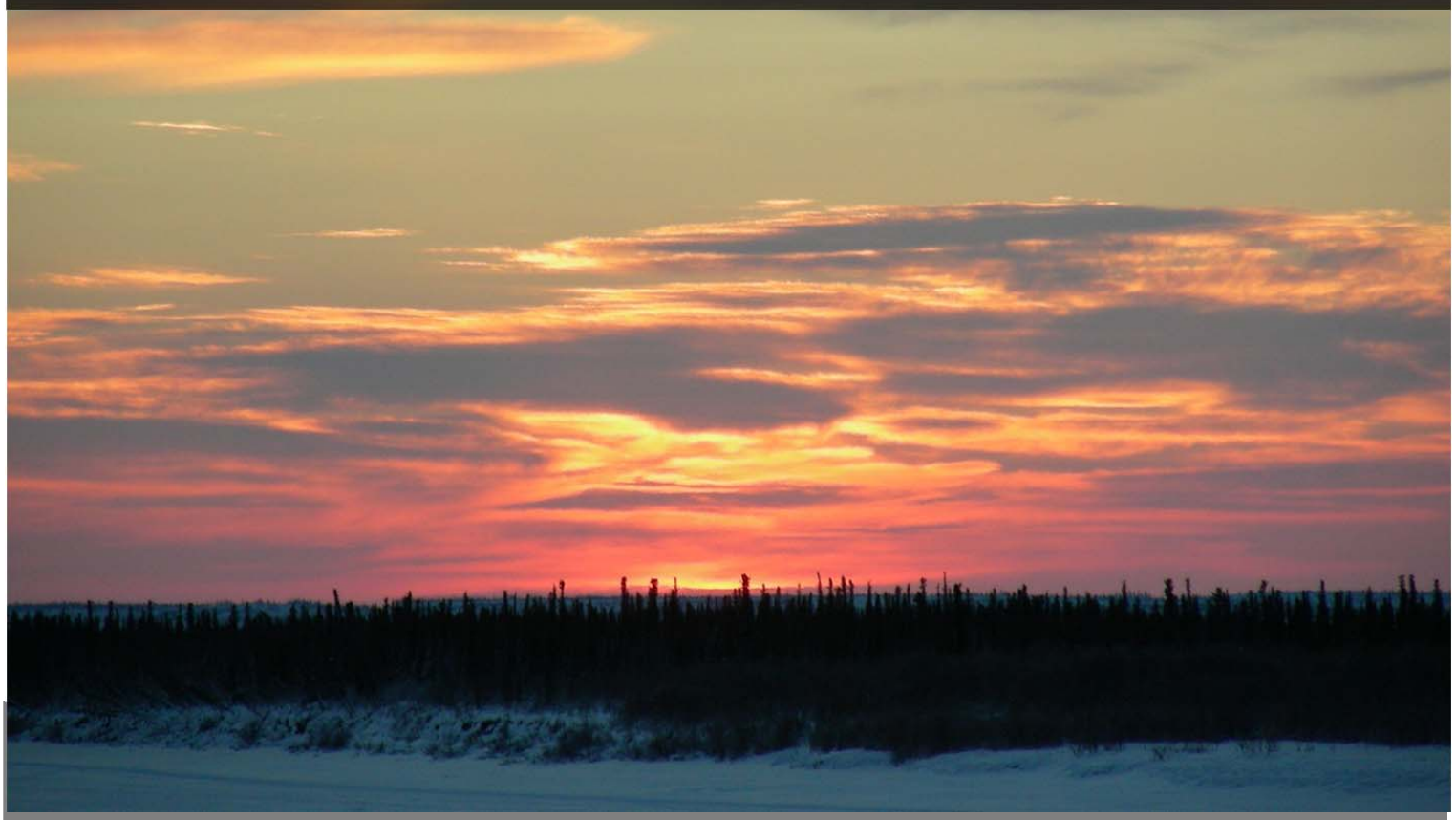
Retrospective on Research Licensing in the Northwest Territories 2000-2009



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Executive Summary

In order to determine licensing burden on researchers and areas of overlap in the licensing process, various types of permits and licences required for research conducted in the Northwest Territories were catalogued and assessed. All *Scientific Research Licences* from the Aurora Research Institute, *Wildlife Research Permits* from the Department of Environment and Natural Resources, *Licences to Fish for Research Purposes* from the Department of Fisheries and Oceans, *Archaeological Research Permits* from the Prince of Wales Northern Heritage Centre, and *Research and Collection Permits* from Parks Canada were assessed for the period 2000 to 2009. They were linked to umbrella projects as appropriate and assessed for amount of community liaison required. The number of other, associated permits (such as land-use or access permits) was also noted. The research permits were categorized by topic or theme, and area.

Report prepared by K. Benson for Aurora Research Institute, Aurora College. March, 2011.

Table of Contents

Table of Figures

Tables

Introduction

This report contains results of a retrospective analysis of the research licensing environment in the Northwest Territories over the last 10 years. Research licences from 2000-2009 were used, including Scientific Research Licences issued by the Aurora Research Institute, Aurora College, Wildlife Research Permits issued by the Department of Environment and Natural Resources of the Government of the Northwest Territories, Licence to Fish for Scientific Purposes issued by the federal Department of Fisheries and Oceans, Research and Collection Permits issued by Parks Canada (also a federal organization), and Archaeological Research Permits issued by the Prince of Wales Northern Heritage Centre of the Government of the Northwest Territories (see sidebar and document footer for acronyms used in this report).

To conduct the retrospective analysis, records from all permits/licences were reviewed, categorized, and analyzed. A large table of all licences was created, and licence information was transformed to fit a standard to allow for counts and assessment. When the table was complete, an analysis of the research licences by theme, researcher, region, funding, and other categories was conducted. This assessment included licensing trends over the ten years.

A major goal of this retrospective was to identify areas of duplication and projects requiring multiple permits to conduct research. This was accomplished using key statistics (total licences required and licences per year). From studies which scored high in these areas, 13 were selected as examples and used to highlight and identify triggers for multiple permit applications to define high impact studies and enhance understanding of areas of overlap.

Acronyms used in this report:

SRL – *Scientific Research Licence (Aurora Research Institute)*

WRP – *Wildlife Research Permit (Department of Environment and Natural Resources)*

LFSP – *Licence to Fish for Scientific Purposes (Department of Fisheries and Oceans)*

RPC – *Research and Collection Permit (Parks Canada)*

ARP – *Archaeological Research Permit (Prince of Wales Northern Heritage Centre)*

TK – *Traditional knowledge*

GNWT – *Government of the Northwest Territories*

Retrospective: Annual

A total of 3,053 licences were issued during the ten year period 2000-2009, in all categories. The total number of licences per year went from a low of 212 in 2000 to a high of 350 in 2009, increasing almost every year. See Figure 1 for a breakdown of total licences from 2000-2009.

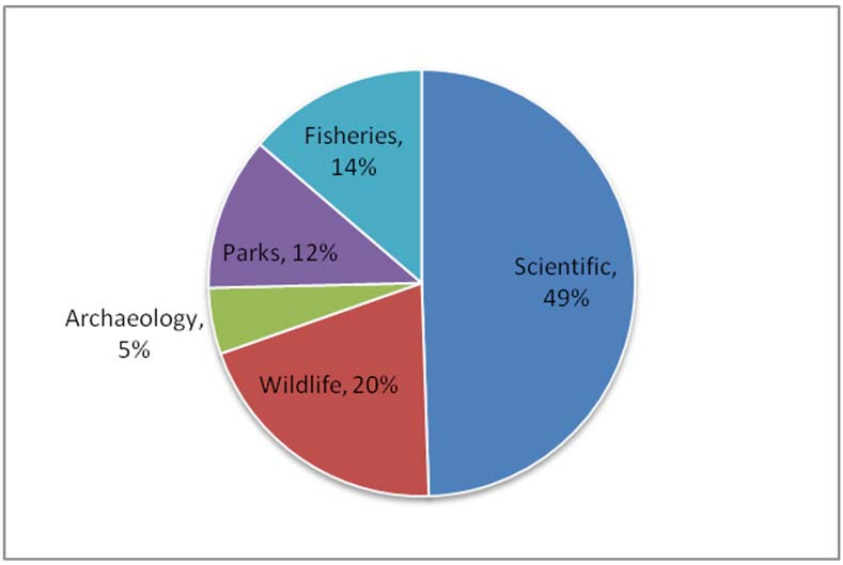

Figure 1. Breakdown of licences 2000-2009.

The number of licences per licensing body varied somewhat by year. Generally, the number of SRL was always the highest (see Figure 2), followed by WRP. The number of LFSP increased above WRP numbers after 2005. Both ARP and RPC numbers remained relatively stable in proportion.

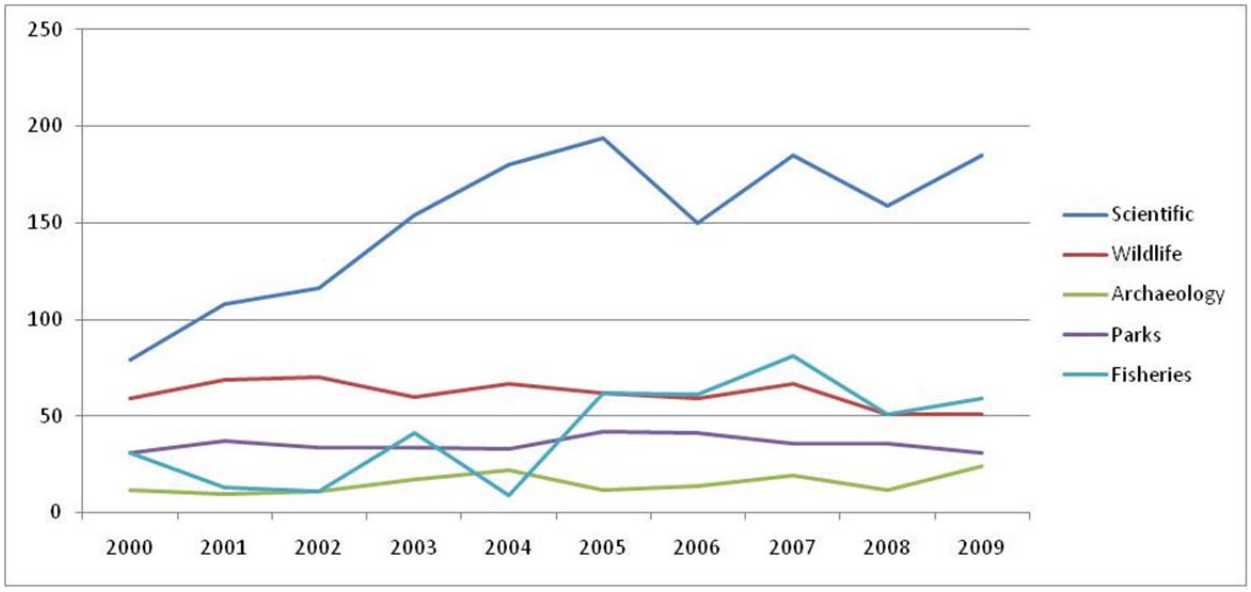

Figure 2. Breakdown of licences annually 2000-2009, by number.

SRL – Scientific Research Licence , WRP – Wildlife Research Permit, LFSP – Licence to Fish for Scientific Purposes, RPC – Research and Collection Permit Parks Canada, ARP – Archaeological Research Permit

Records were flagged as having 'no research' if there was a note indicating that no field work or no research was conducted – essentially that the licence was applied for and received but not used. Only 36 licences out of 3053 (about 1%) were flagged as 'no research.' These licences were included in this assessment which is looking at licensing and licensing burden rather than research or research products.

Retrospective: Theme

Researchers select a theme or themes for their research permits when applying for a SRL, in one or more of the following categories:

- Biology
- Physical Science
- Engineering
- Contaminants
- Health
- Social Science
- TK (traditional knowledge)

Generally, licences in the theme of 'biology' were the most numerous, not surprising considering the existence of separate licensing bodies for fisheries and wildlife research. All of LFSP and WRP were assigned 'biology' as the theme, with the exception of the projects which included the gathering of traditional knowledge – these projects were assigned to both biology and TK. For a breakdown of research themes from 2000-2009, see Figure 3.

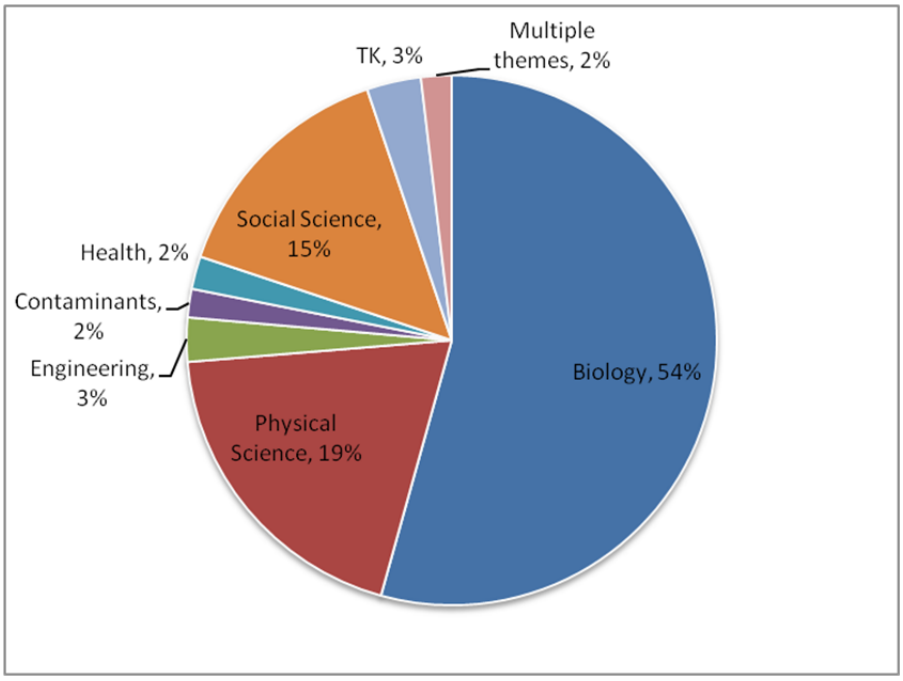

Figure 3. Breakdown of themes 2000-2009.

