, not everyone in Dawson had to carry a revolver. During the year when the gold rush was at its peak, not one murder was committed in Dawson City. The town shut down on Sundays, when even the act of cutting firewood would land a person in jail. In fact, in a town where many government services were corrupted by graft, bribery and insider deals, the Mounted Police established a reputation for their sterling integrity. All of these things contributed to the formation of the special, and almost unique, quality of the gold camp.

Within a few years, it was apparent that the supply of gold was not about to run out. The government expressed its confidence in the future and asserted Canadian sovereignty by commissioning the construction of a half-dozen imposing public buildings, including a courthouse, post office and school. Andrew Carnegie, the prominent American philanthropist, commissioned the construction of an imposing

tin-clad library for Dawson City. It was the most northerly library he had ever built. The architect who designed the library did the same for the Canadian Bank of Commerce, whose metal-clad façade featured prominently on the Dawson City waterfront.

A telegraph line was constructed in 1899 to connect with the outside world. Under construction on the White Pass, a railroad would provide a more reliable and economical means of transporting goods, but it was not complete until the gold rush had subsided. Dawson City could boast five newspapers and two fire halls. In fact, Dawson suffered nine major fires in ten years. The first occurred on Thanksgiving Day in 1897, followed by conflagrations in October 1898, April 1899 and November 1901. Each time the town was rebuilt, giving the streets a much more substantial and permanent appearance, and leaving only a few of the original buildings standing.

By 1900, mail was delivered weekly, which was in dramatic contrast to the sporadic mail service that existed two years before. None of these services would have been there if it were not for the gold. The mines were where the action was, and as long as they kept producing gold, the town would continue to thrive.

### **Growth of the goldfields**

With the rapid influx of stampedes, the number of gold-seekers spilling into the creeks near Dawson City was tremendous. The claims strung out along the creek bottoms had been staked long before they arrived, but some could find jobs working for those claim holders. Others looked around for opportunities to stake on more distant creeks, often embarking to far-away streams on stampedes triggered by whispered rumours. Many simply extended their search to the creeks beyond those already staked. They ascended to the summit above Bonanza Creek where King Solomon's Dome, the highest point of land above Bonanza Creek, looked down on streams that radiated out in every direction from its slopes, like the spokes on a wheel. Gold had already been found on Bonanza, Gold Bottom and Hunker Creeks, so why not find it on the streams radiating out to the south? Discoveries were quickly made on Dominion, Gold Run, Caribou, Sulphur and Quartz Creeks. Even tributaries of the Stewart River to the south, such as Black Hills Creek and Henderson Creeks, were being prospected.

Others tried a different tactic. They looked up to the hills above Bonanza and Eldorado Creeks. The seasoned veterans scoffed that gold could be found on the hillsides as it concentrated through natural processes in the lowest elevations in the valleys which were, of course, the stream bottoms. They could not know that in ancient times a stream snaked its way down the valley at a higher level, before the current creek bottoms were incised into the hills. This stream bed was also loaded with gold. It was left up to the cheechakos to stake this ground. One of them was a Nova Scotian named Oliver Millet. Overseeing Tagish Charley's claim on Bonanza Creek, he sunk a series of shafts until he hit the ancient stream bed, which was instantly recognized for its white quartzite gravel. This bench was jokingly named Cheechako Hill, but it was Millet who had the last laugh: in a short time, he sold his claim for \$60,000. It would eventually yield half a million dollars in gold.

Within a short time, this hill and all the others overlooking Bonanza and Eldorado Creeks were staked to the hilltops. Anywhere one found the wandering channel of white quartz gravel, they also found gold. These rich claims would present an entirely different suite of challenges than those of the creek miners down below.

In the winter of 1896–1897, the pace of mining was constrained by limitations imposed by the sheer isolation of the place. Labour was hard to come by, and labourers demanded a high price for their services. But labour was not the only thing in short supply: there were no horses yet, so dog teams available to haul supplies into the creeks were also at a premium, especially because there were no roads to follow. Hauling supplies in the winter over snow-packed trails was immeasurably easier than attempting the same in the summer when the ground thawed and the muskeg became a sodden quagmire. And dog sleds were one-tenth the cost of packing in supplies on one's back. As the miners quickly learned, better transportation brought down operating costs and made their mining more profitable.

Yet labour and transportation were not the only limitations. Even the most fundamental tools could not be purchased. Shovels, nails and even rubber boots demanded a princely sum, if they could be obtained at all.

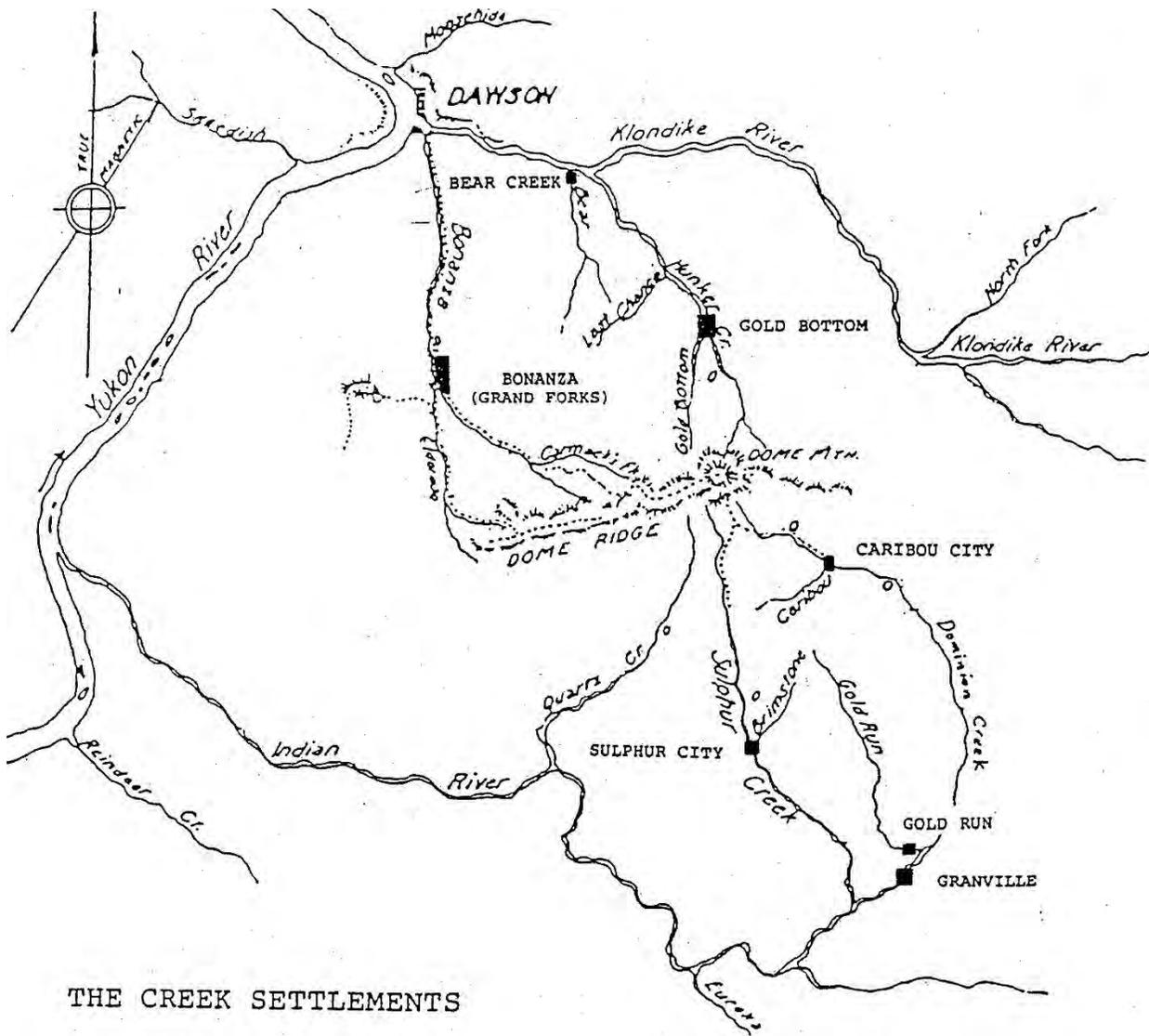
These conditions changed considerably over the next two years as tens of thousands of gold-seekers flooded into the Klondike. Labour became readily available, and at less cost. Transportation improved both through the availability of horses and with the construction in 1899 of a government-built road (Ridge Road) that followed the ridges above the Bonanza Creek valley. Soon material goods of all kinds, from the most ordinary to the most exotic, were readily available. Large crews were hired and set to work on the claims on all of the creeks. On some claims, the holders would have laymen do the work for them, individuals willing to work the property for a share of the gold recovered. During the winter months, the ground was worked by drift mining. In some operations, galleries of huge proportions were opened up underground, supported only by the frozen condition of the gravel, which made the matrix as hard as granite, and by pillars of frozen ground left in place to support the frozen ceilings of muck and gravel under which the men laboured. Work like this would be quite dangerous, as the roof of a gallery could collapse if it started to thaw. Where wood fires were used to thaw the ground, deadly gas could accumulate and overcome the men working below. For these reasons, drift mines were typically worked only in the wintertime.

All of the material excavated from underground was accumulated in large heaps or dumps from which the gold was extracted in the spring by sluicing it with the abundant water available during the spring thaw. During the summer, creek claims where the bedrock was shallow could be worked by the open-pit method. To reach bedrock, the ground would be excavated, often requiring the overburden to be shovelled to the top in lifts. The man in the bottom of the excavation would shovel material up to an elevated platform, where another man would again raise the material by shovelling it even higher. On some of these claims, the entire width of the valley bottom might be excavated, with the creek redirected around the claim in a diversion ditch, or transported through the excavation in a series of overhead flumes. Some of the water would be used for washing the pay dirt.

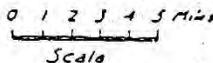
The bench claims posed special problems. First, this work was very labour-intensive. Second, water was not readily available, so the gold was extracted from the gravel in rockers, where only small quantities of water were required and the water could be recycled. Finally, where several tiers of claims all lay on the hillside, side by side, overlooking Eldorado and Bonanza Creeks, each miner faced the same problem: how to dispose of the waste rock from his mining without dumping it on the neighbouring claims.

During the early years of the gold rush, when hand labour was at a premium, the population in the goldfields was high. Individual claim holders might employ 20 or 30 men if the ground was rich enough, largely on Eldorado and Bonanza Creeks. A community grew at the confluence of these two great gold-producing creeks, which became known as Grand Forks. By 1900, it could boast a population of 4,000 including ten hotels, two blacksmiths, three drugstores, two butchers, a doctor and dentist, a library, a fire department and a telephone system linked to Dawson City. Within a couple of years, it would have its own government, a Mounted Police detachment, a school and a red-light district. Only three derelict cabins and a graveyard remain to bear witness of this town today.

There were roadhouses scattered along the creek and many other tributaries in the Klondike region. They were also established along the government roads, once the roads were built. Having passable roads reduced freight costs, making claims on more distant creeks profitable. Satellite communities grew up wherever the number of miners merited it: Bear Creek, Gold Bottom, Caribou City, Gold Run, Granville and Sulphur City – each supporting a market area of a few hundred to a thousand or more people. During this period, women and children joined the men who had laboured in trying conditions in the early days. The total population of the goldfields in 1900 was between 9,000 and 10,000 people. That year was also the most productive the Klondike ever saw: over a million ounces of gold were extracted from the frozen gravel.



THE CREEK SETTLEMENTS



O = Discovery claims

From: Hal Guest: "A Socioeconomic History of the Klondike Goldfields," 1985: 55

Productivity was increased by technological innovations, most notably steam. Steam equipment started to appear in the Klondike goldfields as early as 1899; by the following year, it had become a torrent. Steam engines were being used to hoist gravel on almost every claim. Steam-powered shovels, draglines and derricks were employed to move gravel more efficiently. This need led to the invention of the self-dumper, or "Dawson carrier." This device could be used in either a winter drift mine or an open-pit application. It consisted of a specially designed bucket attached to self-tripping pulley apparatus that would allow an ore bucket to rise vertically out of a shaft or open pit, then ascend a cable anchored to a tall pole off to the side.

The bucket rose along the cable until it hit a trip bolted onto the wire. At that point, the bucket automatically dumped the dirt, forming a large pile of pay dirt in the shape of an inverted cone.



**A steam-powered mining operation in the Klondike goldfields with a self-dumper**

Source: US Geological Survey

Other applications of steam equipment were pumping water, sawing wood and thawing ground. The discovery of steam thawing is credited to Berry, the miner who owned No. 6 Eldorado. Noticing that the exhaust from a steam engine was thawing the frozen ground beneath it, he hooked up a hose to a gun barrel and drove it into the ground. Soon specially manufactured steel “steam points” were being used in mines throughout the goldfields. By driving steam points into the frozen ground, permafrost could be thawed for half the cost of the old-fashioned method, and without the production of noxious fumes.

Steam-powered pumps became essential to the mining process. Piston pumps, centrifugal pumps and pulsometer pumps could lift water to the bench claims where it was badly needed, or remove it from the

working mine face, where it was not wanted. In fact, water was essential for the mining process, either in hydraulicking, where it could wash away overburden more cheaply than by mechanical means, or in sluicing pay dirt. But water was not always available where or when it was needed.

The arrangements for the mining of each claim differed according to a number of variables, including the general lay of the land, availability of water, and the technological knowledge and ingenuity of the claim holder or mine manager. There was no set way in which to mine, although some operations were more practical and cost-efficient than others. All required the excavation of pay dirt, the bringing of water and pay dirt together for sluicing, and the disposal of tailings.

While holding claims that contained an abundance of the auriferous metal, some miners were ruined by the lack of water for sluicing. In August 1903, for example, things were so dry in the goldfields that many of the claims had to shut down for the month. In 1906, the desperate miners, supported by the government, hired an American rainmaker named Charles Hatfield, but even his secret chemical formulations were unsuccessful in producing the much-needed water.

To capture more water, some miners built ditches to direct it to their claims. Others constructed dams; one of the most notable of these was designed by J.B. Tyrrell and constructed on Adams Gulch at a cost of \$75,000. It was capable of holding 260,000 litres of water, which it diverted for use in hydraulicking along the left limit of Bonanza Creek, between Adams Hill and Boulder Hill. This practice was successful where there were concessions or groups of claims. Battles over water kept lawyers busy and courts tied up in litigation. Gold Commissioner Edmund Senkler noted in August of 1904 that there were 84 cases involving disputes over water before the courts:

*The supply is far less than the demand, and the result is many disputes arise as to the right of priority to what water there is in the creeks and streams in the vicinity of the gold-bearing ground. The production in future ... will depend largely on the supply of water.... In order to work at a profit water must be brought by gravity from the most available sources. The expense that will be incurred in carrying out water-schemes properly will be very great, and it is, in my opinion, the chief problem confronting the Territory at the present time.*<sup>8</sup>

These words were prophetic and have bearing on developments that would take place within a few years.

By the beginning of the twentieth century, there was a trend toward larger, more capital-intensive mining operations. Claims were grouped and expensive equipment, mostly steam-powered, was imported to move larger volumes of ground more efficiently. Individual claim owners were supplanted to a degree by better financed partnerships. Chute & Wills, for example, had a grouping of 15 claims on Gold Run Creek, a tributary of Dominion Creek, which drained to the south from the vicinity of King Solomon's Dome. They

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<sup>8</sup> David Neufeld, "Running Water: Supplying the Klondike Mines, 1903–1906," (Department of Indian Affairs and Northern Development Yukon Placer Mining Industry 1998–2002, Placer Mining Section, 2003), p. 25

constructed one of the finest hotels outside of Dawson City, as well as bunkhouses and other facilities, and a small townsite grew up at this location.

### **Landscape transformation**

The impact of this massive influx of people looking for gold over the period from 1896 to 1906 far surpassed anything that had come before. The very scale of the changes was enormous. The Euro-American population increased from 1,500 to 30,000. Within the span of a year, the number of claims staked increased by a similar magnitude. Once the richness of the gold deposits had been realized, the mining activity accelerated, stimulated by the promise of wealth and aided by the use of mechanical mining to increase the volume of ground being excavated. Creeks like Bonanza and Eldorado would have been unrecognizable to someone who had not seen them since their discovery by Skookum Jim. Ditches had been dug, dams built, tailings created and roads constructed.

The hillsides were stripped entirely bare of any tree or shrub that could be burned or turned into lumber. Game was overhunted, and water churning in the streams had become filled with sediment, not unlike spring run-off.

Towns sprang up all over the goldfields, and the creeks teemed with people and activity, the likes of which had never before been seen. The most dramatic landscape change was probably that at the mouth of the Klondike River: in the short span of two years, Dawson City had been transformed from a single cabin on the north side of the mouth of the Klondike River to a bustling metropolis serving a population of 30,000 people. The development filled the valley and the surrounding hills. People had spread out across the Yukon River to West Dawson and up the shores of the Klondike River toward the mouth of Bonanza Creek and beyond. It expanded across the mouth of the Klondike River impacting the Tr'ondëk Hwëch'in First Nation, who had camped and fished at the mouth of the river at Tr'ochëk for generations. To avoid the overwhelming influx of newcomers, they moved down the Yukon River to a village on Moosehide Creek.

### **Global impact**

The discovery of gold in the Klondike is one of the defining events in the development of Yukon as we know it today and as it is viewed by the rest of the world. Though the act of discovery was rather insignificant in its own right, it set about a chain of events that altered the destiny of the territory forever.

On June 13, 1898, less than two years after the original discovery of gold took place, the Yukon Act was passed by the federal government, thereby defining the physical boundaries of the territory as a discrete entity and providing for a structure of governance to guide the administration of the region.

The gold rush advanced the resolution of the boundary question. The boundary line between Yukon and Alaska was not a clear-cut issue. In fact, for almost 75 years nobody knew precisely where the line ran. A

line of division that included the strip of land along the Alaskan panhandle had been drawn up between the Russians and the British in a treaty signed in 1825. The boundary would extend no more than 50 kilometres inland from the coast, but the treaty left the details open to interpretation. It really did not matter much to any nation until gold was discovered in the Klondike in 1896. At that point, it became an issue of international concern.

According to instructions from Clifford Sifton, the Canadian Minister of the Interior, in January 1898, the North-West Mounted Police were dispatched to establish detachments to the Chilkoot, White and Chilkat Passes. An international tribunal including Canada, Britain and the United States established a provisional boundary line in 1899 that acknowledged the sovereign presence of these detachments. In November 1903, just seven years after the discovery, a final decision was reached regarding the dividing line. Thus an issue involving Britain and Russia, and then Canada and the United States, which had remained unresolved for more than 75 years was finally settled.

The North had long been *terra incognita* to the cartographers of the world. The Franklin Expedition, and the subsequent search for the lost party, helped to fill in lines along the northern shores of Canada. But even at the end of the nineteenth century, vast expanses of the region known as Yukon remained uncharted wilderness to the newcomers, although it was the homeland of the Tr'ondëk Hwëch'in. The Klondike Gold Rush contributed to the filling in of the blank spaces. Whatever the North had been in the minds of people – a vast and vacant wilderness, or a region of ice and snow of little economic value – the gold rush helped shape new impressions of the world about this region in particular and of the North in general.

The Klondike Gold Rush became a media event of global scope as announcements of the great find were relayed around the world. The portable camera had just become widely available to the general public, and people took advantage of the innovation to document every aspect of the gold rush through thousands of photographs. Journalists from all over the world descended upon the Klondike to report on what was happening for millions of eager readers. For a period of time, the Klondike was hot news that filled the front pages of hundreds, even thousands, of newspapers. There was an insatiable demand for books on the topic that was obligingly accommodated by writers of all stripes, writers whose books on the Klondike still have currency. The works of two or three writers stand out as definitive for shaping the North in the public mind. The first of these was Jack London, whose best-selling novels *Call of the Wild* and *White Fang* are recognized as classic works still widely read. London came to the Klondike as an aspiring author, and it provided the stories and the inspiration that ignited his career and made him widely known.

Robert Service never participated in the Klondike Gold Rush and only arrived in the Klondike a decade later, yet his classic works of verse, including “The Shooting of Dan McGrew,” “The Cremation of Sam McGee” and “The Spell of the Yukon,” have been popular fare for subsequent generations. Service’s work made him world-famous, and he became a best-selling poet. Pierre Berton, son of a gold rush stamper, was raised in Dawson City and is one of the most widely read Canadian authors of the twentieth century. He wrote *Klondike*, the definitive non-fiction account of the gold rush. A half-century after it was first published, the book is still selling well in many countries and languages. It continues to shape the way in which the gold rush is perceived. Films have been and still are made about the gold rush. It is featured in

popular reality television programming and documentaries. Through print and film media, the Klondike Gold Rush is still one of the signature events defining the North in the public consciousness.

Moreover, this gold rush was a distinctly international affair. On Canadian soil, most of those who participated in the stampede were American, but the horde that came north originated from every corner of the world. It was a shared experience of a global nature that contained a number of common elements. The excitement stirred by the original announcements, the preparations for the journey, and the departure by boat for the Klondike were part of a shared experience. Most of those who came climbed the mountain trails and crossed the snow-bound summits, laboured with heavy loads, cursed the mosquitoes, built their own boats, and challenged the perils of the Yukon River. They all witnessed the sights and sounds of Dawson City that carnival-like year of 1898 to 1899.

Many went out into the mountains and valleys looking for gold and staked their claims. And of the many who tried their hand at mining, only a few found gold and only a small number could return home with the fortune that they had sought. But they came home rich in shared memories of a collective experience: in later years, many claimed to have either remembered Service on the Chilkoot Trail (he was not there) or met London, or they said they witnessed the shooting of Soapy Smith, the infamous con man from Skagway.

Berton wrote of the experience that these bold stampeders shared:

*They returned from the Klondike, as young men return from war, wise beyond their years. In the brief span of the gold rush they learned more about life, more about their fellows, and more about themselves than many mortals absorb in threescore years and ten. There was scarcely one of them who at some moment in the bitter road north had not descended into hell and risen again. They learned the hard way the same lesson that the early prospectors at Fortymile and Circle City had learned before them, until at last the slogan from the Yukon Order of Pioneers, "Do unto others as you would be done by," came to have a real meaning for each of them.*

*The Klondike experience had taught all these men that they were capable of a kind of achievement they had never dreamed possible. It was this, perhaps more than anything else that set them apart from their fellows. In the years that followed, they tended to run their lives as if they were scaling a perpetual Chilkoot, secure in the knowledge that any obstacle, real or imagined, can be conquered by a determined man. For each had come to realize that the great stampede, with all its searchings and its yearnings, with all its bitter surprises, its thorny impediments, and its unexpected fulfilments, was, in a way, a rough approximation of life itself.<sup>9</sup>*

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<sup>9</sup> Berton, *Klondike*, pp. 413–414

The memory of the gold rush remained etched in the minds of the thousands who participated. More than a few of them went away with their experiences and achieved great things during their lives. There was Augustus Mack, who became famous for his Mack truck. Sid Grauman was later made famous for his Chinese Theatre in Hollywood. John W. Nordstrom, a hard-working Swedish immigrant, tried his luck at mining in the Klondike. The \$13,000 that he took away with him was the seed money with which today's massive retail chain was built. Alexander Pantages, who worked as a waiter in one of Dawson's drinking establishments, built a chain of movie theatres. Tex Rickard founded the New York Rangers hockey team and built the third version of Madison Square Garden, while Jack Marchbank, a one-legged gambler, went on to run Tanforan racetrack in San Francisco. Another stamper became a prominent United States senator.

Berry, who held Claim No. 6 on Eldorado, parlayed his good fortune into another in the goldfields near Fairbanks. Back in California, he invested in oil and made a third fortune. The Berry Oil Company continued pumping crude throughout the twentieth century and recently sold out to private investors for nearly \$6 billion. John Grieve Lind, a hard-working Canadian from Ontario, took the fortune from his Bonanza Creek claim back home with him, investing in a company that became the biggest independent cement company in all of Canada. It was sold to foreign investors in 1997 for nearly \$400 million.

Whoever they were, either rich and famous or ordinary souls, the veterans of the Klondike campaign took away with them a common set of shared experiences that shaped the lives that they lived from that day forward. The Klondike changed them forever.

Half a dozen cities can owe their success to the Klondike Gold Rush: Portland, Tacoma, Seattle, Vancouver, Victoria and Edmonton. Seattle's retail sales expanded thirty-fold during the gold rush; Edmonton, Alberta, more than tripled in size during the gold rush years. More than that, the gold rush stoked the economies of the continent and raised them out of the Great Depression, which had stifled the economy for half a decade. Berton proposes that the infusion of Klondike and Alaska gold heralded the end of the depression that had choked the money flow, putting men out of work and dreams out of reach. Between 1897 and 1900, the total amount of gold introduced to the economy reached \$50 million. That alone, however, might not have been sufficient. Jack London, in an essay published in 1900, proposed that the amount of financial and human capital released by the gold rush could have amounted to \$225 million. But this capital was dumped onto a capital-starved marketplace in a short period of time. There is no doubt that it was a significant shot in the arm to a flagging economy.

Looking at this cash infusion another way, the money and labour referred to by London represented a major investment directed at an unknown part of the map of North America. As much as the money was good for reviving the continent, it was even better at opening up the Yukon Territory to investment, exploration and mining. Transportation was greatly improved by a rail link to the interior from the coast and an improved network of river transportation. Thousands of prospectors flooded Yukon and explored the mineral opportunities of the territory. In effect, the gold rush advanced the economic and constitutional development of Yukon by 20 years and opened the previously unknown northwest corner of the continent to exploration and development.

### **The Gold Rush and the Tr'ondëk Hwëch'in**

The Klondike Gold Rush brought with it a clash of two worlds. The Tr'ondëk Hwëch'in were fundamentally impacted by the forces at work as the gold rush gained momentum. Buildings at their traditional camping site at the mouth of the Klondike River were purchased from the Tr'ondëk Hwëch'in by the incoming miners, but the newcomers assumed they were purchasing the land, too. This was a concept completely foreign to the First Nation people, who did not consider land something that could be individually owned. Furthermore, the transactions greatly favoured the buyers over the sellers, as the property quickly appreciated in value.

A number of people influenced the fate of the Tr'ondëk Hwëch'in during this time of disruption, most notably Chief Isaac and Bishop Bompas. Chief Isaac acted as the spokesperson for the collective will of his people when new arrivals rapidly encroached on the traditional territory of the Tr'ondëk Hwëch'in. Devoted to Christianizing the First Nations people, Bishop Bompas was also acutely concerned about their welfare. He saw the bad influence that the prospectors and alcohol had on the Indigenous people at Forty Mile and lobbied to have them protected under the law. Between them, these two leaders negotiated with the newcomers over how the interests of the Indigenous people would be protected. They were able to arrange with the federal government that a parcel of land three kilometres downriver from Dawson City be set aside for them. The Tr'ondëk Hwëch'in relocated there in the spring of 1897 and called it Moosehide.

Long before the Euro-Americans arrived, First Nations people had well developed subsistence patterns based on a mobile seasonal round, as well as trading relationships with neighbouring groups. The arrival of the newcomers resulted in a change of economic pursuit: the exchange of furs, meat and fish for trade-goods. The traders also often exchanged goods for labour: miners from the Fortymile and Circle districts would hire Indigenous labourers to work on their claims, although they did so reluctantly and they paid them low wages. First Nation people were often in demand in the early days for packing supplies to the creeks for the miners.

During the gold rush, some First Nation men were able to secure title to mining claims, which they usually sold to the miners for a substantial profit, especially after gold was discovered in the Klondike creeks. Only Skookum Jim and Tagish Charley, however, are known to have enjoyed more than a short-term benefit from owning a mining claim in the Klondike. At first, they were also able to secure work as a supplementary labour force, but within a year the massive influx of stampedeers erased that opportunity.

Tr'ondëk Hwëch'in also provided fish and game to miners in exchange for money. The winter of 1897–98, Chief Isaac led a hunting party to the upper reaches of the Klondike to hunt for moose and caribou, which were brought back to Dawson and sold at the hefty price of \$3 per kilogram – this was when the going price for beef in the urban centres of North America was roughly eleven cents.

More damaging was the impact that Europeans had on the traditional harvest of wild game and fish, especially the migratory salmon. During the summer of 1896, for example, a number of non-Indigenous

men had set up their own fishing operations on the Yukon River. Within a short time, the First Nation fishermen found themselves, through the bureaucratic procedure of the government licensing of fishing rights, denied the right to follow their traditional pursuit. This denial of traditional rights to fish and hunt may have been one of the most painful consequences for the Tr'ondëk Hwëch'in.

Chief Isaac represented his people at every occasion when the two cultures met, and he handled these events with great diplomacy and patience. His message was always the same:

*Long time ago before the white man come along Yukon Indian was happy. Indian had plenty game, no trouble and was fat. White man comes and Indian go out and kill meat to feed him. Indian give white man clothes to wear and warm him by Indian fire. Byemby ... million white man come and cut down Indian's wood, kill Indian's game, take Indian's gold out of ground, give Indian nothing. Game all gone, wood all gone, Indian cold and hungry, white man no care.<sup>10</sup>*

The core message that he repeated at every opportunity reminded the newcomers, the Euro-Americans, that it was his people's land onto which they had been welcomed. They could have the gold, but they should leave the fishing and hunting to First Nation people. Sadly, events did not happen that way.

Before the gold rush, the Tr'ondëk Hwëch'in witnessed the arrival of prospectors seeking gold. This period lasted nearly a quarter-century and allowed for a gradual and mutual accommodation between the two cultures. By contrast, in a few months, the Klondike Gold Rush brought a rapid and massive influx of people, goods and customs that were foreign to their land, landscape and traditional life.

This invasion of strangers, the extensive impact on the landscape and the massive upheaval of the traditional life were at first a terrible blow to the First Nation people. In the face of this disruption, they displayed remarkable resilience and resolve, but it would take nearly a century to recover. The search for gold and the cash economy was not a part of the subsistence of the Tr'ondëk Hwëch'in before the gold rush, but it quickly became the standard against which all aspects of their lives were set. Even reserving land for the Hän-language speakers was fraught with limitations. The federal government was hesitant to set aside more than 65 hectares for the First Nation, fearing it would limit the potential for future development of the land for mining purposes.

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<sup>10</sup> Michael Gates, "Chief Isaac: The gentle diplomat" (Whitehorse Star January 25, 2013), p. 53



**Klondike City was a mining community that flourished on Tr'ochëk, the traditional settlement of the Tr'ondëk Hwëch'in across the Klondike River from Dawson City (background)**

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Source: Gates Collection

## Chapter 3: POST-GOLD RUSH TR'ONDËK–KLONDIKE: 1906–1966

### Dreamers and businessmen

Production of gold in the Klondike reached its peak in 1900 when it climbed to over one million ounces (or 33 million grams); in today's values, that amounts to more than \$1 billion. After that, the value of production declined steeply: in 1906, it was one-sixth of its peak value, marking the transition of placer mining from an individual enterprise to a corporate-industrial venture.

As the richer ground was worked out by hand-methods, technological innovations involving mechanization and the utilization of steam reduced costs and maintained the profitability of the creeks and hills surrounding Dawson City. For a number of years, these innovations were sufficient to ensure the profits for individual miners or partnerships. Yet vast reserves of gold lay scattered in the frozen Klondike gravel, which even these techniques could not recover efficiently.

In order for gold mining to continue, more capital-intensive methods of recovery were required. Huge volumes of water, beyond the capacity of the small creeks and tributaries, were needed to wash the gold-bearing gravel, and vast tracts of land beyond the means of an individual miner or partnership.

The transition to corporate mining is characterized by two highly interesting personalities, namely Joseph Whiteside Boyle, a Canadian fight promoter, and Arthur Newton Christian Treadgold, an Oxford graduate; financiers like the American Guggenheim family and the Rothschilds; and the mining engineer Warren H.S. MacFarland.

Treadgold received insider information about the magnitude of the new discovery before it was common knowledge, took a course in geology and then, acting as a correspondent for the *Manchester Guardian* and the *Mining Journal*, travelled to the Klondike, following the same route as thousands of others.

Treadgold saw opportunity and potential of the goldfields, and sought out the Canadian government upon his return to Eastern Canada. There he secured a large mining concession upon which he set about assembling large numbers of claims on significant tracts of land under a single ownership. Next he investigated the possibility of directing water to work this land and sought out financial backers to make his dream a reality.

Boyle was a force of nature. Stocky and barrel-chested, he had the chiselled features that would have made him a movie star in Hollywood. Contemptuous of bureaucrats and authority figures, Boyle was a take-charge man, attracted by adventure. He also had a vision of the future and he could clearly see that mucking about in the frozen gravel was not for him. Instead, he saw massive machines chewing up the Klondike placers and collecting the gold trapped within, so he too headed to Ottawa where he was also able to secure a concession upon which to build his dream. He then secured financing from Rothschild interests in Detroit and, through a series of legal manoeuvres, took control of their mining company in the Klondike.

Treadgold and Boyle were men of vision, and while neither was an expert in the science of mining, they both made up for that with their ability to inspire investors and attract money. Boyle secured the land in the Klondike valley that stretched from its mouth all the way to Hunker Creek; Treadgold's concession gave him control of Bonanza, Eldorado, Hunker and Bear Creeks. Boyle immediately set about mining in the vicinity of Bear Creek, and in 1905, he oversaw the construction of the first in a fleet of gold dredges. Treadgold attracted the financial backing of the Guggenheims, who initiated an ambitious program of development in the goldfields starting in 1906. That year, the enterprises of Boyle and the Guggenheims heralded the advent of corporate industrial mining in the Klondike.

### **Development of industrial mining in the Klondike**

Planning and organizing the finances and expertise to develop the Klondike on an industrial scale did not happen overnight, but by 1906 it was well under way. In 1904, Boyle secured financing from the Detroit Yukon Mining Company, headed by Sigmund Rothschild. The company was already mining on Bear Creek; four small locomotives and mining cars arrived in the summer of 1904 to carry the gravel over a light railway to the Klondike River, where the material could be washed.

The following year, the Detroit Yukon Mining Company and the Canadian Klondyke Mining Company constructed a steam-powered power plant and a 500-tonne dredge near the mouth of Bear Creek. They were first put into operation in August 1905, and the dredge, which was capable of excavating 3,800 cubic metres of gravel per day, continued to operate into October.

Gold dredges were first introduced into Yukon in 1898 when a small one was operated on Cassiar Bar on the upper Yukon River. It was subsequently moved to Dawson City in 1901 where it was set to work on Bonanza Creek. In 1903, Keish (Skookum Jim) received \$90,000 in royalties when it operated on his claim, and he sold out the following year for an additional \$65,000.

Dredges soon became the industrial workhorses of the goldfields. Built to float in ponds of water in the gold-bearing gravel, they scooped up the material with a continuous bucket-line at the front, which deposited the material into a large rotating screen that washed the muck and sand from the gravel. The finer material fell through perforations in the screen into a system of sluice boxes, where the gold was captured. The tailings, essentially larger rocks and boulders which were washed clean of the gold-bearing material, were dumped off the back of the dredge at the end of a long conveyor (the stacker). The stacker extended far enough from the stern that the tailings being deposited would not interfere with the forward progress of the dredge.

Construction of the Klondike Mines Railway began in 1903; it commenced operation three years later and connected Dawson City and intermediate points with Sulphur Springs at its terminus above Bonanza Creek. At first a combined freight and passenger service, it slowly transformed into a freight operation that remained in business until 1913. The company planned to make money primarily from passengers and freight, with an expectation of hauling ore as lode deposits were developed. Unfortunately, the railway

became the cause of its own demise. As it hauled freight and timber to the dredges operated by the Yukon Gold Company, this only accelerated the depopulation of Bonanza and Eldorado Creeks. The lode deposits were never developed into profitable ventures, and the revenue generated by the railway never matched the optimistic figures forecast in the original prospectus.

For many years, prospectors optimistically maintained faith in the belief that someone would eventually strike the motherlode – the source in the bedrock underlying the region, from which the rich Klondike placers had weathered. It never happened, but the hills of the Klondike are dotted with the remnants of small prospects and mines probing the schist deposits of the region. Every year there would be reports of potential hard-rock discoveries that would yield fortunes, but none of the deposits ever amounted to much.

The only hard-rock exposure that offered any reason for hope was the Lone Star deposit, in an outcrop of rock on the hillside of Victoria Gulch, a tributary on upper Bonanza Creek. It was staked in 1897, and a series of shafts and adits were chiselled and blasted out of the rock over the following decade. In November 1901, samples of ore from Victoria Gulch were being processed in a two-stamp mill, brought to Dawson City by Chicago financier George Munger and capable of handling five tons of ore per day. A second mill was also soon in operation by Joe Ladue. Within a year, the government had purchased the Munger quartz mill and set up an assay office for crushing and testing ore samples. In 1909, a two-stamp mill was installed at the Lone Star mine, which yielded promising results, but never good enough to commence large-scale mining. The decaying remnants of this mill and the workings still overlook Victoria Gulch today. Interest in the property waxed and waned over subsequent decades, but even in 1966 it was still the best hope of finding hard-rock gold in the Klondike region. Today, it is still of interest to mining companies, and the property undergoes regular exploration and continuing development.

Meanwhile, under the financing of the Guggenheims, the Yukon Gold Company and its various affiliates initiated an ambitious program of construction. Anticipating the need for electrical power to operate a fleet of dredges, they constructed an eight-kilometre-long flume and ditch system that directed water from the Little Twelvemile River to a generating plant located on the Twelvemile River. The ditch supplied 1.7 cubic metres of water per second to three Pelton wheels at an effective head of 198 metres. The 1,800 kilowatts of electricity generated by this plant was transmitted over 86 kilometres of heavy copper lines at 33,000 volts to a fleet of dredges, where it was stepped down to serviceable current for use. The construction of the first three of these dredges began in 1906.

A large sawmill was constructed in the Twelvemile valley to cut and mill lumber for the construction of a flume, ditch and pipeline system known as “The Yukon Ditch.” The mill was situated near a stand of timber that was sufficient to supply the lumber to construct over 30 kilometres of wooden flume that carried water to Bonanza Creek. More than 16,000 cubic metres (seven million board feet) of lumber were milled before the stand of timber was depleted and the project finished.

The ditch also directed a flow of water from the Little Twelvemile and Tombstone Rivers to Bonanza Creek for hydraulic mining. During its construction, comparison of the work was made with the building of the Panama Canal. It snaked its way along the hillsides and across the valleys for 115 kilometres to deliver

water at 3,540 litres per second at a working pressure of up to 3,100 kilopascals (425 PSI) on the hills of Bonanza Creek. The hydraulic mining would begin once the dredges had worked their way up Bonanza Creek, which would then become the dumping ground for the tailings washed from the hills above.

At the same time, a huge storage dam was built at Claim No. 57 Above Discovery on Bonanza Creek that was capable of storing nearly 16 million litres and delivering 1,400 litres of water per second to hydraulic mining on Bunker Hill and the benches overlooking Grand Forks.

All of this was accomplished in three years, at 5,600 kilometres from the nearest manufacturing centres, in temperatures that regularly fell below  $-40^{\circ}\text{C}$  during the winter. The work had to be carefully planned and the orders for equipment placed well in advance. The dredges all had interchangeable parts for ease of maintenance and repair.

During the peak periods of construction, there were 1,800 men working and a payroll of \$300,000 per month. By 1913, the Yukon Gold Company was regularly churning through several million cubic metres of gravel annually. They had prospecting drills systematically testing the frozen ground for future development. Tens of thousands of cords of wood were burned annually to produce the steam for thawing the ground ahead of the dredges. Thawing the ground represented half the cost of mining with dredges. Water was washing away hillsides at 16 different hydraulic operations, three-quarters of them on Bonanza and Eldorado Creeks, and nine electrically powered dredges scoured the valley bottoms. Seven of the nine were plowing their way through the gravels of Bonanza and Eldorado Creeks.

They could, and did, proudly proclaim that they were:

*... bringing into productiveness of tens of thousands of acres of gold bearing gravel hitherto lying idle. It meant reworking with increased profits every inch of ground which formed the original Klondike, with additional hundreds of square miles which never could have been worked by the comparatively primitive means at the disposal of the Argonauts of 1898.<sup>11</sup>*

And furthermore, all of this work was done by a small army of young engineers:

*[The chief engineers and their young assistants] constitute a fine body of young and vigorous men, willing to make the most of the long Arctic day, and eager to hasten work of which it can be said that it is the most interesting example of man's invasion of the trackless wilderness that borders the Arctic Circle.<sup>12</sup>*

Meanwhile, Boyle and the Canadian Klondyke Mining Company were mining the Klondike valley. His operation focused upon dredges for its gold recovery. Dredge No. 1 proved to be profitable from the very beginning, when digging commenced near the mouth of Bear Creek. This dredge, and all the other dredges that Boyle would later construct, had the advantage of working in the Klondike valley, where there was no

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<sup>11</sup> Dawson Daily News (August 17, 1913), p. 43

<sup>12</sup> Dawson Daily News (August 17, 1913), p. 46

underlying permafrost. This gave Boyle's company a decided advantage over the operations of the Guggenheim dredges, which worked the frozen ground of Bonanza and Eldorado creeks.

The disadvantage of the ground along the Klondike valley was that the bedrock was deep, in places up to 12 metres below the surface, and there were boulders over a metre in diameter in the gravel that had to be processed. Dredge No. 1 did not have sufficient length in its digging ladder to reach bedrock, so Boyle commissioned the Marion Steam Shovel Company of Marion, Ohio, to design and ship the components to construct a second dredge. At the time it was touted as the largest dredge of its kind in the world, with digging buckets twice the size of those on Dredge No. 1. Electrical power was supplied by the Coal Creek power plant, located 100 kilometres down the Yukon River below Dawson City.

A power plant in the Klondike valley was the brainchild of Treadgold. Surveying for the proposed power plant began in 1908, and ditch construction came a year later. Construction of a power plant in the Klondike valley followed in 1910. Water was diverted from the North Fork of the Klondike River 10 kilometres from its mouth and channeled through a 10-kilometre-long ditch to a point where it dropped 70 metres into two 3,730 kW turbines. The first electricity surged through its power lines in May 1911.

The power generated by this plant not only supplied energy to dredging operations in the goldfields, but it supplied electricity to the utility company that provided Dawson City with its power and light. Water was later diverted from the South Fork of the Klondike River in 1928, when Treadgold regained ownership, and a third turbine was added to an enlarged plant in 1935. The North Fork power plant continued to supply the electrical needs for dredging and for Dawson City until 1967.

From the beginning, Boyle's Canadian No. 2 dredge added to the profitability of his Canadian Klondyke Mining Company. This dredge was mining unfrozen ground, which allowed for a significantly longer operating season and lower overhead.

After the benefit of a full operating season for Dredge No. 2, Boyle was confident of the potential of his concession and initiated the construction of two more dredges, Canadian No. 3 and Canadian No. 4. These dredges were even larger than No. 2. They were also purchased from the Marion Steam Shovel Company at a cost of \$475,000 each. The components were shipped by boat to Skagway, hauled to Whitehorse by train, and then brought to Dawson on barges pushed by the fleet of Yukon sternwheel riverboats.

Pits were dug for the dredges in the gravel near the mouth of the Klondike River, and construction progressed through the summer and winter of 1912. The work was completed in Spring 1913, and the pits were filled with water. Boyle started Dredge No. 3 himself on May 9, 1913. Mrs. Boyle started No. 4 about 10 days later at a ceremony that included some of her friends, most notable of whom was Mrs. Martha Black, the wife of Yukon Commissioner George Black.



**Dredge No. 3 in the Klondike valley, May 31, 1915**

**Credit: Library of Congress**

With a dozen dredges now in operation in the Klondike, 1913 proved to be the largest production year during the era of dredge mining, with a total output of 8,794,280 grams (282,747 ounces), worth over \$5.3 million. The age of corporate industrial mining had come to stay in the Klondike.

### **Big changes**

The advent of the large-scale corporate mining in 1906 brought with it many changes that altered the social structure of the Klondike. The individual miners felt that government regulations favoured the interests of the large companies. Conflict arose between the prospector-miners and the capitalist investors. The granting of mining concessions by the government was not a popular action; it locked up large tracts of gold-bearing land in the Klondike, making it unavailable for development by individual miners. Worse yet for the miners, the government conceded other rights that tilted the playing field in favour of large corporate interests.

In response to protests from the miners, the government held inquiries and commissions investigating the concessions in the goldfields. Miners argued that the land was locked up without a guarantee that the concessionaire was doing anything to develop the ground. As the richer ground was worked out, the individual miners were selling out to investors like Treadgold, who was amassing long tracts that could be

developed for large-scale mining. These corporate investors operated in a different fashion: where the individual prospectors were willing to take a chance in hope of making another big discovery, the corporate investors were cautious and, because of the large sums of money they were putting on the line, averse to risk.

Where the individual miner worked on his own, relying in great part on chance, the corporate miners included teams of engineers who carefully and systematically tested their holdings and developed plans based on the scientific evaluation of the pay streak. At the same time, they were cementing the conditions under which they operated to ensure stability. Water, timber and access rights were sought and granted. Costs of both transportation and energy were regularized by 1909, and a regulatory regime was fostered that would ensure continuity in the rules governing their mining operations. On the basis of systematic gathering of information, they formulated mining strategies that incorporated many claims that would be mined over a span of years.

The Yukon Gold Company was quick to point out the differences between the earlier individual mining methods and the new order that they were imposing in the Klondike:

*[Now] hundreds of men went to work for the large companies. The Yukon Gold's army of employees on construction never failed to get their pay, and this was quite a contrast to the conditions which existed among many of the individual employers of previous years, when small debt courts were crowded with disappointed laborers.*

*During the earlier days of this camp it was a task among many men to get what they had earned, and oftentimes the men were allowed the poorest fare and not granted regular and considerate hours. The Yukon Gold company never has had any labor troubles in the Yukon. The men have been supplied the best of foods, and their table always is such that any choice and careful liver from the largest cities may set down and enjoy the meals. The highest grades of goods are supplied the camps.*

*The company not only keeps an army of men engaged in operations of dredges and hydraulics, but scores of men and many horses are working constantly in the woods getting out wood in the winter, and in the summer another large contingent is required to float the wood down the streams to the mouth of the Klondike, and then to load it on the cars of the Klondike Mines railway for transportation to the places on the creeks where it is used for thawing.<sup>13</sup>*

The new order of mining was being done on a scale that the early prospectors could not have imagined. It consisted of a highly integrated web of activities and teams of men performing a wide variety of functions in order to bring water, firewood and electricity to the dredges and hydraulic works, which were operated by shifts working around the clock and supported by a maintenance system that kept it all moving. Behind the scenes, a corps of engineers kept records of work performed, materials consumed and conditions

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<sup>13</sup> Dawson Daily News (August 17, 1913), p. 46

encountered. Progress reports were regularly compiled and the progress of the company was analyzed with an eye to reducing costs.

What Yukon Gold said about the irregularity and unreliability of wages from individual miners carried more than a grain of truth. The courts were filled with disputes over payment of wages, and the voters, a large proportion of whom were individual miners, clamoured for a miners' lien act to protect the wages to which they were entitled.

By 1912, the individual miners must have felt as though they were an endangered species. The population was dwindling as the claims were worked out. News of gold strikes in other regions had drawn off large numbers seeking the opportunity that these new discoveries offered. By 1911, the population of the territory was a third of what it had been a decade earlier; within 10 years, it would be halved again, and a larger proportion of those who remained became wage-slaves lured by the appeal of a steady and predictable, if small, pay cheque.

The bustling goldfield communities that thrived 10 years earlier had closed up and disappeared. Gold Bottom, Gold Run, Sulphur City, and Caribou were abandoned by people who moved away to greener pastures and were replaced by temporary camps that serviced the dredges. The new industrial order was also making its mark. After Canadian No. 3 and No. 4 dredges were completed, they began to chew their way east up the Klondike valley from their birthplace near the mouth of the fabled river. Where gold lay beneath the surface, nothing above it was sacred. Around the industrial headquarters at Guggieville, a small cluster of two dozen cabins had been built and market gardens planted; however, the Placer Mining Act gave precedence to what lay beneath the surface. Boyle's company paid the owners' land clearing costs, covered relocation of the buildings, bought any vegetables that had ripened in the gardens, and then proceeded to harvest the gold that lay beneath. The dredge worked its way forward until it loomed over the Old Inn roadhouse, which seemed destined to succumb to its steely bite. Fortunately, it was on Yukon Gold Company ground, so Canadian Klondyke Dredge No. 4 veered away, and the inn was spared – temporarily.

Grand Forks had suffered a similar demise. By 1909, it was a shell of its former self; the glory days were clearly past. The town acquired a gap-tooth appearance as buildings were demolished or moved. Then, in 1910, half of what remained went up in smoke when a major fire swept through town. Another fire completed the devastation the following year. By that time, the Yukon Gold Company was constructing Dredge No. 9 a short distance from where the NAT&T Co. store had once stood. When completed, the dredge began undercutting the very ground upon which the town was located. The Gold Hill Hotel, built by Belinda Mulrooney at the peak of the gold rush, continued to operate until 1920, while the remaining general store continued for another year. After that, Grand Forks became merely another memory of the glory days of the gold rush.

New communities developed, centred on the mining operations of the big dredging companies. Guggieville was located near the mouth of Bonanza Creek, next to where the Ogilvie Bridge crossed the Klondike River. Because of the remoteness of the operation from southern supply centres and slow delivery time for parts, the Yukon Gold Company built massive maintenance shops with cranes, as well as warehouses and a

barn, mess hall, market garden and blacksmith's shop, a gold room for refining gold and a row of staff houses nearby. Guggieville lasted until the company shut down its last dredge in 1923. The company had its own social elite within Dawson City, and was often at odds with the community over its practice of importing employees and supplies from Outside, rather than hiring and making purchases locally.

The Canadian Klondyke Mining Company constructed its headquarters at the mouth of Bear Creek. The three-stack steam plant was the central focus, around which three warehouses, a stable and a machine shop were built. For as long as the company was in business, this camp grew and evolved according to the needs of the business. The Klondike River flowed beside the mining camp, and Bear Creek flowed out of a cleft in the hills behind it.

### Changing times

*Through the first decade of the [twentieth] century, there was an increasing vocal opposition by the independent miners to the 'monopoly' practices of the vertically integrated corporations. The local population felt they were being robbed of their birthright, of control of the society they had built in the wilderness. Forced to limit the time for the earlier holidays in early July by introduced mining practices, the community leaders sought a holiday in the new slow time of the year.<sup>14</sup>*

In 1911, under pressure from the Yukon Order of Pioneers (YOOP), the Territorial Commissioner decreed that August 17, the date on which the original discovery claim was staked in 1896, would become a holiday. The holiday remains to the present day: each August, Yukon celebrates and honours the tradition of the independent miner.

In August 1912, George Black, then newly appointed commissioner of Yukon, noted the dichotomy between big business and the individual miners. "The great work of the pioneer is likely to be forgotten," he stated in a tribute to the pioneer prospectors.

The efforts of men who came north during the 20 years before the gold rush led to the discovery, and the current prosperity and growth could be attributed to them: "We should see to it that men of the stamp of the old pioneers ... are respected and encouraged, remembering that on the success of their efforts the future prosperity of the country depends."<sup>15</sup>

Black knew all about that; he was one of the hardy horde of stampedeers who came over the Trail of '98 during the great gold rush. Black discovered gold on Livingstone Creek, an area still being mined today. He hailed the pioneer spirit of the early miners, who braved the dangers of the pass and went fearlessly into the unknown wilderness. It was by their dauntless spirit and quality of character that the territory was built, he

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<sup>14</sup> David Neufeld, "Public Memories and Public Holidays: Discovery Day and the Establishment of a Klondike Society" (Going Public, Public History Review 8, 2000), p. 80

<sup>15</sup> Dawson Daily News (August 17, 1912), p. 4

said: “The ideals of the pioneers are those that might be followed and to advantage lived up to by all. They stand for the principles of true brotherhood, honesty and fair play.”<sup>16</sup>

The population exodus was accelerated by the Great War of 1914–1918, with nearly a thousand Yukon men going overseas, almost half of whom listed themselves as miners. During their absence, the government made provisions to hold their claims in good standing until their return. For a community of between four and five thousand people, it represented a significant proportion of the population. Of those who fought, 100 people died, and only about 100 returned to the territory after the war.

Yet the individual miner, though threatened by extinction, never disappeared from the goldfields. After the war, many miners held tenaciously to their mining claims, often eking out a living mining by the traditional means that had been used by miners before and during the gold rush. Some found employment with the dredging companies for the summer while working their own claims in the winter; others resolutely carried on in their independent fashion. Many of them survived into the 1960s and 1970s, dying from old age in cabins scattered on various creeks and tributaries or in old-age facilities provided at first by the Sisters of Saint Ann and later by the government.

Corporate industrial mining suffered during and after the Great War. Abandoned by Boyle, who sought greater adventure in faraway Russia during the Great War, the Canadian Klondyke Mining Company faltered and eventually went into receivership. The Yukon Gold Company withdrew from Yukon after the completion of the 1923 dredging season. The fate of the big dredges seemed at risk for a while as the giants in the mining scene faltered or moved away; but Treadgold prevailed and brought together various companies and molded them into the Yukon Consolidated Gold Corporation (YCGC). Gold production never again reached the level that had been achieved in 1913, but neither did corporate mining disappear.

A number of factors favoured gold mining after the Great War. First, experiments conducted with cold-water thawing in Alaska proved that the use of steam was not necessary to thaw the permafrost; cold water could do it even more effectively and at a much lower cost. Second, the price of gold rose to \$35 an ounce in 1934. And third, “The Company” (as it was simply known) could take advantage of the low wages and ready workforce that was available to them during the years of the Great Depression.

Reduced operating costs and a 75 percent increase in the value of gold meant a resurgence in exploration and drilling by the YCGC, followed by the construction of several new dredges during the second half of the 1930s. Under the management of McFarland, a team of engineers plotted the extent of productive ground and planned an ambitious program of dredging that would continue for another 30 years. Each area to be dredged was test-drilled, and the extent of profitable ground was plotted. The course of each dredge was planned, and before digging commenced was bush removal, overburden stripping and pay zone thawing. During the 1930s, when the rest of the country was plagued by an economic depression and high unemployment, the Klondike economy and employment remained stable with an enlarged fleet of dredges

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<sup>16</sup> Dawson Daily News (August 19, 1912), p.4

profitably mining gold. McFarland remained a consistent presence in corporate dredge mining from his arrival in Yukon in 1909 and for the next 50 years.

