Seabirds and Atlantic Canada's Ship-Source Oil Pollution

seabirds and oil pollution: impacts, trends, and solutions

SEABIRDS AND ATLANTIC CANADA'S SHIP-SOURCE OIL POLLUTION: IMPACTS, TRENDS, AND SOLUTIONS

Prepared for World Wildlife Fund Canada by Francis Wiese

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Dr. Wiese's reserach interests focus on the protection and conservation of the marine environment, particularly issues concerning environmental and anthropogenic impacts on marine organisms and their ecosystems. Through his research on chronic oil pollution and its impact on seabirds, Dr. Wiese has worked with the Environmental Studies Research Fund, Environment Canada, Husky Oil, and the Canadian Association of Petroleum Producers. Dr. Wiese has numerous publications to his credit, and is a member of several professional ornithological associations.

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EXECUTIVE SUMMARY

The Grand Banks provide suitable breeding and year-round feeding habitat for millions of seabirds of several species, an abundance and a diversity unparalleled in the North Atlantic. New research indicates that the chronic oil pollution along the southeast coast of Newfoundland has not been reduced over the last two decades, and that pollution levels in Atlantic Canada are the highest in the world (Wiese 2002). On average, it is estimated that 300,000 seabirds are killed annually in Atlantic Canada owing to illegal discharges of oil from ships. Most affected is the thick-billed murre, a species that overwinters on the Grand Banks and breeds in the Canadian Arctic. The seabird mortality due to oil and, to a lesser extent, to the traditional Newfoundland murre harvest has reduced all population growth of this species. Given the current situation, thick-billed murre populations are vulnerable to environmental change and may decline over the next 20 years if current mortality levels do not decrease. Imposed fines and enforcement efforts in Atlantic Canada are not on a par with those of other countries along the Great Circle Route between Europe and North America, and it appears that the coastal area of Atlantic Canada is economically the most feasible location into which ship operators can dump their bilges. Increased year-round enforcement, higher imposed fines, and the establishment of convenient on-land oil disposal facilities have proven effective elsewhere in the world at reducing bilge-oil dumping at sea. It is recommended that these examples be followed, that vessel monitoring be increased, and that education and awareness programs be launched among the public, industry, and government. Chronic oil pollution has not garnered enough attention in the media, government, industry, and the scientific community in the past, given the extent of the problem. It is imperative that more effort is made to prevent chronic marine oil pollution events that collectively have clear detrimental effects on our marine ecosystem.

abbreviations

The following abbreviations have been used in this report:

CCG	Canadian Coast Guard
CEPA	Canadian Environmental Protection Act
CSA	Canada Shipping Act
DFO	Department of Fisheries and Oceans
DND	Department of National Defence
DOJ	Department of Justice
EC	Environment Canada
EDA	Environmental Damage Assessment
EDF	Environmental Damages Fund
FA	Fisheries Act
IMO	International Maritime Organization
MARPOL	International Convention for the Prevention of Pollution from Ships
MBCA	Migratory Bird Convention Act
MCZ	monitoring control zone
MEPC	Marine Environment Protection Committee of the International Maritime Organization
mt	metric ton
nm	nautical miles
POW	Prevention of Oiled Wildlife Project
PSSA	particularly sensitive sea area
PPO	pollution prevention officer
OSIR	Oil Spill Intelligence Report
SSOPF	Ship Source Oil Pollution Fund
TC	Transport Canada

The Problem

Oil slick coming from ship © Canadian Coast Guard

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1.1 INTRODUCTION

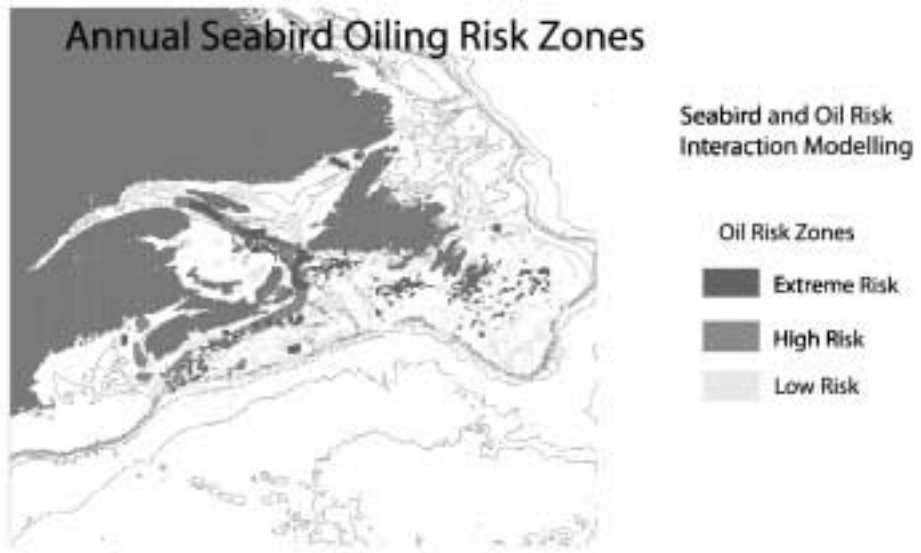
The illegal discharge of oil from ships into the world's oceans is a global problem that affects the entire marine ecosystem. Oil from ships can enter the water through large and catastrophic accidental spills or through small spills caused by malfunctioning equipment, negligence, or willful illegal actions. The total estimated volume of spilled oil from large accidents is less than that released from illegal "operational" discharges (Oil Spill Hazard Team 1997), which have their origin in tank washings, dirty ballast, and bilge pumping.

The most conspicuous organisms of the marine ecosystem, and those most frequently used as an indicator of marine oil pollution, are seabirds (Montevecchi 1993, 2001, Furness and Camphuysen 1997). The effects of oil being spilled chronically on other marine organisms, such as marine mammals, fish, and benthic flora and fauna, have not been investigated. Given the effects observed on seabirds, it seems likely that other species are also affected. Oil at sea is a threat to seabirds because it forms a thin layer on the water surface where many seabirds spend most of their time. The hydrophobic nature of oil causes bird plumage to absorb the oil readily, thereby decreasing a bird's insulation, waterproofing, and buoyancy, leading to death due to hypothermia and starvation (Burger and Fry 1993, Wiese and Ryan 2002, *in review*). When ingested or inhaled, the many toxic compounds in the oil can also lead to fatal or debilitating effects on seabirds' internal organs (Leighton 1993, Briggs et al. 1997). Even a small amount of oil can cause such effects. Oil collected from bird plumage in Atlantic Canada and the North Sea over the last 10 years was analyzed through gas-chromatography and mass-spectrophotometry. The analysis showed that over 90 per cent of the oil collected was composed of heavy fuel oil mixed with lubricant oil, the type found in bilges of large ocean-going vessels (A.R. Lock, Marine Issues Biologist, Environment Canada [EC], personal communication; Averbeck et al. 1992).

Increasing public pressure over the last 15 to 20 years has led governments worldwide to develop effective national and international legislative protection for marine and coastal environments. Many countries, including Canada, have signed agreements such as the International Convention for the Prevention of Pollution from Ships (MARPOL), the United Nations Convention on the Law of the Sea, and regional protection agreements such as the Oslo-Paris and Helsinki Conventions in which dumping of waste materials is strictly controlled or expressly forbidden. According to MARPOL, the highest legal concentration of oil that can be released into the ocean is 15 parts per million, which is achieved by running bilge water through an oily-water separator before disposal at sea. At this concentration, oil does not create a sheen on the water surface and hence no birds die. Whether oil at this concentration still has the potential to damage other marine organisms is not known. The fact that oiled birds keep washing up on shorelines worldwide (Wiese and Ryan 2002, in

review, Camphuysen and Heubeck 2001) suggests that national legislation and international conventions and guidelines are not being followed. As a result, several areas in the North Sea and in Atlantic Canada, where large seabird concentrations occur in areas of intense ship-traffic, have been designated as extremely high oiling risk zones for seabirds (see Figure 1) (Chardine 1990, Lock et al. 1994, Skov et al. 1995). Given the frequent overlap of shipping activities and seabird distribution, it is not surprising that beached bird surveys around the world have for decades reported dead and live seabirds oiled as a result of chronic spills (*Canada east coast:* Tuck 1961, Levy 1980, Piatt et al. 1985, Elliot and Ryan 1988, Lock 1992, Chardine 1992, 1995, Chardine and Pelly 1994, Wiese and Ryan 1999, Wiese and Ryan 2002, *in review; Canada west coast:* Burger 1993a, Burger and Fry 1993; *United States west coast:* Speich and Wahl 1986, Bodkin and Jameson 1991, Nur et al. 1997; United States east coast: Simons 1985; *Argentina:* Perkins 1983, Boersma 1995; *Japan:* Ohata et al. 1993; *New Zealand:* Veitch 1982; Australia: Raaymakers 1995; *South Africa:* Avery 1989; *North Sea:* Dahlmann et al. 1994; *United Kingdom:* Cadbury 1978, Stowe and Underwood 1984, Heubeck 1995; *Denmark:* Joensen and Hansen 1977; *Belgium:* Kuyken 1978; *Netherlands:* Camphuysen 1989, 1998; *Germany*: Averbeck et al. 1992; *France:* Debout 1984, Raevel 1990; *Lithuania:* Vaitakus et al. 1994, Zydelis and Dagys 1997).

FIGURE 1: ANNUAL SEABIRD OILING RISK ZONES, ATLANTIC CANADA



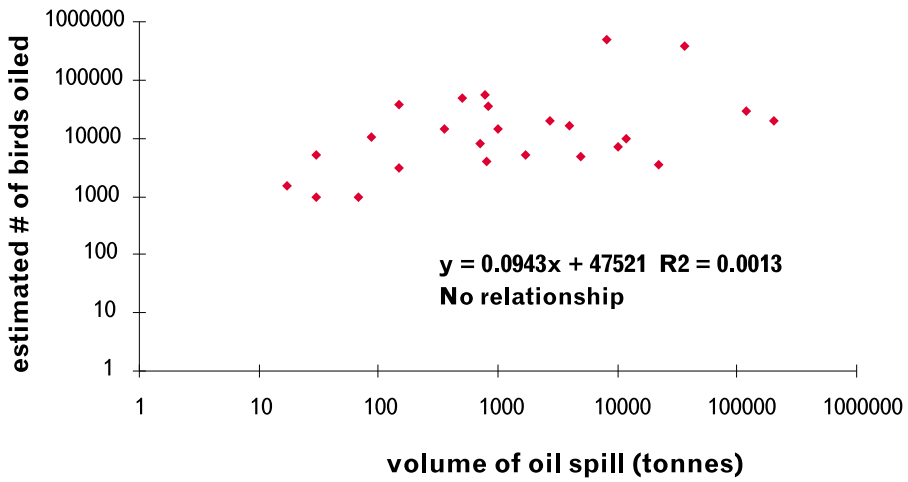
SOURCE: Modelling by Environment Canada (1998) based on known seabird distributions and ship-traffic densities.

The objective of this document is to put the problem and impacts of chronic oil pollution measured in Atlantic Canada into national and international contexts, and to outline an action plan that will help reduce illegal chronic marine oil pollution.

1.2 CHRONIC OIL POLLUTION AND SEABIRDS

Much of the public concern about marine oil pollution has arisen from large catastrophic spills such as those from the *Torrey Canyon, Exxon Valdez, Braer, and Sea Empress*. However, there is no significant correlation between the volume of oil spilled and the number of seabirds oiled (see Figure 2), and long-term sustained mortality rates caused by chronic oil pollution have as great an effect — or an even greater effect — on seabird populations than occasional large spills (Hunt 1987, Burger 1992, Wiese and Ryan 2002, *in review,* Wiese 2002). The degree of seabird mortality seems to be determined by the timing and location of the oil discharge and the life history strategies of the species affected (Burger 1993b).

FIGURE 2: LOG-LOG PLOT COMPARING THE VOLUME OF OIL SPILLED AND THE ESTIMATED NUMBER OF SEABIRDS OILED



SOURCE: Burger 1993b.

Seabirds are the most conspicuous marine organisms and therefore have been used for decades as monitors of the health of the marine environment and specifically of the effects of oil pollution (Furness and Camphuysen 1997). The extent of chronic oil pollution along a given shoreline is usually assessed by conducting systematic

beached bird surveys and calculating the number and proportion of oiled birds found. Oiling rates (also referred to as the proportion of oiled birds found) indicate the risk of birds becoming oiled at sea and thus mirror fluctuations in the amount of oil spilled over time and in different regions (Furness and Camphuysen 1997, Camphuysen and Heubeck 2001).

1.3 ATLANTIC CANADA'S CHRONIC OIL POLLUTION IN A WORLDWIDE CONTEXT

Illegal discharges of oil have occurred in Atlantic Canada for decades. Tuck (1961) first documented the oiled bird problem on Newfoundland beaches in the late 1950s. He observed oiled birds coming ashore every winter, estimated that 500,000 seabirds were being killed every year owing to chronic oil pollution in the region, and called for a halt to such pollution. In 1984, the Canadian Wildlife Service of Environment Canada (EC) in St. John's, Newfoundland, initiated systematic beached bird surveys along the coast of southeastern Newfoundland to document this problem, to determine seasonal patterns and the species most affected, and to develop a means to discern between chronic oil pollution and large oil spills. Piatt et al. (1985) made another estimate of 60,000 to 100,000 oiled seabirds per year. Neither their nor Tuck's estimate, however, included accurate data on the proportion of birds lost at sea, on the origin of beached birds, or on the number of birds lost on beaches between surveys; and both estimates were based on extrapolations to the length of the coastline rather than on seabird densities at sea. As a result, the estimates from these studies are but educated guesses. Oiled seabirds continued to wash ashore, and the real impacts in terms of overall seabird kill and seabird population stability remained unknown.

Determining these impacts is critical to promoting initiatives to reduce chronic oil pollution, especially given the region's geographic importance for seabirds. Newfoundland lies at the easternmost extremity of North America. Major shipping routes between North America and Europe converge here and overlap with the range of more than 40 million pelagic birds that are estimated to reside or migrate annually through the Grand Banks, an area considered to be the most important wintering ground for seabirds in the North Atlantic, and one of the most productive marine areas in the world (Chardine 1995, Montevecchi 2000).

Analysis of the information collected by the Canadian Wildlife Service during beached bird surveys conducted between 1984 and 1999 showed that the proportion of oiled birds has fluctuated over the years, but that overall, 62 per cent of dead birds found on beaches are oiled. The proportion of oiled birds found is the internationally accepted index for chronic oil pollution and represents the risk to birds of coming into contact with oil spilled in the marine environment and dying from such

contact. During the last five years, this rate was 75 per cent (Wiese and Ryan 2002, in review). This implies that three out of four birds found dead on beaches perished as a result of oil, and that the risk to birds of contacting spilled oil and dying as a result is very high in Atlantic Canada. Although it is to be expected that the oiling (that is, mortality) rate should be higher in northern latitudes and colder oceans because the thermal stress to birds after oiling is greater (Hartung 1967, Jenssen et al. 1985, Culik et al. 1991, Doerffer 1992), Newfoundland's overall oiling rate is disproportionately high. In comparison, Germany's and Denmark's rates are stable at around 47 per cent; in the Netherlands the rate has declined from 57 to 38 per cent over the last 20 years; the rate on the west coast of the United States and Canada is below 23 per cent; and the rate on the east coast of the United States was constant at 6.6 per cent between 1975 and 1983 (Burger 1993a, Vaitakus et al. 1994, Heubeck 1995, Nur et al. 1997, Camphuysen 1998).

As found in studies elsewhere (Camphuysen and Heubeck 2001), auks (murres, dovekies) and diving ducks (mostly eiders) are the avian groups most affected by oiling in Newfoundland because they spend most of their time on the water or underwater (Wiese and Ryan 2002, *in review*). Auks and sea ducks are known to dive as an escape response, a behaviour that makes them more vulnerable to oil at sea than species more likely to evade a slick by taking flight (e.g., gulls, gannets). The much higher number of oiled murres compared to all other species reflects their abundance during the winter months. But the overall species-specific oiling rate for murres of 72 per cent, and of 80.4 per cent during the last five years, also ranks among the highest in the world (Camphuysen 1998) and clearly reflects regional oiling risk differences.

In addition to the high proportion of oiled birds found in the study area, the linear density of oiled birds on studied beaches (0.77/km) is also markedly higher than in other regions of the world during a comparable time period (0.02/km to 0.33/km) (Burger 1993a, Vaitakus et al. 1994, Heubeck 1995), and has remained at these high levels for the last 16 years.

As in the North Sea (Camphuysen and Heubeck 2001), oiling rates in Newfoundland are significantly higher in winter than in summer (Wiese and Ryan 1999). Yet, given the strong relationship between weather and oiling rates, it is doubtful that chronic oil pollution occurs only in the winter (Wiese and Ryan 2002, in review). Rather, lower oiling rates in the summer may reflect (1) reduced numbers of highly vulnerable birds such as murres, dovekies, and eiders; (2) reduced overlap with shipping lanes during the nesting season (Lock et al. 1994); (3) reduced susceptibility of seabirds to oil in warmer ambient and sea surface temperatures; (4) faster dispersion of refined oils at higher sea surface temperatures; and (5) faster loss of volatile and soluble toxic components of crude oils and faster reduction of these oils to

biologically inert solids, such as tar balls, at higher sea surface temperatures (Bourne and Bibby 1975, Kennish 1997, Wiese and Ryan 2002, in review). Observations of body conditions and the degree of oiling of beached birds further strengthen this possibility. Small quantities of oil on a carcass, combined with its extreme emaciation, indicate that the bird lived for a while after contacting the oil and before perishing, probably from hypothermia and starvation during harsh weather (Camphuysen and van Franeker 1992). The factors listed above together result in lower observed oiling rates during summer, even though the level of chronic oil pollution may be the same as during winter (Wiese and Ryan 2002, *in review*).

1.4 NUMBER OF BIRDS KILLED BY CHRONIC OIL POLLUTION IN ATLANTIC CANADA

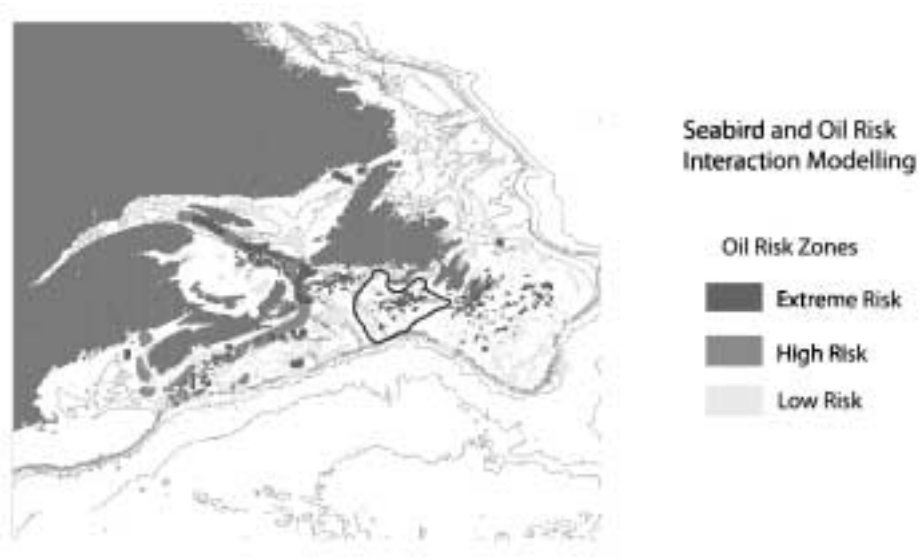
To estimate accurately how many birds die annually owing to chronic oil pollution in Atlantic Canada, researchers have experimentally determined several parameters, described below (Weise 2002). First, they determined the proportion of birds that die at sea and later wash up on the shore. When birds die at sea, they float for only a limited period of time before they naturally lose their buoyancy and sink. Depending on wind conditions, dead birds often do not drift toward the shore, and some floating carcasses get eaten while drifting. As a result, only a small proportion of birds that die at sea reach the shore. To determine the meaning of the number of dead birds counted on beaches in terms of bird mortality at sea, researchers constructed wooden drift blocks and empirically tested their ability to accurately mimic the drift of dead seabirds (Wiese and Jones 2001). Seven thousand of these drift blocks were dropped all along the southern and southeastern coasts of Newfoundland at different times of the year, in different years, and at different distances from shore. Because the wooden blocks would not be lost due to sinking, as dead birds are, researchers conducted a buoyancy loss experiment to determine the average time it takes seabirds to sink under natural conditions and to see whether there was a difference in the time it takes oiled and unoiled carcasses to sink. No differences were detected, and birds remained afloat for an average of eight days. Results from the drift block experiments showed that, generally, only birds that die relatively close to shore (less than 20 nautical miles [nm] offshore) wash up on the beach, and on average, only 5 per cent of them do. Recovery patterns, however, fluctuated between 0 and 23 per cent and clearly indicate that recoveries are extremely weather dependent and that all events have to be analyzed in the context of the wind conditions that prevailed two weeks before a bird was found.

