

Cultured Fish as Pollutants



Salmon cages. (MAIC photo)



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Broad Questions

- Are/should aquaculture escapes be treated as Clean Water Act “pollutants”?
- What are the biological, legal, philosophical and policy implications of such a notion?

Introduction

- CWA Objective: “To restore and maintain the chemical, physical, and *biological integrity* of the Nation’s waters.” Section 101(a)
 - Fish introduction potentially more problematic than introduction of conventional pollutants
 - Fish move across water systems, oceans, and swim upstream
 - In comparison, most pollutants are passive and their spread can be more or less accurately modeled and predicted.
 - Introduction of a non-native stock, strain or species has to be one of the most radical alterations of the biological integrity of a water ecosystem

Some Potential Impacts of Escapes

- Genetic contamination of the wild genome
- Disease and parasite transmission
- Competition w/wild fish for food & favorable space
- Predation on wild fish

Net Pen Culture

- Two percent of all facilities are net pens
 - But 12% of facilities without NPDES permits
- Approx. 50% of all facilities are private commercial, 50% government
- 78 percent grow trout or salmon

EPA Effluent Guidelines, Data Availability, 68 FR 75068 (12/29/2003)

Atlantic Salmon (*Salmo Salar*) Mariculture

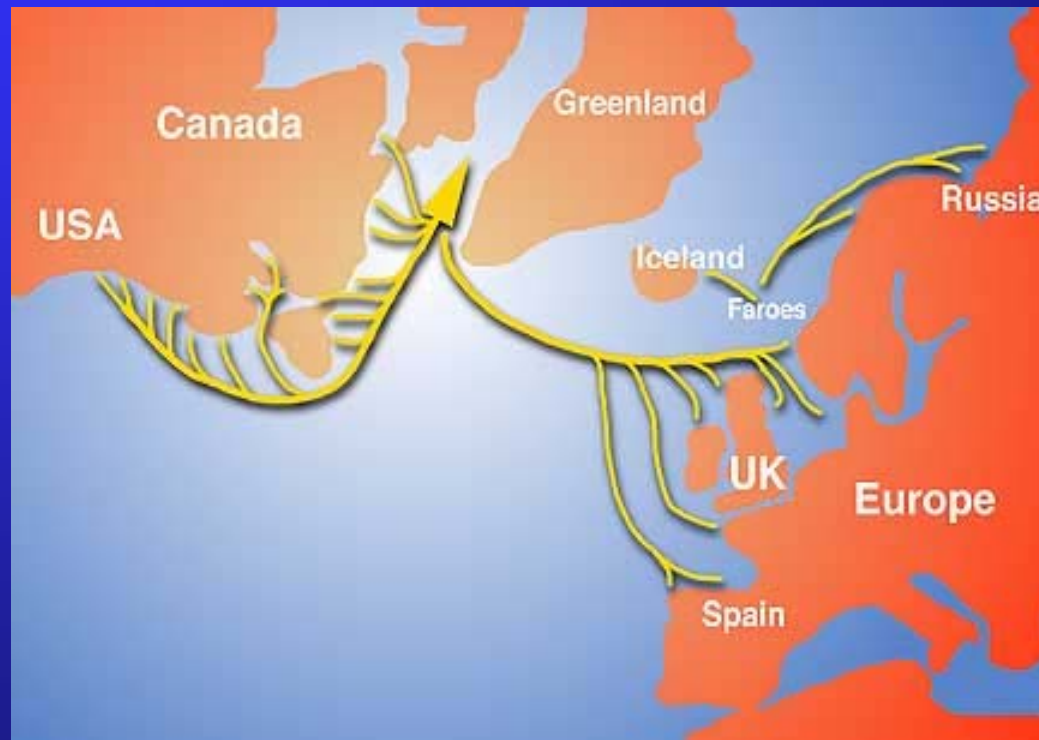
- Worldwide
 - Increased in value nearly 1,600 percent from 1984 to 1999 in Marine and Brackish waters
 - From \$150 million to almost \$ 2.5 billion
- US
 - Increased 595 percent by weight from 1989-99
- Maine
 - Annual revenues of nearly \$18 million
 - Nearly 700 jobs in two counties

