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Report of the
**Auditor General
of Canada**
to the House of Commons

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Chapter 7
National Defence—
Environmental Stewardship of Military Training
and Test Areas

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The April 2003 Report of the Auditor General of Canada comprises seven chapters, a Message from the Auditor General, and Main Points. The main table of contents is found at the end of this publication.

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Chapter

7

National Defence

Environmental Stewardship of Military
Training and Test Areas

All of the audit work in this chapter was conducted in accordance with the standards for assurance engagements set by the Canadian Institute of Chartered Accountants. While the Office adopts these standards as the minimum requirement for our audits, we also draw upon the standards and practices of other disciplines.

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National Defence

Environmental Stewardship of Military Training and Test Areas

Main Points

7.1 The Department of National Defence has areas that have been set aside for testing and for training military personnel. While it is expected that the nature of these activities can be damaging to the environment, it is also understood that the military must continue its training. Nevertheless, National Defence must comply with federal legislation protecting the environment. We found that in some cases, training-related activities did not comply with certain federal legislation, indicating that the Department did not use due diligence in those cases.

7.2 The Department needs to better demonstrate its environmental stewardship of Crown lands by showing that it has integrated environmental concerns into its training and test activities and taken timely action to mitigate the impacts of these activities. It has a protocol to address environmental concerns, developed in 1996, that it has started to implement but it still needs to take action on mitigation, restoration, monitoring, and follow-up plans.

7.3 In some cases, National Defence has continued to train on lands identified as sensitive or unsuitable for military training, even though it has known as far back as 1988 that some areas were unsuitable. The Department needs to address the use of stressed and overused areas. An overall approach to how land is used for training is needed to ensure the sustained use of training and test areas.

7.4 The Department does not have an action plan for managing sites potentially contaminated with energetic material from live firing of munitions. Recent research has shown that there is a potential for contamination from the live firing of munitions. The Department has begun work to identify sites that are contaminated and it needs to continue this work so it can determine what action it must take to deal with these sites. It also needs to resolve some confusion in the categorizing of contaminated sites and in determining its liabilities for them.

Background and other observations

7.5 The Canadian Forces must be ready to defend Canada and Canadian interests while contributing to international peace and security. In order to be ready, it has bases across the country where it trains personnel and tests equipment and munitions.

7.6 The military needs to do training and testing activities in conditions that are as realistic as possible. These activities can often be damaging to the

immediate environment. Therefore, it is the responsibility and challenge of National Defence to ensure that damage is mitigated and to manage the land so training activities can continue in the future. National Defence has committed to practising sustainable development and protecting the environment as it conducts its activities.

7.7 The sustainable development concept was first defined in 1987 by the Brundtland Commission Report of the World Commission on Environment and Development. It is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The Department has responded. The Department is satisfied with the accuracy of the chapter but does consider that some of the case studies only serve to illustrate what happened in the past. The Department has committed to reviewing its progress in the areas noted in the chapter and to continue work already underway.

Introduction

7.8 National Defence must comply with federal statutes and regulations and government policies protecting the environment. Furthermore, the Department has said that it will meet or exceed the letter and the spirit of federal legislation and, where appropriate, provincial, municipal, and international standards.

7.9 Like all government departments, National Defence must comply with federal environmental protection legislation—for example, the *Fisheries Act*, the *Canadian Environmental Assessment Act*, and the *Canadian Environmental Protection Act* (1999). Under the *Canadian Environmental Assessment Act*, the environmental impacts of proposed projects involving certain physical operations, construction, modifications, or other work must be assessed so that decisions can be made about how to proceed. However, National Defence is not required by the *Canadian Environmental Assessment Act* to do an environmental assessment each time it conducts routine military activities or when testing weapons on its designated land.



National Defence must train under realistic conditions but still comply with environmental protection legislation.

7.10 The federal Code of Environmental Stewardship, first released in 1992, requires departments to consider environmental concerns in its operations; meet or exceed the letter and the spirit of all federal environmental laws; and acquire, manage, and dispose of lands in a manner that protects ecologically significant areas. The Treasury Board Secretariat's Environmental Guide for Federal Real Property Managers says it is government policy to acquire, use, and dispose of real property in a manner consistent with the principle of sustainable development. National Defence therefore needs to adhere to the principle of sustainable development as it conducts its activities on land used for training and testing.

7.11 In its departmental performance report, National Defence reports annually to Parliament on how well it is doing against specific targets in its sustainable development strategy.

7.12 The Department's Environmental Protection and Stewardship Policy calls for the protection of "assets held in trust." It states that National Defence will demonstrate respect for the environment in all its activities by implementing a sustainable development strategy, conducting environmental assessments, and exercising due diligence. The policy requires individuals to exercise due diligence by knowing and obeying federal environmental laws and regulations, exercising caution, preparing for risks that a thoughtful and reasonable person would foresee, and responding to risks and incidents as soon as practicable.

The Canadian Forces has been entrusted with large areas of land

7.13 In total, National Defence has about 18,000 square kilometres of land to use for training and other military activities—over three times the size of Prince Edward Island. Training and test areas are used by the Army and the Air Force for live firing of munitions and for training. The Navy conducts its training and testing in waters off the Atlantic and Pacific coasts.

Previous audits have reported on environmental management concerns

7.14 This is our second audit of National Defence that has focussed on the environment since the publication of the Department's first Sustainable Development Strategy in 1997. Our September 1999 Report, Chapter 13, Hazardous Materials: Managing Risks to Employees and the Environment, examined how National Defence managed the risks of hazardous materials such as flammable substances, corrosive products, and ammunition. Our 2001 follow-up audit found that while the Department had taken steps to address our concerns, it had carried out few recommendations fully and had revised or extended many of the completion dates for its action plans.