Second, researchers determined the relationship between birds counted during weekly beach surveys and those lost and not counted after washing up on a beach. Since dead birds on a beach are quickly scavenged by foxes, crows, and gulls or are buried in the beach substrate by the wave action, the time during which beached

birds can be counted is limited. To calculate the proportion of lost birds that wash up on the beach, researchers conducted carcass persistence experiments at three different times of the year, in two years, on five different beaches simultaneously. Seven experiments using 650 bird carcasses demonstrated that, on average, bird carcasses — whether oiled or unoiled — persisted on a beach for only three days.

Third, from weekly winter surveys along the Cape Shore, Newfoundland, from 1998 to 2001, they determined the number and species composition of birds that washed up on shore and the proportion of those that were oiled. These parameters were combined into an Oiled Seabird Mortality Model for Atlantic Canada, which was corrected for persistence and probability of detection. The model also took into account beaches that could not be surveyed because of their inaccessibility; in addition, it incorporated the estimates from the drift block experiments, corrected for weather patterns. The researchers calculated the density of dead seabirds per unit area of ocean per week; they then extrapolated the calculations to a seasonal estimate for a larger area where distributions of the most commonly affected species overlap areas of high ship-traffic and frequent oil spill sightings. Figure 3 illustrates the area where seabird mortality due to chronic oil pollution was calculated. The bulk of seabird mortality due to chronic oil pollution appears to occur in this area, although oiled beached birds have been recorded elsewhere in Atlantic Canada.

FIGURE 3: AREAS FOR WHICH SEABIRD MORTALITY WAS CALCULATED



SOURCE: Modified from Environment Canada 1998.

The estimate of mortality due to oil in Atlantic Canada is 300,000 seabirds per year, which is regarded as very conservative for several reasons: (1) the most conservative value for each parameter in the model was used, (2) the estimate only accounts for the winter months (October through March), and (3) the extrapolation that resulted in this estimate was only to a geographic area for which such a calculation was justifiable, given the actual state of knowledge. However, records of oiled birds in other parts of Atlantic Canada were not included in the estimates described here.

On average, a minimum of 300,000 seabirds are killed every year in the waters of Atlantic Canada as a result of illegal activities of ship operators, a yearly seabird mortality equal to that caused by the Exxon Valdez disaster in Alaska in 1989. Oiled birds continue to wash ashore; whether these losses have had, or will have, a deleterious effect on seabird populations is unknown.

1.5 IMPACT OF CHRONIC OIL POLLUTION ON SEABIRD POPULATIONS IN ATLANTIC CANADA

Human activities can cause three different negative effects on seabird populations: (1) reduction or cessation of population growth, (2) population decline, and (3) population or ecological extinction. Seabirds do not recover quickly from a serious decline in population and they are extremely vulnerable to sustained adult mortality. This is because breeding may not begin until at least four years of age, and pairs usually produce only one egg per year. This low annual fecundity is normally compensated by high adult survival and longevity. However, breeding seabirds are also highly social, and population viability often relies on very high, critical numbers of breeding adults.

Breeding-population size for any species varies naturally from year to year and depends mostly on a variety of environmental conditions encountered on the winter grounds (Gaston *in review*). Because of these natural fluctuations, real population decline can be difficult to detect. When detected, however, the decline is usually quite severe and immediate remedial actions are required. Where colonies are monitored intensively and where modern modelling techniques are employed, it may be possible to see some earlier signs that conditions are not "normal." The most obvious of these signs is a reduction or cessation of population growth. Under such conditions, a population may appear to be stable, and human activities may not appear to be causing any damage when, in fact, their impact can be quite substantial even though a severe population decline is not yet evident.

Of the seabird populations affected by spilled oil along the south coast of Newfoundland, the species most affected is the thick-billed murre (*Uria lomvia*).

It constitutes more than 60 per cent of the seabird populations of that area and more than 80 per cent of the surveyed oiled seabirds. Sexual maturity is late in this species: it lays only one egg per year, lives up to 40 years, and has a high adult survival rate. Thick-billed murres overwinter in the waters of Atlantic Canada but 85 per cent breed in the eastern Canadian Arctic and 15 per cent breed in Greenland. The population in Greenland numbers approximately 400,000 breeding pairs but has declined by 80 to 90 per cent over the last 50 years as a result of the combined effects of a summer egg harvest, summer and winter hunting, mortality in fishing nets, and oiling (Kampp et al. 1994). The relative contributions of each of these factors to the demise of this population has not been investigated. The 1.5 million breeding pairs in the eastern Canadian Arctic suffer winter mortality due to both oiling and hunting. The traditional hunt in Newfoundland harvests approximately 200,000 thick-billed murres from Canadian colonies (Elliot 1991, J. Chardine, Research Scientist, Canadian Wildlife Service, personal communication).

The thick-billed murre population in the Canadian Arctic grew through the 1980s and has been stable since 1997, but is likely to decline over the next 20 years if human-induced mortality remains at current levels. These predictions, which are based on studies conducted by the Canadian Wildlife Service, also showed that in the absence of mortality due to oiling and hunting, the murre population has a yearly growth potential of 4.6 per cent — that is, it is a healthy population with a growth rate similar to that of colonies in the United Kingdom. However, due to hunting and, more important, to illegal discharges of oil at sea, all potential growth of this population has been eliminated. Mortality due to oiling affects population trends twice as much as does hunting. This is because more adult birds are killed from spilled oil than are killed in the harvest, and adults normally have lower mortality rates. In contrast, juveniles are overrepresented in the harvest but they have higher natural mortality rates anyway and they do not breed.

The studies have also shown that the thick-billed murre populations are now extremely sensitive to other catastrophic changes in their ecosystem because they have no "growth buffer" from which to withstand additional impacts. If the human-caused mortality due to oil continues or worsens, and if it coincides with periods of unfavourable environmental conditions (e.g., less ice, warmer water) for murres and their prey, the Atlantic Canada murre population could easily meet the same fate as its Greenland counterpart.

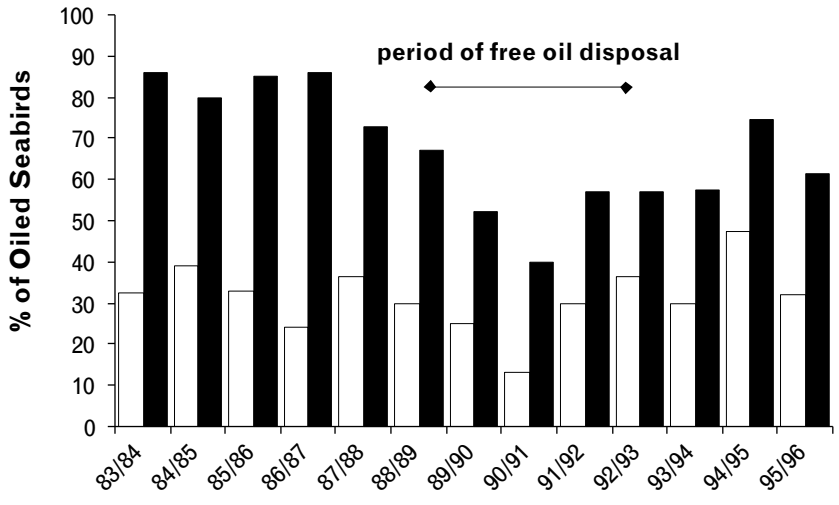
1.6 REMEDIAL TOOLS: THE SIMPLE FACTS

It is disturbing that four decades after the problem was first described, oil continues to be a big threat to many seabird species in Atlantic Canada, especially since the

solutions to the problem are straightforward. The examples of the Netherlands, Germany, the United Kingdom, and the United States are very instructive. Beaches in the Netherlands have been monitored since 1915 (Camphuysen 1989). Over the last two decades, beached bird surveys along the North Sea have indicated a 57 per cent decline in chronic oil pollution (the proportion of oiled birds found is 38 per cent), a decline credited directly both to increased enforcement and surveillance in the area and to decisions to clean up oil slicks rather than wait for them to dissipate naturally (Camphuysen 1998). A temporary decline in the proportion of oiled birds was also found in Germany after no-charge oil disposal facilities were introduced between 1988 and 1991. This decrease, however, was only regional, as parallel investigations in Denmark showed no such trend (Averbeck et al. 1992), and the proportion of oiled birds subsequently increased again in Germany after a fee was reintroduced (Reineking 1997). Figure 4 shows changes in the percentage of oiled seabirds found along the German coast during the winters (October–April) of 1983 to 1996. Clear bars indicate oiled seabirds as a percentage of all birds found, and solid bars indicate oiled murres as a percentage of all murres found. The figure labels the period in which oil disposal facilities on land were available free of charge for shippers.

Finally, fines imposed in the United Kingdom and the United States amount to hundreds of thousands of dollars (see section 1.7.6) and send a clear message to ship operators that local authorities in those countries will not tolerate illegal activities. This strategy appears to be effective because beached bird surveys in those countries indicate low proportions of oiled birds.

FIGURE 4: CHANGES IN THE PERCENTAGE OF OILED SEABIRDS ALONG GERMAN COAST, WINTERS 1983 TO 1996



SOURCE: Adapted from Reineking 1997.

Results of this kind show that it is possible to reduce this human-caused impact on seabirds by means of rigorous enforcement, high imposed fines, and adequate and convenient on-land oil disposal facilities (Averbeck et al. 1992, Camphuysen 1998, Wells 2001, Wiese and Ryan 2002, in review). These examples, however, also accentuate the need for international cooperation to solve this problem. Issues concerning enforcement, fines, and oil disposal facilities are described in the following sections.

1.7 ENFORCEMENT

In a broad sense, enforcement includes in-port inspections; surveillance; ship-traffic monitoring; investigation, detention, prosecution, and conviction; and fines. Each of these is described in detail below.

1.7.1 IN-PORT INSPECTIONS

Canada is a signatory to the Paris Memorandum of Understanding and the Tokyo Memorandum of Understanding, both regional agreements on port state control that set goals for ship inspection rates of 25 per cent and 50 per cent, respectively. Regional approaches like these are necessary so that operators will not just divert their ship to ports in regions where no, or less stringent, port state control inspections are conducted (Hoppe 2000). Another reason for cooperating with other ports in the same region is to ensure that identified cooperating ships are effectively monitored. Although legislation is in place, inspection, investigation, and prosecution of ships are usually difficult tasks. A ship can travel along the coasts of a number of countries en route to a destination port. An oil slick deposited by such a ship may not be discovered for several days, and a number of other ships may have travelled through the same area during that time, which makes identifying the culprit ship difficult.

To assist in the investigation of these types of occurrences, a number of countries have signed MARPOL. This convention advocates cooperation among countries in inspecting ships and investigating offences, and sets up a system of port states and coastal states. The port state is the country in which the ship is legally registered, and the coastal state is the country whose waters the ship was in when an incident occurred. MARPOL permits either port states or coastal states to inspect all ships within territorial waters and exclusive economic zones, as long as international protocols are followed. Enforcement relies on ship inspections to ensure compliance with legislation concerning structural safety and cargo monitoring systems; the legislation is designed to ensure that ships are properly built, maintained, and operated. Inspections also include examining ship logbooks and records of movement of oil onboard. The amount of oil in slop tanks and bilge tanks and any oil that is

incinerated or pumped ashore to proper disposal facilities must be recorded in the ship's oil logbook. These records allow inspectors to audit the entries to determine if operators are handling and disposing of oil and oily wastes properly. Ships can be inspected when they enter a port, but often little evidence exists to indicate that a given ship has discharged oily wastes into the ocean hours earlier. Recent court cases (e.g., the case concerning Royal Caribbean International) have shown that more follow-up action is required to detect false entries and other fraud-related offences. The rigour and frequency of current in-port inspections in Atlantic Canada are neither sufficient nor effective enough to curtail illegal dumping of oil on their own (Wayne Turpin, Chief of Enforcement for Atlantic Canada, EC, personal communication).

Thus, enforcement relies more on surveillance of national waters by means of aircraft, satellites, and ship patrols to deter offenders from illegally discharging oily materials into the ocean. The enforcement program includes the distribution of educational materials to ship's crews and shipping companies as in, for example, Operation Clean Feather (Chardine and Pelly 1994). These materials generally point out the damage that oil can cause to the environment and encourage good environmental practices.

1.7.2 SURVEILLANCE

To ensure that ships engaged in illegal dumping can be caught with sufficient regularity to create an effective deterrent, the authorities must inspect all major sea-lanes at regular intervals. In addition to dedicated offshore oil pollution flights made by Transport Canada (TC) and the Canadian Coast Guard (CCG), commercial airline pilots and personnel of Department of National Defence (DND) airplanes and Department of Fisheries and Oceans (DFO) patrols are encouraged to report sightings of oil and oily wastes. Recently, satellite technology such as RADARSAT has improved surveillance. RADARSAT-1 detects oil slicks with Synthetic Aperture Radar (SAR), which can pierce cloud cover day or night. Radar can detect oil slicks because they smooth the sea surface slightly, changing the amount of radar energy normally reflected back to the satellite. RADARSAT-1's resolution ranges from 10 metres to 100 metres, and the satellite can view swaths from 50 kilometres to 100 kilometres. It orbits the earth 14 times a day, repeating orbits every 23 days. Operators can "steer" its beam to observe any spot on earth within 1.5 days to 8.0 days. According to RADARSAT International, in the case of an emergency, RADARSAT can produce rough satellite images within hours. Prices for these vary, but a typical RADARSAT image costs around C$3000. The use of RADARSAT, however, has been limited to date; time coverage is still considered to be limited, and airplane or ship support is still required to confirm sightings. Greater reliance on satellite data will be possible with the development of new technology, especially with ENVISAT ASAR (Environment Satellite Advanced Synthetic Aperture Radar) and RADARSAT-2 (Oil Spill Hazard Team 1997).

At present, many countries, including Canada, do not have or do not allocate sufficient resources to mount or sustain an effective airborne surveillance program that includes aircraft and satellites. The states on the North Sea, however, have agreed to pool airborne surveillance information to optimize overall monitoring. Such agreements could be extended to other areas (e.g., the Persian Gulf, the Mediterranean, Southeast Asia), resulting in a more effective basis for deterring illegal spills and optimizing airborne and satellite monitoring. But in most countries, until satellite technology can efficiently complement a well-funded aerial surveillance program, surveillance relies mostly on airplanes. The advantages of using airplanes are that they can monitor large areas efficiently if sufficient funds are available, they can detect oil and provide good quality evidence, and ships' crews easily notice them and therefore may be deterred from dumping oil.

In comparison with the aerial surveillance efforts of some other countries, Canada's efforts are poor (see Table 1). During daytime, about 4,900 square kilometres can be surveyed efficiently in one hour by an aircraft flying at an altitude of 300 to 500 metres and at an average speed of 330 kilometres per hour (L. Deneault, pilot of Dash-8 oil patrol aircraft in Ottawa, TC, personal communication). These numbers indicate that Canada's coverage is clearly insufficient, both nationwide and locally for Newfoundland. The available hours for aerial surveillance by the CCG in Newfoundland were even reduced for the winter of 2000/01, from 350 hours to approximately 300 hours. As mentioned above, aerial sightings are often the only means of detecting marine polluters and are of great importance in prosecuting them.

TABLE 1: COUNTRY COMPARISON OF AERIAL SURVEILLANCE COVERAGE AND EFFICIENCY 1997

	Canada	Newfoundland	United Kingdom	Australia	Baltic Sea states
Area to survey, km²	over 2,570,000*	over 675,900*	over 275,000*	over 11,000,000	416,000
Hours of aerial surveying	850	400	925	15,358	5,638
Days coverage/year (assuming 5 h/flight average in NF)	170	80	185	365 (4 h daily)	365 (15 h daily)
% of area covered/day**	0.95	3.6	8.9	1.87	17.67
Number of times area is covered effectively/year**	1.6	2.9	16.5	6.8	64.5

Notes:

* *Canadian Geographic World Atlas,* 1998.,

** Effective coverage is 4,900 square kilometres per hour.

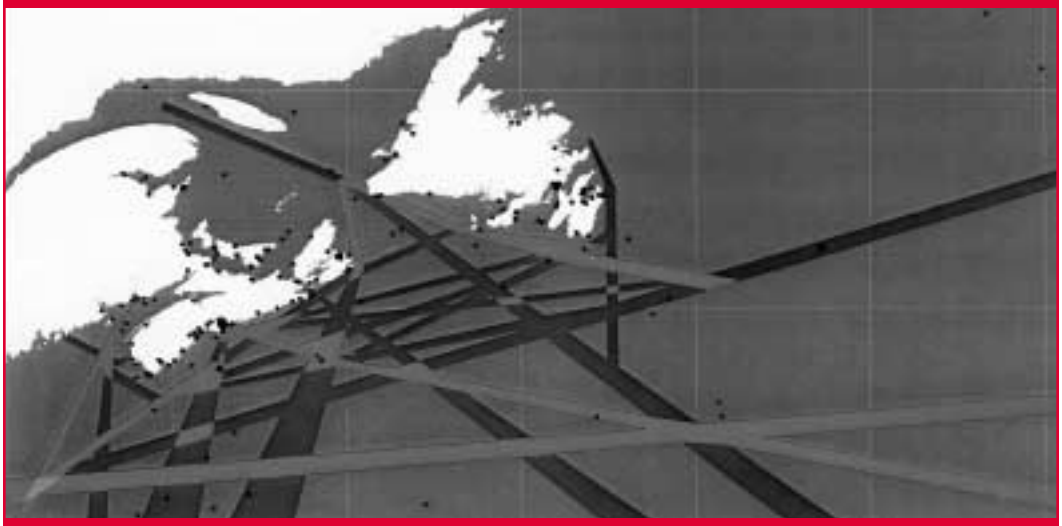
Source: Adapted from Canadian Coast Guard 1999.