The Great War also affected Dawson City in a negative way. The continuous departure of men for fighting – and the seasonal departure of many for warmer climes during the winter months – impacted the local economy. In 1918, toward the end of the war, the federal government made dramatic reductions in civil service expenditures, which hurt the economy. The final blow to the community was the sinking of the Canadian Pacific coastal steamship *Princess Sophia* in October 1918, with the loss of life of several hundred Yukon residents, many of whom were civic leaders.

From that time on, Dawson City was greatly reduced in stature. The aura of the gold rush, which permeated the town, never left, but it was diminished by the lack of heady optimism. The consolidation of the various mining companies under one corporate cover brought continuing stability to the gold rush town, but at a cost: Dawson City became, in effect, a company town dependent on the YCGC. At its peak, the company had as many as 800 employees operating the electrical plant and power distribution, stripping and thawing the ground, operating the dredges, refining the gold, and repairing the equipment. The economics of the businesses in Dawson City fluctuated with the seasonal operation of YCGC, and credit was extended by businesses to company employees who were laid off during the winter, on the understanding that accounts would be settled once they went back to work in the spring.

With the closure of the Yukon Gold Company, Guggieville vanished, but the industrial centre at Bear Creek continued with a small cluster of employees living around the perimeter of the main compound. Roadhouses continued to operate, scattered throughout the goldfields. Dredge camps became population centres on a seasonal basis, although Granville developed into a small year-round settlement, centred on Andrew Taddie's roadhouse, 100 kilometres from Dawson. Each dredge camp consisted of a number of long, narrow bunkhouses, a mess hall, a dredgemaster's residence, and assorted support facilities necessary for the operation of the dredges in the adjacent areas – Dominion, Sulphur and Quartz Creeks.

As long as the YCGC continued to operate, this pattern of settlement continued, garnished with a scattering of independent miners settled on claims not held by the company. Some of these miners had wives with them, though wives were often content to live in Vancouver or other places while their spouses mucked for gold on their faraway claims.



**The giant machine shop at Bear Creek was designed to repair everything**

Source: Gates collection

The lifestyle of the corporate miner was starkly different from that of the independent miner, who always had to contend with risk. Individual miners exercised great freedom in prospecting for gold throughout the region or the rest of the territory, but their incomes were uncertain, dependent in large part on locating and staking ground that they could work themselves or develop for sale. They might form partnerships or take a lay on a piece of ground that they worked for the claim holder. If they were to find a rich piece of ground to mine, they would realize great returns, even wealth; on the other hand, they might not recover enough gold to cover their expenses or pay their employees. Typically, they lived in log homes with log outbuildings that they built themselves. Because transportation had not advanced greatly, most miners did not have their own transportation, and supplies would be delivered to them in the goldfields. Garbage was not easily removed. The stockpile of cast-off metal containers became the raw material to make the things that were needed during the periods between infrequent trips to Dawson.

During the 1930s, there was a certain structure and predictability to the lives of the YCGC “company men.” They were divided into seasonal employees working for wages, and salaried staff who worked year round. The former usually began work in the spring when preparations were being made to start up the fleet of dredges. As the dredges came into operation, shift crews were brought on, as well as crews for stripping

and thawing the ground in advance of the actual mining. During the operating season, these men worked long hours and took no day of rest. For the YCGC, production to cover the costs and operation of the company throughout the year had to be gained during the short summer of continuous daylight. Efficiency of operation was measured by the amount of “down time,” the aim of which was to keep stoppages to a minimum. Weekly and monthly reports detailed the operation of each dredge. The company and staff adhered to strict procedures and highly structured work.

Salaried staff, on the other hand, were offered steady and reliable year-round employment, usually five-and-a-half days a week, with two weeks off at Christmas when the entire staff took a holiday at the same time. They never went “Outside,” meaning they never left the territory, during holiday breaks as the time and distance made such travel impractical. Some were provided company housing; others occupied lots near Bear Creek, the corporate headquarters, where they built homes and raised their families.

The company might make available resources to assist the staff in cutting their winter firewood, or in moving a building onto the lot they intended to develop. Staff could store a certain amount of food in refrigerated company storage that was accessible to them once or twice a week. For staff housing, electricity and running water was supplied at a nominal rate. Such employees were tied to their work and seldom had the opportunity to travel.

Bear Creek became a lively community of its own 10 kilometres from Dawson. Until the late 1950s, private automobiles were uncommon, so the two communities were separate and distinct; children in Bear Creek were bused to Dawson to take classes in the public school, but a trip to Dawson was something of an occasion, usually reserved for the weekend. The Company had created its own specialized work-force adapted to its operational needs, all working to a common schedule, with shared rules and social context. Reflecting upon their experiences, past employees and the children who grew up there remember it with a certain fondness and nostalgia.

### **The changing landscape**

It is difficult to gauge the cumulative impact upon the landscape of activity during the 60 years of corporate industrial mining. The most noticeable landscape-altering activity was that of dredging the gravel for gold. This work was preceded by stripping and thawing the overburden and removing the unprofitable muck that overlay the bedrock to save the best ground for dredging. Similarly, hydraulic mining chewed away the white quartz gravel that covered the hillsides of Bonanza, Eldorado and Hunker Creeks. Entire hills disappeared as the hydraulic monitors washed the gravel away.

Between dredging and hydraulic work, more than one-quarter of a billion cubic metres of material was dug up or removed between 1906 and 1966. The tailings left behind by the dredges look from the air like hundreds of worms twisting and turning across the valley bottoms. The most distinctive of these fill the Klondike valley for 15 kilometres from the mouth of Hunker Creek to the confluence of the Klondike River

with the Yukon. The characteristic form of these gravel tailings is slowly being levelled and smoothed over today as residential and urban industrial development expand into the valley from Dawson City.

The Klondike valley was once a fertile broad plain with tall stands of timber, all of which disappeared as the dredges of the Canadian Klondyke Mining Company and the YCGC chewed their way through the valley. Much of the timber had already been cut and processed in Boyle's sawmill operation, or used as firewood, but the net effect was inconsequential after the dredges had completed their work. An emphatic illustration of the modification of the terrain was the rerouting of the Klondike River. It originally ran along the south side of the Klondike valley where it had passed beside Boyle's mining camp at Bear Creek; in later years, dredging reshaped the landscape and forced the river to the north side of the valley, where it is located today.

The insatiable demand for firewood and timber to fuel the mining in the Klondike had a significant impact upon the vegetation. Within two years of the discovery, the hillsides of Bonanza and Eldorado Creeks had been stripped bare of firewood. The large companies accelerated and increased the demand for firewood to thaw the ground in front of their fleets of dredges. Boyle's power plant consumed large quantities of firewood to keep the boilers up to pressure and the turbines turning smoothly. The demand for more and more firewood sent contractors farther and farther afield in order to meet the demands of their customers. The Yukon Gold Company alone regularly let contracts for 35,000 or more cords of wood per season. A single order of that size would keep a home warm for thousands of winters. Suppliers floated the logs down the Yukon River from timber stands far upriver.<sup>17</sup> Up to 20,000 hectares of timber were cleared from the Klondike and Yukon valleys over the next 60 years. The vegetation has since returned to the hills and valleys of the Klondike, but it is not known to what extent the underlying permafrost has been altered by such massive clearing. The vegetation on the hillsides today appears to be thicker and more deciduous in nature than the vegetation that covered the hillsides in the early days.

The land was crisscrossed with pipelines and ditches, powerlines and roads, all of which supported the large-scale mining that advanced through the valleys over the decades after the gold rush. Relocating a dredge to work new ground meant that all of these features were adjusted to reach and serve the new locations. Their signs still populate the hills and valleys of the Klondike where they have been undisturbed by subsequent mining. They attest to the continuing tradition of corporate industrial-scale placer mining.

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<sup>17</sup> A cord of firewood wood is described as the amount of wood that, when arranged so pieces are aligned, parallel, touching and compact, occupies a volume of 128 cubic feet (3.62 m<sup>3</sup>). This corresponds to a well-stacked woodpile 4 feet (122 cm) high, 8 feet (244 cm) long, and 4 feet (122 cm) deep.

## **Chapter 4: THE MODERN MINING ERA: 1967 TO THE PRESENT**

The large corporate mining industry inhabited the Klondike for six decades. During the second half of this era, it was a single multi-faceted operation that systematically and efficiently dredged the creeks and valleys of the Klondike region. Yet even as the Yukon Consolidated Gold Company (YCGC) was going through a period of resurgence at the end of the 1930s, changes occurred that had an impact upon profitability.

During the Great Depression of the 1930s, when jobs were scarce across North America, there was steady seasonal employment in the Klondike. “The Company” paid the going rate for seasonal labour that worked 10-hour shifts, seven days a week, with no overtime, under often gruelling and unpleasant conditions. Anyone who could not produce was unceremoniously fired without compensation.

With the advent of the Second World War, the demand for labour increased substantially, both for military service and for production jobs in the military industries. Once America entered the war, gold lost its strategic importance. Skilled workers were lured away to better paying jobs in the base-metal industries. The pay elsewhere was good; the wages paid by the Americans for construction work on the Alaska Highway were even better. The YCGC found challenges in recruiting enough men to keep the operations working. Requiring a crew of 700 men at peak operation, the company was able to hire only one-third that number or fewer during the war.

After the Second World War, YCGC continued to be plagued by labour shortages, rising costs, a fixed commodity price, an aging infrastructure and a finite reserve of gold that could be mined profitably with the price fixed at \$35 an ounce. By the end of the 1950s, the sunset of the YCGC was clearly in sight, but the company continued to limp along with a reduced fleet of dredges until November 1966, when the dredges were stilled, the bucket lines stopped moving and gold was no longer melted into ingots in the gold room.

In its later years, the company experimented with new techniques in hopes of improving its profitability. A number of jigs and devices were tested to determine if the gold recovery could be improved, but these attempts failed. Some individual miners had been operating open-cut mines using bulldozers to move the gravel into the sluice boxes. The company attempted the same method of mining on the benches of Dominion Creek, but with their highly structured mining system, it never worked efficiently. As the years progressed, they continued to maintain their aging dredges and the outdated fleet of vehicles. Economies were made in the camp operations, and the quality of food served in the camps declined.

Once YCGC ceased operating, the dredges lay idle, the camps stood empty, and the machinery rusted. The power plant at the North Fork, which had operated for 50 years, was shut down and replaced by a diesel-powered plant in Dawson. Today, the community of Dawson is powered by hydroelectricity, with the diesel plant serving as a back-up system in case of power failure. The company headquarters at Bear Creek were shut down, with only a caretaker remaining to watch over the 70 buildings at the site. It was subsequently purchased by Parks Canada which uses the compound for its operations infrastructure and the

storage of historic collections. Parks Canada also acquired two of the company dredges: No. 12, the smallest of the YCGC dredges, remains on Dominion Creek; and Dredge No. 4 on Bonanza Creek has been declared a national historic site with seasonal on-site historical interpretation. It is maintained and repaired. The remaining seven dredges situated throughout the goldfields are now relics and continue to decline. Some have been cannibalized for parts and machinery to be used at other mining operations. Others were purchased from the company representative and are being disassembled for salvage.

Several of the homes surrounding Bear Creek, however, remained occupied as their owners took on other jobs. A modern subdivision grew up, with improved all-season roads making it easy to commute to new jobs in Dawson City. Buildings in the dredge camps were slowly removed and put to use in modern-day mining camps. Others were hauled into Dawson City, where they have been refurbished for housing. Some of the old bunkhouses were even renovated for part of a modern-day hotel. The goldfields today are like scars on the hillsides with abandoned roads, old ditches and former powerlines. The bed of the Klondike Mines Railroad still snakes along the forested hillsides of Bonanza Creek. One of the old boxcars lies abandoned near the crest above Bonanza Creek, and some running gear and the old inspection pit at the terminus in Klondike city (now Tr'ochëk) survive to testify to the existence of the former railroad. Much of the ground has been reworked, obliterating evidence of the earlier era of dredge mining. Large areas of old dredge tailings still remain in the Klondike valley as mute testimony to a bygone era.



**Dredge tailings from the Klondike valley**

Source: Government of Yukon

Relics of cabins still stand at the site where the town of Grand Forks once flourished. The graveyard remains on the hillside to testify of those who died, with many of the markers restored in recent years. Yet amid the remains of a bygone era along Bonanza Creek are modern mining operations that affirm that the Klondike is a dynamic landscape that continues to evolve. Old tailings have been mined again to pick up the residual gold left behind by earlier mining, while heavy equipment scours the hillsides and the tributaries, extracting gold from areas that had been untouched for decades. Mining is as much a part of the Klondike today as it was in 1896.

Placer mining in the Klondike reached its nadir after the closure of the operations of the YCGC. Where a million ounces of gold had been recovered in 1900, the amount had slowly fallen to five percent of that yield by the last years of dredging. After the shut-down of the YCGC in 1966, the total output of Yukon fell to 4,234 ounces by 1972, a mere 10 percent of what it had been six years before, and 250 times less than at its peak during the gold rush.

The future of gold mining in the Klondike region changed dramatically during the 1970s, although it was too late for the defunct dredging giant. The price of gold began to rise in 1973, and by the following year, it had seen a five-fold increase from \$35 an ounce to nearly \$160 in 1974. The price continued to rise until 1980, when it stood at over \$600. There was another stampede to the Klondike during that period and a corresponding rise in mining activity in the goldfields. In 1980, there were more gold claims in good standing in Yukon than there had been since the gold rush of 1898. Gold production by 1982 was 15 times what it had been a decade before.

Two technologies dominated in the modern mining era. The first had a long tradition in the Klondike: hydraulic mining continued to be an efficient means of stripping off overburden to expose the economic gravel that lay buried beneath.

The second technology, a more modern innovation, has become known as “cat” mining. Road preparation and moving of buildings, dredges and equipment were all performed with caterpillar tractors, but the first known application of these machines for mining occurred during the Second World War. Operating a dredge on Jack Wade Creek, Harold Schmidt and partners used bulldozers to push pay dirt through a sluice box when their dredge broke down.

Despite unsuccessful attempts by YCGC to mine gold using caterpillar tractors, individual miners began to employ them with varying success. When the price of gold skyrocketed in the late 1970s and early 1980s, the use of caterpillar tractors and other earth-moving devices became the common practice.

A typical operation in the early 1980s consisted of one or two mid-range caterpillar tractors, a backhoe operating with a sluice box and a loader. Draglines were used occasionally, and monitors were often employed to wash away overburden before the “cat” was brought in to move the pay dirt to the sluice box. One operation on Hunker Creek employed a rotating screen system, or trommel, salvaged from two abandoned YCGC dredges, to separate and process the gold-bearing gravel. It defies any effort to describe “typical” placer mining during the modern era. Some people mined underground and blasted the frozen material before hauling it out of the drift. Others employed huge “belly dump” scrapers to strip off overburden. Each strategy was employed with varying success.

Some of the mining that was done during this heady period of high gold prices was hastily planned and often inefficient, yet still profitable – until the price of gold declined during the mid-1980s. During the period when the price of gold was rising, there was a rush of investors and mining ventures in the Klondike goldfields. Many of these failed within one or two years. In order to survive, miners looked around to economize in their operations. Many of these innovations revolutionized placer mining and ensured a long and enduring life for the reborn industry.

In the early 1980s, triple-run sluice boxes like the “Ross Box” were popular recovery systems. Scientific testing in the late 1980s indicated that pre-screening pay dirt and ensuring an even flow into the sluice runs was more important than selecting between a single or multiple-run sluice box. Proper pre-screening improved efficiency in gold recovery. Separating the large material from the fine material and breaking up clay clumps were both important measures to ensure that gold was not lost. The finer the pre-screening of the pay dirt, the greater the recovery of gold in the sluice box.



**The Ross Box was a popular innovation with independent miners during the 1980s**

Source: Gates Collection

Modern placer mining has become less of an art and more of a mixture of sound business practices and applied science. The independent miners can no longer rely upon chance for a favourable outcome in their operations. By using systematic drill testing to define the economic deposit and identify the areas to be mined, and scientific testing of screening plants and gold recovery systems, miners have replaced chance with a solid foundation of data-tested analysis. Geophysics is also being used to find bedrock and define the

thickness of gravel. Modern mining operations are carefully planned, often years in advance. There are still a few miners who take chances and do not test the ground before they mine it, but these operations are more likely to fail.

Ground that has been worked before is being worked again. Deposits where bedrock was too deep for the reach of the dredge buckets or that were once deemed too low-grade to be mined by dredging are now being uncovered and mined. Placer deposits along the margins of the old workings are being explored, and exploration is becoming economical because of more efficient mining methods; as the price of gold increases, the extent of these margins expands accordingly.

Efficient mining techniques and careful recycling of water reduces the supply of water required. Combined with controlled feed-rates of gravel, the careful washing and screening of pay dirt optimizes the capture of gold. Other efficiencies in mining have reduced costs and increased profitability. A new rod mill, for example, which has recently been tested with positive results, can be used for extracting fine gold flakes from previously unusable concentrate, further increasing gold recovery. The mill is a small, cylindrical container with a number of steel rods. When filled with concentrate containing gold particles and rotated at the correct speed for the correct time, it will allow for recovery of 99 percent of the gold. Increased fuel economy reduces one of the major expenses in a modern mining operation. Use of conveyors greatly improves the processing capacity of a sluicing operation and reduces the number of times the screening plant must be moved during a season. Larger machinery reduces the number of times that material must be handled.

Another notable characteristic of a modern placer operation is the scale of the work. Equipment now employed in family operations has greatly increased capacity, some rivalling the capacity of the dredges from earlier decades. Bulldozers are capable of pushing as much as 34 cubic metres of material in a U-blade, and some operations strip and sluice close to a million cubic metres in one season.

The impact of the modern mining is of a scale comparable to the dredges of earlier days. Viewed from the air, the hillsides and valley bottoms of the gold-bearing creeks in the Klondike show great areas of exposed gravel. The hilltops have been tested with exploratory trenching in search of paying lode deposits, especially in the region of the Lone Star Mine above Bonanza Creek. The old dredge tailings in the Klondike valley are still visible today. As the dredges worked their way up the valleys, the finer silts and sands were deposited underneath, then covered by the rocks and boulders stacked behind the monstrous machines as they moved forward. Hence, even today there is little vegetation growing amid the characteristic tailings that had been stripped bare of nutrition.

The modern miner faces a different regulatory regime today that requires rehabilitation of the landscape after the mining moves on. Instead of stripping away the topsoil in front of the dredges, the modern miner stockpiles topsoil and gravel for re-profiling the stream beds and valley bottoms after their work is complete. Stream channels are stabilized to reduce erosion. Other rehabilitation work includes built ponds and waterways to encourage habitat for waterfowl and moose. Efforts in this field are recognized annually by the Robert E. Leckie Award for Excellence in Environmental Stewardship, which was named in honour

of a mining inspector from Mayo who passed away in November 1999. Leckie is recognized as an innovator who promoted planned reclamation, research, and cooperation that benefited both government and industry.

One mining company even established an “ethical gold” policy for marketing its gold product. To be considered ethical, gold producers commit to running mines that comply with environmental and socio-economic standards, respect workers’ rights, work with nearby communities and First Nations, and strive to reduce the carbon footprints of their mines.

### The environmental issues

*... as the creeks become worked out, comes the levelling of the hills, the deep, canyon-like creeks affording unlimited dumping ground for an unknown period. There will be no state legislation against it as in California. There are neither farms to be overcome nor sluggish river to become blocked by the dirty water from the mines. Mountain torrents are harnessed for power. Mountain streams furnish the hydraulics....<sup>18</sup>*

\*\*\*\*\*

*The 1906 legislation was focussed on the rights of the claim owners and the conflicts between them, or conflicts between them and outside interests. The law makers gradually became more concerned with damage to the environment and the rights of those not directly connected to the placer mining industry. Land claims settlements introduced more stringent authority over placer mines and put more serious focus on the environment.<sup>19</sup>*

With the passage of the Yukon Placer Mining Act of 1906, a regulatory regime for overseeing the placer mining industry was put in place that remains to the present day. Prior to that time, changes in the regulatory regime were achieved through order-in-council, causing considerable upheaval and uncertainty in the mining industry. The focus of the Act in the early twentieth century was to facilitate mining, and many of its provisions took priority over other concerns. The Act has evolved as a result of precedents established from legal disputes brought before the courts over the years. It recognized the need to protect property owned and/or occupied by those other than the claim holder, but through the passage of time, the demands and needs of other users have become more comprehensive.

During the modern era of placer mining in Yukon, changes in legislation have been enacted to reflect changing values in the community and competing interests. No longer could miners look to the Klondike as a place free from the restrictions and regulations found in other places. Amendments to the Yukon Placer Mining Act of 1972 protected burial places, national parks and designated historic sites, as well as public

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<sup>18</sup> Dawson Daily News, Sourdough Edition, August 17, 1913: 44

<sup>19</sup> Yukon Placer Gold Mining Historical Research Report (Vintage Ventures, 2015), p. 41

infrastructure property or lands needed to fulfill land-claim obligations. The Northern Inland Waters Act imposed requirements for settling ponds to reduce sediment in streams, and the Environmental Assessment Review Process guidelines affected all mining operations in Yukon. The Yukon Fisheries Act of 1977 imposed further restrictions upon the alteration of fish habitat.

The mining industry felt that it was under attack from government bureaucrats administering these various regulations. They were subject to multiple inspection and monitoring activities that seemed like arbitrary requirements resulting in huge increases in operating costs. The industry fought for an integrated review procedure with which they could deal with all of these legislative requirements through a single process. Through these discussions, the Yukon Water Board, a quasi-judicial body, became the forum where the regulatory issues were dealt with and water licences were issued. The signing of the Yukon Placer Authorization in 1993 also set standards for sediment loads and protection of fish habitat on each creek. In 1998, the Placer Mining Land Use Regulations became the final step in formalizing the placer regulatory regime when it established standards for land reclamation and other activities.

The Umbrella Final Agreement (1993) brought about significant changes in the governance of the Yukon Territory, introducing a new level of First Nation self-government. The First Nations joined the communities in offering strong support to the placer mining industry. In 2003, responsibilities formerly administered under the Department of Indian Affairs and Northern Development were devolved to the territorial level, where the physical distance between the placer mining industry and government regulators was greatly reduced. In 2005, the Yukon Environmental and Socio-economic Assessment Act was passed, thus setting up a process to which all placer mining proposals must now be submitted. There was further regulatory instability after the Yukon Placer Authorization was phased out in 2002, until new standards for settling sediment, discharge and stream restoration were established in 2008.

Requirements imposed by Yukon Workers' Compensation Health and Safety Board have altered working conditions in the placer mining industry. The most serious impact upon the family mining operations was that children under the age of 19 years were no longer allowed to work at the mine face. Since this work was how children learned the family business, there is concern that this restriction will impair the ability of the younger generation to learn the mining business from the older one.

In the face of rising operating costs and a more competitive labour market, modern placer mines in Yukon must find greater efficiencies while mining lower grade deposits or re-mining tailings or side pay. All of the changes just described have required a nimbleness of response from individual placer miners. The modern-day miner in the Klondike must be sensitive to the surrounding community, to environmental restrictions, to health and safety guidelines, and to a constantly changing regulatory framework. In addition to this, they have to master the technological innovations that increase the efficiency and productivity of modern mining.

### **The mining life**

*Not only do we like what we are doing, but we are blessed to be in this amazing, absolutely amazing environment that is so beautiful. ... No one else has that luxury, it's really a luxury*

*... it becomes addictive I think, besides the gold fever that some people get, but I think the lifestyle is addictive too.*<sup>20</sup>

The lifestyle and structure of placer mining in the Klondike has evolved greatly over the past century and a half. It started with a small group of determined prospectors, eking out a living in a remote and isolated wilderness, dependent upon their own physical capabilities to survive and pursue their dream of finding gold.

A stream of prospectors trickled into the Yukon Basin for two decades before the discovery of the Klondike turned that trickle into a torrent. The wildest dreams of riches did not match the legendary wealth found buried in creeks like Bonanza, Eldorado and Hunker. The mass migration to Yukon between 1896 and 1899 turned the region into a new social order. The transformation was revolutionary and dramatic. The Klondike became a catchword for fabulous wealth and dreams fulfilled. It inspired literary minds and altered the world's perception of the North.

A decade after the great stampede, large corporate industrial interests changed the placer mining in the Klondike entirely. The individual miners seemed to be at risk of becoming extinct, yet they persevered and survived. The Second World War had brought about many changes, but the most significant for Yukon was that the United States Army had constructed a pioneer road called the Alcan or Alaska Highway, which was expanded and refined for post-war use. The new highway linked Yukon with the rest of Canada, providing a year-round means of delivering goods to the territory. Similarly, advances in aviation shrank the times and distances for travel; these changes did not favour the Klondike. Whitehorse was now the road and aviation transportation hub in the territory. Long isolated from the Outside by its summer river and winter road transportation system, Dawson was eventually connected to it with an all-season highway. By 1955, river transportation had ceased.

To make things worse for the gold rush community, in 1953 the capital was relocated to Whitehorse. Dawson City survived but was dramatically depleted; its population fell below 1,000 people. In its contracting economy, the aging town withdrew into itself. With lack of growth, the old buildings were not torn down but remained standing, slowly but gracefully declining from natural aging. By the end of the era of corporate industrial mining, Dawson was a town of make-do and recycling. When the hospital run by the Sisters of Saint Ann burned down in 1951, long-abandoned government buildings, like the courthouse and the commissioner's residence, were put back into less elegant use as a hospital and old folks' home. The grand territorial administration building on Fifth Avenue served as a temporary school when the original school, designed and built by government architect T.W. Fuller in 1901, burned down in 1957. After a new school was built, the building was used by the community as a museum and small radio station, although it was too big to heat and operate year-round at the time.

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<sup>20</sup> Lilian Grubach-Hambrook interview, 31 March 2015, in Tara Christie, Placer Miners 2015/16: "Telling Our Stories" Interview and Lifestyle Research Summary Report (Tr'ondëk–Klondike World Heritage Nomination, 2016), 8.

The end of the era of corporate mining might have heralded the end of placer mining in the Klondike but for the remarkable increase in the price of gold. The individual miner has again emerged as the dominant force in the long tradition of placer mining in the region. In 1974, the Klondike Placer Miners' Association was formed by 56 placer miners. The organization, the first constituted to represent the interests of the individual placer miners, continues to serve the industry today and proudly includes more than 100 family-operated businesses. Many of these businesses consist of no more than four employees, but some hire as many as 30 people. A family operation seems to be characterized by the presence of a nuclear family mining a claim or claims with one or more employees. These enterprises consist of two or three generations, and some chart a lineage dating back to the gold rush era. Many of these have established homes in Dawson City or on their claims, and they view the Klondike as their home.

The Tr'ondëk Hwëch'in have again emerged as significant participants in the goldfields. Many have gained employment at nearby mines, some even managing or operating their own mines. Tr'ochëk, the village at the mouth of the Klondike River, from which the First Nation was pushed during the peak years of the Klondike Gold Rush, has returned to their ownership as a result of the settlement of the Tr'ondëk Hwëch'in Final Agreement. Actively mined until the 1990s, Tr'ochëk had its mining interests bought out by the Government of Canada when the land was returned to the First Nation as part of its land-claim agreement. It has been designated a national historic site by the Government of Canada and today is managed by the Tr'ondëk Hwëch'in.

Today's placer mines are different from those of the Klondike Gold Rush. The scale of the modern operations, the technologies employed, and the paperwork and regulatory challenges would astound the early placer miners. A job that kept a squad of men working for a full day, such as moving a large volume of dirt, can be done by a modern bulldozer in a few minutes.

Changes in transportation revolutionized and transformed mining in the Klondike. A century ago, the rhythm of the mining industry was formed around the seasonal calendar. The rail and water transportation line connecting the Klondike with the outside world was severed each winter when, for a period of six months, the Yukon River was frozen. Supplies had to be stockpiled to last the winter, and parts and equipment had to be brought in during the navigation season, when the Yukon River was free of ice. Rather than relying upon the tenuous supply chain to bring badly needed parts in from major southern industrial centres, the large dredge companies constructed repair and fabrication facilities at their headquarters in the Klondike valley. They were able to form most of the necessary parts from the raw stock they kept on hand to maintain the operation of their fleet of dredges. At the time, it was the only practical strategy amid the isolation of the Klondike.

Times changed, and roads were built. Air transportation was born and matured, creating direct year-round links with the outside world. Parts that once took months to be delivered to the mines in the Klondike can now reach their destination in hours or a few days. Transportation changed the character of settlement in the goldfields. With the improved network of roads since the 1960s, and with sturdy, fast and reliable vehicles for transportation, the distances within the Klondike have shrunk. Roadhouses, once an essential link in the transportation system of the North, became unnecessary. A trip of one or two days on foot or by

wagon required frequent stops for meals and rest. Today, the same trip can be accomplished in a couple of hours. Intermediate stops between the mines in the outlying creeks and the supply centre at Dawson City are no longer necessary.

Although there are some who have established their homes permanently in the goldfields, the camps of many modern Klondike placer mines are modular units that can be moved easily to meet operational requirements. Combined with better and more sophisticated communications, health and medical services have also come within reach for even the most remote camps. The revolution in communications and digital technology have altered camp life in ways that the early stamperders could not have imagined. Satellite communications make it possible to reach anywhere on the planet at a moment's notice. News and world events are now accessible the moment the events occur. Sports events can be watched and enjoyed as they are played. The advent of computers has made global information as accessible to the miner on a remote creek as it is to someone in New York City or Sydney. There is hardly a mining camp these days that is not linked to the internet. All of these things have happened within one lifespan.

Yet the modern miner, like those of bygone days, must still work within the seasonal variations imposed by the harsh northern environment. Mining stops with freeze up and commences with spring thaw. The mining season is short and the hours of work are long; the frozen ground still imposes challenges to mine efficiency. The modern miners must manage all of these concerns and get the timing just right, if they are to succeed.

### **The individual miner survives and thrives**

One hundred and twenty years have passed since the Klondike Gold Rush, and placer mining is still a mainstay of the economy of Tr'ondëk–Klondike. Generations have come and gone, and the tradition of mining has been passed along from the old to the young. There have been wars and financial crises and major changes in ideas and technology. Between the time gold-seekers first set foot in the Yukon valley and the present, a tremendous transformation has taken place. From poling in leaky scows and hiking across the peaks and valleys on foot, we have seen the advent of air travel, the building of roads, and the design of huge machines that have increased the efficiency of the individual miners a thousand-fold. Humans have set foot on the moon, and news from the other side of the globe is transmitted in milliseconds.

In the early decades of the twentieth century, it looked as though the individual miners would become an extinct species in Yukon. Yet they have persevered and thrived. Today, the Dawson City area is filled with men and women and families who make a living extracting tiny particles of gold which has weathered out of the bedrock that underlies the region. In the immediate area of Dawson City, including Bonanza, Eldorado, Hunker Quartz Dominion Sulphur and Gold Run Creeks, there were 86 mines operating in 1985; today, there are more than 100 mines. Of these, 36 are located within the confines of the nominated property. Today, children and grandchildren carry on the mining tradition. They operate on a scale that

their predecessors from a century ago could not have imagined, using technology that could not have been conceived.

Yet there are many similarities that span the century and a half that placer miners have washed gold from the gravel of the creeks and their tributaries. It is still hard work. Risk is still attached to the enterprise. The harsh seasonality of the region means the frozen ground has to be worked. Temperatures still reach  $-40^{\circ}$  C in the winter, and the days are short. The distances are still great, and despite the introduction of satellite technology, the isolation can be profound. And the modern miner still needs to overcome the challenges presented by the unique conditions in Tr'ondëk–Klondike.

Recurring themes in the stories told by the miners include a love of the land they work on, a fierce sense of independence, and a knowledge that the hard work that is required to be a miner. Many recall their start with a few small pieces of ancient machinery, long hours and sacrifice, and then the gradual growth and expansion of their operation into a going concern.

Then, as now, there are miners who leave the region during the winter, while others call the Tr'ondëk–Klondike their permanent home. Some of these have roots that go back generations, while others go back thousands of years. They are part of the fabric of life in the community and make important contributions to it. No doubt this will continue to be the case in the foreseeable future.

### **Commemoration and celebration**

Dawson City was declared a complex of national historic significance by the Government of Canada in 1959. Today, 18 buildings in Dawson City are specifically recognized as being of national significance. Most of these and a number of other historic structures in Dawson City are managed by Parks Canada as part of a larger complex that includes properties in the goldfields, such as the S.S. *Keno*, a Yukon sternwheel riverboat; Dredge No. 4; Bear Creek; and the Discovery Claim on Bonanza Creek.

The territorial government, the Town of Dawson City, and private individuals and organizations have all made contributions to saving the legacy of the gold rush within the setting of a vibrant living community. The old government road that ran along the spine of hills above Bonanza Creek has been reclaimed as an interpreted historic hiking trail. Within Dawson City, there are two territorial historic sites and four more that have municipal designation. A management plan for Dawson preserves the heritage character and historic streetscapes of the gold rush town, while managing growth and development. Territorial incentives to rehabilitate and maintain historic properties have been a powerful tool in helping to maintain the historic fabric of this vibrant community.

More than 100 years since the discovery of gold on Bonanza Creek was first celebrated, Discovery Day continues, memorialized as a territorial holiday. The Discovery Day parade in Dawson is an ongoing tradition led by the Yukon Order of Pioneers.

The beloved prospector crouching over his gold pan has been immortalized on vehicle licence plates. When the government once tried to remove the image, the public outcry led to its immediate reinstatement. The

gold panner has become one of the iconic symbols of Yukon identity, not only to Yukoners themselves but to the world. Today, a statue honouring the prospector stands in a prominent location on the Dawson City waterfront. The bronze miner sluices gold, a ladle in one hand while the other hand clutches the rocker so common in the early days. The independent spirit of enterprise, self-determination and willingness to accept the harsh conditions imposed by the North are embodied in the image of the Yukon miner as they have become part of the Yukon character.



**A derelict Dredge No. 4 was excavated and floated onto a new foundation in 1991**

Source: Gates Collection

The Discovery Claim on Bonanza Creek is commemorated as a site of national historic significance. The site symbolizes the spark that ignited the gold rush, which led to the formation of what we know today as the Yukon Territory. In addition to the bronze plaque affixed to a massive boulder, an exhibit offers thousands of visitors every year an opportunity to learn about the transition from First Nation land to early prospecting and the transition from early hand-mining to massive factory-scale gold dredges.

Nearby, Dredge No. 4 has been designated a national historic site, and an ambitious program of restoration has continued for a quarter-century. Joe Boyle is recognized as a person of national historic significance and is honoured at the dredge with a commemorative plaque.

Through the efforts of enterprising individuals and various levels of government, dozens of buildings within Dawson City have been stabilized and restored. The cabins occupied by Robert Service and Jack London are enshrined and enjoyed by tens of thousands of visitors every year. Scattered around the

community of Dawson City is an array of plaques acknowledging individuals and buildings of national and local significance. Three old trains from the Klondike Mines Railway are sheltered and displayed to the public, and the Dawson City Museum collects, preserves and presents artifacts of both the Klondike Gold Rush and First Nation traditions.

The Dänojà Zho Cultural Centre now stands at a prominent location on the Dawson City waterfront and serves as a focus of commemoration and celebration of the Tr'ondëk Hwëch'in. The First Nation heritage department and its collections and archives is housed nearby.

In the face of encroaching urban development, the municipal government is exploring its options for setting aside some of the dredge tailings within its boundary as a municipal historic site. Below Dawson City, the settlement of Forty Mile has been set aside as a territorial historic site under the Tr'ondëk Hwëch'in Final Agreement, co-managed by the territorial and First Nation governments.

One hundred and twenty years after the initial discovery of Klondike sparked the most dramatic gold rush in history, the event endures and is memorialized for its national and territorial significance. At the same time, First Nation heritage is recognized in Tr'ochëk, a national historic site, and Forty Mile, a territorial one; and First Nation culture and traditions are celebrated at events like the Moosehide Gathering. Together these two traditions have survived, flourished and intertwined in the site known as Tr'ondëk–Klondike.



# Tr'ondëk Hwëch'in Bibliography: 2008 Update

prepared for  
Tr'ondëk Hwëch'in

by Helene Dobrowolsky  
Midnight Arts

October 2008



# **Tr'ondëk Hwëch'in Bibliography: 2008 update**

**prepared for  
Tr'ondëk Hwëch'in**

**by  
Helene Dobrowolsky  
Midnight Arts**

**31 October 2008**

Cover Photographs: Composite photo showing Tr'ondëk Hwëch'in citizens over the years.

## Captions & Credits

Top Right. R-L: Chief Isaac, his wife Eliza, Mary McLeod and her husband Simon, Old Jonas's wife and child, Old Jonas and Mrs. Jonathan Wood (Ellen). *DCM 1990-77-3.*

Top Left: L-R: Sarah DeWolfe holding son Michael Smith, Patricia Lindgren with godson Douglas Smith, Marge Bergman with son John Roberts, and Agnes Barber and her son Clarence, St. Paul's Church, Dawson, 1959. *YA #5770, Martha and Brian Kates collection.*

Middle: Potlatch at Eagle, Alaska, 1907. *YA #5781, Martha and Brian Kates collection.*

Foreground: Percy Henry, Dorothy Lindgren and Mabel Henry at Moosehide. *Tr'ondëk Hwëch'in Archives.*



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## SOUND RECORDINGS

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### Tr'ondëk Hwëch'in & Other Oral History Transcripts

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Tr'ondëk Hwëch'in has an extensive collection of sound recordings and transcripts dating from approximately the 1960s to the present. The recordings come from a variety of sources and were made for various reasons including documenting language, collecting personal histories, and recording knowledge about traditional practices and places within the traditional territory.

Some of this information is confidential and access is limited to other tapes and transcripts. Consequently I have not listed individual recordings but summarized some of the recording projects conducted by Tr'ondëk Hwëch'in and others. For more information about researching the recordings and transcripts, contact the Tr'ondëk Hwëch'in Heritage Department.

Some collections of recordings and transcripts held by the Tr'ondëk Hwëch'in Heritage Department include:

- transcripts from Julie Cruikshank's interviews with First Nations women including Vicki Johnson, Mary McLeod and Patricia (Isaac) Lindgren, recorded in the mid 1970s (copies of transcripts and recordings from Yukon Archives)
- interviews with Joe and Annie Henry recorded by the Yukon Native Language Centre, ca. 1990
- Shirley Henderson's oral history project of 1992 documenting the history of Twelve Mile through interviews with four former residents.
- Interviews with Eliza Farr, Percy Henry, Archie Roberts and Martha Taylor as part of the 1993-1994 Elders Documentation Project sponsored by the Council for Yukon Indians (now CYFN) and organized by Bob Charlie.
- "Life on the River," an extensive oral history project about living and working on the Yukon River, organized by Georgette McLeod, recorded by various interviewers in 1999 and 2000.
- Alaska Oral History Project of 1994. Interviews with four Alaskan elders including Charlie and Helen David, Titus David and Oscar Isaac.
- Recordings of the proceedings of the Yukon River Symposium of March 1995 featuring comments from elders all over the Yukon.
- Other recordings with elders made during trips on the land to archaeological digs and various places within the traditional territory by Heritage Dept. staff.
- Also interviews about traditional practices such as trapping techniques, tanning hides and traditional uses for plants.

Council for Yukon Indians (now Council for Yukon First Nations)

(The following three reports are finding aids describing a/v resources of various institutions as well as describing the Elders Documentation Project and listing the interviewees.

1994 *Oral History Resources of Yukon First Nations People, Final Report*. Pilot project prepared by Sue Spalding (CYI) and Wynne Krangle, Peter Long (KL Services). TH files

1995 *A Guide to the Elders Documentation Project*. Prepared by the Elders Documentation Project Staff: Bob Charlie, Josephine Holloway, Ann-Marie Miller, Marilyn Jensen and Annie Peters. Tr'ondëk Hwëch'in elders who were interviewed in the course of this project include: Eliza Farr, Percy Henry, Archie Roberts and Martha Taylor. (Transcripts can be accessed through the TH Heritage Department.) TH files

1995 *A Finding Air for Oral History Resources of Yukon First Nation People*. Pilot project prepared by Sue Spalding (CYI) and Wynne Krangle, Peter Long (KL Services).

This includes a listing of the audiovisual holdings of the following organizations: Aboriginal Language Services, YG; Canadian Broadcasting Corporation; CHON-FM and NEDAA, Council for Yukon Indians; Kluane First Nation; Yukon Archives, YG; Yukon International Storytelling Festival; Yukon Native Language Centre; Council for Yukon Indians.

TH Interviewees and subjects include: Lena Christiansen, Willie DeWolfe, Eliza Farr, Rowena Flynn, Annie Henry, Joe Henry, Percy Henry, Charlie Isaac, Chief Isaac, Gerald Isaac, Joe S. Joseph, Pat Lindgren, Richard Martin, Clara Mason, Dora Mason, Martha McLeod, Mary McLeod, Hilda Pohlmann, Archie Roberts, Stan Roberts, Clara Van Bibber, Kathy Wedge. Contact TH to learn where the tapes are held and policies for access. TH files

Yukon College, Dawson Campus.

1994 *Moosehide (Édhä Dädhëchan K ek'èt) An Oral History*. Prepared by the Developmental Studies students of the Dawson Campus (Tr'odek Hatr'unotan Zho) of Yukon College. TH Library

Most of the following references are from the ground-breaking "Project Jukebox" recording projects. This was one of the first endeavours to use the web to share photos, brief bios, maps and spoken interview excerpts from sound recording sessions. For some reason the hotlink at the bottom of each reference does not work if you simply click on it, but it will get you there if you either cut and paste or type the reference into the address section of your web browser. The following interviews were selected by visiting the catalogue details and looking for keywords in individual catalogue records relating to native people, traditional lifestyles and personalities such as Chief Charley and Percy DeWolfe. HD

National Park Service collection - Yukon-Charley [sound recording]

Note: Most of the individual interviews listed below are from this collection.

Schneider, William S., 1946-

Pages: 63 sound cassettes (ca. 90 min.)

Item info: 156 copies available at UAF - Rasmuson Library.

**Charlie Biederman is interviewed by Laurel Tyrrell on November 29, 1994**

Call Number	Location	Material	Copies
H95-14 ORAL HISTORY	UAF - Level 2 - ORAL HISTORY	Audio Cassette	3
H95-14 ORAL HISTORY PT. 1	UAF - Level 2 - ORAL HISTORY	Audio CD	2
H95-14 ORAL HISTORY PT. 2	UAF - Level 2 - ORAL HISTORY	Audio CD	2

Personal

Author: [Biederman, Charlie R.](#)

Title: [Charlie Biederman is interviewed by Laurel Tyrrell on November 29, 1994 \[sound recording\]](#).

Physical descrip: 1 sound cassette (ca. 92 min.): analog.

Series Title: [\(Circle/Central tapes\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on November 29, 1994.

Summary: Charlie Biederman talks about his early life, landmarks named after him/his family, gold mining, old timers, trapping, seasonal activities, fishing, hunting, local knowledge about game habits, caribou, grizzly bears, delivering mail by dog sled, Circle to Eagle mail run, the winter of 1936-37, stopping places from Eagle to Circle, Charley Creek being named, his ancestors and Medicine Lake, effect of gold discovery on his ancestors, Chief Chanatee, Chief Charley, founding of Circle, founding of Biederman's Cabin, memorable mail trip on the Yukon, mail contracts, effect of airplanes on mail delivery, use of dog team and sleds for mail carriers, sled builders, fixing sleds, and his children and grandchildren.

Held by: UAFRAS  
<http://uaf-db.uaf.edu/Jukebox/central/biohtm/chbib.html>

**Helge Boquist is interviewed by William Schneider and Dan O'Neill on November 1, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -50	UAF - Level 2 - ORAL HISTORY	Audio Cassette	3

Personal  
Author:

[Boquist, Helge A.](#)

Title: [Helge Boquist is interviewed by William Schneider and Dan O'Neill on November 1, 1991 \[sound recording\].](#)

Physical  
descrip: 1 sound cassette (ca. 90 min.): analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General  
Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place  
captured: Recorded on November 1, 1991.

Summary: Helge Boquist talks about her personal history, Kennicott Mine, Alaska Railroad, Woodchopper Creek, Preacher Creek, Willow Creek, technology used in prospecting, tools, equipment, windlass, caribou skin rope, cabins, stoves, Bonanza Creek, Deadwood Creek, Chatanika, Chatanika story, Jack Anderson of Mastodon Creek, gold mining, Simon Soboloff, Alaska Roadhouse, bootlegging story, cabins on Woodchopper Creek, supplies from Nenana, steamboat transportation, poling canoes, Stanley Joseph, Rabbit Foot Lake, Coal Creek, Sandy Johnson of Coal Creek, Gladys Boquist, Joseph Sexus, Emma Sexus, Jack McQuesten, Frank Miller, Joseph Sexus story, Miller Roadhouse, Circle, John Pond, Morris O'Leary, Walter Jewell, Chatanika, Trails, mail trails, river ice, Wien Airlines, bootleg alcohol, Japanese relocation, graves, "grass skirts" story, Circle Hot Springs, chores, Jack Cornell, Frank Bennett, Goodnews Bay, Dome Creek, roads, Riley Erikson at Central Roadhouse, Twelve Mile Roadhouse, Birch Creek, Mary Nathaniel, Lucy Roberts, Sandy Roberts, moose, caribou, rabbits, trapping with snares, berries, fish, preservation of fish, salmon bellies, tanning skins, skin clothing, and skin sleeping bags.

Held by: UAFRAS  
HTTP: <http://uaf-db.uaf.edu/jukebox/YUCH/htm/boquist.htm>

**Bill Brown and Bob Howe are interviewed by William Schneider on May 6, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -01	UAF - Level 2 - ORAL HISTORY	Audio Cassette	3
H91-22 ORAL HISTORY -02	UAF - Level 2 - ORAL HISTORY	Audio Cassette	3

Personal  
Author:

[Brown, William E.](#)

Title: [Bill Brown and Bob Howe are interviewed by William Schneider on May 6, 1991 \[sound recording\].](#)

Physical 2 sound cassettes (ca. 90 min.): analog.

descrip:

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on May 6, 1991.

Summary: On H91-22-01 Bill Brown and Bob Howe talk about Al Hansen, professional history, National Park Service, Yukon-Charley National Preserve, Bob Howe's professional history, Rick Caulfield, Eagle City Council, Yukon Charley proposals, Sarge Waller, Mike Potts, Dana Ulvi, Little John Gadeaus, public relations, **Eagle's history, Willy Juneby**, Elva Scott, Ed Scott, Louise Waller, Charley River, Yukon River, traditional use, Eagle concerns, Alaskan life styles, subsistence, Rick Caulfield's professional history, Wrangell-Saint Elias, Yukon Charley administrative history, John Rutter, John Cook, conservation units, congressional action, Jimmy Carter, Cecil Andrus, Mike Gravel, Congress and monument proclamations, Antiquities Act of 1906, Circle concerns, monument regulations, Park Service Alaska Regional Office, demonstrations, Bob Howe's expertise, and Kandik River.

Summary: On H91-22-02 Bill Brown and Bob Howe talk about the Kandik River, Gold Creek, Upper Charley River, line cabins, campgrounds, Yukon-Charley travel, Eagle's population, Eagle's historic environment, Han Athapascan, Charley Village, Yukon-Charley paleontology, Carol Allison, Institute of Northern Studies, peregrine falcons, Yukon-Charley scientific value, EIS, development, Circle, public meetings, Coal Creek, Slaven's cabin, restoration of historic buildings, Melody Webb, Dave Evans, Steve Ulvi, Dana Ulvi, Mike Potts, Nation River, Al Hensen, congressional hearings, Vince James, and Barney Olsen.

### **Bill Brown is interviewed by David Krupa on October 22, 1992**

Call Number	Location	Material	Copies
H93-15 ORAL HISTORY -01	UAF - Level 2 - ORAL HISTORY	Audio Cassette	2
H93-15 ORAL HISTORY -02	UAF - Level 2 - ORAL HISTORY	Audio Cassette	2

Personal Author: [Brown, William E.](#)

Title: [Bill Brown is interviewed by David Krupa on October 22, 1992 \[sound recording\].](#)

Physical descrip: 2 sound cassettes (ca. 90 min.): analog.

Series Title: [\(National Park Service collection - Gates of the Arctic\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Summary: On H93-15-01, Bill Brown talks about his personal background, his involvement with the National Park Service, coming to Alaska, D-2, debates over park formation, Yukon-Charley Rivers, North Slope Borough, University of Alaska Arctic and Environmental Information and Data Center, ANILCA, NPS-Alaska Region, retirement, Gustavus, Randy Brown, hunting, trapping, D-2 land selection historical work, historic site surveys, Mike Kunz,

Middle Fork of Upper Koyukuk, Russ Sackett, Jim Creech, Central Brooks Range Region, Gaunt Beauty, Tenuous Life, park management, Bob Marshall, mapping of Wiseman, U.S. Geological Survey, Arctic Village, Wild River Valley, North Fork of Koyukuk, historic site definition and preservation, Mascot Creek cabin, Yale cabin, Walker Lake, Melody Webb, Yukon Frontiers, Yukon River, Noatak, Kobuk region, **native oral history traditions, cultural lands**, oil exploration, Gates of the Arctic, **ethnography**, Dick Nelson, **native adaptations**, miners, Koyukon, Anaktuvuk Pass, Gwich'in Athabaskan, Chandalar, **anthropology, caribou**, Paneak brothers, Fairbanks, Simon Paneak, Dr. Walter Johnson, Wiseman in 1940, Alaska Road Commission, Hammond River, Haul Road, perceptions of Indian hunters, placer gold mining, Navy and Coast Guard explorers, Onion Portage, Ernie Johnson, Federal division of land, Alaska Statehood Act, Bureau of Education, mining shafts, permafrost, mining in the winter, Salmon River, Kobuk River, Cosmos Hills, miners' strike, Seattle, Bettles, Territorial Department of Education school, Mr. Webster, Juneau, Mr. Minano, Japanese in Wiseman, communication networks, stringers, Seward, Gold Rush, White Pass, Chilkoot, University of Alaska--Alaska and Polar Regions, Alaska magazine, "Deep Hole Tobin", Tobin Creek, Wild Lake, mining on the Glacier River, steamboats, Kuskokwim, gold dredges.

Summary: On H93-15-01, Bill Brown talks about mining in Nome, deep hole mining, the mechanization of mining, National Archives, Allen McKinnet, mosquitoes, river captains, Joe Sun, Charlie Breck, Evansville, David Libby, Shungnak, **native mining claims, native miners**, Grant Spearman, Simon Paneak Museum, Arctic John, Togiak Lake, Anaktuvuk Village, Dr. Cambell, Elijah Kininia, Anna Nageak, Tishu Ulen, trapping in the Lower 48, **native-white relations**, caste system, Bill Schneider, Minchumina, Mt. McKinley, roadhouses, McGrath, impact of aviation, Stewart Udall, ANCSA, and the conservation movement.

Summary: On H93-15-02, Bill Brown talks about the origins of Gates of the Arctic National Park, ANCSA, National Monument Proposal of 1968, North Fork of Koyukuk River, Arrigetch Peaks, Walker Lake, John River, Anaktuvuk River, Lyndon Johnson, Antiquities Act, Bob Marshall, Central Brooks Range, Ernie Johnson, Craggy Peak, Mt. Oriole, Teddy Roosevelt, Mt. McKinley National Park, Sheldon Jackson, Mt. Doonerack, Wild River, Wild Lake, Anaktuvuk Pass, Noatak, Kobuk, ANILCA, Yukon Charley Rivers National Park, John Kauffman, Ray Bane, aircraft access, park service management in Alaska, Alaska Land Use Council, bears, Chip Dennerline, Chugiak, access to traditional hunting and fishing areas, North Slope Borough, Roger Siglin, Frank Willis, Kotzebue, Valley National Monument, Kruzenstern, Denali, local hire, and Shungnak.

Held by: UAFRAS  
 HTTP: <http://uaf-db.uaf.edu/jukebox/GatesN/Parks/wibr.htm>  
 HTTP: <http://uaf-db.uaf.edu/jukebox/GatesN/Parks/wibr2.htm>

**Albert Carroll is interviewed by William Schneider and Dan O'Neill on November 2, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -59	UAF - Level 2 - ORAL HISTORY	Audio Cassette	3

Personal Author: [Carroll, Albert B., Sr.](#)

Title: [Albert Carroll is interviewed by William Schneider and Dan O'Neill on November 2, 1991 \[sound recording\].](#)

Physical descrip: 1 sound cassette (ca. 90 min.) : analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on November 2, 1991.

Summary: Albert Carroll talks about his personal history, Fort Yukon, Fanny Carroll, James Carroll, trapping, Black River, boat travel, pilot houses on boats, piloting, Tanana River, Yukon River, inland riverways, Yukon navigation, Dawson, Yukon navigation story, freighter Brainstorm, barge Lucky, tug boats, Birch Creek, Beaver, Chalkyitsik, Old Crow, Circle, Woodchopper, Coal Creek, oil, Eagle, Canadian border, loading barges, river conditions, Stanley Joseph, Alaskan Native pilots, Don Young, freight, equipment, economics, Roy Smith, Sharon Smith, licenses, ferries, ferry Klondike, Richard Frank, barge construction, tug construction, river trip story, lynx trapping, marten trapping, beaver trapping, Kandik River, cabins, Doyon, Randy Brown, Native allotments, traplines, Manhattan Creek, caribou, portaging, Old Crow Flats, James Carroll's store, Evelyn Shore, Donald Horse, Art James Sr., Yukon Flats, sounding boats, maps, mapping, Albert Carroll Jr., and navigation by memory.

Held by: UAFRAS  
 HTTP: <http://uaf-db.uaf.edu/jukebox/YUCH/htm/lpandrr.htm>

**Karen Kallen-Brown is interviewed by Dan O'Neill on October 29, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -48	UAF Level 2 ORAL HISTORY	Audio Cassette	2
H91-22 ORAL HISTORY -49	UAF Level 2 ORAL HISTORY	Audio Cassette	2

Personal Author: [Kallen-Brown, Karen.](#)

Title: [Karen Kallen-Brown is interviewed by Dan O'Neill on October 29, 1991 \[sound recording\].](#)

Physical descrip: 2 sound cassettes (ca. 90 min.) : analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on October 29, 1991.