However, the trend from 2000-2009 was the proportion of biological research projects decreasing from a high of 66% in 2000 to a low of 44% in 2009 (see Figure 4 for percentages and Figure 5 for absolute numbers). The loss in percentage of biology projects over the period 2006-2009 was countered by an increase in social science research. A dip in biology research around 2004 and a correlating increase in engineering relates to a large proportion of Mackenzie Gas Project-related research receiving a designation of engineering research (21 of 24 engineering research projects in that year). The higher count of biology-related research from 2005-2007 does not relate to industry.

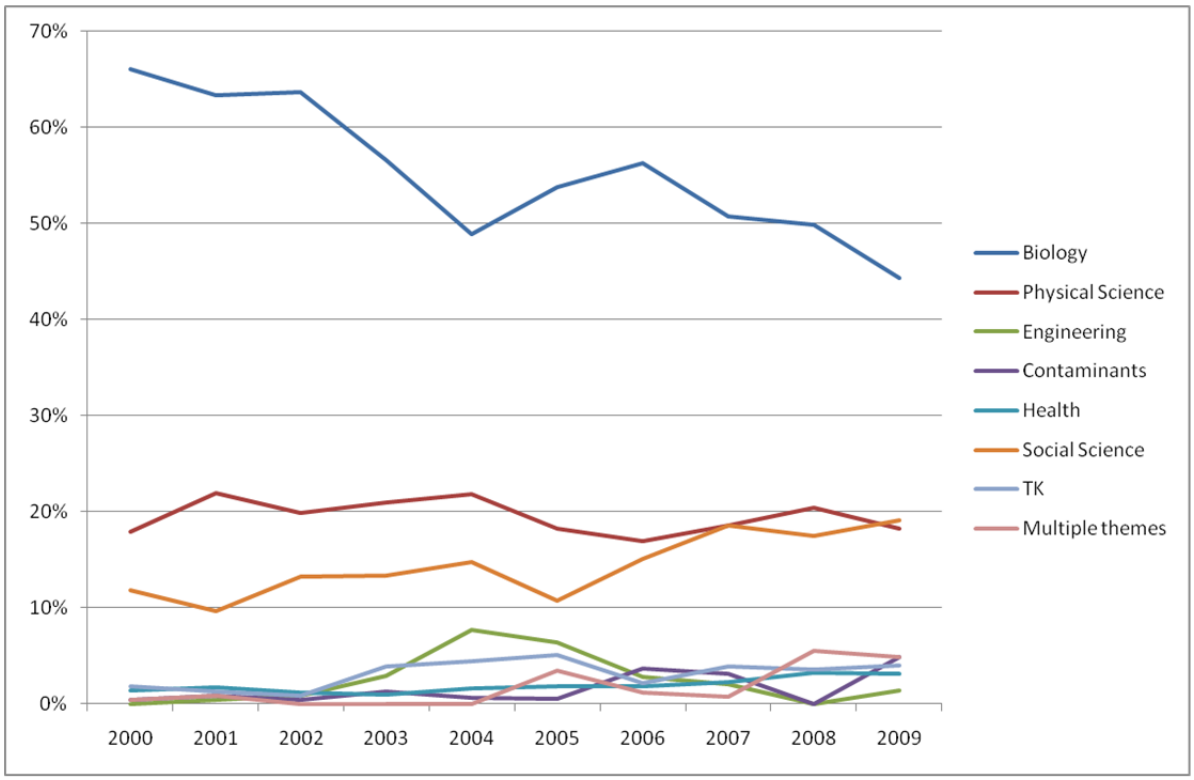

Figure 4. Breakdown of themes annually 2000-2009, by percentage.

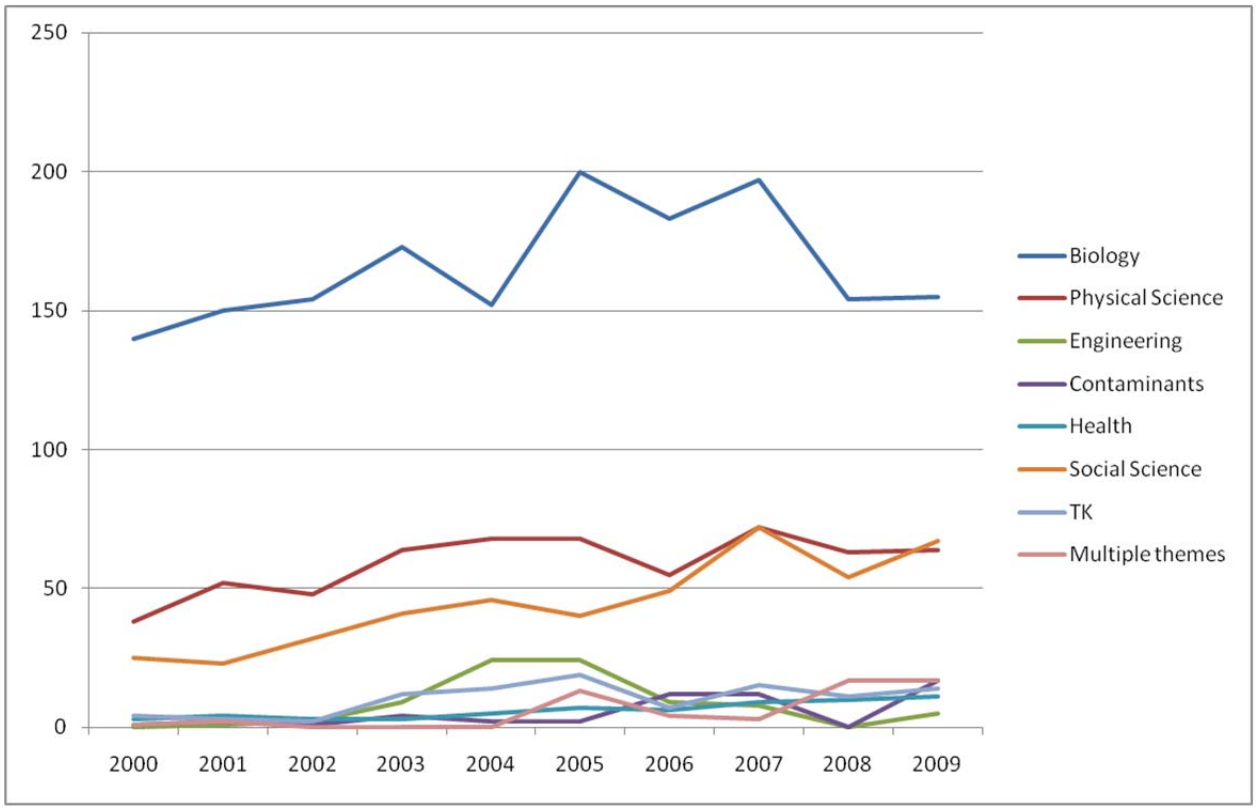

Figure 5. Breakdown of themes annually 2000-2009, by count.

The trend from 2000-2009 relating to projects indicating a single theme or multiple themes has been for an increase in multiple themed projects, see Table 1. No project had more than two themes. Of the multiple themed projects, 33% were biology and physical science projects, 37% were contaminant studies with physical science or biology components (and a single health and contaminants study), and 18% were traditional knowledge studies with either a biology or social science component. The remainder were other combinations of themes.

Table 1. Comparison of single-themed and multiple-themed projects.

	Single theme		Multiple themes	
Year	#	%	#	%
2000	211	100%	1	0%
2001	235	99%	2	1%
2002	242	100%	0	0%
2003	307	100%	0	0%
2004	311	100%	0	0%
2005	359	97%	13	3%
2006	321	99%	4	1%
2007	385	99%	3	1%
2008	292	94%	17	6%
2009	333	95%	17	5%
Total	2996	98%	57	2%

Retrospective: Area

SRL and WRP are assigned to a region or regions of the NWT during the application process. Other licences were assessed and designated in the appropriate region of the NWT based on project descriptions. See Figure 6 for map of regions of the NWT used in this retrospective.

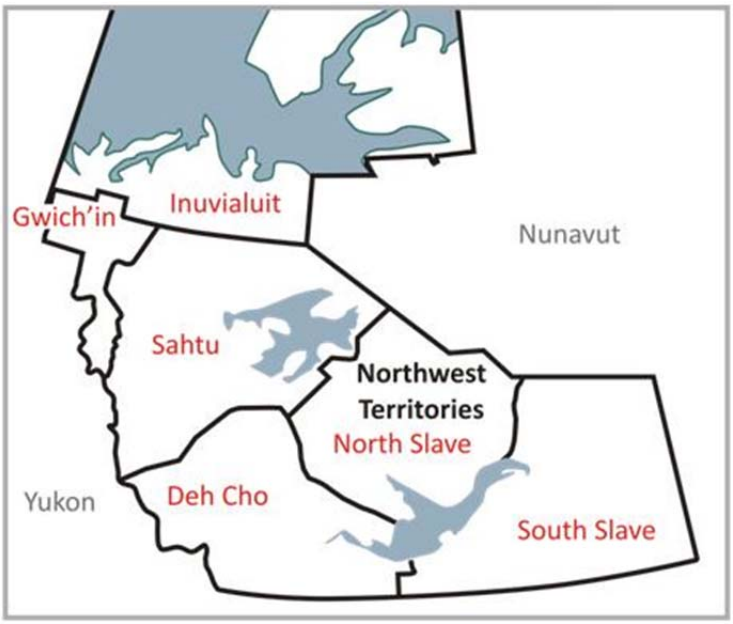

Figure 6. Key map of regions of the Northwest Territories for licensing purposes.

The largest number of research studies from 2000-2009 took place in the Inuvialuit Settlement Region, with the least taking place in the Sahtu area (Figure 7, Figure 8).

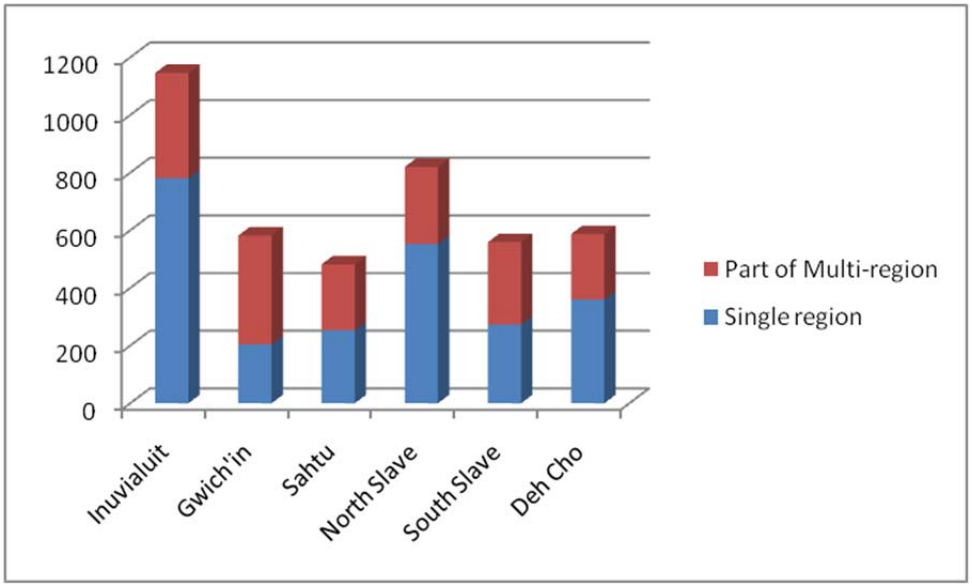

Figure 7. Breakdown of research region 2000-2009, showing counts of projects.

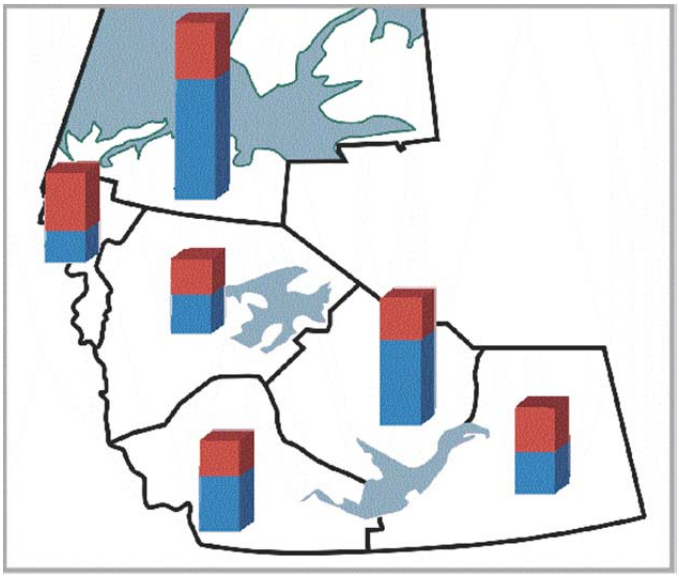

Figure 8. Breakdown of research by region in map format 2000-2009.

The amount of research per region per year from 2000-2009 is shown in Figure 9. Generally the trends are annually variable but somewhat regular overall. Note that the count shown in this figure is an addition of all projects either solely within the region or as part of a multi-region study – so a multi-region study will be 'counted' several times; once for each region.

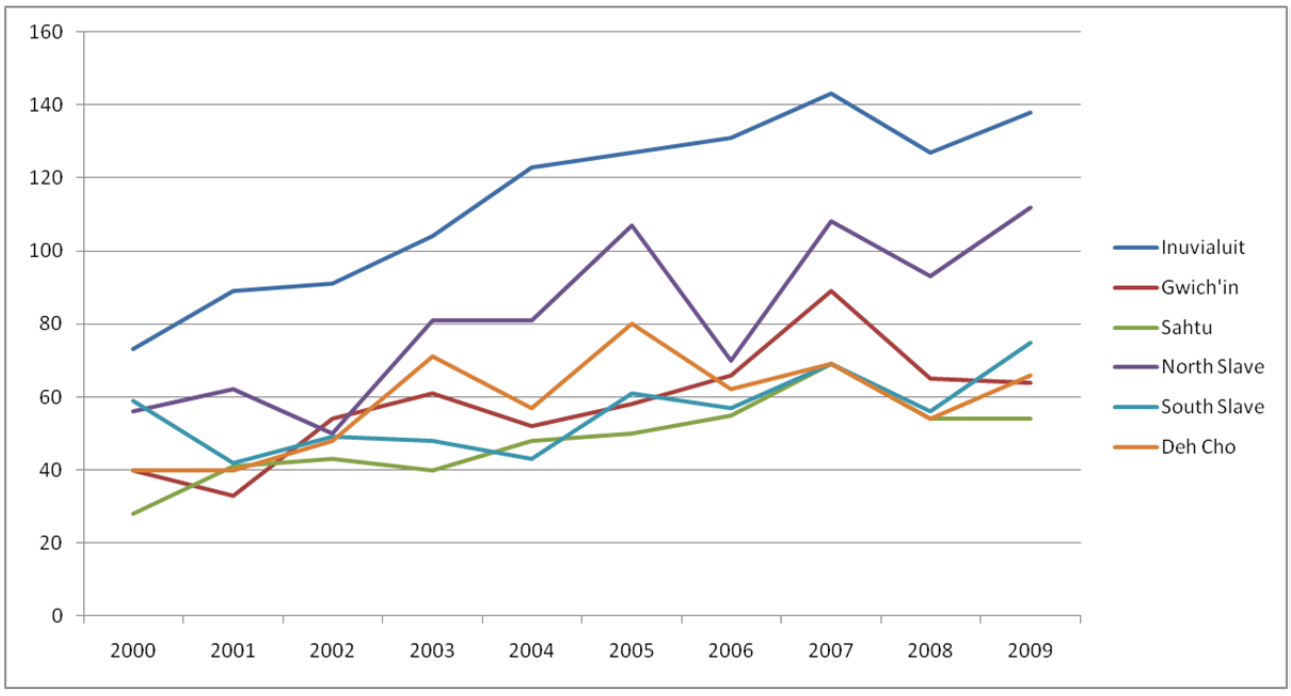

Figure 9. Breakdown of regions annually 2000-2009 by absolute count of all projects within each region.

