SJR

10

FISCAL NOTE

STATE OF ALASKA
1992 LEGISLATIVE SESSION

BILL NO. SJR 10

Revision Date: _____ **Department Affected:** None

Title: Relating to discharge of ballast water. **BRU:** _____

Component: _____

Sponsor: Zharoff

Requestor: _____ **COMPONENT SERIAL NO.** | | | | |

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL						
REVENUE FUND SOURCE:						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER FUND SOURCE:						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of current year impact: None

ANALYSIS: (Attach a separate page if necessary.)

Resolution requests the U.S. Coast Guard to take action on ballast water issue.
No fiscal impact on the state government.

Prepared By: Terry Otness, Committee Aide **Phone:** 465-3743

Division: Senate Resources Committee **Date:** 4/15/92

Approved by Commissioner: Sen. Lloyd Jones, Chairman

Agency: Alaska State Senate **Date:** 4/15/92

Distribution (by preparer): Leg. Fin., Legislative Sponsor, Requestor, OMB/DBR, Gov. Legis. Ofc., & Impacted Agency(ies).

Rev 10/7/91

SENATE COMMITTEE REPORT
FIRST COMMITTEE OF REFERRAL

DATE: 1/23/91 FURTHER:

Date of 5-Day Notice: 4-9-92
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: April 6, 1992

Resources Committee considered SJR 10

Discharge of ballast water by vessels entering the waters of Alaska.

and recommended:

[X] **replace with** _____ **CS** SJR 10 (Res) [X] **same title** [ ] **new title**

[ ] **attached amendment(s)**

[ ] _____ **letter of intent adopted**

[X] **do pass**

[ ] **do not pass**

[ ] **no recommendation**

[ ] **individual recommendations**

[ ] **further referral to** _____

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:	Department(s)/Date:
[ ] fiscal note(s) _____	[X] zero fiscal note(s) Sen Res 4/15/92
[ ] appropriation-no fiscal note	[ ] Governor's bill w/fiscal note

SIGNING DO PASS:

OTHER RECOMMENDATIONS:

Chair Signature and Recommendation

SENATOR FRED F. ZHAROFF
ALASKA STATE LEGISLATURE
P. O. BOX 405, KODIAK, ALASKA 99615 (907) 486-5259
DURING SESSION:
P. O. BOX V, JUNEAU, ALASKA 99811 • (907) 465-3473 • 465-3474
DISTRICT N
ALASKA PENINSULA • ALEUTIAN CHAIN • BRISTOL BAY • KODIAK ISLAND • LAKE CLARK/LAKE ILIAMNA • PRIBILOF ISLANDS • SHUMAGIN ISLANDS

MEMORANDUM

TO: Senator Lloyd Jones
Chairman
Senate Resources Committee

FROM: Senator Fred F. Zharoff

DATE: April 13, 1992

RE: Senate Joint Resolution No. 10 - "Relating to the discharge of ballast water by vessels entering the waters of Alaska."

RESOLUTION SUMMARY: SJR 10 requests the U.S. Coast Guard to adopt regulations that would protect Alaska's ecosystem from the introduction of exotic marine organisms.

A CS has been requested in order to update the Copies section.

PREVIOUS ACTION: Introduced on Jan. 23, 1991. Referred to the Senate Resources Committee. SJR 10 is a reintroduced version of SJR 59, which expired in the House Rules Committee upon adjournment in 1990.

FISCAL IMPACT: No financial expenditures required by the Alaska state government.

RESOLUTION BACKGROUND: SJR 10 is based on a resolution adopted in 1989 by the Pacific Fisheries Legislative Task Force (made up of fisheries-oriented legislators from Alaska, California, Idaho, Oregon and Washington).

