

Future US Seafood Supply: Economic Considerations

Hauke Kite-Powell
Marine Policy Center
Woods Hole Oceanographic Institution

Morss Colloquium
25 May 2011

Outline

- About that seafood trade deficit...
- US Aquaculture...today and tomorrow?
- Future paths and implications:
 - Prices and availability of seafood
 - Employment
 - Ecological footprints
 - Human health & seafood safety
- Conclusions

US Balance of Trade

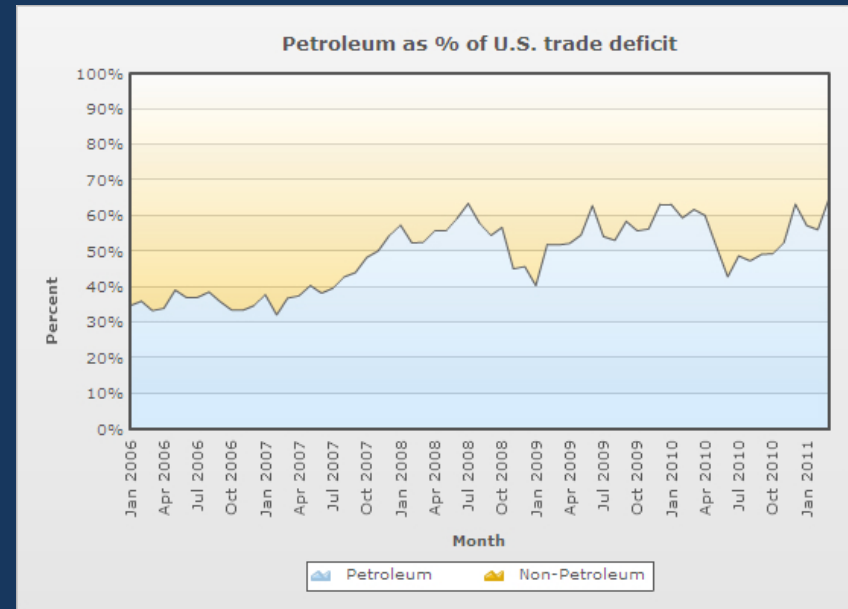
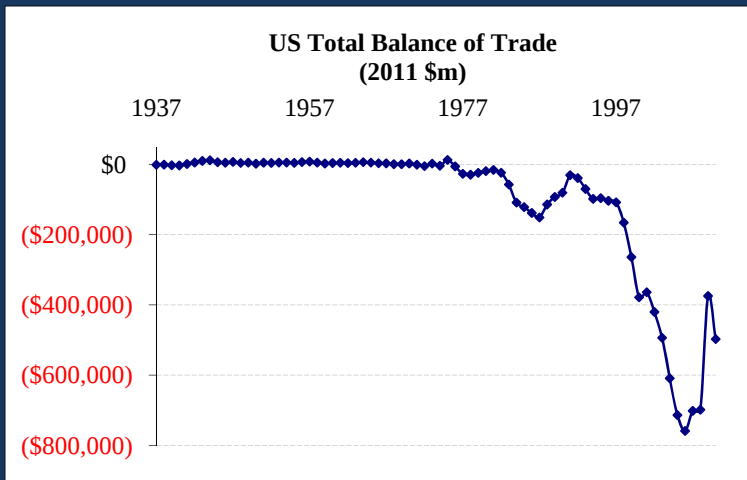
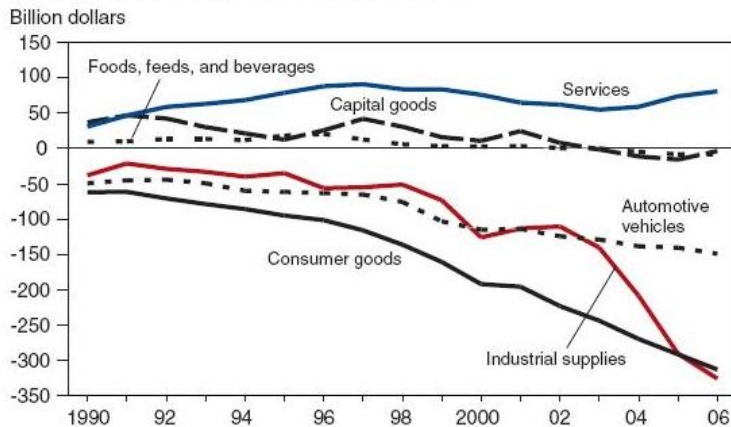


Figure 5
U.S. trade balance declines in all categories

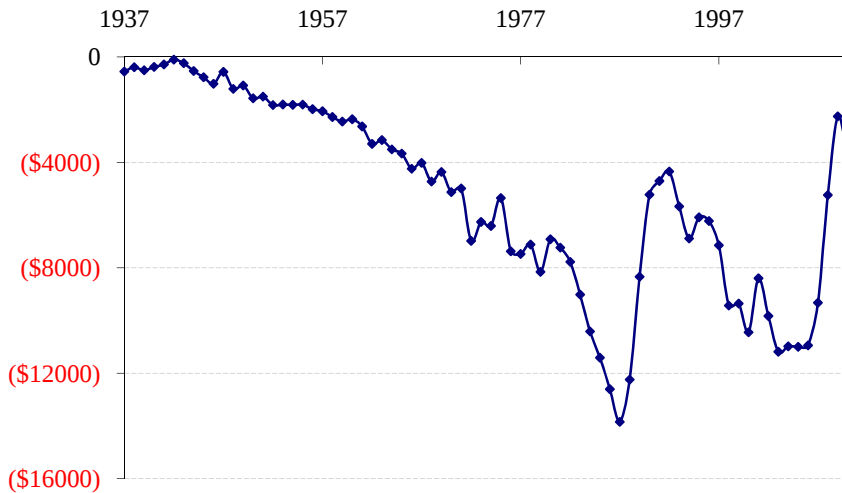


Source: Prepared by USDA, ERS using data from U.S. Department of Commerce, Bureau of the Census.

