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BVAEP

CONSERVATION AND PROTECTION
PACIFIC AND YUKON REGION

PEST MANAGEMENT

FIVE YEAR PLAN OF ACTION

PREPARED BY
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SEPTEMBER, 1988



Environment
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Canada

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and
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Conservation
et
protection

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Protection

Protection de
l'environnement

PEST MANAGEMENT

FIVE YEAR PLAN OF ACTION

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EXECUTIVE SUMMARY

Despite the considerable amount of Canadian legislation governing pesticides and the subsequent large number of agencies carrying out their mandates, a co-operative and collaborative approach to pest management exists within the Pacific and Yukon region. This is largely due to the dedication of the individuals involved but is further facilitated by a streamlined communication structure. Conservation and Protection (C&P) services play a vital role in the pest management process.

Under co-operative agreements made with Agriculture Canada and the B.C. Ministry of Environment with regard to the Pest Control Products Act and the B.C. Pesticide Control Act, C&P services function as advisors on environmental protection. Each C&P service also has more binding legislation that provides their mandate to conduct specific pest/pesticide management activities. This legislation includes the Migratory Birds Convention Act, the Canadian Wildlife Act, the Canadian Environmental Protection Act, the Fisheries Act, the Boundary Waters Treaty and the Canada Water Act.

The objectives of the C&P pest management program are the prevention of deleterious impacts on the environment resulting from the use of pesticides and the restoration of environmental quality where impacts have occurred. Seven specific program activities have been developed to meet these objectives. They are:

1. Advice/Recommendations on Protection Measures;
2. Inventories and Use Pattern Assessments;
3. Research, Monitoring and Assessments;
4. Compliance and Enforcement;
5. Response to Environmental Emergencies;
6. Provision of Public Information; and
7. Planning and Program Development.

Activities to be conducted over the next five years, under each of these programs are outlined in Section 5.0.

Examination of the C&P services programs clearly reveals three important facts. First, the workload in pest management is ever increasing. Secondly, C&P activities are narrowly focused on "pesticide management" not "pest management". Finally, pesticide programs are compromised when resources are shifted to fund high priority issues that arise. Each of these factors inhibit the ability of the C&P services to fulfill their pest management mandate. Increased recognition of the value of pest management work and increased support from C&P senior management are needed to remedy this situation. More detailed recommendations are provided in Section 7.0.

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1.0 INTRODUCTION

1.1 Background

Society has become increasingly dependent on chemical pest management strategies to maintain and increase the quality and quantity of our renewable resources. Environment Canada, Conservation and Protection (C&P) recognizes that where chemicals are introduced to the environment, a potential exists for adverse environmental impacts. C&P therefore, encourages the development and implementation of integrated and/or non-chemical pest management strategies. However, unless funds become available to support this research or these strategies are developed independently and proven viable, the major focus of the agencies work will continue to be pesticide management.

1.2 Objectives

Effective stewardship of the environment requires long range planning. This action plan:

- outlines pest management projects planned by C&P services over the next five years;
- addresses the effectiveness of the program focus;
- examines whether or not the legislative mandate is being met; and
- provides recommendations for the pest management program.

It is intended that this action plan serve as a guide for C&P in refining its pest management programs to effectively and efficiently meet the needs of the region over the next five years.

2.0 LEGISLATIVE AUTHORITY FOR C&P PEST MANAGEMENT

There is a considerable amount of legislation in Canada; Federal, Provincial/Territorial and Municipal, governing the availability, sale, use, storage, transport and disposal of pesticides (1, 2, 3, 4). The Pest Control Products Act (PCPA), which is administered by Agriculture Canada, is the principal piece of legislation governing the availability, sale and use of pesticides (5). The Act is designed to ensure that pesticides are effective for their intended purpose(s) and that the conditions for registration prevent adverse effects to humans and/or the environment. While the final decision on registration is the responsibility of Agriculture Canada, Environment Canada, Fisheries and Oceans Canada and Health and Welfare Canada participate in the pesticide review process as advisors to that Department. While there is a written Memorandum of Understanding between Agriculture Canada and Health and Welfare Canada, which clearly defines the responsibilities of each department (6), the responsibilities of the other two departments are based on more informal practices. A draft Memorandum of Understanding between Agriculture Canada and Environment Canada has been prepared and is expected to clarify and formalize the relationship between the two departments during the review process.

Under its role as advisor to Agriculture Canada, Environment Canada examines the potential of a pesticide to cause negative impacts on wildlife (especially migratory birds), fish and fish habitat, other non-target biota and the ecosystem as a whole. Environment Canada then has the responsibility to ensure that Agriculture Canada is fully aware of, and has taken into consideration, all concerns regarding environmental protection (7, 8, 9).

On the basis of its own research and the recommendations of its advisors, Agriculture Canada may:

1. register the pesticide;
2. register the pesticide after imposing more stringent user directions;
3. require additional research be conducted on the pesticide;
4. refuse to provide pesticide registration.

Once a pesticide has been registered for use by Agriculture Canada, control and responsibility for pesticide use permitting and application lies with the appropriate province or territory.

In British Columbia, the provincial Ministry of Environment administers the B.C. Pesticide Control Act (PCA) (10). The Act regulates the sale, use, storage, transport and disposal of pesticides and requires the licensing of pesticide dispensers and applicators. The Act also authorizes the B.C. Minister of Environment to appoint a Pesticide Control Committee which reviews permit applications for pesticide use on public lands and water bodies. Final decisions on permit conditions and issuance are made by the Director of the B.C. Pesticide Control Branch.

The Yukon Territorial Government (YTG) presently has no legislation pertaining specifically to pesticides, although several moves have been made to initiate such action in recent years (11). As the lead environmental agency in the Yukon, Environmental Protection provides advice and recommendations on the use, sale, storage and disposal of pesticides, on an informal basis, to other government department, industry and the public. This is often done in concern with Health and Welfare Canada, Occupational Health and Safety (YTG) and the Department of Renewable Resources (YTG). In addition, Environmental Protection is responsible for co-ordinating hazardous waste shipments (including pesticides) through Yukon under the Yukon Transportation of Dangerous Goods Act (12).

