ENVIRONMENT CANADA

PACIFIC & YUKON REGION

Fraser Basin Contaminated Sites

Progress Report 1996-1997

Environmental Assessment and Waste Prevention Section

Fraser Basin Contaminated Sites Progress Report 1996-1997

1.0 Introduction

1.1 The Fraser Basin

The Fraser River is the fourth largest river in Canada and is British Columbia's largest river. Flowing for nearly 1,400 km from headwaters in the Rocky Mountains to its mouth in the Strait of Georgia and taking in the watersheds of dozens of tributaries, including the Nechako, Quesnel, Chilcotin, and Thompson, its drainage basin covers nearly 25 percent of the province and encompasses all but one of the 14 major eco-regions and climatic zones in British Columbia.

The richness of the Fraser River basin is evident in its diversity. Its landscapes range from alpine wildernesses to forested plateaus, arid canyons, rolling uplands, verdant valleys, fragile wetlands, and the immense delta at its estuary. Throughout its length, the Fraser River provides critical habitat for hundreds of thousands of migratory birds and waterfowl. Forty-one species of fish inhabit the Fraser River, including five species of Pacific salmon, cutthroat, steelhead, and rainbow trout, dolly varden char; and sturgeon. Another 52 fish species are supported by the Fraser's vast network of lakes and tributaries and its estuary.

Over 60 percent of British Columbia's population lives and works in the Fraser basin, a population expected to grow by 50 percent in the next 25 years. The Fraser basin supports 48 percent of our commercial forests, 60 percent of metal mining operations, and nearly 45 percent of BC's precious farmland. The lower portion of the basin is one of the most productive agricultural areas in Canada. Tourism and outdoor recreation are also significant contributors to the economy of the basin. The Fraser River basin accounts for 80 percent of the gross provincial product and 66 percent of total household income.

While the overall health of the Fraser basin's ecosystem is robust, a burgeoning human population with its urban sprawl, expanding industrial development, and increased resource extraction, is placing the basin under tremendous and increasing stress.

The sustainability of the Fraser basin's fish, wildlife, and human populations is dependent upon the environmental quality of its ecosystems, including the places where we live. Municipal and industrial waste discharges, air and groundwater pollution, agriculture and other human activities can all have impacts on environmental quality.

It is evident that the environmental integrity of the Fraser River basin must be protected and improved in order to safeguard the health of its people and the conservation of its biodiversity. The federal government, working in partnership with other stakeholders, has become pro-active on these issues by establishing the Fraser River Action Plan.

1.2 Fraser River Action Plan (FRAP) Origins

The government of Canada recognizes that the Fraser River is under stress and is striving to improve its long-term health and productivity. Acknowledging its tremendous environmental and economic importance, clean-up of the Fraser River basin was targeted as a priority in 1991, and the Fraser River Action Plan (FRAP) was launched by Environment Canada and Fisheries and Oceans Canada. Initially a five-year program, Environment Canada re-profiled its FRAP resources in 1994 to institute a seven-year program. Since inception, the Fraser River Action Plan has been working on many different fronts toward its goals.

1.3 FRAP Strategy

Jointly run and funded by the Department of Fisheries and Oceans (DFO) and Environment Canada (DOE), FRAP has three main objectives:

1. To arrest and reverse the existing environmental contamination and degradation of Fraser River ecosystems by developing targets and strategies to reduce pollution and by significantly reducing the discharge of persistent toxic substances into the Fraser River.

2. To restore and enhance the environmental quality and natural productive capacity of the Fraser River ecosystems and to return salmon population to historic levels of abundance.

3. To build partnerships with provincial and local governments, aboriginal and community groups, environmental organizations, industry and labour, and other stakeholders to develop a cooperative management program for the Fraser Basin based on the principles of sustainability.

The federal government is forging ahead on each of these goals. The size and complexity of the problem means FRAP must rely on cooperation and partnerships on many levels both to share the work and guide the process.

1.4 FRAP Partnerships

Strengthened partnerships are the key to the future of the Fraser. Only through cooperative efforts will the goal of a healthy and viable river be realized. FRAP is actively working with provincial and municipal governments, industry associations, community groups, and First Nations to take steps to clean up pollution, improve environmental quality, and resolve difficult environmental management issues in the Fraser basin. FRAP

helped create the Fraser Basin Management Board, which facilitates the cooperation necessary to restore and maintain the health of the Fraser River basin.

The Fraser Basin Management Program plays a key role in bringing together all basin stakeholders as partners in FRAP. Its 19-person board, drawn from all levels of government, from industry, community organizations and aboriginal groups, represents a broad spectrum of interests and beliefs. Its role is to assess the needs of the basin's communities and industries, and coordinate development of the management plan, the blueprint for sustainability.

Partners are critical to FRAP for three reasons:

1. The action plan cannot act alone to clean up pollution and restore habitats in the Fraser Basin, the job is simply too large.

2. All those who have a stake in the future of the basin must be closely involved, both to have their say and share the work.

3. Partnerships are crucial to ensure the basin stays healthy after the program ends. This requires a management plan for sustainability - one that balances today's economic and social needs with the environmental conservation so that the basin's rich resources are maintained for future generations.

The action plan itself is a partnership between two federal departments, DOE and DFO. Each focuses on its area of expertise and is responsible for half the cost of the program. FRAP shares information and resources with multi-agency programs in B.C. such as the Fraser River Estuary Management Program and the Burrard Inlet Environmental Action Program. Individual projects often depend on cooperation among all levels of government: federal, provincial and municipal; as well as universities, community and environmental groups. In addition, First Nations are partners in many projects including those under the Aboriginal Fisheries Strategy.

The public also must be partners. Public participation is integral to the Fraser River Action Plan and communicating with the public is an important element of the partnership initiative.

1.5 FRAP Initiatives

The action plan is also about protecting the streams, wetlands, forests and the ecosystems of the Fraser Basin. With this in mind, FRAP is actively involved in a number of initiatives including:

- Integrating the protection of fish stocks, habitat and land use into a management strategy for all areas of the basin.

- Mapping and collecting data on streams, wetlands and vegetation to help biologists plan how to protect and restore critical habitat.

- Improving forest management practices for the benefit of forest ecosystems and the diversity of life they contain.

- Encouraging citizens to protect wetlands and streams through a stream stewardship program that provides training and support in watershed restoration projects; and by promoting environmentally friendly farming practices to protect interior wetlands and improve their biodiversity and waterfowl productivity.

