CANADA ALBERTA NORTHWEST TERRITORIES

RESPONSE

to

The Northern River Basins Study

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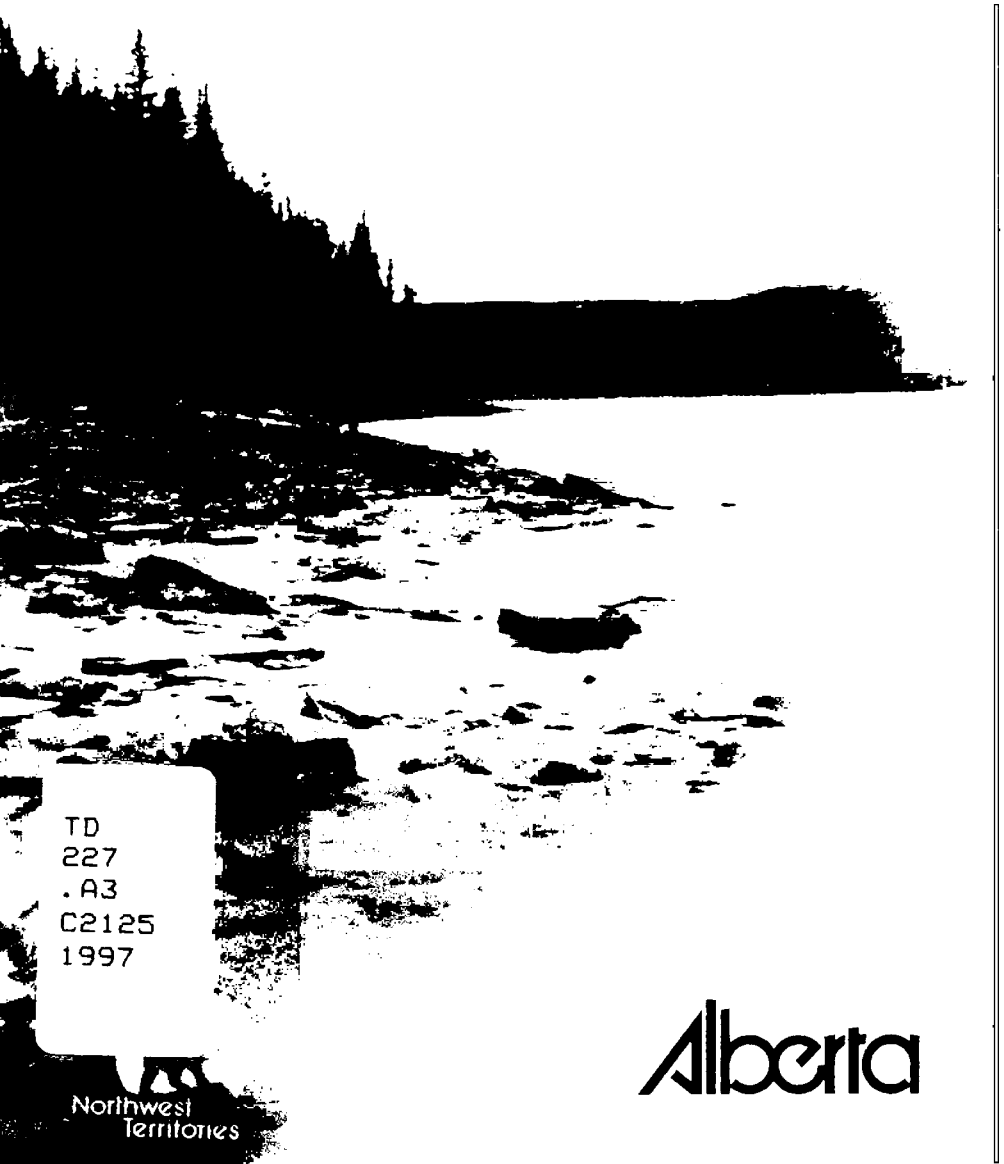
Report to the Ministers



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Cover Photo: View of Peace River shoreline composed of sandy silt and angular sandstone clasts. Photo from NRBS Collection.

Canada-Alberta-Northwest Territories Response
to the Northern River Basins Study Report to the Ministers
(1997)

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I. Introduction and Background

The forest industry in northern Alberta expanded rapidly in the late 1980s. With this expansion came a variety of public concerns about the ecological impacts that might arise from the discharge of pulp mill effluents to the Peace, Athabasca and Slave river systems. These concerns were underscored by findings that some of the fish in these rivers were contaminated by chlorinated dioxins and furans discharged from the two existing bleached kraft pulp mills on the Wapiti and Athabasca rivers. Concerns about pulp mill impacts became further apparent during environmental impact assessment hearings on the Alberta-Pacific Forest Industries plant on the Athabasca River.

In response, the governments of Canada, Alberta and the Northwest Territories agreed in the autumn of 1991 to launch an intensive study to obtain further scientific information on the existing conditions in, and effects of development on, the aquatic ecosystem of the northern river basins. The ultimate goal was to provide a basis for the wise management of the basins' natural resources. As well as providing a sound information base, the study was designed to develop ways to predict future impacts and to consult effectively with the public. A multi-stakeholder Study Board was appointed to manage the study. The board generated 16 questions to guide the investigations, which began in 1992. Many of the 16 questions were in response to the main concerns of basin residents: "Can we drink the water? Can we eat the fish?" The Board released its *Report to the Ministers* at the end of the Northern River Basins Study in June 1996.

The Study Board conducted its work in a spirit of openness. Findings were presented from about 150 projects on such diverse topics as river flow, hydraulics, nutrients, dissolved oxygen, contaminants, fisheries, ecosystem health, traditional knowledge, cumulative effects, modelling, drinking water, resource use and human health. The study found that, on the whole, the condition of aquatic ecosystems in the northern basins is good. Dioxins and furans in fish are declining, and most basin residents have access to good quality drinking water.

The Study identified a number of key issues that warrant further action. These issues include:

- adopting pollution prevention as a primary environmental objective
- improving water treatment in smaller communities
- evaluating hormone disruption and effects on the reproductive biology of fish
- developing winter dissolved oxygen guidelines
- reducing nutrients and biochemical oxygen demand in effluents
- remediation in the Peace-Athabasca Delta
- operation of the Bennett Dam
- protection of the Wapiti and Smoky rivers
- enhanced monitoring on the upper Athabasca River
- reviewing fish tissue consumption guidelines

- new advisory bodies
- creating an integrated ecosystem monitoring committee
- creating a steering committee for the transition to successor organizations
- the early signing of the *Mackenzie River Basin Transboundary Waters Master Agreement*
- incorporating meaningful public participation in future studies.

The Study Board made detailed recommendations regarding these issues and grouped the recommendations into the following topics: basin management, reach-specific issues, monitoring, research, public participation, a successor organization and First Nations and Métis.

The individual recommendations are listed in Section II of this document. Following each recommendation, the governments of Canada, Alberta and the Northwest Territories present an integrated response, outlining their plans of action to ensure the long-term environmental protection of the Peace, Athabasca and Slave rivers. The three governments have worked cooperatively to review these recommendations and provide responses that reflect the individual issue's urgency, as well as fiscal realities of the governments involved.

Action has already begun on high priority recommendations, such as reduction of nutrients on the Wapiti River, adoption of the 6.5 mg/L guideline for dissolved oxygen, and assessing the impact of flow changes on the Slave River Delta. Further details of these and other actions in response to the NRBS recommendations are provided in Section II. Section III gives an overview of how these responses will be implemented in the future, although detailed plans have not yet been finalized.

The governments of Canada, Alberta and the Northwest Territories thank the Board and all involved in the Northern River Basins Study for their hard work, commitment and valuable contribution to the knowledge and understanding of these rivers.

II. Governments' Response

The governments of Canada, Alberta, and the Northwest Territories have reviewed in detail the findings and recommendations of the Northern River Basins Study. The co-operative process adopted by the NRBS Board is acknowledged and governments will continue to work in that spirit.

In response to the NRBS recommendations, the governments commit to ongoing and improving control of water pollution in the northern river basins, to maintain the integrity of ecosystems, and to facilitate the participation of all stakeholders in their protection. The long-term protection of these rivers will require rigorous control programs on point source discharges, and a basin management approach that accounts for all factors affecting the ecosystem.

The Governments commit to:

- integrated planning
- pollution prevention
- ecosystem-based monitoring
- resolving contaminant and nutrient issues
- continuing environmental research
- the implementation of the *Mackenzie River Basin Transboundary Waters Master Agreement*
- building partnerships to address the needs and concerns of aboriginal people
- open and full public participation.