Summary: On H91-22-48 Karen Kallen-Brown talks about her personal history, Alaska, Kobuk, San Francisco, Akiak, Randy Brown, student teaching in Bethel, Eagle, Dave Evans, Sage Patton, housing in Akiak, Mark Lynch, **Alaska Natives**, Rural Alaska, Bethel, Kandik River, clothing, Kandik River cabins, moose story, wedding, Brad Snow, river people, Steve Ulvi, Lynette Roberts, Lily Allen, Gate Estate cabins, **Indian Grave cabins**, Canyon

Cabin, Willard (Sleepy) Grinnell cabins, Evelyn Shore, the book: Born on Snowshoes, peeling logs, cabin construction, Chevak, student loans, infant lifevests, mosquitoes and infants, daily life, dog sleds, trapping, dog food, travel and transportation, Yukon stoves, gender roles, food preservation, gender roles in cooking, philosophy of river people, self reliance, aesthetics of wilderness, peace, craftwork, independence, child rearing, town sports, friends, subsistence, Doyon, and home industry.

Summary: On H91-22-49 Karen Kallen-Brown talks about Fairbanks, opportunities in town, child rearing, schedules, compromise, Doyon, trapping, National Park Service permits, fish camp, salmon, subsistence, National Park Service management, ANILCA and local hire, Steve Ulvi, Bureau of Land Management Fire Service, future of subsistence, Yukon-Charley Rivers National Preserve, access versus wilderness, National Park Service policy, Yukon-Charley visitors, ANILCA and subsistence, and attitudes towards National Park Service.

Held by: UAFRAS  
 HTTP: <http://uaf-db.uaf.edu/jukebox/YUCH/htm/kkbrown.htm#49>

**Matthew Malcolm is interviewed by Steve Ulvi and William Schneider on August 27, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -18	UAF Level 2 ORAL HISTORY	Audio Cassette	2

Personal Author: [Malcolm, Matthew.](#)

Title: [Matthew Malcolm is interviewed by Steve Ulvi and William Schneider on August 27, 1991 \[sound recording\].](#)

Physical descrip: 1 sound cassette (ca. 90 min.) : analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on August 27, 1991.

Summary: Matthew Malcolm talks about family history, trapping, trading, Eagle Creek, dog teams, Sarah Malcolm, Edward Malcolm, Eagle, education, Ole Hansen, Coal Creek, mining gold, dredging, D-35 caterpillar, mining camp in winter, Harry David, Willie Juneby, Susie Paul, Louise Paul, wood cutting, mining camp supplies, Ernest Patty, thawing in mining, mining camp meals, mining camp bunkhouses, mining camp fuel oil, Phil Berail, Slaven's Camp, Molly Ames, George McGregor, Sheep Creek, Heiny Miller, Wood Island, William Pole, Swede River, Hard Luck Creek, Tom Phillips, Red Crager, Nation Townsite, cabins, Barney Hansen, Sam White, Jim Taylor, Biederman Bluff, Charley's Village, Kandik River, and hunting.

Held by: UAFRAS  
<http://uaf-db.uaf.edu/jukebox/YUCH/htm/mmal.htm>

Louise Paul is interviewed by William Schneider on August 26, 1991 [sound recording]

Call Number	Location	Material	Copies
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Personal Author: [Paul, Louise.](#)

Title: [Louise Paul is interviewed by William Schneider on August 26, 1991 \[sound recording\].](#)

Physical descrip: 1 sound cassette (ca. 90 min.) : analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

General Note: This interview does not appear on the Yukon-Charley Jukebox website.

Date/place captured: Recorded on August 26, 1991.

Summary: Louise Paul talks about her personal history, Canada, Coal Creek, Eagle Village school, subsistence lifestyle, Snare Creek, Willie Juneby, Harry David, daily life at Snare Creek, Louise Juneby, moose hunting, Hän place names, Charley River, rafts, hunting, Chief Charley, Willow Creek, Biederman's Camp, Fort McPherson, Pierre House, Hudson Bay Company, Charlie Creek, Woodchopper, David Stanley, Neil Roberts, gold mining, Chief Shanyake, Circle, a rainbow story, Sheep creek, Eagle Bluff, Calico Bluff, Nation River, Tacoma Bluff, Iron Creek story, bear, Slaven's Roadhouse, Joe Malcolm, snowshoes, fish, salmon bellies, and fish camp.

Held by: UAFRAS

### **Louise Paul and Ruth Ridley are interviewed by William Schneider on March 25, 1993**

Call Number	Location	Material	Copies
H91-22-63 ORAL HISTORY	UAF Level 2 ORAL HISTORY	Audio Cassette	3

Personal Author: [Paul, Louise.](#)

Title: [Louise Paul and Ruth Ridley are interviewed by William Schneider on March 25, 1993 \[sound recording\].](#)

Physical descrip: 1 sound cassette (ca. 90 min.) : analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on March 25, 1993.

Summary: Louise Paul talks about her personal background, her marriage to Jose "Susie" Paul, Jose's work at Paddy's Mining camp, their life at Snare Creek, the moose she and Louise Juneby killed, the huge grizzly bear that tried to break into their cabin, Chief Charley, Chief

Shanyake, and the 1937 forest fire at Eagle Village.

Held by: UAFRAS  
HTTP: <http://uaf-db.uaf.edu/jukebox/YUCH/htm/lpandrr.htm>

**Lynette Roberts is interviewed by Dan O'Neill on November 4, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -51	UAF Level 2 ORAL HISTORY	Audio Cassette	2
H91-22 ORAL HISTORY -52	UAF Level 2 ORAL HISTORY	Audio Cassette	2

Personal Author: [Roberts, Lynette M.](#)  
Title: [Lynette Roberts is interviewed by Dan O'Neill on November 4, 1991 \[sound recording\]](#).

Physical descrip: 2 sound cassettes (ca. 90 min.) : analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on November 4, 1991.

Summary: On H91-22-51 Lynette Roberts talks about her personal history, her family history, Steve Ulvi, Mexico, John Gaudio, Anchorage, Eagle, Dana Ulvi, Sarge Waller, Brad Snow, Lily Allen, Dave Evans, Sage Patton, Nation River, Kandik River, Dave Aruda, hippies, gender based attitudes, **Eagle Village, Tony Paul**, Max Beck. Bureau of Land Management, trespass, construction of cabins, level of technology, Buddhism, natural history, sanitary napkins, Tok, Young's Restaurant, petroleum dependent technology, nutrition, chores, gender roles, dog sleds, travel and transportation, hunting, isolation, infancy, home births, child rearing, education, and correspondence studies.

Summary: On H91-22-52 Lynette Roberts talks about National Park Service, attitudes in Eagle, Eagle School, politics in Eagle, Fairbanks, Steve Ulvi, Feminism, employment, goals, career, education, "empty nest" syndrome, economics, child rearing, University of Alaska Fairbanks Fine Arts Camp, and Eagle as home.

Held by: UAFRAS  
HTTP: <http://uaf-db.uaf.edu/jukebox/YUCH/htm/lrob.htm#52>

**James W. Scott is interviewed by William Schneider on August 27, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -27	UAF Level 2 ORAL HISTORY	Audio Cassette	3
H91-22 ORAL HISTORY -28	UAF Level 2 ORAL HISTORY	Audio Cassette	3

Personal Author: [Scott, James W.](#)  
Title: [James W. Scott is interviewed by William Schneider on August 27, 1991 \[sound](#)

[recording\].](#)

Physical descrip: 2 sound cassettes (ca. 90 min.): analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on August 27, 1991.

Summary: On H91-22-27 James Scott talks about personal history, professional history, Homer, Heine Schneider, Henry Chamberlain, Alaska Road Commission, Sterling Highway, Diamond Ridge, Alaskan Fire Control Service, Bureau of Land Management, Division of Forestry, Denali Highway, timber homesteading, Fairbanks, Anchorage, mineral leasing, statehood, Omnibus Act, Roscoe Bell, Phil Hotsworth, William Egan, Chuck Herbert, Alaska State Department of Fish and Game, Elva Scott, school nurses program, education, Old Crow, Dempster Highway, Fort Yukon, freighter Brainstorm, retirement, communications, changes at Eagle, Federal Aviation Administration, George Beck, Nellie Beck, American Forest Association, Max Embry, retired people, river people, public lands trespass, federal agencies, Alaska Natives, Eagle Village, D-2, federal agencies competition, Porcupine River, Fortymile area, Fort Yukon, Yukon Flats, Billy Breedlove, Dick Stenmark, Bob Howe, public lands use, Bill Brown, Rick Caulfield, Yukon-Charley history, Yukon-Charley significance, bureaucracy, impact, value of programs, planning policies, Visitor Center, Eagle attitudes, trespassers, ANCSA, Richard Nixon, and Spiro Agnew.

Summary: On H91-22-28 James Scott talks about Alaska Natives, Dave Mihalic, Yukon-Charley - marketing, studies, National Park Service - impact, National Park Service - inefficiency, National Park Service - public relations, Alaska - beauty, de facto wilderness, Kobuk Dunes, priorities, Alaska Coalition, ecology, environmental disruption, resource demands, economic intrusion, the Sierra Club, Chuck Stoddard, research, human needs, structure - rigidity, and U.S. Forest Service.

Held by: UAFRAS  
<http://uaf-db.uaf.edu/jukebox/YUCH/htm/jscot.htm>

**Steve Ulvi is interviewed by Dan O'Neill on April 9, 1991**

Call Number	Location	Material	Copies
H91-22 ORAL HISTORY -05	UAF Level 2 ORAL HISTORY	Audio Cassette	3
H91-22 ORAL HISTORY -06	UAF Level 2 ORAL HISTORY	Audio Cassette	2
H91-22 ORAL HISTORY -07	UAF Level 2 ORAL HISTORY	Audio Cassette	2

Personal Author: [Ulvi, Steven R.](#)

Title: [Steve Ulvi is interviewed by Dan O'Neill on April 9, 1991 \[sound recording\].](#)

Physical descrip: 3 sound cassettes (ca. 90 min.): analog.

Series Title: [\(National Park Service collection - Yukon-Charley\)](#)

General Note: This interview is copyrighted by the Oral History Program. For information about use, please consult the "Copyright Information" statement at the bottom of the interview page. To get to the interview page, click on the link at the bottom of this record.

Date/place captured: Recorded on April 9, 1991.

Summary: On H91-22-05 Steve talks about his personal history, Sarge Waller, Little John Gaudio, moving out to the country, personal values, Dave Evans, Sage Patton, Brad Snow, Lily Allen, Tony Paul, Max Beck, **native claims**, Territorial boundaries, Charlie Edwards, Cher Edwards, Shade Creek, Dick Cook, Sheep Creek, Mike Potts, lifestyles, Eagle attitudes, role models, sense of community, individualists, historic sites - adaptation, dwellings, subsistence technology, hunting, Windy Corner cabin, dogs, and dog sled technology.

Summary: On H91-22-06 Steve Ulvi talks about dogs, dog sled technology, Dawson City, trapping, Champion Creek, Bear Creek, Charlie Edwards, Fourth of July Creek, trapping marten, Dana Ulvi, snowmobiles, canoe travel with lining, Yukon River, Yukon River community, Canada/US boundary, visiting, territorial disputes, and women's roles.

Summary: On H91-22-07 Steve talks about women's roles, travel and transportation - women, isolation, conflict resolution, information sharing, Dirty Fred Beech, government authority, Yukon-Charley National Preserve, National Park Service, development, and potential interviewees.

Held by: UAFRAS  
<http://uaf-db.uaf.edu/jukebox/YUCH/htm/sulvi.htm#07>

## **Yukon Community Libraries & Yukon Archives**

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### **Canadian Broadcasting Company. YA 88/74R, 1975**

One recorded cassette interview with Michael Enright interviewing Pat Lindgren in March 1975. Patricia (Isaac) Lindgren discusses the Klondike Gold Rush, from the viewpoint of First Nations people who lived in the Klondike area. Lindgren's father, Chief Isaac, moved his people to Moosehide at the turn of the century. Restriction: not to be used without CBC permission

### **Cruikshank, Julie. YA 88/6R, 1973**

This series consists of six tapes in which Julie Cruikshank discusses Yukon native history in political, social and economic terms. Politically she describes the political organization within a traditional native community, and the application of the Indian Act to the Yukon and its problems. She explains the subsistence economy, the role of religion and education and its effect on the native population. Cruikshank gives a historical summary of the various native communities and the impact of the Klondike Gold Rush and fur trade on these communities. This series was recorded by Rusty Reid at the Yukon Archives in October 1973.

Of particular interest are tapes 14-3, Side A & B, 14-4, Side B and tape 14-5.

Restriction: For listening & reference purposes only during the lifetime of Julie Cruikshank. Note: Apparently Julie has family permissions for access to the tapes and transcripts.

### **Faulkner, Victoria. 88/55R, 1972**

Four tapes of Victoria Faulkner discussing the Dawson City education system and social life, the various communities on the surrounding creeks, and the government structures and personalities in the early 1900s. She also described rural life in the Dawson area in the 1920s and 1930s. Brian Speirs conducted the interviews in September 1972.

Tape 8-4 includes a discussion of Chief Isaac, Harper and McQuesten.

### **Henry, Percy and Mabel Henry**

1994 Hän language lessons [sound recording]: Klondike-Moosehide dialect. Whitehorse: Yukon Native Language Centre.

Copies located in WPL and Dawson City library, catalogued as AUD 497.28 Hen NC.

### **Juneby, Isaac**

1994 Hän language lessons [sound recording]: dialect of Eagle, Alaska. Whitehorse : Yukon Native Language Centre ; Fairbanks, Alaska : Alaska Native Language Center, 1994. Copies located in WPL and Dawson City library, catalogued as AUD 497.28 Jun NC.

### **Robb, Jim**

SR 6 (1) (88/53R): Sound recordings  
restricted access

This recording is of an interview conducted by Robb ca. 1972 with Charlie Isaac, discussing his family history and the cultural effects of the Klondike Gold Rush. Isaac also sings a traditional Crow song from Coffee Creek. Restriction: Use only with Jim Robb's permission. [Note: TH may have a copy of this.]

**Skookum Jim Oral History Project fonds. 88/58R, 1972-1973**

Tape nos. SR 11, 1-12.

MSS 254 F.3 (88/58R) : Textual records

COR 1096 (88/58R) : Textual records

The series consists of sound recordings and typed transcripts of interviews conducted by Doris McLean for the Skookum Jim Oral History Project. Individuals interviewed were Angela Sidney, Peter Johns, Johnny Johns, Annie Ned, Patsy Henderson, Kitty Smith, Billy Johnson, and Jenny Lebarge. They discuss the life and adventures of Skookum Jim, particularly his gold discovery on Bonanza Creek, as well as Jim's family, Indian legends, the Anglican Church, and the influenza epidemic.

**Skookum Jim Potlatch Society. 77/37, 1977**

In 1977 Lee Wilkie (now Leslie Hamson) and Audrey Brown interview seven Yukon First Nations people about the symbolic and cultural importance of the traditional potlatch ceremony in various communities.

Tape 41-3 is an interview with Charlie and Elsie Johnson and Mary McLeod.

Restriction: Use only with permission of Skookum Jim Hall.

**Snider, Dr. I.E. 88/77R, ca. 1935-40**

This series consists of five tapes which are the commentaries for Dr. Snider's silent black and white Yukon films. See the Videorecording section. Relevant tape recordings are Tape 30-2 (Films 2& 3), Tape 30-3 for Films 4 and 6.

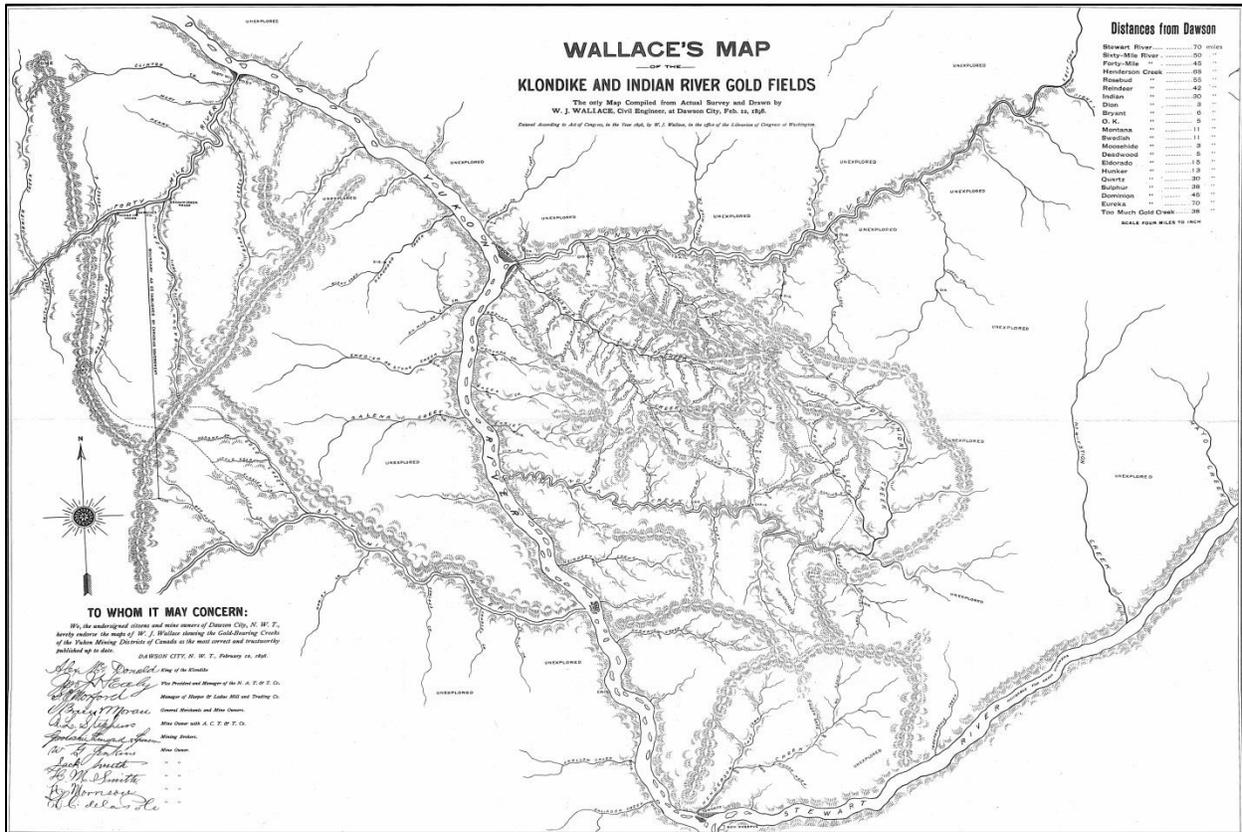




Klondike placer mine drift, 1899. University of Washington Libraries, William Meed MEE051

## **Yukon Placer Gold Mining Historical Research Report**

**Vintage Ventures**  
June 2015



This report supports the nomination of Tr’ondëk–Klondike as a World Heritage Site. It provides an overview of placer mining in Yukon, specifically the Klondike region, from the 1880s onward, as illustrated in the archival record.

The story presented here is of an international event, the Klondike Gold Rush, that changed the land and the people forever, reverberated around the world, and started the tradition of a vibrant mining industry that remains a healthy part of Yukon’s economy today. The written record is supported by physical evidence that remains in protected and unprotected places within the Tr’ondëk–Klondike boundary. These remains are important to the area residents who feel closely connected to the historic placer mining history of the region. The Klondike River dredge tailings are dramatic examples of human-engineered landforms that redefined the landscape.

Placer mining is a living tradition in the Dawson region and illustrates the overall story of adaptation in a challenging environment, dramatic change, and accommodations between cultures.

Submitted to Tr’ondëk Hwëch’in  
For the Tr’ondëk–Klondike World Heritage Nomination  
Project Management Committee  
August 2015

Vintage Ventures:  
Greg Skuce and Sally Robinson  
Box 20248, Whitehorse YT  
Y1A 7A2  
Phone: 867-633-3896

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# 1: Yukon Placer Mining

## 1.1) Overview

### Yukon gold placers

The coastal Tlingit, protective of their trade monopoly, did not allow prospectors easy access through the coastal mountains to the Yukon River drainage until 1882. A subsequent series of gold discoveries encouraged an increasing number of gold seekers to enter the country. These men characteristically thought that if what was found was good, what was yet to be found would be even better. Gold flakes found in gravel bars on the Stewart River were supplying reasonable return for labour in 1885. Coarse-grained gold was found in the creek gravels of the Fortymile River in 1886, and more and better prospects were found in the Sixtymile drainage in the early 1890s. In 1894, the first gold was found in the Indian River drainage, followed by the 1896 Klondike discoveries that sparked the Klondike Gold Rush. The Stewart River remained a place of interest for the prospectors, and in 1897 coarse gold was discovered in two of its tributaries and three nearby tributaries of the Yukon River. From 1986 to 2003, about three hundred and eleven tonnes of gold, eighty-five percent of Yukon's placer gold production, were recovered from the Klondike, and Fortymile and Sixtymile goldfields together with placers along the Stewart and Yukon rivers (Black Hills, Scroggie, Thistle, and Kirkman creeks). Dawson is the main settlement in this region.<sup>1</sup>

Yukon's gold placer deposits (placers) are located in a complex mountainous region in the central and western portion of the territory. Historically important placers are in the Klondike, Fortymile, Sixtymile, Stewart River and its tributaries, Mt. Nanson area, Livingstone Creek, and Kluane Lake areas. Yukon gold originated about 200 million years ago when the mountains were formed. The collision of the continental plates caused widespread volcanism and intrusions of crystallized igneous rock containing gold ores.<sup>2</sup> Yukon's gold placer deposits started to form when the gold-bearing quartz veins were broken by movement from the weight of ancient ice sheets, and erosion distributed the gold-bearing gravels along ancient stream beds. This process occurred from millions of years ago (ma) to thousands of years ago (ka). The placers are commonly found above bedrock schist formed when volcanic magma heated the surrounding granite rock. Yukon's schist is usually described as desiccated, or broken, with many fissures and rough surfaces. The roughness and grade of the ancient stream bed determined the gold disposition sites, with gravel bars being preferentially rich.<sup>3</sup>

Yukon gold placer gravels are categorized by their location in the valleys. The high-level gravel formed first, and gold in the intermediate and low-level gravel was concentrated as braided streams cut through the original level. The levels are easily discernible in the Klondike, Sixtymile, Fortymile, and parts of the Stewart River drainage:

- High-level gravel: usually prominent, continuous high-level terraces that formed as outwash from the initial pre-Reid glaciations in the Pliocene (~5 to 3 ma).
  - White Channel Gravel – highly productive today. Up to 46 metres thick with a predominance of quartz clasts.
  - Klondike gravel – not an economic placer. Up to 53 metres thick and distinguished by chert clasts deposited from the Ogilvie Mountains to the northeast.
- Intermediate-level gravel: usually relatively small, irregularly distributed intermediate to low-level terraces.
  - Least economically viable. Up to nine metres thick with quartz, igneous rock, and metamorphic rock particles. Thought to be Late Pliocene to Early Pleistocene in age (~three ma to 750 ka).

- Low-level gravel: alluvium along present-day creeks, gulches, and rivers.
  - This is historically the most important gold-bearing gravel and has been mined three to four times in the Klondike goldfields. It is about 5 metres thick in creeks and up to 20 metres thick in rivers with quartz, igneous rock, metamorphic rock, and sedimentary rock particles. Considered to be Late Pleistocene to Holocene in age.<sup>4</sup>

Most of the Klondike, Sixtymile, Fortymile, and Clear Creek areas have never been glaciated by large ice sheets. Glaciers advanced obliquely into Yukon from the southeast in three episodes. The advance of the ice sheets occurred about three ma in as many as seven separate glaciations, called collectively pre-Reid.<sup>5</sup> They covered the Stewart River region, affected the Clear Creek region, and reached into the Dawson area. Outwash of pre-Reid Klondike gravels overlies the White Channel gravels along Hunker and Bonanza creeks. Pre-Reid deposits are difficult to recognize because of subsequent processes. The next glaciation occurred around 300 ka, and its effects are easily recognized in the Mayo-McQuesten placers. The McConnell glaciation occurred between 29 ka and 10.3 ka, and it further affected placers in the Kluane and Livingstone areas. Kluane was also affected by local glaciations originating in the Saint Elias Range. The glaciers redistributed gravel, deposited gravel, and changed the course of ancient rivers. In the glaciated area, current placer deposits often contain concentrated gold from pre-existing placers and bedrock.<sup>6</sup>

Placer gravels are generally covered by a layer of surface deposits, called overburden by the miners because it usually does not contain any gold. This layer of gravel, sand, silt, ice, organic material, and volcanic ash, in differing proportions, is often frozen hard in the discontinuous permafrost zone including the Fortymile, Sixtymile, Klondike, and Stewart River areas.<sup>7</sup> Organic overburden is called “muck.” Many more terms and definitions are contained in the glossary on page 81.

### Early prospecting

Yukon placer mining started 23 years before gold was discovered in the Klondike. The first fur traders in the upper Yukon drainage basin were also prospectors who encouraged others to explore this interior area of northwestern North America. Seven men, including Jack McQuesten, Alfred Mayo, Arthur Harper, and Frederick Harte, arrived at the Yukon River in 1873. They wintered just below Fort Yukon with eight other prospectors and traders who were also working on, or exploring, the river.<sup>8</sup>

McQuesten, Mayo, and Harper eventually started their own trading company and encouraged prospectors by carrying mining supplies. The American trading companies, and the Hudson’s Bay Company before them, had discouraged prospectors. Harper and Harte divided their time between prospecting and trading. Harper sent out letters on the “good prospects” for finding minable gold in the upper Yukon River, which at this time meant above the mouth of the Tanana River. The trading posts acted as clearing-houses for information, and the traders kept the prospectors informed of ongoing activities and recent successes.

Significant numbers of prospectors started coming into the Yukon River drainage in the early 1880s. A few, like Edward Schiefflin’s party of about forty-five, prospected along the Yukon River, concentrating their efforts on the large lower river tributaries. Many more prospectors, most of whom had been working in Sitka or Juneau, came over the Chilkoot Pass to prospect or bar mine along the upper Yukon River and its major tributaries. Miners who brought some coarse gold back to Juneau in the fall of 1883 caused great excitement among those who were out of work from the recent abandonment of the Cassiar goldfields. Three hundred men crossed the Chilkoot Pass in 1884.<sup>9</sup>

The earliest prospectors in the Klondike region used the McQuesten and Co. trading post at Fort Reliance as headquarters, even staying the winter in some cases. Some of the rivers in the Klondike district were named for their distance from Fort Reliance. The prospectors were directed and sometimes guided by McQuesten and Harper to explore the Sixtymile and White rivers. None of the tributaries on

the upper Yukon, except the Stewart River, rewarded these early prospectors with enough gold to keep them mining the gravel bars, although there were few rivers that did not yield at least some flakes of gold.

The discovery of coarse gold in the Fortymile River in 1886 and in the Sixtymile drainage in 1891 caused great excitement and issued in a new era of mining for the region. There were many problems including the isolation of the district, the short summer season, and the permanently frozen ground, but there were also great rewards.

The first geological exploration of the “Yukon district” was undertaken by the 1887 Yukon Expedition, led by George Mercer Dawson, director of the Geological Survey of Canada. The expedition took place in the context of the widespread scientific explorations common in the 19th century. Dawson divided the expedition into three parties, one of which he would lead. William Ogilvie, from the Dominion Land Surveyors Office, travelled down the Yukon River to determine the 141<sup>st</sup> meridian marking the United States/Canada border. This activity coincided with the first year of intensive mining in the area, and Ogilvie located the border between the Fortymile goldfields and Forty Mile, the Canadian riverboat landing settlement at the mouth of the Fortymile River. Richard McConnell, of the Geological Survey, descended the Porcupine River and came up the Yukon River and over the coastal pass to the coast. Three separate reports came out of this expedition, and the published geological information was invaluable to later miners.

The discovery of gold on Bonanza Creek in 1896 and the newspaper reports of fabulous wealth started the Klondike stampede. The media reports were extravagant and the Canadian government responded by sending McConnell to report on the area and verify the boundaries of the gold strikes. McConnell was one of Canada’s foremost geological explorers and his meticulous reports described and detailed the early development of Yukon’s placer mining districts. The early miners and prospectors did the ground truthing and the geologists put together the geological puzzle.

The gold discovery in the Klondike was directly related to other important discoveries of Yukon placer deposits around Livingstone Creek, the Mayo River, Kluane Lake, and Mount Nansen. The stampede attracted to the Klondike in 1898 were often discouraged by the numbers of people prospecting near Dawson, and they spread out over the country and into Alaska to search for other gold deposits. The Klondike strike changed the Yukon scenario from a few prospectors spending years looking for a lucky discovery, to a great number of prospectors intensively searching every river and creek they could reach, and developing the richest deposits into working mines. Information gained from the Klondike was beneficial to prospecting and mining endeavours in other parts of Yukon and Alaska. Post-Klondike prospectors recognized that quantities of milky, quartz stones and boulders, coupled with strong evidence of mature weathering, erosion, and re-concentration, were indicators of gold-bearing gravels. These underlying principles would have saved the early prospectors from the laborious task of digging and washing all the gravels they encountered. The post-Klondike prospectors spent their time exploring the ground with the strongest indicators.<sup>10</sup>

### Tr’ondëk–Klondike Lode Mining

The early miners had theories about the origin of the extremely rich placer deposits of gold in the Klondike region. Experienced gold miners knew that free gold eroded from hardrock veins, but the motherlode was elusive.

Men named Chute, Corthay, and Stewart staked the Lone Star surface quartz vein near Victoria Gulch in November 1897, and had completed a 49-foot adit and a 52-foot shaft by 1903.<sup>11</sup> A two-stamp mill made a test run in 1909 with results that were said to be satisfactory.<sup>12</sup> The miners were hoping to find a hardrock vein of gold, but the location had no definite lode or vein, being instead a crushed zone of quartz in the Klondike schist. A 300-foot main tunnel cut into a persistent quartz vein at 225 feet

down, and a drift to the north ended at the Carthy lode in a clay zone. A cross cut about 150 feet from the portal ended at the south end of the north/south Carthy vein. The northern drift was connected to the surface by a shaft and the southern drift ended at a 42-foot connecting tunnel.<sup>13</sup> By 1911, a number of quartz properties had been located in the Klondike district, but the Lone Star Mine was the only claim worked that summer.<sup>14</sup> Sometime after 1911, an open cut of about 350 feet long, 12 to 14 feet wide and 30 feet deep, was opened up, and ore was taken out and milled. There was also a drift driven into the mineral zone and a 22-foot shaft with a 65-foot drift at the bottom. There was an attempt to re-open Lone Star in 1929 with local capital, but the drifts and shafts were partly caved in and flooded. The mill was not very efficient as it was only equipped to recover the free gold, and not any values contained in the sulphides.<sup>15</sup> There have been exploration companies interested in Lone Star during the 1940s, 1960s, and 1980s, and exploration miners have been drilling and sampling at the site over the last 10 years. Lone Star remains the Klondike's best hope to discover a motherlode.

Geologist R. G. McConnell visited the Klondike in 1901 and noted that a great number of quartz claims had been staked, although the veins were usually small and petered out to nothing. They assayed with fair values, and free gold was sometimes visible, but the veins were too small and non-persistent to make good mines. Considerable development work had been done on a quartz claim in the Ophir group, located on the summit of a ridge between Eldorado and Ophir creeks. The miners had opened a cut about 60 feet in length and dug a couple of shafts. The cut followed a quartz vein that swelled to five or six feet in places. The quartz was dotted with feldspar, held a considerable amount of iron, and some galena. The gold values averaged from \$10.50 to \$11 per ton. A large number of quartz claims had also been staked on Lepine Creek and its tributary Ruitter Creek, north of the Klondike River. The Great Eastern claim, south of Ruitter Creek, had schist traversed by a wide dike of quartz-porphry with the ore contained in a 15-foot-deep region of decomposed schist and dike rock. The miners had constructed a half-mile tramway and transported the ore to a small cyanide plant on Ruitter Creek. The results of the operation were not reported, but McConnell collected specimens of the ore, and an assay showed only traces of gold. McConnell encouraged prospectors to continue searching, saying that, although the region was difficult to prospect, it would not be geologically impossible to discover a zone of closely grouped, small, gold-bearing quartz veins that would be economically feasible to mine.<sup>16</sup>

Geologist D.D. Cairnes visited the Klondike in 1911 and noted that quartz claims in good standing included Lone Star, the Violet group, the Mitchell group on the divide between the heads of Hunker and Gold Bottom creeks, the Lloyd group and claims on the divide between Green Gulch and Caribou Gulch, some claims on Sulphur and Dominion creeks, and several groups of claims near the Bear Creek and Lindow Creek confluence.<sup>17</sup> The lode-mining report for 1914 identifies hardrock prospects and investors who were involved with the Violet group, the Mitchell group, the Lloyd group and the Green Gulch group (adjoining the Lloyd group) properties listed above, plus the Gold Run group at the head of Gold Run Creek and Portland Gulch, the Portland group (adjoining the Green Gulch group), the Box Car group on the Ridge Road between Bonanza Creek and Soda Creek, and the McKinnon group in the Indian River valley. The remains of the head frame for the Virgin Mineral Claim still stands today, high on the hill above the Bear Creek Discovery Claim. Investors included Margaret Mitchell, nicknamed the "Quartz Queen of the Klondike," and Thomas O'Brien, a long-time Yukoner and the owner of the Klondike Brewery.<sup>18</sup>

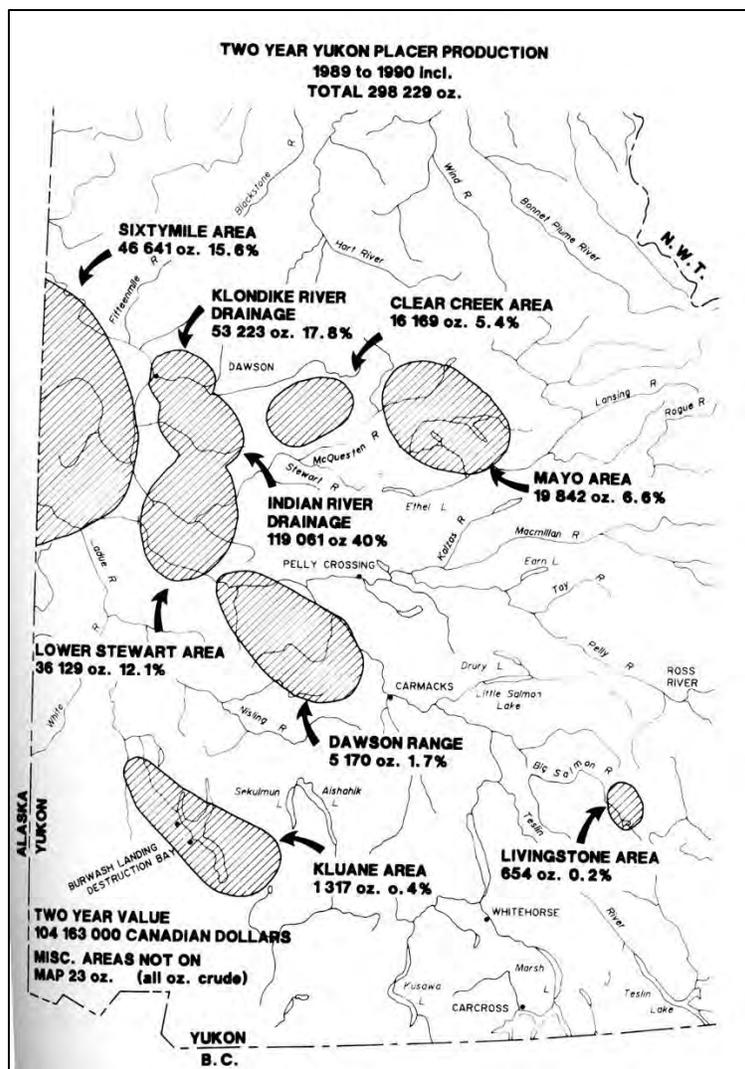
Downriver from Dawson City, on the Yukon River, a number of quartz claims were staked below the Fifteenmile River in 1926, after high values of silver and lead were found in some float on the river bank. Claims that had lapsed about a mile below the mouth of Fifteenmile and about six miles below that, opposite Roal Creek, were re-staked. A short adit was driven into the serpentine schist but no minerals of economic value were found. New quartz claims were staked on the Yukon River opposite the mouth of Cassiar Creek in the same year. The most work was done on the 60 claims just below

Fifteenmile River. P. Rost owned Camp Bird, Yukon Chief, and Yukon Maid claims at that site, and five tons of float material were shipped from the beach at Camp Bird in 1926.<sup>19</sup>

The hope of finding the motherlode remained a driving force for many Klondike miners. For example, in 1941, 20 lode-mining claims were staked in the Dawson Mining District and 101 were renewed.<sup>20</sup> Yukon still had no lode gold production of consequence before 1947, when that spurt of excitement waned.<sup>21</sup>

## 1.2) Yukon Goldfields

The historic Yukon goldfields continued to produce for many years after the glory days of discovery. This map shows the location and gold production from 1989 to 1990 in most of the historic areas described below. The location of the Fortymile goldfields and data from the Canadian Fortymile region is missing from the map.



“Two year placer production” map from L.P. van Kalsbeek, A.R. Waroway, and D.A. Latoski, *Yukon Placer Mining Industry 1989–1990*. Yukon, Indian and Northern Affairs, 1991: xxxiii.

All placer mining techniques need water and thawed ground. The goldfields developed according to their degree of isolation, the extent of the permafrost, the availability of a year-round water supply, and, in some cases, the difficulties imposed by past glaciation.

The Yukon gold-mining industry was historically subject to cycles of activity closely tied to world economics. The price of gold was \$16 an ounce during the Klondike Gold Rush when miners could high-grade the incredibly rich placer deposits. In 1949, the price of gold was \$40.50 and it cost the biggest dredging company \$26.17 to produce one fine ounce of gold.<sup>22</sup> Over the years the price of gold increased slowly enough that by the 1960s it was priced too close to the production costs for the largest dredging company to continue. In some years, gold production was not extremely high because of problems in the management of the dredging and hydraulics companies. The smaller family-operated mines could, and can, more easily adjust their activities according to circumstances.

There were fewer reports published about Yukon placer mines in the years of low mining activity because of wars and/or lower economic importance for gold. The most information is available for the early years from 1898 to the start of World War I. There is scattered information from the 1930s when a worldwide depression brought men north to look for work and try their hand at prying money from the Klondike gravels. The information is in individual geology reports and in the Geological Survey of Canada overviews of the placer mining industry between 1934 and 1940, and starting again in 1960. The best quick source of information on the Yukon placer industry between 1941 and 1959 is in a compilation of unpublished reports edited by R.L. Debicki. The records are not complete, as some boxes of central registry files were taken to the dump about 1950, and others were separated and neglected when the capital of the territory moved from Dawson to Whitehorse in 1953.<sup>23</sup>

The information that follows is understandably most dense in the early years of the goldfields when prospectors wrote memoirs about their adventures and independent miners looked to published reports written by government-paid geologists. As large-scale mining became the norm, and ground was increasingly tied up in hydraulic and dredging leases, the companies tested their own reserves, keeping results private. Many independent miners quietly worked their ground and were not consistently observed or described by visiting geologists. Some current family-run mining operations began at the turn of the century or, more frequently, in the 1940s.

The price of gold rose to unheard-of heights in the 1970s, when local miners were able to cash in on what they deemed to be a second gold rush. Although the price of gold continued to rise until the very recent past, it no longer presented a windfall for Yukon miners who had to cope with poor ground, ever-increasingly stringent environmental restrictions, and a high cost of fuel. Despite these drawbacks, which would discourage most practical people, the history and romance of the Klondike, and Yukon gold mining in general, helped persuade Yukon miners to create a viable industry that continues to be a vigorous part of our economy today. Yukon miners have a deep interest in the history of Yukon placer mining and great pride in the role they continue to play.

### Stewart River Drainage

The Stewart River is one of the major tributaries of the Yukon River. It is a large river from its mouth to Frazer Falls, a distance of about 200 miles. The principal tributaries below the falls are the McQuesten and Mayo rivers, and Clear, Crooked, Lake, Black Hills, and Scroggie creeks. The Stewart River very early became known as a “grubstake” river, meaning that miners could recover enough gold to pay for another season of prospecting in the interior. Gold found in the Stewart River appeared as fine gold flakes or dust caught in the gravel bars of the river. The first mining method applied here was appropriately called bar mining or skim digging. In most locations, gold was found in less than a foot of gravel confined to a small area near the head of each gravel bar.<sup>24</sup>

Harper and Fredrick Harte prospected the Stewart River in 1873. They did not ascend the river very far and failed to find gold.<sup>25</sup> Charley Farcint, formerly of the Schiefflin party, prospected on the Stewart River during the summers of 1884 and 1885. He travelled 150 miles up the river and found gold worth \$8 a day.<sup>26</sup> Charlie Powell, who had prospected with Joe Ladue in 1883, was the first man to make extravagant claims about the gold to be recovered from the Stewart River bars. His party prospected the river in 1883 and sent out to Juneau for supplies so they could stay the winter and get an early start on mining in 1884.<sup>27</sup> His news brought more miners into the area; there were at least five parties prospecting and bar mining on the Stewart River in 1885.<sup>28</sup> John Fraser, Thomas Boswell, Jeremiah Bertrand, and Frank Monfait started mining in May 1885, each making from \$5,000 to \$6,000 that summer.<sup>29</sup> News of gold on the Stewart reached the outside in 1885, prompting 75 men to come in over the Chilkoot Pass. Jack McQuesten took most of them to the mouth of the McQuesten River in the sternwheeler *New Racket*, which he and his associates had purchased from Edward Schiefflin.<sup>30</sup>

McQuesten estimated that about \$75,000 in gold was taken out of the Stewart River in 1886.<sup>31</sup> Yukon miners are always looking for better ways to recover fine gold and easier ways to mine more ground. Schiefflin had equipped the *New Racket* with pumps to sluice placer gravels. Four men leased the *New Racket* from McQuesten and Co. in 1886 to use the sluice equipment on the Stewart River.<sup>32</sup> In 1887 it yielded only \$5,000, as most of the bar miners had relocated to the Fortymile River.<sup>33</sup> By 1900, no one was mining the main seam of the Stewart River below Frazer Falls, but some work was done around Scroggie Creek, near the head of the McQuesten. A strike was made on Clear Creek late in the season.<sup>34</sup> And in 1906 there was a stampede to Barker Creek.<sup>35</sup>

Dominion land surveyor Morley Ogilvie examined the lower Stewart with a dredging project in mind, and found the gold to be coarser in the bed of the river than in the bars, the river not too swift, and the gravel free of many large boulders.<sup>36</sup> The Yukon Basin Gold Dredging Co. was formed, and a new dredge was constructed in Whitehorse and moved to the Stewart River in 1908.<sup>37</sup> The dredge was later moved to Bonanza Creek. In 1915, about 20 men were open-cut mining along Scroggie Creek in the summer, and 40 to 50 men were underground drifting during the winter months. An estimated \$100,000 had been recovered from Scroggie and its tributaries by 1915.<sup>38</sup> The tributaries of the lower Stewart River continue to be mined up to the present time.

### ***Duncan Creek/Mayo Mining District***

The Duncan Creek Mining District was first described in 1904 as the upper Stewart River and its tributaries from the Mayo River east including the Mayo River tributaries and the north and south branches of the McQuesten River and their tributaries.<sup>39</sup> All of the valleys in this district have been glaciated, and the valleys have large deposits of glacial till and sheets of boulder clay. Some of the gravels have been transported from points a long distance from their source. Hematite and Jaspilite pebbles from 100 or more miles away are commonly found in the sluice boxes on Duncan Creek.<sup>40</sup> The gold-producing area was better defined by 1915, and geologist D.D. Cairnes renamed the district in reference to Mayo, the central community, and sternwheeler landing. The district was redefined to include Haggart Creek and Dublin Gulch, Duncan and Lightning creeks, and Johnson Creek, a tributary of the McQuesten River.<sup>41</sup>

Duncan Creek is about 14 miles long and joins the Mayo River about six miles below Mayo Lake. The creek forks about 12 miles from the mouth and splits into Lightning Creek and upper Duncan Creek. In 1898, the Swedish Gustavson family, a father and two sons, discovered and started mining a rich deposit of placer gold in a canyon on Duncan Creek about eight miles from the McQuesten River. The Gustavsons quietly mined their claim for three years without staking it, before a party of four prospectors found the mine and staked the property. The claim-jumpers told the story of their activities, so Duncan Creek was staked from the headwaters to the Mayo River in 1902, prompting the country to

be widely prospected.<sup>42</sup> Shafts were sunk on Lower Duncan Creek to a depth of over 100 feet, but in most cases they flooded when a layer of thawed gravel was pierced. Elmer Makela started hydraulicking the left bench on Lower Duncan in 1915 using 1,500 feet of pipe and a monitor. Three partners holding claims from No. 4 to No. 20 above the Duncan Creek Bridge on Lower Duncan Creek mined the creek gravels after drilling 10- to 16-foot prospect holes with a Keystone drill. Upper Duncan and its tributaries were mined continuously to at least 1915, when 11 miners were at work including two miners hydraulicking around Claim No.8 Above Discovery. The Yukon Gold Commissioner estimated that Duncan Creek had produced about \$55,000 in gold from 1898 to 1915, and the tributary Lightning Creek an additional \$2,000.<sup>43</sup> After galena was discovered in the area, many miners turned to hardrock mining, but placer continued to be economically feasible. In 1932, Andrew Johnson had a mile-long ditch just below Keno for a small hydraulic operation.<sup>44</sup>

Haggart Creek is over 20 miles long and a major tributary of the McQuesten River. It has the same general characteristics as Duncan Creek, with fewer boulders and the addition of vast amounts of boulder clay in places. Coarse gold was found on Haggart Creek in 1895 and prospected in 1896 by Thomas Nelson, after whom the creek was first named. Thomas Haggart built two cabins on the creek and one on Dublin Gulch that year. In 1898 four men started from Nelson Creek to record their claims in Dawson, and when Peter Haggart and Warren Hiatt arrived, they staked Discovery and renamed the creek. About 14 men were working on Haggart in 1915 and another three were on the Dublin Gulch tributary. The miners on Duncan Creek were all working with partners to mine more than one claim. Most had mined their ground for more than three years and had elaborate open-pit mines with boilers, self-dumps, and long bedrock drains or flumes to manage the water. Some were mining continuously, drifting in the winter, and open-pit mining in the summer. Some were hydraulicking the terraces on their claims as an economical method of mining even though the valley floor was probably richer. Fuel was scarce and expensive, so one group installed an overshot waterwheel to power their tram line. As with most claims, the cost of mining on Haggart Creek depended on the thickness of the gravels and whether they were partly thawed in or near the creek, or in the frozen zone farther away from the present channel. Working an open-pit mine in the creek, with a boiler-operated self-dumping operation and a bedrock drain to manage the water, cost an average of 50 cents per square foot of bedrock in 1915. Hydraulic operations could be carried out for about 10 cents per square foot. The Gold Commissioner estimated the total production of Haggart Creek by 1915 was about \$47,000 in gold with gold assaying at about \$18.45 per ounce.<sup>45</sup> There were claims in good standing on Haggart Creek from 1937 to 1941, and in 1943 and 1944. By 1942, most of the mining in the Mayo District was centred in the Haggart Creek area. The largest operation was the Haggart Mining Company which held 22 claims on the creek.<sup>46</sup> Haggart Creek continued to be productive despite the intensive mining that occurred. For example, Spruce Creek Placers started mining on Haggart Creek in 1953 on a 22-claim lease and a two-mile prospecting lease. Klaus Djukastein acquired the company in 1969 and recovered 1,670 ounces of gold that year.<sup>47</sup> Active mining continues on Haggart Creek.

The paystreak on Dublin Gulch is about 100 feet wide near the mouth and tapers upstream.<sup>48</sup> In 1916, there was a demand for tungsten minerals, and placer scheelite became economically important. A mining company opened in 1918 to cut and sluice nine claims starting at the mouth of the creek. They were recovering 50 to 75 cents in gold per cubic yard and 0.8 to 1.2 pounds of scheelite per cubic yard. The spring runoff provided the only water available for washing the gravels, and the Dublin Creek miners were also having difficulty with the number of boulders in the valley.<sup>49</sup> In 1932, a hydraulic operation began to work three miles of placer leases centred around the junction of the Haggart Creek and Dublin Gulch valleys.<sup>50</sup> F. Taylor started intermittently mining seven claims upstream from the mouth of Dublin Gulch in 1937. In 1969, Taylor recovered 800 ounces of gold, and another 208 ounces in 1970.<sup>51</sup>

Minto Creek was staked in 1903, and five more discoveries were made on smaller creeks in the area that fall.<sup>52</sup> A large and efficient hydraulic operation started on Minto Creek in 1913 with three

ditches that together measured over eight miles, bringing water from nearby creeks. The gravel deposit was 20 feet deep and overlain by about 20 feet of fine, partly consolidated sands. In 1915, the mine owner was hoping that the deposit was long enough to pay for his elaborate hydraulic installation, and development and operational costs.<sup>53</sup>

Hight Creek, a tributary of Minto Creek, was also staked about 1903 by William Hiatt, who had located gold in the creek several years before. The creek is about eight miles long and was productive every year between 1903 and 1915, yielding more gold than all other creeks in the Mayo area. Great amounts of boulder clay and gravel were deposited in the valley during the ice age, and in 1915 miners were working a three-mile-stretch of pre-glacial gravels in the creek bottom. There was little frozen ground in the valley, so the workings were summer open-pit mining. A hydraulic operation located two terrace deposits and recovered between \$100,000 and \$140,000 from nine 250-foot claims. Elmer Middlecoff owned about two miles of the creek below the hydraulic operation. Middlecoff's mine was the largest in the Mayo district in 1915, and he designed his own mining equipment to match the conditions of his ground and the limited water available. A large automatic dam was used to sluice off the overburden in the spring. A self-dumping scraper and a clam-shell steam shovel disposed of the tailings. Total production on Hight Creek from 1903 to 1915 was estimated at nearly \$500,000.<sup>54</sup> Middlecoff was still mining successfully on Hight in 1932, using an ingenious and efficient washing plant that cut down the amount of gravel that went through his sluice runs.<sup>55</sup> There were claims in good standing on Hight Creek in 1938 and between 1940 and 1944.<sup>56</sup> There was increased activity on the placer claims around Mayo Lake in 1933.<sup>57</sup>

A Clear Creek Discovery Claim was staked in 1900.<sup>58</sup> The history is poorly documented, but apparently prospectors examined the creek more carefully after that and discovered it was as important an area as Duncan Creek between 1904 and 1905.<sup>59</sup> There were claims in good standing on Clear Creek between 1935 and 1941, and again in 1944.<sup>60</sup> In 1942, Clear Creek Placers discontinued their drag-line operations on the Left Fork and constructed a three-cubic-foot steel pontoon dredge. The company dredged for 49 days and recovered about 949 ounces of gold, for an average cost of about 48 cents a cubic yard.<sup>61</sup> About 129,000 crude ounces of gold were recovered between 1941 and 1998, which includes 49,637 ounces obtained by dredging between 1941 and 1981, and 1981 and 1987.<sup>62</sup>

Chris Sonnicksen, Tom O'Brien, T. Evans and "Old" Herman were among a number of the men who travelled to the Beaver River in 1888, in response to a rumour of a gold discovery, but nothing came of it.<sup>63</sup> A new placer area east of Mayo Lake, and south of the Beaver River, was added to the Duncan Mining District in 1905.<sup>64</sup>

## Fortymile Goldfields

Most of the gold-bearing tributaries of the Fortymile River are in Alaska; the international boundary is about 30 miles above the mouth of the river. Harper and his partner Mr. Bates collected some fine gold and gravel from the North Fork of the Fortymile River in 1881. It proved to be very rich, but Harper was unable to find the spot the following year.<sup>65</sup> Howard Franklin and Henry Madison prospected on the Stewart River in 1886 before they moved down to the Fortymile River in the fall.<sup>66</sup> Franklin located a place where bedrock was exposed about 75 miles above the Fortymile mouth and managed to pan out a shovel of soil containing coarse flakes of gold, the first coarse gold located in the Yukon River drainage. Franklin's discovery was also the first location of a continuous paystreak.<sup>67</sup>

There were only five men prospecting on the river that fall including Lambert, Micky O'Brien, and Madden. Lambert and Madden worked Madden's Bar, a claim about 10 miles above Franklin's Bar.<sup>68</sup> When Franklin went to the Ft. Nelson post at the mouth of the Stewart River for supplies, he showed the gold he had recovered, and 16 men moved to the mouth of the Fortymile to get an early start up the river the next spring. Most of the men working on the Stewart River relocated to the Fortymile in 1887.

