

2014 British Columbia Mine Reclamation Awards

Presented at the MABC Board Meeting

December 3, 2015, Vancouver British Columbia

INTRODUCTION

The TRCR established an Annual Jake McDonald BC Mine Reclamation Award 39 years ago, shortly after mine reclamation legislation was enacted in BC. This award is named for Jake McDonald, a former Senior Reclamation Inspector with the BC Ministry of Energy and Mines. In addition to the major award, the committee may also recognize excellence in reclamation through category awards for metal mining, coal mining, sand and gravel operations, quarries, industrial mineral mines, placer mining, mineral exploration and coal exploration.

The awards may recognize work of various scope and may be the result of a group effort or a single person's activities. These awards are assessed by the awards sub-committee based on:

- quality in research,
- innovation in techniques,
- quality of work undertaken,
- extent of land reclaimed, and,
- work of a high standard that has been conducted over a number of years.

Kim Bellefontaine is the chair of the Awards committee of the TRCR and acknowledged the thoughtful deliberations of the other award sub-committee members, including current TRCR Chair Jonathan Buchanan, Director of Communications and Public Affairs with the Association for Mineral Exploration BC and Angela Waterman, former Vice President of Environment and Technical Affairs with the Mining Association of BC. This year, the awards committee received 5 nominations in 4 categories. The committee's work is always challenging; and as always, we had good debate and various perspectives on the nominations, but this definitely helps the process to determine award-worthy work. I am pleased to report that we reached consensus, and all of the award decisions were unanimous.

I would like to take a moment to recognize that this is a special venue for presentation of the awards this year. Typically, an awards banquet is hosted at the TRCR Annual Reclamation Symposium each fall. This year, the TRCR joined forces with the Mine Closure Conference held in Vancouver in June, so there was no separate Reclamation Symposium or awards banquet this year. So again, we thank the MABC Board of Directors for providing the TRCR with a venue for presentation of these important awards.

I will be presenting 2 awards for this year. First will be the 2014 Metal Mining Reclamation Award, followed by the presentation of the prestigious Jack McDonald jade award.

2014 METAL MINING RECLAMATION AWARD

The award for outstanding achievement for reclamation at a metal mine is presented to Huckleberry Mines Ltd. for their work to remediate a fishway in Creek M near the Huckleberry Mine.

The Huckleberry Mine is an active copper mine located near Houston BC. In 1996 Huckleberry Mine implemented a fisheries habitat compensation plan to offset prospective losses of fish habitat associated with development and operation of the mine. At that time Creek M, located on the south side of Tahtsa Reach in Ootsa Lake, was barren of fish due to two steep gradient reaches that precluded fish from reaching a headwater pond.

The original compensation works were constructed from a series of steps or weirs lined with geotextiles and anchored with rock fill. Fish surveys conducted between 2001 and 2011 found that adult rainbow trout were present in the headwater pond and juveniles were present in the lower reaches of Creek M. However, subsequent surveys conducted between 2008 to 2011 indicated that the juvenile fish numbers decreased to record lows in 2011. This highlights the complexities that can exist with creating fish habitat.

The decline in fish numbers was attributed to failure of the weirs in the lower and middle fishways, causing juveniles to become stranded in isolated pools and precluding adults from reaching the preferred spawning habitat between the lower and middle fishways.

Remediation of fishways in the lower reach of Creek M was initiated during the summer of 2012 and took 2 years to complete. Construction materials were imported to this remote site via helicopter and boat. Fish salvage was completed prior to construction and stream flows were conveyed around the work area. The work involved upgrading the 26 original weirs to 40 weirs to achieve channel grade control as well as pool-jump specifications for fish. During the fishway construction the stream banks were armoured with rock salvaged from the originally constructed works. This work was conducted by hand due to access restrictions for mechanized equipment.