Sources: US Census Bureau,
Gehlhar et al. (2007)

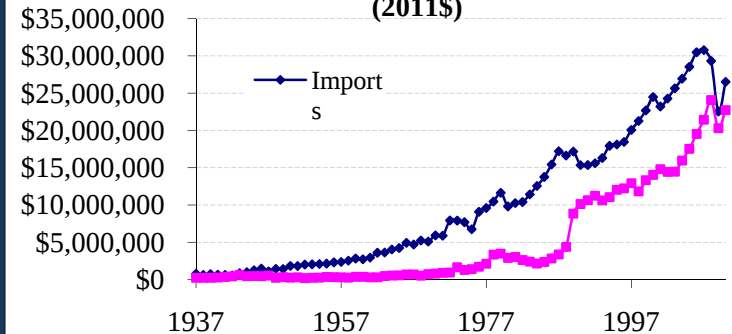
Seafood Balance of Trade

**US Fisheries Balance of Trade
(2011 \$m)**

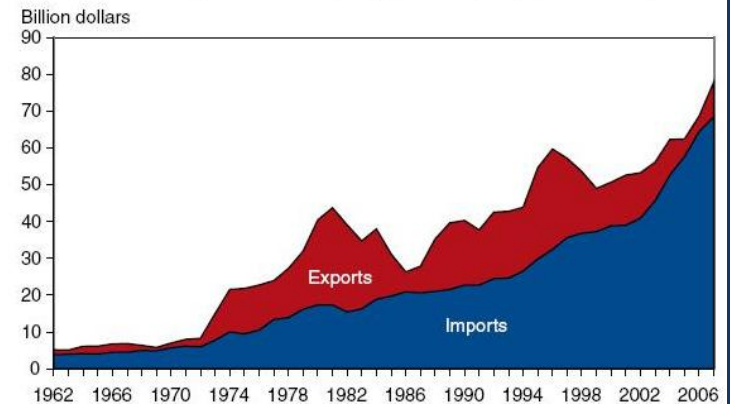


Sources: US Census Bureau,
Gehlhar et al. (2007)

**US Fisheries Trade Volume
(2011\$)**

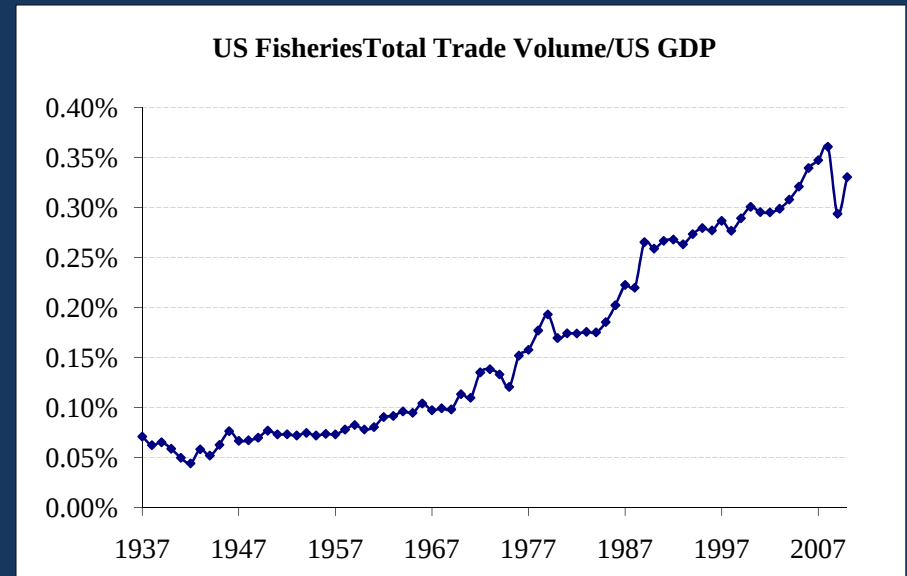
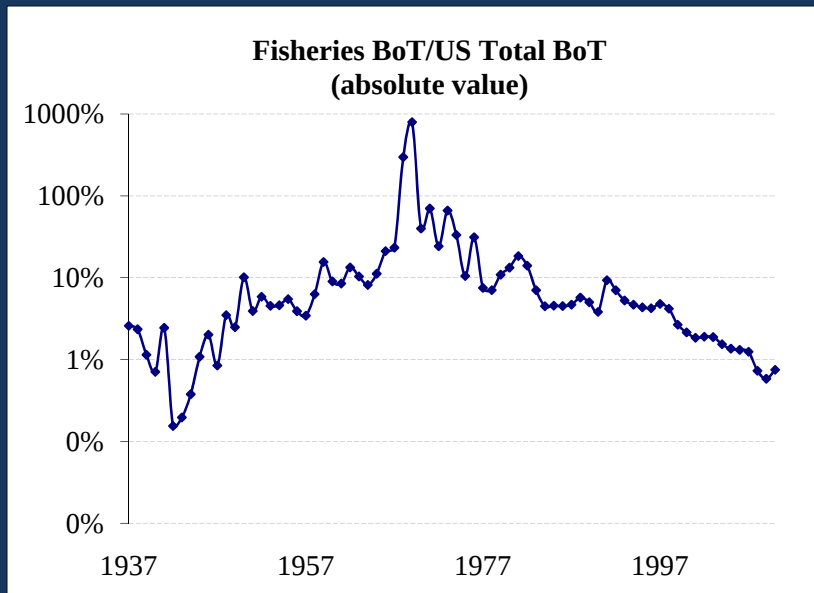


**Figure 1
U.S. agricultural imports rise steadily, while exports are more volatile**



Source: Prepared by USDA, ERS using data from U.S. Department of Commerce,
Bureau of the Census.

