

ALASKA

7665

LEGISLATURE

SENATE

COMMITTEE

RESOURCES

FILES

1991-1992

8672

JAN 5 1977

DEPARTMENT OF FISH AND GAME

1416 NINTH STREET
ACRAMENTO, CALIFORNIA 95814

(916) 445-3531



1-1-77

Mr. Charles Fullerton
Director
National Marine Fisheries
Service, Southwest Region
300 S. Ferry St.
Terminal Island, CA 90731

Dear Mr. Fullerton:

In the last ten years the Sacramento-San Joaquin Estuary has been invaded by a number of exotic aquatic organisms. These include four species of copepods, a clam and an amphipod. The copepods originated in China and Japan and were brought in by ballast water of freighters or tankers. The origins of the clam and amphipod have not been determined but ballast water is the assumed mode of introduction as a wide variety of invertebrates and fish have been found to survive for weeks in ballast tanks.

All of the introductions have become abundant in the Estuary and some of them may be having adverse impacts on a native species of copepod that is an important food for larval striped bass.

The problem is not limited to the Sacramento-San Joaquin Estuary; the Great Lakes have been invaded by a fish, a cladoceran, a crab and an alga, all brought in by ballast water. The problem is undoubtedly world-wide: Japanese copepods have been found in Chilean fjords and a Chinese copepod has appeared in San Diego Bay. The problem is severe enough in the Great Lakes for the Great Lakes Fishery Commission to appeal to the U. S. Coast Guard, the State Department and the International Maritime Organization of the U.N. The Commission is asking for a regulation that will require ocean-going vessels entering the Great Lakes to first exchange their ballast water in the open ocean. The reasoning being that oceanic organisms are unlikely to survive in the fresh water of the Great Lakes. Alternate means of eliminating ballast water organisms are filtering and disinfection. However, filtering is not practical due to the small size of some of these organisms and disinfection is likely to result in the release of toxic substances to the environment.

The U. S. Coast Guard has the authority to adopt and enforce a regulation requiring exchange of ballast water at sea but their representatives have indicated to the Great Lakes Fishery Commission that it will take political and agency pressure to get such a regulation adopted.

Mr. Charles Fullerton

-2-

The Department plans to pursue the issue through the Western and International Associations of Fish and Wildlife Agencies. I believe it would be most helpful if you would pursue the issue through federal channels.

If you want more detailed information on introductions into the Sacramento-San Joaquin Estuary, Pete Chadwick can see that it is provided. His telephone number is: 209-466-4421.

Sincerely,

Pete Bontadelli
Director

File: D, DRF, EXfile, Bay-Delta, Chron

Chadwick/aec

The Problem of the Accidental Introduction of Exotic Aquatic Organisms to the Sacramento-San Joaquin Estuary

In 1978, a new species of planktonic copepod (a small relative of shrimp) appeared in the catches of the DFG's Bay-Delta Zooplankton Study. When sent to the Smithsonian Institution for identification, it turned out to be Sinocalanus doerrii, a species previously known only from Mainland China. In 1979, Sinocalanus became very abundant throughout the Delta and extended into Suisun Bay. In the same year another exotic copepod was discovered in the zooplankton catches. It also proved to be a Chinese species, Limnoithona sinensis. A third copepod also appeared that year but turned out to be one that had been previously taken in 1964 by the DFG and not seen since. This copepod was later found to be numerous in South San Francisco Bay and was described as a new species, Oithona davisae. Japanese scientists later found it in Tokyo Bay and other locations in Japan where it had been known for some time but misidentified under another name.

The story continues. In 1987, specimens of Pseudodiaptomus, a copepod, were taken a few times by the DFG and were initially thought to be strays from San Francisco Bay. The next year, however, these animals became very abundant and a check of the literature showed that Pseudodiaptomus had never been caught in the Bay. The Smithsonian identified our specimens as P. forbesi, a species from the China coast.

In addition to copepods, in the last few years an amphipod, Lagunogammarus, and a clam, Potamocorbula, have entered the estuary from foreign parts, and in the last twenty to thirty years, a shrimp, Palaemon, and a fish, the yellowfin goby, have also come in and established populations.

The mode of introduction of the exotic species is ballast water of freighters and tankers. A variety of invertebrates and fish have been found to remain alive for weeks in such water while being transported across oceans. When discharged at a ship's destination the exotic organisms may find conditions unsuitable and die off or they may be dispersed by currents and never establish breeding populations. Sooner or later, however, conditions will be favorable and a new species will gain a foothold.

The impact of the new organisms on the plankton and fish of Suisun Bay and the Delta is difficult to ascertain but Sinocalanus may have been responsible for the precipitate decline of the native Diaptomus copepod in 1979, the year Sinocalanus became established. The native Eurytemora copepod, which is the most important food for larval striped bass, seems to have coexisted well with Sinocalanus, but in 1988, its abundance was as much as two orders of magnitude lower than in any previous year. This may be due to Pseudodiaptomus or to predation by an exotic clam, Potamocorbula, which consumed the early life stages of Eurytemora in a laboratory experiment and which became abundant for the first time in January 1988. Whether Pseudodiaptomus can replace Eurytemora as a food source for bass is still unknown.

Experiments have shown that copepods vary considerably in their vulnerability to larval bass predation.

We can expect more exotic organisms to enter the estuary as long as foreign-origin ballast water is emptied anywhere inside the Golden Gate. The effects of continued introductions is impossible to predict but the food chain leading to striped bass may already have been harmed irreparably by P. forbesi and Potamocorbula. To allow further introductions would be foolhardy.

The introduction problem is world-wide. Japanese copepods have been found in Chilean fjords. A Chinese copepod has appeared in San Diego Bay. The Great Lakes have been invaded by a fish, a crab, a cladoceran, and an alga.

The Great Lakes Fishery Commission (GLFC) has moved to end the dumping of foreign-origin ballast water in the Great Lakes. It has asked the U.S. and Canadian Coast Guards to require ships entering the Lakes to exchange their ballast water in the open ocean. Organisms from the high seas are unlikely to survive in the fresh water of the Great Lakes. The presiding officers of the Coast Guards of both nations are sympathetic to the idea and have the necessary power to enforce such a regulation but they have said that it will require political and agency pressure to move them. To apply the necessary pressure the GLFC will bring the matter up at a meeting in June 1989 of the United Nations International Maritime Organization.

The GLFC has also explored alternatives to ballast exchange. These are filtration of ballast water, discharge of ballast water into holding tanks for treatment, and disinfection of ballast water in the ballast tanks of ships. These alternatives will be either ineffective as in the case of filtration, or more costly and likely to result in the discharge of toxic substances to the environment in the case of the other two alternatives.

THE INTRODUCTION OF EXOTIC ORGANISMS INTO THE GREAT LAKES
SINCE THE LATE 1800S

prepared by

Edward L. Mills
Department of Natural Resources
Cornell Biological Field Station
5114 Shackelton Point Road
Bridgeport, New York 13030
USA

and

Joseph H. Leach
Ontario Ministry of Natural Resources
Lake Erie Fisheries Station
R.R. #2
Wheatley, Ontario N0P 2P0
CANADA

SUMMARY

North American scientists have been concerned for many decades about risks associated with introduced aquatic organisms. Such introductions to aquatic systems can have undesirable effects and pose a threat to the integrity of valued resources. The Laurentian Great Lakes have been subjected to introductions of non-native species since the time of settlement by Europeans. Recently, the Great Lakes have been invaded by three exotic species and these organisms pose a serious threat to the long-term integrity and value of the Great Lakes resource.

The first comprehensive inventory of flora and fauna introduced into the Great Lakes is currently being prepared. Establishment of such a database is presently funded by the Great Lakes Fishery Commission-Introductions Task Group. The goal of the Introductions Task Group is to increase our knowledge regarding Great Lakes exotic species, their introduction, their modes of entry, and prospects for prevention and control. To date, a total of 69 organisms ranging from disease pathogens to fish have been identified as non-native to the Great Lakes. Of this total, the bulk of organisms belong to three taxonomic groups, namely benthos, algae, and fish (Figure 1).

Exotic species have gained entry into the Great Lakes through a variety of vectors including waterfowl, birds, infected fish, stocking, canals, bait, and ballast water of ships. In the current survey of non-native species introductions, ballast water has been identified as the major vector through which exotic organisms have entered the Great Lakes. So far, 27 out of 69 exotic organisms have been identified as entering the Great Lakes via ballast water (Figure 2). Organisms associated with ballast water or ship hauls having the greatest impact on the Great Lakes resource include zebra mussel, sea lamprey, ruffe, and the spiny water flea. Canals also have been important vectors through which organisms have entered the Great Lakes. For example, the Erie-Barge Canal system has been an important historical route through which exotic organisms have

entered the Great Lakes. It is quite possible that the sea lamprey and the alewife entered the Great Lakes through the Erie-Barge Canal system. The white perch expanded its range into the Great Lakes from the Hudson River and the Erie-Barge Canal system. Further, the Welland Canal which connects Lakes Ontario and Erie was the primary route through which the sea lamprey expanded to the upper Great Lakes. The sea lamprey, alewife, and white perch have all had significant impacts on native Great Lakes species.

Figure 1. Number of Exotic Species Introduced Into the Great Lakes by Taxonomic Group

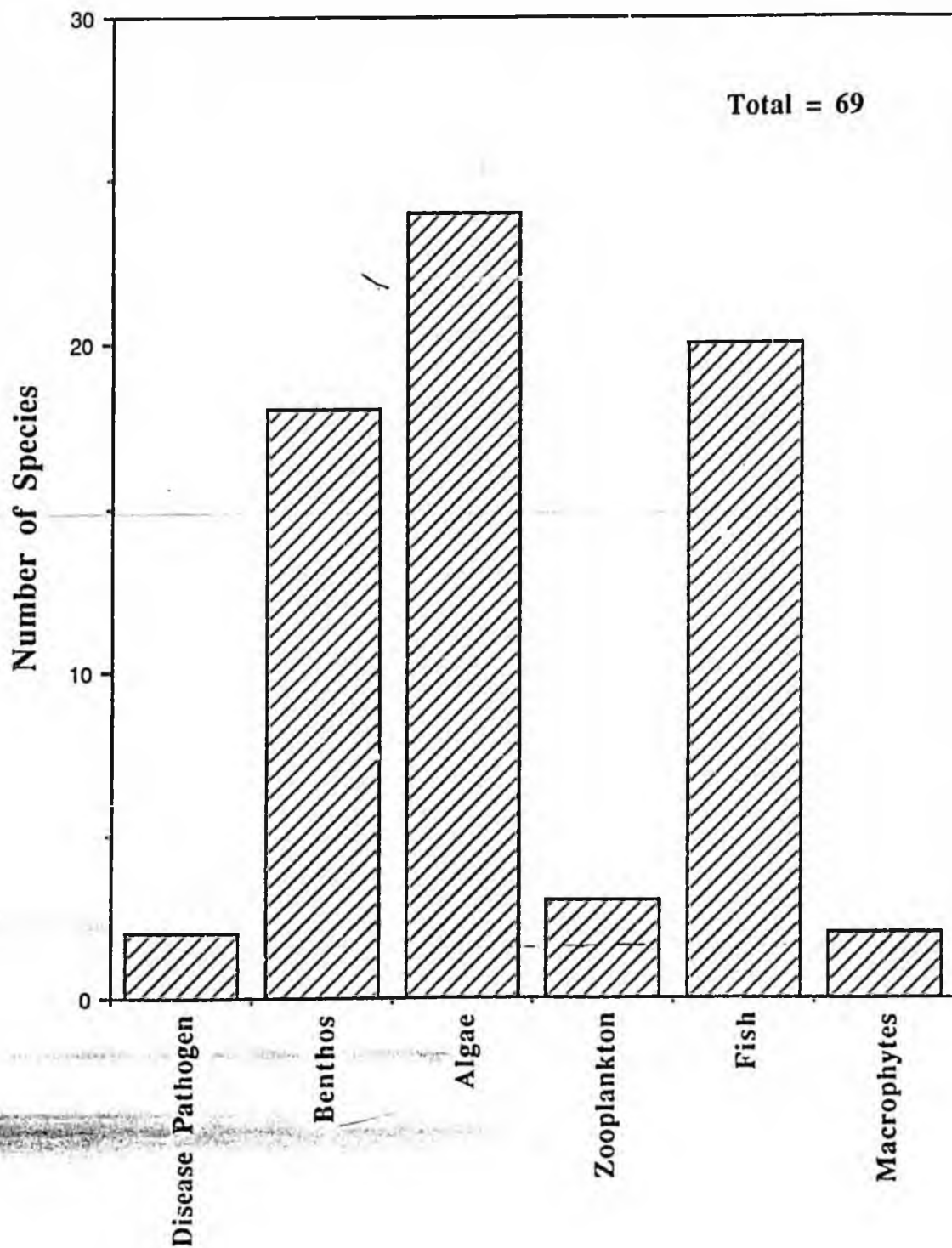
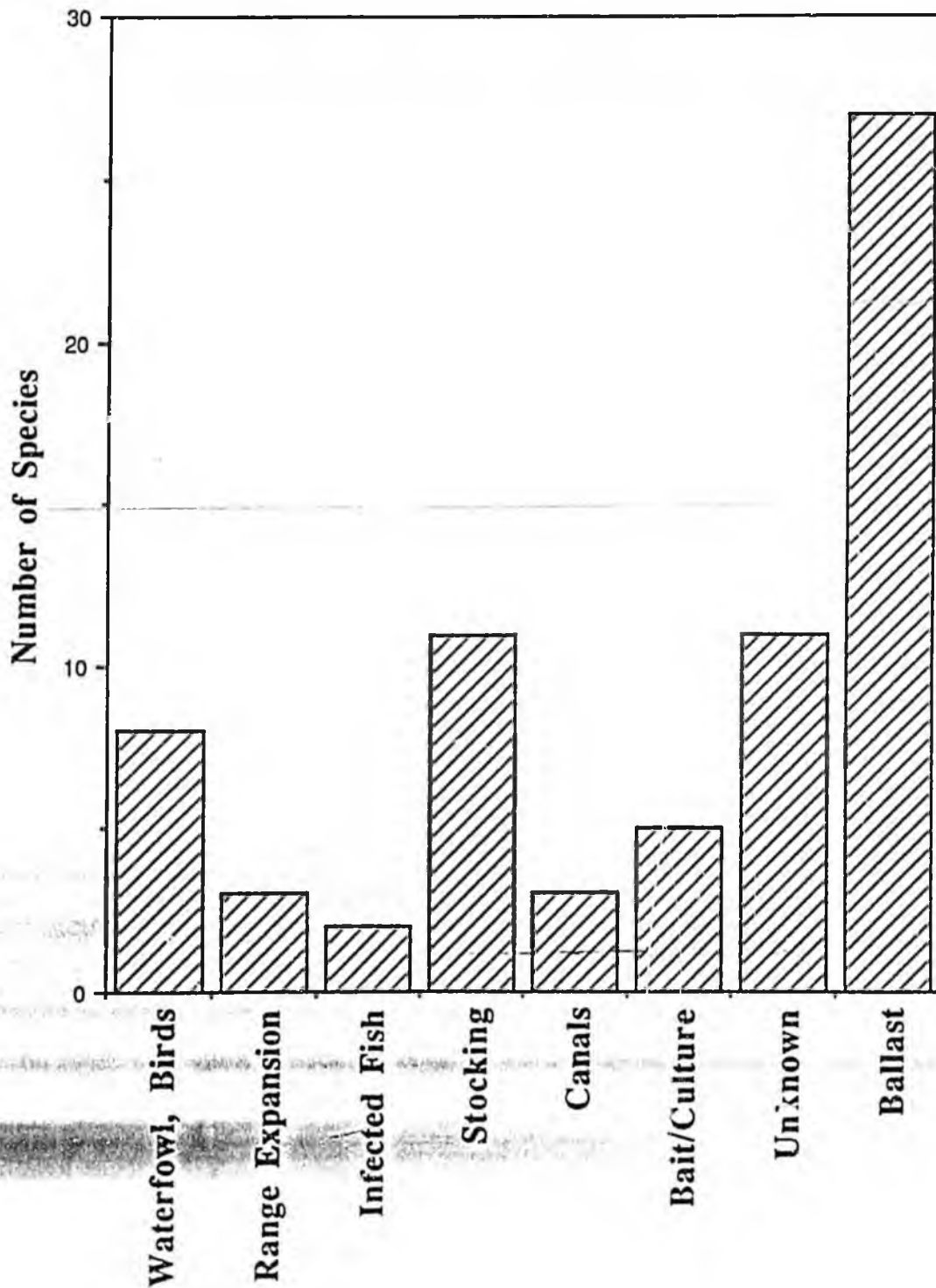
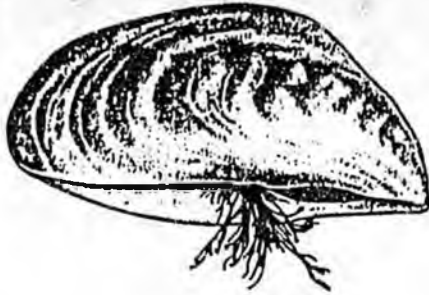


Figure 2. Entry Vectors of Exotic Species Introduced Into the Great Lakes Since the Late 1800s.





Monthly News Letter #45

February 1989

Water Resources Assessment Unit,
Southwestern Region, Ministry of the Environment

INTRODUCTION OF ZEBRA MUSSELS INTO THE GREAT LAKES: TRUTH AND CONSEQUENCES.

Over the past two years, the predacious zooplankter "B.C." (*Bythotrephes cederstroemi*), the perch-like ruffe (*Gymnocephalus cernuus*) and the zebra mussel (*Dreissena polymorpha*) have all been sighted in the Great Lakes' ecosystem. These recent immigrants join the long list of exotic species that have entered the Great Lakes probably as a result of discharges of freshwater ballast from ocean-crossing ships; a practice allowed because of the lack of Federal regulations.

While each of these recently introduced species will disturb the ecological relationships among native biota, the zebra mussel (Figure 1) will probably be the first exotic species to impart a severe cost on the users of the lakes. Using its byssal apparatus to secrete horny threads, the zebra mussel can climb and firmly attach itself to any solid surface (e.g. rocks, piers, breakwalls, pipes, boats, fishing nets, mussel shells). As a consequence, they have already restricted the inflow of water to electrical generating and water treatment facilities by reducing the diameter of intake pipes. They are expected to reduce the catch of fish by fouling impounding gear, affect sailing activities by colonizing the hulls of boats, restrict swimming activities by forming large "mussel mats" in littoral areas, interfere with beach activities because of large numbers of shells washing up along shorelines, and reduce the aesthetics of water-front areas by encrusting anything in contact with the water.

Based on the size of the shells collected (maximum length of 30mm), the zebra mussel has probably been in the Great Lakes for 2-2.5 years. The occurrence of zebra mussel shells along beaches (arrows in Figure 2) and their reported occurrence in water treatment plants (solid circles in Figure 2) indicates that they currently are found in the central and western basins of Lake Erie, the Detroit River and Lake St. Clair. Their rapid dispersal has been facilitated by their high reproductive capacity, free-swimming larval (veliger) stage, and the ability of yearlings to disperse by drifting. By 1990, the zebra mussel will probably expand its range into the eastern basin of Lake Erie and the Niagara River. However, it is not confined to Great Lakes' habitats, and will probably begin to appear in inland reservoirs, lakes and rivers in the near future, transported by waterfowl and wildlife.

