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THE TRIUMPH OF THE OTHER EGG

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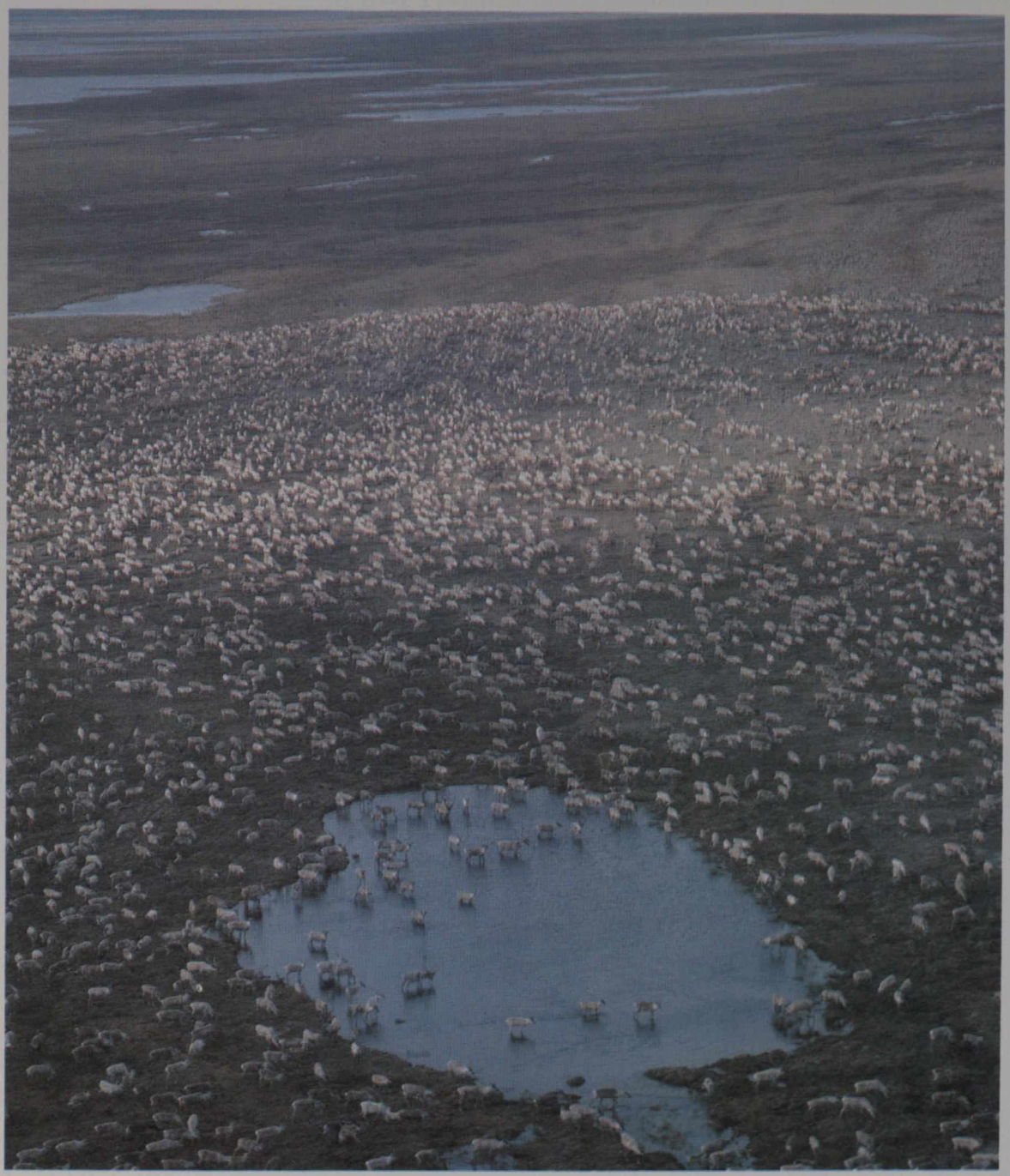
PHOTOS: COVER, US FISH AND WILDLIFE SERVICE; PAGE TWO, FRED BRUEMMER

Coho, Cranes and Caribou



Animals may be Canadian or American, but they move across the border as easily as they move from hill to valley or river to sea. To paraphrase Sitting Bull, the salmon tastes the same on either side.

