Implications of Aquaculture for Wild Fisheries: The Case of Alaska Wild Salmon

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My Objectives in this Presentation

1. To emphasize the growing significance of aquaculture
2. To point out the wide range of potential effects of aquaculture on wild fisheries
3. To describe the effects of salmon farming on the Alaska wild salmon industry
4. To stimulate thinking by fisheries economists about the implications of aquaculture for wild fisheries

Conclusions . . .

- Aquaculture is growing rapidly--in volume, value and significance for world seafood production.
- Aquaculture raises many important and interesting issues for fisheries economists, even those concerned mainly with wild fisheries.
- Aquaculture has significant and wide-ranging potential implications for wild fisheries.
- Competition from aquaculture can have dramatic effects on markets for wild fisheries.
- The most important competitive advantage of aquaculture is that it is market driven. Wild fisheries produce what nature provides. Farmers produce what markets want.

Conclusions (continued)

- Tomorrow's aquaculture won't necessarily look like today's. Large-scale aquaculture production of new species can emerge within a short period of time.
- No wild fishery market—especially for higher valued species—should be taken for granted.
- Competition between aquaculture and wild fisheries will become a significant international trade issue.
- Competition from aquaculture may become a driving force in changing the management of wild fisheries.
- Anyone interested in wild fisheries needs to pay close attention to what is happening in aquaculture.

1. The Growing Significance of Aquaculture

Aquaculture accounts for a significant and growing share of world seafood production.

World Aquaculture and Capture Fisheries Production, as Reported by FAO (millions of metric tons)

	1990	2000	% Change
Countries other than China			
Aquaculture	8.9	13.3	49%
Capture	81.0	80.6	0%
Total	89.9	93.9	
Aquaculture share	10%	14%	
China			
Aquaculture	8.0	32.4	308%
Capture	6.7	17.2	156%
Total	14.7	49.6	
Aquaculture share	54%	65%	

Source: FAO, Fishstat+ Database, 2002.

There is some uncertainty over the reliability of Chinese data for aquaculture and capture production.

Aquaculture is a very important industry in many countries.

The World's Largest Aquaculture Producers in 2000

	Country	Aquaculture production in 2000 (thous. mt)	Aquaculture share of total production	Aquaculture % increase 1990-2000
Countries other than China	India	2,095	36%	107%
	Japan	1,292	20%	-6%
	Philippines	1,044	36%	56%
	Indonesia	994	19%	66%
	Thailand	707	19%	142%
	South Korea	698	28%	-12%
	Bangladesh	657	40%	241%
	Viet Nam	526	27%	224%
	Norway	488	14%	224%
	North Korea	468	70%	-48%
	USA	428	8%	36%
	Chile	425	9%	503%
	New Zealand	86	13%	199%
	Others	3,364	7%	45%
	TOTAL	13,271	14%	49%
China		32,444	65%	308%

Source: FAO, Fishstat+ Database, 2002.

The mix of aquaculture species differs from that of capture species.
There is no overlap between the top aquaculture and capture species.
Aquaculture production is concentrated in a smaller number of species.

Largest Aquaculture and Capture Species by Volume, Countries Other than China, 2000

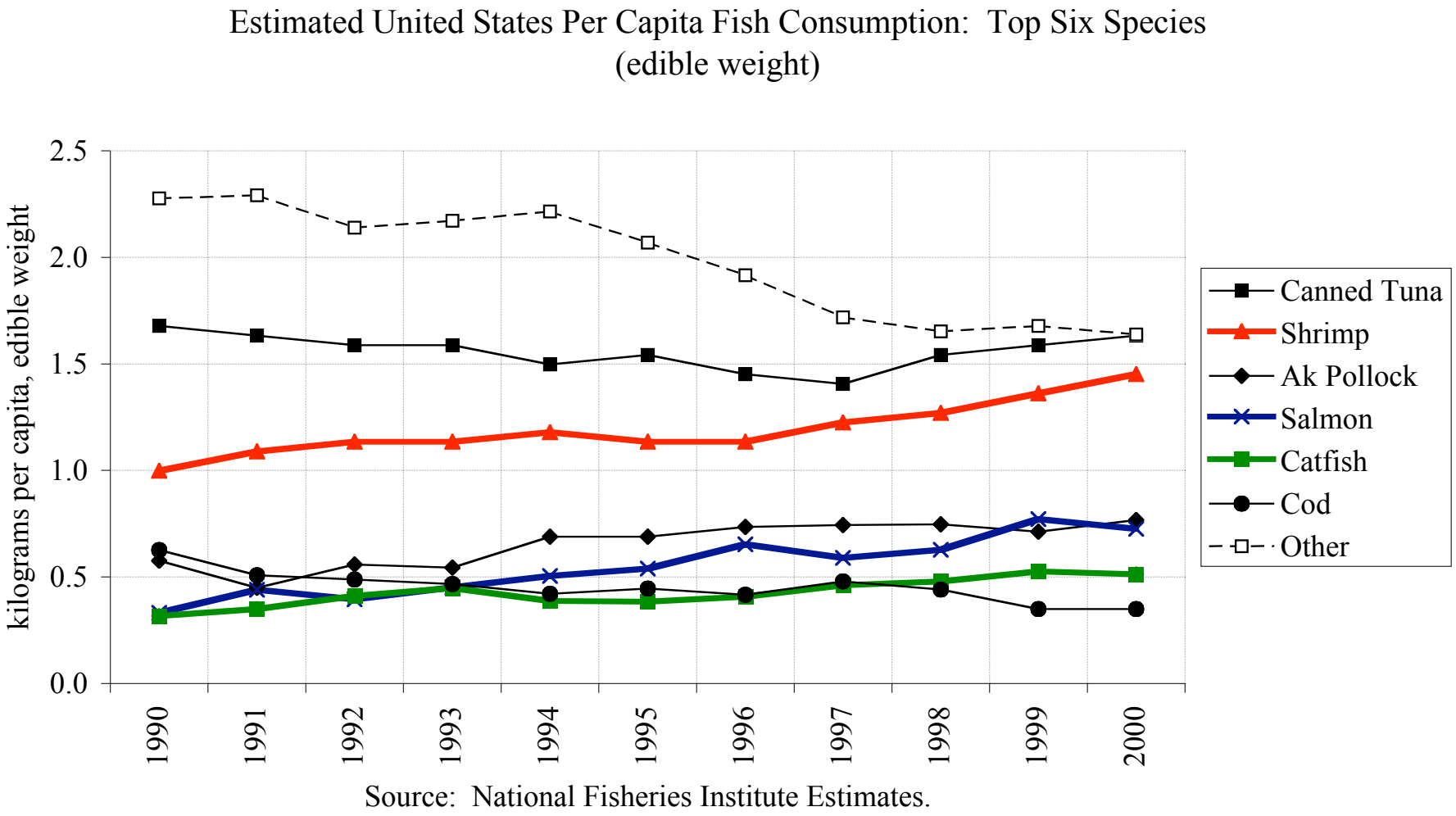
Aquaculture				Capture Fisheries			
Species	Metric tons (000)	% of total	Cumul. %	Capture Fisheries	Metric tons (000)	% of total	Cumul. %
Atlantic salmon	884	6.7%	6.7%	Anchoveta	11,276	14.0%	14.0%
Roho labeo	795	6.0%	12.6%	Alaska pollock	2,870	3.6%	17.6%
Catla	653	4.9%	17.6%	Atlantic herring	2,370	2.9%	20.5%
Pacific cupped oyster	652	4.9%	22.5%	Skipjack tuna	1,889	2.3%	22.8%
Eucheuma cottonii	605	4.6%	27.0%	Chilean jack mackerel	1,540	1.9%	24.8%
Common carp	599	4.5%	31.6%	Capelin	1,456	1.8%	26.6%
Mrigal carp	573	4.3%	35.9%	Blue whiting	1,420	1.8%	28.3%
Giant tiger prawn	571	4.3%	40.2%	Chub mackerel	1,105	1.4%	29.7%
Laver	529	4.0%	44.2%	Yellowfin tuna	990	1.2%	30.9%
Milkfish	462	3.5%	47.6%	Atlantic cod	945	1.2%	32.1%
Blue mussel	459	3.5%	51.1%	European pilchard	943	1.2%	33.3%
Rainbow trout	448	3.4%	54.5%	Argentine shortfin squid	836	1.0%	34.3%
Japanese kelp	428	3.2%	57.7%	Araucanian herring	723	0.9%	35.2%
Nile tilapia	416	3.1%	60.8%	Spectacled caiman	712	0.9%	36.1%
Wakame	311	2.3%	63.2%	Atlantic mackerel	674	0.8%	36.9%
Grass carp	285	2.1%	65.3%	European sprat	660	0.8%	37.7%
Channel catfish	269	2.0%	67.4%	European anchovy	605	0.8%	38.5%
Others	4,332	32.6%	100.0%	Others	49,574	61.5%	100.0%
TOTAL	13,271	100.0%	100.0%	TOTAL	80,588	100.0%	100.0%

Source: FAO, Fishstat+ Database, 2002.

Selected indicators of the significance of aquaculture (Anderson 2002)

- In Norway, the landed volume of farmed Atlantic salmon exceeds its traditional Atlantic cod harvest.
- In the United States, the volume of catfish production in 1999 was exceeded only by Alaska pollock, Gulf menhaden and salmon.
- Based on landed value, farmed salmon is the number one species harvested in British Columbia.
- The most valuable fish harvested in Thailand is farmed shrimp.
- The fastest growing U.S. seafood imports are farmed Atlantic salmon, farmed mussels, and farmed tilapia.

Farmed shrimp, salmon and catfish are among the largest and fastest growing components of U.S. seafood consumption.

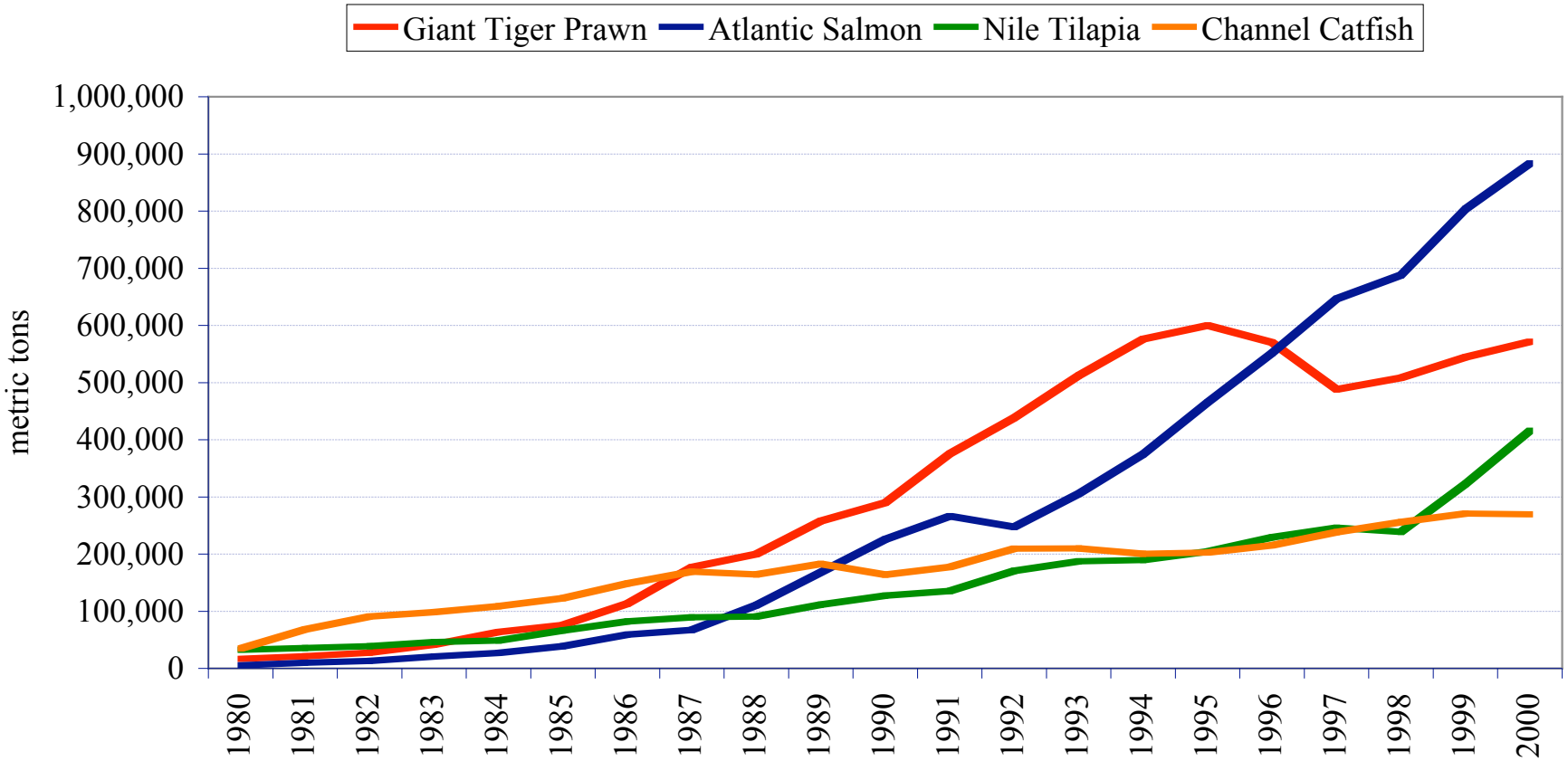


The future of aquaculture

- Driven by economics
  - Seafood prices
  - Farming sites
  - Input prices (in particular feed)
- Driven by politics
  - Subsidies
  - Regulation
- Driven by technological change
  - Technological innovation is occurring at a very rapid rate
  - Just because farming of a species isn't profitable now doesn't mean it won't be in the future
  - Once technological hurdles are overcome, production of new species can expand at a very rapid rate
  - Tomorrow's aquaculture species may not be the same as those of today.