Focus of the audit

7.15 This audit focussed on the extent to which National Defence shows environmental stewardship of its major land training areas by integrating environmental considerations into military training activities to achieve sustainable training. While the audit focussed primarily on the land activities, we have some observations on air and sea training and testing as well (see About the Audit at the end of the chapter for more details on the audit scope).

7.16 We would expect that a responsible occupier of Crown land such as National Defence would have

- complied with existing laws and regulations when undertaking military training activities,
- identified ranges that are suitable for military training activities,
- developed and implemented management tools to ensure that training activities are undertaken in a sustainable manner, and
- developed a list of sites potentially contaminated by energetic material from the live firing of munitions, assessed the risks they pose, and put in place a plan to deal with these sites in a timely manner.

Observations and Recommendations

Need for due diligence

Some training-related activities did not comply with federal legislation

7.17 We found some evidence of non-compliance by National Defence with *Fisheries Act* provisions designed to protect fish habitat. We also found a case of non-compliance with the *Canadian Environmental Assessment Act*. We are concerned that the issues represented by the case examples in this chapter illustrate a lack of due regard to the environmental effects of the Department's everyday activities on the training ranges.

7.18 **Land cleared and timber sold at Combat Training Centre (CTC) Gagetown appears to have contravened several laws.** Up to 7,250 hectares of trees at CTC Gagetown, New Brunswick, were cut between 1995 and 1997 to expand the mounted manoeuvre area (see case study "Erosion at Combat Training Centre Gagetown shows lack of due diligence" on page 5). The tree cutting was not authorized by the Canadian Forest Service as required by the

Timber Regulations (1993) under the *Forestry Act*. Those regulations applied to that land because of a 1979 memorandum of understanding that gave the Canadian Forest Service responsibility for managing the forests on National Defence land, including the land at CTC Gagetown. CTC Gagetown had severed its relationship with the Canadian Forest Service effective in 1996. However, the 1979 memorandum of understanding was not amended so there was still a legal requirement to obtain the authorization of the Canadian Forest Service before cutting the timber.

7.19 A draft internal audit report in September 2001 identified several weaknesses in the contracting methods used at CTC Gagetown. It indicated that staff did not have the authority to enter into the contracts. It noted that

Erosion at Combat Training Centre Gagetown shows lack of due diligence

The Combat Training Centre (CTC) Gagetown is a primary training area for the Canadian Forces and has been used since the early 1950s. It totals 110,000 hectares, of which 30,000 are cleared for manoeuvres. The land includes 65 lakes, 365 wetlands, and 251 permanent and intermittent streams.

Between February 1995 and May 1997, over 50 contracts were let to clear lands and increase the manoeuvre areas. CTC Gagetown relied on the Treasury Board policy on Accounting for Non-Monetary Transactions in bartering timber rights for stump removal (grubbing) and other deliverables. The contracts called for the grubbing of 8,310 hectares after timber was removed, but departmental estimates show that so far only about 5,600 hectares have been grubbed even though 7,250 hectares of timber were removed.

The value of the contracts let was about \$4 million, but the Canadian Forest Service estimates the value of the timber to be around \$6.7 million. As well, the base found that contractors grubbed in areas where they were not supposed to but did not grub in areas where they were supposed to.

Several sectors have been unavailable for off-road training since they were cleared. Base estimates show that 10 percent to 20 percent of the cleared area will never be suitable for training due to the amount of exposed rock, sedimentation, and soft ground and to the soil's high susceptibility to erosion.

In 1988, an environmental baseline study identified soil erosion and sedimentation on the training area. This was attributed to mass land clearing, improper road construction and maintenance, and military training activities. A review in 2001 again highlighted erosion and sedimentation and damage to the quality of the surface water.

In this case, impacts of sedimentation on the fish habitat can affect salmon spawning by filling natural pools, causing gravel beds to become unstable for spawning, and causing streams to erode their banks—all of which affect aquatic life.

Activities between 1988 and 2001 have aggravated problems identified in the 1988 study. Although vegetation should have been re-established in the newly cleared areas immediately after grubbing, it has not been done. It is estimated that the remaining soil is up to 150 times more susceptible to erosion than dense vegetation cover, and soil loss is estimated at 100 tonnes per hectare in many areas. Some soil erosion protection has been put in place but more is needed.

In 1996, National Defence entered into an agreement with Fisheries and Oceans Canada to assess fish habitat within the training area, initiate restoration, and study methods to permit realistic military training without environmental degradation.

National Defence put forward a remediation plan for CTC Gagetown in November 2001. The proposal asks for \$108 million over 10 years to address problems. The proposal has not yet been approved.

A 2001 internal audit draft report noted weaknesses in the contracting authority, inadequate documentation, and a poor separation of duties. As well, it remains unclear whether an environmental assessment was completed. We found that an assessment was registered in 1996 but the Department could not provide us with a copy. In 2002, National Defence began a further investigation of this matter and concluded there was nothing "to show that any public servant or CF member had knowingly broken the law, or hidden information, or profited personally from the Gagetown expansion." The report, therefore, recommends no further military police investigation.

The *Statement of Defence Ethics* requires military personnel to be accountable for the consequences of their decisions and actions. Despite findings from an internal audit and the recently completed investigation, there has been no accountability for the environmental impacts of the land clearing activities.

the assistance of Defence Construction (1951) Limited and Public Works and Government Services Canada, while not required, could have been useful in avoiding the problems that arose with the land clearing contracts. The internal audit found no evidence that “the land clearance initiative was either directed or authorized by Army headquarters.”

7.20 The land clearing activity was consistent with an objective set earlier through the chain of command, but we could not find any authorization for this activity. Even though departmental documents show that senior officers at CFB Gagetown were aware of the clearing being conducted, we did not find evidence that they either formally approved of or halted the activity.

7.21 In addition, under the *Canadian Environmental Assessment Act* an environmental assessment was required for the work on the mounted manoeuvre area. An assessment was registered with the Federal Environmental Assessment Index in 1996, but the Department could not provide us with a copy of the assessment to prove that it was completed.