The governments of the two countries share the responsibility of protecting the migrating animals of land, water and air. Some need protection from fishermen and hunters; some need constant supportive care; and some, merely sound management. Animal populations rise and fall from natural as well as man-made causes. Some changes in population are simply mysterious, and sometimes it is difficult to tell which animals need what kind of help.

The whooping crane is a dramatic example of assisted survival; the caribou needs only to be left alone; and the salmon's well-being is principally a matter of commercial restraint.

In this issue of CANADA TODAY/ D'AUJOURD'HUI we consider the cooperative strategems used by Canada and the United States to preserve these species while permitting fishermen to fish, Inuit to hunt and the cranes to keep on whooping.

The Triumph of the Other Egg

The whooping crane's name derives from the bugle-like note it sounds when, among other times, it is warning other cranes away from its nesting turf.

Whoopers were never as plentiful as pigeons, or even as sandhill cranes, their only North American cousins. By 1850 there were probably only 1,500, nesting over a wide area from the southern end of Lake Michigan to the Peace River country of Alberta. A few ventured up the Mackenzie River to the Arctic. They all wintered at the southern end of the continent, ranging from northern Mexico, through Texas, to the Louisiana coast.

Some were shot by hunters: they are among the most conspicuous and beautiful of birds — white with long necks, dark pointed bills, long thin black legs and caps of crimson, standing four and a half feet tall with a wingspan of six feet or more. However, it was not the hunters who were most responsible for their decline, but the farmers, the homesteaders and even, to a considerable degree, the egg collectors. Each nesting pair requires over 400 acres of shallow water or marsh, with sedges, grasses, bulrushes and abundant water animals and insects. As man moved in, the whooping crane moved out.

Since 1922, when a single pair was spotted near Davidson, Saskatchewan, none have been found nesting near towns or farms.

Efforts to protect the dwindling species were underway in 1937 when their southern wintering area in Texas was declared a refuge, but no really effective steps could be taken until their northern nesting place was found.

By 1941 there were only 21 left in the world and few whoops were ever heard by human ears. Fifteen wintered in the Aransas National Wildlife Refuge on the Texas Gulf Coast. The six who lived in Louisiana year round vanished by 1950. In 1954 G. M. Wilson and J. D. Landells — a scientist and a forester who were flying equipment to a forest fire — spotted an adult pair with a young bird south of Great Slave Lake. The next year a ground party found the flock's full nesting area near Fort Smith in Wood Buffalo National Park, north of Alberta. The cranes were watched, counted and worried about. By 1956 the number had risen to 27, three of them in captivity. In 1967 the Canadian Wildlife Service and the US Bureau of Fisheries and Wildlife decided to hatch eggs artificially at Patuxent, Maryland. Nesting cranes usually produced two eggs but had difficulty finding enough food to keep two chicks alive. The Patuxent theory was that if one egg were removed and incubated artificially, the remaining egg would still be hatched by the parents and both chicks would have a better chance of survival. It proved correct. Six eggs were removed from Wood Buffalo Park in 1967, ten more in 1968 and ten in 1969. By 1970 the captive flock totalled 22. By 1971 the total was 59, but the flock was still in danger; a single violent storm could kill them all. In Wood Buffalo Park, more young reached maturity in years when one egg was removed from each nest than in years when both were left.

The Patuxent experiment had only limited success; the captive birds remained captive and did not breed. There was no clear way to convert them into wild birds following natural nesting and migrating patterns.

In 1973 two new plans were conceived.

Patuxent added an animal behaviourist to its staff. He separated the captive whoopers into what he hoped would be compatible pairs. Each pair had its own quarters where artificial light lengthened the day to 22 hours — like that in Wood Buffalo National Park. The cranes courted, but did not mate. Artificial insemination provided the first fertile eggs in 1975. In 1978, one captive female laid ten eggs; another, nine.

The second plan was even more daring; it made sandhill cranes foster parents of whoopers. The sandhill cranes are relatively plentiful. A large flock nests in Grays Lake National Wildlife Refuge in Idaho. In May 1975 Ernst Kuyt, of the Canadian Wildlife Service, and Dr. Elwood Bizeau, of the Idaho Cooperative Wildlife Unit, collected eggs, as usual, at Fort Smith.

The process is slow and careful. Collectors fly in by helicopter, the noise frightening the nesting whoopers who leave their nests. The helicopter lands in the marsh, and the visitors take one of the two light olive-green and brown speckled eggs. If

Whoopers whoop for a variety of reasons. One is to announce their territorial nesting rights to intruders; another, to attract each other at mating time.