Ronald W. Griffiths

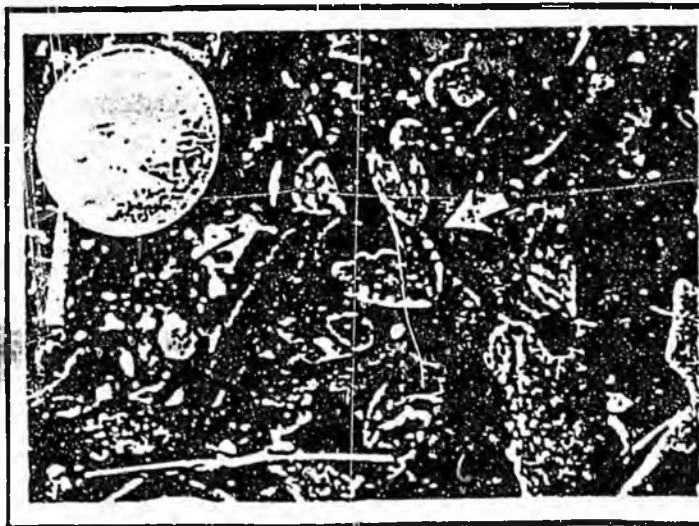


Figure 1: Zebra Mussel

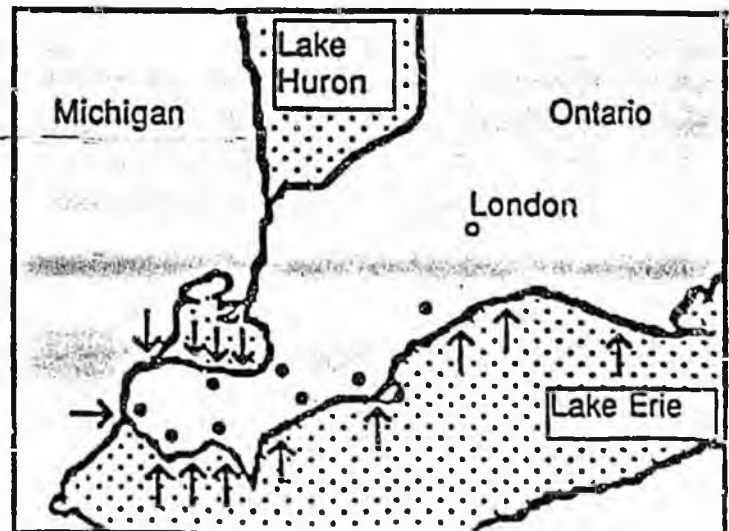


Figure 2: Occurrence of Zebra Mussels along the shoreline and in Water Treatment Plants.

'Radical change' in state's VHS policy suggested

Up until 1989, the Viral Hemorrhagic Septicemia virus (VHS-V) had not been known in North America, Washington State Department of Fisheries (WDF) director Joe Blum told the Washington Senate Environment and Natural Resources committee March 5 in Olympia.

Very serious, the annual loss in Europe has been estimated at \$40 million, he added.

VHS does not effect warm-blooded animals, Blum stated. Per policy regarding fish diseases in Western states—in cases of Class-1 virus—all eggs and fry associated with infected fish must be destroyed and facilities sanitized, then quarantined for a five-year period.

He explained that WDF's concern and methods used in combatting the disease had been approved by Danish VHS expert Dr. Paul Vestergard-Jorgensen, who visited the state last year.

The director said that he had hoped that measures taken last year would wipe it out here, but that discoveries this

Norwegian vessels may sail NorthEAST passage

A limited number of Norwegian vessels will be allowed to sail the NorthEAST Passage—Top of the World route, over the Soviet Union—this summer, according to a Norwegian Information Service report. (Ed.: See "Over the (Soviet) top..." Nov., 1989 issue, *The Fishermen's News*.)

Norwegian factory fishing vessels are among the many seeking clearance to use the passage, which has been closed

winter of VHS presence in Lummi Sea Farms samplings and in wild late-run coho in the Quillayute River system (Elwha chinook fry held at Sol Duc Hatchery, too) has led to destruction of approximately 1.5 million eggs and fry.

"We've had to destroy more than 12 million eggs and fry from VHS-affected facilities during the last two years," Blum stated, adding that "we truly do not know where it comes from."

Kevin Amos, chief pathologist from the WDF Fisheries Disease laboratory, added that the virus could have been here for a number of years at very low levels. He added that VHS had never been found occurring naturally in salmon, in Europe.

Blum said that every fish farm in the U.S. and Canada has been sampled for VHS effects. And he suggested that one possible source here might be the bilge pumpings of vessels from Europe.

"This year, in conjunction with the federal government, we are studying VHS effects on salmon, trying to find how it spreads. The Fish and Wildlife Service is kooking for about \$300,000 in federal money for research," the director added.

He explained that the Sol Duc has been being used as a "cross-roads" facility, raising and transferring on or

back to the original facility, a variety of salmonid stocks.

Asked what is happening with fish associated with VHS-affected stocks. Blum replied that "we're continuing to destroy; Coho from Queets, the Clearwater, Hoh...have destroyed more than one-half million chinook fry from the Elwha...into a pit at the Sol Duc Hatchery.

Due to fears of VHS spreading, Blum said that the policy folks are discussing the advisability of continuing cross-roads types of operation.

Asked if it is possible to rear affected fish in isolated ponds, the answer was "no. All fish are to be quarantined, remaining on-station."

Don Stevens, identifying himself as a commercial salmon troller, one relying on the Quillayute River stocks, stated: "The garbage needs to be cleaned up!"

Explaining that Jim Porter, also a commercial troller, and he had visited several hatcheries 17 days after the (VHS) outbreak had been discovered, Stevens reported finding three open pits of carcasses and one open pit of eggs, "with birds of all descriptions feeding on the carcasses, and then messing in the river.

"You people have to stop the movement of fish within this state!" Stevens

commanded. "We've got real problems here, be it smolt, fries, adults, eggs—whatever!"

"We've got it (VHS) in Puget Sound. We've got it at the Cape (Flattery). We've got it on the coast. Where next? Grays Harbor, the Columbia...Canada? We don't know.

"I'm a fisherman, and I need some salmon to make a living," he concluded.

Dr. Anna Marie Johnstone, with a Phd. in fish diseases, a fish toxicologist/consultant, suggested investigation of how the disease (VHS) is being handled within Washington State.

Noting that the visiting VHS expert (Vestergard-Jorgensen) said that the VHS virus cannot be identified at any other time than during winter, and that all the expensive monitoring is being done in February and March and later, that "we need a radical change in our methodology of studying this disease."

Explaining that the (great blue) heron, feeding on VHS-infected fish can regurgitate the virus back into streams within two hours after feeding—placing native rainbow trout and steelhead populations at risk—"open pits, per Mr. Stevens' statements, are no good!" As rainbow trout move upriver into fresh water, all fish can be affected, she added.

Out here,

SJR

12

DATE: 3/22/91

FURTHER: *No Further*

DATE TURNED INTO OFFICE: 4-3-91

Resources Committee considered SENATE JOINT RESOLUTION NO. 12

Endorsing S.49, the Ocean and Coastal Resources Enhancement Act, federal legislation which would direct the federal government to share with the states and their local governments federal revenue generated by the development of the resources of the outer continental shelf.

and recommended: *and a majority of the committee recommends do pass*

- replace with _____ CS _____
- or adopt _____ CS _____
- attached amendment(s)
- _____ letter of intent adopted

- same title
- new title
- technical title change (HB only)

do pass

do not pass

no recommendation

individual recommendations

further referral to _____

Previous Fiscal Note

ATTACHES NEW FISCAL NOTE(S): Dept/Date:

fiscal note(s) _____

zero fiscal note(s) _____

appropriation-no fiscal note

APPROVES PREVIOUS:

Dept/Date:

fiscal note(s) _____

zero fiscal note(s) *Revenue 3/22/91*

Governor's bill w/fiscal note

SIGNING DO PASS:

St. East _____ *Cotton*

DeGinn _____

Frank _____

OTHER RECOMMENDATIONS:

Frank Jones (Do Pass)

Chair: Signature and Recommendation

Alaska State Legislature



311 C STREET, SUITE 550
ANCHORAGE, ALASKA 99503
(907) 561-7615

While in Juneau
P.O. BOX V
JUNEAU, ALASKA 99811
(907) 465-3818


SENATOR
ARLISS STURGULEWSKI

Senate

MEMORANDUM

March 25, 1991

TO: Senator Lloyd Jones, Chairman
Senate Resources Committee

FROM: Senator Arliss Sturgulewski 
Senate District F

RE: Hearing request for Senate Joint Resolution 12

This resolution supports pending federal legislation introduced by Senator Ted Stevens and Co-sponsored by Senator Frank Murkowski that would provide for coastal states to share in federal revenue generated by outer continental shelf(OCS) developments.

At present, states do not receive any share of revenue generated from OCS development. Under this pending federal legislation, each adjacent coastal state would receive a one-third share of the OCS revenue. The state's one-third share would be divided evenly between the state and those communities impacted by the development.

In addition, the federal legislation calls for a Coastal Zone Impact Assistance Fund to be created using 4 1/2 percent of OCS lease sale income, royalties and other revenues. Money from this fund would be provided to coastal states and communities impacted by any type of energy development.

The federal Office of Minerals Management Service has estimated that development of oil resources in the Chukchi and Beaufort Seas alone, could bring as much as \$12 billion in revenue to the state if this legislation passes. Thank you for your consideration of an early hearing on this legislation. If there are any questions please contact Frank Homan on my staff at 465-3818.

Enclosure

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SJR12

Revision Date: _____ Department Affected: REVENUE
 Title: Endorsing S.49 the Ocean and Coastal Resources Enhancement Act.... BRU: Revenue Operations
 Component: Oil and Gas Audit
 Sponsor: Sturgulewski
 Requestor: Sturgulewski COMPONENT SERIAL NO.

	1	1	5
--	---	---	---

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING						

CAPITAL						
---------	--	--	--	--	--	--

REVENUE	0	0	-----	see analysis	-----	-----
---------	---	---	-------	--------------	-------	-------

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of current year impact: None

ANALYSIS: (Attach a separate page if necessary.)

See attached analysis

Prepared By: Roger Marks Phone: 277-5627
 Division: Oil and Gas Audit Date: 3/14/91

Approved by Commissioner: _____ Date: 3-20-91
 Agency: _____

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

Analysis of Senate Joint Resolution 12
Endorsement of the Ocean and Coastal Resources Enhancement Act

Senate Joint Resolution 12 endorses S.49, the Ocean and Coastal Resources Enhancement Act, federal legislation which, if passed, would direct the federal government to share with the states and their local governments federal revenue generated by the development of the resources of the outer continental shelf (OCS).

The act would deposit one-third of all OCS revenues (bonuses, rents, and royalties) received beginning in FY 92 into a fund. Note that the federal fiscal year begins October 1. For leases in existence at that time any bonuses and rentals would be exempt, as would royalties if the lease was producing then. Six months later, and annually thereafter, half of the fund balance (with interest) would be distributed.

Currently there is no production on the Alaska OCS. There are some confirmed discoveries in the Beaufort Sea, but their size makes commercial production uncertain. No production plans have been filed. Around Alaska there are active leases in the Bering, Chukchi, and Beaufort Seas. The probability of commercial success in Bering Sea appears very small. The Minerals Management Service (MMS) of the U.S. Department of Interior has estimated that the Chukchi Sea has a 16 percent chance of commercial success with a mean resource estimate of 4.16 billion barrels recoverable, and that the Beaufort Sea has a 21 percent chance of commercial success with a mean resources estimate of 1.45 billion barrels recoverable. MMS estimated that this act would generate \$5.4 billion to Alaska from royalties over the economic life of these areas, assuming a constant \$23 per barrel wellhead price, if discovery and production occurred. (Note that MMS made a serious methodological flaw in the use of probability in these calculations. Correcting this flaw would reduce that number by half.) Note that commercial production in these areas usually follows about ten years after discovery, so these revenues may not be forthcoming soon.

As far as unleased acreage is concerned the current draft proposed Federal OCS lease sale schedule shows the following sales over the next few years:

- Beaufort Sea	Late 1993
- Chukchi Sea	Mid 1994
- Cook Inlet	Mid 1994
- St. George or Hope Basin	Mid 1995
- Gulf of Alaska	Late 1995
- Norton or Navarin or St. Mathew-Hall Basin	Mid 1996
- Beaufort Sea	Late 1996
- Chukchi Sea	Mid 1997

It would be impossible to precisely estimate the lease bonuses that might be realized from these sales. However it should be noted that the most prospective of acreage in these areas has already been leased. Also, exploration efforts in all but the Chukchi and Beaufort has been disappointing. (Results on the former are currently unknown.) Ultimately, the magnitude of lease bonuses would depend mainly on expectations on the probability of success, oil prices, size of find, and exploration costs. Perhaps a range of \$0 to \$100 million per sale could be considered reasonable.

S.49 also creates the Coastal Zone Impact Assistance Fund, which deposits 4.5 percent of all OCS revenues in a fund beginning in FY 92. Six months later, and annually thereafter, half of the fund balance (with interest) would be distributed to coastal states (including the Great Lakes) and communities by a yet to be determined formula that would consider the number, location, and impact of energy facilities. It would be impossible to make a reasonable estimate of what Alaska might realize from this.

Alaska senators call for government to share production revenues

By MIKE MEYERS

TIMES WASHINGTON BUREAU

WASHINGTON — Alaska's senators introduced a bill Wednesday calling on the federal government to share revenues generated by offshore energy production, estimating the state and its communities could receive a total of more than \$12 billion.

The federal government has considered the idea for years.

But the idea has some opponents, chiefly the Office of Management and Budget.

The White House agency oversees the production of the annual budget and has expressed concern about losing revenue to states and communities at a time of rising federal deficits.

But Sens. Frank Murkowski and Ted Stevens said the money should be shared with states and

communities directly involved in the exploration and development of oil off their coasts.

There is often strong opposition from some coastal communities as well as state governments to offshore oil and gas exploration.

The Murkowski-Stevens bill calls on the federal government to share one-third of the revenue generated by a development in the Outer Continental Shelf with

the adjacent state. Half of this amount would go to the state, with the rest divided among the communities affected by the energy development.

This money, at a time of tight state and municipal budgets, could help ease political opposition to energy development, particularly in environmentally sensitive areas such as California.

"This bill would give states

and coastal communities the funds they need to help ensure OCS leases are developed in an environmentally sensitive way and to lessen the impact of development on affected communities," Stevens said.

"Under existing law, coastal states and communities don't share in the revenues generated by OCS development, but they are expected to shoulder the increased costs that come with it."

The government estimates the total state and local share for Alaska from Outer Continental Shelf development in the Chukchi and Beaufort Seas could be more than \$12.7 billion.

This sum is based on an estimate of the Minerals Management Service of maximum production of 9.1 billion barrels of oil from the Chukchi Sea and more than 4 billion barrels from the Beaufort Sea.

The Anchorage Times

Bill J. Allen, Publisher
William J. Tobin, Assistant Publisher
Gene R. Arthart, General Manager

J. Randolph Murray, Editor
Paul Jenkins, Managing Editor
Dennis Fradley, Editor, Editorial Pages

Robert B. Atwood, Publisher Emeritus

ALASKAN OWNED AND OPERATED SINCE 1915

SHARE THE BURDEN

Share the profits

BESIDES CONCERN about effects that offshore oil development might have on fisheries and other resources, Alaskans haven't been too excited about oil development far off our shores because the state loses on the deal.

Under current law, the federal government claims all tax revenues from development of the Outer Continental Shelf (OCS), which is the area beyond the state's 3-mile coastal limit. States get none of the revenue.

Yet OCS development increases costs for state and local communities that are impacted by a temporary increase in population of workers and business activities that support offshore operations.

Sen. Ted Stevens wants to remedy the situation by requiring the federal government to share one-third of OCS revenues with states off whose shores oil is developed.

Under legislation he introduced the other day, Alaska could receive about \$12 billion from its share of projected revenues from the potential oil reserves off the Arctic Coast.

The U.S. Minerals Management Service estimates between 5 billion and 13 billion barrels of recoverable oil lie offshore in the Chukchi and Beaufort Seas. That equates to revenue to Alaska between \$7 billion and \$16 billion if the proposed revenue sharing plan becomes law.

Stevens' legislation, which is backed by the two other members of the Alaska delegation, would require individual states to share one-half of their OCS receipts with local coastal communities. These communities could use the income to increase fire and police protection, expand sewer and water facilities, and provide additional services required by the increased population due to OCS development.

Louisiana, Texas, California and other states with oil potential off their shore would benefit similarly.

Additionally, part of the Stevens' proposal would require the federal government to set aside 4.5 percent of OCS revenues for what he dubs the Coastal Zone Impact Assistance Fund.

Money from that fund would be used for environmental and natural resource projects in all coastal states, including those adjacent to the Great Lakes, whether or not there was OCS development off their shores. As envisioned by Sen. Stevens, this fund would be used by states to enhance and protect the environment and for determining whether OCS activity is consistent with state and local coastal-zone management plans.

The legislation could have a positive impact on the national energy policy debate. At present, a number of states have taken a strong position in opposition to any oil development off their shores. Governors and legislators in these states may want to reconsider their position if OCS development offers them a means to meet other state obligations.

Rather than face horrendous deficits, states might be able to receive a substantial income from oil development — as Alaska does.

Under an OCS revenue-sharing plan, which by the way President Bush has indicated he may support, states will have an incentive to sit down with the federal land owner and the industry to work together to develop an environmentally sound plan of action. That's a goal worth pursuing.

FEB 4, 1991

Ted Stevens

United States Senator For Alaska



Contact: Press Office
(202) 224-8208

January 16, 1991

FOR IMMEDIATE RELEASE

BILL WOULD SHARE OCS REVENUES WITH STATE AND LOCAL GOVERNMENTS

Alaska and its coastal communities could receive as much as \$12 billion from the revenues generated by Outer Continental Shelf (OCS) development under legislation introduced by Senator Ted Stevens and cosponsored by Senator Frank Murkowski.

The Ocean and Coastal Resources Enhancement Act (S. 49) would require the federal government to share one-third of the revenue generated by a particular OCS development with the state that is located adjacent to the offshore wells, Stevens said. One-half of that amount would go to state government, with the remaining to be divided among the communities impacted by OCS development.

Under current law, the federal government shares none of the lease sale income, royalties or other revenues derived from OCS development since it occurs in federal waters.

"This bill would give states and coastal communities the funds they need to help ensure OCS leases are developed in an environmentally-sensitive way and to lessen the impact of development on affected communities," Stevens said.

"Under existing law, coastal states and communities don't share in the revenues generated by OCS development, but they are expected to shoulder the increased costs that come with it. This bill would correct that inequity," he added.

For example, Stevens said, the revenues could be used for projects designed to enhance and protect the environment and for determining whether OCS activity is consistent with state and local coastal zone management plans.

Coastal communities could use their funds to increase fire and police protection, expand sewer and water facilities and provide additional government services for the increased population that results from nearby energy development, Stevens said.

Alaska Offices: Anchorage: 271-5915 Fairbanks: 458-0261 Juneau: 688-7400
Kenai: 283-5808 Ketchikan: 225-8080

OCS revenue sharing

"Development of oil and gas resources on the Alaska outer-continental shelf is an important issue to Alaskans," Murkowski said. "It makes sense for states and coastal communities impacted by OCS activity to receive some benefit from that development."

"This revenue-sharing concept is particularly important in Alaska, where OCS development would occur near rural communities with unique histories and heritages, many of them small enough to have great difficulty absorbing the impacts smoothly. Revenues received in these communities as a result of OCS development would be available to ease any adverse effects, accelerate necessary infrastructure development and provide seed money for economic diversification," Murkowski added.

Federal officials have estimated that the combined state and local share for Alaska from OCS development in the Chukchi and Beaufort Seas could be as much as \$12,745,833,333. That amount is based on the Minerals Management Service's (MMS) estimates of maximum production of 9.1 billion barrels of oil from the Chukchi Sea and 4.2 billion barrels from the Beaufort Sea.