Does it matter?



Sources: US Census Bureau,
Bureau of Economic Analysis

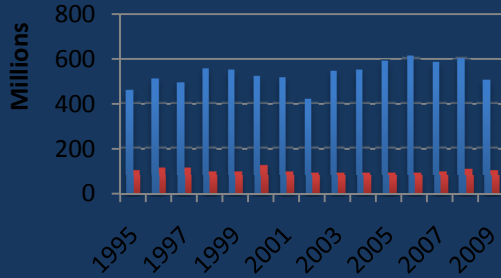
US Seafood Supply, 2010

80% + of US consumption is imported

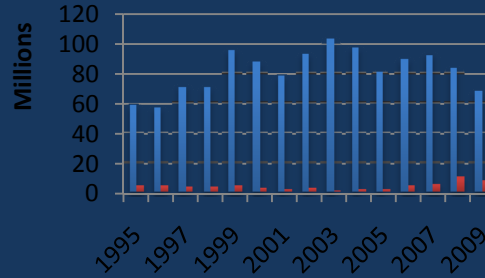
50% + of that is farmed

- Net imports:
 - Shrimp (550,000 t -- \$4.2 billion)
 - SW fish (225,000 t -- \$2.0 billion; >50% salmon)
 - FW fish (253,000 t -- \$1.4 billion)
- Exports:
 - Groundfish (\$312 million)
 - Flatfish (\$154 million)
 - Canned salmon (\$132 million)

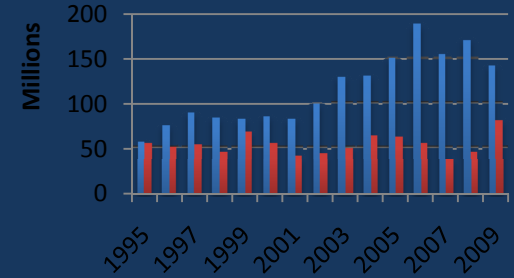
Tuna



Flatfish



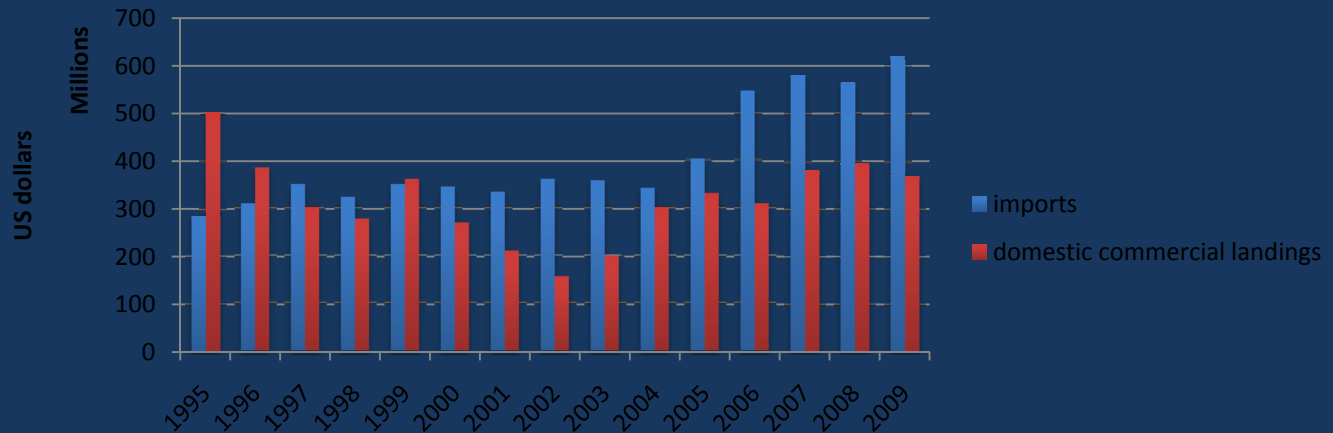
Squid



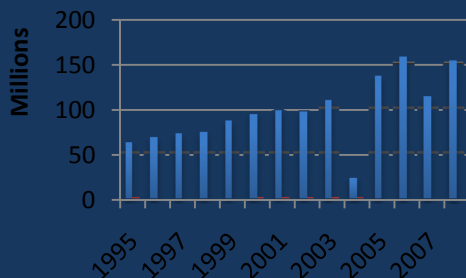
Value of domestic commercial landings and import since 1995

Source: National Marine Fisheries Service, Fisheries Statistics Division

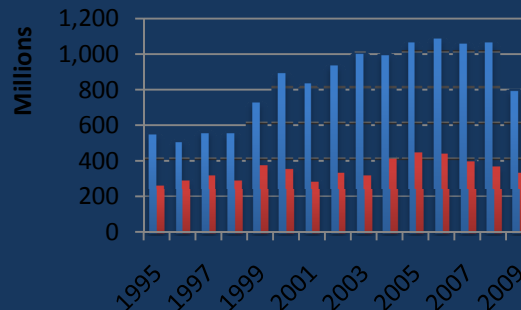
Salmon



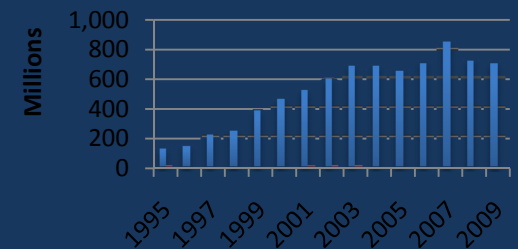
Freshwater fish



Lobster



Crabs



US Aquaculture Industry, 2010

- About \$1 billion production
 - Half of this is food finfish (catfish, salmon, ...)
 - \$200 million mollusks
 - \$50 million crustaceans
- Fresh water production in decline since 2003
- Low growth except in shellfish