The recommendations from the NRBS *Report to the Ministers* follow and are printed in *italics*. The individual recommendations are followed by the response of the governments.

1 1.1 *Regulatory agencies for the northern rivers declare and implement, through law, policy and practice, pollution prevention, including but not limited to zero discharge, as a primary environmental objective and as an important component of sustainable development.*

The governments of Canada, Alberta, and the Northwest Territories declare pollution prevention as a primary environmental objective and as an essential component of sustainable development. All three governments endorse the Canadian Council of Ministers of the Environment document *"A National Commitment to Pollution Prevention (November, 1993)."*

Pollution prevention is implemented by means of federal, provincial, and territorial laws, regulations, and practices. Canada implements this commitment through its policy entitled *"Pollution Prevention - A Federal Strategy for Action (1995)."* Alberta manages wastewater discharges through its *Industrial Effluent Limits Policy (December, 1995):*

"Limits for effluent discharges will be based on the most stringent of two approaches: either that required to meet ambient water quality objectives or that based on best available technology. Discharges are further minimized by optimizing the operation of individual treatment systems".

It is recognized that zero discharge is one means of achieving pollution prevention. However, zero discharge for all wastes in liquid effluents would be very difficult to achieve, and could result in other waste disposal challenges. Nevertheless, pollution prevention practices are becoming ever more stringent with time, resulting in the progressive reduction of point source contaminant discharges.

The governments commit to maintaining this trend (see recommendations 1.2, 1.3, 1.4, 1.5 below).

The governments also acknowledge that non-point source inputs and atmospheric deposition of pollutants can be important, and commit to addressing these in pollution prevention strategies.

1.2 *For contaminants;*

a. The objective be achieved within ten years for persistent toxic substances, to eliminate their use, generation or discharge with respect to the northern rivers.

b. Implementation begin by "capping" direct loadings into the rivers of persistent toxic substances at 1996 levels.

c. An open, credible process be employed to: (i) identify substances or test for sub stances within the category; (ii) develop a timetable for a step down to elimination; and (iii) determine ways in which the step down may be achieved. This should be accomplished with reference to the definition of persistent toxic substances and process contained in the Canada Toxic Substances Management Policy (June 1995).

The governments agree that elimination is the ultimate goal for persistent and bioaccumulative toxic substances, and note that work towards this goal has already been implemented for dioxins, furans and PCBs. Persistent toxic substances refer to those compounds which are toxic, accumulate in plants and animals, do not readily break down in the environment and which originate as a consequence of human activities.

Direct loadings of dioxins and furans to the northern rivers have come mainly from bleached kraft pulp mills. In Alberta, the generation and discharge of these contaminants have been significantly reduced in the last several years as a result of technology improvements, specifically at the Weldwood plant at Hinton and the Weyerhaeuser plant at Grande Prairie. Further reductions are being sought from the Daishowa-Marubeni mill at Peace River. The Alberta Pacific mill near Athabasca does not have detectable amounts of these substances in its effluent. The net result is that direct loadings of these substances to the northern rivers will continue to decline, even from 1996 levels. NRBS studies have confirmed that levels of dioxins and furans have now been significantly reduced in fish tissue as a result of these improvements.

Toxaphene, a persistent toxic pesticide, was also reported by NRBS to occur in the food chains of the northern river basins. It probably reaches the basins by long-range atmospheric transport. The sources of this pesticide are external to the basins and believed to be external to Canada. Therefore, control of toxaphene will be pursued by Canada through international mechanisms (see Recommendation 1.5).

Mercury is bioaccumulative and persistent, and was detected by NRBS in several fish species at various locations throughout the basins. NRBS was unable to characterize any significant, single, point source of mercury. The governments commit to long-term monitoring of mercury and other contaminants in fish tissue and to the associated assessments of human health implications (see Recommendation 12.1).

The governments also note the concern expressed by the NRBS Board concerning polychlorinated biphenyls (PCBs). This class of contaminants is currently regulated and there are no known point sources in the northern basins. Therefore, the generation or discharge of these contaminants appears to have been eliminated. Nevertheless, Alberta and Canada will conduct further site-specific investigations of PCB contamination issues identified by NRBS (see Recommendation 13).

The objective of the federal *Toxic Substances Management Policy* is the virtual elimination of persistent, bioaccumulative, toxic substances. Alberta will use its *Environmental Protection and Enhancement Act* and its *Industrial Effluent Limits Policy* to implement reductions of these contaminants and to continue to progress toward elimination. Canada will use the *Canadian Environmental Protection Act*, the *Fisheries Act* and the *Toxic Substances Management Policy.*

The *Alberta Environmental Protection and Enhancement Act* process and the federal *Policy* both allow for public review and input to the regulatory control of such contaminants. Alberta reports on the effectiveness of effluent discharge regulation by issuing periodic data summaries entitled *"Alberta Industrial and Municipal Effluent Quality Monitoring."*

1.3 *For nutrients;*

a. The objective be achieved within a reasonable period of time for nutrients, to eliminate or substantially reduce their discharge to the northern rivers, consistent with environmental management objectives.

b. Implementation begin by "capping" direct nutrient loadings into specific reaches of the rivers, as indicated by the Study's findings.

c. An open, credible process be employed to: (i) identify environmental management objectives with respect to nutrients; and (ii) develop a plan to reach those environmental management objectives.

The governments agree with the need for nutrient control and will continue to seek reductions in point-source discharges of nutrients. Through its *Environmental Protection and Enhancement Act* approvals process, and under the *Industrial Effluent Limits Policy (1995)*, Alberta is requiring pulp mills to develop and implement nutrient reduction programs.

Nutrients are added to pulp mill wastewater treatment systems to optimize microbial breakdown of or-

ganic wastes. There will, therefore, always be small concentrations of nutrients in effluents but the reduction programs will bring these amounts down to levels equivalent to those typically obtained by tertiary treatment.

The governments will develop water management plans for the long-term protection of these rivers which will include reach-specific objectives for controlling nutrients (see Recommendation 10.1). The development of these plans will include consultation with stakeholders and the general public.

To ensure the long-term protection of selected river reaches identified by NRBS, certain municipalities will also be required to implement tertiary treatment for nutrients. This requirement will be applied to Grande Prairie during its forthcoming *Environmental Protection and Enhancement Act* Approval renewal. The sewage treatment plant at Jasper townsite is also undergoing review and modification to improve nutrient control (see Recommendation 2.5). In the Northwest Territories the NWT Water Board has issued environmental management objectives for municipal sewage discharges and sets site-specific requirements in water licences. The approval processes for controlling all of these discharges are open to the public.

The relationships between river biota and nutrient concentrations are very complex. The governments agree that such knowledge is a fundamental component of water management plans. Accordingly, Canada and Alberta have agreed to pursue joint research efforts to understand and quantify these relationships (see Recommendations 2.5 and 10.1). The federal government is conducting an extensive review of the impacts of municipal effluents and nutrients on Canadian aquatic ecosystems. The results of this review will be pertinent to the northern rivers and the development of water quality guidelines.

1.4 *For other wastes;*

a. The objective be achieved within a reasonable period of time for other wastes, to eliminate or substantially reduce their discharge to the northern rivers.

b. An open, credible process be employed to develop a plan for achieving waste reduction or elimination.

The governments agree that other wastes should be restricted, with a view to reduction or eventual elimination of their discharge to rivers. Canada and Alberta have been pursuing this goal by placing high priority on the reduction of other wastes discharged from pulp mills. These wastes affect colour, odour and other aesthetic characteristics, and have been shown to negatively impact the use of receiving waters. For example, the older pulp mills (Weldwood and Weyerhaeuser) are presently on a compliance schedule to reduce the amount of colour in their effluents.

Continuing technological developments will allow further reductions in waste discharges from other industrial sectors. For example, technology is being devel-

oped in the oil sands industry that promises to reduce and eventually eliminate the existing large tailings ponds, and reduce existing discharges from plant operations. These reductions are also handled under the *Alberta Environmental Protection and Enhancement Act* approvals process, which allows for full public disclosure and input. The federal government is committed to work cooperatively with the provinces and industry to continue to pursue such reductions and to achieve improved waste management overall.

Canada and Alberta will soon complete a province-wide evaluation of agricultural impacts on the aquatic environment. This work was conducted under the *Canada Alberta Environmentally Sustainable Agriculture Agreement*, which was a federal-provincial cost-shared program operating from 1992 to 1997. The program has yielded substantial information which can be used in the future to minimize water pollution from agricultural non-point sources. A successor program, called the *Alberta Environmentally Sustainable Agriculture Program*, will ensure that research continues on this topic.