7.22 Erosion and silting of streams at Combat Training Centre (CTC) Gagetown in violation of the *Fisheries Act*. Silting because of land clearing activities in 1996 at CTC Gagetown affected a salmon spawning stream, contrary to subsection 35(1) of the *Fisheries Act* (see case study “Erosion at Combat Training Centre Gagetown shows lack of due diligence” on page 5). The activities would not have been contrary to that subsection if they had been authorized by the Minister of Fisheries and Oceans. However, there is no indication that National Defence obtained authorization for the work from the Minister of Fisheries and Oceans.



Erosion and damage to streams can affect fish habitat.

7.23 Erosion that has led to silt entering streams at CTC Gagetown has been aggravated by land clearing and the movement of vehicles over land that lacks vegetation. The primary responsibility for preventing silt from entering streams on military sites rests with National Defence. National Defence is required to conduct operations and maintain land according to applicable environmental laws, and it may not have demonstrated due diligence in this instance. Fisheries and Oceans Canada and Environment Canada are responsible for enforcing the fish habitat protection and pollution prevention provisions of the *Fisheries Act*. Environment Canada’s responsibility for enforcing those pollution prevention provisions results from a memorandum of understanding it has with Fisheries and Oceans Canada. If the Minister of Fisheries and Oceans becomes aware of any work that is likely to damage fish habitat in a training area, he may ask that National Defence provide information about the work, after which the work could be modified or cancelled.

7.24 Silt is still entering the streams. To date, Fisheries and Oceans Canada has chosen to encourage National Defence to comply with the Act by working with it co-operatively rather than resorting to the offence provisions of the Act.

7.25 Deposit of substances in the course of testing at Nanoose Bay, British Columbia. Lead weights, lithium batteries, and other substances have been deposited since 1965 at Canadian Forces Maritime Experimental and Test Ranges off the coast of British Columbia (see case study “National Defence has not taken action to assess the effect of substances deposited in Nanoose Bay” below). This raises issues of compliance with the fish habitat protection and pollution prevention provisions of the *Fisheries Act*. Recently, Fisheries and Oceans Canada concluded that materials in the lithium batteries constitute a deleterious substance and the deposit of this material would be in contravention of section 36(3) of the Act if found to be destroying fish habitat. Since 1996, not enough information has been gathered to determine the impacts.

7.26 Action to mitigate damages to streams at CFS Aldergrove. In 1994 and again in 1995 at Canadian Forces Station Aldergrove, British Columbia, silt and sediment were discharged into a stream flowing into the Salmon River, an important fish-bearing watercourse (see case study “Silt that damaged fish-spawning beds in Salmon River shows lack of due diligence at Canadian Force Base Aldergrove” on page 8). In the first instance, National Defence personnel had carried out work that violated environmental standards. Fisheries and Oceans Canada considered the incident to be a violation of section 35 of the *Fisheries Act*, and officials forwarded the matter for prosecution in the fall of 1996. However, the *Fisheries Act* limits the period in which timely enforcement action can be taken. The Crown did not proceed for several reasons, including the fact that National Defence took action to fix the problem and that the two-year limitation period had almost expired.

National Defence has not taken action to assess the effect of substances deposited in Nanoose Bay

The Canadian Forces deposited lead weights and lithium batteries during the course of testing activities conducted since 1965 in waters designated as the Canadian Forces Maritime Experimental and Test Ranges off the coast of British Columbia. An environmental assessment of the range was done in 1996 but it did not directly assess the effects of these deposits on fish or fish habitat. Nevertheless, Fisheries and Oceans Canada did not feel there was a significant chemical hazard to fish stocks or a major disturbance to fish habitat. However, it did encourage National Defence to look into the feasibility of reducing and recovering materials deposited as a result of its activities. It expected that National Defence would do a more detailed examination of the effects of depositing materials.

Fisheries and Oceans Canada has received little information about its 1996 concerns. National Defence recently provided it with a draft report, Status of 1996 EA Recommendations, that shows little movement toward addressing the 1996 recommendations of Fisheries and Oceans Canada. National Defence has carried out fewer test activities, which has reduced the amount of material being deposited.

Fisheries and Oceans Canada recently did a more comprehensive review of the 1996 environmental assessment and stated that steps should be taken to assess and mitigate potential environmental damage.

Silt that damaged fish-spawning beds in Salmon River shows lack of due diligence at Canadian Force Base Aldergrove

Between October and November 1994, silt was discharged into a small stream on CFS Aldergrove, British Columbia that flows into the Salmon River, an important fish-bearing watercourse off the station.

The discharge resulted from maintenance work on the base near the stream. Sediment was found six kilometres downstream in the fish-spawning beds and was tracked back to CFS Aldergrove. Fisheries and Oceans Canada contacted the Environment Officer at CFB Chilliwack—the base responsible for CFS Aldergrove. This was the first time the CFB Chilliwack Environment Officer had heard of the work, as it had not been authorized by base officials.

Fisheries and Oceans Canada initiated an investigation into the possible violation of section 35 of the *Fisheries Act* by National Defence. A brief recommending that charges be laid was forwarded to the Crown prosecutor but charges were not pursued, partly because National Defence had taken corrective action and the limitation period had almost expired.

National Defence ordered a summary investigation in February 1995 and concluded that the incident was the result of not following established procedures, a lack of supervision and communication between parties involved at all levels, and poor judgment in the decisions made.

A second incident occurred in May 1995, one month after the summary investigation, on the same watercourse. A Fisheries officer noticed that soil had been piled too close to the stream. Fisheries and Oceans Canada gave a directive to the CFB Chilliwack Environment Officer, who passed it on verbally to the CFS Aldergrove Unit Environment Officer, who indicated that the situation would be addressed immediately. One month later, a Fisheries official on that site noticed that no action had been taken. Upon second notice, National Defence officials responded immediately and restored the area by removing the soil and planting sod. National Defence conducted a summary investigation into this incident and found that insufficient attention, possibly due to lack of knowledge, had been given to environmental concerns, legislation, and regulations.

