KPMG

Project Report

ISSUES AND OPTIONS PAPER FOR NONPOINT SOURCE POLLUTION MANAGEMENT IN BC

Prepared for

Ministry of Environment, Lands
and Parks
Victoria, BC

Submitted by

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Executive Summary

Across North America, point sources of pollution are being brought under control through a combination of legislation and economic incentives. However, nonpoint source (NPS) pollution, which includes such releases as storm water discharges, fertilizers and pesticides, has not been as actively managed and continues to contribute significantly towards aquatic pollution in both urban and rural areas.

The Water Quality Branch of the Ministry of Environment, Lands and Parks (MoELP) contracted KPMG to review the issues and options for NPS pollution management in British Columbia. Norecol Dames and Moore (NDM) was awarded a similar contract, over the same study period, which required them to define the nature and extent of NPS pollution within British Columbia. KPMG and NDM worked closely with one another in the conduct of these separate, yet closely related studies.

A. Magnitude and extent of NPS pollution problem in British Columbia

As part of its Problem Definition Study, NDM addressed the technical aspects of NPS pollution in British Columbia. Specifically, NDM characterized a number of NPS sources (i.e., identified contaminants of concern and expected concentrations); estimated loadings of selected contaminants by region; described documented impacts from key NPS pollution sources; reviewed future trends and expectations; and contrasted NPS and point sources of pollution based on relative significance.

The NDM study demonstrated that a number of human and industrial activities, which are not "end-of-pipe" in nature, can have a profound impact on the aquatic environment. The extent to which this impact is detrimental depends on such factors as the type of activity, geology (e.g., permeability of the soil) and climate. However, NPS pollution is clearly a major waste management issue which affects communities across British Columbia.

NDM concluded that—based on the properties of NPS pollution—control measures should be implemented either regionally or locally to address NPS priorities. Specifically, human and industrial practices may differ across the province, resulting in region-specific issues and impacts.

The following key sources of NPS pollution were identified as existing and potential problem areas in BC:

- Agricultural activities
- Septic systems
- Stormwater
- Spills and leaks
- Atmospheric deposition

B. Existing legislative and regulatory framework

The existing legislative and regulatory framework is summarized below, according to the significant activities which relate to NPS pollution management.

Development of water quality and environmental protection standards—The development of air, water and environmental protection standards falls within the domain of both federal and provincial governments. The Federal government, sets national water, air and environmental protection standards. For the provincial government, air, water and environmental protection standards, which cannot fall below equivalent federal standards, are set primarily by the MoELP. However, the Ministry of Health is responsible for the quality of the Province's drinking water, and local governments are responsible for ensuring an adequate supply and protection of water for community purposes.

Regulation of discharges and uses—The management of discharges and uses requires the integration of numerous Acts and regulations, including legislation relating to waste management, land-use planning, water quality, pesticides and fish and wildlife protection. However, as outlined above, no one level of government is responsible for all these regulations. In addition, some Acts and regulations may overlap or conflict.

Development of management and protection policies—Developing management and environmental protection policies is the responsibility of all three levels of government. The federal government is primarily responsible for policies relating to the management of fish (salmonid) and fish habitat. For all other management and protection policies, the provincial government has primary responsibility with the federal government providing guidance. Local governments, along with First Nations and non-government agencies, have become increasingly involved in the development and administration of management and protection policies.

Development of land and resource use plans and policies—The federal government is responsible for managing all uses of federal land and coordinates, at a national level, land and resource use. While the provincial government is responsible for managing most resources and for development on Crown and private land, authority for managing private land development has been provided to local governments. Responsibilities for land use planning on Crown land are shared among MoELP, the Ministry of Energy, Mines and Petroleum Resources (MEMPR), the Ministry of Agriculture, Fisheries and Food (MAFF) and the

Ministry of Forests (MoF). Private land development plans and policies are primarily the responsibility of local governments.

Monitoring of water and environmental quality—The federal government is responsible for monitoring the water and environmental quality on a national level. Within provincial boundaries, monitoring of water (excluding drinking water) and environmental quality is primarily the responsibility of MoELP. However, local and regional governments (especially in the Lower Mainland and Vancouver Island), along with stakeholder groups and associations, are becoming more involved with monitoring and reporting in specific areas (e.g., the State of the Fraser Basin Report).

Research, modelling and dissemination of data—All levels of government and several non-government organizations participate in researching, modelling and disseminating data related to NPS pollution. However, the federal government places a great deal of emphasis on the importance of research and can be considered a leader in this area. There is also a recent trend towards cooperative ventures involving the federal, provincial, local and First Nations governments, as well as non-government stakeholders.

C. Limitations of existing regulatory and non-regulatory approaches

Our assessment of the current NPS management situation in BC found that current regulatory and non-regulatory approaches—as a whole—are less than adequate in meeting most of the factors that stakeholders consider necessary for effective NPS pollution management in BC.

To effectively begin controlling the problem, and to focus efforts to the unique requirements of individual ecosystems, there is a need for integrated watershed planning; which is currently not taking place. We also found that the following factors are not being met in an integrated or consistent manner by the present NPS pollution management approach.

- **It is not flexible and responsive enough to alter priorities if new information or legislation makes it practical**—A number of concerns were raised, including the absence of an integrated regional monitoring system and potential duplication in roles and responsibilities, which would have an impact on the ability of government agencies to adjust their NPS management priorities.

- **It does not ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy**—Based upon continuing fiscal restraints, all levels of government are facing significant cuts to program budgets and resources.

- **It does not ensure that agencies are targeting their activities towards NPS management priorities**—Currently, a number of government activities and

programs have not accounted for factors related to NPS pollution or its impact on water quality.

- **It does not institute, where possible, the principles of "polluter pay"**—Although the provincial government has demonstrated a commitment towards the development and implementation of a "polluter pay" framework for point sources, such a mechanism is absent in the context of NPS pollution.

It does not appear that the current NPS pollution management situation in BC is sustainable. The provincial government, and key stakeholders across BC, cannot expect the NPS pollution problem to improve over time unless significant and prompt action is taken to control it.

D. Management of NPS in other (selected) jurisdictions

Our study focused on the programs in place in Washington State, California and Colorado. Although these programs have several common themes (e.g., the need for broad involvement of responsible and interested agencies, prioritization of problems and strategies, and public education), they also differ in the way each individual state has generally approached issues related to NPS pollution.

In Washington, the state has assumed a coordinating/partnership role with other agencies in delivering an integrated watershed approach to NPS pollution management. Specifically, the state developed a framework outlining how individual watershed management committees were to be formed, and provided guidance on how individual watershed action plans were to be prepared, reviewed and finalized. By establishing the planning process, leading the action plan review and approval process, and detailing implementation and reporting requirements, the Washington Department of Environment is able to facilitate consistency across the state. In addition to its coordinating role, the state also facilitates communication through publishing materials, providing technical contacts and advice, and providing information on funding alternatives.

In contrast to Washington State, California initially assumed a regulatory role that encouraged and (eventually) mandated responsible agencies to implement Best Management Practices (BMPs). California has recently recognized that this strategy was not effective in controlling the problem, and is now in the preliminary stages of moving towards a more integrated, watershed-based strategy.

Like California, Colorado focused its strategy on encouraging the adoption of BMPs; initially—at least on the surface—its strategy was more voluntary than regulatory. However, by issuing discharge permits for stormwater outfalls, the state appears to have leaned towards regulatory control of the NPS problem. Although Colorado encourages integrated involvement though subcommittees (to the Task Force), these committees are issue-based (e.g., agriculture/silviculture) rather than watershed-based (i.e., as are the committees in Washington). Further, to promote consistency, the state reviews the development of demonstration and education projects; however, it has limited control over how the responsibilities of various agencies are divided and coordinated.

E. Options for NPS management in BC

1. Criteria for successful NPS management

The following vision statement was developed for British Columbia's NPS pollution management initiative:

> *To efficiently and cooperatively achieve zero NPS pollution by working in partnership with others to prevent, minimize and control the release of NPS contaminants.*

To support this vision, twenty critical success factors—describing the outcomes a successful NPS management strategy should accomplish—were designed based on stakeholder input. These statements, in turn, formed the "yardstick" against which alternative NPS management strategies were assessed. The 20 CSFs were divided into the following areas:

- Legislation and enforcement
- Problem identification and prioritization
- Appropriateness
- Education, communication, training and reporting
- Institutional framework
- Achievement of Intended Results
- Operational effectiveness

2. Assessment of alternative options

Although other NPS pollution management options are available to the province, only two "alternative" options (i.e., in addition to the status quo) were selected for our analysis. These alternatives were selected because both approaches are in place in other jurisdictions, and both are *realistic* in light of the British Columbia's geographic, regulatory and political characteristics.

The two alternative options, the regulatory control model and the coordinated planning model, are briefly described and assessed below.

The regulatory control model

In the regulatory control model, the province focuses on developing watershed-by-watershed quality control standards and Best Management Practices (BMPs), and—through monitoring and enforcement—encourages local agencies to develop strategies that will meet or exceed the standards and/or result in the adoption of specified BMPs.

Under this model, the provincial government would operate in a similar fashion to that traditionally used for point source pollution control (i.e., as a regulator). Before the actual watershed planning process can begin, the provincial government (through MoELP) must address key requirements such as: setting defensible provincial and watershed level water quality, quantity

and related resource objectives and standards; prescribing provincial BMPs; developing watershed monitoring systems; prioritizing sites; and, integrating and coordinating existing initiatives.

Once the provincial government has addressed, to some degree, these requirements, the planning process can be initiated. Under this model, local and regional governments are the key agencies responsible for developing and implementing watershed management plans.

Key pros and cons from our analysis of the regulatory control model follow:

Pros:

- Facilitates a coordinated and integrated provincial strategy to deal with NPS problems.
- Emphasizes the need for priority rankings of watersheds and monitoring.
- Strategies can be readily incorporated into the provincial planning process.
- Monitoring is a key aspect of this model; therefore, reporting on progress is possible.
- Improves likelihood that NPS polluters will be identified and penalized.

Cons:

- Relies heavily on legislation which would be inflexible to changes in NPS priorities.
- Potential for interjurisdictional conflicts and inconsistencies are increased due to the regulatory nature of the model. Also, the focus may shift from prevention of NPS *causes* to control of NPS *effects*.
- Does not facilitate the adoption of conflict resolution and consensus techniques.
- Because the standards and BMPs are "generic", local flexibility to institute strategies that deal with unique problems would be constrained. Also, provincial success indicators may not be applicable to specific watershed needs.
- The inherent regulatory and standardized characteristics of the model may constrain ability to develop creative solutions.
- Relatively resource intensive which does not fit current fiscal restraints. Also, a province-wide monitoring system and database may not be feasible.

- No formal mechanisms for public and stakeholder participation.

The coordinated planning model

In this model, the province allows locally-based committees to develop individual watershed management plans, with the ministry providing direction and technical support as well as reviewing all plans.

As such, the provincial government would act as a coordinator and reviewer; and it would provide planning support, for a series of local watershed committees or authorities. The regional districts (or local government equivalents) would generally act as the lead agency responsible for establishing the committees who—on a watershed-by-watershed basis—would be responsible for developing and implementing NPS pollution management plans.

This model is premised on the understanding that each watershed is inherently different, with a unique set of environmental, social and economic issues which require individualized standards and strategies that have been prepared by local stakeholders and agencies.

The MoELP would be responsible for ensuring that other ministries and the federal government are involved in the development and refinement of minimum standards, coordinating the review process, providing support to lead agencies and committees in plan development, reviewing plans to ensure they are consistent with provincial needs, and ensuring that provincial and federal objectives and standards are met.

The watershed committees would be comprised mainly of representatives from local governments, key stakeholder groups (e.g., First Nations, environmentalists, industry associations and public "watchdog" groups) would also be represented on a pre-determined basis.

Regional districts would be the logical entities to act as the lead agencies since their jurisdiction is broader than that of municipalities, and since NPS pollution is generally a regional issue. As such, the regional district would be responsible for initially establishing the watershed management committees.

Key pros and cons from our analysis of the coordinated planning control model follow:

Pros:

- Preliminary legislation review would ensure that regulations, legislation and guidelines address provincial priorities.

- Supports integrated watershed planning and comprehensive enforcement.

- Conflict resolution and consensus techniques would be designed into each watershed management plan.

- Committees would design plans to "fit" abilities of the key agencies responsible for each watershed.

- Greater potential for public participation, volunteer activities and cost-sharing. Also, public education and training activities would be designed into each plan.

- Key agencies participate in the planning process as "partners". Moreover, local control, provincial coordination and partnership orientation fosters commitment.

- Local monitoring systems and databases would be kept. Also, annual progress reports would be required.

- Key indicators would be established on a watershed basis based on generic guidelines.

- Supports the development of creative solutions to solving local problems.

- NPS "polluters" would be more readily identified, which would support improved enforcement and "polluter pay" objectives.

- Preventative measures would be encouraged through provincial guidelines, and plans would be reviewed for incorporation of solutions which prevent pollution.

Cons:

- Potential for inconsistencies in monitoring and enforcement.

- Potential problems in aggregating results to the provincial level (i.e., because individual monitoring programs are established).

- Local participants may not always agree with provincial changes in focus.

3. Implementation requirements for selected option

Based on our assessment of the status quo and the two alternative models, the coordinated planning model best fits the requirements for an NPS pollution management strategy in British Columbia. The need for site-specific pollution management supports the use of watershed committees. One of the key factors which underlies the presence and impact of NPS pollution is land use. Consequently, by emphasizing the role of both provincial and local governments in developing and delivering an NPS management plan, as well as providing a

mechanism for the participation of key stakeholders including industry and First Nations, the coordinated planning model provides a solid basis for integrated land use planning.

There are a number of additional factors which will need to be addressed under the coordinated planning model, including:

- A legislation review process—the need for a new legislation to provide the context and authority for watershed management planning should be considered.

- Regional NPS pollution priorities, including agriculture (e.g., application of manure and chemical fertilizers) and stormwater, will need to be accounted for provincially.

- For regions within the Fraser Basin, established stakeholder and government initiatives, including the FBMP, should be integrated into the planning process.

- Representation and participation of existing community groups should be sought.

- Existing guidelines and standards should be incorporated.

- Existing conflict resolution and dispute mechanisms should be adapted to meet the needs of the model.

- Existing education and training programs should be integrated into the planning process (e.g., the Storm Drain Marking program).

The ministry should develop an implementation plan for the coordinated planning model based on the following seven-step implementation guidelines:

1. **Conceptualize the model**—The ministry should conceptualize how the model will operate in British Columbia. The ministry can then produce a brief discussion paper describing the objectives, goals and proposed application of the model in BC.

2. **Fine tune its development through soliciting input from affected agencies and stakeholders**—The ministry should circulate the discussion paper to all affected agencies and stakeholders to obtain their input. This feedback will assist in identifying areas where the model needs to be revised, and will allow the ministry to gauge how positively the process will be received.

3. **Detail the provincial Watershed Planning and Review processes**—It will be important at this stage to: identify all legislative and regulatory impediments; revise, where necessary, the existing legislative framework; initiate discussions with applicable agencies and stakeholder groups; develop the necessary policies and procedures to support the planning process; and,

identify (and train where necessary) the individuals who will assume responsibility for the watershed management plan review process.

4. **Research availability of financing and technical resources**—An important role of the ministry, as the coordinating agency, will be to provide technical assistance and information about the availability of financing sources to Watershed Management Committees. Consequently, the ministry must conduct the necessary research to ensure that it has a current and complete listing of funding sources and related information and it must identify professionals who can be put forth as contacts for the planning process.

5. **Develop the Planning Process Handbook**—The ministry should prepare a user-friendly handbook that will serve as a key reference source for the committees and the lead agencies in ranking watersheds and NPS; determining representation; and undertaking all elements of the watershed planning process. The handbook should also include appendices with such items as lists of funding sources, technical contacts, sample plans and working templates.

6. **Pilot the process and handbook in a selected Watershed**—Prior to "full-scale" implementation of the plan, it would be advisable to pilot the ministry's strategy in a given watershed to test both the materials they have produced and the overall operation of the strategy. The experience gained from a pilot project will assist the ministry with refining specific planning and administrative requirements prior to full-scale implementation, as well as ensuring that the handbook and related materials are sound.

7. **Make any necessary refinements and implement the process provincially**—Having made the necessary refinements based on the pilot implementation, the ministry will be in a position to proceed with full-scale implementation. This may involve focusing on one watershed at a time, or having multiple plans being developed simultaneously.

I

Introduction

In recent years, concerns have become more pronounced about the need to balance economic and social changes with long-term sustainability and protection of the natural environment. These concerns are especially evident in British Columbia due to its abundant water resources.

The BC Roundtable on the Environment and Economy noted that both water quality and quantity were growing concerns; there is evidence of long-term, detrimental changes in water supplies. This reflects a number of dynamic factors which BC has experienced over the last few decades, including dramatic increases in regional populations, urban development, levels of industrial discharges, motor vehicle usage and more intensive agricultural practices.

As a first step in addressing the issues related to NPS pollution, the Water Quality Branch within the Ministry of Environment, Lands and Parks held a workshop in March 1995 —specifically with respect to impacts on the aquatic environment. A key recommendation which came out of this workshop was the identification of the need for an NPS pollution strategy and action plan. Consequently, the Water Quality Branch contracted KPMG to review the issues and options for NPS pollution management. Norecol, Dames and Moore (NDM) was awarded a similar contract, over the same study period, which required them to define the nature and extent of NPS pollution within British Columbia. KPMG and NDM worked closely with one another in the conduct of these separate, yet closely related, studies.

A. Issues related to the management of NPS impacts in British Columbia

Across North America, point sources of pollution are being brought under control through a combination of legislation (e.g., the proposed BC Environmental Protection Act) and economic incentives (e.g., the emissions trading program in Idaho). However, nonpoint source (NPS) pollution, which includes such releases as storm water discharges, fertilizers and pesticides, has not been as successfully managed and continues to contribute significantly towards aquatic pollution in both urban and rural areas.[1]

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1 *For the purposes of this document, aquatic refers to fresh surface water, coastal marine water, sensitive habitats including wetlands and estuaries, and groundwater.*

As identified above, there are a number of issues which need to be addressed when evaluating the environmental impacts resulting from NPS as well as the options for pollution management.

1. Potential sources of NPS pollution

As part of its Problem Definition Study, Norecol, Dames and Moore (NDM) addressed the technical aspects of NPS pollution in British Columbia. Specifically, NDM characterized a number of NPS sources (i.e., identified contaminants of concern and expected concentrations); estimated loadings of selected contaminants by region; described documented impacts from key NPS pollution sources; reviewed future trends and expectations; and contrasted NPS and point sources of pollution based on relative significance. Through this research, the following key potential sources of NPS pollution were identified.

a) Agricultural activities

The application of "biosolids" (i.e., solid, semi-solid or liquid residue such as manure) can have an impact on water resources if it is mismanaged. Nitrate leaching into groundwater in the Fraser Valley and the Okanagan Valley lakes appears to be a major concern, particularly from a human health standpoint.

b) Septic systems

The use of septic tanks is a significant environmental concern in BC. The following are some of the key concerns noted in the NDM report:

- older tanks are often leaky
- connections may be illegal
- improper maintenance
- inappropriate location, size or construction.