The bright white cranes are whoopers; the others are sandhills.

one egg is smaller or somewhat misshapen, it is chosen and the more promising egg left in the nest. Both eggs from non-reproductive parents are also taken, and one is replaced with an egg from a more successful pair. Each chosen egg is slipped carefully into a thick wool sock and returned to the helicopter where it is transferred to an incubator suitcase heated with hot water bottles. The helicopter flies on to the next nest until the operation is completed. (One year one nest was found with three eggs and two were removed.)

Fourteen eggs were collected in 1975 and flown south in a cabin plane. The cabin pressure was manipulated to approximately 4,500 feet, a compromise between the altitudes at Grays Lake, which range from 750 feet to 6,390. Oxygen was fed to the eggs every five or ten minutes.

At Idaho Falls, Idaho, a US customs official gave the eggs quick entry and the scientists climbed into a small helicopter with the incubating suitcases on their laps. Thirty-five minutes later they landed on a large island in Grays Lake, transferred to shallow-draft air boats and head for the nests. One sandhill egg had been removed from each selected nest before the day the whooper eggs arrived. The second was exchanged for a single whooper egg. An aerial survey the next day showed the nesting sandhills back on the job. Three eggs proved infertile and two were lost to predators. Nine hatched. One of the chicks was killed in a June snowstorm and two disappeared in July. The remaining six survived and five were colour banded. Seven months after hatching at least five had made it to the sandhills' winter quarters near the Bosque del Apache National Wildlife Refuge in New Mexico. The whoopers, larger than the sandhills, have no trouble defending themselves among other cranes. Two winters ago one

Nesting cranes usually produce two eggs but only one baby, a fact that underlies the joint US-Canada survival program.

whooper-sandhill family selected a Texas cattle feeding trough as their main source of food. The whooper kept both other sandhills and the steers away when he wanted to eat.

Drought has made survival difficult in more recent years, making chicks easier prey to coyotes and reducing available food, but the experiment is clearly a success. This winter the Grays Lake flock included nine or ten whoopers. However, to Ernst Kuyt, the man who selects the eggs from Wood Buffalo, the increased survival rate there is the most important result of the experiment. The Grays Lake whoopers are simply a bonus. Since 1975 the original whooping flock at Wood Buffalo National Park (which kept the more promising eggs) has increased by 30 cranes. The flock now has 74 birds.

PHOTOS: ERNST KUYT; LUTHER C GOLDMAN; US FISH AND WILDLIFE SERVICE

Ernst Kuyt is in charge of egg transfers.

There are now an estimated 106 whoopers, free or captive, in North America. Whoopers are long-lived (Crip at the New Orleans Zoo lived to be 35 years old), and they do not mate until they are at least three. This spring it is possible, though unlikely, that the first whoopers hatched by sandhill cranes could find each other, mate and produce one or more whoopers of their own.

Whoopers' eggs are speckled with shades of green and brown. The better-formed egg is left undisturbed; the lesser one taken.

Eggs travel nest to nest in a special incubator and are bathed in oxygen along the way.

Wild Goose Chase

In 1959 the city of Toronto put two Canada geese and five Canada goslings on an island in the city's harbour. There are now 6,000 geese covering the waterfront, spotting picnic tables and interfering with aircraft. This spring federal authorities began steps to reduce their number. After they molt, they will be captured and shipped to a wildlife preserve, possibly one in the United States. Joe Carreiro, of the Federal Wildlife Service, said, "We have more geese in North America now than there were before the white men came. They're very smart animals, very adaptable. We just have to reduce their numbers to a manageable level."

Caribou

The caribou is the great survivor.

It resists summer swarms of mosquitoes and black flies, which hang on its eyes and lips and burrow beneath its hide. It outruns ravening wolves and Inuit with rifles. It winters where temperatures drop to -60°C (-75°F), and it has shown an ability to cope with pipelines across its migration paths. It eats what is available — sedges, grasses, willow shoots, leaves, dwarf birches, horsetails, mushrooms and, most particularly, lichen, which grow in the most barren lands and take sustenance from the air.

The Porcupine herd, the major caribou herd in Canada and the United States, winters on the Ogilvie Range, straddling the Alaska-Yukon border. The coldest spot on the continent, the temperature may be below -50°C (-60°F) for a month at a time. The caribou, a member of the same species as the Lapland reindeer, survives because it maintains a body temperature of 39.4°C (103°F) except in its legs and hooves, which keep steady at 10°C (50°F) and insulate the rest of the body.