7.27 In the second instance, the Department was slow to respond to a request by Fisheries and Oceans Canada that it remove soil that was too close to the watercourse. The area was restored after a second request for action.

7.28 Recommendation. National Defence should exercise due diligence by complying with the fish habitat and pollution protection provisions of the *Fisheries Act* on its test and training areas.

Department's response. The Department and the Canadian Forces are committed to meeting or exceeding the letter and spirit of all federal environmental legislation, including the provisions of the *Fisheries Act* and the *Canadian Environmental Assessment Act*. Additionally, the Defence Team is committed to exercising due diligence. This commitment is clearly stated in our Environmental Policy.

The Department will continue to reinforce environmental responsibilities, of which due diligence is a component, through various forums.

7.29 Recommendation. National Defence should ensure that appropriate environmental assessments are carried out on all projects in test and training areas for which assessments are required.

Use of tools for environmental stewardship

Department's response. National Defence will use the communication opportunities afforded by the proclamation of the amended *Canadian Environmental Assessment Act* to ensure that assessment requirements are communicated for all projects, not just those in test and training areas.

The Department has a protocol for managing environmental issues and demonstrating environmental stewardship

7.30 Routine military activities are not generally subject to the requirements for an environmental assessment under the *Canadian Environmental Assessment Act*. But the Department recognizes that it is accountable for the effects of its activities, and it developed the Manoeuvre Area Planning System (MAPS) protocol in 1996. It calls for environmental studies of test and training areas and for plans to manage environmental concerns.

7.31 The protocol outlines how to determine the impacts of training activities on the environment; how to identify sensitive and overused ranges; and how to develop mitigation, restoration, monitoring, and follow-up plans (Exhibit 7.1). The protocol requires the following:

- a training area inventory of natural resources (sensitive ranges, rare species and habitat, wetlands, archaeological and cultural resources);
- an assessment of military training activities (infantry, artillery, armour, engineer training);
- an assessment of the effects of training activities on the environment (nature of effects, magnitude, duration, frequency, cumulative effects including outside training areas); and
- development and implementation of mitigation, restoration, monitoring and follow-up plans under the direction of the base commander.

Exhibit 7.1 National Defence 1996 Manoeuvre Area Planning System (MAPS) Protocol

- 1. Assessment of impacts**—to conduct an environmental study on the impacts of military training activities. Each impact is evaluated for duration, magnitude, and frequency of activity to help determine the priorities for the mitigation plan and the restoration plan.
- 2. Mitigation plan**—used to reduce or eliminate the environmental or social effects of training impacts through design alternatives, avoidance and control, scheduling, and other measures.
- 3. Restoration plan**—to return the environment to as close to its natural state as possible or to a state that will sustain a desired level of training.
- 4. Monitoring plan**—to measure the effectiveness of restoration and mitigation activities and to ensure sustainable military training.
- 5. Follow-up plan**—to bring together all of the follow-up requirements from the environmental study and summarize what actions are required during the year, their timing, and where and by whom any results should be reported.

Source: Summary of National Defence 1996 MAPS protocol

7.32 The Assistant Deputy Minister for Infrastructure and Environment provided about \$2.5 million for studies of training and test areas, conducted between November 1993 and April 1998, that gave bases

- a natural resources inventory,
- an assessment of the environmental impacts of training activity, and
- recommendations to mitigate impacts.

MAPS needs to be better implemented

7.33 Implementation of the MAPS protocol has progressed as far as completing environmental studies that include recommendations. But seven years after the publication of the protocol and almost five years after the completion of the last MAPS study in 1998, plans to address the environmental impacts of routine training activities have not been developed and implemented. We found the following:

- Although the Assistant Deputy Minister for Infrastructure and Environment issued some communications on implementing MAPS, the requirement to implement the protocol was not clear at all levels.
- While the initial MAPS studies were funded separately, the remaining work to develop and implement plans must compete for resources as part of the business planning exercise.
- The Department did no monitoring to follow up on the implementation of recommendations at the bases.

7.34 We looked at the study recommendations that had been accepted to see whether any action had been taken. We found evidence that on average, army bases were addressing about one third of the recommendations in whole or in part. The Department informed us that action was being taken on a further one-third of the recommendations, but we were unable to determine their status due to a lack of data.

There are some good examples of environmental management at training and test areas

7.35 The Department works with Environment Canada, Fisheries and Oceans Canada, and Natural Resources Canada to find appropriate ways to mitigate the effects of its activities or to prevent damage from occurring where possible. While military activities often have impacts, National Defence has acted to mitigate damage and protect the environment in certain areas.

7.36 Use of some training and test areas is restricted at some bases to accommodate environmental sensitivities. For example, training on or near watercourses is limited at certain times of the year to help protect fish and fish habitat. Similarly, fords and bridges have been constructed to minimize damage to watercourses.

7.37 In some cases, the presence of National Defence has protected the environment. For example, one of the last remaining areas of natural prairie is located on the Canadian Forces Base–Suffield, Alberta; Environment Canada

and National Defence have agreed to place about 458 square kilometres of this area out of bounds. There is a proposal to make this a national wildlife area.

The approach to using sensitive areas for training has not been consistent

7.38 We found that most training areas have identified those ranges that are sensitive, as required in the MAPS protocol. We did not see, however, that action was always taken to manage these areas as environmental studies have recommended.

7.39 We did find that temporary measures were put in place after a 1998 environmental study at the Militia Training and Support Centre Meaford classified two ranges as sensitive. A new range-training management plan expected for March 2004 is to outline mitigation measures.