These problems may result in site-specific impacts such as nutrients and fecal coliforms leaching into the surrounding soil and watercourses. Septic systems are considered to be a significant source of NPS pollution in inland waters, particularly in the Okanagan.

c) Stormwater

Municipal storm drains may discharge directly into freshwater systems such as creeks and rivers. In these cases, storm drains act as a conduit for a number of chemicals which are collected off roads and lawns. There may also be direct runoff from roads entering freshwater systems during heavy rainfalls (i.e., roads located alongside lakes and rivers). Stormwater contaminants including metals in sediments, fecal coliforms, nutrients and Polycyclic Aromatic Hydrocarbons (PAHs), are of major concern throughout BC.

d) Spills and leaks

Spills and leaks can have severe and acute, but relatively localized, impacts (e.g., fish kills). While water quality can recover quickly from individual incidents, it appears that the number of accidental spills is increasing (i.e., in terms of total volumes released). It is also important to note that depending upon the damage to fish and invertebrate populations, biological diversity may not recover as fast as water quality.

e) Atmospheric deposition

Atmospheric deposition (e.g., motor vehicle emissions) contributes towards overall contaminant loadings to the aquatic environment including nitrogen and sulphur oxides (which produce acid rain), as well as metals and various organics such as dioxins and furans. Major concerns include acidification of watercourses and the addition of nutrients and toxic compounds.

2. Need for regional pollution management

Based on the dynamics of NPS pollution, control measures should be implemented either regionally or locally to address NPS priorities. Specifically, human and industrial practices may differ across the province, resulting in region-specific issues and impacts.

For example, in the context of agriculture and ranching:

- Manure management is the major agricultural issue in the Fraser Valley because the populations of livestock (including poultry) exceed the capacity of the available land to absorb the manure they produce. To dispose of the manure, livestock producers provide it to farmers to use as fertilizer and/or spread it on fields. These practices result in excess nitrogen (i.e., relative to crop needs), which subsequently leaches during rainfall.

- Nitrate contamination of groundwater and domestic wells are also a concern in parts of the Okanagan Valley (Osoyoos and Armstrong). As with the Abbotsford Aquifer, the groundwater in the Osoyoos area is particularly susceptible to contamination due to permeable soils overlying a shallow aquifer. However, the agricultural practice responsible for the groundwater contamination is different from the issue in the Fraser Valley. The nitrate originates from chemical fertilizers applied to orchards.

- In more northern and central parts of the province (e.g., Williams Lake), the major agricultural impact is phosphorus loadings from livestock wintering areas. The problem arises when large numbers of cattle are confined near a stream, particularly if they have direct access.

Clearly, climate and local environmental sensitivities also play an important role. With respect to the latter, an example can be found in stormwater containing high levels of fecal coliforms. This problem is more serious when stormwater discharges to a public beach rather than to a small stream. Conversely, stormwater with high levels of toxic constituents will have a greater impact when it discharges to habitat that contains sensitive aquatic species, especially if there is little dilution (e.g., a small stream).

Summary

The NDM study demonstrated that a number of human and industrial activities, which are not "end-of-pipe" in nature, can have a profound impact on the aquatic environment. The extent to which this impact is detrimental depends on such factors as the type of activity, geology (e.g., permeability of the soil) and climate. However, NPS pollution is clearly a major waste management issue which affects communities across British Columbia.

B. The scope and objectives of this study

With respect to the review of issues and options, the terms of reference identified that five key areas were to be addressed:

- The major institutional and operational issues related to NPS pollution management in BC.
- NPS pollution management approaches in other jurisdictions across North America.
- The options for NPS pollution management based on identified NPS pollution priorities, including institutional and operational requirements.
- Potential linkages which would be required between federal, provincial and local government initiatives.
- Recommended changes and approaches for effective action to manage NPS impacts on the aquatic environment.

The geographical scope of the study was limited to NPS impacts in Southern Vancouver Island, the Lower Mainland and the Okanagan Valley. In addition, NPS impacts related to forestry were excluded (i.e., on the assumption that they are accounted for under the Forest Practices Code).

C. Our approach and workplan

The approach used in this assessment of the issues and options for NPS pollution management can be broken down into seven primary steps. These steps are outlined below. The initial emphasis was placed on obtaining a preliminary understanding of the various programs and concerns related to NPS pollution. Subsequently, a strategic vision and critical success factors (CSFs) for an NPS pollution management strategy were developed. This framework of CSFs, in turn, formed the basis for effectively targeting resources and data collection efforts, as well as providing the "yardstick" against which various options could be evaluated.

1. Preliminary review of information

Prior to developing the data collection and evaluation framework, it was necessary to establish a basic understanding of the roles and responsibilities of government and non-government agencies; the nature of existing programs targeting NPS pollution; and the level and form of NPS pollution within the province. This knowledge was obtained through a preliminary review of documentation and the results from the March NPS workshop.

2. Drafting the strategic vision and critical success factors

Based upon the preliminary review, a strategic vision and twenty CSFs were formulated[2]. Each CSF, as outlined in chapter III, was phrased as a statement describing what a successful NPS pollution management strategy should accomplish or the outputs that the strategy should produce. These statements, in turn, formed the yardstick against which the various options for pollution management were evaluated. There are seven main areas into which the 20 CSFs were divided:

- Legislation and enforcement
- Problem identification and prioritization
- Appropriateness
- Institutional framework
- Operational effectiveness
- Achievement of intended results
- Education, communication, training and reporting

The draft framework of CSFs was subsequently refined based on the interviews with key stakeholders and government representatives.

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2 *A critical success factor is a target which, if met, will serve to maximize the requirements of a "successful" NPS pollution management strategy.*

3. Drafting NPS management roles and responsibilities

In order to begin formulating and assessing alternative NPS management strategies, it was necessary to firmly establish the status quo in BC regarding the roles and responsibilities of key players in the management of NPS pollutants. An understanding of this delineation was formed based upon the preliminary review of documentation and through initial interviews.

4. Finalize sources of secondary data and interview candidates

The interview strategy was designed to include representatives from key agencies identified earlier in the project. An initial target of twenty interviews was set in order to remain cost-effective. Concurrently, available and relevant sources of literature and documentation were finalized along with the jurisdictions to be reviewed (i.e., to provide information on potential solutions for managing NPS pollution in BC).

Prior to conducting the interviews or reviewing the materials in-depth, the data collection strategy and draft interview guides were approved by Water Quality Branch representatives.

5. Conducting data collection activities

A total of 21 direct interviews were conducted and an additional 13 interview guides were distributed by facsimile (i.e., respondents reviewed the guide and provided their comments in-person, over the telephone or by facsimile). These interviews were held to:

- Confirm the preliminary understanding of the current roles and responsibilities in the management of NPS pollution in BC.
- Gather ideas on integrated and cooperative NPS pollution management strategies for BC.
- Finalize the vision, goals and CSFs for an NPS pollution management strategy.

During this stage of the project, a detailed review of existing literature and documentation was also conducted, along with the case studies of selected jurisdictions. With respect to the latter, the NPS management strategies in place for Washington State, California and Colorado were reviewed. These jurisdictions were selected either because their strategies were particularly innovative or unique (i.e., in relation to each other), and/or because the issues and problems they faced with respect to NPS pollution were similar to those in BC.

6. Summarize the information and develop management options

The analysis for this study consisted of consolidating the information collected previously; documenting the current NPS management framework (i.e., roles and responsibilities); and outlining the vision, goals and CSFs for NPS pollution management.

In addition, various NPS pollution management strategies were outlined in detail based upon findings from the research. The applicability of these various alternative NPS management models were then assessed against the success indicators.

7. Formulation of recommendations and reporting

Once the actual analysis was performed, a draft report outlining the current institutional framework (i.e., roles and responsibilities), approaches in selected jurisdictions and NPS pollution management options was prepared. The option or model that best fit the CSFs was explored further to identify how it could be implemented into the existing institutional framework.

II

Current Roles, Responsibilities and Activities in the Management of NPS Pollution

This chapter presents the current institutional framework for NPS pollution management (i.e., roles and responsibilities of key agencies) along with identified NPS pollution priorities. Information was obtained through personal and telephone interviews with representatives from government agencies and key stakeholder groups, as well as from existing program literature and documentation.

A. Current roles and responsibilities in the management of NPS impacts

In developing an effective strategy for the management and control of NPS pollution, it is important to understand the form and extent of related policies, programs, legislation and activities within the province. In this section, key legislation and programs having some impact on NPS pollution management are summarized at the federal, provincial and local level. Firstly, however, we provide profiles of key stakeholder and agency groups involved in the management of NPS pollution throughout the province.

1. Stakeholder and agency groups

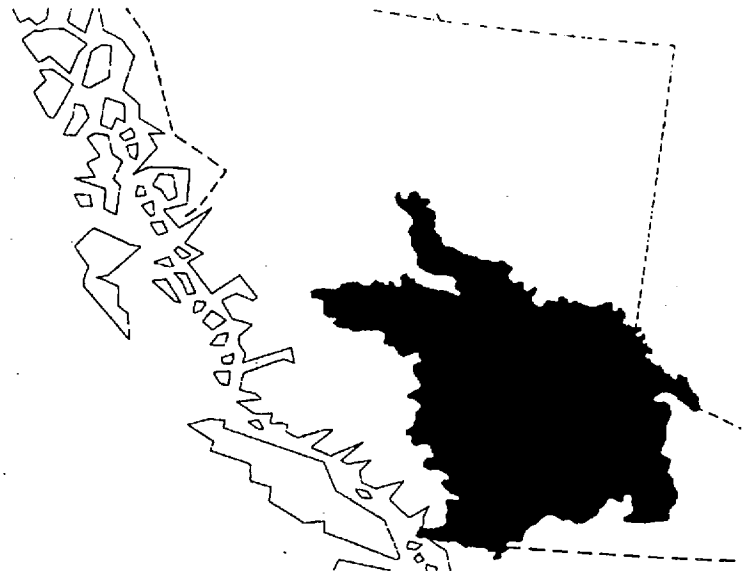
A number of stakeholder and government agency groups have been formed to address environmental issues across the province (e.g., Commission on Resources and the Environment—CORE), particularly within the Fraser Basin. The importance of the Fraser Basin reflects concerns associated with water quality as well as the economic importance of this region. While the Basin only covers 25% of the provincial land base, it accounts for approximately 80% of the gross provincial product and supports almost two-thirds of the province's population. Exhibit II-1 provides an indication of the scope of the Fraser Basin.

Examples of key government programs and regional initiatives which target the environmental, social and economic state of the Fraser Basin include:

- Fraser Basin Management Program (FBMP).
- Fraser River Estuary Management Program (FREMP).
- Burrard Inlet Environmental Action Plan (BIEAP).
- Fraser River Action Plan (FRAP).

The goals and objectives of each of these programs and initiatives are summarized in Exhibit II-2.

Exhibit II-1
Schematic of the Fraser Basin



The FBMP was established in May of 1992 and is managed by a 19-member Board which includes federal, provincial and local government representatives as well as First Nations and non-government parties. The FBMP's strategic plan outlines five key management focuses:

- fisheries and aquatic habitat
- water resources
- pollution prevention
- community development
- communications and education.

Funding for administration and supported programs comes from federal, provincial and local governments. Recently, the FBMP published both a "State of the Fraser Basin" report and a "Report Card" outlining progress towards addressing population growth, quality of water resources, protection of salmon fisheries, sustainable forestry, economic growth, relations with First Nations, coordinated and comprehensive planning processes, and integrated decision making.

The FREMP was established in 1985 as a cooperative agreement and is managed by representatives from Environment Canada (DOE), Department of Fisheries (DFO), Ministry of Environment, Lands and Parks (MoELP), Greater Vancouver Regional District (GVRD) and two harbour commissions. The program has been extended to March of 1996, providing the opportunity to assess the need, scope and potential structure for a future program to improve and monitor the environmental, social and economic health of the lower Fraser Basin.

Exhibit II-2
Goals and objectives for FBMP, FREMP, BIEAP and FRAP

Regional Initiative	Goals and Objectives are to:
FBMP	• facilitate coordination and improve institutional arrangements among government and non-government programs • foster changes in public attitudes, perceptions and behaviour • audit sustainability • recommend priorities for programs and budgets.
FREMP	• develop management systems • facilitate co-operation between agencies • coordinate water and land use planning • monitor water quality • manage the Project Review process • promote public awareness in the context of the estuary.
BIEAP	• reduce existing contaminant discharges • control future discharges • control habitat degradation • provide remedial measures for impacted areas (where appropriate).
FRAP	• build partnerships with government and non-government organizations • establish pollution targets and eliminate toxic discharges to the Fraser River • restore productivity to the Fraser River ecosystem • restore and maintain salmon populations.

The BIEAP was initiated in 1991 by federal, provincial and local governments. The BIEAP management area includes Burrard Inlet and False Creek, and focuses on the water and waterfront. While abatement studies represented the bulk of BIEAP's initiatives in 1994/95, BIEAP expects to concentrate its efforts in 1995/96 on identifying sensitive habitats and coordinating current and planned land uses. A "State of the Inlet" report is expected to be produced at the end of BIEAP's mandate in 1996.

The FRAP is a federal government initiative approved in 1991 under the Green Plan. It is administered by both DOE and DFO, although only the term for the DOE component has been extended to 1997/98. Through FRAP, the federal government has participated in and funded a number of other organizations and cooperative arrangements including the FBMP, FREMP and BIEAP. In addition, research on loadings and ecosystems, state of the environment monitoring, habitat enhancement and remediation of waste sites have been conducted on a cooperative basis. The primary goal of the program is to achieve and maintain a state of the environment that would ensure clean water and abundant renewable resources.

In addition to the organizations targeting NPS pollution in the Fraser Basin, there are a number of community-based groups involved with the protection and enhancement of water quality in other regions of the province. These associations and groups are typically formed of local residents who have concerns over the deterioration of water quality, the disappearance of fish and abnormal water flows. For example, the Bilston Watershed Habitat Protection Association was registered in 1991 and is actively promoting the development of an integrated watershed plan

habitat must immediately notify the federal government. In addition, they must take all reasonable steps to prevent any further discharge and to minimize any damage which may result. Penalties under this Act are substantial. Under the "Salmonid Enhancement Program", DFO provides for the enhancement of fish (salmonid) stocks and habitat restoration.

Discussions are underway to transfer jurisdiction over inland fisheries from the DFO to the provinces; in BC, the authority to manage specific sports fisheries and freshwater fish stocks has already been recognized.

Although DFO and DOE are the lead agencies with respect to environmental management and protection, other federal agencies may have a role in supporting NPS pollution management. For example, Transport Canada is responsible all activities which take place on navigable waters.

3. Provincial government

The provincial government has jurisdiction over all Crown lands, which comprise approximately 93% of the total land base in the province, including all subterranean and forest resources, as well as all waters within its boundaries (e.g., foreshore and inter-tidal). As delegated under the Fisheries Act, the provincial government is also responsible for managing designated sports fisheries, along with land and water that comprise fish habitat. There are a number of provincial government agencies delivering programs and activities which are related, to some extent, to NPS pollution management. Exhibit II-4 provides an overview of the major responsibilities of ministries and agencies which play a role in managing and protecting the environment.

Clearly, MoELP is the lead agency with respect to NPS pollution management in that it has provincial jurisdiction over the regulation of emissions and management of waste. However, as indicated above, a number of other agencies play a significant role with respect to specific forms of NPS pollution.

- The Ministry of Forests (MoF) manages the application of pesticides and herbicides on forest lands. The MoF also has jurisdiction over logging and road building activities which can influence runoff patterns and increase surface water turbidity.

- The Ministry of Health (MoH) has jurisdiction over small (flow less than 22.7 m^3 per day) septic systems, well drilling (i.e., separation distances from sources of contamination) and public water supplies. The former can be a source of NPS pollutants while the latter two may be threatened from NPS pollution.

- The Ministry of Transportation and Highways (MoTH) maintains provincial highways and roads. Consequently, MoTH has implemented a number of initiatives that address runoff from roads, a potential source of NPS pollution.

- The Ministry of Agriculture, Fisheries and Foods (MAFF) licenses and regulates aquaculture operations as well as supporting the development of agricultural industries. Both aquaculture and agricultural operations are potential sources of NPS pollutants.

- The Ministry of Energy, Mines and Petroleum Resources (MEMPR) regulates exploration and development; one potential source of NPS pollution may be mine tailings.

Exhibit II-4
Key NPS related responsibilities of provincial ministries and agencies

MoELP	• Manages the use and disposition of Crown lands; administers the allocation of surface water and protects water quality and quantity; regulates all emissions to air, water and land and sets ambient standards for the province[3].
	• Manages waste reduction, recycling, treatment and disposal; manages freshwater fish and regulates sport fishing; manages wildlife and habitat; manages recreational use and commercial operations in provincial parks; and researches, assesses and monitors the environmental health of the province.
MoF	• Manages "forest lands" (92% of Crown lands) and administers timber harvesting tenures.
CORE	• Developing a provincial land use, resource and environmental management strategy. To date, CORE has completed four regional land use plans.
MoH	• Responsible for testing and regulating drinking water quality and for providing approvals for the installation of small (flow < 22.7 m3 / day) septic systems.
MoTH	• Responsible for planning, construction and maintenance of provincial highways, roads and the inland ferry system, as well as setting standards and jointly administering the AirCare program.
MAFF	• Licenses and regulates aquaculture operations and fur and game farming in conjunction with MoELP; manages the commercial harvest of wild oysters and marine plants; supports the development of agricultural and food industries; and develops economic development policies.
MEMPR	• Responsible for allocating rights to mineral and energy resources; regulating exploration and development; ensuring the safety and health of mining operations; and developing provincial mineral and energy policies.

3 *While provincial standards can be more stringent than respective national standards, they cannot exceed maximum allowable Federal limits.*

Exhibit II-5
Key provincial legislation related to NPS pollution management

Lead Agency	Legislation/Program	Description
MoELP	Water Act & Water Protection Act	• the Water Act provides for the approval of all short-term use, storage and diversion of water, as well as alterations and work in and around a "stream". Under the Water Protection Act, Crown ownership of surface and groundwater is confirmed and large-scale diversion or removal, either between watersheds or outside of BC, is prohibited.
MoELP	Waste Management Act	• requires permits, approvals or operational certificates under a waste management plan for discharges to land, air and water, and handling of solid and toxic wastes.
MoELP	Environmental Management Act	• outlines the duties and powers of the Minister and provides for environmental assessments, protection orders, environmental emergency measures and enforcement.
MoELP	Environmental Assessment Act	• requires an environmental impact assessment for specified projects and activities.
MoELP	Pesticide Control Act	• regulates the use of pesticides and herbicides.
MoELP	Land Act	• regulates the sale, lease and license of occupation, rights of way, special use permits, assessments, map reserves and construction on Crown lands.
MoH	Health Act	• requires approval of construction camps and regulates public water supplies, sewage disposal (under 22.7 m^3 per day), sanitation and food supply operations.
Attorney General	Fire Services Act	• provides approval for more than 22.5 litres of on-site fuel storage and dispensing.
MAFF	Soil Conservation Act; Agricultural Land Commission Act	• permits for removal of soil from an Agricultural Land Reserve (ALR); and regulates soil erosion and use of land in ALR.
Ministry of Municipal Affairs	Municipal Act	• provides local governments with authority to permit construction; approval of zoning and re-zoning; regulation of setbacks, development and local land use.

As reflected in Exhibits II-4 and II-5 on the previous pages, the provincial government has a number of important programs, policies and statutes which address, to some degree, the issues surrounding NPS pollution. The following are brief descriptions of key statutes and policies.