1.5 *Regarding international agreements;*

a. The Government of Canada should vigorously pursue the development of international agreements, treaties or protocols consistent with the elimination or reduction of the use, generation or discharge of airborne pollutants.

Canada is committed to addressing the transboundary movement of hazardous air pollutants and is involved in the management of chemicals through the 1991 *Canada-United States Air Quality Agreement.* Canada is also a participant in the *"Partnership for Pollution Prevention"* developed by the Organization of American States to advance continental action to reduce the atmospheric transport and deposition of lead and pesticides.

Through the United Nations Economic Commission for Europe's *"Convention on Long-Range Transboundary Air Pollution"*, Canada works towards the development of new protocols on persistent organic pollutants and heavy metals. The global management of persistent organic pollutants is being pursued through the *United Nations Environmental Program.*

Canada and Alberta are involved internationally in the sound management of chemicals as partners in the *North American Agreement on Environmental Cooperation* under the *North American Free Trade Agreement.*

1.6 *And with respect to performance evaluation;*

a. The Ministers and their governments make a report to the public in five years (after this Study) on the progress achieved in implementing these recommendations.

The federal and provincial governments regularly report on the state of the aquatic environment and pollution control effectiveness by means of interpretive technical reports, annual reports, performance measures, State-of-the-Environment Reports, and public meetings. These communication mechanisms will be continued and will cover actions taken in response to the NRBS recommendations. The task of addressing progress on the NRBS recommendations will also be referred to the Board to be constituted under the *Mackenzie River Basin Transboundary Waters Master Agreement* (see Recommendation 23).

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2 **2.1** *The Government of Alberta and Canada initiate and complete the necessary studies to determine the winter dissolved oxygen requirement for fish and other aquatic species as per the CCME Guidelines Protocol, and subsequently assess the oxygen requirements for the organisms in the various reaches of the northern rivers.*

Canada and Alberta have committed to develop a joint three-year research plan to further assess the dissolved oxygen requirements of aquatic biota, and initiated preliminary studies in March, 1997 on this issue. In the Athabasca River, benthic invertebrates at the location of lowest dissolved oxygen levels were monitored to gather direct information on the biological effects of winter dissolved oxygen conditions.

2.2 *Alberta adopt the CCME Dissolved Oxygen Guideline of 6.5 mg/L as an overall provincial approach in making decisions on future development proposals.*

Alberta accepts this recommendation and is adopting the 6.5 mg/L guideline province-wide. It is noted that winter dissolved oxygen concentrations in the Athabasca River have met the existing *Canadian Council of Ministers of the Environment* guideline of 6.5 mg/L throughout this decade. The federal government also applies this guideline for use in the National Parks and the Northwest Territories.

2.3 *Throughout the basin, nutrient and biological oxygen demand monitoring be improved, especially for municipal sewage treatment facilities and some pulp mills. Standards for Quality Assurance / Quality Control requirements be enhanced for existing and future effluent licences and permits. These data be logged in a central database and linked to provincial water quality data.*

The governments agree that monitoring, quality control, and data management are very important.

A large amount of performance data is available for municipal and pulp mill effluent treatment systems, so that governments now have a good understanding of the expected levels of biochemical oxygen demand and nutrients in these effluents. Alberta will examine these data regularly as nutrient management strategies are developed for the northern rivers and will improve effluent monitoring as required. Nutrient and biochemical oxygen demand monitoring in the northern river mainstems will also receive regular reviews and upgrades (see Recommendation 11).

A new data management system (ENVIRODAT) is being implemented by both Canada and Alberta. It will store effluent and surface water quality data together, thereby improving data access and sharing among all users. Ready access to stored quality assurance/quality control data is a feature of ENVIRODAT.

2.4 *Phosphorus concentrations in pulp mill effluents be reduced to minimal levels. Alberta require pulp mills to monitor and assess their operations to ensure that phosphorus additions are not in excess of what is needed to minimize BOD of effluent.*

Alberta is actively seeking nutrient reductions through the pollution prevention and minimization initiatives stipulated in pulp mill approvals under the *Environmental Protection and Enhancement Act*. The objective is to ensure that mills do not use any more phosphorus than is required to optimize the performance of their wastewater treatment systems (see also Recommendation 1.3).

2.5 *Municipal sewage effluent may require tertiary treatment to reduce phosphorus additions at certain locations. The Board recognizes the significant cost implications but emphasizes the importance of reducing phosphorus inputs over the long-term. Particular attention is drawn to the Wapiti / Smoky system at Grande Prairie, and to the inadequately treated municipal sewage entering the upper Athabasca River from the town of Jasper in Jasper National Park.*

The governments agree with the importance of reducing phosphorus discharges at certain locations within the northern river basins. Alberta will require the City of Grande Prairie to implement tertiary treatment for phosphorus reduction at its municipal sewage treatment plant (see Recommendation 1.3). Canada, in cooperation with the Jasper Town Committee, is currently designing a new sewage treatment plant for that community. Tertiary treatment for phosphorus has been agreed upon and the target date for completion of the plant is the winter of 1999.

Canada and Alberta will develop a joint research plan in the autumn of 1997 to further refine reach-specific water quality objectives used to regulate nutrient discharges in the Wapiti/Smoky and upper Athabasca River systems.

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3 **3.1** *The federal, provincial and territorial governments increase their efforts in the smaller communities to educate facility owners regarding the need to properly operate the water treatment facilities including the use of the existing programs for operator training, certification and assistance.*

The governments acknowledge that a concerted, ongoing effort is required to educate operators and maintain drinking water facilities in small communities. The governments will work together to maximize efficiency in this regard. Alberta will maintain its programs of communication, assistance, training, and certification for operators. As well, Alberta will continue to work with the Plant Operator's Association in the preparation of an operator's manual for small treatment systems. Canada will provide assistance for First Nations to run training and certification programs. Canada will continue to assist First Nations with the monitoring of water quality and with advice on human health. The government of the Northwest Territories will co-operate with associations such as the NWT Water and Wastewater Association to raise the standard and expertise for operator training and certification.

3.2 *The federal, provincial and territorial governments ensure that there are adequate treatment facilities, equipment and operating standards for their constituents.*

The governments agree with this recommendation and will work closely with local governments and First Nations to ensure this is always the case.

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4 **4.1** *The proposed Alberta Water Act make specific provision for the integration of water quatity and water quality planning and administration.*

The governments concur with this recommendation. The new *Alberta Water Act* includes provisions that recognize the importance of integrating water quantity and water quality planning and administration, and therefore addresses this concern.

5 **5.1** *The Government of Alberta provide leadership in water management planning incorporating, as a first priority in the water management process, instream flow needs for ecological purposes in the northern rivers and their tributaries within the province.*

Alberta commits to providing such leadership. The commitment is demonstrated in specific provisions of the new *Alberta Water Act* which call for the development of water management plans that incorporate aquatic environmental protection strategies. Instream flow needs for the protection of biological communities will be incorporated as a high priority in the planning.

6 **6.1** *Jurisdictions of the northern river basins strengthen and publicize inspection and enforcement activities with respect to protection of water quantity and quality.*

The NRBS Board found that basin residents were not fully aware of the range of inspection and enforcement activities already being undertaken by governments. The governments agree that enforcement of environmental laws is very important. Under federal and provincial laws several enforcement tools are used to accomplish this including: tickets, enforcement orders, administrative penalties, prosecutions, and cancellation of approvals or certificates. The governments endorse the publicizing of enforcement actions taken and note that both the federal and provincial governments publish annual reports on this topic. In the Northwest Territories the federal government makes inspection reports relating to water licences available to the public on request. The three governments will develop improved mechanisms to inform the public.

7 **7.1** *The governments of Canada, Alberta and British Columbia implement an action plan for reclamation of the Peace-Athabasca Delta, the plan to include provisions for environmental impact assessment and public consultation with delta residents and with those that might be affected downstream, such as at the Slave River Delta.*

The governments agree to the long-term protection of the ecologically important deltas of the northern river basins. Furthermore, governments recognize their societal importance. NRBS studies identified several deficiencies in our understanding of the ecological effects of flow regulation and of hydro-

logic-climatic interrelationships.

Canada and Alberta, in concert with First Nations and BC Hydro, released the final report of the *Peace-Athabasca Delta Technical Studies* in March, 1997. Based on these results and those of the NRBS, Canada, Alberta, and BC Hydro in partnership have initiated a follow-up study to specifically assess the hydrological and climatic conditions in 1996 that resulted in two significant floods of the delta. Based on the findings of all studies, Canada and Alberta will work with stakeholders to develop appropriate action plans for management and research which will include environmental evaluations and public consultation.

