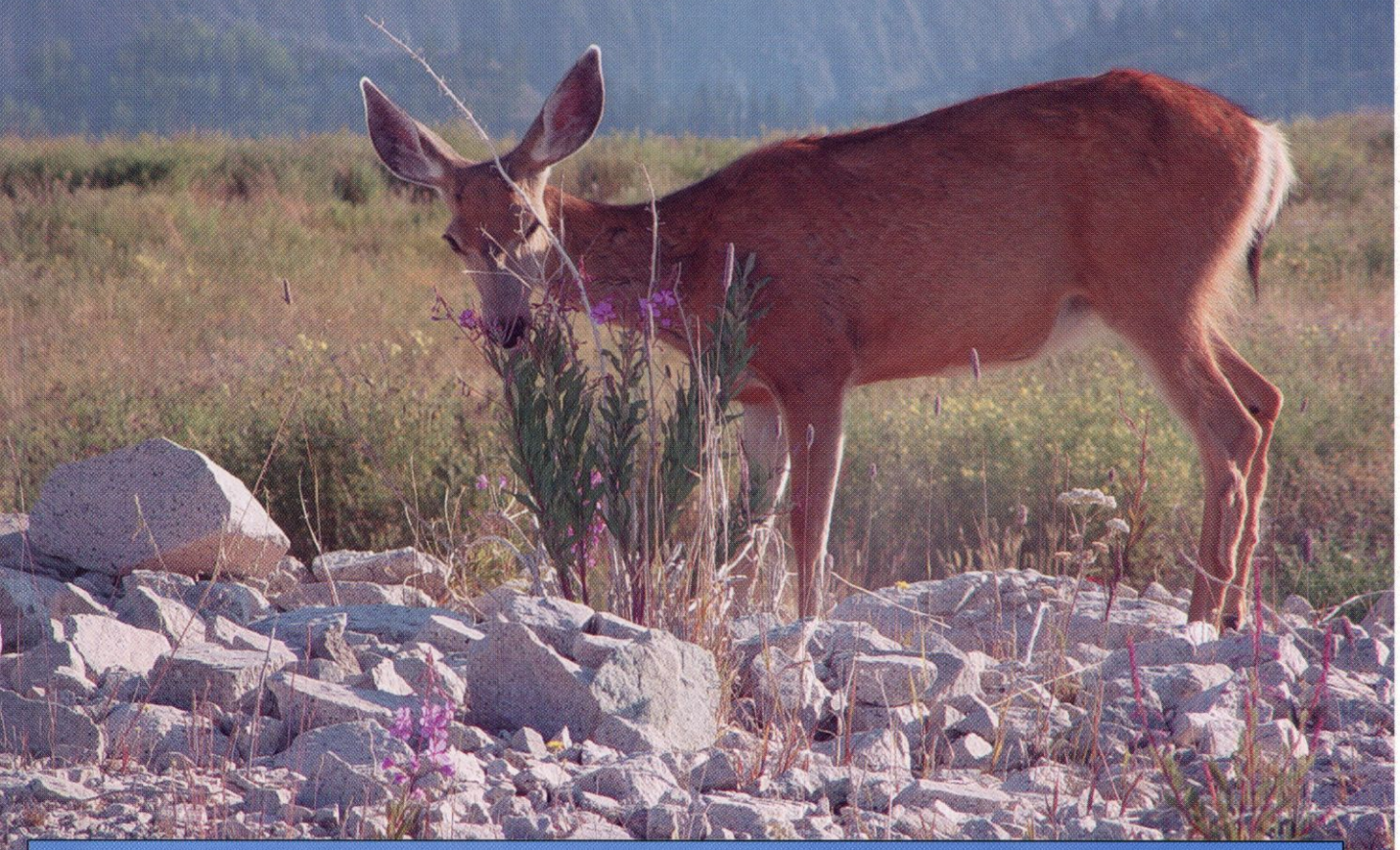
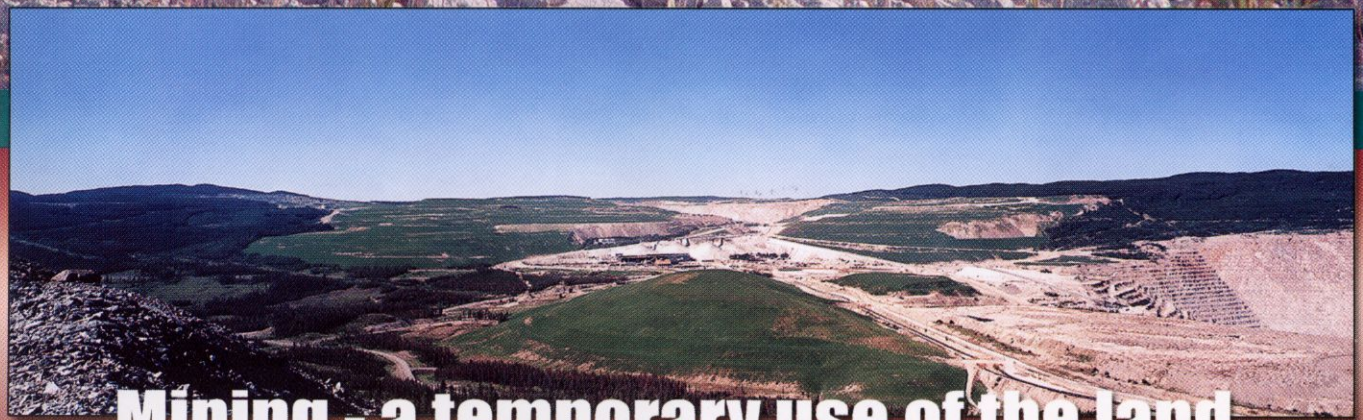
Reclamation at Highland Valley Copper