All boats investigated for offshore oil pollution in Atlantic Canada were detected by aerial surveillance; between 1989 and 2000, the number of slicks sighted every year ranged from 6 to 25. The presence of surveillance planes may have prevented more occurrences of oil dumping. Since dead oiled seabirds most likely will not wash up on Newfoundland shores unless they die within 20 nautical miles of the coast (Wiese 2002), aerial surveillance is the only means of detecting oil slicks in the offshore environment. If aerial surveillance is not carried out to a level at which coverage and deterrence are efficient, reducing oil dumping at sea will probably not be possible.

1.7.3 SHIP-TRAFFIC MONITORING

Current Canadian legislation extends the enforcement of shipping, environmental, and wildlife law to the 200-mile exclusive economic zone; but some federal legal decisions have restricted these laws to the 12-nautical-mile territorial zone (Wayne Turpin, Chief of Enforcement for Atlantic Canada, EC, personal communication), thereby effectively tying the hands of enforcement personnel. Ironically, many ships that come close to the east coast of Canada are never detected because they do not have to report their presence to the Canadian authorities if they remain outside the 12-nautical-mile limit or if they are not travelling to a Canadian port. Detailed ship-traffic information on all vessels in the area is extremely important because many oil spills occur in areas of high ship-traffic (see Figure 5) and often are detected only once the ship responsible for the pollution has left the area. In addition to aerial surveillance, several other methods relating to ship-traffic monitoring have been considered in the past (CCG 2001). Perhaps the most effective method, which should be considered seriously in Atlantic Canada, is the establishment of a monitoring control zone (MCZ). An MCZ would require all ships to report when they enter and leave the zone and would allow reminders about local regulations and enforcement measures to be delivered to ship operators. In addition, the use of automated identification systems is currently being explored by CCG and, if effective, would increase the knowledge of the number and types of boats present in this vulnerable area at all times (CCG 2001).

FIGURE 5: KNOWN OIL SPILL LOCATIONS IN RELATION TO SHIPPING LANES IN ATLANTIC CANADA, TRAFFIC FROM JANUARY TO APRIL



SOURCE: Adapted from Lock et al. 1994.

Finally, Canada should continue to pursue the establishment of a marine protected area or special area on the Grand Banks. In 1998, the Marine Environment Protection Committee (MEPC), the International Maritime Organization's (IMO's) senior technical body on marine- pollution matters, agreed to the establishment of the North West European Waters Special Area, which was to take effect on 1 August 1999. In special areas, all discharges of oil or oily mixtures into the sea from any oil tanker or ship over 400 gt are prohibited. The governments of the countries concerned confirmed to MEPC that in accordance with MARPOL requirements for special areas, adequate facilities for the reception of dirty ballast and tank-washing water from tankers are necessary throughout the special area (see section 1.9).

The waters of northwest Europe were made a special area under Annex 1 of MARPOL 73/78 in September 1997. The waters comprise the North Sea and its approaches, the Irish Sea and its approaches, the Celtic Sea, the English Channel and its approaches, and part of the Northeast Atlantic immediately to the west of Ireland. Other special areas designated under Annex I of MARPOL 73/78 include the Mediterranean Sea area, the Baltic Sea area, the Red Sea area, the Gulf of Aden area, and the Antarctic area.

MEPC also adopted, in November 1999, a new resolution for the designation of a particularly sensitive sea area (PSSA), which supersedes the previous guidelines in resolution A.720(17) (adopted in 1991). The proposed new procedures simplify the consideration process at IMO and take into account environmental, ship-safety, and

navigational aspects. Under the guidelines, a member government or two or more member governments that share a common interest may submit an application to IMO for identification of a PSSA and the adoption of associated protective measures, or an amendment thereto.

The application should include a summary of the objectives of the proposed PSSA identification, the location of the area, the reason for protection, and a preliminary proposal for associated protective measures, including the reasons why these proposed measures are the preferred method for providing protection for the area to be identified as a PSSA. The application should first set out a description of the area, the significance of the environmental characteristics of the area at risk of damage from particular international maritime activities, and an assessment of its vulnerability to damage by these activities. Second, the application should show how the proposed associated protective measures — such as routing measures, strict application of MARPOL discharge and equipment requirements for ships (such as oil tankers), and installation of ship-traffic services — will protect the area from the identified risks. For such an application to be successful, however, the presence of proper land-based oil reception facilities is an important requirement (see section 1.9). Currently, two PSSAs have been designated: the Great Barrier Reef in Australia, and the Sabana-Camagüey Archipelago in Cuba. For more information, see http://www.imo.org.

1.7.4 INVESTIGATION, DETENTION, PROSECUTION, AND CONVICTION

Deterring marine polluters can be accomplished by detaining ships, maintaining high prosecution rates, and imposing large fines. In Canada, when an oil slick is detected within the Canadian 200-mile exclusive economic zone and a ship is suspected of being the source of the slick, MARPOL can be enforced in one of three ways, as described below.

1. Under the Canada Shipping Act (CSA), the Migratory Bird Convention Act (MBCA), the Canadian Environmental Protection Act (CEPA), and the Fisheries Act (FA), enforcement officers and pollution prevention officers (PPOs) are empowered to turn a ship back to any port to allow further investigation, and to detain the ship once it arrives in port (as mentioned above, this power has recently been restricted to the 12-nautical-mile limit, although discussions on this limit are still in progress). The power to turn a ship back to a Canadian port is rarely exercised, despite the fact that many ships involved in marine pollution incidents are destined for foreign ports and once such ships leave Canadian waters, investigations become very complicated. To date in Atlantic Canada, only one vessel has been turned around and directed back to port; detentions have been relatively rare. Compared with imposing fines, which are often low

(see section 1.7.5), detaining and redirecting vessels to Canadian ports would be an effective method of deterring polluters because these measures are costly to ship operators.

Coastal states have the right and the responsibility to ensure compliance with environmental laws, and thus detaining vessels suspected of causing marine pollution is justified. In the United Kingdom, for example, the Maritime and Coastguard Agency reported 169 detentions of foreign vessels in their ports in 1998 alone. Of interest is a new IMO convention on the arrest of ships, which spells out global standards for the arrest of ships facing maritime claims, including allegations of pollution or threat of pollution. This convention — the International Convention on Arrest of Ships, 1999 — was unanimously adopted by senior representatives of nearly 100 nations on 12 March 1999 at a joint United Nations and IMO diplomatic conference in Geneva, Switzerland, and could take force six months after 10 nations ratify it. The convention became available for signatures on 1 September 1999. No updates on the status of this convention have been released, but it would supersede international guidelines, unchanged since 1952 and adopted by 75 countries. Notably, the 1999 convention recognizes a broad variety of claims by salvers, by people who respond to spills, and by victims of pollution as grounds for detaining a ship or restricting its movement. Claims include salvage operations intended to prevent pollution and "reasonable measures of reinstatement of the environment." In a crucial vote, conference delegates deleted draft language that would have allowed governments to arrest a ship while it was under way. "This means it will be for national courts to determine when ships may be arrested within their jurisdictions," says Linda Howlett, legal advisor to the International Chamber of Shipping. Although ship owners now face "greatly expanded" grounds for arrest of their vessels, they gain "international uniformity" in ship-arrest law, Howlett says. She calls the convention "reasonably balanced" (for more information, see Appendix 1).

2. A vessel detected polluting Canadian waters can be prosecuted under Canadian law, in which case authorities usually board the ship once it arrives in port. Vessels of foreign registration as well as Canadian vessels can be detained and charged under Canadian law.

3. The pollution incident can be referred to the flag state (the country in which the vessel is registered) for prosecution (Article 4 of MARPOL). Once a report is made to the flag state, it is up to that country to lay charges, and all control of the prosecution is lost by the country whose waters were polluted. The success rate of this enforcement method is extremely low. Between 1979 and 1988, TC Atlantic Region referred 58 incidents to foreign states, but received only 26

responses about them. TC could not provide an update of these figures (M. Balaban, Senior Marine Safety Officer, TC, personal communication). Of the responses, only 13 indicated convictions, leading to a total of $34,362 in fines (Brander-Smith et al. 1990). This amounts to $2643 per conviction, for 22.4 per cent of all incidents reported! In the United States, the success rate of referrals to foreign flag states is even worse, and action was taken in only 2 of 111 cases (Frantz 1999). Given this rate, prosecution in the country in whose jurisdiction the offence occurs is clearly the only effective means to obtain convictions.

Under current Canadian legislation, oil polluters can be charged under the CSA, MBCA, FA, and CEPA. Dozens of reports concerning offshore oil pollution are received by TC and EC every year. Very few of these reports are investigated because resources for gathering evidence are limited and consequently convictions are unlikely. Where evidence is sufficient to carry out an investigation and lay charges, the majority of polluters are charged under the CSA. This act deals primarily with poor shipping practices and does not include charges relating directly to deleterious effects on wildlife or the marine environment, as some of the other acts do. Since 1996, EC has charged only five vessels (*Elm, Brandenburg, Atlantic Cartier, Donau Ore, and Sandviken*) under the MBCA, which is the only legislation that directly protects migratory seabirds from such offences. In four of these cases, federal prosecutors either preferred to proceed under the CSA or dropped the charges completely. In only one case, that of the *Donau Ore*, the ship was convicted under the MBCA and a fine of $30,500 was levied in an out-of-court settlement (N. Melling, Oil Pollution Investigator, EC, personal communication). This is the first and only time in the 40-year documented history of oiled birds on beaches in Atlantic Canada that the impact of spilled oil on seabirds has been legally acknowledged.

The few charges and poor success of convictions under the MBCA, however, do not reflect a lack of interest by EC in this issue. Rather, the lack is clearly one of resources to collect suitable evidence to pursue more cases. As well, it appears that prosecutors prefer, or are more inclined to proceed under, the CSA for three reasons. First, the CSA has greater precedence; second, it seems easier to gather evidence for cases tried under this law; and third, TC has been the lead agency in these investigations in the past. Environmental interests, however, are clearly not represented properly under the CSA; government departments cooperating and laying joint charges would seem to be reasonable actions to take. In theory, an umbrella memorandum of understanding exists in Atlantic Canada between TC Atlantic Region, EC Atlantic Region, and CCG Newfoundland Region. It outlines the cooperation between these government agencies in oil pollution incidents and should facilitate the laying of joint charges and a reduction of investigation costs. Unfortunately, in reality this cooperation is far from optimal. TC has not signed the enforcement memorandum of understanding, which outlines the more applied part of cooperative investigations, and

some "territorial" issues appear to exist between government departments. Therefore, effective cooperative actions between government agencies, such as cooperative investigations and the laying of joint charges, which have proven so effective elsewhere (e.g., in the United States), have not been taken in Atlantic Canada.

1.7.5 FINES IN ATLANTIC CANADA

Current Canadian legislation and the regime of fines for illegal discharge of oil at sea are adequate and high by international standards (Schmidt Etkin 1999). As mentioned above, polluters can be charged under the CSA, CEPA, MBCA, and the FA, depending on the offence. Although fines vary, a maximum fine of $1 million can be imposed (see Table 2).

TABLE 2: REGIME OF MAXIMUM FINES UNDER CANADIAN LEGISLATION FOR ILLEGAL DISCHARGES OF OIL AT SEA

ACT	OFFENCE	SUMMARY CONVICTION	INDICTABLE OFFENCE
CSA	poor shipping practice	$250,000 and/or up to 6 months in prison	$1 million and/or up to 3 years in prison
CEPA	dumping of any substance unless permitted by law	$250,000 and/or up to 6 months in prison	$1 million and/or up to 3 years in prison
FA	altering, disrupting, or destroying of fish habitat, discharging of deleterious substance in water frequented by fish	$300,000 and/or up to 6 months in prison for subsequent offences	$1 million and/or up to 3 years in prison for subsequent offences
MBCA	depositing of oil or oily wastes in any waters frequented by migratory birds	• $100,000/day/bird for a corporation, plus amount of benefits due to commission of the offence • $50,000/day/bird for an individual and/or 6 months in prison, plus amount of benefits due to commission of the offence • double for subsequent offences	• $250,000/day/bird for a corporation, plus amount of benefits due to commission of the offence • $100,000/day/bird for an individual and/or 5 years in prison, plus amount of benefits due to commission of the offence • double for subsequent offences

Imposed fines — not theoretical fines — are the effective deterrent against pollution, however, and these have remained low. Between 1979 and 1988, fines under the CSA averaged $4,700 (Brander-Smith et al. 1990). Since the judicial system works on the basis of precedent, the increase of fines since then has been slow. The highest imposed fine for offshore oil pollution in Atlantic Canada until 2001 was $40,000. On 25 February 2002, the M/V *Baltic Confidence* was fined $125,000 for illegally discharging oily substances into Canadian waters (see Appendix 2). Although this tripling of the maximum imposed fine to date is very encouraging, TC reported only 24 successful prosecutions between 1994 and 2001, with an average fine of $21,437 (M. Balaban, Senior Marine Safety Officer, TC, personal communication).

Low levels of surveillance and imposed fines that are small in comparison with those of other countries along the Great Circle Route raise three important issues for Canada. First, spills are seldom detected, vigorous investigations are difficult and uncommon, and convictions are rare. Second, even though ship owners must pay only $2,600 per ocean crossing to discharge their waste at a reception facility (Martin 2001), they still find it cost-effective to dump oil illegally in Canadian waters (ship owners do not dump oil in international waters, preferring instead to keep the extra ballast onboard while on the open ocean). Third, enforcement investigations leading to prosecutions each cost the Canadian government an average of $30,000 (Wayne Turpin, Chief of Enforcement for Atlantic Canada, EC, personal communication). Such funds usually come from other programs that subsequently get cut, and little of the money collected in fines flows back into the programs to support them (see section 1.10). By not enforcing national legislation and international conventions and regulations as effectively as other countries do, Canada appears to be sending the message to ship operators that it will tolerate illegal dumping of oil.

1.7.6 FINES WORLDWIDE

The following examples show the range of fines imposed worldwide for illegal oily waste dumping. Due to the nature of each investigation, comparing different cases that take place in different countries is difficult. The examples are presented here, however, to point out processes followed elsewhere in the world that would be instructional for Canada.

In the United States, Royal Caribbean International was found guilty of routinely bypassing antipollution devices (oily-water separators) and dumping oily wastes overboard, as well as routinely falsifying oil record books. Apparently, bypass systems had been in place on some of the company's ships since 1990. What started as a thorough investigation of a 7-kilometre oil slick observed behind one of the company's ships (a slick very similar to others noted off the east coast of Canada) resulted in a full investigation of the company and a final fine of US$23 million for all offences of falsification and illegal discharges (including awards for environmental damages). One other damage claim against the company is still to be settled (Frantz 1999). Clearly, this investigation grew as more evidence was gathered, and the case against Royal Caribbean International was certainly larger and more severe than those the Canadian authorities usually confront. In such a case, fines in Canada would most likely have been substantially lower, given Canadian legal precedents.

Perhaps more comparable to routine situations in Atlantic Canada was the 1997 case of the bulk-liquid carrier *M/V Frances Hammer*, a vessel registered in the United States. This ship was charged with illegally dumping oil on the high seas in the Atlantic Ocean (about 720 nm southeast of Newfoundland). An estimated 204 metric

tons of oily waste were spilled, and, as expected because of the distance from land, no effects on shorelines or wildlife were ever detected. The *M/V Frances Hammer* had left Hamburg, Germany, en route to Tampa, Florida, on 30 March 1993 with oily bilge water (slop) in its tanks because the captain did not want to wait to deposit it at the reception facility in Hamburg. When the ship arrived in Tampa, its oil logbook showed that a discharge had taken place at sea (a rare case in which the offence is recorded in the logbook!). In December 1997, the owner/operator of the vessel was charged US$50,800 and placed on probation for two years. The company was ordered to pay US$203,200 in restitution for harming the environment, and the captain faced a maximum of five years in prison, a 24-month suspension of his licence, and a fine of US$250,000. The chief mate agreed to pay a fine of US$5,000 and surrendered his papers for one year. The total sum of these fines: US$509,000.

In Australia, the maximum fine that can be imposed by law is C$200,000 for the master and up to C$1 million for the vessel owner. The highest Australian fine for chronic oil pollution was imposed in 1999 when the *M/V Asian Glory* was fined C$100,000 for spilling 50 litres of oil.

In the Netherlands, a 30-kilometre slick was spotted behind the *M/V World Prophet* in May 1999, and a fine of C$129,380 was imposed for that offence. (No information about the quantity of oil spilled is available, but slicks of its size are often observed in the waters off Newfoundland [Gerry Mallard, Exercising Officer/Aerial Surveillance Coordinator/Environmental Response, CCG Newfoundland Region, personal communication].)

In September 1998, the United Kingdom imposed its record fine of US$411,000. It was the first time a court had imposed Britain's maximum fine for ship pollution since the government quintupled the penalty on 1 September 1997. The crew of a passenger aircraft serving the Scilly Isles observed the ship discharging oil and alerted local authorities. A fisheries patrol plane followed the intermittent slick, which was about 30 metres wide, and found the *M/V Weser* at the end of it. The pilot took photographs, which prosecutors introduced in court. Observers last saw the oil about 9 kilometres off Cornwall, and it is believed that rough seas dispersed the slick, because no reports were received of environmental damage and the oil never came ashore. No chemical evidence linking the ship to the slick was available. Despite the lack of such physical evidence, the magistrates made it perfectly clear that this pollution created a serious risk to the environment. The court heard no satisfactory explanation as to what caused the spill and levied the maximum fine. With this case, the United Kingdom sent a clear message to the shipping industry that illegal dumping of oil in its waters will not be tolerated (OSIR 19 March 1998).

Appendix 3 contains reports regarding other relevant cases of chronic oil pollution and mystery spills, issued by the *Oil Spill Intelligence Report*, which is published by an organization that provides news, data, and analysis in the environmental and energy sectors. Additional cases and surveillance regimes in other countries have been reviewed by CCG (1999) in its report on the Prevention of Oiled Wildlife Project (POW) Phase II.

1.8 CONSIDERATIONS REGARDING LEVELS OF IMPOSED FINES

To efficiently act as a deterrent to polluters, a penalty must be appropriate to the offence. Proposed international guidelines for courts to determine appropriate penalties include the following factors that should be taken into account (Schmidt Etkin 1999):

- The amount of oil spilled
- The degree to which the pollution incident was intentional
- The efforts that were made to report and mitigate the damage
- The environmental or property damage resulting from the oil spill
- Previous violations by the party responsible
- The financial gain achieved by the party responsible through noncompliance

Several key issues, however, are not taken into consideration fully in these superficial guidelines and have therefore led to the problem of low imposed fines in Canada. These issues are described below.

1. Determining the volume of oil spilled is difficult. Estimating oil volume from any surveillance platform, such as an airplane, is an imprecise science at best. Generally, estimates of the volume of oil are based on colour codes and the surface area of the ocean covered by the slick. The actual volume is often underestimated because oil that is suspended in the water column (i.e., oil that is below the surface of the water) is never accounted for. As pointed out previously, no direct relationship is known to exist between the amount of oil spilled and the number of seabirds killed. To focus too much on the amount of oil spilled is, therefore, misleading. More relevant are factors such as the time of year and the location of the spill in relation to known seabird distributions and vulnerable marine habitat.