While C&P is involved in pest management through co-operative agreements, primarily under the federal Pest Control Products Act and the B.C. Pesticide Control Act, other pieces of legislation provide C&P services with their mandates to conduct specific pest/pesticide management activities.

2.1 Canadian Wildlife Service

The Migratory Birds Convention Act, the Canadian Wildlife Act and the Canadian Environmental Protection Act provide CWS with a strong mandate to conduct research, collect information, and provide information to the public on factors (including pesticides) affecting the numbers and health of Canada's wildlife (13, 14, 15).

In addition, Section 35(1) of the Migratory Bird Convention Act may be used to prosecute pesticide applicators for causing harm to migratory birds. It states:

"no person shall deposit or permit to be deposited oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds".

2.2 Environmental Protection

While much of Environmental Protection's mandate for pest management activities comes from co-operative arrangements made under the Pest Control Products Act and the B.C. Pesticide Control Act, some additional authority is derived from Canada's Fisheries Act and the Canadian Environmental Protection Act (CEPA).

Environmental Protection has used the Fisheries Act as its primary means of taking preventative and remedial measures to protect the environment from release of toxic substances, including pesticides (16).

The Act has comprehensive powers to protect both fish and fish habitat from the discharge of deleterious substances. Section 34(1) of the Act specifies that it is an offence to harmfully alter, disrupt or destroy fish habitat. Section 36(3) of the Act states:

"no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where such deleterious substance or any other deleterious substance that results from the deposit of such deleterious substance may enter any such water".

A 1985 Memorandum of Understanding between Fisheries and Oceans Canada and Environment Canada outlines the responsibilities of each department in co-ordinating the enforcement of Section 36 violations (17). Under the terms of the memorandum, Environment Canada, primarily through Environmental Protection, administers those aspects dealing with the control of pollutants affecting fish in co-operation with Fisheries and Oceans Canada. The minister of Fisheries and Oceans Canada is, however, legally responsible for all sections of the Act.

Under CEPA, Environmental Protection conducts a wide range of activities to identify, assess and control substances whose properties and entry into the environment may constitute a threat. Substances that are exclusively used as registered pest control products are not included as they are subject to the Pest Control Products Act. However, under emergency conditions where a toxic substance (including pesticides) may be or has been released, CEPA provides Environmental Protection with the authority to act expeditiously to control the release.

2.3 Inland Waters Directorate

The mandate for Inland Waters Directorate (IWD) to perform pest management work is derived from the Boundary Waters Treaty, the Canada Water Act and the Canadian Environmental Protection Act (18, 19, 15). Under

agreements made with regard to these Acts, IWD conducts environmental sensing and effects monitoring on water resources of national significance. The information generated by these studies is used to set water quality objectives and provide advice and technical support to meet Canada's obligations with regard to inter-provincial and international boundary waters.

* Additional Canadian legislation pertaining to pesticides is outlined in Appendix I.

3.0 RELATIONSHIPS BETWEEN AGENCIES RESPONSIBLE FOR PEST MANAGEMENT IN THE REGION

Under the authority of the federal and provincial/territorial legislation previously outlined, a wide variety of research, monitoring, evaluation, response and communication activities are carried out in the region. These, often diverse, activities are co-ordinated through a structure of three key committees.

The Interdepartmental Core Group, comprised of Agriculture Canada, Environment Canada (CWS & EP), Fisheries and Oceans Canada, Canadian Forestry Service and Health and Welfare Canada (Foods and Occupational Health Branches) members, occurs at the headquarters level. Regional input is provided when required and relevant information resulting from committee activities is communicated to the regions.

The Regional Toxic Chemicals Co-ordinating Committee is formed by one member each from CWS, IWD, AES and DFO with EP providing both the chair and secretary functions. The committee determines and co-ordinates research, monitoring, evaluation, communication and some regulatory projects undertaken by DOE in the region.

Communication between the Federal Government and the B.C. Provincial government is facilitated through the B.C. Pesticide Control Committee. Members of this committee include the B.C. Ministry of Environment - Pesticide Control Branch and Recreational Fisheries Branch, the B.C. Ministry of Agriculture and Fisheries, the B.C. Ministry of Forests, the B.C. Ministry of Health and Pacific and Yukon Region Environmental Protection, Environment Canada.

Communication and co-ordination of regional pesticide activities is further facilitated via the regional pesticide officer of Agriculture Canada's Agriculture Inspection Directorate. This individual acts as a

liaison between policies and directions of Ag Can Headquarters and regional agencies involved in pesticide activities.

The communication structure for pest management in the region is shown in Figure 1.