Mining - a temporary use of the land

Introduction

Highland Valley Copper, located 55 kilometres southwest of Kamloops, British Columbia, is Canada's largest open pit copper mining operation.

On average the mine produces 360 million pounds of copper and 5 million pounds of molybdenum annually.

The history of Highland Valley Copper dates back to 1962, when large scale mining began in the valley with the commissioning of Bethlehem Mine, the first low grade, high volume open pit copper mine in Canada. This was followed by the start up of the Lornex Mine in 1972 and Highmont Mine in 1979.The three worked as independent operations until 1986 when they merged to form Highland Valley Copper. Today Highland Valley Copper is owned 97.5% by Teck Cominco and 2.5% by Highmont Mining Co.

Reclamation Process

Since the commencement of mining activity in the valley, approximately 6200 hectares of land have been disturbed. Reclamation began in the mid 1980's and to date over 2000 hectares have been reclaimed.
One of Highland Valley Copper's main reclamation objectives is to develop a self-sustaining vegetation cover of native and agronomic species. This process follows a number of stages.

1. The disturbed ground is first contoured using large equipment to create the profile chosen for the site.

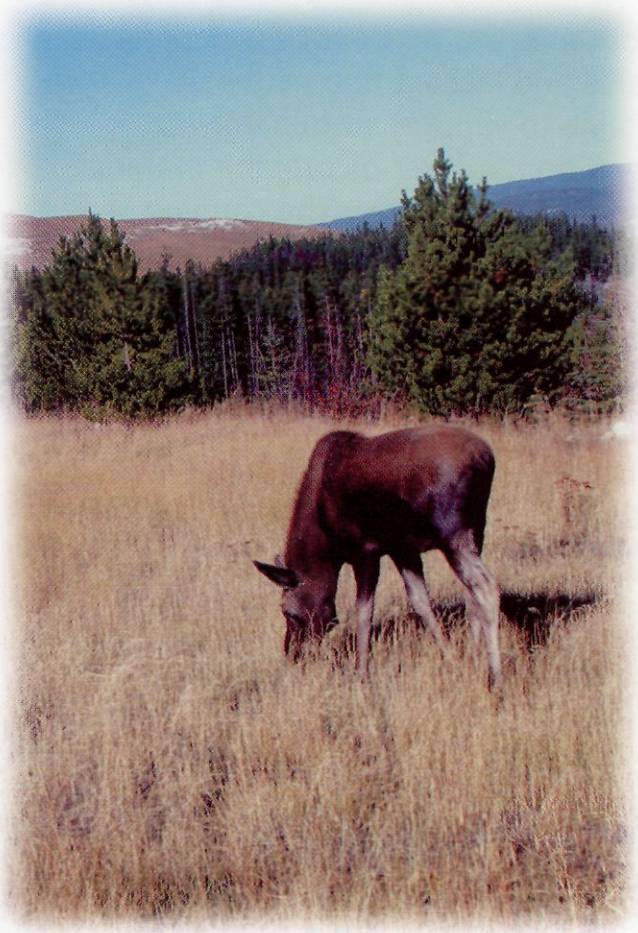
2. Because the waste rock is generally coarse and lacking fine materials suitable to support sustainable vegetation, a layer of capping material is applied to the site. The capping layer is between 0.5 and 1.0 metres thick and is composed of either fine waste rock from the pits or overburden removed to develop the pits.

3. Each area is then seeded and planted with appropriate species, and aerially fertilized annually for the next three to four years until the plants are established.

4. Detailed assessments of all the sites are done regularly to monitor plant survival and growth, and to determine if additional fertilization is required.

End Land Use Planning

An End Land Use Plan has been developed for Highland Valley Copper to direct reclamation efforts. The plan, that was accepted by the Ministry of Energy and Mines in 1998, details the post-mining uses of different areas of the site and the reclamation requirements necessary to achieve those uses. The plan identifies four specific categories of land use: aquatic, wildlife, agriculture and mixed agriculture and wildlife.



Aquatic

Lake development has been initiated in the Trojan Tailings pond and in some of the decommissioned pits. Shallow tailings ponds are being developed as wetlands with nesting and feeding areas for waterfowl. The water that leaves the site is tested to ensure compliance with relevant regulations, and if required, is treated in passive water treatment ponds.

Agriculture

Livestock grazing in the Highland Valley existed prior to mining and presently continues in surrounding areas during the summer months. Establishing summer cattle grazing on the mine site requires the development of open or semi-open forage areas with access to a suitable water supply. The main tailings pond has the potential to produce high quality forage and support a cattle operation due to its flat topography and availability of water for irrigation.

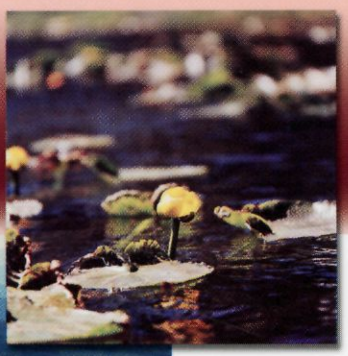
Wildlife

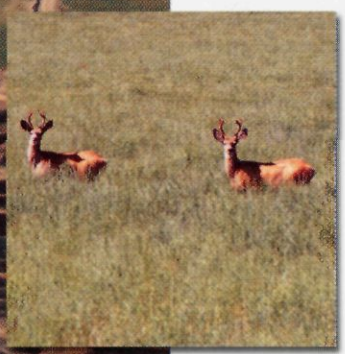
Providing corridors for animals to travel through between summer and winter ranges is a critical end land use component. Browse islands with shrubs and trees are being created as areas for foraging and for thermal and visual cover.