Future US Seafood Demand

US population:

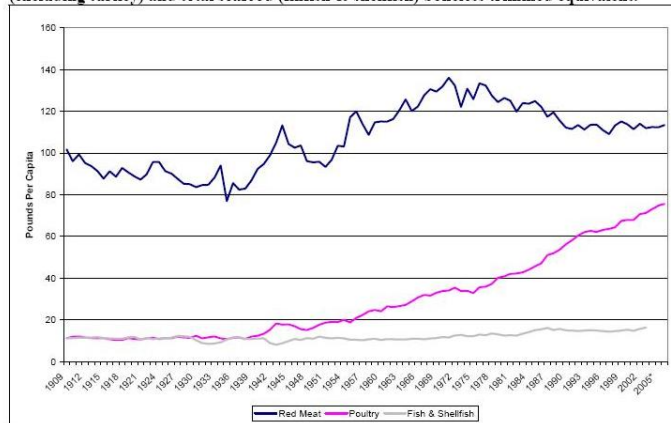
2010: 310 million

2050: 440 million

16 lbs/person/year seafood

Chapter 5: Lessons from the Development of the U.S. Broiler and Catfish Industries

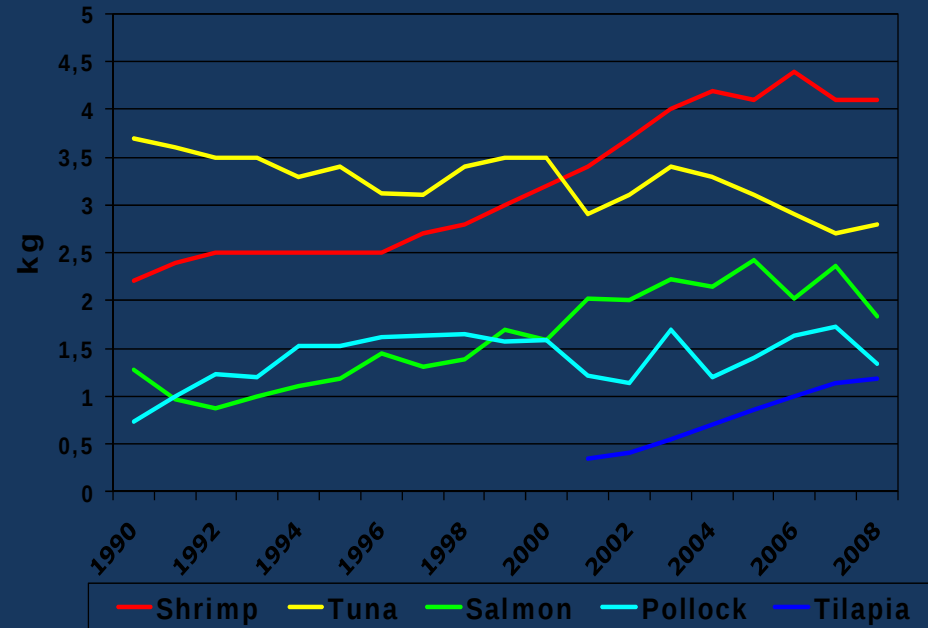
Figure 5.4. Per-capita consumption of total red meat (pork, beef, lamb, veal), total chicken (excluding turkey) and total seafood (finfish & shellfish) boneless trimmed equivalent.



Source: USDA/ERS, 2004a; NMFS, 2005

Source: Shamshak and Anderson (2008)