There has been an increase in multi-area research over the decade assessed (Table 2).

Table 2. Comparison of single-themed and multiple-themed projects.

	Single area		Multiple areas	
	Number	Percentage	Number	Percentage
2000	171	81%	41	19%
2001	204	86%	33	14%
2002	194	80%	48	20%
2003	247	81%	59	19%
2004	252	81%	59	19%
2005	315	85%	57	15%
2006	257	79%	68	21%
2007	298	77%	90	23%
2008	232	75%	77	25%
2009	254	73%	96	27%
TOTAL	2424	79%	628	21%

Retrospective: Researcher affiliation and funding

Researcher affiliation of proponents for projects between 2000-2009 fall into four general categories of broadly equal contribution:

- Federal Government such as Geological Survey of Canada, Department of Fisheries and Oceans, Environment Canada and its various components, and others. Federal government-affiliated research constitutes 25% of research between 2000-2009.
- University researchers, generally from Canada but also from the United States or more rarely other international researchers, accounted for 26% of all licences between 2000-2009.
- Industry-related research accounts for 28% of all research between 2000-2009, generally biophysical and social research associated with the environmental impact assessment (EIA) process, and research or monitoring required under various processes subsequent to EIA.
- Other researchers, including GNWT at 12%, Aboriginal and Inuit organizations (such as renewable resource boards, cultural organizations, trappers associations, etc) at 4%, Non-profit organizations at 2%, with the final 3% of research being conducted by Yukon government employees, US government employees, other, or those of unknown affiliation.

See Figure 10 for a chart showing breakdown of research by affiliation from 2000-2009.

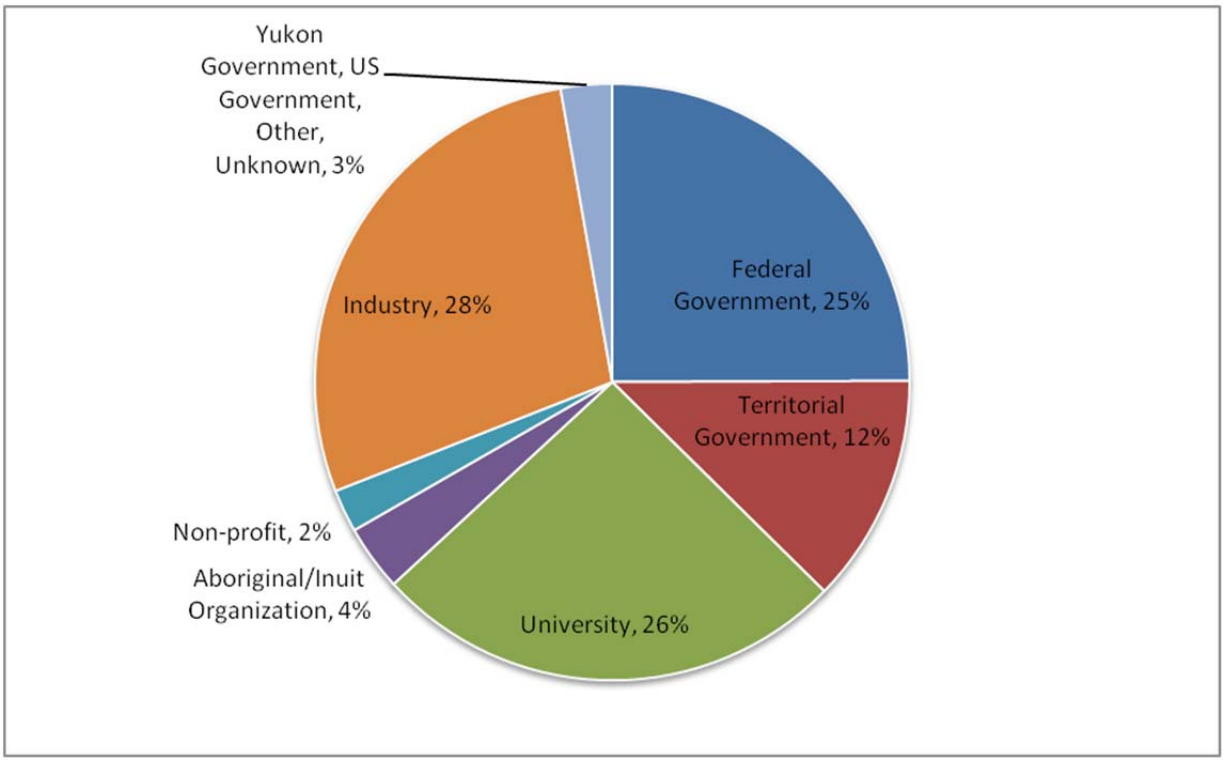

Figure 10. Breakdown of researcher affiliation 2000-2009.

Annual trends for researcher affiliation are shown in Figure 11. Generally the percentages of research conducted by non-profit, Aboriginal and Inuit organizations, and GNWT employees has remained relatively constant, whereas research conducted by industry-affiliated researchers, federal employees, and to a lesser degree, university-affiliated researchers has fluctuated more wildly. As seen in Figure 11 and Figure 12, there are a few notable peaks worth exploring.

Industry affiliation peak: 2003-2004. Of 116 industry-related licences issued in 2003, 48 were relating to the Mackenzie Gas Project. Of the 113 industry-related licences issued in 2004, 48 were relating to the Mackenzie Gas Project.

Federal government affiliation peak: 2008. This peak relates generally to the lower number of licences issued overall in 2008, coupled with a generally consistent number of studies conducted by federal employees, rather than an increase in federal projects.

Industry affiliation drop: 2008. A low number of industry-related projects were permitted in 2008, possibly related to economic recession, the delayed Joint Review Panel of the Mackenzie Gas Project process, and stalled gas exploration in the Mackenzie Delta. The recession also affected mining exploration development in other parts of the NWT.[1]

[1] Paulo Flieg, pers. comm., 2011.

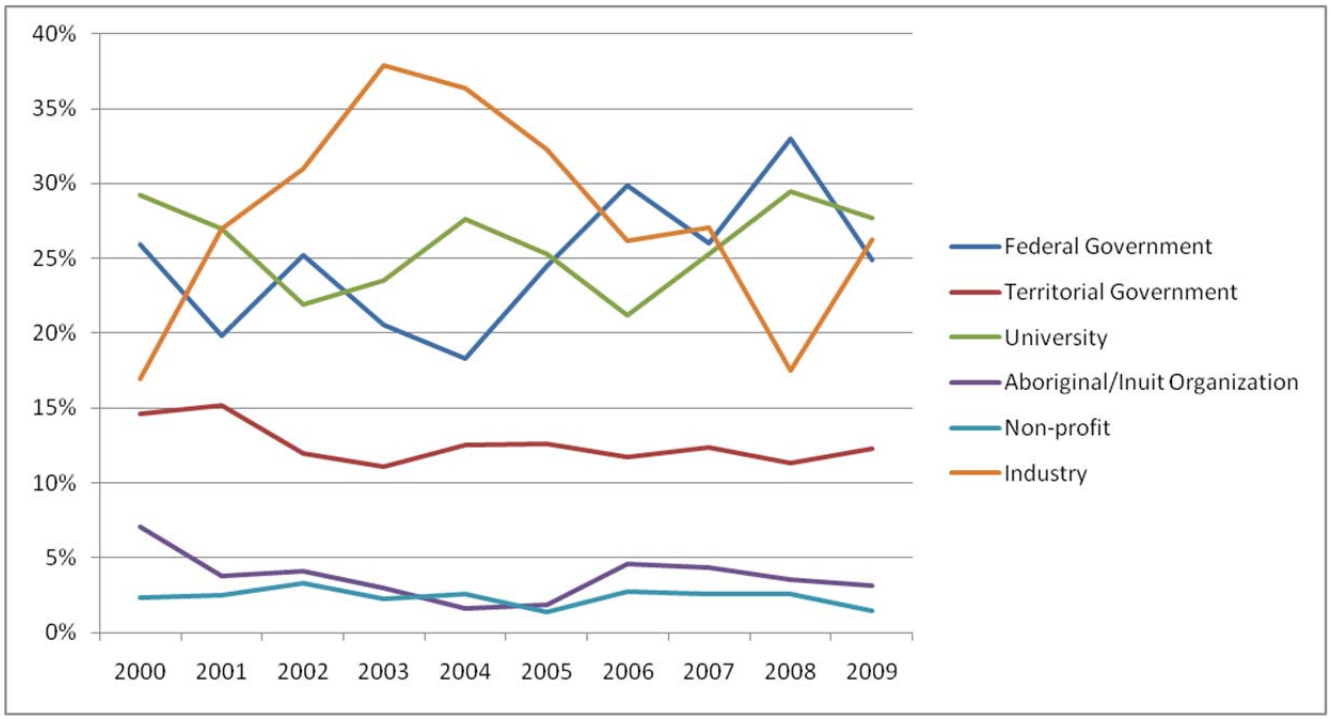

Figure 11. Breakdown of researcher affiliation annually 2000-2009, by percentage.

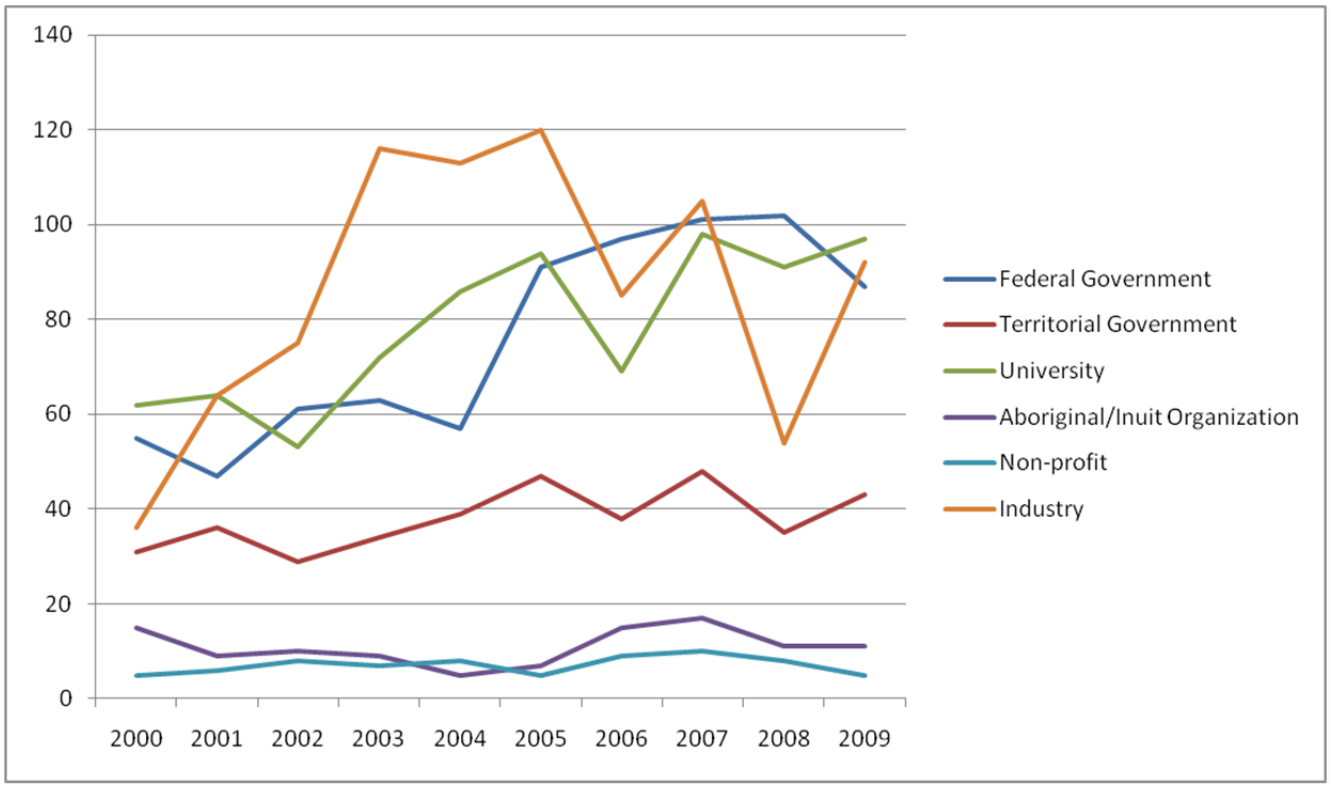

Figure 12. Breakdown of researcher affiliation annually 2000-2009, by absolute count.

Unfortunately, funding information is only available for SRL issued from 2000-2004, a portion of SRL issued for 2005, a majority of ARP, and about a quarter of RPC. For the purposes of this assessment and to ensure consistency, only SRL from 2000-2004 are included in the following graphs (Figure 13, Figure 14, Figure 15). Based on the SRL from 2000-2004, the majority of research projects which required a SRL are funded by the federal government or by industry.