OCS tracts in the Chukchi and Beaufort Seas are currently under lease, although to date no commercial discoveries have been made. Future OCS activity will be based on the MMS's new five-year leasing plan which will be issued later this month, Stevens said.

The Stevens bill would also direct the federal government to establish a Coastal Zone Impact Assistance Fund, into which the Secretary of the Treasury would deposit four and one-half percent of OCS lease sale income, royalties and other revenues. Money from the fund would be provided to coastal states (including the Great Lakes states) and communities impacted by any type of energy development.

The funds would be allocated under a formula that would take into account the number, location and impact of energy facilities. No state could receive more than 20 percent of the fund, according to the Stevens bill.

The money would be used to help pay the states' costs of leasing and permitting energy facilities, including refineries and pipelines, and fund environmental and natural resource projects.

The legislation has been referred to the Senate Commerce Committee.

###

OCS REVENUE SHARING FACT SHEET

ALASKA CCS REGION
BONUSES, RENTS, AND MINIMUM ROYALTIES

1985	\$11,715,642
1986	7,618,752
1987	7,748,634
1988	705,849,842
1989	18,810,814

TOTAL	751,743,684
-------	-------------

	<u> + 3</u>
	250,565,929

State and local government share had OCS revenue sharing legislation been in place beginning in 1985

Information provided by Al Powers, Minerals Management Service
Anchorage, Alaska -- 907-261-4010

ESTIMATED UNDISCOVERED, ECONOMICALLY RECOVERABLE, UNLEASED
RESOURCES FOR THE CHUKCHI SEA AND BEAUFORT SEA

<u>Lease Area</u>	<u>Minimum</u>	<u>Mean</u>	<u>Maximum</u>
Chukchi (16% chance of commercial find)	1.1bb	4.16bb	9.1bb
Beaufort (21% chance of commercial find)	.4bb	1.45bb	4.2bb
TOTAL ARCTIC	1.5bb	5.61bb	13.3bb
Multiply by \$23 for wellhead value of oil		\$129.03 billion	\$305.9 billion
Divide by 1/8 for federal royalty share		\$16,128,750,000	\$38,237,500,000
Divide by 1/3 for State/local gov't share under OCS revenue sharing bill		\$5,376,250,000	\$12,745,933,333

Information provided by Marshall Rose,
Minerals Management Service, Washington, D.C. 703-787-1536

STATEMENT OF SENATOR TED STEVENS

IN SUPPORT OF S. 49,
THE COASTAL ZONE IMPACT ASSISTANCE ACT

Monday, January 14, 1991

MR. STEVENS: Today I introduce S. 49, the Ocean and Coastal Resources Enhancement Act. The measure, which is similar to legislation I introduced in the mid-80s, is designed to give coastal states and communities the tools they need to minimize the impacts energy development can bring to coastal areas. The bill directs the Secretary of Commerce to distribute 4 1/2 percent of all OCS revenues to coastal areas impacted by a wide spectrum of energy development ranging from refineries to pipelines. All coastal areas would be eligible including the Great Lakes states.

The bill uses many of the concepts established in the Coastal Zone Management Act, and is intended to complement the provisions of that Act. For states and local governments directly impacted by OCS leasing activities, the Commerce Department would share one-third of OCS revenues derived off the coast of that particular state. The Secretary of Commerce would pass half the sum to the States and half to local governments.

The funds would be used to help state and local governments participate meaningfully in the permitting process. The monies would also enable them to undertake their own projects to enhance and protect the environment. In addition, local governments most directly impacted by energy development could use their funds to increase police and fire protection, sewer and water facilities, and provide needed government services for the increased population that energy development can bring.

Mr. President, twice the Senate approved similar legislation, but unfortunately because of administration opposition, we were not successful in getting it enacted into law. When he announced his decision on OCS development off the coasts of California and Florida, President Bush hinted that his Administration might support a revenue sharing concept. I look forward to working with the Administration to develop a fiscally responsible bill that addresses the concerns of coastal states and communities.

102D CONGRESS
1ST SESSION

S. 49

II

To establish an Ocean and Coastal Resources Enhancement Fund and a Coastal Zone Impact Assistance Fund, to require the Secretary of Commerce to provide States and local governments with block grants from moneys in the Funds, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JANUARY 14 (legislative day, JANUARY 9), 1991

Mr. STEVENS (for himself and Mr. MURKOWSKI) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To establish an Ocean and Coastal Resources Enhancement Fund and a Coastal Zone Impact Assistance Fund, to require the Secretary of Commerce to provide States and local governments with block grants from moneys in the Funds, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 SHORT TITLE

4 SECTION 1. This Act may be cited as the "Ocean and
5 Coastal Resources Enhancement Act."

6 DEFINITIONS

7 SEC. 2. For purposes of this Act—

1 (1) the term "coastal State" has the meaning
2 given such term under the Coastal Zone Management
3 Act (16 U.S.C. 1453(4));

4 (2) the term "local government" has the meaning
5 given such term under the Coastal Zone Management
6 Act (16 U.S.C. 1435(11));

7 (3) the term "coast line" has the meaning given
8 such term under the Submerged Lands Act (43 U.S.C.
9 1301(c));

10 (4) the term "coastal zone" has the meaning
11 given such term under the Coastal Zone Management
12 Act (16 U.S.C. 1453(1));

13 (5) the term "Outer Continental Shelf" has the
14 meaning given such term under the Outer Continental
15 Shelf Lands Act (43 U.S.C. 1331(a));

16 (6) the term "Secretary" means the Secretary of
17 Commerce; and

18 (7) the term "energy facilities" has the meaning
19 given such term under the Coastal Zone Management
20 Act (16 U.S.C. 1453(6)).

21 OCEAN AND COASTAL RESOURCES MANAGEMENT FUND

22 SEC. 4. (a) ESTABLISHMENT.—There is established in
23 the Treasury of the United States an interest-bearing account
24 to be known as the Ocean and Coastal Resources Enhance-
25 ment Fund, which shall be administered by the Secretary.

1 (b) PAYMENTS TO FUND.—Beginning in fiscal year
2 1992, the Secretary of the Treasury shall pay into the Fund
3 33 per centum of all revenues described in subsection (c)
4 which are attributable to an Outer Continental Shelf lease,
5 any part of which is within 200 miles of the coast line. The
6 Secretary of the Treasury may adjust amounts in the Fund at
7 any time to account for overpayments, underpayments, and
8 errors.

9 (c) NEW REVENUES.—Subsection (b) shall apply only
10 to—

11 (1) bonus revenues under a lease if no bonus reve-
12 nues have been received by the United States under
13 that lease before October 1, 1991;

14 (2) rent revenues under a lease if no rent reve-
15 nues have been received by the United States under
16 that lease before October 1, 1991;

17 (3) royalty revenues under a lease if no royalty
18 revenues have been received by the United States
19 under that lease before October 1, 1991; and

20 (4) other revenues under a lease if no other reve-
21 nues have been received by the United States under
22 that lease before October 1, 1991.

23 (d) COASTAL STATE SHARE.—(1) Six months after the
24 end of fiscal year 1992, and annually thereafter, the Secre-
25 tary shall pay from the Fund to coastal States one-half of

1 such revenues paid into the Fund with respect to the fiscal
2 year most recently completed, and any interest earned on
3 those revenues. Each coastal State shall receive only that
4 share of revenues attributable to those leases that lie seaward
5 of the boundaries of that particular coastal State.

6 (2) In order to determine to which coastal State reve-
7 nues are attributable for purposes of this Act, the Secretary
8 shall delimit the lateral boundaries between the coastal
9 States to a point 200 miles seaward of the coast line. Such
10 boundaries shall be set according to the following principles,
11 listed in the order of priority of application:

12 (A) any judicial decree or interstate compacts de-
13 limiting lateral offshore boundaries between coastal
14 States;

15 (B) principles of domestic and international law
16 governing the delimitation of lateral offshore bound-
17 aries; and

18 (C) ~~the~~ desirability of following existing lease
19 boundaries and block lines on the Secretary of the In-
20 terior's official protraction diagrams.

21 (e). LOCAL GOVERNMENT SHARE.—(1) At the same
22 time that the Secretary pays revenues to a coastal State
23 under subsection (d), the Secretary shall pay to local govern-
24 ments within that State the remaining one-half of the reve-
25 nues for that fiscal year attributable to that State, and any

1 interest earned on those revenues. Each local government
2 shall receive only that share of revenues attributable to those
3 leases that lie seaward of the boundaries of that particular
4 local government.

5 (2) In order to determine local government boundaries
6 for purposes of this Act, the Secretary shall delimit the later-
7 al boundaries between the local governments to a point 200
8 miles seaward of the coast line. Such boundaries shall be set
9 according to the following principles, listed in the order of
10 priority of application:

11 (A) existing boundaries between local govern-
12 ments with valid supporting legal authority;

13 (B) the desirability of following existing lease
14 boundaries and block lines on the Secretary of the In-
15 terior's official protraction diagrams; and

16 (C) the principle that, to the extent consistent
17 with subparagraphs (A) and (B), the size of the local
18 government's adjacent offshore area, as a percentage of
19 all of that State's adjacent offshore areas, shall be
20 based on a formula giving equal weight to—

21 (i) the local government's coast line as a per-
22 centage of the State's coast line, calculated using
23 the same methods that are used to delimit the ter-
24 ritorial sea under international law; and

1 (ii) the local government's population as a
2 percentage of the population of all local govern-
3 ments in the coastal State, calculated by the Sec-
4 retary using the best available national census
5 data.

6 (f) **USE OF FUNDS BY STATES.**—Each coastal State
7 shall first use funds received pursuant to subsection (d) to pay
8 for the administrative costs the State incurs in the leasing
9 and permitting process under any applicable law including,
10 but not limited to, the Coastal Zone Management Act (16
11 U.S.C. et. seq.) and the Outer Continental Shelf Leasing Act
12 (43 U.S.C. 1331 et. seq.), with any remaining funds to be
13 used for such environmental and natural resource projects in
14 the coastal zone as the State determines.

15 **COASTAL ZONE IMPACT ASSISTANCE FUND**

16 **SEC. 5. (a) ESTABLISHMENT.**—There is established in
17 the Treasury of the United States an interest bearing account
18 to be known as the Coastal Zone Impact Assistance Fund,
19 which shall be administered by the Secretary.

20 (b) **PAYMENTS TO FUND.**—Beginning in fiscal year
21 1992, the Secretary of the Treasury shall pay into the Fund
22 4½ per centum of all revenues described in subsection (c)
23 which are attributable to an Outer Continental Shelf lease,
24 any part of which is within 200 miles of the coast line. The
25 Secretary of the Treasury may adjust amounts in the Fund at

1 any time to account for overpayments, underpayments, and
2 errors.

3 (c) REVENUES.—Subsection (b) shall apply to all bo-
4 nuses, rents, royalties, and other revenues received by the
5 United States under the Outer Continental Shelf Lands Act
6 (48 U.S.C. 1331 et. seq.).

7 (d) COASTAL STATE SHARE.—Six months after the
8 end of fiscal year 1992, and annually thereafter, the Secre-
9 tary shall pay from the Fund to coastal States one-half of
10 such revenues paid into Fund with respect to the fiscal year
11 most recently completed, and any interest earned on those
12 revenues. The amount disbursed to each coastal State shall
13 be determined by the Secretary under a formula established
14 by the Secretary, after notice and public comment, which
15 considers the number, location, and impact of energy facilities
16 located within each State's coastal zone during the previous
17 fiscal year. If any coastal State would receive an allotment
18 greater than 20 per centum, the Secretary shall reduce such
19 allotment to 20 per centum. The amounts resulting from such
20 reduction shall be reallocated proportionately among those
21 coastal States that receive less than 20 per centum.

22 (e) LOCAL GOVERNMENT SHARE.—At the same time
23 that the Secretary pays revenues to a coastal State under
24 subsection (d), the Secretary shall pay to local governments
25 within that State the remaining one-half of the revenues in

1 the Fund for that fiscal year attributable to that State and
 2 any interest earned on those revenues. Each local govern-
 3 ment shall receive only that share of revenues attributable to
 4 the number, location, and impact of energy facilities located
 5 within or seaward of the boundaries, as determined by the
 6 Secretary under section 4(e) of this Act, of that particular
 7 local government during the previous fiscal year.

8 (f) USE OF FUNDS.—Each coastal State shall first use
 9 funds received pursuant to subsection (d) to pay for the ad-
 10 ministrative costs the coastal State incurs in the leasing and
 11 permitting process for energy facilities, with any remaining
 12 funds to be used for such environmental and natural resource
 13 projects in the coastal zone as the coastal State determines.

14 LIMITATIONS ON APPLICABILITY OF BOUNDARIES

15 SEC. 6. The coastal State and local government bound-
 16 aries delimited by the Secretary under this Act are solely for
 17 the purposes of this Act.

18 RULES AND REGULATIONS

19 SEC. 7. Within one hundred and eighty days of enact-
 20 ment of this Act, the Secretary shall promulgate, after notice
 21 and opportunity for comment, such rules and regulations as
 22 may be necessary to carry out the provisions of this Act.

23 APPROPRIATIONS

24 SEC. 8. The authority to pay revenues to coastal States
 25 and local governments pursuant to the Act shall be regarded
 26 as a permanent indefinite appropriation.

SJR

25

DATE: 4/2/91

FURTHER:

*Amicus
to file*

Date of 5-Day Notice: 4/8/91
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: 4-30-91

Resources Committee considered SJR 25

Regulation of underground petroleum storage tanks.

and recommended: **and a majority of the committee recommends do pass**

- replace with _____ CS _____ same title
- attached amendment(s) new title
- _____ letter of intent adopted

do pass

do not pass

no recommendation

individual recommendations

further referral to _____

OK

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:

Department(s)/Date:

fiscal note(s) _____

zero fiscal note(s)
Dec 4/29/91

appropriation-no fiscal note

Governor's bill w/fiscal note

SIGNING DO PASS:

OTHER RECOMMENDATIONS:

Sen. G. C. Collier
Steve Frank
Carl W. ...

Thy Jones (Do Pass)

Chair: Signature and Recommendation



Alaska State Legislature

Senator Curt Menard



*While in
Session:*
P.O. Box V
Juneau, Alaska
99811
(907)465-2679

Interim:
165 E. Parks
Highway
Wasilla, Alaska
99687
(907)373-2878

*Senate
District
E*

SPONSOR STATEMENT

As a part of its extensive underground storage tank regulations, the Environmental Protection Agency (EPA) has required that owners of 1 to 12 underground tanks obtain a minimum of \$1,000,000 of liability insurance for pollution cleanup by October 26, 1991.

SJR 25 requests the EPA to extend the \$1,000,000 financial responsibility deadline for at least one year. Most owners and operators are unable to meet the financial responsibility requirement and will face up to \$10,000 per day in fines. The impact particularly on small businesses will be very severe.

The State is in the process of implementing regulations and a grant and loan program to help underground tank owners meet all the EPA requirements. Owners and operators in Alaska, like in many states, are still in the process of assessing the extent of their pollution problems and determining the best course of action to protect the state's groundwater and local economies.

It is the sponsor's understanding that the EPA has recently announced an intent to delay the financial responsibility deadline for small tank owners for an unspecified length of time. SJR 25 requests that the extension be granted for at least one year.

WE SUPPORT



FISCAL NOTE

**STATE OF ALASKA
1991 LEGISLATIVE SESSION**

BILL NO. SJR 25

Revision Date: _____
 Title: EPA's regulation of underground
storage tanks
 Sponsor: Senator Curt Menard
 Requestor: Senate Resources

Department Affected: DEC
 BRU: Environmental Quality
 Component: EQ Projects

COMPONENT SERIAL NO.

1	1	0	1	1	6
---	---	---	---	---	---

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	0.0	0.0	0.0	0.0	0.0	0.0
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND&STRUCTURES						
GRANTS, CLAIMS						
MISCELLANECUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	0.0	0.0	0.0	0.0	0.0	0.0
FEDERAL FUNDS						
OTHER						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME	0.0	0.0	0.0	0.0	0.0	0.0
PART-TIME						
TEMPORARY						

Estimate of current year impact:
 ANALYSIS: (Attach a separate page if necessary.)

Prepared by: Janice Adair
 Division: Commissioner's Office

Phone: 4/29/91
 Date: 465-2600

Approved by Commissioner: *John O'Leary*
 Agency: Dept. of Environmental Conservation

Date: 4/29/91

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).



Alaska State Legislature

Senator Curt Menard




*While in
Session:*
P.O. Box V
Juneau, Alaska
99811
(907)465-2679

Interim:
165 E. Parks
Highway
Wasilla, Alaska
99687
(907)373-2878

*Senate
District
E*

MEMORANDUM

TO: Senator Lloyd Jones, Chairman
Senate Resources Committee

FROM: Senator Curt Menard 

RE: SJR 25 - Relating to EPA's Regulation of Storage
Tanks

DATE: April 15, 1991

I am writing to request a hearing on SJR 25 at your earliest convenience.

SJR 25 asks the Environmental Protection Agency to delay the October 26, 1991 financial responsibility deadline for underground storage tank owners.

Thank you for your consideration and attention to this request.



Note to Correspondents

RECEIVED
APR 19 1991
A00-JUNEAU

MONDAY, APRIL 15, 1991

The U.S. Environmental Protection Agency today announced its intention to propose a short-term extension of the October 1991 compliance deadline for financial responsibility for underground storage tank (UST) owners. The proposed extension affects those owners with 12 or fewer tanks as well as non-marketers with a net worth of less than \$20 million.

The Agency plans to extend the compliance date, under Subtitle I of the Resource Conservation and Recovery Act (RCRA), for this group because many of these owners and operators in this category are now unable to obtain insurance or achieve compliance through other mechanisms. The proposed extension will not adversely affect human health and the environment since the technical requirements for USTs, including leak detection, tank upgrading and corrective action, remain in effect.

This compliance group generally includes the smallest gas stations and convenience stores most in need of an effective financial responsibility mechanism. EPA will continue to work with Congress and the states to enable small businesses to remain economically viable while, at the same time, ensuring mechanisms exist to pay for cleanup of leaking tanks.

Forty-three states have enacted legislation creating state assurance funds, and 21 have received EPA approval for the funds to be used as a compliance mechanism. States need additional time to have their funds approved and to make them operational. EPA will use the additional compliance extension time to actively work with the states to accomplish this. Also, 13 states have initiated financial assistance programs to help owners and operators upgrade or replace their tanks. EPA encourages these efforts and continues to assist states to establish similar programs.

Under Subtitle I of RCRA, UST owners and operators must show financial means to cover cleanup costs and third-party damages resulting from potential leaks. The financial responsibility requirement has been phased-in over several years with petroleum marketers owning 1,000 or more USTs as well as non-marketers with more than \$20 million in tangible net worth required to comply by January 1989. Marketers owning between 100 and 999 USTs were required to comply by October 1989. By April 26, 1991, petroleum marketers owning between 13 and 99 USTs are required to comply.

For more information, contact Lauren Milone at 202-362-4355.

John Kasper, Director
Press Services Division
202-362-4355



Board of Storage Tank Assistance

Walter J. Hickel, Governor

P.O. BOX "O"
JUNEAU, AK
99811-1800
(907) 465-2110

POSITION PAPER

IN SUPPORT OF: Senate Joint Resolution No. 25 (SJR25)

SUBJECT: Relating to Underground Petroleum Storage Tanks

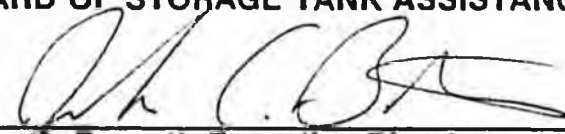
A request by the Alaska State Legislature to the EPA for a delay in implementing the October 26, 1991 financial responsibility requirement.