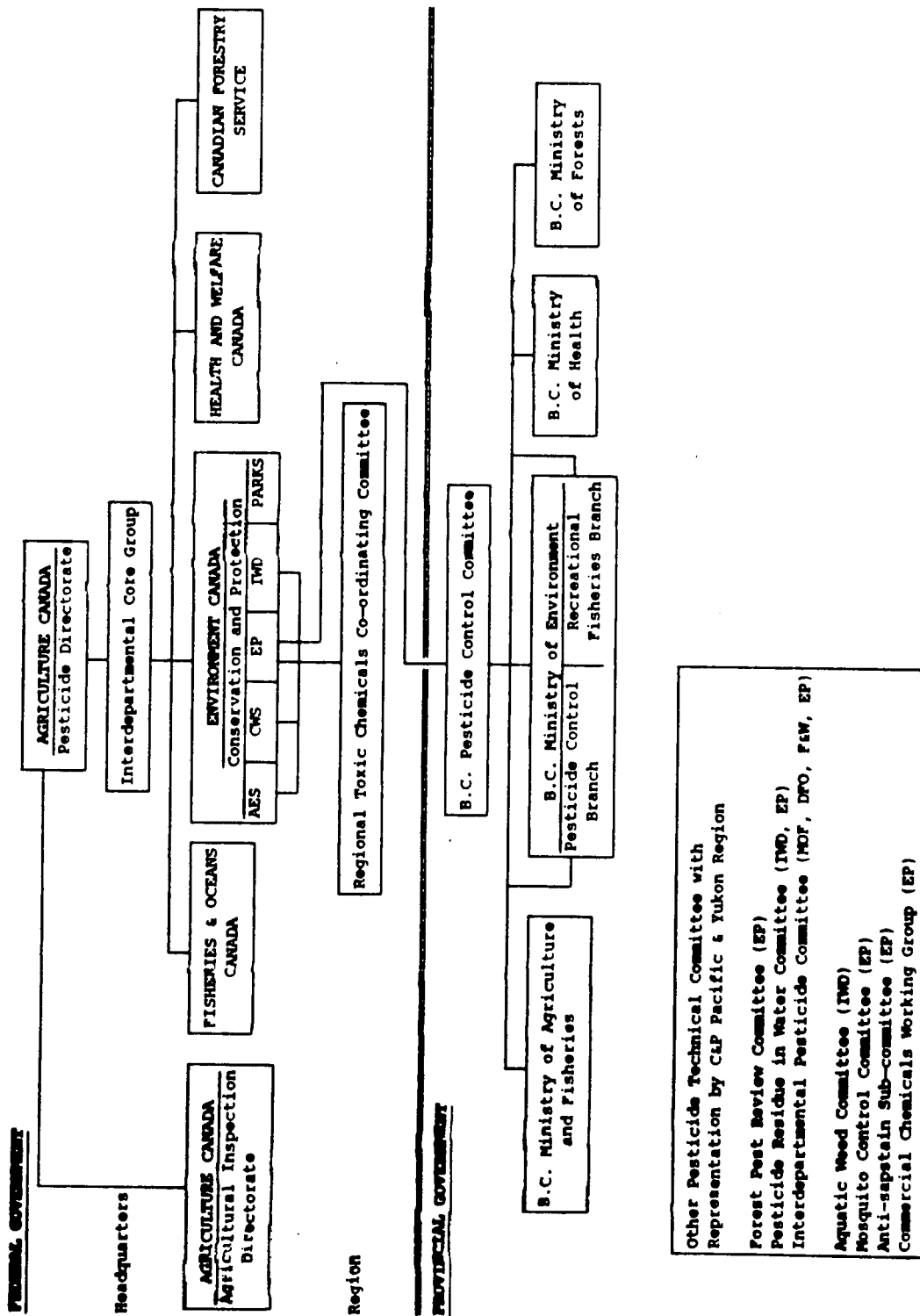


FIGURE 1 - COMMUNICATION STRUCTURE FOR PEST MANAGEMENT IN PACIFIC AND YUKON REGION

4.0 C&P PACIFIC REGION PEST MANAGEMENT PROGRAM

The C&P Pacific and Yukon region pest management program includes a wide variety of projects conducted by or under the direction of CWS, EP and IWD often in concert with federal headquarters and provincial counterparts. The program is developed and co-ordinated through the Regional Toxic Chemicals Co-ordinating Committee.

4.1 Objectives

The objectives of the C&P pest management program are the prevention of deleterious impacts on the environment resulting from the use of pesticides and the restoration of environmental quality where impacts have occurred. Seven specific program activities have been developed to meet these objectives.

4.2 Activities

4.2.1 Advice/Recommendations on Protection Measures

Results Definition Model Activity C2 and C3 (20)

Under the PCPA and PCA mandates, Conservation and Protection provides advice and recommendations to both Federal and Provincial authorities on potential environmental impacts of pesticides and the appropriate precautions to be taken to protect the environment. Advice and recommendations are given in four areas.

4.2.1.1 Registration/Re-evaluation

Registration

To introduce a new pesticide product to the Canadian market, industry must make a submission to Agriculture Canada. The submission includes information on product formulation, efficacy for requested use(s),

toxicology, environmental fate and effects. Environment Canada is provided with the information and assesses the potential for the product to persist in the environment, contaminate surface and groundwater supplies and cause deleterious effects on wildlife, other non-target organisms and their ecosystem.

At the present time, participation in the pesticide evaluation process is primarily a headquarters activity of CWS, EP and IWD. The region has limited involvement in the evaluation of pesticides, although in some specific cases data obtained within the region may be used to support DOE advice given to Agriculture Canada.

Re-evaluation

Section 19 of the Pest Control Products Regulations provides for the re-evaluation of registered products to "satisfy the Minister of Agriculture Canada that the availability of the control product will not lead to an unacceptable risk of harm to things on or in relation to which the control product is intended to be used or public health, plants, animals or the environment".

In May 1986, Agriculture Canada announced that approximately 500 active ingredients of pesticides would be re-evaluated, in light of current knowledge and concerns, to determine whether those products could continue to be used safely and effectively. DOE is involved in recommending priorities for the sequence of reviews, advising on the presence, levels, trends and environmental impacts of in-use pesticides and advising on changes in use patterns and other environmental protection measures that should be introduced. Again, this is primarily a headquarters activity, however data obtained within the region may be used to support advice given to Agriculture Canada. The information generated in this review is then subjected to an evaluation similar to that for new pesticides and may lead to regulatory changes ranging from minor deletions from product labels, to

clarified and/or redefined conditions for use, or when warranted, suspension or cancellation of registered products.

4.2.1.2. Provincial Permits

Under the authority of the provincial Pesticide Control Act, Environmental Protection participates as the federal representative on the Pesticide Control Committee. Each member of the committee receives copies of pesticide use permit applications and makes a written comment or recommendation about it.

Routine Applications

If the applicant is known to be experienced and reliable, the proposed pesticide use is within label requirements, the pesticide effects are predictable, the site for proposed use is well documented and the program does not intrude on the 10 metre pesticide free zone then the application is treated as routine. In this case a general recommendation concerning environmental protection and an application for inspection are provided.

Non-Routine Applications

Special attention is provided to non-routine applications, for example:

- applications that provide inadequate information;
- where the pesticide applicator has been unreliable;
- where the use of the proposed pesticide is publicly controversial in the proposed use region;
- if the application is by aerial means, which are not target specific, and
- where programs intrude on the 10 metre pesticide free zone.

In these cases, additional information may be requested from the applicant or a site visit may be made. Environmental Protection plays a major role in consulting with local officials, conducting on-site visits and providing comments on restricting the use of pesticides.

