

MERG Report 2000-2 - Assessment of Long-Term Vegetation and Site Conditions at Reclaimed Yukon Mineral and Coal Exploration Sites

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Non-technical summary

There have recently been many changes in the way mining exploration projects operate, including new technologies, new exploration targets and new environmental regulations. Following recent amendments to the Yukon Quartz and Placer Mining Acts, a significant new piece of legislation came into effect in December 1999. The Yukon Quartz Mining Land Use Regulations, administered by the Department of Indian Affairs and Northern Development, now requires the reclamation of disturbed land on mining claims. But what happens at these reclaimed sites several years after the work is finished? Is there more than one way to successfully reclaim such land? How do local conditions affect the regrowth of plants on these sites and how much preparation of the reclaimed surface is needed? This report may not provide answers to all these questions, but it presents data collected at several Yukon sites, each with different ages and having had different reclamation treatments. From these observations, patterns on the success or failure of revegetation programs emerge and provide information on the rate and extent of natural revegetation at reclaimed mining trenches.

Several types of reclamation sites were looked at in several different areas of Yukon, both above and below the treeline. Three of these were exploration trenches that were backfilled and revegetated as part of an experimental reclamation program in 1995. These reclaimed exploration sites included the Red Ridge trench, near Annie Lake in the Whitehorse area, the Nucleus trench west of Carmacks and the Hawk trench near Dawson City. Each of these reclaimed trenches were revegetated with different seed and fertilizer mixes. This report summarizes how these sites looked in 1999, four years after the reclamation work was done.

At Division Mountain, west of Braeburn, several coal trenches and drill pads were reclaimed by a mineral exploration company between 1995 and 1997. These sites were also looked at in 1999 in order to measure the success of the revegetation program. The last place visited in 1999 was Jason Knoll near Macmillan Pass where a number of exploration trenches and drill pads were reclaimed in the early 1980s. This site provides a look at the longer-term success rate of a revegetation program near the treeline.

Refilled and contoured trenches, with rough and loose surfaces seem to revegetate well. The replacement of original soil is most important and makes the most significant contribution to the revegetation process, particularly at high elevation sites or sites in extreme climatic conditions. The replacement of tree debris significantly improves habitat conditions for small mammals by decreasing access and visibility for predators.

Seeded agronomic legumes are not surviving long and do not appear to contribute to surface coverage in a significant way at any stage. The use of sod-forming species such as red fescue can inhibit the natural invasion of colonizing

plant species (the resultant litter from the thick vegetative mat further retards new growth). Meadow foxtail, fowl bluegrass and red top are not surviving on the two forested trench plots (Nucleus and Hawk trenches). From observations at all properties surveyed, agronomic species are not colonizing undisturbed sites. Results at the Nucleus and Hawk properties, located below treeline suggest that although an early dense coverage by agronomic species may be required to control soil erosion in areas with steep slopes, this dense seeding may not be necessary or desirable in most cases.

Observations at Division Mountain, also situated below tree line, reinforce these conclusions. Rough surfaces, with very loose and rugged micro-topography, foster the growth of seeded species, but the coverage is not dense. Native species, therefore, can invade pockets that act as seed traps and provide shade and moisture. This results in the rapid colonization of these surfaces. The use of the original top soil and vegetation debris definitely plays an important role in the return of native species. The replacement of tree debris creates an environment similar to burned over areas. In addition to preventing access by all-terrain vehicles to the corridors created by the trenches, it also avoids creating long corridors of high visibility for predators. Travel by ungulates is still possible across trenches. Small mammal habitat is probably enhanced by the numerous cavities, vegetation pockets and good cover created by the reclaimed trenches.

The Jason Knoll drill sites located below treeline are located in moisture-rich, nutrient-rich sites, and long-term impacts should be negligible. The ground-cover vegetation, as well as shrubs and seedlings, invading these sites 15 years after reclamation are dense, diverse and robust. The current seral stage of vegetation includes plants adapted to these wet conditions. Over the next 20 years, the vegetation on these disturbed areas will probably return to plant communities that resemble the surrounding forest.

Reclamation of disturbed land in alpine areas is the most problematic. The Red Ridge test plots and the highest reclaimed trenches at the Jason Knoll property are returning to natural conditions more slowly than lower elevation sites. In the lichen-moss alpine zone, the climate and soil conditions are often extreme and the growth of both agronomic and native plants is more difficult. At the Jason Knoll property, frost boils, evident both on both disturbed and undisturbed sites, are retarding plant colonization. This active process likely occurs at most high-elevation sites in the Yukon. Overall, from the sites visited during this project, we can conclude that refilling, recontouring and seeding trenches significantly reduces the long-term impact of exploration disturbances, and that changes in vegetation or habitat do not seem to extend beyond specific disturbances.