The Board of Storage Tank Assistance wholeheartedly supports Senate Joint Resolution Number 25 pertaining to underground petroleum storage tanks. The Board recognizes the concerns of Alaskan underground petroleum storage tank owners and operators in regard to the October 26, 1991 deadline for meeting the EPA financial responsibility requirement. Although insurance is steadily becoming available, thereby enabling owners and operators to meet the federal financial responsibility requirement, the insurance is limited to only those owners and operators demonstrating their site is free from petroleum contamination.

Although a new state program has been implemented to assist owners and operators determine the extent and subsequently clean up contamination resulting from underground petroleum storage tanks, a considerable amount of time and effort will need to be invested to achieve that goal. Underground petroleum storage tank owners and operator's in Alaska will need time to participate in this program, time to determine the scope of the problem and time to mitigate the problem. It is absolutely imperative that underground petroleum storage tank owners and operators be allowed an opportunity to clean up their sites to become insurable, without persecution from the EPA. The state underground petroleum storage tank program is based on the premise of technical, educational, and financial assistance. Senate Joint Resolution Number 25 is consistent in that aim.

Dated: APRIL 5, 1991

For and on behalf of the
BOARD OF STORAGE TANK ASSISTANCE,


John C. Barnett, Executive Director



Environmental Fact Sheet

*To: OPS
States
Gollaker IASTP
Sims WPLIA
New News on FR
will keep on
posted when more
we hear from C*

EXTENDED COMPLIANCE DATE FOR UNDERGROUND STORAGE TANK FINANCIAL RESPONSIBILITY

Background

Subtitle I of the Resource Conservation and Recovery Act (RCRA) requires owners and operators of underground storage tanks (USTs) to show through insurance coverage or other acceptable financial mechanisms that they can pay for cleanups and third-party damages resulting from any leaks that may occur. In final regulations published on October 26, 1988, EPA phased in the financial responsibility requirements over a 2-year period because of concerns about the unavailability of financial assurance mechanisms to large portions of the regulated community. The phase-in (with its four distinct groups of tank owners) was designed to achieve the maximum balance between the need to ensure the financial capability for UST releases and necessary time for owners and operators to obtain assurance mechanisms.

The phase-in set different compliance dates for the four compliance groups. Petroleum marketers owning 1000 or more USTs and non-marketers with more than \$20 million in tangible net worth were required to comply in January 1989. Petroleum marketers owning between 100 and 999 USTs were required to comply in October 1989.

In 1990, EPA revised its regulations by extending the compliance date for petroleum marketers owning between 13 and 99 USTs from April 26, 1990, to April 26, 1991. The compliance date for petroleum marketers owning between 1 and 12 USTs and non-marketers with less than \$20 million in net worth was extended from October 26, 1990, to October 26, 1991.

Action Taken Today

The Agency will begin a rulemaking to propose a short term extension of the October 26, 1991, compliance date and will make a final decision concerning any extension after considering public comments received on the proposed rule. The Agency has also decided that the April 26, 1991, compliance date will remain unchanged.

REVISED COMPLIANCE SCHEDULE

Compliance Group Description	Original Date	Extended Date	New Date
Petroleum marketers more than 1,000 USTs; nonmarketers more than \$20 million	January - 1989	-	-
Petroleum marketers between 100-999	October - 1989	-	-
Petroleum marketers between 13-99	April 26, 1990	April 26, 1991	**
Petroleum marketers between 1-12; nonmarketers less than \$20 million	October 26, 1990	October 26, 1991	To be determined*
Local Governments	October 26, 1990	-	To be determined**

* After reviewing public comments on proposed extension.

** One year after publication of additional self-insurance mechanisms.

CORRECTION

**THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY**



Environmental Fact Sheet

To: OPS
States
Gollaker 185TF
SIMS
WPLIA

New News
will keep
posted when
we hear more -
Jan C

EXTENDED COMPLIANCE DATE FOR UNDERGROUND STORAGE TANK FINANCIAL RESPONSIBILITY

Background

Subtitle I of the Resource Conservation and Recovery Act (RCRA) requires owners and operators of underground storage tanks (USTs) to show through insurance coverage or other acceptable financial mechanisms that they can pay for cleanups and third-party damages resulting from any leaks that may occur. In final regulations published on October 26, 1988, EPA phased in the financial responsibility requirements over a 2-year period because of concerns about the unavailability of financial assurance mechanisms to large portions of the regulated community. The phase-in (with its four distinct groups of tank owners) was designed to achieve the maximum balance between the need to ensure the financial capability for UST releases and necessary time for owners and operators to obtain assurance mechanisms.

The phase-in set different compliance dates for the four compliance groups. Petroleum marketers owning 1000 or more USTs and non-marketers with more than \$20 million in tangible net worth were required to comply in January 1989. Petroleum marketers owning between 100 and 999 USTs were required to comply in October 1989.

In 1990, EPA revised its regulations by extending the compliance date for petroleum marketers owning between 13 and 99 USTs from April 26, 1990, to April 26, 1991. The compliance date for petroleum marketers owning between 1 and 12 USTs and non-marketers with less than \$20 million in net worth was extended from October 26, 1990, to October 26, 1991.

Action Taken Today



The Agency will begin a rulemaking to propose a short term extension of the October 26, 1991, compliance date and will make a final decision concerning any extension after considering public comments received on the proposed rule. The Agency has also decided that the April 26, 1991, compliance date will remain unchanged.

Discussion

The Agency believes that a short-term extension of the compliance date for financial responsibility will not adversely affect human health and the environment, as the technical requirements for USTs will remain in effect. These requirements include leak detection, tank upgrades, and corrective action.

In proposing an extension of the October 26, 1991, compliance date, the Agency desires to provide short-term relief to UST owners and operators to whom methods of financial assurance are not readily available. This compliance group generally represents the smallest gasoline and service stations most in need of an effective financial responsibility mechanism. EPA continues to work together with Congress and the States to enable small businesses to remain economically viable while, at the same time, ensuring that mechanisms exist to pay for the cleanup of leaking tanks.

The Agency has concluded that no changes are needed to the April 26, 1991, compliance date. Data available to the Agency suggest that up to 80 percent of tank owners in this compliance group are in compliance, either through State assurance funds or private mechanisms. It is our belief that more owners may be able to obtain coverage from current insurers.

Rationale for Proposing a Short-Term Extension

The Agency collected information from the UST insurance industry, the regulated community, and the States which indicates that many owners and operators in the fourth compliance group may need more time to comply with the financial responsibility requirements.

Forty-three States have enacted legislation creating state assurance funds, and 21 have received EPA approval to be used as compliance mechanisms. States need additional time to have their funds approved and to make them operational. EPA will use the additional compliance extension time to actively work with the States to accomplish this.

Contact

For additional information, contact EPA's RCRA Hotline, Monday through Friday, 8:30 a.m. to 7:30 p.m. EST. The national toll-free number is 800-424-9346; for the hearing impaired, the number is TDD 800-553-7672. In Washington, D.C., the number is 703-920-9810.

REVISED COMPLIANCE SCHEDULE

Compliance Group Description	Original Date	Extended Date	New Date
Petroleum marketers more than 1,000 USTs; nonmarketers more than \$20 million	January - 1989	-	**
Petroleum marketers between 100-999	October - 1989	-	-
Petroleum marketers between 13-99	April 26, 1990	April 26, 1991	**
Petroleum marketers between 1-12; nonmarketers less than \$20 million	October 26, 1990	October 26, 1991	To be determined*
Local Governments	October 26, 1990	-	To be determined**

* After reviewing public comments on proposed extension.

** One year after publication of additional self-insurance mechanisms.

SJR

19

DATE: 2/19/91

FURTHER:

No Further Rules

Date of 5-Day Notice: 3-7-91
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: 3-11-91

Resources Committee considered SJR 19

Management of the walrus population.

and recommended: and a majority of the committee recommends it be replaced with

replace with _____ CS SJR 19 (Res) same title
 attached amendment(s) and do pass new title

_____ letter of intent adopted

do pass

do not pass

no recommendation

individual recommendations

further referral to _____

DFN

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:

Department(s)/Date:

fiscal note(s) _____

zero fiscal note(s) _____
FRG 2/26/91
SB 100'S

appropriation-no fiscal note

Governor's bill w/fiscal note

SIGNING DO PASS:

OTHER RECOMMENDATIONS:

Shane G. Cottrell
[Signature]
[Signature]
[Signature]
[Signature]
[Signature]

[Signature]
Chair: Signature and Recommendation

Alaska State Legislature



Sen. Lloyd Jones, *Chair*
Sen. Sam Cotten, *Vice-Chair*
Sen. Dick Elliott, *Member*
Sen. Steve Frank, *Member*
Sen. Rick Halford, *Member*
Sen. Curt Menard, *Member*
Sen. Fred Zharoff, *Member*

P.O. Box V
Juneau, AK 99811


907 465-4907
Fax: 907-465-3922

Senate Resources Committee

MEMORANDUM

March 8, 1991

TO: Senate Resources Committee Members

FROM: Senator Lloyd Jones, Chair 

SUBJECT: SJR 19, relating to the management of the walrus population

SJR 19 requests that the Pacific walrus remain with its current Appendix III designation.

The Convention on International Trade in Endangered Species (CITES) places restrictions on international trade in certain endangered species. At this time, the Pacific walrus Appendix III designation means that the population needs to be watched but it is not threatened to the point of curtailing international trade.

In 1987, the Netherlands proposed that all walrus be designated as Appendix II which would have meant restrictions on international trade. The Netherlands was primarily concerned about the status of Atlantic walrus.

Although the proposal was ultimately withdrawn, the Netherlands has indicated that they might reintroduce the proposal at the 1991 CITES conference.

This resolution sends a message of support for maintaining the current Appendix III listing for Pacific walrus.

The resolution is supported by the Alaska Department of Fish and Game and the Eskimo Walrus Commission.

Alaska State Legislature

Al Adams
District L

WHILE IN SESSION
P.O. Box V
State Capitol
Juneau, Alaska 99811
(907) 465-3707

OUT OF SESSION
P.O. Box 333
Kotzebue, Alaska 99752
(907) 442-3245

3111 C Street
Anchorage, Alaska 99503
(907) 561-7622

Official Business

FEB 20 1991

TO: Senator Lloyd Jones, Chair
Senate Resources Committee

FROM: Senator Al Adams *AA*

RE: Senate Joint Resolution 19, Relating to the management of the walrus population

DATE: February 20, 1991

This is to request a hearing on the aforementioned resolution regarding Pacific walrus. The resolution requests that a coordinated effort be established by the U.S. Department of Fish and Wildlife Service, the Alaska Eskimo Walrus Commission and the Alaska Department of Fish and Game to thwart any proposals to change the appendix designation of Pacific walrus with the Convention on International Trade in Endangered Species (CITES) and that Pacific walrus remain with the current Appendix III designation.

Enclosed as background information are information on Pacific walrus and correspondence that has gone on addressing the events surrounding the 1987 CITES meeting.

A fiscal note has been requested from the Department of Fish and Game.

Thank you for your consideration of this request.

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SJR 19

Revision Date: _____ Department Affected: Fish and Game
 Title: Relating to the management of BRU: Division of Wildlife Conservation
the walrus population Component: Wildlife Conservation
 Sponsor: Senator Adams
 Requestor: _____ COMPONENT SERIAL NO.

	4	7	3
--	---	---	---

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0

CAPITAL	0	0	0	0	0	0
---------	---	---	---	---	---	---

REVENUE	0	0	0	0	0	0
---------	---	---	---	---	---	---

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0	0	0	0	0	0

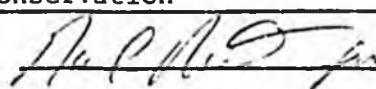
POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

Estimate of current year impact: No FY 91 impact

ANALYSIS: (Attach a separate page if necessary.)

See attached page.

Prepared By: Phil Koehl Phone: 465-4190
 Division: Wildlife Conservation Date: 2/26/91
 Approved by Commissioner:  Date: 2/25/91
 Agency: _____

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

The next CITES Conference of the Parties will be held on March 2-13, 1992 in Kyoto, Japan. Any proposal to change the designation of walrus from Appendix III to Appendix II may be submitted up to October 4, 1991. Later that month, we will learn whether a proposal regarding walrus has in fact been submitted. By January 1992 a U.S. negotiating position on proposals will be developed, and Alaska should then decide what state action (perhaps involving sending a delegation to Japan) is appropriate.

The cost of representing Alaska at such conferences is not budgeted within the department's marine mammal program and would require a supplemental appropriation from the state. (In 1987 a two-person delegation was sent to the CITES biennial meeting in Ottawa, Canada to represent state interests on walrus and furbearer issues for the approximate cost to the state of \$10,000. Additional funding was provided by the Alaska Outdoor Council.)

NORTH SLOPE BOROUGH

Department of Wildlife Management

P.O. Box 69
Barrow, Alaska 99723

Phone: Central Office: (907) 852-2611
Arctic Science Facility: (907) 852-2401
FAX: (907) 852-2403

*Further
Plo Research
what can we do for CITES?*



Benjamin P. Nageak, Director

January 28, 1991

Mr. John F. Turner, Director
U.S. Fish and Wildlife Service
Department of the Interior
18th and C Streets, NW Room 3256
Washington, D.C. 20240

Dear Mr. Turner,

As you may know, the Eskimo Walrus Commission (EWC) represents Alaska Natives who hunt walruses for subsistence. Since the communities and individuals represented by the EWC have a strong cultural and economic dependence on walruses, we are very concerned that appropriate conservation and management programs are in place for the Pacific walrus population. One of our efforts in that regard was the signing of a Memorandum of Agreement with the U.S. Fish and Wildlife Service (U.S. F&WS) and the Alaska Department of Fish and Game (ADF&G) that formally commits the three groups to cooperation in walrus conservation and management activities.

One issue of major concern to the EWC is the possibility that the Convention in International Trade in Endangered Species (CITES) may consider listing of walrus at their 1991 meeting. Such a proposal was made by the government of the Netherlands at the 1987 CITES Convention. Although that proposal was ultimately withdrawn, the Netherlands indicated that they might re-introduce such a proposal in the future.

When this issue was under consideration in 1987 we were very disappointed that the U.S. Fish and Wildlife Service did not consult with both the EWC and the ADF&G prior to the Convention in Ottawa, even with the Memorandum of Agreement in effect at that time. That was a clear violation of the agreement and an insult to the other two signatories. The slight to both the EWC and the ADF&G resulted in an unnecessarily disorganized and difficult negotiation process during the Convention itself. This would have been avoided if the U.S. Fish and Wildlife Service had lived up to the agreement and made available to us all the communication and documentation which dealt with the attempt by a member nation to

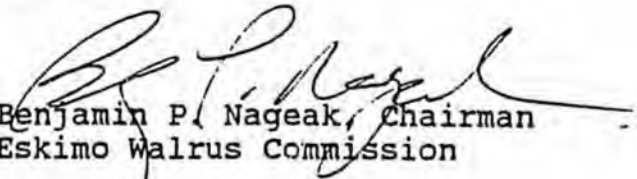
Mr. John F. Turner, Director
January 28, 1991
Page 2

CITES to place walrus in appendix II of the convention. I can't speak for the ADF&G, but the EWC does not want to go through a similar situation again. Although it is evident from contacts between people in the Netherlands and walrus experts in Alaska that a proposal may be forthcoming from a member country, it is not clear whether that will be done during the 1991 CITES convention. We want to be prepared if such a proposal is to be considered during the Convention and we would like to be apprised and notified if the federal government has any notification to that effect as soon as that information is received by your agency.

The Eskimo Walrus Commission is opposed to the listing of Pacific walrus by CITES, and is convinced that domestic and local laws and authorities are adequate to provide conservation and management of the population. This view is shared by virtually all people who are familiar with subsistence hunting of walrus in Alaska and the use of ivory for production of handicrafts. Additional international regulation will not enhance walrus conservation and will definitely harm Alaska Natives who depend on this and other renewable resources for their sustenance.

As I stated earlier I would appreciate it if you would ensure that the EWC is kept informed of any activities that relate to CITES listing of walruses. We would like to know if listing proposals are submitted, and to receive copies of any supporting documentation or other correspondence. We would also like to be fully involved in the development of the U.S. position on any such proposals. As indicated by the Memorandum of Agreement, the goals of the EWC are consistent with those of federal and state wildlife agencies, and we are committed to working cooperatively towards the development of effective walrus conservation programs.

Sincerely,


Benjamin P. Nageak, Chairman
Eskimo Walrus Commission

cc. Mr. John Twiss, Marine Mammal Commission
Hon. U.S. Senator Stevens
Hon. U.S. Senator Murkowski
Hon. U.S. Representative Young
Mr. Lloyd Lowry, Alaska Department of Fish and Game
Mr. Matthew Iya, Executive Director, Eskimo Walrus Commission
Eskimo Walrus Commission members
Mr. Burton Rexford, Alaska Eskimo Whaling Commission
Hon. State Senator Al Adams
Hon. State Representative Eileen Maclean
NSB Mayor, Jeslie Kaleak, Sr.



Official Business

Alaska State Legislature

Al Adams
District L

WHILE IN SESSION
P.O. Box V
State Capitol
Juneau, Alaska 99811
(907) 465-3707

OUT OF SESSION
P.O. Box 333
Kotzebue, Alaska 99752
(907) 442-3245

3111 C Street
Anchorage, Alaska 99503
(907) 561-7622

February 9, 1991

Mr. John F. Turner, Director
U.S. Fish and Wildlife Service
Department of the Interior
18th and C Streets, NW, Room 3256
Washington, D.C. 20240

Dear Mr. Turner:

This is to resonate the requests of Ben Nageak, Director of the North Slope Borough Department of Wildlife Management and State Representative Eileen MacLean in their letters to you regarding cooperation in deflecting efforts to place Pacific walrus on the CITES Appendix II designation.

As I understand the situation, your department was less than helpful before and during the 1987 CITES meeting when the Netherlands proposed the change in status for Pacific walrus. I consider this a breach of the faith and spirit that surrounds the Memorandum of Agreement between your department, the Alaska Department of Fish and Game and the Eskimo Walrus Commission.

Given the schedule of another CITES meeting in 1991 where again an inappropriate proposal regarding Pacific walrus may surface, I urge your sincere and concerted efforts to share information with the other parties in the memorandum and diligence in working with them to scotch these unfounded attempts to change the status of Pacific walrus.

Sincerely,

A handwritten signature in cursive script that reads "Al Adams".

Senator Al Adams

cc: Matthew Iya, Eskimo Walrus Commission
Ben Nageak, North Slope Borough
Representative Eileen MacLean
Lloyd Lowry, Alaska Dept. of Fish and Game



REC'D AUG 3 1987

KAWERAK, INC.



P.O. BOX 948 • NOME, ALASKA 99762

(907) 443-5231

SERVING THE
VILLAGES OF:

- BREVIG MISSION
- COUNCIL
- DIOMEDE
- ELIM
- GAMBELL
- COLOVIN
- KOYUK
- NOME
- SAVOONGA
- SHAKTOOLIK
- SHISHMAREF
- SOLOMON
- STEBBINS
- T. MICHAEL
- LLER
- UNALAKLEET
- VALES
- WHITE MOUNTAIN

DATE: July 29, 1987

TO: Interested Parties

FROM: Matthew Iya - Staff to EWC *Matthew Iya*

RE: ~~Netherland's Proposal to Place Pacific Walrus on CITES~~

I just returned from the CITES Meeting at Ottawa, Canada. CITES stands for Convention on International Trade in Endangered Species of Wild Flora and Fauna to prevent trade in animals and plants from contributing to further decline of endangered species. The Netherlands and some animal rights groups has proposed to place the Pacific Walrus on Appendix II of CITES. If placed on Appendix II, it would be similar to the International Whaling Commission, in that they can regulate and effect quotas and restrictions that Yupik and Inupiat had to abide by. Under the Convention, there are different degrees of protection depending on how endangered a particular species is. Appendix I Species are considered to be the most endangered and are stringently regulated. Currently, walrus are listed on Appendix III of CITES. Species listed on Appendix III are "unilaterally designated by a member nation as being subject to regulation within it's jurisdiction for the purpose of preventing or restricting exploitation, and as needing the cooperation of other parties in the control of trade." As one literature states that "in reality, much of the interest at a CITES meeting is generated, not by endangered species, but by issues of International Trades in plants and animals and the politics of conservation, preservation and animal rights."