The action plan is also about finding ways to stop or reduce pollution.

The goal is to reduce by 30% the amount of environmentally damaging pollutants entering the basin and to significantly reduce the release of toxic substances that stay in the environment. These targets require action from industries, agriculture, governments and individuals in the Fraser Basin, and the federal government has entered into many partnerships to encourage them all to reduce pollution.

Projects include:

- Developing new codes of practice for agriculture and industry that help them reduce or avoid polluting.

- Introducing environmentally friendly technology and training, such as support to operators of wastewater treatment plants and a pilot study to find ways to make microbes consume more organic waste in wastewater treatment systems.

- Exploring economic incentives to stop or reduce polluting, such as fees for garbage collection and water use; and economic uses for manure that would offer incentives to farmers to reduce manure stockpiles, which contribute to toxic runoff.

1.6 Regulations

Enforcement activities have been aimed at industries under federal regulations including pulp and paper mills, wood preservation and treatment facilities, metal mines and municipal treatment plants. Also under inspection are pollution programs not specifically covered by regulations, such as municipal wastewater, leachates from contaminated sites and runoff from industrial facilities.

Enforcement of pollution laws and regulations is key to achieving lower levels of pollution. FRAP targets significant polluters through a program of inspections and investigations backed up by laboratory analysis and the full force of the law to prosecute

violators. Contaminated sites in the Fraser Basin are identified and entered on a joint federal/provincial registry called SITE. This database is an inventory of contaminated sites and provides a method to track remedial activities. The long-term objective of the program is to achieve 90% compliance with environmental legislation in cooperation with provincial and federal enforcement agencies.

A major thrust of cleaning up pollution is identifying and reversing the existing sources of environmental contamination and implementing measures to prevent pollution from being created in the first place. The Fraser Pollution Abatement Office is adding to the store of tools and knowledge needed to achieve this objective.

1.7 Fraser Pollution Abatement Office (FPAO) Mandate

The Fraser Pollution Abatement Office (FPAO) was established in 1991 to lead the pollution abatement component of FRAP. Working closely with the Environmental Quality and Enforcement components, the mandate of FPAO is to address the FRAP goal of cleaning up pollution in the Fraser River basin.

Of the 48 FRAP deliverables, ten (numbers 8 through 17 under the Pollution Prevention heading) apply specifically to FPAO. Of these ten, 3 deliverables are directly related to contaminated sites.

Re-stated, these deliverables aim to:

1. Develop and maintain an inventory of major pollution sources and loadings in the basin (# 8 on the FRAP Deliverables List - See Appendix 1 for a list of FRAP Deliverables).

2. Establish a Groundwater Protection Strategy that includes the remediation of high priority sites (#14).

3. Clean up 70% of contaminated federal waste sites to CCME (Canadian Council for Ministers of the Environment) standards (#15).

The legislative authorities for the clean-up part of FRAP are *the Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*, for which Environment Canada has responsibility. FPAO also encourages stewardship and voluntary actions by industry and government operations wishing to move beyond compliance.

The work of the FPAO is carried out in the following sectors: industrial discharges, municipal discharges and combined sewer overflows, urban runoff, agricultural runoff, groundwater, airborne contaminants, and contaminated sites.

In order to achieve its goals, FPAO has developed a multilateral and cooperative strategy to identify and reduce or eliminate contaminants entering the Fraser River Basin. Overall, there has been an on-going shift in activity from pollution control type approaches to pollution prevention.

Specifically, FRAP calls for the reduction in contaminant loading from pollutants entering the river from industrial and domestic point and non-point sources, including contaminated sites. This is achieved through the identification and prioritization of sources and the development and implementation of suitable abatement and prevention measures.

2.0 Fraser Basin Contaminated Sites Inventory

In November 1994, the Fraser Pollution Abatement Office (FPAO) of Environment Canada and the Contaminated Sites Remediation and Assessment Section (CSRAS) of the British Columbia Ministry of Environment, Lands and Parks entered into an agreement to collaborate in the development and completion of the BC Environment Site Information System (SITE). SITE is designed to assist, monitor and manage contaminated site data, prioritize remedial actions, and form the basis of a "Site Registry" pursuant to regulations of the BC Waste Management Act (Bill 26).

SITE enables contaminated sites information (such as status, site participants, description, and exact location of contamination) to be retrieved and reviewed for assessment and remediation. This ongoing process is being updated continuously by BC Environment and Environment Canada.

SITE is a key component in meeting FRAP's overall objective of maintaining an inventory of contaminant sources having potential impacts on the Fraser River basin. This 1994-97 Fraser Basin Contaminated Sites Progress Report is intended to be a summary of SITE data as of May 1997 compiled by BC Environment and Environment Canada.

2.1 1996/1997 SITE Status Summary

By May 1997, the total number of contaminated sites identified by the SITE database was 3165. This was up from a total of 2731 sites identified in June, 1996, and remains above the October 1996 baseline total of 2867 sites.

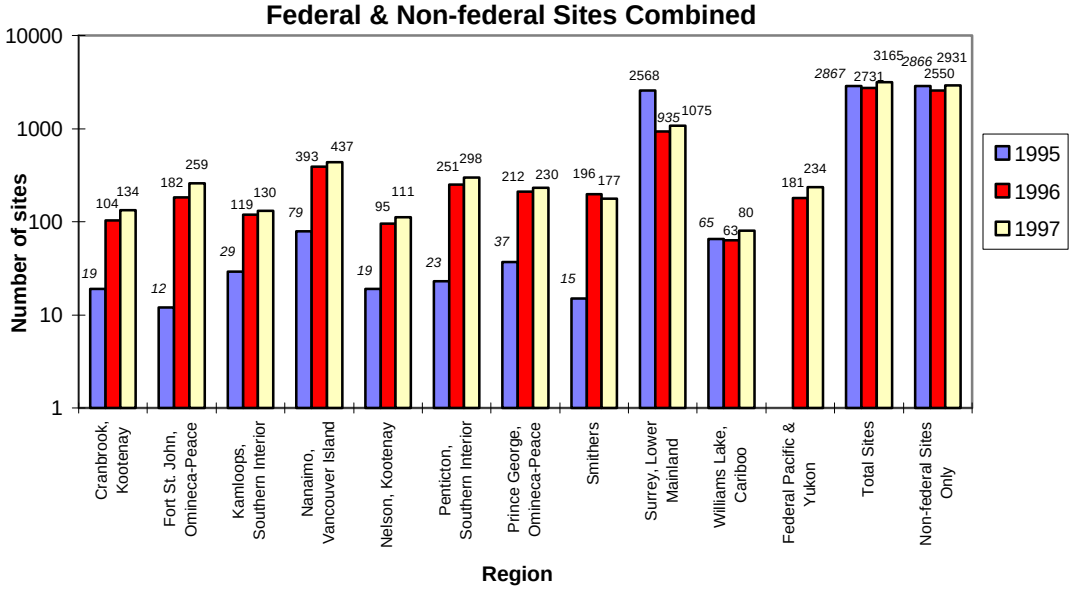
The total number of 1997 non-federal sites has increased by 381 to 2931, up from the 1996 total of 2550. Compared to 1995 levels, the total number of non-federal sites has remained roughly constant rising from 2866 sites to 2931, an overall increase of only 65.