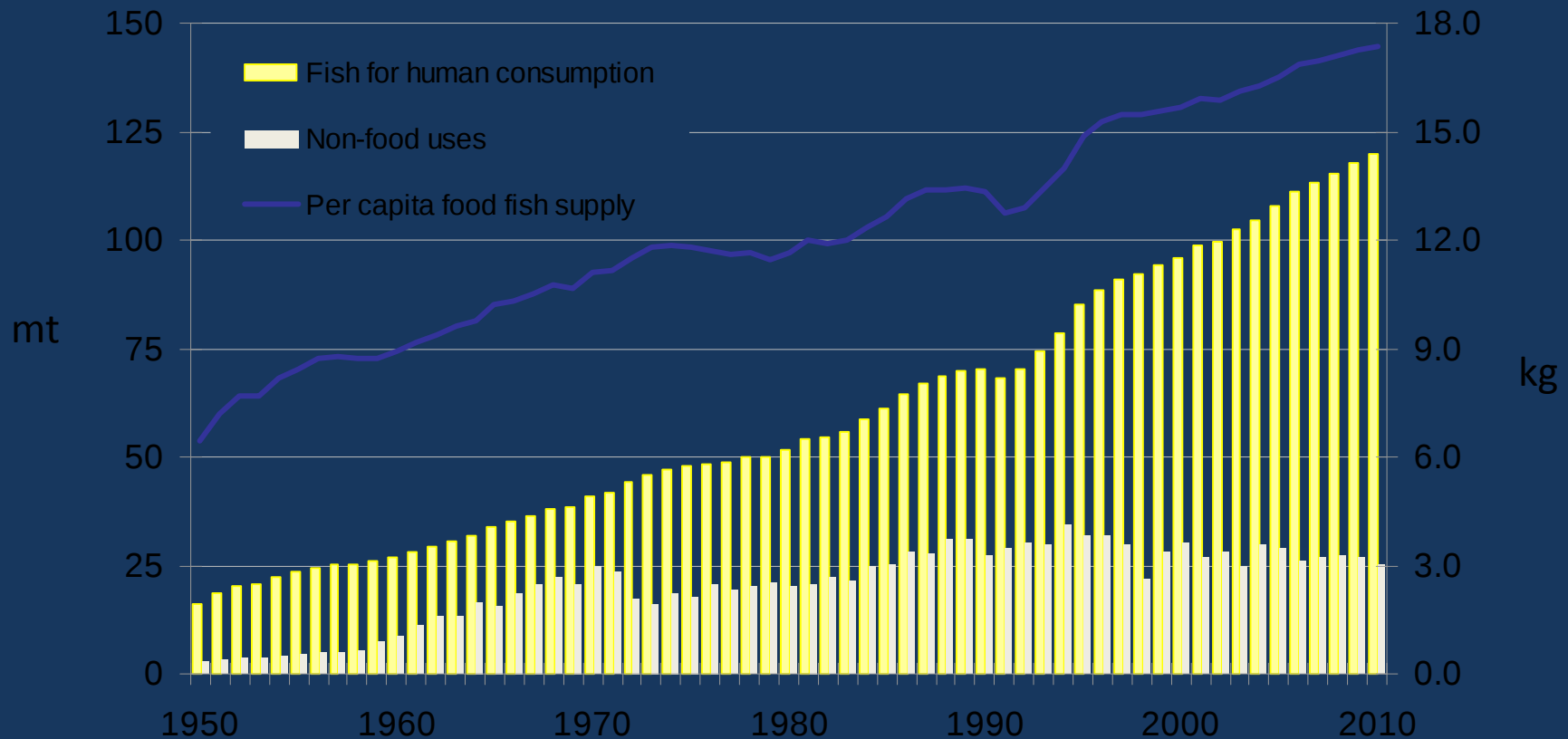
Per capita US consumption



(borrowed from Frank Asche)

We'll need another 1 million tons/year by 2050... at least.

World Demand is Growing Faster



Source: S. Vannuccini, FAO

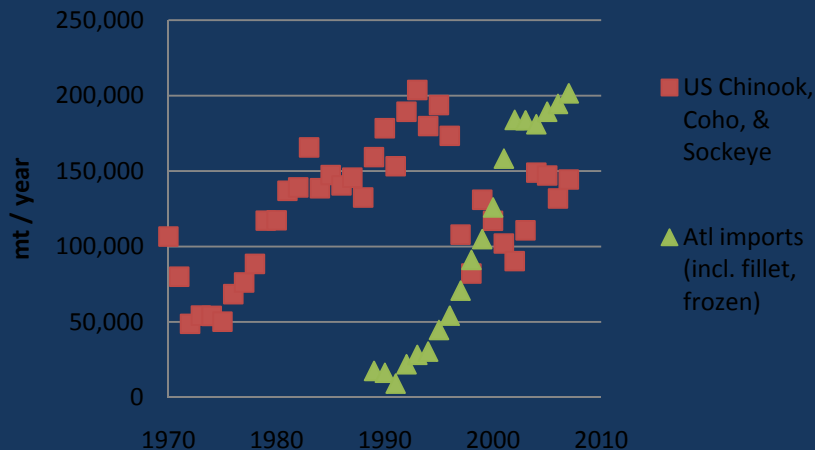
Future Seafood Supply

- Significant additional supply will not come from US wild capture fisheries
- Either we will import more...or we will farm more. (It will be farmed either way.)
- Implications for...
 - Price and availability
 - US employment
 - Ecological footprints
 - Human health and food safety

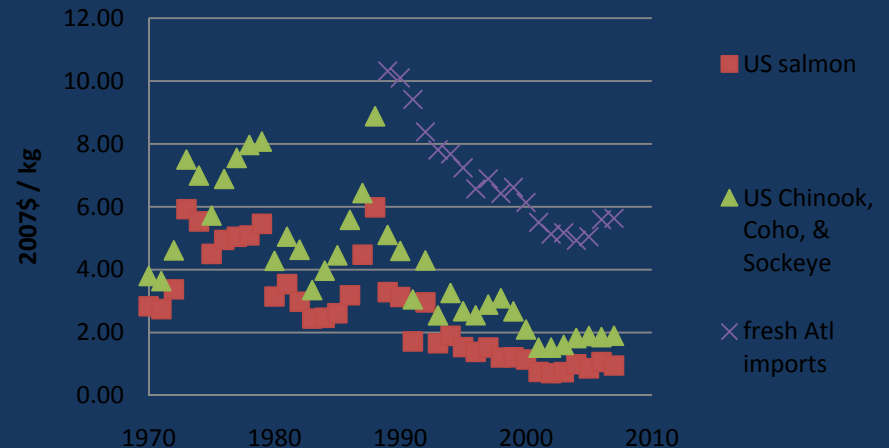
Price and Availability

- Aquaculture production lowers prices
- Greater control over availability
- Expanded markets