7.2 *As a principle for any future negotiations on mitigation of the impacts of the Bennett Dam, that the dam's operating regime be modified to help rehabilitate the Peace-Athabasca Delta and the riparian and aquatic conditions of the Peace River system. Further, that economic considerations of power production from this industry should not take precedence over the environmental stability and natural ecosystem of the Peace River, Peace-Athabasca Delta, Slave River and Delta and the Mackenzie River system.*

The governments agree that the operating regime of the Bennett Dam must consider downstream impacts. Alberta has been negotiating with British Columbia on water management issues in the Peace River for over a decade, particularly with regard to operation of the Bennett Dam. This has had some benefit in terms of mitigating impacts on the town of Peace River and on winter ice bridges along the river. More recently, there has been co-operation in operating the dam in such a way as to enhance spring flows in the Peace-Athabasca Delta with the hope of flooding the unique "perched" basins.

The governments will continue negotiations with the province of British Columbia to mitigate the effects of the Bennett Dam on downstream ecosystems. Any mitigation for the Peace-Athabasca Delta will require careful consideration of the results of all studies, as noted above for Recommendation 7.1.

8

8.1 *Formal arrangements be made to ensure that land use planning and water use planning are integrated as basin management planning throughout the northern river basins;*

- *a. The effects on surface waters and the mainstem rivers of agriculture, forestry, oil and gas activities and other land clearing be reviewed on a continuing and comprehensive basis;*
- *b. All aspects of land use activities be scrutinized including land clearing, road building, channelization, revegetation, use of fertilizers and biocides and waste disposal;*
- *c. Attention be given to groundwater levels, flow patterns in tributary streams and the integrity of fish spawning areas; and*

d. Compounding effects of potential climate change and of atmospheric sources of contaminants be considered as important elements of context.

The governments agree with these recommendations and note that such formal planning arrangements have now been set out in the recently passed *Alberta Water Act*. As noted in the response to recommendation 1.1, land use effects (as non-point source inputs), local atmospheric deposition, and long range transport of air pollutants, are specifically acknowledged as important elements of aquatic ecosystem planning and protection.

Alberta is committed to integrating its natural resource management decision-making. This commitment is supported by the corporate structure of Alberta Environmental Protection which includes lands, forests, parks, fish, wildlife, water, air and water approvals, and pollution control enforcement. Canada conducts integrated planning as part of its strategy to manage Wood Buffalo and Jasper National Parks.

Further research is needed to fully understand the ecological effects of land use changes. Governments commit to work with industry and other stakeholders to identify priority research needs. In addition to the Northern Forest Research Centre in Edmonton and forestry research at the Alberta Research Council, Vegreville, Canada and Alberta are supporting the Foothills Model Forest, and the Network Centre of Excellence in Sustainable Forest Management at the University of Alberta. Other research programs at the National Hydrology Research Institute, Saskatoon, and at the Forest Engineering Research Institute of Canada, Vancouver, are continuing forestry-related research in these basins. Alberta has commissioned the *Alberta Forest Conservation Strategy*, and has established a Forest Management Science Council to advise on the best management of forests. Recommendations have been received from these two initiatives and are under consideration.

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9 **9.1** *The government of Canada, the Northwest Territories, Alberta, British Columbia and Saskatchewan exercise their legislative powers to the fullest in preventing major diversions of basin water outside of the northern river basins.*

Canada, Alberta, and the Northwest Territories will exercise their powers to the fullest to prevent major diversions of water out of the basin. In Alberta, the recently passed *Water Act* prohibits the transfer of water between major river basins. Also, the *Federal Water Policy (1987)* prohibits the export of water through inter-basin diversions.

10 **10.1** *The Ministers direct action to be undertaken to protect the Smoky and Wapiti Rivers from further dissolved oxygen, nutrient and contaminant stress, and undertake to develop and apply reach-specific guidelines and associated regulatory requirements relevant to the small size of these rivers.*

The governments concur with this recommendation and acknowledge the need to carefully manage water quality in this river system. Alberta has obtained reductions in loading to the Wapiti River for several contaminants, and is working with the City of Grande Prairie and the Weyerhaeuser pulp mill on further reductions. Any new developments on the Wapiti/Smoky River system will be subject to stringent discharge restrictions and will have to work with the existing facilities to ensure that water quality is protected.

In 1997, Alberta will initiate the development of a water quality management strategy for the Wapiti River which will include reach-specific objectives for nutrients. Alberta is also preparing updated provincial water quality guidelines for other pollutants which will be stringent enough to protect aquatic life in all rivers. Canada and Alberta, in cooperation with industry, will conduct further studies on the relationship among nutrients, dissolved oxygen, contaminants, and the biota in these systems.

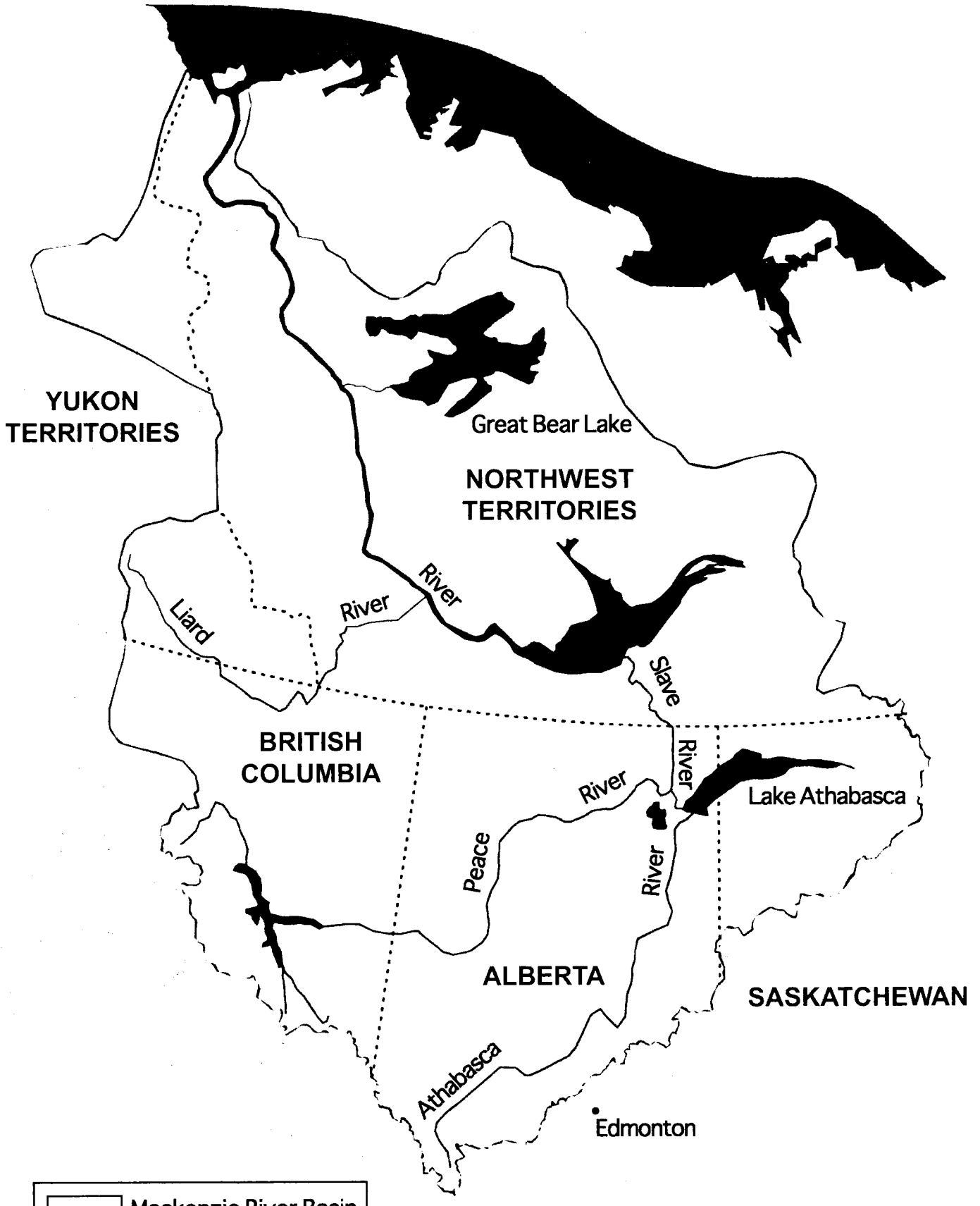
10.2 *Fish contamination and fish health effects be assessed for the populations of fish in the Slave River Delta ecosystem.*

Canada and the Northwest Territories agree that deficiencies exist in our knowledge base concerning fish contaminants and fish health for the Slave River Delta fish populations. Therefore, they agree to conduct studies to address these information gaps. Through the cooperation and funding support of several federal government departments, contaminant investigations (metals, organochlorine compounds, and metallothionein) focusing on water, sediments and fish were conducted during 1996. The investigations will be completed and reports prepared by 1998/99.