From June 1996 to May 1, 1997, federal sites have increased by 53 new sites to a total of 234. For the fiscal year, April 1996 to April 1997, 60 new federal sites were added to the SITE database. It should be emphasized that a direct comparison between current federal

site totals and 1995 totals is not possible because up-loading of federal data was not completed until after October 1995 when summary data was compiled. (Note: Only 1 federal site was up-loaded by Oct. 1995). Federal sites represent 6.6% of the total number of combined sites (both federal & non-federal) in 1996 and 7.4% in 1997.

Figure 1 shows the total number of contaminated sites entered on the SITE database. The majority of sites up-loaded to the registry in 1995 were located in the Lower Mainland (ie. 2568 of 2899 or 89%). By 1996 and 1997, the number of sites contributed by each region was roughly equal within each provincial region and the Lower Mainland contributed less than 50% of the total number of sites.

Figure 1. Contaminated sites entered on the BC SITE registry database
Federal & Non-federal Sites Combined



Note that non-federal data is entered by region whereas federal sites are combined in a separate "Federal PYR" category. The federal sites are not delineated by region. Therefore, where non-federal data can be searched and sorted according to specific parameters (such as site totals for regions that comprise the Fraser Basin), the federal category cannot.

Figure 2 provides a comparison of non-federal contaminated site totals for regions that comprise the Fraser Basin. In 1996, the Lower Mainland region contributed the majority of contaminated sites to the Fraser Basin (ie. 2568 of a total 2699, or 95%). By 1997, the Lower Mainland's contribution of contaminated sites in the Fraser Basin had fallen to approximately 70%, or 1075 of a total 1515 sites. In addition, the total number of Fraser Basin sites has decreased from a baseline level of 2699 contaminated sites in 1995 to 1515 in 1997, a drop of 44%.

Figure 2. Contaminated sites entered on the BC SITE registry database

Non-federal Fraser Basin Sites Only

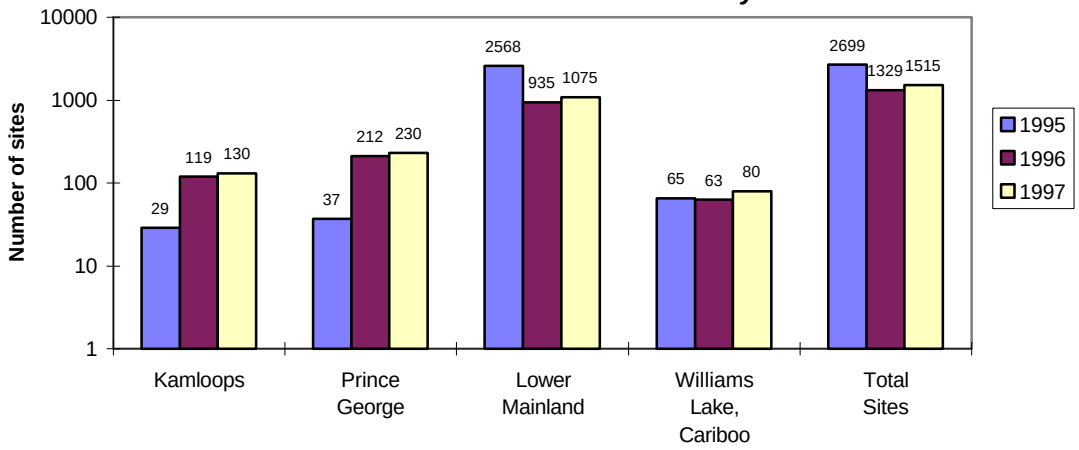


Table 1 provides a summary of the total numbers of federal, non-federal, and federal & non-federal contaminated sites. These numbers are shown as totals for the province and the Fraser Basin. In addition, the percentage of contaminated sites residing within the Fraser Basin has been calculated for each category. Since federal sites are not categorized by region like non-federal sites, the percentage of federal sites located within the Fraser Basin was derived from the 1996 and 1997 Federal PYR Contaminated Sites Working Inventories compiled by the Pollution Prevention & Abatement Division at Environment Canada. In both 1996 & 1997, the percentage of federal sites within the Fraser Basin was nearly 60% of federal totals. This percentage was used to estimate the total number of federal sites in the Fraser Basin from 1995 to 1997. These totals, in turn, resulted in an estimation of the percentage of federal & non-federal sites in the Fraser Basin. As Table 1 shows, the percentage of Fraser Basin sites has declined from over 90% in 1995 to approximately 50% in 1996 and 1997. This is most likely the result of the large number of Fraser Basin, and in particular Lower Mainland, contaminated sites entered on the SITE database in 1995. In subsequent years, the number of Fraser Basin sites entered on the registry has declined while the number of sites located outside the Fraser Basin has risen. This trend is also reflected in Table 1 where the total number of

Fraser Basin sites (ie. federal & non-federal sites combined) has dropped from 2820 in 1995 to 1627 in 1997, while concurrently, provincial totals remained at approximately 3000 sites.

Table 1. 1995 to 1997 Summary of Federal & Non-federal Contaminated Sites in the Fraser Basin.