2. Environmental damages resulting from offshore oil spills are impossible to measure (see section 1.10), not because they are absent, but because of their location. Unless oil slicks are large and close to shore, no response team is deployed. Monitoring is done from airplanes, and oil slick trajectory models are used to predict day-to-day locations. Damage to the bottom fauna, flora, or fish populations cannot be assessed. If slicks occur in areas frequented by seabirds (which most areas on the Grand Banks are), seabirds will surely die. Yet again, unless slicks occur close to shore, no dead oiled seabirds will ever be found on the beach (see section 1.4). Courts need to focus on an estimate of environmental damage, calculated using the best current scientific models, rather than on the damage that can be measured, since in most cases that cannot be done.

3. Previous violations should play a larger role in sentencing. If the same party has offended in the past, the fine should increase substantially, regardless of the severity of the current offence.

4. In addition to considering the legal violation and the environmental damage, courts should, as the guidelines point out, consider the financial gains achieved through noncompliance by the party responsible. These include saving money by not using proper oil separation equipment (such as oily-water separators), by not paying for removal of oily waste, and by gaining time (i.e., by not going to an oil reception facility to dispose of oily waste legally). Fines should also include the cost of monitoring oil slicks (e.g., the aerial surveillance cost of approximately C$9,000 for 10 flight hours), as well as the costs of the investigation and prosecution (which average C$30,000 in Atlantic Canada).

   If the levels of imposed fines are not substantially higher in the future, shipping companies carrying millions of dollars in cargo will not be deterred from dumping oil at sea. The “polluter pays principle” is clearly not at work in Canada. Canadian courts must levy fines that reflect the immediate, potential, and long-term damage to wildlife, fisheries, and the environment that arises from persistent and deliberate acts of oil pollution. A minimum fine of $100,000 would be more effective than a maximum fine of $1 million that is never imposed; pollution would cease to be a profitable part of doing business, and fines would become a significant deterrent factor.

1.9 ON-LAND OIL RECEPTION FACILITIES

According to Brander-Smith et al. (1990), no port anywhere in Canada has sufficient pump-out facilities to handle contaminated tanker ballast; moreover, many ports either lack or have inadequate or inaccessible oil reception facilities for bilge slops.

If enforcement were more efficient and, as result, more ships followed the rules and made use of these facilities, they would become even more inadequate. In 1995, TC produced a reference manual on port reception facilities for marine wastes in Atlantic Canada. Forty-five ports were surveyed, of which only 20 indicated that they could receive oily bilge water. Facilities are insufficient in many places, however, and a few trucks serve many ports simultaneously (see Table 3), which may indicate that time delays occur at some facilities. In 1998, in accordance with MARPOL (see Appendix 4), Canada submitted to IMO a survey of 65 ports throughout the country, detailing their facilities for receiving oily wastes from ships. Out of these 65 ports, only 48 indicated that they accepted oily bilge water, although many impose restrictions. These inadequacies are a major impediment to reducing the chronic oil pollution problem and certainly increase illegal discharges of oil into Canadian waters.

TABLE 3: OILY BILGE WATER RECEPTION FACILITIES, ATLANTIC CANADA PORTS

PROVINCE	NUMBER OF PORTS SURVEYED	NUMBER OF PORTS THAT HANDLE OILY BILGE WATER	NAME OF PORTS WITH FACILITY	TYPE OF FACILITY AND COMPANY NAME
New Brunswick	8	2	Dalhousie	mobile contractor: Victor Bernard & Sons Ltd. in Charlo
			Saint John	fixed if destination is Irving Oil; otherwise 3 mobile contractors in Saint John
Newfoundland	22	5	St. John's	2 mobile contractors: Crosbie's and Pardy's in St. John's
			Stephenville, Port aux Basques, Corner Brook	mobile contractor: Western Trading in Stephenville (2 trucks for all)
			Lewisport	mobile, small amounts: — harbour master
Nova Scotia	12	10	Yarmouth, Shelburne, Pugwash, Pictou, Mulgrave, Hantsport	mobile contractor: Island Oil in Debert
			Sidney, North Sidney	mobile contractor: Scotia Transport in Sydney
			Liverpool	mobile contractor: Atlantic Industrial Cleaners in Dartmouth
			Halifax	fixed contractor: ESSO services own vessels only; otherwise, mobile contractors: Island Oil in Debert or Maritime Oil Services in Dartmouth
Prince Edward Island	3	3	Charlottetown	fixed contractor Creeds Petroleum Equipment Maintenance Ltd. in Charlottetown
			Souris	2 mobile contractors: Septimus MacPhee in Souris and Creeds in Charlottetown
			Summerside	mobile contractor: Creeds in Charlottetown

All power-driven vessels accumulate oily bilge water during normal operations, generally because of leakage from machinery and engines, worn seals, or accidents. Oil finds its way into the bilge, where it collects, along with water. The rate at which bilge water accumulates and the amount of oil it contains depend on the age, condition, and size of the vessel (Brander-Smith et al. 1990). Kiash and McCarter (1996) noted that ocean-going vessels, such as container vessels, produce on average 2800 litres of oily waste daily. In the case of tankers using non-segregated ballast (which according to MARPOL do not have to be phased out until 2015), their ballast is also contaminated with oil. Depending on the configuration of the vessel, oily waste can be treated onboard, legally discharged at sea if oil concentrations are first reduced by oily-water separators to 15 parts per million (as set by MARPOL and adopted by Canada in 1994), or retained for later disposal ashore if the vessel's tanks have sufficient capacity to hold all accumulated residues. Even if oily waste is recycled onboard, after crossing the Atlantic, a large container vessel, for example, would still have several tons of oily waste to dispose off at an onshore facility (Kiash and McCarter 1996).

The additional cost (although generally a small one), the inconvenience (e.g., the time delay incurred by a visit to an on-land oil reception facility), or the absence of reception facilities for dirty ballast water and oily bilge water are still major problems for the shipping industry in some areas, and may be some of the main reasons for polluting the marine environment. Container ships, tankers, barges, and other vessels were accountable for 62 per cent of reported international accidental or intentional illegal discharges of oil into the sea (spills over 0.17 T 1988-1997) (Schmidt Etkin 1999). (Other sources of oil entering the sea include runoff from land, natural seeps, and so on.) Parties to MARPOL have a duty to provide adequate reception facilities in ports, terminals, ship repair yards, and marinas. In December 1999, the United Kingdom submitted revised guidelines to MEPC on the provision and use of port waste reception facilities (IMO 1999). The guidelines relate to the provision and improvement of port waste reception facilities and the ongoing management of existing facilities, as well as to the planning and establishment of new facilities. The guidelines are intended to encourage better and more active use of waste facilities and, ultimately, the complete elimination of intentional pollution of the marine environment by oil, plastic, and other harmful substances. The guidelines can be ordered from IMO (http://www.imo.org). The provision of reception facilities is particularly important to countries that are seeking to have their coastal areas designated as special areas under IMO.

A recent report by Jason Burton, a student intern in 2000 in the Operation Clean Feather program (EC, St. John's, NF), examined the infrastructure problems associated with oil handling facilities in Newfoundland and their capability to store and dispose of oily waste from tanker vessels. He indicated that Newfoundland and

Labrador had 32 designated oil handling facilities (37 more were to be designated in the near future) at which large quantities of oil are transferred from ships to shore or vice versa. In addition to major ports, these are the places where reception facilities seem most important. Of the 32 facilities, only 4 can accept oily waste, depending on its composition.

In Newfoundland, three oil disposal management companies can handle oily bilge water: Crosbie's Industrial Services, Pardy's Industrial Services, and Western Trading Ltd. Among them, these three companies have 19 vacuum trucks located all around the island, with a total capacity of 237,215 litres (Perry Clark of Pardy's, Joe White of Crosbie's, and Erik Rockwell of Western Trading, personal communication). In addition, three tractor trailers are available, with a total capacity of 81,720 litres. Operators indicated that usually no advance notice is required, but if quantities are large, notice is recommended to ensure speedy service. Although the quantities of oily bilge water to be removed vary, the average quantity seems to be two to three truckloads and disposal requires about 2 to 4 hours per truckload. Therefore, on average, removal of oily bilge water takes between 4 and 12 hours, at a cost of approximately C$2,000 per truckload. Crosbie's indicated that it operates at only about 60 per cent of its capacity, while Pardy's has mostly fixed clients and generally operates at full capacity. Unfortunately, it seems that foreign vessels often discharge only part of their oily waste at oil reception facilities but enough to make entries in their logbooks. The foreign vessel operators indicate that they take care of the rest themselves (Perry Clark of Pardy's)!

TC recently released a report that compares costs for disposing of oily discharges at selected ports in Europe, the eastern United States, and eastern Canada (Martin 2001). TC concluded that average costs at Canadian waste disposal facilities are low enough not to provide an incentive to risk the high fines that can be imposed on operators caught dumping oily waste illegally in Canadian waters, and that the operator of a vessel travelling to the United States through Canadian waters would have more incentive to discharge waste in the United States, since disposing of waste there is twice as high. This conclusion, however, is misleading. The frequency of aerial surveillance and other enforcement efforts is much higher in the United States than in Canada, and therefore a vessel illegally discharging oily waste is more likely to get caught in U.S. waters than in Canadian waters. More important, as mentioned above, in the United States imposed fines are at least 10 times higher than those in Atlantic Canada, which makes Canadian waters attractive to operators who engage in illegal dumping of oily waste at sea, but the difference in average disposal fees in the two places is a mere $2,500.

The IMO document recommends that criteria should be applied to Atlantic Canada to determine the use, accessibility, and convenience of oil disposal facilities for ships arriving in the area. Coastal states such as Canada have the right to prohibit the discharge of wastes by foreign and domestic vessels within their coastal zone, but if coastal states do so, they also have the duty to provide adequate disposal facilities. The adequacy of such facilities clearly needs to be examined, particularly in terms of the capacity that is thought to be required, assuming that the majority of ships will use these facilities in the future.

1.10 ENVIRONMENTAL DAMAGE ASSESSMENT

Fines levied for marine pollution should flow back into the system to aid existing efforts to prevent chronic oil pollution or to repair damage when possible. It has also been pointed out that measuring environmental damage is difficult and that, in certain cases, models of such damage, rather than actual measurement, should be used instead to assess damage. Environmental damage is defined as the physical and biological damage to a resource and its ecosystem and the consequence of that damage on the various biophysical and socioeconomic services provided by the resource and ecosystem (Campbell 1999). Environmental damage assessment (EDA) involves evaluating, quantifying, and assigning monetary value to loss of or injuries to natural resources due to a pollution incident. Full-cost accounting can be used to propose appropriate court awards and compensation, which then make polluting activities expensive to the parties responsible. Thus EDA, first, supports enforcement and pollution prevention initiatives that deter damaging activities and, second, promotes best management practices.

The EDA approach also recognizes that ecosystems provide services and benefits to people and other components of the environment beyond mere extractive benefits. EDA works to protect ecosystems by providing a basis for recovering suitable monetary compensation for ecosystem damage, compensation that can be redirected toward ecosystem restoration, enhancement, and protection via the Environmental Damages Fund (EDF) (MacDonald et al. 2000).

When large catastrophic oil spills or coastal pollution incidents occur, an EDA seems a logical step to take since the effects of such events are often obvious. During an EDA, the injuries to specific parts of the environment are identified and a link between the damage and its cause must be proven. However, the effects of oil discharged illegally offshore are hardly ever visible or measurable, given the l ocation. Therefore, the framework set up for this type of assessment, as described by Campbell (1999), does not apply to offshore areas, yet environmental damage has nevertheless been caused. In such cases, a modelling approach has been used,

primarily in the United States, in which mathematical analysis, scientific data, and economic valuation are used together to determine how and to what degree organisms and their surrounding environment have been negatively affected. Models are only as good as the information that goes into them, and a lot of baseline information is needed to make them as realistic as possible. An EDA model for offshore areas, where the environment and seabird distribution are extremely variable, should be based on the best available data for seabird distribution and oil slick trajectories known to date.

At present, Canada has no established national standard for EDA, but existing practices make the adaptation of the U.S. EDA approach feasible (Campbell 1999, MacDonald et al. 2000). Each year in Atlantic Canada, approximately 2500 spills or releases of oil and chemicals are reported through the pollution reporting network. Spill sources, the circumstances surrounding such incidents, and their potential impact on the environment are quite varied. The variability of environmental damage makes the use of a single, standard EDA protocol impossible. Therefore, EDA protocols are being developed to respond to particular types of environmental injuries caused by, for example, chemical spills in freshwater systems or oil spills in coastal environments (for more detail and an EDA case study based on a fish kill, see MacDonald et al. 2000).

It is possible to estimate a seabird kill using available information and oil slick trajectory models. The models need to be improved by filling gaps in the existing data on seabird distribution, and more information is needed on the effects of oil slicks on seabird behaviour. Surveys also need to be conducted to increase our knowledge of seabird distribution at sea year-round, and seabird carcass trajectory models need to be built to permit more realistic approximations of the total number of seabirds killed by an oil spill. At a workshop in January 2001, EC concluded that EDA models are close to being sufficiently developed for presentation in the courts and may be introduced in future court cases.

In 1995, the Government of Canada set up the EDF as a special holding or trust account of EC, monitored by the Treasury Board of Canada, for managing monies collected through court orders, out-of-court settlements, voluntary payments, and other awards provided by various international liability funds and others. The EDF has some similarities to the Oil Spill Liability Trust Fund set up in the United States in support of the national Natural Resource Damage Assessment process, although no initial contingent funds have been allocated to the EDF (MacDonald et al. 2000). The money is to be used to remediate damages to the environment in a cost-effective way, including assessment or research and development work required to support such restoration efforts. Just as with the use of EDA models, judicial awareness of the role of the EDF in restoration efforts is minimal, yet the courts are often

responsible for ensuring that fines are deposited into the EDF. The Environmental Protection Branch of EC has already created an information brochure about the EDF and distributed it to prosecutors and judges.

Ordering polluters to restore the environment or, alternatively, to make payments to the EDF that are high enough to be significant to the polluter would clearly convey the message that illegal activities will not be tolerated and that offenders will be held responsible for their actions. Canadian courts can provide serious economic disincentives for illegal activities by imposing higher fines and requiring restoration of environmental damages.

1.11 CONCLUSIONS

The chronic oil pollution index — the proportion of oiled birds found, or the oiling rate (see sections 1.2 and 1.3) — shows that the problem of illegal discharge of oil at sea by ships is larger in Newfoundland waters than in other areas of the world's oceans. On average, 300,000 seabirds are killed annually in Atlantic Canada as a result of this activity, and the thick-billed murre population in the Canadian Arctic is being negatively affected by the resulting pollution. Many people consider Canada to be one of the leading nations in environmental conservation in the world; therefore, Canada has a responsibility to deal with ship operators who pollute the marine environment. Section 2 identifies the actions that should be taken to solve the problem of chronic marine oil pollution. In light of the evidence, Canada cannot afford to ignore these.

The Solution

Great Island, Newfoundland, A common murre colony © John Chardine, CWS

2.1 INTRODUCTION

The problem of chronic oil pollution in Atlantic Canada has not gone unnoticed, and much can be learned from past actions and recommendations. Since the early 1980s, several initiatives have been undertaken to combat this illegal activity and to understand its environmental impacts. Many reports have been written and numerous workshops dealing with marine oil pollution issues have been held. The most important recommendations and their implementation to date are reviewed in Table 4.

TABLE 4: OUTCOME OF PAST RECOMMENDATIONS TO MINIMIZE CHRONIC OIL POLLUTION IN ATLANTIC CANADA

RECOMMENDATION	IMPLEMENTATION	AGENCY/AUTHOR
1. INFRASTRUCTURE		
Establish on-land oil disposal facilities and make them attractive to use (1988, 1989, 1994, 1997, 1998–2000) — a commitment under MARPOL since 1994.	This recommendation has not been implemented.	
Establish policies for EDA and subsequent payments (1997).	The publication of several documents (Sawyer 1999, MacDonald et al. 2000, Campbell 1999) in 1999 and 2000 started the EDA process.	EC
	A master's thesis (supported by EC and completed in 2001) created a conceptual framework for an EDA model for this region.	Philip Clement (M.Sc. thesis, Dalhousie University, Halifax, NS)
Establish a system to reward people who file pollution reports leading to convictions (1989).	Such a system exists under the FA, but has not been used to date.	DFO, DOJ
Set up a 24-hour spill reporting hotline (1989).	A spill reporting hotline, the Marine Rescue Sub-Centre, St. John, (1-800-563-2444) was set up in late 1970s.	EC, CCG
2. MONITORING AND ENFORCEMENT		
Require all merchant vessels to empty slop tanks before leaving a Canadian port (1989, 1998–2000).	This recommendation has not been implemented because of the lack of facilities.	TC
Update marine charts to include ecologically sensitive areas (1998–2000).	This recommendation has not been implemented.	TC
Establish an MCZ to force mariners to report when they enter and leave such zones (1998–2000).	This recommendation has not been implemented.	TC
Designate, under MARPOL, the Grand Banks as a special area and the southern shore of the Avalon Peninsula, NF, as a marine protected area (1997).	EC staff wrote an internal report and produced the CD Seabirds at Risk. No formal application has been made to IMO, although presentations have been made to introduce the idea of creating the special area and the marine protected area.	EC Atlantic Region

RECOMMENDATION	IMPLEMENTATION	AGENCY/AUTHOR
2. MONITORING AND ENFORCEMENT		
Monitor vessel traffic in more detail (1997) and explore the use of automatic identification systems (1998–2000).	"Over the horizon" radar was set up at Cape Race, NF, in 1997, but ships outside the 12-mile limit still go mostly undetected. An automated identification system pilot study is ongoing.	CCG, TC
Use satellite imaging as a full-time tool to detect ship-source oil pollution (1997, 1998–2000).	A pilot project called STOP, explored this technology in 1999; RADARSAT has been used but needs to be improved	EC, TC
Increase aerial surveillance (1988, 1989, 1994, 1997, 1998–2000).	Aerial surveillance in NF increased in 1997 to 400 hours but decreased again to 300 hours in 2000/01. Coverage is still insufficient.	CCG Newfoundland Region, Ottawa
Undertake regular oil-fingerprinting (matching the chemical signature of oiled birds with ship source) of birds and beaches (1985, 1994, 1998–2000).	Regular oil-fingerprinting of birds and beaches has been common practice since 1993.	EC, TC, CCG
Increase the involvement of the DFO and enhance the role of the DND in surveillance and evidence gathering (1988, 1997, 1998–2000).	CCG has carried out surveillance flights in Newfoundland since 1997; the DND reports pollution incidents encountered during regular operations.	CCG, TC, EC, DND
Improve enforcement of applicable laws (1988).	Enforcement efforts have increased, but prosecution and conviction records are poor.	CCG, EC, TC
Station an EC DC-3 surveillance airplane in the Atlantic region during the winter months (1997).	No resources are available to operate EC's DC-3 in Atlantic Canada. CCG's Dash 8 is already responsible for surveillance of the Great Lakes and the Gulf of St. Lawrence. No resources are available to assist off-shore.	CCG, TC, EC
Formalize standard pollution reporting procedures for the DND and the DFO to conform with Canadian court standards (1998–2000).	Several modifications have been made 2000.	EC
Appoint more PPOs (1989, 1994, 1997, 1998–2000).	Determining the number of PPOs who are actually engaged in inspection and investigation is difficult because some persons involved strictly in office administration have been appointed as PPOs.	CCG, TC
Explore prosecution under other legislation if vessels are not prosecuted under CSA (1988).	Only one vessel has been convicted under legislation other than the CSA, a vessel convicted under MBCA in July 2000.	EC
Aggressively pursue cases involving ships operating under a foreign flag (1989).	Some cooperation exists with other countries and INTERPOL. International cooperation needs to be improved.	TC, EC, CCG
Amend the CSA to allow routing of tankers and tank barge traffic around sensitive areas (1989).	The power to reroute exists but has never been used.	TC
Search vessels that might be hazardous more often, and bar those that fail inspection from Canadian ports for two years (1989).	This recommendation has not been implemented.	TC