Canada will maintain its food inspection program for fisheries to ensure that all commercially caught fish in the NRBS area meet human health consumption guidelines (see Recommendation 12.1).

10.3 *Monitoring activity be intensified in the reach of the Athabasca River from Hinton to below Whitecourt.*

The governments of Canada and Alberta agree that this reach of the Athabasca River requires intensive surveillance. Accordingly, Alberta has ex-


YUKON TERRITORIES
Great Bear Lake
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Liard River
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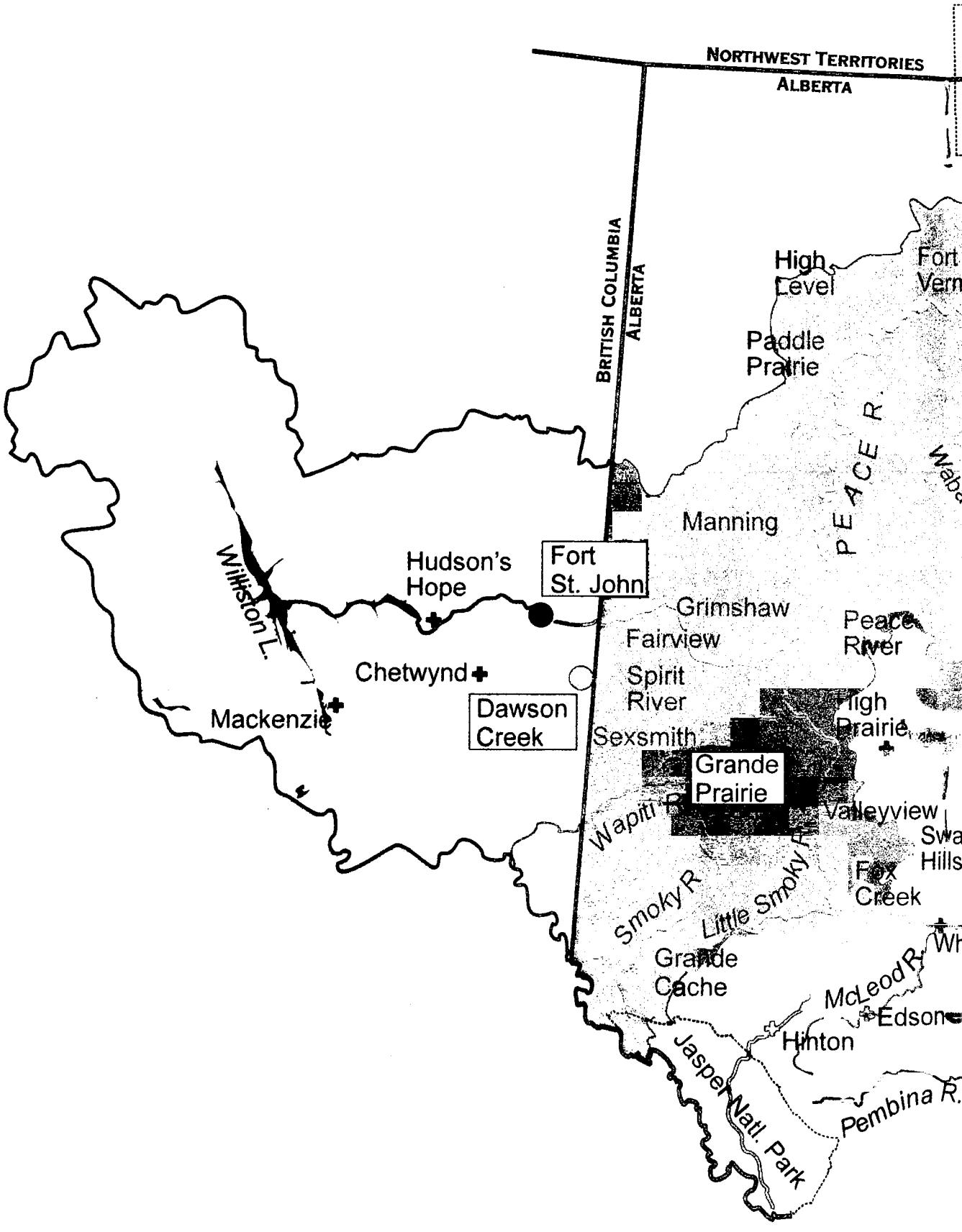
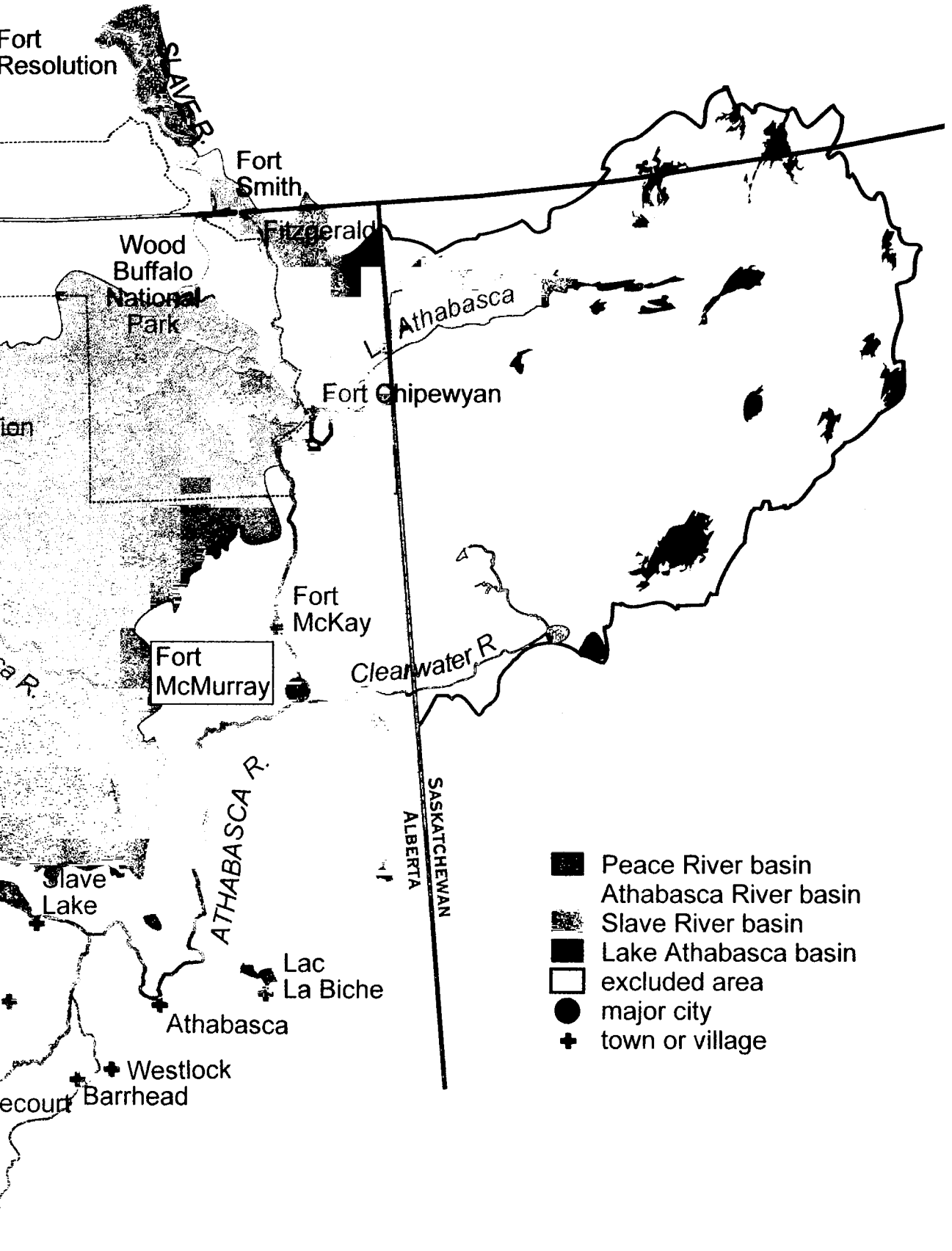
Slave River
BRITISH COLUMBIA
River
Lake Athabasca
Peace River
ALBERTA
SASKATCHEWAN
Athabasca
Edmonton
Mackenzie River Basin
Northern River Basin

Northern River Basins Study Area

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Wood Buffalo National Park
L. Athabasca
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Fort McKay
Fort McMurray
Clearwater R.
ATHABASCA R.
SASKATCHEWAN
ALBERTA
Slave Lake
Lac La Biche
Athabasca
Westlock
Barrhead
Peace River basin
Athabasca River basin
Slave River basin
Lake Athabasca basin
excluded area
major city
town or village

panded its monitoring in this reach to include more detailed surveys of nutrients and benthic algae, while at the same time maintaining the existing year-round networks of water quality and quantity stations, some of which are run in conjunction with the federal government. A report summarizing the results of this enhanced monitoring work will be produced in 1998.