Caribou are seldom vulnerable to predators — cows birth on high, wind-swept hills in less than a half hour. The calves can stand and walk within minutes. In three days they can run with their mothers and outrun a wolf.

The herd's most difficult trial is in the summer when mosquitoes and black flies settle on all exposed flesh in literal blankets. The caribou gain relief by milling together and by submerging in tundra lakes.

There are three major varieties of caribou in North America — the barren-land, the wood and the Peary. A fourth sub-type has evolved in isolation on Slate Island in Ontario.

Caribou are powerful swimmers, as at home in the lakes as on the hills. When plagued by black flies, they submerge.

The wood caribou are larger than the others — males weigh up to 400 pounds. They spend summer and winter in the same forests. The Peary live on Queen Elizabeth Island in the Arctic. The severe winter of 1974 reduced their numbers drastically, from an estimated 25,000 to 2,500. The Slate Island caribou crossed the ice of Lake Superior some decades ago and became stranded on the island where, with an absence of wolves and insect swarms, they found life peaceful, though not abundant. They have evolved rapidly, their antlers becoming much smaller. They depend on arboreal lichen; and when the winds are slight and the lichen is not blown from the winter trees, many starve to death.

The migrating barren-land caribou are the ones with which conservationists are most concerned; and the United States and Canada have taken extraordinary measures to preserve them. The Porcupine herd of 170,000 animals moves year round, covering vast distances on the tundra, wintering in the Alaska-Yukon interior and birthing in the spring near the shore of the Beaufort Sea. Numerous sightings of the same great packs once led scientists to overestimate their number. One respected observer concluded that there might once have been as many as 30 million. He was very wrong. In 1900 there were probably between 2.5 million and 3 million. Today, after almost a century of decline, there are probably about 250,000.

It is clear that something has happened, but it is difficult to decide precisely what. There may be a natural, wide-range rise and fall in caribou populations, as there is, for example, among the arctic fox and the lemming on which it feeds. Some scientists believe that caribou numbers follow a thirty-year cycle.

Hunters equipped with rifles have contributed to the decline since the late 19th century when thousands were killed by wintering whaling crews. The caribou has been hunted by the Inuit for centuries: its meat has fed both humans and dogs; its hide has been used for shelters and boats; and its bones and antlers, made into tools and ornaments. The Inuit, using bow and arrow, had a variety of ingenious hunting methods; but the arrival of the automatic rifle made it easy to kill caribou, and many more were killed than were needed. The hunting has slackened off in recent years as Inuit families, for better or worse, moved from isolated groups to modern communities.

Conservationists have become increasingly concerned with the effect of gas and oil developments on migrating herds. A few years ago, a two-mile simulated surface pipeline was constructed across migration paths and the behaviour of some 5,599 migrating caribou observed. Nine hundred and ninety-four crossed over on gravel ramps. Some 300 used underpasses. About 2,500 went around the pipe and some 2,000 turned back. The test results were suggestive, but clearly not conclusive.

In 1977 Mr. Justice Thomas R. Berger and a Royal

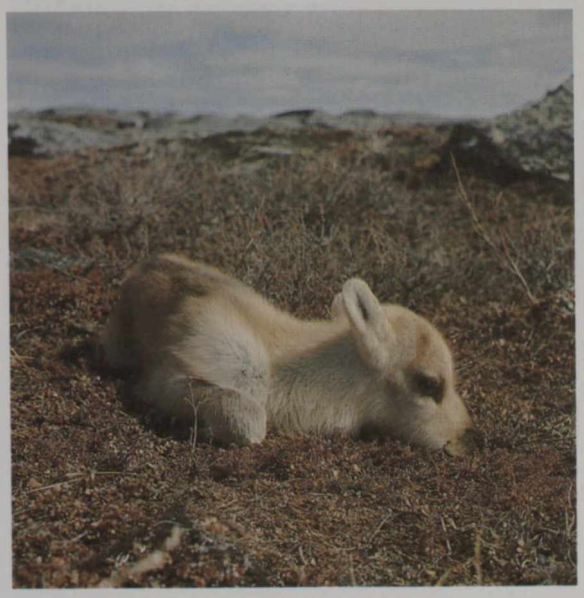
PHOTOS: FRED BRUEMMER; JEAN LOUIS FRUND, NATIONAL FILM BOARD

Caribou can outrun wolves. Within days after birth, young caribou can keep pace with the herd.