US Salmon Landings & Imports



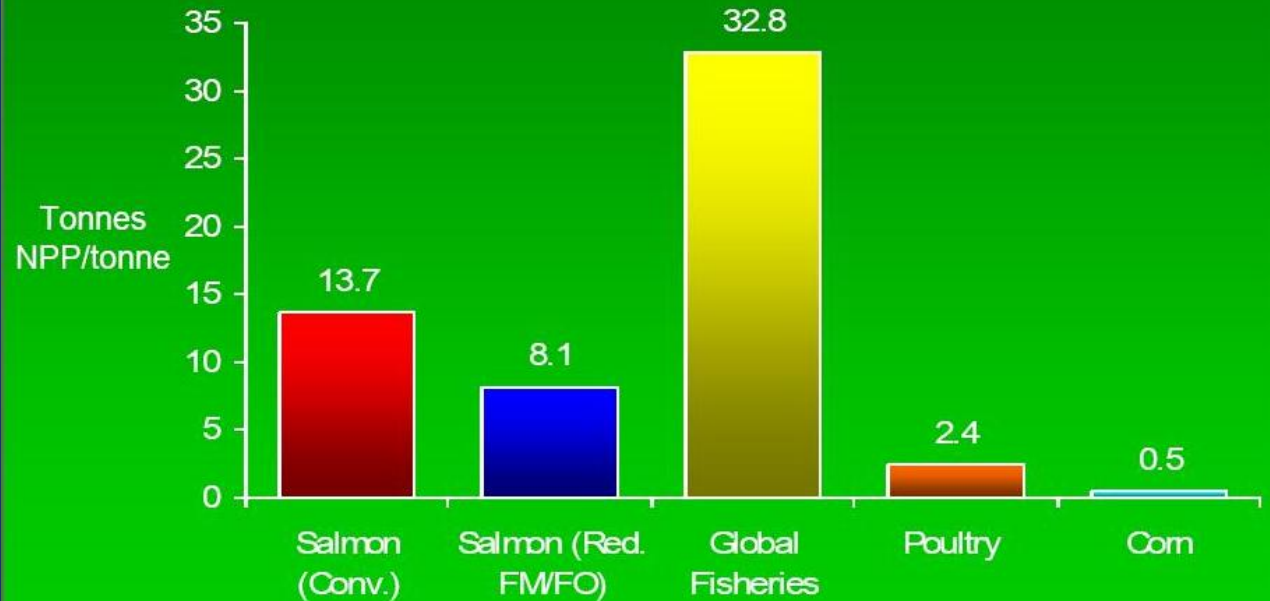
US Salmon Prices



Primary Production Efficiency

Increasing resource constraints, especially on terrestrial food production

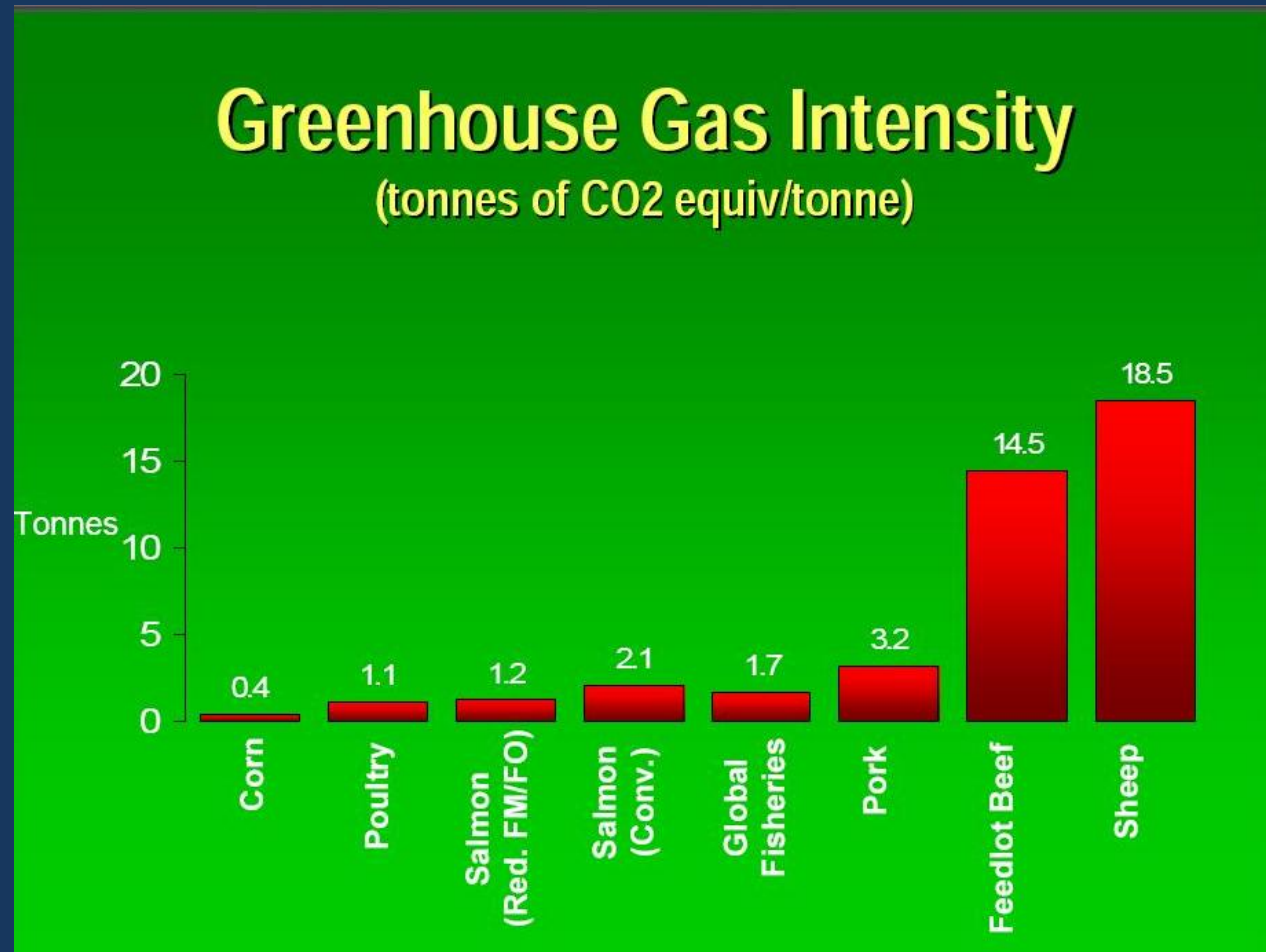
Biotic Resource Use Efficiency in Food Production



