

Aquaculture: Everything you wanted to know but were afraid to ask.

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Text modified from C. Weeks 2014 presentation

Global Fish Needs

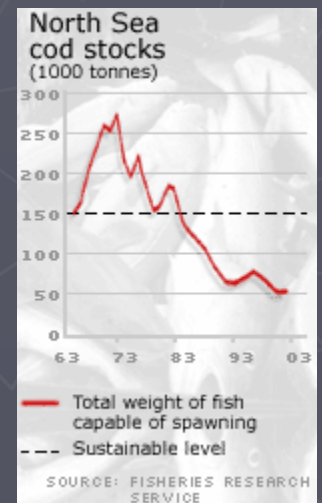
7,000,000,000+ People

(9 Billion by 2050)

Where does our fish come from?

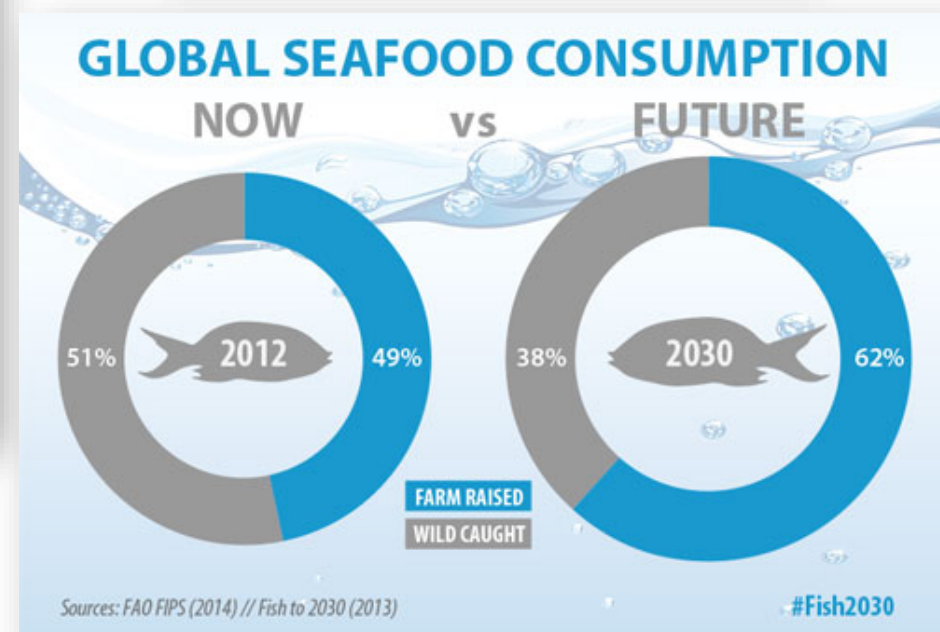
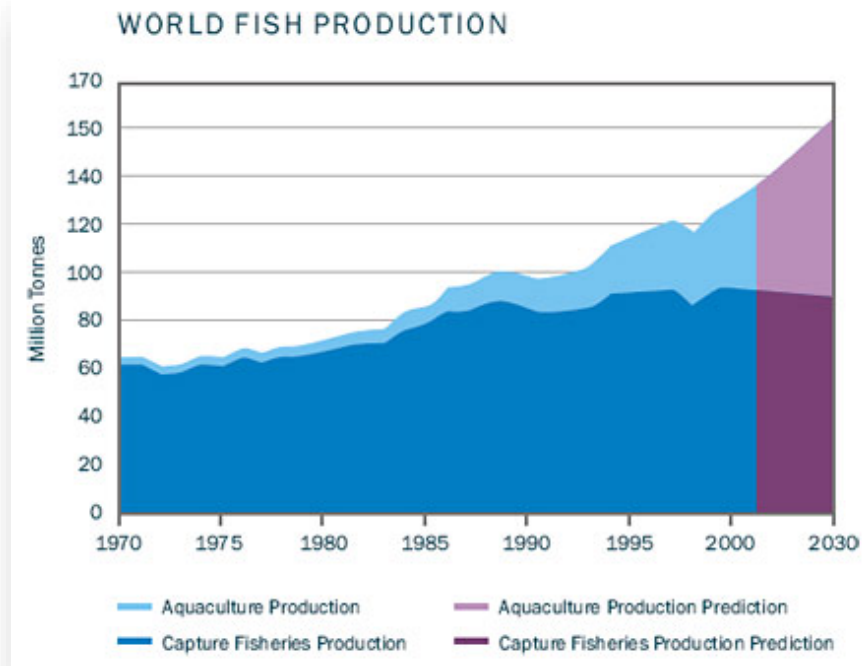
Only Two Sources-Capture or Culture