The final decision on whether to grant or refuse a permit is made by the Director of the Pesticide Control Branch. This decision is based on the advice provided by committee members. The conditions attached to permits often reflect this advice.

4.2.1.3 Research Permits

Under the agreement between Agriculture Canada and Environment Canada, the regional office of Environmental Protection reviews permit applications for research on experimental chemicals or new applications of registered chemicals and provides advice to Agriculture Canada on the environmental safety of the projects.

4.2.1.4 Federal Lands Pesticide Use

The use of pesticides on federal lands is reviewed by regional Environmental Protection offices, including the Pacific and Yukon region. Advice is provided to ensure that pesticide use is conducted only when necessary and in an environmentally sound manner.

4.2.2 Inventories and Use Pattern Assessments

Results Definition Model Activity C5 (20)

One of the means by which C&P - EP ensures that pesticides in use pose minimal environmental risks is by conducting chemical inventories and use pattern assessments. Such studies determine the type and amount of pesticides used by various industry sectors. This information is used to set environmental monitoring priorities and may be used in the re-evaluation procedure.

4.2.3 Research, Monitoring and Assessment

Results Definition Model Activities A6, A12, A17, A23, A28, B8, C4, C10, C11, C16, C21 (20)

Research, monitoring and assessment are vital in:

1. understanding the nature of chemicals;
2. determining control and baseline environmental conditions;
3. identifying environmental problems;
4. assessing the adequacy of and compliance with permit requirements, regulations, guidelines and codes of practice.

Studies in the Pacific and Yukon region address a number of important areas. The regional chemistry laboratories refine existing methods and develop new methods to meet the needs of research projects on an as needed basis. Work is also ongoing at the regional bioassay lab, where aquatic toxicity tests examine some of the effects of priority pesticides on local salmonids. This is particularly valuable information to staff responsible for making assessments and providing advice on pesticide use since aquatic toxicology studies submitted by product manufacturers are usually limited to one or two non-salmonid species. Regional staff also conduct surveillance of some provincial pesticide use application site to ensure that environmental protection measures are appropriate, understood and implemented by the permittee. Other efforts include assessing the presence, levels and trends of a limited number of priority pesticides in surface and groundwaters, sediments and selected biota. Additionally, Canadian Water Quality Guidelines are being developed for pesticides, to guide in establishing water monitoring programs.

4.2.4 Compliance and Enforcement

Results Definition Model Activities A2, A8, A14, A19, C4, C7, C8, C13, C14, C18 (20)

4.2.4.1 Formulation of Regulations, Guidelines and Codes of Practice

To assist industry and all levels of government in improving the quality of the environment, C&P is involved in developing environmental quality objectives, environmental protection guidelines, codes of practice and regulations under pertinent legislation. This work is done in concert with other federal departments, the provincial government, industry and other interested individuals. Texts are published and made available to both effected and interested parties.

4.2.4.2 Inspection Program

In keeping with the emphasis C&P places on preventing damage to the environment, Environmental Protection conducts inspection programs for specific priority chemicals. Inspectors examine both facilities and management practices to ensure compliance with recommended safeguards to protect fisheries and the environment. Inspections assist managers of industrial, federal, provincial or municipal facilities to:

- develop environmental policies and programs that implement regulatory requirements;
- develop procedures to control environmental hazards; and
- train and motivate facility personnel to comply with government regulations and the facilities own environmental policies.

4.2.4.3 Investigations

When a violation of C&P environmental legislation is discovered, an investigation is undertaken. The investigation involves gathering information and evidence relevant to the violation. The desired result of investigations is compliance with regulations and guidelines, within the shortest possible time to ensure protection of the environment.

4.2.4.4 Enforcement Actions

While the Pest Control Products Act takes precedence in pesticide issues, violations of environmental regulations and guidelines may lead C&P to pursue prosecution or other court-related actions, to ensure the protection of the environment. Under various legislation, the following actions are available to enforcement officials:

- warnings
- compliance guarantees
- orders by the Minister
- directions by inspectors
- prosecution
- penalties and court orders upon conviction
- recovery of clean-up costs by the Federal Government
by means of a civil suit

4.2.5 Response to Environmental Emergencies

Results Definition Model Activity C19 (20)

Both CVS and EP have programs for dealing with pesticide crises such as accidental spills and bird, fish or other biota kills. In the case of adverse environmental impacts resulting in bird kills, fish kills, etc. an investigation is conducted, frequently in collaboration with provincial authorities and/or DFO. The investigation attempts to determine the source, cause, extent and implications of the impact and to develop methods, instructions and criteria, for containing, minimizing and ultimately cleaning up the environmental contamination. This involves meeting with the federal and provincial officials, representatives of the registrant or manufacturer of the pesticide involved and the applicator or user. This investigation enables the determination of action that might be taken to avoid similar occurrences in the future.

The EP Environmental Emergencies Group is responsible for handling accidents and spills of environmentally hazardous chemicals, including

pesticides. To carry out this activity, technical information is constantly being obtained and reviewed. This includes data on persistence, toxicity, solubility, mobility, formulation, established procedures related to denaturation or detoxification, and methods to accelerate degradation, disposal and clean-up. Information on these different aspects are obtained from different groups or individuals in the services through their various activities related to pesticides, and from a variety of sources outside the department.

4.2.6 Provision of Public Information

Results Definition Model Activities A11, A16, A22, A27,
B4, B7, C3, C9, C15, C20 (20)

C&P believes that most environmental damage resulting from pesticide use is caused by ignorance of pesticides and/or the environment. C&P information programs attempt to:

- create an enhanced awareness and understanding of pest management;
- foster a sense of individual and shared responsibility regarding pest management activities;
- advocate the use of alternative, non-chemical pest management strategies where possible; and
- improve the co-ordination and co-operation between government, industry and the public in pest management activities.

To this end, C&P services conduct or participate in training seminars and presentations, prepare and distribute publications on pesticides, respond to enquiries on the impacts of pesticide usage and alternative practices, and participate on a variety of technical committees and working groups.