RECOMMENDATION	IMPLEMENTATION	AGENCY/AUTHOR
2. MONITORING AND ENFORCEMENT		
Sample for oil and oiled birds at selected marine sites (1988).	Due to limited resources, sampling has been incident-driven rather than systematic.	EC
For reference purposes, collect oil samples from vessels regularly and ask private companies involved with ship cargo to cooperate in such sampling (1988, 1989, 1994, 1997, 1998–2000).	Private companies have not been asked to cooperate. Oil samples are being collected for reference on an ad hoc basis and as part of Operation Clean Feather.	CCG, TC, EC
Continue and expand the monitoring of beaches on the Avalon Peninsula, NF (1985, 1988, 1994, 1997, 1998–2000).	Beached bird surveys have continued and have been intensified to weekly surveys during winter months since 1998.	EC
.	Monthly beached bird surveys are done on Sable Island, NS, and began in Cape Breton, NS, in the winter of 2001/02.	EC
Increase inspection of foreign ships to 40 per cent by 1993; recommendation made in 1988	Inspections are carried out on 8 per cent of ships. TC has not provided any information as to whether the 40 per cent target has been reached.	TC
Bring together federal government departments to combat chronic oil pollution (1988).	POW has been operating since 1997, and an umbrella memorandum of understanding between TC, EC, and the DFO has been in effect since 1999.	TC Atlantic Region, EC Atlantic Region, CCG Newfoundland Region
Increase fines to act as deterrents to polluters (1988, 1989, 1994).	Fines have increased, but averaged only $21,500 between 1994 and 2001. The highest fine to date is $125,000 (February 2002).	TC, EC, DOJ
Extend enforcement from the 12-nautical mile limit to the 200-mile zone (1988, 1997).	Enforcement to the 200-mile zone is thought to be possible under FA, CSA, CEPA, MBCA, the Clean Water Act, and the Ocean Act; but legal opinion interprets the law as restricted to the 12-nautical-mile limit.	DOJ, EC
Include in legislation compensation for environmental damages caused by mystery spills (1988).	The EDF was established in 1995. Courts can commit to this fund part of fines imposed on parties guilty of causing environmental damage.	EC, DOJ
3. RESEARCH		
Commit the EC Newfoundland Region laboratory to work on oil-fingerprinting and develop a reference database (1997).	The EC Newfoundland Region lab was moved to the EC lab in Moncton (NB). It is not clear what changes have been made concerning resources available for oil-fingerprinting and technique research.	EC
Develop more accurate models that both predict the trajectory of oil spills (1989) and ascertain the source of the oil from the location of the oiled birds (1997).	Oil spill trajectory models are being revised.	EC
	Data for developing seabird carcass trajectory models are being collected.	Francis Wiese (Ph.D. candidate, Memorial University of Newfoundland)

RECOMMENDATION	IMPLEMENTATION	AGENCY/AUTHOR
3. RESEARCH		
Carry out experiments to determine what proportion of beached birds are counted on monthly surveys (1985).	Some carcass persistence studies were carried out in 1994 and 1995, and have been continuing more comprehensively since 1998.	Francis Wiese (see above)
Conduct more drift block experiments to determine the proportion of birds that die at sea and reach the shore (1985, 1997).	Some experiments were carried out in 1985.	Piatt et al. 1985
	Extensive drift block experiments were conducted in February 2000, the winters of 2000/01 and 2001/02.	Francis Wiese (see above)
Explore technologies for night surveillance (1988, 1989).	Some technologies are available, but no night surveillance is being carried out because of cost and safety considerations.	EC
Conduct a research program to estimate the total number of birds killed by oil (1988).	This program has been in progress since 1998 and completion is expected in August 2002.	Francis Wiese (see above)
Make at-sea oil sampling equipment recoverable; make it available on DND and CCG surveillance aircraft (1988, 1989); and continue research for new techniques for sampling oil at sea (1998–2000).	Currently there are only three SABRE buoys (used for oil sampling) in Atlantic Canada, but their functionality is questionable, and their locations are unknown.	EC, CCG
4. EDUCATION		
Develop a program to educate lawyers on environmental problems and legislation pertaining to the marine environment (1988, 1997, 1998–2000).	The EDF brochure was published (2000).	EC
Establish province-wide education programs (1985, 1988, 1989, 1997, 1998–2000) and a volunteer network (1985, 1998–2000) and continue to distribute information packages, published in several languages, to marine personnel (1988, 1994, 1997, 1998–2000).	Operation Clean Feather started in 1991, and education of marine personnel in eastern NF has been carried out to some degree since then. No volunteer network has been established. An information brochure is available in seven languages (1997) but needs to be updated to reflect changes in the MBCA, CEPA, and CSA.	EC Atlantic Region
Incorporate marine environmental education into mariner-training curricula (1998–2000).	Marine environmental education is not included in TC courses in NF.	TC
5. OTHER		
Engage SSOPF to pay for operations and recovery during oil incidents (1997).	Implementation of this recommendation seems unlikely because SSOPF pays only for cleanup costs.	
Once SSOPF reaches C$200 million, allocate one-third to research in spill prevention and response (1989).	This recommendation has not been implemented. Currently the SSOPF contains about C$375 million.	

Table 4 reveals that few of the recommendations made in the past have been implemented efficiently. This failure is due to a lack of resources; the difficulty in changing national and international regulations, codes, and agreements; the difficulty in changing the practices of the international shipping community; and the varying priorities and interests of the agencies and organizations concerned about this issue. As a result, Newfoundland now has — four decades after the problem was first described — the world's highest proportion of oiled beached birds.

2.2 STRATEGIES AND SOLUTIONS

To curb chronic oil pollution in Atlantic Canada, remedial actions must be identified, along with defined time frames for their implementation. Past experience has made it clear that just putting an action plan under the auspices of an organization or a council, without providing any funding or mechanism to implement the plan, is not effective. The actions needed to minimize the problem of chronic oil pollution fall into five categories: infrastructure, monitoring, enforcement, research, and education. Discussed below are those actions believed to be the most realistic, effective, and achievable. They are based on past suggestions and actions, effective examples from other countries, and identified gaps in current programs and knowledge. Although they have been prioritized, these actions should not be viewed as being effective separately, nor should they be implemented only locally. Many approaches in the past have been restricted geographically, but chronic oil pollution is clearly an international problem whose solution requires national and international effort. Finally, these actions should be viewed as achievable goals not only for WWF-Canada, but also for all parties involved.

2.2.1 INFRASTRUCTURE

Priority 1: Establish in Atlantic Canada convenient and accessible on-land oil disposal facilities for bilge and oil-contaminated ballast

Actions:

I. Determine the use, capacities, and locations of existing on-land oil disposal facilities in Atlantic Canada for bilge and oily waste.

II. If applicable, determine ports where facilities need to be established immediately and over the long term, given current shipping trends.

III. Review examples of port systems around the world where facilities are used in an effective and economically profitable way (e.g., the United Kingdom, Germany, the Netherlands).

IV. Recruit the SSOPF, industry, and government to help fund facilities and establish them as a separate industry.

V. If, or when, sufficient and convenient facilities exist, require all merchant vessels to empty slop tanks before leaving port.

2.2.2 MONITORING

Priority 2: Improve ship-traffic monitoring

Actions:
I. Establish an MCZ for Canada's eastern continental shelf, thereby forcing all vessels to report as they enter and exit the zone.

II. Designate the entire eastern continental shelf of Canada as a special area or PPSA under IMO.

III. Explore the use of automated identification systems to keep track of all vessels in the area.

IV. Update marine charts to include ecologically sensitive areas.

V. Produce informational materials to increase environmental awareness among member states and industry. The IMO should develop these materials.

Priority 3: Expand beached bird surveys

Actions:
I. Establish a network of trained volunteers in strategic places throughout Atlantic Canada to conduct weekly or monthly beached bird surveys throughout the year.

2.2.3 ENFORCEMENT

Priority 4: Increase the thoroughness and frequency of ship inspections

Actions:
I. Review current standards and frequencies of in-port ship inspections and the adequacy of international systems for tracking substandard ships.

II. Collect ship oil samples during every inspection to expand the reference database.

III. Explore the option to ban from Canadian waters for two years ships that fail an inspection twice. The IMO could allow such inspections under special provisions of MARPOL.

Priority 5: Increase the effectiveness of aerial surveillance of the Grand Banks, the Scotian Shelf, and the Gulf of St. Lawrence

Actions:

I. Expand and update the review of worldwide aerial surveillance regimes and their effectiveness presented by POW, and use the review to help obtain increased funding to augment the number of hours of surveillance (by the same or additional planes) in Atlantic Canada.

II. Seek the cooperation of Saint-Pierre and Miquelon (a French island group near Newfoundland) in aerial surveillance.

III. Train all surveillance personnel (DFO, DND) as PPOs to increase and formalize the standards for gathering evidence.

IV. Provide resources for technicians to sample oil spills on location.

V. Determine an efficient mechanism to use RADARSAT in conjunction with "over-the-horizon" radar and aerial surveillance.

Priority 6: Increase imposed fines

Actions:

I. Use, and if necessary expand, current knowledge of the effects of chronic oil pollution on marine ecosystems and their components, and of worldwide fine regimes for offences similar to those observed in Atlantic Canada, in order to (1) create and present educational information packages to judges and prosecutors, (2) establish a minimum fine regime, and (3) ensure that levied fines go into the EDF.

Priority 7: Improve detention and prosecution records

Actions:

I. Provide more resources to gather intelligence on reported incidents.

II. Use existing powers to the fullest extent possible to reroute and detain in Canadian ports ships suspected of illegally discharging oil or oily wastes at sea.

III. In cases of pollution caused by foreign vessels in Atlantic Canada, take legal action in Canada, rather than referring such cases to the state in which the vessel is registered.

IV. Charge polluters under all applicable acts, rather than only under the CSA.

2.2.4 RESEARCH

Priority 8: Increase support for oil-fingerprinting

Actions:
I. Provide more resources or create a partnership with universities to continue the development of the Multivariate Statistical Analysis Technique on absolute quantities of the unweathered fractions of oil, a key element if both environmental and ship samples are available.

II. Increase analysis of oil samples taken during beached bird surveys and add to the database (the Australian Maritime Safety Authority's National Oil on the Sea Identification Database could serve as an example; see CCG 2001).

Priority 9: Develop oil slick sampling devices

Actions:
I. Support research to develop effective ways of sampling offshore oil slicks (e.g., examine the functionality of EC's SABRE buoys).

Priority 10: Investigate the effects of chronic oil pollution on marine ecosystems

Actions:
I. Investigate the following questions, which still remain although several research projects on the effects of chronic oil pollution on seabirds are close to completion:

a. Are seabirds attracted to oil slicks?

b. Can mussels along the south coast be used as alternative or corroborative monitors of chronic oil pollution?

c. Are wintering sea ducks (e.g., the harlequin duck, a species of concern) or other intertidal or subtidal organisms bio-accumulating polycyclic aromatic hydrocarbons and being affected by them?

Priority 11: Increase and update knowledge of seabird distribution at sea

Actions:
I. Set up a network of trained volunteers to conduct surveys of seabirds at sea, and create liaisons with industry and the DFO to coordinate use of boats. These actions are perhaps most easily achieved with the help of interested students at universities throughout Atlantic Canada. The data collected in such surveys will aid in the enforcement of the MBCA and in accurate EDAs.

Priority 12: Develop EDA models and implement the use of EDAs in the courts

Actions:
I. Expand on existing frameworks to develop a working EDA model that combines oil slick trajectories with biological resources in the area (e.g., seabird distribution, fisheries, coastal sensitivities). Additional research may have to be done to provide the information needed to create such a model (legally accepted U.S. models could be used as examples).

2.2.5 EDUCATION

Priority 13: Expand education of ship operators

Actions:
I. Expand Operation Clean Feather (EC St. John's) to all major ports in Atlantic Canada and Quebec; this program educates marine personnel, through the distribution of information packages, in southeastern Newfoundland. .

II. Recruit industry leaders to promote environmentally sound shipping practices worldwide (e.g., the Greenship initiative based on the Netherlands Green Award Program or the American Bureau of Shipping green guide).

III. Lobby schools and TC to include marine environmental education in mariner-training curricula.

Priority 14: Recruit support from the Department of Justice (DOJ)

Actions:
I. Prepare, in consultation with "sympathetic" individuals in the DOJ, a document that summarizes the most critical issues regarding chronic oil pollution.

II. Lobby the DOJ to submit the resulting document to judges as "sentencing guideline directives" that recommend the range of fines that judges should consider imposing.

III. Hold information sessions across the country to the same effect.

Priority 15: Increase public awareness

Actions:
I. Launch an extensive nationwide media campaign to raise public awareness and, ultimately, put pressure on the government. Expand this campaign internationally.

II. Investigate the feasibility of "adopt-a-beach" or similar programs to raise awareness, concern, and money.

Priority 16: Engage the support of the SSOPF

Actions:
I. Encourage the SSOPF to make funds available to support research, education efforts, and other actions outlined above.

2.3 CONCLUSIONS

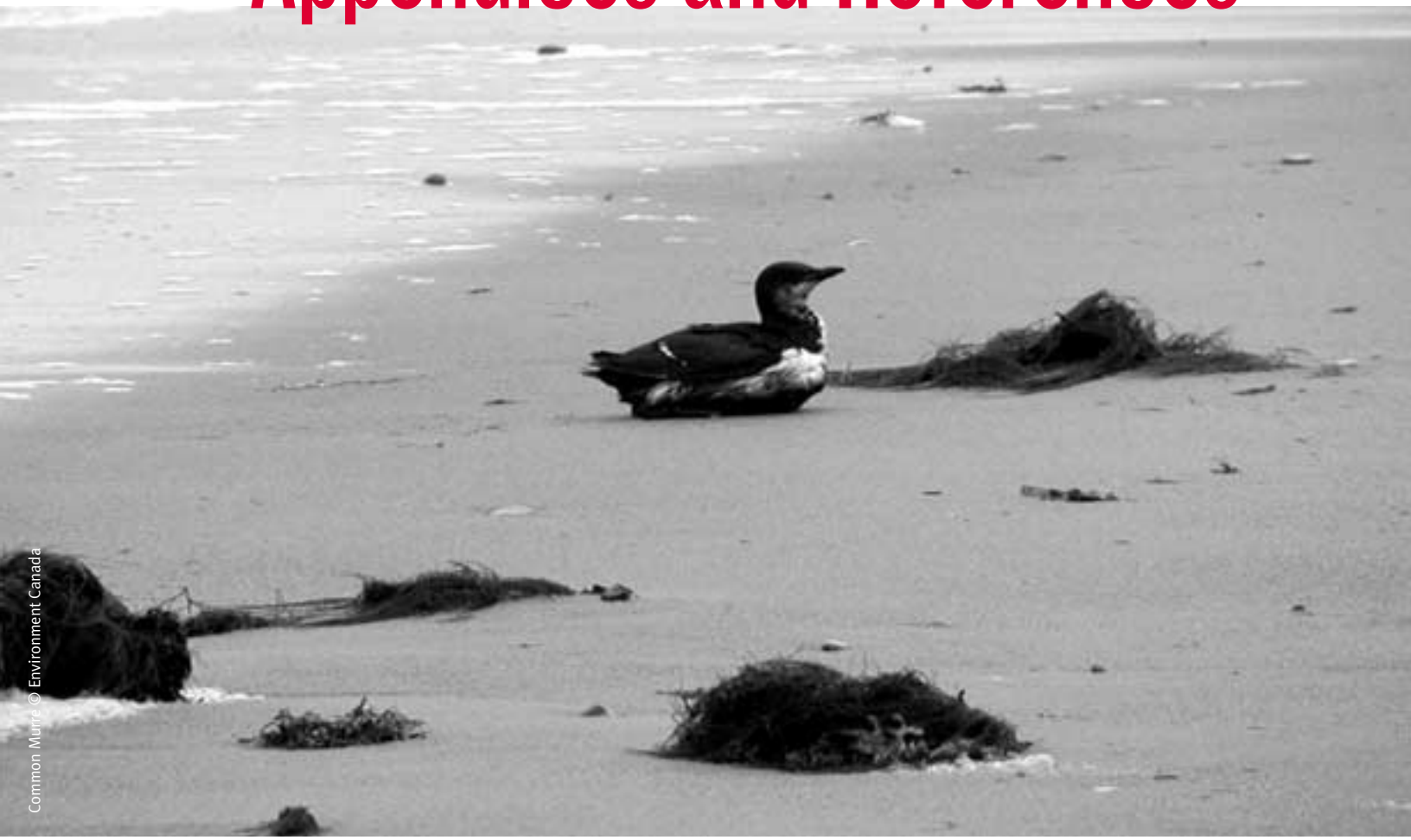
The lack of sufficient surveillance and enforcement in Atlantic Canada encourages careless or deliberate dumping of oil and oily wastes at sea. Ship operators flout national legislation and international conventions and dump toxic hydrocarbons into our waters almost at will. An estimated 300,000 seabirds, which breed all over the North and South Atlantic, are killed on average every year in Atlantic Canada, a death toll equivalent to that caused by the *Exxon Valdez* oil spill in 1989 (Chardine 1995). Oil and oily waste dumped by unscrupulous ship operators have caused high mortality locally in Atlantic Canada and have affected the thick-billed murre population in the Canadian Arctic. The effects of this illegal activity may be felt in places as far away as Greenland, arctic boreal Europe, and the southern hemisphere. Action in this region is Canada's international responsibility.

Enforcement agencies have several means to ensure enforcement, many of which have proven powerful and effective in other parts of the world. Given the current situation in Atlantic Canada, aerial surveillance and ship inspection regimes need to be intensified. To be an economic deterrent, fines imposed under the current legal system need to be increased and should be calculated on the amount of money saved by the polluter, the costs incurred by investigating agencies, and the costs of the damage caused to the environment. EDA should become more common, even in

the case of small oil spills, and more research should be carried out to increase assessment capabilities.

Many of the facts surrounding the problem of chronic oil pollution are obscure to most Canadians. It is important to stress that this damage is not necessary and that steps have been identified that would, if taken, reduce illegal activity at sea: convenient and accessible on-land oil disposal facilities should be established; vessel monitoring, enforcement efforts, and levels of imposed fines should be increased; and education and awareness programs should be launched among the public, industry, and government. The attention that chronic oil pollution has garnered in the media, government, industry, and the scientific community has been small compared with that created by large, catastrophic oil spills. More effort must be made to prevent chronic oil pollution events that collectively have clear detrimental impacts on our marine ecosystems.