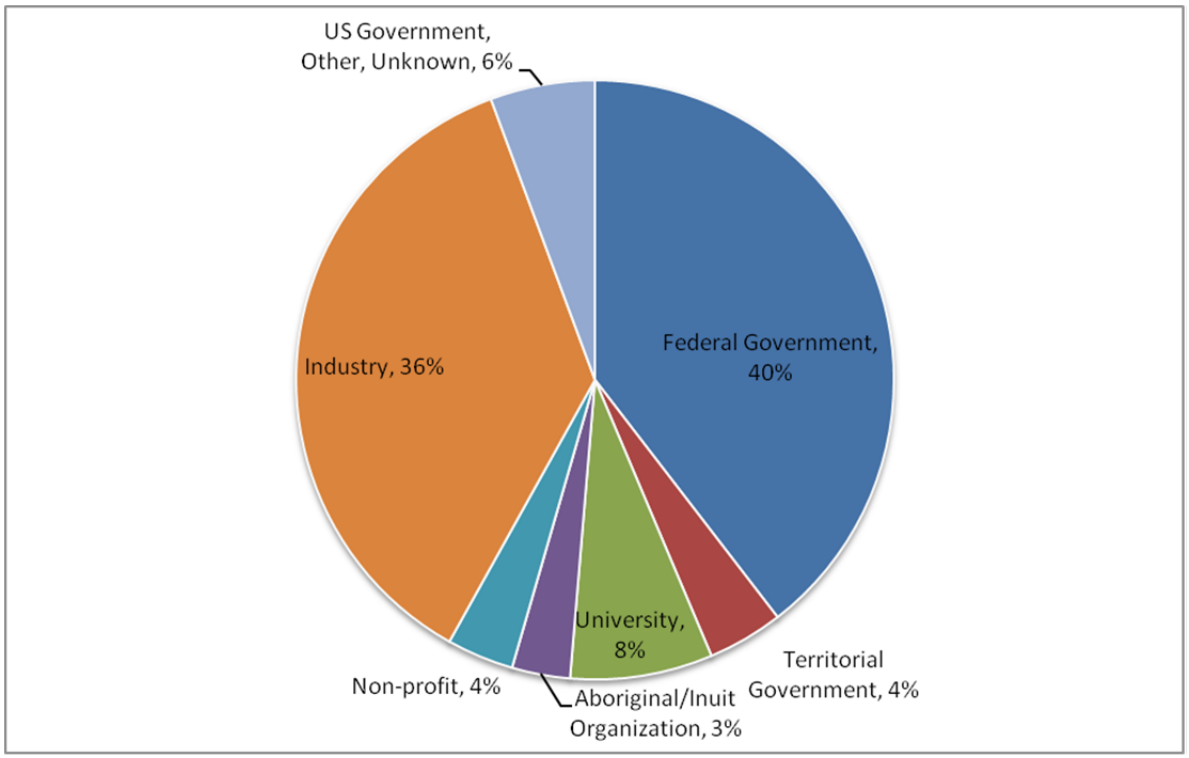

Figure 13. Breakdown of project funding, SRL only, 2000-2004.

Although it is difficult to discern long-term patterns from the five years of SRL data available, a large increase in industry-funded projects around the time of the Mackenzie Gas Project licence 'explosion' as described above is noticeable.

It also appears that a large number of projects are funded by the federal government. Of the 252 SRL funded by federal moneys (Figure 13), 155 or 62% were associated with university researchers. Additionally, six SRL are from Aboriginal or Inuit organizations, ten are consultants or industry-related, three are from non-profit organizations, and five are from territorial government organizations. Only 73 federally-funded projects, or 29%, are from federal employees. The federal government funds universities and academic programs such as Natural Sciences and Engineering Research Council (NSERC), Social Science and Humanities Research Council (SSHRC), Canadian Institute of Health Research (CIHR), and others such as International Polar Year (IPY). The federal government also funds federal employees through their various agency budgets, including Environment Canada, Natural Resources Canada, and Indian and Northern Affairs. Of the 16 SRL issued to territorial researchers between 2000 and 2004, 11 are funded territorially and five with federal funds. In addition, some of the funds shown here as University 8%, may actually be federally supported.

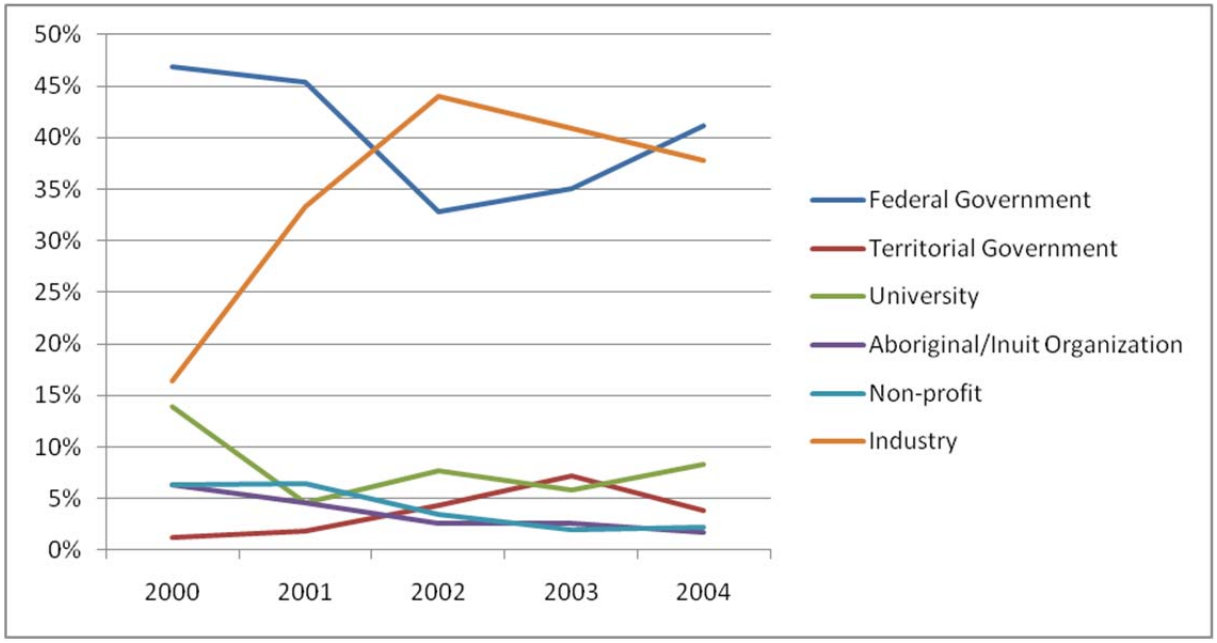

Figure 14. Breakdown of annual project funding, SRL only, 2000-2004, by percentage.

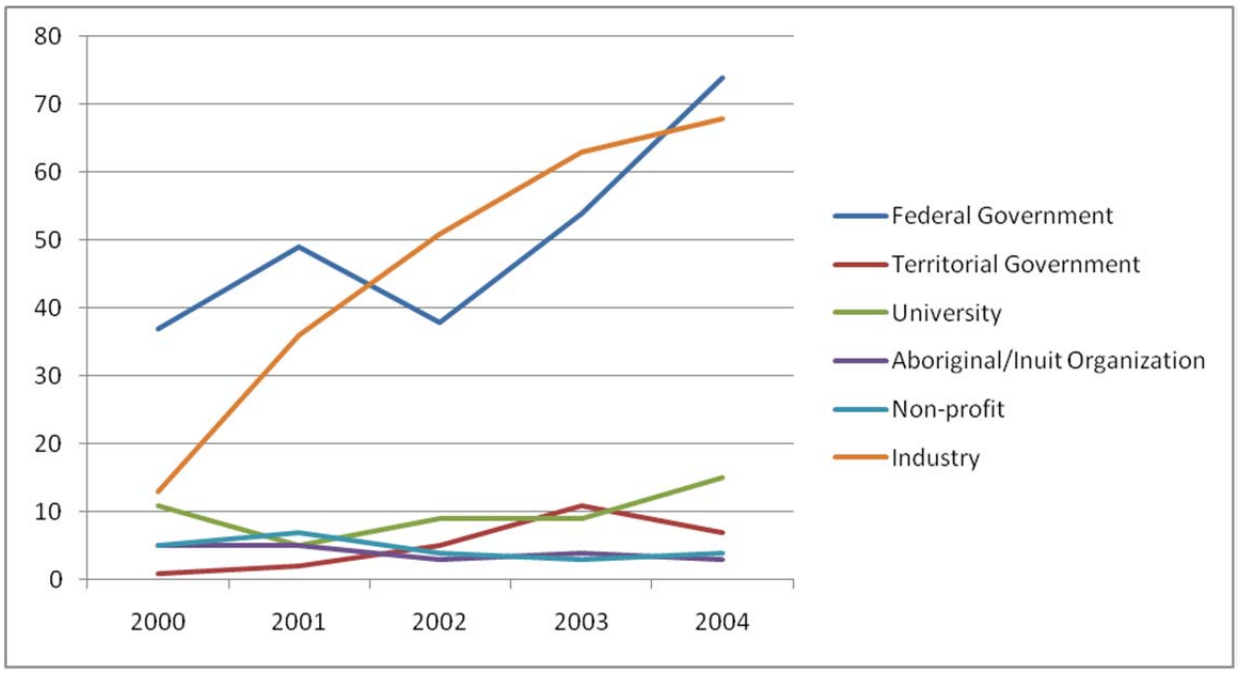

Figure 15. Breakdown of annual project funding, SRL only, 2000-2004, by absolute count.

Retrospective: Licensing Burden

A key aspect of the licensing retrospective was to determine the licensing burden on researchers conducting research in the Northwest Territories. In order to determine and define 'burden', each licence was assessed to determine if there were other licences applied for, for the same study; and if the other licences were in the same year or if the study was a multi-year undertaking. In some cases (in particular wildlife research permits and some university research) it was difficult to assess the end of one study and the start of another by the same proponent. In these cases, projects were more often grouped rather than split. An imaginary example might be a university professor who studies Laurentian geology in the North Slave in year one, Laurentian geology in the Sahtu in year two, and Devonian geology in the Sahtu in year three – all with similar funding and research methodology. However, such instances of 'scope creep' in projects were somewhat limited and should not impact this assessment greatly.

Retrospective of Licensing Burden: Multi-year projects

Of 3053 licences, 2155 or 71% were multi-year projects. The categorization of multi-year was added to each record during this assessment by searching for similar project titles and proponents. If a project occurred in more than one year, it was given the multi-year tag. To correct for projects which may have ended in 2000 or started in 2009, from 2001-2008 the number of multi-year projects was 1857 out of a total of 2491, or 74.5%, probably a more accurate figure. Note that multi-year SRL started to be issued in 2009, however this statistic would miss projects ending in 2009 and not apply to all other licence/permit types. Figure 16 shows the annual breakdown of multi-year and single-year projects.

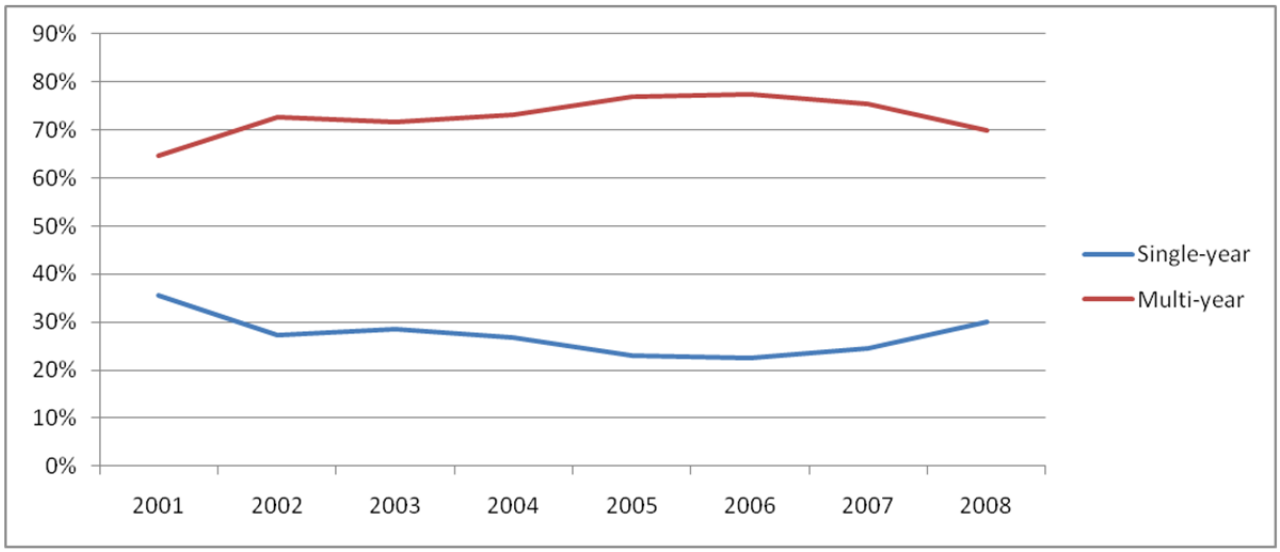

Figure 16. Breakdown of annual percentages of multi-year vs. single year projects 2001-2008.

From 2001-2008, 890 multi-year SRL were applied for, out of a total of 1246 licences (71%). It is therefore possible that in the future, nearly three-quarters of SRL applications will be for multi-year licences. Although likely rare (this was not assessed), some multi-year licences had different types of licences in different years – for example, a study on waterfowl was issued five licences in three years (see Table 3).

Table 3. Example multi-year project with multiple licence types.

Year	Licence	Component
2001	Scientific Research Licence (ARI)	Traditional Knowledge component
2002	Scientific Research Licence (ARI)	Traditional Knowledge component
2001	Wildlife Research Permit (ENR)	Biological research component
2002	Wildlife Research Permit (ENR)	Biological research component
2003	Wildlife Research Permit (ENR)	Biological research component

Retrospective of Licensing Burden: Community contact requirements

Only the SRL data had an indication of the number of community organizations contacted by the proponent about their research, although all major permit types require this type of contact.[2] The number of organizations contacted by the researcher is inferred from the distribution list included in SRL data (see *APPENDIX 1: Assumptions and information about data analysis* for more information on how this list was used). The assessment of community contact requirements is therefore limited to SRL. Twenty projects had no organizations listed, which is assumed to be a data entry error. These 20 were not included in this assessment.

The number of organizations contacted ranged from one (n=27) to 81 (n=1), with the most common number of contacts at five organizations (232 licences required five contacts). The following chart shows the number of organizations contacted (Figure 17). It does not include the 13 licences issued which required from 31 to 81 community organizations to be contacted.