- **Waste Management Act**—the Act, and its supporting regulations, is the overriding legislation for protecting the environment in BC. Through the Waste Management Permit System, permits and approvals are issued to control, monitor and reduce municipal and industrial waste discharges; and to regulate the storage of special wastes.

  Under the Waste Management Act, municipalities and regional districts must also develop Solid Waste Management Plans (i.e., to promote waste reduction and recycling) and Liquid Waste Management Plans (i.e., to address all forms of municipal liquid waste including sewage, urban stormwater runoff and biosolids) for approval by MoELP. As reflected in the "Guidelines for Developing a Liquid Waste Management Plan", the plan must outline waste management options, discharge standards, implementation schedules and financial requirements. An operational certificate is issued following approval of the plan ("Stage 3") and replaces all existing waste discharge permits.

- **Agricultural Waste Control Regulation**—an amendment to the Waste Management Act and Health Act which describes practices for the use, storage and management of agricultural waste. Wastes must be handled in accordance with a "Code of Agricultural Practice", which specifically covers the storage and use of agricultural by-products; application and composting; emissions; storage and use of wood waste; disposal of mortalities; the location and operation of feeding areas and access to water; and the use and storage of agricultural products. If an operator is not in compliance with this regulation, then they are no longer exempt from the Waste Management Act and may be charged accordingly.

- **Pesticide Control Act**—requires the licensing (i.e., vendor licenses, dispensing certificates and use permits) of individuals selling or applying pesticides, as well as outlining specific requirements for disposal. The Act also provides for the inspection of storage facilities, transportation arrangements, sales, application, and disposal of pesticides. Enforcement can consist of seizures, suspension of license rights, issuance of an abatement order, fines and potential imprisonment. Under an Annex to the Act, pesticides are classified as either Permit Restricted, Restricted, Commercial, Domestic or Exempted.

- **Pleasure Boat Sewage Discharges**—under Federal legislation, the Province can restrict the discharge of sewage, from pleasure boats, into provincial waters. The program provides a mechanism for agencies and stakeholders to submit a request for the application of sewage discharge restrictions for a designated body of water. Decisions are made based on the principal uses of the water and its overall environmental sensitivity.

- **British Columbia Environmental Protection Act (BCEPA)**—this proposed Act is intended to consolidate and revise several statutes including the Waste Management Act, Environmental Management Act,

Pesticide Control Act, Litter Act and the Ministry of Environment Act. The draft legislation provides an emphasis on:

- pollution prevention
- establishing partnerships with agencies and industry
- expanded enforcement options
- the use of economic incentives (e.g., levies, deposits)
- integrated pest management
- contaminated sites
- generally applied waste management regulations and standards
- environmental accidents and emergencies
- a common appeal process.

- **Water Act**—under the Act, a license entitles a user to divert and use, within a stipulated timeframe, a specified quantity of water. A licensee can also store water; construct, maintain and operate water works; alter or improve a stream or channel; and construct fences or screens for conservation purposes. The only reference which addresses water quality and NPS pollution is found under Section 7 of the Act, which provides standards to ensure that changes in or around a stream are carried out in an environmentally sensitive manner to protect water quality.

- **Growth Strategies Act**—this legislation supports regional districts in adopting a regional growth strategy to guide decisions on community growth and development. These plans must cover a period of at least 20 years and need to include, at a minimum, social, economic and environmental objectives; population and employment projections; and actions to address housing, transportation, service delivery, parks, natural areas and economic development.

- **Forest Practices Code**—The four main components to the Forest Practices Code are guidebooks, the Code itself, regulations and standards. There are two guidebooks which are directly relevant to NPS pollution management, the first being the Lake Classification Guidebook (LCG). An LCG has been developed for each region and assists in the establishment of management goals for individual or groups of lakes based on such criteria as recreational, commercial, fishing and wildlife use. The LCG also provides recommended practices for each class of lake. There is also the Community Watershed Guidebook (CWG), which outlines the forest practices necessary to protect the quality and quantity of water. Topics covered by the CWG include terrain hazard mapping, watershed assessment, riparian management, pesticides, fertilizers and monitoring.

The provincial government, specifically MoELP, has also published a number of guidelines, quality objectives, standards and criteria related to water quality and NPS pollution. The following are descriptions of selected initiatives:

- "Urban Runoff Quality Guidelines for BC" were developed by MoELP to assist local governments with the preparation of management plans to control urban runoff. General recommendations are provided with respect to the design of stormwater conveyance, detention and treatment facilities, along with an overview of the nature of urban runoff and recommendations for developing specific aspects of a management plan (i.e., public and private sector education and participation; developing site-specific goals and objectives; monitoring; source control programs; appropriate treatment technologies; land use restrictions; and funding opportunities). Urban Runoff Control Plans are an integral part of the Liquid Waste Management planning process.

- A set of "Guidelines for Developing a Liquid Waste Management Plan" were published by MoELP to assist local governments. This document provides an overview of what should be included in a Liquid Waste Management Plan (LWMP) as well as information on the key issues (i.e., environmental, technical and economic) and planning processes (i.e., initiation, notification, establishing advisory committees, the public participation process, preparation and submission) related to an LWMP.

- A number of Pollution Control Objectives were developed in 1975 to manage municipal waste discharges. These objectives are in the process of being revised and draft discharge criteria which incorporate Best Available Control Technologies (BACT) have been prepared. Specifically, the criteria address effluent discharges, environmental assessments, monitoring, treatment and disposal operations, combined sewer discharges and semi-solid wastes. These criteria are providing the basis for a Municipal Sewage Discharge Regulation which will eventually replace the current permitting system.

4. Federal and provincial combined initiatives

There are a number of joint federal and provincial initiatives which have addressed various aspects of environmental stewardship. The "Stream Stewardship—A Guide for Planners and Developers" was developed jointly by DFO and MoELP. Essentially, this guide outlines the need for stream stewardship; profiles the costs (e.g., development, financing and potential fines under the Fisheries Act) and benefits (e.g., tax base, funding, environmental and social) associated with the development of environmentally sensitive areas (ESAs); and provides an overview of roles and responsibilities of agencies and community members. The guide encourages local governments to include environmental objectives in Official Community Plans (OCPs) and to use zoning, design approvals and standards as a mechanism for controlling impacts on streams and fish habitat.

Through another joint project, DFO and MoELP developed "Land Development Guidelines", which are intended to protect fish populations and habitat (i.e., the "no net loss" principle) from impacts associated with land development. These guidelines also encourage the submission of environmental assessment and impact information. There are six key objectives:

- provide and protect leave strips along waterways
- control soil erosion
- control rates of water runoff
- control instream work
- maintain fish passages
- prevent the discharge of deleterious substances.

Although adoption of the guidelines is voluntary, there are some key incentives which promote their use including timely approval of land development plans and a reduced likelihood of prosecution under the Fisheries Act and other local or provincial statutes. In addition, a number of the key objectives (e.g., control of instream work) fall under Section 7 of the Water Act.

Finally, the "Options Evaluation Process" represents a partnering of DOE, Health Canada, provincial government agencies and stakeholder groups. This multi-stakeholder approach has targeted the establishment of environmental objectives and the development of effective and efficient options for the management of toxic substances as defined under CEPA. Essentially, a number of activities are encouraged including pollution prevention; the use of economic incentives; labelling and the provision of information; regulations; guidelines; and quality objectives. There are three main stages under the Options approach:

1. **Issue Integration**—which entails the collection and provision of information on toxic substances and related products.

2. **Strategic Options Process**—where options for reducing exposure to toxic substances are developed and evaluated.

3. **Implementation**—where the options are implemented and their results monitored.

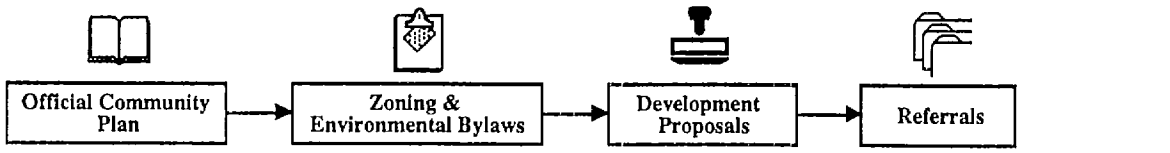
5. Local government

The Municipal Act delegates the responsibility of land use and development of private land to local governments. Under the Act, municipal and regional governments regulate local land use planning through OCPs or regional district plans, bylaws, zoning and development permit provisions. The OCPs identify Environmentally Sensitive Areas (ESAs) and provide policies for managing these areas, including the issuing of conservation covenants in cases where public access would compromise the quality of the habitat. OCPs may also include other measures for protecting local ecosystems, including Density Bonus Zones, which allow for higher densities in developments. For density bonuses to apply, developers must provide amenities such as identifying or managing ESAs, and Development Permit Areas, which protect aquatic and riparian resources.

In addition to Solid and Liquid Waste Management planning, municipalities can provide other measures for protecting local environments. Specifically, Tree Protection (regulates tree cutting), Soil Removal (regulates the removal or placing of fill), and Drainage bylaws (regulates stormwater disposal) as well as on-site

sewage disposal bylaws and zoning can be adopted. Zoning bylaws, which set out permitted uses for areas included within the OCP, may also be used to create Conservation Zones or, alternatively, to provide environmental regulations which are triggered by developments located near ESAs (e.g., setbacks, landscape standards, fencing and minimum parcel sizes). However, with each municipality being able to develop and adopt environmental measures on an independent basis, there are inconsistencies among local government policies, procedures and bylaws which relate to NPS pollution management. Exhibit II-6 provides an overview of the planning tools traditionally available to local governments (i.e., under the Municipal Act).

Exhibit II-6
Conventional planning approach



- Identify ESAs
- Goals & policies for the protection of local ecosystems

- Tree Protection, Soil Removal, Drainage and Storm Sewer bylaws
- Zoning bylaws which allow for Conservation Zones and general regulations triggered by proximity to ESAs

- Refer design plans to federal and provincial agencies (e.g., in case of aquatic habitat being affected, DFO and MoELP would be involved).

As outlined in the prior section, there are additional avenues available to local governments for protecting environmental resources, including the voluntary development, by regional districts, of regional and sub-regional growth strategies. Both regional districts and municipalities can also participate in the development of LWMPs. Finally, local governments have the authority to regulate development on floodplains and must provide community water services that comply with provincial standards.

An important, recent initiative for local governments is the development of Storm Sewer bylaws which restrict or limit the discharge of contaminants to storm sewers. The Capital Regional District (CRD) has developed a model Storm Sewer bylaw which is currently being revised and will be adopted by municipalities within the CRD. The City of Kelowna has developed a Sanitary Sewer Discharge bylaw which applies to both sanitary and storm sewers. Essentially, a Storm Sewer bylaw addresses:

- The protection of stormwater collection systems.

- The protection of both the receiving environment and the health of local community members.

- The promotion of proper waste management practices.

- The need for consistent regulation.

In developing a stormwater bylaw, a municipality can either develop effluent criteria for discharges and incorporate them into a planning authorization process, or require the application of Best Management Practices (BMP) and BACT. Either approach is subject to the constraints inherent in the current Municipal Act, which limits municipalities to the protection of water flowing within a drain or creek (i.e., rather than allowing for the protection of the receiving environment).

Typically, the following generic departments in a local government play a role, to some extent, in land development and environmental management.

- **Council or Regional Board**—should provide the overall mandate for implementing environmental programs and measures.

- **Administrator's Office**—directs staff in all departments on planning and implementation actions and supports co-operative efforts with other levels of government.

- **Planning Department**—incorporates environmental measures into OCPs, zoning bylaws, subdivision bylaws, development permits, comprehensive development and bonus areas, building permits and security arrangements.

- **Engineering and Public Works Department**—adapts existing design standards to be consistent with environmental standards. Can also train field inspection staff in environmental mitigation and enforcement.

- **Parks and Recreation Department**—incorporates protection and environmental strategies (e.g., ESAs) into community park and open space plans. Can also integrate parks and ESAs into a Greenways strategy.

- **Environmental Department**—provides services to all other departments in the areas of stewardship and environmental protection (i.e., through a single environmental bylaw which consolidates the appropriate powers under the Municipal Act). It should be noted that many municipalities do not have designated environmental departments, but, rather, tend to assign these responsibilities to an existing department (e.g., the Engineering Department).

- **Building Department**—ensures that environmental measures are required during the approval stage and are incorporated into final plans. Can also train field staff in environmental mitigation and enforcement.

- **Advisory Commissions**—provide the opportunity to include environmental professionals and other key stakeholders on Advisory Planning and Public Works commissions. Alternatively, a local government can form an Environmental Advisory Committee to provide a mechanism for stakeholder direction.

Finally, the Union of BC Municipalities (UBCM) provides an opportunity for local governments to present their concerns on a consolidated basis. In addition, member municipalities and regional districts are able to develop common strategies that support the principles of environmental stewardship and protection while balancing concerns for social and economic growth.

Summary

This summary is organized according to the most significant activities which relate to NPS pollution management.

Development of water quality and environmental protection standards

The development of air, water and environmental protection standards falls within the domain of both federal and provincial governments. The Federal government, through the DOE and the DFO, sets national water, air and environmental protection standards. For the provincial government, air, water and environmental protection standards, which cannot fall below equivalent federal standards, are set primarily by the MoELP. However, the Ministry of Health is responsible for the quality of the province's drinking water, and local governments are responsible for ensuring an adequate supply and protection of water for community purposes.

Regulation of discharges and uses

The management of discharges and uses requires the integration of numerous Acts and regulations, including existing legislation relating to waste management, land-use planning, water quality, pesticides and fish and wildlife protection. However, as outlined above, no one level of government is responsible for all these regulations. In addition, some Acts and regulations may also overlap or conflict. The Water Act and Fisheries Act, for example, are in conflict with respect to the allocation of water rights. The Water Act allocates water on the basis of "beneficial uses", but an aquatic environment is not listed as a "beneficial use". Hence, the Water Act does not guarantee sufficient flows to maintain fish populations.

The complexity of existing regulations is revealed when considering the issues related to stormwater. Federal and provincial requirements and standards are based primarily on the Fisheries Act (federal), the Waste Management Act (provincial), Municipal Act (provincial), Health Act (provincial) and the Water Act (provincial). The government agencies involved include the DFO and the DOE as well as the MoELP, the Ministry of Health and the Ministry of Municipal Affairs. In addition, under the Waste Management Act,

municipal governments must prepare LWMPs which cover the management of stormwater.

Development of management and protection policies

Developing management and environmental protection policies is the responsibility of all three levels of government. The Federal government is primarily responsible for policies relating to the management of fish (salmonid) and fish habitat. For all other management and

also been noted in the Fraser Valley, Grand Forks, Powell River, the Gulf Islands and the Okanagan Valley.

In attempting to prioritize these NPS pollution problems and sources, it is important to recognize that there are both normative and quantitative aspects. Normative aspects exist where water quality fails to meet established norms which are not quantifiable based on current scientific and technical knowledge. Conversely, quantitative aspects are present when water quality fails to meet specific numerical standards (i.e., Federal and provincial).

On the basis of overall contaminant loadings, the general NPS pollution priorities are stormwater and agriculture. However, stormwater cannot be considered independently as contaminants are contributed partly through atmospheric deposition and spills and leaks. Although priority issues in terms of impacts are more site-specific, agriculture and stormwater remain the key concerns. Specifically, because NPS loadings from stormwater and agriculture are relatively continuous, many of their impacts are chronic and widespread, causing gradual increases in environmental contaminants that eventually may affect water use. For example, there is evidence that nitrate levels in the Abbotsford Aquifer have been increasing since the 1970s. In some wells, these levels may now exceed the drinking water guidelines and may threaten the health of infants.

Clearly, the relative contribution of each NPS is difficult to assess since contaminant loadings are not always comparable across regions and sources. However, it is possible to assess the NPS of highest concern for various provincial regions. The following lists the primary source of NPS contaminants for generic geographical areas.

- Urban areas—stormwater.
- Non-urban and undeveloped areas—agriculture.
- Inland lakes—septic systems.
- Coastal marina facilities—boat sewage discharge.
- Pristine wilderness areas—atmospheric deposition.

III

Effectiveness of the Current BC NPS Pollution Management Situation

This chapter outlines the issues surrounding the province's NPS pollution management vision, goals and critical success factors (CSFs). In addition, the extent to which the current NPS pollution management situation in BC meets each CSF is assessed and rated. This information was obtained primarily through a series of personal and telephone interviews held with local, provincial and federal government representatives, as well as with administrators from selected stewardship groups.[4] These findings were supplemented by detailed literature and documentation reviews.

A. Vision, goals and critical success factors for NPS management in BC

A vision statement describes what an organization aspires to achieve through its actions and activities. Consequently, in formulating a vision for NPS pollution management in BC, it was important to ensure consistency with the MoELP's overriding strategic plan and the vision for the Environmental Protection Division. Based on such considerations, the following statement was developed for British Columbia.

> To efficiently and cooperatively achieve zero NPS pollution by working in partnership with others to prevent, minimize and control the release of NPS contaminants.

Following the formulation of the Province's NPS vision, 20 critical success indicators were initially drafted using Ministry documentation; these were later refined based upon input from the interviews. Each of these factors were phrased as a statement describing what a successful NPS management strategy should accomplish. These statements, in turn, formed the "yardstick" against which current and alternative NPS management strategies were assessed. The 20 CSFs were divided into the following areas:

- Legislation and enforcement
- Problem identification and prioritization
- Appropriateness
- Education, communication, training and reporting
- Institutional framework
- Operational effectiveness
- Achievement of Intended Results

4 *In light of time and resource constraints, 21 direct interviews were conducted and an additional 13 interview guides were distributed by facsimile (i.e., respondents reviewed the guide and provided their comments in-person, over the telephone or by facsimile).*

Exhibit III-1
Critical success factors

Legislation and Enforcement:

- Ensure that regulations, legislation and guidelines appropriately address the NPS pollution priorities of BC.
- Encourage the use of conflict resolution and consensus techniques that reduce the need for court action
- Have an effective mechanism in place that ensures equitable and consistent enforcement of activities that cause NPS pollution

Institutional Fremework

- Be delivered by those agencies with the legislative authority, skills, knowledge and ability to control, monitor and reduce the release — or minimize the impact — of NPS contaminants to the environment
- Minimize or eliminate the existence of duplication in roles and responsibilities between operating agencies (keeping within the theme of cooperative NPS management)
- Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy

Problem Identification and Prioritization:

- Ensure that a system is in place to monitor key human activities and the magnitude of specific NPS contaminants in identified problem areas
- Set and monitor key indicators that track the effectiveness of NPS pollution management activities
- Continually (re)assign NPS pollution management priorities based on the results of performance monitoring programs
- Be flexible and responsive enough to alter priorities if new information or legislation makes it practical

Operational Effectiveness:

- Ensure that agencies are targeting their activities towards NPS management priorities
- Support the development and implementation of creative solutions by participants (in accordance with the overall strategy)

Internal and External Education, Communication, Training and Reporting:

- Ensure that key agencies understand, agree and are committed to the integrated (i.e., umbrella) strategy
- Encourage key agencies to expedite the successful implementation of their NPS management activities through employee education and training
- Encourage public and stakeholder education, training, involvement and support for effective implementation and operation
- Periodically report to the general public and other key stakeholders on the effectiveness of activities designed to address NPS water quality problems

Appropriateness:

- Promote integrated watershed management within the existing land use planning framework
- Institute, where possible, the principles of "polluter pay"
- Encourage key agencies to take a preventative / pollution prevention approach to reducing NPS releases rather than attempting to control those releases through remediative actions

Achievement of Intended Results:

- Result in a 50% reduction in annual NPS loadings by the year 2005

B. Evaluation of NPS pollution management situation in BC

In this section, we assess the current NPS pollution management situation in BC against the CSFs. Assessments of the alternative models are provided in Chapter V. Exhibit III-2 provides a summary of the ratings used in this evaluation; refer to Exhibit III-3 for a summary of the ratings provided for the current situation.

