Canol Pipeline, August 1978

Abandoned Pipeline . . . The Effects 35 Years Later

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The Northern Canadian ecosystem can respond on its own and in some ways be enhanced as a result of development, says Peter Kershaw, a biogeographer from the University of Alberta in Edmonton.

Kershaw, 30, has conducted extensive research for his doctorate thesis on the environmental effects of Canol #1, a 4-inch diameter oil pipeline built for the U.S. army during World War II to ensure a secure supply of inland fuel along the Alaska Highway. The line ran 924 km (574 mi.) from the producing oilfields at Norman Wells in the Northwest Territories, west over Macmillan Pass into the Yukon, south to Johnsons Crossing and then north to the refinery in Whitehorse. Built, operated and abandoned in a span of three years from 1942 to 1945, Canol was likely the most hurried, shortlived project of this scale ever undertaken in the north. Unlike pipeline projects today, little effort was made to protect the environment.

Kershaw has concentrated his studies on a 120 km (75 mi.) segment of the Canol located above timberline in the Northwest Territories because the area has remained virtually untouched since abandoned 35 years ago. Revegetation and associated recovery in this tundra section of the project have been natural.

Kershaw's work provides insight to possible long-term environmental effects of other northern energy developments such as the proposed Norman Wells oil pipeline and the Alaska Highway gas pipeline. Canol was a 4-inch diameter oil line laid on the surface of the ground, whereas the Alaska Highway pipeline will be a buried, large diameter line carrying natural gas. Impacts such as the pipeline right-of-way, access roads, communications networks and construction activity could be similar. However, measures will be taken to prevent adverse environmental and socio-economic effects from construction of the Alaska Highway pipeline.

Assisted by his wife Linda, a botanist, Kershaw spent three summers and two winters in the field, comparing plant groups and wildlife responses in untouched areas with areas disturbed by Canol activity which included construction camps, gravel pits, access roads, vehicle traffic, bulldozed tracks and bladed trails. He estimates in total they covered over 2,900 km (1,800 mi.) on foot, skiis, and snowshoes, and at least 700 km (435 mi.) by snowmobile. He also studied Canol progress reports to determine the season of construction in certain locations, as well as to learn more about on-site conditions.

Kershaw demonstrated with colour slides how the "pre-Canol" plant life in disturbed areas has been replaced. Colonizers such as willow shrubs and a variety of flowering plants now flourish along roadsides and in cleared sites. The result, says Kershaw, can be enhancement of forage for wildlife. Ground squirrels have made burrows in well-drained mounds where gravel was once dumped; weasels and swallows have taken advantage of abandoned buildings and bridge abutments for habitation. Large mammals such as moose and wolves seem to prefer the roadbed, which permits easier movement than brush-covered terrain.

Kershaw identifies oil spills which occurred during the 13-month operational phase of the Canol pipeline as the most negative impact in terms of irreversible change and sterilization of the affected area. Today we know that the addition of fertilizer and scarification, that is breaking up the soil surface, can improve recovery substantially. His studies reveal that as much as 14.6 percent (169,132 barrels) of the oil put in the line could have been spilled because it was never received. When

Canol Pipeline, September 1944


Canol Pipeline, April 1943

Canol was abandoned in June 1945, 9.4 percent of the oil was left in the line, and much of this was drained onto the terrain during the salvage operation. Some of the remaining 5.2 percent may have been burned as fuel, but at least 46,108 barrels has definitely been accounted for in known oil spills.

Kershaw has found adverse impacts to be site-specific rather than on an overall scale. Nothing grows in certain gravel pits, he notes, because the organic material and fine silt needed to retain moisture and nutrients was entirely removed.

Dr. Tony Yarranton, manager of the Northern Pipeline Agency's environmental group, says Kershaw's research is unique because he has documented environmental impacts in an area over a long period of time. "Time is a great healer. After 35 years many of the adverse effects have been modified or reduced. The most severe effects which has persisted is that of oil spills, and we won't have that problem with the gas pipeline."

Yarranton observes that most of the permanent changes, like improved drainage in certain areas and alterations in vegetation type, are not adverse effects from the point of view of wildlife habitat, but probably advantageous.

By looking at the impact of the Canol #1 pipeline 35 years later, Kershaw hopes to develop prediction models for areas of similar terrain undergoing major development. His research will apply to the proposed Dempster Lateral of the Alaska Highway gas pipeline, which will tap the gas reserves in the Mackenzie Delta/Beaufort Sea.


Canol Pipeline, August