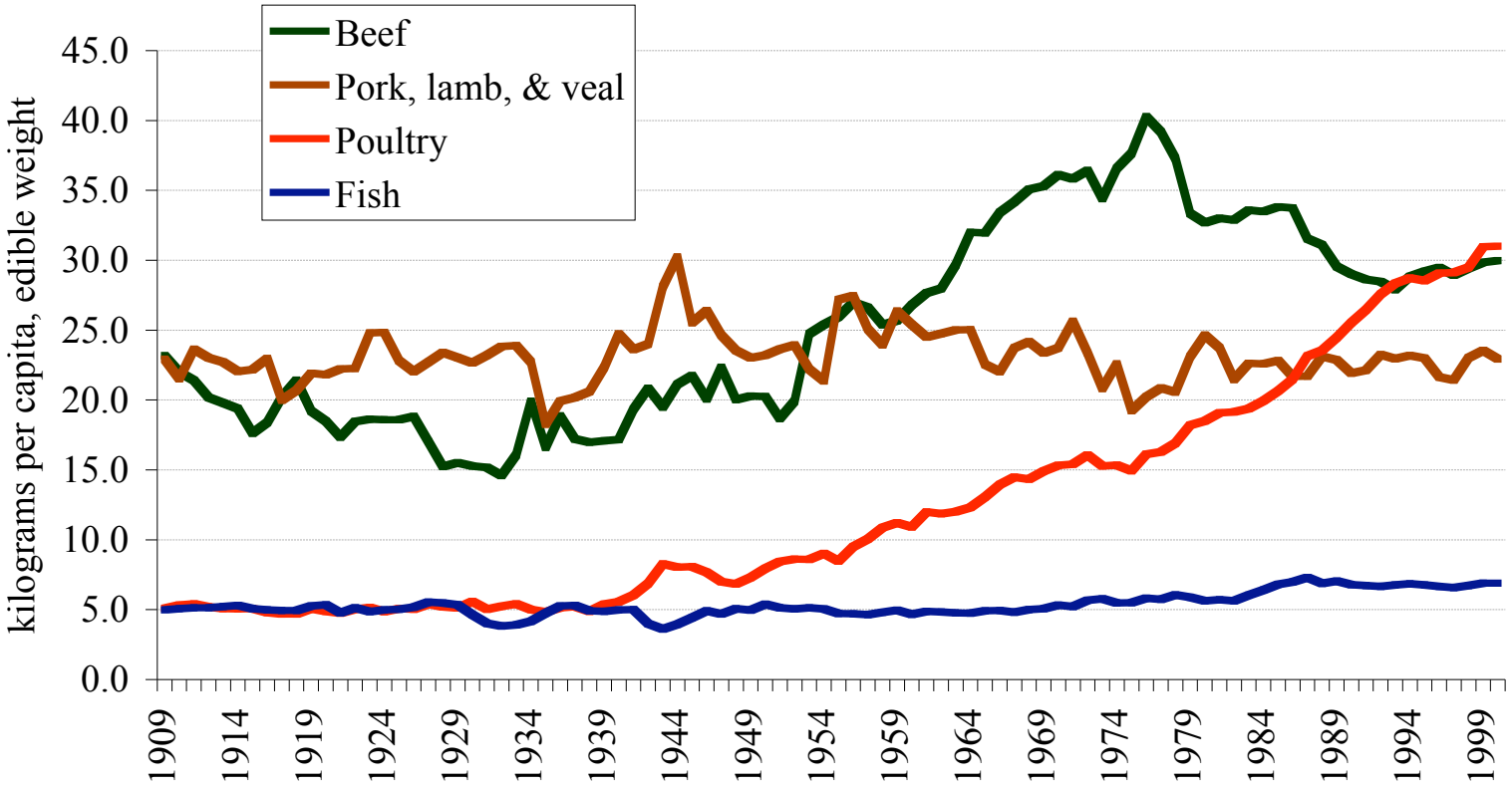
Aquaculture production of some species has grown very rapidly. The ability to increase production in response to market demand is a fundamental difference between aquaculture and wild fisheries.

Aquaculture Production of Selected Species in Countries Other Than China



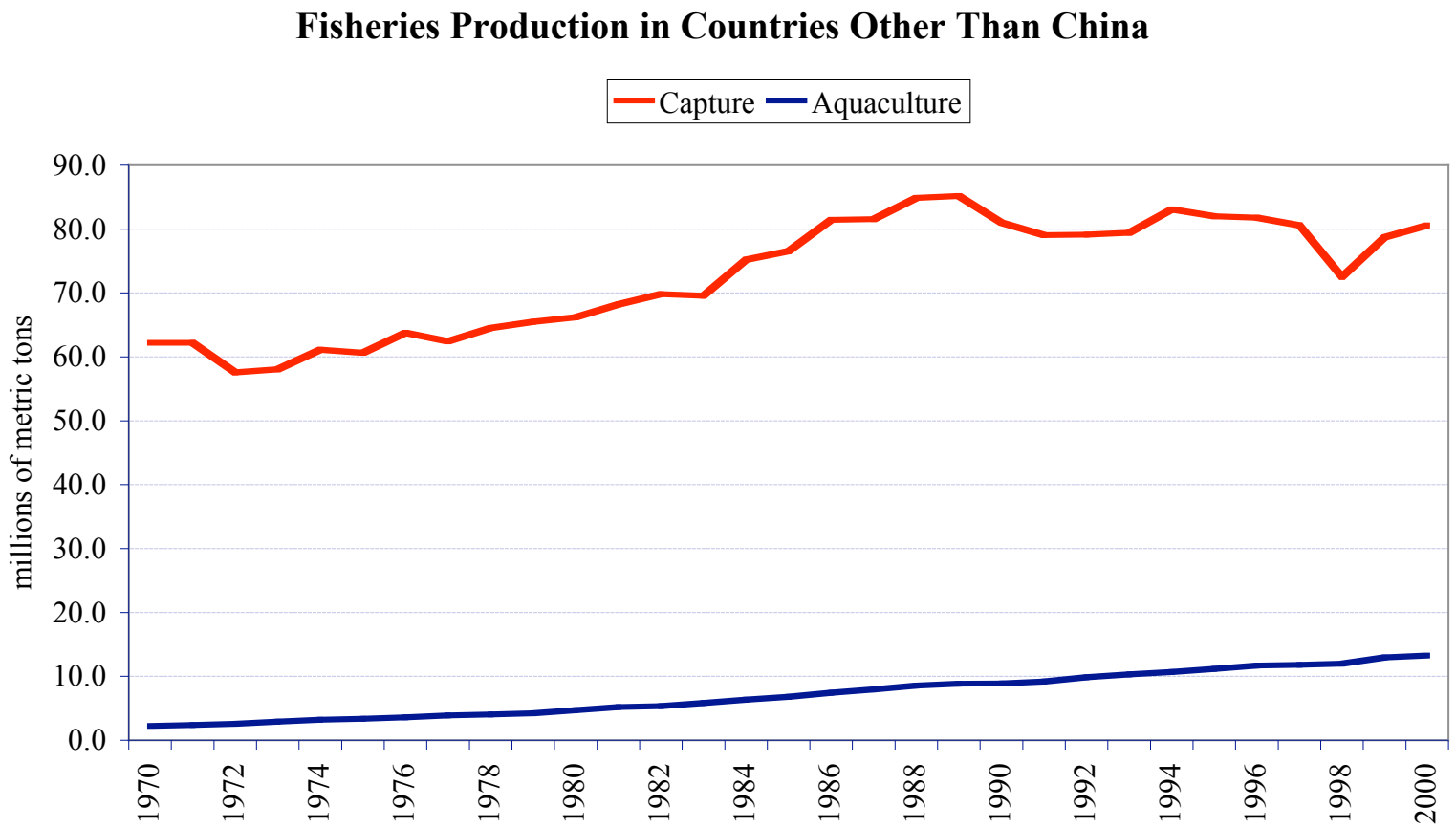
This historical experience of poultry may be a better indicator of the potential for aquaculture than that of wild-caught fish.

U.S. Per Capita Consumption of Meat, Poultry and Fish
(edible weight)



Source: USDA Economic Research Service.

The future of the two lines in this graph are not independent of each other. We need to think about the implications of aquaculture for wild fisheries.



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2. Potential Effects of Aquaculture on Wild Fisheries

The Not-So-Clear Difference Between "Aquaculture" and "Wild Fisheries"

- Most of us talk about "aquaculture" and "wild fisheries" as if there were a clear distinction between the two.
- Jim Anderson (2002) argues that the distinction is not so clear:
  - "The naïve perspective of the traditional open-access fisheries is that there is essentially no control, and that with aquaculture there is nearly complete control. In most of the real world, this is not the case. . . There is a continuum between fishing and aquaculture, defined basically by the degree of control. This degree of control, at its core, is largely defined by the strength of property rights."

Anderson's "Aquaculture, Ranching, Fishery" Index
(1 = no control, 5 = full control)

	Salmon: Alaska Wild	Salmon: Alaska Coop, Hatchery-Based	Chum Salmon: Coop Hatchery Based-Japan	Salmon: Cage System, Chile
Depend on wild broodstock/juveniles	1.00	1.70	2.00	5.00
Depend on wild feed	1.00	1.70	2.00	2.50
Control of environment/habitat	1.20	2.20	2.20	4.00
Degree of confinement	1.00	2.90	3.10	4.20
Harvest and market management	1.50	2.00	3.50	5.00
Aquaculture Ranching Fishery Index	**1.14**	**2.30**	**2.56**	**4.14**

Defining “aquaculture” is neither easy nor unimportant.

- “Aquaculture: The farming of aquatic organisms in marine, brackish or fresh water. Farming implies private or corporate ownership of the organism and enhancement of production by stocking, feeding, providing protection from predators, or other management measures.” (NMFS, 2001).

“Always wild, never farmed”

(Newly adopted marketing slogan of the Alaska Seafood Marketing Institute)

Hatchery share of Alaska “wild” salmon:

All Alaska salmon: 19%
Alaska chum salmon: 50%+

We may rephrase the question:

"What are the implications of aquaculture for wild fisheries?"

as

"What are the implications of fish production involving greater control and more rights for fish production involving less control and fewer rights?"

Rephrasing the question in this way hints at answers.

Understanding the effects of aquaculture on wild fisheries is complicated by the fact that many other factors are are also affecting wild fisheries—and aquaculture--in important ways.

- Global Climate Change
- Local Environmental Change
- Globalization
- Technological Change
- Economic Change
- Political Change

Potential Effects of Aquaculture on Wild Fisheries: A Simple Typology

	Type of Effect	Mechanism
Direct Effects	Environmental effects	Aquaculture causes changes in the environment which affect wild fishery resources
	Fish-as-feed effects	Aquaculture increases demand for wild fish for use as feed, potentially increasing harvests
	Market effects	Aquaculture affects demand and supply in seafood markets, leading to changes in markets and prices for wild fishery products
Indirect Effects	Political effects	Changing economic conditions resulting from direct effects of aquaculture lead to changes in political support for wild fisheries, which in turn affect subsidies for wild fisheries and allocations between commercial and other uses of fish.
	Management effects	Changing economic and political conditions resulting from direct effects of aquaculture lead to changes in the management of capture fisheries.

Examples of potential "environmental" effects of aquaculture on capture fisheries

Type of effect	Examples
Spatial competition	Aquaculture production physically intrudes on areas used for wild production*
Environmental alteration	Aquaculture alters the environment for wild fisheries, for example by introducing fish feed or waste
Species introduction	Aquaculture introduces new species into the environment which wild resource
Disease transfer	Transfer of diseases
Removal of wild resource	Juveniles for growing out; broodstock

*Topic of IIFET 2002 paper by Porter Hoagland.