Exhibit III-2
Assessment ratings

○=Does not meet CSF, ⊙=partially meets CSF, ●=meets CSF

Each assessment is supported by a discussion of the key points and issues surrounding the particular factor. Although the assessment process is subjective in nature, the information provided under each factor is indicative of the reasoning behind the assignment of the ratings. It is important to note that the order in which the factors are presented in no way corresponds to their relative importance or priority.

1. Ensure that regulations, legislation and guidelines appropriately address the NPS pollution priorities of BC

Rating: ⊙

A fairly solid base of legislation currently exists, especially within the Waste Management Act and the Fisheries Act. However, where such legislation is already in place, there is a need for coordination (i.e., a number of independent actions are taking place) and refinement to better support enforcement and the adoption of NPS management practices. For example, the Municipal Act does not readily support the development of comprehensive bylaws which address NPS pollution along with other environmental issues (e.g., impact on receiving environments). In addition, the Municipal Act does not support coordinated land use planning at the local level.[5]

There is also a lack of legislation and authority to deal with specific NPS aspects of agricultural practices (e.g., aerial spraying of pesticides outside of forested areas) and groundwater protection (e.g., to require the submission of groundwater information, development of standards for well construction and management plans to protect water quality in aquifers). With respect to the use of specific guidelines and codes of practice, in most cases there doesn't appear to be any supporting legislation which requires them to be followed.

5 *Regional growth strategies, under the "Growth Strategies Statutes Amendment Act", provide social, economic and environmental objectives along with proposed planning actions, and, as such, cannot be considered as a traditional land use planning process.*

2. Have an effective mechanism in place that ensures equitable and consistent enforcement of activities that cause NPS pollution

Rating: ⊙

While the focus for an NPS management strategy may be on other preventative factors such as education, an enforcement mechanism appears to be important in that penalties should exist for "bad players" (i.e., operations or individuals who do not meet or adopt stewardship principles). Although there currently exists an enforcement mechanism(s) based upon legislation such as the Waste Management Act (e.g., a pollution abatement or control order) and the Fisheries Act, and a network of regional MoELP Environmental Protection offices, the current system is reactive and cannot manage the large number of sources of potential NPS pollution. The main premise behind present enforcement activities is "command and control", which entails an enforcement proceeding once an allowable level of discharge has been exceeded. However, in many cases, available information is not sufficient to track specific NPS pollutants to their source.

3. Encourage the use of conflict resolution and consensus techniques that reduce the need for court action

Rating: ⊙

In light of the nature of NPS pollutants—where the source may not be clearly identified based upon objective information, and limited resources exist for enforcement purposes—the ability to use legal action may be constrained. Hence, there is a need for conflict resolution and consensus techniques to support enforcement activities. Individual consensus and conflict resolution processes do exist within the province, including:

- The Commission on Resources and the Environment (CORE) dispute resolution process.
- Alternative dispute resolution processes under the proposed BCEPA.
- The BC International Commercial Arbitration Centre's environmental dispute resolution project.

However, an integrated and comprehensive set of techniques, which can be applied on a consistent basis in the context of NPS pollution, does not exist within BC.

4. Be delivered by those agencies with the legislative authority, skills, knowledge and ability to control, monitor and reduce the release—or minimize the impact—of NPS contaminants to the environment

Rating: ⊙

There currently exists an artificial delineation in responsibilities between local, federal and provincial agencies (i.e., through the British North America Act and the Constitution Act). The federal government has traditionally been responsible for scientific research; monitoring; the development of national resource quality and environmental protection standards; issues of national concern; enforcement over trade, sea coasts, fisheries (i.e., salmonids) and migratory wildlife; First Nations; and interjurisdictional transport. The provincial government is responsible for managing most of the resources within its boundaries, including waste management and control of all discharges to land, air and water. Finally, under the Municipal Act, local governments have jurisdiction over private lands (excluding forest lands) and are able to manage land use through bylaws, OCPs, zoning and development permit provisions.

However, concerns were raised about the effectiveness and efficiency of the current distribution of authority to address issues associated with NPS pollution. Such concerns included conflicting mandates, existing resource (financial and human) constraints, and lack of consistency. Consequently, there is a need for a clear definition of roles and responsibilities which reflects jurisdiction, interests and organizational ability for all levels of government as well as key stakeholder groups.

5. Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy

Rating: ○

In light of continuing fiscal restraints, there is a demonstrated need for additional resources at all levels of government (e.g., at the regional level for enforcement and monitoring activities). For example, DOE and Natural Resources Canada are facing budgetary cuts in the order of 32% and 50% respectively over the next three years; and the MoELP, along with other Ministries, has had to adjust to significant cuts in program and administrative budgets. With respect to DOE, the majority of these cuts are reported to be in the Atmospheric Environmental Service and regional offices. In terms of the provincial government, it was noted that if key resources are increased in one program area, then there will need to be a relative decrease in resources for other programs. Finally, for local governments, concerns were raised about downloading of responsibilities without the provision of supporting funds, authority and/or resources.

Consequently, as part of the implementation of an NPS management strategy, the extent to which financial, physical and skilled human resources are available must

be considered. Specifically, the strategy should maximize the use of existing resources.

6. Minimize or eliminate the existence of duplication in roles and responsibilities between operating agencies (keeping within the theme of cooperative NPS management)

Rating: ⊙

While there is a degree of uncertainty about the extent to which duplication in roles exists, the organizational structure of government, coupled with the lack of a comprehensive framework that facilitates the coordination of government agency actions and policies within British Columbia, implies that more progress could be made towards improving the efficiency of delivery of government services. Specifically, there are a number of independent mechanisms (e.g., the Land Use Coordination Office (LUCO), government agent's offices and the proposed Environmental Management Framework or EMF) which have improved the coordination of specific administrative processes (e.g., the focus of EMF on Canadian Wildlife Services).

There is also a need for a clear delineation of responsibilities among the various levels of government. For example, a 1993 review of Environment Canada's regulatory programs found that five out of the 25 regulations under CEPA overlapped with provincial requirements for toxic substances, emissions and PCB storage. Another example can be found with respect to emissions harmful to fish and fish habitat, where there is a potential for conflicting enforcement activities which are authorized under both the Waste Management Act and the Fisheries Act.

7. Ensure that a system is in place to monitor key human activities and the magnitude of specific NPS contaminants in identified problem areas

Rating: ⊙

A broad range of information on specific contaminants, contributing activities and loadings for regions exists within the province. For example, research has shown that higher concentrations of some contaminants are evident in runoff from highways versus runoff from other land use areas. Other data has shown that in terms of septic system overflows or runoff, very little nitrogen is retained in soils in comparison to phosphorus. However, this information is not sufficient to provide a comprehensive and accurate representation of ambient conditions as well as NPS contaminants and sources across the province. This reflects that pollutant types, concentrations, and loadings to receiving environments can vary on a regional and site-specific basis due to such dynamic factors as annual rainfall cycles and land use practices.

Because of the relationship between local conditions and NPS pollution, a monitoring system cannot be general in nature (i.e., there is a significant level of uncertainty associated with extrapolating the monitoring results from one specific region to other areas). Rather, there is a need for a system which can monitor key activities and water quality aspects on a region-specific basis. While monitoring of

basins has been carried out on an annual basis since 1987, there is currently no system in place for stormwater monitoring at the local level. There is also a lack of comprehensive monitoring protocols and an integrated system which can address regional priorities (e.g., combined sewer overflows in the Vancouver region).

8. Set and monitor key indicators that track the effectiveness of NPS pollution management activities

Rating: ⊙

Individual actions at the local, provincial and federal level are taking place with respect to the development of sustainability and environmental indicators. However, there is still a need to refine and integrate key indicators which account for NPS pollution and the extent to which it is dependent on regional geology, climate and related characteristics. There is also a need to account for the nature of NPS discharges as part of current monitoring activities (e.g., storm and "first flush" events). While MoELP has developed a set of objectives for water quality, they represent more of a goal or reference point against which water quality can be assessed. For those objectives that do exist, concerns have been raised on the need to both provide more direct measures of aquatic health and to expand the objectives to address more toxic substances. Further, although variables for monitoring trends in water quality have been in existence since 1985, their use to date has been limited in that data has been assessed for only a small number of watersheds.

9. Continually (re)assign NPS pollution management priorities based on the results of performance monitoring programs

Rating: ⊙

In addition to the concerns noted above with respect to existing monitoring systems, NPS priorities have not been balanced, in terms of resources, with priority actions and programs related to permitted point discharges. In addition, priorities which are being assigned tend to be reactive in nature, based more on public and political pressures. Hence there is, in general, a need to raise the profile of NPS issues within and across government agencies with subsequent priorities being assigned based on monitoring results. Some recent initiatives, such as MoELP's "Aquifer Classification System" which prioritizes aquifers based on their use and vulnerability to contamination, have attempted to do this, and demonstrate a movement towards a more proactive system of management and priority setting.

10. Be flexible and responsive enough to alter priorities if new information or legislation makes it practical

Rating: ○

As described above, there are a number of concerns which have an impact on the ability of government agencies to adjust priorities based on new requirements and information, including:

- The absence of an integrated regional monitoring system.

- Potential duplication in roles and responsibilities.
- Reactive assignment of priorities based on political and public pressures.
- The availability of information on NPS pollution for the province.

Coupled with such concerns are issues surrounding the extent to which governments have the administrative and procedural flexibility, and the available funding and resources, necessary to address new priorities. Consequently, it appears that significant progress is required to ensure that there is an inherent degree of flexibility in the implementation and delivery of programs targeting NPS pollution management.

11. Ensure that agencies are targeting their activities towards NPS management priorities

Rating: ○

To date, activities within and across levels of government have not been consistently linked with impacts on water quality (e.g., the registration of septic systems without provisions for location and maintenance). In specific circumstances, government and government agencies, as well as community and stakeholder groups, have not assigned a high priority to NPS problems.

NPS has been linked to a number of human activities, including:

- agriculture
- forestry
- motor vehicle usage
- mining
- land development

These activities, in turn, fall within the mandates of a number of government agencies and community groups. Hence, if these agencies are not working in partnership towards a strategy to address NPS, then further environmental degradation is likely to continue.

12. Support the development and implementation of creative solutions by participants (in accordance with the overall strategy)

Rating: ⊙

It was noted that existing technologies and best practices are not always being adopted to handle identified problems associated with NPS pollution. For example, there are apparently three or four new septic system technologies which can address some of the issues associated with discharges from traditional systems. In its report card, the FBMP notes that "while federal, provincial and GVRD governments debate who will pay for upgrading sewage treatment, salmon and other aquatic species are being subjected to sewage wastes that have received only primary

treatment." This indicates the need for cost-sharing agreements and time schedules to support the implementation of new technologies and procedures.

Overall, participants must be aware of, and willing to adopt, such solutions (i.e., BMPs and BACT) as part of an NPS pollution management strategy.

13. Ensure that key agencies understand, agree and are committed to the integrated (i.e., umbrella) strategy

Rating: ⊙

Although it is difficult to assess this factor for the status quo (i.e., in the absence of an integrated strategy for NPS pollution management), the level of uncertainty among key agencies on the administration and adoption of NPS pollution management strategies indicates the need to enhance communication and cooperation across ministries as well as with other levels of government and stakeholder groups. For example, the FBMP notes in its report card that "there is no clear and understandable picture of the purposes and functions of the various levels of planning processes".

While some progress has been made towards promoting cooperation between agencies, as evidenced by the "Protocol for Sharing Environmental Responsibilities",[6] there remains a need for an integrated and comprehensive consultation framework that supports an effective commitment to action. In this study, it quickly became apparent that each group generally agreed with the factors that would constitute a successful NPS management strategy. Therefore, the "will" exists for an integrated strategy to address the problem.

14. Encourage key agencies to expedite the successful implementation of their NPS management activities through employee education and training

Rating: ⊙

A number of concerns have been raised about the need for diverse skill sets and, in specific cases, the lack of highly skilled personnel. For example, while municipalities have an abundance of skilled engineers, they often do not have access to biologists, geologists or other specialized personnel. Even in those cases where such expertise is available, there is a demonstrated need for upgrading with respect to the latest research and techniques, especially in regional offices where training budgets may not allow for travel and accommodation.

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6 *The protocol was entered into in 1993 by MoELP, Ministry of Municipal Affairs and the Union of BC Municipalities. The agreement provides for harmonized environmental policies and programs by establishing ten principles which address such issues as effective communication systems; definitions of roles and responsibilities; a commitment to action; the development of standards; and educational programs.*

Balanced against these concerns is the presence of employees with skills and backgrounds applicable to NPS pollution management in specific ministry departments and branches (e.g., Environmental Protection Officers and Technicians).

15. Encourage public and stakeholder education, training, involvement and support for effective implementation and operation

Rating: ⊙

A key issue concerning the general public and key stakeholders is a general ignorance about the impact which certain behaviours have on the environment. For example, dumping solvents, detergents or used oil down storm drains while not recognizing that these drains can discharge directly into sensitive receiving environments (e.g., streams and creeks). Essentially, the disposal of wastes is a "free good" for the public in that there is no incentive (i.e., "price") to change such behaviour. Consequently, an NPS management strategy cannot succeed without involvement and support from the public and stakeholders.

There currently are several established programs which target stakeholder and public education. These include the Storm Drain Marking Program, which entails the painting of a yellow fish symbol beside drains that discharge directly into nearby streams and waterways, and the Salmon Enhancement Program, which incorporates a number of individual educational programs targeting water quality through the stewardship of salmonids and protection of sensitive habitats. In 1993, FREMP distributed a package to teachers (Grades 5-9) which provided materials to support role playing related to land and resource management planning. However, these initiatives appear to be independent in nature and, hence, there is a need for some integrative framework or mechanism to coordinate their delivery with a common theme.

16. Periodically report to the general public and other key stakeholders on the effectiveness of activities designed to address NPS water quality problems

Rating: ●

In order to promote accountability, there is a need to report to the public and other key stakeholders on a regular basis (i.e., by having key agencies provide information on their activities). The recent BC State of the Environment report, and the proposed water quality report card, both support accountability by describing current environmental conditions; potential sources of contaminants; and actions being taken to address quality problems. A number of stakeholder groups (e.g., FBMP) also produce similar monitoring and evaluation reports.

Naturally, it is imperative that this reporting process continue in order to improve the public's and stakeholder's general understanding about NPS issues as well as roles and responsibilities in the management of NPS pollution. Although existing initiatives have been successful in providing information of a specific nature, there remains a need for continued and expanded public reporting.

17. Promote integrated watershed management within the existing land use planning framework

Rating: ⊙

There are currently a number of agencies engaged in land use planning, including the Commission on Resources and the Environment (CORE) and MoELP (i.e., land and resource management plans or LRMPs). In 1985, the provincial government also began the process of "integrated watershed management planning", which brought together concerned stakeholders and groups. As of 1994, nine plans were completed for community watersheds with an additional 13 being under development. The theme of integrated watershed management is also reflected in the Forest Practices Code (e.g., the LCG and CWG).

LUCO was established to coordinate the delivery of these land use planning activities. However, there is still a need to further integrate site-specific planning processes with higher level sub-regional and regional land use plans to help address NPS issues. To achieve this level of integration, a framework to encourage local stewardship groups and private property owners to participate with existing agencies in a coordinated land use planning process (i.e., integrating CORE's regional plans, LRMPs and watershed plans with private land management) should be developed.[7]

18. Institute, where possible, the principles of "polluter pay"

Rating: ○

A key issue entails how governments should finance pollution control, waste management and remediation. One consideration is that polluters, and not government, should bear the cost and ultimate responsibility for their waste products. The only other alternative would be to use general tax revenues, which implies that the general public is subsidizing waste generators. The provincial government is continuing to move towards a "polluter pay" framework for point source pollution management. However, such a mechanism is currently missing with respect to NPS pollution management. Naturally, there are a number of factors which would need to be addressed in developing a polluter pay framework for NPS pollution.

- Principles of polluter pay only apply in those cases where the pollution source can be identified.
- Incentives to adopt better practices should exist.
- The cost for enforcement should be offset through some form of revenue (e.g., fees).

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7 *Although public and private open space planning processes are part of the Community Greenways initiative, greenway planning is only one aspect of an integrated land use/watershed plan.*

19. Encourage key agencies to take a preventative/pollution prevention approach to reducing NPS releases rather than attempting to control those releases through remediative actions

Rating: ⊙

Traditionally, the provincial government has focused on "end of the pipe" discharges. However, there is a growing level of support for the adoption of strategies that are targeted towards, where possible, the source of pollutants. Although a number of initiatives focusing on pollution prevention have been implemented, there is an absence of incentives to promote better waste management and "housekeeping practices" for key sources of NPS pollution. Pollution prevention is also not directly supported by the current Waste Management Act.

20. Result in a 50% reduction in annual NPS loadings by the year 2005

Rating: ⊙

There are a number of issues surrounding the validity and practicality of instituting targets for reducing NPS pollution. Concerns have been raised on the ability to assess progress in light of gaps in existing baseline information. Other issues include the need to address site-specific characteristics, targeted practices and linking ecosystem goals with water quality. However, despite the uncertainty surrounding the format and extent to which targets can be applied, there clearly is a need to develop goals (preferably quantifiable) as a means of measuring achievement towards intended results. Although a target for reducing NPS pollution has been identified in this study, these targets could also address the degree of compliance with management strategies. Clearly, once more reliable baseline data are in place, this factor will need to be revisited and, if necessary, revised or expanded.

It is difficult to assess the current situation in BC against this factor, for the reasons identified above. Based on such information as the 1993 State of the Environment Report, it appears that limited progress has been made to date in reducing the impact of NPS pollutants. Although water quality objectives were reported in 1993 as being met in over 90% of the samples taken at selected basins, a number of concerns on surface and groundwater quality have been raised including local contamination of groundwater (e.g., nitrates), leaking septic and underground storage tanks, and runoff from land developments and highways (e.g., heavy metals). For example, as part of its 1994/95 annual report, FREMP reported evidence of fish tissue contamination and abnormalities. In addition, monitoring for attainment of objectives normally entails weekly sampling over a five-week period, which may not be optimal for detecting NPS problems (i.e., NPS problems may be more effectively detected by targeting "first flush" events).

Based on the assessment below, there is clearly a need for an NPS pollution management strategy in British Columbia. This also reflects the relationship between NPS and point

sources of pollution, with NPS accounting for a growing proportion of the total loadings to receiving environments.

- NPS account for over 90% of reported loadings to the Saanich Inlet.
- NPS are the more prominent sources of phosphorus loadings to the Okanagan Lake system (i.e., mainly septic tanks, forestry and stormwater).
- Stormwater (including atmospheric deposition) and agriculture account for the greatest proportion of nitrogen loadings in the Lower Mainland. Similarly, stormwater and combined sewer overflows (CSOs) account for over 80% of the total phosphorus loadings in the Lower Mainland.

Overall, the current status quo approach to NPS pollution management appears to be insufficient in terms of addressing the NPS pollution problem.