Commission of Inquiry conducted hearings on pipeline construction and concluded, among other things, that it posed a serious threat to caribou in the Mackenzie Valley of the Northwest Territories.

"Caribou are disturbed by any unfamiliar sight or noise. Low-flying aircraft may cause the herd to run and even to stampede, frights that use up great amounts of energy. The animals are disturbed by people, machinery and sudden noises, such as blasting, and when these annoyances are repeated, they can be driven from their ranges. Dr. Peter Lent, a biologist from the University of Alaska, explained that the migratory barren-ground caribou is a wilderness species that can survive only in a wilderness where it has virtually untrammelled access to a vast range. Lent said that when other caribou populations have shrunk, they retreated from peripheral ranges, but they persisted in returning to the same calving grounds. He therefore urged the protection of the calving grounds and the post-calving area on the coast."

The Berger commission proposed that a nine-million-acre refuge be created in the Yukon, north of the Porcupine River. Oil and gas exploration would be banned, and only the native people would be permitted to fish or hunt there. The Canadian park would join the existing nine million acres of the United States' Arctic National Wildlife Range in Alaska. "Together these two areas would constitute a magnificent area large enough to provide for the long-term well-being of its wildlife, especially of the Porcupine caribou herd and the snow geese," Justice Berger said.



Birthing is brief and the calves are able to stand and walk in less than one hour. This one, resting, is one day old.

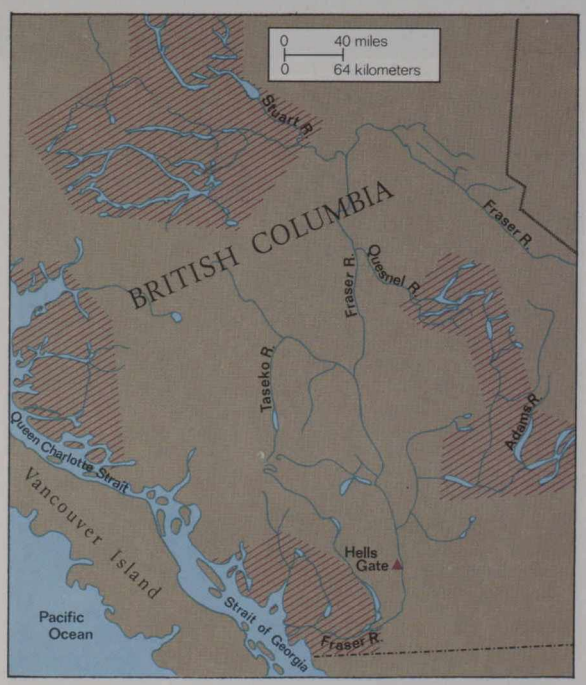
Last July the Canadian government did reserve 9,600,000 acres in the Yukon for a possible national wilderness park. New sales of surface rights, new staking of mineral claims and new exploration for oil and gas were banned. Public hearings will soon be held in Canada, and the Canadian Wildlife Service and the US Department of the Interior are now developing a joint management plan for the herd.

Coho, Sockeye, Pink, Chinook and Chum

In a good year millions of salmon — sockeye, pink, coho, chinook and chum — return from the Pacific to the rivers of the North American west coast. American and Canadian trollers are waiting offshore; net fishermen are behind the surf line, in inlets and river mouths; and the two governments are watching to see that each gets a fair share of the catch and that enough salmon make it to the spawning grounds to assure future harvests.

They have been doing this separately and jointly, for most of the century. The first efforts were in the Fraser River system, in British Columbia, one of North America's greatest spawning grounds. Salmon of all types come back to the Fraser, but the sockeye are the most plentiful. Normally 10 to 20 per cent return past the top of Vancouver Island through Queen Charlotte Strait and the Strait of Georgia. The rest come through the internationally divided waters of the Strait of Juan de Fuca.

Cooperation began slowly and proceeded one step at a time. In 1913 a rock slide caused by railway construction blocked the Fraser at Hells Gate and threatened the survival of that river's run. Canada built some fishways past the blockage. By a convention signed in 1923, the two countries agreed to work together to manage the Pacific halibut, but could not agree on the salmon.



Salmon return through the Fraser system to reach the spawning grounds (shaded areas) where they were hatched.