	Non-federal Sites			Federal Sites			Federal & Non-federal Sites		
Year	*1995*	*1996*	*1997*	*1995*	*1996*	*1997*	*1995*	*1996*	*1997*
Provincial Totals	2866	2550	2931	201[1] (1)	181	234	3067[2] (2867)	2731	3165
Fraser Basin Totals	2699	1329	1515	121	109	112	2820	1438	1627
% of sites in Fraser Basin	94%	52%	52%	60%[4]	60%[3]	60%[3]	92%	53%	51%

Notations: (1) As of Oct. 1995 when summary data was compiled, only 1 federal site had been up-loaded to the SITE Registry. It is estimated that the number of federal sites (201) was 7% of federal & non-federal combined totals in 1995. Note: 7% is the average of 1996 & 1997 values (181/2731 X 100 = 6.6% and 234/3165 X 100 = 7.4% respectively).

(2) Input of federal sites to the SITE database was incomplete to Oct. 1995. A federal & non-federal combined total is estimated from the number of non-federal sites in 1995 plus 7% (average of 1996 & 1997 percentages).

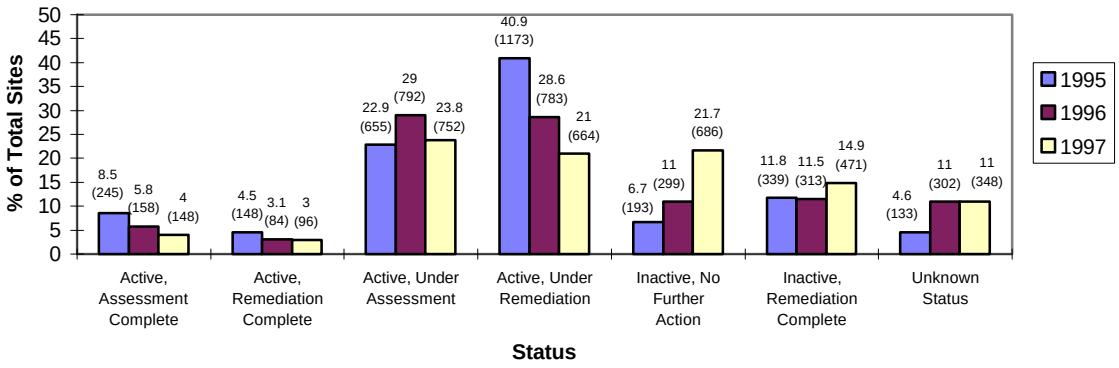
(3) The SITE database does not categorize federal sites by region. Therefore, the percentage of federal sites in the Fraser Basin is calculated as an average of values derived from the 1996 & 1997 Contaminated Sites Working Inventory.

(4) Estimated as the 1996 & 1997 'Contaminated Sites Working Inventory' average.

Since 1995, the number of contaminated sites given "active" status (ie. requiring further assessment or remediation) has decreased while the number of sites designated as "inactive", where remediation has been completed or no further action is required, has increased. As Figure 3 illustrates, the percentage of total federal & non-federal sites under various categories of active status has generally decreased. Most noticeable is the decrease in the percentage of sites undergoing remediation, dropping from nearly 41% in 1995 to 21% in 1997. This 20% decrease in the percentage of sites undergoing remediation is matched by a similar increase in the percentage of sites achieving "inactive" status. Sites requiring 'no further action' rose from 6.7% in 1995 to over 20% in 1997.

In addition, the percentage of sites categorized as "remediation completed" rose from 11.8% to almost 15% in 1997.

Figure 3. Status of Federal & Non-federal Sites Combined
As a percentage of Provincial Totals
(number of sites in brackets)



** See Appendix 2: Glossary of Terms for Site Status definitions*

Figures 4 & 5 provide comparisons between the number of federal and non-federal sites in 1996 and 1997. Overall, the number of provincial and federal sites designated 'Active" have decreased in each category while the total number of 'Inactive' sites has risen. Most notable is the increase in non-federal sites designated "Inactive, No Further Action" required. This category more than doubled from 294 sites in 1996 to 670 in 1997.

Figure 4. Site Status
As of June 1996

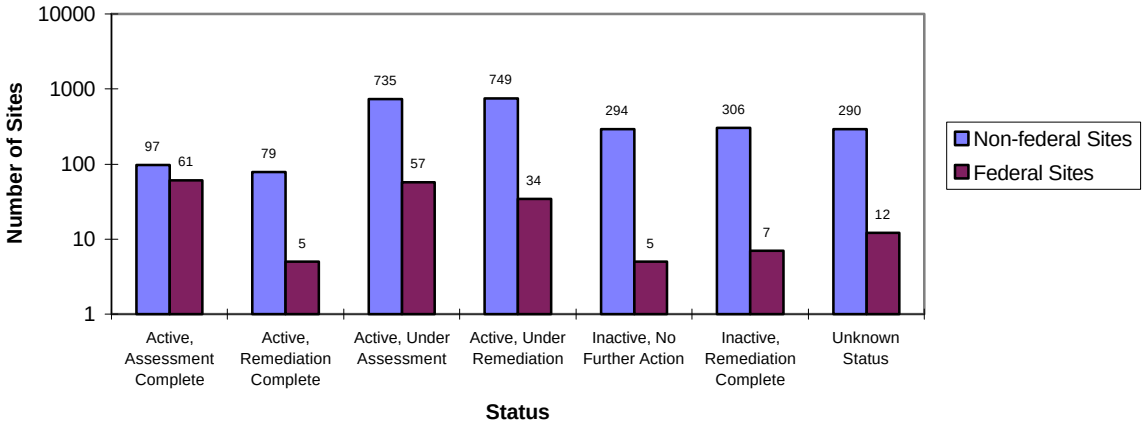
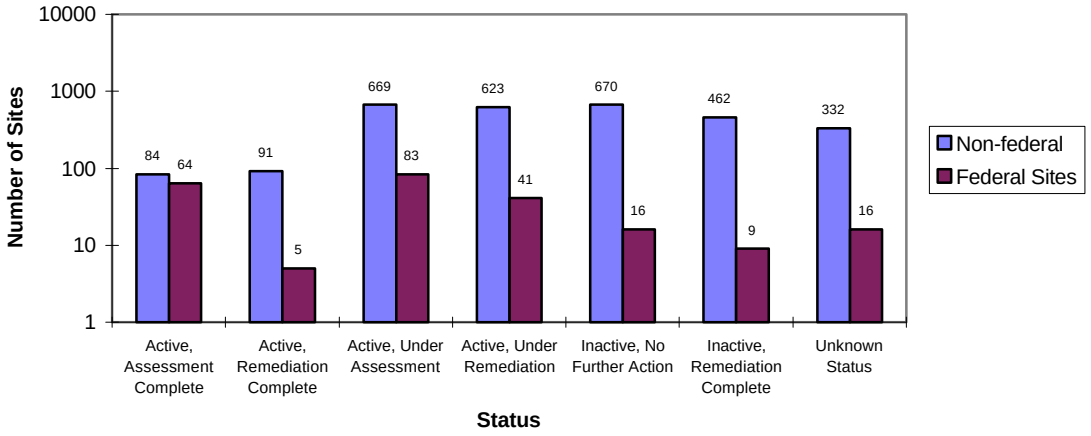