Exhibit III-3
Summary of the status quo assessment

Factors		Summary
1. Regulations, legislation and guidelines should address the NPS pollution priorities of BC.	⦿	• Legislation in place needs to be better coordinated.
2. Have an effective enforcement mechanism in place.	⦿	• Available information is not sufficient for "command and control" enforcement.
3. Encourage conflict resolution and consensus techniques.	⦿	• An integrated and comprehensive set of techniques does not exist.
4. Be delivered by the appropriate key agencies.	⦿	• Roles and responsibilities are not clearly defined.
5. Ensure that key agencies have adequate resources.	○	• Fiscal restraints indicate that existing resources need to be used more effectively.
6. Minimize or eliminate the existence of duplication.	⦿	• *Independent* mechanisms indicate progress could be made towards improving efficiency.
7. Ensure that there is an effective monitoring system in place.	⦿	• Current information is not sufficient to provide a representation of NPS loadings.
8. Set and monitor key effectiveness indicators.	⦿	• There is an absence of key indicators which account for NPS pollution.
9. Continually (re)assign NPS pollution management priorities.	⦿	• NPS priorities have not been balanced with point source discharges.
10. Be flexible and responsive enough to alter priorities.	○	• Ability of government agencies to adjust to priorities is constrained.
11. Ensure that agencies are targeting their activities.	○	• Government activities have not been consistently linked to water quality.
12. Support creative solutions by participants.	⦿	• Existing technologies and BMPs are not always adopted to address identified problems.
13. Ensure that key agencies committed to the strategy.	⦿	• Level of uncertainty indicates the need to enhance communication and cooperation.
14. Encourage key agencies to educate and train internal staff.	⦿	• Need for diverse skill sets and, in some cases, better skilled personnel.
15. Encourage public and stakeholder education, training, involvement and support.	⦿	• Independent initiatives are in place, but an integrative framework is needed.
16. Report to the general public and stakeholders.	●	• Existing initiatives have been successful; however, expanded reporting is required.
17. Promote integrated watershed management.	⦿	• A framework to encourage local participation with existing agencies is lacking.
18. Institute the principles of "polluter pay".	○	• Mechanism for identifying sources of NPS pollution is missing.
19. Take a preventative/pollution prevention approach.	⦿	• Incentives to promote preventative management of NPS are needed.
20. Result in a 50% reduction in annual NPS loadings.	⦿	• *Limited progress to date in reducing the impacts of NPS pollutants.*

IV

Management of NPS Pollution in Selected US Jurisdictions

In this chapter, we outline the current NPS pollution management framework for the United States along with the NPS management strategies in place for Washington State, California and Colorado. These jurisdictions were selected for further research either because their strategies were particularly innovative or unique (i.e., in relation to each other), and/or because the NPS pollution issues and problems were similar to those faced in British Columbia (e.g., Washington State and California both have similar coastal issues).

A. Current NPS management framework of the United States

National attention to NPS pollution in the United States surfaced in 1972, when Congress enacted the Clean Water Act. Section 208 of this federal water quality statute directed states to conduct planning for water quality management, including NPS pollution control.

The Clean Water Act was re-authorized as the Water Quality Act (WQA) in 1987. Section 319 of the WQA required all states to conduct NPS pollution assessments, and to develop state-wide management plans to address identified problems. Specifically, the assessment reports were intended to provide an analysis of NPS water quality problems in each state, while the management reports (or state plans) provided the direction to correct these problems. State plans approved by the Environmental Protection Agency (EPA) receive annual "319" federal funding for their implementation.

Section 319 outlined the various components of an acceptable state NPS management plan/program as follows:

- Best Management Practices (BMPs) to reduce loadings from sources listed in an assessment report.
- A program to achieve implementation of the designated BMPs.
- A schedule containing annual milestones for implementation of the BMPs.
- Certification by the Attorney General that state laws provide proper authority for implementation of BMPs.

- Sources of Federal assistance and funding as well as other avenues for financing.

- A list of federal financial assistance programs and development projects which the state will review for consistency with existing management programs.

Although states must meet certain Federal requirements when planning for NPS pollution management, the federal government, in return, must be responsive to the strategies of each state. Under the WQA's consistency provision, if a state determines that a federal activity or project is not consistent with its NPS pollution management program, the federal agency must either implement a solution for the identified inconsistency or explain in a timely manner why it cannot do so.

With the intent of building upon and integrating existing federal, state and local NPS programs in the coastal zone, section 6217 of the Coastal Zone Act Reauthorization Amendments requires states with approved coastal zone management programs to develop and implement NPS pollution management procedures. These procedures are to be incorporated into both the 319 and coastal zone programs for each state. A key component will be the implementation of management measures to address the various sources of NPS pollution in coastal watersheds. The EPA and National Oceanic and Atmospheric Administration (NOAA)—who are jointly responsible for the coastal program—recently (January 1993) produced guidance materials to assist with the development and integration of these management measures (which must be implemented by January 1999).

B. Washington State

In the early 1970s, the Washington Department of Ecology (WDOE) led a number of "208" (referring to section 208 of the 1972 federal Clean Water Act) planning efforts. In 1981, however, Federal funding for this program ended which resulted in few of the state's 208 plans actually being implemented.

With the introduction of section 319 of the WQA, the WDOE developed a Nonpoint Source Pollution Assessment and Management Program (October 1989), which was approved by the EPA. The WDOE is responsible for allocating EPA funding (i.e., through grants) to local governments, First Nations and conservation districts to implement portions of the state's program.

The Puget Sound area—due to the efforts of the Puget Sound Water Quality Authority (PSWQA)—is undoubtedly the most advanced region in the state in terms of NPS management strategy development and implementation. This review, therefore, focused on the efforts of the PSWQA.

The 1987 Puget Sound Water Quality Management Plan (the "Plan") adopted the watershed approach to identify and correct NPS pollution problems.

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The reasons provided for taking this approach were based on a shared understanding that:

- Cumulative effects from NPS are a threat to the health of the Puget Sound and its resources.
- Water quality impairments within each watershed have the potential to affect the entire Puget Sound.
- Locally-based control of cooperative watershed program design and implementation is essential.
- NPS pollution will only be controlled through ongoing efforts to change public understanding and behaviour.

The Plan established a system for protecting Puget Sound and its resources from the effects of NPS pollution. It directed the 12 counties bordering the Sound to identify and rank their watersheds in priority order for NPS pollution control, and, subsequently, to develop and implement action plans that would protect these watersheds. To support watershed planners, the PSWQA worked with federal, state and local governments to develop the document: Managing Nonpoint Source Pollution: An Action Plan Handbook for Puget Sound Watersheds. The first edition of this document was released in 1989; it was subsequently revised in 1993.

At the core of the Plan are the Watershed Ranking Process and the Watershed Planning Process—each of which are described in the following sections.

1. The watershed ranking process

In 1988, the 12 Puget Sound counties ranked their watersheds according to the provisions of the "Nonpoint Rule" (the Rule).[8] To do this, each county established a committee made up of county and city government representatives as well as representatives from other jurisdictions (i.e., ports or conservation districts) and key stakeholders. The committees were directed to take into account such factors as current and potential water quality problems, their effects on beneficial uses, and the likelihood of intensified land use in each watershed's future.

In 1989, the watershed rankings were submitted to the WDOE—these lists have been used to determine the order in which NPS action plans will be developed in each county. Issues related to revising these priorities based on new information are addressed through the Rule, which requires the committee to reconvene at least every five years (not necessarily with the same members).

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8 *The Nonpoint Rule identifies stormwater and erosion, agriculture, forest practices, on-site sewage disposal, and marinas and boats as the major contributors to NPS pollution in the basin. It directs watershed management committees to develop action plans aimed at controlling NPS pollution from these sources. However, when other sources—such as, pesticides, landfills, mines and hazardous household substances—are important or potentially important contributors, the Rule requires the committees to develop strategies to minimize their effects.*

2. The watershed planning process

According to the Rule, watershed management committees (WMCs) had to be formed in each watershed to prepare action plans that address the NPS problems in the order identified by the ranking process. The lead agency[9] initially invited local governments, conservation districts and tribal councils to appoint representatives to a preliminary committee; this committee then consulted with affected parties and stakeholders to determine the size and composition of the final committee. The "bottom line" in forming these committees entailed adequate and balanced representation from all stakeholders. Committees range in size from 12 to 50 members and, in most cases, include representatives of the agency which is eventually responsible for implementing the plan.

The following elements—according to the Rule—had to be included in the action plan (at a minimum):

- A characterization of the watershed—including biological conditions; physical characteristics; land use and population information; habitats; existing water quality; maps; and existing water quality programs (federal, state and local). In addition, the plan had to list types and sources of information that would be desirable but was not currently available.

- A problem definition—extent of existing and potential water quality problems, and the effects of NPS pollution on beneficial uses.

- Goals and objectives—for prevention and correction of the problem.

- Specific control strategies—for addressing the existing or potential problems identified by the WMC as priorities; these must include justification for the management actions proposed.

- An implementation strategy—identifying the specific actions required of each implementing agency (or entity), a lead agency and a process for resolving disputes. It must also include a schedule with milestones, estimated implementation costs and a budget including funding sources. In addition, the strategy must specify provisions for including public involvement and provide a process for integration and coordination with existing plans in the watershed (i.e., growth management plans, stormwater and drainage basin plans, wetlands protection programs, and other water and natural resource plans and programs).

- Methods for evaluating and reporting progress and making revisions to the plan—The plan must include a process for evaluating the overall

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9 *The lead agency is usually the county unless the watersheds are entirely within city or tribal boundaries.*

effectiveness of the action plan, including a long-term monitoring program and a process for annual review.

To assist the WMCs with developing their action plans, an interagency team—specifically created to provide technical assistance—was available at the WMC's request. The team—coordinated by the WDOE—was comprised of staff members from a number of state and federal agencies and First Nations with expertise in watershed planning and management. The PSWQA also provided technical assistance through the Puget Sound Cooperative River Basin Team. The names of the contacts available in each agency are provided in the handbook.

The WMCs were encouraged to contact the WDOE frequently during development of the action plan. Also, the Rule specifies that drafts of the various elements of the plan had to be submitted prior to completion of the draft watershed action plan (i.e., ensuring that comments on each section could be dealt with during the development process).

3. Action plan review and approval

A completed draft plan was subsequently submitted to the lead agency (i.e., usually the county), to the WDOE and any planning and implementing agencies for review. The lead agency also ensured that the plan was available to the public and had to initiate a State Environmental Policy Act (SEPA) review.

Within 30 days, a public hearing—sponsored jointly by the committee and the implementing agencies—was held to take testimony on the draft action plan. Each planning agency evaluated the provisions of the plan that directly apply to it—the WDOE, planning and implementing entities and the public had to submit comments within 60 days. Within an additional 60 days, the WMC was required to review and respond to the comments and make revisions in a final proposed action plan. This plan was again submitted to lead, planning and implementing entities. The implementing entity had to then submit to the WMC "statements of concurrence" and "statements of nonconcurrence". Statements of concurrence outlined the agencies intent to adopt the policies, ordinances and programs (or statements) of the final proposed plan. Statements of nonconcurrence indicated revisions to those sections requiring its involvement. At this stage, the lead agency only needed to concur with those elements of the plan that required its direct involvement.

The WMC was responsible for resolving statements of nonconcurrence through dispute resolution methods and to make final revisions to the plan within 60 days. The final plan—together with any unresolved issues and statements of nonconcurrence—was then forwarded to the lead agency. The lead agency proposed solutions to the unresolved statements of nonconcurrence and submitted them to the WDOE along with the revised plan.

The WDOE subsequently notified (in writing) the lead agency of its decision to accept or reject specific or all portions of the plan. The lead agency was responsible for communicating the results of the decision. Once the plan was approved, all involved parties began implementing it. If the plan was not approved—or if the

WDOE, the lead agency and the committee could not reach an agreement—the PSWQA was called in to assess the final plan for consistency with the Puget Sound Water Quality Management Plan. The implementing agency could then begin implementing those elements of the plan which received approval.

4. Implementation of the plan

Since each plan, by design, is customized to the to the unique characteristics of each watershed, their implementation is also unique. The Rule, however, spells out the minimum requirements for implementation. The lead implementing agency had to coordinate the work of all other agencies and provide annual progress reports to the WDOE. The annual progress reports provided the lead agency with a mechanism to ensure that other agencies were meeting the requirements of the concurrence agreements. These reports could also form the basis for a system of public reporting.

The lead agency also had to establish a public involvement process that ensures watershed residents and other affected parties are informed of the plan's achievements.

In some cases, committees were developed to oversee implementation of the plan. These implementation committees could be completely independent of the original committee.

5. Funding watershed action programs

Grants, loans, easements, special taxes and user fees are some of the key funding options for action programs in the Puget Sound basin. The Rule requires careful attention to funding as part of the watershed planning process. Watershed action plans had to include estimated implementation costs and an estimated budget, plus a financial element that identifies existing and potential local, state and federal funding sources to fully implement the plan. The Action Plan Handbook includes a section that outlines available funding options, and provides a list of available funding sources that may be applied.

C. California

The Porter-Cologne Water Quality Control Act (Porter-Cologne) is the principal law governing water quality in California. Under this statute, the State Water Resources Control Board (State Board) and nine regional Water Quality Control Boards (Regional Boards) are responsible for implementing its provisions. Porter-Cologne is a comprehensive statute which provides broad authority to the State Board to protect water quality.

Each of the Regional Boards has adopted a Water Quality Control Plan (Basin Plan) which describes and directs the regulation of water quality in its region. Specifically, Basin Plans outline the beneficial uses of waters within the region and contain water quality standards to protect those uses; they also establish implementation programs to

ensure that water quality standards are met. The Basin Plans must be consistent with State Board directives.

In November of 1988, California developed its Nonpoint Source Management Plan (State Plan) in fulfilment of section 319 of the federal Water Quality Act. The State Plan contains the strategies and mechanisms used to affect the implementation of BMPs to prevent water quality impacts from various land uses.

At the core of the existing State Plan are three compliance options of increasingly stringent regulation, as follows:

- Prevention of NPS pollution through implementation of BMPs is first encouraged on a voluntary basis.

- Where voluntary compliance is not forthcoming, regulatory-based encouragement of BMPs is used (e.g., a conditional waiver of waste discharge requirements or through management agency agreements).

- Finally, if preliminary steps fail, formal permits containing effluent limitations are issued to the responsible party.

In practice, the various programs identified in the State Plan have focused on the use of grants and loans, public education, management agency agreements (MAAs) and technical assistance to achieve improvements in NPS pollution. Few formal effluent limitation permits have been issued.

California recognizes that, although it has had some successes in using management measures to prevent NPS pollution, the benefits of existing programs and strategies have not been sufficient to control the growing NPS pollution problems in the state. The Division of Water Quality has indicated that more effective coordination between other state, federal and local agencies which share the responsibility for protecting water quality is critical. Also, the state is supporting the concept that "the most useful scale for organizing this coordination is on a watershed basis." Therefore, California is currently undergoing a comprehensive "review process" of state NPS pollution management programs to identify opportunities for eliminating duplication of effort between agencies; to reconcile conflicting objectives; and to streamline bureaucracy. By including those key agencies which will be affected by related state mandates in the process, it is hoped that subsequent recommendations for action will be considered reasonable and effective among these groups. Further, the State Board also intends to consider implementing the requirements of Section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (discussed previously) as part of this review.

As mentioned, California is moving towards supporting the development of watershed plans throughout the state. They have indicated that an effective watershed plan must include the following four elements:

1. **A problem statement**—which describes the current quality of the resources in the watershed, the desired quality of those resources and an identification of the most important resources to target for management.

2. **A resource management strategy**—which outlines the general approach to solving the stated problem, including the roles and responsibilities of various agencies and interest groups.

3. **Implementation mechanisms**—the particular actions required to achieve the solution will be highlighted and described. Contingency actions, in the event that adequate progress is not realized, must also be described.

4. **A monitoring plan**—will provide the basis towards measuring progress. This plan must include types of measurements to be used, the frequency and location of field measurements, milestones for progress and other indicators for progress. The state feels that effective and efficient monitoring is the key to successful watershed protection.

Although a formal watershed planning process has not yet been developed, the Division of Water Quality visualizes that the plans will "integrate the work of a number of individuals, groups or agencies". Further, the Regional Boards will be responsible for approving the plans as part of their Basin Plans. By incorporating the elements of the watershed plans into the Basin Plans, agencies will be legally obliged to follow the planned activities; likewise, state and federal agency actions must also be consistent with the Basin Plans unless these actions are in conflict with the legally mandated mission of these agencies.

D. Colorado

The control of water quality in Colorado is established under the Water Quality Control Act. This law provides regulatory and administrative powers to the Water Quality Control Division (the "Division") of the Colorado Department of Health. The Division, therefore, has primary responsibility for the NPS pollution management program in Colorado. The Division is also responsible for the issuance of (point source) discharge permits, as well as permits for stormwater discharges. A nine member board—known as the Water Quality Control Commission (WQCC)—was appointed by the Governor to serve as a regulatory and policy setting entity for water quality issues. The WQCCs regulatory power may be used to either control specific nonpoint sources which affect waterbodies, or it may set quality standards which protect water bodies (and, hence, require control of NPS to achieve the standards). Regulations may also be adopted which provide an administrative procedure for voluntary actions designed to control NPS pollution. These regulatory authorities represent an alternative mechanism for the control of NPS in those cases where voluntary incentive or other non-regulatory measures have failed.

Colorado prepared its Nonpoint Source Management Program—in fulfilment of the requirements of Section 319 of the Clean Water Act—in October 1990. The program was lead by the Division with assistance from the Colorado Nonpoint Source Task Force. The Task Force—a committee consisting of representatives from governmental agencies, environmental groups and special interest groups—served as an advisory body and assisted in the writing and editing of the plan. Four subcommittees were formed as a part of the overall Task Force to focus on the following key areas.

- Agriculture/silviculture
- Urban and construction runoff
- Mining
- Hydrological modification.

The Task Force is committed to serving the following roles.

- To review and make recommendations for proposed changes to the Colorado Nonpoint Assessment Report.

- To determine appropriate management programs for control of NPS pollution and to update these programs as necessary.

- To develop a BMP handbook for NPS pollution and to update the handbook as necessary.

- To prioritize and recommend demonstration projects and necessary programs for NPS pollution control funding.

The Task Force is also responsible for coordinating the efforts of its various subcommittees. The subcommittees have open membership to ensure public input into specific NPS source control programs.

Colorado's overall NPS plan is based on a "voluntary approach to nonpoint source controls". The state also believes that education is a key element that has been missing in previous control efforts, and that it should occur in at least three phases:

1. The pubic must be made aware of the extent of the problem and what will occur if nothing is done to address it.

2. The public must be made aware of the BMPs which are available to treat an identified source.

3. The public must be made aware of the possible sources of financial assistance to install the needed BMPs.

Colorado believes that, with the proper education and planning, the public will proceed to implement the states management program on a voluntary basis.

1. Process for prioritization of projects for NPS funding

To determine which demonstration projects should be eligible for state and federal funding, the Task Force assists the Division in applying ranking criteria and other factors to determine the priority of NPS pollution management projects (on an annual basis). Out of this ranking process—designed to take into account both tangible and intangible benefits—the Division prepares a priority list for funding. The Division reviews statewide education projects separately from the ranking process and provides funding based on their individual merit.

The WQCC assigns final state priorities for funding based on the recommendations of the Division and the Task Force. This process occurs annually to coincide with federal funding, and to ensure that statewide NPS pollution needs are being met on an ongoing basis.