Follow-up on PCB contamination will be done (see Recommendation 13), and joint investigation of fish health in this reach will also be undertaken (see Recommendation 15). As well, intensive monitoring in this reach is being undertaken by the pulp and paper mills in accordance with the federal *Pulp and Paper Mills Environmental Effects Monitoring Guidelines*, and provincial regulations.

11 11.1

The Alberta and Northwest Territories Governments invite representatives of the governments of Canada, British Columbia and Saskatchewan, municipalities, industry, universities, First Nations and other agencies involved in monitoring activities, in consultation with an advisory committee involving members of all stakeholder groups concerned with or affected by monitoring activities, to participate in an Integrated Ecosystem Monitoring Committee (IEMC). The role of the IEMC would be to coordinate and oversee technical and scientific aspects of water quality, water quantity and biota monitoring in the northern river basins to ensure minimal duplication of effort and greatest collective efficiency. The IEMC would adopt an ecosystem approach to environmental monitoring (see Synthesis Report #10).

The governments agree that an integrated monitoring committee is in the best interests of northern basins stakeholders and will refer this recommendation to the Board to be established under the *Mackenzie River Basin Transboundary Waters Master Agreement*. The Board would determine the membership of any such monitoring committee, taking into account the stakeholders and the agencies with monitoring responsibilities.

The Integrated Ecosystem Monitoring Committee would serve to co-ordinate and optimize aquatic ecosystem monitoring, particularly with regard to transboundary waters. The committee would identify issues and problems, promote standardization of methods, ensure quality control, minimize duplication, and provide for public input into the development of monitoring programs. It may set up expert sub-committees to deal with specific aspects such as hydrology, water quality, and fisheries. Governments would participate fully in such a committee, providing technical and scientific support, and would submit their monitoring programs to it for scrutiny and feedback.

12 **12.1** *Alberta Health, Alberta Environmental Protection and Northwest Territories Health and Social Services, together with Health Canada and First Nations Health Authorities be charged with the responsibility of leading and coordinating the development of new, human health-based fish consumption policies, standards and guidelines for the Northern River Basins. This will require close collaboration and cooperation with other provincial, territorial and federal agencies, to rationalize and harmonize the extent of advisories across administrative boundaries. The process should build on the data and information generated by periodic surveys of fish contaminants. An improved mechanism should include the timely interpretation of findings, dissemination of information in a meaningful and culturally sensitive fashion, and contemporary population health risk assessment, risk management and risk communication concepts.*

The Governments of Canada, Alberta and the Northwest Territories are cooperating to review the NRBS contaminant and dietary information for people who live within the basin, and to evaluate the applicability of the existing human health consumption advisories for the basins. The review of contaminant data by Canada and Alberta is underway and will be completed in 1997. The current fish consumption advisories will be amended as necessary. The review of fish consumption policies, standards and guidelines will involve First Nations and Métis communities and the results will be communicated directly back to them.

Canada and Alberta will design and implement routine fish tissue testing programs for key species and reaches of the northern rivers. The data collected in these programs will be regularly evaluated against tissue consumption guidelines established for the protection of human health.

13 **13.1** *The Ministers direct further investigation to be undertaken into defining the extent of PCB contamination and their sources in the Wapiti, Smoky, Peace and Athabasca river systems.*

Canada and Alberta agree to undertake investigations of PCB contamination in the priority reaches identified by the Northern River Basins Study. Alberta is reviewing all NRBS data on this topic, and is undertaking a complete review of known PCB incidents, atmospheric transport and deposition phenomena, storage sites, and utilization sites in the northern basins (including British Columbia).

In consultation with the federal government, follow-up sampling is being designed and will be carried out in 1997 and 1998. A report on this work will be prepared in 1999. If significant PCB sources or problems are identified, remediation will be undertaken.

14 **14.1** *The Ministers, for a five-year period following completion of the Northern River Basins Study, report annually on the progress of implementing the research and management recommendations of this Report to the Ministers and the synthesis reports; that the annual summaries clearly describe the results of the ongoing research and management initiatives; and that the report be made available to the general public.*

The governments agree that reporting progress on implementing the responses to the recommendations is important. This task will be referred to the Board to be established under the *Mackenzie River Basin Transboundary Waters Master Agreement* (see Recommendation 23). The results of research and management initiatives will be reported by the agencies responsible, and will also be made available to this Board.

15 **15.1** *The Ministers initiate an intensive and comprehensive study of endocrine disruption and reproductive biology of fishes throughout the basins, and the implications for the fish populations and the integrity of the aquatic ecosystems.*

The governments are concerned about endocrine disruption compounds, the lack of information about their sources and occurrence in these basins, and their potential effects on aquatic biota. Canada is addressing the issue of endocrine disruption and its implications to aquatic ecosystems on a national basis and will include the pulp mills and other sources in the Peace and Athabasca River basins within the study design. Alberta will support this work and industry co-operation will also be sought. Specifically, Canada will:

- **conduct research into the development of bioassays capable of predicting the effects of pulp mill effluent on the reproductive biology of fishes;**
- **utilize the bioassays to identify the compounds responsible for the effects;**
- **identify pulp mill processes and technologies that generate these compounds;**
- **survey effluents nationally to describe the concentrations of the responsible compounds.**

This assessment is targeted for completion by the year 2001.

15.2 *The Ministers initiate a complementary study to assess the increased incidence of fish abnormalities in reaches immediately below pulp mills.*

Canada and Alberta agree that the Northern River Basins Study results concerning the incidence of fish abnormalities below pulp mills warrant further

study. Such studies will be undertaken collaboratively with industry and will attempt to make use of fish collected as part of the existing *Environmental Effects Monitoring* program prescribed under the federal *Fisheries Act*. The studies will be designed in 1997/98 and implementation will begin in 1998/99.

16 **16.1** *The Ministers draw on such expertise as necessary to undertake research on the effects on aquatic biota of exposure to substances arising from oil sands, both naturally and as a result of oil sands industry development, giving particular attention to establishing monitoring requirements.*

The governments agree that, given the scale of the industrial developments in the oil sands area, it is necessary to improve our understanding about potential impacts to aquatic ecosystems. Governments will ensure that the relative importance of natural versus industrially-derived contaminants is examined.

In this regard, there are several completed and on-going evaluations of industry, government, and universities on oil sands aquatic issues. These include surveys of existing aquatic conditions in the oil sands area, research on tailings pond reclamation, development of new technology to minimize tailings, research on oil sands-related contaminants in existing water bodies and tailings ponds, and evaluation of fish-tainting potential of wastewaters. A technical environmental advisory group of the Canadian Oil Sands Network for Research and Development, which includes industry, government, and universities, has been established to facilitate issue identification, research, co-ordination, and communication on this general issue. Several reports on these topics were released as part of the environmental impact assessments and applications recently submitted by Suncor Inc. and Syncrude Canada Ltd.

Alberta and Canada commit to maintaining a broad level of co-operative research, monitoring, and communication on this issue and to ensuring that industry is involved. This commitment to environmental protection is demonstrated by the recent Suncor Inc. Steepbank Mine development. The company conducted environmental research, described existing conditions, assessed impacts, and submitted the information as part of the impact assessment and application process under the *Alberta Environmental Protection and Enhancement Act*. After wide-ranging government and public review, residual issues were identified and requirements for further research and environmental effects monitoring were included in the Approval.