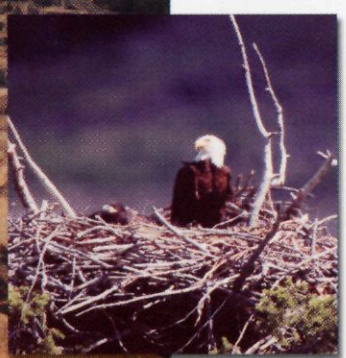
Mixed Agriculture and Wildlife

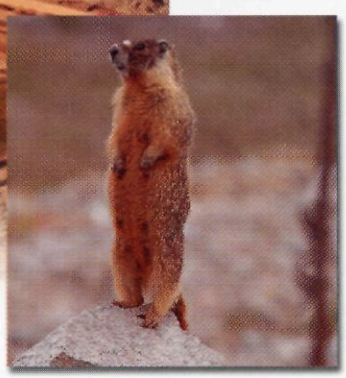
Substantial portions of the site are designated as mixed use for wildlife and livestock grazing. Open grasslands are dotted with shrub islands at a ratio considered suitable for mule deer (approximately 60% grasslands to 40% shrub lands).

Reclamation Projects









Wildlife Habitat

Waste rock and waste wood has been piled on reclaimed areas to create habitat and protection for small mammals such as marmots and pikas. These piles are also large enough to provide visual cover for larger mammals such as moose, deer and coyotes.

Bluebird Monitoring

Highland Valley Copper has worked with the Southern Interior Bluebird Trail Society to build and put up over 150 bluebird boxes throughout the property. Each box is checked regularly throughout the season and the number of eggs and fledglings are recorded. The data has shown that the bluebird population has tripled since the commencement of the program.

There are plans to expand the program even further as 100 more boxes will be placed throughout the property for the 2006 season.

Trees and Shrubs

The planting of trees and shrubs is an important part of the reclamation program. The plants provide cover, shade and food for a variety of animals and satisfy the end land use goals of designated wildlife areas.

Over 1.5 million shrubs and trees have been planted at Highland Valley Copper. Species planted include lodgepole pine, ponderosa pine, black cottonwood, trembling aspen, Interior spruce, saskatoon, chokecherry, and many more.

Reclamation Projects

Grazing Trials

Since 1994, Highland Valley Copper and Agriculture and Agri-Food Canada have been jointly studying the effects of cattle ingesting molybdenum rich forage on reclaimed tailings. The results of the studies have shown that at high concentrations the molybdenum can affect some cattle for short periods. Agriculture & Agri-Food Canada are continuing to study why and how cattle are affected and Highland Valley Copper is studying how to manage the cattle grazing in forage that is high in molybdenum.

Remote Sensing

The use of airborne remote sensing is being investigated to monitor the effectiveness of reclamation at Highland Valley Copper in conjunction with the existing surface sampling. The present vegetation monitoring program represents a significant commitment of both financial and manpower resources, but only addresses a small portion of the reclaimed area each year. The mine is attempting to use remote sensing to increase the efficiency and expand the area monitored each year.

Airborne multispectral imagery has been acquired over four years and the results were compared to routine monitoring. The quantities of legumes and grasses can be successfully determined as can legume species. Due to their homogeneity, grasses are more difficult to separate into species.

In 2003 aquatic imagery was analyzed for the first time. Some success in identifying species was achieved.

Biosolids Application

Highland Valley Copper has been using biosolids (treated sewage sludge from municipal waste water treatment plants) as a soil amendment since 1998. Biosolids provide essential plant nutrients, facilitate soil development, reduce soil erosion and add organic matter that is essential for nutrient cycling and plant growth.

The program provides the regional districts with an opportunity to beneficially reuse the residual material while providing the mine with a source of nutrient rich organic material for use in re-vegetation. To date, over 184,000 wet tonnes of biosolids have been used, and numerous research studies have been conducted on these areas throughout the property.

Pond Development

Trojan Pond is a great example of how a biologically inactive water body can progress into a productive, healthy ecosystem that is able to support a wide variety of fish and wildlife.