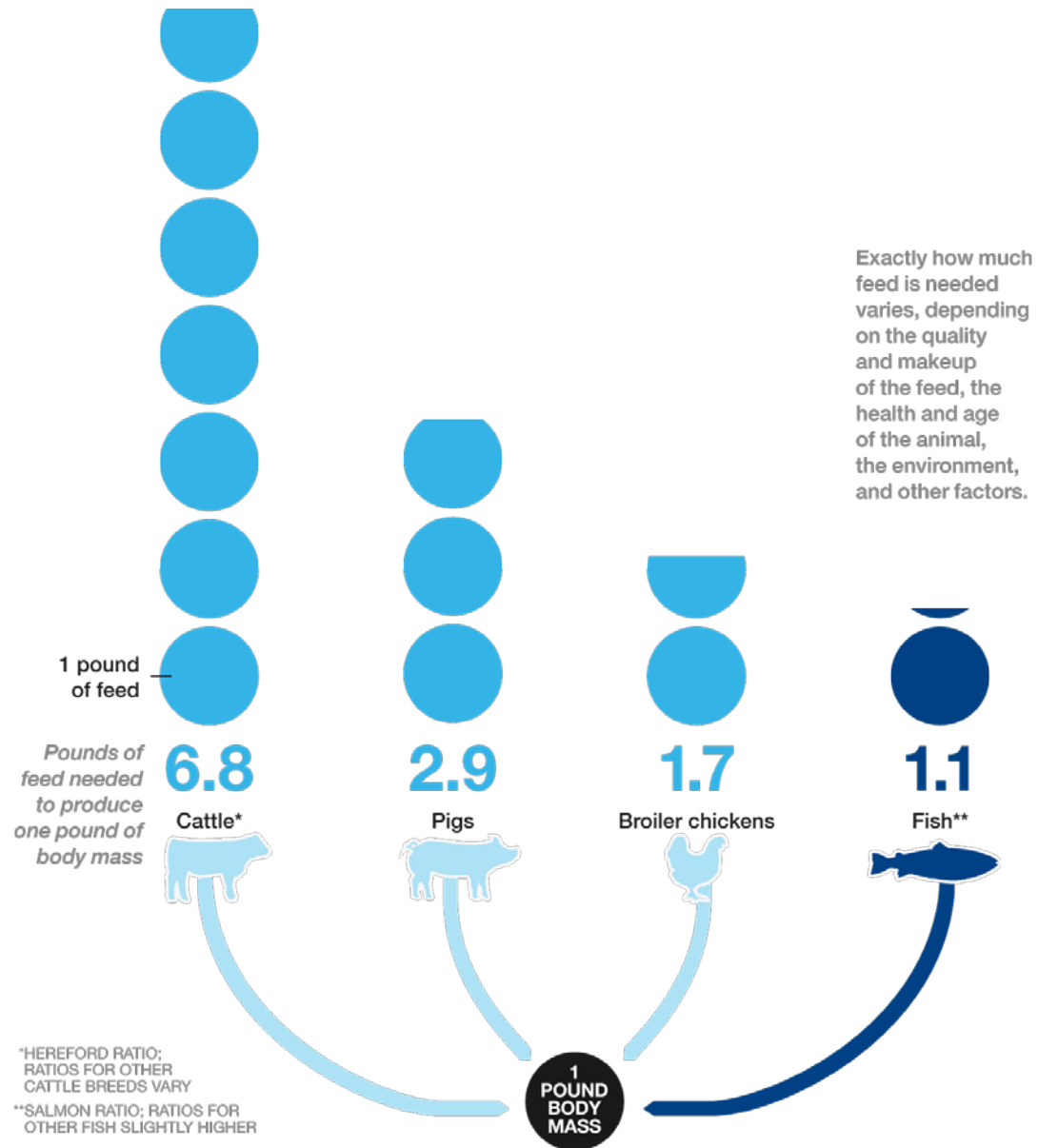
- ▶ Historically – Most captured from the oceans
- ▶ We have always thought the ocean was limitless. **Wrong!**
- ▶ Most wild fisheries are at maximum sustainable yields or declining.