When I arrived at Ottawa, the animal rights groups were showing a video tape of "NBC 1986", a one-sided publicity on walrus. By then, John Burns, with Alaska Outdoors Council and Lloyd Lowry, State of Alaska, was at Ottawa and they had found out that International Union for Conservation of Nature (ICUN) and World Wildlife Fund (WWF), the scientific committee to CITES, had opposed the proposal. We contacted the press thru Indigenous Survival International (ISI) and had a press conference the next morning for one hour. Portion of the press conference is enclosed. Meanwhile, while we were at the press conference, the Netherland's had postponed reviewing the proposal until they could consult their country.

The range-state countries of USA, Canada and Denmark was opposing the proposal and John Burns talked and convinced USSR to oppose the proposal. Norway was still uncertain but we were invited to attend a closed door meeting with Netherlands, USA, Denmark, Canada, USSR, and Norway that evening on Friday. The animal rights groups, since they have a non-governmental organization (NGO) status was circulating "Walrus: Species in Crisis" as a NGO document.

We had a five hour meeting arguing point per point at the proposal and the animal rights groups document which has a lot of misconceptions. Our biggest argument was that the Netherlands proposal did not meet "Berne Criteria." To qualify for listing, there should be "some indication" that the species will become "threatened with extinction." This can be indicated by "a decreasing for very limited population size for geographic range of distribution." Information of the biological status must be based on, in order of preference:

- 1) scientific reports on population size or geographic range over a number of years;
- 2) similar reports based on single survey's;
- 3) reports by "reliable observers other than scientists" over a number of years; or
- 4) reports from various sources on habitat destruction, heavy trade or other potential causes of extinction.

In addition to these biological criteria, the species must either be subject to trade or likely to become subject to trade.

First of all, in the 1950's, there were 50,000 Pacific Walrus. According to the U.S. Fish and Wildlife Service, walrus population estimates are as follows: 1975 - 221,360, 1980 - 246,140 and 1985 - 233,828. (Source J.R. Gilbert, 1986 Aerial Survey of Pacific Walrus in the Chukchi Sea, 1985). In the Soviet side walrus haul-out areas for males have increased from 9 haul-outs in 1975 to 17 haul-outs in 1980 to a total of 13 haul-outs in 1985! The native people who has observed walrus for numbers of years are harvesting healthier animals since early 1980's and are observing more walrus calves in the spring, that have an excellent recruitment in the future. **This spring was our lowest harvest since 1979 with only 1,790 walruses taken.** We had to convince Netherlands that we do not take walrus year round and when we did in spring time, our harvest are hampered by weather and ice conditions. The other argument that the animal rights groups argued upon was the excerpt from a paper entitled "Managing the Exploitation of Pacific Walruses; A Tragedy of Delayed Response and Poor Communication" by Dr. F.H. Fay, B.R. Kelly, and J.L. Sease of the Institute of Marine Science, University of Alaska (in press). They put excerpts of certain material that is best for their argument and distorted the paper. From my understanding is that there is poor communication with the Soviets and that walrus should have management and should be managed like any other species. Since walruses are believed to reach their carrying capacity in early 1980's, the increase harvest could reduce or help with the natural decrease of the walrus. That is why "Walrus Management needs to be based on more than response to crisis and needs more sensitive means for monitoring the present and predicting the future status of the population." We had to explain the number of "headless" walruses in the beaches and a picture of all the ivory heads in the pictures. If there is 234,000 walrus out there, then 2-5% of the walrus die naturally. That is 5,000 - 11,000 that dies from natural mortality. There are some that dies from wounds but we need to study the present loss/sunk ratio.

In the early 1960's, John Burns estimated that 40-60% of the walrus taken, were lost. That was based on single surveys that he observed when hunters had 0% loss to 100% loss of their harvest. He estimated somewhere in the middle. The pictures was explained that certain hunting communities, like Little Diomed, have large extended families and others, with a crew of 12-15 people who hunt together during the spring. They divide the meat when they bring them home but stockpile the ivory and then divide the ivories at the end of the season. We told them that Ottawa was a very clean city and if we want to distort the image, we could go out and take pictures we want the audience to see, as was in the picture. There was some major bust of ivories but the majority of the ivories were returned to the owners because they were legally taken before 1972 and when the State of Alaska had management. The U.S. Fish and Wildlife Service states that they haven't observed walrus tusks that was in international trade. By the end of the meeting, the Netherland's wanted to continue the meeting in the morning and indicated to us that they are going to be withdrawing their proposal. I made a quick presentation of the recent Memorandum of Agreement that the Eskimo Walrus Commission, the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game signed for the management of Pacific Walrus. This document was one of the major contributor for winning the proposal and we are very proud of the document, a success to the native people.

The next morning, Saturday, the Netherland's said that they are officially going to withdraw their proposal and we helped them with proper wordings on their presentation to the assembly. By Tuesday morning at 8:00 a.m., they met with the European Economic Community (EEC) and advised them that they were withdrawing their proposal. The EEC have to vote the same way on various proposals - majority wins. At 9:00 a.m., Tuesday, the Netherlands brought the proposal to the floor and said that they have new scientific information and asked the range-states for their comments. **Mr. Charles Dane, a delegate from the USA said that there were 234,000 walruses and have no indication of extinction or will be threatened.** Our government has signed a Memorandum of Agreement with the natives and State of Alaska for management of walrus. The sealing and tagging regulations will be finalized in the future so our government would have an idea if walrus ivories is getting into the international markets. That we were having better communication and will improve communications with the Soviets in the future for management and research needs for walrus. The chair was handed over to the Netherlands and they said that they will continue to watch the situation and they will re-submit the proposal if they think the walrus are in trouble in the future. The Netherland's representative, Van Vlick then withdrew their proposal and the chairman of CITES put his gavel down and went on to the next agenda item.

The tougher battle will be when the reauthorization hearing takes place in 1988 on the Marine Mammal Protection Act and the Eskimo Walrus Commission is seeking your funding so we can participate with the hearings, with a unified native position.

MEMORANDUM

State of Alaska

TO: Don W. Collinsworth
Commissioner
Juneau

DATE: July 29, 1987

FILE NO:

TELEPHONE NO: 456-5156

THRU: W. Lewis Pamplin, Jr.
Director
Anchorage

SUBJECT: Outside Travel - CITES
Meeting

L.F.L.

FROM: Lloyd F. Lowry
Marine Mammals Coordinator
Division of Game
Department of Fish and Game
Fairbanks

From July 15 to 21 I attended meetings of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which were held in Ottawa, Canada. My main purpose in attending the meetings was to represent the State's position on the Netherlands proposal to include walrus on CITES Appendix II. Other Alaskans attending the meeting were John Burns (representing the Alaska Outdoor Council), Matthew Iya (representing the Eskimo Walrus Commission (EWC)), and Ron Nalikak (representing the Inuit Circumpolar Conference). The official U.S. delegation consisted of 15 people, of which 14 were from the Washington, D.C. area. Although several members of the delegation were from the Fish and Wildlife Service (FWS) there was no one from their Alaska Region.

The CITES meetings officially started on July 12. By the time I arrived Burns had already taken a number of substantial actions relating to the walrus proposal. After contacting the U.S. delegation and determining that they had no plan for dealing with the issue, he arranged a meeting with the Netherlands representative and representatives of the range states (countries within the range of the walrus - Canada, Denmark/Greenland, Norway, U.S.A., and U.S.S.R.). Range state representatives, with the exception of Norway, agreed that neither Atlantic nor Pacific walrus fit the criteria for inclusion on CITES Appendix II. Although the Netherlands did not entirely agree with this it was evident that their primary concern was not with population status or international trade, but rather was due to the large, mostly unregulated harvests being taken from the Pacific population. Subsequent to the meeting, Burns and representatives from Canada and Greenland continued working to try and convince the Netherlands and other delegations that the proposed listing of walrus was inappropriate. The U.S. delegation seemed to be systematically avoiding the issue and appeared to plan on waiting to deal with it during the meeting of the full committee.

After being briefed by Burns, Matt Iya and I went to Charles Dane (a FWS representative on the U.S. delegation), reminded him of the Memorandum of Agreement (MOA) regarding walrus which commits FWS to cooperation with ADF&G and the EWC, and insisted that we be involved in any subsequent

discussions. We also suggested that the U.S. delegation should take a more active role in trying to ensure defeat of the proposal.

The walrus proposal came up in committee on July 17. At that time, the Netherlands requested that discussion be postponed until July 21. That evening a meeting was held between the Netherlands, range state representatives, and representatives from Alaskan non-governmental organizations. At that time, population status, trade, and existing management measures were discussed. We presented the MOA as an indication of ongoing conservation and management activities and discussed provisions of the Marine Mammal Protection Act (MMPA) and the proposed federal sealing/tagging regulations. It was suggested to the Netherlands that they might consider withdrawing their proposal in light of this new information.

On the morning of July 18 the U.S., Alaskan, Canadian, and Greenland representatives met again with the Netherlands. The Netherlands representative indicated a willingness to withdraw the proposal provided that he could get approval from his government and members of the European Economic Community, and that the range states, particularly the U.S., would address their concerns when the proposal came up in committee. This strategy was agreed upon.

During the next 2 days I tried to ensure that the statement prepared by the U.S. delegation was appropriate, but it became clear that it would not be prepared until the last minute. Burns and I made sure that we and others were prepared to discuss the proposal in the committee meeting if the Netherlands representative decided to change his mind.

The walrus proposal was introduced the morning of July 21. The Netherlands stated that they thought the proposal was well prepared and appropriate but that they had been given new information and deferred to the range states for comments. Greenland, Norway, and Canada each stated that their walrus populations, although small, were well managed and they therefore opposed the listing. The U.S. statement recognized the Netherlands' concern about large and possibly wasteful harvest, stated that the population was large and would be censused regularly, indicated that international trade was not a problem, and pointed out that certain provisions of the MMPA should prevent the population from becoming endangered and that better management should result from the MOA. The Netherlands then stated that they were still concerned because the Pacific population is thought to have reached carrying capacity and may decline, that they strongly supported marking of tusks to help control trade, and that they would withdraw the proposal but would continue to monitor events.

This was an interesting exposure to the politics of international wildlife conservation. I gained a number of insights into the process which, as relates to the walrus issue, can be lumped into 3 topics:

1. You cannot depend on scientific fact to determine the outcome of a proposal. It was clear that walrus did not fit the Appendix II criteria on scientific grounds but the Netherlands representative was

continuously pressured by protectionist groups to try for the listing. Even when it became fairly clear that the proposal would fail to pass if voted upon, they continued to try and use the issue to embarrass Alaskan walrus hunters and management agencies. Notwithstanding, it is essential to be represented at such meetings by people thoroughly familiar with the scientific facts because the politics cannot be dealt with until the scientific battle is won.

2. We cannot depend on federal agencies to defend the State's interests in these issues. For some unexplicable reason the FWS Alaska region staff was not represented. The U.S. delegation was insensitive to the issue, made several errors during public statements, and was generally not inclined to do what was necessary to ensure that the proposal was withdrawn without creating unnecessary problems.
3. Our allies on this issue were representatives of the governments of Canada and Greenland/Norway who were concerned with the welfare of their residents and opposed to unnecessary regulation, and several Native organizations. Groups such as the Inuit Circumpolar Conference, Inuit Tapirisat of Canada, and Indigenous Survival International were well represented at the meeting by dedicated and professional people. They were very effective in exerting political influence and their efforts complimented the scientific arguments provided by government agency staff. A coordinated effort is clearly required in order to successfully oppose the combined efforts of radical preservationist groups and the governments that they influence.

cc: Bishop
Burns
Coady
Iya
Nalikak

NGO DOCUMENTPopulation Status and International Trade in Pacific walrus, *Odobenus rosmarus divergens*.

The Pacific walrus population was severely depleted by commercial hunting twice in the last 100 years (Fay 1982). Population size began increasing in about 1960 and the population is now fully recovered.

Aerial surveys conducted in 1975, 1980, and 1985 have provided estimates of the minimum population size. The mean of these estimates, approximately 234,000 animals, compares favorably with the minimum estimate of the "pre-exploitation" population (200,000), and the range of estimates (221,000 to 246,000) indicates that the population size is stable (Gilbert 1986). It should be noted that recent estimates are conservative indices of population size because they do not account for animals occurring outside the survey area or for animals that were in the water at the time surveys were conducted. The actual population is therefore larger, perhaps much larger, than is indicated by the surveys. The healthy and abundant status of the Pacific walrus population is confirmed by the fact that their historical range is now completely re-occupied (Fay 1982).

Pacific walrus are harvested by coastal Native peoples of Alaska and the USSR and are also subject to controlled exploitation from ships by the USSR. Harvests taken through the 1970's were obviously not excessive since the population increased by an average of approximately 10,000 animals per year. Average harvests have been somewhat higher in the 1980's, but have not shown a consistently increasing trend. The take at 5 villages in Alaska that are monitored annually was lower in 1987 than in any of the previous 10 years (Alaska Department of Fish and Game and United States Fish and Wildlife Service, unpublished data).

Although it has been suggested that the population exceeded carrying capacity in the late 1970's and is now declining (Fay et. al. in press) this projection was based on static population parameters and larger removals from the population than have actually occurred. Recent information suggests that density dependent responses are occurring which would slow a decline and maintain the population within an optimum range.

The United States Marine Mammal Protection Act has prohibited both domestic and international trade in raw walrus ivory (and other marine mammal products) since 1972. Illegal trade has been monitored by State of Alaska and federal law enforcement agents. Results of enforcement efforts indicate only occasional minor

infractions of a domestic nature. International trade is therefore not a significant conservation concern for the Pacific walrus population.

Summary: Pacific walruses now occupy all of their historical range. The population has increased from about 60,000 in the 1950's to approximately 234,000 in 1985. Average annual harvest had increased (about 40%) since the 1970's, commensurate with the increase in population. Recent harvests (1986 and 1987) have been reduced through cooperative efforts of the Eskimo Walrus Commission, the State of Alaska, and the United States Fish and Wildlife Service. The magnitude of this recent voluntarily reduction in harvests is 20% of the average for 1980 - 1987. International trade in walrus ivory from Alaska is presently illegal and the amount of illegal trade is insignificant.

Submitted by:

Lloyd F. Lowry, Marine Mammal Specialist, State of Alaska

John J. Burns, Marine Mammal Specialist, Alaska Outdoor Council

References:

Fay, F.H. 1982. Ecology and biology of the Pacific walrus, Odobenus rosmarus divergens. North American Fauna. No. 74, U.S. Fish and Wildlife Service, Washington, D.C.

Fay, F.H., B.P. Kelley, and J.L. Sease. (In press) Managing the Exploitation of Pacific Walrus: A Tragedy in Delayed Response and Poor Communication. Marine Mammal Science. Vol. 3. 1987.

Gilbert, J.R. 1986. Aerial Survey of Pacific Walrus in the Chukchi Sea, 1985. U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska.

MEMORANDUM OF AGREEMENT

U.S. Fish and Wildlife Service
Anchorage, Alaska

Alaska Department of Fish and Game
Juneau, Alaska

and

Eskimo Walrus Commission
Nome, Alaska

THE UNITED STATES FISH AND WILDLIFE SERVICE, THE ALASKA DEPARTMENT OF FISH AND GAME AND THE ESKIMO WALRUS COMMISSION DO MUTUALLY AGREE AND DECLARE:

That there should be open and continuous communication and exchange of information among agencies and groups interested in the health, well being, and utilization of the Pacific walrus (*Odobenus rosmarus divergens*), and that a sound management policy for this species is best implemented as the result of mutual cooperation and assistance.

THEREFORE:

The following Memorandum of Agreement (Agreement) is presented in recognition of this acknowledgment of mutual goals and understanding.

I. PURPOSE:

This Agreement is designed to assist the signatory Agencies in the management of the Pacific Walrus by forming a memorandum of agreement for the exchange of biological and management information and for support of the requirements of pertinent statutes, regulations and resolutions.

In furtherance of this purpose, the Agreement provides for:

A. cooperation among the Eskimo Walrus Commission, the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service (Service) for the sound management and utilization of the Pacific Walrus, and;

B. a vehicle by which information regarding the effective and efficient management of the walrus can be exchanged, shared, and/or made public.

PACIFIC WALRUS MEMORANDUM OF AGREEMENT, PAGE 2

II. AUTHORITIES:

The United States Fish and Wildlife Service enters into this Agreement pursuant to the authority granted in the Marine Mammal Protection Act, 16 USC 1382 (c).

The Alaska Department of Fish and Game enters into this Agreement pursuant to the authority granted in AS 16.05.050.

The Eskimo Walrus Commission enters into this Agreement pursuant to Article I of Commission By-Laws.

III. APPLICATION TO OTHER TREATIES, CONVENTIONS OR AGREEMENTS:

A. Nothing in this Agreement shall be read to abrogate the responsibility of the U.S. Fish and Wildlife as charged under the Marine Mammal Protection Act (16 USC 1361-1407). Further, the provisions of this Agreement shall be deemed to be in addition to and not in contravention of, the provisions of any existing international treaty, convention, statute or agreement, which may otherwise apply to the Pacific walrus.

B. If anything in this Agreement shall be deemed unlawful, or contrary to the Regulations made and provided for in such case, it shall be null and void and not affect the remainder of the Agreement.

WHEREAS:

This Agreement, is developed to serve the following purposes:

1. to promote sound management and utilization of the Pacific walrus based upon scientific information by encouraging a cooperative management process in a manner consistent with the Marine Mammal Protection Act of 1972, as amended;
2. to promote the development and dissemination to the public of information and educational material concerning walrus;
3. to encourage cooperation by the U.S. Fish and Wildlife Service, the Alaska Department of Fish and Game, and the Eskimo Walrus Commission in scientific, management and enforcement programs concerning the Pacific walrus and its utilization;
4. to encourage further cooperation and exchange of information between the United States and other Nations in matters pertaining to the Pacific walrus.