Alberta commits to applying this process to further oil sands developments. As well, Canada and Alberta will con-

tinue to conduct monitoring and research on the effects of oil sands developments, such as the ongoing contaminant and toxicity work under the federal *Panel on Energy Research and Development.*

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17 **17.1** *A study be undertaken by the federal and territorial governments to determine the causes for physical changes in the Slave River Delta and their environmental impact. Elements of the study would include:*

a) history of the Delta
b) recent changes to the Delta, including erosion and deposition processes
c) the influence of lake levels and shore processes to wind, waves, current and ice conditions; and
d) evaluation of the effects of the Bennett Dam, climatic factors and other natural causes on recent changes to the Delta.

In addition to its regular monitoring programs, Canada is undertaking new scientific investigations in 1997 on the Slave River Delta to address flow regulation and climate-related effects, the spatial distribution of erosional and depositional zones, and riverine processes in both the Delta and nearshore areas (see Recommendations 7.1 and 17.2). The study will be completed by the year 2000.

17.2 *The federal and Northwest Territories governments undertake a study of the limnology of Great Slave Lake with emphasis on sediment deposition and contaminant distribution.*

Canada and the Northwest Territories agree that a limnological investigation of Great Slave Lake would be of value.

Canada will take the lead in the preparation of an environmental overview which will address the current understanding of the Great Slave Lake ecosystem. This report will be completed by 2000. Subsequent studies would depend on the results arising from the overview and consultations with stakeholders.

In addition, Canada has instituted new scientific investigations to specifically address contaminant transport and deposition within the Slave River Delta and nearshore areas. Further bottom sediment and fish samples will be obtained to investigate the concentration and effects of various contaminants identified during NRBS.

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18 **18.1** *Federal, provincial and territorial governments give priority to ensuring that scientific resources (including personnel) be maintained at levels necessary for long term protection of the northern rivers and that the national granting councils provide increased funding for the*

support of multi-sectoral sponsored research on environmental problems through their various partnership programs.

Governments acknowledge that sound science is central to environmental policy and decision-making. Canada and Alberta are continuing their commitment to environmental research in the basins, as explicitly indicated in this report.

National granting councils, such as the Natural Sciences and Engineering Research Council, and the Province of Alberta are currently providing funding for joint university-government-industry research programs in the basins. For example, the National Centre of Excellence for Sustainable Forestry (led by the University of Alberta) was initiated in 1995-96 to examine forest management procedures and related ecosystem impacts. In 1996, Alberta announced the creation of the Forest Management Science Council to help integrate forest management research findings.

The *Alberta Environmentally Sustainable Agriculture Program* will continue to provide information concerning the effects of agriculture on aquatic ecosystems. Studies will continue in the watersheds of the Peace and Athabasca rivers.

Canada is conducting further research in the Mackenzie Basin under the *Panel on Energy Research and Development* (see Recommendation 16), the *Northern Contaminants Program* and the *Global Energy and Water Cycle Experiment.*

In addition to the research outlined above, governments commit to the ongoing application of scientific and engineering resources to support regulatory and monitoring functions.

19 19.1

The governments of Canada, Alberta and the Northwest Territories prepare a comprehensive review of the use, condition and sustainability of fish stocks in the Slave River basin and Great Slave Lake that are used for domestic and commercial purposes.

The governments agree with the need to monitor fish stocks. The government of Canada, with co-operation from the Northwest Territories, will prepare a comprehensive review of current knowledge on the use, condition, and sustainability of commercial fish stocks in the Northwest Territories portion of the Slave River Basin and in Great Slave Lake. Domestic fishery information, although much more limited, will also be reviewed.

Alberta monitors commercial fish stocks extensively and also shares information on domestic fisheries with users. This program will be maintained and expanded where feasible.

20 **20.1** *In light of the benefits to be gained through public involvement it is important that meaningful public participation be an integral part of the planning and development of future studies and their scientific programs.*

The three governments recognize that the meaningful public participation initiated by the Study will continue to help all parties make better decisions for effective basin management. Canada, Alberta, and the Northwest Territories share responsibilities with all residents and sectors in the basins in managing the northern rivers and promoting sustainable development. Public involvement and open communication are explicit in federal and provincial operating guidelines. The Integrated Ecosystem Monitoring Committee under the Mackenzie Basin Board (see Recommendation 23) is expected to provide a forum for public input into the design of studies and monitoring programs.

21 **21.1** *A valid and representative sample survey be conducted five years hence to assess changes in the use of the river basins and in the perceptions and attitudes of residents, providing a means of comparing public perceptions with realities at that time and providing guidance for policy development.*

The governments agree that a survey would be valuable. This recommendation will be referred to the Board established under the *Mackenzie River Basin Transboundary Waters Master Agreement* for advice on survey design and implementation (see Recommendation 23).

22 **22.1** *The Ministers co-operate to establish, on a suitable financial basis, such new bodies as are needed to meet the present and future concerns about the aquatic and riparian ecosystems of Northern River Basins.*

The governments agree that a mechanism is required to facilitate basin-wide water management. The governments therefore agree to cooperate to establish a Board under the *Mackenzie River Basin Transboundary Waters Master Agreement* as the body to address many of the issues concerning the aquatic and riparian ecosystems of the northern river basins (see Recommendation 23).

23 **23.1** *All reasonable efforts by the Ministers be directed to the earliest possible signing of the Mackenzie River Basin Transboundary Waters Master Agreement, and the establishment of that Board.*

23.2 *Membership of any new board or panel related to the affairs of the northern river basins be kept small but appointed to represent federal, provincial and territorial governments, First Nations, municipalities, industry, environmental interests, residents and other stakeholders without dominance by any one constituency or interest group.*

23.3 *The method of appointment for each member be acceptable to the constituency to be represented by the member.*

23.4 *An advisory board, to be called the Northern River Basins Board (NRBB), be created jointly by the governments of the jurisdictions covered by the northern river basins, to advise governments on matters related to the aquatic and riparian ecosystems of the northern river basins.*

23.5 *If the NRBB is established as recommended, the Integrated Ecosystem Monitoring Committee (IEMC) as described in Monitoring Recommendation 11-1 should be closely linked to NRBB, possibly reporting to the NRBB.*

The governments agree with the need for a prompt establishment of a Mackenzie River Basin Board. Canada, Alberta, the Northwest Territories, Saskatchewan, British Columbia, and the Yukon have all signed the *Mackenzie River Basin Transboundary Waters Master Agreement* under which such a Board will function. The Board will be a cooperative forum in which governments in the basin could develop consistent and cooperative management approaches and resolve interjurisdictional issues. The governments propose that the Mackenzie River Basin Board serve the purpose of the recommended Northern River Basins Board, thus avoiding the duplication and cost of having two boards.

24 **24.1** *A steering committee be established by the governments of Canada, Alberta and Northwest Territories to facilitate a transition, by April 1, 1997, from the NRBS to other bodies with successor functions.*

Since the release of the NRBS *Report to the Ministers*, a federal-provincial-territorial task force as been struck to develop an integrated, considered response to the NRBS findings and recommendations. As well, the governments have

completed the signing of the *Mackenzie River Basin Transboundary Waters Master Agreement* and are working to establish the Board under that *Agreement*. The federal-provincial-territorial task force will facilitate the transition to that Board.

First Nations/Métis

The recommendations of the Study's First Nations Committee, as supported by the NRBS Board and contained in its "Report to the Ministers", are listed below in *italics*, followed by the response of governments.

1 *Governments establish a committee, that will involve communities and other stakeholders, to consult, advise and implement resulting programs and projects which are the outcome of the recommendations from the Northern River Basins Study, so that the interests and rights of the First Nations / Métis are safeguarded and protected.*

The governments agree that people most directly affected by water policies and programs should have the opportunity to provide input to the development and implementation of them. The *Mackenzie River Basin Transboundary Waters Master Agreement* and associated bilateral agreements will provide important mechanisms for this and other purposes. First Nations/Métis will be represented on the Board under this *Agreement*.

2 *The governments develop a government to government relationship with First Nations / Métis governments concerning implementation of northern river basins strategies and recommendations.*

The governments are committed to First Nations and Métis involvement in the implementation of the NRBS recommendations. The *Mackenzie River Basin Agreement* will be an important mechanism for involving First Nations/ Métis peoples; however, other mechanisms will also be used as appropriate to address specific recommendations. For example, the document "*An Understanding on First Nations/Alberta Relations*" of November 10, 1995 sets a framework in which Alberta deals with First Nations signatory to the document. Similarly, the *Alberta/Métis Framework Agreement* signed August 16, 1993 sets a framework in which the province interacts with the Métis Nation of Alberta Association.

3 *An ecosystem management approach be used which includes all aspects of the watershed management and encompasses the commitment of First Nations / Métis people to the ecosystem approach.*

The governments support and will use an ecosystem management approach. This is one of the fundamental principles behind the *Mackenzie River Basin Transboundary Waters Master Agreement* and of the operational policies of Canada, Alberta, and the Government of the Northwest Territories.