2030 Forecast

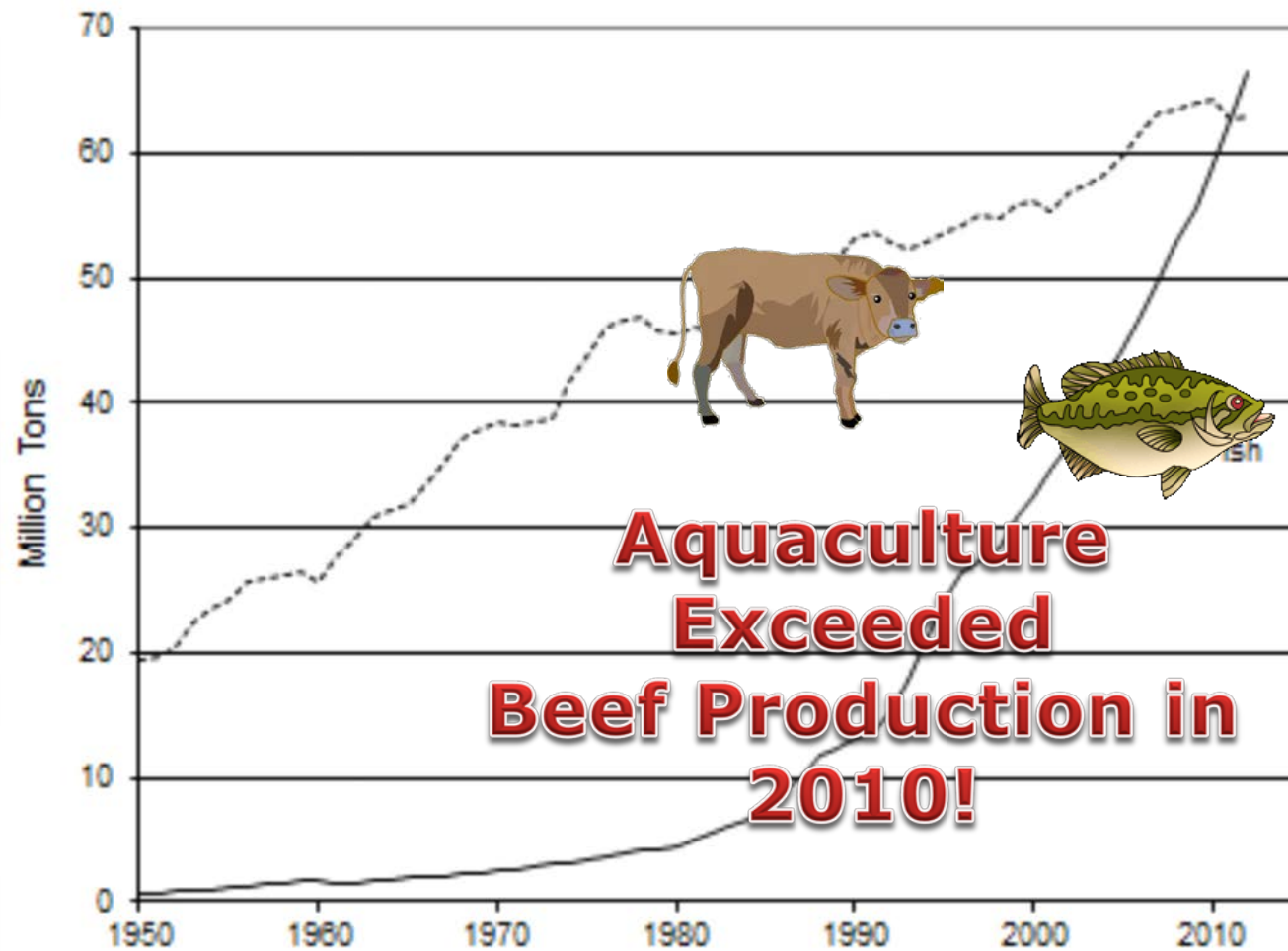
Global seafood demand:
increase by 100-170 billion pounds
and \$330 billion