Active reclamation began at the Trojan Tailings Facility in 1991. Fertilization and the introduction of aquatic flora and fauna are the primary techniques used to encourage the growth of aquatic life and increase water quality. Most algae, bacteria and zooplankton emigrate to the pond from natural water sources, and the fertilization provides nutrients needed for algae growth. Invertebrates are introduced using donor material from other Highland Valley Copper water bodies. Cattails, sedges and shrubs are transplanted to the shoreline of the pond.

In 1991, an experimental stocking program was launched to determine the fisheries potential of Trojan Pond and to study the metal uptake in the fish. Success was almost immediate. The growth rates of the trout in Trojan Pond have far exceeded those of other lakes in the area. This is likely due to the low stocking densities and the abundance of invertebrate food supply. The fish population is supplemented annually with fry from a spawning channel that was built in 1995.

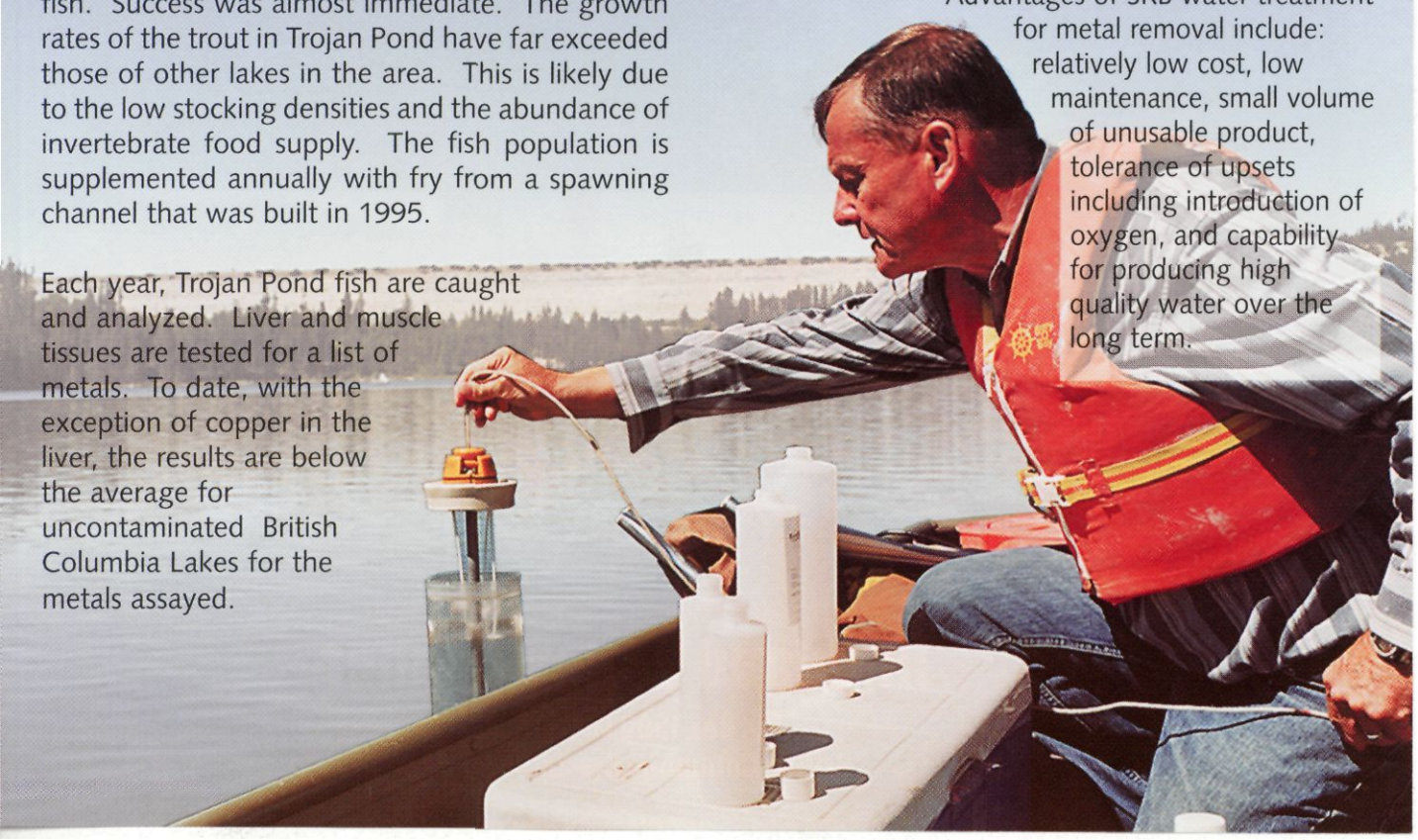
Each year, Trojan Pond fish are caught and analyzed. Liver and muscle tissues are tested for a list of metals. To date, with the exception of copper in the liver, the results are below the average for uncontaminated British Columbia Lakes for the metals assayed.