Figure 5. Site Status
As of May 1997



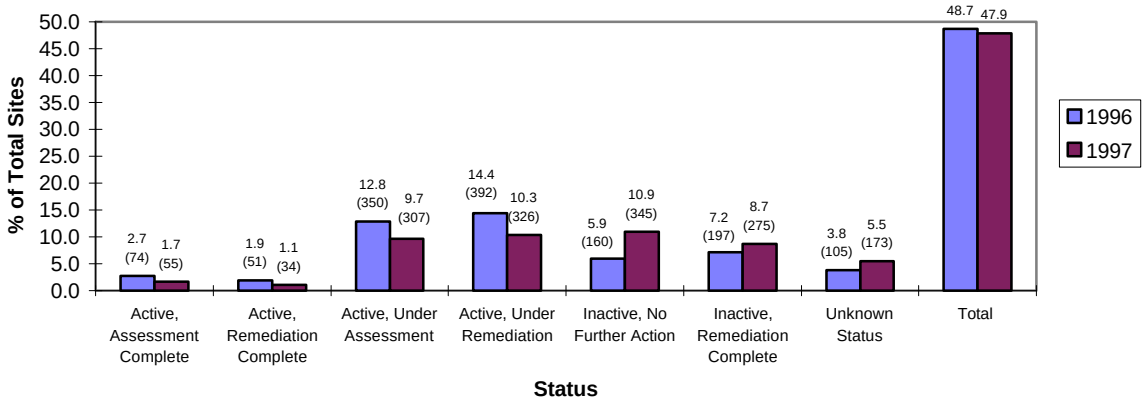
In comparisons of non-federal Fraser Basin sites with provincial totals, the percentage of non-federal 'active' sites has also decreased. Presumably, this is a result of contaminated sites progressing from a status of 'active assessment and remediation' to a status where 'remediation has been completed' and 'no further action is required' (Refer to Figure 6). The percentage of sites actively under assessment & remediation decreased by 2 to 4 percent depending on the category. More significantly, the percentage of 'inactive' sites requiring no further action has climbed from 5.9% in 1996 to 10.9% in 1997. Likewise, the percentage of sites having completed remediation rose from 7.2% to 8.7% in 1997.

Province-wide, the percentage of non-federal sites residing within the Fraser Basin remained at approximately 48% in both 1996 and 1997.

Figure 6. Status of Non-federal Sites in the Fraser Basin

As a percentage of Provincial Totals

(number of sites in brackets)

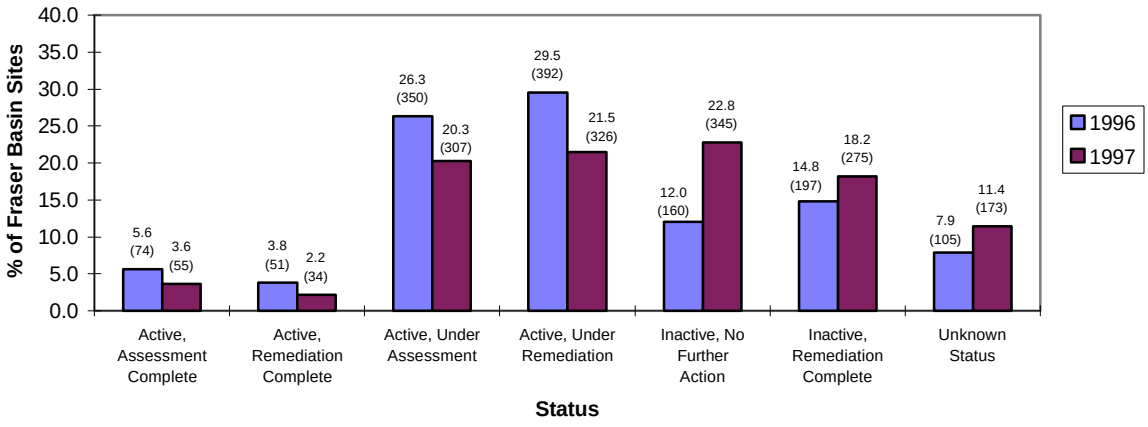


Examining Fraser Basin data specifically, comparisons of individually categorized sites (*ie. Active, Assessment Complete, Active Remediation Complete, Inactive, No Further Action, etc*.) with Fraser Basin totals (non-federal sites only) reveal results similar to comparisons made province-wide. Figure 7 indicates a decreasing percentage of 'active' sites from 1996 to 1997 associated with an increase in the percentage of sites categorized as 'inactive' for the same time period. For example, percentages for sites actively under assessment or remediation declined by 6% and 8% respectively from 1996 to 1997. Concurrently, the percentage of sites requiring 'no further action' or where 'remediation was completed' increased by 10.8% and 3.4% respectively during the same period.

Figure 7. Status of Non-federal Sites in the Fraser Basin

As a percentage of Fraser Basin Totals

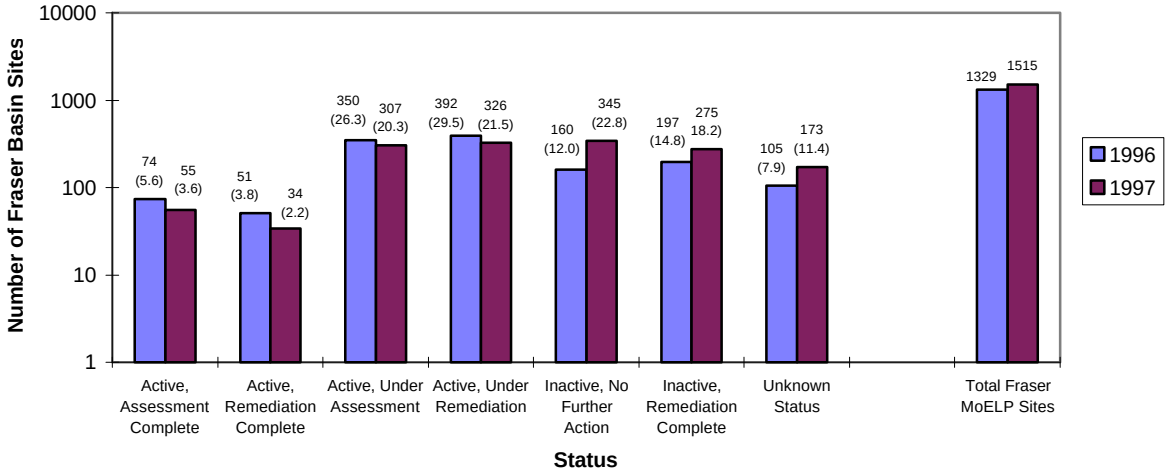
(number of sites in brackets)