Source: National Geographic

World Farmed Fish and Beef Production, 1950-2012



Source: EPI based on FAO, USDA

Protein Sustains Life

- Humans need ~ 0.37 g of protein per pound of body weight daily.
- **A 200 lb person needs ~ 74 grams of protein daily to maintain health.**

Global Aquaculture Production

**World Fish, Shellfish and
Seaweed Culture, by country in
2010**

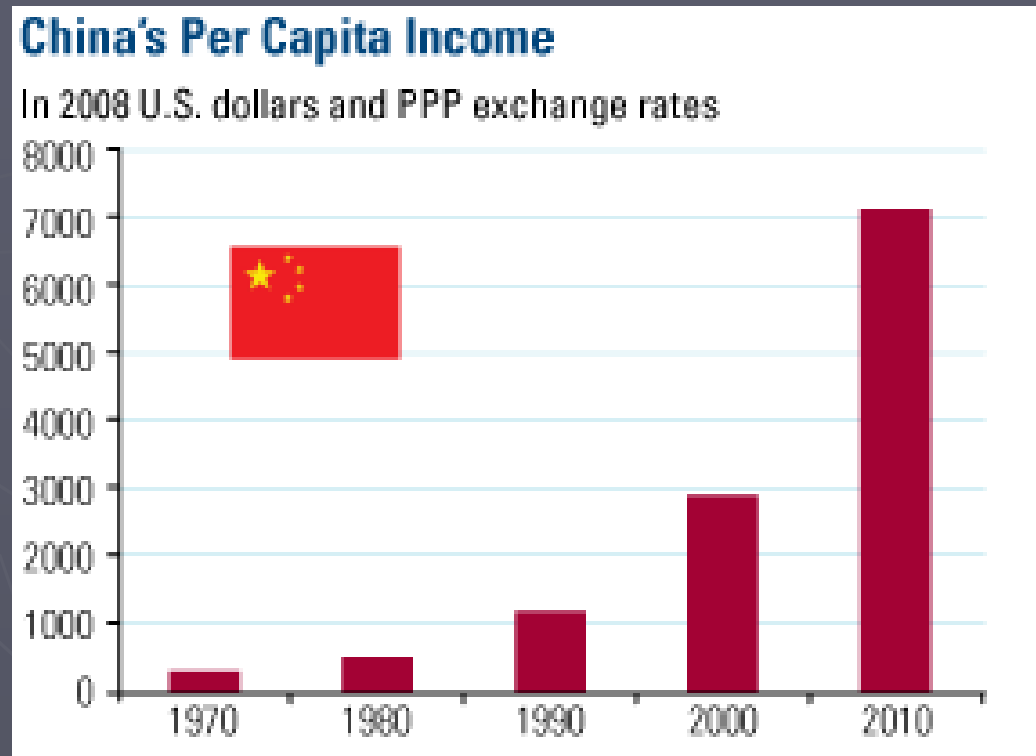


**Top 10
account
for
87.6%
of
World
Product
ion**

FAO.org

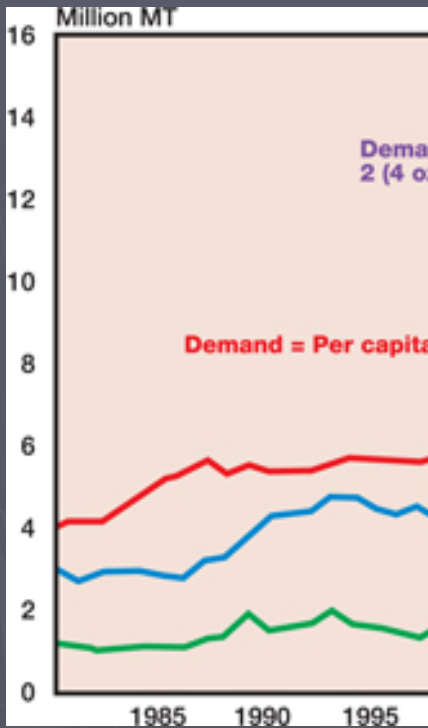
| Rank | Country | Annual Production (MMT) |
|------|---------------|-------------------------|
| 1 | China | 36.7 |
| 2 | India | 4.6 |
| 3 | Vietnam | 2.7 |
| 4 | Indonesia | 2.3 |
| 5 | Bangladesh | 1.3 |
| 6 | Thailand | 1.4 |
| 7 | Norway | 1.0 |
| 8 | Egypt | 0.92 |
| 9 | Myanmar | 0.85 |
| 10 | Philippines | 0.74 |
| -- | United States | 0.495 |

A Seismic Shift in World Seafood Supplies



Shifting from Global Seafood Exporter to Net Importer??