Appendices and References



Common Murre © Environment Canada

part 3 // appendix 1: international convention on arrest of ships / appendix 2: transport canada news release / appendix 3: oil spill intelligence reports / appendix 4: facilities in ports for the reception of oily wastes from ships / references

APPENDIX 1: INTERNATIONAL CONVENTION ON ARREST OF SHIPS, 1999

Unlike its 1952 predecessor, the International Convention on Arrest of Ships, 1999 applies to all ships. It clearly places legal jurisdiction with courts in the country in whose waters officials arrest the ship and excludes intervention by courts of flag states or by courts in the homelands of owners, operators, or "characters." This new convention parallels the international oil spill liability and compensation conventions, which place jurisdiction in the nation where the damage occurs. The 1999 convention also closely follows the 1993 Convention on Maritime Liens and Mortgages. Under this latest convention, courts in member nations would be bound to release ships once owners posted sufficient security "not exceeding the value of the arrested ship." However, countries could arrest sister ships — other vessels owned by the same ship owner or character — as security for a claim. In a crucial vote, delegates defeated a proposal from the United Kingdom that would have extended the sister-ship rule to any vessel "controlled" by a potentially liable owner. Delegates from the United Kingdom argued that the broader definition would prevent owners of large ships from circumventing liability by creating single-ship subsidiaries; the International Chamber of Shipping and its allies argued that the provision would open a legal morass for both ship owners and claimants.

Grounds for arrest related to pollution include unresolved maritime claims for the following:

- Salvage operations or any salvage agreement, including special compensation relating to salvage operations in respect of a ship that by itself or by the nature of its cargo threatened damage to the environment;
- Damage or threat of damage caused by the ship to the environment, coastline, or related interests;
- Measures taken to prevent, minimize, or remove such damage;
- Compensation for such damage;
- Costs of reasonable measures of reinstatement of the environment actually undertaken or to be undertaken;
- Loss incurred or likely to be incurred by third parties in connection with such damage;
- Costs of wreck removal or the "rendering harmless" of a sunken or abandoned vessel.

For more information concerning the International Convention on Arrest of Ships, 1999, see the draft document at http://www.unctad.org/en/docs/imo99d6.pdf and the feedback document from selected countries on the convention at http://www.unctad.org/en/docs/imo99d3.pdf.

APPENDIX 2: TRANSPORT CANADA NEWS RELEASE 25 FEBRUARY 2002

No. A02/02

For publication February 25, 2002

Transport Minister Collenette Announces Record Penalty for Prosecution of Marine Polluter

HALIFAX, NS - Transport Minister David Collenette today announced that the federal government has successfully prosecuted the *M/V Baltic Confidence,* a Philippines-registered bulk carrier, owned by Prime Orient Maritime, based in Manila, Philippines, for unlawfully discharging a minimum of approximately 850 litres of an oily substance in Canadian waters.

As a result of the Government of Canada's extensive investigation and prosecution efforts, the operator of the vessel pleaded guilty to the offence and was assessed a penalty of $125,000. This is highest ever penalty issued for ship source pollution in Canadian waters.

"Transport Canada is committed to ensuring safe and environmentally responsible commercial marine operations," said Mr. Collenette. "This precedent-setting fine sends a strong message to potential marine polluters about the consequences of illegal discharges in Canadian waters."

On December 22, 1999, Transport Canada initiated an investigation after the *M/V Baltic Confidence* was sighted by both a Canadian Coast Guard (CCG) helicopter and a private aircraft, illegally discharging an oily substance in Canadian waters approximately 85 nautical miles south-west of Halifax. This area is known to be heavily populated by seabirds during this time of the year. The vessel was observed and photographed trailing an oily slick of more than 20 nautical miles. The CCG helicopter crew recorded the incident and reported it to Transport Canada.

The vessel, en route to Tampa, Florida, was boarded at the request of Transport Canada by U.S. Coast Guard inspectors upon its arrival on December 30, 1999. Relevant evidence, including the pollution control documents, was obtained and forwarded to Transport Canada to assist in its investigation.

The vessel was subsequently boarded by Transport Canada inspectors in Windsor, Ontario, on December 6, 2000, during its first return visit to a Canadian port. Following Transport Canada's extensive investigation, which lasted over two years and which included the co-operation of U.S., Russian, Dutch and Finnish maritime

administrations, charges were laid under the Canada Shipping Act (CSA) against the owners of the vessel. The strong evidentiary package presented by the prosecution led to a guilty plea being entered by the company and the resultant fine.

This case is an example of how Transport Canada actively promotes safe and environmentally-sound shipping practices of vessels operating in Canadian waters through the enforcement of domestic and international shipping regulations. Transport Canada works closely with other federal agencies such as the Canadian Coast Guard, Environment Canada, Justice Canada and the Department of National Defence to reduce the occurrence of ship source pollution in Canadian waters. This co-ordinated approach promotes an effective monitoring, response and enforcement program.

"The majority of those in the marine industry carry out their operations in a safe and environmentally responsible manner," said Mr. Collenette. "For the few who do not, Transport Canada will, in co-operation with its domestic and international partners, continue to recommend prosecution and will seek higher fines from the courts under the Canada Shipping Act as a deterrent to ship source pollution."

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APPENDIX 3: OIL SPILL INTELLIGENCE REPORTS (OSIRS) 1997–2000

Articles relating to chronic and mystery oil spill pollution and ways to reduce them (sorted by date)

We are always smarter when we look back at past incidents and actions. But doing this can teach us a lot for the future. OSIR is the main international news release about oil spills. Members can access it online or subscribe to the printed version. Back issues are available online from January 1997 onwards. These issues have all been reviewed for cases involving chronic oil spills, mystery spills, and technologies or initiatives to help reduce these incidents. It is amazing how often Canada, and specifically Atlantic Canada, is mentioned in these articles. These articles clearly show how many times high expectations of programs and prosecutions have not been met. Included here are also comparable cases or initiatives in other countries that we may learn from.

OSIR 30 January 1997

Mystery Spill Kills Over 2,000 Seabirds

A mystery spill in Newfoundland, Canada, has killed over 2,000 seabirds, according to Wayne Halley of the Canadian Coast Guard (CCG) in St. John's, Newfoundland. He reports that dead birds began washing ashore at the Cape St. Mary's Ecological Reserve on 20 January and continued to wash ashore the week of 27 January. In response, two CCG personnel and an official from the Canadian Wildlife Service surveyed the area. Halley reports that the CCG saw only some small tarballs in Gooseberry Cove and Patrick's Cove, but dead birds continued to litter a 50-km area from Branch to St. Brides. Tests of the oil on the birds indicated that it's "heavy marine fuel." The CCG has identified a number of vessels in the area at the time that the agency believes the spill occurred, anytime from 16-19 January, and is investigating whether these vessels could have been the source of the oil.

OSIR 22 May 1997

A government-commissioned study on the economic impact of numerous marine initiatives in Canada has placed the cost to the shipping industry of response organization's fees in Canada at US $18 million in 1997 and 1998. The Canadian government commissioned the study to determine the cumulative impact of several federal marine initiatives on the shipping sector. The high cost of response fees, along with a 1996 panel report that was highly critical of the response fee proposal (see OSIR, 10 October 1996), has led the Canadian Coast Guard (CCG) to take a nother look at the issue. In March, the CCG reported that it has examined the

economic study and the panel report and will in the near future make a recommendation to the Transport Minister on how to proceed.

OSIR 29 May 1997

European Union Begins Two-Year Oil Spill Detection and Monitoring Project

Earlier this spring, the European Union's (EU) Center for Earth Observation (CEO) began a two-year project aimed at detecting and monitoring oil spills in the Mediterranean and coastal areas in the southwest Atlantic Ocean. The project will assess the feasibility of implementing an early warning system to detect oil spills and a management decision system to determine how best to respond to spills. The project's overarching goal is to find ways to prevent marine pollution at its source. Five EU member states are providing the CEO with guidance, expertise, and technical support for the project through existing research institutions. These include Cetemar in Spain, Fresti in Portugal, CEDRE in France, Enea-Cram in Italy, and E.O.S. Ltd. in the UK. As part of the OILWATCH project, scientists will identify at-sea oil spills, estimate the seriousness of the spill, and determine who they should notify and what form these notifications should take. They will utilize Synthetic Aperture Radar (SAR) from Canada's RadarSat satellite and process the data with the Oil Spill Detection Workstation (OSDWS), located at a receiving station in West Freugh, Scotland, UK. The aim is to develop a real-time service that will allow users to respond immediately to detected spills. The project has three main phases. During the first phase, scientists will conduct preparatory work needed to coordinate the OSDWS with the RadarSat satellite. In addition, they will develop a comprehensive spill database, which will allow them to archive all the data they collect on oil spills and to analyze this data. In addition, they will also collect information on who will use the data, with the goal of providing specific information to meet these users' needs. During the second phase of the project, scientists will, on a regular basis, screen SAR for oil spills, capture this data in charts, and send these charts to interested parties. The goal is to provide a loop by which scientists receive feedback from people who will actually use the information, with a goal of refining the information to meet the needs of end users. During the third phase, scientists will evaluate the project and hold a series of conferences and seminars to disseminate their results. Officials at the CEO indicate that they will make a special effort to invite to these events authorities responsible for preventing and responding to marine pollution, along with a wide range of people from universities, private companies, and environmental groups. The project's sponsors hope to promote further interest in the use of satellite data for environmental purposes by publicizing their results.

OSIR 11 September 1997

CCG Begins Effort to Reduce Bird Deaths from Newfoundland Mystery Spills

Canada has begun a multi-agency effort, led by the Canadian Coast Guard (CCG), to reduce bird deaths from mystery spills off the coast of Newfoundland, Canada. The other agencies involved include the Canadian Wildlife Service (CANADIAN WILDLIFE SERVICE) and Transport Canada. Some industry and environmental groups have also joined the effort. Canadian officials estimate that 27,000 birds have been killed from mystery spills so far in 1997, and that 1.6 million birds have died since 1926, when officials first began documenting bird deaths from mystery spills in this area. The most recent example of the problem occurred on 20 January of this year, when oiled and dead seabirds began washing ashore at the Cape St. Mary's Ecological Reserve in Newfoundland (see OSIR, 30 January 1997). CCG officials suspect that the oil came from a vessel discharging its tanks at sea, but have not been able to identify the source. Officials from the CANADIAN WILDLIFE SERVICE now estimate that between 30,000 and 50,000 birds died as a result of that spill. CCG officials report that this pattern of oiled birds is common from November through February. They suspect that vessels coming to the end of their Atlantic crossing are the primary source of this oil. At the first sign of land, the vessels empty their ballast tanks into waters 50-100 miles off the Newfoundland coast, where migratory birds feed during winter months. Once oiled, the birds' feathers lose their insulating properties, exposing them to the harsh North Atlantic environment. In addition, they ingest oil through preening, which causes intestinal track bleeding and ulceration, and they may absorb oil through their eyes, rendering them blind. The CCG's Terry Harvey explains that the end result is that the birds die either at sea, near the coast in rough seas, or in sandy coves exposed to sub-zero temperatures. The CCG has established the Prevention of Oiled Wildlife (POW) project to develop short- and long-term solutions to address this recurring problem. The POW project arose out of a February meeting to discuss the most recent mystery spill and its impacts. The CCG and other agencies are beginning to implement the plan, and hope to publish a report at the end of September that will detail the magnitude of the problem and a plan of action to reduce bird deaths during the 1997/1998 winter months. Details of the plan are still emerging, but Harvey reports that participants have agreed on some short-term solutions: Increased aerial surveillance. Canadian agencies, spearheaded by the CCG and the Department of National Defence, will increase surveillance from approximately 300 to 400 hours winter months. They will conduct both daytime and nighttime overflights in an attempt to track all vessel traffic moving through the area. Vessel traffic services will communicate with all mariners traveling through the area about the sensitive nature of the bird population, increased patrols, and the heavy fines associated with dumping oil. The CCG and CANADIAN WILDLIFE SERVICE will tie into Canada's CANMARNET system, run by the Department of National Defence.

This system collects information from CCG and National Defense overflights and feeds it into a centralized computer system. That system provides a database of vessels traveling off Canadian shores, particularly in waters more than 22 km offshore, outside of Canada's territorial waters. The system will allow Canadian officials "to keep tabs on all vessel movements off the coast," Harvey explains, so that when a spill occurs officials can identify potential spillers. The CANMARNET system will also provide officials a tool for planning overflights, he explains. They can get an idea of which areas contain heavy vessel traffic and plan overflights accordingly. Canadian agencies will conduct coastal and on-water surveys to obtain a more accurate and comprehensive picture of the extent of oiled wildlife in the area. The CCG initially has provided nearly US $22,000 to fund a permanent bird rehabilitation facility in Ship Cove, Newfoundland, on the southwest Avalon Peninsula. The facility, slated to open in early October, will be staffed to clean approximately 25 heavily oiled birds at a time. A number of veterinarians in the area will help staff the center. Harvey reports that the CANADIAN WILDLIFE SERVICE is particularly concerned about the impact of mystery spills on the endangered eastern harlequin ducks and eiders. He explains that the total world population of eastern harlequin ducks, numbering 300, all winter off Newfoundland. These two species of birds would be given high priority for cleaning in the event that they become oiled. Officials are still attempting to find a long-term funding source for the rehabilitation center through a cooperative government/industry initiative. The CCG is pursuing a number of long-term solutions. These include having the areas declared a special area under MARPOL, and possibility establishing a traffic exclusion zone in some offshore areas. Harvey explains that Canadian officials are in the exploratory phase on these projects, determining the criteria that they must meet before moving forward. In addition, Canada plans to work through the International Maritime Organization (IMO) to obtain consensus before moving forward on a solution. Canada is also pursuing a number of other long-term solutions, including aerial remote sampling radio and RADARSAT.

OSIR 25 November 1997

POW: Canada's Atlantic Surveillance Teams Nab Accused Polluter

Canada's new offensive against passing-ship pollution off Newfoundland -- POW, for Protection of Oiled Wildlife (see OSIR, 11 September 1997) -- has netted its biggest prize: a 292-m Bahamian container ship and three of its officers. The Atlantic Cartier, its captain, first engineer, and third engineer are accused of eight pollution offenses for which they face fines of US $714,000 per count, according to Canadian officials. The charges include discharging a substance harmful to migratory birds, polluting waters frequented by fish, and failing to report pollution. Evidence in the case is unequivocal, Jon Stone of Environment Canada (EC) tells OSIR: A Canadian Coast

Guard (CCG) plane saw the ship trailing a 15-km slick of petroleum on 19 November. According to charge sheets, the ship was 139 km southeast of Cape Race at the time – well within Canada's territorial sea. The CCG demanded that the ship cease its discharge and dock at St. Johns, Newfoundland, Canada. There, a judge formally arraigned the third officer, the vessel operator posted a letter of undertaking, and CCG allowed the ship to leave for Liverpool, UK, its scheduled destination, officials say. The accused officers and the responsible party agreed to appear at a hearing on 20 January 1998, Stone says. The operator of Atlantic Cartier, Transocean Ship Management of Gothenberg, Sweden, declined comment on the affair. Those charged were Captain Jonas B.O. Rahmberg and First Engineer Claes P. Hjortsberg, both Swedish citizens, along with third engineer Eleaser S. Laurenta of The Philippines, and the vessel itself. The men could face imprisonment, but the Canadian government is more likely to seek restitution against the vessel operator, Stone says. The severity of government action may rest upon the impact of the slick: Wildlife officers on the coasts of Labrador and Newfoundland are watching for birds oiled by the slick to wash ashore, Stone says. POW is a multi-agency effort by CCG, Environment Canada, and Transport Canada to protect winter feeding grounds for migratory birds. It includes longer and more frequent overflights by CCG, and standing orders for all Canadian military aircraft to report vessel discharges, Stone says. Radar satellites also are monitoring the coast, he adds. Mystery spills have plagued northeastern Canada for years. POW began after a single mystery spill last winter killed 30,000-50,000 birds (see OSIR, 30 January 1997). "If you combine the likely impact on birds over the past few years, we have numbers similar to the Exxon Valdez" spill in 1989, Stone says. For the past month, oiled birds have been washing ashore from Cape Race to Placentia Bay -- losses that cannot be laid to Atlantic Cartier, which departed Halifax, Nova Scotia, Canada, on 18 November. At greatest peril: the endangered, eastern Canadian race of harlequin duck. "Their numbers are down to only a few dozen and they frequent the areas where this oil was found. They flock, so one small spill could eliminate them," Stone says. This fall, CCG built a bird rehabilitation center at Ship Cove, Newfoundland. In the meantime, the courts in St. John have reserved two weeks in January for the oil pollution trial of another vessel, the Panamanian-flagged bulk carrier Elm, Stone says. "We are taking this very seriously. We are pulling out all the stops to make sure these spills come to an end," he says.

Cruise Lines to Pay Pollution Fines

Two cruise ship companies have pleaded guilty to violating the US Clean Water Act by jettisoning plastics and oily bilge water, and will pay US $500,000 in fines and restitution, according to federal prosecutors in Miami, Florida, USA. The four separate cases involve garbage bags, oily water dumped from the cruise ship Seabreeze I, and oil discharged from the vessel Star of Texas between 1992 and 1994, according to the USCG. Ulysses Cruise Lines of Panama, operator of both vessels, paid

$150,000 in fines and $275,000 in restitution. Seaway Maritime Co., owner of the Star of Texas, will pay $75,000 in fines, according to prosecutors. Some $225,000 will go into the Oil Spill Liability Trust Fund; $275,000 will finance coral reef restoration, marine pollution research, and an antipollution education campaign by the National Oceanic and Atmospheric Administration (NOAA), prosecutors said.

OSIR 19 February 1998

Canadians Charge Third Freighter for Oil Pollution

On 16 February, officials in St. John's, Newfoundland, Canada, laid nine pollution-related charges against the Malaysian container ship Brandenburg, its captain, and its chief engineer, both Indian nationals. Simultaneously, trial began in St. John's on similar charges lodged against another freighter and its officers for an incident in November 1996. Penalties in each case, brought for discharging oil in overwintering waters for seabirds off Canada's Atlantic Coast, could exceed $690,000, according to Jon Stone of Environment Canada. Charges against the Brandenburg, its captain Yogash Bali, and chief engineer Ajoy Bhasin, include illegally discharging oil and failing to report that discharge. They also face charges of endangering fish and migratory birds. "This is the ninth incident of this type that has been reported in the last four months," Stone tells OSIR. "The Brandenburg is the second vessel in the past three months that has been searched by officers enforcing environmental crime legislation," he says. Canadian officials have vowed to end oil spills from passing ships, which they blame for the deaths of thousands of sea birds each year. Authorities caught the Brandenburg discharging oil about 110 km south of Cape St. Mary's Ecological Reserve, Newfoundland, Stone says. "At approximately 9:50 LT on 8 February, a Canadian Fisheries patrol flight observed a slick 11.6 km long and 100 m wide emanating from MV Brandenburg," Stone says. When officers contacted the ship and asked it to stop discharging, "they did so immediately and informed the crew of the aircraft they had mechanical problems," he says. Investigators from Environment Canada, Transport Canada, and the Canadian Coast Guard boarded the ship after it arrived in Montreal on 12 February. After a two-day search, charges followed, Stone says. In the meantime, prosecutors opened their case against representatives of the Bahamian bulk ship Elm and several of its officers. A patrol flight photographed the Elm discharging what appeared to be oil off Newfoundland in November 1996, and officials filed nine pollution-related charges after investigators searched the ship during a port call at Chicoutimi, Quebec, in March 1997, Stone says. Representatives and officers of another Bahamian vessel, the container ship Atlantic Cartier, are scheduled to face trial on eight pollution charges in St. John's on 21 April. Canadian officials say spotters caught the Atlantic Cartier, in the act of spilling oil on 19 November 1997. The ship was outward bound from Halifax, Nova Scotia, Canada, and authorities ordered it into port at St. John's, where they searched the ship and laid the charges.