PACIFIC WALRUS MEMORANDUM OF AGREEMENT, PAGE 3

NOW, THEREFORE, be it known that the Parties hereto agree as follows:

THE UNITED STATES FISH AND WILDLIFE SERVICE AGREES:

1. that it may cooperate with other agencies and persons in carrying out its responsibilities under the Marine Mammal Protection Act of 1972, as amended, as provided in 16 U.S.C. section 1377 (a) and (b), 1379 (h) and (k), and 1382 (c);
2. to manage the Pacific walrus under the requirements of the Marine Mammal Protection Act of 1972, as amended, until such time as relieved of this responsibility by law;
3. to support the development of a resource management plan through which the State of Alaska may seek a transfer of management authority consistent with requirements of the Marine Mammal Protection Act;
4. To continue to observe the Alaska Native exemption of the Marine Mammal Protection Act of 1972, as amended, as implemented by the Service's regulation at 50CFR section 18. 23;
- X 5. To conduct scientific studies in cooperation with the Alaska Department of Fish and Game, and the Eskimo Walrus Commission, as allowed by budgetary constraints and fiscal priorities to:
 - a) determine the size and trends of the Pacific walrus population;
 - b) assess the general health, welfare, and other life history parameters of the Pacific walrus;
 - c) monitor the presence of pollutants and/or contaminants, and their effects upon walrus;
 - d) determine the distribution and migration chronology of Pacific walrus;
 - e) identify, describe and protect important breeding, calving, and feeding habitat and haul-out areas of the Pacific walrus;
 - f) assess the impact on walrus of harassment; oil, gas or other exploration or development activity; aircraft over-flights; noise pollution; and hunting;
 - g) conduct research on methods of take of Pacific walrus in order to reduce loss due to non-retrieved animals;
6. to utilize input from users of the Pacific walrus as represented by the Eskimo Walrus Commission;

PACIFIC WALRUS MEMORANDUM OF AGREEMENT, PAGE 4

7. to provide such law enforcement input and activity as necessary and possible under budgetary constraints and fiscal priorities, and to cooperate with the Eskimo Walrus Commission and designated user groups to continue compliance with the provisions of the Marine Mammal Protection Act;
8. to implement Reporting and Sealing Regulations if feasible, and as permitted by budgetary constraints and fiscal priorities, consistent with section 109(i) of the Marine Mammal Protection Act of 1972, as amended, and to utilize village residents as monitors to the maximum extent practicable;
9. to prepare and disseminate educational materials regarding the Pacific Walrus, including information about pertinent scientific, management and enforcement programs;
10. to cooperate with the Eskimo Walrus Commission, Alaska Department of Fish and Game, and other parties in the development and implementation of management plans;
11. to promote and encourage further research, communication and agreements with foreign nations regarding the management, conservation and utilization of the Pacific walrus.

THE ESKIMO WALRUS COMMISSION AGREES:

1. to recognize the United States Fish and Wildlife Service as the agency with legal responsibility for the management of the Pacific Walrus under the mandate of the Marine Mammal Protection Act (16 USC 1361-1407), as amended;
2. to fulfill such responsibilities assigned and accepted by all parties of this Agreement, or through amendment to the Agreement;
3. to cooperate by informing and educating users of the Pacific walrus regarding:
 - a) the value and necessity of their compliance with applicable statutes, laws, regulations and agreements;
 - b) the value and necessity of cooperating with efforts to obtain biological specimens;
4. to provide a method for the acquisition and transfer of traditional Native knowledge for application to biological and other studies;

PACIFIC WALRUS MEMORANDUM OF AGREEMENT, PAGE 5

5. to cooperate with the Service in the implementation of walrus Reporting and Sealing Regulations (when implemented by a final rule issued by the Department of the Interior) and to assist through information and education programs and the provision of monitors, as budgetary constraints and fiscal priorities allow;

6. to cooperate with the Service, and the Alaska Department of Fish and Game as appropriate in:

a) the development and implementation of management plans for the Pacific walrus;

b) the development of conservation management plans for walrus haul-out areas in Alaska;

c) conducting scientific studies to monitor the health, status and trends of the Pacific walrus population;

d) research on methods of take of Pacific walrus in an effort to reduce loss due to non-retrieved animals;

7. to actively encourage and promote a harvest that is consistent with Fish and Wildlife Service regulations, and the Eskimo Walrus Commission's applicable authorities, based upon considerations of the biological status of the walrus population, by means such as:

a) manipulation of the age and sex composition of the harvest;

b) maximizing utilization of the walrus and by-products thereof within the constraints of the Marine Mammal Protection Act and related legislation;

c) improving the retrieval rate by using the most efficient, effective, and humane methods of harvest, including but not limited to the prohibition of the use of fully automatic weapons;

8. to cooperate with the Service and the Alaska Department of Fish and Game in efforts to:

a) monitor the presence of pollutants and/or contaminants and their effects upon walrus;

b) determine the distribution and migration chronology of Pacific walrus;

c) identify, describe and protect important breeding, calving, and feeding habitat and haul-out areas of the Pacific walrus;

d) assess the impact on walrus of harassment; oil and gas and other exploration or development activity; aircraft overflights; noise pollution; and hunting;

PACIFIC WALRUS MEMORANDUM OF AGREEMENT, PAGE 6

9. to cooperate in the preparation and distribution of educational materials and information concerning the Pacific walrus as a valuable natural resource;
10. to promote and encourage further research, communication and agreements with foreign nations regarding the management, conservation and utilization of the Pacific walrus.
11. to encourage village residents to make suggestions, comments or concerns to the Eskimo Walrus Commission, (P.O. Box 948, Nome, Alaska 99762).

THE ALASKA DEPARTMENT OF FISH AND GAME AGREES:

1. to recognize the United States Fish and Wildlife Service as the agency with legal responsibility for the management of the Pacific Walrus under the mandate of the Marine Mammal Protection Act (16 USC 1361-1407), as amended;
2. to fulfill such responsibilities assigned and accepted by all parties of this Agreement, or through amendment to this Agreement:.
3. to cooperate with the Service and the Eskimo Walrus Commission in;
 - a) conducting scientific studies to monitor the health, status and trends of the Pacific walrus population;
 - b) the development of conservation management plans for walrus haul-out areas in Alaska;
 - c) research on methods of take of Pacific walrus in an effort to reduce loss due to non-retrieved animals;
 - d) monitoring the presence of pollutants and/or contaminants and their effects upon walrus;
 - e) determining the distribution and migration chronology of Pacific walrus;
 - f) studies to identify, describe and protect important breeding, calving, and feeding habitat and haul-out areas of the Pacific walrus;
 - g) studies to assess the impact on walrus of harassment; oil, gas, or other exploration or development activity; aircraft overflights; noise pollution; and hunting;
4. to encourage local programs for voluntary compliance with applicable laws, regulations and agreements;
5. to cooperate with the Service in the implementation of walrus Reporting and Sealing regulations (when implemented by a final rule issued by the Department of the Interior) as allowed by budgetary constraints and fiscal priorities;

PACIFIC WALRUS MEMORANDUM OF AGREEMENT, PAGE 7

6. to cooperate in the preparation and distribution of educational materials and information concerning the Pacific walrus as a valuable natural resource;
7. to encourage village residents to make suggestions, comments or concerns to the Eskimo Walrus Commission, (P.O. Box 948, Nome, Alaska 99762).
8. to promote and encourage further research, communication and agreements with foreign nations regarding the management, conservation and utilization of the Pacific walrus.

Amendments to this agreement may be proposed at any time by submission in writing to the other affected parties, and shall become effective upon approval by the signatories hereto or their representatives.

The effective date of this agreement shall be from the date of final endorsement. The agreement shall remain in force until one of the parties signifies in writing to the others the desire to terminate its participation and obligations. The agreement shall become null and void 30 days after such notification. This agreement shall be reviewed by all signatory parties annually on the anniversary date and recommended changes be incorporated by amendment, or the agreement terminated in part or in whole.

SIGNED:

Walter O. Stiglitz

Regional Director
U.S. Fish and Wildlife Service
Anchorage, Alaska

DATED:

5/21/87

Oliver Callenworth

Commissioner
Alaska Department of Fish and Game
Juneau, Alaska

5-21-87

Joseph K. Johnson

Chairman
Eskimo Walrus Commission
Nome, Alaska

May 21 1978

Pacific Walrus *Odobenus rosmarus divergens*

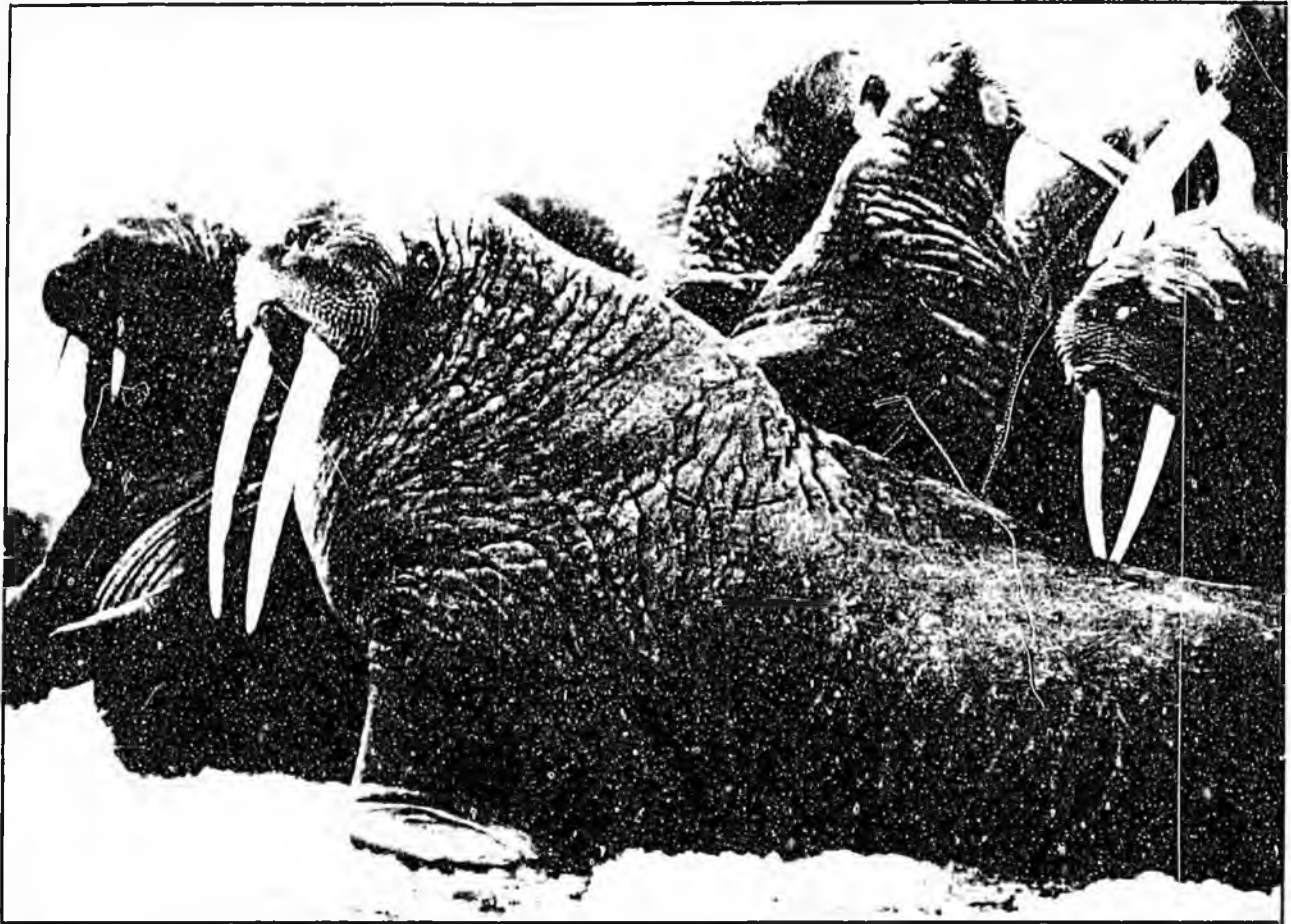
JOHN L. SEASE,* *Department of Biology, Fisheries, and Wildlife, University of Alaska, Fairbanks, Alaska 99775*
and

DOUGLAS G. CHAPMAN, *Center for Quantitative Sciences, University of Washington, Seattle, Washington 98105*

CURRENT POPULATION STATUS	20
Distribution	20
Population Size	22
Age Composition and Sex Ratio	24
Reproduction	25
Food Habits	26
Blubber Thickness and Physical Condition	27
Mortality	27
EXPLOITATION	29
Russian Expansion—1648 to 1867	29
The Yankee Whalers—1848 to 1914	29
The Arctic Traders—1880 to 1930	29
Soviet Exploitation—1930 to 1960	29
Recent Trends—1960 to 1985	30
CONSERVATION ISSUES	31
Management and Exploitation	31
Petroleum Exploration and Development	32
Coastal Development	32
Fisheries Conflicts and Incidental Take	32
Environmental Contaminants	32
RESEARCH AND MANAGEMENT RECOMMENDATIONS	33
ACKNOWLEDGMENTS	34
REFERENCES CITED	35
PERSONAL COMMUNICATIONS AND SOURCES OF UNPUBLISHED DATA	38

*Current address: U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Northwest and Alaska Fisheries Center, P.O. Box 1668, Juneau, Alaska 99801.

Pacific Walrus _____ *Odobenus rosmarus divergens*



Photograph by Kathryn J. Frost

Walruses have a discontinuous, holarctic distribution. Several discrete populations are generally included in two subspecies. The Pacific walrus (*Odobenus rosmarus divergens*), which includes about 80% of the world's walrus population, occurs primarily in the Bering and Chukchi seas. The Atlantic walrus (*O. r. rosmarus*) occurs in at least four distinct populations from Hudson Bay and the eastern Canadian Arctic to Greenland, Spitzbergen, and the Barents and Kara seas (Allen 1880; Smirnov 1929; Fay 1981, 1982, 1985). Some Soviet authorities recognize a third subspecies (*O. r. laptevi*), the small, isolated population that occurs in the Laptev Sea (Chapskii 1940, Arsen'ev 1976). Fay (1982, 1985), however, tentatively included the Laptev walrus with the Pacific form because of morphological similarities. The Pacific walrus population is the only one that occurs in waters of the United States (Alaska).

Pacific walruses have traditionally been extremely important in the subsistence economy of the Natives in the Bering-Chukchi region. The origins and cul-

tures of some communities were centered around the hunting of walruses, which were a source of food, fuel, and raw materials for construction of homes, boats, tools, and weapons (Collins 1937, Rudenkov 1947, Arutiunov and Sergeev 1968). At several times in the past, reduction of the Pacific walrus population has led to severe hardship, and even starvation, for the dependent Natives, especially the residents of the island communities. The Pacific walrus resource is still extremely important to Natives in some areas of Alaska.

The population has undergone several episodes of reduction and recovery since the late 1880s. Each time, recovery was possible only after relaxation of harvest pressure. In 1980 the Pacific walrus population was estimated to number about 250,000 animals (Fay *et al.* 1984a; Gilbert, pers. commun.). Some biologists believe that this population level is similar to or even larger than the population size prior to exploitation by Europeans, but because there are no reliable estimates of the early population levels, there

CORRECTION

**THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY**

Pacific Walrus _____ *Odobenus rosmarus divergens*

JOHN L. SEASE,* *Department of Biology, Fisheries, and Wildlife, University of Alaska, Fairbanks, Alaska 99775*
and

DOUGLAS G. CHAPMAN, *Center for Quantitative Sciences, University of Washington, Seattle, Washington 98105*

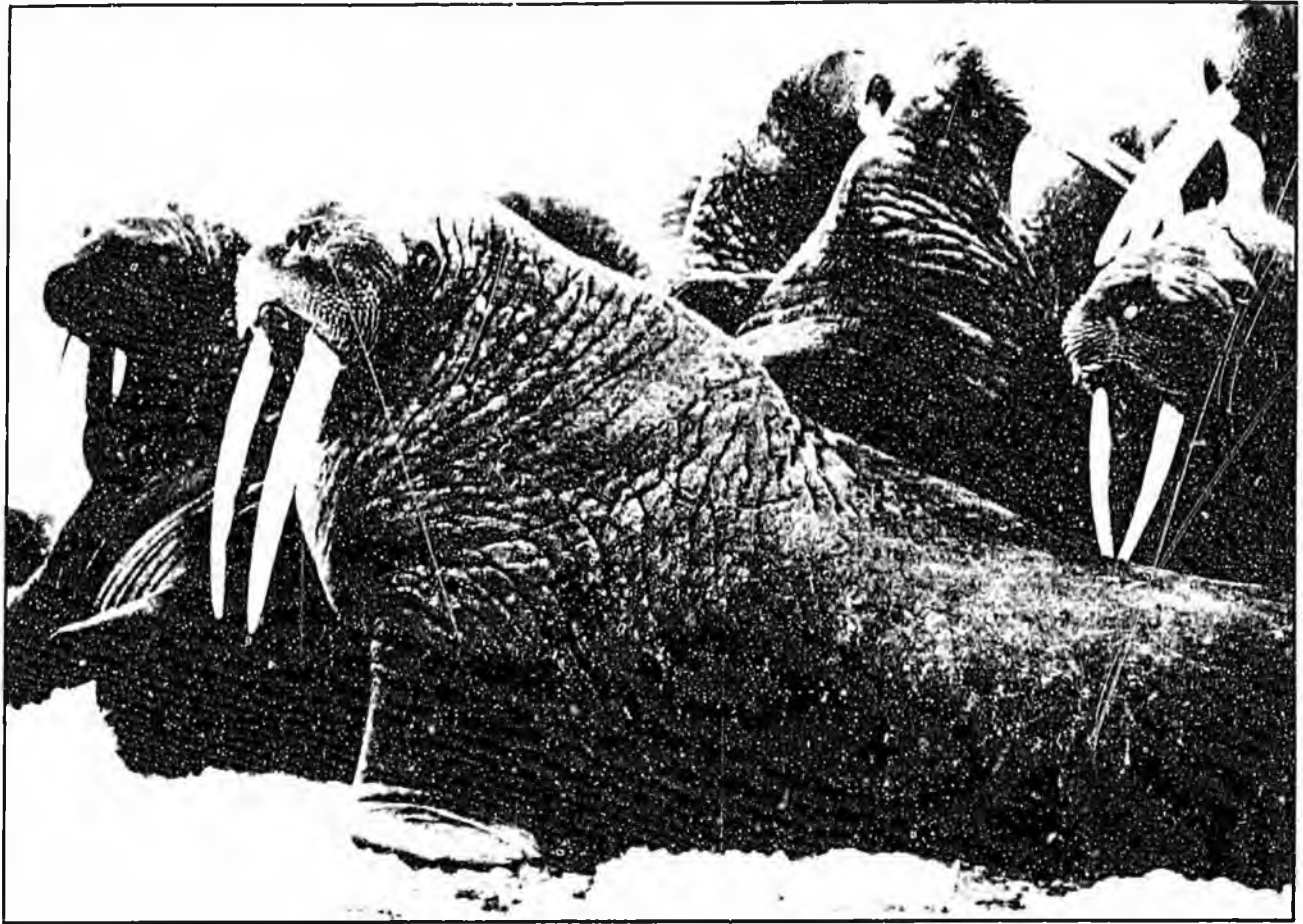
CURRENT POPULATION STATUS	20
Distribution	20
Population Size	22
Age Composition and Sex Ratio	24
Reproduction	25
Food Habits	26
Blubber Thickness and Physical Condition	27
Mortality	27
EXPLOITATION	29
Russian Expansion—1648 to 1867	29
The Yankee Whalers—1848 to 1914	29
The Arctic Traders—1880 to 1930	29
Soviet Exploitation—1930 to 1960	29
Recent Trends—1960 to 1985	30
CONSERVATION ISSUES	31
Management and Exploitation	31
Petroleum Exploration and Development	32
Coastal Development	32
Fisheries Conflicts and Incidental Take	32
Environmental Contaminants	32
RESEARCH AND MANAGEMENT RECOMMENDATIONS	33
ACKNOWLEDGMENTS	34
REFERENCES CITED	35
PERSONAL COMMUNICATIONS AND SOURCES OF UNPUBLISHED DATA	38

* Current address: U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Northwest and Alaska Fisheries Center, P.O. Box 1658, Juneau, Alaska 99801.



Photograph by Brendan P. Kelly

Pacific Walrus _____ *Odobenus rosmarus divergens*



Photograph by Kathryn J. Frost

Walruses have a discontinuous, holarctic distribution. Several discrete populations are generally included in two subspecies. The Pacific walrus (*Odobenus rosmarus divergens*), which includes about 80% of the world's walrus population, occurs primarily in the Bering and Chukchi seas. The Atlantic walrus (*O. r. rosmarus*) occurs in at least four distinct populations from Hudson Bay and the eastern Canadian Arctic to Greenland, Spitzbergen, and the Barents and Kara seas (Allen 1880; Smirnov 1929; Fay 1981, 1982, 1985). Some Soviet authorities recognize a third subspecies (*O. r. laptevi*), the small, isolated population that occurs in the Laptev Sea (Chapskii 1940, Arsen'ev 1976). Fay (1982, 1985), however, tentatively included the Laptev walrus with the Pacific form because of morphological similarities. The Pacific walrus population is the only one that occurs in waters of the United States (Alaska).