U.S. Seafood Imports



Food Security
Tainted Imports

www.doctoroz.com/iguide/supermarket-seafood-what-you-need-know-about-world-s-most-affordable-and-wide-...
VintagHatchery.org... Mult Vial... Getting Started... Google Scholar... WoodNet Forums Ye... Fish Hatchery Manage... Croydplot arena, B.co... Small Western Bank... NPS Reporting Portal... https://elene.app...

OZ EPISODES RECIPES TOPICS MORE SEARCH
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RELAX & RECHARGE BODY AND MIND SO YOU CAN BE YOUR BEST TOMORROW

SUPERMARKET SEAFOOD: WHAT YOU NEED TO KNOW

The Controversial Reputation of Tilapia
Originally aired on 11/14/2007
Tilapia is the world's most affordable fish, but it's also known as a counterfeit and "dirty fish." Author Larry Olmsted joins Dr. Oz to get to the bottom of the debate. Plus, see the difference between wild-raised and farm-raised tilapia.
GUESTS: Larry Olmsted, Dr. Teriaggi Ciccone

MORE FROM THIS EPISODE

Statement from Walmart About Tilapia
Thanks for reaching out. As we shared in detail with the Associated Press, we audited...

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From True Crime Tuesday to True Crime Thursday, tune in for the shocking true...

The Ultimate Food Label Guide
Decode food labels easily at the grocery store with this guide.

Statement from The International Association of Trampoline Parks
Read the full statement here.

Dr. Oz's Orders
An important message from Dr. Oz on how to best use the information you learn on the...

ASK OZ ENTER YOUR HEALTH QUESTION FOR DR. OZ TO ANSWER
POWERED BY @sharecare

TODAY'S TOP STORIES

- **Swamp Peak:** Corey Feldman Exposes Hollywood Pedophile Ring
- **Swamp Peak:** Corey Feldman Opens Up About...

WE RECOMMEND

- **Go Inside the Gut - 6 Signs Your Stomach Upset Isn't Normal**
- **The #1 Thing to Do to Prevent Alzheimer's**

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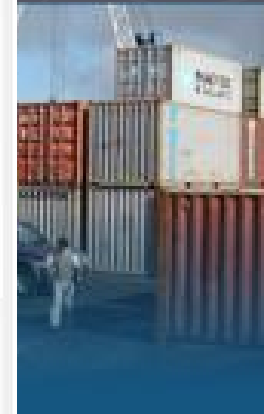
- **Pay 0% Interest For Holiday Purchases With This Outrageous... (Credit.com)**
- **[Photos] The Reason He Broke With...**

Imports

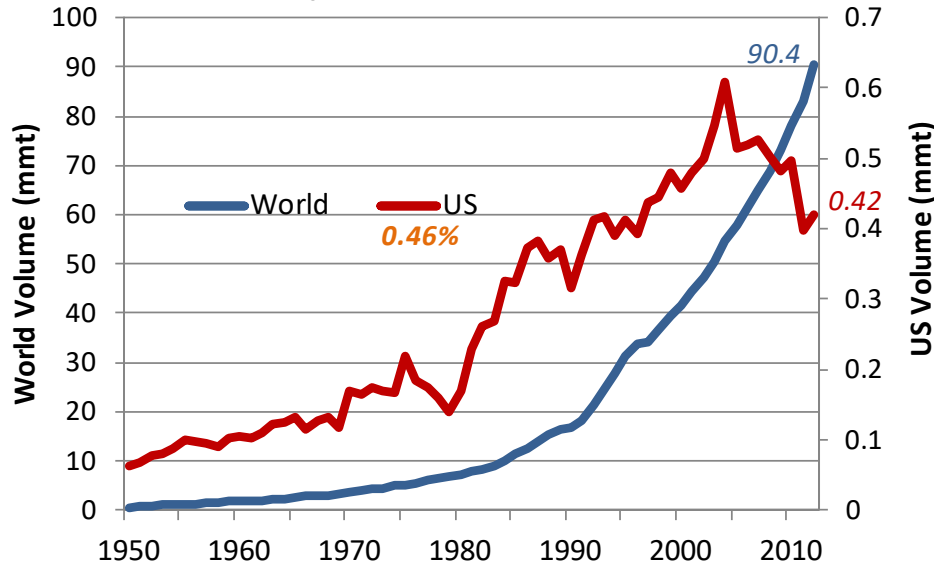
% of the US food supply is imported!!