Environmental and "fish-as-feed" effects of aquaculture are receiving a lot of attention—and most of the public attention.

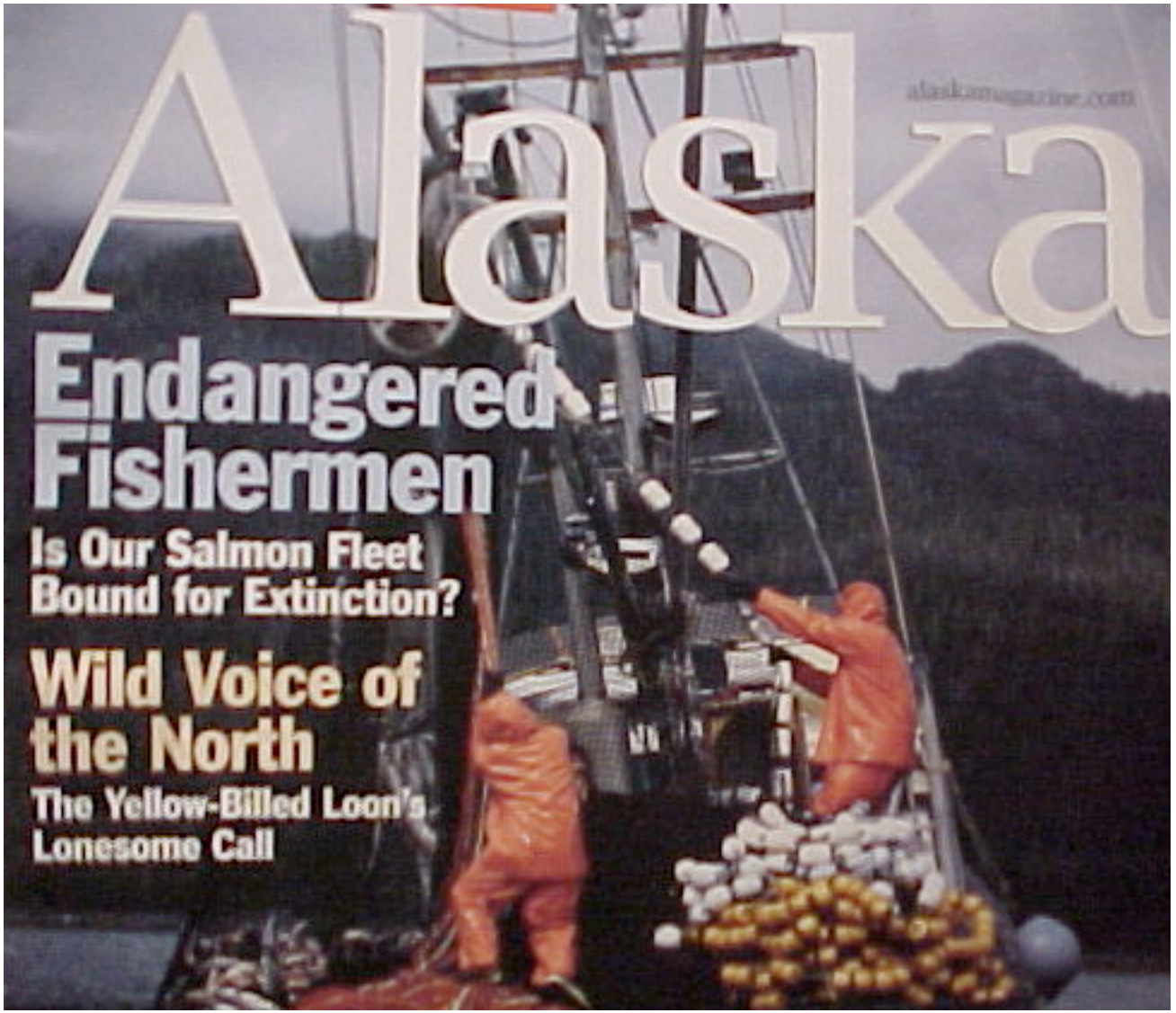
- The issues are important.
- Environmental effects of aquaculture on wild fisheries are only part of the broader environmental issues associated with aquaculture.
- Much of the analysis and debate has been critical of aquaculture, and has argued that aquaculture should be significantly restricted
- Much of the analysis and critique of aquaculture has failed to recognize that
  - Many environmental effects of aquaculture can be reduced
  - Societies can and will regulate aquaculture
  - It is in the interest of the aquaculture industry to reduce environmental effects
  - All food production has environmental effects
  - As fish meal and fish oil prices change, aquaculture will adjust the inputs used in fish feed.

The most significant effects of aquaculture on wild fisheries will be market effects, and their resulting political and management effects.

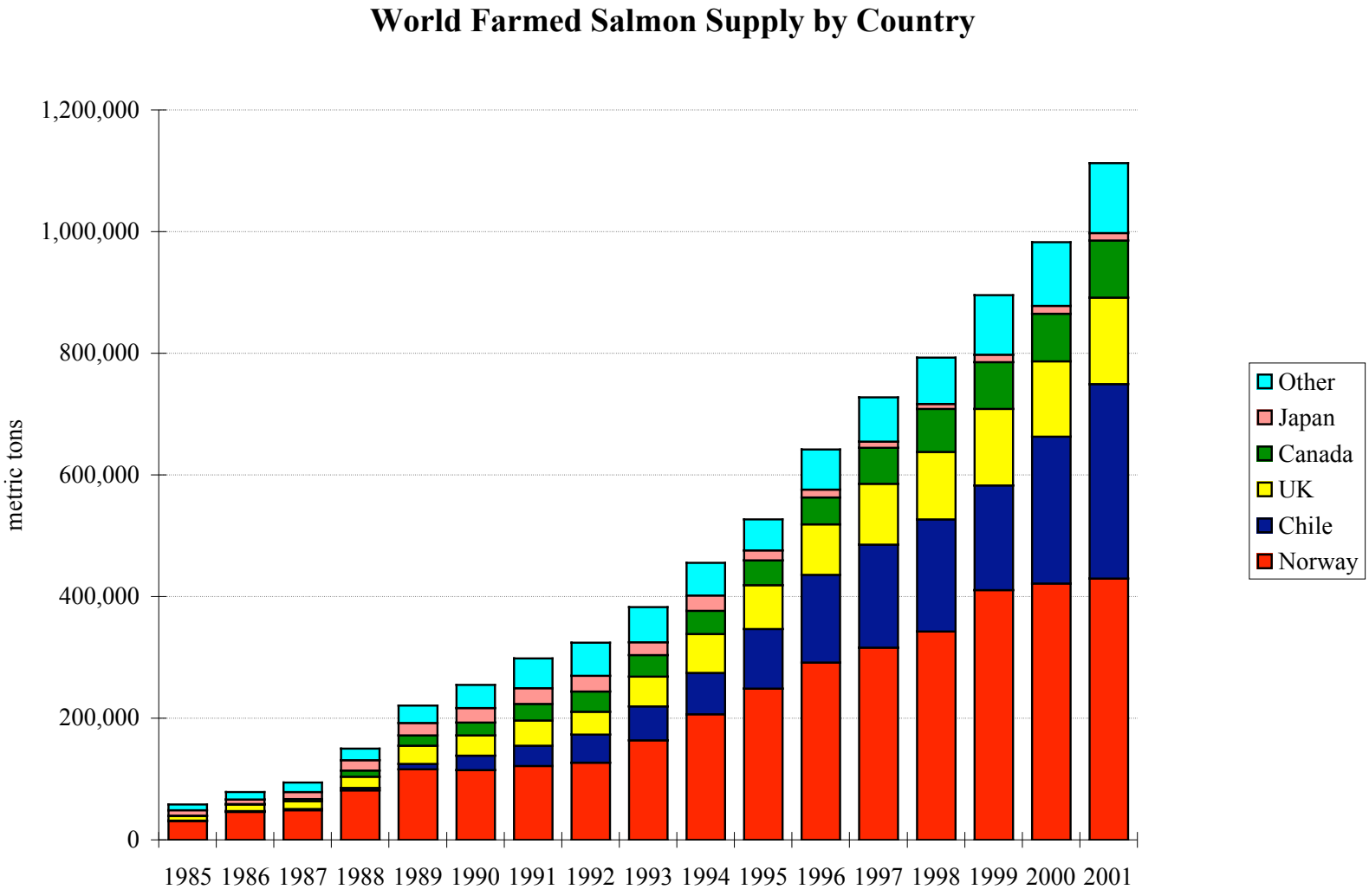
The potential market effects of aquaculture on wild fisheries go far beyond the expansion of total supply of similar products.

- Aquaculture will create new products to meet the demands of the market
- Aquaculture will engage in significant marketing efforts to expand demand
- Aquaculture will expand the opportunities (in space and time) for consumers to purchase fish
- As consumers eat more aquaculture seafood, tastes will change and demand for seafood will increase
- Aquaculture will change the short-term dynamics of markets, and will create price cycles similar to those experiences in meat and poultry markets
- Large scale aquaculture production will affect the distribution and retailing of seafood
- Aquaculture will change the balance of economic and political power in the seafood industry
- Not all of the market effects are necessarily bad for wild fisheries

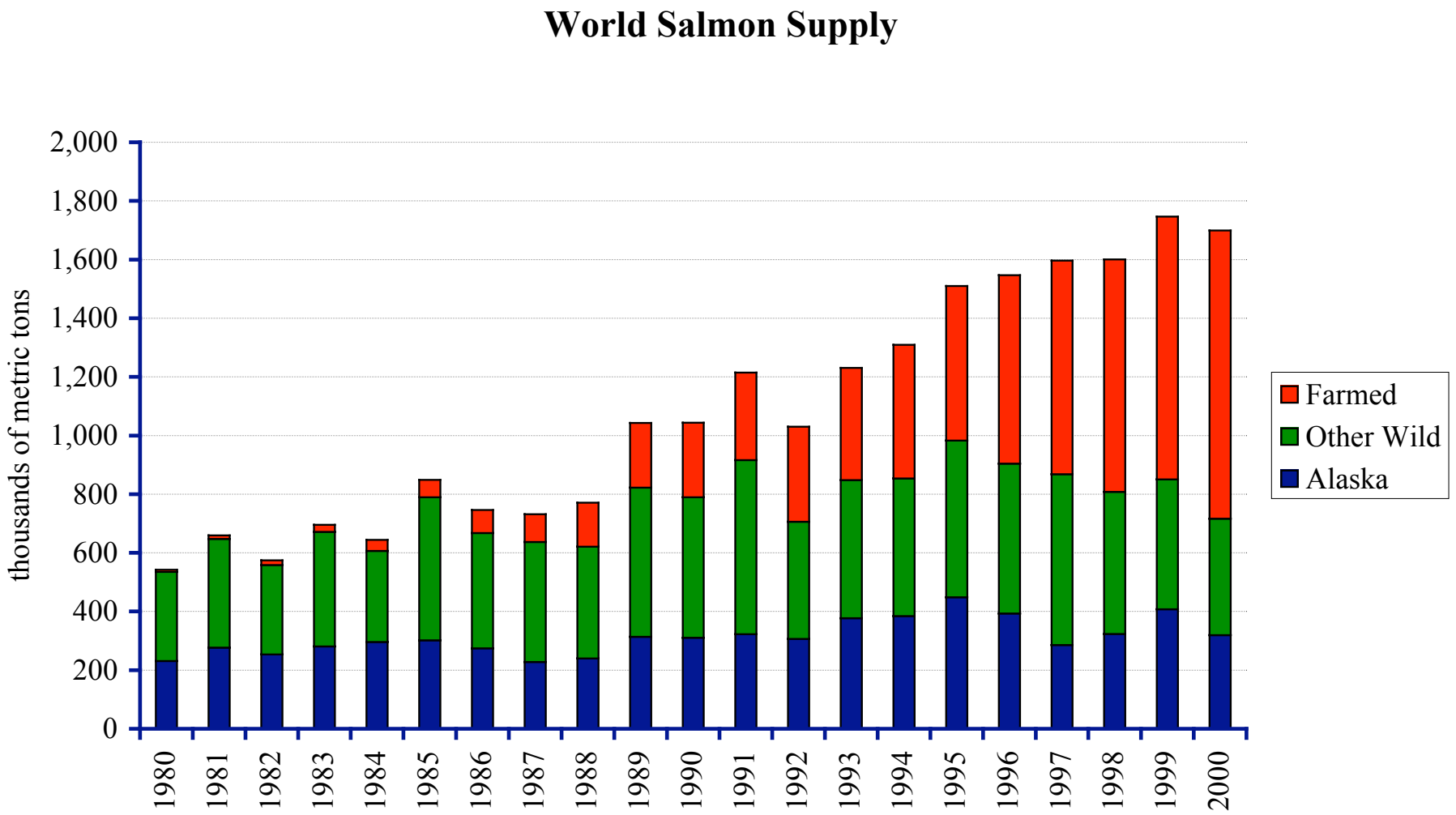
3. Effects of Farmed Salmon on the Alaska Wild Salmon Industry



World farmed salmon production has grown dramatically since the early 1980s. Most farmed salmon is Atlantic salmon (*Salmo salar*).