Pacific walruses have traditionally been extremely important in the subsistence economy of the Natives in the Bering-Chukchi region. The origins and cul-

tures of some communities were centered around the hunting of walruses, which were a source of food, fuel, and raw materials for construction of homes, boats, tools, and weapons (Collins 1937, Rudenko 1947, Arutiunov and Sergeev 1968). At several times in the past, reduction of the Pacific walrus population has led to severe hardship, and even starvation, for the dependent Natives, especially the residents of the island communities. The Pacific walrus resource is still extremely important to Natives in some areas of Alaska.

The population has undergone several episodes of reduction and recovery since the late 1880s. Each time, recovery was possible only after relaxation of harvest pressure. In 1980 the Pacific walrus population was estimated to number about 250,000 animals (Fay *et al.* 1984a; Gilbert, pers. commun.). Some biologists believe that this population level is similar to or even larger than the population size prior to exploitation by Europeans, but because there are no reliable estimates of the early population levels, there

may be no way to resolve this question. The vulnerability of the Pacific walrus population to overharvest by man underlines the need for development of sound management guidelines to prevent future depletion of this important resource.

CURRENT POPULATION STATUS

Distribution

The Pacific walrus population occurs primarily in the shelf waters of the Bering and Chukchi seas (Allen 1880, Smirnov 1929). Most of the population congregates during the summer in the southern edge of the Chukchi Sea pack ice between Long Strait and Wrangel Island to the west and Point Barrow to the east (Fig. 1). The main concentrations are near the coasts of Chukotka and Alaska, rather than in the middle of the Chukchi Sea (Fay *et al.* 1984a). The remainder of the population, primarily adult males, stays in the Bering Sea during summer.

In winter, walrus occur in areas where there are polynyas, open leads, or thin ice in which they can create and maintain breathing holes. There are two main concentrations in winter: one in the northwestern Bering Sea, south and west of St. Lawrence Island and in Anadyr Gulf; and the other in the southeastern Bering Sea, especially in Bristol and Kuskokwim bays (Fay 1982, Fay *et al.* 1984a).

Extralimital observations of walrus in the Beaufort, East Siberian, and Okhotsk seas and the Gulf of Alaska are not uncommon, but they represent very few animals (Harrington 1966, Kosygin and Sobolevskii 1971, Arsen'ev 1976, Fay 1982). The frequency of extralimital observations has been greatest in recent years, which coincides with the recent increase in the abundance of the walrus population (Fay *et al.* 1984a, Sease 1986) and may be a good indicator of relative population size.

Walrus spend about one-third of their time hauled out on ice or land (Fay and Ray 1968). The preferred substrate is ice, and thus the distribution of walrus is closely associated with the distribution of the pack ice. This association results in most of the Pacific walrus population migrating northward as the pack ice breaks up and melts in spring and southward as the ice re-forms in winter. Weather and ice conditions influence the timing of migrations, and the entire migration or portions of the migration may be advanced or delayed, compressed or drawn out. The following general description of the Pacific walrus migration is from Brooks (1954), Fay (1955, 1982), Burns (1965), and Fay *et al.* (1984a).

Female and young walrus, which are more migratory than the adult males, travel from the wintering areas in the Bering Sea to the summering areas in the Chukchi Sea. The migration begins in late March

or April. Sometimes walrus are transported northward while they rest on ice floes, but the principal progress in migration is achieved by swimming (Fay 1982). Animals from the northwestern Bering Sea wintering area migrate through Anadyr Strait, between St. Lawrence Island and the Chukotsk Peninsula, and begin to reach Bering Strait in mid-May. Animals from the southeastern Bering Sea pass to the east of St. Lawrence Island and reach Bering Strait by late May or early June. Virtually all walrus remaining in the Bering Sea during summer are males, which stay principally in Bristol Bay, Anadyr Gulf, and western Bering Strait.

When the pack ice begins to re-form in autumn, the females and subadult males begin their southward migration toward Bering Strait, swimming ahead of the ice edge in the open sea (Fay 1982). At the same time, some of the adult males that remained in Bristol Bay during the summer move toward Bering Strait and join the females there (Kelly and Taggart, pers. commun.). Soviet biologists have observed a similar "reverse migration" by males in the fall from Anadyr Gulf to southwestern Bering Strait, where they presumably join the southward-migrating females and young (Nikulin 1941, Krylov *et al.* 1964, Gol'tsev 1968, Fay *et al.* 1984a). The magnitude of the reverse migration by males in fall is not known. Most of the walrus arrive in their wintering areas by December or January.

Since the mid-1960s walrus have reoccupied portions of their range where they had not occurred for many years. Reoccupation has been most pronounced along the Soviet coast, from Anadyr Gulf southward to Karaginskii Bay, on the eastern coast of the Kamchatka Peninsula. This area had been the southwestern limit of the walrus' range until the end of the nineteenth century. A few walrus appeared south of Cape Navarin during the 1930s, but large numbers were not observed there until the mid- to late 1970s. Fedoseev (1981) observed about 1,500 walrus in Karaginskii Bay in fall 1980, and large herds of males have been seen along the Koryak coast (south of Cape Navarin) each year since then (Bukhtiyarov, Burns, and Kibal'chich, pers. commun.).

Research Needs. — Our knowledge of the seasonal distribution of the Pacific walrus contains many gaps because of insufficient data. The area to be covered is large, and weather and ice conditions are extremely variable, especially during fall and winter. It is quite clear, however, that walrus are widely distributed in the Bering and Chukchi seas. They are not restricted to the economic zones of either the United States or the Soviet Union, and may occur in both areas at different times of the year. For this reason, effective management of the walrus population requires a joint U.S.-Soviet effort.

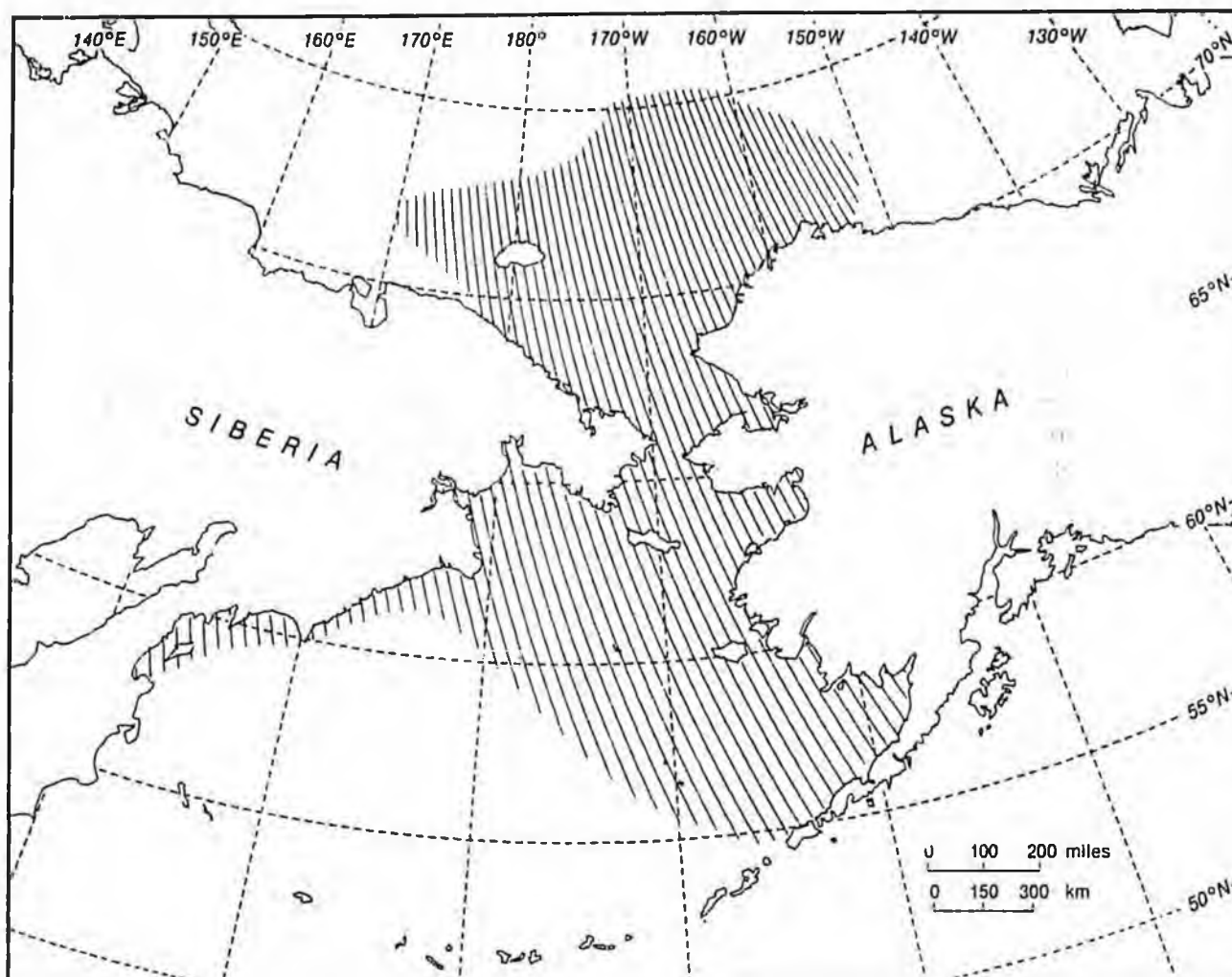


FIGURE 1.—Range of the Pacific walrus (*Odobenus rosmarus divergens*) population. (Adapted from Fay *et al.* 1984a.)

The degree to which the two wintering groups mix or remain discrete is unknown. Similarly, their contributions to the main concentrations near the Alaskan and Chukotkan coasts during summer are unknown. It is possible that individual animals are faithful to particular summering and wintering (breeding) areas and only mix casually as they move through Bering Strait in spring and fall. On the other hand, there could be interbreeding and genetic interchange. The two extreme possibilities, *i.e.*, a single, mixed population versus two or more discrete populations, would dictate radically different management approaches.

Radiotelemetry probably offers the best opportunity for investigating these questions. Research at Round Island in Bristol Bay (Taggart and Zabel 1980), which used radio transmitters attached to the tusks of male walrus to study haulout behavior, confirmed the occurrence of northward migration in fall by some males. Investigation of distribution and migration over the entire range of walrus certainly would require

the use of satellite transmitters, such as those used successfully with polar bears (*Ursus maritimus*) and caribou (*Rangifer tarandus*) (Amstrup, Cameron, and Pank, pers. commun.).

Visual tags are another potential tool for investigation of walrus distribution and migration patterns. Fay (1982) cited several tagging studies that had been conducted on walrus in the Bering and Chukchi seas and the Canadian Arctic in the 1950s and 1960s. Those efforts were not successful because none of the 638 tags was recovered. Metal or plastic tags are extremely difficult to apply, but paint or dye may be more practical. Marking walrus with paint or dye has been attempted, but on a very small scale (Fay, pers. commun.).

In 1980 the U.S. Fish and Wildlife Service began analyzing walrus tissue samples for the presence of environmental contaminants: heavy metals, organochlorines, and hydrocarbons (Metsker and Taylor, pers. commun.). Examination of the samples may reveal that walrus that winter in a particular geographical

region carry characteristic contaminant traces in their tissues; identification of the same "natural tags" in other areas might provide information about migration routes and summer range. Electrophoretic analysis of blood and tissue proteins might offer similar possibilities, but the initial attempts to identify different races of several delphinid species have not been successful (Sharp 1975). Analysis of mitochondrial DNA has proved to be an extremely successful method for the identification and separation of populations of several vertebrate species, including birds and small mammals (Wilson *et al.* 1985). This technique may be able to distinguish walrus stocks if those stocks are actually discrete (Shields, pers. commun.).

Potential Conflicts with Development Activities.—Walrus use terrestrial haulouts extensively during the fall migration and in other seasons when suitable haulouts on ice are unavailable. The major haulouts are located along the northern, eastern, and southern coasts of the Chukchi Peninsula, on islands in Bering Strait, on the Penuk Islands (east of St. Lawrence Island), and on Round Island in Bristol Bay. Coastal development already appears to have conflicted with walrus use of terrestrial haulouts in two locations on the Soviet coast and could also be a major concern in Alaska, especially on the Alaska Peninsula. Walrus haulout sites currently in use in the Soviet Union are protected from disturbance, but extensive development of coastal areas may occur if the economic trade-offs are high enough.

One of the two most important terrestrial haulouts in the United States, Round Island, is a State of Alaska preserve. The other, the Penuk Islands, is controlled by a Native corporation. Since the late 1960s and early 1970s walrus have begun using new haulouts or re-establishing abandoned haulouts elsewhere along the Alaskan coast, especially in the southeastern Bering Sea (Frost *et al.* 1982). Two of these, St. Matthew Island and Cape Pierce, are protected by federal refuge status. Creation of new preserves may be necessary to protect walrus from hunters, tourists, or coastal development on some of these haulouts.

The potential adverse effects of oil and gas exploration and development are another concern. The range of the Pacific walrus includes all of the proposed outer continental shelf oil lease areas in the Bering and Chukchi seas. Disturbances from drilling platforms and support vessels could impinge on major mating areas in winter, calving areas and migration corridors in spring, nursery areas in summer, and feeding areas and migration corridors in autumn. Ship and aircraft traffic in the immediate vicinity of walrus may cause them to flee into the water, potentially resulting in injury or abandonment of calves (Fay *et al.* 1984a). Environmental contamination from drilling muds or

oil spills could affect food supplies or directly affect walrus through bioaccumulation (see Food Habits). Future management plans should include means to assess and monitor the extent of disturbance from oil development as well as to mitigate adverse effects.

St. Matthew Island has been proposed as a staging and supply base for drilling platforms in the central Bering Sea. This island had been a traditional walrus haulout in summer and fall up to the late 1800s, then was abandoned for nearly 100 years (Sease 1986). Its reoccupation by walrus apparently began in 1978, and it has been used regularly at least since 1980 (Frost *et al.* 1982). Establishment of the proposed staging and supply base could cause the walrus to abandon the area once again. Furthermore, large numbers of breeding walrus frequently gather on the ice to the north and west of St. Matthew Island during winter (Fay 1982, Fay *et al.* 1984a), and aircraft traffic to and from the island at that time could disrupt breeding activity. The proposed support base has been blocked by a federal court action (Martin, pers. commun.), but similar proposals may be offered in the future, especially if oil is discovered in the Navarin Basin.

Population Size

The first attempts to enumerate the Pacific walrus population ranged from general statements of relative change over time to educated guesses based on little data. Nelson and True (1887) reckoned that the walrus population had been halved between about 1870 and 1880. In the 1930s Zenkovich (1938) derived an estimate of 60,000 walrus from harvest data and from information from Chukotkan hunters and workers. The first census estimated 40,000–50,000 animals from counts made during the cruise of the U.S. icebreaker *Northwind* in May and June 1954 (Fay 1957, Fay *et al.* 1984a).

The first aerial survey of walrus was conducted by the Soviet Union in 1958 (Nikulin, unpubl. data, cited in Fedoseev 1962), and the second by the United States in 1960 (Kenyon 1960a; Kenyon, unpubl. data, cited in Fay 1982). The countries conducted a combined total of seven additional surveys during the next 15 years. Most of the surveys were planned and conducted without benefit of communication between Soviet and U.S. biologists. Communication was established in 1973, and the U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection, Project V-6 (Marine Mammals), led to the first joint U.S.-Soviet survey in 1975 (Estes and Gol'tsev 1984). Additional joint surveys were conducted in 1980 (Johnson *et al.* 1982) and 1985 (Gilbert, pers. commun.). The population estimates from surveys in 1954 to 1985 are presented in Table 1.

All of the U.S. surveys have been based on strip sampling methods, but the techniques have continually

been refined and the statistical treatment of data has become increasingly sophisticated (Gilbert, pers. commun.). The time of year and area of coverage of the surveys have also varied. All of the U.S. surveys up to 1972 were conducted in February, March, and April in the Bering Sea and were attempts to survey the entire population. Since 1975 the U.S. surveys have been conducted in September and October in the Chukchi Sea, and only of the eastern part of the population in the pack ice. Consequently, the results are not directly comparable (Fay *et al.* 1984a).

The Soviet surveys have been less sophisticated statistically than the U.S. surveys, but the methods have remained constant. Each of them since 1958 has

counted walrus only along the Soviet coast in September and October and, at least initially, assumed that the number of walrus in the U.S. zone at that time was insignificant. During each survey the Soviets have based about 60% of their estimate on direct counts from aerial photographs of walrus on the coastal haulouts. The remainder of each estimate has been based on strip surveys over the pack ice in the western Chukchi Sea. Thus, the differences among the Soviet estimates cannot be attributed to increased sophistication of methods or equipment, or to changes in timing or coverage. Their results, therefore, at least for the Soviet zone, are more comparable than those from the U.S. surveys. The Soviet results indicate nearly a tripling of the number of walrus in the Soviet zone from 1958 to about 1975 and a lesser increase from 1975 to 1980 (Fig. 2).

An exponential curve fitted to the estimates for the Soviet zone from 1958 to 1975 is

$$N_t = 40.2 e^{0.067t}$$

with $t = 0$ in 1958. This curve implies an instantaneous growth rate of 0.067 during that time. The 1980 survey estimate for the Soviet zone falls significantly below that for the exponential model, which is in accord with the views of Fay *et al.* (1984a) that population growth slowed after 1975.

In the most recent joint U.S.-Soviet survey, conducted in September and October 1985, the estimate from the U.S. survey in the eastern Chukchi Sea was about 80% of the 1975 estimate and 65% of the 1980 estimate (Gilbert, pers. commun.). The joint surveys in September and October 1975 and 1980 indicated each time that the U.S. estimate from the eastern Chukchi Sea represented about 40% of the total estimated population, with an additional 5% occurring in Bristol Bay (Fay *et al.* 1984a; Gilbert, pers. commun.). The decrease that is suggested by the 1985 U.S. survey cannot be evaluated more precisely until the results from the Soviet portion are available.

Aerial survey is the best tool currently available for assessing the size of the Pacific walrus population. Like many other marine mammals, however, walrus tend to be patchy in distribution, unequally visible (*e.g.*, underwater, at the surface, on land, on ice), and distributed over very large areas (see Chapman *et al.* [1977] for discussion of sampling techniques). Consequently, sampling variances and confidence intervals for strip surveys are discouragingly large (Estes and Gilbert 1978). Because the Soviets base their estimates largely on visual and photographic counts, the problem of sampling variance for those estimates is reduced, but the Soviets have not given confidence limits for their total estimates. Adverse weather frequently interrupts survey operations, thus upsetting the continuity of coverage and increasing the probability of counting

TABLE 1.—Estimated size of the Pacific walrus population based on a shipboard survey in 1954 and aerial surveys from 1958 to 1985.