Trade Deficit
Seafood

10 Billion/Year

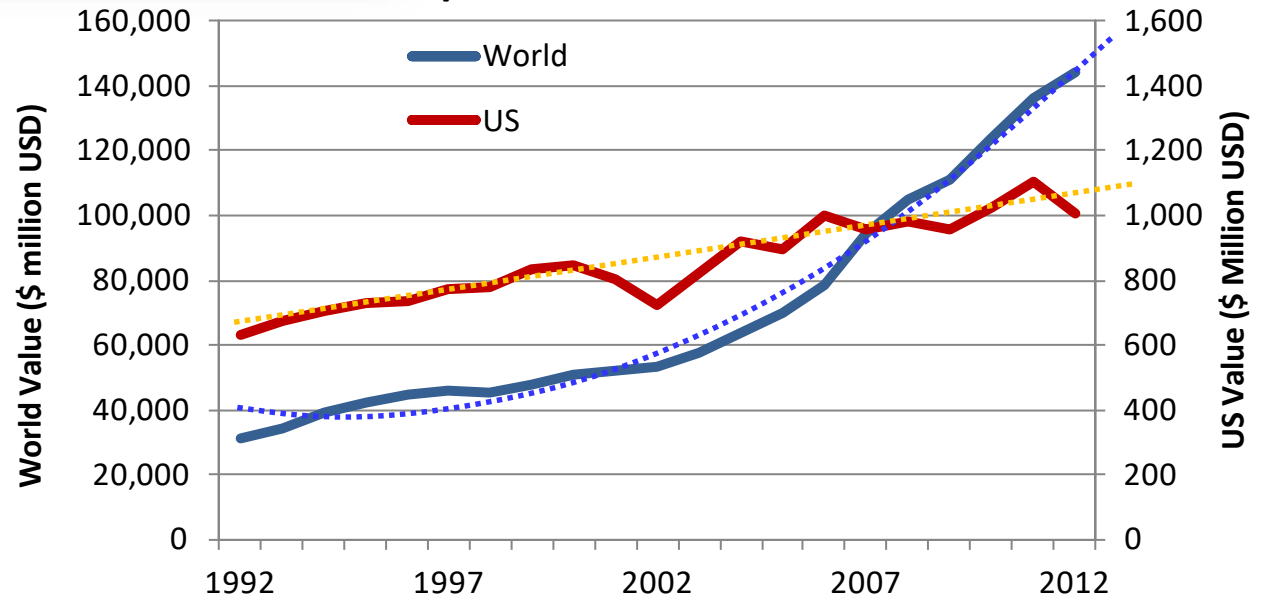


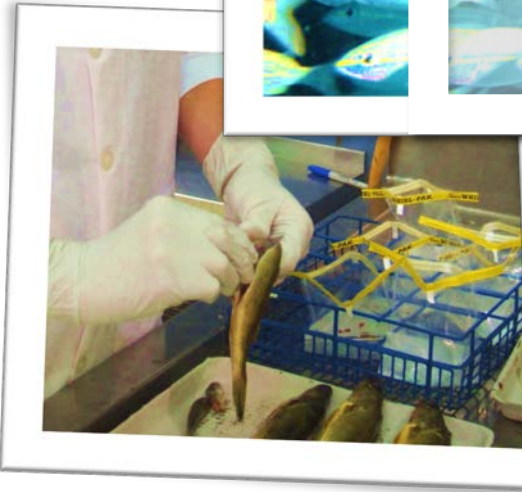
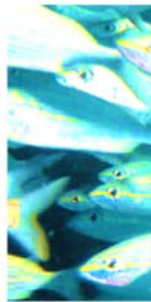
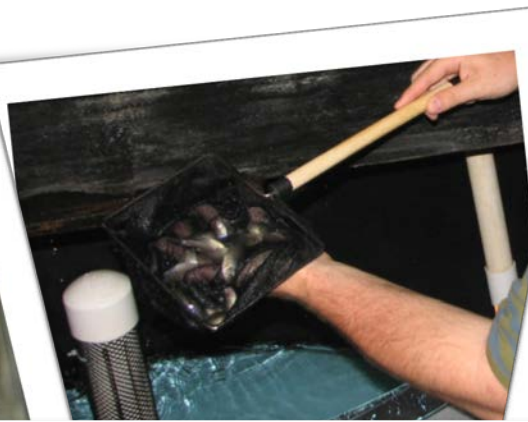
Aquaculture Production