That spring and summer, Frank Buteau started working on Bonanza Bar about halfway between Franklin's Bar and Madden's Bar, at the foot of a riffle a half mile above Canyon Creek. Louis Coty located another bar, also called Bonanza Bar, above the riffle, and about one-quarter mile above Buteau. After the ice went out, Buteau built a rocker and started working the ground – making from \$30 to \$100 a day. Five men working on Madden Bar were trying to construct a ditch from an upriver creek to carry water for sluicing the gravel bar, as it was not rich enough to work with a rocker. This would have been the first instance of hydraulic mining in the Yukon drainage. Buteau took on a partner that summer, and they made about \$600 a week, more than any other miner. Buteau was named 'The King of Fortymile River.'<sup>69</sup>

In 1888, William Ogilvie determined that only 23 miles at the lower end of the Fortymile River was in Canadian territory.<sup>70</sup> Placer discoveries of commercial value were located at the headwaters of Walker Fork, Alaska, in 1888, and prospectors spread out to explore that area. By 1893, 35 miners on the Fortymile had produced about \$25,000 in gold, and 40 miners on Franklin Gulch had produced about \$35,000.<sup>71</sup> In 1891, coarse gold was discovered on Miller and Glacier creeks, which head against Walker Fork in the Bald Hills and drain into the Sixtymile River on the Canadian side of the border. It was largely due to this discovery that prospectors and miners flooded into the region. Most of the important discoveries in the two goldfields were located within 10 years of the 1893 Sixtymile stampede.<sup>72</sup>

In 1893, gold was discovered farther down the Yukon River at Birch Creek, Alaska, and about 80 miners relocated. A strike on Chicken Creek in the Alaskan Fortymile in 1896 caused some excitement, but more miners were leaving the district than staying. The creeks appeared to be mined out, and a six-week drought meant there was not enough water to sluice in almost all of the gulches. Low water, however, is necessary for bar mining, engaging about 35 men. Only a few bars were yielding more than \$8 a day, which was a loss at the prevailing price of goods and materials.<sup>73</sup> Despite the setbacks, placer gold has been continuously mined in the American Fortymile River drainage since 1886. Total gold production to the mid-1990s was about 500,000 ounces.<sup>74</sup>

Most of the mining on the Fortymile drainage occurred west of the Yukon/Alaska border, but there was some on the Yukon side. Between 1902 and 1910, prospectors staked claims on Brown's Creek, along the Fortymile River, and on Fortymile Island. Bruin Creek was worked between 1886 and 1896, as shafts and open cuts found by the 1993 owners indicate.<sup>75</sup> Forty-eight claims were staked on Bruin (Bear) Creek from 1902 to 1910.<sup>76</sup> A dredging operation worked on the lower reach of the creek in the early 1930s. The dredge operated for a short time and stopped when it fell into poor condition.<sup>77</sup> There were claims in good standing on Bear Creek in 1944.<sup>78</sup> Mickey Creek was worked from 1909 to 1911. Marten Creek was staked in the early 1900s and had a reputation as a coarse-gold creek. It was impossible to drift due to pockets of thawed ground. Marten Creek was known as Log Cabin Creek in the early days, because there were many miners living in the area.<sup>79</sup> The creek was re-staked between 1908 and 1910, and again between 1933 and 1935.<sup>80</sup> There were placer claims in good standing in the Canadian section of the Fortymile River in 1940 and 1941.<sup>81</sup>

Two Canadian Securities Company dredges were installed on the Canadian side of the Fortymile River in 1907. One was located at the international border and may have done most of its work on the American side.<sup>82</sup> The other started about four miles above the mouth and operated successfully until 1912, when it was dismantled, moved to the North Fork, Alaska, and soon abandoned.<sup>83</sup> A Canadian Forty-Mile Gold Dredging Company dredge working on the sandbars and shore of the Fortymile River in 1910 was swamped in the spring of 1911. In 2002, the remains were observed on the left limit of the Fortymile River, just below the canyon.<sup>84</sup> The Yukon Fortymile Gold Concessions took over the six dredging leases that stretched from the international boundary to the mouth of the river in 1911 but did not install another dredge on the mining property. There was some pressure on the government from other applicants, and particularly from Ernest Schink, to revoke the leases as the property was not being worked as required. Schink owned a Risdon dredge that was stored on ways at the mouth of the

Fortymile, and he was eager to start work. The dredging leases were transferred to the Great Northern Syndicate in 1916 and to the Fortymile Power and Dredging Company in 1919. They held them by completing drilling projects on the high benches along the Fortymile until 1923, when the leases were revoked.<sup>85</sup>

In the 1930s, Schink, with the backing of H. G. Blankman, was successful in developing a dredging property on the Canadian section of the Fortymile River. In 1933, Blankman was awarded an eight-mile lease starting 2,000 feet below Bruin Creek and continuing eight miles upstream.<sup>86</sup> The Blankman dredge (as the Risdon-manufactured Fortymile dredge was called) was assembled a short distance below the mouth of Bear (Bruin) Creek. It ran for a short time in 1935 as a test.<sup>87</sup> In 1937, Schink started a drilling program 16 miles from the mouth and seven miles from the international boundary. A light gasoline drill out in 10 holes showed 17 feet of gravel and bedrock cut by numerous quartz veins.<sup>88</sup> The test holes for the lower section of the lease did not show enough value for dredging, but the company continued drilling the upper half of the lease.<sup>89</sup> The results may not have been good, as the dredging lease above the Fortymile River Canyon was allowed to lapse in 1938.<sup>90</sup> The Blankman dredge was pushed to the bank of the Fortymile River below Bruin Creek in 2002, and the hull and decking are still visible during low water.<sup>91</sup>

The early beliefs that dredging would be successful in the Canadian section of the Fortymile River have proven to be true in recent years. Fortymile Gold Placers started developing their mining property in the 1980s. The company now has operating permits for large-scale mining on 400 bench claims and 23 miles of dredging leases on the Canadian portion of the Fortymile River, and most productive tributaries. The family-owned operation uses a floater dredge on their dredging leases. This smaller washing plant has proved to be the ideal equipment for the Fortymile where the river channel gravel is thawed and the distance to bedrock is shallow.<sup>92</sup>

### Sixtymile Mining District

Arthur Harper discovered gold in the Sixtymile River drainage in 1875, and he thought correctly that the river would pay good wages.<sup>93</sup> Jack McQuesten recovered \$6 to \$8 per day, at \$23.54 an ounce, from several bars.<sup>94</sup> McQuesten guided several newly arrived prospectors into the area in 1882. The men tested the gravel bars and also dug prospect holes into the frozen ground, finding enough to return to the area the next year but not the third.<sup>95</sup> The gold they found about three miles below Miller Creek was probably too deep.<sup>96</sup> Miller and Glacier creeks were prospected shortly after gold was discovered on Franklin Gulch in the Fortymile River drainage.<sup>97</sup>

Oliver Charles "Charlie" Miller discovered the first minable gold on Miller Creek in 1891, and more claims were staked soon after. The first real work on the creek was done by Nolasque "Jack" Tremblay, Joe Lemay, Joe King, and Louis Boucher, who staked a claim in 1892 and recovered about \$4,000 in gold.<sup>98</sup> The richest strike in the Yukon River drainage, before Bonanza was made on Miller Creek, was when John Muller recovered between \$30,000 and \$50,000 in gold in 1893. Over four years, Muller hired between eight and 18 men to prepare the ground, and then dig and wash the pay gravels over two winters and one summer.<sup>99</sup> Eighty men took out \$100,000 from Miller Creek in the spring of 1893.<sup>100</sup> Miller Creek has been continuously mined since the first discovery. In the 1930s, many miners used the most up-to-date hydraulic equipment while others stuck to the old-time methods of sinking and drifting. In the mid-to-late 1930s, a number of shafts were dug at 300-foot intervals to follow the paystreak down the valley below Discovery. In 1938, a crew of 10 to 14 men sunk a shaft 110 feet to bedrock, and a self-dumper was installed to bring the pay gravels up from the underground workings. The drift must have been big, because geologist H. S. Bostock reported that the miners found gold between three inches and eight feet above bedrock.<sup>101</sup>

Gold was discovered on Glacier Creek and Big Gold Creek in 1892, and those creeks and Miller were the major producers until at least 1917.<sup>102</sup> For three years after its discovery, Miller Creek was the

chief producer of gold in the entire Yukon River drainage. Soon after, the low-level gravels were considered exhausted.<sup>103</sup> In the winter of 1895 to 1896, there were 500 miners in the vicinity, mostly on Miller, but more than half left for the diggings at Birch Creek, Alaska, in the spring. Many men left the creek with \$3,000 or \$4,000 in gold, and many made only wages of \$10 per day or less.<sup>104</sup>

In 1896, there were more than 250 miners sluicing their dumps of pay dirt on Glacier Creek, and 150 were still working on their claims in July.<sup>105</sup> Sixtymile was one of the main producing camps in the Yukon drainage until late 1896, when the claims were practically abandoned as the miners rushed to the Klondike. Miners started returning to their old claims in 1900 with about 40 men working there in 1901, when McConnell estimated the total production at about \$500,000.<sup>106</sup> The terraces on the left limit, about 50 feet above the stream, were discovered around 1900, and a claim opposite creek Claim No. 17 recovered \$18,000 that year.<sup>107</sup> Paying claims on Moose Creek were located in a mile-long stretch about 10 miles above the mouth. Poker and Davis creeks have their heads in Canada, but the most productive claims were in Alaska. Gold Creek, Twelvemile Creek, and California Creek had prospects, but were not being mined in 1901.<sup>108</sup>

That year, Glacier Creek was being worked from Claim No. 28 Above Discovery, five miles down to the mouth. Claim No. 18 was said to be the richest; a few of the other rich claims were being worked for the second time in 1901, and bench claims were staked for the first time around 1900. A shaft on the bench claim opposite No. 10 Above proved the existence of an old channel separated from the current creek bed by a ridge 27 feet high and about 200 feet in width. The old channel was about 75 feet above the valley bottom. The terrace gravels of Glacier Creek are ordinary stream wash and bear no resemblance to the White Channel gravels on Bonanza and Hunker creeks.<sup>109</sup> Glacier Creek remained productive, with six miners working there in 1933.<sup>110</sup>

The first dredge in the Fortymile goldfields worked on Walker Fork, Alaska, from 1907 to 1909 and then was moved to the South Fork. A second dredge was installed on Walker Fork in the winter of 1907 to 1908 by Robert Mulvane, and it operated successfully through the 1908 to 1912 seasons. The Mulvane dredge was dismantled and moved into Canada to Miller Creek in September 1912.<sup>111</sup> The North American Transportation and Trading Company (NAT&T) used the Mulvane dredge on Miller Creek for only a few years after 1912.<sup>112</sup> The years 1915 and 1916 were very successful for the dredge.<sup>113</sup>

The only hydraulic operation in the Sixtymile Mining District in 1917 was on J. P. Miller's claims near the mouth of Miller Creek. Water from the monitor dislodged and pushed boulders towards the sluice boxes where they were lifted by a hydraulic elevator so they could pass through the sluices. This was necessary to get sufficient grade to dispose of the tailings.<sup>114</sup> There was not a lot of activity in the Sixtymile drainage after that, until 1929 when the Mulvane dredge, after being idle for 12 years, was refitted by Holbrook and Edmundson and started working between Glacier and Miller creeks. The ground ahead of the dredge was only partly prospected, so the dredge was testing as it moved, but the owners were pleased with the results.<sup>115</sup>

In 1932, prospectors came back into the district to look at ground that had been practically abandoned since the Klondike discovery. Twenty-four men were employed in the Holbrook dredging operation, and individual miners were working a few claims above the NAT&T concession on Miller Creek, and on Glacier Creek and Big Gold Creek.<sup>116</sup> One miner had successfully mined on Matson Creek since 1913.<sup>117</sup> The dredge directly and indirectly employed 30 men in 1933. It was moved up the river to just below the mouth of Miller Creek that summer. The ground was more consistently thawed there, and the pay gravel areas were better understood. Lack of water was a factor in the season's operations, but the dredge operated well, considering it was cut off from hydroelectric power and organized transportation.<sup>118</sup> In 1933, the McCorick, McDonald, and Stewart group had six hired men working the NAT&T concession along the upper part of Miller Creek. The paystreak was on a bench and too deep to hydraulic with the limited water available. A drift was driven to bedrock to intersect the paystreak at a

location known from some of the early workings. Some of the shallow ground next to the drift was stripped in preparation for a hydraulic operation in 1934.<sup>119</sup>

The North American Mines Inc. started prospect drilling at the confluence of Glacier and Big Gold creeks in the late 1930s. Yukon Exploration Limited was mining this ground in 1948.<sup>120</sup> From 1949 to 1959, the Yukon Placer Mining Company mined Yukon Exploration's property on Big Gold, using a 3.5-cubic-foot bucket-line diesel-electric dredge, built by the Yukon Exploration Company in 1947, and an open-cut bulldozer sluicing plant.<sup>121</sup>

In the 1950s and 1960s, several small operators including Jimmy Lynch, Miller Creek Placers, and Glacier Creek Placers mined on Miller, Glacier, Bedrock, and Big Gold creeks, as well as the left limit of the Sixtymile River.<sup>122</sup> Lynch operated under his own name from 1964 to 1977.<sup>123</sup> In 1969 Glacier Creek Placers held 15 claims on Glacier Creek starting about a half-mile upstream from the abandoned Glacier Creek post office. They used two D-6 bulldozers and recovered 347 ounces of gold, despite being hampered by a lack of water and the need to strip frozen ground for the 1970 season. Lynch owned 11 claims on Glacier and Big Gold creeks and used a D-7 bulldozer to feed the sluice box and stack the tailings. He recovered 206.9 ounces of gold in 1969 and 147 ounces in 1970.<sup>124</sup>

### Klondike Goldfields

The Klondike Region, as described by the Dominion Land Surveyors, R.G. McConnell and J. B. Tyrrell, in 1898, covers about 1,000 square miles between the Klondike and Indian rivers, both tributaries of the Yukon River. The many streams in the region are deep trough-like valleys. Bonanza and its tributary Eldorado, Bear, Hunker, Too Much Gold, and All Gold creeks flow into the Klondike. Dominion, Sulphur, and Quartz creeks flow into the Indian River. The main ridges and creeks flow out, in a general way, from a central hill called King Solomon Dome. The Dome separates the tributaries of the Klondike River from the Indian River and has an elevation of about 3,000 feet above the Yukon River.<sup>125</sup>

The Geological Survey of Canada estimated that Yukon gold production for the first eight years following the discovery of the Klondike goldfields was \$96 million in 1903 dollars. The annual production was estimated as follows:<sup>126</sup>

1896	\$300,000
1897	\$1,500,000
1898	\$10,000,000
1899	\$16,000,000
1900	\$22,275,000
1901	\$18,000,000
1902	\$14,000,000
1903	\$12,500,000

About \$1 million of this amount came from smaller camps like Livingstone and the Sixtymile, but the rest was recovered from the Klondike goldfields and principally from Bonanza, Eldorado, Hunker, and Dominion creeks, and the Bonanza bench claims. Gold production declined from 1900, as the richest claims on Eldorado and Bonanza were worked out as far as hand-mining techniques were concerned. The number of claims worked and amount of gravel processed increased, as did the efficiency of the mining process, but the gravels available to mine were of a lower grade.<sup>127</sup>

R. G. McConnell's field report in 1903 described considerable stretches of unworked gravel, and he estimated that the hand-mining practices of the day could continue profitably for more than another 10 years.<sup>128</sup> That might have proved true if hand-mining practices had remained the dominant form of mining, but most independent miners acquired machinery as soon as they could afford it. The process remained the same, in that gold-bearing gravel was moved into a washing plant using the most efficient

means at hand, but the process became faster and more efficient with improved equipment. Successful miners acquired more than one claim and grouped them so that the required work on one claim kept the others in good standing. Some of the larger operations employed 100 men or more. Open-pit mining was the most efficient method of mining claims where the bedrock was within 15 feet of the surface. The Dawson-developed, steam-operated self-dumper equipment could move three wheelbarrow loads at a time and soon replaced expensive manpower and hand-operated windlasses and wheelbarrows on many independently-owned creek claims.<sup>129</sup> Some of the ground described by McConnell was poor in gold, or the deposits were deeper than was feasible to mine using hand-mining methods.

Robert Anderson was the first to apply for a lease to hydraulic mine ground in the Hunker Creek valley that was not economical to mine by drifting. In 1897, the Yukon Gold Commissioner defined Anderson's lease as 2 ½ miles of ground between Last Chance Creek and the mouth of Hunker Creek, and exceeded his authority by closing it to staking by other miners. His actions were confirmed in 1898 in a federal Order-in-Council, and eventually 40 of these types of leases, called hydraulic concessions, were approved. Some of the ground tied up in the leases, like the Boyle Concession issued in 1900 that covered the Klondike valley, was not economical for hand miners, but some included the main gold-bearing creeks and their White Channel benches.<sup>130</sup>

The White Channel bench and hillside claims were very rich, but water was scarce and expensive to pump from the creeks. Some of the miners brought their pay dirt to the valley floor where it could be sluiced, as moving the ground was more economical than moving the water. In 1907, the Yukon Gold Company had a huge hydraulicking project to bring water 70 miles from the Ogilvie Mountains to the Klondike goldfields. Seventeen miles of ditching, four miles of flume and the foundations for the rest had been completed, and 12 miles of piping was on the ground ready to be installed. The Klondike syphon, with an inside diameter of 49 inches and a length of 15,760 feet, was in place.<sup>131</sup> The syphon had a capacity of 5,000 miner's inches, which converts to about 12 ½ cubic feet per second or 30,000 gallons per minute.<sup>132</sup> This was a wealth of water at a time when Klondike miners needed a "sluice head" of 50 miner's inches to sluice and could pay up to \$4 per sluice head per hour. The hydroelectric plant near the Twelvemile River was ready to supply power to the company's dredges, elevators, and camps. Bonanza Dam was completed with a capacity for 350 million gallons of water to be used to hydraulic mine the Bonanza bench claims during the dry months of June, July, and August. Two ditches of 1,000 miner's inches each were ready to convey water to two large hydraulic plants that would work with the elevators in the creek bottom in 1909.<sup>133</sup>

The first Yukon gold dredge, a small steam-driven washing plant with a bucket capacity of 3 ¼ cubic feet, was dredging on Cassiar Bar in the Yukon River in 1899. In 1901, it was moved to Claim 42 Below on Bonanza Creek, where it proved to be a successful way to extract gold from previously mined ground. Half of the gold recovered from Claim 42 went to the claim owners, but the owners of the dredge made enough profit to purchase the Bonanza Discovery group of claims, and they moved the dredge to the Discovery claims in 1903.<sup>134</sup> The success of this first dredge encouraged other companies, and by 1907 the Yukon Gold Company had three dredges on Lower Bonanza Creek, one on No. 90 Below, and two on No. 104-A Below Discovery. They worked all summer but were hampered by frozen ground. More dredges were constructed in 1907, including one on No. 90 Below Bonanza and three on Hunker Creek.<sup>135</sup> The Canadian Klondyke Mining Company was working in the Klondike River near the mouth of Bear Creek. It had a capacity of 2,800 cubic yards per 24 hours and operated for 167 days in 1907. The Indian River Gold Mining and Development Company bought and moved a dredge that had been working in the Klondike River to the Indian River. The Bonanza Basin Gold Dredging Company remodelled their dredge from steam to electric. The Lewes River Dredging Company had moved their dredge from Bonanza Discovery Claim to No. 6 Below Discovery for the 1908 season.<sup>136</sup> Gold production for the year ending March 31, 1908, was 189,011.68 ounces, \$2,820,161.60 at the assayed value of \$15 per ounce, the lowest output from the Klondike since 1898. The Yukon Commissioner attributed this to

concessions acquired in 1908 by Yukon Gold for dredging and hydraulicking on Hunker, Bonanza, and Eldorado creeks.<sup>137</sup> Much of the ground was not worked as Yukon Gold organized their operations. Production recovered in 1909 when Yukon Gold was operating seven dredges, and hydraulicking on Lovett Hill using water from the newly completed Yukon Ditch.<sup>138</sup> In 1910, Canadian Klondyke started up the world's largest dredge at Bear Creek in the Klondike valley, and even larger dredges were to follow.<sup>139</sup> 1913 was the peak gold production by Yukon dredges, when Yukon Gold and Canadian Klondyke together mined about nine tons of gold.<sup>140</sup>

The large dredging and hydraulic companies had trouble attracting foreign investment during World War I, and there were labour shortages as many Yukon men volunteered for the army. Yukon Gold had only two dredges operating in the Klondike in 1919, and the last one shut down in 1923.<sup>141</sup> Canadian Klondyke declared bankruptcy in 1918, and the Receiver kept three of its four dredges operating in poor working condition on low-grade ground. The company defaulted on an interest payment in 1921 and was taken over by a private company, Burrall and Baird Ltd.<sup>142</sup> In 1923, A.N.C. Treadgold attracted the financing to create the Yukon Consolidated Gold Corporation (YCGC) which took over Canadian Klondyke/Burrall and Baird assets and then purchased the remains of Yukon Gold's operation in 1926. The company did not flourish during the 1920s, when the fixed price of gold, at \$20.67 an ounce, was eroded by inflation, and Treadgold provided poor management until he was removed by the Board of Directors in 1930.<sup>143</sup> Under the able management of Andrew Baird, YCGC was able to end 1931 with a positive cash balance.<sup>144</sup>

In 1932, over three-quarters of Yukon's placer gold production came from the Klondike district, with the remainder coming from the Sixtymile, Mayo, Livingstone, and Kluane districts.<sup>145</sup> YCGC and its subsidiaries held almost the entire known gold-bearing ground in the Klondike district. A report commissioned by the company indicated very large reserves of partly tested ground, and estimated that the three large dredges in the Klondike drainage would be able to operate at full capacity for another 23 years. The author also referred to McConnell's 1906 map of the high-level gravels, and recommended the restoration of the hydraulic system to mine those properties for another 17 years. The most promising areas were considered to be in the Indian River tributaries with an estimate of over 74 million cubic yards of proven and partly proven ground suitable for dredging. The report concluded that a considerable increase in gold production could be expected after 1935, and that production in the Indian River area would be maintained for at least 20 more years.<sup>146</sup> Individual miners and small groups were encouraged by the higher price for gold in the mid-1930s and a few new mines were developed on Bonanza, Eldorado, Upper Bonanza, Gold Run, Dominion, Sulphur, and Quartz creeks.<sup>147</sup> The last YCGC dredge shut down in 1966, but small operations continued to be profitable.

### *Klondike River Drainage*

In 1886, prospectors headquartered at Fort Reliance travelled overland a distance of about 35 miles and struck the Klondike River about 45 miles up from the mouth.<sup>148</sup> Joe Ladue, Dan Sprague, and John and Pete Nelson travelled down the Klondike River, testing as they went. Sprague and Nelson found 25-cent to 30-cent prospects on one bar but did not consider it significant.<sup>149</sup>

The Klondike River was neglected by many early prospectors as not having the proper vegetation to be a gold-bearing creek. Robert Henderson came into the drainage from the Indian River side, and so was not aware that he was prospecting and mining on ground that others disregarded. Despite the perceptions of the early prospectors, the Klondike goldfields had two equally important conditions that made them Yukon's richest streams. The bedrock was mainly old, highly mineralized schists which had originally carried the gold in veins. The area had not been glaciated, so when the gold eroded out of the rock and concentrated in the stream gravels, it was not disturbed or overlaid with deep accumulations of glacial debris as in areas to the east and south.<sup>150</sup>

The Klondike River valley bottom was never hand mined, because the gravels were thawed and the water table was high. Dredges are the best placer mining equipment for recovering gold under water and are also good choices for mining low-value ground. By 1909, placer mining in the Klondike was rapidly changing from small mines to large-scale operations.<sup>151</sup> Individual claims were purchased and consolidated into larger holdings, and there were plans to rework the hand mines with hydraulic or dredging equipment. Ten dredges were working in the Klondike goldfields that year, three on the Klondike River, five on Bonanza Creek, and two on Hunker Creek. The Yukon Gold Company ran seven dredges with power generated from their power plant in the Ogilvie Mountains 36 miles north. An ambitious plan was underway to generate power from a plant on the north fork of the Klondike River.<sup>152</sup> By 1911, Treadgold had constructed a ditch system and power plant on the North Fork that would generate enough power for dredging operations throughout the goldfields, and also provided electricity for Dawson City. It was taken over by Canadian Klondyke in 1913.

In 1929, there were two YCGC dredges working between the mouths of Bonanza and Hunker creeks. These electric large-capacity bucket dredges could process 10,000 cubic yards of ground daily. YCGC also had a hydraulic operation at Jackson Gulch on the left limit of the Klondike valley.<sup>153</sup>

### *Bonanza and Eldorado*

The pay gravels of Eldorado Creek and most of Bonanza Creek extended across the whole width of the valley bottoms, although the values varied. McConnell called Eldorado “one of the richest creeks ever discovered.”<sup>154</sup> It is seven miles long and barely six feet wide at the mouth.<sup>155</sup> The hill claims are on the plateaus that occur from 150 to 200 feet above the valley bottoms. They were extensively worked in 1898 and proved to be extremely rich. The most productive claims were along the lowest edge of the deposit and were worked by open cuts. The gold was often found in large nuggets that contained a lot of quartz.<sup>156</sup> One selected pan from a drift on Charlie Anderson’s Claim No. 29 on Eldorado was said to yield \$1,000 at an assayed value of \$20 an ounce.<sup>157</sup>

By 1903, the first 37 Eldorado claims had yielded between \$20 and \$25 million at \$16 an ounce. The most productive stretch of Eldorado to 1903 was the first 3 ½ miles up from Discovery Claim at the mouth. All of those claims, except 34 and 35, and 18 to 21, were extraordinarily rich. No. 17, at the mouth of French Gulch, was reputed to be the richest claim in the whole district, and by 1903 it had yielded \$1.5 million in gold. Claims No. 5, 16, and 30 almost rivaled it in production. Eldorado gold is very coarse and almost unworn.<sup>158</sup> McConnell named the gulches that were important to Bonanza Creek producers in 1903: Victoria, O’Neil, and Ready Bullion on upper Bonanza and Big Skookum; and Magnet, American, Fox, Monte Christo, and Lovett gulches on Lower Bonanza.<sup>159</sup> Victoria Gulch, about two miles long, was the most productive of the upper Bonanza gulches at that time. The trough-shaped bottom of the valley was covered with two to seven feet of coarse angular gravel and slide rock, covered by a few feet of muck. The recovered gold was coarse and angular and looked “as if it had just dropped out of crevices in the quartz.”<sup>160</sup> The gulches between Adams and Boulder creeks on Lower Bonanza cut through the White Channel gravels.<sup>161</sup> Big Skookum Gulch, above Adams Creek, was also rich at the mouth with gold concentrated from the White Channel gravels and coarse angular gold near the headwaters.<sup>162</sup>

In 1903, there was still some virgin ground; some of the richest claims on Bonanza and Eldorado were being worked for the second time, and none of the claims considered to be “drifted out” had been abandoned. Bonanza Creek had been mined from Victoria Gulch down to 50 claims below Discovery. A few untouched claims and some partly worked claims remained, and there were still stretches of low and medium-grade gravels untouched in the lower part of the valley. The Eldorado and Bonanza bench claims were largely exhausted for hand-mining techniques, and very little ground suitable for drifting was available in the rich hills above Adams Creek. A number of hand mines were still operating between

Adams and Boulder creeks and also on Lovett and other gulches in the lower valley.<sup>163</sup> Some family-run operations survived a general move to mining on a larger scale.

The 71-foot Lewes River dredge started mining on Bonanza Creek in July 1903 with a crew of 11 men including those in the thawing operation. The thawing was accomplished by driving 12 pieces of 11-foot gas pipe vertically into the ground ahead of the dredge. This dredge did not use spuds and could dig 500-cubic yards in 24 hours. The bucket line had 30 ¾-foot buckets and could dig 28 feet below the water surface. The dredge was steam powered and burned three cords of wood every 24 hours. It operated successfully in 1904 on ground that was previously drifted.<sup>164</sup> Victoria Gulch was at the top of what was considered productive ground on Bonanza Creek in 1909.<sup>165</sup>

YCGC operated a hydraulic plant on Lovett Gulch on Bonanza Creek between 1929 and 1933. There were still many individual miners working in the Klondike, mainly on Bonanza and Hunker creeks, and their production of gold was estimated at less than 5 percent of the Yukon total of about \$600,000 in 1929.<sup>166</sup> There were about eight individual properties being worked on Bonanza Creek and the same on Hunker Creek in 1930. The Lovett Gulch hydraulic operation did not operate to capacity in 1929, as there was a lack of rainfall and there were breaks in the ditch, but it was back on line in 1930 operating at only one-fifth of its design capacity.<sup>167</sup> A rise in the price of gold in 1933 brought 20 to 35 men back to individual claims on Bonanza and Eldorado.<sup>168</sup> Bonanza and Eldorado and their tributaries continue to be successfully mined.

### *Hunker Creek*

Hunker Creek is a tributary of the Klondike River. It is about 15 miles long and is similar to Bonanza Creek in width. The most important tributaries are Last Chance and Gold Bottom. Like Bonanza, the present valley is sunk in the floor of an older one. Also like Bonanza, the gravel layers include the creek gravels, terrace gravels, White Channel gravels, and a sheet of high-level gravels overlying the Channel near the mouth of the creek. Before they were mined, the creek gravels were from 4 to 10 feet thick covered by 5 to 20 feet of organic muck. At Discovery Claim, the thickness of both gravel and muck was less than 10 feet for a short distance. Pay gravels in 1903 extended from Claim No. 46 Above Discovery down the valley for a distance of about 12 miles. A few claims for a mile above and below Discovery proved to be very rich, up to \$1,000 per running foot of valley. Another good stretch of ground was found from the mouth of Gold Bottom for 1 ½ miles downstream.<sup>169</sup> The gold-bearing White Channel gravels, marking the remains of ancient stream beds, and found on many bench and hillside claims in the Klondike goldfields, are more widely distributed along Hunker than on any other creek in the district but are not as rich as those found in the Bonanza valley. They are discontinuous along the length of the creek starting at No. 4 Below Discovery and ending at Henry Gulch near the mouth. The thickness of White Channel between Gold Bottom and Last Chance creeks varies from 20 to 100 feet, with a width from 500 to 2,000 feet. Below Last Chance, White Channel is over 100 feet thick and nearly a mile wide.<sup>170</sup>

Gold Bottom and Last Chance were the best gold-producing tributaries of Hunker Creek in 1903. Gold Bottom is almost as wide as Hunker Creek at the mouth and extends up the valley for about six miles. Gold was found almost to the headwaters, but the distribution of values was irregular. Last Chance is about six miles long, was gold-producing for the first four miles, and a number of claims in the first miles were highly profitable. White Channel gravels follow the creek for about 2 ½ miles and were fairly rich in places. The gold found here is noted for its crystallized character, but it assayed as low grade, from \$14.50 to \$15 per ounce.<sup>171</sup> By 1903, the claims above Gold Bottom were worked out, but only a few claims below the tributary had been started. Gold Bottom and Last Chance had a considerable stretch of unworked gravels. The hill gravels were a lower grade than on Bonanza so had not been so completely prospected, but a new discovery below Hester Creek was found to be good ground for drifting.<sup>172</sup> Hunker Creek and its tributaries continue to be successfully mined.

### **Allgold**

The head of Allgold Creek is near the central King Solomon Dome and drains the eastern slopes of the Klondike hills. It was staked in the late 1890s and a few shafts dug to bedrock, and then mostly abandoned. After the richest Klondike claims were mined out, the Allgold claims were re-staked in 1901 and 1902. The longest paystreak discovered by 1903 was near the mouth, but the ground was not very rich. White Channel gravels occur on the left limit of the creek along the lower valley at an elevation of 150 to 250 feet above the stream. Almost no work had been done on them by 1903 because of the scarcity of water for sluicing. Allgold Creek gold has high-grade gravels.<sup>173</sup> It continues to be successfully mined.

### **Indian River Drainage**

William Redford discovered gold on Quartz Creek, a tributary of the Indian River, in 1894. He bought his supplies from Ladue at the Sixtymile Post on the Yukon River. Redford's full poke of gold was the reason that Ladue turned Robert Henderson's attention to the Indian River drainage.<sup>174</sup> Henderson and three other men came over the Chilkoot Pass together that year, and went to work for Redford at Quartz Creek in 1895. Henderson spent his free time prospecting, and soon left to work on promising placers he located on Gold Bottom Creek in the Klondike drainage.<sup>175</sup> Redford mined his Quartz Creek claims from 1894 to 1937 but never made more than good wages.<sup>176</sup>

Dominion Creek was the most important gold-bearing creek in the Indian River drainage in 1903. Its headwaters are near the Dome, and it winds about 30 miles east, south, and then west to join with Australia Creek at the start of the Indian River. Among its tributaries are Gold Run, Sulphur, and Jensen creeks. Dominion starts in a steep valley, but the lower valley widens to an extraordinary extent compared with the size of the stream. The paystreak is 1,000 feet wide in places. From Jensen Creek to the mouth, the valley exceeds a third of a mile and in places spreads out to half a mile or more. The stream is about 25 feet wide with an average depth of about a foot. Dominion Creek differs from creeks draining into the Klondike in that it does not possess a well-defined secondary valley. The ancient stream bed wandered across a broad swath of land and did not create the benches where White Channel gravels are typically found in the steeper-sided creeks like Bonanza and Eldorado. The Dominion Creek gravels are of local origin, formed from rock outcroppings along the valley. In the central valley the bedrock is unusually soft with small pebbles.<sup>177</sup> New ground was discovered on Caribou Creek in 1909 where a visiting geologist was shown a pan of nuggets as a reminder that rich discoveries were still possible.<sup>178</sup>

### **Dominion Creek**

Klondike stampeders discovered gold on Dominion Creek as they spread across the country looking for land not already staked. It is indicative of the disorganization at the government Mining Recorder's office in 1898 that Dominion Creek has two discovery claims called Upper Discovery and Lower Discovery. Gold was found the whole length of the creek, but the most productive part in 1903 was between the two Discoveries where the gravels range from 2 to 7 feet under 5 to 15 feet of muck. The richest claims, worth up to \$500,000, were from Lombard Creek down to Lower Discovery and a few miles beyond. Near the mouth, the depth of muck increases to 40 feet in places, which made it expensive to mine with early methods. Dominion claims are not as rich as those on Eldorado but were profitable enough in 1903.<sup>179</sup> By that time, the narrow portion of the valley above Lower Discovery was mostly worked out, and the amount of unworked ground below Lower Discovery was rapidly decreasing.<sup>180</sup> Between 1929 and 1932, YCGC had two electric dredges working on Dominion Creek, one at Cariboo and the other at Granville. They were relatively small dredges, having a capacity of about 3,500 cubic yards per day.<sup>181</sup> In 1930, there were only six individual properties being worked in the

Dominion drainage: six on Quartz Creek, three on Sulphur, one on Gold Run, and several on Upper Dominion.<sup>182</sup> The largest Yukon nugget weighed 3,937.7 g (126.6 crude ounces) and was found on Claim No. 9 Below Upper Discovery on Dominion Creek.<sup>183</sup> Dominion Creek continues to be successfully mined.

### **Gold Run Creek**

Gold Run Creek is about eight miles long and enters Dominion about five miles above its mouth. The gold-bearing terraces are low. The thickness of gravel and muck varies from 20 to over 30 feet above Claim No. 13, where the depth increases to over 50 feet. The most productive claims in 1903 were near the mouth, while the lower part of Gold Run Creek was exceedingly rich. McConnell predicted that a number of claims would yield over \$250,000 worth of high-grade gold.<sup>184</sup> Every claim had been partially mined, and some of them were already drifted out.<sup>185</sup> Although the high-grade gold was mined out in the early days, Gold Run Creek continues to be successfully mined to the present day, with better recovery methods and modern equipment.

### **Sulphur Creek**

Sulphur Creek is 17 miles long from the Dome to its mouth at Dominion Creek where the stream is about 12 feet wide with a depth of about 6 inches. Sulphur is unique in the mining district as having no well-defined terraces and a 50-foot layer or more of muck bordering the creek. Pay gravels occur almost continuously for seven miles from a point near the mouth to Claim No. 35; most of the claims yield fair returns. Sulphur gold is lower grade than Gold Run gold.<sup>186</sup> In 1903, Sulphur had not been mined as extensively as the richer creeks.<sup>187</sup> Sulphur Creek continues to be successfully mined.

### **Quartz Creek**

Quartz Creek is a 9-mile stream that starts near the Dome and flows into the Indian River about 19 miles below the mouth of Dominion. The valley is wide and flat and has been deepened like the Klondike, unlike the upper Indian River streams. The first discovery in the district was on Quartz Creek, but production to 1903 was relatively insignificant. At Redford's Discovery, the pay gravels were under about 75 feet of muck and were reached through drifts from the creek. A number of claims above and below Discovery were worked at a profit. The bench gravels were more important than the creek gravels in 1903. Shafts to bedrock were from 100 feet to 60 feet or less. The paystreak near Calder Creek was near the surface, and the mines were open cuts.<sup>188</sup> Quartz Creek continues to be successfully mined.

### **The Yukon River**

In the course of his surveying duties, William Ogilvie picked up some promising samples of ore from the banks of the Yukon River between Dawson and Forty Mile. A specimen from the north bank of the Yukon River, opposite the mouth of the Klondike River, contained traces of gold and silver. The seam appeared to be extensive, and Arthur Harper had sent some samples of this ore out for assaying some years before. He was not excited by the results.<sup>189</sup> Based on the idea that lode gold may have eroded into the river, Anglo American Corp staked five dredging leases on the Yukon River by Dawson in December 1973. The river bottom near Dawson is a steep-sided, flat-bottomed trough. Depending on the swiftness of the current, there is from 1 to 49 feet of gravel, 10 percent sand, and no clay or silt. The river bottom bedrock is altered andesite and serpentine. Chlorite-sericite schist, which underlies the Dawson townsite, is found on the west side of the river. Anglo American was granted a lease covering approximately 2.2 miles of the Yukon River and floodplain downstream of the confluence of the Yukon and Klondike rivers. In April 1974, roads were constructed on the Yukon River ice and 35 holes were drilled – three lines of holes across the river and one line along the shore on the west side. Gold was found in all of the boreholes in concentrations of up to 0.06 ounces per cubic yard, and ranging in size from flour gold to small nuggets with an average size of about 2 square millimetres. Gold values were

erratically distributed through the sediments and were not concentrated at the bedrock surface. This project was conducted as an exploratory survey, and no further work was done.<sup>190</sup>

A sample from one of Ogilvie's survey stations near the Twelvemile River, 10 or 12 miles below Fort Reliance, contained traces of gold and silver but no indication of an extensive quantity of ore.<sup>191</sup> These indications of lode gold were explored by later prospectors and are discussed in the lode-mining section of this paper.

In 1888, some miners were excited by the prospects of mining Roger's Bar, on the Yukon River below the Fortymile River. It was thought that at some point Old Man and Old Woman rocks, significant features near Roger's Bar, were connected to form a barrier and a waterfall. Fine gold would have collected in the river at this point. The miners thought they could bring sluice water 30 miles from the high level of the Fortymile River to work the bar. Ogilvie explained that they would need pumps, and after he made an estimate of the size of engine required and the cost of such an operation, the miners abandoned their plans.<sup>192</sup>

R.G. McConnell examined the Yukon River with some care from the Stewart River to just below Cliff Creek in 1900. He found that the Indian River slates changed to bedrock schists and quartz-porphyrines, the gold-bearing rocks of the Klondike district, from just below Ensley Creek almost to the mouth of the Klondike River. Continuing downriver, the Klondike schists are succeeded by what McConnell termed the Moosehide group of green, mostly diabase, rocks often alternated with serpentine.<sup>193</sup> Thick bands of green schists and dark lead-coloured argillites alternating with gray limestones occur between Moosehide Creek and a point just above the Fortymile River, where the upper part of the "Nasina schists" and overlying Indian River slates were exposed for some distance.<sup>194</sup> The Nasina series is non-gold-bearing almost everywhere it is found.<sup>195</sup> Alternated green and dark schists resume below the mouth of the Fortymile River and continue down to Cliff Creek.<sup>196</sup> Miners following the geology reports of the day were discouraged from prospecting the Yukon River for placer deposits between Dawson and Forty Mile. In 1909, prospectors explored a Yukon River rock bluff 10 miles below Dawson. The bluff is coarse, quartz-mica schists with layers of quartz gravels, a few of which were said to contain gold. The prospectors were looking for hardrock gold, but the investigating geologist was unable to pan out any colours.<sup>197</sup>

McConnell was most interested in the economic prospects of lignite-bearing outcrops that extended in a long narrow basin, or series of basins, that generally followed the east side of the Yukon River for 60 miles between the Klondike River and Cliff Creek. In 1900, the Alaska Exploration Co. was mining coal in the Klondike River drainage at two seams in the Coal Creek and Rock Creek valleys, while the North American Trading and Transportation Company was mining a group of coal seams at Cliff Creek about 55 miles below Dawson. A "considerable quantity" of coal was shipped to Dawson in 1899 and used for heating purposes and by a number of Yukon River sternwheelers.<sup>198</sup> High operating costs in 1914 led dredge owners in the American Fortymile goldfields to briefly consider developing an electrical power system at the Coal Creek mine, where a power plant already existed.<sup>199</sup>

The first Yukon prospectors found gold flakes in the gravel bars of many Yukon rivers and were most successful on the upper Yukon River and Stewart River bars. Miners coming into the Yukon River drainage in the early 1880s prospected the gravel bars as they travelled down the Yukon. Thomas Boswell discovered a good paying bar about 75 miles above Fort Selkirk in 1883. When Dr. Willis E. Everette travelled down the river in 1884, he met Boswell, Howard Franklin, Henry Madison, and John Fraser, who were working on Boswell's Bar and waiting for the water to go down so they could get to gold-bearing silt. Boswell reported that the bar was paying \$15 for each man per day, and that they had taken out \$2,000 that year.<sup>200</sup> In 1885, Mike Hess spent some time with Franklin, Madison, and Boswell skim digging with rockers on the Yukon River about 125 miles above the mouth of the Pelly River. Hess made \$127 in 11 days, and the others took out \$500 each for their summer's work.<sup>201</sup>

Cassiar Bar was discovered about 10 miles below the Big Salmon River in 1886. In the early 1890s, miners considered a paying prospect one that yielded about nine-tenths of an ounce a day.<sup>202</sup> The six men who mined Cassiar Bar in 1886 each recovered between \$200 and \$900 in gold (from 15 to 60 ounces), and they spread the news when they went “outside” in the fall.<sup>203</sup> In 1891, four or five men were working on Cassiar Bar but were not recovering much gold.<sup>204</sup> Rock piles and a few ruined cabins marked the spot in 1898, and all the bar workings were deserted.<sup>205</sup> A dredging operation on Cassiar Bar in 1900 was deemed a failure. About 50,000 cubic yards of gravel were washed, and the average yield was only five cents per cubic yard. The dredge operated only one season in the Yukon River and was later moved to Bonanza Creek.<sup>206</sup>

Kirkman Creek enters the Yukon River about 16 miles above the White River and 28 miles above the mouth of the Stewart River. Gold was discovered there in 1898, but no mining took place until 1914, when J.C. Britton and William Hess made a discovery that started a staking rush. In the winter of 1914 to 1915, about 40 men were mining along the creek and about 30 were mining the following summer. More miners were working in the winter because the creek gravels were frozen and the men could drift mine when there was little work elsewhere. About \$8,000 in gold was recovered between April 1914 and October 1915 from a two-mile stretch of the creek.<sup>207</sup>

Thistle Creek enters the Yukon River about eight miles above the White River. It is about eight miles long and from 15 to 20 feet wide at the mouth. The valley is flat bottomed in the lower reaches and the gravels resemble those in the Klondike. Discovery claim was staked about six miles up in 1898, but not a lot of work had been done by 1901. The gold is mostly coarse grains or nuggets.<sup>208</sup> In 1915, 13 men were mining on the creek by hydraulicking the bench gravels during the summer, and drifting mainly in the winter, producing about \$125,000 in gold.<sup>209</sup> There was little activity on Thistle in 1929. Two men were stripping the overburden, but they did not wash any gravel.<sup>210</sup> This mine was shut down in 1930.<sup>211</sup> Yukon Gold Placers owned 148 claims on Thistle Creek in 1947, employed in mechanical and hydraulic stripping. The men freighted the components of a 4 ½ cubic foot steel pontoon dredge to a construction site about 15 miles up from the Yukon River. The dredge was completed in July 1949 and worked until 1952, when it shut down because of poor recovery rates.<sup>212</sup>

Harper and George Finch were among the earliest prospectors on the White River. They saw some White River copper nuggets at Fort Yukon, at the mouth of the Porcupine River. This intrigued them enough that they travelled up the Yukon River and then prospected 50 or 60 miles up the White River.<sup>213</sup>

Henderson Creek enters the Yukon River about three miles below the mouth of the Stewart River. The creek is longer than Thistle Creek and carries more water but is very similar otherwise. The valley was staked in 1898 and then virtually abandoned. In 1901, two Australian miners had been working for several seasons on a claim about 14 miles upstream, using a combination of drifting and open cut.<sup>214</sup> There was a claim in good standing on Henderson Creek in 1940. In 1946, Yukon Gold Placers were working on Thistle and Henderson creeks preparing to install new steel-hulled dredges. The Henderson property included 144 claims owned by YCGC and worked by Yukon Gold Placers under a lease agreement. Forty-two men worked the season of 1947 constructing a dredge and thawing by hydraulic stripping and mechanical stripping and thawing. The 4½-cubic-foot, steel pontoon bucket-line dredge was completed at the end of August and operated until the first week of October. It recovered 275 fine ounces of gold.<sup>215</sup> The gold is finer than on Thistle Creek and, as at Bonanza Creek, extends into the gravel above the bedrock for several feet.<sup>216</sup> White Pass & Yukon Route stopped running sternwheelers on the Yukon River in 1954, and Yukon Gold Placers were forced to freight fuel and supplies to Minto Landing and then hire a local boat to bring the supplies to the Henderson Creek Landing. The Henderson Creek dredge operated until the end of the season in 1956.<sup>217</sup>

Black Hills Creek was first staked and mined by a syndicate of miners from Minnesota called The Monitors. A small stampede staked the whole creek, but no serious work was done until 1908 when it

became a successful mining district. The Overland Trail from Whitehorse to Dawson was re-routed through the area between 1912 and 1925. Most of the miners moved out when the road was closed, and the mines were mostly abandoned until 1980, when the area was revived by a rise in the price of gold.<sup>218</sup>

### Livingstone

The Livingstone Creek region was originally called the Salmon River Gold Field and later the Livingstone Placer Camp. Four miners crossed the Chilkoot Pass in 1881 and prospected the Big Salmon River. Two of them reported finding gold for the entire length of the river, while two others did considerable bar mining. These two, Langtry and McGlinchey, were probably the first producing miners in the Yukon River drainage.<sup>219</sup>

There is evidence of glaciation everywhere in the Livingstone Creek region, with the ice reaching as high as 7,000 feet. The schists generally resemble the Klondike schists and there are many quartz lenses carrying small amounts of sulphides. Free gold is sometimes visible, especially in the western side of the region.<sup>220</sup> The creeks have steep narrow walls and differ radically in appearance from the Klondike creeks, with gravels that include glacier-borne granite material.<sup>221</sup> The region was most easily reached by travelling 20 miles up the Teslin River to Mason's Landing, and then following a 15-mile pack trail over the ridge to the northeast. Gold in good quantities was found in a number of creeks east of the south fork of the Big Salmon River.<sup>222</sup> The creeks with producing mines in 1901 included Livingstone, Summit, Lake, Cottoneva, Martin, Sylvia, Little Violet, and Mendocina. The total production of this gold field up to 1900 was an estimated \$20,000, with the greatest amount recovered from Discovery Claim on Livingstone Creek.<sup>223</sup>

Respected prospector and Livingstone resident Clem Emminger said there were five people from Dawson and Big Salmon who discovered the Livingstone placer camp in 1898: Louis Kiser, George Black, Bob Chestnut, Joseph Peters, and another he could not recall but who was probably either Jesse "Kit" Watters or Sam Lough. They sent someone down to Dawson via Big Salmon to record five claims and then found that the richest ones were recorded for the Crown. The rule in 1898 was that for every 10 claims recorded, another 10 were recorded for the federal government.<sup>224</sup> George Black told a federal geologist that he went on to Dawson that fall with \$12,000 in gold dust.<sup>225</sup> Canadian geologist R.G. McConnell travelled into the region in 1901 and considered the field to be of moderate richness. This report may have discouraged development of the area.<sup>226</sup>

Livingstone Creek is about 10 miles long, and in 1901 the working claims were at first confined to a canyon area with shallow gravels seldom deeper than 3 feet. The steep grade of the valley made hydraulicking practical, and water was flumed along the bank at Discovery Claim to achieve a head of about 50 feet. This water was used to ground sluice the stream bed; the heavy boulders were removed with a derrick. The miners started with steam and ended up with power from a waterwheel. The gold was very coarse, about one-third over an ounce in weight. and no fine gold was found. The gold lay right at bedrock or in the crevices. The largest nugget found at that time was valued at \$304 and the second at \$295 with gold assayed at \$16 an ounce. The average assay value of Livingstone gold was \$18.20 an ounce.<sup>227</sup>

Laberge Charlie staked Claim No. 12 Above Discovery on Livingstone Creek in 1913.<sup>228</sup> Harry Berry and Andy Campbell were driving a 300-foot drift on Claims Nos. 9 and 10 Above Discovery in the winter of 1914.<sup>229</sup> The Thomas O'Brien Syndicate from Dawson had a 190-foot tunnel on No. 8 Above Discovery and struck good pay in 1901.<sup>230</sup> Discovery Claim recovered a small amount of gold in 1899 and produced \$11,000 in 1900. The 1901 season was looking good as well.<sup>231</sup> James Edwin Peters bought the lower half of Discovery Claim on Livingstone Creek from Arthur Johnson in 1913 and the upper half of Discovery Claim from Percy Sharpe in 1924.<sup>232</sup> Peters sold the 1,500-foot Livingstone Discovery Claim to Percy Sharp in 1930. The sale included sluice boxes, flume, pipe and monitor, a waterwheel hoist, and

a derrick.<sup>233</sup> The Livingstone Creek Syndicate Company purchased the 10 claims below Discovery on Livingstone Creek at a government auction in 1900. A crew worked an open-cut mine, and the boulders were removed using derricks operated by steam winches or water wheels.<sup>234</sup> The syndicate mined for about 10 years, and then Big Salmon Harry staked Claim No. 4 and Hootalinqua Johnny staked Claim No. 5 Below Discovery in 1913.<sup>235</sup> The paying gravels were very deep in the claims farther down the creek. One shaft was dug to a depth of 70 feet without reaching bedrock.<sup>236</sup> The gold in Livingstone Creek is very coarse, and large nuggets have been found. The old-timers say this creek had produced over \$1 million in gold by 1930.<sup>237</sup> Several First Nations families were reworking the old diggings of the Livingstone placer camp in 1929 and 1930.<sup>238</sup>

In the 1930s, after the good ground in the lower part of the Livingstone Creek canyon was worked out, an old pre-glacial channel with good pay was discovered just below the head. The pay gravels on Livingstone Creek were not frozen but extended upstream at a gentle slope under a great deal of frozen ground. The paystreak was about 30 feet wide and about 2 feet deep. The channel was worked at first on individual claims, some of which had long drifts going south from the present stream. The upper drifts had trouble with water, and these difficulties led to an amalgamation of the workings for drainage and operations. The gold at the top of the paystreak was finer and rarer, and finally was not economically feasible to mine. There was an attempt to hydraulic the paystreak, but the great depth of overburden and the low-grade ground discouraged the miners.<sup>239</sup> Louis Engels found a 21-ounce nugget on Livingstone Creek in the late 1950s. Max Fuerstner, and partners Bob Miller and Gerry McCully, started sluicing on Livingstone Creek in May 1974, and found a 20½-ounce nugget worth \$6,000 that July.<sup>240</sup>

Lake Creek valley has a gentle gradient until it nears the main valley of the south fork, where it enters a narrow canyon and then drops steeply. The creek was a good producer of gold from a pre-glacial river channel about 15 feet wide, lying close to the present stream on the north side. Several independent miners worked the paystreak, removing the rich pockets and leaving the intervening ground untouched.<sup>241</sup> T. Kerruish started working the pre-glacial channel on the right limit of Lake Creek in 1931. The paystreak was 40 feet wide and had a depth to bedrock of about 12 feet. The creek grade is steep, and there was only enough water to sluice for a few hours every day.<sup>242</sup> Kerruish made a reservoir and put in a small hydraulic plant, which proved quite effective, especially in a wet season.<sup>243</sup> The gold was high in value and consisted mostly of nuggets with no fine gold. Kerruish recovered \$2,360 from 546 cubic yards of paystreak, and he leased a mile-long placer lease on the creek in 1930.<sup>244</sup> A little hydraulicking was done on Lake Creek again in 1931 with encouraging results. Kerruish made an open cut 20 to 30 feet wide following the old workings. The exposed ground showed that the paystreak was wider than had been known, and the ground was stripped in preparation for mining virgin ground in 1932.<sup>245</sup> Kerruish and his wife hydraulic mined on Lake Creek until he died in 1944.