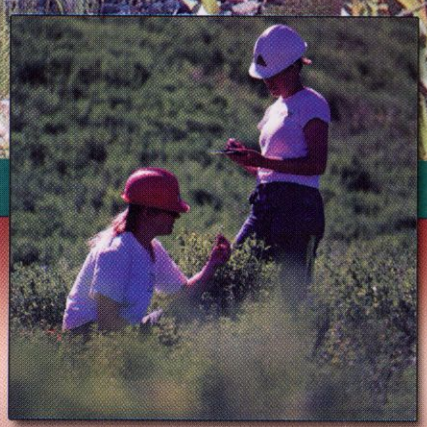
Passive Water Treatment Ponds

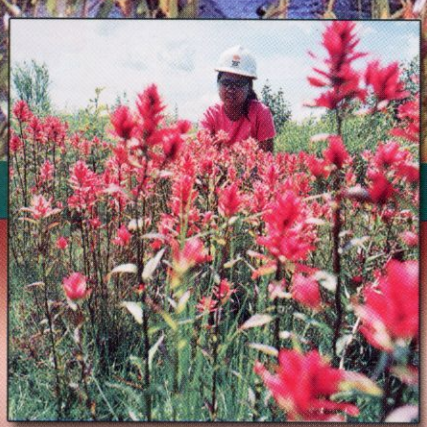
Seepage water from the Highland Valley Copper tailings ponds is continuously monitored and regulated to ensure that the water released into the environment is low in dissolved metals. The water from the Highmont tailings pond is treated on site in two passive treatment ponds (S5 and S8) that utilize Sulphate Reducing Bacteria (SRB) to treat seepage water from the toe of the tailings dam.

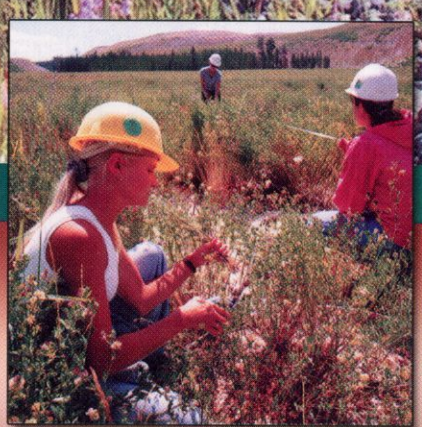
The SRB use carbon in a reaction that reduces the dissolved metal content of the water through either direct precipitation with hydrogen sulphide or through co-precipitation with ferric sulphide. Once the metals have precipitated from the water, they will remain stable in the rock substrate under anaerobic conditions. Thus, as long as water cover is maintained, precipitated metal sulphides represent permanent metal storage at Highland Valley Copper.

Advantages of SRB water treatment for metal removal include: relatively low cost, low maintenance, small volume of unusable product, tolerance of upsets including introduction of oxygen, and capability for producing high quality water over the long term.









Highland Valley Copper

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