4.2.7 Planning and Program Development

Results Definition Model Activities B2, B3 (20)

Conservation and Protection planning and program development for pesticides is guided by the results definition model (20), long term action plans and annual work plans for each service. The translation of individual mandates into program activities is facilitated by various working groups and technical committees (refer to Figure 1). These meetings establish regional priorities, co-ordinate pest management activities and function as performance evaluators. This process is vital in ensuring that programs and policies are developed to respond to both new and old environmental issues and that programs are managed effectively and efficiently.

5.0 C&P - PACIFIC AND YUKON REGION FIVE YEAR PEST MANAGEMENT
ACTION PLAN

The actions to be taken by C&P services over the next five years, under the activities outlined in Section 4.2, are identified on the pages that follow.

**ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93**

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
1. ADVICE ON PROTECTION MEASURES - Registration/Re-evaluation - Provincial Permits - Research Permits - Federal Lands Pesticide Programs	OWS	various	Provide recommendations for regulatory and other actions under <u>PCPA</u> , <u>MBCA</u> , <u>OWA</u> & <u>CEPA</u>				
	EP-Pacific	various	Provide recommendations for regulatory & other actions under <u>PCPA</u> , <u>CEPA</u> & <u>P.A.</u>				
		DOE-CCB Agri. Can.	Assist DOE Commercial Chemicals Branch and Agriculture Canada in development & implementation of tributyltin control strategy under <u>PCPA</u> or <u>CEPA</u>				
			Provide recommendations on approx. 500 B.C. pesticide permit applications				
		NOE-PCB NOE-RFB DFO		Computerize pesticide referral system including electronic link with BC Pesticide Control Branch and possibly DFO regional offices			
			Provide advice on pesticide research permit (approx. 5/year)				
			Provide recommendations on approx. 25 federal department pesticide use applications				
			Supervise assistance & training for pesticide programs at Federal facilities				
	EP-Yukon	OGD	Review mosquito control program and provide advice & site specific recommendations				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
1. ADVICE ON PROTECTION MEASURES (continued)	EP-Yukon (con't)			Provide advice and site specific recommendations on herbicide use			
	IWD	various	Provide recommendations for regulatory & other actions under PCPA, EMT, CMA and CEPA				
2. INVENTORIES AND USE PATTERN ASSESSMENTS	EP	Contractor	Prepare inventory report on pesticide use in the Lower Mainland of B.C.				
		Contractor		Prepare use pattern assessments of selected pesticides on a regional basis			
		PCG, MOE	Update wood preservation plant inventory assessment report				
3. RESEARCH, MONITORING AND ASSESSMENT	CMS	NRWC Contractor	Monitor the productivity of Great Blue Heron colonies near wood processing operations on the Strait of Georgia over an extended period of time, in relation to dioxin contamination				
		Pharm.Sci.- UBC Agri.Sci.- UBC Agri. Can.	Determine if there is a correlation between the dioxin content of Great Blue Heron eggs and the occurrence of deformities & other developmental effects and the induction of liver enzymes				
			Determine whether or not dioxins are affecting the ability of adult herons to successfully incubate their clutches, & care and feed their young				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
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1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	OAS (con't)	NWRC	Survey dioxin contamination in double crested Cormorants in the vicinity of wood processing operations on the Strait of Georgia				
			Survey dioxin contamination in the shrew and crow in the vicinity of wood processing operations on the Strait of Georgia	Depending on results of 88/89 study more work may be performed on dioxin contamination in terrestrial systems			
		EP NWRC	Assist NWRC in determining sources of PCDD's/PCDF's found in the Strait of Georgia and the effects on wildlife, especially resident fish-eating birds such as the Great Blue Heron				
		NWRC M of Agri. Agri. Can. Contractor		Study the impact of selected agricultural insecticides on wildlife in the Lower Mainland region Year 1 - determine bird use of agricultural fields in the Lower Mainland of B.C. during the fall, winter and spring			
		NWRC	Collect eggs from Doublecrested Cormorant, Leach's Storm-petrel, Rhinoceros auklet, and Snow Geese colonies along the west coast of B.C. as part of a national seabird monitoring program. Eggs will be analyzed for a battery of persistent organochlorine contaminants				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	CNS (con't)		<p>Tabulate, analyze and report pesticide data collected over the past several years;</p> <ol style="list-style-type: none"> 1. Organochlorine levels in Great Blue Heron colonies in the Lower Mainland area of B.C. 2. Review of fensulfothion bird kill incidents in B.C. 3. Organochlorine levels in Barrow's Goldeneye and American Kestrel collected at Riske Creek 4. Heavy metal and organochlorine levels in various raptor species collected in the Lower Mainland area of B.C. 				
		ADM Consultants Ltd. EP	<p>Determine the role of vascular plants in accumulating or concentrating toxic materials from their environment, & assessing the potential for the contaminants to be incorporated into the estuarine food web</p>				
	EP-Pacific		<p>Perform chemical analyses, refine methods, develop new methods</p>				
		NOZ DFO Industry	<p>Monitor applications of selected pesticides and prepare inspection reports (approx. 25)</p>				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	EP-Pacific (con't)	BC Research DFO BC MOE RPB BC MOE PCB	Collect water and sediment samples for analysis of priority pesticides used in forestry, railways, agriculture and federal facilities				
			Measure select pesticides in ambient water and sediments in tributaries of the Fraser River	Monitor levels of selected herbicides in railway right-of-way ditches leading to salmon fishery waterbodies in the Lower Mainland of B.C. Assess forestry uses of Weedone and persistence in the environment Measure acute toxicity to juvenile salmonid and rainbow trout of weedone CB, its carriers and active ingredients butoxyethyl ester of 2,4-D and 2,4-DP			
			Determine the persistence of diazinon and its metabolite diazoxon in water and sediment of a cranberry bog environment	Determine toxicity of selected pesticides to juvenile salmonids (Diazinon)			