Summit Creek was similar in character to Lake Creek but not as extensively mined. Kerruish's success on Lake Creek sparked some interest in the area, and there were some miners on Summit Creek in 1931 and 1932.<sup>246</sup> George Bruce had an open-pit mine below Discovery in 1914.<sup>247</sup> James Peters worked on Summit Creek until June 1914, when he was forced to suspend operations because of a lack of water for sluicing. He started a sawmill operation to cut sluicing lumber for a 6,500-foot flume. He owned four claims and had options on more and planned to start hydraulicking on the upper end of Discovery.<sup>248</sup> Peters leased his claims and all cabins and equipment on Nos. 2, 3, and 4 Above Discovery on Summit to Percy Sharpe in 1930.<sup>249</sup>

Lower Little Violet Creek is small and steep. Some mining was done in the more gentle headwaters, and some new work was started in 1931. The flow of water here is slow, there are many boulders in the valley, and the schist is less foliated and efficient at retaining the gold.<sup>250</sup> William Cletheroe came into the Livingstone district in 1902, and he and his Ta'an First Nation wife mined Discovery Claim on Little Violet Creek.<sup>251</sup> In 1914, Cletheroe was hydraulicking with a single giant on

Little Violet.<sup>252</sup> Stan Cletheroe was 20 when his family moved away from the creeks, but he and his father went back to mine in the summers until 1953.<sup>253</sup>

Cottoneva Creek has a gentle slope, but the amount of coarse gravels in the valley made it difficult to work. L. Keyzer had a small hydraulic plant on the creek in 1914. He built an automatic dam to control the water supply and used a Pelton waterwheel to hoist the boulders. Keyzer found a nugget worth \$215 during the 1914 season.<sup>254</sup> The expensive hydraulic and derrick equipment and the workings had been abandoned for some time by 1931.<sup>255</sup> Clem Emminger and his partner Louis Engle mined on Cottoneva Creek for many years in the 1930s. They had a little derrick for hoisting boulders out of the stream, and hand drilled the larger ones so they could blast them apart. They shovelled the pay gravels up to a sluice for washing.<sup>256</sup> Engle continued to mine the creek until 1953.<sup>257</sup>

There was considerable interest in mining the Livingstone district creeks when the price of gold rose between the 1970s and 1990s. The road from Whitehorse was improved, encouraging more development. Max Fuerstner, Bob Miller, and Jerry McCully mined on Livingstone Creek from 1973 to 1977. Max Fuerstner Jr. mined in the area for 27 summers until 2001. In 2007, the only active claim in the district was on Little Violet Creek.<sup>258</sup>

### Mt. Nansen District / Dawson Range

Nansen Creek is in the headwaters of the Nisling River, and the mouth of the Nisling is about 30 miles west of Carmack. The district is 10 miles long by 7.5 miles wide or about 75 square miles, and it includes all of Nansen and Victoria creeks and most of their tributaries. Loose sands and gravels overlie boulder clay, and Nansen Creek is gently flowing with an even grade. Both Nansen and Victoria are about 10 miles long. Both creeks have the flat-bottomed, U-shaped valleys typical of glaciated creeks. The bedrock is Precambrian-age mica schists, quartz-mica schists, and the quartzite schists of the Yukon group.<sup>259</sup> The valley bottoms have a thick deposit of boulder clay overlaid with sands, gravels, muck, and associated deposits. The gold is distributed through the gravels, sometimes near the surface and sometimes on or near the boulder clay. There was little to no glacial ice in the smaller tributaries, and the gold accumulated there remains where it was originally concentrated.<sup>260</sup> Prospectors explored the upper tributaries of the Nisling River between 1912 and 1914. The geologist examining the area in 1914 concluded that the gravels found in the district were not profitable to mine.<sup>261</sup>

Henry S. Back discovered the first gold on Nansen Creek in 1899. He and his party stayed in the area for two or three days, and Henry and his son Frank Back returned to the area in 1907. Frank Back and Tom Bee staked the first claim in 1910. Most of the creeks in the district were staked just after that, but many of the claims were lapsed by 1914. The gold mined during that time came from tributaries of Nansen Creek, Discovery Creek, and the east and south forks and totalled between \$2,000 and \$3,000. In 1912, George McDade sank an 18-foot shaft to bedrock about 1 ½ miles above Discovery and drifted from the bottom of the shaft to recover a modest \$300. In the winter of 1913 to 1914, two partners brought in a Keystone drill and sank 10 holes on or near the Nansen Creek Discovery Claim to penetrate the boulder clay. The largest nugget, weighing about an ounce, was found on Discovery Creek. The claims on the East Fork were mined in 1913 and 1914 by open cut and sluicing, and the gravels were said to be about \$1.50 per cubic yard. About \$2,000 had been recovered from the East Fork by July 1914. Partners Miller and Shaw worked for three winters from 1911 near the mouth of the South Fork by drifting on bedrock, hoisting from a shaft, and sluicing. The pay gravels are from 10 to 20 feet wide, and 20 feet deep to bedrock. From 1913 to 1914 the owners recovered about \$1,200 from 2,500 eight-pan buckets. Courtney Mack started ground sluicing on Webber Creek in 1914 to strip the ground to bedrock. John Rymer sank three shafts to bedrock on Back Creek to find an encouraging amount of gold, and the abandoned creek claims were relocated as a result.<sup>262</sup>

In 1917, a small staking rush to a placer deposit on Seymour Creek, a tributary of Big Creek, focused some attention on the region, but it soon faded. F. Gruder returned to the area several times,

and in 1930 staked a quartz claim that started another rush. Over 100 claims were staked that winter along the ridge on the north side of the creek.<sup>263</sup> Placer prospectors were still working on Seymour and Stoddard creeks in 1932. The two creeks drain the northeast and southwest sides of Mount Freegold where lode discoveries had been made. The placer workings were not very profitable.<sup>264</sup> Five men were working on Nansen Creek and its tributaries, and two were working on Back Creek in 1933. The miners were working as individuals or with one partner, and Bostock commented that this was commonly the way that small amounts of gold had been recovered from these creeks over the last 20 years.<sup>265</sup>

### Kluane Mining District

The Kluane Mining District in the White River drainage basin has bedrock described as a series of quartz-mica schists resembling the Nasina series found along the Yukon River. Like the Nasina, the Kluane schists are the oldest rocks in the area, but they differ from Nasina in having no quartzite or limestone bands.<sup>266</sup> All of the lowlands in this region were covered by glaciers. Placer gold in the Kluane district is concentrated in the pre-glacial river channels, which is sometimes still in place and sometimes has been swept aside by the ice. The valley bottoms in many places are deeply covered by glacial debris.<sup>267</sup>

First Nation prospectors reported gold on the Alsek drainage in 1903. Soon after, Dawson Charlie staked Discovery Claim on Fourth of July Creek, and two days later a discovery claim was located on Ruby Creek. Both of these were in the Ruby Range to the east of Kluane Lake. Discoveries of coarse gold on creeks draining the mountains on the west side of the lake soon followed. A party consisting of Altamose, Ater, Smith, and Bones staked creeks in the Slims River drainage – Bullion Creek in September and Sheep Creek in October. The same party staked claims on Burwash and Arch creeks farther north in May 1904. These strikes set off a stampede that led to discoveries on four more creeks on the west side of Kluane Lake and three, including Gladstone Creek, on the east side. The goldfield area extends along the base of the Saint Elias Range for over 75 miles, with a maximum width of about 30 miles.<sup>268</sup> This area is now inside Kluane National Park and Reserve.

The most important gold-producing creeks in 1904 were Ruby, Fourth of July, and McKinley creeks in the Ruby Range, with Ruby being the only one producing significant quantities of gold. Ruby Creek, a tributary of Jarvis River, is a steep mountain stream with a large volume of water in the spring and summer that dwindles to 200 miner's inches or less in late summer. The lower creek is in a wide valley filled with boulder clay and other drift deposits. The upper valley is a depression cut into the Kluane schists, and so steep in places that the gravel has been swept away to expose bedrock. Mining in 1904 was confined to about three-quarters of a mile in the central section of the creek, where the valley is covered with up to 10 feet of stream gravels and boulders. Sluicing was done on claims between No. 28 and No. 34 Above Discovery. The ground was not rich, although half-ounce nuggets were found. Shafts were sunk in the lower valley, but the bedrock was down more than 75 feet. Glaciers would have disturbed the paystreak, so drifting would not have been profitable.<sup>269</sup> In 1909, all of the mining was taking place in the three-quarters of a mile on and downstream of Claim No. 21 Above Discovery, where the gold was unevenly distributed through the stream gravels. The Ruby Creek gravels mined in 1914 were low grade.<sup>270</sup>

Fourth of July Creek was staked along its length when traces of gold were found in 1904. One 28-foot shaft was dug on Claim No. 58 Above, and pay gravels were found resting on boulder clay and under a considerable thickness of glacial silt. Not much work was done because of the excessive cost of mining in this remote area.<sup>271</sup> A number of claims were still being held 10 years later, and there was a little mining being done on Fourth of July. Shafts up to 70 feet deep were dug in an effort to reach bedrock but were abandoned when they flooded. Even in winter, the ground near the stream is only frozen 5 to 10 feet down. Nearly all of the gold recovered from Fourth of July Creek was found between

Claim No. 65 and Claim No. 77 Above Discovery. The total amount of gold taken out by 1914 was estimated to be about \$10,000.<sup>272</sup>

A small patch of rich gravel was found on Twelfth of July Creek in 1914, with several ounces of coarse gold obtained in a few days.<sup>273</sup>

Nearly all of the streams flowing from the Saint Elias Range on the west side of the Kluane Lake carried coarse gold. Bullion, Sheep, Burwash, and Kimberly creeks were all heavily prospected in 1904.<sup>274</sup>

Bullion Creek is filled with boulder clay and associated glacial till. The stream has cut its way through the deposits and some way into the bedrock. For about five miles up from the mouth to about Claim No. 20 Above Discovery, the creek flows through a steep-sided gorge.<sup>275</sup> About 50 claims around Discovery Claim on Bullion Creek were being worked or prospected in 1904, and the gravels carried gold throughout – but not enough to pay wages. Bullion Creek Hydraulic Company was organized to hydraulic the claims where the valley had a good grade and water was abundant. The challenges lay in removing the large boulders and disposing of the tailings.<sup>276</sup> The company operated for three seasons from 1904 to 1906 and spent about \$300,000 on buildings and equipment. Only a small amount of mining was accomplished for about \$1,000 in gold. At the beginning of 1914, all of the claims had lapsed, but a few were re-staked and new claims located over that summer. Fewer than 10 men spent the season prospecting the stream.<sup>277</sup>

Sheep Creek is parallel to Bullion Creek in the Slim River drainage and has a similar appearance and geological history. Mining was practically confined to comparatively shallow gravels between Claims Nos. 52 to 75 Above Discovery. The richest ground found to 1914 was on the Fisher brothers' claims No. 74 and No. 75, where \$7,000 in gold was recovered in 40 days. The pay gravels are very irregular, as the old channel has been affected by the glaciers.<sup>278</sup>

Coarse gold was found in an eight-mile stretch along Burwash Creek, but the excessive cost of bringing in supplies stopped most work on the creek before the 1904 season ended.<sup>279</sup> Some miners did persist, and in 1914 Burwash Creek was the most important in the Kluane mining district, with more gold recovered from its gravels than from all the other creeks combined. Nuggets worth \$25 and \$30 were commonly found, and a five-ounce nugget was found on Claim No. 65 Above Discovery. Burwash Creek gold is very pure. There were about 40 claims held and about 14 men working on the creek in 1914. The creek has been mined from the lower canyon to No. 66 Above Discovery.

Gladstone Creek, north of the Ruby Range, is similar to other creeks on the east side of the lake in being deeply layered with boulder clay and other glacial deposits. The Kluane schists are dominant along the lower five to six miles of the valley. A number of claims were held in 1914, but the only gold recovered was from Discovery and No. 1 Below Discovery. The miners had worked their claims over the past two years using an open-cut method and working to a depth of 11 or 12 feet. A group of men prospected Gladstone in 1913 with an Empire drill supplied by the Yukon government. They were unsuccessful in discovering the original pre-glacial stream channel.<sup>280</sup> Gladstone Creek was dredged from 1951 to 1995 by the Kluane Dredging Company. Al Dendys mined this ground in the late 1990s and won the 1999 Robert Leckie annual award for his reclamation work on the creek. During the mining process, the main channel was diverted into a man-made channel, and 2,200 grayling were caught and relocated. Boulders were placed in the new stream to slow the flow and provide micro-environments for the fish. Dendys estimates that he spent 30 percent of his operating budget on environmental care.<sup>281</sup>

A First Nation man from Neskataheen, Paddy Duncan, found gold on Dollis Creek in the Tatshenshini-Alsek drainage south of Kluane Lake in 1927.<sup>282</sup> The creek rises from a glacier and enters the Tatshenshini River about four miles below Dalton Post before crossing the border between Yukon and British Columbia. Staking occurred on both sides of the border, and almost all of the claims were staked by First Nation prospectors. The creek has a steep gradient, and many big boulders lie in the stream bed.<sup>283</sup> This was the last gold strike in the Kluane area before World War II and the construction of the Alaska Highway into the area. Big Jim and Paddy Duncan took 53 ounces of gold from the claim,

and it continued to yield for many years.<sup>284</sup> First Nation miners were still working the creek in 1929.<sup>285</sup> In 1933, the whole Yukon side of the valley was taken up in a placer lease and tested by Yukon Ventures Ltd. The tests were encouraging, and the operation was expected to continue in 1934.<sup>286</sup>

### White River District

Prospectors reported finding gold in the upper reaches of the White River long before William James, Peter Nelson, and Frederick Best discovered gold on Pan Creek in the winter of 1912 to 1913. They were forced to stop mining when their shafts flooded at the bedrock level. James and Nelson travelled farther west to discover the first placer gold in the Alaskan district of Chisana, 30 miles west of the Alaska/Yukon border. That discovery brought a large number of prospectors through the country on the Canadian side.<sup>287</sup> Seven streams were staked almost from end to end, and promising prospects were found on Pan, Bowen, and Hidden Creek, a tributary of Bowen. Pan Creek is three miles long with a deep gorge-like valley and a stream that flows with considerable force. The gravels are from 5 to 40 feet deep, and bedrock is exposed near some of the rapids. The gravel is coarse and thaws during the summer, and it never freezes near bedrock. Sinking a shaft is impossible, so the miners ground sluiced to bedrock.<sup>288</sup> Gold was reported on Lake Creek, which joins the White River about 18 miles below the mouth of the Generc River. First Nation and non-Indigenous prospectors reported good prospects on Albert Creek, which flows into Lake Sekulmun. Satisfactory results were reported on Klotassin Creek, a tributary of the Donjek River.<sup>289</sup>

## 1.3) Different Forms of Placer Mining

A gold pan, pick, and shovel are the iconic symbols of the Yukon placer miner. The pick can loosen the gravel on a river bar, start a shaft through the thawed surface soil, and break up partially thawed or lightly frozen ground. The shovel can carry the pay gravels into a pan, a rocker box, or a sluice run. The gold pan is the basic tool of a placer prospector. Even without the shovel and pick, a prospector can do a quick test of some promising-looking ground with a scoop of gravel and some water swirled for sorting, until a concentrate of only the heaviest material is left in the bottom. The glint of “colours” indicates gold flakes or dust and the prospect of high-grade ground. Panning is a method used in all stages of placer mining: to prospect new ground, to test the efficiency of whatever mining method is used, and to use in the final stages of separating the gold from the concentrate. All techniques of placer mining use water. Gold is always the heaviest material in whatever situation it is found. It is naturally found in alluvial deposits and is removed in a similar process to the way it was deposited; it is washed in a turbulent situation until it settles to the bottom.

### Bar mining/skim diggings

It was logical for northern placer prospectors to look for gold in the gravel deposits of the rivers. The gravel deposits were thawed and easy to work; the river was low in the early summer, exposing the gravel bars. There was plenty of water nearby to wash the pay dirt in order to separate out the gold. Alluvial deposits are eroded out of bedrock and washed downstream to settle in a bed of gravel and small stones. This shallow recovery of very fine gold, often called dust, is a process called “skim digging” or “bar mining.”

A miner could use a pan to mine a rich gravel bar, but with a few tools and some nails he could construct a rocker box, an efficient washing plant developed in the early goldfields of Australia and California. The rocker looks like a long, narrow box on a cradle. The top is a receiving area with a floor of metal with holes in it. A shovelful of gravel with added water is sorted as the whole cradle box is moved

back and forth in a rocking motion. The “fines,” and any gold that was clinging to the larger rocks, are washed through the holes onto a lower inclined compartment. This small central sluice might be a rough board or have constructed obstacles called riffles attached across the board to catch the heaviest material including the gold. A layer of coarse woven material was laid under the riffles to catch and hold the finest gold. The lighter sand and gravel was carried out of the rocker box on a stream of water and the gold concentrate collected to be panned out as a final stage.

The bar gravels could also be sluiced, in which case a longer open-topped straight box with riffles on the bottom would be set on an incline, and the gold-bearing gravel dumped into the top end of the box. The miner would put a forceful flume of water into the box to wash the gravel along the sluice run. The water could be directed from a creek farther upstream, or from an undershot waterwheel rotated by water striking the bottom of the wheel. Riffles placed across the bottom of the sluice box caused a disturbance in the water and slowed the current so the gold could collect on the bottom of the sluice, and the larger pieces of gravel travelled through the box to create a pile of waste tailings on the ground.

Some bar miners in 1884 were using mercury to recover the gold from the fine river silt. The silt was run through rockers, and the resulting concentrate included gold and heavy grains of magnetic black sand. This concentrate was put in a gold pan over a quantity of mercury, which bonded with the gold to form an amalgam. The black sand was not affected by the mercury and was washed out of the pan. The amalgam was put in a buckskin bag and squeezed until the mercury ran out through the pores. The concentrate was then subjected to strong heat in a frying pan over a hot fire and became a hard compact mass of yellow grains, or flakes.<sup>290</sup> Modern miners use a magnet, instead of mercury, to remove black sand from the concentrate.

### Sinking and Drifting

The overburden of organic muck and non-gold-bearing gravels has to be removed before mining can begin. This can be very difficult, as it is often frozen hard and sometimes very deep. Testing for gold in areas of deep overburden was historically accomplished by sinking a shaft and digging out the pay dirt from tunnels, called drifts, along the surface of the bedrock.

There were two early forms of hand mining: underground, more common in the winter, and open pit in the summer. After the prospectors on the Fortymile River found coarse gold, they started digging holes in thawed ground near the river to locate the paystreak and then found ways to thaw the permafrost.

The first miners in the Klondike also tested their claims by thawing the ground and digging a shaft to bedrock. Two miners would sink a shaft and mine the gravels in a drift that followed the paystreak. They used buckets and a windlass to bring three or four cubic yards of gravel to the surface in a long working day. The frozen sides and roof of the drift did not need supporting timbers, and some surprisingly large rooms could be excavated without fear of collapse.<sup>291</sup> After the pay gravels were on the surface, they were shovelled into a sluice box to recover the gold.

Bench and hill claims high above the streams were worked by drifting tunnels into the hillsides and bringing the pay gravel out to the surface where it was processed in rocker boxes. Rocker boxes made the most economical use of any available water, as the water could be recovered from the bottom tray to use again. Here again, the permafrost took the place of cribbing. R.G. McConnell reported seeing a “room” in a permafrost drift 140 feet by 230 feet on Dominion Creek. These drifts often collapsed in the summer, but the miners were by then busy sluicing their winter dumps using the fleeting spring runoff.<sup>292</sup> Some of these rooms remained for modern miners to find. In 1985, D. Johnson was working ground on Eldorado Creek, one that had been heavily hand mined, and uncovered two 150-foot by 70-foot “ballrooms.” The unsupported rooms were separated by a six-inch wall of unworked ground. One of these rooms had a plank floor with a chair and candles in place, with mittens, shoes, chain, and new

shovels and picks nearby. Upstream from the ballrooms, a 300-by-5-foot drift ran in an arc that began and ended under some more recent dredge tailings.<sup>293</sup>

In 1903, most of the claims in the Klondike goldfields were being mined by “sinking and drifting.” In the summer, gravels could be brought to the surface and processed right away if there was enough water to sluice.<sup>294</sup> Sinking a shaft remained an economical method of placer mining through the 1980s for a few miners starting out with no money. Some independent miners worked all winter in hand-dug drifts. In 1988, Pierre Monfette was working alone on his Little Blanche Creek claim near Quartz Creek using this time-tested method. Monfette had hand dug a 4-by-4-foot cribbed shaft 25 feet to bedrock in four steps, for safety reasons, and then dug a 6-by-6-foot drift following along the bedrock for 30 feet. He brought all of the material to the surface in two 5-gallon buckets.<sup>295</sup>

In 1969, F. Chudy and J. Simcox sank a 5-by-5-foot shaft 45 feet to bedrock on Medby’s Miller Creek property. They then used a mucking machine, a jackleg drill, and a compressor to drift along a paystreak and recover 45 ounces of gold.<sup>296</sup> This is a technique normally used in hardrock mining, but it can be successfully used for placer mining in Yukon’s permanently frozen ground. Drifting in permafrost was so successful that even larger operations used it from time to time. From 1984 to 1988, Klondike Underground Mining, working the Miller Creek mine, operated in two phases: drill and blast underground drift mining in the winter, and sluicing the stockpiled ore in the summer. The drift was entered through two concrete braced portals at the bedrock level, at the base of an alluvial fan terrace. An air track drill prepared the face of the drift for explosives, and two scoop trams “mucked” out the blasted faces. In 1988, a crew of eight men and a cook advanced 400 feet into the deposit and stockpiled and sluiced 26,000 cubic yards of pay gravels. This type of mining had more hazards than just maintaining a frozen ceiling. In the winter of 1988 to 1989, mining was briefly halted after a large explosion in the compressor room of the mine resulted in evacuation of a miner in minus-47 degree weather.<sup>297</sup>

YCGC used drifting to mine Lovett Gulch in the 1920s and 1930s. In the 1980s, drifting was used on an even larger scale on the opposite end of this same deposit at Jackson Hill in the Klondike valley. The drifts were big enough to manoeuvre motorized equipment entering the hill through a portal at ground level, and fans brought cold air into the drift to keep the mine ceiling frozen and stable.

### Open cut

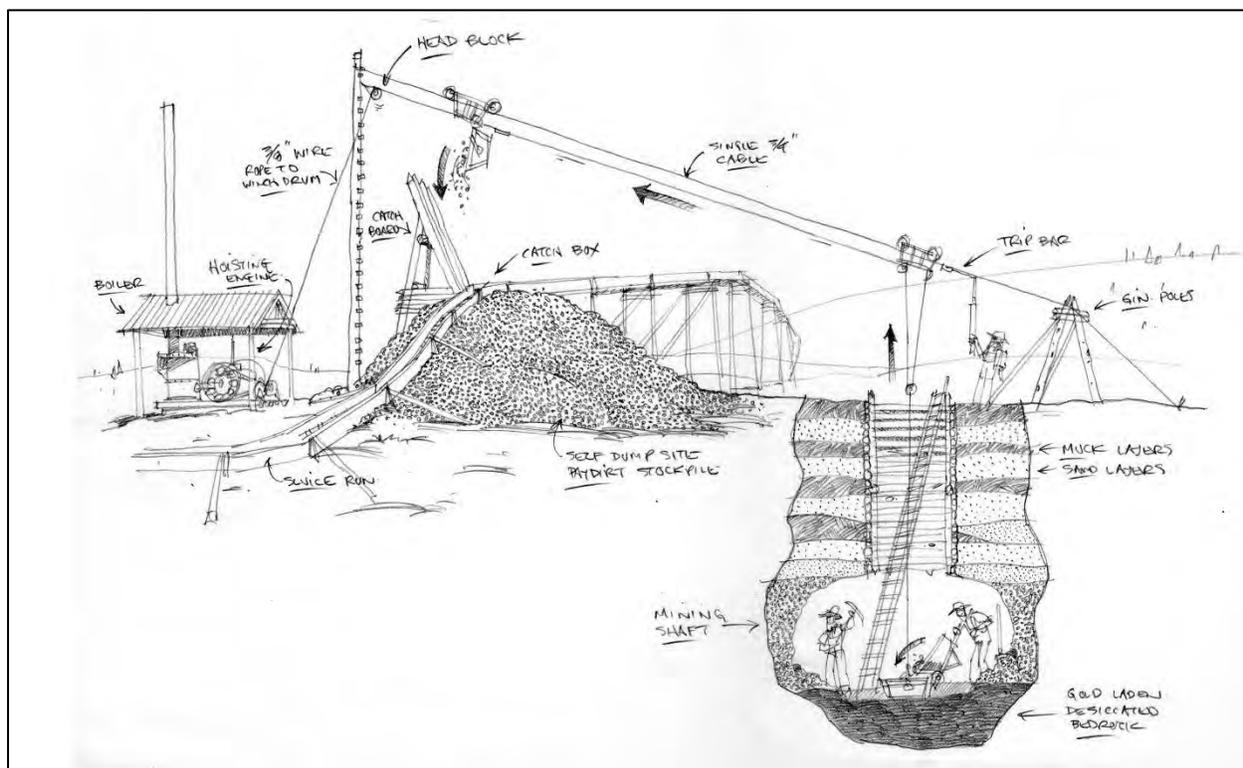
If the overburden is not too deep, the most economical way to placer mine on a large scale is by using open cuts and sluice runs.<sup>298</sup> The early miners used shovels and wheelbarrows, or horses and slip scrapers, to remove the muck. A crew working in an open cut would shovel the gravel, sometimes in several stages, up to the sluice runs. Hand mining by the open-cut method was more labour intensive than underground sinking and drifting, unless miners could use hydraulic methods or ground sluicing to remove the overburden. Modern miners use bulldozers (“cats”) with a specialized tooth-shaped tool on the back to rip the permafrost and stockpile the overburden to the side of the pay gravel. “Ripping” the ground is commonly done the year before the miners plan to move the by-then thawed pay gravels to the washing plant.

### Steam-assisted mining

By 1903, the Klondike miners were commonly using steam and small pumps to thaw the gravels. The hand windlass was largely replaced by steam hoists with self-dumping buckets. Steam scrapers had replaced shovels and wheelbarrows in removing the overburden. Steam power and machinery had replaced hand labour in moving the pay gravels through the gold-recovery process. Water was pumped up to high sluice runs instead of flumed from a high point required to achieve the necessary grade. A typical creek claim would have a 30- to 50-horsepower boiler, a hoist and self-dumping bucket operated by an 8- to 10-horsepower engine. A 15-horsepower engine would operate a centrifugal pump with a 6-

inch discharge for pumping water up to the sluice runs. A small pump with a 3-inch discharge and an inch nozzle would be used for surface thawing or for driving steam into steel “points” driven into the ground. Summer steam thawing was usually done at night and did not require a crew.<sup>299</sup>

The self-dumping carrier and steam hoist was developed in the Klondike and was the most efficient and economical device for hoisting and conveying material a distance not exceeding 200 feet. In 1905, it was considered the best system for handling gravel from a shaft of shallow depth. The parts were durable and could withstand hard usage. No springs were used in its construction, so it could withstand very cold temperatures. When it is operating, the bucket is held in an upright position as it travels up and down the shaft. When the bucket reaches a horizontal position with the conveying cable, it is carried along the cable to a gin pole and then triggered to dump the payload, creating a conical heap around the pole. The pay is easily shovelled from there into the sluice.<sup>300</sup>



Self-dumper developed (ca.1902) and manufactured in Dawson. (Lorne Carnes: Bonanza Discovery Claim interpretive panel.)

### Hydraulic Mining

Hydraulic equipment was developed around 1852 in California, where a rawhide hose and a wooden nozzle directed a stream of water against a gravel bank. The first metal pipe made specifically for hydraulicking was manufactured in San Francisco in 1856, and various monitors, also called hydraulic cannons or giants, were made and improved in the following years. By the early 1900s, the monitors manufactured by Joshua Hendy Ironworks were sized to handle water at a very high pressure. Hydraulic operations need a good water supply, as the quantity of gravel worked needs a roughly proportional quantity of water. A 5 percent increase in the amount of water can increase the yardage sluiced by about 10 percent. The stream of water washes down a gravel face, and the amount of gravel excavated is related to the “head” used by the monitors, meaning the force of the water directed at the gravel face. The water is directed through the pit and washes the pay gravels into sluice runs on the bedrock. The sluices must be at the proper grade to carry the water and gravel efficiently with enough room for the tailings to accumulate out of the way of the mining process. Large-scale hydraulic mining yields a

larger production per shift than any other type of placer mining and is more effective in areas of high clay content or in places with a lot of boulders.<sup>301</sup>

In hydraulicking a high bank of frozen gravel, it was effective to use the giant against a part of the bank for two to six hours a day and then allow the gravel to thaw. Gold cannot be extracted from frozen gravel, and frozen White Channel gravel has the consistency of granite. Deep trenches, or ground sluices, were cut into the bedrock leading from the face to the head of the sluice. These trenches needed to be cut and extended continuously as the face was blasted back, at a considerable expense to the operation. Bench mines sometimes sank a central shaft and ran a sluice tunnel for the pay gravel. This was often less expensive than the constant cutting of trenches.<sup>302</sup>

The management of hydraulic tailings was of concern to miners working the White Channel benches. The tailings were quantities of white quartz stones that could not be allowed to slide to the creek bottom where they would impede the operations of miners in the valley. Dams of brush and poles 20 feet high were built to contain the weight of the tailings along Bonanza Creek.<sup>303</sup>

### Dredging

Because dredging equipment is large and specialized, there are high capital costs attached. Dredging projects are usually undertaken by mining companies with access to a large amount of ground with substantial gravel reserves. Dredging is the most effective way to mine the gravels submerged below the water table, and, in some cases, these conditions are manufactured for the dredge operation, which creates and moves its pond as it works up or down a valley. It is an efficient method of mining and the only one employed when the pay gravel cannot be drained. Dredges contain both digging and processing equipment, which are moved to the pay gravel. Shortening the travel distance between the head feed and tailings lowers the operating costs and allows the dredge to work profitably in lower grade deposits.<sup>304</sup>

Two types of bucket-line dredges operated in Yukon placer mines. The majority of the dredges used a central trommel to agitate the gravel/water mix and send the fines and heavy gold through holes in a trommel, to sluice runs in the bottom of the dredge. The Lewes River dredge, which first worked in the Yukon and Stewart rivers and then moved to Bonanza Creek, used a flat washing plant instead of a trommel. A third style of related equipment is locally referred to as a dredge but is technically a floating processing plant using a trommel or vibrating screen, but fed by an excavator station on dry ground.

The early dredges used diesel, while later dredges were powered by electricity. In 1906, the Yukon Gold Company constructed a 5½-mile flume on the Little Twelvemile River in the Ogilvie Mountains to provide water under pressure for their newly-constructed electric power plant at the river's mouth. The transmission line ran across the country with over 36 miles of main line and 18 miles of branch high-tension wire, with 8 miles of secondary lines from four substations.<sup>305</sup>

### Machinery/Cat mining

The first bulldozer mining in the Yukon River drainage may have been an operation owned by Harold Schmidt and his partners. In 1942, the dredge they were using on Jack Wade Creek, a tributary of the Fortymile River in Alaska, broke down. The partners continued to mine 24 hours a day using bulldozers and sluice boxes and were able to successfully finish their mining season.<sup>306</sup>

A modern method of excavating and processing relatively large volumes of low-grade material is usually accomplished with diesel-powered equipment including tracked bulldozers, rubber-tired loaders, backhoes, and scrapers. A bulldozer prepares the ground by stripping off the overburden, leaving the pay gravel to thaw in the sun. Stripping can start in March and continue as late as November. The northern mining season is short, and there can be as few as 100 frost-free days. A bulldozer or loader brings the pay gravel to the concentrating plant, usually a rectangular metal sluice box. The cat, loader, backhoe, or bobcat, loads the pay gravel into the concentrating plant. For most of the mines, sluice

boxes are more efficient than jigs or other types of washing plants. Water is pumped into the concentrating plant to wash and sort the gravels. A metal, rectangular sluice box contains riffles of expanded metal, angle iron and/or flat bar. The slurry of water and pay gravels flow over top of them. Matting is placed under the riffles to catch the finest gold. To remove the gold, the washing plant is closed down and the riffles and matting removed and cleaned. The cat clears the outflow and moves the sorted and washed waste rock away from the bottom of the sluice box. Water is pumped from settling ponds where the clay and silt settles out of the sluicing water.

As always with placer mining, each piece of ground presents its own problems. For example, Ballarat Mines Ltd. was mining on Dominion and Quartz creeks in 1969. The overburden on the Dominion property had been stripped for five years, but because there were still problems with the drainage, mining was carried out below the water level using a coffer dam, diversion ditches, and pumps to keep the cut dry. The mining equipment included two D-6 caterpillars and a bulldozer-mounted conveyor and elevated washing plant designed by the owner. The operation on Quartz Creek was conducted on 32 owned or leased claims using a bulldozer sluicing plant. The mining here was hampered by a shortage of water and mechanical breakdowns.<sup>307</sup>

Placer miners sometimes use whatever equipment is handy. In 1970, E. Greely mined his ground on Miller Creek using a John Deere tractor to haul gravel 200 feet from the bench to the creek and feed it into the sluice. He was successful in recovering 35 ounces of gold.<sup>308</sup>

## 1.4) The placer mining lifestyle: 1880s to 1950

### 1880 to 1886

Before coarse gold was discovered on the Fortymile River, prospectors and miners did not usually overwinter in interior Yukon and Alaska. They might work for the winter at Sitka, and later Juneau, and save enough money for a summer outfit of food and basic tools. An outfit could weigh 900 pounds.<sup>309</sup> The summer was spent on the rivers testing or mining the thawed gravel bars.

It was common that the men travelled with a partner, and sometimes in a party of more than two, so the duties and packing could be shared. There were few commercial boats on the river, and miners who wanted to stay later in the season had to pole or line their boats up the Yukon River. This was easier with two people.

Prospectors travelling through the Yukon drainage in the summer used small boats or moved up and down the creeks on foot, testing the ground as they went. Moving an outfit on a sled in the winter might require moving small loads several times, and it was all done by hand as dogs were not commonly owned by the prospectors at this time. A sail was often erected if there was a good wind.<sup>310</sup>

Travelling in and out of the interior took much of the mining season. Those who wanted to stay “inside” for the winter moved to the trading posts, where the trader would likely front them an outfit for the next summer, a “grubstake,” in exchange for a promise to pay in the fall. They were often forced to go “outside” to seek work in order to afford another mining season.

The country was sparsely populated, and sometimes existence depended on the kindness of strangers. Those who exhibited bad behaviour were subjected to a trial by majority opinion in a miners’ meeting. The sentence for theft was exile and, depending on the time of year, this could be a very harsh judgement.

Few prospectors lived off the land.<sup>311</sup> In the 1880s, miners brought everything they needed with them as they travelled into the Yukon River drainage to prospect. Nails were heavy but necessary in order to build a rocker box and sluice run, the simplest of mining equipment. The boards could be left behind when the miner moved on, but the nails went with him. The trading posts carried some miners’ supplies, and more were promised in 1886, when coarse gold was first mined on the Fortymile River.

Even a successful miner was sometimes forced to leave, because gold could not acquire food and equipment that was not available to buy.

### 1887 to 1896

The lives of Yukon miners and prospectors were changed by the discovery of gold on the Fortymile River in 1885 and in the Sixtymile drainage in 1891. The miners thawed the permafrost and dug holes in the ground instead of skim digging in the river's gravel bars. It became possible to mine summer and winter. Yukon placer miners were pioneers, and they mined for the most part without the benefit of technology. It was hard pick-and-shovel work, and the miners worked long hours to take advantage of the short summer season when there was free water to sluice.

A more permanent group of miners in the area led to the establishment of Forty Mile, a supply community at the mouth of the Fortymile River. The town offered most of the amenities of a southern community: church, stores, saloons, and, after 1894, police. The first woman reached Forty Mile in the summer of 1887. Dutch Kate was described as a "sporting woman," and she arrived with enough goods to support herself over the winter. Kate sold her belongings and returned to Dyea, Alaska, in 1888.<sup>312</sup> Many of the miners in the area built small cabins in town so they could spend the winter there or just have a comfortable place to wait for the supply boats during the mining season.

The majority of miners in the Canadian upper Yukon River drainage were located in the Fortymile goldfields and had access to stores at Forty Mile and Fort Cudahy. Jack McQuesten's store moved to Circle City in 1893, but until then he continued his habit of grubstaking the miners even if they used the last of their money to go on a "spree." The NAT&T company did not allow accounts and demanded cash up front. The stores depended on supply boats from St. Michael, near the mouth of the Yukon River, and the bacon was often green and the flour mouldy or hard. Many of the miners were sick during the winter of 1888, and there were three deaths, only one of which was due to scurvy.<sup>313</sup>

The tradition of the spree started in this time and continued through the Klondike Gold Rush. Miners hoped to recover enough gold to at least buy drinks at the saloon at the end of the mining season and to have enough left over to pay back the trader who offered them credit for their food and equipment. Sometimes the spree took all of the money made over the season, but more often the miners had a few drinks, paid their debts, went outside the Yukon River drainage for the winter, and had a stash of gold to come back to. Some who took a celebrated ton of gold to Seattle and San Francisco had been in the country for years, and their gold was not all from the Klondike.

The transient nature of the goldfields was sometimes a forced issue. The supply boat from St. Michael was delayed in 1889, and there was a general exodus of about 100 men who travelled down the Yukon River in small boats. This "starvation winter" reduced the population of the Fortymile goldfields until it was replenished by newcomers arriving in the spring of 1890.<sup>314</sup>

There was a streak of wanderlust even in those who had good paying claims, and it was not unknown for miners to go hundreds of miles away to test a rumour. Charlie Miller discovered the first minable gold in the Sixtymile district, and even as a stampede of men was coming into the country he was travelling to the Koyukuk River, a tributary on the lower Yukon. He returned to the Sixtymile camp with a report of good prospects before moving down to Circle.<sup>315</sup> Josiah Spurr commented on the transient nature of the placer miners in 1897, saying even established mining camps were not stable and that travelling individuals might not be heard from for months at a time. He found it impossible to tell how many men were coming over the Chilkoot Pass and where they settled, as they might stop only briefly at the mining camps along the Yukon River.<sup>316</sup>

Wanderlust was tied to a wide communication network and information exchange. A simple example is the designation of "pups" for the short steep ravines that run from the hills into larger, well-marked valleys. John Muller was mining on Miller Creek in the Sixtymile district in 1893. He kept some puppies up a ravine, so the term changed from "like the place where Muller keeps his pups" to "like

Muller's pup." The term was useful to the placer miners, and spread throughout all of the northern goldfields.<sup>317</sup>

Nolasque "Jack" Tremblay came into the country in 1886 and, like many others, he poled a boat up the Yukon to travel over the Chilkoot Pass every fall. In 1893, Tremblay was one of four men who located a rich claim on Miller Creek, recovering about \$10,000. Tremblay left the Yukon River drainage that year as usual, but because of his new-found fortune he was able to marry Emilie Fortin. They travelled back to the Yukon together in 1894. Emilie did not travel lightly and had packed her belongings in a trunk. They arrived at Forty Mile on June 24, poled a boat up the Fortymile River for 20 miles and then walked over the Moose Creek trail to Miller Creek.<sup>318</sup> The Tremblays spent the winter on Miller, and Emilie was the only woman living on the creek. In the spring they went back to Forty Mile, took the boat to St. Michael, and then returned to Sitka en route to New York.<sup>319</sup> The rich gold strike had completely changed Jack Tremblay's lifestyle.

The pioneer miners thought of themselves as men of truth, honour, and integrity. The Yukon Order of Pioneers was a fraternal organization established in 1894 for the mutual protection and benefit of its members, and to unite them by the strong ties of brotherhood. Membership was initially confined to men who had been resident in the Yukon River valley for six years.

The miners' meetings outlived their usefulness as the population started to include adventurers attracted by the chance to make a fortune by any means other than mining. Disputes occurring in the goldfields were often settled in town by those not competent to judge impartially.<sup>320</sup> A detachment of North-West Mounted Police (NWMP) arrived in 1895 to wield a more formal Canadian version of justice.

### 1896 to 1899

The discovery of gold in the Klondike River drainage in the late summer of 1896 changed the lifestyle of Yukon miners again. The style of mining remained the same until mid-June 1897, when the steamers *Excelsior* and *Portland* reached the south. The miners on the *Excelsior* took out \$750,000 in gold and miners on the *Portland* had about \$800,000 in gold. There had been no place to spend that kind of wealth in the north, so they bought new equipment and invested in extra or specialty equipment to sell to those still in the north. After seeing the San Francisco store-front display of Clarence Berry's \$130,000 worth of Klondike gold, newcomers headed north, and some returned miners brought back family or friends. Their expectations of life in the north, however, did not include the hard work that went into the acquisition of that gold.

The habit of a celebratory spree took a deadly turn for those who now had the means to damage themselves. The gold recovered from a July 1898 clean-up at Dick Lowe's claim on Bonanza Creek filled six gold pans with coarse gold. Each pan weighed 40 to 50 pounds with a total value of about \$40,000.<sup>321</sup> Lowe was a seasoned and respected miner who loved to party and gamble. He was able to spend two fortunes in his lifetime and was confident that luck would benefit him one more time, but died in poverty in San Francisco.<sup>322</sup>

Up to now, the miner's diet had consisted mainly of bacon and beans, sourdough bread or bannock, and locally supplied or gathered meat and berries. After the supply lines were established, well-off Klondike miners could buy the foods that reminded them of home: canned goods of a unified appearance, quality, and taste, and exotic fruits such as oranges and bananas. Fresh beef, pork, and mutton were available by 1899. Not all miners were well off, so many were confined to the old diet of bacon, beans, and bread. Scurvy was reported in Dawson as early as August 1898 and was increasingly common by December.<sup>323</sup>

A wide variety of preserved food was shipped to the Yukon Territory in bottles and cans. Garbage dumps from this time reveal the common consumption of lard, canned milk, butter, and meat. Oysters were a common item on Klondike restaurant menus. Almost as appreciated as the food and drink was the way that the containers could be re-used. Five-gallon liquid fuel containers made useful

water buckets and could be flattened to serve as a waterproof roofing material. The wooden crates they were packed in could be nailed to the wall as shelves. Smaller tins were used as dippers and storage containers for nuts and bolts and other small items, or could hold a candle. The tobacco tin full of gold nuggets is a Klondike cliché. Bottles were the least useful to reuse but could be stacked in a window opening to provide some light into a dark cabin.<sup>324</sup>

Many of the Klondike stampeders came north with the idea of striking it rich quickly and escaping the increasingly industrial world of labour in the south. Those who were able to stake ground, or find work on others' claims, had to work very hard, and sometimes there was no reward. A shaft had to be dug to test the ground for gold, and it was a gamble that sometimes did not pay. A man could work all winter and have nothing to show for it in the spring. Even when mine owners could pay wages, the cost of labour was standardized and offered quite the opposite of the freedom of the stampeders' dreams.<sup>325</sup>

Would-be miners, old and new, travelled the Yukon drainage prospecting for the next big strike. There were no roads to these untested regions, and men travelled by foot or with dogs to cover enormous distances. Partners were valuable to share costs, the work of opening a new mine, and cutting wood for fuel or building cabins. Partners could also be a source of irritation; there are stories of boats, supplies, and even fry pans being cut in half, and cabins with territorial lines drawn on the floor.

The Yukon Order of Pioneers' values of "Do unto others as you would be done by" still held for many, but there were also a number of miners who followed a motto of "Every man for himself." In the days before the Klondike strike, it was common for someone who found good prospects to tell those he came in contact with about the find and invite them to join him in staking and mining the area. After the Klondike strike, it happened that rumours of a gold strike would be started by store owners who profited from the resulting stampede.

Every person who was a part of the Klondike stampede or who lived in Dawson during this time was aware of the historic nature of the event. Dozens of memoirs were written about Dawson and the Klondike goldfields, and hundreds of photos were taken, many with family and workers standing by their sluice boxes or cabins.

### **1900 to 1950**

The reuse of packing material and scrap continued through this time period. Miners are known for their skill in reusing and repairing everything they can, and what looks like a junkyard is a store of potentially precious parts for the creative. The Boutillier brothers, who mined on Adams Gulch, even managed to attach an engine to some scrap metal and old machinery to create a tracked vehicle.<sup>326</sup>

The miners were more settled than in earlier times. A network of roads was completed by 1902, but many lived in the goldfields on their claims and travelled infrequently, even to Dawson. Not many people had vehicles, and transportation continued to be by foot in the summer and by dog team in winter.<sup>327</sup>

The early miners, prospectors, and discoverers of the goldfields were treated like folk heroes in the early literature and memoirs. Miners who later reworked the ground found the evidence of their hand mining, and recounted with awe their feats of endurance and years of hard work. As the technology evolved, and hand mining gave way to steam-powered mechanization and then large-scale hydraulic and dredging operations, the stories changed to recount the gambles and ruthlessness of managers and mine engineers. The stories today are of canny businessmen, long-term mining families, and educated and experienced miners with new techniques and technology. All Yukon mining districts have long histories, peopled with interesting characters. These stories continue to resonate.

## **1.5) Impacts of legislation: 1886 to 2003**

## Overview

There are several eras of legislation that affected Yukon placer miners between 1886 and 2003. Between 1886 and 1895, the men searching for gold in the Yukon River basin were left on their own to choose the mining regulations that suited them, and enforce protection for the claim holders through miners' meetings. The majority of the miners were American, so the regulations they adopted, for the most part, were American as well, although geologist Josiah Spurr observed that they were different from both United States and Canadian law, and could differ from creek to creek.<sup>328</sup>

Common rules observed in the early goldfields defined claim size and registration. Claims were 500 feet from rimrock to rimrock for creek claims, and the length along the creeks might vary. Some miners with poor ground were trying to stake claims 1,320 feet long, while rich creeks crowded with claims were staked at 300 feet each. No one was allowed more than one claim except for the discovery claim, which was double the normal length. The only officer in what Spurr called "the republic of miners" was a Mining Recorder appointed by popular vote for each creek. His normal duties included recording the claimants' names, claim locations, and any sales or transfer of claims, for which he received an average of \$2 per claim. On some creeks the Mining Recorder could decide if a claim was rightly owned. On others that judgement was reserved for the miners' meetings where majority ruled, and the Mining Recorder had only an obligation to inform the original staker of any claim-jumping scheme. The miner or his assigned worker had to do assessment work in July to keep the claim in good standing.<sup>329</sup>

The arrival of the NWMP at Forty Mile in 1895 introduced Canadian federal legislation and regulations enforced through the authority of a more official Mining Recorder. The creation of Yukon as a separate territory, and the oversight of the federal Department of the Interior, allowed the minister of the day, Clifford Sifton, to briefly enforce regulations that greatly benefited the government over the miners. Local political representation, and a Yukon gold-mining industry that proved remarkably persistent, led to the 1906 Yukon Placer Mining Act and the basis of our mining laws today. The length of a creek claim was set at 500 feet in length in 1906, and an amendment in 1919 set the width of a creek claim to be 1,000 feet on each side of the baseline. The size of a claim not on a creek was set in 1906, and amended in 1908, to be 500 feet long by 1,000 wide, parallel to the baseline of the creek that it fronts.<sup>330</sup>

The 1906 legislation was focused on the rights of the claim owners and the conflicts between them, or conflicts between them and outside interests. The lawmakers gradually became more concerned with damage to the environment and the rights of those not directly connected to the placer mining industry. Land claims settlements introduced more stringent authority over placer mines and put more serious focus on the environment. As Yukon moved towards more autonomous control of its lands and waters, the number of federal departments with related legislation increased. This was duplicated by authority exercised by the Yukon government. Devolution in 2003 brought the first opportunity to clarify the legal environment, and the first step was to mirror federal legislation as a basis for change.

The impacts of legislation were, in many cases, particular to the eras briefly described above, but some of the issues and concerns were heard throughout. A dissatisfaction with laws made in far-away Ottawa, and a call for local representation and more regional control over legislation, was strongly articulated from 1898 to 2003. Some concerns were over conflicting or overlapping federal authorities and a lack of an appeal process where government acted in a quasi-judicial manner.

As environmental controls were imposed, starting in 1975, placer miners were impacted by the duplication and unclear separation between the environmental assessment process and regulatory requirements. A lack of legal certainty and the lack of timelines in the process of environmental assessment created problems for the industry in the areas of financing and project scheduling.<sup>331</sup> For example, a change in the mining regulations resulted in delays during the 1990 season because miners could not get water licences until they submitted their work plans for an environmental review. The

reason for the change was that, although a system for screening major projects already existed under the Regional Environmental Review Committee, the federal government wanted to avoid court challenges by applying the full environmental review to every mineral claim.<sup>332</sup> The miners were not sympathetic and considered it an unreasonable burden on their time.

### Cause and effect

The British North America Act (now called the Constitution Act) came into effect on July 1, 1867, and for the next 30 years the question of the international border between Alaska and the Northwest Territories was, for the most part, ignored by the federal government. Miners in the Fortymile River were not initially concerned about the border location. Canadian miner Frank Buteau and his party, who travelled down the Yukon River for the first time in 1886, thought the international boundary was at Fort Reliance just north of the Klondike River. He passed the imaginary line with no thoughts on differing jurisdictions.<sup>333</sup> In 1887 to 1888, Dominion Land Surveyor William Ogilvie determined the boundary line where it crossed the Yukon and Fortymile rivers. Ogilvie notified the Canadian government first that the Americans posed no threat but were instead opening up the country. He later revised his opinion to report that the discovery of gold was important enough that the sovereignty of the country should be marked with an official government presence. The report was tested with an initial trip by Superintendent Charles Constantine and Corporal Brown in 1894, and on their recommendation a force of 20 NWMP officers was sent the next year to establish a base at the mouth of the Fortymile River. The police were able to end the ad-hoc system of justice that existed in the miners' meetings. The first complaint they adjudicated was a dispute over the ownership of a placer mining claim in the Fortymile district.

When Ogilvie arrived at Forty Mile to survey the Canada/US border, the American miners were very eager to talk to him about Canadian mining regulations and laws that they thought were overly stringent.<sup>334</sup> Ogilvie wrote a letter to Ottawa requesting an official Mining Recorder and land agent and the establishment of a legal system. Up to this point, the NWMP at Forty Mile had been enforcing laws and regulations, but there was no judge. The Canadian government appointed Ogilvie to lay out mining claims in the goldfields.<sup>335</sup>

The first claim staked on a creek was a double claim labelled Discovery. The claims running up and down the stream from that point were in sequential numbers Above Discovery and Below Discovery. Miners were allowed to stake one claim in each mining district; a creek claim could be from one side of the valley to the other and up to 500 feet in a straight line. In the staking rush following the Bonanza Creek discovery, the creek claims on Bonanza were staked in a haphazard fashion. An attempt to straighten out the mess resulted in more chaos. Ogilvie surveyed the creek to settle the disputes resulting from overlapping claims and counter claims.<sup>336</sup>

The first mining legislation in Canada was the Quartz Mining Regulations in the Dominion Lands Act. They were created in response to a number of nineteenth-century gold rushes. The colonial government of British Columbia borrowed from Australian legislation during the Cariboo gold rush. The legislation was then adapted by the Minister of the Interior to benefit the federal government from the supposedly fleeting phenomenon of the Klondike Gold Rush. The Dominion Land Act regulations were enforced in 1897 by Thomas Fawcett, who was appointed the Gold Commissioner and Land Agent.

The Minister of Northern Affairs and Northern Development, Clifford Sifton, through an Order-in-Council dated May 21, 1897, changed Yukon mining regulations to benefit the federal government. Among other things, he decreased the size of a mining claim from 500 to 100 feet, retained alternate claims for the government, and raised the royalty rate to 20 percent.<sup>337</sup> The royalty rate was lowered almost right away, but even half the rate was considered too high by the miners, who thought that the government was interfering with their economic prosperity. Late in 1897, a miners' meeting chose two delegates to travel to Ottawa to ask for changes in the placer mining regulations, including the size of

claims, the size of the royalty, and the reservation of gold-bearing lands for the Crown. E.J. Livernash represented American miners, while the other delegate, Maxime Landreville, represented French Canadian miners.<sup>338</sup>

Matters were not helped by the inefficiency of the Dawson Mining Recorder's office. Gold Commissioner Fawcett closed Dominion Creek to further staking in November 1897 after hearing accusations of claim jumping and finding errors in the records. Fawcett received the brunt of complaints about the new mining regulations. There were many accusations of dishonest acts by the Gold Commissioner's officials, and it is certain that some were bribed and others had special interest in mining properties. Fawcett was honest, but he ran a chaotic and inefficient office that was understaffed and overcrowded. There was no safe for files, and the work was months behind.<sup>339</sup>

The Yukon Act was passed in June 1898, separating Yukon Territory from the Northwest Territories. Federal control limiting the power of the Yukon legislature was set out in a number of statutes in the Department of Indian Affairs and Northern Development Act. The legislation defined the powers, duties, and functions of its minister relating to the Yukon Territory, including the undertaking, promoting, and recommending of policies and programs for economic and political development. Any statute passed by the Yukon legislature could be disallowed by the Governor-in-Council and had to be tabled before both Houses of Parliament.<sup>340</sup>

The regulations governing placer mining in the provisional district of Yukon, North-West Territories, was approved by Order-in-Council on January 18, 1898. Every joint stock company and every person over the age of 18 was entitled to mine if they applied for and received a Free Miner's Certificate from the federal government. The certificate cost \$10 for individuals and had to be renewed annually. Stock companies with nominal capital of less than \$100,000 paid \$50, and companies with greater nominal capital paid \$100. The certificate allowed an individual to mine, and to hunt and fish, subject to other legislation. Miners could also cut timber for their own purposes including building houses and boats, and mining, but the regulations allowed the government to grant timber licences to other persons or corporations.<sup>341</sup>

The legislation allowed anyone with a Free Miner's Certificate to enter into Crown land not already occupied and to locate a claim. The registered claim owner gained exclusive rights to the minerals on the claim. The free-miner concept remains the basis of Canadian mineral exploration in Canada, although miners in most Canadian locations, including the Yukon Territory, gain a lease and are obliged to carry out work on the claim to keep the lease in good standing.<sup>342</sup>

An early clause in the Canadian mining regulations declared a claim lapsed if it was not worked for three consecutive days.<sup>343</sup> This was later changed to a requirement for representation work. The federal government later gave each miner a lease for a year subject to his working the claim to the value of \$200 per year. The owner of a proven claim was entitled to a renewal of his lease for another year – and again until he had worked out his claim.<sup>344</sup>

The size of a creek claim was defined by the regulations as 250 feet long in the general direction of the creek or gulch, and not exceeding 1,000 feet on each side of the centre line of the watercourse. The size of a hill claim was set at 250 feet in parallel to a watercourse or ravine, and running to the summit of the hill or 1,000 feet, whichever was less. Individuals who discovered gold on an un-staked creek could stake a claim 500 feet in length, and a party of two discoverers could stake two claims to 1,000 feet. No miner could be granted more than one claim in a mining district, but the same miner could, within 60 days, also stake an available adjacent hill claim at a cost of \$100. Any number of miners could unite to work their claims in common as long as the agreement was registered with the Mining Recorder and a fee of \$5 was paid. A claim was said to be abandoned and open to other occupants if the ground was not worked without permission during the mining season for 72 hours. If 10 claims were staked in a row, the next 10 were reserved for the Government of Canada and could be disposed of in any manner the Minister of the Interior saw fit. A fee to record a claim was set at \$15, and there was an

annual fee of \$15 to hold the claim for every following year. Royalties were set at 10 percent, collected on the gross output of each claim.<sup>345</sup>

Sifton's changes to the mining regulations continued to be hotly protested by the miners in Dawson. An agent of London mining interests wrote to his principals in June 14, 1898, that "they" were trying to get up an agitation against the amendments to the mining laws, especially the 10 percent royalty and the alternate and abandoned claims returning to the government. "It is absolutely essential to every success of every individual and company in the country that no time be lost in removing the clauses in the regulation...."<sup>346</sup>

In 1898, Yukon's Chief Executive Officer, James Morrow Walsh, added his voice in a letter to Minister Sifton, but Walsh did nothing himself to alleviate the situation. He had already resigned before he reached Yukon in May 1898 and was gone by the end of July. Apparently, he did little because he did not want to start any work that might not be approved by his successor.<sup>347</sup> Walsh was quoted as mimicking Sifton by saying: "This is a placer camp. It won't last long. Make money as quick as you can and get out."<sup>348</sup>

William Ogilvie was Yukon Commissioner between 1898 and 1901. As the senior government official in the Yukon Territory, he received many complaints from the miners about the Canadian mining legislation, especially compared to the American mining laws in the Fortymile Mining District. Americans were allowed to stake and mine in the territory, while only American citizens could mine in Alaska. The United States Mining Law of 1872 set the size of a claim at 1,320 square feet, and Alaskan officials charged a recording fee of \$2 or \$3. Canadian miners needed the \$15 Free Miner's Certificate and another \$15 to record a 100-foot claim. Ogilvie commented that the Ottawa lawmakers had little knowledge of northern conditions and problems. Apparently, that complaint had a familiar ring even in the late 1980s.<sup>349</sup>

An early cause of concern to the placer miners was the lack of legislation protecting claim holders and the men who laboured in the mines. Dawson miners held several mass meetings in 1898 to ask for a miners' lien act permitting individuals to register miners' liens against mineral claims. The Act was passed in 1906, and one of the earliest cases concerned a lien for wages. The Court ruled that the object of the Act was to provide some security for those who, through their efforts and labour, enhanced the value of the mining claim.<sup>350</sup>

An 1898 Order-in-Council created five-mile leases or concessions, which could be applied for by any free miner individual or company. This was an attempt by the government to encourage large-scale mining development, but it had the effect of allowing some rich ground to lie unmined for years. A lessee could obtain as many as six concessions but could not hold more than 30 miles of a river. The term of the concession was for 20 years and could be renewed at the discretion of the Minister of the Interior. The lessee was required to have at least one dredge in operation for each 15 miles of multiple concessions within two seasons of the date of the lease, and if a year of operation was missed, the concession could be declared null and void. The concession owner was prohibited from clogging the watercourse with tailings or other debris.<sup>351</sup> If a miner or promoter could prove that an area was not economical to mine using hand methods, and if the area was not currently being mined, they could apply to lease and mine that area where individual claims would not be allowed. Hydraulic mining regulations provided that a lease would not exceed 12 years in duration, with a frontage of one to five miles in length and one mile in depth. There was an annual rental of \$150 for each mile of frontage; the payment of the usual royalty on gold output, with an annual exemption of \$25,000; the beginning of operations within one year from the lease date; and the spending of not less than \$5,000 annually from the lease date.