Atlantic Salmon

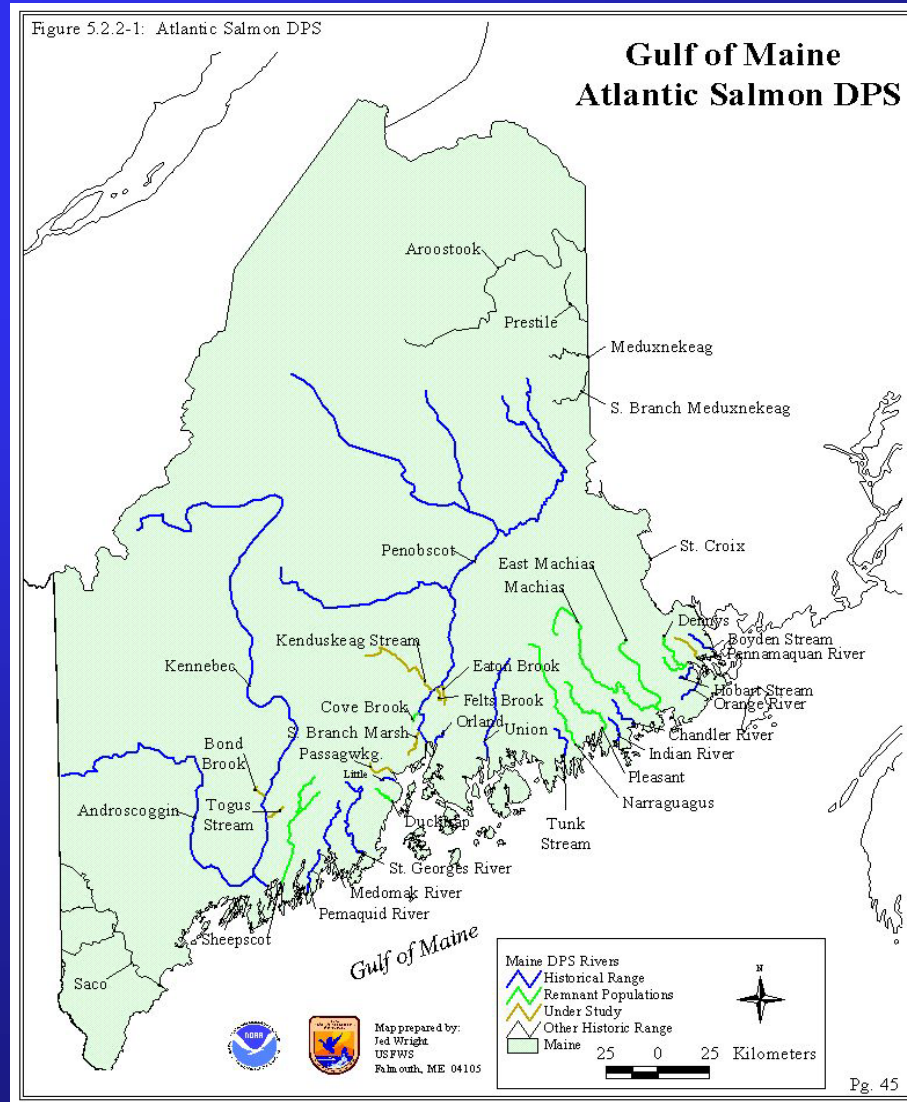
Net Pen Mariculture in Maine

- Off the Maine coast in state waters
- Appealing milieu to consider questions
 - Use of non-native stocks
 - Judicial developments
 - Documented escapes
 - 90,000 between 1994-98
 - 113,000 in two incidents in late 2000
 - Endangered native/wild populations

Native Range of Wild Atlantic Salmon Populations



Atlantic Salmon Federation,
www.asf.ca/Overall/atlsalm.html



<http://library.fws.gov/salmon/dps.gov>

Related Contexts

- Fish Stocking
 - A large number of federal and state fish hatcheries have Clean Water Act discharge (NPDES) permits
 - Those permits do not authorize the unintentional or intentional release of fish into US waters
- Ballast Water/Introduced Species
 - Northwest Environmental Advocates v. EPA
 - “Clearly introduce biological materials from outside sources, as demonstrated in the introduction of the zebra mussel”

Recent Judicial, Scientific and Regulatory Developments

What is a CWA “Pollutant”?

“dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.”

33 U.S.C. §1362(6)

USPIRG Cases

(District of Maine, Feb. 20, 2002)

- “Conventional” pollutants are regulated under CWA
 - Feces
 - Uneaten feed, pigments and antibiotics
 - Pesticide (to kill sea lice)
 - Copper (net anti-foulant)
- AS mariculture escapees regulated under the CWA
 - Focus on origin - Non-native stocks
 - Court did not mention possible genetic contamination of the wild genome
 - Blunt fins—due to stress associated with crowded pens
 - Deformities—due to physical injuries or unbalanced nutrition

National Academies (Spring 2002)

- Genetic makeup of farmed fish differ from that of Gulf of Maine DPS
 - Non-native strains
 - Breeder selection
 - Inadvertent selection due to novel environment

USPIRG Cases (2)

- Heritage Settlement
 - Forego non-North American stocks and transgenic salmonids
 - Limit stocking densities
 - Fallow salmon farms
 - Undertake measures to prevent escapes
 - Pay \$750,000

Marine Environmental Consortium v. Washington Dept. of Ecology (2000)

- Facts
 - Two escape farmed Atlantic Salmon incidents
 - 105,000 in 1996
 - 369,000 in 1997
 - 12 Atlantic Salmon smolts in Tsitika River
 - May be spawning, but no evidence that it is self-sustaining
- State Court
 - Not a “nuisance” and does not render waters “harmful” within meaning of state law.
 - But remanded to agency to take into account Tsitika River finds when it considers and reissues permits.