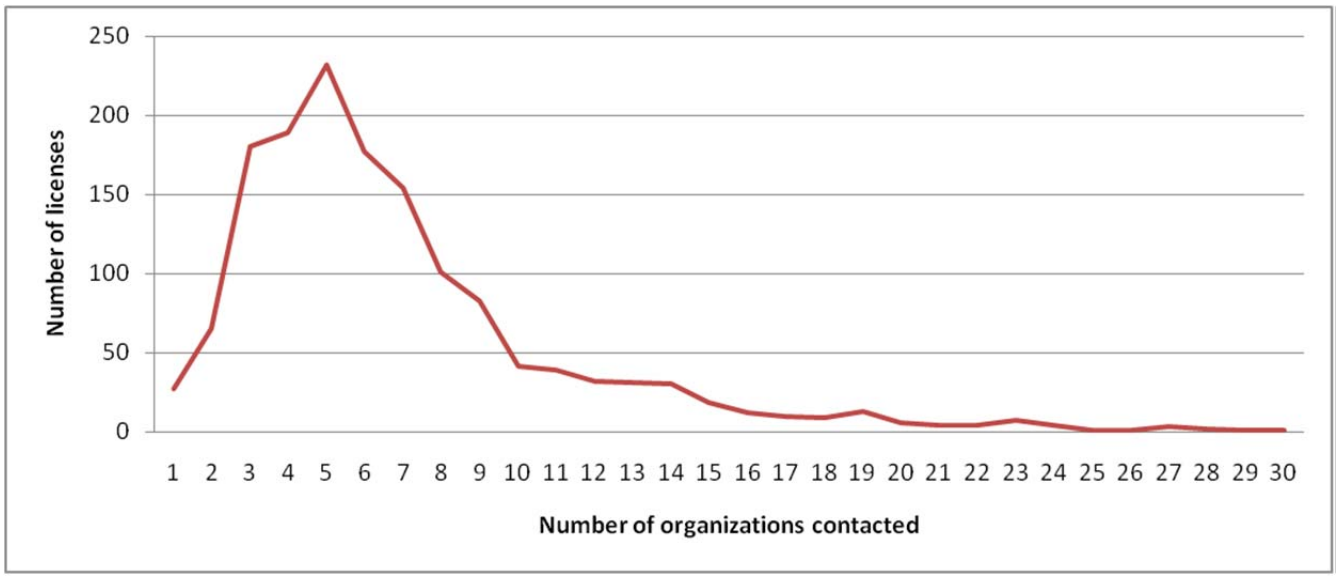

Figure 17. Number of organizations contacted per licence 2000-2009.

[2] For further information about the research permitting process, including community contact, please see:
Canadian Arctic Research Licensing Initiative: Scientific Licensing in the NWT. An International Polar Year – Federal Program Office Initiative. Prepared by Terriplan Consultants, Yellowknife NT. Revised by Aurora Research Institute, NT.

SRL – Scientific Research Licence , WRP – Wildlife Research Permit, LFSP – Licence to Fish for Scientific Purposes, RPC – Research and Collection Permit Parks Canada, ARP – Archaeological Research Permit

The majority of licences require between three and nine contacts. However, almost 200 licences – a substantial number – required 10 to 15 contacts.

The annual trend has been for the number of organizational contacts to remain constant at between six and eight, after a slight increase early in the decade (Figure 18). The 2009 average is 8.6 organizations per licence, which may indicate a general overall increasing trend. This tendency likely reflects changes in research trends as described below, for example:

- An increase in multi-scope projects (see Table 1). A biology project with a traditional knowledge components would have to contact renewable resource or hunters and trappers councils, plus the Band or cultural organizations.
- A shift in the type of research being conducted. More social research, for example, may cause an increase in the number of organizations being contacted per project (see Figure 4 and Figure 5).
- A shift to more multi-region projects (Table 2).

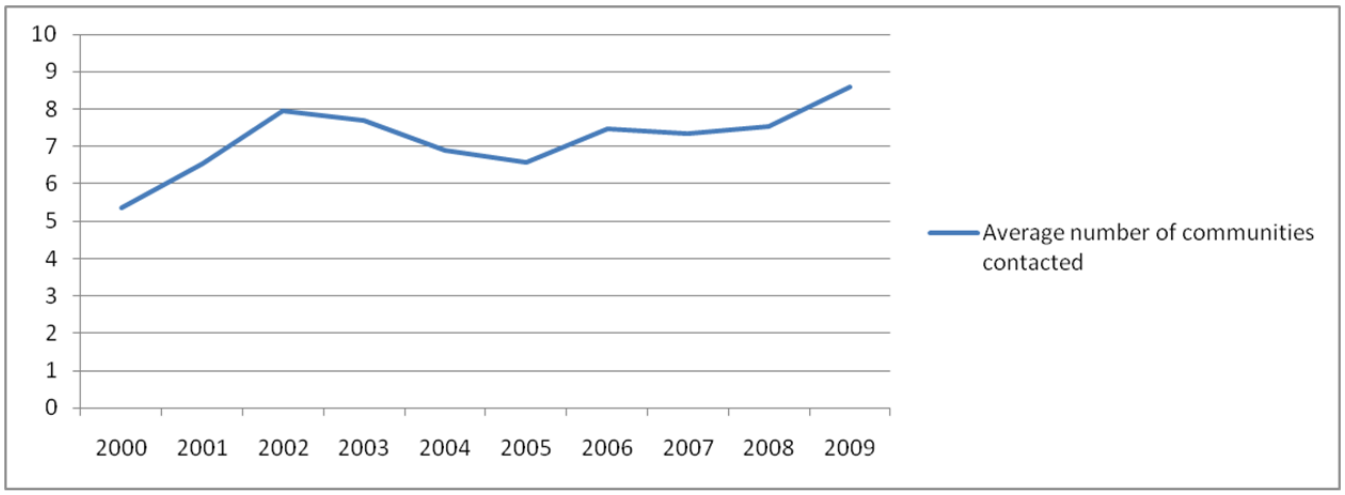

Figure 18. Annual average for number of communities contacted, 2000-2009.

For discussion purposes, licences which required more than 15 community organizations to be contacted can be considered "*high-impact: contacts*". There were 91 of these projects. An obvious factor in the number of community contacts required is the number of regions the project will take place in, as demonstrated in Table 4. NWT-wide licences were much more likely to be *high-impact: contacts* than not, and a much smaller portion of *high-impact: contacts* licences were conducted in a single region compared to all licences.

Table 4. Comparison of 'high-impact: contacts' licences with all licences.

Number of Regions	Percent of 'high-impact: contacts' licences	Percent of total licences
1	23%	79%
2	30%	14%
3	16%	2%
4	15%	2%
5	2%	0%
6	13%	2%

Table 5 shows the percentage of licences that were categorized as *high-impact: contacts* compared to the total licences for theme and region. These percentages are also displayed as 'radar' charts in Figure 19 and Figure 20. They indicate that the *high-impact: contacts* licences were much more likely to come from social science, traditional knowledge, or engineering work; and much less likely to come from biological studies. Additionally, it is slightly more likely that research conducted in the Sahtu, Deh Cho, and Gwich'in areas will be classified as *high-impact: contacts*.

Table 5. Comparison of 'high-impact: contacts' licences with all licences for theme and region.

Theme	Percentage of 'high-impact: contacts' licences	Percentage of total licences
Biology	15%	55%
Physical Science	20%	20%
Engineering	11%	3%
Contaminants	1%	2%
Health	10%	2%
Social Science	35%	15%
TK	10%	4%
Region		
Inuvialuit	66%	38%
Gwich'in	68%	19%
Sahtu	46%	16%
North Slave	30%	27%
South Slave	27%	18%
Deh Cho	46%	19%

The two obvious trends for *high-impact: contacts* licences can be easily seen in the 'radar' chart below where the spike of social sciences is quite different than the overall trend of most research falling into the biology category. Even when compared to only other SRL, there is still a strong trend towards more social science over biology or physical science being designated as *high-impact: contacts.*

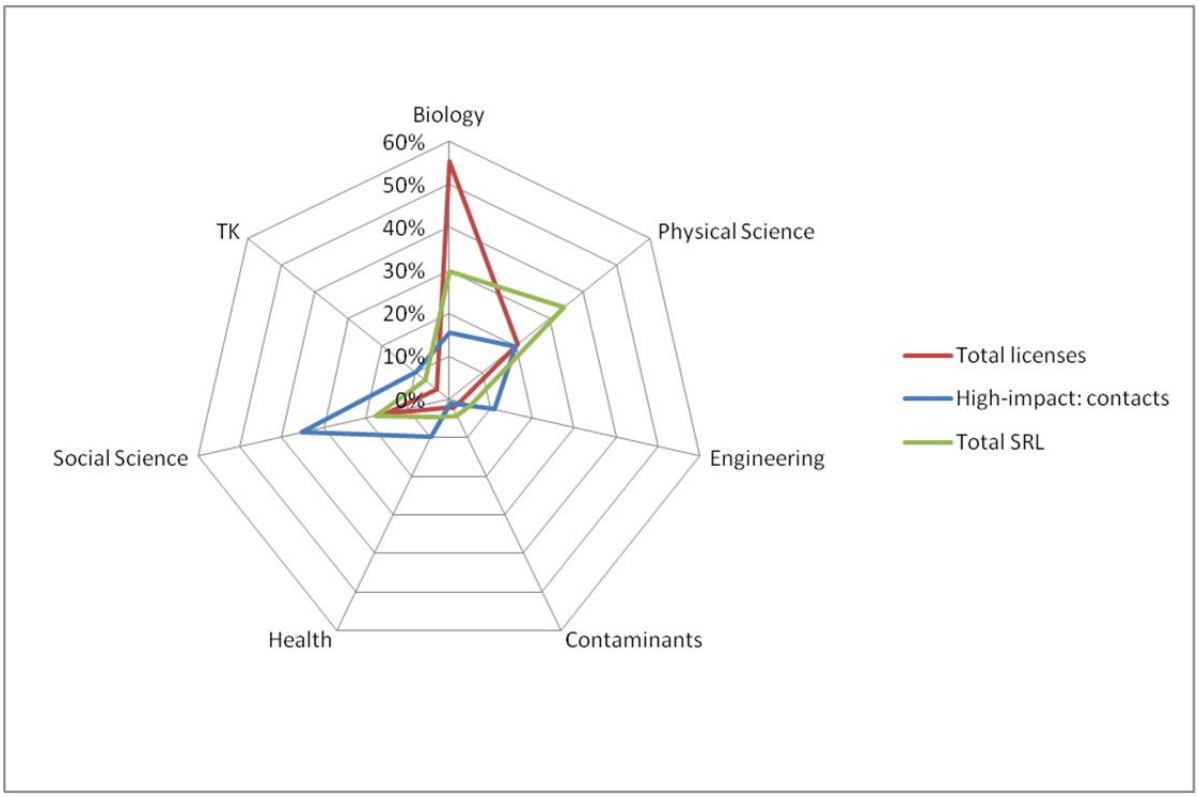

Figure 19. Comparison between total licences and *high-impact: contacts* licences by theme, 2000-2009.

The trend for *high-impact: contacts* for regional difference is much more muted, as shown in Figure 20. There is a slight trend for a higher number of contacts required in the Gwich'in, Sahtu, and Deh Cho.

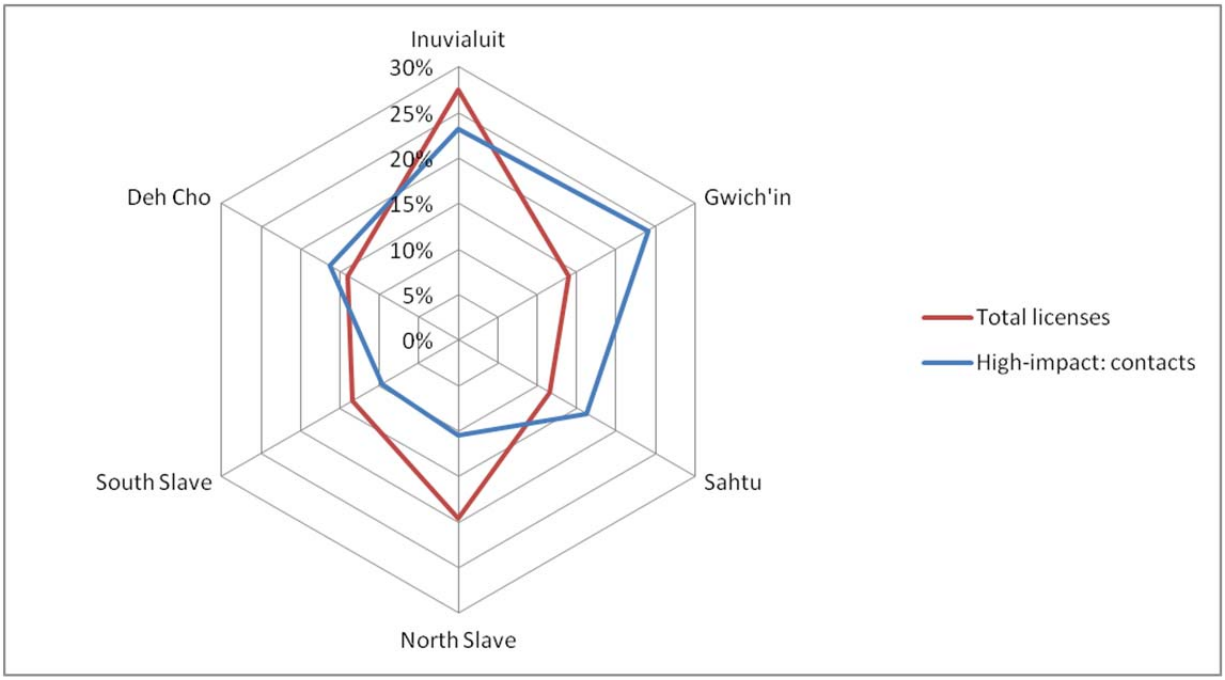

Figure 20. Comparison between total licences and *high-impact: contacts* licences by region, 2000-2009.

SRL – Scientific Research Licence , WRP – Wildlife Research Permit, LFSP – Licence to Fish for Scientific Purposes, RPC – Research and Collection Permit Parks Canada, ARP – Archaeological Research Permit

Retrospective of Licensing Burden: Duplication of major permits

As noted above, during this assessment projects were assigned to 'umbrella' projects as appropriate, using a key word. There were two main types of umbrella projects: research and industry. For example, umbrella project Taltson includes all work on the Taltson Hydro Project, in the South Slave region. This is an example of an industry project. An example research umbrella project is GroundIce - Near-surface ground ice in sediments of the Mackenzie Delta region. Non-industry umbrella projects generally include a single research focus and might be as small as a population count of wolverine in a single area over several years, or might be as large as an International Polar Year project with several components.