In 1899, Joseph Burr Tyrrell entered a partnership with C.C. Ray and E.H. Bronson to set up the Bonanza Creek Hydraulic Company and apply for a concession. Ray and Bronson were to provide the operational money and complete the necessary paperwork in Ottawa, while Tyrrell would manage the

operation in the Klondike. Two certificates were needed from Klondike officials before the permit could be issued – one from the Commissioner and the other from the Gold Commissioner. The certificates stated that the ground applied for could not be economically worked with hand-mining methods. The company applied for five miles running from Dawson to the mouth of Bonanza Creek. There were two applications for the same property and the local government approved each for half of their request. With the certificates in hand by May 5, 1899, Tyrrell was able to stake 2½ miles of the creek including both sides of the valley to the summit. The company was later able to acquire all five miles and add it to their lease. Tyrrell wanted to mine, but Ray and Bronson were only interested in selling the property for a profit. Tyrrell attempted to buy out his partners, but they raised the price beyond his means. The Bonanza Creek Hydraulic Company lease was within sight of Dawson and, no doubt, that stretch of land not being worked helped to increase the ire of the local miners until a royal commission was appointed to investigate. Because the land had not been mined under the lease, the partners were in danger of having it cancelled, so Ray lowered his asking price to just under \$50,000. The concession was without title, water, or dumping ground and had a debt load of about \$18,000. Tyrrell responded with a recommendation that Ray sell quickly if he could find a buyer. He then resigned as manager and filed a claim against the company for what was owed to him. For seven years, Tyrrell spent more time in the courtroom than on the concession. The lawsuit was still in the courts when he left the Klondike in 1906, and the settlement in his favour went to the new owners.<sup>352</sup>

A shift in the Klondike goldfields from high-grade hand mining to large company hydraulic and dredging operations took place between 1901 and 1909, but it was not completely uncontrolled. A government investigation started in November 1905 to consider if the contractual obligations on a mining concession were being met. A series of hearings led to an order that the lessee cease some practices on penalty of forfeiture. The *Dawson Daily News* used this as an opportunity to display evidence that much of the ground in the other leases was lying idle. On May 5, 1906, the federal government announced the revocation of six leases, stating that compensation would be granted if the syndicates cancelled within 60 days. Many of the lessees challenged the government decision in court. The Supreme Court of Canada handed down 32 decisions unfavourable to the concessionaires on January 9, 1908.<sup>353</sup>

The order reserving alternate claims for the Crown was rescinded in July 1900, just a month before Lord Minto arrived in Dawson. On the day he arrived, he attended a miners' meeting and heard a petition delivered by the Citizens' Committee. The document listed all of the complaints about alleged dishonesty in the Mining Recorder's office and mismanagement by the Gold Commissioner as well as a call for reducing the royalty rate and improving the transportation infrastructure. The Board of Trade also had a prepared petition containing the same requests, and adding one that the federal cabinet delegate its authority over mining regulations to the Territorial Council. Lord Minto forwarded the petitions to Sifton and added his comments in support of many of them.<sup>354</sup>

Placer miners generally dislike royalties, which in this case are fees paid to the federal government landowner that allow the claim holder to remove mineral resources from the ground and sell them for a profit. As mining depletes the resources available to future generations, it was unlikely that the government would ever remove them. On July 20, 1900, the federal government promised that the royalty would be reduced.<sup>355</sup> The promise of a reduced royalty was announced again on September 27, 1900, by Gold Commissioner E. C. Senkler, but again the Ottawa authorities took no immediate action.<sup>356</sup> On January 21, 1901, the Territorial Council forwarded a request to the Ottawa-based Governor-in-Council seeking a reduction in the royalties, larger placer claims, and other changes in the mining regulations.<sup>357</sup> Finally, on March 13, the royalty was reduced to 5 percent and larger claims were permitted. The changes were publically announced on April 1, 1901.<sup>358</sup>

The request for more locally elected representatives on the Territorial Council was also heard by the federal government. The Citizens' Committee convened a meeting on August 28, 1900, and decided

to enter the campaign as a political party. The new Citizens' Yukon Party elected miner Arthur Wilson and contractor Alexandre Prudhomme. Wilson owned three placer claims and was well known on the creeks. They were to run against businessman Thomas O'Brien and lawyer Auguste Noel, both liberal independents.<sup>359</sup>

Before 1900, the value of money was based on the amount of silver or other metal used in its manufacture. Paper currency was introduced during the American Civil War, and a debate was waged as to whether the paper should represent the silver or the gold held by the government. The United States Gold Standard Act of 1900 settled the debate by allowing the government to peg the value of a dollar to the price of gold, initially just over \$20.67 per Troy ounce.<sup>360</sup> The price of gold has a great deal of bearing on the number of claims being worked in Yukon goldfields.

The Yukon Placer Mining Act, enacted in 1906 and amended in the years since, continues today as Yukon's statutory regulation for placer mining. The Act took the place of the Free Miner's Certificate.<sup>361</sup> It described how claims could be staked, and their size, and provided for the collection of a royalty on gold taken out of the territory at a rate of 2.5 percent. For the purposes of estimating the royalty, gold was valued at \$15 per ounce.<sup>362</sup> The Act allows individuals over 18 to demarcate an area on Crown land, or other land open for placer mining, by staking it and filing the claim location with a Mining Recorder. The applicant may then apply for a grant of claim for one or five years and pay a fee of \$10 or \$15 respectively. If the grant is approved, the placer miner has the right to renew the grant from year to year provided a minimum amount of work is completed. Claim holders have the exclusive right to mine the claim and are entitled to the proceeds of any mining activity. The Yukon Placer Mining Act was designed to resolve disputes between those seeking to mine on the same or adjacent land and those who have plans for the land for other purposes. It recognized the need to protect property owned and/or occupied by those other than the claim holder. Owners of the fee simple title, or someone acquiring an interest from the fee simple owner, were given recognition. A section deals with compensation in these cases.<sup>363</sup>

The Act divided the territory into four mining districts, each with a Mining Recorder's office that recorded information in public books. The Mining Recorder could grant permission to run a drain or tunnel for drainage purposes. The Yukon Placer Mining Act also defined the role and authority of the Mining Recorder in assessing development work. In the case of Grant versus Treadgold, the Court decided that the Mining Recorder should allow whatever work he believes the prospector or developer of the claim honestly performed, no matter what kind of work it is, so long as it was done on the claim or adjacent to it for the purpose of developing it.<sup>364</sup> A claim owner could sell, mortgage, or dispose of the claim as long as the documents were filed with the Mining Recorder. There is no residency or citizenship requirement to own a mineral claim.<sup>365</sup>

The Yukon Placer Mining Act has been refined by the many disputes brought before the court. For example, the case of Baptist versus Erikson dealt with two men who separately staked a mining claim. Each applied for a grant and paid the fees. The defendant staked his claim on November 30, 1909, and the plaintiff staked on November 19, 1909. The Court decided for the defendant on the grounds that the plaintiff's staking, although it was the first, was defective.<sup>366</sup>

In January 1908, the Supreme Court of Canada handed down 32 decisions against the concessionaires, marking the end of the decade-long fight by independent miners against the federal government policy on hydraulic mining.<sup>367</sup> The concessions remained in place, but the rules were more strictly enforced. Another longstanding complaint was addressed in July 1908 when the Yukon Act was amended to establish a wholly elected council of 10 members.

The United States dropped the gold standard on April 25, 1933, and raised the value of gold to \$35 per ounce. President Franklin Roosevelt hoped that a rise in the price of gold would have an inflationary effect on the economy and bring the country out of economic depression. A contract signed before the re-evaluation, now cost more if paid in gold, so Congress enacted the Gold Reserve Act of

1934 which withdrew all gold from circulation and nullified all contracts that provided for payment in gold.<sup>368</sup> The rise in the value of gold brought more independent miners to the Yukon Territory and supported the industry.

The Canadian Emergency Gold Mining Assistance Act was in effect from 1848 through 1959. A complex formula determined assistance for gold mines that produced more than 50 fine ounces of gold per year. This was an attempt to offset increasing production costs during a time of stable gold prices. There was an upper limit on the assistance available; in 1957 it was \$12.33 per ounce. Those who applied were obliged to sell their gold to the Royal Canadian Mint, or other approved facility, and were not able to sell on the open market.<sup>369</sup> Many Yukon miners were eligible and benefited from the Assistance Act.

The United States and Great Britain created the International Monetary Fund (IMF) after the end of World War II to stabilize the international economy and provide money for reconstruction loans. The agreement made at Bretton Woods, New Hampshire, made \$35 US per ounce an international standard for all IMF members and required that they keep their national currencies at a specified parity against the US dollar. The system fell apart in the 1960s when global inflation caused countries holding US dollars to demand exchanges of their dollars for gold, as the value of gold had been pushed higher by inflation. In August 1971, President Nixon took the United States off the IMF Bretton Wood gold standard, meaning its dollar was no longer directly convertible to gold. The effect of this was to create floating-value currencies that are traded on an international financial exchange comprising banks and currency dealers.<sup>370</sup> The price of gold was free to rise, and rise it did. The Yukon placer industry has benefited most from a floating price when the Canadian dollar, which the miners use to pay for fuel and equipment costs, is low compared to the US dollar.

In 1972, a significant amendment to the Yukon Placer Act allowed the federal government to supervise Yukon placer mining. Section 17 was amended to prohibit placer mining in a National Park, in cemeteries or burial grounds, on land needed to fulfil obligations to First Nations, and on land needed for public infrastructure or designated as a historic site or townsite as defined by the Governor-in-Council. This amendment represented a huge change in direction for the Act, and in the consideration for the occupations of First Nation hunters and trappers. A further amendment to the Act withdrew the right of the placer claim holder to have first refusal to the ownership of surface rights on his/her claim.

The Northern Inland Waters Act (NIWA) was passed in 1972. The federal legislation governed the use of inland water resources in the Yukon Territory and the Northwest Territories and established the powers of the Yukon Territory Water Board. Appointments to the Board were made by the Minister of Indian Affairs and Northern Development. The Board was tasked with providing for the conservation, development, and utilization of Yukon water resources for the benefit of all Canadians and Yukon residents.<sup>371</sup> This Act required that all persons who would alter or divert the flow of a watercourse must have a licence issued by the Board. It also prohibited the deposit of any type of waste that would detrimentally alter water quality. The Board could issue permits for water use and impose conditions that conformed to the standard and restrictions passed under the Canada Water Act and the Fisheries Act. There are penalties for contraventions.<sup>372</sup> The Federal Court held, in the 1982 case of Yukon Conservation Society versus Yukon Territory Water Board, that the Board was performing quasi-judicial functions in hearing applications for a licence and should conduct itself without bias.<sup>373</sup>

Prior to 1984, water licences were issued by the Controller of Water Rights, a federal employee.<sup>374</sup> In 1984, the Department of the Environment Act set out the powers, duties, and functions of the Minister of the Environment and included all environmental protection matters under federal regulation not covered by any other department. The Canadian Environmental Assessment and Review Process Guidelines were enacted in 1984 and applied to lands administered by the Government of Canada. The Guidelines applied to almost all Yukon mineral exploration and development with the

possible exception of applicants who were applying to the Yukon Territory Water Board only for a water-use licence.<sup>375</sup> Since 1984, all placer miners have been issued a water licence by the Water Board.<sup>376</sup>

Miners had to know both federal and territorial legislation, because sections 53 through 68 of the Yukon Placer Mining Act, which dealt with water control and management, did not apply to areas described in NIWA.<sup>377</sup> Both the Water Board, subject to the approval of the Minister of the Department of Indian and Northern Affairs, and the Controller of Water had the right to attach conditions to authorizations. Typical conditions might call for the provision of settling facilities, the provision of fish passage, the maintenance of minimum stream flows, and the prohibition of certain practices.<sup>378</sup>

In 1986, the Water Board held a public hearing when a Hunker Creek miner started discharging process water through a watercourse affecting the Bear Creek subdivision in the Klondike Valley. The Board considered it in their mandate to allow the local residents to air their concerns regarding their domestic water supply and to provide a public information forum. The Board ruled that it did not have the jurisdiction to license the “non-use” of waters.<sup>379</sup> In 1987, The Board decided that it had no jurisdiction over Aboriginal title to waters.<sup>380</sup>

Inland and coastal fisheries are federal responsibilities under the Constitution Act. The Fisheries Act was passed in 1977, and administered by the Department of Fisheries and Oceans, to manage fish and their habitat, with habitat protection provisions applied to placer mining practices that could harm them. Sections of the Act describe prohibitions of the harmful alteration, disruption, or destruction (HADD) of fish habitat and the deposit of deleterious substances; sufficient flows for fish, fish passage and intake screening, and the accidental killing of fish.<sup>381</sup> The Yukon Fisheries Protection Authorization, issued in April 1988 and reissued in May 1989, revised the environmental review process. Before the reform, placer miners had to deal with several agencies including the federal departments of Indian Affairs and Northern Development, and Fisheries and Oceans, and were subject to duplication of inspection and monitoring activities. One set of officials was given the authority to ensure placer miners’ compliance with NIWA, the Yukon Placer Mining Act, and the Fisheries Act. Charges under NIWA could be laid by the inspectors, and charges under the Fisheries Act proceeded through existing mechanisms after consultation with all three departments. The goal of an integral Policy Directive was legal certainty and the timely resolution of conflicts. The central element of the directive was the classification of streams and the acceptable levels of sediment for each. The principle applied was “no net loss” to preserve fish habitat.<sup>382</sup>

The Authorization set out a hierarchy of preferences to approve the actions of a placer miner. A mining plan is assessed regarding its potential impact on fish habitat and is developed to deal with lost habitat. Long-term costs are paid by the placer miner. Streams with no fish populations are exempt from the no-net-loss principle, but habitat restoration measures had to be incorporated into the mining plan. The miner was required to restore the stream to a condition better than the one existing when operations began.<sup>383</sup> The Fisheries Act, as administered by the federal government, sets out the design and construction of fish habitat, stream channel restoration, restoration plan requirement for water use licences, and stream classifications. Before the Act was changed, the defendant could prove that a stream was not, has never been, and is not likely to be frequented by fish.<sup>384</sup> Placer miners have had issues with the no-net-loss policy as it appears in the Fisheries Act, Canadian Environmental Assessment Act, and the Yukon Placer Mining Act. Clarification was requested, as protecting and providing the environment can be expensive and can complicate future mining plans.<sup>385</sup>

In 1990, amendments were under discussion to bring NIWA into line with the Fisheries Act and the Canadian Environmental Protection Act, as well as a proposed Yukon Territory Inland Waters Act, which was separate from the Northwest Territories Inland Waters Act. The discussion on separate acts was in recognition of the emerging ability of both territories to accept devolved powers. A new section would allow the Minister of Indian Affairs and Northern Development to delegate powers to his counterpart in the Yukon Government. The amendments addressed four areas of interest to the

resource community: recognition of different uses and priorities, new compensation principles, harsher penalties, and abandonment of undertakings.<sup>386</sup>

The Yukon Territory's administrative control over placer mining was relatively minor until devolution, but the years approaching 2003 were a time of partial emergence from federal oversight and changes to the statutory infrastructure regulating resource exploration activity. The territory was starting to exert some control over mining, the largest contributor to the Yukon economy, as powers were devolved.<sup>387</sup> At the same time, the federal regulations continued as the key regulatory statutes.<sup>388</sup>

The Yukon Umbrella Final Agreement (1993) contains Chapter 23 that deals with sharing resource royalties in mining claims on lands held by a First Nation. The Yukon Government continues to administer mineral claims on settlement land including permitting, licensing, and collecting royalties. Royalties paid on Category A settlement lands (including surface and subsurface rights) are transferred to the respective First Nation. The First Nation also receives 50 percent of the first \$2 million that exceeds Yukon's royalties over that of the First Nation's and 10 percent of any amount that exceeds \$2 million.<sup>389</sup>

The Yukon Placer Authorization (YPA) was signed in 1993 and amended in 1998. Under Section 35(2) of the Fisheries Act, the YPA controlled the alteration, disruption, or destruction of fish habitat in certain Yukon streams, or portions of streams, by placer mining. The 1993 Authorization imposed lower standards than elsewhere in Canada, many jurisdictions in the western United States, and New Zealand. It was introduced as a temporary measure to allow mines to carry out activities that would normally be prohibited by the Fisheries Act. The YPA allowed a greater discharge of sediments than otherwise allowed as long as they were uncontaminated by unnatural metals or toxic chemicals. Yukon placer mines are not required to monitor their effluent for metal concentrations. Conservation groups called on the government to set the allowable suspended sediment above background at zero milligrams per litre.<sup>390</sup>

In 1998, the federal, Yukon, and First Nation governments were engaged in negotiations on the devolution of the federal department's responsibilities for the management and administration of lands, water, forests, and minerals. The process provided Yukon with an opportunity to streamline the regulatory process in conjunction with a new development assessment process. The mining industry saw devolution as a positive step in gaining closer access to government officials and having them be more responsive to the investment and operating climate in issues that related to the regulatory regime. Devolution was seen as an opportunity to change the mining regime and introduce additional certainty. Changes were considered in the Yukon Placer Mining Act, Yukon Quartz Mining Act, Yukon Waters Act, and Territorial Lands Act.<sup>391</sup>

Significant changes in the regulation of Yukon placer mining since 1998 were made in the Mining Land Use Regulations (1999), Pacific Salmon Treaty (1999), the federal Regulatory Policy (1999), and the Yukon Salmon Treaty (2001). The First Nation land claims, Yukon's Protected Area Strategy, and National Parks system strategies all raise issues for placer miners who see documents with land-use provisions in the light of possible restraints on mining development. Even the planning process can create a climate of uncertainty, which can, in turn, affect exploration investment.<sup>392</sup>

The Klondike Placer Miners' Association (KPMA) has proven a valuable organization in its role of industry support. As its 2015 website states:

"The Yukon placer mining industry is a unique industry, primarily composed of family-operated businesses with fewer than four employees. Placer operations range in size from single operators to around 30 people on site.

"Until recently, few resources were available or developed specifically for the placer miner industry. Recent changes in legislation, regulations and increased liability require that placer

miners become informed on what these changes mean to their operations and have a clear understanding of the liabilities and their responsibilities. As such, the KPMA, in cooperation with the Yukon Workers Compensation Health and Safety Board, sought funding and has developed a safety program to help educate and improve the level of safety on our work sites within the placer industry in the Yukon.”

“An integrated regime governs placer mining in the Yukon to accommodate the policy, regulatory and legal requirements of First Nations and federal and territorial governments.”<sup>393</sup>

KPMA offers help in deciphering the regulation regime and provides an avenue for notifying government of Yukon miners’ concerns.

## 2: The Dawson Mining District

### 2.1) Milestones

**1874:** Jack McQuesten and F. Barnfield established Fort Reliance on the Yukon River below the Klondike River. McQuesten and Arthur Harper prospected in the off-seasons and got fine gold dust from the river bars.<sup>394</sup>

**1882:** First prospectors overwintered in the Klondike River area. Twelve prospectors crossed the Chilkoot Pass and spent the winter with Jack McQuesten at Fort Reliance, prospecting the Yukon tributaries in the area.<sup>395</sup> Among these 12 were some that would go on to play important roles in the history of Yukon placer mining: Howard Franklin, Joe Ladue, Thomas Boswell, and William Moore.

**1886:** Fortymile River gold strike and establishment of Forty Mile. Howard Franklin’s discovery of coarse gold on the Fortymile River drew prospectors and miners from all parts of the Yukon and Alaska and, as the news spread, many more men arrived from outside to establish the Yukon mining industry. The miners on the Fortymile quickly evolved their mining technique from bar mining to sinking shafts through the permafrost. Forty Mile was established as the first large Yukon settlement.

**1895:** Yukon’s first detachment of federal police arrived at Forty Mile in 1895 and established Fort Constantine. The judgements of the NWMP brought the settlement of mining disputes under the regime of Canadian mining law. The police administered customs duties, liquor traffic, and land administration, and they took over the role of Mining Recorder.

**1896:** The discovery of gold on Bonanza Creek in the Klondike River drainage fulfilled Dominion Land Surveyor William Ogilvie’s 1887 prediction that major deposits of placer gold may occur at any time.<sup>396</sup> The strike drew experienced miners from the established goldfields in Yukon and Alaska and 500 claims were staked in the Klondike drainage in the three months after discovery. Mining claims on Bonanza Creek, and its tributary Eldorado Creek, proved to be the richest ever found. Eldorado Claim No. 17 was a 425-foot claim that yielded 125 million ounces, or 4.3 tons of gold. Lowe’s Fraction, just below the community of Grand Forks on Bonanza Creek, was an irregularly shaped claim of just 86 feet, and it produced 400 ounces of gold for every foot hand-mined. Further gold was later recovered by dredging.<sup>397</sup>

**1897:** Thomas Fawcett, the first Gold Commissioner and Land Agent, arrived in Dawson and replaced Inspector Constantine as Dominion Agent. Fawcett assumed the duties of chief Mining Recorder, arbiter of miners' disputes, and administrator of the Dominion Lands Act regulations. All major decisions for the developing territory were executed by the Minister of the Interior (Sifton) through his agent, the Commissioner of the Yukon.

Newcomers covered the creeks and found gold in Bonanza, Hunker, Eldorado, and Bear creeks, using only pick and shovel. Eldorado and Victoria creeks panned out higher values than Bonanza, and the claims above Bonanza Discovery showed richer panning than those below. The values were regular and continuous and covered a large unbroken area of the country. G.A. Lancaster located a bench claim on the left limit of No. 2 Eldorado Creek and found paying ground on July 3, 1897. This was the first claim in the White Channel gravels. Late in 1897, a mass meeting of miners chose two delegates to travel to Ottawa to ask for changes in the placer mining regulations including the recent reduction in the size of claims, the increase in royalty fees, and the reservation of gold-bearing lands for the Crown. One delegate represented American miners and the other represented French Canadian miners.

**1898:** The first hydraulic concession, the Anderson Concession on Lower Hunker Creek, was granted by the Minister of the Interior on January 2, 1898. The Laurier administration wanted to encourage large-scale mining by granting Robert Anderson, an English mining engineer, a lease to conduct hydraulic mining on a section of Hunker Creek. The Order-in-Council was in response to Fawcett's opinion that the tract of land applied for was too wide to prospect in search of the paystreak, and that the experiment of hydraulic mining needed a large expanse of land to test for success. Conditions attached to this lease became the basis for successive hydraulic mining regulations.

Nearly all the gold had been mined in the winter of 1897 to 1898 by the burning and drifting method, but some miners were starting to use open pits by June 1898.

**1898:** Klondike Gold Rush. "A ton of gold" reached Seattle and San Francisco in 1897, and news of the Bonanza strike started a rush of mostly inexperienced would-be miners from "outside." The Klondike Stampede started with the spring breakup in 1898. It is impossible to say how many started out for the Klondike and how many made it to Dawson. There were many routes, not all of the men were counted by the ever-vigilant NWMP, and some who did arrive left on the next boat out and never saw the goldfields. The generally accepted numbers are that 100,000 started out and about 30,000 made it to Dawson. It is also difficult to say how many stampeders became placer miners. Nearly everyone who started for the Klondike purchased a Free Miner's Certificate but, of those who made it, a good percentage ended up as labourers on someone else's claim for the first months or years. After 1898, most of the creeks in the Dawson area were staked from top to bottom, and important discoveries were made in other parts of the Yukon Territory and northern British Columbia. The first Yukon census was taken in 1901 when the population of the territory was 27,219 people.

**June 13, 1898:** "An Act to Provide for the Government of the Yukon Territory" created the Yukon Territory as separate from the Northwest Territories and provided it with executive, legislative, and judicial institutions. Orders-in-Council created administrative offices and machinery for administration by the Department of the Interior. Because of the distance between Ottawa and Dawson, the Commissioner was given authority over all officers of the federal government in the territory. Dawson had an estimated population of 17,000 in July 1898.

**1898:** There were several miners' protest meetings in the summer of 1898. They started just after a small committee was organized by some miners who had been in the country for several years, and were led by J.F. (Barney) Sugrue. The meeting on July 9 was advertised through the press and by word of

mouth. There were a reported 3,000 people in attendance. Frank Dunleavy called a meeting that drew a similar-sized crowd a few days later. The two groups joined, and several more meetings were held in July and August. Livernash and Landreville spoke at one meeting about their trip to Ottawa in 1897; another meeting was held about a Dominion Creek scandal; and another elected a watchdog committee of 11 that drew up a petition to the government. One of their demands, led by Donleavy, was that the government appoint an advisory committee of miners and tradesmen to assist the Commissioner.

**1898:** The Miners' Association was organized in August, and the members drew up a constitution and elected officers in September. Only men who owned miners' certificates could join the association. On October 7, William Ogilvie was appointed Commissioner with the powers to investigate complaints registered in a miners' petition of August 25, 1898. An October meeting of the Miners' Association passed a resolution to call on the Laurier government to provide the Yukon Territory with representation in the House of Commons and requested that the Commissioner-in-Council add two elected members to the Yukon Council.

**1899:** Telegraph communication was established. The laying of telegraph lines substantially improved communication between the federal officials in the Yukon Territory and Ottawa.

**March 1899:** The federal government addressed some of the miners' grievances, and a bill passed both houses to provide for the election of two councillors to the Yukon Council.

**1899:** News of the Nome gold strike started a stampede out of Dawson and removed some of the destabilizing influences of speculation.

**1899:** The accidental discovery of steam thawing by Clarence Berry revolutionized northern mining techniques.

**February 1900:** The merchants of Dawson established the Board of Trade and at first restricted their demands to sweeping changes in placer gold regulations, but later in the year they added federal representation to the list.

**1900:** The White Pass & Yukon Route railway was completed from Skagway to Whitehorse and connected to a fleet of sternwheelers that could deliver heavy freight to points along the Yukon River. Before this, heavy machinery had to be shipped up the Yukon River from the mouth.

**July 20, 1900:** The federal government rescinded the orders reserving alternate claims for the Crown and promised that the royalty would be reduced.

**1900:** Gold production peaked. Dawson was the most populous centre in Canada west and north of Winnipeg.

**November 5, 1900:** The Boyle Concession (Lease No. 18) covering the Klondike Valley is issued to Joe Boyle.

**1901:** The extremely rich placer deposits in the Dawson Mining District were depleted by about 1901. There was considerable prospecting for quartz veins, and numerous discoveries were reported including New Bonanza and Lone Star at the head of Victoria Gulch.<sup>398</sup> The Lewes River Mining and Dredging Company installed their dredge on No. 42 Below Discovery on Bonanza.

**March 13, 1901:** The royalty was reduced to 5 percent, and larger claims were to be permitted. P.C. 574. The changes were announced publicly on April 1, 1901.

**1901:** Lewes River Mining and Dredging Company moved the 3¼-cubic-foot bucket steam-operated dredge from Cassiar Bar on the Yukon River to 42 Below on Bonanza Creek.

**February 13, 1902:** The Gold Commissioner, E.C. Senkler, announced that the federal government was giving all abandoned claims on Bear, Bonanza, and Hunker creeks to the Treadgold Concession, a hydraulic mining syndicate. The announcement that the Treadgold Concession Order-in-Council had been amended to close all abandoned claims to relocation, effective the first day of the previous month, marked the impending transition from small-scale to large-scale mining.<sup>399</sup> In response to protests, more stringent conditions were placed on the Treadgold Concession in April 1902.

**1902:** The Dawson Carrier, which was self-dump technology developed for placer gold mining by Bernard Esby, was used for the first time on Kirkpatrick and Munroe's Hunker Creek claim.

**1902:** Serious Yukon road construction started. A network of roads led from Dawson to all producing creeks in the Klondike goldfields. This was a great boon to the industry as freight now moved on wheels, and the excessive freight costs of the early years were reduced to reasonable numbers. The construction of a winter road from Whitehorse to Dawson improved the movement of mail and light freight when the river was closed to navigation.

**January 17, 1903:** News of the Tanana gold strike at Fairbanks, Alaska reached Dawson, and many miners left the territory, realizing that the conversion to advanced techniques of gold production was inevitable.<sup>400</sup>

**1903:** The Lewes dredge was installed on Bonanza Discovery Claim.

A fleet of well-equipped river steamers with dependable schedules was in place. A trip from Vancouver to Dawson could now be made in comfort in less than a week.<sup>401</sup> The Dawson population declined with news of the strikes in Alaska, and more machinery was brought in to replace labourers. Lewes River Mining and Dredging Company's 3¼-cubic-foot bucket steam-operated dredge moved from 42 Below Bonanza Creek to the Discovery group of claims.

**1904:** The Detroit Mining Company acquired the former Fields and Berry operation at Claim No. 19 and No. 20 Below Discovery on Bear Creek in April 1904.

**1905:** The Canadian Klondyke Mining Company was established, and the Bear Creek Compound was constructed. Canadian Klondyke Mining Dredge No. 1 started work on Bear Creek.

**May 26, 1906:** The Yukon Placer Mining Act was passed by the Governor-in-Council and Parliament.

**1906:** Bonanza Basin Gold Dredging Company started up the "Red Devil" dredge near the mouth of the Klondike River. The dredge was an Allis-Chalmers steam-powered dredge with 6½-cubic-foot buckets.

**October 1906:** Treadgold persuaded the Guggenheims in New York to invest in the Klondike, and the Yukon Gold Company was formed in 1906 with a capitalization of \$17.5 million. The consolidated mining

code passed by Parliament allowed the Guggenheims and other smaller interests to group claims and begin hydraulicking and dredging operations.<sup>402</sup>

**1907:** The construction of the Klondike Mines Railway, delayed in 1905 by disputes with claim owners, had resumed early in the spring of 1906. In 1907, the railway was completed and in operation from Dawson to Sulphur Springs, a distance of 30 miles. The resulted in a reduction in the freight rates from Dawson to the creeks.

**January 9, 1908:** The Supreme Court of Canada handed down 32 decisions unfavourable to the concessionaires. This was the end of a decade of Yukon miners fighting against the federal policy on hydraulic mining.<sup>403</sup>

**July 20, 1908:** The Yukon Act was amended to establish a wholly elected Council of 10 members.

**1908:** The North Fork Power Plant and ditch system was built from 1908 to 1911 by A.N.C. Treadgold, 36 kilometres east of Dawson City. Water was diverted from the North Fork of the Klondike River through a power plant that produced power until 1967. The system used dams, diversions, spillways, penstocks, and underground pipelines to convey water to the turbines in the plant. There were also shops, warehouses, and cabins for workers, as well as roads for maintenance.

**1908:** The Bonanza Dam was completed. The richest creek claims were absorbed into groups of claims to be worked by large-scale hydraulic operations (on the hillside diggings) and dredges (in the valleys and creek bottoms). Large areas of the principal gold-bearing creeks remained idle as the large plants were being installed.<sup>404</sup> All Guggenheim Klondike operations were consolidated under the Yukon Gold Company. The Marion Steam Shovel Company Yukon Gold Dredge No.4, with 7-cubic-foot buckets, was built in 1908 on the Anderson Concession. Yukon Gold Dredge No. 6, manufactured by Bucyrus Manufacturing Company with 7-cubic-foot buckets, was built in 1908 at 90 Below on Bonanza Creek.

**1908:** Large-scale mining did not sustain the economy as before. It did bring an increase in gold production, which rose for the first time since 1900, and increased slowly and steadily from 1908 to 1914.<sup>405</sup>

**June 4, 1909:** Water from the Twelve Mile Ditch flowed to the hydraulic operations on Lovitt Hill. The completion of the Yukon Ditch brought a dependable water source to the Klondike hydraulic operations.

**April 29, 1910:** The Canadian Klondike Power Company Ltd., formerly the Granville Power Company, was incorporated. The power plant was located on the Klondike River about 26 miles from Dawson. Construction on the plant started in June 1910, and the plant started generating power on May 6, 1911.

**November 4, 1910:** The world's largest dredge at the time, Boyle's Canadian Number 2, started working at Bear Creek.<sup>406</sup>

**1916:** Numerous hydraulic plants in the Klondike district creeks, plus the hydraulic operations of the Yukon Gold Company, comprised one of the largest undertakings of this kind in the world. Over three million cubic yards were handled by Yukon Gold each season for five months.<sup>407</sup>

**1916:** Joe Boyle left for the war in Europe, marking the start of the collapse of his corporate empire. His Canadian Klondyke companies were in default to Granville Mining in July 1916. Granville Mining went

into receivership in April 1917. The company dredges operated under receivership until 1921, when it was taken over by Burrall and Baird Ltd. A fire in the Bear Creek shops and the sinking of Canadian No. 4 in 1924 put Burrall and Baird in danger of collapse. YCGC took over control of Burrall and Baird and New North West Corporation Ltd. dredging companies in 1925, although neither was consolidated into YCGC until 1933 and 1936.<sup>408</sup>

**1919:** Cold-water thawing was first tried in the Yukon Territory in 1919 by the Yukon Gold Company and the North West Corporation. By 1926 the bulk of the thawing was done using this method, with steam thawing being used in April to May and September. A plant of 1,200 1½-inch points can use water under a pressure of 25 pounds per square inch to thaw the ground ahead of a 7½-foot bucket dredge when a sufficient quantity of water is available.<sup>409</sup>

**1920:** Canadian No. 1 dredge was dismantled and rebuilt on Dominion Creek.

**1922:** New North West Corporation dredging company took over Canadian Klondyke Power Company.

**1923:** YCGC was incorporated to consolidate the various dredging operations in the Klondike goldfields and conducted major dredging and hydraulic operations. Over its long life from 1923 to 1966, the company created many important documents of great value to current placer miners including maps, drill reports, property overviews, and exploration summaries.

**1925:** YCGC took control of Burrall and Baird Ltd. and New North West Corporation dredging companies.

**1926:** YCGC purchased Yukon Gold Company's Klondike assets.

**1929:** The stock market crash was the worst economic turndown in Canadian economic history, but the Yukon placer industry benefited from men coming into the country looking for work.

**1930:** YCGC suffered from poor management, and the Board relieved Treadgold of active management in August 1930. This marked the start of rehabilitation at the Bear Creek Compound.

**1934:** The United States passed the Gold Reserve Act in 1934, which allowed government to change the value of the US dollar from \$20.67 to \$35 to the Troy ounce. The change increased the number of Yukon economically viable placer deposits. People had lost faith in the dollar and were cashing them in for gold. Roosevelt's new law made this illegal as the government became the sole owner of gold. This was the dismantling of the gold standard in the US; Britain had abandoned the gold standard in 1931. Thousands flocked to the Canadian gold camps to find work.

**1934:** Yukon Ditch shut down.

**1935:** An additional ditch, a 26-kilometre diversion from the South Fork of the Klondike River, was added to the North Fork power plant and ditch system.

**1938to 1939:** YCGC built three new dredges.

**1941:** New Dredge No. 4 launched. Dredge No. 4 was the largest dredge in the Klondike. Dredging operations were cut back in 1941 due to WWII. Gold mining was economically viable during the war, but

the Yukon Territory experienced a shortage of labourers, which curtailed large-scale mining in the Klondike.

**1942:** YCGC hired First Nation labourers for the first time.<sup>410</sup>

**1946 to 1949:** Dredging operations were expanded until eight dredges were in operation. Gold production approached pre-war years.<sup>411</sup>

**1959:** Dredge No. 4 ceased operation.

**1960:** Bonanza Dam broke and flooded Dredge No. 4.<sup>412</sup>

**1966:** The last YCGC dredges were shut down, ending its mining operation in the Yukon Territory. In 1969 the company continued to hold its 235 placer claims in the Klondike area and was leasing 101 of them to individual placer operations.<sup>413</sup>

**1967:** North Fork Power Plant stopped producing power.

**1974:** KPMA was established by 56 placer miners who set up an organization to promote and advance Yukon's placer mining industry. Yukon's modern placer mining industry is based in family-run operations; some span three generations and some date from the Klondike Gold Rush.

**1973:** *Together Today for Our Children Tomorrow* was presented to the Canadian government. A delegation of Yukon First Nation chiefs persuaded Prime Minister Pierre Trudeau to start the Yukon land claim negotiations. During the negotiations, government frequently set land aside as First Nations indicated claims to land parcels.

**1975:** Start of the environmental regulations for placer mining. Parks Canada acquired the Bear Creek Compound.

**1993:** Yukon Placer Authorization Policy Directive and the Yukon Waters Act: Fisheries Act 35(2).

**1993:** Umbrella Final Agreement ratified. It provided the basis for Yukon First Nation land claim settlements. First Nations registered land set aside for them upon the signing of each agreement. Lands not registered lost their special status.

**July 1998:** Tr'ondëk Hwëch'in final land claims signed.

**2003:** Devolution. Yukon took responsibility for minerals administration and management.

## 2.2) Klondike settlement patterns

The location of the first trading post on the upper Yukon River was chosen by the Tr'ondëk Hwëch'in Chief Catsah (Gah ts'at), who was visiting Fort Yukon in 1873. Catsah talked to François Mercier, the Yukon River agent for the Alaska Commercial Company, and requested the location of a post "near his house."<sup>414</sup> At that time, the Tr'ondëk and Upper Tanana people were travelling 250 to 300 miles to bring their furs to the post at Fort Yukon. Mercier and Jack McQuesten, who was hired to

establish the new post, would have considered the location ideal as it was near Deer River, later renamed Klondike River, which indicated at least a seasonal harvest of meat. The location also provided an opportunity to trade with the Upper Tanana people, who often visited the semi-permanent village of Nuclaco, across the river from the post, to fish and trade.<sup>415</sup>

The post was established without difficulty about seven miles below present-day Dawson in the late summer of 1873. McQuesten arrived with Catsah and 10 Tr'ondëk Hwëch'in men who helped the traders haul logs and put up the buildings.<sup>416</sup> The traders, McQuesten and Frank Barnfield, traded three tons of supplies for meat and furs that fall and winter. Soon after the ice broke in the spring of 1874, the traders took their furs downriver and closed the post for the summer.<sup>417</sup> In 1875, McQuesten, Harper, and Mayo formed their own trading company with the freedom to open and close posts on the upper Yukon River. They continued to trade Alaska Commercial Company goods and sold them their furs, bringing trade goods and supplies up the river in the late summer and returning to the coast in the spring.<sup>418</sup>

In 1882, two parties of miners came over the Chilkoot Pass. They built cabins at Fort Reliance and prospected the area. They organized a mining district and elected McQuesten as the Mining Recorder. All prospectors, except Ladue and Charley Powell, left the country in 1883 after McQuesten sent word that the supply steamer was out of commission and Fort Reliance would not be operating that winter.<sup>419</sup> The post was open again in the winter of 1884 to 1885, and five or six prospectors stayed there or in the vicinity. In the late summer of 1885, McQuesten brought in the area's first supply of miner's work boots, clothes, and tools, and 16 Stewart River miners stayed at the post for the winter. In the spring of 1886, McQuesten took the miners back up to the Stewart River and relocated the post at the mouth.<sup>420</sup>

The post at the Stewart River, called Fort Nelson, was short-lived although there were several substantial store buildings and cabins to house the miners.<sup>421</sup> There were more than 75 men working on the Stewart River in the summer of 1886.<sup>422</sup> The post was established to meet the demands of the miners, but the traders did not anticipate the rush to the country that took place that year, and the community was on the verge of starvation for some months. Scurvy broke out in the camp and many suffered.<sup>423</sup>

Coarse gold was discovered on the Fortymile River in 1886, and Harper, McQuesten and Co. opened a post at the mouth of the river in the spring of 1887. Most of the miners relocated with them, and about 100 miners wintered at Forty Mile that year.<sup>424</sup> During the winter of 1887 to 1888, the traders operated both posts, Harper and McQuesten at Forty Mile and Mayo at Fort Nelson. Fort Nelson was kept open principally for the First Nation fur trade, although Ogilvie thought that if there had been no miners they would have closed it. He estimated their sales to the miners in 1887 to be worth around \$60,000.<sup>425</sup> Twenty-five men abandoned Fort Nelson in the spring of 1887 and travelled over the ice to the Fortymile diggings. Chris Sonnicksen and some other miners from the upper Yukon River made it to Fort Nelson on their own in May, and they caught a ride to Forty Mile with Al Mayo, who was taking the *New Racket* to St. Michael to pick up supplies. They arrived in mid-June, just ahead of a stampede of men heading for the Fortymile River from the Alaskan Panhandle. The Alaskans had heard news of the strike through newspaper accounts and letters from the Yukon.<sup>426</sup> When George Snow arrived at Fort Nelson in the summer of 1888, he found the trading post and cabins boarded up and looking as if they had been abandoned for years.<sup>427</sup>

The first Forty Mile residents built cabins on an island at the mouth of the Fortymile River in the fall of 1885. There were no streets or grid organization. The buildings faced the Yukon River or were lined up along the back slough.<sup>428</sup> A young Anglican deacon, John Ellington, arrived in 1887 and started holding services for the First Nation people in the area. The following year his congregation built a mission house and school. Buxton Mission was on a Yukon River island just upstream from the townsite.<sup>429</sup> The first riverboat brought supplies to Forty Mile in July 1887. Before that, the camp of

about 85 men survived mostly on fish.<sup>430</sup> The first cabins had dirt floors and were heated by “Russian” furnaces constructed of rocks and clay. Iron stoves were rare before 1888.<sup>431</sup> About 300 men were mining in the region, but the small steamer could not bring in enough supplies for more than 100, so the winter population stayed the same until 1890, when the sternwheeler *Arctic* started making regular trips from St. Michael.<sup>432</sup>

In 1892, Captain John J. Healy, who had been operating a trading post in Dyea, Alaska, found backers in Chicago to organize the NAT&T, with the goal of trading on the Yukon River and in Alaska. Their first boat, the *Porteus B. Weare*, arrived at Forty Mile in 1893, and Healy started building large warehouses, shops, and living quarters at Fort Cudahy, just below the mouth of the Fortymile River.<sup>433</sup> The Fortymile miners were generally unhappy with Healy’s operation that was not as free with credit as McQuesten’s. McQuesten staked two Fortymile miners, Pitka and Sorresco, to prospect Birch Creek, Alaska in 1893. When the men returned with news of a rich gold strike, McQuesten took supplies from Forty Mile to found Circle City near the Birch Creek diggings. In 1895, both the NAT&T and the Alaska Commercial Company put up buildings at Circle, which became a larger community than Forty Mile.<sup>434</sup> By 1895 there were 700 people living in the Circle City area, while the Fortymile area population was about 600.<sup>435</sup>

Warburton Pike arrived at Forty Mile in July 1893, when the town was full of miners awaiting news from Birch Creek. He estimated the area population at fewer than 400, of which about 150 would stay through the winter. Many of the miners were well acquainted with mining camps in other areas and knew how to keep the peace by conducting miners’ meetings. Pike noted that the professional gamblers and toughs arrived in town just before the NWMP set up a post in 1895. A customs office was established at the same time to levy taxes against American goods coming into the country.<sup>436</sup> The Mounted Police established their post, Fort Constantine, across the Fortymile River from the townsite. Ironmonger Sola described Forty Mile in the summer of 1894 as a mining camp with a company store, a barber’s shop, two bakeries, two restaurants, billiard parlours, distilleries, saloons, an opera house, and about 80 cabins. The Anglican Mission was just upstream of the camp.<sup>437</sup> Harry de Windt sounded less impressed when he described Forty Mile in 1896 as a collection of 80 to 90 dismal huts and shanties scattered about on a mud bank, where bread was often lacking, but whiskey was never scarce.<sup>438</sup> In 1897, Forty Mile had an estimated population of 140 people.<sup>439</sup> The community remained the major Yukon riverboat landing, supply camp, and social centre for the Fortymile River drainage prospectors and miners, until a road was completed from Eagle, Alaska, into the American goldfields in 1908.<sup>440</sup>

Some of the Forty Mile miners explored the upper Sixtymile River drainage, travelling over the ridge between the two drainages. Major gold discoveries in the Sixtymile in 1892 and 1893 led to a small settlement being established on Glacier Creek, but Forty Mile remained the main supply centre for the region.<sup>441</sup> The most common route into the Sixtymile drainage in the early 1900s was up the Fortymile River from the landing at Forty Mile, and then along a 20-mile trail starting at Moose Creek.<sup>442</sup> Harper and Ladue set up a trading post on an island in the Yukon River at the mouth of the Sixtymile in 1892.<sup>443</sup> Warburton Pike stopped at the post in 1893 and was advised to stock up on supplies and travel up the Sixtymile to the new diggings.<sup>444</sup> Travel between Forty Mile and the Sixtymile post was accomplished by ascending the Fortymile River some distance, making a short portage to the Sixtymile River, and coming down with the swift current. The traveller would return on the Yukon River, making almost the entire trip downriver.<sup>445</sup> In 1909, Dawson was supplying the Klondike, Sixtymile, and the southeastern part of the Alaskan Fortymile goldfields.<sup>446</sup>

Gold was discovered on Bonanza Creek in the Klondike drainage on August 17, 1896. There was a fishing camp of perhaps 200 people at the mouth of the Klondike that summer.<sup>447</sup> The Tr’ondëk Hwëch’in camp was located at Tr’ochëk, across the Klondike River from the location of modern-day Dawson, which was boggy and subject to periodic flooding. The camp was a gathering spot in the summer, and in late summer and early autumn it was a place to harvest and dry fish, tan moose hides

and caribou skins, and prepare food for winter storage.<sup>448</sup> There were log cabins at Tr'ochëk in the early 1890s.<sup>449</sup>

When gold was discovered on Bonanza Creek, all of the prospectors and miners in the country descended on the area; the cabins at Tr'ochëk were in high demand. The Tr'ondëk Hwëch'in sold their cabins and briefly moved across the river, before relocating downriver in the spring of 1897 to a traditional campsite named Jëjik Ddhä Dënezhu Kek'it.<sup>450</sup> Seasonal use of this site dates from 8,000 years ago. The Anglican missionary applied to purchase 40 acres of land beside Moosehide Creek with the intention of holding the land for the Tr'ondëk Hwëch'in. The application was withdrawn in 1900 and the federal government surveyed a 160-acre Moosehide reserve for the First Nation, and then amended the Order-in-Council to exempt the buildings erected by the Anglican Mission. Requests to extend the reserve were refused on the basis that the land might be valuable for gold mining.<sup>451</sup>

Ladue was the first to see the potential for a townsite near the Klondike goldfields, so he staked a townsite across the river from Tr'ochëk, moved his sawmill down from his post at Sixtymile, put up the first buildings, and started selling lots. Ogilvie surveyed the Ladue block lots in January 1897 and named the settlement after the director of the Geological Survey of Canada, George Mercer Dawson. Starting at a point midway between Princess and Harper Streets, the boundary ran north along Front Street to Albert Street, east to Tenth Avenue, south to a point midway between Princess and Harper Streets, and west to the beginning point.<sup>452</sup> The lots were 100 feet by 50 feet. The streets were 50 feet wide running at right angles to the river, and the avenues were 66 feet wide running parallel to the river. In the same year, James Gibbon DLS laid out more town lots for Ladue and Harper. Gibbon continued with Ogilvie's plan and staked most of the rest of the flat into 655 lots, completing this work by August 9th. On August 10th, Gibbon started the survey of F. Atkin's north-end location of 14.3 acres into town lots. Atkin's agents loaned the surveyor three extra men for this, as the old helpers quit to go prospecting. The Roman Catholic mission occupied two acres on the lower end of the property where the hospital was built. A valuable spring flowed out of the side hill bordering the mission property, and the surveyor projected the plan to reserve it for public use and put it in the street. The Atkin lots were 60 feet by 50 feet, and the street and avenues corresponded to those in the adjoining property. Gibbon then staked out the remaining 103 lots. There was still land available outside of the surveys, and a large number of cabins were informally built there. On August 17, Gibbon started the survey of A.L. Day's block and laid out the part that was suitable for town lots. He ran the streets at right angles and parallel to the outlines of the government reserve, leaving a street 66 feet wide fronting on the Klondike River, and making the other street 50 feet wide. In total he staked 125 lots that were each 100 feet by 50 feet and completed the survey by August 21, 1897.<sup>453</sup>

The lots were quickly sold at high prices. A Dawson newspaper reported in June 1898 that a vacant lot on Second Street in the business district might be bought for the bargain price of \$7,000, and that a corner with a two-story log cabin recently sold for \$20,000 cash. Waterfront lots were leased at \$10 per front foot per month and a 14- by 16-foot tent could be erected for about \$400.<sup>454</sup> With no drainage or sanitation systems, the townsite quickly became an unhealthy bog, and newcomers often decided to build on terraces above Dawson and Tr'ochëk, now called Klondike City. It was cheaper and healthier. A police census in mid-summer 1898 counted 17,000 to 18,000 people in Dawson and 4,000 to 5,000 more within a radius of 50 miles.<sup>455</sup> And the population kept growing. Dawson was the world's most extravagant mining town in 1899, just after the peak of the gold rush and before news of a gold strike at Nome.<sup>456</sup> Dawson was the supply centre for the mines, and all roads led from the Dawson sternwheeler landing to the producing creeks in the goldfields.

Small settlements, connected by a system of trails, started to spring up in the Klondike goldfields as early as 1897. They first offered food, drink, and lodging, and sometimes grew to boast post offices, stores, hotels, churches, schools, and a NWMP post. The early communities acted as social hubs and drop-off points for the miners' supplies and equipment. Most, if not all, of the communities, started as a

single roadhouse.<sup>457</sup> The creek bottoms were spongy until the mining operations brought up enough gravel to build a good base for road construction. The first government road in the Yukon Territory was built in 1899 along the ridge between Bonanza and Hunker creeks, and over the hill and down the ridge by Gold Run Creek to Dominion Creek in the Indian River drainage. Numerous other roads followed the first; most of them were built in 1902, when government services were consolidating at the height of personal wealth for the community of Dawson.

The local superintendent of public works, David Macfarlane, described some of the roads that were built in 1901 to a local newspaper. They included a road that connected Grand Forks with the Ridge Road, an extension of the Eldorado Road over the summit and along Calder Creek to the mouth of Quartz Creek, and a small section of road from Bonanza Creek to Adams and Cheechako Hill. A road to Eureka Creek was surveyed via Montana Creek, but there was not enough money that year to complete a wagon road.<sup>458</sup> About 145 miles of road were built in the territory in 1901, and about 407 were constructed in 1902. About 283 miles were on the new Overland Trail winter road from Whitehorse to Dawson. Several wagon roads were built in the Klondike goldfields including 3 miles on the Hunker Road up Bear Creek; 2.5 miles on the Hunker Road up Last Chance Creek; 4 miles on the Hunker Road up Gold Bottom Creek; 6.5 miles between 7 Below Lower Dominion to 92 Below; 3.5 miles from Claim 12 Gold Run down Dominion Creek; 2 miles from the Ridge Road to Claim 36 above Sulphur via Green Gulch; 3.5 miles on the Hunker Road at Beamish Road House to the Ridge Road connection with the Green Gulch road to Sulphur; and 1.5 miles of road from Bonanza Road up Lovett Gulch.<sup>459</sup> The roads were rough, mostly used for the conveyance of freight, and travel times were slow.

Grand Forks, officially called Bonanza, was established in 1897 at the confluence of Bonanza and Eldorado creeks. A day's journey from Dawson, Grand Forks had branches of Dawson stores plus dozens of local businesses – everything from a public bath to a dentist. By 1902, mechanized mining and larger work crews helped the town flourish. The amalgamation of large blocks of claims on Bonanza, and on Hunker soon after, eliminated individual operations, eventually causing the town to lose its reason for being. By 1903 it was connected to Dawson, 12 miles away, by telephone and a government road, and was supplied with electricity by the Dawson City Electric Light and Power Company.<sup>460</sup> It was the largest of the communities in the Klondike goldfields and the only one to elect a mayor. Walter Woodburn was its first mayor and the choice of all 40 voters in 1901. Woodburn also owned the only Grand Forks drugstore and was the postmaster as well.<sup>461</sup> Grand Forks' red-light district was located at the far end of First Avenue, not far from the NWMP post.<sup>462</sup> Members of the seven-man detachment raided Molly Smith's house in March 1903 and confiscated opium and pipes.<sup>463</sup> Grand Forks was a small community with big-city problems. In 1911, a fire started in the Queen's Hotel and swept through the wooden town, destroying half the buildings. Two hundred men fought the fire using water brought in by a pipe attached to a nearby mining claim flume.<sup>464</sup> In 1923 to 1924, the population of the town had declined to 100 people.<sup>465</sup> Eventually the land under the town was mined, and only a few buildings remain to mark the site.

The community of Hunker, also known as Gold Bottom, was established in 1898 at the mouth of Gold Bottom Creek. The community was substantial, with a long street of businesses, dwellings, and other buildings spread out nearby to accommodate miners visiting from the creeks. In 1903, the NWMP post housed a detachment of one corporal and three constables.<sup>466</sup> The police post was abandoned in 1907 because of a lack of funds and personnel.<sup>467</sup> In 1917, the S.W. Ebbert General Store at Gold Bottom was advertising general merchandise, groceries, feed, provisions, hardware, clothing, and drugs, with outfitting for miners and prospectors as a speciality. The Hunker Post Office and a public telephone were located in the store.<sup>468</sup> By 1923 to 1924, the population had declined to 50 people with a general store, a public school, and a hotel.<sup>469</sup> One building from the early community remains standing today.