7.40 A natural resource management plan completed for Western Area Training Centre Wainwright in 1998 recommended restricting the use of off-road vehicles and munitions on sensitive ranges at critical times of the year. We were informed that some action was taken but, four years later, this restriction still is not part of operational procedures.

7.41 We also found that the sensitivity assessment undertaken in 1991 for the Canadian Forces Base Suffield training area is now outdated. Some assessment work was done in 1998, but it did not update the 1991 study. Since 1998, military training activity has increased.

7.42 Combat Training Centre Gagetown has not yet identified its sensitive ranges but has deemed some areas to be “no-go areas.” A 2001 presentation by the Land Force Atlantic Area to the Departmental Senior Review Board noted that at CTC Gagetown “the potential impact caused by the current [erosion] situation would be the continued environmental degradation that would deteriorate manoeuvre ranges to the point that they would be unsuitable for users to train in.” CTC Gagetown officials informed us that they plan to study this further next year.

7.43 We also found that studies in 1996 at Canadian Forces Base Shilo recommended that several overused training ranges be placed out of bounds for a limited period. This was not done, and German troops continued to train there until they left in December 2000.

The Department needs to do more to meet its sustainable development strategy target to implement MAPS

7.44 Implementation of the MAPS protocol is one indicator the Department uses to report on achieving its Sustainable Development Strategy 2000. The 2001–2002 *Departmental Performance Report* stated that 6 of 13 selected units had implemented MAPS by 2001–02. We examined four of the six units—the Cold Lake Air Weapons Range, CTC Gagetown, Area Support Unit Shilo, and Area Support Unit Valcartier. We found that the initial studies were done but mitigation, restoration, monitoring, and follow-up plans were not yet completed as required by the MAPS protocol.

7.45 From the data provided, we found that the implementation of accepted study recommendations at these four bases ranged from about 15 percent to 45 percent.

7.46 **Recommendation.** National Defence should finish implementing the Manoeuvre Area Planning System by developing and implementing the mitigation, restoration, monitoring, and follow-up plans and should ensure that these plans include budgets, priorities, and timelines.

Department’s response. The Department recognizes the importance of the Manoeuvre Area Planning System and its implementation, and has included this subject as a target in our Sustainable Development Strategy since 1997. Our current strategy requires that priority recommendations in the plans developed from the MAPS protocol be implemented by 31 March 2004. National Defence’s business planning process is the method whereby all departmental activities are prioritized, funded, and actioned. The recommendations that flow from MAPS must compete for funding with all other departmental activities.

The Department will review the progress of MAPS implementation and take the appropriate action.

Federal contaminated sites

In October 2002, the Commissioner of the Environment and Sustainable Development released a report that examined how the federal government as a whole was managing its legacy of federal contaminated sites. In her report, the Commissioner found that despite having first recognized the need to address the problem of federal contaminated sites 13 years ago, the federal government still

- does not know how many of its sites are contaminated;
- does not know the full extent of the risks to human health and the environment and the likely cost of cleaning up or managing the sites;
- does not have a ranking of the worst sites by order of risk;
- does not provide the long-term, stable funding needed to manage the problem effectively; and, most important,
- does not have a firm central commitment and leadership or an action plan essential to the timely clean-up or management of the higher-risk contaminated sites under its control.

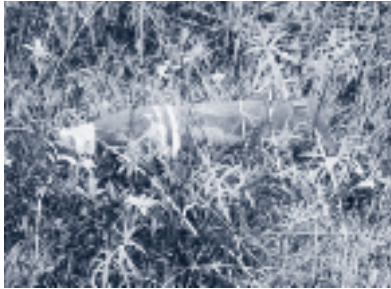
The Commissioner cited federal contaminated sites as only one of the issues contributing to the growing sustainable development deficit. Failure to deal with this issue in a timely manner will leave an unwanted legacy for future generations.

Managing potentially contaminated sites

The potential exists for energetic material contamination at some sites

7.47 Contamination related to munitions has become an increasingly prominent issue. Since 1994 there has been evidence to suggest that contamination can occur as a result of firing munitions in training ranges. National Defence has done some work to identify this contamination and to manage health and safety risks. The Department views unexploded ordnance concerns as health and safety issues, separate and distinct from contamination or environmental issues.

7.48 Munitions that fail to explode when fired and that are left lying on or beneath the ground can pose a safety concern. For example, forest fires at Canadian Forces Base Petawawa set off unexploded ordnance that the base was able to manage but that put firefighters at risk.



Unexploded ordnance can be an environmental concern as well as a health and safety concern.

7.49 Energetic material in residue left on the surface after munitions explode can cause contamination. It is considered carcinogenic and mutagenic. Energetic material can also leach into the soil when munitions that fail to explode are damaged or corrode over time. Years of live firing in training ranges can leave an accumulation of this material that could eventually reach the groundwater below (see case study “The composition of ammunition fired by foreign militaries on Canadian lands was not known” below).

7.50 Energetic material comprises the following:

- HMX or High Melting Explosive—a colourless solid that explodes violently at high temperatures and is used in various kinds of explosives and rocket fuels.
- RDX or Research Department Explosive—a very explosive synthetic product used in combination with other ingredients in explosives.
- TNT or 2, 4, 6-Trinitrotoluene—a yellow, odourless solid used in military shells, bombs, and grenades.

The composition of ammunition fired by foreign militaries on Canadian lands was not known

Ninety-nine percent of Canada’s weapons systems are fired in training exercises on Canadian soil. We asked the Department for a list of in-service ammunition, complete with the chemical characteristics making up the explosive. We then asked bases which ammunition was fired in the training ranges.

All the bases fired the same ammunition and have done so for decades. Consequently, the potential exists in all these ranges for contamination resulting from energetic material either in residue from detonation or leaked from unexploded ordnance.