2. Guidelines for project implementation

In order for a project to be considered for funding, a project implementation report must be prepared and submitted to the Task Force and Division for review. These reports must document:

- baseline conditions
- proposed improvements
- anticipated water quality and beneficial use improvements
- project costs
- long term monitoring, maintenance and financial arrangements.

Prior to preparing a project report, interested parties are encouraged to meet with funding agencies, the Nonpoint Source Task Force and the Water Quality Control Division to discuss implementation and funding requirements.

E. Summary

Section 319 of the federal Clean Water Act (1987) has done much to spur the development of plans to control and eliminate NPS pollution problems throughout the United States. With varying degrees of comprehensiveness, each state has developed an NPS pollution management strategy that, theoretically, best suits its philosophical, legislative and institutional framework.

This chapter focused on the programs in place in Washington State, California and Colorado. Although these programs have several common themes (e.g., the need for broad involvement of responsible and interested agencies, prioritization of problems and strategies, and public education) they also differ in the way each individual state has generally approached issues related to NPS pollution.

In Washington, the state has assumed a coordinating/partnership role with other agencies in delivering an integrated watershed approach to NPS pollution management. Specifically, the state developed the framework for how individual watershed management committees were to be formed, and, through the Nonpoint Rule, provided guidance on how individual watershed action plans were to be prepared, reviewed and finalized. By establishing the planning process, leading the action plan review and approval process, and detailing implementation and reporting requirements, the WDOE is able to facilitate consistency across the state. In addition to its coordinating role, the state also facilitates communication through publishing materials, providing technical contacts and advice, and providing information on funding alternatives.

In contrast to Washington State, California initially assumed a regulatory role that encouraged and (eventually) mandated responsible agencies to implement BMPs. California has recently recognized that this strategy was not effective in controlling the problem, and is now in the preliminary stages of moving towards a more integrated, watershed-based strategy.

Like California, Colorado focused its strategy on encouraging the adoption of BMPs; initially, at least on the surface, its strategy was more voluntary than regulatory. However, by issuing discharge permits for stormwater outfalls, the state appears to have favoured more regulatory control of the NPS problem. Although Colorado encourages integrated involvement though subcommittees (to the Task Force), these committees are issue-based (e.g., agriculture/silviculture) rather than watershed-based (i.e., as are the committees in Washington). Further, to promote consistency, the state reviews the development of demonstration and education projects; however, it has limited control over how the responsibilities of various agencies are divided and coordinated.

V

Options for Management of Priority NPS Pollution Problems

In this chapter, we review our analysis of the province's current management of NPS pollution, and we introduce and assess two alternative models—the regulatory control model and the coordinated planning model. However, we first provide a brief introduction to the concept of integrated watershed management planning which forms the basis of both alternative models.

Introduction to integrated watershed management plans

With respect to the proposed alternative approaches to NPS pollution management, it is assumed that management plans are developed on a watershed basis. A watershed plan integrates ecosystem considerations (i.e., physical, chemical and biological processes which are linked through a hydrological system) with land use decisions. Within the watershed, priority values are assigned, based on environmental sensitivity, to resources and areas to help target preservation, protection, enhancement and rehabilitation efforts. As reflected in Exhibit V-1, the plan essentially provides a framework to manage the water, land, resources and aquatic organisms within a particular watershed.

Exhibit V-1
Factors considered under a watershed plan

- ecological integrity and capacity
- management of surface water quality and quantity
- fisheries management
- regional servicing needs and constraints
- green space planning
- aquifer and groundwater management
- rehabilitation and enhancement
- management of natural resources in a sustainable manner

There is typically a sub-watershed or site management plan(s), which is tailored to meet specific tributary needs and local issues (e.g., FREMP's estuary management plan) within the objectives and goals of the broader watershed plan. The sub-watershed or site plans provide more detailed guidance on BMPs, allowances for construction and land clearing, environmental assessments, stormwater management and land use classifications.

As highlighted in earlier chapters, the priority NPS issues in terms of impacts tend to be region-specific. Remedial measures and management planning processes, consequently, must address regional and local priorities.

Naturally, this type of planning requires that the province is divided, on a geographical basis, into watersheds (i.e., depending on the size of the watershed unit, there may be between 36 and 150 watersheds across BC). The proposed BCEPA provides for "clean water management areas," which would support this type of process. There would also have to be some flexibility in the plans in terms of the amount of land included in the management area (i.e., to address aquifers and near shore marine waters).

Watershed management planning becomes more complex when watersheds are not contained within regional, provincial or national boundaries. These watersheds—such as the Abbotsford Aquifer, which spans the BC/Washington border—may require integrated strategies with other jurisdictions. These jurisdictions, however, will not necessarily share BC's philosophy to NPS management, let alone its legal, regulatory, or fiscal climate. In such cases, an effective communication and education strategy may facilitate a commitment to a watershed management approach. Therefore, regardless of the option chosen, BC will need to ensure processes are in place to integrate inter-jurisdictional strategies into the development of certain watershed management plans. Clearly this integration will be easier if other jurisdictions share BC's commitment and vision towards effective NPS pollution management.

As profiled in earlier chapters, there also exists a number of existing policies and programs related to resource planning and land use management. These include CORE LRMPs, and regional growth strategies. However, these planning processes do not directly address the protection of water quality and quantity and are not at the operational level that is required to manage watersheds. Regional and sub-regional planning examines the value of resources and utilizes public consultations in developing resource management zones, objectives and strategies that, in turn, guide operational planning. Similarly, regional growth strategies outline trends and management options for regional matters including housing, transportation, services, parks and natural areas. A watershed plan that addresses NPS pollution clearly continues to make sense in light of the advent of regional and sub-regional planning processes. Rather, the issue is the extent to which the watershed plan is coordinated with these planning processes in order to minimize duplicated effort and ensure consistency.

NPS management options for BC

Essentially, there are three general approaches available to the provincial government (MoELP) to control NPS pollution across the province. Specifically, the government could:

- Continue with the status quo.
- Focus on developing watershed-by-watershed quality control standards and BMPs, and—through monitoring and enforcement—encourage local agencies to develop strategies that will meet or exceed the standards and/or result in the adoption of specified BMPs.

- Allow locally-based committees to develop individual watershed management plans with the ministry providing direction and technical support as well as reviewing all plans.

Although other NPS pollution management options are available to the province, only two "alternative" options were selected for our analysis. These alternatives were selected because both approaches are in place in other jurisdictions (discussed in chapter IV), and both are *realistic* in light of British Columbia's physical, regulatory and political characteristics.

It is important to note the distinction in philosophies which underlie these two alternative approaches to the status quo (i.e., provincial "control" versus "coordinating" role). Although these models are presented as "either/or" management strategies, this does not preclude a third option that combines attributes from the first two. For example, the coordinated planning model could have characteristics of regulatory control in place in order to enhance consistency and ensure that BMPs are adopted where applicable. The scope of this study, however, did not allow us to examine the many potential variations of these two alternatives.

The remaining sections of this chapter provide an overview of how each of these strategies might be structured in BC, along with an assessment of their potential ability to meet the CSFs. The final section provides more details on the option that best fits the CSFs.

A. The status quo

In Chapter III, the status quo approach to NPS pollution management in BC was described and assessed for its ability to meet the CSFs. As discussed previously, the status quo did not fare well in this assessment. As noted above, there is a need for integrated watershed planning, which is currently not taking place. We also found that the following factors are not being met in an integrated or consistent manner by the present NPS management approach.

- **Be flexible and responsive enough to alter priorities if new information or legislation makes it practical**—A number of concerns were raised, including the absence of an integrated regional monitoring system and potential duplication in roles and responsibilities, which would have an impact on the ability of government agencies to adjust their NPS management priorities.

- **Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy**—Based upon continuing fiscal restraints, all levels of government are facing significant cuts to program budgets and resources.

- **Ensure that agencies are targeting their activities towards NPS management priorities**—Currently, a number of government activities and programs have not accounted for factors related to NPS pollution or its impact on water quality.

- **Institute, where possible, the principles of "polluter pay"**—Although the provincial government has demonstrated a commitment towards the development and implementation of a "polluter pay" framework for point sources, such a mechanism is absent in the context of NPS pollution.

Further, only one of the remaining factors—periodically reporting to the general public and other key stakeholders on the effectiveness of activities designed to address NPS water quality problems—is being met for those limited NPS activities that have been undertaken.

Consequently, it does not appear that the current NPS pollution management situation in BC is sustainable. The provincial government, and key stakeholders across BC, cannot expect the NPS pollution problem to improve over time unless significant and prompt action is taken to control it.

B. The regulatory control model

As demonstrated by both California and Colorado, governments can attempt to control NPS pollution through an increasingly stringent regulatory system. In the US, the state government develops and outlines the standards and BMPs that are "appropriate", and the local or regional government is responsible for developing management plans that meet or exceed these requirements. Initially, the state will encourage the adoption of the BMPs by providing funding to support the management plan's implementation. However, if local or regional governments do not meet the specified requirements, then state agencies can proceed with enforcement measures.

1. Application of the regulatory model in British Columbia

Under this model, the provincial government would operate in a similar fashion to that traditionally used for point source pollution control (i.e., as a regulator). For reasons outlined in Chapter II, the MoELP is the most logical choice for a coordinating agency, ensuring that Ministries and the federal government (i.e., DFO and DOE) are involved based on their jurisdiction and authority under existing legislation.

Before the actual watershed planning process can begin, the provincial government (through MoELP) must:

- Define the planning strategy(s), objectives and goals.
- Refine and establish defensible water quality, quantity and related resource objectives and standards (e.g., hydrology, biology and toxicity) on a provincial and watershed basis. To some extent, these objectives and standards already exist (e.g., MoELP's water quality objectives).
- Prescribe BMPs that regional and local governments must adopt as part of a watershed management plan (i.e., in order to meet specified

objectives and standards). These prescriptions would outline approaches to address water management needs on an ecosystem basis (including education) and/or technologies that are cost-effective means for managing water resources.

- Develop a watershed monitoring system to ensure that local and regional governments adhere to provincial objectives, standards and BMPs. This system could model those already established in the Fraser Basin; for example, FREMP has outlined a three-year program with effluent, water, sediment and biota quality and quantity information being collected during the first two years. During the third year, the collection is completed and the information is subsequently consolidated. Alternatively, local and/or regional governments may be responsible for providing periodic monitoring information. In either case, the provincial government will need to maintain a database of information that provides a periodic representation of the health of each watershed. Presumably, this may be incorporated into MoELP's proposed Environmental Monitoring System (EMS).

- Identify sites that are a priority in terms of susceptibility to contamination. Essentially, this would entail integrating the findings from existing site assessment processes (e.g., ESAs and aquifer classifications).

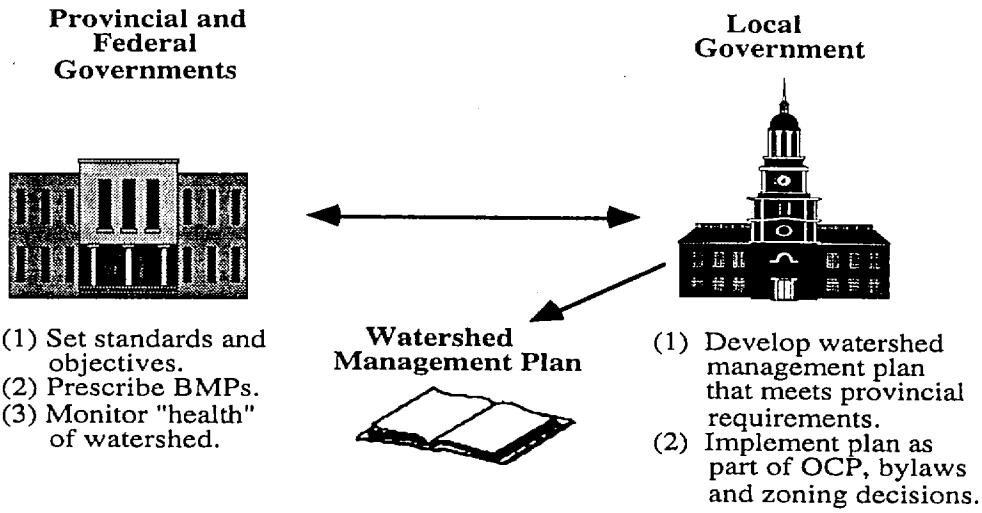
- Integrate existing land use planning processes (e.g., local plans and LRMPs) into an overall framework that is compatible with a watershed management planning process.

- Review the application of existing legislation and statutes (i.e., to require the development and implementation of management plans as well as providing for the enforcement of provincial requirements). Where existing legislation is found to be inadequate, or fails to address a specific issue (e.g., groundwater protection and the relationship between water quality and quantity), amendments or new legislation may be considered.

- Coordinate its efforts with the federal government; specifically, the provincial government could enter into a memorandum of understanding detailing the enforcement of provincial and federal statutes and regulations that have an impact on managing water quality.

Once the provincial government has addressed, to some degree, these requirements, the planning process can be initiated. Under this model, local and regional governments are the key agencies responsible for developing and implementing a watershed management plan. This entails ensuring that planning guidelines, standards and related requirements are met for that part of the watershed which is under their jurisdiction.

Exhibit V-2
Simplified overview of regulatory model



Specifically, development and implementation of the watershed management plan would entail the following.

- Integrating LWMPs (i.e., under Stage 2 of the LWMP process, local governments must address agricultural runoff, on-site disposal systems, pleasure craft discharges, discharges into storm systems and spills and leaks), existing land use plans (i.e., site-specific such as community watershed plans and local resource plans to sub-regional plans—LRMPs) and regional growth strategies to ensure consistency and minimize duplicated effort.

- Incorporating water quality, quantity and related standards and objectives, along with required management practices, into OCPs, bylaws and as part of the municipalities zoning decisions.

- Enforcing the practices and requirements detailed under the plan. While the provincial and Federal governments would be responsible for developing and enforcing, in a coordinated manner, the adoption of standards and BMPs as part of the watershed plans, local governments are best suited for enforcing the application of the plan itself. However, it is important that MoELP ensure that enforcement activities are both consistent in their application and equitable across the province. This may entail a memorandum of understanding or agreement between provincial, Federal and local governments.

  As outlined above, the effectiveness of local government management may be enhanced by delegating authority over enforcement activities. One avenue may be the appointment of municipal inspection officers

under the Fisheries Act. Alternatively, powers may be delegated under an amendment to existing provincial legislation.

Unlike the situation in California or Colorado, MoELP is likely not in a position to provide direct funding to local and regional governments to assist them with implementing a regional watershed management plan. This reflects the fiscal restraints to which all levels of government in BC have had to adapt. However, long-term funding for both local and provincial agencies is a critical factor underlying the success of this strategy.

2. Assessment of the regulatory model

As presented in Chapter III, the assessment process is subjective in nature, being supported by a review of the key points and issues surrounding each particular success factor. Similarly, the order in which the factors are presented in no way corresponds to their relative importance or priority. A summary table, with the ratings for each critical success factor, may be found at the end of this section (see Exhibit V-3).

1. Ensure that regulations, legislation and guidelines appropriately address the NPS pollution priorities of BC

Rating: ⊙

The regulatory model relies heavily on existing and new legislation to enforce the adoption of standards and BMPs as part of the planning process. However, ensuring that legislation remains relevant and applicable is a complicated process involving amendments, legal clauses and potential drafting of new statutes. Consequently, it would be difficult to ensure that the legislation addresses the NPS priorities on a consistent basis. Further, a sound database would need to be maintained with adequate monitoring information to ensure that the priorities are tracked and periodically reassessed.

2. Have an effective mechanism in place that ensures equitable and consistent enforcement of activities that cause NPS pollution

Rating: ⊙

By having local governments responsible for the enforcement of management plan actions and requirements (e.g., through bylaws and zoning decisions), there is potential for conflict over local jurisdictions as well as inconsistencies in enforcement activities. In addition, with provincial and federal governments requiring the adoption of standards and BMPs, local governments may focus more on meeting these standards and management practices (i.e., through remediative actions) than on attempting to restrict individual causes of NPS pollution.

3. **Encourage the use of conflict resolution and consensus techniques that reduce the need for court action**

Rating: ○

Clearly, this is a major weakness in the regulatory model in that the focus is more on "control" than on developing partnerships. By relying on regulations and the enforcement of standards and BMPs, the model is inherently not capitalizing on the benefits of conflict resolution and consensus techniques.

4. **Be delivered by those agencies with the legislative authority, skills, knowledge and ability to control, monitor or reduce the release—or minimize the impact—of NPS contaminants to the environment**

Rating: ⊙

Under the coordinated direction of provincial and federal government agencies, local governments are responsible for the implementation of the watershed management plans. However, the standards and BMPs are provincial (i.e., generic) in nature and, as such, may constrain the ability of local governments to address sub-regional NPS pollution issues. Further, having local governments responsible for developing and implementing a watershed plan does not take into account their jurisdiction (i.e., a watershed may lie outside a specific local government's boundaries).

5. **Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy**

Rating: ○

Although responsibilities associated with managing NPS pollution across the province are shared among federal, provincial and local governments, there still remains the issue of ongoing fiscal restraints. Specifically, local governments are, in all likelihood, operating with limited resources which may be further strained to meet the requirements of NPS pollution planning. Clearly this is the case under this model, where local governments are responsible for the development and implementation of the watershed management plan.

6. **Minimize or eliminate the existence of duplication in roles and responsibilities between operating agencies (keeping with the theme of cooperative NPS management)**

Rating: ●

A key aspect noted under this model is the coordinated delivery of provincial and federal activities in developing and enforcing standards and BMPs. In

addition, it was emphasized that existing local and provincial land use plans must be integrated as part of the watershed planning approach.

Although the model outlines these requirements, it is important to recognize that the planning process would need to be managed and delivered optimally to ensure that they are met. As demonstrated by the findings in Chapter II, the current framework of roles and responsibilities is complex and there continues to be areas where authority overlaps.

7. Ensure that a system is in place to monitor key human activities and the magnitude of specific NPS contaminants in identified problem areas

Rating: ⊙

A key requirement of this model is the development of a province-wide monitoring system and database. But the extent to which this is feasible is questionable. Specifically, as identified above, there is a limitation on the availability of resources to develop, implement and maintain a monitoring system; especially one as comprehensive as a provincial database.

8. Set and monitor key indicators that track the effectiveness of NPS pollution management activities

Rating: ⊙

As part of the standard and BMP development process, key indicators for NPS pollution management could be established and/or existing indicators could be refined. If these indicators are provincial in nature, there is the risk that they may not be applicable to specific watersheds (i.e., they may neglect site-specific trends and characteristics). Consequently, indicators should be watershed-specific unless the type of NPS problem being monitored is broader in nature. Finally, the extent to which these indicators can be tracked is questionable based on existing fiscal and resource constraints.

9. Continually (re)assign NPS pollution management priorities based on the results of performance monitoring programs

Rating: ●

Although the level of flexibility required to (re)assign NPS management priorities may be constrained by the formal relationships between local and provincial/federal governments (i.e., based upon the enforcement of standards and BMPs), the model itself emphasizes the need for priority rankings of watersheds and a monitoring system.

10. Be flexible and responsive enough to alter priorities if new information or legislation makes it practical

Rating: ⊙

Clearly, the ability to alter priorities based on new information and legislation is the responsibility of the MoELP with cooperation and support from the federal government (i.e., DFO and DOE). As such, there is an integrated mechanism for priority setting. However, the ability to revise provincial standards, BMPs and objectives to reflect these new priorities—and subsequently implementing them through the local government planning process—is subject to time and resource constraints.