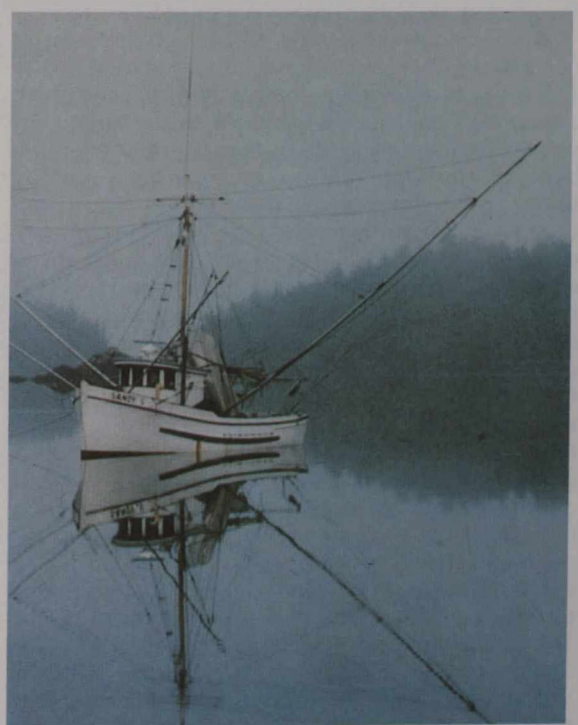
In 1937, after the United States ratified a 1930 convention, the International Pacific Salmon Fisheries Commission (IPSFC) was formed to make sure that the sockeye in the Fraser system had clear, protected passage through pure water to the spawning grounds. The commission took no official interest in the pink, chinook, coho and chum. In 1944 it supervised the removal of the major obstructions at Hells Gate and construction of the Hells Gate fishways.

In 1952 the two nations signed the International North Pacific Fisheries Convention with Japan. Japan, which fishes for salmon on the high seas, agreed to keep its salmon fleets on the Asian side of a line in the northern Pacific.

In 1955 both countries, through the IPSFC, began restoration of the Fraser tributaries whose runs had been depleted by one thing or another. An artificial spawning bed was built on Jones Creek, to restore a run that had been cut by a hydroelectric development from 6,000 to 400 fish. The bed — a man-made channel swept by water moving over clean gravel — produced 100,000 migrant salmon in the spring of 1956; and by 1961 the Jones Creek run was back to normal. The Stuart, Bowron and Horsefly were also restored. The Quesnel, down to a level of 1,000, was increased to 100,000 by 1953 and 229,000 by 1957.

In 1957 the two countries agreed to let the commission take the pink species as well as the sockeye under its care.

It is possible to regulate the netting of particular salmon off the mouths of particular river systems with relative ease because their arrival dates are known and their numbers can be predicted. Pacific salmon arrive in the mouths of the rivers two to five years after they are born, swim upstream, spawn and die. The salmon of any river can be identified by their scales — not only can those from the Fraser system be distinguished from the Columbia River



Trollers use multi-hooked lines to catch unblemished salmon, which are sold whole to gourmet markets.

salmon, but those spawned in one tributary can be distinguished from those of another. The netters, who catch most of the salmon caught, supply the canneries. The Canadians and Americans stay in their own territorial waters, and in the case of the Juan de Fuca entrance to the Fraser, where salmon come through the waters of both, they divide the catch equally between them under the terms of the 1930 convention.

Trolling regulation presents more difficult problems. Between April and October, trollers drop ten to fifteen multi-hooked lines from each boat to catch undamaged salmon to sell whole to gourmet markets. Until the last five years they caught mostly coho and chinook salmon since other species heading for the spawning grounds would not take the bait. Now the trollers have lures that attract sockeye and pink as well. Since the trollers work offshore, they are more likely to catch immature fish and intermingled stocks from both countries' river systems.

Both netters and trollers from one country are likely to catch salmon native to a stream in the other. Canadians "intercept" American-spawned fish off the west coast of Vancouver Island and Americans catch Canadian-born fish in Puget Sound, the Strait of Juan de Fuca and the waters off Alaska.

In 1971 the two countries began negotiating methods to fix the value of intercepted fish. In 1977 the extension of fishery jurisdictions by both countries to 200 miles offshore brought the question of the reciprocal access granted to trollers of both countries into focus and made the negotiations much more complex. At the UN Law of the Sea Conference, both nations accepted the concept that every country has the primary responsibility for managing and increasing the numbers of migratory fish born in its territory. Negotiators are now seeking arrangements to provide for a high degree of coordination in future enhancement programs as well as for current interceptions. They are endeavouring to provide for cooperation in the conduct of fisheries for all species from Alaska to northern California. Both countries agree that a maximum possible increase in the number of salmon available is the proper goal. Both wish to begin new enhancement programs as soon as they can be assured that they will benefit from them.