A similar trend can be seen in Figure 8 which shows the change in non-federal sites per year for each site category. Again, the number of 'active' sites is declining while 'inactive' site totals increase. This is shown in terms of site numbers rather than percentage of total Fraser Basin sites as illustrated in Figure 7.

Figure 8. Status of Non-federal Sites in the Fraser Basin

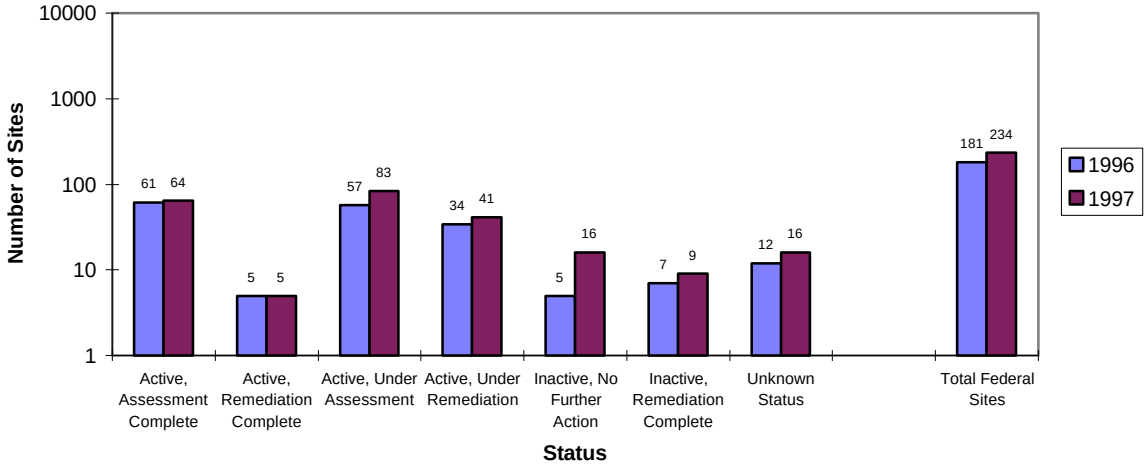
(percentage of Fraser Basin Totals in brackets)



With regards to sites under federal jurisdiction in the Pacific Yukon Region, there were 181 sites entered on the SITE registry as of October 1995 and 234 as of May 1, 1997. Of

these totals, 157 of 181 total sites in 1996, or 88%,were categorized as ‘active’ while 12 (7%) were designated ‘inactive’. In 1997, 193 of 234 total sites (82%) were given ‘active’ status and 25 (11%) were considered ‘inactive’ (Figure 9).

Figure 9. Status of Federal Sites in British Columbia & the Yukon



In terms of percentages, 6.6% of all sites (federal & non-federal combined) on the registry in 1996 were federal and this figure rose slightly to 7.4% in 1997 (Refer to Figure 10).

Figure 10. Status of Federal Sites in British Columbia
As a percentage of total provincial sites

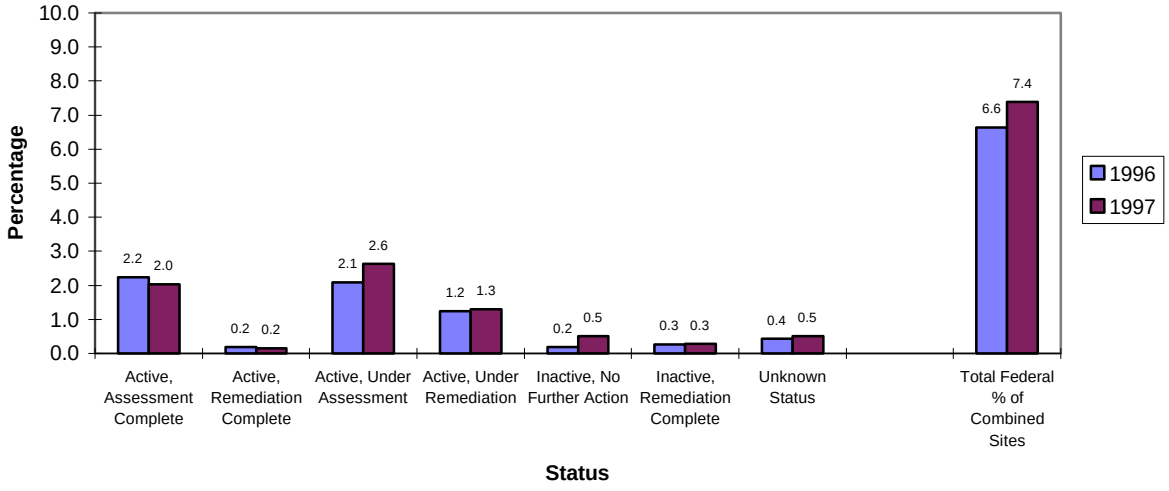
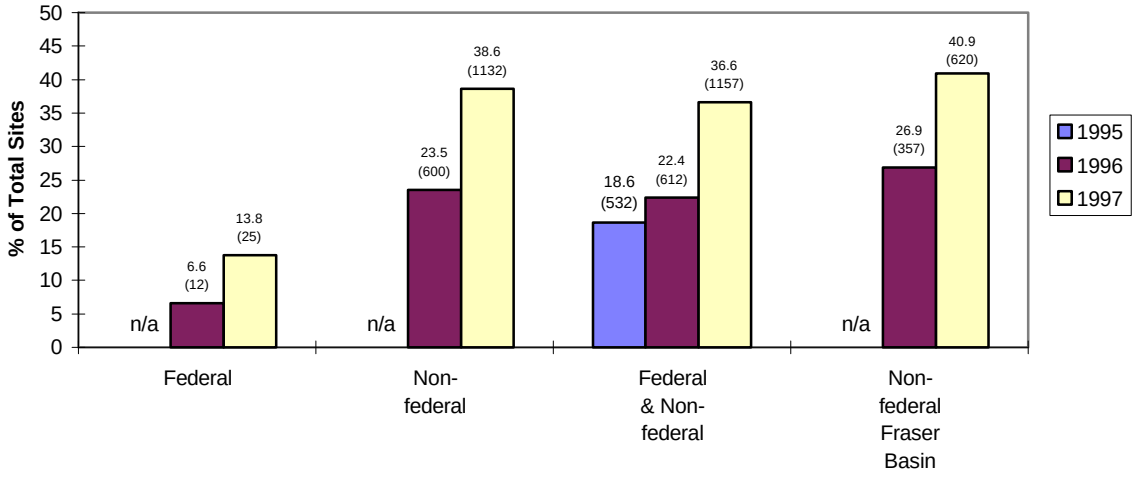