The resolution is aimed at a national problem - the introduction of exotic species through the discharge of ballast water. In many locations throughout the United States -- in particular, California and the Great Lakes region -- foreign marine species have overwhelmed native species, creating serious environmental problems and widespread destruction. The most dramatic example of this is the zebra mussel, which -- through its rapid reproductive capability and ability to clog up water intake and discharge systems -- has caused millions of dollars worth of damage in the Great Lakes basin.

To the best of our knowledge, Alaska has been spared this problem. However, the potential threat exists, particularly

in regard to the introduction of exotic marine organisms from northern Asia and Siberia.

ATTACHED BACKUP INFORMATION:

1. Resolution adopted by the Pacific Fisheries Legislative Task Force.
2. Historical overview on ballast water discharge and the invasion of exotic species.
3. Information about exotic species invasions in California.
4. Summary of a paper on Great Lakes exotic organisms.
5. Background information about zebra mussels.
6. Article from The Fishermen's News, April, 1990.

Pacific Fisheries Legislative Task Force
Passed in Eureka, Calif.
Aug. 20, 1989

RESOLUTION
89-10

INTRODUCED ORGANISMS FROM BALLAST WATER

WHEREAS, west coast sport and commercial fisheries are resources of great economic and recreational importance; and

WHEREAS, these resources are threatened by the introduction of aquatic organisms from foreign ports brought in by means of the ballast water of freighters and tankers; and

WHEREAS, in recent years several planktonic and benthic organisms have arrived and become established, at least one of which is suspected to have caused a great decline in the abundance of an important striped bass food organism in California's Sacramento-San Joaquin Estuary; and

WHEREAS, exotic eel grass brought in through ballast water has created problems in Humboldt Bay and estuaries along the Pacific Coast; and

WHEREAS, similar introductions have probably occurred or will occur at other estuarine and coastal ports all along the west coast and they already have occurred in the Great Lakes with consequent harm to Great Lakes fisheries.

NOW, THEREFORE, BE IT RESOLVED that to protect native fisheries and ecosystems of the Pacific Coast States, the Pacific Fisheries Legislative Task Force urges the U.S. Coast Guard to adopt a regulation prohibiting the dumping of ballast water originating in foreign ports in any west coast river, estuary, bay or coastal area. Such ballast water should be dumped at sea and exchanged for open ocean water prior to entry into State waters; and

BE IT FURTHER RESOLVED that this resolution be forwarded to the Commandant of the U.S. Coast Guard, the Secretary of the Treasury, the Secretary of Commerce and the respective Congressional Delegation of the Pacific Fisheries Legislative Task Force states.

BALLAST WATER AND THE INVASION OF EXOTIC SPECIES
A Brief Historical Review: 1868 - 1990

James T. Carlton
Maritime Studies Program, Williams College - Mystic Seaport Museum
Mystic, Connecticut 06355

A Chronological Summary of the Some of the Events and Concerns Relative to Ballast Water:

1868 Grantham (1868) describes the design of double-bottom tank systems for water ballast in iron ships

1880 Lloyd's Register begins in 1880 (but not before) noting types and capacities of water ballast tanks

1896 "Probably most cargo steamers in these days are fitted with some means of carrying water as ballast..." (Walton, 1896)

1900 Fulton and Grant (1900) suggest that the European shore crab Carcinus maenas was introduced to Australia by ballast water

1908 Ostenfeld (1908) suggests that the Asian diatom Odontella (Biddulphia) sinensis may have been introduced to the North Sea in 1903 by ballast water

1933 Peters describes the introduction of the mitten crab Eriochier sinensis, sometime before 1912, from Korea or China to Germany

1968-1978 Extensive literature discussions on the role of ballast water in exchanging marine organisms through the Panama Canal (reviewed by Carlton, 1985, p. 319)

1973 Medcof and Scribner (1975) provide first detailed report of living organisms in ballast water, based upon samples of a ship arriving from Japan to New South Wales, Australia