With the dramatic growth in the supply of farmed salmon, Alaska wild salmon shrank from more than 40% of total world supply in the early 1980's to less than 20% by 2000.

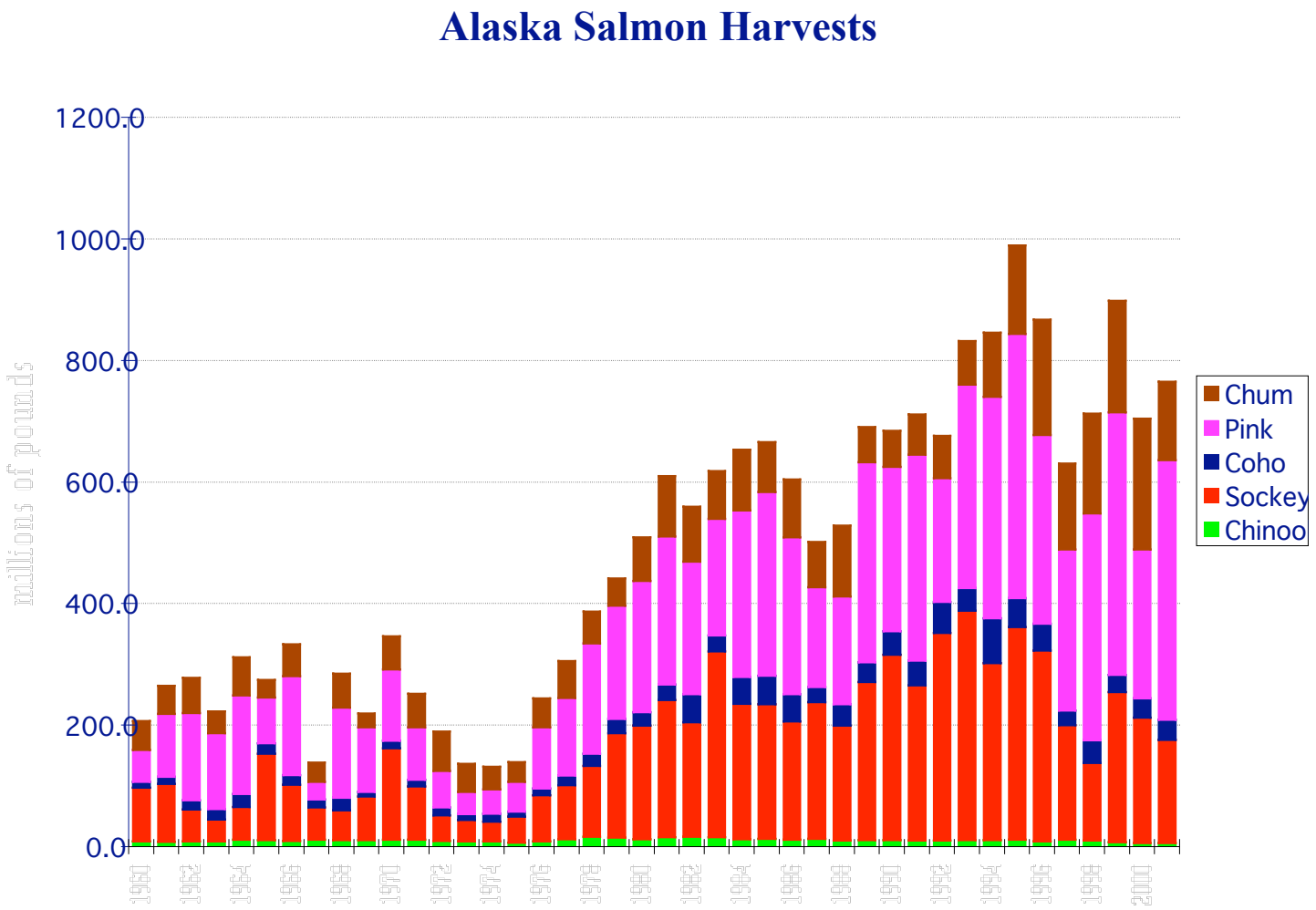


Five different species of Pacific salmon are harvested in Alaska. There are important differences between species in products, end markets and value. This complicates any attempt to describe the "Alaska salmon market."

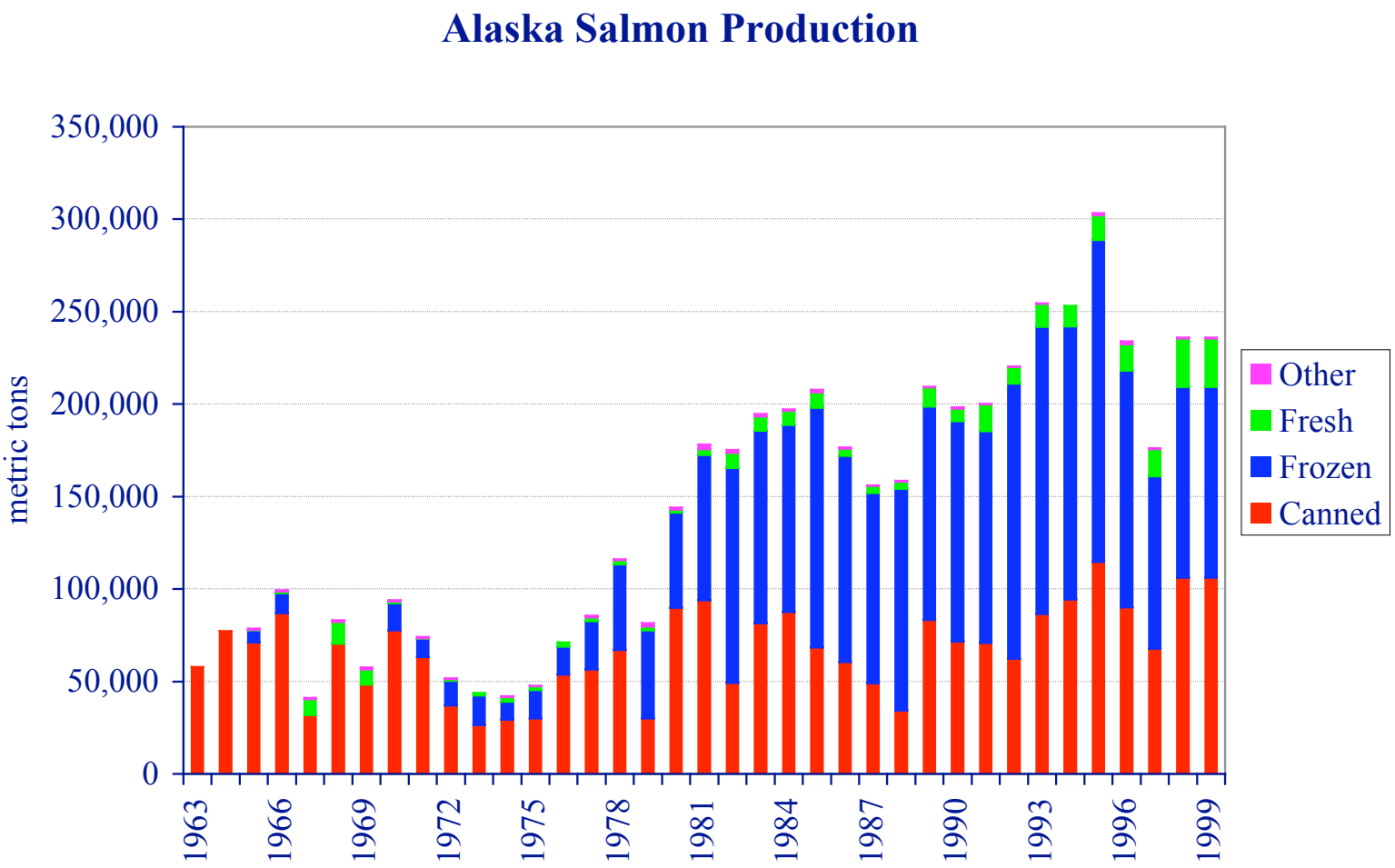
Selected Alaska Salmon Industry Indicators (1991-95 averag

	Species					
	Chinook	Sockeye	Coho	Pink	Chum	TOTAL
Havest volume (000 mt)	5	147	23	152	42	368
Hatchery share of harvest (%)	9%	5%	14%	24%	40%	19%
Ex-vessel price ($1998/lb)	$1.99	$1.09	$0.91	$0.20	$0.37	
Ex-vessel value (millions of $1998)	22	353	46	66	34	520
Wholesale value (millions of $1998)	29	603	84	234	64	1013
Production (% of volume)						
Canned	1%	18%	5%	73%	12%	35%
Frozen	78%	79%	87%	23%	76%	60%
Fresh	20%	3%	7%	4%	12%	5%
Export share of production (%)						
Canned	0%	92%	0%	25%	21%	39%
Frozen and fresh	44%	98%	65%	53%	47%	77%

Alaska wild salmon resources are healthy. Harvests of all species set records in the early 1990s. Sockeye harvests declined in the late 1990s effects. The Marine Stewardship Council has certified Alaska salmon management as "sustainable."



Four major product forms are produced from Alaska salmon: canned salmon, frozen salmon, fresh salmon, and roe. To date, only fresh and frozen salmon faces significant competition from farmed salmon.



Alaska salmon fisheries are managed by limited entry. There are 27 different salmon fisheries which differ widely in value, number of permit holders, average earnings and average permit value.

Overview of Selected Alaska Salmon Fisheries, 2000

Area	Gear	Gross earnings ($millions)	Total permits	Resident permits	Resident share of permits	Share of permits fished	Average earnings per permit fished ($ 000)	Average permit value ($ 000)
Bristol Bay	Drift gill net	65.5	1,896	916	48%	96%	35.9	80.5
Southeast	Purse seine	28.8	416	189	45%	86%	80.8	39.3
PWS	Drift gill net	22.2	541	393	73%	97%	42.3	59.3
PWS	Purse seine	19.2	268	197	74%	49%	147.8	22.0
Chignik	Purse seine	12.3	99	75	76%	100%	124.4	200.0
Cook Inlet	Drift gill net	4.2	577	384	67%	89%	8.3	32.3
Kuskokwim	Gill net	1.2	823	815	99%	76%	1.9	6.5
Lower Yukon	Gill net	0.7	704	694	99%	80%	1.3	12.1
Other 19 fisheries		91.5	6,432	5,193	81%	62%	23.0	
Total		245.7	11,756	8,856	75%	73%	895.8	1103.1

Source: Commercial Fisheries Entry Commission, Basic Information Tables.

Alaska's coastal communities are heavily dependent on salmon fishing and processing for jobs, income and taxes.

Alaska banned all finfish farming in 1990:

"A person may not grow or cultivate finfish in captivity or under positive control for commercial purposes."