11. Ensure that agencies are targeting their activities towards NPS management priorities

Rating: ⊙

As identified above, this model provides some level of improvement over the status quo in that Federal, provincial and local government activities are coordinated and targeted, at a macro level, towards NPS pollution management. Despite this improvement, there remains some level of difficulty associated with coordinating activities and ensuring programs address NPS pollution at a more micro or operational level (i.e., within Federal and provincial government departments and branches).

12. Support the development and implementation of creative solutions by participants (in accordance with the overall strategy)

Rating: ⊙

The reliance on regulations, standards and prescribed BMPs may constrain the ability of local governments to develop creative solutions to NPS pollution based on regional and sub-regional characteristics. Naturally, this does not imply that such solutions are unobtainable; rather, they are less likely given the inherent characteristics of a regulatory approach.

13. Ensure that key agencies understand, agree and are committed to the integrated (i.e., umbrella) strategy

Rating: ⊙

By emphasizing a regulatory (i.e., control) approach, the potential for alienating key local government participants exists. Further, local government representatives may argue that the provincial and federal governments should not have the final authority to dictate what should take place (i.e., standards and BMPs) within their unique ecosystems.

14. Encourage key agencies to expedite the successful implementation of their NPS management activities through employee education and training

Rating: ●

An emphasis on employee education and training can be incorporated into the provincial planning objectives. In addition, the need for employee education and training can be emphasized as part of a communication plan that details the overall process, the prescribed standards and BMPs, and the responsibilities of local governments. Naturally, the extent to which this is successfully accomplished is dependent on the municipalities and regional districts, with the provincial government acting mainly as a "watchdog".

15. Encourage public and stakeholder education, training, involvement and support for effective implementation and operation

Rating: ⊙

Similar to the issues described above, the need for public and stakeholder involvement can be incorporated into the provincial objectives. However, this model does not provide any formal mechanisms for public and stakeholder participation. More importantly, this model does not actively involve the public in the planning process which limits their ability to understand local NPS pollution issues. Ideally, a watershed plan should be driven by the public.

16. Periodically report to the general public and other key stakeholders on the effectiveness of activities designed to address NPS water quality problems

Rating: ●

Monitoring is a key aspect under this model and, consequently, the mechanism for reporting on the progress made towards addressing NPS water quality issues exists. Specifically, provincial monitoring results can be integrated into documents similar to the BC State of the Environment report and the FBMP report card.

17. Promote integrated watershed management within the existing land use planning framework

Rating: ⊙

Both the need for watershed management plans and an integrated approach to land use planning (i.e., local and sub-regional provincial planning processes) were emphasized under this model. In addition, as part of the watershed plan, existing LWMPs and regional growth strategies must be referenced.

However, by segregating the watershed based on local government boundaries, the extent to which this process can be coordinated is limited.

18. Institute, where possible, the principles of "polluter pay"

Rating: ⊙

This model provides for municipal and regional government enforcement of watershed plan requirements and, consequently, increases the likelihood that local sources of NPS pollution can be identified and penalized. Although principles of "polluter pay" can be integrated into provincial planning objectives and prescribed BMPs, the extent to which they are adopted is dependent on local government representatives and provincial enforcement.

19. Encourage key agencies to take a preventative/pollution prevention approach to reducing NPS releases rather than attempting to control those releases through remediative actions

Rating: ⊙

As outlined above, a preventative or pollution prevention approach can be supported through the provincial guidelines and prescribed BMPs. However, under this model, there is also a heavy reliance on regulation and "control" mechanisms, which may result in local governments targeting their efforts towards meeting provincial requirements rather than adopting a preventative approach.

20. Result in a 50% reduction in annual NPS loadings by the year 2005

This factor cannot be assessed at this time; as better information becomes available, we may find that this target is either too modest or too ambitious. However, based on the issues reviewed above, this approach will likely not be as successful in controlling NPS pollution as the second alternative (which is profiled in the next section). This statement is based on the potential effectiveness of the theoretical model to reduce NPS pollution rather than an assessment of being able to actually meet the above target.

Exhibit V-3
Summary of the assessment of the regulatory control model

Factors		Summary
1. Regulations, legislation and guidelines should address the NPS pollution priorities of BC.	⊙	• Model relies heavily on legislation which would be inflexible to shifts in NPS priorities.
2. Have an effective enforcement mechanism in place.	⊙	• Interjurisdictional conflicts and inconsistencies possible. Focus may shift from NPS causes.
3. Encourage conflict resolution and consensus techniques.	○	• "Control" focus does not capitalize on these techniques.
4. Be delivered by the appropriate key agencies.	⊙	• "Generic" nature of standards and BMPs may constrain local flexibility.
5. Ensure that key agencies have adequate resources.	○	• Model is relatively resource intensive which does not fit current fiscal restraints.
6. Minimize or eliminate the existence of duplication.	●	• Coordinated and integrated delivery are key features of this model.
7. Ensure that there is an effective monitoring system in place.	⊙	• Development of a province-wide monitoring system and database required, but not feasible.
8. Set and monitor key effectiveness indicators.	⊙	• Provincial-level indicators may not be applicable to specific watershed needs.
9. Continually (re)assign NPS pollution management priorities.	●	• Model emphasizes the need for priority rankings of watersheds and monitoring.
10. Be flexible and responsive enough to alter priorities.	⊙	• Integrated mechanism exists; however, it is subject to time and resource constraints.
11. Ensure that agencies are targeting their activities.	⊙	• Difficulty associated with coordinating activities at the operational level.
12. Support creative solutions by participants.	⊙	• The inherent characteristics of the model may constrain ability to develop creative solutions.
13. Ensure that key agencies committed to the strategy.	⊙	• Potential to alienate local government participants. Inadequate local understanding.
14. Encourage key agencies to educate and train internal staff.	●	• Can be incorporated into the provincial planning process.
15. Encourage public and stakeholder education, training, involvement and support.	⊙	• No formal mechanisms for public and stakeholder participation.
16. Report to the general public and stakeholders.	●	• Monitoring is a key aspect of this model; therefore, reporting on progress possible.
17. Promote integrated watershed management.	⊙	• Integrated watershed and land use planning key aspects—possible coordination problems.
18. Institute the principles of "polluter pay".	⊙	• Improves likelihood that NPS polluters identified and penalized.
19. Take a preventative/pollution prevention approach.	⊙	• Focus towards meeting standards may impair pollution prevention approach.
20. Result in a 50% reduction in annual NPS loadings.	—	• *Cannot assess.*

C. The coordinated planning model

This model—which is similar in nature to that applied in Washington State—assumes, in key areas, a very different position than that detailed under the regulatory model. In Washington State, the counties generally act as the "lead agency" to oversee watershed planning processes within their boundaries. This includes establishing watershed management committees; ranking the priority of each individual watershed; and overseeing the implementation of NPS management plans.

1. Application of the coordinated planning model in British Columbia

Under this model, the provincial government would act as a coordinator and reviewer; and it would provide planning support, for a series of local watershed committees or authorities. The Regional Districts (or local government equivalents) would generally act as the lead agency responsible for establishing the committees who—on a watershed-by-watershed basis—would be responsible for developing and implementing NPS pollution management plans.

This model is premised on the understanding that each watershed is inherently different, with a unique set of environmental, social and economic issues which require individualized standards and strategies that have been prepared by local stakeholders and agencies.

Essentially, MoELP would play three important roles, ensuring that:

- Ministries and the federal government (i.e., DFO and DOE) are involved in the development and refinement of standards and the plan review process.

- Lead agencies and committees (or authorities) are provided support (e.g., technical) to develop effective action plans. This would include information on aquifers and NPS pollutants based on existing monitoring data. Further, the MoELP would provide information (e.g., a handbook) on how the local entities should implement the process (e.g., the selection of committees, requirements of the plan and potential sources of funding).

  This handbook could draw extensively from the existing document, "Community Stewardship—A Guide to Establishing Your Own Group".

- The action plans meet the Ministry's overriding NPS management objectives and strategy (e.g., public education), and that they are consistent across the province. In addition, MoELP would ensure that relevant provincial and federal standards are met, although the manner in which the plan meets these requirements can vary based on local needs and characteristics.

Hence, prior to initiating the development and implementation of watershed plans, the provincial government, through MoELP, would need to:

- Integrate existing land use planning processes (e.g., LRMPs), regional growth strategies and LWMPs into an overall framework that supports and guides the committees in their efforts.

- Review the application of existing legislation and statutes (i.e., to require the development and implementation of management plans).

- Incorporate existing documentation into a handbook which outlines key aspects of the planning process along with information on ranking the priority of watersheds.

- Initiate negotiations with federal and local authorities on the sharing of responsibilities and resources as detailed under this model. However, final authority and regulatory powers should be retained at the provincial level. As noted under the regulatory control model, it is critical that enforcement activities be applied in a consistent and equitable manner across the province.

Once these considerations have been addressed, the committees (or authorities) can be formed. Although the committees would be comprised mainly of representatives from local governments, key stakeholder groups (e.g., First Nations, environmentalists, industry associations and public "watchdog" groups) would also be represented on a pre-determined basis. These committees should be encouraged to have frequent contact with the coordinating agency (i.e., through MoELP regional offices) and the lead agency (reviewed below). At the same time, the MoELP should endeavour to provide support and advice during the initial stages of the planning process. Clearly, if the MoELP spends time on the front-end, ensuring that the plans are developed in an acceptable manner, then this will reduce the need for significant revisions later in the process.

Regional districts would be the logical entities to act as the lead agencies given that their jurisdiction is broader than that of municipalities and the regional characteristics of NPS pollution. As such, the regional district would be responsible for initially establishing the watershed management committees. These committees, in turn, would be responsible for developing plans that address four key areas (i.e., in addition to, or as part of, the factors detailed under the introduction to watershed management plans):

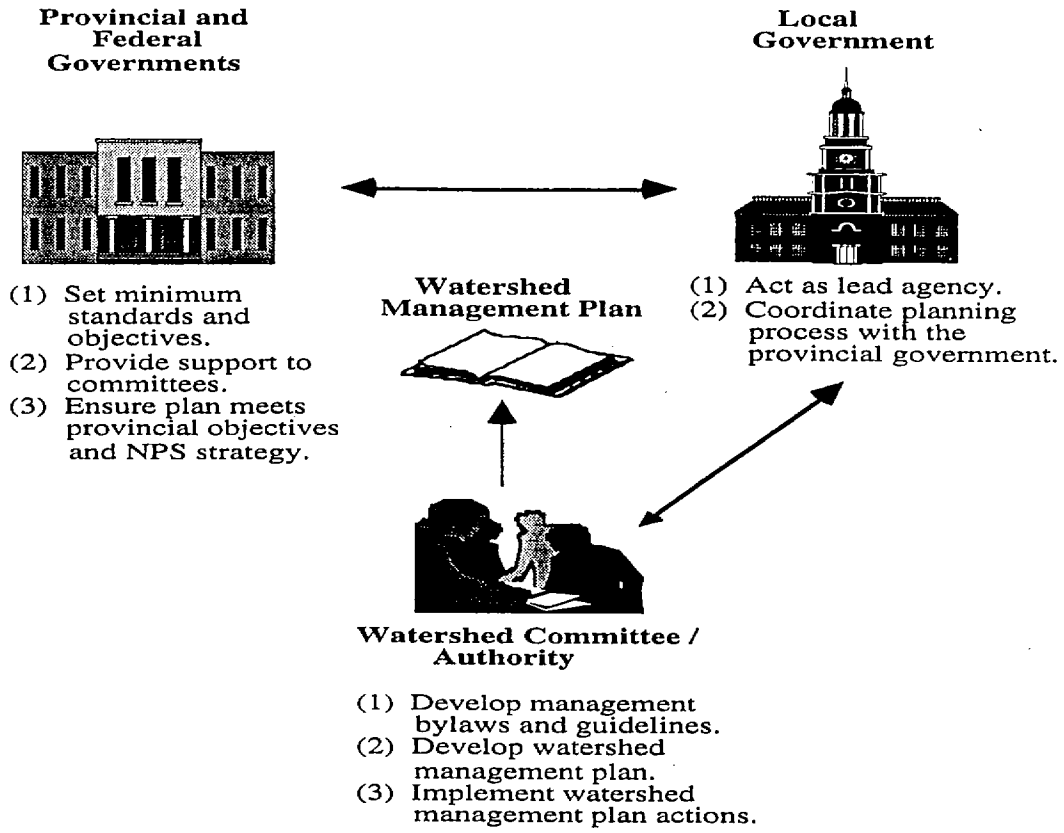
- Ongoing assessment of environmental quality.

- Management of existing pollution sources.

- Remediation and clean-up of existing contamination.

- Prevention of future pollution.

Exhibit V-4
Simplified overview of coordinated planning model



As part of the planning process, the committees would need to:

- Develop, where necessary or desired, bylaws and guidelines; however, these local requirements could not fall below provincial and federal standards. Further, they would need to remain consistent with existing provincial water quality, quantity and related resource objectives (i.e., to ensure consistency across the province).

- Integrate relevant components of local land use plans, LRMP, LWMPs and regional growth strategies into the watershed management plan.

- Develop a monitoring and reporting system that provides a periodic representation of the health of each watershed.

  To minimize the need for additional resources and reporting structures, existing monitoring and reporting systems (e.g., the water quality report card) should be utilized wherever possible.

The regional districts would then review the management plan and, subsequently, provide a copy to the MoELP. The MoELP would act as the coordinating agency

for other Ministries and the federal government (e.g., DFO and DOE) in the review process, distributing information as received. Within a specified timeframe, a public consultation process would take place to provide the opportunity for further review and evaluation of plan components. Based on responses, the committee would revise the management plan and then submit it once again, within a specified timeframe, to the provincial and federal governments for final approval.

In implementing the plan, it would be important for the committee to prioritize activities based on importance and available resources (local, provincial and federal). This recognizes the need to ensure that all levels of government support the implementation process (i.e., in terms of funding, staff resources, etc.) rather than becoming overly dependent on local governments. As part of the plan, it would be necessary to provide for periodic status reports as well as a review process whereby the plan and detailed actions are assessed every five years (i.e., in terms of relevancy, achievement of objectives and impacts).

Funding opportunities would be similar to those detailed under the regulatory model. However, by supporting a partnership orientation between the provincial, federal and local governments, there may be a greater opportunity to develop cost-sharing agreements.

2. Assessment of the coordinated planning model

Similar to the assessment provided for the regulatory model, the key issues surrounding each success factor in the context of the coordinated planning model are discussed below. A table at the end of this section provides a summary of the ratings for the coordinated planning model (see Exhibit V-5).

1. Ensure that regulations, legislation and guidelines appropriately address the NPS pollution priorities of BC

Rating: ●

Although there is less of a reliance on regulations, a legislation review process is required prior to establishing the committees. Specifically, this preliminary review of existing statutes and Acts ensures that, to the extent possible, the current legislative framework is integrated and provides sufficient support to MoELP, regional districts and the watershed committees.

2. Have an effective mechanism in place that ensures equitable and consistent enforcement of activities that cause NPS pollution

Rating: ⊙

Under this model, the planning process and subsequent monitoring takes place on a watershed basis, which supports an integrated and comprehensive approach to enforcement. In addition, by coordinating local government and key stakeholder activities through the committees, enforcement is likely to be more consistent and equitable in its application (i.e., on a watershed scale).

However, there still exists the potential for inconsistencies across the province.

3. **Encourage the use of conflict resolution and consensus techniques that reduce the need for court action**

Rating: ●

The use of conflict resolution and consensus techniques is a key aspect under this model. Specifically, potential political conflicts may arise between local governments or across levels of government. The development and implementation of the watershed plan must be based upon a partnership between federal, provincial and local governments as well as key stakeholders.

4. **Be delivered by those agencies with the legislative authority, skills, knowledge and ability to control, monitor or reduce the release—or minimize the impact—of NPS contaminants to the environment**

Rating: ●

By design, this model recognizes the need to ensure that the development and delivery of the watershed management plan is based on the ability and jurisdiction of key agencies. As identified in Chapter II, local governments, in conjunction with key stakeholders, are the logical choice for developing and delivering an NPS pollution plan based on their authority over private development and their understanding of community needs and characteristics (e.g., local industries). Similarly, the provincial government (i.e., MoELP) is best suited as a coordinating agency in that it has jurisdiction over waste management and related activities with the province's boundaries. Finally, the federal government, in partnership with MoELP, would provide support (e.g., monitoring, development of standards) to the committees as well as ensuring that federal concerns, such as fisheries and wildlife, are properly addressed.

5. **Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy**

Rating: ⊙

As noted under the regulatory control model, fiscal restraints are continually being placed on all levels of government. However, by integrating key stakeholders into the committees, there exists a greater potential for public participation and volunteer activities as well as cost-sharing (e.g., industry grants). The role of community members and local stakeholders should not be underestimated. As outlined in Chapter II, community-based groups draw upon participants (e.g., local residents) to undertake monitoring, inventory, reclamation and repair activities.

6. **Minimize or eliminate the existence of duplication in roles and responsibilities between operating agencies (keeping with the theme of cooperative NPS management)**

Rating: ●

As noted above, federal, provincial and local government agencies participate in the watershed planning process in a coordinated and partnership-oriented manner (i.e., MoELP serves as the coordinating agency, regional districts are lead agencies and municipalities participate as part of the committees). In addition, existing provincial and local land use plans must be integrated as part of an overall framework to support the planning process prior to the establishment of the committees.

7. **Ensure that a system is in place to monitor key human activities and the magnitude of specific NPS contaminants in identified problem areas**

Rating: ⊙

Similar to the regulatory control model, a key requirement of this model is the development of a watershed monitoring system and database. However, as identified above, there remains a limitation on the availability of resources to develop and implement such a monitoring system that can track key individual actions. Another constraint exists in terms of aggregating individual watershed monitoring results to the provincial level (i.e., it would be difficult to ensure consistency and quality control).

8. **Set and monitor key indicators that track the effectiveness of NPS pollution management activities**

Rating: ●

As part of the planning and monitoring process, key indicators will be established by the committees on a watershed basis. These indicators will provide a holistic representation of the progress made towards addressing local NPS pollution. Naturally, these watershed indicators may, in turn, form the basis for a more generic set of indicators, which the provincial and federal governments can use to monitor the health of watersheds on a provincial scale. By providing guidelines to the committees on setting indicators, the province and federal governments can ensure that useful indicators are developed and that they can be tracked locally and aggregated provincially.

9. Continually (re)assign NPS pollution management priorities based on the results of performance monitoring programs

Rating: ●

By requiring the committees and lead agencies to review the watershed management plan on a periodic basis (e.g., every five years), this model supports the reassignment of NPS pollution priorities. In addition, the focus of this model is on developing a partnership between key agencies and stakeholders, as well as continual monitoring of watersheds, which supports the revision of NPS pollution priorities.

10. Be flexible and responsive enough to alter priorities if new information or legislation makes it practical

Rating: ⊙

As outlined above, the emphasis on a partnership orientation and management plan reviews provides the level of flexibility required to ensure that NPS pollution priorities can be revised. However, this partnership approach may also undermine the adoption of new provincial priorities in that the committees may not agree with the provincial change(s) in focus.

11. Ensure that agencies are targeting their activities towards NPS management priorities

Rating: ●

By providing a mechanism for local control over watersheds, commitment from municipal and regional governments, as well as stakeholder groups and associations, may be more easily fostered. Similarly, provincial and federal activities are coordinated through MoELP, which has the mandate and authority to ensure activities are targeted towards NPS management priorities.