1973 **"Resolution 18"**: "Research into the Effect of Discharge of Ballast Water Containing Bacteria of Epidemic Diseases" passed by the International Conference on Marine Pollution (including the International Convention for the Prevention of Pollution from Ships)

1976-1977 CSIRO (Australia) biologists sample bulk cargo carriers coming from Japan to Western Australia (see Williams et al., 1988)

1980 Environment Canada commissions ballast water study at Montreal, to sample 55 merchant vessels in the summer and fall; published as Bio-Environmental Services (1981)

1980-1982 Ballast water investigations commence at the Woods Hole Oceanographic Institution, Woods Hole, based upon experimental studies using oceanographic research vessels, and upon bulk bulk cargo traffic arriving at US ports (J. T. Carlton and colleagues)

1985 Publication of review monograph by Carlton (1985)

1986 Ballast water investigations commence in Coos Bay, Oregon, at the University of Oregon Institute of Marine Biology, based upon bulk cargo vessel traffic from Japan to Pacific Northwest (J. T. Carlton and colleagues) [Sea Grant funded, 1987-1988, 1989-1991]

1987 Publication of monograph on introductions of non-indigenous marine organisms by ballast water and other vectors into Australia, by Hutchings, van der Velde, and Keable (1987)

1987 CSIRO (Australia) scientists re-commence sampling of bulk cargo vessels inbound from Japan (Dr. G. Hallegraeff, of CSIRO Division of Fisheries, Hobart)

1987 Revision of Water Quality Agreement between Canada and the United States assigns responsibility (under Annex 6) for studying the ballast water issue and possible solutions to the US and Canadian Coast Guards

1988 Publication of paper on ballast water as a mechanism of introduction of exotic species in Australia by Williams et al. (1988).

1988 (May) Great Lakes Fishery Commission meeting in Toledo, Ohio, considers issue and questions of ballast water release in the Great Lakes

1988 (June) **"Recommendation No. 1"** of the International Council for the Exploration of the Sea's "Working Group on Introductions and Transfers of Marine Organisms" formulated and sent to ICES for consideration at Plenary Session in October 1988

1988 (Sept) Canada and U.S. raise the issue of Great Lakes introductions via ballast water at the London meeting of the Marine Environment Protection Committee of the UN's International Maritime Organization (IMO).

1989 March Congressmen Davis and Hertel introduce a House of Representatives bill "to direct the Secretary of Transportation to report on methods available to control the influx of exotic species into the Great Lakes"

1989 [continued]

May Canadian Coast Guard Voluntary Guidelines on ballast water exchange go into effect in Great Lakes (compliance begins in April)

Aug Mandatory guidelines on ballast water exchange go into effect in Australia; suspended soon thereafter

Aug **"Resolution 89-10"** passed by Pacific Fisheries Legislative Task Force, "Introduced Organisms from Ballast Water", urging US Coast Guard to prohibit non-exchanged ballast water release

Sept American Fisheries Society's Introduced Fishes Section passes Resolution at Annual Meeting (Alaska) on control of ballast water discharges

Oct New York Congressman Nowak introduces House of Representatives Bill 3403 "to require that vessels exchange their ballast water entering the Great Lakes" [legislation pending, February 1990]

Oct Ballast Water Monitoring Workshop, sponsored by the Great Lakes Fishery Commission, at St. Catherines, Ontario

Dec House of Representatives bill 2459 passes, calling for US Coast Guard to produce report on ballast water management strategies by June 1990 (Bill authored by Michigan Congressmen Robert Davis and Dennis Hertel)

1990

Jan Senator F.F.Zharoff submits "Senate Joint Resolution No.59" to State of Alaska legislature "Relating to the discharge of ballast water by vessels entering the waters of Alaska" (and the organisms therein)

Feb Voluntary guidelines on ballast water exchange go into effect in Australia (February 1)

Feb Ballast Water Monitoring Workshop II, sponsored by the Great Lakes Fishery Commisson, at Toronto, Ontario (8-9 February)

Feb Exotic Species and the Shipping Industry Workshop, sponsored by the International Joint Commission and the Great Lakes Fishery Commission, at Toronto, Ontario (28 Feb, 1-2 March)

JAN 5 1989

STATE OF CALIFORNIA—RESOURCES AGENCY

GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF FISH AND GAME

1416 NINTH STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-3531

1-4-89

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 those 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.