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
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1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	EP-Pacific (con't)	NMRC CNS DFO CCIW DFO-WV Lab Agri. Can. NMRI BCDPE-WVB	Assist NMRC in determining sources of PCDD's and PCDF's found in the Strait of Georgia & the effects on the environment				
			Obtain additional environmental samples near B.C. wood treatment facilities & pulp mills for chlorophenol, replace chemicals, and dioxin analysis				
				Determine levels of TCWVB (Woodstat 30MB) Antisepstain chemical in receiving waters & sublethal effects on juvenile salmon			
			Review number and causes of CP spills to measure effectiveness of regulations and code of practice				
			Conduct leaching study of wood protection chemicals from wrapped and sealed lumber				
			Determine & implement best practical technologies for preventing leaching of anti-sepstain chemicals	Conduct audit programs at 10 wood preservation facilities			

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICES	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	EP-Pacific (con't)	CCIW Seakem EP-Atlantic Lab	Conduct environmental monitoring (sediments & biota) for TBT, DDE and other contaminants in the vicinity of marinas, salmon farms, harbours, and shipbuilding/repair facilities				
	EP-Yukon		Investigate DDT contamination of soil at the Granger sub-division Inspect abandoned landfill suspected of being contaminated with DDT and other toxic chemicals				
	TWO		As required, conduct quality control studies to determine recovery efficiency of selected organic and inorganic contaminants				
		EP	Conduct quality control study on the analysis of dioxins by splitting and analysing samples of sediment and biota Conduct quality control study to determine the precision and accuracy of procedures used for the determination of chlorophenols in fish tissue from the Fraser River Estuary Assess procedures for solvent and resin extraction of chlorophenols from water in the Fraser River Estuary				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	IWD (CONT)		Survey pesticide contamination of ground-water in high risk agricultural areas in the Pacific Region (Lower Mainland)	Expand Survey Program (Okanagan and Peace River)			
		NRRI NRRI	Provide assistance to NRRI and NRRI in expanding groundwater pesticide contamination research at Osoyoos and Abbotsford				
				Determine the effects of in-use pesticides on aquatic biota in selected tributaries of the Lower Fraser River			
		NRRI	Monitor chlorophenols in Fraser River Estuary precipitation	expand program to include other organic contaminants			
		Contractor	Monitor dioxin levels in biota and sediments in the vicinity of lumber mill operations using chlorophenols in the Lower Fraser Estuary and Vancouver Island				
			Prepare proposal for and organise in situ bioassay studies for wood treatment chemicals in the Fraser River Estuary				
		EP DFO	Monitor biota, sediment and water in the vicinity of ten inland pulp and paper mills for dioxin contamination				

ENVIRONMENT CANADA - OBSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
3. RESEARCH, MONITORING AND ASSESSMENT (continued)	IWD (con't)	EP	Provide hydrogeological support as required to EP in the assessment of groundwater contamination or potential risk of contamination at mine sites, land-fills, chemical spills, and other contaminant sources				
4. COMPLIANCE AND ENFORCEMENT - Formulation of regulations, guidelines and codes of practice - Inspection program - Investigations - Enforcement actions	CNS	MOE	Provide hydrogeological support to FREMP Task Force on Tilbury Island toxic chemical spills				
			Enforce MBCA and WA as required				
	EP-Pacific	MOE Industry HQ	Assist HQ in revising the wood protection code of good practice to include alternative chemicals				
			Assist with implementation of wood protection code and stormwater controls				
			Assess compliance of wood protection industry to technical recommendations, promote and implement remedial measures where required				
			Prepare guidelines for in-situ wood preservation				
			Conduct investigations and enforcement actions where required	Conduct audit program at 10 wood preservation facilities			

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
4. COMPLIANCE AND ENFORCEMENT (continued)	EP-Yukon		Co-ordinate 1 shipment of pesticides containing DDT for proper waste disposal				
	IWD	BC MOE	Finalize national guidelines for pesticide residues in water				
			Review approx. 4 provincial documents on WQO's for toxic substances				
			Review national WQO's and guidelines studies				
			Prepare status report on information to support formulation of WQO's for Chlorophenols in the Fraser River Estuary	Formulate WQO's for wood treatment chemicals			
5. RESPONSE TO ENVIRONMENTAL EMERGENCIES	CNS	PRDMP	Investigate die-offs of birds and wildlife to establish cause and management				
	EP	MOE-MWB DFO Trans. Can. ENCO's	Respond to spills, promote spill contingency planning and review bulk storage contingency plans				
6. PUBLIC INFORMATION	CNS		Provide information & advice on the impacts of pesticides on wildlife, especially migratory birds				
			Prepare and distribute research reports: a) Assessment of the Impact of Dioxins on Great Blue Herons:				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
6. PUBLIC INFORMATION (continued)	CNS(con't) EP-Pacific		1. Productivity of Great Blue Heron Colonies on the Strait of Georgia in Relation to Dioxin Contamination				
			b) Assessment of the Impact of Dioxins on Great Blue Herons				
			2. Impact on Embryo Development				
			c) Assessment of the Impact of Dioxins on Great Blue Herons				
			3. Induction of Enzymes				
			Respond to public enquiries regarding the use and environmental impacts of pesticides				
			Provide advice to users on storage, disposal etc.				
			Lecture at six (6) pesticide applicator licensing courses				
			Provide pesticide applicator examinations				
			Provide 5-7 compliance seminars for industry and WMB regional offices				
			Upgrade regional audio/visual pest management presentation				
			Prepare reports on three field/laboratory assessments of pesticide programs:				
			a) Drift Potential of Aerial Herbicide Applications				

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
6. PUBLIC INFORMATION (continued)	EP-Pacific (con't)		<p>b) Levels of Selected Pesticides in farm ditches leading to rivers in the Lower Mainland of B.C.</p> <p>c) Effects of different dilution water types on the acute toxicity to juvenile pacific salmonids and rainbow trout of glyphosate and its formulated products: Roundup, MDW 8709, and their surfactant MDW 0818</p> <p>Publish and distribute 2 chemical profile reports and 2 fact sheets (arsenic, chlorophenols)</p> <p>Prepare draft assessment report on CP levels in the environment near B.C. wood treatment facilities and pulp mills</p> <p>Prepare inventory report on pesticide use in B.C. Lower Mainland</p> <p>Prepare 5yr Pest Management Plan of Action</p>	<p>Publish and distribute 2 chemical profile reports and fact sheets (organotins, dioxins)</p> <p>Prepare assessment report on dioxins in the environment near B.C. wood treatment facilities and pulp mills</p> <p>Prepare draft report on levels of TBT in the B.C. environment</p> <p>Publish and distribute 5000 brochures for pleasure boaters providing guidelines on the use of anti-foulant paints</p> <p>Prepare wood preservation plant inventory report</p>			