We asked the Department for a list of the types and compositions of ammunition fired by foreign militaries training in Canada. We were told that the Department does not have that information and we would have to contact the foreign militaries directly for it. Since the Department is not aware of the chemical composition of ammunition used by foreign militaries, it cannot be aware of the potential for contamination as a result of their training exercises.

The risks in not knowing the composition of foreign military ammunition are real and have created concern for the Department in the past. Prior to 2001, the German army trained extensively at ASU Shilo in Manitoba. In summer 2000 the German military notified the Department about potential contamination from the firing of the Milan missile system. A component of the system contained thorium, a radioactive substance and a known carcinogen. Defence Research and Development Canada—Valcartier conducted sampling in the training area and found detectable levels of thorium in the soil. The levels were below concentrations of concern. However, had the Germany military not notified it, the Department would have been unaware of the potential risk.

7.51 The Department established an Energetic Materials Working Group in 1996 to help manage the effects of explosive chemicals on human health and the environment. Despite plans to meet more than twice yearly to expedite its activities, the group has not met since November 2000.

Work has begun to identify some sites contaminated by energetic materials

7.52 Defence Research and Development Canada–Valcartier (DRDC–Valcartier) has been studying energetic materials. Defence scientists are part of international collaboration to develop methodologies for contaminated-site characterization—an approach to help identify the extent of energetic material contamination on National Defence lands. DRDC–Valcartier has conducted several studies at various locations since the mid-1990s to better understand energetic material contamination.

7.53 Between 1994–95 and 2002–03, Defence Research and Development Canada–Valcartier received about \$310,000 per year from the Assistant Deputy Minister for Infrastructure and Environment to do fundamental research. The Army also provided funds to the end of fiscal year 2002–03 to assess the extent of contamination, if any, at its major training sites. Although the Army requested \$2.2 million per year from a centrally funded environment program to continue this work to fiscal year 2005–06, it did not meet the program’s funding criteria. The Army now plans to commit about \$500,000 annually starting in fiscal year 2003–04 to finish testing its sites, but this could mean taking longer to get all the work done. The cost to complete the environmental characterization of all Army training areas is estimated by the Army at about \$9 million.

7.54 Live firing has been conducted at Canadian Forces Base Borden since before World War II and several sites have been identified as likely to contain unexploded ordnance. However, since DRDC–Valcartier is looking only at Army bases right now and CFB Borden is not an Army base, its sites are not included in the study.

7.55 Preliminary work has been done at the Cold Lake Air Weapons Range to determine if contamination has resulted from Air Force live weapons training and testing. However, financial support is limited and additional funding is being sought for a thorough site characterization.

To develop consistent and comprehensive management plans for its contaminated sites, the Department must first identify all of them

7.56 National Defence has a framework that provides guidance on the management of contaminated sites. Under the Departmental Contaminated Sites Remediation Framework 1996 and the 2001 update (draft), base environment officers must review areas to see if they should be included in the base’s inventory of contaminated sites. There are five stages:

- Stage 1 – contaminated site characterization and risk assessment
- Stage 2 – development of a contaminated site management strategy

United States government’s response to contamination on two military sites

In 1997 the United States Environmental Protection Agency ordered that no more artillery and mortar firing be conducted at the Massachusetts Military Reserve on Cape Cod until environmental investigations were completed. Energetic material, such as RDX and HMX, had been found in the soil and groundwater—the sole source of drinking water for the Cape Cod area. The data indicated that it would take about 15 years for the contamination to reach the perimeter of the reserve.

Energetic material has also been found in the water at Fort Lewis in Washington State. The facility is used for large-scale manoeuvres and live-fire operations. While training activity has not halted, negotiations with regulators are under way.

- Stage 3 – implementation of a contaminated site management strategy
- Stage 4 – monitoring and site closure
- Stage 5 – archiving and record retention

7.57 Training ranges that we examined were at the first stage and varied in their approaches to completing it. Some site characterizations and risk assessments were done formally with consultants, and others were based on the experience of the environment officers.

7.58 National Defence identifies and tracks its contaminated sites through its internal EcoNet database. The database is maintained centrally, and local environmental staff are responsible for providing accurate and up-to-date information.

7.59 We examined the EcoNet database to determine the comprehensiveness of the information on land-based training and test areas. We found that EcoNet does not consistently identify sites with potential contamination from the live firing of munitions.

7.60 The Department does not determine that a site with unexploded ordnance is potentially contaminated until energetic material is found. As a result, there are inconsistencies in its tracking and addressing energetic materials and unexploded ordnance.

7.61 Departmental officials told us that local staff seem to have some confusion about the use of the term “explosives” in categorizing contaminated sites. We were told that “explosives” was originally intended to categorize sites where energetic material contamination has been identified. However, local staff in some places have used it also to categorize sites with unexploded ordnance.

7.62 CFB Borden has at least eight ranges identified on EcoNet with potential contamination from range activity, including the presence of unexploded ordnance. CFB Shilo and CFB Gagetown each have only one range identified, even though live ordnance training was carried out on several ranges in their training areas.

7.63 Other bases that have live-fire ranges do not identify any training ranges potentially contaminated with energetic material or where unexploded ordnance is present. CFB Suffield does not indicate any sites in its manoeuvre area that potentially are contaminated with energetic material, despite extensive use by British and Canadian soldiers. Defence Research and Development Canada–Suffield identified one range as contaminated by high-explosive rockets from field trials.

7.64 CFB Petawawa and Western Area Training Centre Wainwright do not identify any ranges on EcoNet as potentially contaminated with energetic material, even though both have live-fire ranges. Furthermore, WATC Wainwright has an anti-tank range that was one of the first in Canada to be studied, and energetic material contamination was found in surface soils.