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/aee

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

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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 identifed 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

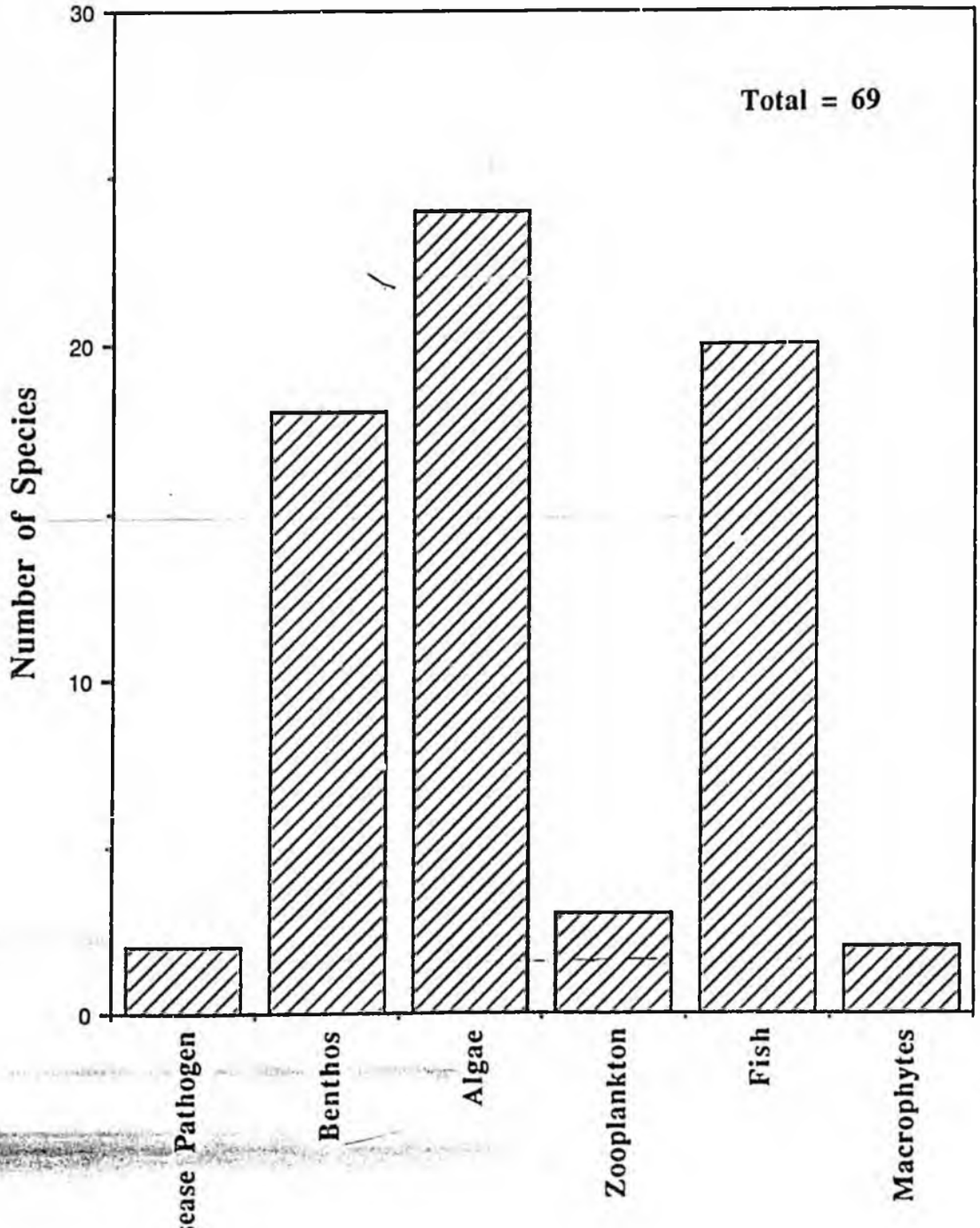
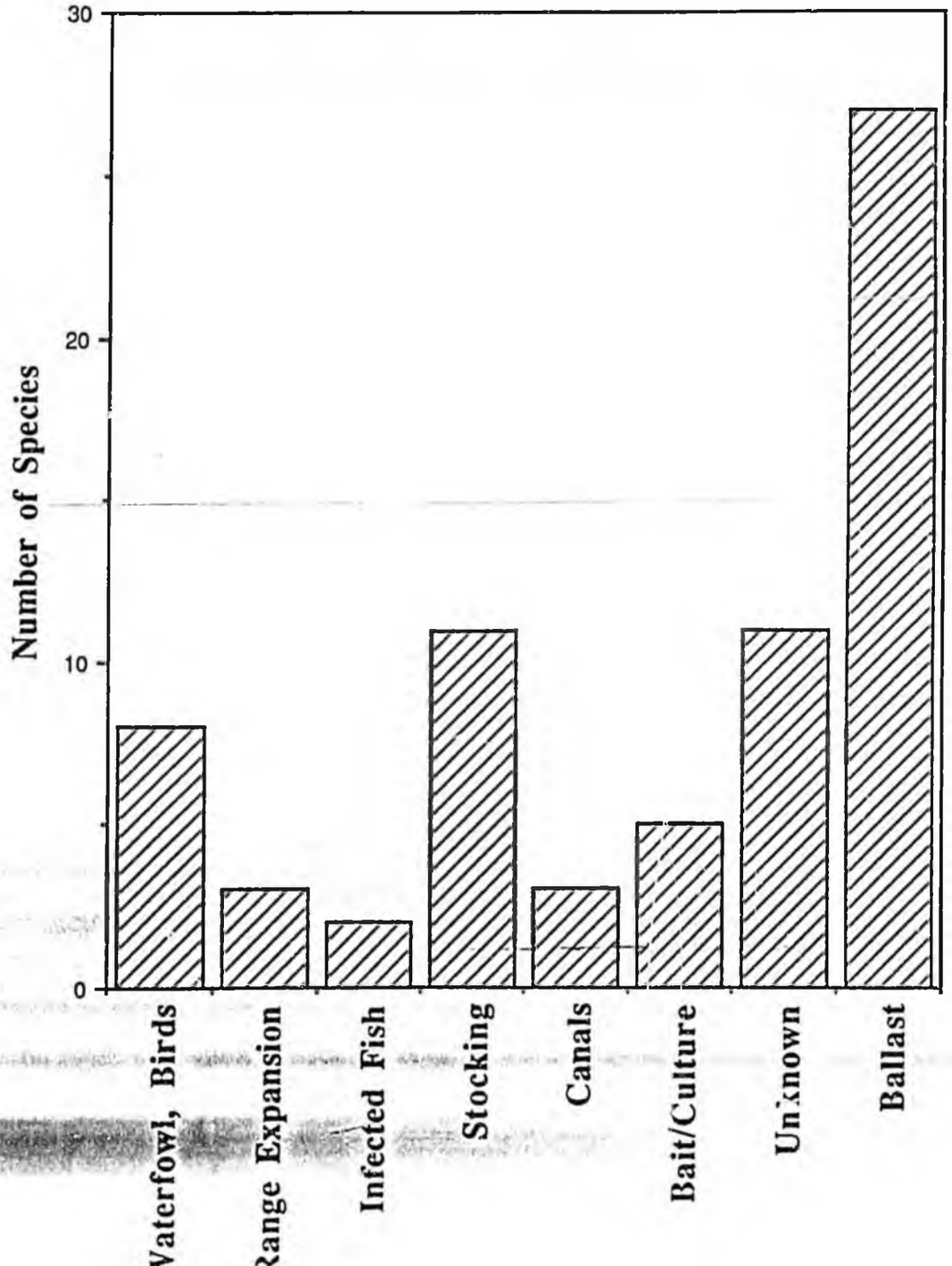
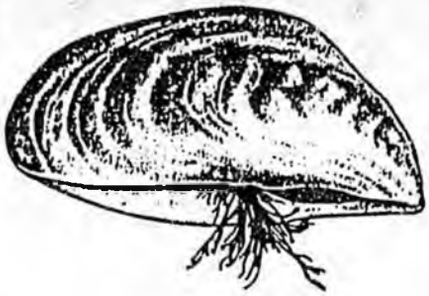