Table 2 provides a summary of the numbers and percentages of federal and non-federal sites achieving "inactive" status in both the province and the Fraser Basin. These numbers represent the combined sum of the separate "inactive" categories (ie. those designated as "Inactive, No Further Action Required" and "Inactive, Remediation Complete"). Combining the numbers and percentages into one category provides a clearer picture of the distribution of inactive sites from year to year and the progression of contaminated sites from active to inactive status. In Table 2, the total number and percentage of remediated or inactive sites in both the federal & non-federal site categories has risen annually since 1996. The number of non-federal remediated/inactive sites increased from 600 in 1996 to 1132 in 1997, an increase of over 15%. Likewise, the overall percentage of federal sites achieving inactive status rose from 6.6% in 1996 to nearly 14% in 1997. Together, federal and non-federal sites have seen the number and percentage of remediated/inactive sites climb annually from 18.6% in 1995 to over 36% in 1997. Non-federal sites attaining inactive status within the Fraser Basin have grown from 357 in 1996 to 620 in 1997. From 1996 to 1997, the percentage of remediated/inactive sites increased from 26.9% to over 40% respectively. Figure 11 graphically illustrates this increase in the number and percentage of sites achieving inactive status.

Table 2. Summary of "inactive" sites from 1995 to 1997

Remediated/ Inactive Status	1995 # of Sites	1995 % of Totals	1996 # of Sites	1996 % of Totals	1997 # of Sites	1997 % of Totals
Federal Sites	n/a	n/a	12	6.6%	25	13.8%
Non-federal Sites	n/a	n/a	600	23.5%	1132	38.6%
Federal & non-federal Sites Combined	532	18.6%	612	22.4%	1157	36.6%
Non-federal Fraser Basin Sites	n/a	n/a	357	26.9%	620	40.9%

Figure 11. Summary of "Inactive" Sites from 1995 to 1997
(number of inactive sites in brackets)



Distribution of Inactive Sites

3.0 Summary

Based on SITE Registry data reviewed by Environment Canada to May 1997, there were 2931 (93%) non-federal and 234 (7%) federal contaminated sites identified in British Columbia. Of the 2931 contaminated provincial sites, 1515 (52%) were located in the Fraser Basin and of this total 1075 were located in the Lower Mainland (71%). Overall, the total number of federal and provincial sites entered onto the SITE database and residing in the Fraser Basin fell from over 90% in 1995 to just over 50% in 1997. This trend reflects the high percentage of Lower Mainland sites entered into the database in 1995 and the subsequent increase in the number of sites registered that were located in other Fraser Basin regions or outside the Fraser Basin.

Both federal and provincial comparisons between the percentage of sites designated 'Active', undergoing assessment or remediation, and sites considered 'Inactive', those listed as requiring no further remediation or action, show comparable trends. Since 1995 & 1996, there has been an overall decline in the percentage of 'Active' sites throughout the province and in the Fraser Basin. This is reflected in federal, non-federal, and combined federal and provincial numbers. This decline in 'Active' sites has been paralleled by a similar increase in the percentage of federal and provincial sites designated 'Inactive'. In the Fraser Basin, non-federal sites attaining inactive status jumped from 26.9 % to over 40% from 1996 to 1997 while percentages for combined federal & provincial sites climbed from a baseline of 18.6% in 1995 to over 36% in 1997.

Province-wide, the number of federal sites increased from 181 in 1996 to 234 in 1997. Of these totals, 88% were designated 'Active' in 1996, dropping to 82% in 1997. 'Inactive' federal sites rose from 7% to 11% in 1996 and 1997 respectively.

These trends reflect the increasing number of contaminated sites progressing from an original status of undergoing assessment to a point that remediation has been completed, the site is clean, and no further action is required. The most significant progression in remedial action from 1996 to 1997 is seen in the Fraser Basin where the percentage of provincial sites achieving inactive/remediated status increased from 26.9% to over 40%.

Appendix 1

FRAP 48 Deliverables

Sustainability

Develop a management program for sustainable development in the Fraser River basin in partnership with the provincial and local governments and other basin stakeholders.

1. Prepare a "blueprint" for sustainable development.
2. Involve 5% of the basin's population in the planning and decision making process to create the Blueprint for Sustainability.
3. Expose 40% of the basin's population to the principles of sustainable development.

Pollution Prevention

Arrest and reverse the existing environmental contamination and degradation of the Fraser River ecosystem by developing targets and strategies to reduce pollution and by virtually eliminating the discharge of persistent toxic substances in the Fraser River.