4 *Any future research programs developed or endorsed by the governments or research organizations be encouraged to focus on the integration of scientific and traditional knowledge within a First Nations / Métis research protocol.*

The NRBS has demonstrated the importance of traditional knowledge. The governments encourage the integration of traditional and scientific knowledge in research programs. *The Mackenzie River Basin Transboundary Waters Master Agreement* calls for the incorporation of traditional knowledge and values in the conduct and actions of the Board.

5 *The northern river research strategies endeavour to enable First Nations / Métis communities and governments to initiate and carry out scientific research which answers First Nations / Métis environmental questions about the northern river basins.*

The governments endorse the participation of First Nations/Métis communities in strategies for environmental research. As in the NRBS, it is important that research programs are designed to include the concerns of First Nations/ Métis people. Governments are committed to working with First Nations/ Métis people to initiate and carry out scientific activities. The *Mackenzie River Basin Transboundary Water Master Agreement* and associated bilateral agreements provide mechanisms through which such an objective can be achieved.

6 *Governments commit to a cooperative and participatory thrust of future research in the northern river basins focusing on human health and its link to environmental contaminants or ecological change, and the cause and effect relationship of environmental contaminants or*

ecological change to the health of the communities and peoples involved; particular effort should be placed on the quality of water within the region encompassed by the Northern River Basins Study boundaries.

The governments agree with co-operative and participatory research, and the need to examine potential linkages between human health and environmental conditions. Their commitment to this is demonstrated by the Northern River Basins Human Health Monitoring Program, being completed by Alberta Health. This study is examining the situation carefully, and will identify knowledge gaps or deficiencies and make recommendations accordingly. Governments are committed to reviewing the findings and addressing the recommendations.

III. Summary of Actions

The following table summarizes the actions to be taken in response to the NRBS recommendations. The actions are grouped under the main headings from the recommendations section of the NRBS report. The relevant individual recommendations from the report are also listed and the lead government is indicated.

NRBS Heading and Government Actions	Relevant NRBS Recommendations	Lead Government
BASIN MANAGEMENT		
Endorse the *National Commitment to Pollution Prevention*	1.1	All
Continue to reduce persistent toxic substances	1.2	Alberta
Minimize nutrient discharges from pulp mills; implement tertiary treatment at large municipalities and at Jasper	1.3, 2.4, 2.5, 10.1	Alberta and Canada
Apply the *Industrial Effluent Limits Policy*	1.1, 1.2, 1.3, 1.4	Alberta
Negotiate international agreements to control airborne pollutants	1.5, 1.1, 1.2	Canada
Determine winter dissolved oxygen requirements for aquatic life	2.1	Canada

Adopt the 6.5 mg/L dissolved oxygen guideline	2.2	Alberta
Implement the ENVIRODAT data base	2.3	Alberta
Maintain and improve drinking water programs	3.1, 3.2	All
Implement the provisions for integrated land and water planning under the *Alberta Water Act*	1.3, 4.1, 5.1, 8.1, 9.1	Alberta
Prevent major diversions of water out of the northern river basins	9.1	All
Evaluate the 1996 floods in the Peace-Athabasca Delta and develop action plans	7.1, 7.2	Alberta
REACH-SPECIFIC ISSUES		
Develop a water quality management strategy for the Wapiti River, including reach specific nutrient objectives	1.3,2.3,2.5,10.1	Alberta
Initiate contaminant investigations in the Slave River Delta	10.2, 17.2	Canada
Increase monitoring in the Hinton-Whitecourt area of the Athabasca River	10.3	Alberta
MONITORING		
Enhanced monitoring and establishment of an integrated ecosystem monitoring committee	11.1, 18.1, 20.1	All
Improve nutrient and BOD monitoring	2.3	All
Monitor non-point source effects on aquatic ecosystems	1.1, 8.1	All
Review the NRBS fish contaminant data and consumption guidelines, and implement long-term monitoring of contaminants in fish tissue	1.2, 12.1, 18.1, FN6	Alberta and Canada
RESEARCH		
Initiate follow up investigations on PCB contamination	1.2, 10.1, 10.3, 13.1	Alberta
Conduct further research on nutrient- DO-contaminant effects on biota	1.3, 2.5, 10.1, 10.3	Canada and Alberta

Investigate endocrine disruption and abnormalities in fish	15.1, 15.2	Canada and Alberta
Maintain research and communication on environmental aspects of oil sands development	16.1, 18.1	Alberta
Evaluate hydrologic-climatic relationships in northern deltas	7.1, 17.1	All
Initiate studies on the evolution of the Slave River Delta, the limnology of Great Slave Lake, and contaminant transport and deposition in both.	10.2, 17.1, 17.2	Canada
Review knowledge on commercial fish stocks in Great Slave Lake and the NWT portion of the Slave R. Basin	19.1	Canada
PUBLIC PARTICIPATION		
Involve, and report to, the general public and First Nations on various initiatives on a regular basis	1.3, 1.6,14, 20.1, 21.1, FN1, FN2	All
Develop new ways of publicizing enforcement actions	6.1	All
SUCCESSOR ORGANIZATION		
Work to implement the *MRB Agreement* and establish its Board.	7.2, 11.1, 14.1, 20.1, 22.1, 23.1, 24.1, FN1, FN2, FN6	All
FIRST NATIONS / Métis		
Use an ecosystem management approach	FN3	All
Include traditional and scientific knowledge, as per the *Mackenzie River Basin Agreement*	FN4, FN5	All
Complete the Northern River Basins Human Health Monitoring Program	FN6	Alberta

IV. Moving Forward

The governments of Canada, Alberta and the Northwest Territories are committed to ensuring that the findings and recommendations of the NRBS are used as a basis for the future management of the Peace, Athabasca and Slave River basins. The NRBS has been a successful multi-stakeholder initiative in addressing key environmental issues throughout these basins. Governments wish to build upon these basin-wide successes by implementing the NRBS recommendations through existing programs and through new initiatives, in accordance with their respective jurisdictions and legislation. The general means by which the governments will implement the recommendations are discussed below.

The governments recognize the need for successor organizations to guide and co-ordinate aquatic ecosystem monitoring and research in the northern river basins. Accordingly, many of the recommendations will be referred to the agency to be established under the *Mackenzie River Basin Transboundary Waters Master Agreement*. The *Agreement* will see the establishment of a Mackenzie River Basin Board, probably with a subsidiary monitoring committee which would co-ordinate and optimize aquatic ecosystem monitoring. The monitoring committee may set up expert sub-committees to deal with aspects of hydrology, water quality, and fisheries. Public participation would play an important role when monitoring programs are developed. The governments will participate fully in these committees, providing technical and scientific support, and will submit their monitoring programs to them for scrutiny and feedback.

A number of the NRBS recommendations will be addressed under existing government programs and practices, or under programs upgraded in light of the NRBS results. A prime example is the set of recommendations under Recommendation 1: "Pollution Prevention". Because most effluents in the northern basins are in Alberta, the main vehicles for responding to these recommendations will be the *Industrial Effluent Limits Policy* and the Approvals process under the *Alberta Environmental Protection and Enhancement Act*. They will be used to ensure the long-term protection of the northern rivers through rigorous pollution prevention and control programs on point source discharges. Public input is an integral part of the Approvals process.

There will also be new initiatives and projects pertinent to the NRBS recommendations. For example, Canada is now addressing the issue of fish endocrine disruption and its implications to aquatic ecosystems on a national basis and will include the pulp mills in the Peace and Athabasca River basins within the study design. Alberta, in consultation with the federal government, will be carrying out follow-up investigations of the PCB contamination identified by NRBS. These programs will not be done in isolation from the Mackenzie River Basin Board, but will be brought to the interim monitoring committee, and its successor, for comment and co-ordination with other programs.

The First Nations and Métis have a special relationship with the land, water and wildlife of the basins. NRBS has learned much from these peoples and communities. Governments will work cooperatively with these communities and their organizations to address the NRBS and First Nation recommendations. This will apply to all the recommendations and particularly the drinking water issues.

The governments are pleased to be in a position to respond positively to the NRBS recommendations. Detailed action plans to address the recommendations are presently being developed. In several cases action has already been taken by shifting priorities and undertaking new work. In other cases, the responses are not yet fully developed because there is a need to conduct more thorough planning and arrange both funding and implementation partnerships. The governments of Canada, Alberta and the Northwest Territories will continue to follow through on the recommendations and will inform the public of new actions as they are developed.