Figure 2. Entry Vectors of Exotic Species Introduced Into the Great Lakes Since the Late 1800s.





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 immigrates 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, interfer 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

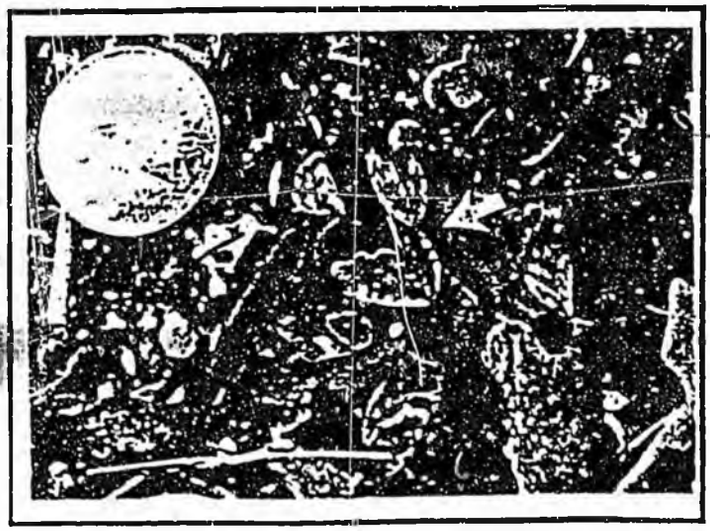


Figure 1: Zebra Mussel

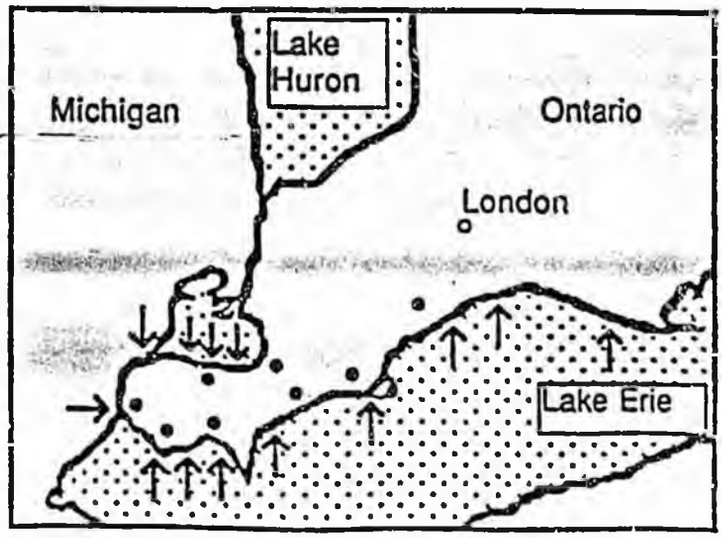


Figure 2: Occurrence of Zebra Mussels along the shoreline and in Water Treatment Plants.

'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 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-effected 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-effected 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.

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

Out here,