Industry projects were assessed differently – instead of the theme or topic of the research being the linking mechanism, the development was the link. For example, a diamond mine will have multiple research studies relating to fisheries, wildlife, human environment, contaminants, and others as part of the impact assessment; and may also have multiple monitoring projects after construction or production commences. All of these studies would be assigned to the same umbrella project, irrespective of their theme or topic.

An umbrella project might be simple: a project which obtained a single SRL every year for five years and nothing else; or a single-year project which obtained both a SRL and a WRP. It may also be more complex, a project which obtained multiple major permits over multiple years.

Categorizing research into umbrella project has allowed for an understanding of which projects required multiple licences and how many years these projects tended to last, and to identify triggers to high-impact projects.

Of the 3053 permits assessed, 2212 (72%) were affiliated with an umbrella project, and 840 (28%) were stand-alone, single year projects. A total of 412 umbrella projects were identified, with an average of 5.3 licences per umbrella project. However, if the Mackenzie Gas Project – which accounted for an inordinately large number of licences – is removed, the numbers are 1965 total projects associated with an umbrella project (or 70% of all non-MGP permits), and an average of 4.8 licences each.

Umbrella projects were assessed for total number of licences, number of years, number of types of licences, and licences per year. A majority – 239 or 58% – were umbrella projects which had a single licence (generally WRP, less often a SRL) per year. There were 173 umbrella projects (41%) which required more than one type of permit in any one year (for example, a LFSP and a SRL, or two WRP, or two SRL and one PCRC, etc). These projects account for 1183 of the permits assessed – that is, 39% of all licences issued are issued to portions of research projects which obtain multiple permits in at least one year of their research.

The following table shows the 25 largest umbrella projects sorted based on the number of licences issued. All development-related projects are italicized and bold.

Table 6. High-impact umbrella projects with licence counts.

Umbrella project	Count of licences	Number of years	Licences per year
Mackenzie Gas Project	247	10	24.70
Ekati Mine	82	10	8.20
Diavik Mine	52	10	5.20
Snap Lake Mine	40	10	4.00
Gah Cho Kué Mine	36	8	4.50
NICO Mine	30	7	4.29
Anadarko (petroleum)	26	6	4.33
Evolutionary change in stickleback populations	20	7	2.86
Taltson hydro	20	8	2.50
Bathurst Caribou survey	17	9	1.89
Colomac Mine	17	5	3.40
Snow goose study ISR	16	7	2.29
Great Slave Lake contaminants	16	6	2.67
Whooping Crane study, Wood Buffalo NP	16	10	1.60
Grizzly study ISR	15	8	1.88
Devon Canada (petroleum)	14	4	3.50
Tibbit to Conwoyto Winter Road	14	8	1.75
Cameron Hills/Paramount (petroleum)	13	6	2.17
Carbon Dynamics study	13	8	1.63
Canadian Zinc's Prairie Creek mine	13	4	3.25
GNWT monitoring of furbearers and hares	13	10	1.30
Yellowknife Gold Project (Tyhee)	13	5	2.60
Biological studies of waters – MGP route	11	4	2.75
Canadian Arctic Shelf Exchange Study (CASES)	11	6	1.83
Giant and Con Mine, Enviro. Effects Monitoring	11	5	2.20

If the umbrella projects are sorted by the number of licences per year, a slightly different list emerges, one which places less emphasis on projects which stretched over many years, and more emphasis on projects which required more licences over a shorter period (Table 7).

Table 7. High-impact umbrella projects sorted by licences per year.

Project	Licences per year	Count of licences	Number of years
Mackenzie Gas Project	24.70	247	10
Ekati Mine	8.20	82	10
Hydro-ecological Responses of Arctic Tundra...	6.00	6	1
Diavik Mine	5.20	52	10
Thor Lake Rare Earth Metals Project	5.00	10	2
Gah Cho Kué Mine	4.50	36	8
Anadarko (petroleum)	4.33	26	6
NICO Mine	4.29	30	7
Snap Lake Mine	4.00	40	10
Alaskan Gas Producers Pipeline	4.00	4	1
Mini-harvest of muskoxen for meat & disease study	4.00	4	1
Devon Canada (petroleum)	3.50	14	4
Abnormal loche livers GSA	3.50	7	2
Colomac Mine	3.40	17	5
Canadian Zinc's Prairie Creek mine	3.25	13	4
MacTung Project	3.00	6	2
Pine Point Mine (closure and EIS)	3.00	6	2
Shortjaw Cisco survey in Yellowknife Bay	3.00	6	2
The Genographic Project	3.00	3	1
GRRB Fish Studies in the Arctic Red River	3.00	3	1
Lutsel K'e Mini Hydro Project	3.00	3	1
Tuktoyaktuk to Source 177 Access Road	3.00	3	1
Evolutionary change in stickleback populations	2.86	20	7
Biological studies of waters – MGP route	2.75	11	4
Great Slave Lake contaminants	2.67	16	6

As industry-related projects and non-industry related projects are essentially quite different, they will be considered separately in the assessment of overlap. Four categories of high-impact studies can be identified from the two tables above: *high-impact: licence count (industry), high-impact: licence count (non-industry), high-impact: licences per year (industry)*, and *high-impact: licences per year (non-industry)*. Six industry and six non-industry projects from the two tables above will be used as examples to identify duplication and triggers for high-impact studies. Projects will be selected from within the highest ranking studies and will be from various regions and study types.

High-impact: licence count (industry) and high-impact: licence per year (industry)

Research permits associated with the proposed Mackenzie Gas Project were by far the most numerous and will be included in this assessment. The four industry projects which had the largest number of

licenses after the MGP were diamond mines. A single diamond mine (Diavik) will be assessed as representative of the licensing process for these mines. The Taltson River Hydro Power Supply to Snap Lake Diamond Mine Environmental Baseline Studies will also be assessed and Paramount Resources Limited petroleum developments in the Cameron Hills. Two projects of short duration but high impact will also be assessed: Tuktoyaktuk to Source 177 Access Road, and Thor Lake Rare Earth Metals Project.

Mining developments were well represented in the identification of *high-impact: licence count (industry)* studies.

Mackenzie Gas Project

> *The Mackenzie Gas Project is a proposed 1,196-kilometre natural gas pipeline system along the Mackenzie Valley of Canada's Northwest Territories to connect northern onshore gas fields with North American markets.*[3]

The proposed Mackenzie Gas Project was far and away the highest-impact development for licensing burden. It is a *high-impact: licence count (industry)* and *high-impact: licence per year (industry)* project.

Table 8. Mackenzie Gas Project licensing

Years: 2000-2009	
Number of licences	247
Years	10
Licences per year	24.7
Community contact for SRL (av. per licence)	9
Regions	Inuvialuit: 119 Gwich'in: 71 Sahtu: 66 Deh Cho: 57
Types and number of licences	SRL: 184 (2000-2009) ARP: 17 (2001-2008) LFSP: 17 (2003, 2005-7, 2009) WRP: 29 (2001-4, 2006-9)
Themes and counts of licences/theme	Biology: 117 Physical science: 33 Engineering: 52 Contaminants: 1 Health: 0 Social science: 22 Traditional knowledge: 24
Affiliation of proponent researchers	Industry: 246 University: 1

Duplication and overlap:

Multiple licences were issued for the Mackenzie Gas Project in multiple areas, for each theme, in the same year. The scope of the research was large and varied – from technical engineering studies to traditional knowledge gathering research to socio-economic interviews to fisheries studies; and many separate components each received a separate permit. There was duplication of licences of the same

[3] http://www.mackenziegasproject.com/ Visited March 4, 2011.

topic between regions and between years. Generally, all permit types were issued yearly, so overlap of permitting effort was spread across the decade.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (10)
- Multiple regions (4)
- Multiple themes (6)
- Multiple licence types (4)
- Main focus: biology
- Licences split by component (e.g. separate license for hydrology component and social science component, etc)

Diavik Mine

> *The Diavik Diamond Mine is located in one of the most remote and forbidding places in the world - 220 kilometres south of the Arctic Circle and on the bed of a vast northern lake, Lac de Gras... construction of the Diavik Diamond Mine [was] completed in 2003. The mine, which has a current footprint of approximately 10 square kilometres, is projected to produce approximately 110 million carats of diamonds over its mine life of 16 to 22 years, with an expected annual diamond production peak of approximately 10 million carats. Diavik currently mines three diamond-bearing ore bodies known as kimberlite pipes using a combination of open pit and underground mining methods.*[4]

The Diavik mine in the North Slave is an operating diamond mine – licences included in this assessment are from both before the mine was complete but during construction, and post-construction research and monitoring (i.e. the archaeological work and EIS was not included in the timeframe of this assessment). It is a *high-impact: licence count (industry)* and *high-impact: licence per year (industry)* project.

Table 9. Diavik mine licensing

Years: 2000-2009	
Number of licences	52
Years	10
Licences per year	5.2
Community contact for SRL (av. per licence)	5.9
Regions	North Slave: 52 South Slave: 25
Types and number of licences	SRL: 30 (2000-2009) ARP: 0 (assume all was pre-2000) LFSP: 14 (2000, 2003, 2005-9) WRP: 8 (2000-4, 2006-9)
Themes and counts of licences/theme	Biology: 44 Physical science: 6 Engineering: 0 Contaminants: 1 Health: 0

[4] http://www.diavik.ca/ENG/ouroperations/index_ouroperations.asp Visited March 5, 2011.

Affiliation of proponent researchers	Social science: 0 Traditional knowledge: 3 Industry: 44 Federal Government: 1 Territorial Government: 3 University: 4

Duplication and overlap:

Multiple licences were issued for Diavik each year, although it focussed on biology research under SRL and LFSP – Diavik is located on a large lake and fisheries and fisheries ecosystem management seems to be important. More than five licences were required per year. Generally, all permit types were issued yearly, so overlap of permitting effort was spread across the decade.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (10)
- Multiple licence types (3)
- Main focus: biology
- Licences split by component

Taltson River Hydro Power Supply to Snap Lake Diamond Mine

> *In 1966, a hydroelectric generating facility was built on the Taltson River to provide power for the Pine Point Mine. The mine was closed in 1987. Since then, the hydro generation facility has been operating below its capacity...The proposed Taltson Hydroelectric Expansion Project would take advantage of the excess generating capacity and untapped hydroelectric potential of the Taltson area...Using 690 kilometres of new transmission line, this facility would supply renewable electricity to the existing Ekati, Diavik and Snap Lake mines, and to the proposed Gahcho Kué mine.*[5]

Environmental and other research relating to the Taltson River Hydro project, although currently on hold, spanned eight years. It is a *high-impact: licence count (industry)* project.

Table 10. Taltson River Hydro licensing

Years: 2000-2009 (no licences 2002 and 2005)	
Number of licences	20
Years	8
Licences per year	2.5
Community contact for SRL (av. per licence)	6.3
Regions	North Slave: 7 South Slave: 18
Types and number of licences	SRL: 7 (2003-4, 2006-9) ARP: 4 (2004, 2007-9) LFSP: 2 (2006-7) WRP: 7 (2000-1, 2003-4, 2006, 2008)
Themes and counts of licences/theme	Biology: 15 Physical science: 1

[5] http://www.deze.ca/taltson_project/index.html Visited March 5, 2011. The project is currently on hold.

	Engineering: 0 Contaminants: 0 Health: 0 Social science: 4 Traditional knowledge: 0
Affiliation of proponent researchers	Industry: 18 Territorial Government: 2

Duplication and overlap:

The Taltson project had fewer licences per year than the large mining projects, which may relate to the type of development or to the stage of assessment. As with the Diavik mine, research focussed on biology but was generally conducted under SRL and WRP. Although permits of each type were not issued each year, there was still a significant amount of overlap each year with permits.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (8)
- Multiple regions (2)
- Multiple licence types (4)
- Main focus: biology

Paramount Resources Limited Petroleum Developments in the Cameron Hills

> *Paramount Resources Ltd. is a Canadian energy company, incorporated in 1978, that explores for, develops, processes, transports and markets petroleum and natural gas.*
> *... [Paramount's "Northern" unit's] primary focus remains at Cameron Hills in the Northwest Territories, where properties generate a significant portion of Northern's total natural gas, crude oil and NGLs production.* [6]

Six years of various research projects for a variety of drilling, pipeline, and related petroleum development for Paramount Resources in the Cameron Hills area received research licences. It is a *high-impact: licence count (industry)* project.

Table 11. Paramount Resources: Cameron Hills licensing

Years: 2000-2007 (no licences 2001 and 2006)	
Number of licences	13
Years	6
Licences per year	2.2
Community contact for SRL (av. per licence)	9.5
Regions	North Slave: 3 South Slave: 8 Deh Cho: 10
Types and number of licences	SRL: 4 (2000-2004) ARP: 1 (2000) LFSP: 1 (2000)

[6] http://www.paramountres.com/about_us/ and http://www.paramountres.com/operating_areas/operating_units/northern.html Visited March 7, 2011.

	WRP: 7 (2000-2007, multiples some years)
Themes and counts of licences/theme	Biology: 11 Physical science: 0 Engineering: 1 Contaminants: 0 Health: 0 Social science: 1 Traditional knowledge: 0
Affiliation of proponent researchers	Industry: 13

Duplication and overlap:

As with other industry-related projects, the majority of licences were relating to biological research. The SRL included general environmental assessment, as well as re-vegetation/permafrost monitoring. Wildlife research permits covered general bio-physical research for the environmental impact assessment process and wildlife presence monitoring. There were more licences, and consequently more duplication of licensing effort, near the start of the assessment period.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (8)
- Multiple regions (2)
- Multiple licence types (4)
- Main focus: biology
- Early in EIS process

Tuktoyaktuk to Source 177 Access Road

> *The Hamlet of Tuktoyaktuk is constructing a 22-km all-weather road from the community south to a gravel source known as "Source 177".* [7]

Three licences were issued in a single year for research pertaining to this road. It is a *high-impact: licence per year (industry)* project.