7.65 During our audit, the Department released a draft environmental directive on the management of contaminated sites in order to clarify this issue. The directive included a definition of an unexploded ordnance site:

A site where unexploded ordnance (UXO) is present or where the likelihood of UXO is prevalent based on past operations. UXOs present a clear safety hazard from accidental detonation of ordnance. A UXO site becomes a contaminated site if the energetic materials (such as TNT, RDX, HMX) leach into the soil or the groundwater, where their concentrations occur at levels that pose, or are likely to pose, an immediate or long-term risk to human health or the environment.

The Department needs to clearly determine the cost of its contaminated sites

7.66 In 1999, the Treasury Board Secretariat drafted the Policy on Accounting for Costs and Liabilities Related to Contaminated Sites, which became effective April 2002. The policy requires departments to identify liabilities and contingent liabilities associated with each contaminated site. Liabilities must be accounted for in the year the damaging event occurs or when the damage is identified.

7.67 The Department's Contaminated Sites Liability Accounting protocol identifies an unexploded ordnance site as a contingent liability if the site is known to require clearance of unexploded ordnance, and as a liability if the site is known to be contaminated by lead or energetic materials.

7.68 Therefore, any training area, range, or impact area can be considered a contingent liability if it is likely to be cleared of unexploded ordnance in the future. However, if clearance is not likely, the Department would not recognize the site as a contingent liability—and few sites are recognized as such. For example, while CFB Shilo has a contingent liability, other large bases such as WATC Wainwright do not have contingent liabilities for unexploded ordnance.

7.69 During our audit, the Department stated that all active ranges with unexploded ordnance should be recognized as having a contingent liability for surface-level clearance. Subsequently, a draft policy on Contaminated Sites Liability Accounting was prepared to address this and other issues related to contaminated sites.

7.70 National Defence leases land from the provinces, which can have implications for future liability. As a departmental assessment states, experience shows that training areas are not used forever and eventually must be cleared of unexploded ordnance at some level. For example, the lease for CFB Shilo in Manitoba provides that on termination of the lease, National Defence must decontaminate the land and restore it to its former condition as far as practicable. The lease could expire in 2013. Whether it will be renewed is a decision that will influence how clearance will proceed (see case study "National Defence is negotiating shared cost of cleanup of contaminated land at CFB Shilo with Germany" on page 17).

National Defence is negotiating shared cost of cleanup of contaminated land at CFB Shilo with Germany

Canadian Forces Base Shilo sits on 40,622 hectares of land, of which 34,622 hectares are leased from the Province of Manitoba. The lease expires in 2013 but National Defence can extend it to 2034. At the end of 1999 about 26,837 hectares were assessed as needing clearance, ranging from level one (surface) to level three (free from explosives).

The German Army trained at CFB Shilo between 1974 and 2000, and National Defence has an agreement with Germany to share environmental cleanup costs. Canada and Germany are currently discussing cleanup costs but no agreement has been reached.

7.71 Recommendation. National Defence should identify the sites potentially contaminated by energetic materials and develop an action plan for mitigation that includes priorities, timetables, and budgets. It should also identify potential contamination related to munitions fired by foreign militaries.

Department's response. Contamination from energetic material is a relatively new field of science and much research remains to be undertaken. The Department continues to fund this field of study and our research has been recognized internationally. The Department realizes that additional policy direction is required in the area of contaminated site management and contamination emanating from energetic material. The nature and composition of this potential contaminant, be it from Canadian or foreign munitions, must be understood. Work on a Departmental Environmental Directive on contaminated sites, including an update of the Department's existing Contaminated Sites Remediation Framework, is already under way.

7.72 Recommendation. National Defence should review the EcoNet database for completeness and reliability in order to help establish potential future liabilities.

Department's response. Activities are under way to validate EcoNet information.

Ensuring sustained use of lands

The Army needs an overall plan for the sustained use of land training and test areas

7.73 In August 1998, the Army directed that its own environmental protocol, similar to MAPS, be implemented. The Army requires training areas to update environmental studies every five years. Under this direction, existing studies are now out of date and will have to be updated.

7.74 In July 2001, the Army released its Land Force Range and Training Area Development Plan as a framework that includes environment issues when planning exercises. One goal is to ensure that training areas will permit training for all eventualities. As the plan notes,

Since the publication of the Land Force Range and Training Area Development Plan (RTADP) draft in 1995, RTA development has not been fully realized. The development of

RTA has been left to each area, resulting in different development priorities for each area. Without any overall Army [Land Force] plan, the long-term effects are an imbalance in the training conducted, not only affecting the quality of training, but also the over and under-utilization of certain RTA.

7.75 Most training areas can sustain military training if appropriate mitigation and restoration measures are put in place. And the Range Training Area Development Plan can be used to help identify environmental stress and overused ranges. However, we found that the Plan has not yet been implemented—range training area plans that follow the July 2001 framework have not been completed.



Routine training with heavy equipment like Leopard tanks has impacts on the environment.

7.76 The Army vision of the future—*Army of Tomorrow*, released in spring 2002—already calls for changes in the way some training areas are now used. It says, for example, that the Army may decide to concentrate heavy combat capability training at the Western Area Training Centre Wainwright. Overall plans for environmental management are needed to ensure the sustained use of training and test areas.

7.77 Recommendation. National Defence should identify which types of military training are sustainable on which lands.

Department’s response. “Sustainable training,” “training area carrying capacity,” “range and training area development,” “range management,” “environmental stress,” and “sustainable military training” are all terms related to the same idea—where, when, and how to train so that we can continue to train in the future. Knowing the importance of training and of using our areas appropriately, now and in the future, the Department will develop indicators to measure sustainable military training on each of its training areas.

7.78 Recommendation. National Defence should ensure that it has an overall strategy for alleviating environmental stress and should include priorities, timetables, and costs in the budget planning process.

Department’s response. The Department knows that environmental impacts from training must be managed. Environmental assessments, implementation of MAPS recommendations, management of energetic contamination, management of unexploded explosive ordnance, and sustainable military training are some of the many tools available that can help with alleviating environmental stress. The challenge facing the Department is arriving at an appropriate equilibrium that takes into consideration realistic training, environmental protection, and resource availability.