OSIR 5 March 1998

Tanker Operator Fined for UK Spills

A magistrate in Hull, UK, has fined a local tanker company nearly $66,000 and assessed nearly $9,400 in costs for two oil spills that occurred off the coast of Kent, UK, in 1997, according to the UK Marine Safety Agency (MSA). No oil came ashore in either case, MSA reports, although officials observed sheen 100 m offshore of the white cliffs of Dover after the largest spill, at least 588 gallons (2 tonnes [mt]), on 3 September. The oil spilled from an overfull tank while crews of two vessels owned by John H. Whitaker Tankers were blending fuel for cross-English Channel ferries, according to MSA. The company reported both spills immediately to the UK Coastguard Agency and cooperated fully with authorities throughout their investigation, MSA says. "It is hoped this heavy fine will send a strong message to tanker owners and masters that the antipollution legislation will be enforced with vigor whenever it is appropriate," says Mark Capon, prosecuting surveyor for MSA.

OSIR 19 March 1998

UK Shipping Minister Vows to Make Polluters Pay

Sounding not unlike a US anti-pollution prosecutor, UK Shipping Minister Glenda Jackson has vowed to "stamp out . . . the pervasive practice of deliberate pollution from ships" with high-profile punishments. She is urging magistrates to impose painful fines, and has declared a government policy of "naming and shaming" culprits who spill oil. Britain's national contingency plan for pollution from shipping must be used not only in major spills like those from the Sea Empress (see OSIR, 22 February 1996) and the Braer (see OSIR, 23 March 1995), but to "track down and prosecute those who deliberately pollute," Jackson told an Institute of Petroleum conference in London on 10 March. The UK government boosted five-fold the maximum fine for spilling oil from a ship, from US $82,000 to $425,000, in September 1997. However, in her 10 March speech, Jackson suggested actual fines should rise even more dramatically. She offered as exemplary the judgment of $75,400 - 22 times larger than the average UK oil pollution fine from 1991 to 1995 - against a tanker operation that spilled oil off the White Cliffs of Dover last year (see OSIR, 5 March 1998). Acknowledging that the owner in that case cooperated with investigators, she added "I hope this heavy fine will send a strong message to all tanker owners and masters that anti-pollution offenses will be enforced vigorously, and that offenders will be named," she said.

Deterrence and Encouragement

Shaming and sterner punishment fits into a four-part strategy of combating illegal discharges of ship's waste, Jackson says. Those include discouraging pollution, encouraging responsible disposal of waste in port, advocating tighter international restrictions on ocean discharge, and enforcement, Jackson says in a December 1997 article for the UK professional journal, The Magistrate. To deter polluters, "fines should generally exceed the savings that disreputable ship owners can make by discharging wastes illegally at sea," she says, adding that daily operating costs for tankers run $4,900 to $19,700 a day. "Magistrates should also note the significant cost to government of dealing with discharges," Jackson adds. The UK Marine Pollution Control Unit spends $10.6 million annually on counter pollution measures, and local authorities (who are responsible for cleaning shoreline pollution in the UK) spend millions more, she says. The economic cost of oil and garbage pollution from ships on mari-culture, traditional fishing, and tourism, "is huge," according to Jackson. "We have a duty to those who come after us to ensure that the sea . . . should be for them the inspiration, the challenge, and the life-enhancing force it has been for preceding generations and not the great sewer of the world," she says. The new Maritime and Coastguard Agency, to form by merger on 1 April, "will have a dedicated prosecution team," Jackson reports. Prosecutors would target the owners and managers of an offending ship, rather than its crew, Jackson adds. "We would prosecute a ship's master in addition to the owner only if the offense arose from the master's personal fault or negligence and if the master was acting against the instructions of the owner," she says. Owners also feel the brunt of shaming, which draws the attention of their customers and insurers, she indicates.

Other Anti-Pollution Efforts

The Minister also promises to ensure that all UK ports offer adequate waste reception. Effective 1 January 1998, Jackson ordered all UK ports, harbors, terminals, and marinas to put proper waste management plans in place. Each port authority must consult its customers, analyze what kinds of waste they produce, calculate adequate capacity, and then make proper disposal easy to use, easy to find, and attractively priced, Jackson says. Detailed plans are due by 30 September 1998, she says. Authorities who do not comply can be fined, according to the UK Department of the Environment, Transport and the Regions (DETR). Port planners who discover through surveys or interviews that ships are not properly disposing their waste on shore must inform Marine Safety Agency inspectors, DETR says. During its current presidency of the European Union, the UK will press for similar, European-wide legislation, Jackson adds. Internationally, the UK also has joined with 8 other nations calling for a ban on oil discharges from ships into northwestern European seas effective in April 1999 (see story, this issue). On 17 April 1998, it plans to convene a

special meeting of at least 30 states to promote ratification of the 1996 International Conference on Hazardous and Noxious Substances and Limitation of Liability (HNS Convention). The HNS Convention would establish an international liability and compensation system for death, personal injury, or pollution caused by hazardous cargoes, including petroleum. It would make liability insurance compulsory for ships carrying hazardous cargo, and its compensation limits would be substantially higher than those of the 1992 Protocols to the 1971 International Pollution Compensation (IOPC) Fund. So far, only the UK has ratified the HNS Convention, according to Måns Jacobsson, IOPC Fund director. The UK also will champion an international liability convention and compensation regime for spills of bunker fuel by freighters and passenger ships, Jackson says. The legal committee of the International Maritime Organization (IMO) is reviewing draft conventions, according to UK and IMO officials. Jackson calls the lack of an international bunker spill regime "unacceptable." Some ships "carry more oil as bunkers than small tankers carry as cargo," says a DETR statement, and spilled bunker fuel is often more pernicious than crude oil.

MEPC Asked to Activate North Sea Oil Discharge Ban

Nine European nations bordering the North Sea and Irish Sea are asking the Marine Environment Protection Committee (MEPC) of IMO to put into force in April 1999 the prohibition on oil discharges from ships that MEPC approved a year ago (see OSIR, 20 March 1997). The International Chamber of Shipping (ICS) seeks a delay, saying that ship captains still consider port reception facilities for oily waste, commonly known as slops, inadequate in the region. The dispute is on MEPC's agenda for its 41st session, scheduled to begin 31 March in London. MEPC has designated North West European Waters a special area under Annex I of MARPOL, which would effectively prohibit all oily discharges from ships. Before the designation can come into force, however, all bordering coastal nations must notify IMO that all waste reception facilities in their ports also comply with MARPOL Annex I, according to a paper submitted jointly by Belgium, Denmark, France, Germany, Ireland, Norway, the Netherlands, Sweden, and the UK. In that paper, those nations assert that all of their ports are in compliance, and call on MEPC to impose the special area restrictions in 12 months. The shippers oppose action, citing a "gap between the claimed provision of facilities by ports and the perceived availability of facilities by ships. . . . If the gap is real, then it should be catalogued and remedied," ICS says in a companion paper filed with MEPC. Despite years of discussion on the waste issue, there remain "no factual standards" for ports to meet, ICS says. The nine nations' one-sentence claim that "all reception facilities in each state are adequate" is not enough, ICS contends. Efforts by some North Sea states to improve reception facilities, and efforts by the European Commission to devise an enforceable directive (see OSIR, 5 March 1998) may improve the situation, ICS says. Better, the shippers say, would be improved global standards governing discharge of oil into the sea - because ships banned from

dumping in the North Sea could just wait until they're clear of the special area before discharging. ICS calls for a cooperative solution that makes it easier for captains to discharge their waste properly in port, than to dump it at sea.

OSIR 26 March 1998

Nordic Pollution Dragnet Snares Polish Vessel

Danish authorities intend to file criminal charges against the crew of a Polish ship, Eugeniusz Kwiatkowski, for dumping oil into waters where it is forbidden, according to Evan Andersen, head of the marine pollution section for Denmark's Environmental Protection Agency (DEPA). The case would be only the second Denmark has pursued for illegal pollution by a vessel, and the first in which the culprit was "caught red-handed," Andersen tells OSIR. The incident already has involved close international cooperation among Germany, Sweden, and Denmark, he adds. The captain of ship has denied discharging oil, according to DEPA. The coastlines of all three nations have been plagued by mystery spills that have injured wildlife and required significant cleanup efforts (see OSIR, 20 July 1995, 27 April 1995, and 14 April 1994). Denmark and its neighbors have responded with increased surveillance (see OSIR, 29 May 1997), and redoubled efforts to hasten adequate waste reception at ports in Poland and other former communist nations (see OSIR, 5 March 1998).

Two Mystery Spills in Six Weeks

Despite those efforts, two mystery spills over the past six weeks have stranded oil on the Danish island of Fanöe, and oiled an estimated 5,500 sea birds, Andersen says. Authorities estimated the largest of those spills at 294 gallons (1 tonne [mt]), but the oil was "very stiff, stuck to the birds and required a lot of cleanup," he says. DEPA chemists believe the oil came from a ship, Andersen reports.

Nordic Cooperation

The unrelated case involving the Polish ship began on 16 March, Andersen says. Crew and scientists aboard a German research ship, Solea, saw the Eugeniusz Kwiatkowski discharging what appeared to be oily bilge water into a shipping channel in the Kattegat, the roughly triangular sea that separates Denmark from Sweden, and that lies between the North and Baltic Seas, he indicates. The International Maritime Organization (IMO) has designated the Kattegat a MARPOL special area, and Danish law forbids vessels from discharging any oil into it, according to Andersen. Scientists aboard the Solea collected samples of the spilled oil, as did personnel of two Danish agencies, Andersen says. He reports that the Danes sent a rescue boat from Anholt Island, as well as an oil pollution response vessel owned by

DEPA and manned by the Danish Navy. Both vessels collected samples of the spill, and the DEPA vessel skimmed up a small amount of oil, Andersen says. Oil Samples Matched to Vessels The Eugeniusz Kwiatkowski proceeded to Sweden, where investigators of the Swedish Coast Guard boarded the vessel and collected oil from its bilge. DEPA chemists found in preliminary tests that the oil samples "are all similar," according to Andersen. On 25 March, DEPA announced that its chemists had conclusively matched the ship to the spill, and that it would ask prosecutors to file criminal charges. Under Danish law, charges probably would be brought first against the crew, Andersen reports. If the courts clear the crew of responsibility, authorities could move against the ship's owner or operator, he says. The legal process could be a long one: Danish authorities are still gathering evidence for possible prosecution of a vessel which DEPA chemists matched to oil that stranded on a Danish beach in 1995, Andersen indicates. In that case, the vessel owner assumed financial responsibility for the spill response, he adds.

OSIR 23 April 1998

Netherlands Offers Port Waste Reception Plan

The Netherlands ministers of transport and the environment have proposed a comprehensive policy to reduce illegal ocean dumping from ships that a Dutch official calls more flexible than the one adopted by environmental ministers of the Baltic States on 26 March (see OSIR, 2 April 1998). European Commission officials may incorporate the Dutch plan into a directive on waste reception that they promise by June, says Theo Janssen, of The Netherlands Ministry of Transport, Public Works and Water Management. The Baltic and Dutch plans both propose simple, swift waste disposal service in all ports. They disagree over billing methods and whether disposal should be compulsory. Main points of the Dutch proposal include: financing through a combination of general port fees and pay-as-you-go disposal charges, conditional mandatory disposal of waste while in port, and enhanced port state inspection.

Incentives, Rules Differ from HELCOM Plan

By contrast, the plan adopted in March by Convention on the Protection of the Marine Environment of the Baltic Sea (the Helsinki Convention, or HELCOM) relies on uniform port fees and mandatory disposal. HELCOM leaders contend that ships lose any incentive to pollute if ports include waste reception in a uniform dockage fee. Still, the only way to assure that ships do not dump waste at sea is make sure that they depart with none, HELCOM insists. Janssen argues that the HELCOM plan, by offering waste reception at no extra charge, destroys any incentive for ships to reduce their waste. The Dutch plan would capitalize waste reception facilities

through port fees paid by every entering vessel, and finance operations through user fees based on volume. Properly balanced, that structure would keep disposal fees low enough to encourage compliance, and reward efficient operators, Janssen contends. The Dutch consider compulsory disposal unnecessary, warning it may generate unnecessary delays. Janssen proposes that instead port state inspectors compel a ship to dispose of its waste if "reasonable doubt exists whether there is an intention to dispose at any port reception facility." Evidence supporting a disposal order might include a sludge tank too full to accommodate the next scheduled voyage, or garbage piled on deck, he says.

Enforcement Key

Nations must more rigorously enforce anti-dumping laws, Janssen says, but expanding surveillance of shipping lanes "might be a very expensive alternative." Instead, Dutch officials propose that port inspectors target ships likely to dump at sea - and report the results of spot checks to the ship's next port of call. Should inventoried waste turn up missing at the next port, "a wide ranging MARPOL inspection may be carried out," Janssen says. Dutch port state inspectors already are developing such procedures, he adds. The Dutch transport and environment ministries are not pressing Parliament for swift approval of their ship waste plan - but they intend to amend it as necessary and press ahead with legislation once the European Union settles on its port waste reception directive, Janssen says.

OSIR 7 May 1998

Canadian Judge Acquits Ship, Officers in Mystery Spill Case

Citing "lingering doubt," a provincial court judge in St. John's, Newfoundland, Canada, on 5 May acquitted the Panamanian bulk vessel Elm and three senior officers of charges that the ship dumped oil off the south coast of the province in November 1996, leaving behind a 109-km slick. Defense lawyers insist the slick came from another, unknown vessel. Despite their defeat, Canadian enforcers vow to pursue similar cases against two other ships in a bid to deter mystery spills that biologists blame for killing thousands of seabirds annually. The Elm case was the first brought under Canada's Migratory Bird Act, which permits fines up to US $350,000. In addition, never before had a Newfoundland court tried a ship's crew on pollution charges. "It would be wrong if this ship and its crew were found guilty on the basis of being at the wrong place at the wrong time on this ocean highway," Judge Robert Hyslop told the court. "Had samples been obtained from this slick or from dead birds matching the samples taken from the Elm, or had there been further checking east of the Elm together with longer observation of [the vessel] from the air, a number of questions in my mind might have been answered," he said.
The possibility that the Elm was passing through another ship's slick is "remote, but

possible," concedes Wayne Turpin, Atlantic Region enforcement chief for the Wildlife Services Division of Environment Canada. However, he says that the agency reserves the right to appeal Hyslop's verdict, and expects to introduce more persuasive evidence in pollution cases pending against two container carriers, the Bahamian Atlantic Cartier (see OSIR, 25 November 1997) and the Liberian Brandenburg (see OSIR, 19 February 1998). In each of those cases, "we have video that shows very, very explicitly there is no pollution in front of the ship," Turpin tells OSIR. In the Elm matter, four members of a Canadian Fisheries Patrol flight "circled that ship 16 times and made a lot of notes," but they were inexperienced at pollution investigation and defense lawyers successfully undermined their testimony, Turpin says.

Crucial Jurisdiction for Seabirds

Convictions in St. John's courts may be crucial to the success of Protection of Oiled Wildlife (POW), Canada's multi-agency effort to deter North Atlantic mystery spills that officials blame for the deaths of 1.6 million birds since 1926, and more than 30,000 in 1997 alone (see OSIR, 30 January 1997). The waters off Newfoundland are important wintering areas for many species and a spill at the wrong place and time could exterminate the Canadian race of harlequin duck, says Environment Canada official Jon Stone. Those waters also are vast and tempestuous, frustrating investigators' attempts to collect samples of oil pollution, Turpin says. The bird habitat and sea lanes off Newfoundland lie around 260 km offshore, making it nearly impossible to reach a suspected bilge slick by boat before it dissipates, Turpin says. "By the Atlantic Cartier case, we had developed the Sabre buoy to be dropped from a plane to collect a sample of the oil and be retrieved later. We dropped the Sabre buoy, a marking buoy, and tracking buoys - and then we lost them in a storm," Turpin says. In neither case, did shore patrols find oiled birds washed ashore, but that is not surprising given the distance carcasses would have had to travel, Turpin insists. "We have to paint that picture better for the judge," he says.

Crew Acquitted

In addition to clearing the Elm of wrongdoing, Judge Hyslop acquitted Captain Spiridon Katopodis, Chief Engineer Ioannis Giannaras, and Second Engineer Chrisostomos Makridakis, all of Greece. Officials accused the engineers of discharging 180 gallons (less than one tonne [mt]) of oil and cited all three men for failing to report the discharge. Fines against the men were limited to $175,000, because prosecutors exercised their option under Canadian law to try the case without a jury, Turpin says. The government probably will pursue summary trials against the Atlantic Cartier as well the Brandenburg, and their senior officers, according to Turpin. Those cases are due for hearings on 29 May, Stone says.

OSIR 3 September 1998

Canada Continues Ship Pollution Prosecutions

Despite losing a hard-fought ship-pollution case five months ago (see OSIR 7 May 1998), Canadian prosecutors continue to pursue oil pollution charges based on aerial surveillance by Canadian Coast Guard (CCG) spotter planes. Authorities have charged five vessels with fouling Canada's Atlantic waters so far this year, according to Jim Lawson, senior regional pollution prevention officer for Transport Canada's Atlantic Region. CCG evidence may lead to flag-state action against a sixth ship for violating MARPOL, Lawson tells OSIR. Furthermore, Transport Canada is considering charges against another 12 ships seen trailing slicks, Lawson adds. Canada has launched a multi-agency mission to stop passing ship spills, which biologists believe kill thousands of birds annually. However, the only pollution fine collected so far involved the Pine Islands, a Belize-flagged general cargo ship. Its owners pleaded guilty on 10 August to violating the Canada Shipping Act by discharging oil during the 18 months the ship spent at anchor in Sydney, Nova Scotia, Canada. "They denied it, they didn't report it, and they didn't do the cleanup," Lawson says. After chemical analysis of the spill produced "an identical match" to samples from the Pine Island's bilge, the ship owner pleaded guilty, Lawson tells OSIR. A trial judge fined the ship $8,100, only about 5% of the maximum fine of $161,000, but this is "sufficient sanction" because ship owner Naviera Poseidon of Havana, Cuba, was short of funds, Lawson says. The company's insurer paid the fine, he says. Failing to report pollution in Canada carries an even stiffer penalty, but prosecutors can lodge that charge only at the captain or crew; they elected only to charge the owner in the Pine Islands case, Lawson says. In May, provincial court judge Robert Hyslop of St. Johns, Newfoundland, Canada, acquitted the Panamanian bulker Elm and three of its senior officers of pollution charges. Absence of chemical evidence left him with "lingering doubt" about the source of a slick that photos showed trailing from the Elm, Hyslop said. Investigators say that collecting samples from slicks hundreds of kilometers offshore is nearly impossible. Trial pends in two similar cases, against the container ships Atlantic Cartier (see OSIR, 25 November 1998) and Brandenburg (see OSIR, 19 February 1998).

OSIR 8 October 1998

California Claims Culprit Identified in Mystery Spill

Investigators have identified the source of a mystery spill that took more than a week to clean up after it appeared off the mouth of San Francisco Bay, California, USA, on 27 September (see OSIR, 1 October 1998), reports Pete Bontadelli, administrator of the Office of Spill Prevention and Response (OSPR) in the California

Department of Fish and Game. USCG and California chemists have matched the oil to bunker fuel from a vessel believed to have left US waters, Bontadelli tells OSIR. Estimates put the size of the spill at around 2,500 gallons (8.5 tonnes [mt]). "This was not a small incident," Bontadelli says. OSPR and the USCG are cooperating on enforcement action, as they cooperated during the investigation and the spill response, he says. "We are comfortable that we have a very solid case," Bontadelli adds. Officials used two new tools in their investigation: images from a commercial satellite that OSPR hired to be on the lookout for mystery spills and oil samples that OSPR began collecting routinely from bunker operations and ships visiting California ports just within the past 90 days, Bontadelli says. The satellite turned up no evidence in this case, but the surveillance contract is cheap, and "we only need one hit to more than pay for it," he says. Recurrent mystery spills along the California coast have been expensive for the state and for the US Oil Spill Liability Trust Fund, justifying increased surveillance and inspections, he says.