Table 12. Tuktoyaktuk to Source 177 licensing

Years: 2009	
Number of licences	3
Years	1
Licences per year	3
Community contact for SRL	6
Regions	Inuvialuit: 3
Types and number of licences	SRL: 1 (2009) ARP: 1 (2009) LFSP: 1 (2009)
Themes and counts of licences/theme	Biology: 2 Physical science: 0 Engineering: 0 Contaminants: 0

[7] From SRL database

	Health: 0 Social science: 1 Traditional knowledge: 0
Affiliation of proponent researchers	Industry: 3

Duplication and overlap:

One of each fisheries, archaeological, and scientific licences were issued to this study. The SRL was fisheries-related, creating an area of overlap.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple licence types (3)
- Main focus: biology (fisheries)

Thor Lake Rare Earth Metals Project

> *The Nechalacho Rare Earth Element Project located at Thor Lake, Northwest Territories, is Avalon's 100% owned flagship project and is recognized internationally for its exceptional wealth of heavy rare earth elements.*[8]

Ten licences in only two years issued for the proposed "Nechalacho Rare Earth Element Deposit" make it a *high-impact: licence per year (industry)* project.

Table 13. Thor Lake Rare Earth Metals licensing

Years: 2008-2009	
Number of licences	10
Years	2
Licences per year	5
Community contact for SRL (av. per licence)	7.8
Regions	North Slave: 10 South Slave: 10
Types and number of licences	SRL: 9 (2008-2009) WRP: 1 (2009)
Themes and counts of licences/theme	Biology: 6 Physical science: 4 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	Industry: 10

Duplication and overlap:

Duplication and overlap in licences issued for this development are limited to SRLs. Each component of the study had a separate licence:

- *2008 Terrain component*

[8] http://avalonraremetals.com/projects/thor_lake/thor_lake_intro/ Visited March 7, 2011.

- *2008 Aquatics and Hydrology component*
- *2008 Fisheries component (assume at least some years will require LFSP)*
- *2009 Groundwater Hydrology and Hydrogeology*
- *2009 Surface Water Hydrology*
- *2009 Soils, Terrain and Permafrost Component*
- *2009 Aquatics Component*
- *2009 Vegetation Component*
- *2009 Fisheries Component*

As the project EIS ramps up, it is likely that other components would require separate permits: Human Environment (multiple themes), TK, and archaeology.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Main focus: biology
- Early in EIS process
- Licences split by component

High-impact: licence count (non-industry) and High-impact: licence per year (non-industry)

The *high-impact: licence count (non-industry)* projects which had the highest licensing burden included a study on stickleback fish by an American university professor, surveys of the Bathurst caribou herd, snow geese, grizzly bears, and furbearers by GNWT biologists, a whooping crane study in Wood Buffalo National Park, a hydrological study relating to petroleum development, and the Canadian Arctic Shelf Exchange Study. The *high-impact: licence per year (non-industry)* projects were also varied, and included more fisheries studies and the Genographic project, and had overlap with the *high-impact: licence count (non-industry)* list as well. Although originally six projects were selected to assess, the preponderance of biology as a main topic was noted – although this reflects a major trigger of biological studies being high-impact – and a seventh example was included (CASES).

Molecular Analysis of Evolutionary Change in Stickleback Populations

> *The research team is interested in the genetic and molecular basis of evolutionary change in animal form. The research goal is to determine whether the same genes control similar skeletal change in different populations and species. Stickleback fish are ideal subjects because different freshwater populations show morphological differences in skeletal structures. Variation in the pelvic spines may be the most striking of these differences: some populations of the ninespine stickleback, brook stickleback and threespine stickleback have large pelvic spines, while others have none at all. In order to test whether these similar skeletal changes also have a similar genetic basis, the researchers will collect sticklebacks with reduced pelvic spines and cross them in the laboratory with sticklebacks with complete spines. This procedure will allow them to map and eventually identify the genes responsible for skeletal differences between populations. Fox Holes Lake is unique because it is one of the few sites in the world containing ninespine and brook sticklebacks with complete reduction of the pelvic spines. Thus, laboratory crosses using fish from this lake will allow the researchers to map the genes responsible for evolutionary change in these exceptional populations.*[9]

It is a *high-impact: licence count (non-industry)* and *high-impact: licence per year (non-industry)* project.

[9] From SRL database.

Table 14. Evolutionary change in stickleback populations licensing

Years: 2000-2, 2004-5, 2007-8	
Number of licences	20
Years	7
Licences per year	2.9
Community contact for SRL (av. per licence)	3.2
Regions	South Slave: 20
Types and number of licences	SRL: 7 (2000-2, 2004-5, 2007-8) LFSP: 6 (2000-1, 2004-5, 2007-8) RPC: 7 (2000, 2002, 2004-5, 2007-8)
Themes and counts of licences/theme	Biology: 20 Physical science: 0 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	University: 17 Non-profit: 3

Duplication and overlap:

Generally, all permit types were issued yearly; and multiple permits of the same type were not needed by year. The duplication of permit effort was therefore between permitting bodies.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (7)
- Multiple licence types (3)
- Main focus: biology

Bathurst Caribou Survey

The Department of Environment and Natural Resources, GNWT, conducted numerous studies on the Bathurst Caribou Herd during 2000-2009. The caribou studies included: monitoring projects including several other herds, studying female caribou movements, collaring caribou, photocensus studies, and contaminants studies. Only WRPs were issued and this is an example of multiple projects of different scopes which were lumped together under a single umbrella project. It is a *high-impact: licence count (non-industry)* project.

Table 15. Bathurst Caribou Survey licensing

Years: 2000-2009 (not including 2004)	
Number of licences	17
Years	9
Licences per year	2
Community contact for SRL (av. per licence)	N/A (none issued)

Regions	Inuvialuit: 7 Gwich'in: 1 North Slave: 9 South Slave: 10
Types and number of licences	WRP: 17 (2000-3, 2005-9)
Themes and counts of licences/theme	Biology: 17 Physical science: 0 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	Territorial Government: 17

Duplication and overlap:

Multiple WRP were issued each year. The permits may be for slightly different aspects of study or for different areas. For example, in 2005, the following two permits were issued:

- *Photocensus, late winter recruitment and post-calving productivity surveys of the Cape Bathurst, Bluenose-West and Bluenose-East barren-ground caribou*
- *To continue to monitor the movements of the Bathurst Caribou Herd*

And in 2009, another two permits:

- *Bathurst Caribou Health, Condition and Contaminants Monitoring*
- *Monitoring of the Bathurst Herd*

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (9)
- Main focus: biology
- Licences split by component

Whooping Crane Studies, Wood Buffalo National Park

> *The last self-sustaining population of whooping cranes breeds in a vast wetland complex in northern Wood Buffalo National Park (WBNP), Canada. For the past fifty years, Canada and the United States have participated in successful conservation efforts to prevent the species' extinction. However, the population of whooping cranes is still not large enough for the cranes to be de-listed from their current endangered status...*[10]

Several types of research were included in this umbrella project: the development of monitoring program, the monitoring program, ecological studies, sampling, studying of prey species. It is a *high-impact: licence count (non-industry)* project.

[10] From SRL Database.

Table 16. Whooping Crane studies licensing

Years: 2000-2009	
Number of licences	16
Years	10
Licences per year	1.6
Community contact for SRL	5 (only one)
Regions	South Slave: 16
Types and number of licences	SRL: 1 (2005) WRP: 6 (2004-9) RPC: 9 (2000-6)
Themes and counts of licences/theme	Biology: 16 Physical science: 0 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	Federal Government: 7 Territorial Government: 6 University: 3

Duplication and overlap:

Generally the licensing burden for this study relates to the number of years it was licensed. However, on several occasions, different component of the study were each given a RPC. It is possible that the different components were each separate and very different studies; unfortunately the level of detail available was insufficient to make this determination.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (10)
- Multiple licence types (3)
- Multiple affiliations (3)
- Main focus: biology
- Licences split by component

Hydro-ecological Responses of Arctic Tundra Lakes to Climate Change and Landscape Perturbation

> *The goal of this work is to understand and model the effects of changing climate (using permafrost degradation as an analogy for changes under a warming climate) on the supply of nutrients to tundra lakes, and on the biological communities within the lakes.*[11]

Six licences were issued in a single year, making this research a *high-impact: licence per year (non-industry)* project.

[11] From SRL database.

Table 17. Hydro-ecological responses licensing

Years: 2009	
Number of licences	6
Years	1
Licences per year	6
Community contact for SRL (av. per licence)	8.7
Regions	Inuvialuit: 6
Types and number of licences	SRL: 3 (2009) LFSP: 3 (2009)
Themes and counts of licences/theme	Biology: 4 Physical science: 2 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	University: 6

Duplication and overlap:

Multiple licences were issued for this project in 2009. The overlap consists of two factors: two types of licences; and multiple licences of the same type for different components. For example, a SRL was issued for this study for each the biology and physical science component. Additionally, a SRL 'amendment' was issued to extend or change the area being studied. Three LFSP were issued, one in/for August and two amendments in October for unknown reasons.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple licence types (2)
- Main focus: biology
- Licences split by component

Mini-harvest of Muskoxen for Meat and Disease Studies

The GNWT was issued four WRPs in one year for this study, making it a *high-impact: licence per year (non-industry)* project.[12]

Table 18. Mini-harvest of muskoxen licensing

Years: 2001	
Number of licences	4
Years	1
Licences per year	4
Community contact for SRL (av. per licence)	N/A
Regions	Inuvialuit: 3 Gwich'in: 1
Types and number of licences	WRP: 4 (2001)

[12] Project description not available.

SRL – Scientific Research Licence , WRP – Wildlife Research Permit, LFSP – Licence to Fish for Scientific Purposes, RPC – Research and Collection Permit Parks Canada, ARP – Archaeological Research Permit

Themes and counts of licences/theme	Biology: 4 Physical science: 0 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	Territorial Government: 4

Duplication and overlap:

The four WRP issued had overlap due to a permit being issued for the same activity in a different areas. One WRP was issued for the Gwich'in area, and three in the Inuvialuit area, all for the same research, but issued in different months so perhaps for different stages or field seasons.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Main focus: biology
- Multiple areas (2)

Spatial and Long-term Trends in Persistent Organic Contaminants and Metals in Lake Trout and Burbot from the Northwest Territories (Great Slave Lake contaminants)

> *This study is designed to determine whether contaminant levels are changing in fish in the Northwest Territories, with a focus on Great Slave Lake…Data received from these various analyses will strengthen Environment Canada's expanding dataset and will prove to be very valuable in investigating whether contaminant levels in fish are changing over time, and whether they differ among locations.*[13]

This Environment Canada project was a long-term project with multiple SRL and LFSP. It is a *high-impact: licence count (non-industry)* and *high-impact: licence per year (non-industry)* project.

Table 19. Great Slave Lake Contaminants licensing

Years: 2004-2009	
Number of licences	16
Years	6
Licences per year	2.7
Community contact for SRL (av. per licence)	7.9
Regions	Inuvialuit: 3 Sahtu: 10 South Slave: 14 Deh Cho: 4
Types and number of licences	SRL: 8 (2004-9) LFSP: 8 (2005-9)
Themes and counts of licences/theme	Biology: 10 Physical science: 0 Engineering: 0 Contaminants: 9

[13] From SRL database.

	Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	Federal Government: 16

Duplication and overlap:

Duplication of permitting effort for this project is mainly related to the number of years involved, and the two types of research permits needed. There was a single SRL issued per year. However, with the LFSP, there was a single licence issued yearly for two years, then multiple permits annually. The multiple permits may relate to different species or field seasons.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (6)
- Multiple licence types (2)
- Main focus: biology

Canadian Arctic Shelf Exchange Study (CASES)

> *Given the possibility of a sustained reduction of the ice cover of Arctic shelves in response to climate warming, the Canadian Arctic Shelf Exchange Study (CASES), a major international effort under Canadian leadership, aims at understanding the biogeochemical and ecological consequences of sea ice variability on the Mackenzie Shelf and provide the knowledge needed to model the impacts of present and forecasted variations in Arctic ice cover.*[14]

This multi-year study was federally funded and had both SRL and LFSP. It is a *high-impact: licence count (non-industry)* project.

Table 20. CASES licensing

Years: 2002-5, 2007, 2009	
Number of licences	11
Years	6
Licences per year	1.8
Community contact for SRL (av. per licence)	6
Regions	Inuvialuit: 11
Types and number of licences	SRL: 8 (2002-5) LFSP: 3 (2005, 2007, 2009)
Themes and counts of licences/theme	Biology: 3 Physical science: 8 Engineering: 0 Contaminants: 0 Health: 0 Social science: 0 Traditional knowledge: 0
Affiliation of proponent researchers	University: 9 Federal Government: 2 (both LFSP)

[14] From SRL database.

Duplication and overlap:

Duplication of permitting effort for this project is mainly related to the size and complexity of the CASES project- including various sub-projects. The sub-projects were each treated like a separate project for licensing purposes; and indeed they were different in scope and topic. There was not appreciable overlap in licensing effort between two licensing types, as in only one year were both SRL and LFSP issued.

Triggers:

The following conditions are considered to be the key triggers to the high number of licences:

- Multiple years (6)
- Licences split by component

Summary: Duplication of major permits

The triggers most commonly associated with high-impact projects (that is, factors which increased licensing burden on scientists or researchers) were:

- If the project was on-going for multiple years
- If the project crossed multiple areas
- If the project included multiple themes (such as physical science and social science)
- If the type of research required multiple licence types, such as a project which included gathering traditional knowledge as well as collecting fish samples.
- If the project was a biological study, that is, if it required WRP and/or LFSP
- If the various components of a larger project each required a permit or permits
- If the project is in the social sciences (from "*high-impact: contacts*" assessment above)

Lesser triggers included:

- For development-related projects, there was an increased burden early in the EI assessment process
- When researchers of differing affiliations shared proponent status (i.e. part of the project led by federal government and part by university researchers)

Retrospective of Licensing Burden: Other permits and licences

Several other types of licences potentially added to the licensing burden. Unfortunately, records for many other types of licences were not as comprehensive as those kept for SRL, WRP, LFSP, RPC, and ARP. In some cases, records were flagged as requiring extra permits if it seemed likely they would based on research type and descriptions (see *APPENDIX 1: Assumptions and information about data analysis*).[15] Flagging the records was possible if the information available supported an educated guess – for example, it was often possible to determine if wildlife would be handled and as such the project would require an Application to Handle Wildlife by description such as "the bears will be radio-collared."

[15] For further information about these extra permitting processes see:
Canadian Arctic Research Licensing Initiative: Scientific Licensing in the NWT. An International Polar Year – Federal Program Office Initiative. Prepared by Terriplan Consultants, Yellowknife NT. Revised by Aurora Research Institute, NT.