Source: Pelletier and Tyedmers (2007)

Carbon Footprint: Production

Increasing concerns of carbon emissions from all economic activity, including food production



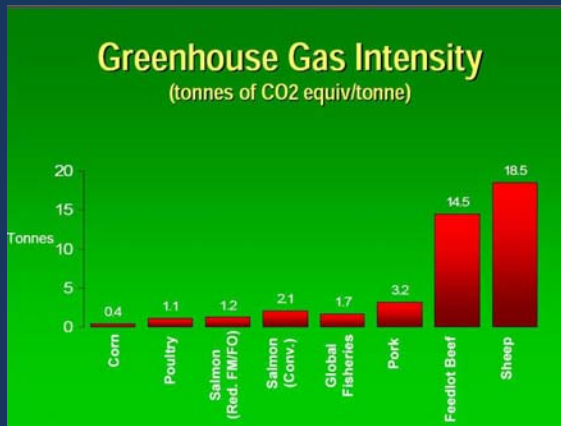
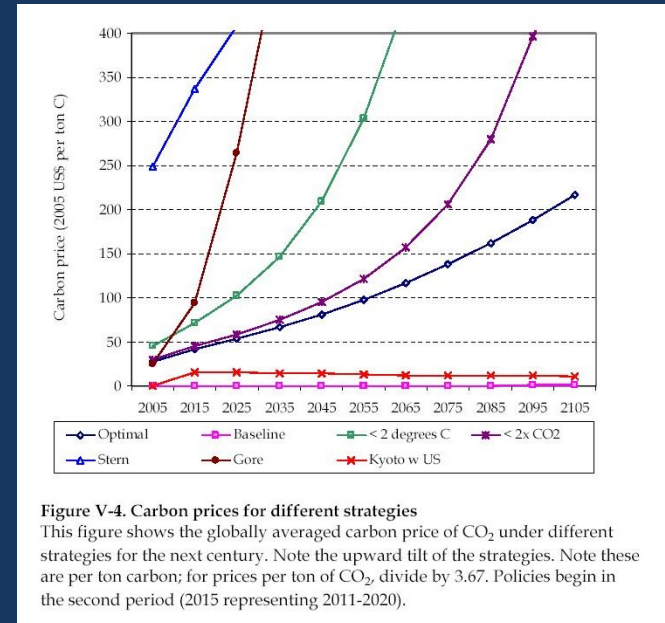
Source: Pelletier and Tyedmers (2007)

Carbon Footprint: Production

- Salmon aquaculture has a lower ecological footprint than beef/pork, roughly equivalent to poultry
- Salmon aquaculture has similar C intensity and more efficient PP utilization compared to capture fisheries
- Lower use of FM/FO reduces the ecological footprint

Carbon Footprint: Transportation

- Direct cost
 - \$0.10/lb frozen (sea)
 - \$0.75/lb fresh (air)
- C emissions
 - 2.5 million tons of seafood imports at 0.2 t CO₂e / ton = 500,000 t CO₂e
 - @ \$100/t CO₂e (Nordhaus 2007) = \$50 million



- Transport cost is 5-10% of import value (sea transport)
- C emissions cost from transport is less than 1% of import value, or 10 – 20% of CO₂e from production

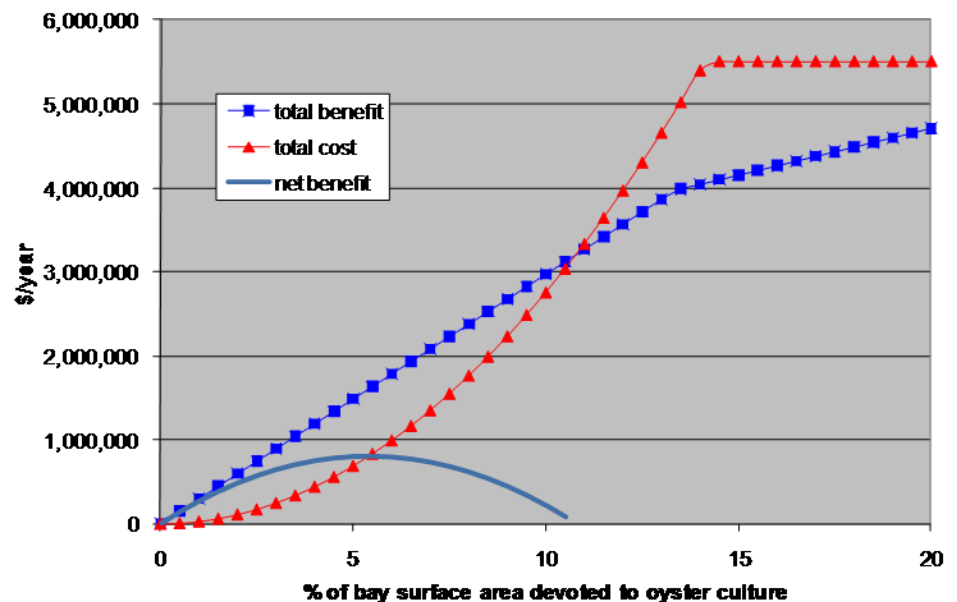
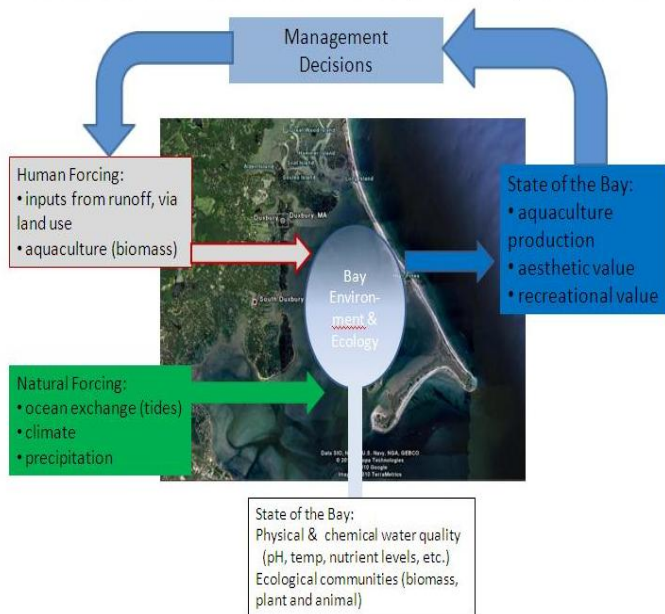
Employment