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
6. PUBLIC INFORMATION (continued)	EP-Pacific (con't)		<p>Publish report on Computer Simulations of the Use of Diffusers to Reduce the Toxicity of Contaminated Storm Water Run-off from Treated Lumber Storage Yards</p> <p>Publish and distribute 3 Pesticide Fact Sheets</p> <p>a) <u>Larvicide-Bacillus thuringiensis</u></p> <p>b) <u>Larvicide - Abate</u></p> <p>c) <u>Adulticides - Malathion & Vagone</u></p>	<p>Inform public through lectures, displays, etc</p> <p>Update TV audio-visual presentation and support material</p>			
	EP-Yukon	D.R.R.		<p>Publish report on levels of dioxins in water, sediment and biota in the vicinity of inland pulp and paper mills</p>			
	IWO			<p>Submit status report on information to support formulation of WQO for chlorophenols in the Fraser River Estuary</p> <p>Provide assistance to EP, as required to provide public information on "Security from Toxic Contamination"</p>			
				<p>Report on the use of specific bioassay techniques to assess aquatic quality in the Fraser River</p>			

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
7. PLANNING AND PROGRAM DEVELOPMENT	CNS	EP, IWD AES, DFO	Participate in Regional Toxic Chemicals Co-ordinating Committee				
		Regions HQ	Participate in National Toxic Chemicals Review Committee				
				Participate in the development of strategies for work under CEPA			
	EP	HQ Regions	Prepare annual work plans				
		CNS, IWD AES, DFO	Provide chair and secretary to Regional Toxic Chemicals Co-ordinating Committee				
		MOE-PCB MOE-RFB MOF, MOH, MDAF	Participate in B.C. Pesticide Control Committee				
		various	Participate in B.C. Forest Pest Review Committee				
		MOF, DFO P&W	Participate in MOF, DFO, P&W meeting				
		various	Participate in Pesticide Residues in Water Committee				
		various	Attend anti-sapstain subcommittee meetings				
		various	Attend ODFI meetings				
		Regions HQ	Attend Commercial Chemicals Working Group				
		HQ Regions		Participate in the development of strategies for work under CEPA			

ENVIRONMENT CANADA - CONSERVATION AND PROTECTION
FIVE YEAR PESTICIDE MANAGEMENT PLAN OF ACTION
1988/89 - 1992/93

ACTIVITIES	SERVICE	CO-OPERATORS	1988/89	1989/90	1990/91	1991/92	1992/93
7. PLANNING AND PROGRAM DEVELOPMENT (continued)	EP(con't)		Prepare Annual Work Plans				
	IWD	EP, CWS, AES, DFO	Participate in Regional Toxic Chemicals Co-ordinating Committee				
		Various	Participate in Pesticide Residues in Water Committee				
				Develop a regional strategy and participate in the development of a Canada-wide strategy for environmental quality objectives, guidelines and monitoring for CEPA			
			Prepare annual work plans				

6.0 RESOURCES ALLOCATED TO C&P PEST MANAGEMENT PROGRAMS

C&P Pest Management Program Resource Summary \$(000's)

		<u>PY's</u>	<u>Salary</u>	<u>O & M</u>	<u>Cap.</u>	<u>Other</u>
CWS	1988-89	-	-	60.0	3.0	-
	1989-90	?	?	?	?	?
	1990-91	-	-	-	-	-
	1991-92	-	-	-	-	-
	1992-93	-	-	-	-	-
EP	1988-89	5.96	255.5	56.9	0	97.5
	1989-90	5.16	238.1	54.9	0	101.4
	1990-91	-	-	-	-	-
	1991-92	-	-	-	-	-
	1992-93	-	-	-	-	-
IWD	1988-89	?	?	?	?	?
	1989-90	2.2	84.3	48.0	25.0	93.25
	1990-91	-	-	-	-	-
	1991-92	-	-	-	-	-
	1992-93	-	-	-	-	-

7.0 CHALLENGES AND RECOMMENDATIONS

1. Program funding restraints coupled with an erosion in technical and clerical support services has resulted in a narrowing of program focus within C&P from "pest management" to "pesticide management". Pesticide programs are further compromised when resources are shifted to fund "high priority" issues that arise. If C&P is to fulfill its mandate for pest management activities and respond to an ever increasing workload, increased recognition and support from C&P senior management is required. It is recommended that this support take the following form:
 - a) increased PY allocations for technical and clerical support staff;
 - b) increased program funds committed to pest management activities;¹
 - c) increased laboratory analysis allocations (committed to pesticide programs) and improved access to research centre expertise;
 - d) strengthening of the RTCCC, in promoting, co-ordinating, conducting and communicating pest management studies including, where possible, co-operative efforts between agencies;
 - e) increased commitment to staff to attend conferences, workshops, symposiums and educational leave, to keep abreast of scientific and technological advances.

These changes would result in:

- getting the toxic chemicals information computer system on line thereby improving data management;
- expansion of pesticide work from primarily forestry and rights-of-way to other priority areas including agriculture;
- expansion of research effort into integrated and non-chemical pest management strategies;
- acceleration of alternate strategy implementation.

¹ pestfund and MYOPs monies have enabled C&P services to conduct some very valuable studies in the past, however, projects are not guaranteed funding and there is no commitment for long-term funding of projects that cannot be completed in one year.

The resultant increased knowledge would go a long way in lessening our dependence on synthetic chemicals and reduce the likelihood of negative environmental impacts.