12. Support the development and implementation of creative solutions by participants (in accordance with the overall strategy)

Rating: ●

Clearly, a strength of this model is the encouragement of creative management solutions as part of the participatory planning process. By including industry representatives and other key stakeholders, strategies will reflect a myriad of viewpoints and experiences. Naturally, experienced government representatives will have to facilitate this process, ensuring that consensus on such issues is obtained.

13. **Ensure that key agencies understand, agree and are committed to the integrated (i.e., umbrella) strategy**

Rating: ●

As noted above, the emphasis on local control, along with the role of MoELP as a coordinating agency and the emphasis on a partnership orientation, ensures that the level of commitment towards NPS pollution management among key agencies is maximized.

14. **Encourage key agencies to expedite the successful implementation of their NPS management activities through employee education and training**

Rating: ●

Similar to the regulatory control model, an emphasis on employee education and training can be incorporated into the provincial planning objectives. In addition, the need for employee education and training can be emphasized as part of the handbook. In light of the provincial government, in cooperation with the federal government, providing technical support, and given the existence of Ministry, Crown Corporation and federal government training programs which may be adapted (e.g., BC Hydro's suite of internal training programs), there appear to be minimal constraints to developing and adopting an employee education process.

15. **Encourage public and stakeholder education, training, involvement and support for effective implementation and operation**

Rating: ●

By providing formal mechanisms through which key stakeholders can participate in developing and implementing NPS management strategies, the coordinated planning model encourages public and stakeholder education and involvement.

16. **Periodically report to the general public and other key stakeholders on the effectiveness of activities designed to address NPS water quality problems**

Rating: ●

Similar to the regulatory control model, monitoring is a key aspect which supports reporting to the public and stakeholders on the progress made towards addressing NPS water quality issues. In addition, this model requires that committees and lead agencies develop and distribute an annual progress report.

17. Promote integrated watershed management within the existing land use planning framework

Rating: ●

As noted above, both the need for watershed management plans and an integrated approach to land use planning (e.g., coordinating local, LRMP and regional activities across ministries) were emphasized under this model. In addition, existing LWMPs and regional growth strategies must be incorporated into the watershed plan.

18. Institute, where possible, the principles of "polluter pay"

Rating: ●

The principles of "polluter pay" can be incorporated into both provincial planning objectives and the handbook. By providing local control (i.e., regional districts, municipalities, industry, the public and stakeholder groups) over watersheds, there is also a greater likelihood that the sources of NPS pollution can be identified.

19. Encourage key agencies to take a preventative/pollution prevention approach to reducing NPS releases rather than attempting to control those releases through remediative actions

Rating: ●

As outlined above, a preventative or pollution prevention approach can be encouraged through the provincial guidelines and the handbook. There is also a clear emphasis on developing partnerships between key stakeholders, including industry.

20. Result in a 50% reduction in annual NPS loadings by the year 2005

As noted in the assessment of the regulatory model, these management options are theoretical and, consequently, this factor cannot be assessed at this point in time. However, based on the issues reviewed above, this approach is more likely to be successful in reducing NPS pollution across the province.

Exhibit V-5
Summary of the assessment of the coordinated planning model

Factors		Summary
1. Regulations, legislation and guidelines should address the NPS pollution priorities of BC.	●	• Preliminary legislation review ensures integration and support.
2. Have an effective enforcement mechanism in place.	⊙	• Supports integrated and comprehensive enforcement. Potential for inconsistencies.
3. Encourage conflict resolution and consensus techniques.	●	• A key aspect of this model. Techniques designed into the plan.
4. Be delivered by the appropriate key agencies.	●	• Committee must design plan to "fit" abilities of key agencies.
5. Ensure that key agencies have adequate resources.	⊙	• Greater potential for public participation, volunteer activities and cost-sharing.
6. Minimize or eliminate the existence of duplication.	●	• Key agencies participate in the planning process as "partners".
7. Ensure that there is an effective monitoring system in place.	⊙	• Local monitoring systems and databases kept. Possible problems in aggregating results.
8. Set and monitor key effectiveness indicators.	●	• Key indictors will be established on a watershed basis based on generic guidelines.
9. Continually (re)assign NPS pollution management priorities.	●	• Periodic reviews of plans must be conducted, and structural barriers minimized.
10. Be flexible and responsive enough to alter priorities.	⊙	• Local participants may not always agree with provincial changes in focus.
11. Ensure that agencies are targeting their activities.	●	• Model fosters commitment. Coordinating agency must communicate priorities.
12. Support creative solutions by participants.	●	• Encouragement of creative solutions part of the planning process.
13. Ensure that key agencies committed to the strategy.	●	• Local control, provincial coordination and partnership orientation fosters commitment.
14. Encourage key agencies to educate and train internal staff.	●	• Emphasis on employee education and training incorporated into planning objectives.
15. Encourage public and stakeholder education, training, involvement and support.	●	• Stakeholder participation in plan development. Public education and training part of plan.
16. Report to the general public and stakeholders.	●	• Monitoring supports reporting. Also, annual progress reports required.
17. Promote integrated watershed management.	●	• Emphasis of this model. Existing strategies must be incorporated into the local committees.
18. Institute the principles of "polluter pay".	●	• Incorporated into provincial guidelines. Improved NPS polluter identification.
19. Take a preventative/pollution prevention approach.	●	• Encouraged through provincial guidelines. Emphasis on stakeholder partnerships.
20. Result in a 50% reduction in annual NPS loadings.	—	• *Cannot assess.*

D. Recommended strategy

Based on the assessment of the status quo and the two alternative models against the CSFs, the coordinated planning model best fits the requirements for an NPS pollution management strategy in British Columbia. Specifically, the following factors were rated higher under the coordinated planning model in relation to the regulatory model. Exhibit V-6 summarizes the assigned ratings for each of the models by CSF.

- **Ensure that regulations, legislation and guidelines appropriately address the NPS pollution priorities of BC**—Under the coordinated planning model, there is less of a reliance on regulations and legislation, which minimizes the need for ongoing amendments or new statutes to ensure that current and future NPS pollution priorities are addressed. At the same time, a legislation review process is required prior to the development of the management plans.

- **Encourage the use of conflict resolution and consensus techniques that reduce the need for court action**—Inherently, the coordinated planning model encourages a partnership approach to NPS pollution management.

- **Be delivered by those agencies with the legislative authority, skills, knowledge and ability to control, monitor or reduce the release—or minimize the impact—of NPS contaminants to the environment**—As highlighted above, local governments and key stakeholders (e.g., industry representatives) are the most logical choice for developing and implementing NPS pollution management plans (including site-specific standards and control measures). Similarly, the provincial government (i.e., MoELP) is best suited as a coordinating agency with support being provided by the federal government (e.g., DFO and DOE).

- **Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy**—By providing for public and key stakeholder participation, there is a greater likelihood that cost-sharing and volunteer agreements can be arranged under the coordinated planning model.

- **Set and monitor key indicators that track the effectiveness of NPS pollution management activities**—Key indicators will be established on a watershed basis (versus local jurisdictions) under the coordinated planning model, which will provide for a more holistic and consistent representation of the progress made towards addressing NPS pollution.

- **Ensure that agencies are targeting their activities towards NPS management priorities**—By coordinating local government, industry and key stakeholder activities through the committees, as well as providing local control over the watersheds, the coordinated planning model is likely to foster a greater level of commitment.

- **Support the development and implementation of creative solutions by participants (in accordance with the overall strategy)**—A strength of the

coordinated planning model is the encouragement of creative management solutions as part of the participatory planning process (i.e., the regulatory model is more likely to lead to local government actions which are designed simply to meet provincial/federal standards and BMPs).

- **Ensure that key agencies understand, agree and are committed to the integrated (i.e., umbrella) strategy**—By emphasizing a partnership approach, the coordinated planning model is more likely to achieve a high level of understanding and commitment among key agencies.

- **Encourage public and stakeholder education, training, involvement and support for effective implementation and operation**—In addition to incorporating education and training as part of the provincial planning guidelines, the coordinated planning model provides a mechanism through which the public and key stakeholders can participate in the planning process.

- **Promote integrated watershed management within the existing land use planning framework**—By focusing on watersheds versus local jurisdictions, the coordinated planning model provides for a more integrated approach to land use planning.

- **Institute, wherever possible, the principles of "polluter pay"**—Through the participation of key stakeholders, including the public and industry, there is a greater likelihood that sources of NPS pollution can be identified under the coordinated planning model.

- **Encourage key agencies to take a preventative/pollution prevention approach to reducing NPS releases rather than attempting to control those releases through remediative actions**—Similar to the findings above, a pollution prevention approach can be encouraged through the handbook and by ensuring the participation of key stakeholders in the planning process.

The need for region-specific pollution control, as emphasized in Chapter I, supports the use of watershed committees. One of the key factors which underlies the presence and impact of NPS pollution is land use (e.g., the removal of natural barriers and uptakes). Consequently, by emphasizing the role of both provincial and local governments in developing and delivering an NPS management plan, as well as providing a mechanism for the participation of key stakeholders including industry and First Nations, the coordinated planning model provides a solid basis for integrated land use planning.

There are a number of additional factors which will need to be addressed under the coordinated planning model. These reflect the findings from Chapter II and the assessments of the management options.

- As part of the legislation review process, the need for a new legislation to provide the context and authority for watershed management planning should be considered. This could be similar in format and content to the Growth Strategies Statutes Amendment Act, which outlines the purpose of a regional growth strategy, its content and application, and provides the authority to

impose the adoptions of a growth strategy. Whatever form this authority takes, there is clearly a need for legislation to support the planning process in the case where cooperative processes might fail.

- Regional NPS pollution priorities, including agriculture (e.g., application of manure and chemical fertilizers) and stormwater, will need to be accounted for.

- For regions within the Fraser Basin, established stakeholder and government initiatives, including the FBMP, should be integrated into the planning process.

- Representation and participation of existing community groups (e.g., the Bilston Watershed Habitat Protection Association) should be sought.

- As part of the handbook and provincial/federal planning criteria, existing guidelines and standards should be incorporated. This would include relevant FPC guidebooks (i.e., LCG and CWG), current discharge standards, the Stream Stewardship Guide, land development guidelines and the Urban Runoff Control guidelines.

- Existing conflict resolution and dispute mechanisms should be adapted to meet the needs of the model (e.g., CORE and BCEPA processes).

- Existing education and training programs should be integrated into the planning process (e.g., the Storm Drain Marking program).

Exhibit V-6
Ratings of alternative NPS managment strategies for British Columbia

○=Does not meet CSF, ⊙=partially meets CSF, ●=meets CSF

The provincial NPS management strategy should:	Alternative NPS Managment Strategies		
	Status Quo	Regulatory Control Model	Coordinated Planning Model
Legislation and enforcement			
• Ensure that regulations, legislation and guidelines appropriately address the NPS pollution priorities of B.C.	⊙	⊙	●
• Have an effective mechanism in place that ensures equitable and consistent enforcement of activities that cause NPS pollution.	⊙	⊙	⊙
• Encourage the use of conflict resolution and consensus techniques that reduce the need for court action.	⊙	○	●
Institutional framework			
• Be delivered by those agencies with the legislative authority, skills, knowledge and ability to control, monitor or reduce the release — or minimize the impact — of NPS contaminants to the environment.	⊙	⊙	●
• Ensure that key agencies have adequate physical, financial and human resources to fulfil their commitments to the strategy.	○	○	⊙
• Minimize or eliminate the existence of duplication in roles and responsibilities between operating agencies (keeping with the theme of cooperative NPS management).	⊙	●	●

Problem identification and prioritization			
• Ensure that a system is in place to monitor key human activities and the magnitude of specific NPS contaminants in identified problem areas.	⊙	⊙	⊙
• Set and monitor key indicators that track the effectiveness of NPS pollution management activities.	⊙	⊙	●
• Continually (re)assign NPS pollution management priorities based on the results of performance monitoring programs.	⊙	●	●
• Be flexible and responsive enough to alter priorities if new information or legislation makes it practical.	○	⊙	⊙
Operational effectiveness			
• Ensure that agencies are targeting their activities towards NPS management priorities.	○	⊙	●
• Support the development and implementation of creative solutions by participants (in accordance with the overall strategy).	⊙	⊙	●
Internal and external education, communication, training & reporting			
• Ensure that key agencies understand, agree and are committed to the integrated (i.e., umbrella) strategy.	⊙	⊙	●
• Encourage key agencies to expedite the successful implementation of their NPS management activities through employee education and training.	⊙	●	●
• Encourage public and stakeholder education, training, involvement and support for effective implementation and operation.	⊙	⊙	●

• Periodically report to the general public and other key stakeholders on the effectiveness of activities designed to address NPS water quality problems.	●	●	●
Appropriateness			
• Promote integrated watershed management within the existing land use planning framework.	⊙	⊙	●
• Institute, where possible, the principles of "polluter pay".	○	⊙	●
• Encourage key agencies to take a preventative/pollution prevention approach to reducing NPS releases rather than attempting to control those releases through remediative actions.	⊙	⊙	●
Achievement of intended results			
• Result in a 50% reduction in annual NPS loadings by the year 2005.	⊙	*Cannot Assess*	*Cannot Assess*

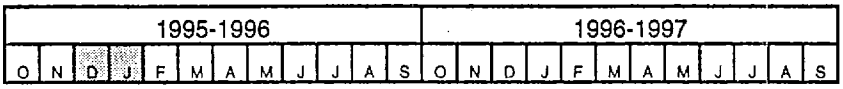
VI

Implementation Guidelines

In this chapter, we outline a seven-step implementation strategy, in summary form, that the MoELP should consider if it chooses to implement the coordinated planning model. Since those most familiar with the province's current NPS pollution management situation overwhelmingly feel that the ministry must act quickly to begin dealing with this problem, a two year strategy is recommended—beginning in October 1995.

For each step in this strategy, we provide a schematic timeline that the ministry should target to ensure that full-scale implementation is met within a two-year timeframe.

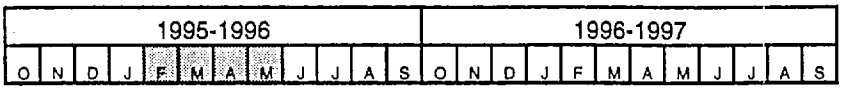
1. Conceptualize the model



Building upon the findings and research conducted for this study, the ministry should conceptualize how the model will operate in British Columbia. This step would involve, firstly, conducting a detailed review of the Washington State NPS planning process, and, perhaps, meeting with Washington DOE officials. Essentially, the ministry should attempt to learn as much as possible from Washington State's experiences in its pioneering of this model.

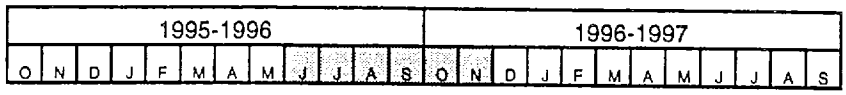
Having developed a solid understanding of the Washington State model—and having gained an awareness of potential obstacles and shortcuts—the ministry can produce a brief discussion paper describing the objectives, goals and proposed application of the model in BC.

2. Fine tune its development through soliciting input from affected agencies and stakeholders



The ministry should circulate the discussion paper to all affected agencies (e.g., local governments, DFO and Environment Canada) and stakeholders (e.g., special interest groups and associations) to obtain their input. This feedback will assist in identifying areas where the model needs to be revised, and will allow the ministry to gauge how positively the process will be received.

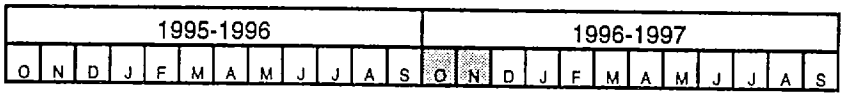
3. Detail the provincial Watershed Planning and Review processes



Having completed the consultation process, the ministry will be in a position to formulate the details of the strategy. It will be important at this stage to:

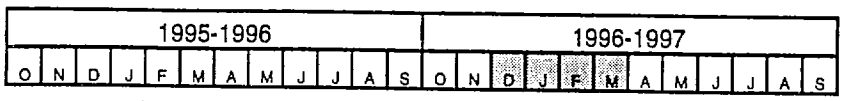
- Identify all legislative and regulatory impediments.
- Institute the necessary steps to revise, where necessary, the existing legislative framework.
- Initiate discussions with agencies and stakeholder groups currently involved with watershed planning, public education, development of management guidelines and standards, and land use planning.
- Develop the necessary policies and procedures to support the planning process.
- Identify — and train where necessary — the individuals who will assume responsibility for the watershed management plan review process.

4. Research availability of financing and technical resources



An important role of the ministry, as the coordinating agency, will be to provide technical assistance and information about the availability of financing sources to Watershed Management Committees. Consequently, the ministry must conduct the necessary research to ensure that it has a current and complete listing of funding sources and related information. Also, the MoELP must identify professionals, both internal and external (e.g., DFO and DOE), who can be put forth as contacts for various elements of the planning process.

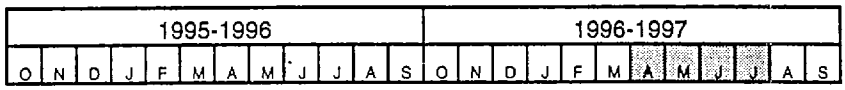
5. Develop the Planning Process Handbook



The ministry should prepare a user-friendly handbook that will serve as a key reference source for the committees and the lead agencies (i.e., the regional districts and other local governments) in ranking NPS; determining representation; and undertaking all elements of the watershed planning process. The handbook should also include appendices with such items as lists of funding sources, technical contacts, sample plans and working templates.

The importance of this handbook cannot be overstated. It will provide the users with the information they need to successfully initiate the planning process as well as ensuring that all committees are working within a common frame of reference. This will promote consistency and reduce the need for extensive and time consuming revisions in the ministry's review process.

6. Pilot the process and handbook in a selected Watershed

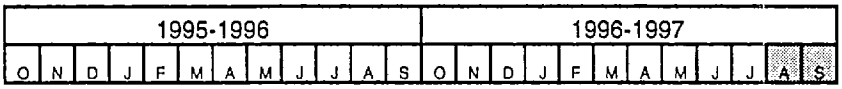


Prior to "full-scale" implementation of the plan, it would be advisable to pilot the ministry's strategy in a given watershed (e.g., in the Okanagan Valley or the Abbotsford Aquifer). This will give the ministry the opportunity to test both the materials they have produced and the overall operation of the strategy. Specifically, the ministry should enter into discussions with regional districts that have demonstrated a willingness to participate in past planning exercises (e.g., LWMPs). Alternatively, a watershed planning process that is already underway may serve as a pilot (e.g., Salmon River or Lillooet River projects). Once a pilot lead agency has been selected, the process outlined in Chapter V (e.g., formation of the watershed committee and development of the draft management plan) can be initiated.

The experience gained from a pilot project will assist the ministry with refining specific planning and administrative requirements prior to full-scale implementation, as well as ensuring that the handbook and related materials are sound.

Naturally, the pilot process would extend beyond the four-month timeframe highlighted above. However, this time should be sufficient for the development of a draft plan and, consequently, will provide feedback on the design of the planning process.

7. Make any necessary refinements and implement the process provincially



Having made the necessary refinements based on the pilot implementation, the ministry will be in a position to proceed with full-scale implementation. This may involve focusing on one watershed at a time, or having multiple plans being developed simultaneously. The adoption of either approach will depend on the urgency of the problem and the anticipated synergies and/or staff availability that would be expected from multiple processes.