APHETI v. Taylor Resources

299 F.3d 1007 (9th Cir. 2002)

- Facts
 - Two mussel-harvesting facilities in Puget Sound
 - Mussel species present in Sound for at least 25 years
 - By-product of metabolism includes feces, ammonium, inorganic phosphate and mussel shells
- Court:
 - Policy Considerations
 - Mussels filter excess nutrients
 - Prioritization of finite regulatory/enforcement resources
 - Term “biological materials” is ambiguous

APHETI

299 F.3d 1007 (9th Cir. 2002)

- “Biological materials” (and hence CWA “pollutants”) are limited to waste products of some human or industrial process
- Mussel shells, feces and other byproducts are from “natural growth and development of mussels” rather than from a “waste product of a transformative human process”
- Implied term includes the discharge of “live fish, dead fish and fish remains” through a dam turbine.

NOAA Draft Code of Conduct for Mariculture Operations (8/23/2002)

- Guiding Principles
 - Precautionary approach
 - Adaptive management
- Emphasizes imperative of preventing escapes
- Remedial action to address significant escape incidents

FAO Code of Conduct for Responsible Fisheries

- 9.3.1. Efforts should be undertaken to *minimize the harmful effects* of introducing non-native species or genetically altered stocks
- States should, whenever possible, promote steps to *minimize adverse genetic, disease and other effects of escaped* farmed fish on wild stocks.

EPA Proposed Effluent Guidelines

67 Fed. Reg. 57872 (9/12/2002)

- Persons operating certain net pen systems must use best management practices to minimize the potential unintended escape of non-native species.
 - E.g., installing double netting on net pens
- Mandates non-native escapement plans

Non-native aquatic animal species

- An individual, group, or population of a species:
 - (1) That is introduced into an area or ecosystem outside its historic or native geographic range; **and**
 - (2) That has been determined and identified by the appropriate State or Federal authority to threaten native aquatic biota.

The term excludes species raised for stocking by public agencies [Proposed 40 CFR 451.2(k)]

Costs of Proposed Measures

- EPA subsequently confirmed its assumption that “No costs would be incurred in ...net pen facilities as a result of the proposed action.”

Effluent Guidelines, Data Availability, 68 FR 75068 (12/29/2003)

EPA Final Effluent Guidelines

69 Fed. Reg. 51891, 51913 (8/23/2004)

- EPA received comments arguing against escape controls:
 - “Other authorities are already dealing with non-native species”
 - “Complexities of determining what is a non-native species and when such species may become invasive.”
- “Today’s regulation does not include any requirements specifically addressing the release of non-native species.”
- Facilities are, however “required to conduct routine inspections and perform repairs to ensure proper functioning of the structures.”

Management Implications

1. Atlantic salmon hatchery operations that support mariculture should relocate to rivers outside of the Gulf of Maine DPS
 - Will not be biologically imprinted with the same biological markers as endangered wild populations
2. In the short-term, Atlantic salmon mariculture facilities should move further offshore into federal waters to minimize potential ecological harm and water-use conflicts

Management Implications (2)

3. In the long-term, offshore Cage Aquaculture should be phased out unless bio-security can be ensured
4. Congress should consider passing separate legislation regulating the intentional and unintentional introduction of fish to US waters, including addressing bio-security and escape response planning.

Management Implications (3)

5. Focus should not be solely be on mariculture as a savior but rather much attention should be directed toward improving fisheries management and water quality to the point where native fish that historically were dominant are once again abundant

USPRIG v. Atlantic Salmon of Maine, LLC

- Feb. 2003 - Order preventing introduction of new fish
- April 2003 - ASM stocks 100,000 smolt in net pens
- May 2003 - held in contempt
 - 257 F.Supp 2nd 407; 273 F.Supp 2nd 126

USPRIG v. Atlantic Salmon of Maine (2)

- Maine General Permit June 2003
 - Allows non-native salmon until July 31, 2004
 - Thereafter only native salmon, unless:
 - the permit holder proves that native stock is not available in sufficient quantities to match the farm's prior stocking level based on historical data
 - USPIRG v. Bd. of Env'tl. Prot., Docket No. AP-03-43
- August 2003, 339 F.3d 23 (1st Cir.), affirmed
 - “Companies do not challenge the ultimate finding that non-native species are a pollutant and can be banned.”