OSIR 17 December 1998

Canada Launches International Probe of Mystery Spill

Canada's Protection of Oiled Wildlife (POW) project launched an international investigation to identify the source of an oil spill that the Canadian Wildlife Service estimates has killed 3,000 open-ocean birds since 3 December. Transport Canada identified 30 vessels that passed east of Cape Race, Newfoundland, Canada, around 1 December. The Canadian Coast Guard (CCG) is arranging to have oil from those ships sampled upon their arrival at ports in Canada, the US, or Europe, POW Manager Terry Harvey tells OSIR. Oiled pelagic birds began stranding along 161 km of Newfoundland's rugged Avalon Peninsula on 3 December, Harvey says. Ground crews have recovered 340 corpses so far, including 60 on 16 December alone, he says. So far, chemical fingerprints by Environment Canada show that all of the birds were oiled by a mixture of Bunker C fuel and lubricating oil from the same source, he reports. Biologists believe most of the birds were oiled around 1 December because they appear to have been starving for two weeks, Harvey adds. Most of the victims are murres and dovekies, deep-ocean divers that are vulnerable to oiling and rarely recover even with treatment, he says. Wildlife officials place the avian death toll at 3,000, based on "an internationally agreed upon standard" that for each oiled corpse found in Newfoundland, 10 more birds have died, Harvey tells OSIR. Ground crews have been able to search only isolated coves, covering only about 16 km of the affected coastline, he says. Mystery spillage in the North Atlantic shipping lane east of Newfoundland "seems to have worsened" since POW began operation more than a year ago (see OSIR, 11 September 1997), Harvey says. The CCG intensified aerial surveillance of the area since 1 December, from one flight per week to more than four flights per week, Harvey says.

OSIR 6 May 1999

Canada Wins Guilty Plea

Owners of the Malaysian container ship Brandenburg pleaded guilty on 29 April 1999 to polluting the North Atlantic shipping lane off Newfoundland, Canada, with oil on 8 February 1998 (see OSIR, 19 February 1998), and paid a $24,154 fine. The conviction is the first for pollution detected by Canada's multi-agency Protection of Oiled Wildlife initiative, aimed at stopping oil discharges from passing ships that authorities say are killing thousands of overwintering sea birds each year (see OSIR, 3 September 1998). Accusing the Brandenburg of trailing a slick 11.6 km long, Transport Canada charged the ship and its crew with violating five antipollution statutes. Prosecutors settled for a guilty plea by the ship owner to one violation of the Canada Shipping Act. The Brandenburg paid 15% of the maximum fine of $161,000 under the act. Critics contend Canada's pollution penalties are insufficient to encourage proper disposal of oily waste in port.

OSIR 22 July 1999

RCCL to Pay $18 Million for "Midnight Dumping" of Oil, Toxics

Royal Caribbean Cruise Lines (RCCL) has agreed to pay US $18 million in fines and plead guilty to 21 US felonies for systematically and covertly dumping oil and hazardous waste at sea from passenger ships. The penalty, a record for pollution by a cruise line, involves offenses by eight ships operating from six US ports. This fine would be in addition to a record $9 million criminal fine that RCCL paid in US courts last year (see OSIR, 4 June 1998), bringing its total penalties to $27 million. The counts include violations of OPA 90, the Resource Conservation and Recovery Act (RCRA), and the Clean Water Act, as well as lying to the US Coast Guard through doctored oil record books and false statements. All offenses occurred after RCCL knew it was under investigation for pollution violations in 1994, and one violation continued through 1998, according to a statement by the US Justice Department.

"Case Will Sound Like a Foghorn"

"Royal Caribbean used our nation's waters as its dumping ground even as it promoted itself as an environmentally 'green' company," said US Attorney General Janet Reno in a 21 July announcement conferring uncommon attention to a pollution case. "This case will sound like a foghorn throughout the entire maritime industry," she declared. The Justice Department and RCCL provided starkly different interpretations of the plea bargain. Prosecutors accused the company of a "fleet-wide conspiracy" of "midnight dumping." They pointed to "the unprecedented charge" that RCCL deliberately and illegally stored hazardous substances including spent dry cleaning

fluid, photographic chemicals, and printing solvents at its wharf in Miami, Florida, USA. Rather than dispose of the chemicals legally on land, crews mixed them with household garbage, which they loaded aboard RCCL liners to be burned or dumped at sea, prosecutors said. The plea bargain follows, but does not conclude, a five-year investigation of the company, prosecutors said. Two RCCL engineers indicted by a US federal grand jury in San Juan, Puerto Rico, are fugitives, they added. RCCL, by contrast, called the agreement a "final settlement." "We are profoundly sorry that a group of our employees knowingly violated environmental laws and our own company policy," RCCL President Jack Williams said. "The majority of these violations reflect a lapse in our enforcement efforts -- not a lapse in our corporate conscience or our commitment to protecting the ocean," he added. RCCL admitted that crews on some ships dumped photographic chemicals and dry cleaning solvent into cabin sinks or drains which discharged directly into the sea. Those offenses were inadvertent because environmental auditors had approved the practice, which the company has now stopped, Williams said. On its official Internet Web site, RCCL touts its "Save the Waves" environmental compliance program without mentioning it is compelled to reform its practices under a five-year probation imposed in the 1998 judgment. If six federal judges accept the 1999 agreement, RCCL must surrender documents from its internal investigations and aid prosecution of employees charged with wrongdoing. Prosecutors rejected RCCL's excuses. Dumping saved the company hundreds of thousands of dollars, and it paid bonuses to ship engineers for cutting expenses, they said. RCCL had challenged the government's initial case against it on technical grounds, asserting that it was immune from prosecution in the US because it is a Liberian corporation. Its first guilty plea came weeks after a federal judge rejected that argument. By port, the charges to which RCCL has pleaded guilty include:

Anchorage, Alaska, USA — Four OPA 90 violations for "deliberate and routine midnight dumping" of waste oil into Alaska's Inside Passage and other waters from the liners Nordic Prince and Sun Viking in 1995, and two felony counts for falsifying oil record books on the two ships.

Juneau, Alaska — Violation of the Clean Water Act for dumping photographic and dry cleaning waste into the port of Juneau and Alaskan coastal waters, from the Legend of the Seas, the Nordic Prince, and the Sun Viking. Total fines for Alaskan offenses: $6.5 million.

Miami — One felony count for falsifying the oil record book of the Grandeur of the Seas in 1997, one violation of RCRA for storing ignitable waste on a pier without a permit from 1997 to 1998, and two felony violations of the Clean Water Act for dumping hazardous waste at sea and in the port of Miami in 1994 and 1995. Fine: $3 million.

New York, New York, USA — Two felony counts for false oil record books on the Song of America in 1994, and two felony counts for dumping photo and dry cleaning waste into the port of New York and other coastal waters. Fine: $3 million.

Los Angeles, California, USA — Three felonies for false statements and a false oil record book aboard the Nordic Prince in 1994. RCCL pleaded guilty to those charges earlier this year (see OSIR, 22 March 1999). Fine: $3 million.

St. Croix, US Virgin Islands — Felony violation of the Clean Water Act for dumping photo and dry cleaning waste into the Port of St. Croix and coastal waters, and one felony count for a falsified oil record book aboard the Grandeur of the Seas in 1997. Fine: $1.5 million.

San Juan — One felony for falsifying the oil record book of the Song of Norway in 1994. Fine: $1 million.

If approved by the courts, $6 million of the 1999 fine would be earmarked for environmental projects in each judicial district. Since 1993, the US Justice Department has won criminal penalties against six other cruise lines, including Holland America Lines, Ulysses Cruises, Regency Cruises, American Global Lines, Palm Beach Cruises, and Princess Cruises

OSIR 12 August 1999

Canada Gets Minister with Teeth

A 3 August cabinet shuffle in Ottawa installed David Anderson, 61, as environment minister. Anderson is an environmentalist with three decades' experience on oil transportation and spill prevention policy. A former transport minister and fisheries minister, Anderson also fought in the 1970s to keep US domestic tanker traffic from Alaska away from the British Columbia coast. According to an OSIR source, the new environment minister immediately ordered Environment Canada to find justification for increasing oil pollution fines under the Canada Shipping Act, which critics call too puny to deter routine spills that threaten seabirds off Newfoundland (see OSIR, 6 May 1999). Anderson also ordered Environment Canada to better coordinate enforcement, communication, and compliance promotion with Transport Canada and the Canadian Coast Guard, the source says. Anderson wants to emulate the "name and shame" strategy of high-profile prosecution adopted in the US and the UK, the source says.

OSIR 1 January 2000

Canadian Judge Imposes Record Oil Pollution Fine

A provincial court judge in Halifax, Nova Scotia, Canada, has imposed a record US $27,265 fine against the operator of a Bahamian-flagged tanker, Nordholt (39,777 dwt). A Transport Canada pollution surveillance pilot saw the ship trailing an 11-km oil slick on 29 March 1998. "It was the largest fine ever for a ship caught by aerial surveillance in Canada," says Jon Stone, a spokesman for Environment Canada. Prosecutors in Canada's Atlantic region have had to accept smaller fines for passing-ship pollution, and the shipping company's lawyer had argued that previous Canadian court decisions supported no more than a $6,816 fine in the case. Norden D/S, A/S of Copenhagen, Denmark, was the ship operator in 1998, according to Lloyd's Maritime Directory. Contending that fines must be large enough to deter pollution, prosecutor James Martin had sought a $68,162 penalty after the ship operator lost a six-day trial. "We are encouraged the upward movement in the range of penalties will help deter other people from intentionally dumping oil and will encourage companies to do more to assure there are not any accidental spills." Canadian officials have long argued that routine oil pollution from passing ships in the North Atlantic shipping lanes kill thousands of seabirds that raft there in winter. "An individual ship may not do a huge amount of damage, but, overall, the incremental damage of these happening day in and day out is causing huge impacts on seabird populations," says Tony Lock, an Environment Canada biologist. The arguments persuaded Judge Patrick Curran. Although prosecutors offered no evidence that the Nordholt spilled oil deliberately or that the spill harmed birds, "operators of these vessels have to be discouraged [from breaking the law] and do everything to prevent" pollution, he said. In convicting the Nordholt's operator, Curran accepted -- without chemical corroboration -- the testimony of Larry Deneault, whom Stone calls "Canada's number one observer-pilot." Curran's acceptance of Deneault's expertise is a further boost for Canada's interdepartmental Protection of Oiled Wildlife Program, because collecting oil samples from the North Atlantic is usually impossible for Canadian enforcers.

OSIR 17 February 2000

Another Canola Spill Fouls Vancouver Harbor

Environment Canada moved quickly from cleanup to damage assessment following an 11 February canola oil spill in the Burrard Inlet of Vancouver, British Columbia, Canada. Although cleanup of the estimated 14,700 gallons (50 tonnes [mt]) of oil was completed just 48 hours after it began, oiled birds continued to appear nearly a week after the spill, says Fred Beech, Environment Canada's emergency coordinator

for the West Coast. Last week's spill is the second of its kind in these waters in less than three months (see OSIR, 9 December 1999). On 24 November 1999, an estimated 58,800 gallons (200 tonnes [mt]) of canola oil fouled Vancouver's harbor, oiling beaches and killing hundreds of birds. The source of that spill, whose cleanup was plagued by poor weather, uncertainty, and delays, remains under investigation, Beech says. Cleanup in February proceeded smoothly, thanks to some important differences, not the least of which was a clearly identified responsible party. "It was a first-class response," Beech says. Oil spilled from a burst transfer hose as workers loaded a tanker at Neptune Bulk Terminals in North Vancouver, according to Beech. Neptune took full responsibility and immediately hired regional oil spill recovery organization Burrard Clean Operations to clean up the spill, according to Environment Canada. Burrard used containment boom and skimmers to clean up the slick, Beech says. Rehabilitators from Environment Canada had recovered 10 to 20 oiled birds by 14 February and were preparing to treat many more in the next several days, he said.

OSIR 4 May 2000

In Atlantic Canada: You Spill, You Pay

Investigations by Canada's Federal Department of Transportation, in cooperation with other government departments, have resulted in the successful prosecution of 11 vessels for unlawful discharges of "oily products" in Atlantic Canadian waters between 1 January and 31 March 2000. Fines totaling C$122,000 (US $81,476) have been levied. Atlantic Canada includes the country's four eastern provinces: Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland/Labrador. (For a detailed list of Atlantic Canadian fines, visit Cutter's Web site at www.cutter.com/osir/finelist.html.) The prosecutions stem from 19 investigations of marine pollution and from 12 enforcement actions taken by the Transportation Department's regional Marine Safety branch. In cases where the oily products weren't sampled, their identity was confirmed by aerial surveillance and photography and by oil-like properties indicated by the photographic evidence. The prosecutions have highlighted the importance of such surveillance, which is performed by the Canadian Coast Guard and the Department of National Defence. Both have substantially assisted Transport Canada in securing successful prosecutions under the Canada Shipping Act. Canadian Transportation Minister David Collenette says, "Our department is committed to ensuring safe and environmentally responsible commercial marine operations in Canadian waters. In cooperation with the Coast Guard, Environment Canada, Justice Canada, and the Department of National Defence, the Transportation Department is continuing its long-standing objective of detecting and prosecuting marine polluters in order to discourage would-be polluters. "While some of the cases we prosecute involve minimal amounts of

pollutants, even small amounts of pollutants such as oil can have a negative impact on marine life," Collenette says. In 1999, the Transportation Department initiated 119 investigations of potential marine pollution incidents in Atlantic Canada. These resulted in 18 enforcement actions that led to more than Cdn $152,000 (US $101,520) in fines. In the case of two suspicious vessels that were unlikely to return to Canadian waters, the cases were referred to the vessels' Flag States for action, as indicated under the terms of MARPOL.

Educating and Investigating

In an effort to increase awareness of marine-pollution incidents, the Transportation Department has begun to release quarterly reports that detail successful prosecutions. The department has also instituted public information programs at various ports and developed a multilingual pamphlet to educate shipmasters about Canadian legal requirements. The Transportation Department investigates all reported incidents of marine pollution. If sufficient evidence of an infraction is obtained, the department recommends prosecution. Each incident must be assessed based on the likelihood of prosecutorial success, in order to ensure that resources are used effectively. If an investigation provides a sufficient level of evidence to pursue a prosecution, the department exercises its authority to do so. In addition to conducting aerial and surface-based surveillance activities, the Transportation Department actively promotes safe and environmentally sound shipping practices through the enforcement of domestic and international shipping regulations. Collenette points out, "Most of those in the marine industry carry out their operations in a safe and environmentally responsible manner. For the minority that do not, our department, in cooperation with its domestic and international partners, will continue to recommend prosecution, and, in the future, will seek higher fines from the courts as a deterrent to ship source pollution."

Oceanspace Issue 281 — Tuesday, October 31, 2000

Environment, Research Finally Get 2001 Funding

Washington, D.C., USA -- President Bill Clinton signed two appropriations bills on Friday, the veterans affairs and housing bill and the energy and water bill. The new law will provide $106 billion in fiscal year 2001 for the Departments of Veterans Affairs, Housing and Urban Development, and Energy and independent agencies, including the Corporation for National and Community Service, the Environmental Protection Agency, the National Aeronautics and Space Administration, the National Science Foundation, and the Army Corps of Engineers. In part, the legislation provides for "investment in cleaner environments." The agreement contains increased funding for enforcement of the nation's environmental laws and protection

of air and water. Before signing the legislation, Clinton insisted that Congress drop or fix objectionable riders that threatened the environment. The approved budget provides $3.9 billion for the U.S. Environmental Protection Agency, a 9% increase, to strengthen the backbone of the nation's environmental protection efforts. These resources, he said, will enable EPA to continue to provide American communities with cleaner air, cleaner water, and improved quality of life. The budget also includes an 8% increase - more than $164 million -- for the president's Clean Water Action Plan. The budget includes a $38 million increase for controlling non-point source pollution, the greatest remaining source of poor water quality, and a $56 million increase to help states and tribes strengthen water quality control programs. It also provides funds to help restore the Florida Everglades. This year's appropriation includes $118 million for Army Corps of Engineers projects to restore wetlands and natural waterflows in this internationally important ecosystem. This project is an important step to implement the president's $7.8 billion Comprehensive Everglades Restoration Plan, which had unprecedented support from Congress and agricultural, community, business, and environmental groups.

The bill signed Friday also increases the U.S. investment in scientific discovery and education, which has helped fuel economic growth. As part of the Clinton-Gore plan to reduce America's reliance on oil and lower the nation's fuel bills, the budget includes a $65 million increase for solar and renewable energy technologies at the Department of Energy. These initiatives will help the United States achieve greater energy security, reduce pollution, and create new high-tech industries and jobs. The law also contains a $529 million increase for the National Science Foundation, the largest increase ever, for a total investment of $4.4 billion. It boosts university-based research and ensures balanced support for all science and engineering disciplines. Increased investments will spur new discoveries in the fields of information technology, nanotechnology, and other areas of fundamental science and engineering.

APPENDIX 4: FACILITIES IN PORTS FOR THE RECEPTION OF OILY WASTES FROM SHIPS

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Ref. T5/1.01
MEPC.3/Circ.3

6 October 1998

Facilities in Ports for the Reception of Oily Wastes from Ships

It will be recalled that the Government of a Party to MARPOL 73/78 undertakes to ensure the provision of adequate reception facilities in its ports for the reception of oily wastes from oil tankers and other ships using its ports in accordance with regulation 12 of Annex I of the Convention. Furthermore, all Parties to the Convention are required to communicate to the Organization a list of reception facilities in their ports in accordance with article 11(1)(d) of the Convention, and all IMO Member States which are not yet Party to the Convention are also invited to provide such information.

With the aim of promoting the effective implementation of the Convention, the Organization, since 1983, has been collecting and disseminating information on the availability of reception facilities through MEPC circulars. In recent years, every effort has been made to update the MEPC circular on reception facilities annually so that end-users of the circular will have up-to-date information. Further, the information contained in MEPC.3/Circ.2 of 14 May 1996 and MEPC.3/Circ.2/Add.1 of 20 June 1997 has been available on the Internet (IMO's Homepage, circulars) since 1997.
This circular will replace the above circulars.

The present circular lists all information on oily waste reception facilities submitted by Governments up to June 1998. The list of IMO Member States which have submitted information on oily waste reception facilities contained in this Circular is set out in annex 1 to this circular and the list of facilities in annex 2.

Governments are invited to bring this circular to the attention of their Administrations, port authorities and shipping companies concerned through appropriate means.

Member States which have not yet submitted information on their reception facilities are invited to do so, and those Member States which have done so are invited to inform the Organization of changes, if any, to their list of reception facilities on a nation-wide port-by-port basis, including telephone and telefax numbers, so that the circular can be kept up to date. The information should be sent to IMO by April each year.

It may be noted that this circular is compiled on the basis of information submitted by Governments, and that non-entry of reception facilities in the circular may not necessarily mean that there is no reception facility in that country.

This circular supersedes MEPC.3/Circ.2 and MEPC.3/Circ.2/Add.1.

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