Negotiations have been slow partly because some of the advisers from both countries are fishermen, who can meet only in the off-season. British Columbia, Alaska, Washington, Oregon and Indian groups from both countries are also represented.

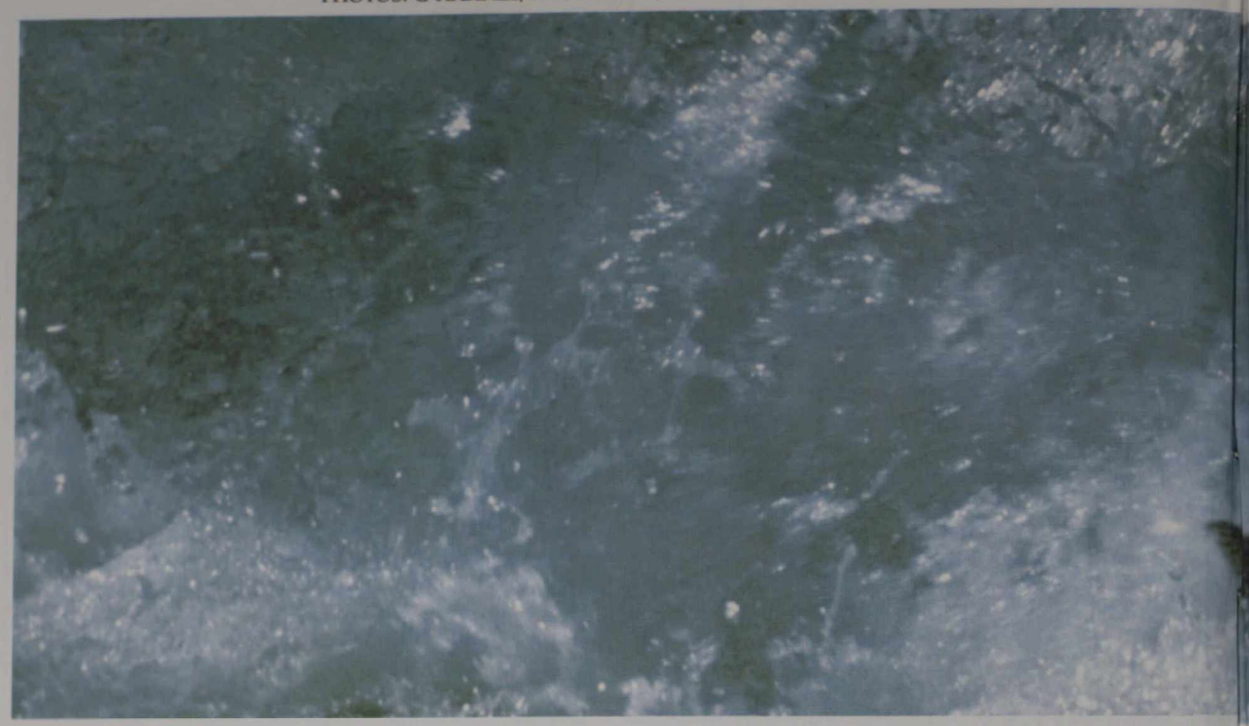
At the conclusion of negotiations a new international salmon commission will probably be formed to coordinate research and data collection and to assure that management and enhancement policies are in accord with the desires of the two countries as expressed in a new treaty. In the past both countries have contributed to the maintenance and enhancement of Fraser salmon. Canada takes about 58 per cent of the Fraser sockeye run. It believes that future divisions of the catch should reflect the fact that it will have sole maintenance and enhancement responsibilities on the river, which is entirely in Canadian territory. A formula is also needed to ensure that in the matter of interceptions each nation can catch an amount of salmon commensurate with its own production.

Box Score

On March 29, 1979, the United States and Canada agreed on rules governing reciprocal access to their respective fishery zones off the Atlantic and Pacific coasts, including quotas available to fishermen of one side fishing in the zone of the other.

The cast nets form ovals on the sea. Netting operations are relatively easy to regulate.