Among the reasons for the ban, the legislature cited:

- the state has the healthiest stocks of wild salmon and other wild finfish in the world and benefits from thriving commercial, sport, and subsistence fisheries for these fish and a growing tourism industry related to sport fishing;
- the people, economy, and environment of the state are dependent in large measure upon the continued health of the state's wild finfish resources;
- serious risks are posed by commercial finfish farming, including the spread of disease among wild fish by farmed fish, genetic intermingling of wild fish stocks with genetically manipulated farmed fish, degradation of water quality near finfish farms, and land use conflicts over the siting of commercial finfish farms;

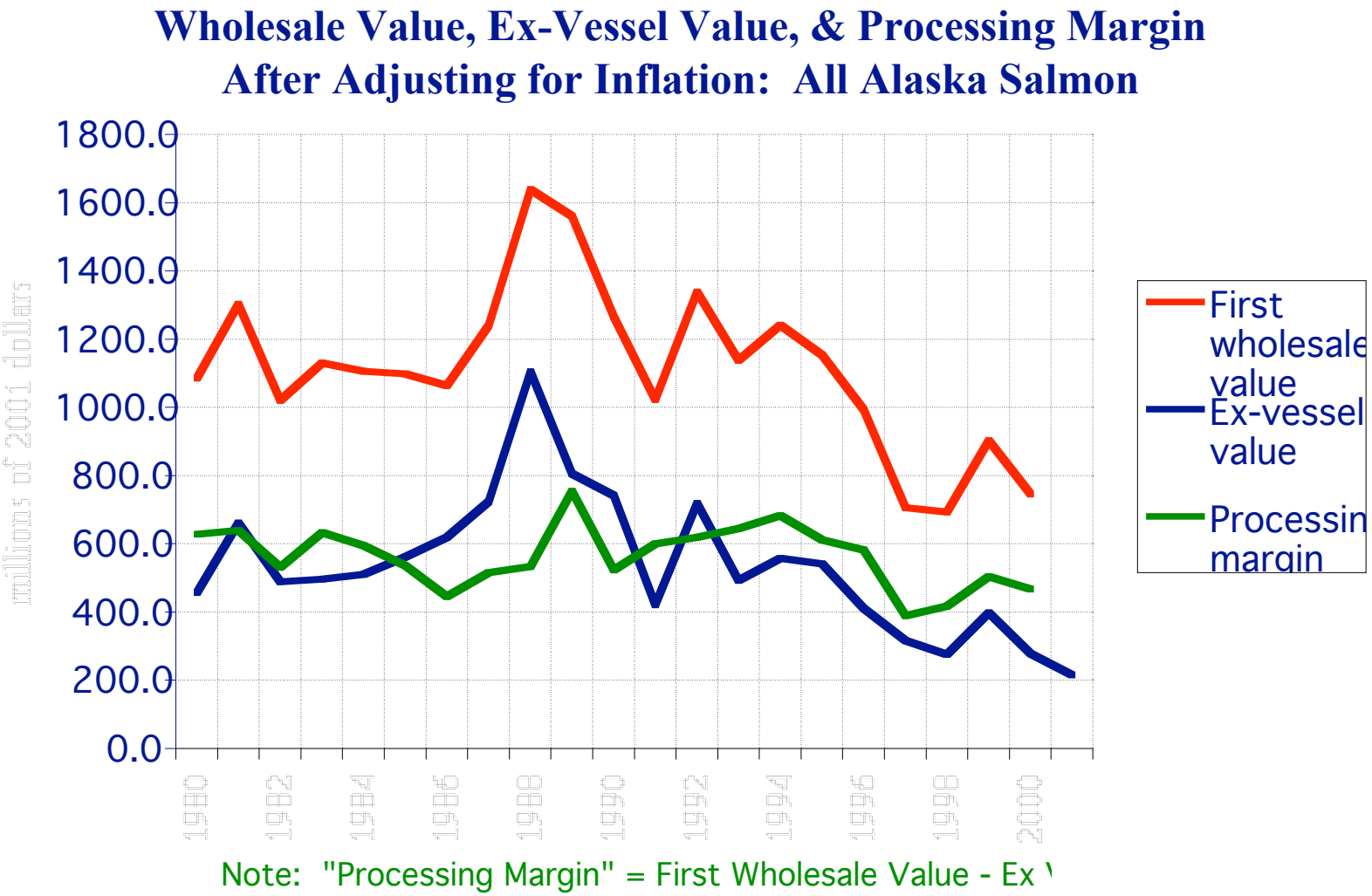
Reasons for the finfish farming ban . . . (cont.)

- the state has invested significantly in marketing efforts to promote Alaskan finfish as wild and natural fish products, and this investment in developing the reputation of Alaskan finfish would be lost by allowing commercially farmed finfish to be produced and marketed from Alaska;
- the cost to the state to regulate the commercial finfish farming industry would be high;
- few jobs would be generated by a commercial finfish farming industry in the state;
- avoiding harm to the state's wild finfish, land, and water resources must take precedence over the development of a new speculative and potentially harmful commercial finfish farming industry.

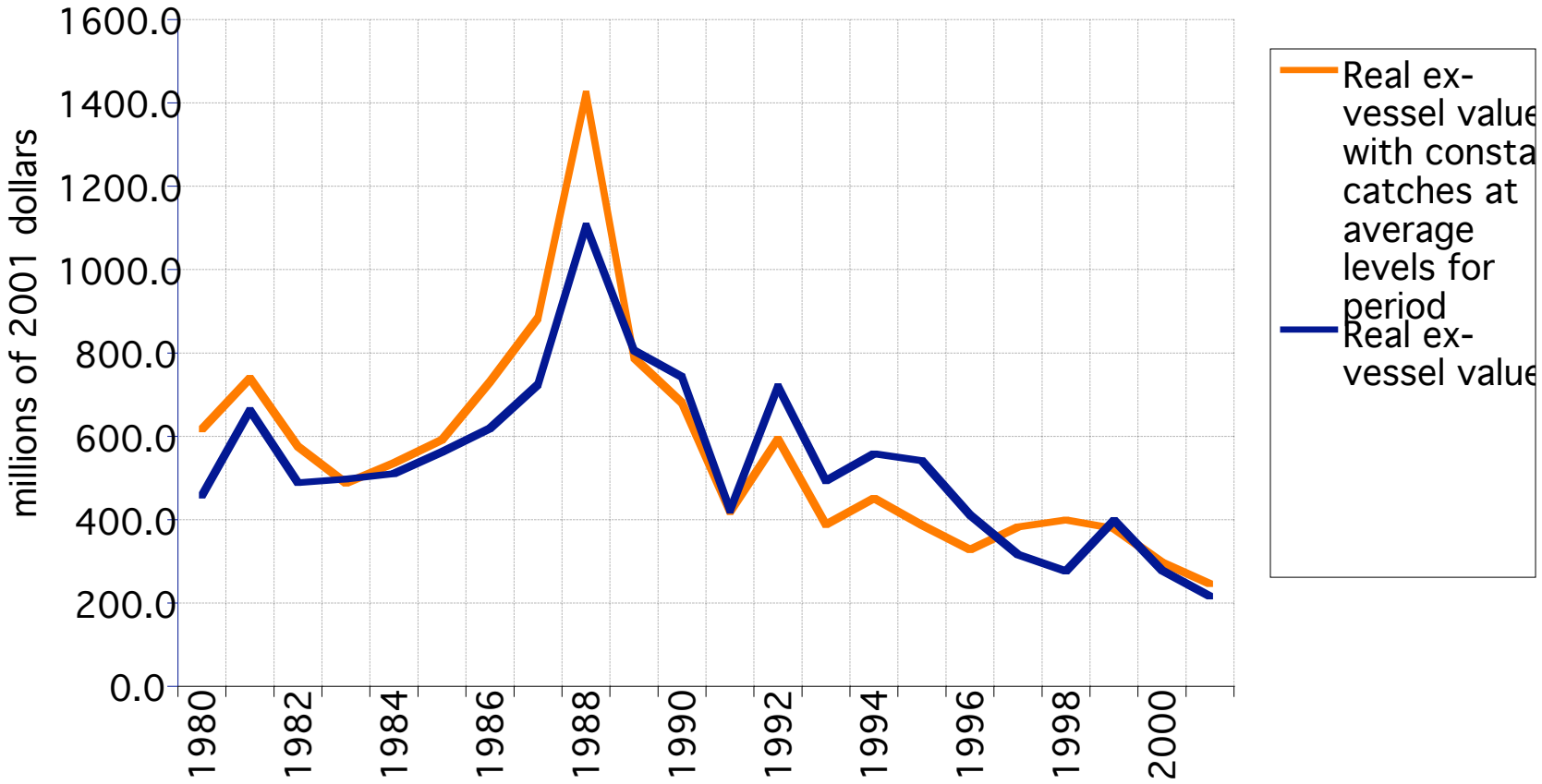
As a result of the salmon farming ban, environmental effects of salmon aquaculture on the Alaska wild salmon industry have been very small to date. However . . .

- Atlantic salmon which have escaped from British Columbia salmon farms are caught in Alaska with increasing frequency—raising significant concern in Alaska (and growing political tension).
- Some critics have alleged that Alaska's salmon hatcheries may be affecting Alaska's wild salmon stocks through:
  - "overgrazing" of limited Pacific Ocean "carrying capacity"
  - Genetic effects of hatchery fish on wild stocks
  - Interceptions of small wild salmon runs in the harvesting of large-scale hatchery returns

There has been a tremendous erosion in the wholesale and ex-vessel value of Alaska salmon since the late 1980s.

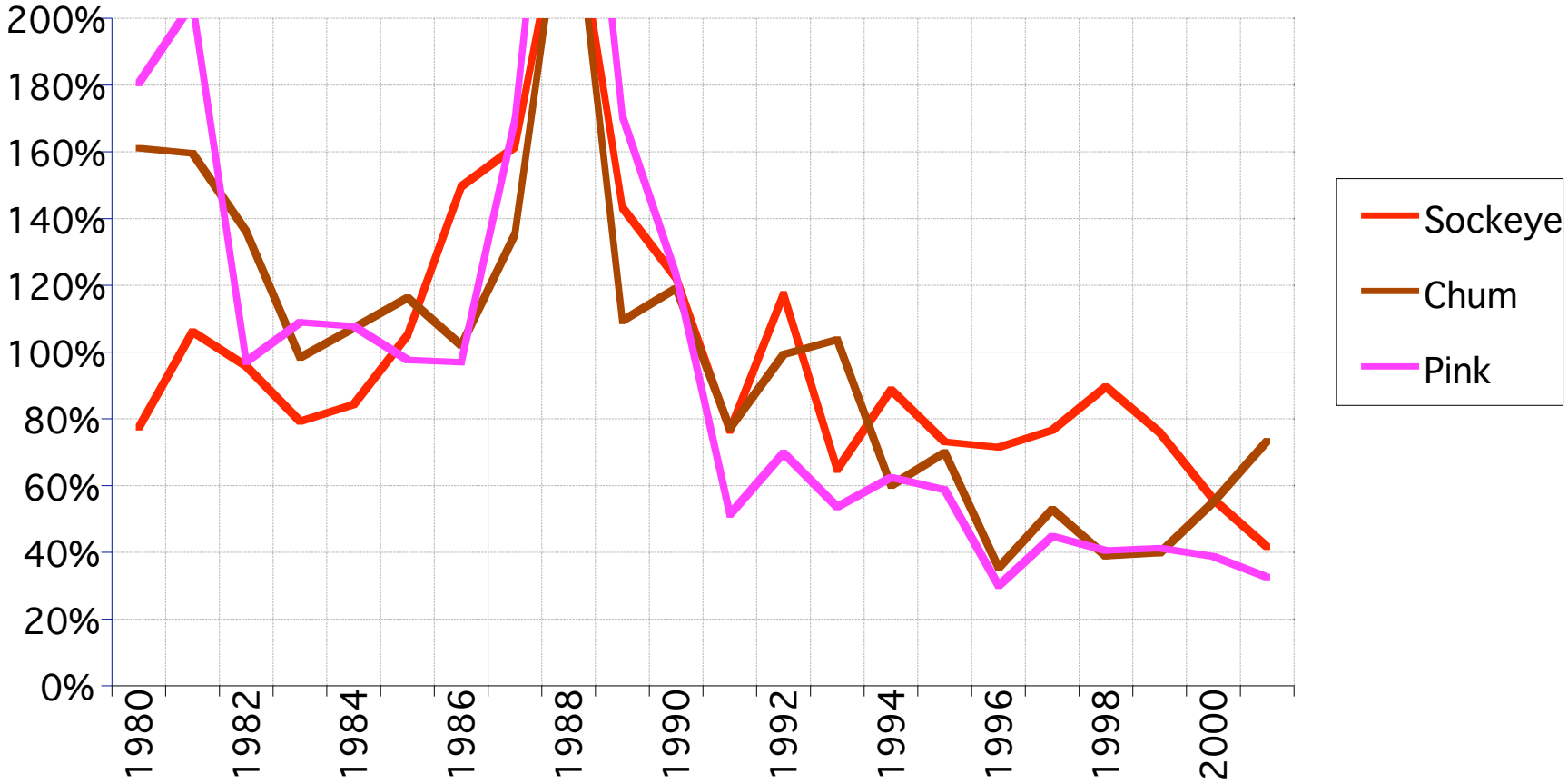


Most of the decline in value of the salmon harvest during the 1990s is attributable to lower prices.



Real ex-vessel prices have fallen by more than half since 1990 for most Alaska salmon species.

