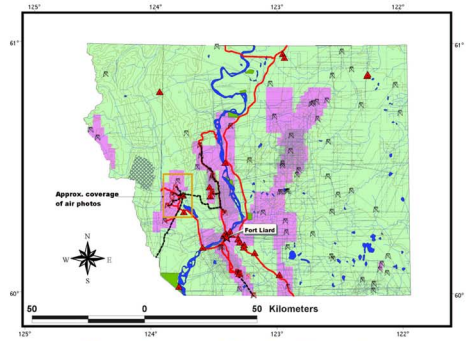
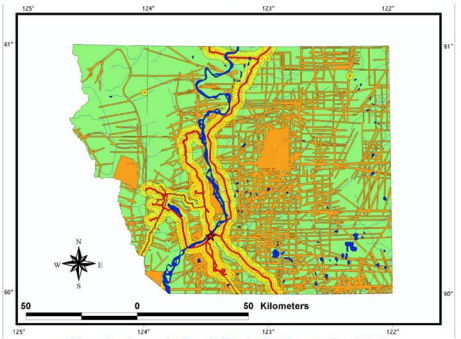
Cumulative Effects
A NWT Case Study



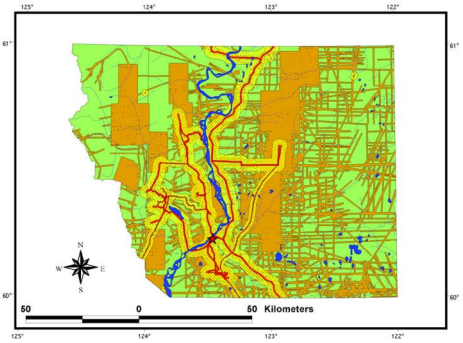
Map 1. Current and Past Land Use to 2001
This map shows the physical footprint up to 2001 for land used for roads, pipelines, wells, cut-lines, logging, buildings and communities.

1.6 sq km Fort Liard
15 sites Leased Well Sites
82 sites NEB Wells
24 sites Utilities and Buildings
128 linear km Pipelines
368 linear km Roads
10,094 linear km Land Use Permit Lines (1973-2001)
04 linear km NTDB Cut Lines (1983)
54 linear km NEB Seismic Lines (1957-1991)
114 sq km 3D Seismic N96B576
61 sq km Logging
Elevation
Lakes
Rivers
3,541 sq km Oil and Gas Rights
4,173 sq km Study Area



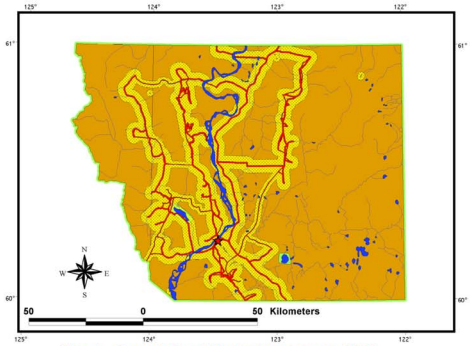
Map 2. Cumulative Effects Estimate for 2001
This map shows the ecological footprint from all activities shown on Map 1.

Fort Liard
Lakes
Rivers
234 sq km (1.7%) High risk of reduced survival/abundance of birds
2,022 sq km (14.3%) High risk of effects on plants, animals, and food chains
5,609 sq km (39.6%) High risk of reduced survival/abundance of large mammals
14,173 sq km (100%) Study Area



Map 3. Cumulative Effects Forecast for 2010
This map shows the ecological footprint at 2010 if oil and gas development continues at current levels and operating standards.

Fort Liard
Lakes
Rivers
299 sq km (2.1%) High risk of reduced survival/abundance of birds
2,541 sq km (17.9%) High risk of effects on plants, animals, and food chains
6,997 sq km (49.3%) High risk of reduced survival/abundance of large mammals
14,173 sq km (100%) Study Area



Map 4. Cumulative Effects Forecast for 2050
This map shows the ecological footprint at 2050 if oil and gas development continues at current levels and operating standards.

Fort Liard
Lakes
Rivers
533 sq km (3.7%) High risk of reduced survival/abundance of birds
4,118 sq km (29.1%) High risk of effects on plants, animals, and food chains
14,107 sq km (99.5%) High risk of reduced survival/abundance of large mammals
14,173 sq km (100%) Study Area

Cumulative Effects

Cumulative effects are the combined changes from past, present, and future human activities and natural processes. Cumulative effects can be caused by day-to-day activities or industrial developments that are nearby or far away. Effects can include fewer animals, polluted waters, climate change, social problems, or economic benefits.

Cumulative effects can be greater than the sum of individual effects. Change can happen slowly and not be noticed. Effects can add up and have a greater impact on an ecosystem than we may have thought. The loss of some good feeding areas for a caribou herd may not be a problem by itself. It could be a problem if it is combined with an increase in hunting or there is a harsh winter.


Location Map

The Case Study

The maps show the physical and ecological footprints of major human activities in the Fort Liard region. An ecological footprint is the actual impact of development on the land, plants, animals, air, water and people. This is larger than the physical footprint of roads, buildings and other development shown on Map 1. Maps 2, 3 and 4 use ecological footprints to show cumulative effects.

Two tools were used to make the cumulative effects maps.

1. The GLOBIO method developed by the United Nations Environment Program to estimate impacts on plants andanimals but not air or water. (www.globio.info)
2. Research studies of the effects of oil and gas development on woodland caribou in northern Alberta.

Research Needs

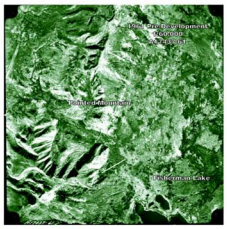
- Land and water agencies need to better track and map human activities.
- We need maps that show all past human activities.
- We need better methods to forecast the pace, type and amount of human activity.
- We need better information about nature's response to development. For example, how and when does disturbed vegetation recover? How do caribou respond to development?

Ways to Avoid or Reduce Cumulative Effects

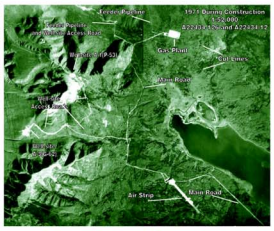
On Map 4, the ecological footprint from human activities covers the land. We can change our ways.

- Complete land use planning to avoid resource use conflicts and to set limits.
- Establish protected areas.
- Use best practices. For example, use helicopters to bring in drilling equipment rather than build roads.
- Set better conditions on permits and licences to reduce footprints. Monitor, inspect and enforce these conditions.
- Monitor environmental changes to make better choices about the future.

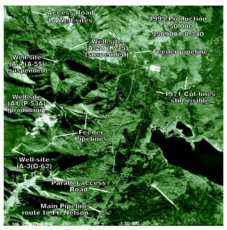
These **Air Photos** show an increase over the last 40 years in the amount of land used for roads, pipelines, gas wells, and cut-lines in the Pointed Mountain area, 25 km northwest of Fort Liard (see Map 1).



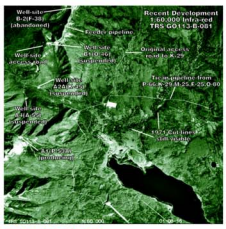
1961 Air Photo
The only development is a narrow road along Fisherman Lake.



1971 Air Photo
New development includes roads, an airstrip, natural gas wells, a gas plant, feeder pipelines, and cut-lines.



1995 Air Photo
New development includes the main pipeline. We can still see development from 1971.



2001 Air Photo
New development includes new feeder pipelines. We can still see development from 1971.

For More Information:

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