PHOTOS: G HAHNEL; A KATOWITZ, NATIONAL FILM BOARD



The powerful spawning urge sends this pink salmon leaping up a waterfall in Alaska.

These salmon, cleaned and gutted, were taken by trollers. They are being processed on the Queen Charlotte Islands.

Binding arbitration will decide the boundaries between the new fishing zones in the Gulf of Maine and in offshore waters on Georges Bank. When each country extended its jurisdiction to 200 miles offshore, there was an overlap.

An equally-divided, fourteen-member Canada-United States East Coast Fisheries Commission will manage certain specified fish stocks. The agreement will assign each country the primary responsibility for management of certain species.

Canadians may fish for halibut off Alaska through the next two years but then will stop.

By an exchange of notes Americans will be permitted to continue to take ground fish off British Columbia for the same period and then stop.

The three treaties must be ratified by the US Senate before they come into effect.

The Great Cross-Country Coho Salmon Run

The coho salmon of the Pacific coast have been moving east.

In the spring of 1966 Michigan tried to restock the Great Lakes with Atlantic salmon, but the young fish turned belly up as soon as they hit the water. It switched to the Pacific coho with immediate, extraordinary results. Canadian coho were planted in lakes Michigan, Huron and Superior. That fall, fishermen caught immature fish measuring 17 inches and weighing 2.5 pounds. The next year the province of Ontario introduced coho into Lake Ontario and Nipigon Bay in Lake Superior. They thrived and returned to spawn in 1970, averaging 25 inches and 5 pounds.

In the first nine months of 1970, US fishermen caught 700,000 pounds of salmon and Canadians began catching them in substantial quantities in Georgian Bay and Lake Erie. Everyone was delighted, at first; but the abundance brought out the worst in some anglers, and entire spawning runs were taken in some rivers. Fish were found to be carrying traces of DDT; and though DDT was later banned, others were discovered carrying PCB (polycholrinated biphenyl), a chemical used in industrial plants ringing the lakes, and Mirex, a compound known to cause cancer. Some officials became concerned that the coho would contribute to the decline of the native lake fish.

More recently the coho have moved east toward the Atlantic and some have been taken in the St. Lawrence at Montreal. George Gruenfeld suggested in a recent *Atlantic Salmon Journal* article that the coho and the native Atlantic salmon may soon be locked in a competition for food and spawning space. He wrote: "The coho are considered to be a much more aggressive fish than the Atlantic salmon, which means that inevitably our native species will suffer, perhaps the mature salmon being crowded off the spawning beds entirely and their fry out-hustled in the search for food."

Booby Hatch

Some early United States-Canadian experiments in artificial salmon hatching had disconcerting results. For several years some fish heading upstream in the Fraser system were stripped and the eggs hatched artificially. The results were measured against the results of natural spawning, and they proved to be the same. In either case, less than 0.3 per cent of the eggs produced adult fish. Artificial hatching was suspended, but in the 1970s, new methods of controlling the temperature and flow of water in both artificial hatcheries and spawning channels were developed. Canada now expects to double its salmon stocks by the 1990s.

Dempster Highway

After 22 years of effort, at a cumulative cost of $97 million, the government of the Yukon Territory has opened the 460-mile Dempster Highway. It begins 300 miles north of Whitehorse near Dawson City, stretches through virgin forest, climbs the Ogilvie Range, and moves north to the tundra above the tree line. At the halfway point there is a gas station and the Eagle Plains Hotel.

The road is made of gravel and would be called a highway only in the far north. The Yukon, which is four times the size of New York State, has 2,726 miles of road, only 119 miles of which are paved. The Dempster road has been built piecemeal over the last two decades. Hunting is banned along its entire length and for five miles on each side. The effect of traffic on wildlife is being closely monitored, and the Yukon government has said that if the road proves adverse for migrating caribou, it may be closed down for periods or travellers may be required to travel in convoys. Dan Lang, the Yukon's Minister of Highways and Public Works, said his department will measure the environmental impact carefully, but the road is a vital addition to resource development. "We are in the twentieth century now, and we have to expand our economic base."

The road is named for W.J.D. Dempster, the Royal Canadian Mounted Police corporal who found a lost patrol in the area in 1911.

PHOTO: FRED BRUEMMER

The caribou is the great survivor migrating to the coldest part of North America and taking sustenance from the barren ground. During this century its numbers have declined, and the US and Canadian governments are now engaged in concerted programs to protect its birthing grounds and migration routes from damaging developments.

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