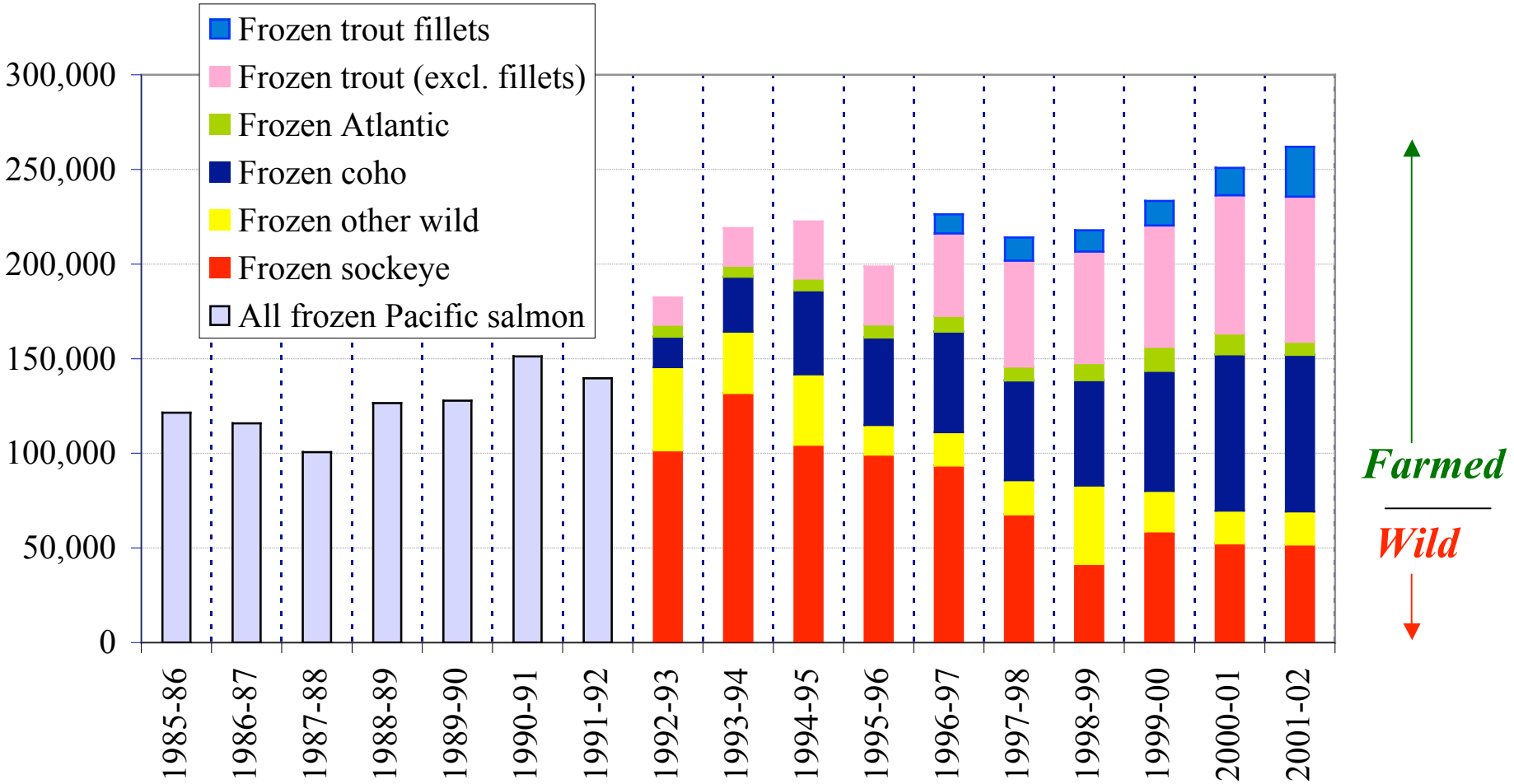
Real Ex-Vessel Prices as % of Average for 1980-2001



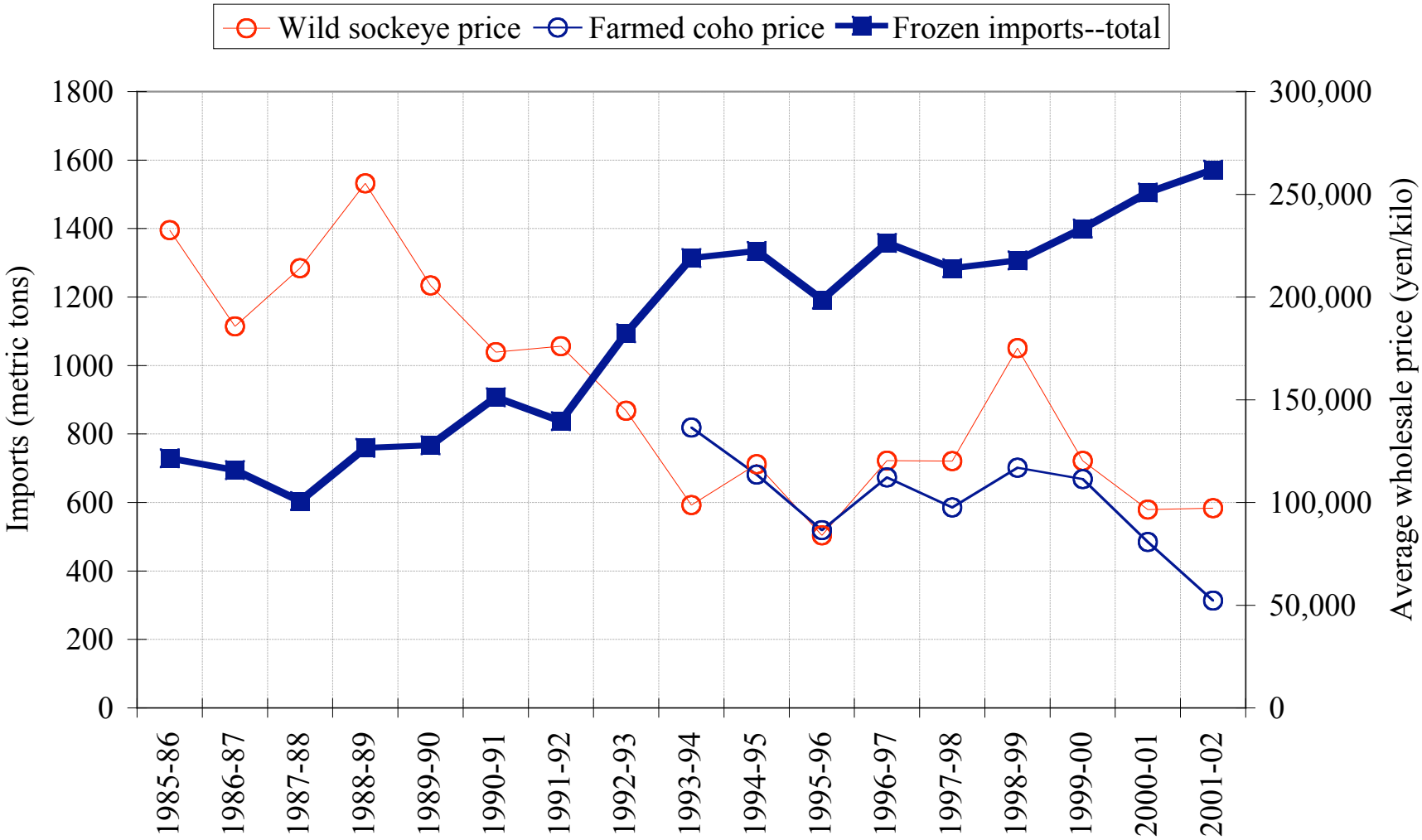
Most Alaskans blamed farmed salmon for the drop in prices. But the extent to which the decline in value of the Alaska salmon fishery was caused by farmed salmon is not obvious.

- Numerous other factors have clearly played a role:
  - Decline in Alaska sockeye salmon runs
  - Stagnant or declining demand for canned salmon
  - Economic recession in Japan
  - Increasing concentration and vertical integration in food distribution and retailing
- Rapid structural change and the short time period hinder the availability of econometric modeling to "explain" the fall in prices.
- It is nevertheless clear that competition from farmed salmon has played a very significant role in changing markets and reducing prices.

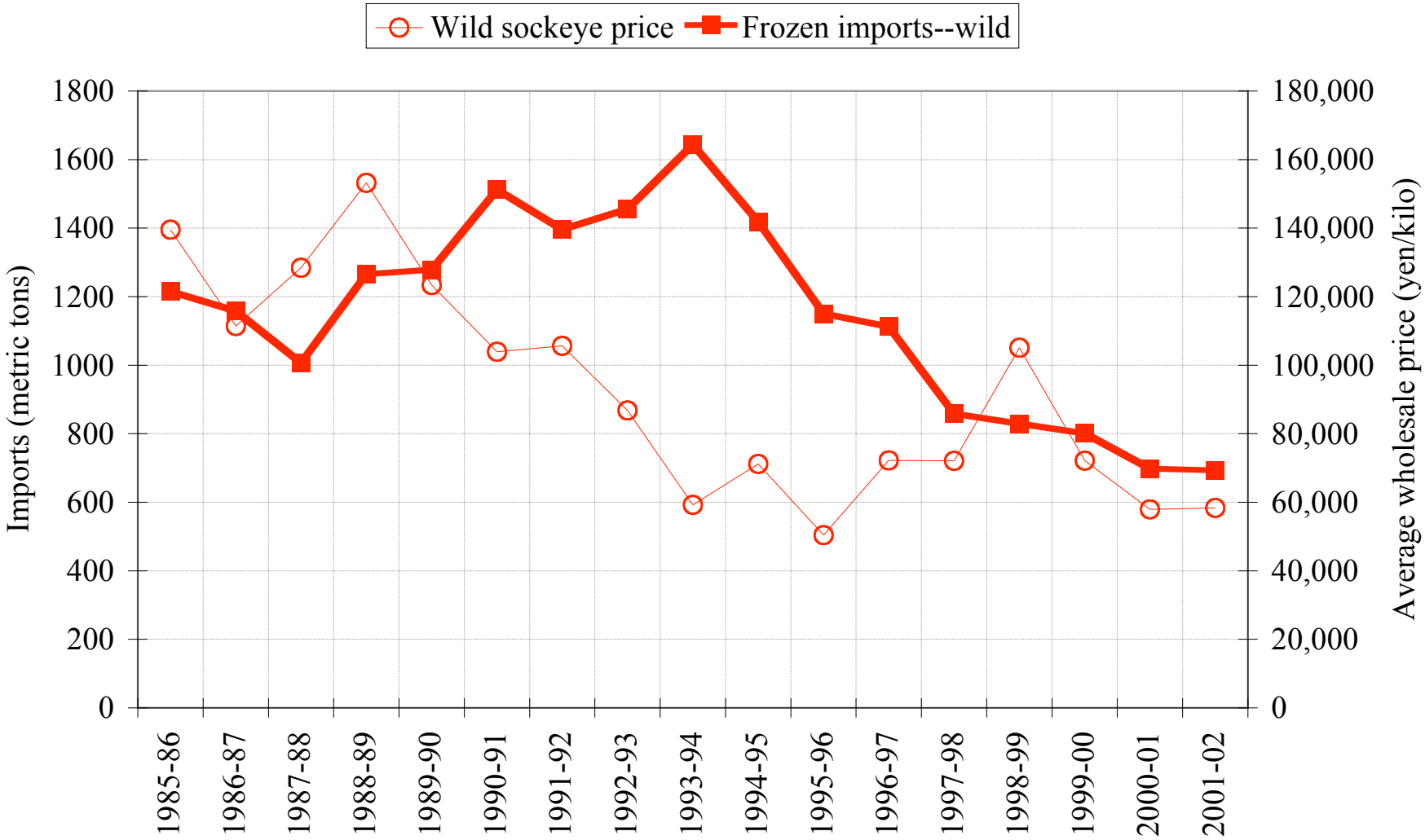
Wild salmon—mostly Alaska sockeye--dominated Japanese frozen salmon imports during the 1980s. During the 1990s imports of wild salmon declined while farmed salmon imports grew rapidly.