Until 1904, Gold Run was one of the most important creeks in the Klondike goldfields. From 400 to 500 men were employed in the mines, and the town boasted a post office, hotels, stores, and a

NWMP post with a stable and storehouse. By 1907, there were fewer than 10 people working on Gold Run Creek, and the business owners had moved to a new settlement at Granville, five miles away. The police abandoned their well-built detachment to rent a cabin in the new settlement.<sup>470</sup> The area has been well mined, and little remains of the Gold Run townsite today.

The miners on Dominion Creek could have their mail directed to a number of post offices in communities stretched along the creek or nearby. The area along Dominion Creek was heavily populated between the mouth of Gold Run and Sulphur Creek. Caribou City, at the confluence of Dominion and Caribou creeks, was settled in 1897 as the supply point for miners in that area. The first territorial road, built in 1899 along the ridge between Bonanza and Hunker creeks, ended at Caribou. With transportation established, a post office was built in the community. After 1905, this settlement was referred to as Dominion. The Gold Run, Driard, and Caribou hotels were located here, as was a four-man Mounted Police detachment. Dominion was abandoned during World War I.<sup>471</sup> The community of Lower Dominion was established in 1898, six miles away on Lower Dominion Creek, at the mouth of Australia Creek. By 1923 to 1924, Lower Dominion had a population of 135 people serviced by a post office and a Presbyterian church.<sup>472</sup> This site is now covered in dredge tailings. The longest-living Dominion Creek community was Granville, built at the road junction of the Sulphur Creek and Dominion Creek roads. It was settled in 1903 by A.N.C. Treadgold and named for Lord Granville, one of his English backers. The community was also used by YCGC and became a company town that was abandoned with the nearby dredges around 1965.<sup>473</sup> In 1923 to 1924 Granville had a population of 150 with a general store and two roadhouses.<sup>474</sup>

The community located at Redford's 1894 Discovery Claim on Quartz Creek was a regular stagecoach stop on the Overland Trail between Whitehorse and Dawson. There was a store and a Royal North-West Mounted Police (RNWMP) post there when the Radford Post Office opened in 1905. The post office was closed for some months in 1934, and when it reopened the name was changed to Readford. The townsite became a dredge camp for YCGC, and the post office closed at the end of 1952. The YCGC camp is currently the headquarters for Ballarat Mines.<sup>475</sup>

A few of the smaller mining communities in the Klondike goldfields never reached the cohesiveness of a town. For example, a 1905 description of Sulphur, 37 miles southeast of Dawson, used mining claim numbers as locaters for the buildings. The Sulphur Hotel was at 1 Below Discovery on Sulphur Creek, adjacent to the RNWMP detachment; the 2b Roadhouse was at 2 Below; the Shoop Roadhouse was at 3 Below; the Sedlmeier House was at 12 Below and the Brimstone House was at 32 Below Discovery on Sulphur Creek, three miles from the RNWMP detachment.<sup>476</sup> Somewhat more consolidated was the mining community of Paris – first settled in 1901 by hundreds of French-speaking prospectors and miners who camped there during the Klondike Gold Rush. The post office and community was only three miles below the town of Dominion, and by 1937 Paris was a ghost town with one operating, but somewhat dilapidated, roadhouse.<sup>477</sup>

In 1908, the RNWMP were relieved of their Mining Recorder's work at Sulphur and Dominion. Officers remained as agents at Grand Forks, Forty Mile, and Dominion in the Dawson district.<sup>478</sup> In February 1909, owing to the decrease in strength of the Yukon RNWMP, the Sulphur detachment was closed, and the creek then was patrolled by the lone constable remaining at Granville. The Hunker (Gold Bottom), and Dominion detachments were also closed, or greatly reduced, and the buildings rented to residents. The Yukon Gold Company wanted to rent the large detachment building at Grand Forks, but there was no suitable cabin to move the constable into, so the police retained it.<sup>479</sup>

The older Yukon River settlements in the Klondike region gained new importance between 1898 and 1905. The NWMP, and then RNWMP, established detachments at the mouth of the Indian River, at Sixtymile (soon to be renamed Ogilvie Island), Stewart Island, and points south. All of the posts up to and past Fort Selkirk were managed by the Dawson "B" Division.<sup>480</sup> Posts at Ogilvie, Halfway, Indian River, and Selwyn were withdrawn after the rush to the Klondike subsided.<sup>481</sup> In 1907, the buildings at

Indian River were described as log huts in a state of decay, and a prospective buyer thought he might be able to recover about 12 cords of wood from them.<sup>482</sup>

The Sixtymile miners depended on getting supplies from Forty Mile until the early 1900s. The Sixtymile District is about 40 miles west of Dawson, near the Alaska border. A 56-mile pack trail from Dawson following the divide from Swede Creek was seldom used, as it followed the river with interruptions for numerous rapids.<sup>483</sup> When a good wagon road was constructed in the early 1900s, Dawson became the supply centre for the Sixtymile region. The government claimed that by the summer of 1901, an ordinary team of horses could haul 1,800 pounds from Dawson to Glacier in three days.<sup>484</sup> In reality, the road was a good summer wagon road for the first 30 miles and then became a pack trail. In 1901, 20 miles of winter road and pack trail were built from the Glacier Trail to Boucher Creek. In 1902, a short road was blasted through the rock bluff on the west side of the Yukon River, across from Dawson. This first bit of what would become the Top of the World Highway connected with the existing trail to Glacier that started away from the Yukon River at Swede Creek. A cable ferry was installed on the Yukon River to connect with the new road and, from the end of May to the end of September 1902, the ferry carried over 31,387 foot passengers, 58 wagons and teams, 609 pack horses, 299 head of cattle, and 440 sheep.<sup>485</sup> A Dawson to Glacier wagon road was built in 1904 to 1905 at an estimated cost of just over \$15,600.<sup>486</sup> The road was re-routed along the Sixtymile River in 1912, and freight rates dropped for the 70-mile route from 10 cents to 3 or 4 cents a pound.<sup>487</sup> Geologist W.E. Cockfield described the wagon road from West Dawson to Glacier Creek as it was in 1917, when the summer road followed the high country between Swede Creek and the Yukon River and between the Sixtymile and Fortymile rivers. The road was generally in excellent condition in the summer, and roadhouses were located along the route at convenient locations. The distance between Dawson and Glacier Creek was 60 miles, and the Boucher Creek trail branched off at a point 24 miles from Dawson. An overgrown trail existed between Glacier Creek and Walkers Fork, to connect with a trail cut during the survey of the Alaska/Yukon boundary and used during the Alaskan Chisana gold rush in 1913. The winter road between Dawson and Glacier Creek followed a more protected route up Swede Creek and down California Creek to the Sixtymile River.<sup>488</sup>

Not all of the Hän people who left Dawson during the Gold Rush moved to Moosehide. Charlie Adams, his wife Anne, and their eight children settled at the mouth of the Twelvemile River, halfway between Dawson and Forty Mile. There was a population in 1902 to 1903 of 25. It was a good fish camp, and caribou migrated through the area. Residents sold cordwood to the sternwheelers, one man hauled freight to the Twelvemile power plant in 1906, and Ellen Taylor ran a coffee shop and roadhouse for the workers travelling back and forth to Dawson.<sup>489</sup> Only 15 people remained at Twelve Mile in 1942, and the 1957 spring breakup and flood carried away all the remaining buildings.<sup>490</sup>

It was Chief Isaac's decision to move his people away from the mouth of the Klondike River. He recognized that change was inevitable and the Moosehide relocation offered the best option.<sup>491</sup> The new site never flooded, and Moosehide Creek supplied good water year-round.<sup>492</sup> However, it was not a good trade. The Tr'ondëk Hwëch'in lost their claim to one of the best salmon harvesting sites along the Yukon River through stamper settlement and subsequent mining activities in the river. Chief Isaac frequently reminded the newcomers that their prosperity came at the expense of his people.<sup>493</sup> It was NWMP Inspector Constantine's opinion that the sale of the Tr'ochëk cabins transferred ownership of the land as well. The Tr'ondëk Hwëch'in disagreed.<sup>494</sup>

Tr'ochëk was renamed Klondike City by local entrepreneurs; houses and business sprang up on the flats and up the hill.<sup>495</sup> The "roundhouse" for the 1906 Klondike Mines Railway was located here; there were two sawmills, and the O'Brien Brewing and Malting Company operated from 1904 to 1919 when prohibition came into effect. The hillside became the preferred location for residences, and archaeologists have since mapped 72 hillside housing platforms interconnected by narrow trails.<sup>496</sup> Klondike City was on the same side of the Klondike River as the Klondike goldfields, and rail and road

offered safe access. It was connected to Dawson by a footbridge, a ferry, and finally a railway bridge. All the bridges were washed away in the mid-1920s.<sup>497</sup> The community was essentially abandoned. The sternwheeler landing was better across the river, and Dawson became the bigger town and the administrative, transportation, and supply centre for the Klondike goldfields.<sup>498</sup>

The Klondike Highway was completed by 1953 and terminated at Dawson. The Sixtymile River is now reached via the Top of the World Highway and the Sixtymile River Road. The Forty Mile townsite is reached from the Top of the World Highway via the Clinton Creek Road.

### 2.3) Changes, challenges, and major technological advances

Yukon placer miners were faced, sometimes every day, with challenges that demanded resilience and adaptation. The early miners did not endure the heavy work of hand mining without constantly thinking of ways and devices to make it easier. Treadgold, the man who organized the Yukon Gold dredging company, identified challenges in frozen ground, a short 150-day mining season, costly transportation, high tariffs on imports to a remote area, and small individual claims leading to high individual costs. His suggested solution was industrial mining: abundant power and water, and large digging plants on large connected areas of ground.<sup>499</sup> Nature, and the limits of technology, challenged all Yukon's placer miners. Their ingenuity and skills have allowed the industry to survive and prosper.

#### **The challenge of frozen ground led to many innovative thawing techniques.**

In some cases, permafrost benefited the placer miners who were able to mine the frozen gravel as if it were hardrock. One large chamber in the frozen gravels on Miller Creek measured 64 by 32 feet and 19 feet high. Only eight feet of gravel separated it from the surface, but it held firmly until spring when the gravels thawed and the stope caved in. As one observer commented, "The ordinary methods of sinking, drifting, timbering, stoping, etc. have been peculiarly modified in the Fortymile district due to the exceptional character of the climate, and these modifications have spread from this district over the rest of the diggings."<sup>500</sup> The placer miners had to work very hard to thaw the ground they wished to mine.

Before 1887, Yukon placer mining was accomplished between early June and mid-September, with activities focused on the fine gold in the thawed gravel bars of the rivers and streams. For the most part, miners used gold pans and rocker boxes in a process called bar mining. When coarse gold was discovered on the Fortymile River, the miners started exploring the means of extracting gold from the permanently frozen ground beside the streams. Gulch diggings were performed by directing the current of the stream through a sluice box. American geologist Harold Goodrich considered this a significant advance in technology marked by its first use on Franklin Gulch in the American Fortymile goldfields.<sup>501</sup> There was a short season when the water was low enough for miners to work the thawed gravel bars in the rivers. The gold in the gulches was frozen hard about 18 inches below a thick layer of moss. Northern miners had learned to burn off the moss in the Cassiar Mining District, but the work was very hard and took a long time. Only the most shallow and easily reached deposits were worked until the winter of 1887 to 1888. Fred Hutchinson, who later mined on Claim 7 Eldorado, was working at Franklin Gulch in 1887. He was following a paystreak but had to stop work when he reached the river. After the ice formed, he chopped through at the spot he wanted to work, letting the ice freeze and form a coffer dam as he chopped. When he reached gravel he built a fire to thaw the ground, and he took out a little pay dirt. His neighbours laughed, but two of them tried it the next winter on their shallow diggings and took out considerable pay dirt.<sup>502</sup> Ogilvie takes the credit for suggesting the "burning down" method of

reaching bedrock in the Fortymile diggings.<sup>503</sup> He remembered seeing workers using a coal fire to burn down through the ice and snow of an Ottawa winter to reach defective gas and water pipes.<sup>504</sup> O.C. Miller was the first to dig a drift, or tunnel, using fire to thaw the ground. Winter work soon became more common.<sup>505</sup>

Thawing with heated rocks was an early uncommon thawing method. Rocks were heated in a fire and dropped to the bottom of a shaft where they were covered to keep in the heat.<sup>506</sup> In a few years, the practice of thawing the ground by setting nightly fires until bedrock was reached became more common. This method was also used in Siberia but, considering the isolation and limited communication of the time, it is likely that this was an independent innovation. The fire would be out by morning, leaving nothing in the drift but warm ashes and thawed ground; the smoke and gases would have hopefully dissipated.<sup>507</sup> In fact, this system only worked well in the winter, when the difference in air temperature created a good draft to lift the smoke and gases. More than a few miners burning fires in their shafts and drifts during the summer were incapacitated by smoke inhalation or killed by poisonous gases.<sup>508</sup> Many miners started burning down in two places, so they could muck out the thawed ground in one shaft while a fire worked to thaw ground in the other.

Miners on claims with only a few feet of frozen overburden could dam a stream in the spring and direct the water over the claim in channels. The frozen muck would thaw and be washed away in a few weeks. The exposed gravel would thaw in the sun, and, if it was removed as it thawed, bedrock was reached before the end of the season.<sup>509</sup> By 1903, miners thawing with water were commonly using a small Worthington pump with a three-inch discharge and a three-quarter inch or inch nozzle. Only a small amount of water was needed, as the stream working against the gravel face was collected in a sump and used again repeatedly.<sup>510</sup>

Clarence J. Berry discovered steam thawing by accident in 1898. Berry was working on his Eldorado Creek claim when he noticed that his hoisting engine's steam exhaust hose had thawed the permafrost it was lying on. He experimented with the best method of delivering the steam to the frozen gravel and developed the "steam point."<sup>511</sup> The point that became commonly used was a six-foot hydraulic pipe with a solid head and vent for the steam. The pipe was attached by a hose to a boiler and needed 1½-horsepower capacity. The point would stand the blow of a six- or eight-pound hammer as it was set in a shaft or drift and gradually driven the whole length as the gravel thawed. The steam point could thaw from three to seven yards in 10 hours.<sup>512</sup> This process was at least twice as efficient as thawing with wood and was not affected by wet ground in the summer months. It was also more cost-effective, as mine owners could work their mines in the summer and let their labourers go in the winter. In this way, the discovery of steam thawing revolutionized the working regime of the Klondike goldfields and allowed mines that were not that rich to continue operating.<sup>513</sup> Steam thawing was used on the majority of Klondike claims by 1903.<sup>514</sup> Two men working three shifts could sink a shaft five feet square and 28 feet deep using about two horsepower of steam over 30 hours.<sup>515</sup>

Extensive stripping had to be done in front of the dredges when they were operating in frozen ground. They used a thawing plant with boilers that ran from 100 to 150 horsepower. Steam was carried to the frozen ground by a main steam pipe, with laterals connecting to groups of four, six and eight steam points. The points in this situation were from 12 to 15 feet in length, depending on the depth to bedrock. They were set four to six feet apart and left in the ground for about eight hours.<sup>516</sup> The success of the early dredges operating in deep permafrost depended on the steam-point technology.

In places where the overburden was less than 15 feet, it was less expensive to clear the area of moss and trees and remove the organic ground with channeled water in the spring. This is called ground sluicing, and it was efficient at clearing the land to the level of the gravel where open-pit mining could begin.<sup>517</sup> If the miner had the luxury of time, or could alternate work on several claims, he could strip the land and leave it open to the sun so it would thaw during the short summer season.

Yukon Gold conducted some large-scale hydraulic experiments on their creek claims during the seasons of 1906, 1907, and 1909. At one point, two five-inch giants, under a 400-foot head, were used when a supply of 3,000 miner's inches of water was available on Bonanza Creek. There were no problems moving the muck using the hydraulic system, but the solid material had to be driven along with the force of the water. Sand and gravel, deposited on top of the muck, impaired the effectiveness of the operation. As the ditches cut down to bedrock they lost grade, and buried roots and stumps had to be cut out by hand at great expense. The North West Corporation used 5,600 miner's inches of water to strip more than 3.3 million cubic yards of muck from 1911 to 1914 inclusive. The cost was from two cents to eight cents per cubic yard. The hydraulic removal of muck worked, but it was sometimes hard work and often expensive.<sup>518</sup>

Cold-water thawing was developed in Alaska and was first tried in the Yukon Territory in 1919 by Yukon Gold and the North West Corporation. The dredging companies found this method so successful that by 1926 the bulk of the thawing for the dredges was done by extensive cold-water thawing plants. The plants were operated by 25 to 35 men, depending on the frequency with which the points were moved. The cost of thawing for a dredge near Granville was three cents per cubic yard dredged in 1926 – about half of what it cost to use steam. Steam thawing was still used between early April and late May and after the end of August.<sup>519</sup> For miners who dug drifts, cold-water thawing could be controlled more easily than steam. Steam, especially in the summer, heated the air in the underground chambers and thawed the roofs, which then fell down into the drift.<sup>520</sup>

The efficiency of thawing with hot water was discovered accidentally as well. A miner on Gold Run Creek was attempting to mine a three-foot paystreak about 50 feet below the surface. A small force pump was set in the main drift near the shaft, and it drew water from a nearby sump where the workings drained. Six thousand gallons of water were pushed against the face of the drift and used again and again. The water in the sump was heated to a temperature of 150 degrees as the pump exhaust was discharged into the sump. In 10 hours, about 175 cubic yards of gravel was thawed and ready for the men to shovel. This was much more efficient than steam thawing which, using the same 30 horsepower, would power only 20 points with a maximum thaw of 80 cubic yards. The hot-water method worked well in this case because there was no silt in the gravel, so the sump remained clear. In places where the schist bedrock was in big flakes, the pay sank into it and the hydraulic method became inefficient. Thawing with hot water was being used by other miners in the Klondike by 1905.<sup>521</sup> It was not a process that could be adapted to large-scale mining.

By 1933, the cold-water thawing plants in front of the YCGC dredges were becoming very expensive to operate.<sup>522</sup> A description of a cold-water thawing operation in the Sixtymile River drainage in 1948 illustrates some of the problems that could be encountered. Point driving proved to be very difficult in the Sixtymile ground because of three layers of coarse boulders in the gravel. The third stratum was about two feet thick and about two feet above bedrock. It was particularly hard to get through, and many points had to be pulled out and re-set. The dredge came into some frost when it reached the area where there had been trouble driving the points, as well as in the last area thawed, as the process had been rushed in order to cut down on the crew.<sup>523</sup> Frozen chunks of pay dirt would have gone through the dredge without being properly washed.

In comparison, the cost of hydraulically removing the muck remained around 2 cents to 10 cents per cubic yard.<sup>524</sup> Pumps were installed to supply a great volume of water in order to ground sluice the frozen muck before thawing the gravel underneath with the points. In shallow ground, where brush had been cleared off and the muck sluiced away, the ground was left to thaw naturally so the use of steam points was unnecessary.<sup>525</sup> The permafrost did not generally return after the ground was thoroughly thawed, so the process could be done well in advance of dredging operations. Hydraulic stripping was very successful during the high water in the spring.

The use of tracked vehicles to strip the ground became common in the 1940s, although there were cases of a shortage of parts hampering their operation for a major part of the season.

### **The challenge of an inconsistent water supply led to pumping plants, ditches, and dams.**

Water is necessary in the process of mining for placer gold, and an abundant and constant supply of water has always been a concern of Yukon placer miners. The early Bonanza Creek miners worked rich paystreaks in the valley bottoms where the creek could be diverted for sluicing. As larger areas of ground were worked, an elaborate system of water management evolved, with ditches from higher streams or dams channeling water down the valley or along the hillsides. The early placer miners relied on the spring runoff to provide enough water to sluice their winter's work. There was sufficient water for sluicing the creek claims but not enough to hydraulic the high benches on even a modest scale.<sup>526</sup> Eldorado was an important gold producer in 1903, and it held barely enough water to sluice in the late summer.<sup>527</sup> The scarcity of water on the hillsides of Hunker Creek curtailed mining where the greater part of the deposit was too low-grade to bear the expense of pumping water to sluice.<sup>528</sup> In an operation where pay dirt was shovelled from a pit and conveyed to a sluice, seepage water was pumped from the pit for use in the sluice.<sup>529</sup>

Water for sluicing needed to be under some pressure, and so dams were often constructed for "booming" or creating a forceful flow. The ends of logs were sometimes set in the frozen ground and muck allowed to refreeze around them. The dam could be as long as 40 feet with 12-inch timbers laid in two rows filled with earth and rock. The dam would ideally have a self-dumping gate that would flush the reservoir when the water reached a certain level. Automatic water gates were used as long ago as the pre-Christian era in Spain.<sup>530</sup> A small overshot waterwheel pump could be inexpensive when water was plentiful. A small China pump with a five-foot wheel used 20 inches of water to lift about a third of that amount to a height of 10 feet.<sup>531</sup>

Sometimes too much water was a problem when it had to be held back from the workings. Dams constructed with sod walls lined with sacks were more economical than those of sod and brush. In 1905, a dam of moss, brush, and gravel was built on Hunker Creek at a cost of \$500. It was 90 feet long and 18 feet wide and worked to keep water out of an open pit.<sup>532</sup> Miners built bedrock drains on ground that was too flat to drain. They were common in hydraulic operations where a lot of water could accumulate. A 2 percent grade necessitated a drain that was over 600 feet long. A 1905 operation on Bonanza Creek found that several thousand yards of drain was less expensive, by 40 cents per cubic yard, when compared to pumping.<sup>533</sup>

Some very large pumping stations were set up by private companies with a view to selling water to the miners. In 1902, Alex McDonald had one on Bonanza Creek at the mouth of Adams. He could pump 100 miner's inches to a height of 380 feet and supplied water to at least 15 claims. The operation was expensive and not long-lived.<sup>534</sup>

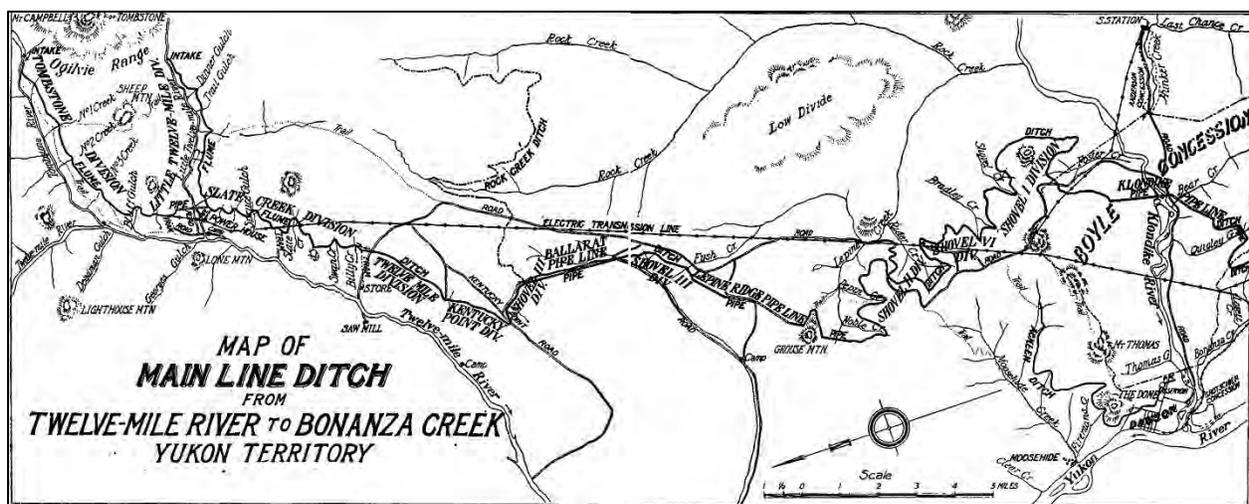
Some miners were able to construct their own elaborate water systems. In 1904, the lessees of the Matson and Doyle Concession constructed the Adams Dam on Adams Creek. Joseph Burr Tyrrell, a Dawson geologist and mining engineer, designed the dam which cost about \$75,000 to build. It had a capacity of 58 million gallons of water accumulated from an area of between six and eight square miles. The water from the dam was conducted along the left limit of Adams Creek. Water under a pressure head of 175 feet was used on three miles of hills and benches on the left limit of Bonanza, between the mouth of Adams and Boulder creeks. The water was conducted entirely by a 24-inch by 30-inch flume, having a capacity of 1,000 miner's inches of water. Three monitors, with 4-inch and 5-inch nozzles, were used to hydraulic the ground on Adams Hill.<sup>535</sup>

The legal right to use water was an important issue, and in 1904 the majority of cases before the court were water disputes. In 1905, Gold Commissioner Senkler commented that the expense of

carrying out a major water-delivery system was the main problem faced by the territory. Large-scale hydraulic plants were the only way to effectively mine the great volume of pay gravel in the high levels, and, while they used an enormous amount of water, they were often able to sell their surplus to smaller mines. The miners continued to lobby the government for a public water system.<sup>536</sup>

Private projects faced huge expenses. The 41,500-foot Aklen Ditch brought water from Moosehide Creek and was built across the face of Moosehide Slide and overland to the Klondike River valley to hydraulic the Klondike high benches. The ditch was 7 feet by 4 feet and 2 ½ feet deep. Other local ditches and flumes were small, delivering a small amount of water at a low head of about 100 miner's inches of water at a 75-foot head in favourable conditions. One of these ditches on Hunker Creek was in excellent condition after four years of service and an annual maintenance cost of \$1,000, or about 10 percent of the original cost.<sup>537</sup>

In 1906, engineers with the Yukon Gold Company started to build the Yukon Ditch. It was a massive system of 38 miles of ditch, 12.6 miles of pipe, and 19.6 miles of flume. It carried water more than 70 miles from the Twelvemile River in the Ogilvie Mountains to the hydraulic mines along Bonanza Creek. The difference in elevation is 1,112.8 feet, so the effective head at Gold Hill was 375 feet. The size and gradient of the ditch was modified according to the local conditions, but the standard was a 9-foot bottom built to carry a water depth of 3 ½ feet. The grade ranged from a minimum of 4 feet to a maximum of 7 feet per mile. In places, the ditch was 20 feet wide. The standard flume was 6 feet wide and 4 feet deep with a gradient of 14 feet per mile. The pipe was built of steel or wooden staves and had a diameter that ranged from 42 to 54 inches. The water was conveyed through ditches wherever possible, as that was the cheapest conduit. The builders used flumes, when possible, to cross deep ravines or broad valleys. Pipes and syphons (pipes in U-form, also called an inverted syphon) were used as a last resort and only when the grade was very steep, because they caused a loss of head measured by the friction between the water and the sides of the pipe.<sup>538</sup> The ditch was functional at Trail Gulch in 1906, reached Gold Hill in 1909, and was in operation until 1930.



The Yukon Ditch (Rickard, 1909: 10–11)

The Yukon Gold Company also undertook the construction of the Bonanza Dam between 1906 and 1908 to supply water for hydraulic mining on Gold Hill. The construction was based on their acquired right to impound the unappropriated waters of Bonanza Creek below Carmack Fork. Bonanza Dam was 400 feet wide at the bottom and 500 feet at the top. It could hold 43.5 million cubic feet of water, which was enough to last 40.3 days of hydraulic mining, with a flow of 500 miner's inches. Ditches, flumes, and a syphon carried water from the dam to Gold Hill.<sup>539</sup>

### **The challenge of high costs led to more efficient mining practices.**

Mining costs fluctuated depending on the techniques used, but from 1879 to 1933 the price of gold remained constant at US\$20.67. In the 1930s, it rose to \$35 an ounce. In the late 1940s, it rose to over \$40 an ounce, and for much of the 1950s and 1960s it was again around \$35 an ounce.<sup>540</sup> Klondike gold was fairly pure, with the major impurity being silver.

Before gold was discovered on Bonanza Creek, wages in the Fortymile and Sixtymile drainages were \$6 to \$10 a day, and in 1897 that rose to \$15. After the Gold Rush, Klondike mine workers cost about \$1 a day for meals and \$4.59 for a 10-hour day of labour. McConnell reported that in 1903 the average creek claim required 50 horsepower of wood-generated steam to thaw the frozen overburden and gravels, hoist the pay gravels to the surface, and pump water through the sluice runs. He estimated a capital cost of from \$5,000 to \$7,000, with a daily operating cost of about \$100 for every 50 to 60 cubic yards of gravel thawed, mined, hoisted, and sluiced. The installation of a steam plant cost between \$5,000 and \$7,000. The open-cut method of hand mining recovered more gold but was too expensive where the overburden of muck was deeper than 10 to 15 feet.<sup>541</sup>

The White Channel gravels had major economic importance in the Bonanza Creek valley, especially a three-mile stretch from the mouth of Eldorado to Boulder Creek. Costs were very high when rocking was the only way of mining this high-level ground. In 1903, a paystreak nearly 1,000 feet wide was still profitable after expenses of from \$4 to \$6 per cubic yard of material mined. The richest claims yielded over \$60 per surface yard, and values from \$20 to \$40 per square yard of surface were common.<sup>542</sup> Poorer ground became more common after 1901.<sup>543</sup>

If the ground was sufficiently rich, it could be mined by drifting throughout the year. Pay dirt from creek drifting was hoisted up through a shaft and on a bench claim, and the pay gravel was carried out by tram through an adit. In 1905, it cost over \$1 per cubic yard more to mine in the winter than the summer, because of the extra cost moving and thawing the winter pay dumps for spring sluicing. Winter labour costs were 25 percent less than summer costs, so only the richest ground was mined year-round.<sup>544</sup>

There was constant pressure to find cheaper ways to mine as the richest ground was mined out. Steam power and machinery had, by 1903, mostly replaced hand labour and cut the cost of mining by nearly half. The reduction in costs gave value to stretches of ground previously viewed as too low-grade to work.<sup>545</sup> Even so, the change to modernization was not universal, even as the wisest of analysts continued to predict the demise of hand mining. As late as 1989, an analyst commented that mining using hand methods was almost non-existent, being too costly even at a December closing price of \$401.<sup>546</sup> Small-scale hand mining continues to be an option for those not too worried about large-scale returns on their investment in time and equipment. For large-scale miners, the hydraulic method of mining placer gold deposits is the most economical method in terms of power, capacity, and labour, although it is very wasteful in terms of water use.<sup>547</sup>

In 1903, the cost of drifting in to the White Channel gravels was over \$3 a cubic yard, and McConnell estimated that the proportion of the deposit that could be profitably mined in this fashion was less than 0.5 percent of the total volume. A small amount of hydraulicking had recovered gold in the upper levels of the White Channel deposit, and the long mining face would be ideal for this less expensive method of mining. The challenge in 1903 was the expense in obtaining the necessary supply of water.<sup>548</sup> Miners consolidated a number of claims in a block of land to make a better return on investment.<sup>549</sup>

Freight rates played a big part in mechanized mining, although rates to the Klondike in 1903 were about one-sixth of what they were in 1899.<sup>550</sup> High operating costs mean that modern operators leave very little to chance. Extensive testing and drilling programs take the guesswork out of the long-term operation of a mine. Exploration programs have always been expensive, but the resulting mines are smaller and more efficient.<sup>551</sup>

### **The challenge of lifting and moving heavy material led to creative invention and use of technology.**

The early mines used manual labour to bring the gold-bearing gravels to the sluice runs. The material was heavy, the work was hard, and labour was expensive. Clarence Berry was unable to hire enough labourers to work his Eldorado Creek claim in the winter of 1897 to 1898 and so he purchased a sternwheeler steam engine and boiler to run a scraper and a derrick.<sup>552</sup> Between 1898 and 1903, many Klondike hand windlasses were replaced by steam hoists working with self-dumping buckets to pull the gravel up from the bottom of shafts. Steam scrapers replaced the shovels and wheelbarrows of the early days, and later horse-drawn slip scrapers were used to remove the waste in open cuts.<sup>553</sup>

Early open-pit mining involved a number of men using shovels. Depending on the height of the sluice, the men in the pit shovelled up to a man on a platform who could shovel into the sluice. In such a case, two men shovelling in two stages up a total of a 9-foot lift could move 2 feet of pay gravel into the sluice box at the rate of 3 ½ cubic yards “per 10-hour man.” Ground exceeding 12 feet of combined overburden and pay gravels was usually not economical to mine by shovelling in.<sup>554</sup>

Shallow ground to be shovelled could usually be worked with a horse and a slip scraper at a third of the cost. In ground with boulders, two horses could convey 30 to 40 cubic yards of pay gravel over a distance of 75 feet a day.<sup>555</sup> Steam scrapers were used to dispose of the tailings because it was as big a job as getting the pay gravels to the sluice. An operation observed in 1905 involved a scraper, or open-ended bucket, of from one-third to one-half cubic yard. It was operated by a double-drum and a two-cylinder hoist. The scraper could move an average of 250 cubic yards of material in 24 hours, with three to four men on a shift: a fireman, a hoist man, and one or two men to fill, guide, and dump the scraper. Moving the tailings cost an average of 49 cents per cubic yard; the equipment had an average cost of \$3,500.<sup>556</sup>

The self-dumper, designed specifically for the Klondike, was a light and simple machine that would hoist and convey the dirt from the bottom of the shaft or from an open-cut to a dump or sluice box.<sup>557</sup> Self-dumpers were used where conditions did not allow shallow open-cut methods, and where drifting was impossible or dangerous through ground that was not completely frozen. A bucket holding about two-thirds of a cubic yard was dropped onto a crib in the mine, and men brought the pay dirt to the bucket in wheelbarrows. The bucket had no mobility and rose and fell to the same spot every time. It would take from four to six wheelbarrows full to fill the bucket. It was hoisted up with a steam-driven cable system and carried to the sluice, where a trigger on the cable dumped the bucket of pay into the sluice.<sup>558</sup>

Miners working in the high gravels had to either bring the water to the mine site or take the gold-bearing gravels to the water. Three gravity trams were built at Cheechako Hill in the Bonanza valley to bring gravel from the level of four drifts, 300 feet down to the sluice boxes at the foot of the hill. Five thousand feet of steel track was laid in drifts and cross cuts. The large cars emptied into hoppers that fed directly into the sluice runs. The hillside miners often had to purchase places to dump their tailings.<sup>559</sup>

Steam shovels were an efficient way to move bench gravels where the ground was not permanently frozen, and where it was difficult to obtain water for hydraulicking. Heavy gravels and boulders were not a problem for the machine. The shovel-fed cars were on rails so they could convey the gravels to the washing plant. This system worked well where the bedrock was soft, but otherwise men were employed to clean the bedrock, and wheelbarrow the rock to the sluice. The system was slow if the shovel was waiting for cars to fill.<sup>560</sup>

A steam shovel at the mouth of Bear Creek dug in a pit 20 feet below the surface. It emptied the dipper into cars that were pushed by hand to the foot of an incline, and raised by a steam winch to the platform of a washing plant where they were dumped by hand into a hopper on the sluice. About 250 cars could be raised in 10 hours. The pay gravel went through a trommel, and the oversize waste fell

into a self-dumping carrier and was elevated to a dump. This shovel was able to excavate about two feet into the bedrock, and prongs were added to the dipper lip to prolong its life. The shovel weighed 35 tons and revolved 360 degrees on a turntable, and the boom, when horizontal, could reach 22 feet beyond the bow.<sup>561</sup> After 1905, this system was changed so that excavated material was hauled by locomotive and trains of six cars to a washing plant on the Klondike River. The ground there was eight feet below the upper edge of the mine, and the gravel could be washed using gravity water from Bear Creek.<sup>562</sup>

Some areas of Bonanza and Eldorado were not suitable for the early forms of large-scale mining. Dredging was impaired by hard bedrock and permafrost, and hydraulic operations could not operate where there was limited access to water and insufficient grade for the tailings disposal. In 1908, Yukon Gold engineers devised an operation to remove tailings that had accumulated in the creeks as a result of hydraulic mining. A mechanical apparatus, locally called an elevator, used a bucket line to move the tailings from the creek bottom to a sluice run. This had been tried before but was unsuccessful because of a lack of water under pressure and the cost of fuel. In 1908, fuel and water were plentiful and cheap, and three devices were installed on Bonanza Creek.<sup>563</sup> It was hoped that this method of open-cut mining would be successful on claims that could not be dredged, but there is no record of Yukon Gold using the machinery in subsequent years.

Before the era of bulldozers, the most common mining equipment was drag lines and backhoes. These machines were difficult to operate, and mine operators grew to be very skilled at placing the mined material. Mining equipment evolved as mine owners shared their good ideas.<sup>564</sup> In the 1980s, most miners used bulldozers as their basic mining machine, but there were always innovative attempts to improve methods and reduce costs. They commonly used what was available on their claims before buying new equipment. For example, a few miners built rigs with conveyors to cut the cost of moving pay dirt to the washing plant. They used the tracks and motors from old draglines to move the rigs as mining progressed up the creek. Modern mines often use road-building equipment like scrapers. Rock trucks, more commonly found in lode mining, are sometimes repurposed for moving pay dirt in large open-pit placer mines.

### **Declining values in the goldfields led to large-scale mining and better technology.**

The most productive placers were discovered and mined in the first years after the discovery of gold in 1896. New methods of large-scale mining were able to mine low-grade marginal ground. It was easy to recover high-grade material in the Klondike goldfields, but miners had to use greater ingenuity and more efficient methods after the richest ground was mined. Lowering the costs of mining increased the ground available to mine. For example, changing from steam thawing to cold-water thawing lessened the cost and made mining possible where it had not been considered before.<sup>565</sup>

After 1898, abandoned claims and claims with low-value ground could be grouped together and mined by large-scale operations using hydraulic systems or dredges. In 1907 to 1908, the number of operations decreased but the scale of the work materially increased. Twenty-two separate operations were active, and each one worked a group of from 10 to 100 claims.<sup>566</sup> Declining values in the goldfields hastened the end of economically viable hand mining, but large-scale mining took its place. Hydraulicking and dredging continue today as an efficient way to mine difficult and low-value ground.

Dredges are floating, digging, and washing plants. The Holbrook dredge in the Sixtymile region operated in 1912 and was refitted in 1932 to recover deeper gravels and work more efficiently and economically. The dredge was working through tailings left by a previous dredging project, as it was thought that the earlier dredge had not reached the gold just above and in the bedrock. One of the improvements was a new bucket line that weighed the same but could dig deeper and had twice the digging power. A closed line of 52 four-cubic digging buckets replaced the old open line of 28. The refitted dredge could dig to a depth of 20 feet under water.<sup>567</sup> Dredges continued to improve, getting

bigger and more sophisticated. The largest in the Klondike, YCGC Dredge No. 4, handled about 600 tons of gravel every hour and recovered almost 50 pounds of gold every three to four days.<sup>568</sup>

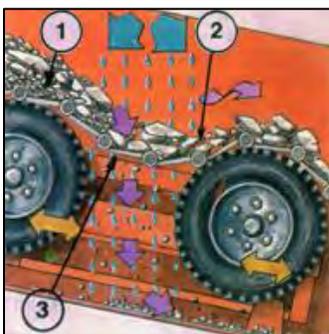
The revolving screen, or trommel, was the first stage in the dredge's washing plant or concentrator. Water that was forcefully sprayed at the material in the trommel slowed the sorting process to thoroughly wash the gold-bearing gravel and break up any frozen clumps. The gold and other small heavy material was forced through the holes in the trommel, collected in the concentrator pans, and distributed into sluice runs. The sluice box has been a staple of gold mining for over 150 years.

Early sluice runs were wooden boxes with introduced material, such as upright pieces of wood, wooden poles, rocks, and later angle iron set across the box, to act as riffles in the bottom. The riffles were positioned so that gold would collect in the matting underneath and between them. All sluice runs simulate a watercourse where placer gold might naturally be found and require a good supply of water with a sufficient force to move the gravel. A narrow section, where the fines are introduced to the sluice as a slurry, creates turbulence, and the riffles overturn the slurry to form vortices. At the bottom of the vortices, centrifugal forces and gravity combine to push the gold into the matting laid under the riffles.<sup>569</sup> After this, a widening of the sluice run would spread the slurry out and slow it down, which was thought to aid in recovering the fine gold.<sup>570</sup> Skim-digging miners, working the gravel bars on Yukon rivers and streams, would connect several sluice boxes together and set them up at a steep slope. Gravel from a rocker box was dumped at the top end and washed down with a strong current. The gold was held in the box by the introduced obstructions. If the gold was fine, mercury was introduced between the riffles. Three times as much gravel could be washed by a sluice, compared to a rocker box.<sup>571</sup>

Water is introduced at an early stage in the concentrator. It simulates the natural process of placer deposition by pushing the gravels through the plant and creating turbulence so the gold moves towards the bottom of the mix. Most miners use water that has already been through the concentrator to reduce operating costs. Water with too many suspended solids was thought to be less efficient at separating the gold. Water used for sluicing is kept in ponds where the solids settle out. The settled water can be used for sluicing or released back into the main stream.

Placer mining concentrating devices wash the gravel and play a part in dividing it into coarse waste gravel and gold-bearing fines. They range from sluice boxes, shaker plants, trommels, and jigs, to unique objects built by the mine owner.<sup>572</sup> Most concentrator plants are a combination of several devices added or created in response to the situation, and they come in as many forms as there are miners and the variety of the material processed. The ground to be mined and the type of gold it contains present the challenges. These challenges can be as varied as very fine gold, too much clay, coarse gold with the odd very large nugget, too many boulders, gold that has penetrated the bedrock by two feet or more, a steep-valley location, a flat location with no water close by, too much water – and on it goes.

Some choices are obvious. If the pay gravel is under water, then the best concentrator plant would be in a dredge. If the gold is very fine, then adding a trommel before a sluice run would slow the washing process down. If the ground has a lot of boulders, then a "grizzly" can be added with bars that prevent boulders from entering the plant and causing wear or jamming. A properly designed grizzly will direct boulders away from the approach to the concentrator. The plant often requires some personal attention to untangle jams or pry loose any stuck rocks.



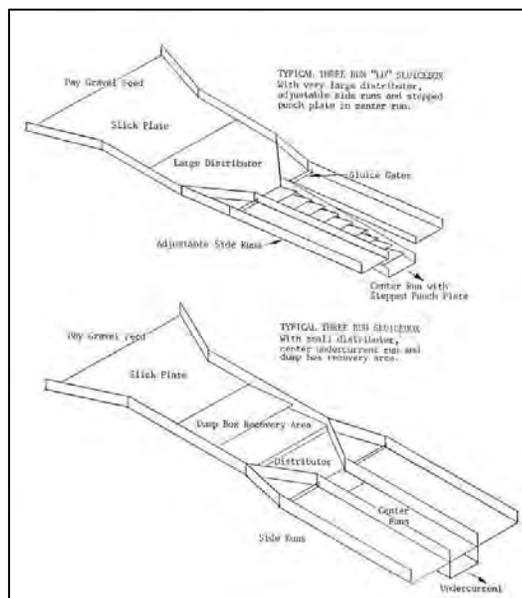
If the gold is in an area of large rocks, or boulders need to be washed away from chunks of bedrock, then a Derocker can be used. The Ross Derocker, developed in Yukon, can handle boulders up to four feet in diameter. As the frame moves back and forth, the deck (3) moves up and down in a wave motion. The fines (1) fall through the slats in the

metal carpet and are washed into the sluice run below. Washed waste rock (2) over two inches in size is pushed out the end of the box.

Ross Derocker ([http://www.rmsross.com/pdf/RMS\\_Derocker.pdf](http://www.rmsross.com/pdf/RMS_Derocker.pdf))

The top of a plant or concentrator can be as simple as the end of an inclined metal box, or it can be a hopper that controls the feed of gravel into the screening unit. A flatter entrance to the processing area will need the forceful addition of water to disturb the gravel and get it moving. If the pay gravel has a lot of clay in it, then a “shaker deck” can be used to break up any sticky chunks. Less of an incline would allow the water to break up the clay before it moves down the sluice run. Clay is sometimes called the box robber, for it can carry the gold right through and out of a concentrator. Finding the best solution is a matter of trial and error with results tested in the sluice runs using a gold pan.<sup>573</sup>

The Ross and Pearson boxes are Yukon triple-run sluice boxes named for their inventors and commonly used in the Dawson Mining District.



Triple-run sluice boxes were thought to be an improvement on single-run sluices. The flat-bottomed top of the box is a mixing area where pay gravels are washed with a stationary or manually operated water monitor. These monitors can react to uneven deliveries of pay gravel and provide a more efficient washing process. A stationary punch plate will screen the slurry and send the fine pay gravels to the smaller side runs. The Ross Box has side runs fixed at the same steep incline as the centre run, under the current run, and dump box recovery area. The slurry flow is manually controlled by blocking or opening holes in the punch plate. The box is not easily adapted to changes in gravel size. The Pearson Rock Box allows an easier allocation of water to the runs with sluice gates installed at the distributor’s discharge. The slope of the side runs can be adjusted for the most efficient operation of the riffles.<sup>574</sup> See a Ross Box video at <https://www.youtube.com/watch?v=e7fMj172FiY>.

**Triple-run sluice boxes**  
Clarkson, Placer Gold Recovery Research, 24.

A 1990 study for KPMA concluded that sluice boxes remain the most important Yukon placer gold concentrator, as they recover up to 99.9 percent and are reliable, inexpensive, and easy to operate. Twenty-four placer mines were tested for efficiency in 1989 and 1990. Ten of those were using bulldozer-fed triple-run sluice boxes, nine were using screening equipment, two were using Derocker moving-deck grizzlies, and two were using raised stationary screen decks. Recommendations were offered to the operators, and two installed screening equipment that increased their gold recovery by 20 percent. Many of the operators had already implemented improvements recommended after a 1989 test program, including the use of unbacked Nomad matting, coarse expanded metal, and one-inch angle-iron riffles. The study found that unscreened single and triple-run sluice boxes were the least efficient, sluices with Derockers or raised stationary decks for coarse screening had lower losses, and the fine-screened sluice boxes had the lowest losses of gold.<sup>575</sup>

Sluice designs continue to evolve. Oscillating sluice boxes have proven to be reasonably efficient at recovering fine gold from pay gravels with a high percentage of clay or a high amount of a specific gravity mineral such as magnetite. These materials fill up the riffles of a conventional sluice box and prevent the gold from reaching the matting. The oscillating equipment has sluice runs suspended from a frame by cables. A motor mounted between, and above, the runs rotates a bent shaft through an angle drive to create a circular motion. These sluice boxes do not have a high rate of success in processing normal pay gravels.<sup>576</sup> Hydraulic riffles were introduced into the Yukon in the 1990s from New Zealand. Two-inch flat bar riffles are alternated with one-inch square tubing riffles, perforated on the bottom. Low pressure water is sent into the square tubing. The right pressure will keep the riffles clear while not ejecting the fine gold. Matting is not necessary due to the lack of turbulence near the riffles. The manifolds and tubing have to be cleaned relatively often for the highest efficiency.<sup>577</sup> The 1990 Clarkson study, conducted by researcher and mining engineer Randy Clarkson, recommended more testing before this design was universally adopted.<sup>578</sup>

Clarkson also recommended changes in technique. Miners who screened their pay gravels before sluicing saw dramatically increased gold recovery. Miners found that much less sluicing water was needed, non-gold-bearing gravels were eliminated from the feed, and riffle wear was significantly reduced. Pre-screening eliminated the need for a triple-run box and the problems of sorting fine gravels to specific sluice runs. The screens broke up clumps of clay and cemented material, and improved the efficiency of the washing process, which is of primary importance in gold recovery. Miners who replaced their triple-run boxes with pre-screened sluice runs recovered their costs within the first season. A vibrating screen, with two or three decks stacked on top of one another, has high throughput, low height requirements, and reasonable capital costs. Very large boulders can be sorted from the feed by a grizzly set above the hopper.<sup>579</sup>

Since 1990, improvements to sluice box design have improved production from 60 to 95 percent for some operators. Depending on the richness of the ground, mine owners clean out their sluice boxes and equipment, and come away with about a metre of sluice box concentrate. The gold is heavier than the surrounding mineral, but the particles are flat making them hard to separate. The concentrate is often left unprocessed.<sup>580</sup>

In 2013 KPMA, and two levels of government, funded Clarkson in a multi-year project that promised to boost gold production by 1 to 5 percent, by finding an efficient and effective way of extracting the gold from concentrate.<sup>581</sup> In 2014, Clarkson demonstrated a rod mill that he predicts will be found on every Klondike placer mine within the next five years. The mill is a small steel tumbler partially filled with 20 cm steel rods. The concentrate is put inside, and the tumbler is turned to grind the rocks into dust and flatten the gold. The resulting paste is put through a sieve, and the gold sits on the top and is easy to recover. The technique recovered between 5 and 10 ounces of gold per day during the tests. This equated to a daily profit of \$5,000 with a total cost of \$2,000 in equipment costs.<sup>582</sup>

### **3: Placer mining in Tr'ondëk-Klondike**

#### **3.1) Historical involvement of the Tr'ondëk Hwëch'in in the placer mining industry and related cash economy**

Yukon First Nations had extensive trading networks before the introduction of a cash economy in the late 1800s. The original societies were self-sufficient, so trade provided rare or scarce goods. The partnerships and gatherings associated with trade satisfied the western Athapaskan's consuming

interest in travel and provided a safe means of travelling into another group's territory. The trade in obsidian and native copper did not involve mining; blocks and nodules could be picked up out of the stream beds. The source of this material was often associated with a specific clan or local group.<sup>583</sup> The trade routes were also protected by clans, and placer miners were for many years forbidden to travel the Chilkoot Pass from the coast. Only after they promised not to be active traders were they allowed passage.<sup>584</sup>

Arthur Harper met a First Nations man at Fort Yukon who had a chunk of native copper from the White River, more than 400 miles away. Based on information from the owner, Harper and two companions prospected up the Yukon River in 1874 and found good gold prospects.<sup>585</sup> The Hän traded at Fort Yukon and, like all First Nations at the time, knew that copper, and later gold, had great value in trade. The First Nations collected placer copper in the White River, Sheep Creek, and Bullion Creek areas. Copper had cultural significance, as well as being useful, and was traded over long distances. The nuggets were hammered into thin, flat sheets and cut into the desired shapes. Copper was used for knife blades, prongs, hooks, gaffs, awls, and arrow points as well as being fashioned into tubular beads.<sup>586</sup>

The early prospectors learned about the country from conversations with the local people who travelled extensively and had an intimate relationship with the land. Mike Hess was wintering at Fort Reliance in 1884 and spoke to the Tanana people who came to trade at Jack McQuesten's post. The Tanana people could travel overland from Fort Reliance to the Copper River in about 15 days. They made frequent trips from the Tanana River in 8 days, coming across the headwaters of the White River and then rafting down the rivers. It was easier to bring furs 200 miles down the White than carry them 150 miles overland.<sup>587</sup>

Prospectors, and Hän and Tanana people, were all trading at Fort Reliance from 1882 to 1886. The system was the same for both trappers and miners: valuable items like furs or gold for Alaska Commercial Company articles, or a grubstake in store goods on the promise of fur or gold at the end of the season. The traders bought fish and meat and paid for labour with trade goods. A cash value would be assigned to some items that the traders carried for the miners, but the cost could easily be translated into the barter and exchange system.<sup>588</sup> The prospectors and the First Nations had to carry their goods with them, and so the accumulation of heavy possessions was of no interest.

This method of trade continued when the McQuesten and Co. post moved to the mouth of the Stewart River and then to the mouth of the Fortymile River. The establishment of Forty Mile, the first Yukon town, coincided with the introduction of a real cash economy. Sam Patch was selling his locally grown potatoes rather than trading them. The First Nations continued to prefer barter and exchange at the store but also worked for wages. This was the first time that the Hän had occupational alternatives to hunting, fishing, and trapping.<sup>589</sup> Most miners worked alone or with a partner, but additional help was sometimes needed during the spring sluicing season. First Nation labourers could earn from \$4 to \$8 a day – a good wage for the era, but less than a non-Indigenous worker.<sup>590</sup>

In 1893, gold was discovered at Birch Creek by two First Nations men educated by prospecting in the Fortymile drainage.<sup>591</sup> In 1895, Bishop Bompas noted that First Nations people were becoming rich by trading meat and fish and working for the miners as packers and labourers.<sup>592</sup> The Hän name for Sixtymile is Khel Dëk which translates as Packsack Creek. Tr'ondëk Hwëch'in Elder Percy Henry thinks the name may refer to a time when the miners started work in the region and needed supplies packed in.<sup>593</sup> The first NWMP detachment in the territory bought parkas, mitts, and boots made by First Nation women, and it is likely that was a common experience at Forty Mile.<sup>594</sup> There is no documentation that cash was exchanged. It likely was not common practice, as Sergeant Hayne wrote that the police traded bacon for fish.<sup>595</sup>

The Hän did not seem to be employed as packers over the Chilkoot Pass but would have been aware of the practice. Coastal Tlingit and Chilkoot clans controlled the coastal passes and decided who could

work as packers. Skookum Jim Mason (Keish) worked as a packer before he and his nephews joined his sister and her husband George Carmack at Tr'ochëk, the Tr'ondëk Hwëch'in fish camp at the mouth of the Klondike River.<sup>596</sup> When Skookum Jim struck gold on Bonanza Creek, there were many First Nation names among the first stakers; there was no regulation restricting First Nation ownership in Canada. It is probable that these men sold their claims soon after discovery, as there is no history of First Nation mine owners in those early years, other than Skookum Jim and Dawson Charlie. As soon as the ground was proven to be very rich and the claims highly valued, there are photos of richly dressed First Nation men in Dawson with good suits and gold watch fobs.<sup>597</sup>

The Klondike Gold Rush was a time of great dislocation for the Tr'ondëk Hwëch'in. Tr'ochëk was overtaken by early miners looking for a base camp on the Yukon River.<sup>598</sup> The Tr'ondëk Hwëch'in were very knowledgeable about a cash economy by September 1896 when individuals sold 14 or 15 cabins located at Tr'ochëk to the first Klondike placer miners. They earned between \$50 and \$200 for each cabin and received cash, as trade was not an option.<sup>599</sup> What was not so clear between buyer and seller was the extent of the exchange. It was not a First Nation tradition that a purchase, in this case a cabin, would include the land on which it sat.