4. Provide decision makers with a knowledge of non-market values produced by a healthy environment/ ecosystem.
5. For both public and private sectors, integrate environmental concerns in the planning and decision making process.
6. Through our partners, initiate the use of economic instruments in the basin.
7. Provide decision makers with knowledge of the cost effectiveness of various pollution abatement and habitat enhancement alternatives.
8. Develop and maintain an inventory of major pollution sources and loadings in the basin.
9. Reduce environmentally disruptive industrial effluent discharges by 30% to meet environmental quality objectives.
10. Reduce contaminant loadings from combined sewer overflows and untreated sewage discharges by 30% to meet environmental quality objectives.
11. Reduce the contaminant load from inadequately treated sewage discharges by 30% to meet environmental quality objectives.
12. Implement a strategy to reduce the loading of nutrients, bacteria and agrochemicals from agricultural operations to ground and surface waters by 30% to meet environmental quality objectives.
13. Implement a strategy to reduce the contaminant loading from urban runoff by 30% to meet environmental quality objectives.
14. Establish a Groundwater Protection Strategy which includes the remediation of high priority sites.
15. Clean up 70% of contaminated federal waste sites to CCME standards.
16. Develop and maintain a toxics air emission inventory for major industrial sectors.
17. Reduce the release of persistent toxic substances pursuant to the Canadian Environmental Protection Act and identified as priority from inventories and environmental data to the extent allowed by best practicable technology.
18. Provide new knowledge for environmental quality assessments and the development of objectives.
19. Measure and report on the condition of the basin.
20. Develop water quality objectives and criteria for contaminants of concern in the four main sub-regions of the basin.
21. Provide a provisional framework for developing ecosystem objectives.
22. Initiate a pilot project for ecosystem objectives.
23. Assess water quality relative to water quality objectives.
24. Assess contamination from major pollution sources.
25. Assess and report on the effectiveness of selected pollution abatements relative to the environment.
26. Achieve 90% compliance with environmental legislation in cooperation with provincial and federal enforcement agencies
    - Annually conduct approximately 180 inspections at federally regulated sectors discharging/ impacting in the basin, and initiate 8 - 10 investigations per year;

- Prosecute violators having continuous or significant non-compliance;
- Participate in the development of compliance strategies, which include punitive and other instruments (e.g. economic incentives).

27. Target enforcement programs to assist in achieving the pollution abatement goals and environmental quality objectives of the program.
28. Establish an enforcement field office in Prince George and implement a pilot project for delivery of coordinated, effective and efficient enforcement programs in the basin.

In partnership with the other four parties to the Burrard Inlet Environmental Action Program Agreement (BIEAP):

29. Establish a sustainable development plan for the Inlet.
30. Develop and implement a long term, integrated, focused monitoring program to identify existing and emerging environmental problems and evaluate the effectiveness of abatement actions.
31. Establish water quality objectives for contaminants of concern as a guide for abatement actions.
32. Develop and maintain an inventory of all contaminant sources and loadings in the inlet.
33. Reduce environmentally disruptive industrial discharges by 30% to meet environmental quality objectives.
34. Reduce contaminant loadings from combined sewer overflows by 30% to meet environmental quality objectives.
35. Reduce contaminant load from urban runoff by 30% to meet environmental quality objectives.
36. Develop and implement a dredge material management plan and sediment remediation strategy for dredging and disposal of contaminated sediments as part of site remediation and maintenance programs.
37. Develop and implement land use classification criteria and strategy to protect existing habitats.
38. Develop and maintain an environmental review process for expanded and new development projects proposed for the Inlet.

Habitat Restoration and Conservation

Restore the productivity of the natural environment by restoring and enhancing environmental quality and the natural productive capacity of the Fraser River ecosystem.

39. Directly protect 15 ha. of estuary land.
40. Track and protect additional habitat in the lower Fraser uplands through cooperative stewardship initiatives and publish two maps and two technical reports.
41. Retain 1200 ha. of farmland, annually, as seasonal bird habitat, and control crop damage.
42. Complete (at least) six interior wetlands demonstration projects
    - Protect 100 hectares at Salmon Arm in Year Two.
43. Deliver annually, and report on, coordination/ extension liaison function with ranchers to
    - Improve ranchers' understanding of wetland values;
    - Reduce the impact of grazing on wetlands;
    - Increase wetland productivity for wildlife on private lands.
44. Map and analyze critical interior habitats and report on forest fragmentation/ biodiversity.
45. Develop procedures to protect critical forest habitats
    - Produce (up to) four operational level pamphlets on selected forest habitat management issues;
    - Produce a technical report on managing for cavity-nesters.
46. Jointly develop guidelines for the protection of riparian zones after holding a workshop and publishing proceedings.
47. Integrate wildlife values into forest management policies through participation on PAS, CORE, IRPC, Inter-Ministry Biodiversity Group, and RIC.
48. Demonstrate methods to maintain forest bird diversity
    - Produce a report on integration of Shuswap bird data with other biodiversity attributes;
    - Complete identification of bird groups with common habitat dependency.

Appendix 2

Glossary of Terms as Defined in the Site Information System Users Guide

(AAC) ACTIVE-ASSESSMENT COMPLETE - This status denotes the point at which BCE feels that a site, or the contaminated 'area of concern' on a site has been adequately investigated to decide whether or not remediation is necessary, and if so, enough assessment information is present to support the remedial approach chosen. Often sites will remain in this status for a considerable period of time until the most cost effective remedial plan is developed.

(ARC) ACTIVE-REMEDIATION COMPLETE - This status generally applies when a Risk Assessment/Risk Management (RA/RM) approach is used to remediate a site. The risk management 'facilities' have been constructed as required to minimize risk. All appropriate permits and approvals have been obtained and a 'conditional' Letter of Comfort or Conditional Certificate of Compliance (under Bill 26) has been issued. 'Active' refers to the ongoing requirements (i.e. monitoring, maintenance) associated with the RA/RM remedial approach.

(AUA) ACTIVE-UNDER ASSESSMENT - The site is currently undergoing investigation or an environmental assessment of some kind.

(AUR) ACTIVE-UNDER REMEDIATION - A remediation plan has been developed and implemented at the site, or remediation is simply known by BCE personnel to be occurring on the site. No further information has been submitted to BCE to indicate that remediation is complete (i.e. to change its status).

(INFA) INACTIVE-NO FURTHER ACTION - A site which may not have gone through the entire remedial process; however, BCE has no additional requirements at this time. For example, BCE may accept a site's state of environmental quality for its proposed use or circumstance, but there may not be a specific reference to an acceptable criteria guideline. Essentially by mutual agreement, no further action is required of either BCE or the site owner/operator.

(IRC) INACTIVE-REMEDIATION COMPLETE - A site where remediation is complete, a "Letter of Comfort" or "Confirmation of Compliance (under Bill 26) has been issued, and there are no outstanding permit or other requirements (e.g. on-going monitoring).

(US) UNKNOWN STATUS - Often a site exists which is known to BCE personnel, but because of circumstances (e.g. lack of reporting), the remedial status is 'unknown' to BC Environment.