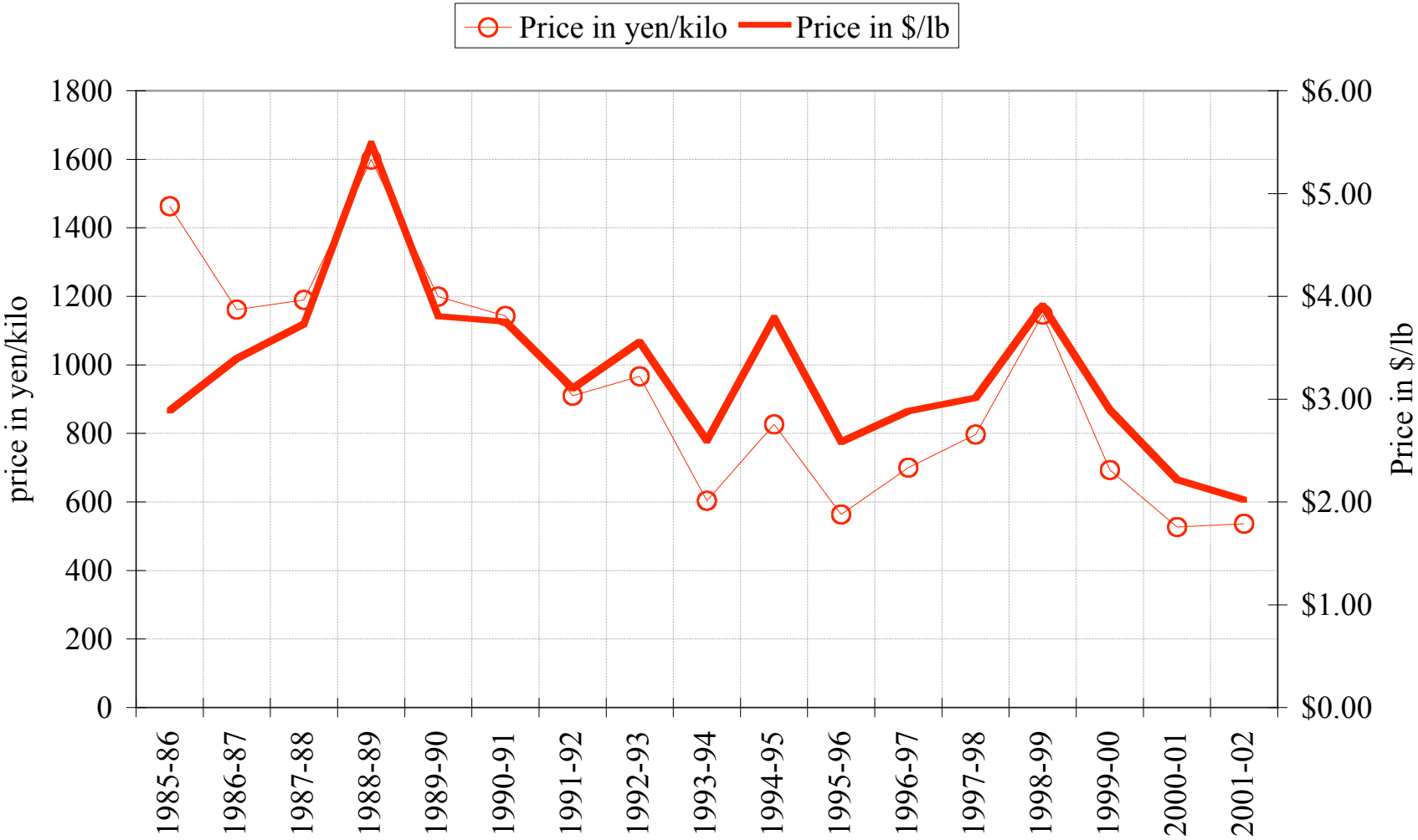
As total frozen salmon and trout imports grew, average Japanese wholesale prices declined dramatically.



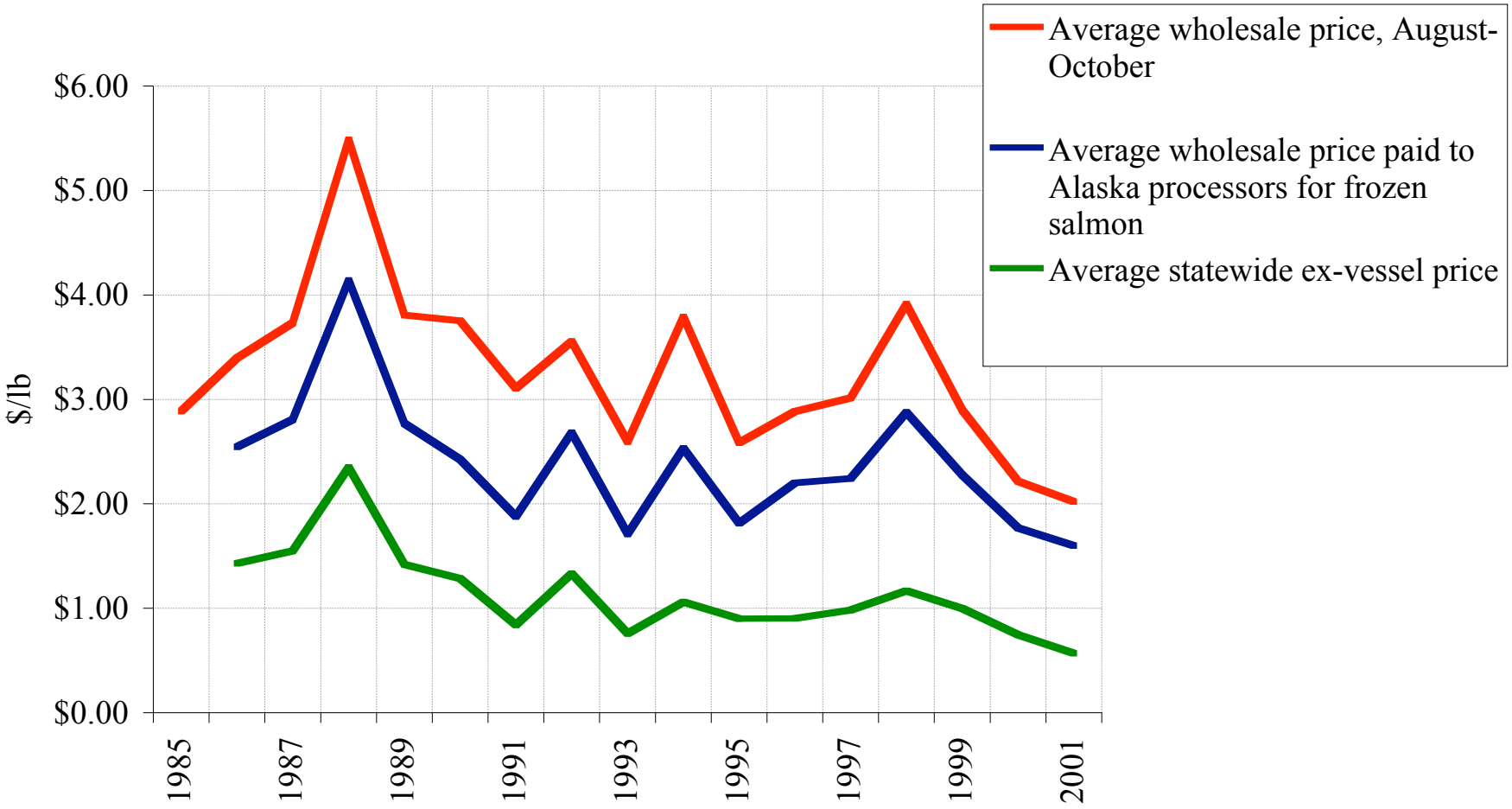
Until the early 1990s, changes in sockeye wholesale prices tended to be inversely correlated with frozen wild salmon imports. By the late 1990s this was no longer the case.



In dollar terms, the decline over the past few years in the Japanese wholesale price was exacerbated by the drop in value of the yen relative to the dollar.



The drop in Japanese wholesale prices (expressed in dollars) is reflected in a drop in prices paid to Alaska processors and fishermen.



Increasingly, Alaska fresh and frozen salmon producers are hearing that buyers' needs for consistent high quality and year-round dependable supply are better met by farmed salmon—which is available in increasing quantities at increasingly lower prices.

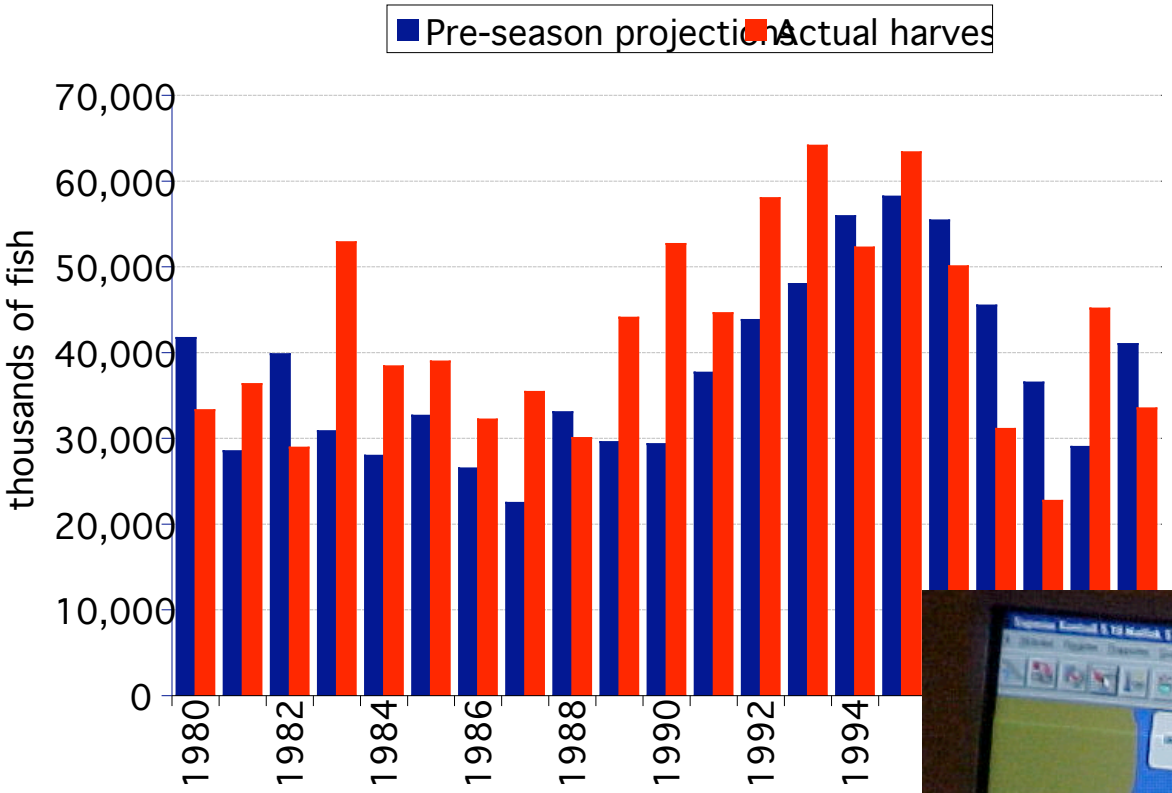
- High-priced niche markets willing to pay a premium for natural wild salmon—such as Copper River sockeye and Yukon River kings—are very much the exception rather than the rule.

Farmed salmon has significant competitive advantages over wild salmon in producing to meet market demands . . .

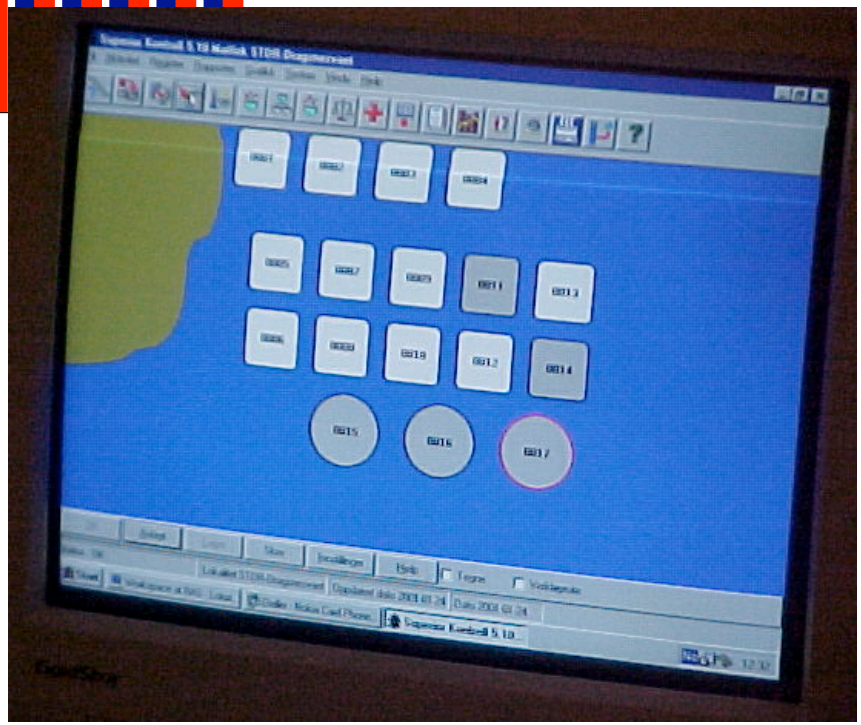
	Wild Salmon	Farmed Salmon
Production volume	Production volume is inconsistent from year to year and difficult to predict.	Farmers can accurately forecast production and guarantee supply commitments. Farmers can expand production to meet growing demand.
Production timing	Wild harvests must occur during a short summer run.	Farmed production can occur over many months or year-round.
Product consistency	There is wide variation in the size and quality of individual wild fish.	Farmed fish can be produced of consistent sizes and quality.

Farmed salmon has significant competitive advantages over wild salmon in producing to meet market demands (cont.)