The Klondike stampede brought many into the country who were unprepared for the local conditions. Moosehide women could make \$20 to \$40 a day selling gloves and moccasins to the miners, and the prices escalated with demand. An American journalist observed prosperous First Nation people buying toys at a Dawson store.<sup>600</sup>

The sale of meat and fish was an important source of income for local First Nation hunters.<sup>601</sup> Journalist Tappan Adney recounted a story where the agent of the Alaska Commercial Company told three Hän leaders that the store would no longer grubstake trappers but would exchange store goods for moose meat.<sup>602</sup> The Hän must have taken this direction to heart, as Bishop Bompas commented: "The Indians now place such high prices on any meat or fuel, or other things which they supply to the whites ... it is hard for your missionaries to live with economy among them."<sup>603</sup>

Working for wages was not always easy in a social sense. In May 1901, Chief Isaac and 17 other men from Moosehide signed on to the sternwheeler *Louise* for a downriver trip. Some drunken deckhands objected to their presence at meals and apparently started throwing crockery.<sup>604</sup> In June 1901, Chief Isaac complained that when outsiders first came into the country, the First Nation shared their food, and now that game was scarce in the country and First Nation people needed jobs, the "white man" had forgotten how they were helped.<sup>605</sup>

The Tr'ondëk Hwëch'in had some difficulties in finding jobs, and white hunters impacted the hunt for game. Chief Isaac's solution was that every non-Indigenous man who shot game should give the First Nation \$10.<sup>606</sup> The *Klondike Nugget* newspaper commented that the Peel River people living at Moosehide reported plenty of game on the Dawson side of the Ogilvie Mountains, but Chief Isaac's people must have been in serious immediate need. In early July, the local agent for the Northern Commercial Company gave Chief Isaac and 25 of his people the use of a waterfront warehouse so they could hold an exhibition dance and charge an admission fee of 50 cents.<sup>607</sup> In October 1901, Chief Isaac returned to the newspaper with a different solution to the problem of overhunting. He suggested that non-Indigenous people should not be allowed to hunt until New Year's; and, before that, First Nation hunters alone should be allowed to hunt after the close of Yukon River navigation. His main reason for talking to the newspaper was to say that handmade mittens, caps, and arrows were for sale at Moosehide, and if the white men bought them then the First Nation people would have money to buy sugar, tea, and flour.<sup>608</sup>

Chief Isaac often commented on the skills of his people and their need to be part of the wage economy, although sometimes his comments were tongue-in-cheek. In 1906, during a long drought, nine of the larger mining companies, mostly hydraulic, persuaded the territorial government to hire a professional rainmaker for \$10,000. Chief Isaac claimed Hatfield, the rainmaker, failed because of the

power of the First Nation's four medicine men. He said they would stop the rain until Hatfield was dismissed and then his medicine men could produce "oceans of rain" for just \$5,000.<sup>609</sup> When it finally rained, Chief Isaac told a *Dawson Daily News* reporter that Moosehide medicine men were responsible, and that the government should pay him \$700 for "making the clouds weep."<sup>610</sup>

Chief Isaac did stake four placer claims, but he was not a successful miner.<sup>611</sup> It is more likely that he was protecting his cabins and subsistence harvesting sites. Between 1904 and 1919, Chief Isaac staked claims on Moosehide Creek, on Cary Creek just below the mouth of the Fortymile River, on the South Fork of the Sixtymile River and on Pine Creek, a tributary of Matson Creek in the Sixtymile district.<sup>612</sup>

Chief Isaac's brothers, Jonathon Wood and Walter Benjamin, worked for the Northern Commercial Company as dog drivers and guides.<sup>613</sup> During and after the Gold Rush, the Hän worked many different jobs related to the Yukon River sternwheelers, one of which was as pilots on the upper Yukon River.<sup>614</sup> Although wage-earning jobs were available, the Hän were not totally reliant on them. Percy Henry commented in 1999 that "When I was young ... if I want money, or if I start to get hungry, I hitch up my dogs and go out in the bush, and there's lots to eat there. Or I can pick up my Swede saw and axe, go out there and cut wood. Money right there. That's how simple it is."<sup>615</sup> Cutting firewood for the sternwheelers was a major source of wages for the Hän. Willie Juneby, a fluent speaker of Hän, spent his working life as a trapper, freighter, wood cutter, and miner. As a woodcutter he drove a Caterpillar tractor to haul wood down to the riverbank at a wood camp near Sheep Creek, Alaska. Caterpillar tractors were a new machine in 1937, and First Nation people came from Dawson to watch Juneby work.<sup>616</sup>

Many First Nation men worked and continue to work in the mining industry. Willie Juneby started working on Ernest Patty's dredge at Coal Creek, Alaska, in 1938, stayed there with his family every summer through 1942, and then moved to another dredge camp on Woodchopper Creek. The Alaskan dredges shut down during World War II, but after the war Juneby went back to work on the dredge at Coal Creek until 1952.<sup>617</sup> Archie Roberts, born at Moosehide, worked for some years on the Klondike dredges.<sup>618</sup> Willie deWolfe had many jobs over his lifetime, and one was as a deckman on the Klondike dredges. The dredges had four men on a shift: a winchman, an oiler, and two deckmen – one on the bow and one at the stern. Willie's job was at the stern, where he watched for trouble on the stacker belt where the tailings left the dredge. Willie is most famous for his discovery of asbestos on Cassiar and Clinton creeks. He sold his shares to Consolidated West for \$10,000.<sup>619</sup> Percy DeWolfe Jr. worked for YCGC on the Klondike dredges in the 1930s.<sup>620</sup> Frank Blanchard moved from Fort Selkirk on the Yukon River and cut wood for the City of Dawson until he was hired by YCGC as a handyman to maintain the city's sewer and power lines.<sup>621</sup>

J.J. Van Bibber and Johnny Olsen were new miners in the late 1950s when they set up on a tributary of the McQuesten River. Previous miners at the site suffered from a lack of water, and their dam provided water for only about five hours of sluicing per day. Van Bibber set up an innovative return system so they could reuse the water, but the claim did not pan out with any profit. The gold was stuck in the clay, and the miners did not have the money to buy the proper equipment to mine the ground. He moved on to work for other miners, including Territorial Placers, where he learned the proper techniques and quickly became the working foreman, letting the foreman know what was happening on the ground. In the late 1980s, Van Bibber returned to mining, and he and his family very successfully worked claims on Clear Creek in the Mayo Mining District. By the 1970s, he was working as a mining consultant, teaching new miners how to strip, set up sluice boxes, and make money.<sup>622</sup>

### 3.2) Placer mining techniques that have marked the landscape

The Klondike, Bonanza, and Bear Creek valleys have been radically altered through the process of placer mining. Early placer-mining operations removed vegetation and topsoil, redistributed the underlying gravels, and diverted and released fine sediments into natural watercourses.<sup>623</sup> Mining removes any existing permafrost, which increases the soil temperature. In ideal conditions, warmer soil allows for more rapid plant growth, so a reclaimed valley might initially have a variety of wetland plants, willow and alder thickets, shrubs, and berries and grasses. Permafrost will return within 10 years where fines are replaced with coarse tailings, and black spruce will end the story of forest regeneration.<sup>624</sup>

Early hand-mining techniques were not environmentally destructive on an individual basis, but the Klondike Gold Rush brought in thousands of miners who spread over the area digging holes and creating gravel dumps. The cumulative effect was dramatic and long lasting if rather benign. If the paystreak was good, more invasive techniques were employed. Ground sluicing washed huge amounts of earth and gravel into the watercourses and away from their original location. Open cuts removed vegetation and employed ditches and flumes to relocate water courses.

Trees were cut to provide fuel or building materials. In 1898, the largest timber was at the bottom of the Klondike Valley. The white spruce at the mouth of Bonanza Creek was a forest of tall trees 14 to 18 inches in diameter. There was “excellent timber” extending up the sides of the hills for several hundred feet above the level of the Yukon River.<sup>625</sup> There was a serious demand for firewood from miners who were winter mining by thawing down to bedrock. Once the gravel and the gold deposits were reached, the miners thawed drifts, again using wood fires. About a quarter cord of wood was required to thaw a cubic yard of overburden or gravel.<sup>626</sup> Steam thawing replaced wood thawing about 1902, but pressure on the wood supply remained, as the steam boilers were wood fired. Logging scarred the landscape in the upper valley slopes, and the loggers used gravity to send the trees down the hills in prepared slides.

Hydraulic mines in western North America were big users of mercury. The water cannons directed a slurry of the gold-bearing gravels through sluices and bedrock drains. Mercury was added to the sluice runs where fine gold flakes combined with the mercury to form a heavy amalgam, which would remain in the sluice run to improve the gold recovery rate. Loss of mercury in California operations using this method was 10 to 30 percent per year.<sup>627</sup> There are no figures for the Klondike but, since the techniques used were the same, the figure is likely comparable. When the YCGC gold room was vacuumed in 1979, about a cup of mercury was recovered.<sup>628</sup>

Dredges were the largest source of sediments deposited into the rivers and streams by 61 years of Yukon placer-mining operations from 1906 to 1966.<sup>629</sup> They moved along the valley floor, generally following the paystreak over a number of spring, summer, and fall seasons. Dredges put the fine materials under a windrowed layer of gravel, so the tailings lost their ability to retain moisture or support vegetation for many years. They can work in a pond of their own creation, so the release of sediments into the watercourse is not a problem. Dredges that work in the rivers can affect the water course. The large historic dredges were electric and required a power plant and power lines to various places in the goldfields. A system of roads was needed to connect labour and supplies to the mine sites.

In 1933, YCGC dredge Canadian No. 2 was working its way upstream from Bear Creek in the central part of the Klondike Valley. It was digging small islands of virgin ground left among the tailings of the old smaller dredges. The company was planning to prove and thaw ground on the left limit of the valley below Bear Creek for this dredge. The regular thawing plant was too expensive an operation for this project, so a large part of the Klondike River was diverted and a canal dug to divert the water from the river below Bear Creek.<sup>630</sup> The diversion of the Klondike River had a huge, if brief, effect on the Klondike valley habitat. Salmon and grayling continue to thrive in the river, and the valley is known for its strong population of rabbits and lynx.

Cat-mining operations starting in the 1960s and 1970s were highly mechanized and involved the building of roads and fuel storage areas. Claim owners set up camps and needed large buildings for

machine maintenance and the storage of parts and equipment. The overburden was stripped and piled to the side, and the size of the material dumps depended on the depth of the muck and the mechanical ability of the machines. Mines increased in size as the equipment grew larger, but that was countered by environmental regulations that required more elaborate settling ponds and safeguarding against spills from fuel storage tanks. The equipment used in cat mining is very efficient at building roads, and placer miners are allowed to move public roads if they replace them with equal-quality routes. The miners' road compared favourably with government roads, as the miners had a wealth of gravel on which to draw. Mining roads inside grouped claims are preferably placed on permafrost-free south-facing slopes and generally avoid sensitive wetlands.

### **3.3) The evolution of Klondike placer mining as illustrated by examples in Tr'ondëk-Klondike**

The evolution of Klondike placer mining is found in the remains of equipment, machinery, and changes to the landscape.

Much of the equipment used in hand mining was small and mobile, and it included picks, shovels, wheel barrows, and gold pans. These objects and remnants can still be found discarded on the land. Wooden sluice boxes were often burned to recover whatever gold was hidden in the cracks, so there are almost certainly none left. Windlasses were often used until they broke and so are usually in pieces when they can be found. Modern miners find hand-mined drifts and large excavated rooms in the permafrost. Hand-dug, wood-lined shafts were sometimes more than 20 feet high and are often saved by today's miners when they are able to excavate them. Sometimes the evidence of past mining is that no gold can be recovered by modern miners, as a result of the efficiency of those who mined first. Horses were used by the early miners, and horse-drawn scoops called slip scrapers were used to remove the overburden. Some of these can still be found in artifact collections held by Parks Canada and the local museum, and in the junk piles of modern miners. Metal objects are most commonly kept. Horses also pulled stone boats filled with waste rock or tailings, and these can sometimes be found abandoned after a change in technology.

Klondike miners started using steam-assisted machinery as soon as they could afford it. The more portable porcupine boilers were used, as were horizontal tube boilers. Both types are commonly found abandoned on mines in the Tr'ondëk-Klondike. Steam points of various sizes and manufacture are in the Parks Canada collection at Bear Creek. There is a story that Clarence Berry made the first steam point from a rifle barrel. Later steam points could be purchased from stores such as the Klondike Thawing Machine Company in Dawson. Parts of steam engines are found throughout the Klondike goldfields. There are two at Discovery Claim and several on town properties in Dawson.

There is a private collection of mining equipment at Claim 33, a tourist gold-panning business on Bonanza Creek. An extensive collection that included a churn drill was moved to a private lot in the Klondike valley, after the sale of the Guggieville RV Park. This collection can still be viewed from the Klondike Highway. A small collection of machinery pieces is displayed, without interpretation, on a gravel platform by the Klondike highway opposite the Bonanza Creek Road.

Conveying water was a serious pastime for early miners. Tin cans, brought into the country at considerable effort and expense, were modified and re-used as water buckets. These are perhaps the most commonly found remains of early equipment. On a larger scale, the early miners dug ditches to bring water from higher creeks, and evidence of these ditches remain on the Bonanza valley slopes and along the historic Aklen Ditch. The Adams Creek Dam is an impressive example of a quarried rock dam from this early era. Alex McDonald abandoned his scheme to supply water to Bonanza Creek miners, and his giant pump has been excavated and is in the Parks Canada compound at Bear Creek.

Corporate hydraulic mining began with the construction of the Yukon Ditch, and pieces of it can be found throughout Tr'ondëk–Klondike. Water was brought from the Little Twelvemile and Tombstone rivers in the Ogilvie Mountains by ditch, flume, and pipe. A Yukon Ditch bridge and sections of pipe are extant at Bear Creek. There is a scar still faintly evident on the east-side slope of the Klondike valley where a pipe burst, washing out soil and uprooting trees. A scar on the west slope marks the path of the syphon pipe as it climbed out of the valley. The ditch is still visible along the bench southwest of Bear Creek. It crosses the Ridge Road Heritage Trail to an extant pressure box and gate with a diversion to Trail Gulch.

The strongest evidence of hydraulic mining is the carved hills at Lovett Gulch that can be seen from the Bonanza Creek Road. The evidence of hydraulic mining can also be seen at Gold Hill, Fox Gulch, American Hill, and Monte Cristo Hill. The Bonanza Creek Dam was complete by 1907 and stored water for use by hydraulic operations on the bench gravels of Bonanza Creek. These mines would otherwise cease sluicing operations in the dry months of June, July, and August. Most of the dam washed away in 1960, but the sides can be seen from a viewpoint on the Upper Bonanza Road.

The dredging era left the most impressive remains. Small buckets from a Lubecker dredge are used as markers for the hills and gulches along Bonanza Creek Road. Joe Boyle's Canadian Klondyke Mining Company Ltd. dredges are represented by the restored Dredge No. 4 and dredge remains at Bear Creek and Quigley Creek. The Bear Creek dredge remains are in a tailing pond near the Klondike Highway. These dredges were used by YCGC and fitted with more modern parts. Dredge No. 4 is a National Historic Site of Canada and remains in place in the Bonanza Creek valley. The most dramatic evidence of the dredge era is the tailings piles and ponds that fill the lower Klondike Valley. Dredge tailings from a smaller Yukon Gold dredge remain intact at Discovery Claim.

Machinery from the early days of tracked and rubber-tire machinery mining can be seen from the Bonanza Creek Road. The early bulldozers used an overhead cable to lift the blade. Old metal sluices of very simple designs were also abandoned for complex washing plants with screens and tables and several sluice runs. The older equipment remains on the land, and modern miners still find them useful for parts.

### 3.4) Tr'ondëk–Klondike Placer Mining Key Representative Evidence

#### **The named gulches and creeks along Bonanza Creek**

The Klondike Gold Rush redrew the map of the Tr'ondëk–Klondike region. Rabbit or Scarf Creek, depending on the translation, was transformed into Bonanza Creek, indicating a change in thinking about important resources. The First Nation named locations from incidents that occurred there, or the type of plant or animal that could commonly be found in the area. The gold miners named creeks, gulches and hills for themselves or the likelihood of finding gold, or as a reference to their cultural heritage. Klondike is the sole name that did not change, being an anglicized version of Tr'ondëk, referring to the stones that the First Nation people used to pound in stakes for their fish traps. The map names of the area were based on the original surveys of William Ogilvie, who made common names official. Some names refer to gold prospects: Bonanza, Eldorado, Gold Hill, Big Skookum, and Ready Bullion are examples. Some names refer to the culture or background of the predominant group of miners: American Hill, Jew Hill, and Victoria Gulch are examples. Some names refer to the gamble of placer mining: Monte Christo and Magnet are examples. Boulder Creek refers to the terrain and challenges to mining. O'Neil, Lovett, and Adams refer to the first person who staked the creek. Being an early discoverer had a special cachet in the stories told about the region. The system of claim numbers dates from the first claim that was staked on Bonanza Creek.

The following is a list of representative sites documented in the Yukon Historic Sites Inventory held by the Yukon Government, Historic Sites Unit. The sites are described in more detail in Appendix A.

**Early mining eras:**

Representing a gold-rush community, Grand Forks 1898  
Three Above Discovery Cabin – YHSI No.115O/14/072

Representing Yukon’s first gold-rush town:  
Forty Mile townsite – YHSI Site No. 116C/07/003 to 017

Representing early mining dwellings on Eldorado Creek:  
Stone fireplace on Eldorado – YHSI No. 115O/14/091

Representing light industrial mining period of 1900 era:  
Five Below Bonanza boiler – YHSI No. 115O/14/069

Representing early steal equipment (circa 1900 boiler house, shaft, and windlass):  
California Gulch – YHSI No. 116B/03/549 and YHSI No. 116B/03/584

Representing open-cut placer mining (on a bench):  
Spring Gulch cabin and shed near diggings – YHSI No. 115O/14/078

Representing drift and shafts:  
O’Neil Gulch – YHSI No. 115O/14/084

Representing gold-rush era cabin:  
Bonanza Shed and Worksop – YHSI Nos. 115O/14/137 and 138

Representing water management before Yukon Gold Company:  
Adams Dam – YHSI No. 115O/14/063

Representing mining machinery of various ages:  
Claim 33 – YHSI No. 115O/14/054

Representing the early use of steam-assisted mining:  
Adams Steam Shovel – YHSI No. 115O/14/065

**Hydraulic mining:**

Representing hydraulic mining flumes:  
Acklen Mine Site – YHSI No. 116B/03/566  
The scar where the flume crossed Moosehide Slide is visible from Dawson.

Representing support for hydraulic operations:  
Administration: Coffey’s Office – YHSI No. 115O/14/012  
Supervision: Lovett Gulch Cabin – YHSI Sites – No. 116B/03/585  
Engineering: Bridge and Pipe at Bear Creek YHSI No. 116B/03/487

Ditch: Watchman Cabin and Pressure Box at Trail Gulch on Ridge Road Heritage Trail – No. 116B/03/518  
Camp: Adams Hill Cabins – YHSI No. 115O/14/067

Representing effects of hydraulic mining:  
Trail Gulch Intake Sites – YHSI No. 116B/03/518 to 520 and contoured hills at Trail Gulch

Representing bedrock drains:  
Orofino Hill – YHSI No. 115O/14/058

Representing Yukon Gold water management:  
Bonanza Dam – no YHSI number; built in 1906  
Gauvin Gulch – Bonanza Dam Ditch Sites – YHSI No. 115O/14/080

**Dredging:**

Representing a large dredge at peak of technology:  
Dredge No. 4

Representing support for Klondike dredge construction and repair:  
Bear Creek Compound – YHSI No. 116B/03/484

Representing thawing operations or transportation: tractor used to haul wood for thawing plants:  
Dunbar Tractor – YHSI No. 116B/03/490

Representing the electrical grid for the dredges:  
Queen Gulch Transformers – YHSI No. 115O/14/057

Representing dredge master's houses:  
Mosquito Gulch – YHSI No. 115O/14/053

Representing tailings from a smaller dredge:  
Discovery Claim – YHSI No. 115O/14/107

**Gold field infrastructure:**

Representing roadhouses:  
Calder Summit Roadhouse – YHSI No. 115O/14/101

Representing the Klondike Mines Railway:  
Boxcar – YHSI No. 115O/14/106  
Boxcar – YHSI No. 115O/14/089

**Hardrock mining:**

Representing mining head frame:  
Ophir Headframe – YHSI No. 115O/14/102

Representing hardrock stamp mills:

Lone Star Stamp Mill – YHSI No. 1150/14/086

## 4: Gaps in Research

- There are few examples of hand-dug shafts inside the boundary, but interviews with current miners might locate them.
- The wooden dam at Boulder Creek and Gretchen Bench workings were 1904 Tyrrell mines; these areas could be investigated.
- 44 Gulch and upper Lovett Gulch might contain some representative evidence.
- Information about the dam on French Gulch was difficult to find, and more research could be done in this area.

## 5: Recommendations

- Adams Dam is an impressive example of water management and should be an asset inside the Tr'ondëk-Klondike boundary.
- Extending the boundary up the Yukon Ditch would include some very interesting sites, protect some heritage values, and offer the possibility of summer-use and winter-use trails.
- Extend the buffer in the Fortymile area to include Bruin and Marten Creek.

## 6: Glossary

**Adit:** A horizontal shaft driven in from the side of a hill.

**Bar mining and skim digging:** The act of recovering fine gold from the gravel bars of creeks and rivers.

**Below/Above:** Terms that indicate where a claim is located in relation to Discovery Claim, which would be surrounded by No.1 Above and No.1 Below. A claim with no “below” or “above” indicator generally means that Discovery Claim is at the mouth of the creek, and the claim numbers ascend from there.

**Bench claim:** A claim higher than a creek claim. There can be first-, second-, and third-tier bench claims in a wide creek.

**Black sand:** A magnetic mixture of fine sand particles that is removed by using a magnet during the process of cleaning the gold concentrate for smelting.

**Boiler:** A device for delivering steam power. A riveted sheet steel exterior covers a firebox with a chimney and steel water tubes. Types include horizontal (locomotive type) or a porcupine arrangement of water tubes.

**Boulder clay:** Glacial till containing sticky clay that can carry gold out of a sluice box.

**Bulldozer:** A gasoline or diesel-powered machine where the engine turned steel tracks in order to move. The early ones had no blades in front and only towed implements. The later ones had blades lifted by cables and a winch at the back. Modern bulldozers use hydraulic oil to operate the blade.

**Claim jumping:** If a miner working a piece of ground has not officially staked a claim to it, the mining ground is considered open, and another miner can “jump” the working miner’s claim by staking his/her own claim to it. Claim jumping was unknown in the Yukon drainage until the Klondike Gold Rush.

**Clast or clastic rock:** Geological term for a rock fragment or grain broken off from larger rocks through physical weathering. Placer deposits are formed of clasts: clastic rocks and particles.

**Coarse gold:** Pieces of gold that show no or little effects of erosion and can include nuggets and pieces of quartz with embedded gold.

**Derrick:** Heavy wood-framed timbers built in a tower used in a placer mining open cut to lift heavy pieces of mining equipment, hold up a self-dump system, or to hoist boulders.

**Diggings:** Casual term for an area of placer mining.

**Dredge:** Mining dredges were built like boats, digging gravel in the ponds that allowed them to float, and moving across the area to be mined. The floating dredge most commonly operated in the north was the bucket-line dredge. This type of dredge used a continuous line of buckets (called the digging ladder) to scrape the bottom and edge of the pond. The buckets carried the mud and rock to a screening area, where the heavier metal particles were separated from the rest of the material. After the gold was captured, the waste rock, or tailings, would be deposited out the back of the dredge.

**Drift:** Horizontal tunnel used for mineral exploration or mining, sometimes cribbed with wood timbers.

**Drifting:** Digging a tunnel along the paystreak.

**Dumps:** Collection of pay gravel brought to the surface in preparation for sluicing.

**Elevator:** Stationary washing plant with a conveyor belt and buckets to lift pay dirt up to a sluice box.

**Fine gold:** Small thin flakes and dust.

**Flume:** Three-sided open-top wooden box built on pilings or scaffolding (called trestle bents), used to convey water.

**Gold:** Gold does not occur naturally in a pure form. The most common impurity in Klondike gold is silver. It is common for Klondike miners to say they can recognize the creek origin of recovered coarse gold from the district.

**Grade:** Purity of gold. During the Klondike Gold Rush, high grade was about \$17.75 per ounce. Low grade was less than \$15.00 per ounce.

**Ground sluicing:** Using water to move ground into a sluice run. The water could be a redirected watercourse, or contained water directed by a monitor.

**Grubstake:** Grub is slang for food, and a grubstake was an amount of money that could buy necessities for life and occupation. The person could create a grubstake for a particular endeavour through his/her own activities. If a person was given a grubstake, the person giving it would claim some return in repayment and/or a claim on the mineral property.

**Gulch:** A small stream that comes into the main stream.

**Hydraulicking:** Using high pressure water to move ground, including overburden and gravels.

**Lay:** A miner could work another person's claim for a portion of the profit.

**Lode discoveries:** Hardrock veins.

**Minable gold:** Gold in quantities or in purity, that made it economically feasible to work.

**Miner's inch:** For practical purposes, a miner's inch is equivalent to 1.5 cubic feet of water per minute. One cubic foot per second equals 40 miner's inches.<sup>631</sup> It was a measurement first used in California in 1848 to calculate the flow of water over a defined period of time. It was defined by California law as the flow of water through a one-inch hole in a board in a 24-hour period with the top of the supply water being six inches above the hole. A sluice head of 50 miner's inches of water was considered a necessary amount of water to use in sluicing. Early Klondike miners paid as much as \$4 per sluice head per hour.<sup>632</sup>

**Mining District:** Legally defined area under the administration of a Mining Recorder's office.

**Monitor:** A water gun that sends out streams of water at a tremendous pressure.

**Muck:** Organic overburden.

**Open-cut mining:** Where gold-bearing gravel is found close to the surface, it is possible to hand mine by opening up a pit and shovelling the gravel into a sluice run. The modern-track and rubber-tire machinery mining is commonly done in a cut.

**Pan:** Metal pan with 30° angled sides used to separate gold flakes from gravel.

**Pan out:** The last stage in separating gold from gravel using a gold pan. The descriptive phrase, "panning out well," became part of normal conversation to indicate that after a period of turbulent activity, a person was left with something of benefit.

**Pay dirt:** Ground that contains an economically feasible amount of gold, either undisturbed in the ground or collected by the miner in preparation for sluicing.

**Pay gravel:** An economically feasible layer of gravel. In a typical unglaciated creek, the head might have exposed bedrock or bedrock with a thin coating of debris and moss. The thickness of gravel increases

from a few feet to up to 100 or more in places near the mouth. The gravels are a combination of flat fragments of schist, quartz, and boulders eroded from the bedrock outcroppings along the sides of the creek valley. The degree of sorting between fine and coarse material depends on the volume and speed of the water over the time of erosion. Steeper creeks have coarser gold. The thicker gravels usually have the same consistency from top to bottom, and they lie under a layer of organic material. The gold is always found at the bottom of the gravels of whatever thickness. This pay gravel can be thin and is not often deeper than three to four feet thick. The upper layer of the bedrock schist is often richer than the pay dirt.

**Paystreak:** The course of pay gravels laid down along the path of an ancient stream bed. The paystreak usually wanders as the river course would have. The amount of gold is not consistent, as the uneven bed of the ancient stream would vary in roughness and stream strength, which would affected its ability to collect fine and coarse gold. Channels of pay dirt can differ from the course of the present drainage, due to the natural wanderings of the creek over time or because a landslide has forced a repositioning.

**Placer gold deposit:** Stream bed (alluvial) deposits. Placer gold forms when an existing gold source is broken down and eroded into concentrations of material at some distance from its source.

**Placer mining:** The mining of placer deposits. Klondike placer mining techniques include sinking shafts and drifting tunnels, hydraulicking, dredging, and cat mining.

**Porphyry:** A volcanic rock of large crystals and fine-grained glossy background indicating two stages of solidification. Porphyritic texture is common in dikes and lava. Quartz-porphyry contains large quartz crystals.

**Portal:** Entrance to an adit.

**Prospect:** A potential mine site.

**Prospect holes:** Holes dug to bedrock to check on the existence of gold-bearing gravels. In the days of hand mining, a shaft would be dug by hand. After the Klondike Gold Rush, a prospect hole might be dug by a churn drill.

**Prospects:** The estimation of a prospected area's potential.

**Pup:** A pup is a short steep ravine that runs from the hills into larger, well-marked valleys. The term originated in 1893 in the Sixtymile goldfields.

**Quartz claim:** Hardrock claim.

**Riffle:** An obstruction in a sluice run that causes turbulence and creates an opportunity for gold to drop out of a stream of gravel and water slurry.

**Rocker box:** The most basic and early washing plant that is essentially the design for all later and more complicated plants. A cradled box was loaded with gravel at the top. Added water and a shaking motion

caused the gravel to descend through a series of slanted trays where the gold was caught on riffles. “Rocking the ground” refers to this method of gold recovery.

**Self-dump:** A Klondike-designed system of moving pay dirt or tailings. A metal bucket is hoisted by a steam engine and cable up a mining shaft and is carried by means of an overhead cable directly to a dump pile or a sluice box, where an automatic tripping device opens the bucket and dumps the dirt. The “Dawson Carrier Dump” was developed, manufactured, and sold in Dawson. It was the most economical method of moving material and capable of working in very cold temperatures.

**Shaft:** A vertical tunnel used for mineral exploration and mining, often cribbed with wood timbers.

**Schist:** A medium-grade metamorphic rock formed by the high temperature and pressure metamorphosis of mudstone or shale. It has sheet-like grains in roughly parallel orientation, and the base mineral is often interleaved with quartz and feldspar.

**Slip scraper or Fresno:** Horse-drawn metal bucket with two wooden shafts used to move overburden, tailings, and gravel in the mining area.

**Sluice head:** Usually considered the amount of water needed to properly carry all the gravel that six to eight men can shovel into a 12-inch sluice box with a grade of 6 inches over 12 feet. A sluice head ranges from 30 to 100 miner’s inches.

**Sluice run:** A flume with riffles to cause vortices in the water, which allows gold to drop out of the gravel.

**Stake (noun):** A post marking the legal limits of a claim. Historically, it needed to be at least four feet off the ground and flattened on two sides to allow a surface of at least four inches across the face. Any stump or tree can be flattened for this purpose.

**Stake (verb):** The act of marking the extent of a claim by installing marked posts at the perimeter, followed by applying for and paying for a document that gives the staker rights to mine the ground.

**Staking rush:** A confirmed discovery of gold encouraged people to stake untested ground in the vicinity.

**Stampede:** A rush of people to a rumoured or real new discovery of gold.

**Steam engine:** Single or double metal pistons in metal cylinders moving a connecting rod and powered by a steam boiler. The connecting rod could operate a machine such as a winch or water pump.

**Steam shovel / draglines:** A machine, powered by steam or gasoline, with a cable-operated digging system and wooden housing covering the machinery. A metal derrick carries the cable to a digging bucket.

**Steam point:** Pointed steel pipe, driven into the frozen ground to deliver steam into permafrost for the purpose of thawing the ground.

**Steam line:** Usually rubber high-pressure hose with metal connectors to transfer steam from a boiler to a steam engine or a steam point.

**Steam scraper:** A sheet metal bucket that is attached to a long length of cable and a winch. It drags dirt towards the winch; pulleys can be added to change the direction.

**Strike:** The discovery of economically profitable gold.

**Tailings:** Refuse from any form of mining.

**Trommel:** A trommel screen is a perforated cylindrical metal drum mounted at an angle down from the feed end. The trommel physically separates material by size according to the holes in the drum. The trommels mounted in Yukon dredges weighed several tons.

**Veins:** Ore bodies found in unwanted rock or minerals. Fissure veins are formed when ore fills a fissure in the bedrock. Ladder veins are short fractures filled with ore that traverse dikes of igneous rock. Ladder veins are not as important as fissure veins.

**Volcanic ash:** Fragments of rock, minerals, and volcanic glass smaller than 2 mm created during explosive volcanic eruptions.

**Water pump:** Steam- or gasoline-operated centrifugal or piston type pump, used to move water from a stream or reservoir to a mining operation. Worthington and Pulseometer are some common Klondike brand names.

**Water wheel:** Wooden or metal paddles built in a wheel shape, with an axle in the centre to turn in a current of water in order to rotate a mining machine; often a winch, water pump, or electric generator. Pelton is a common brand name. Pelton wheels produced a greatly concentrated stream of water.

**Winch:** Cable attached to rotating drum that hoists buckets from a shaft or pulls a digging bucket.

**Windlass:** A wooden pole about two metres long with a crank handle on one end. It rested on a wooden framework over a shaft and was used to hoist wooden ore buckets by means of a rope tied to the bucket and wrapped around the pole.

**Windlass Bucket:** Usually a square wooden bucket with a flat bottom, but could be any container used to hoist dirt from the shaft by means of a windlass.

**Washing gravel:** Part of the process of recovering gold.

## Endnotes

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<sup>20</sup> R. L. Debicki, ed., *Yukon Mineral Industry 1941 to 1959* (Ottawa: Indian and Northern Affairs Canada, 1983), 16.

<sup>21</sup> W. R. Bacon, Lode Gold Deposits In Western Canada, *CIM Bulletin*, July 1987, 96–103: 96.

<sup>22</sup> Debicki, ed., *Yukon Mineral Industry 1941 to 1959*, 1.

<sup>23</sup> Ibid.

<sup>23</sup> LeBarge, Placer geology and prospective exploration targets of Sixtymile River area, 158.

<sup>24</sup> R.G. McConnell, Exploration of Tintina Valley from the Klondike to Stewart River (1900), in H.S. Bostock, ed., *Yukon Territory: Selected Field Reports of the Geological Survey of Canada 1898 to 1933* (Ottawa: Department of Energy Mines and Resources, 1957), 29.

<sup>25</sup> Spurr, *Geology of the Yukon Gold District*, 108–109.

<sup>26</sup> Francois Xavier Mercier, *Recollections of the Youkon*. Memoires from the Years 1868–1885 (Alaska Historical Society, Anchorage, 1986), 32–33, 35.

<sup>27</sup> Spurr, *Geology of the Yukon Gold District*, 112.

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<sup>28</sup> Spurr, *Geology of the Yukon Gold District*, 115.

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## Appendix A:

### Yukon Historic Sites Inventory: Sites within the Tr'ondëk–Klondike Proposed Boundary

#### KLONDIKE RIVER VALLEY (going upstream)

**Red Devil Dredge** (YHSI No. 116B/03/489): Archaeological site. The dredge was the only sluice dredge in the Klondike and was brought into the country by Colonel Williams for the Bonanza Basin Gold Dredging Company in 1906. It was an Allis Chalmers dredge of 750 cubic foot capacity with 6.5 cubic foot buckets. The machine was initially a steam-operated dredge with a side discharge but was later modified to electricity with a conventional tailings stacker. Despite many changes, it proved incapable of handling the ground effectively and was operated intermittently until the 1909 season. It was painted red. Demolished.

**Acklen Mine Sites** (YHSI Nos. 116B/03/566 to 568): Sites include a hydraulic mine, a flume, a ditch, and a reservoir. Construction on the flume was started by the Acklen family to provide water for their hydraulic operation on Thomas Gulch. They had water rights to Moosehide Creek. They sold the water rights to the Yukon Gold Company, which constructed the flume and put it into operation by 1907. The water was carried from Moosehide Creek to a reservoir above the mine site. The reservoir is in the Dawson Dome subdivision and has been partially covered by the building of the subdivision. The hydraulic tailings are still visible from the Klondike Highway. The excavated path for the flume crosses Moosehide Slide and is still visible.

**Dredge No. 2** (YHSI No. 116B/03/482): This dredge was manufactured by the Marion Steam Shovel Company. 15-cubic-foot buckets were modified to 16 shortly after building. It was built in 1910 near Bear Creek and operated in the Klondike River valley until 1942. Formerly Canadian No. 2. Designated Yukon Consolidated Gold Company (YCGC) No. 2 in 1935. From 1910 until 1942, it dredged 48,855,800 cubic yards of gravel and recovered \$5,135,793 in gold. The dredge was salvaged for usable parts by YCGC for the other dredges it operated. This dredge is sinking into its pond, the superstructure has collapsed, and the digging ladder and stacker have been removed and are close by.

**Quigley Gulch Sites** (YHSI No. 116B/03/521): Three kilometres upstream on Quigley Creek. Yukon Ditch site consisting of a pressure box, and a ditch and a diversion, constructed in 1906. Collapsed.

**Dredge No. 3** (YHSI No. 116B/03/483): YCGC No. 3 was manufactured by the Marion Steam Shovel Company. It has 16-cubic-foot buckets and was built near the mouth of the Klondike River in 1912–13. It operated from 1913 to 1917 and from 1929 to 1952. It was formerly Canadian No. 3 and was designated YCGC No. 3 in 1935. This dredge has been pulled apart and is overgrown with willows. The hull is buried; the deck is removed; the fly wheel is gone; the pumps, sluice runs, boilers, stacker, and bucket ladder have been removed and are stored nearby; and the spuds and buckets are missing.

**Bear Creek Compound** (YHSI No. 116B/03/484): The headquarters containing the offices, bunkhouses, and workshops of the Canadian Klondike Mining Company and later the Yukon Consolidated Gold Corporation. This compound was used from 1900 until 1966. To name a few important artifacts, the compound contains Alex McDonald's pump, an electric shovel, and a spare dredge spud. The collection stored at Bear Creek includes two blacksmith shops (one from Northern Canada Power Commission and the other from the Yukon Consolidated Gold Company) complete with tools, plus a self-dump bucket and steam points. Sections of the Yukon Ditch pipeline are also found here.

**Klondike River Syphon Crossing** (YHSI No. 116B/03/487) and **Klondike Syphon Intake Sites** (YHSI No. 116B/03/523 to 533): The bridge and syphon were built in 1907 and 1908 as part of the Yukon Ditch water system, transporting 55,000 gallons of water per minute across the Klondike valley. This water was brought from the mountains at the head of the Twelvemile River for mining purposes on Bonanza Creek and the adjacent hills. The inverted syphon across the Klondike valley was a total of 16,759 feet long, 2,389 feet of which were made from California redwood stave pipe, with the remaining 14,370 feet made of steel pipe that had to withstand a pressure of 500 p.s.i. It took 300 men two summers to install the bridge and syphon, driving the last rivet on Oct. 9, 1908. This enabled the Yukon Gold Company to turn 30,000 gallons per minute into the ditch in the spring of 1909, thus allowing them to hydraulic mine extensively on Crofton Hill and Lovett Hill on Bonanza. It was another year or two before the Bonanza extension of the ditch was finished and an additional 25,000 gallons of water was available for use on the hills as far away as Grand Forks and Gold Hill. Current condition: the bridge has begun to twist sideways because of the deterioration of the supporting bridge piers. The steel of the bridge is in good condition and exhibits only surface rust. There are sections of the metal syphon that are intact. There is another section of pipe extant, behind the Acetylene Plant, in the Bear Creek Compound. The central pipeline area was mined, and a section of the pipe is now near Yukon Ditch interpretive panels on the Klondike Highway. The upper Klondike syphon intake site is complete; the lower outlet on the north side has been salvaged and is missing.

### **BONANZA CREEK (going upstream)**

**Ninety Below Bonanza KMR Station** (YHSI No. 116B/03/534): The Klondike Mines Railway (KMR) was 32 miles long and operated between 1906 and 1914, from Dawson City to Sulphur Springs, hauling mostly freight and some passengers. The route of the railway crossed the Klondike River into Klondike City, where the locomotive service shed, coal bunkers, and sidings were, then up Bonanza Creek to Grand Forks, then via Carmacks Fork to Sulphur Springs. There were several stations or stops, water tanks, and trestles along the route. This site was a siding on a list of stations of the KMR and was possibly a dredge-construction site for a Yukon Gold Company Dredge. The railway would have dropped off construction material for it, and probably also firewood for the steam thawing of the ground in front of it. There is very little visible here except a midden, although the railway grade is discernible.

**Dunbar Tractor** (YHSI No. 116B/03/490): Steam tractor from 1910, with a locomotive-type boiler, that drove flexible tracks like a bulldozer. The machine was covered in a wood-framed housing. The tractor

was used to haul firewood for the steam-thawing plants by Yukon Gold Company. The tractor has been moved a few times and is sitting on its side.

**California Gulch Cabins** (YHSI Nos. 116B/03/549 and 116B/03/584): Construction dates from the early 1900s. They were operated during the 1930s as a hand-mining operation and in the late 1960s as a tourist gold-panning operation. One building was built as a boiler house. There is also a shaft that is caved in and two collapsed cabins.

**Lovett Gulch Cabin** (YHSI No. 116B/03/585): Standing log cabin and log-loading ramp on a high white channel bench. Lovett Gulch was a gold hydraulic mine, operated from 1906 to the 1930s by the Yukon Gold Company. The gold was washed from the hills using high-pressure monitors and water from the Yukon Ditch. There have been subsequent mining operations here since then, and this cabin is probably a residence built by a miner.

**Trail Gulch Intake Sites** (YHSI Nos. 116B/03/518 to 520): Yukon Ditch lunch room for maintenance workers, also a flume and spillway for diverting water to Trail Gulch. This was the first area to which the water of the ditch was diverted for hydraulic mining. The ditch was extended upstream on Bonanza Creek to Gold Hill during 1906 to 1909. The Ridge Road is 200 metres from the site. The structures are collapsed.

**Trail Hill Building** (YHSI No. 116B/03/550): Part of the Yukon Gold Company hydraulic mining operations that worked here from 1906 to 1935. The hydraulic mining was extensive here. This building was part of their offices or residences. The building has been moved and renovated.

**Claim 33** (YHSI No. 1150/14/054): This claim is on Bonanza Creek and is set up for a gold-panning operation. Mining machinery and Pete Pamuchina's log cabin are on display as a tourist attraction. The cabin was moved from the mouth of 49 Gulch claim #P6341 because of mining activity in the mid-1980s. The machinery is a good example of steam technology and contains artifacts from the Lone Star Mine, which includes milling equipment, air compressors, and vehicles that were used in the goldfields.

**Mosquito Gulch** (YHSI No. 1150/14/053): Large frame house on Bonanza Creek that was a Yukon Gold Company dredge master's house for Dredge No. 5, from circa 1920 to 1950, then used by Art Fry as a residence. This was also a railway station for KMR and a water tower. Buildings were constructed overtop of the railway sites.

**Coffey's Office** (YHSI No. 1150/14/012): This site is at Fox Gulch where the Yukon Ditch crosses Bonanza Creek. Found here is a log cabin with the roof collapsed, as well as a boiler and a large cast iron Y-pipe fitting. This building was George Coffey's office. Coffey was the Hydraulic Mining Superintendent for Yukon Gold Company. The office was part of a bigger camp including a cook shack, bunkhouses, blacksmith's shop, and various outbuildings that housed men who worked on the hydraulic mining and on the Yukon Ditch. The cabin was used from 1908 to 1930 by Yukon Gold Company and until recently as a miner's cabin.

**Orofino Hill** (YHSI No. 115O/14/058): This is a good example of large-scale hydraulic mining from 1908 to the 1930s, owned by Yukon Gold Company. There is an excavated tunnel here for maintaining the grade for a sluice box. There are also drains on the bench above. Posts are visible where the sluice box was, and punch plate and lengths of steel are visible in the runout immediately below the adit. Several stacks of riffles and steel are located below the road across from the adit. The drain continues below the road to Bonanza Creek.

**Queen Gulch Transformers** (YHSI No. 115O/14/057): These transformers were once in a shed close to Dredge No. 4. They were used by Yukon Gold Company or Yukon Consolidated Gold Company for power supply to the goldfields, dredges, etc. from 1906 to 1966. Surface rust.

**American Gulch Cabin** (YHSI No. 115O/14/060): Standing log cabin from the Gold Rush era, as well as an outside cooking oven on a high bench. Modern mining surrounds it.

**Dredge No. 4** (no YHSI number): Dredge No. 4 was constructed in 1912–13 by the Canadian Klondyke Mining Company to mine the gravels of the Klondike River valley. It was dismantled when paying gravels ran out in 1940. All of its major mechanical components were refurbished by the Yukon Consolidated Gold Corporation and encased in a new wooden hull and superstructure built on Bonanza Creek. From September 1941 to the fall of 1959, it mined Bonanza Creek. When the Bonanza Dam washed out in 1960, the dredge was turned sideways and sank. It has since been preserved as a national historic site and has been worked on considerably by Klondike National Historic Sites.

**Cheechako Hill** (YHSI No. 115O/14/070): There are stacked stones and collapsed flumes here, as well as two plank sheds from a hydraulic mine from 1910 to 1930 when this hill was being mined using hydraulic methods by Yukon Gold Company. These were outbuildings used by the workers. One building may have been a bath house or workshop. Buildings are standing.

**Five Below Cabin** (YHSI No. 115O/14/068): Standing log cabin from Gold Rush era. Surrounded by modern mining.

**Five Below Boiler** (YHSI No. 115O/14/069): A large steam-operated tramline operated here on the hillside, bringing pay dirt down from the hill to be washed in the creek. This boiler may have been used with Alex McDonald Pump to pump water to hydraulic mining operations on Adam Hill above in 1899. Alex McDonald Pump was later moved to Hunker Creek and is now located at Bear Creek. The boiler has only the pipes showing, and Bonanza Creek runs across it.

**Adams Creek Dam** (YHSI No. 115O/14/063): The dam site includes a stone dam, a reservoir, and a ditch related to hydraulic mining. The dam was built in 1904, at a cost of \$75,000, by the Matson and Doyle Concession lessees and was designed by Joseph Burr Tyrrell, a Dawson mining engineer. (Tyrrell is famous for the discovery of dinosaur bones at Drumheller, Alberta, and the museum there is named after him.) The dam drained an area between six and eight square miles, and had a capacity of fifty-eight million gallons. The water was channelled through a 24 x 30 inch flume three miles down the left limit of Adams Creek, and was used in a hydraulic operation between the mouths of Adams and Boulder creeks on the left limit of Bonanza Creek. The flume had a capacity of 1,000 miner's inches of water, and fed

three monitors, with 3, 4, and 5 inch nozzle diameters, on Adams Hill. Fitted stone is on the downstream side across Adams Creek valley. Outlet and gate are on the east side of the dam. Wooden cribbing inside is filled with dirt; stone was placed on the outside. The stone was hauled and cut from a quarry on the north side of the valley. A system of light mining-type railway and dump cars and many workers and flat cars was used to fill the dam and place the rock. It is washed out on one side.

**Adams Steam Shovel** (YHSI No. 1150/14/065): The steam shovel was used by the Boutilier brothers to keep the ditch in the Adams area clean of silt in the 1940s and 1950s. The manufacturer is Hendrie and Boltoff Mfg. and Supply Co. (Denver, Colorado), Patented May 18, 1897. The steam shovel is three kilometres from the dam, sitting in the ditch.

**Adams Hill Cabins** (YHSI No. 1150/14/067): These two standing buildings were constructed by the Yukon Gold Company during the operation of the Yukon Ditch from 1906 to 1933. They were used as housing and shops for the hydraulic monitoring of Adams Hill. They were later used by the Boutilier brothers and Art Fry family as part of their mining operations.

**Discovery Claim** (YHSI No. 1150/14/107): Gold was discovered here in 1896. It is now a display for early mining methods. The site was first mined from a shaft, then in an open pit, dredged and then mined using tracked vehicles. There is evidence of mining from the dredge and the more modern Cat mining. Discovery Claim was the location where Keish ("Skookum Jim Mason) discovered the gold that started the Klondike Gold Rush. The site was continuously mined through the twentieth century and contains a relocated 1960s-style metal sluice box, a small tracked vehicle, and two engines.

**Little Skookum Gulch** (YHSI No. 1150/14/071): A 1940 white YCGC dump truck and other equipment are parked here.

**Three Above Discovery Cabin** (YHSI No.1150/14/072): This building dates to the Gold Rush era and was on the very northernmost edge of the Grand Forks townsite. There has been some damage because of the proximity of the Upper Bonanza Road. Its west wall and sections of the roof have collapsed; the cabin is falling down the hill.

**Gold Hill Cabin** (YHSI No. 1150/14/073): This standing building is from the Yukon Gold period of hydraulic gold mining: 1908 to 1930. It has been occupied during the summer by local miners for many years. It is located on a flat bench overlooking Bonanza Creek.

**Grand Forks Buildings** (YHSI Nos. 1150/14/147 to 151 on the south side of Bonanza Creek and 1150/14/075 to 076 on the north side of Bonanza Creek): Grand Forks was the largest settlement in the Klondike after Dawson. There are buildings on the southernmost and northernmost edges of the townsite, and the Klondike Visitors Association's free gold-panning claim is in the centre. The buildings are all collapsing.

**Grand Forks Cemetery** (YHSI No. 1150/14/077): This is the graveyard of the town of Grand Forks, used from 1897 to the 1920s. Grave markers are illegible except for two. It contains at least 15 depressions, seven with collapsed markers, and one fenced grave that possibly holds two plots; head markers are rotting.

**Cabins Opposite Spring Gulch** (YHSI No. 115O/14/078): Two buildings and a shed were built from rough-sawn boards quite high on the hill above Upper Bonanza Creek. There are overgrown tailing piles, pits, and ditching in the area. Buildings have collapsed.

**Gauvin Gulch Cabin** (YHSI No. 115O/14/079): This standing log cabin has Hudson Bay notched corners and is from circa 1900, with a more modern addition.

**Gauvin Gulch Bonanza Ditch Sites** (YHSI No. 115O/14/080): These are a flume, ditch, and pressure box from Bonanza Dam Reservoir crossing Gauvin Gulch. The ditch carried water from the Bonanza Dam to the hydraulic mines on Gold Hill. The Yukon Gold Company built it in 1906. This was the water diversion to a pressure box to cross Gauvin Gulch. The KMR also had a trestle here for the railway to cross Gauvin Gulch.

**Homestake Gulch Cabin** (YHSI No. 115O/14/081 and YHSI No. 115O/14/143): Collapsed log cabin (081) and standing outhouse (143) from the 1900s time period. The cabin is next to a good example of a hand-mining open, high on a bench.

**Boxcar Group** (YHSI No. 115O/14/106): This hard rock gold mine is from circa 1909; no buildings remain, but the ladder and shaft are visible. This is on the Ridge Road trail close to the Boxcar Station.

**Lone Star Mine** (YHSI Nos. 115O/14/087 to 089): These buildings were used as a bunkhouse and office for mine employees throughout the years of operation. Most of outbuildings YHSI Nos. 115O/14/139 to 141 are standing, and the site is a good example of early hard rock mining. The ore car tramway and the transfer station and stamp mill are all still in place. Staked as Lone Star in November 1897, the mine was operated intermittently until the 1940s. The mining system was to shaft and drift and then to send the ore via tramway to a stamp mill located down the hill on Victoria Gulch. The loose rock was pulverized, and the gold was washed from it. Modern mineral exploration companies have been searching for quartz deposits here and have used the buildings as a headquarters.

**Lone Star Stamp Mill** (YHSI No. 115O/14/086) and **Ore Transfer Station** (YHSI No. 115O/14/087): This post-and-beam and frame building housed heavy metal stamps to pulverize the gold ore and wash the gold out. The gold-bearing ore was transferred by ore cars on a tramway up the hill from the Lone Star mine.

**Bonanza Shed and Workshop** (YHSI Nos. 115O/14/137 to 138): This Gold Rush-era standing cabin and greenhouse are at the road going up Victoria Gulch where it crosses Upper Bonanza Creek.

**Boxcar on KMR** (YHSI No. 115O/14/089): At this KMR station with a siding and switch, a boxcar was removed from its wheels and put here for use as a shelter. The boxcars for the KMR were not as useful as flatcars; they were often turned into storage sheds or station buildings, leaving a flatcar for the railway to use. Victoria Gulch had an operating hard rock gold mine in this vicinity, and this may have been used as an access building. Opposite Victoria Gulch. Collapsed.

**Bonanza Dam** (no YHSI number): The dam was built in 1906 at Claim No. 57 Above Discovery on Bonanza Creek. It could hold 350 million gallons of water, conveyed from the dam by two 1,000 miner's inch-capacity ditches. The water was used on Bonanza Creek by two hydraulic operations on the benches and electric elevators in the valley, and allowed mining to continue through the dry summer months. The dam washed out in 1960, causing flooding downstream and turning Dredge No. 4 sideways. Timbers are still visible in the washed-out section of the dam.

### **ELDORADO CREEK (going upstream)**

**Stone Building on Eldorado** (YHSI No. 115O/14/091): The stone wall is probably part of a heating device from a settlement period before metal stoves were commercially available. The stone fireplace is one end of the building, and log purlins and log walls are missing. A standing outhouse remains just up the hill.

**Calder Summit Roadhouse** (YHSI No. 115O/14/101): The one-storey log roadhouse is on the Dawson to Whitehorse Stagecoach road, at the summit of Calder and Eldorado creeks. It has a collapsed roof with a modern protective roof built overtop for an overall covering.

**Ophir Headframe** (YHSI No. 115O/14/102): At this hard rock gold mine from circa 1900, the post-and-beam head frame over the shaft is still in place. It is also known as the Violet group of quartz claims; a 400-foot drift was dug. Standing building.

### **OTHER**

**Yukon Ditch Sites** (YHSI Nos. 115O/14/010 to 019): These include inverted syphon intakes and discharges, pressure boxes, sandboxes, and maintenance sheds. These structures are from 1908 and are collapsed.

**Klondike Mines Railway Sites** (YHSI Nos. 115/14/020 to 035): These include two boxcars, sidings, bridge abutments, fallen trestles, a water-tower spigot, a maintenance shed, a box culvert, and foundations. They are along the length of the KMR route on Upper Bonanza Creek and are from 1906.

**Ridge Road Sites** (YHSI Nos. 115O/14/129 to 134): Here, several foundations remain of roadhouses, barns, fences, wells, and can and bottle dumps. These are along the length of the Ridge Road above Bonanza Creek. They are from 1899; no structures are left of the Ridge Road sites, only foundations.

**YUKON RIVER:** There are no known YHSI sites as a result of placer mining.

**Forty Mile Townsite** (YHSI Nos. 116C/07/003 to 017) and **Fort Cudahy, Fort Constantine** (YHSI Site No. 116C/07/027):

The Forty Mile, Fort Cudahy and Fort Constantine Historic Site is comprised of 50 ha located on both sides of the Fortymile River at its confluence with the Yukon River. The site includes a significant material record of late prehistoric Hän use and occupation, overlain by archaeological evidence from the historic period dating back to 1886. Forty Mile was a dynamic, mixed community that predated the Klondike Gold Rush, and provided support for placer miners in the Fortymile River mining district. The townsite currently has 18 standing and collapsed structures, either stabilized or in the process. The Fort Constantine archaeological site is at the location of Yukon's first North-West Mounted Police post. Fort Cudahy, now an archaeological site, was a commercial outpost for the North American Trading and Transportation Company.

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