2. Pestfund submission and allocation procedures should be reviewed to address the following concerns:
 - funding doesn't necessarily go to regionally identified top priority projects, then lower priority projects;
 - lower priority projects of one agency may be funded over top priority projects of another agency;
 - there is no opportunity for services to downsize projects to suit available funds;
 - commitment for long-term (over one year) funding is unavailable;
 - C&P has not received an equitable share of Pestfund resources in the last 2 years.
3. C&P services should increase their encouragement and support (where possible), of the private sector in developing and implementing integrated and/or non-chemical pest management strategies.
4. EP should continue to plan for link-up with the provincial permit referral computer system, which would greatly increase handling efficiency.
5. EP should encourage the Pesticide Control Committee to examine the feasibility and costs of developing a map digitizing system to co-ordinate with the computerized referral system.
6. An examination should be made into the pesticide use notification procedure for fisheries officers. Currently they request written notification, 2 weeks prior to pesticide application. This requires considerable resources. An audit should be conducted to justify this

process, specifically;

- a) what use is made of the notice; and
- b) what % of notices are actually monitored.

If DFO wishes only to be kept informed, some thought should be given into how this could be performed more effectively.

7. Clarification is required on guidelines determining "fisheries sensitive water courses". The majority of EP permit comments simply request they apply a 10m pesticide free zone around fisheries sensitive waters. Many proponents don't know exactly what this mean (i.e. does a dry water course receive protection or not).
8. An examination of pesticide application techniques should be undertaken to determine if a program specific permit response that prescribes set operational conditions, could be instituted. The program could begin with safer applications (i.e. hack and squirt), which could be audited for compliance before expanding the program. This could make the system more efficient by eliminating some time consuming reviews. The Pesticide Control Branch could issue permits and send copies of approvals and provisions to EP for their notification.

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22. Food and Drugs Act, R.S.C. 1970, c.F-27.
23. Pesticide Residue Compensation Act, R.S.C. 1970, c.P.11.
24. Plant Quarantine Act, R.S.C. 1970, c.P.13.
25. Northern Inland Waters Act, R.S.C. 1970, c.28 (1st Supp.).
26. Arctic Water Pollution Prevention Act, RSC 1970, c.2 (1st Supp.).
27. Waste Management Act, S.B.C. 1982, c.41.
28. Environmental Management Act, S.B.C. 1981, c.14.
29. Workers Compensation Act Industrial Health and Safety Regulations, BC Reg. 585/77.
30. Wildlife Act, R.S.B.C. 1979, c.433.
31. Weed Control Act, R.S.B.C. 1979, c.432.

APPENDIX

Additional Canadian legislation with application to certain aspects of pest/pesticide management.

FEDERAL:

Transportation of Dangerous Goods Act

Transport Canada is responsible for the Transportation of Dangerous Goods Act, although it has been adopted as provincial and territorial legislation by both British Columbia and Yukon (21). Under the Act, all dangerous goods or substances (including pesticides) to be transported in Canada must be handled by trained personnel and categorized according to the nature of their human and environmental hazard. Environment Canada and Health and Welfare Canada assist in this evaluation.

Food and Drugs Act

The Food and Drugs Act, administered by Health and Welfare Canada, ensures that foods offered for sale in Canada are safe, fit for consumption, clean and unadulterated (22). Under the authority of the Food and Drugs Act regulations, the Health Protection Branch has established maximum allowable pesticide residues in food crops. Harvested crops that have pesticide residues in excess of the allowable limit are subject to seizure by the Health Protection Branch.

Pesticide Residue Compensation Act

Under the Pesticide Residue Compensation Act, farmers whose crops have been seized by the Health Protection Branch may receive compensation (23). Compensation would only be provided if the pesticide application and the pre-harvest interval were in accordance with label directions or government recommendations.

Plant Quarantine Act

The Plant Quarantine Act is administered by Agriculture Canada. It is intended to prevent the introduction or spread of pests, and plant diseases which may be destructive to Canadian agriculture or forestry resources (24). Under this Act, Agriculture Canada can require the treatment of a serious pest outbreak with a specific pesticide.

Northern Inland Waters Act and Arctic Waters Pollution Prevention Act

The Department of Indian and Northern Affairs (DINA) administers both the Northern Inland Waters Act and the Arctic Waters Pollution Prevention Act (25,26). The Acts provide DINA with the mandate to prohibit the discharge, into designated waters, of any substance that would degrade or alter the quality of those waters to an extent that they become detrimental to man, or any animal, fish or plant that is used by man.

PROVINCIAL

Waste Management Act

The B.C. Ministry of Environment - Waste Management Branch under the Waste Management Act, prohibits the introduction of wastes into the environment without a permit or approval or compliance with regulations (27). The Special Waste Regulations ensure that hazardous wastes (including pesticides and pesticide containers) are containerized and properly transported to disposal facilities. The Act requires a manifest for off-site disposal of designated hazardous wastes and in this respect conforms to the Transportation of Dangerous Goods Act.

Environmental Management Act

Under the Environmental Management Act the minister of Environment is empowered to prevent or reduce environmental damage resulting from emergency situations (28). The cost for this work is charged to the person or group responsible for the emergency. The Act also provides for an Environmental Appeal Board which hears appeals to decisions made under any provincial environmental legislation.

Workers Compensation Act

Under the authority of the Workers Compensation Act, the Workers Compensation Board enforces the Industrial Health and Safety Regulations (29). Specific sections of these regulations apply to hazardous substances (including pesticides) and provide guidelines for signage, worker training, use of protective clothing and equipment and periodic worker health examinations.

Wildlife Act

The B.C. Ministry of Environment - Fish and Wildlife Branch administers the Wildlife Act (30). The Act states that it is an offence to destroy or damage wildlife or wildlife habitat in a wildlife management area. The Act further specifies that poison must not be used to hunt or kill certain birds (raptors), threatened or endangered animals, fur bearing animals or game species. The only exception is where a Pesticide Use Permit is granted for predator control programs conducted by the B.C. Wildlife Branch.

Weed Control Act

The Ministry of Agriculture and Fisheries controls and prevents the spread of noxious weeds under the Weed Control Act (31). Under the

authority provided by this legislation, inspectors evaluate properties and can request weed control, usually by means of herbicides, if necessary.

MUNICIPAL/REGIONAL DISTRICT

Some municipalities, regional districts and towns within B.C. and Yukon have bylaws restricting or regulating pesticide use within their jurisdictions.