Date	Estimated size (thousands)		Source
	Soviet	Total	
May-Jun 1954	—	45	Fay 1957
Aug-Sep 1958	40	(73)	Nikulin, unpubl. data, cited in Fedoseev 1962
Feb-Mar 1960	—	96	Kenyon 1960a
Apr 1960	—	85	Kenyon 1960a
Sep-Oct 1960	46	(84)	Fedoseev 1962
Mar 1961	—	85	Kenyon, unpubl. data, cited in Fay 1982
Sep-Oct 1964	59	(107)	Gol'tsev 1968
Apr 1968	—	92	Kenyon, unpubl. data, cited in Fay 1982
Sep-Oct 1970	101	(184)	Gol'tsev 1972
Sep-Oct 1970	—	168	Fedoseev 1984
Apr 1972	—	124	Kenyon 1972
Sep-Oct 1975	129	(235)	Gol'tsev 1976
Sep-Oct 1975	—	170	Estes and Gol'tsev 1984
Apr 1976	112	(204)	Fedoseev 1981
Sep-Oct 1980	—	280	Johnson <i>et al.</i> 1982
Sep-Oct 1980	140	250	Fedoseev 1981, 1984
Sep-Oct 1980	—	246	Fay <i>et al.</i> 1984a; Gilbert 1986
Sep-Oct 1985	155	234	Gilbert 1986

NOTE: Median values are used for estimates that were reported as ranges (adapted from Fay 1982). Total estimates in parentheses are extrapolated from the estimates for the Soviet zone, based on the estimates from the 1975 and 1980 joint U.S.-Soviet surveys that about 40% of the population occurs in U.S. waters of the Chukchi Sea in September and October and about 5% occurs in Bristol Bay.

individual animals more than once. In addition, the estimate derived from each of the aerial surveys may have been very conservative, because none was corrected for the activity rhythms of walrus and the proportion of animals underwater (Fay *et al.* 1984a). A comprehensive discussion of sampling problems associated with the walrus surveys is being prepared by Gilbert (pers. commun.).

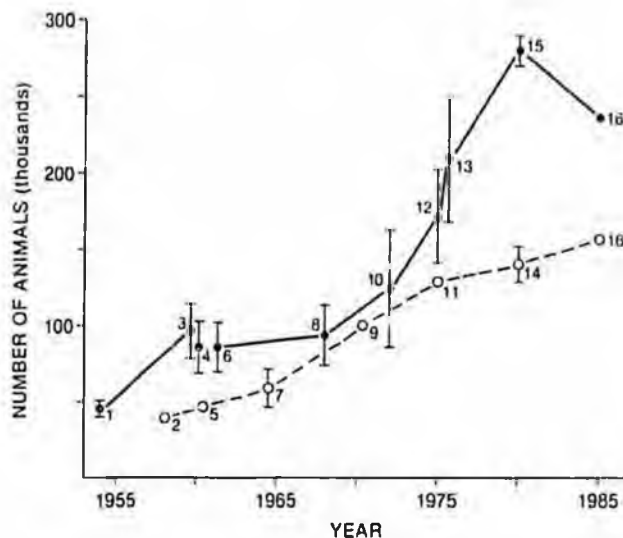


FIGURE 2.—Estimated size of the Pacific walrus population, based on a shipboard survey in 1954 and aerial surveys from 1958 to 1985. Open circles represent estimates for the Soviet zone; solid circles represent estimates for the entire population. Vertical bars represent confidence limits reported by the investigators. Sources: (1) Fay 1957; (2) Nikulin, unpubl. data, cited in Fedoseev 1962; (3) and (4) Kenyon 1960a; (5) Fedoseev 1962; (6) Kenyon, unpubl. data, cited in Fay 1982; (7) Gol'tsev 1968; (8) Kenyon, unpubl. data, cited in Fay 1982; (9) Gol'tsev 1972; (10) Kenyon 1972; (11) Gol'tsev 1975; (12) Estes and Gol'tsev 1984; (13) Krogman *et al.* 1979; (14) Fedoseev 1984; (15) Johnson *et al.* 1982; (16) Gilbert 1986.

Because of these sampling problems, interpretation of survey results has been a persistent problem. For example, the total initial estimate of 270,000–290,000 animals in 1980 (Johnson *et al.* 1982) was later adjusted to about 250,000 (Fay *et al.* 1984a; Fedoseev 1984; Gilbert, pers. commun.). Nonetheless, a dramatic increase in the size of the walrus population up to 1980 has been indicated by the survey results, and has also been suggested by expansion of range, as noted above (see also Fay *et al.* 1984a, Sease 1986). Other methods to estimate population size, such as mark-recapture, have not been used.

Research Needs.—Additional research is needed to reduce the sampling variances and confidence limits

for population estimates. Radiotelemetry could help to analyze activity patterns and to calculate the proportion of walrus that would be underwater, out of the survey area, or otherwise uncountable during aerial surveys. Radiotelemetry may also improve our understanding of walrus distribution in the pack ice in September and October, thus allowing improvement of survey design and reduction in sampling variance. If a suitable tag or other marking procedure could be developed and used to mark animals which could be recovered in the harvests, a mark-recapture program might be attempted as an alternate census method.

Age Composition and Sex Ratio

In recent years some of the Eskimo walrus hunters from St. Lawrence Island reported their observations of an unusually high proportion of adult walrus with extremely worn, blunted tusks (Fay *et al.* 1988). These observations could indicate an abundance of old animals in the population because, although tusks grow continuously during life, the rates of wear and breakage exceed that of growth for old animals (Fay 1982). A shift in the age structure of the population toward older animals is also suggested by an increase in the mean age of females in nonselective samples taken during U.S.–Soviet research cruises in the 1960s, 1970s, and 1980s (Krylov 1965, 1968; Fedoseev and Gol'tsev 1969; Fay *et al.* 1983, 1988, unpubl. data). The trend of increased mean age is also apparent in walrus dying of natural causes on the Punuk Islands during the 1960s and 1970s (Fay and Kelly 1980, Fay *et al.* 1984a) and in the walrus harvested by Alaskan Natives from the 1960s to the 1980s. Although the data from the Punuk natural mortality and the Native harvests may not be representative of the population as a whole, the changes in the harvest samples cannot be attributed entirely to the selective biases of the hunters (Fay *et al.* 1984a, 1988; Sease 1986). (See Exploitation for a more complete discussion of the harvest data.)

An adult walrus sex ratio of 1 : 1 was assumed until estimates by Fay (1982) and justification based on polygyny (Fay 1982; Fay *et al.* 1984b) suggested a ratio of about 1 male to 3 females. Since females mature at an earlier age than males, the adult sex ratio would be unbalanced even if natural mortality rates were equal for both sexes. Higher mortality rates for adult males, either from exploitation or natural causes, will skew the adult sex ratio even more.

Research Needs.—Analysis of photographs of herds will probably provide information about current age composition, as well as relative values for comparison of past and present values. Detailed information on sex ratio is needed for computer modeling of population dynamics. The acquisition

of sex ratio information will require cooperation between the United States and Soviet Union.

Reproduction

Mating takes place primarily during January and February, when the walrus are concentrated in their wintering areas in the pack ice of the Bering Sea. Implantation of the blastocyst is delayed 4–5 months, until June. Calves are born during the northward migration the following spring, mainly in May (Belopol'ski 1939; Krylov 1969; Fay 1981, 1982). Female walrus often give birth in isolation, but typically they congregate in large, compact "nursery herds" a day or two after birth (Burns 1965, 1970). The cow-calf bond is stronger in walrus than in other pinnipeds; cows are extremely protective of their young. Calves are dependent on their mother's milk during the first year of life and are gradually weaned during the second year. Other adult females may foster orphaned calves, but most orphaned calves probably perish. Young males usually remain with the female herds for 2–5 years after weaning, before joining the all-male herds, whereas young females remain with the herds of adult females (Fay 1981, 1982).

Males typically become reproductively mature at the age of 9 or 10 years, but they are usually excluded from breeding until they are about 15 years old and large enough to compete successfully with other adult males (Fay 1981, 1982). Because walrus are polygynous, there is potentially a surplus of males; hence, a harvest that consists predominantly or exclusively of males would not have the same impact on the population as a harvest that removed large numbers of females. The potential, long-term effects (*e.g.*, through changes in the gene pool) of selective male harvests have not been examined.

Samples collected during the 1950s, 1960s, and early 1970s, when the population was still growing rapidly, indicated that female walrus ovulate for the first time at an age of 4–8 years, with a median age of about 6 years. The age at first birth was about 8 years (Krylov 1966, Fay 1982). Maximum fecundity was at 9–10 years, with a decline in older age classes (Fay 1982, Fay and Stoker 1982a). The ages of first ovulation and maximum fecundity calculated at that time probably reflect ideal conditions for rapid growth and maturation of individual animals. More recent data suggest that the age at first birth has shifted upward by about 2 years since 1975 (Fay *et al.* 1988). The greater age of first breeding observed since 1975 is probably more representative of a population at or near carrying capacity.

The recent samples have not been examined yet for a corresponding shift in age of maximum fecundity. However, such a shift has been suggested by changes

in the mean ages of female walrus in the Alaskan catches. In general, the mean age of the catches increased from 1960 to 1980. Hunters from St. Lawrence Island preferentially select female walrus with calves (Fay 1958; Iya, pers. commun.), thus taking a high proportion of females from the age classes with the highest mean fecundity. Mean ages of those catches remained fairly constant at St. Lawrence Island until about 1972, when they also began to increase. Since hunter selection for females with calves apparently did not change in that time (Burns and Fay, pers. commun.), a shift in age-specific fecundity of the females is implied (Fay *et al.* 1984a, Sease 1986).

Because the duration of pregnancy is 15–16 months, the intervals between successful parturitions for any given female cannot be less than 2 years. Biennial breeding is typical for females in their reproductive prime (9–10 years), but older females may breed at intervals of 3, 4, or more years (Krylov 1962). For this reason the reproductive potential of walrus is much lower than that of any other pinniped. Using samples collected from 1952 to 1976, Fay (1982) calculated a mean birth rate of about 37% for adult females. As noted above, the Pacific walrus population was growing rapidly during most of that period; hence that birth rate is probably higher than it would be in equilibrium conditions with the population near carrying capacity.

Recent data suggest that the reproductive rate of the Pacific walrus population has decreased slightly and has become erratic, at least since the late 1970s. Calf production was especially poor in 1980. Samples of reproductive organs collected at Gambell and Diomed indicate the estimated birth rate in 1980 was about 15%, the lowest ever recorded and significantly lower than the mean rate of 37% calculated from earlier samples (Fay and Stoker 1982b, Sease 1986). Since 1980, birth rates have been extremely variable and generally lower than they were before (Fay *et al.* 1988). Samples of reproductive organs from adult females collected in 1980 and 1983 revealed a higher frequency of prenatal mortality than was observed in other years (Fay *et al.* 1983; Fay and Kibal'chich, unpubl. data). Samples collected by the U.S. Fish and Wildlife Service in 1985 have not been analyzed yet.

Age of maturation and birth rate are density-dependent for many species of large mammals, including several species of pinnipeds (Fowler *et al.* 1980). Erratic pregnancy rates are also typical for populations of K-selected species that have closely approached or exceeded the carrying capacity (Fowler, Siniff, pers. commun.). The observed reproductive performance of the Pacific walrus population is consistent with the hypothesis that the population is at or near the carrying capacity of the Bering-Chukchi region.

Research Needs.—Additional research is needed to determine the current reproductive parameters of Pacific walrus. For example, using data collected primarily at St. Lawrence Island, Fay (1982) calculated that the interval between ovulations increases with age; hence fecundity is maximum at 9–10 years of age (Fay and Stoker 1982a). Reexamination of those data led Gilbert (pers. commun.) to believe that the interval between ovulations does not increase in older age classes and that fecundity remains high. As Fay (1982) pointed out, however, because of the hunters' selective harvesting of females with calves, those samples are primarily from the most productive portion of the female population and thus may not be representative of the population at large.

The existing data sets need to be carefully reexamined to resolve such differences in interpretation. In addition, recent samples have suggested that values of several reproductive parameters have changed during the past 5–10 years. The 1985 sample needs to be analyzed and additional new data need to be collected to quantify the changes as precisely as possible. Such information is crucial for population modeling.

Food Habits

Walrus feed almost exclusively on benthic invertebrates. Vibe (1950) and Fay (1982) reported that walrus typically feed in depths of 10 to 50 m, with a maximum depth of about 80 m. A greater maximum feeding depth of 115 m was recorded near St. Matthew Island in the central Bering Sea in February 1985 (Burns and Fay, pers. commun.), but walrus probably cannot feed efficiently at depths much greater than that.

More than 60 genera of marine organisms from 10 phyla have been identified from stomach contents. Several kinds of bivalve molluscs appear to be the preferred or most important prey (Fay 1982; Fay and Stoker 1982a,b; Fay *et al.*, unpubl. data). Average daily food intake of walrus in captivity is at least 5–7% of the total body weight (Fay 1982, Gehrich 1984). Some walrus, primarily males, occasionally feed on seals. Pieces of ringed seals (*Phoca hispida*), spotted seals (*Phoca largha*), and bearded seals (*Erignathus barbatus*) have been found in walrus stomachs, sometimes in substantial volume. Most seal-eating is thought to be predation, rather than scavenging on carrion (Lowry and Fay 1984).

Fay *et al.* (1977) observed that stocks of benthic bivalves were low in areas where large numbers of walrus were feeding. This led to the hypothesis that maximum, or nearly maximum, utilization of food resources was occurring in those locations at that time. Soon after that, Alaskan Eskimos observed that walrus apparently were eating different foods than they had eaten during previous years. Stomach samples

collected during the spring harvests at Gambell, Savoonga, and Diomed in 1980 and 1982 confirmed a decrease in the proportion of bivalves and a corresponding increase in the proportion of fishes and other alternative prey. Sizes of individual prey were approximately 50% smaller than they were before 1980 (Fay and Stoker 1982a,b). In addition, those samples suggested that male and female walrus were consuming similar sizes and species of bivalves. Prior to 1980, males and females had consumed bivalves of different species and size ranges (Fay and Stoker 1982a,b; Fay *et al.* 1984a). The 1980 and 1982 stomach samples also contained greater quantities of gravel and sediments than had been observed previously. Presumably, walrus ingest small quantities of sediments along with prey, and they probably ingest more sediments with soft-bodied epifaunal organisms than with the preferred bivalves. Increased amounts of sediments in stomachs could result from the increased consumption of non-bivalve prey or the shift to smaller organisms, possibly suggesting that walrus are working harder to find the necessary quantities of food (Fay and Stoker 1982a,b).

Research Needs.—Walrus are selective feeders, but the kinds and sizes of prey may vary considerably among age classes, sexes, and locations (Fay 1982). In addition, rates of food intake may vary during the year. Walrus reared in captivity show the highest food intake in autumn and lowest in midwinter, during the breeding season (Gehrich 1984). The quantity of food in stomachs and the overall condition of digestive tracts from samples of walrus collected in the Bering and Chukchi seas confirm that feeding activity is lowest in midwinter but autumn samples are too few for speculation (Fay *et al.* 1984a). Detailed statistical analysis of the available samples is necessary to qualify and quantify the suspected differences in diet between sexes, age classes, and locations, as well as to clarify the probability that changes took place during the late 1970s and 1980s. Those analyses may also add to our understanding of the seasonal aspects of feeding by walrus, possibly allowing identification of critical feeding areas.

Walrus appear to have a structuring effect on the benthic fauna by selectively feeding on the mature age classes of a few species, especially of the larger bivalve molluscs (Vibe 1950; Fay and Stoker 1982a,b). Intensive feeding by walrus could directly reduce or limit populations of those long-lived, slow-maturing bivalves (Fay *et al.* 1977; Feder, pers. commun.). Foraging by walrus also causes massive perturbation of the benthic sediments; this perturbation releases nutrients that may be beneficial to other organisms, but it also may have a disruptive effect by interfering with colonization by invertebrate larvae (Ray 1973, Fay *et al.* 1977, Oliver *et al.* 1983). The relationship

between walrus and the benthic invertebrate communities appears to be complex and is not well understood. If change is indicated by walrus stomach contents, then larger changes could be expected in the structure and successional stages of benthic communities in the Bering-Chukchi region, due to selective feeding by walrus. Three large, comparable data sets exist for benthic communities within the walrus range in the Bering Sea from 1970 to 1986, and preliminary analysis of these indicates major change (Feder, pers. commun.). A full analysis is planned if funding for it can be obtained (Feder and Fay, pers. commun.).

Potential Conflicts with Development Activities.—

Depletion of food resources by fisheries is not considered a problem at this time. Development of a clam fishery in Bristol Bay could have had a severe impact on the male walrus that spend the summer in the bay (Fay and Lowry 1981), but development of that fishery appears to be unlikely in the near future. Trawl fisheries present a potential threat to walrus food resources through disruption of benthic communities. Most trawl fisheries have occurred along the shelf break, beyond the range of walrus (Fay, pers. commun.). Detailed analysis of food habits, as outlined above, may identify critical feeding areas that should be monitored for, and perhaps protected from, potential damage from fisheries.

As noted above, all of the proposed offshore oil lease areas on the Bering-Chukchi shelf lie within the range of the Pacific walrus. Contamination from oil spills, drilling muds, and other sources could have long-term adverse effects on walrus benthic food resources by killing benthic invertebrates directly, altering species composition, lowering productivity, or slowing growth rates (Hansen 1985).

Blubber Thickness and Physical Condition

Blubber thickness has been used as a general index of body condition in several species of pinnipeds, including walrus (McLaren 1958, Pitcher and Calkins 1979, Fay 1982, Fay *et al.* 1984a). Age, sex, time of year, and reproductive condition can confound comparison of samples (McLaren and Smith 1985), but if the contrast is great enough, even those factors may not mask it (Sease 1986). Adult male Pacific walrus (10 or more years of age) and adult females (6 or more years old and divisible into those at or near full-term pregnancy and those not at or near full-term pregnancy) were all found to be significantly leaner in 1980 and 1981 than they had been earlier (Fay *et al.* 1988). Only samples from February to June were included in that analysis to reduce the impact of seasonal variation. Furthermore, those sampled in 1985 were significantly leaner than the 1980 and 1981 samples, which indicates that the walrus are still

not eating as nutritious a diet as they were in the 1960s to early 1970s or are expending more energy than before. Reduced nutritional intake could be affecting their growth and reproduction.

The available data sets have not been examined yet for shifts in growth rate, but some of the reproductive data show that the age at first parturition has been increasing in recent years (Fay *et al.* 1988). Age of sexual maturation is highly correlated with growth rate for several species of large mammals, including marine mammals (Laws 1956, 1981; Fowler *et al.* 1980); hence increases in age of maturation are indicative of reduced growth of individuals in the population.

Research Needs.— Additional research is needed to analyze growth and reproductive data sets, and monitoring of blubber thickness should continue. Combined, these data sets may help to determine the physical condition of the walrus population. Because of potentially large observer variability in measurement of blubber thickness, these data should be collected only by experienced observers.

Mortality

Mortality of exploited animals is typically divided into two categories, mortality due to human activity and natural mortality. As used in this report, mortality due to human activity includes direct exploitation as well as indirect effects, such as habitat modification or depletion of food resources by fisheries. "Natural" mortality includes mortality from all causes other than human, including predation, parasitism, and disease.

Mortality Due to Human Activity.— Mortality of Pacific walrus due to direct disturbance, alteration of habitat, depletion of food resources by fisheries, or incidental catch by fisheries is thought to be near zero at this time. The potential impacts of fisheries and oil development are discussed above (see Distribution, Food Habits).

Mass mortality of calves and abortion of fetuses due to trampling during an aircraft-induced stampede have been observed once in the Soviet sector (Tomilin and Kibal'chich 1975). The principal mortality due to human activity is the annual harvest by Natives of the Bering-Chukchi region, and, at present, by Soviet sealing vessels. These harvests appear to be the most significant source of mortality affecting the population (Fay 1982). The historical and current exploitation of walrus is discussed below (see Exploitation).

Natural Mortality.— Fay (1982) summarized the known major sources of natural mortality. For calves, these sources include trauma from trampling, abandonment, predation by polar bears, and possibly hypothermia. For all age classes, sources of mortality