Priorities, timetables, and costs are all issues integral to the business planning process. National Defence’s business planning process addresses all departmental requirements and environmental items must be considered in light of all the pressures facing the Department.

The Department, in continuing to develop its vision for the future, will ensure that any training changes that may unfold consider potential environmental impacts and build mitigation measures into the process.

Conclusion

7.79 National Defence has not always shown due regard to protecting fish and fish habitat on its training and test areas as required by the *Fisheries Act*. In one significant case, an environmental assessment was not completed as required under the *Canadian Environmental Assessment Act*. The Department's own environmental policies agree with the need to follow federal legislation consistently and are consistent with the Treasury Board Secretariat's policy on real property management. Nevertheless, our case examples show that this has not always been the Department's practice, even though it has committed to following the letter and the spirit of federal legislation.

7.80 National Defence has had long-standing environmental concerns, some of which have not yet been resolved—for example, issues identified at CTC Gagetown back in 1988. It needs to demonstrate environmental stewardship by identifying and resolving the environmental impacts of its activities in a timely manner. It needs to implement its Manoeuvre Area Planning System protocol, developed in 1996, to manage environmental impacts in its training and test areas.

7.81 The Army has begun to take an overall approach to its use of training and test areas. Its approach includes considering the environmental issues it needs to address to ensure the sustained use of the areas.

7.82 The Department's information on potentially contaminated sites has not been clear. Information on sites potentially contaminated with energetic material has to be recorded consistently and completely before the Department can rely on the information and take appropriate action. National Defence also needs to have information more readily available about the composition of munitions used by foreign militaries on Canadian soil.

7.83 The Department can do better at reporting its progress toward the target in its sustainable development strategy to implement MAPS.

Department's overall comment. Operational readiness of military forces mandates realistic training in a variety of geographic and climatic situations. National Defence needs training areas to develop, practice, and hone the skills of CF members. We recognize that the establishment of new military training areas is improbable and we acknowledge that environmental effects from training must be managed in the interest of future training. We also recognize that health and safety issues are paramount.

National Defence respects Canadian values; values that include the protection of ecologically significant areas and species. The recovery of the

Oregon Spotted Frog (Aldergrove B.C.), the establishment of the National Wildlife Area (Suffield, Alta.), and the internationally designated wetland in Nicolet, Quebec are examples of the many initiatives we have implemented to protect ecological areas and species. The Defence Team continues to work co-operatively with federal departments, agencies, and interested partners in such areas as forest canopy research and eagle nest monitoring (Esquimalt, B.C.); white pelican breeding protection (Cold Lake, Alta); archeological research (Kingston, Ont.); and fisheries habitat restoration (Gagetown, N.B.).

Military training can have complex environmental implications. Defence's environmental professionals work closely with regulatory departments and other technical experts to ensure that our mitigation activities meet expectations. Examples include sediment management (Gagetown, N.B.) and the clean-up and restoration prior to disposal of surplus training areas (Tracadie, N.B., and Calgary, Alta).

About the Audit

Objectives

The audit objective was to assess the environmental stewardship performance of National Defence in its test and training areas. More specifically, we wanted to assess

- the extent to which environmental due diligence has been exercised in the conduct of testing and training activities,
- whether the Department has adopted the principle of sustainable development for its testing and training sites, and
- whether environmental considerations have been integrated into departmental activities to ensure sustainable military training.

Scope

The audit focussed primarily on land testing and training sites, but in the course of the audit we noted certain impacts of air and sea activities.

We selected the major land training areas (see Appendix) to assess the implementation of the 1996 Manoeuvre Area Planning System (MAPS) protocol and its integration into departmental operations and activities. These training areas cover 94 percent of National Defence land areas in Canada. In July 2001 the Chief of Land Staff directed that maximum use be made of primary as well as secondary land training areas; we reviewed these training areas and specifically the suitability of the land for military activities.

Our audit identified various sites potentially contaminated by unexploded ordnance and energetic material. We assessed departmental plans to address the issue. We selected the major land training areas and Canadian Forces Base Borden. We also examined reports and information from Defence Research Development Canada–Valcartier, the United States General Accounting Office, and the United States military about site characterization and groundwater contamination.

We reviewed funding and budget allocations from the Department's Corporate Environmental Program, the business planning process over the years, and the recent priority systems.

We assessed the impact of military training activities on the environment by reviewing departmental files. Environmental legal compliance issues were assessed against various federal acts and regulations and by reviewing departmental legal opinions related to the environment.

We also met with officials from various federal departments, such as the Canadian Environmental Assessment Agency, the Canadian Forest Service, Fisheries and Oceans Canada, and Environment Canada.

Criteria

We expected that National Defence would

- achieve its own standards for environmental protection and stewardship,
- meet targets related to testing and training sites that it set in its 1997 and 2000 sustainable development strategies,
- conform with the letter and spirit of federal legislation and policies on the environment, and
- have adequate information systems to report on results achieved for environmental stewardship.

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Appendix National Defence training and testing areas included in the audit

	Hectares
TOTAL DND land area	1,833,730
Alberta	
Canadian Force Base (CFB) Suffield	264,035
Western Area Training Center (WATC) Wainwright	64,500
Cold Lake Area Weapon Range (CLAWR) Cold Lake	541,000
Saskatchewan	
Cold Lake Area Weapon Range (CLAWR) Cold Lake	640,000
Manitoba	
Area Support Unit (ASU) Shilo	40,622
Ontario	
Area Support Unit (ASU) Petawawa	34,085
Québec	
Area Support Unit (ASU) Valcartier	21,308
New Brunswick	
Combat Training Center (CTC) Gagetown	110,597
Total training and test area included in audit	1,716,147

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