However, the project descriptions did not allow for other permit types to be flagged, such as regional land-use permits. For example, project descriptions did not include information like "working on Gwich'in Private Lands" or "the camp will use 10,000L of water per week." Additionally, Forestry Licence information was not available and they were not assessed.

Note that the burden on community reviewers and licensing bodies was not assessed but it is likely that a mirror effect would be in place: for every extra permit a researcher must apply for, staff and community members would have to review, log, and process.

Export Permits – Government of the NWT

Very little information about export permits was recorded in the WRP list. However, when it could be reasonably assumed that an export permit was required, a flag was added to the record. Twenty-three records were flagged. Two were SRL (including one year of the stickleback study described above), the remainder were WRP. Only two are confirmed as requiring export permits. More than half of the projects flagged for export permit requirements were not associated with an umbrella project. As such, export permits are not considered to be adding to licensing burden greatly.

Application to Handle Wildlife – Department of Environment and Natural Resources

No information was available about the application to handle wildlife process. However, when it could be reasonably assumed that an application to handle wildlife was required, a flag was added to the record. A total of 208 records received this flag, or about 7% of all projects (about 34% of WRP, which is substantial). The vast majority of flagged records were WRP. About 1/3 of the flagged records were affiliated with umbrella projects. If applications to handle wildlife are indeed required then the licensing burden for non-fisheries related biological studies is increased.

Federal Species at Risk Act

A total of 295 projects, or almost 10%, of all records were for projects which studied species currently listed as Species At Risk. There may be special permitting requirements for these species in certain conditions. Flagged records were from SRL, RPC, WRP, and LFSP. If regulatory and permitting processes will become more focussed on Species At Risk requirements or if collating this research should be easier, then proposed licensing processes could include specific reference to species at risk.

Bird Banding Permits – Canadian Wildlife Service

A total of 158 projects, or 5% of all projects (25% of WRP), were flagged as likely to require a bird banding permit. The vast majority were WRP. As with the application to handle wildlife, this increases the burden for scientists conducting these studies.

Permit to Conduct Activities in a Migratory Bird Sanctuary – Environment Canada

Environment Canada information on permits to conduct activities in a migratory bird sanctuary was only available for 2006-2009. Out of 1372 total research permits issued during those years, 25 or about 2% required this permit. It is not considered to be a burden on licensing.

Scientific Permit for Migratory Birds – Environment Canada

Environment Canada information on permits issued for various activities (such as killing migratory waterfowl) was only available for 2006-2009. Out of 1372 total research permits issued during those years, only a single Scientific Permit for Migratory Birds was issued. It is not considered to be a burden on licensing.

Traditional Knowledge Research Agreement – Gwich'in Social and Cultural Institute

Of the 61 social science/TK projects conducted within the Gwich'in area between 2005-2009, 10 were flagged as requiring a traditional knowledge research agreement.[16] Although this will not increase the licensing burden in general, if all areas of the NWT have similar agreements in place it will be an increase for traditional knowledge and anthropological studies.

Environmental Impact Screening Committee

A total of 510 licences or about 44% were flagged as likely requiring Environmental Impact Screening by the Environmental Impact Screening Committee (EISC), out of a total of 1146 licences issued for research within the Inuvialuit Settlement Area. This represents a licensing burden on research conducted wholly or partly within the ISR:

> *Researchers have to apply ... directly to the EISC. Territorial and federal research licensing authorities will often notify the EISC about an application that is proposed to take place in the ISR, but application forms and processes are different from these authorities'. Project descriptions are written according to the requirements outlined in the EISC Operating Guidelines and Procedures (OGP) and are submitted through its online application process.*[17]

Mackenzie Valley Land and Water Board Water and Land Use permits/licences

The Mackenzie Valley Land and Water Board and related regional boards – Gwich'in Land and Water Board, Sahtu Land and Water Board, and Wek'èezhìi Land and Water Board – all have provisions for permitting certain types of research project. However, their records were searched and only three projects from the ten years were noted – two land use permits and one water licence. Therefore, land use permits and water licences from this process are not considered a burden on licensing. With the notable exception of the Inuvialuit Land Administration (see below), information for other land-use permitting processes was not available, and it is unknown whether these permits present a burden at this time.

Inuvialuit Land Administration Land Use Permits

Land Use Permits from the Inuvialuit Land Administration were issued to 134 projects or about 12% of a total of 1146 licences issued for research within the Inuvialuit Settlement Area. Forty-one of these also were flagged as requiring EISC screening. These permits together create a burden on licensing for research taking place on Inuvialuit Private Lands and potentially meeting EISC criteria.

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[16] http://www.gwichin.ca/TheGwichin/traditional.html

[17] Canadian Arctic Research Licensing Initiative: Scientific Licensing in the NWT. An International Polar Year – Federal Program Office Initiative. Prepared by Terriplan Consultants, Yellowknife NT. Revised by Aurora Research Institute, NT, pp27.

Nunavut and Yukon Research Licences

Projects which span the Northwest Territories and Yukon or Nunavut will require permitting in all areas. Although information was not available from other permitting bodies, research was flagged if it appeared likely to be trans-border. A total of 22 projects were flagged as likely crossing into Nunavut, and 28 were flagged as likely crossing into the Yukon. A single project was flagged for both. Of the Yukon-NWT projects, 12 were WRP and the remainder SRL. Of the Nunavut-NWT projects, only 3 were WRP and the remainder SRL. Permitting efforts for these projects was likely very high, but it was a low number of projects overall.

Recommendations

During the course of the assessment, recommendations were noted ad-hoc for future licensing processes.

- Industry and non-industry research projects are very different in scope and method. The licensing process might be split to better suit the needs of research being conducted for industry.
- Newly-created geo-political regions (e.g. land claim or self-government regions) should be included in the licensing process sooner rather than later if this type of assessment will be conducted in the future.
- It might be relevant, if the licensing process does not already include this, to request funding information in a specific format from applicants. For example, a checkbox for main cash and in-kind support type (federal, territorial, other, for example). Some discussion should take place about which extra categories should be included or excluded, for example Networks of Centres of Excellence, federal funding channeled through Universities, National Science Foundation (USA), etc.
- It might be relevant to include a checkbox if the proponent is conducting MA/PhD dissertation work if this level of information would be useful in the future – i.e. to track trends in early career researchers.
- If tracking complex projects such as the one shown in Table 3 is important, then the application system should be both built to accept these types of linkages and easy for the proponent to use when indicating which other projects are related. Additionally, it may be relevant to create policy to decide what is considered a linked project – some questions might include: does the proponent have to be the same? Only the institution? Topic consistency i.e. would the two components of the waterfowl project be best understood as two separate projects? Proponent self-identifying that it is a linked project?
- To reduce the licensing burden on researchers, focusing on the triggers causing overlap and duplication would make the most impact. Some examples may include (and some of these may already be in place):
    * Multi-year permits with minimal yearly application process. However, this should not reduce requirements for yearly notification and contact of community organizations.
    * Harmonization or standardization of research licences issued to multi-area projects. For example, if a project will cross through two regions, a single application may be submitted with sub-packages for the communities to review, rather than separate applications per region.
    * Harmonization or standardization of separate research components of biological

studies. For example, having a single area for the researcher to add project goals, funding, applicant information; but an automatic or user-driven function to send application to all relevant bodies. (Note: this should also be aimed at reducing burden on community reviewers, but that aspect was not assessed)

* Applications could be tailored to the size (or impact) of the project. A small, one-year study for an MA thesis could have fewer steps than a large, multi-region, multi-applicant study with numerous permit-able components. Linkages between projects should be clearly shown. Linkages might be hierarchical – a single overarching study with numerous sub-projects; or complex and fluid. The permitting system should be able to handle relevant linkages in a way that makes it easy for the applicant to select or add linkages. (Note: community reviewers may wish to have a choice in how in-depth they review a project. In some contexts a reviewing body may wish to review all components, in others they may only wish to see information about the overarching study.) Showing linkages would be useful for both communities and regulators.
* As record-keeping for other permit types is dissimilar to SRL, if a future assessment such as this one will be done, it might make sense to have check boxes for the applicant if they will or have applied for the various land-use or other permits for their research.
* Applications which require or may require special conditions when Species At Risk are being studied should have requirements built into the system. A flag when certain species are indicated in the text may be a useful reminder.

APPENDIX 1: Assumptions and information about data analysis

For data entry/data assimilation purposes

1. Government-led or university-led projects at or near developments were not classified as development or within umbrella development projects unless it was funded by industry.
2. For industry – keywords such as a mine name were not assigned to wildlife research which was happening in the general area, even if it appeared likely that the research was related to the development. However, other government bodies such as Northwest Territories Energy Corporation were assigned industry keywords when conducting research specific to a development.
3. Parsons Lake developments were assigned to Mackenzie Gas Project (MGP). Also, drilling and related barging activities in the ISR were also assigned to MGP.
4. If studies were related to a linked umbrella project they were added as multiple years even if the projects were stand-alone and/or conducted by different applicants and categories of applicants.
5. Projects got flagged as requiring Export Permits if they were from out-of-territory applicants and had research methods which may have indicated the requirement for a permit – such as DNA testing, etc.
6. Wildlife handling permits were assessed as a flag when it appeared that animals were likely to be handled, for example in collaring and banding studies. Many studies could not be assessed and the number is possibly under-represented.
7. SRL permits with category code "f" (for fossils?) were assigned to 'physical sciences' – there were only a few.
8. SRL permits with category code "g" (for geology?) were assigned to 'physical sciences' as well.
9. For counts of community contact, the number of community organizations listed in the SRL data were counted. However, the following entries were not counted as they were notifications of research rather than relating to community contact requirements:
    a. Manager, South Slave Research Centre or co-ordinator of Scientific Licences
    b. Manager, Inuvik Research Centre or Senior Technician/Manager, Inuvik Research Centre
    c. DFO
    d. ENR
    e. PWNHC
    f. Director, Forest Management Division, Department of Resources, Wildlife & Economic Development
    g. NWT Habitat Biologist, Canadian Wildlife Service, Environment Canada
10. Early SRL database has only "Inuvialuit" area when research occurs in town of Inuvik. For this reason, all 'region' notations were double-checked and corrected as appropriate.
11. Museums that are a part of the government such as the Canadian Museum of Nature are categorized as government. Others such as the ROM are 'non-profit.' This was a small number of research permits.
12. Multi-year projects with the same name but which lapsed for several years (three or more) are not generally categorized as multi-year. However, studies which repeat every few years on purpose are called multi-year. For example, a health survey which is delivered every four years.
13. Early SRL database entries – categorization of main funding source is only based on first funder listed.
14. Networks of Centres of Excellence are categorized as federal government, but this category was a difficult one to quantify since it is partnership funding and includes academia, government, and industry.
15. No information was available about forestry licences.
16. Assumed projects applied for Nunavut and / or Yukon licences if the Nunavut and/or Yukon government or research licensing bodies were notified or if text indicated trans-boundary research.

17. Projects were classed as multi-year if they had a similar or exact title and were in similar methodology and project goals. Not all multi-year projects would have been caught using this method, and a small number of non-related projects may have been lumped. Wildlife projects were much more likely to be lumped as many of the on-going studies conducted by the government were included.
18. DFO licences span two calendar years – i.e. 1999-2000. The years 2000-2001 to 2009-2010 were selected, and the first year of the range was used.
19. There were some major differences in database entry of DFO licences which required major cleaning. Some DFO licences were issued for each location and each species, apparently; or at least a separate record was kept. For this assessment, all extra instances of each licence were removed. DFO licences also had extra records if there was more than one applicant, in some years. This may be a function of their exporting procedure. These extra copies were also removed, and the first instance was used as the one from which statistics were calculated. Also, if a separate licence was issued for each location of a project which crossed several regions, each region might be selected, depending on ease of identifying the region in question.
20. DFO columns were truncated and some linkages may be missed.
21. DFO regions were assigned generally and may be inaccurate. When in doubt, multiple regions were selected.
22. POLAR (i.e. SRL from 2005 to 2009) distribution list didn't include non-community organizations, and as such, the determination of Nunavut/Yukon licences is probably vastly under-represented.
23. Parks Canada data – WBNP research that was clearly outside of the NWT was excluded. A large amount of the research included might still be within AB. Also, projects wholly within Ivvavik Park were excluded from the Western Arctic Field Unit data. Projects which were in both NWT and Yukon National parks were not given the "Yukon" designation as they did not have to apply for a Yukon gov't permit, only the one Parks Canada permit
24. For the Nahanni National Park Reserve, licences were presented with multiple year ranges. These were copied into single-year records to match the other data.
25. For adding the CWS tags (Migratory Bird Sanctuary permits, largely) – if there were only one CWS permit, it was only added once per year. Even if a project had to apply for multiple permits for other reasons, only one tag per year was added. If multiple major permits were applied for, only one would get the tag.
26. Information from the ILA did not match licences directly, so the resulting number of projects with the ILA LUP (Land use permit) tag is an estimate. And some single projects had more than one LUP.
27. 2002 and 2005 DFO data were not available and were added from the compendia. They are not as complete as the other years for this reason.
28. All Western Arctic Field Unit Parks Canada Data had to be manually entered from their publications.
29. DFO licences where the licensee, task, method, were the same, but only differed in location and species, were conflated to be a single record, even if they spanned regions (multiple regions were so noted). This is based on the assumption that these licences were actually issued from a single licence. However, in the instance where the licence number included an apparent amendment, they were left as separate entries based on the assumption that the amendment was a separate submission to DFO and thus increased licensing burden. However it was noted that these amendments became more common in the last few years of the assessment.
30. For EISC, since we did not get a listing – the following two criteria were used:
    a. The licensee is a federal/territorial employee, or,
    b. It's big industry (MGP, other petroleum developments)
31. Exact copies (I.e. data entry errors) removed from WPR and SRL.

The following species at risk were used for this assessment:

Mammals

Boreal Caribou/Woodland Caribou
Bowhead Whale
Dolphin and Union population, Barren-ground caribou
Grizzly
Northern Mountain [Woodland] Caribou
Peary Caribou
Polar Bear
Wolverine
Wood Bison

Birds

Canada Warbler
Common Nighthawk
Eskimo Curlew
Horned Grebe
Ivory Gull
Olive-sided Flycatcher
Peregrine Falcon (forest type)
Peregrine Falcon (tundra-type)
Red Knot
Rusty Blackbird
Short-eared Owl
Whooping Crane
Yellow Rail

Freshwater Fishes

Shortjaw Cisco

Amphibians

Northern Leopard Frog
Western Toad