	Wild Salmon	Farmed Salmon
Fish characteristics	Wild salmon producers have no control over their fish	Through breeding and choice of feeds, farmers can alter fish characteristics (size, color, taste) to meet market demands.
Property rights	Wild salmon producers do not have secure access to fish resources and face constant political risk.	Farmers own their fish.
Tradition	The wild salmon industry is constrained by tradition and political and social considerations	The farmed salmon industry is freer to evolve and respond to changing markets and opportunities



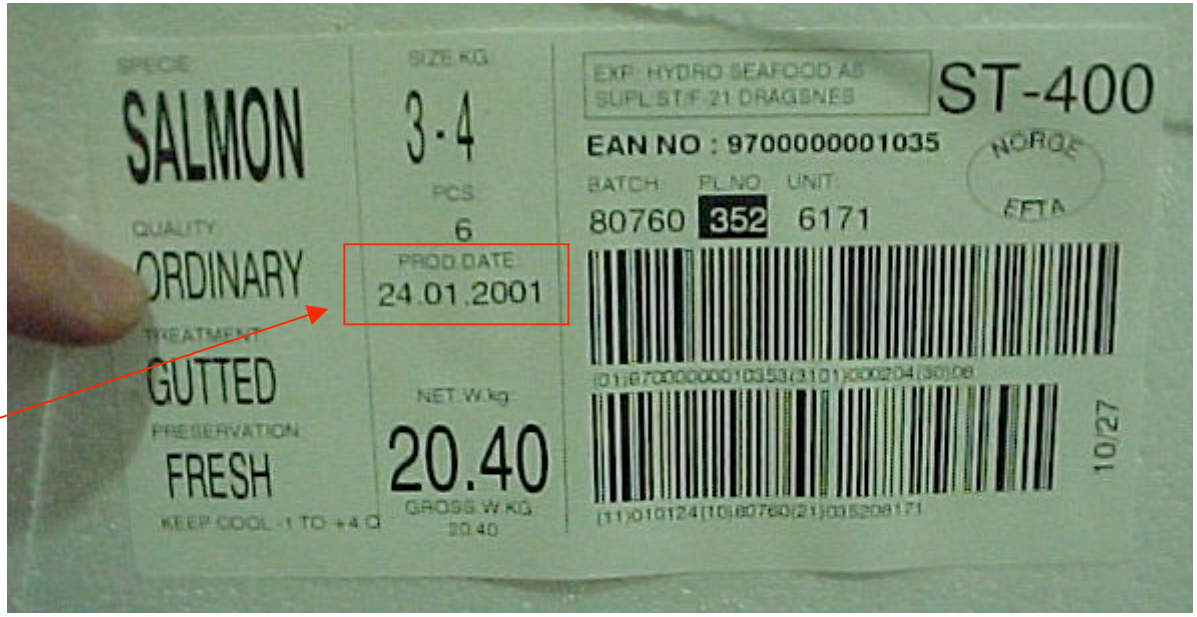
Actual Alaska sockeye salmon harvests typically differ from pre-season projections by 30%.



This computer at a Norwegian salmon farm can tell the producer exactly how many fish of what size are in each pen (and in the pens of all the farms owned by this company on three continents)

Alaska salmon fishing boats in winter

Norwegian salmon processed in winter



Catching salmon in Alaska

Catching salmon at a Norwegian farm

Dead wild salmon
arriving for processing
in Alaska

Live farmed salmon arriving
for processing in Norway

Holding salmon before processing in Alaska

Holding salmon before processing in Norway

Alaska wild salmon handling tradition

Chilean farmed salmon handling tradition

What Alaska is making
more of:
canned salmon

What Chile is making
more of:
fresh pinbone-out fillets

Old Alaska salmon processing plant

New Norwegian salmon processing plant

As a result of lower earnings, limited entry permit prices have dropped dramatically in most Alaska fisheries since the late 1980s. In some fisheries, a substantial share of limited entry permits are no longer fished.

Changes in Selected Alaska Salmon Fisheries Since the Late 1980s

Area	Gear	Gross Earnings in 2000 as % of 1986-90 average	Average permit price in 2000 as % of 1986-90 average	Permits fished in 2001as % of 1986-90 average
Bristol Bay	Drift gill net	44%	45%	85%
Southeast	Purse seine	72%	59%	92%
PWS	Drift gill net	80%	59%	101%
PWS	Purse seine	61%	13%	58%
Chignik	Purse seine	57%	68%	91%
Cook Inlet	Drift gill net	11%	24%	100%
Kuskokwim	Gill net	17%	60%	64%
Lower Yukon	Gill net	9%	51%	na

Source: Commercial Fisheries Entry Commission, Basic Information Tables

As a result of the decline in earnings and permit prices, many fishermen who borrowed money to purchase permits are now unable either to earn enough money to make loan payments, or to pay off the loans by selling their permits.

Trends in Selected Alaska Salmon Fisheries: Average Permit Values ($ 000)

Fishery	1985-89	1990-94	1995-99	2000	2001
Bristol Bay Drift Gill Net	159	197	142	81	35
Southeast Purse Seine	52	84	55	39	35
PWS Drift Gill Net	79	110	64	59	58
Kodiak Purse Seine	67	90	40	20	17
Bristol Bay Set Net	42	52	37	32	25
Statewide Power Troll	27	33	20	15	13
Peninsula/Aleutians Drift Gill Net	233	350	257	146	123
Cook Inlet Drift Gill Net	106	125	61	32	22
Southeast Drift Gill Net	69	82	50	33	41
Chignik Purse Seine	274	363	191	200	186

Source: Commercial Fisheries Entry Commission, Basic Information Tables.

Other effects of the decline in earnings include:

- A substantial decline in the number of processors buying salmon in many areas
- Limits by processors on the amount of fish they will buy from fishermen, as well as the number of fishermen from whom they will buy fish
- A decline in state and local fisheries business taxes, hatchery assessments, and Alaska Seafood Marketing Institute assessments—all of which are based on a percentage of ex-vessel value.
- "Multiplier" effects of reduced spending on fisheries support businesses and economies of fishing communities.
- Lobbying by sport fishermen for higher allocations, based on the relative decline in value of the commercial fishery.

Alaska salmon fishermen and policy makers were slow to recognize or accept the implications of farmed salmon as a market competitor.

- Relatively few Alaskans have every seen a salmon farm.
- Alaska fishermen found the taste of of farmed salmon vastly inferior to that of wild salmon—and argued that it could never successfully compete in the market.
  - Some *still* believe this.
  - Wild fishermen—accustomed to the taste of the fish they catch--are not likely to be good judges of what consumers will buy.
- "Japan will buy farmed fish."
  - From Gislason (2001), "Some Lessons Learned from Farmed Salmon," from a report about the economic potential of halibut and sablefish aquaculture in BC
  - The fact that Gislason felt it necessary to state this reflects the long-held belief among wild salmon fishermen that Japan would *not* buy farmed fish.

Alaska salmon fishermen and policy makers were slow to recognize or accept the implications of farmed salmon as a market competitor. . .

- Salmon processors, who were hearing directly from the market, spoke early on about the effects of farmed salmon on prices.
  - But historically the relationship between processors and fishermen is characterized by deep distrust.
  - Many fishermen thought processors were exaggerating the effects of farmed salmon as an excuse to lower prices.
  - Most processors are based outside of Alaska. Policy makers respond to what they perceive as the interests of Alaska fishermen.
  - Fishermen in Bristol Bay, the largest sockeye salmon fishery, brought a class-action lawsuit against almost all Bristol Bay salmon processors and Japanese importers, alleging price-fixing as the major cause of the fall in prices.

Economic distress caused partly by farmed salmon is building political pressure for change in the Alaska salmon industry.

- Proposals are being advanced for:
  - Management of the fishery to enhance quality
    - shorter fishing periods
  - Permit and vessel buybacks
  - Fewer vessel and gear restrictions
  - Harvesting cooperatives
  - Individual Fishing Quotas (difficult for salmon)
  - Chignik salmon coop experiment

". . . The uneconomical nature of the fishery has come into stark focus in the last few years. . . Salmon boats, fishing practices, processing methods and fishery regulations were developed and refined during a three-decade period when the average value of a salmon was double and triple what it is today. In today's market, much of Alaska's salmon harvest is at a cost disadvantage to the competition . . . Something must change.

--From a brochure for fishermen explaining the purpose of the "Bristol Bay Salmon Fishery Restructuring Study," 2002.

Photograph by Bart Eaton

From a speech by Alaska Senator Ted Stevens at the “Alaska Fish Summit,” Kodiak, Alaska, April 4, 2002:

“Everyone in this room and in your communities . . . now realizes that the dramatic growth and over-capacity in worldwide farm production of salmon and other fish species has marginalized Alaska’s wild fish production. That glut in world production took away the traditional markets of Alaska and has created crisis in our industrial production of canned and frozen salmon and other species. . . “

From a speech by Alaska Senator Ted Stevens . . . (cont.):

"The threats facing us today . . . creep into our lives slowly through changes created by globalization of national economies, rapid transportation changes that move goods across borders with greater frequency and rapid advances in fish farm technology. None of us here can reverse those forces, but my great hope is that Alaska will be able to change with these times."

"We have fished, packaged, and marketed our salmon, cod, and other fish from our area almost the same way for decades now. . .Fishermen in the past have not had to look beyond the dock to the world at large. . . It was a good way of life, easily understood with a rhythm of its own for our people, and times were good. But we've got to realize for each and every one of us that way of life is disappearing."

From a Resolution by the Alaska State Legislature establishing a Salmon Task Force (May 2002):

WHEREAS the salmon industry is one of the cornerstones of the Alaska economy, supporting tens of thousands of jobs, and salmon is one of our most valuable foreign export commodities . . .

WHEREAS the global salmon market has changed considerably in recent years, placing the Alaska salmon industry in economic peril . . .

WHEREAS hundreds of harvesters are in danger of actually being without markets and being forced into bankruptcy this year . . .

WHEREAS numerous salmon processing facilities have recently ceased operations or plan to do so before the 2002 salmon fishing season due to market factors and difficulty in obtaining operating loans . . .

From the charge to the Alaska Legislature's Salmon Task Force (May 2002):

Recommending specific means by which state government can assist one of the state's most important industries to adapt to changing economics in the most efficient and effective way possible . . .

Recommending improvements for the coordination of the harvesting, processing, and marketing of wild Alaska salmon . . .

Encouraging the development of new product forms for salmon;

Recommending improvements to the marketing efforts of the Alaska salmon industry and ensuring the distinction of Alaska salmon products from farmed salmon . . .

Researching methods to improve the quality of Alaska salmon products. . .

But change in the Alaska salmon industry is happening slowly will not come easily.

Responses of an Alaska salmon processor
and former legislator to the question:

"What will it take to bring real change to the Alaska salmon industry?"

Response in 1999:

"Pain."

Response in 2002:

"Death??"

Can the wild salmon industry survive?

- "Whether the North American salmon ocean fishing/ranching industry ever establishes a management system based on well-defined property rights may, in the grand scheme of things, be largely irrelevant. Given the current productive capacity of the pen-raised salmon sector; the potential for technological, genetic, and disease management advances; and the potential for market development, the growth of this industry is still potentially enormous. This may render the traditionally managed commercial ocean harvest sector noncompetitive in most markets." (Anderson 2002)
- Whether or not the wild salmon industry can "survive" against competition from farmed salmon depends not only on what salmon farmers can do but also on what the wild industry can do.
- The relevant questions have not been empirically addressed.

We don’t know the potential cost structure of the wild salmon industry.

- Present or past harvesting and processing is not—even remotely—an indicator of what may be technologically or economically feasible.
- There is very significant potential to lower costs, improve quality, and market wild salmon more effectively.
- Past inefficiency and rent dissipation in the wild salmon industry provides a large “cushion” for lowering costs in the face of farmed salmon competition—but we don’t know how large.
- Despite a drastic decline in prices and significant contraction in numbers of fishermen and processors, there is little evidence of a fall in the actual harvest relative to run sizes.

For example, we don't know what cost savings and quality improvements might be possible with salmon traps . . .

Painting of a Russian salmon trap at the Fisheries Technical University in Vladivostok.

. . . because Alaska banned salmon traps as the first act of the Alaska legislature upon receiving management authority for salmon when Alaska became a state in 1959.

AS 16.10.070. Operation of Fish Traps.

"Fish traps, including but not limited to floating, pile-driven, or hand-driven fish traps, may not be operated in the state on or over state land, tideland, submerged land, or water."

"Why should fisheries economists care about aquaculture?" (Anderson 2002)

- "Aquaculture is where future growth will come from."
- "Aquaculture is the focus of pivotal policy decisions regarding ownership and management in aquatic environments."
- "Aquaculture will have an increasing influence on wild fish stocks and the aquatic environment."
- "Aquaculture will dominate the international trade and marketing of many species (especially high-valued species)."
- "Competition from aquaculture is an increasingly important catalyst for change in fisheries management."