Initial monitoring of the remediated area in 2013 and 2014 evaluated the stability of the constructed works as well as presence of fish. The structural integrity of the fishways have remained intact through high-flow periods, with no erosion or undermining of the weir structures being observed. During the 2013 fish survey, 39 rainbow trout were captured in Creek M, the largest number of fish observed since 2008. These observations were made even while construction of the middle reach fishways was ongoing. Monitoring will continue in the future to confirm the effectiveness of the restoration work, including hydraulic functioning, physical stability and structural integrity, fish distribution and net gain.

Huckleberry Mines Ltd. is also recognized for their hard work in developing and maintaining positive relationships with local First Nations. The Huckleberry nomination was augmented by three separate letters of support from local First Nations including the Cheslatta Carrier Nation, the Nee Tahi Buhn Indian Band, and the Office of the We'suwet'en.

Hiroyuki Tarumi (President), Randall Thompson (Chief Operating Officer), and Marke Wong (Environmental Superintendent) of Huckleberry Mines Ltd. accepted the award for outstanding Metal Mine Reclamation for the restoration of Creek M fishways at the Huckleberry Mine.

ANNUAL BRITISH COLUMBIA JAKE MCDONALD MINE RECLAMATION AWARD

The recipient of the 2014 British Columbia Jake McDonald Mine Reclamation Award is Valley Gravel Sales Ltd. for outstanding reclamation achievements at the Valley Gravel Mine.

The Valley Gravel mine operation is located on Huntingdon Road in Abbotsford BC, within the Agricultural Land Reserve. Gravel extraction occurred between 1994 and 2013, with reclamation activities beginning in 2010. The overall objective of reclamation for these properties was to return them to an equal or better agricultural capability compared to what existed prior to gravel mining.

The Valley Gravel operation covered an area of approximately 38 acres that was primarily used for hay and pasture prior to gravel extraction. A smaller portion of the property was also used for raspberry production, however this was limited by the topography of the fields and poor soil conditions. Overall the area had a variable agricultural capability rating including areas with ratings that are typically challenging to improve.

Significant planning went into the reclamation program. The process for reclamation included subgrade leveling through a cut and fill process to achieve a final subgrade. This required moving quantities of till and materials into place to ensure a grade of 80 to 85 m above sea level. A sloped area in the southeast corner of the property was steepened which enabled an improvement to the overall grade of the field and maximized the flat farmable land area for crop planting. A sand filter layer was then added across the reclamation area to improve drainage and help with creation of a soil profile that is preferable for plant root development. This was then capped with stockpiled topsoil. This topsoil was screened to remove large rocks prior to placement to ensure the final soils could be tilled using farm equipment; an innovative and expensive step to improving capability. Finally, local manure was tilled into the soil to provide an initial nutrient source.

The final result of reclamation activities was a uniformly graded field with gradual slopes and high quality topsoil that represented a significant improvement over pre-mining conditions. To

confirm that reclamation would be successful, additional soil surveys and soil chemistry analyses were completed to assess the quality of the reclaimed area. The information has demonstrated that the agricultural land capability was greatly improved. Prior to mining, only 40% of the area had a Class 3 agricultural capability rating, and subsequent to reclamation, more than 77% of the land is classified as Class 2 and Class 3.

Today, the reclaimed area has been successfully growing forage crops. Additionally, a smaller plot of land has supported demonstration plots for various vegetable crops along with a home garden. Crops have included corn, cabbage and zucchini.

Valley Gravel Sales Ltd is recognized for their well-planned and very well executed and successful reclamation program that has greatly improved the agricultural land capability at the Huntingdon Road properties in Abbotsford BC.

Barry McLean (Chief Financial Officer) with Valley Gravel Sales Ltd. accepted the 2014 British Columbia Jake McDonald Mine Reclamation Award for Valley Gravel.

CLOSING

That concludes the award presentations for this year. On behalf of the TRCR, I would like to thank all the companies and individuals that submitted nominations for the reclamation awards. There is excellent reclamation work underway across the province and the TRCR looks forward to next year's event, at the 2016 Reclamation Symposium in Penticton, September 19th to 22nd. Next year we will be celebrating the 40th Anniversary of the TRCR and the Annual BC Mine Reclamation awards. I hope you will join us then to recognize more outstanding achievement in BC Mine Reclamation.