- Direct aquaculture farm employment could be 1 job per \$100,000 production
- Indirect and induced employment: another 2-3 jobs per \$100,000 production
- Additional jobs in processing, distribution, and retail – depends on species, markets (domestic vs. export)
- Potential for several 100,000, but...

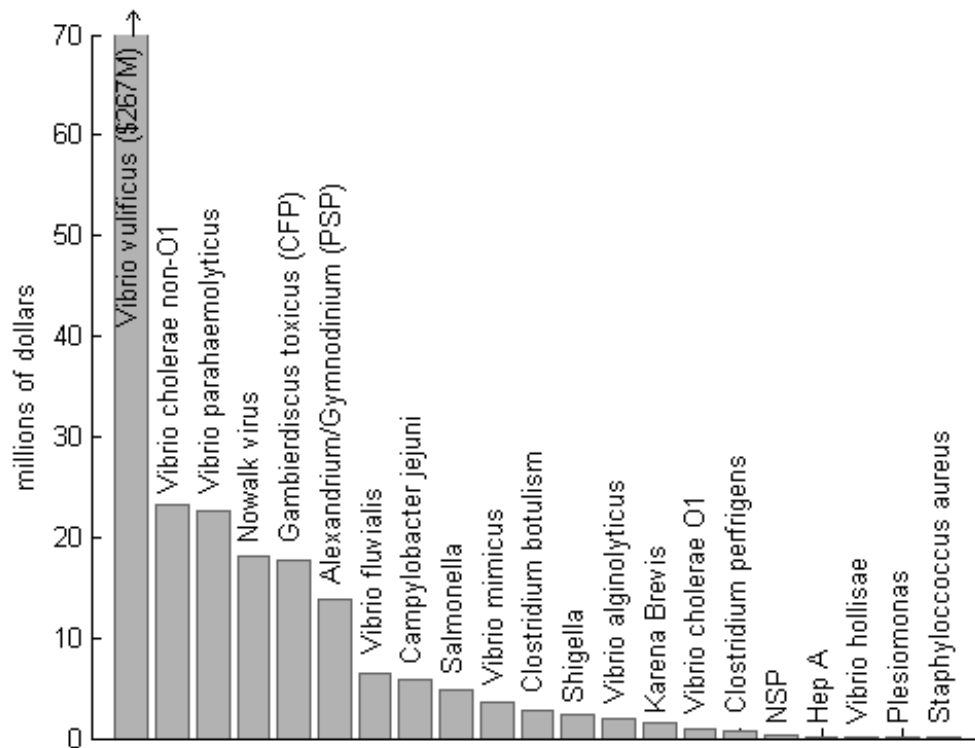
Positive Ecological Externalities: Shellfish Aquaculture and Nutrient Loads

Economic value of nutrient level reductions from oyster culture can be same order of magnitude as harvest value (Kite-Powell et al. 2006)

CNH Interactions in a Coastal Bay: Conceptual Model



Eating Seafood is Good for You and for the Planet...but...



Acute health costs
estimated \$660
million/year
(Ralston et al. in
press)

Net chronic health
effects are positive
but not well
quantified

Imported seafood?

Health Effects ?

- Questions about feed content, additives (drugs), water quality in imported (farmed) seafood
- Extensive investment in seafood quality control in the US, and some overseas (HACCP)
- Limited inspection of imports – could change soon (GAO 2011)
- Costs reflected accurately in consumer prices?

GAO
United States Government Accountability Office
Report to Congressional Requesters

April 2011

SEAFOOD SAFETY

FDA Needs to
Improve Oversight of
Imported Seafood and
Better Leverage
Limited Resources



Conclusions: Looking to 2030/40

- Aquaculture will supply most of global seafood (Asia, So. America,...)
- Per capita consumption of seafood will likely be higher
 - Health, wealth, ecology, prices
 - Global consumption & per capita rate growing faster than US – US market becomes relatively less important
- Seafood prices likely to be lower relative to red meat, poultry
 - Increasing resource constraints, especially on terrestrial production
 - More room for efficiency gains in seafood

Conclusions: Role of US Aquaculture?

- It is feasible to increase US aquaculture production significantly (if we want to!)
- If we do...
 - Job creation [100,000] – not a big deal for the nation but can be very important locally
 - Marginally lower US prices on some fresh seafood
 - Reduced seafood trade deficit – mainly through more exports
 - Enhanced development of US aquaculture technology and infrastructure/support industry for global market

To get there...

- More streamlined process for permitting and access to marine sites
- Process/will/political backing for permitting agencies to make positive decisions on aquaculture permit applications
- New partnership between the public, government, industry, and NGOs for governance of aquaculture