**Aquaculture
US -vs- World**

Aquaculture Production





Aquaculture began in China

Today's Aquaculture



Silver carp



Bighead carp



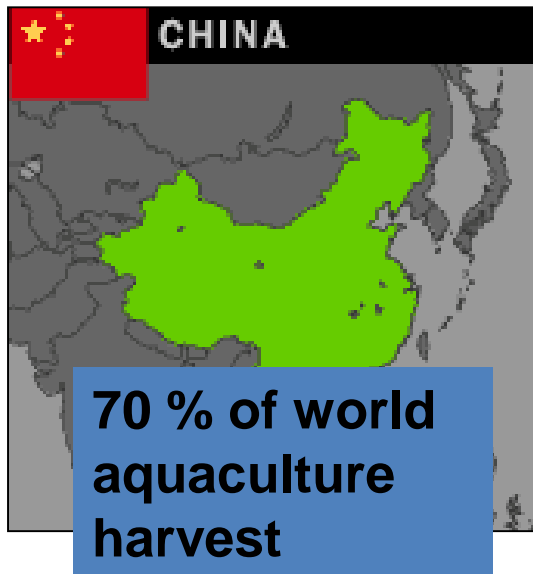
Common carp



Grass carp



Carp harvest in
2000 was
11,275,400 MT



70 % of world
aquaculture
harvest

What is Aquaculture ?



Fish fry



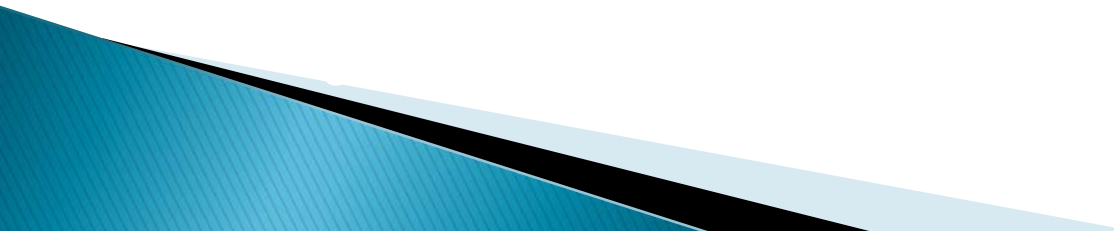
Fish feed pellets



Fish harvest from ponds

Definition #1

“Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated.”



Definition #2

- ▶ It is the production of aquatic plants or animals in some type of controlled environment for all or part of their life cycle.



Fish Production Components



Aquaculture Markets

- ▶ Food
- ▶ Bait
- ▶ Ornamentals
- ▶ Stock Enhancement
- ▶ Sport
- ▶ Fee Fishing



Species



Channel Catfish



Tilapia



Nile Tilapia



Red Tilapia



Outdoors in Ecuador and

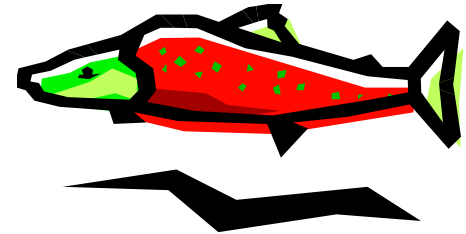


Indoors in the U. S.



Indonesia

Atlantic Salmon



Hills Island Salmon Ltd.
Bliss Harbour



Rainbow Trout



Marine Shrimp



Culture Systems

Ponds



http://www.lincolnu.edu/image/image_gallery?uuid=a908a3ba-b905-47e7-8e04-d111fca6706d&groupId=31934&t=1301606495802

Cages



<http://www.lib.noaa.gov/retiredsites/docaqua/images/cageanddivers.jpg>

Raceways



<http://www.ag.auburn.edu/fish/mediagallery/files/2013/08/935.jpg>

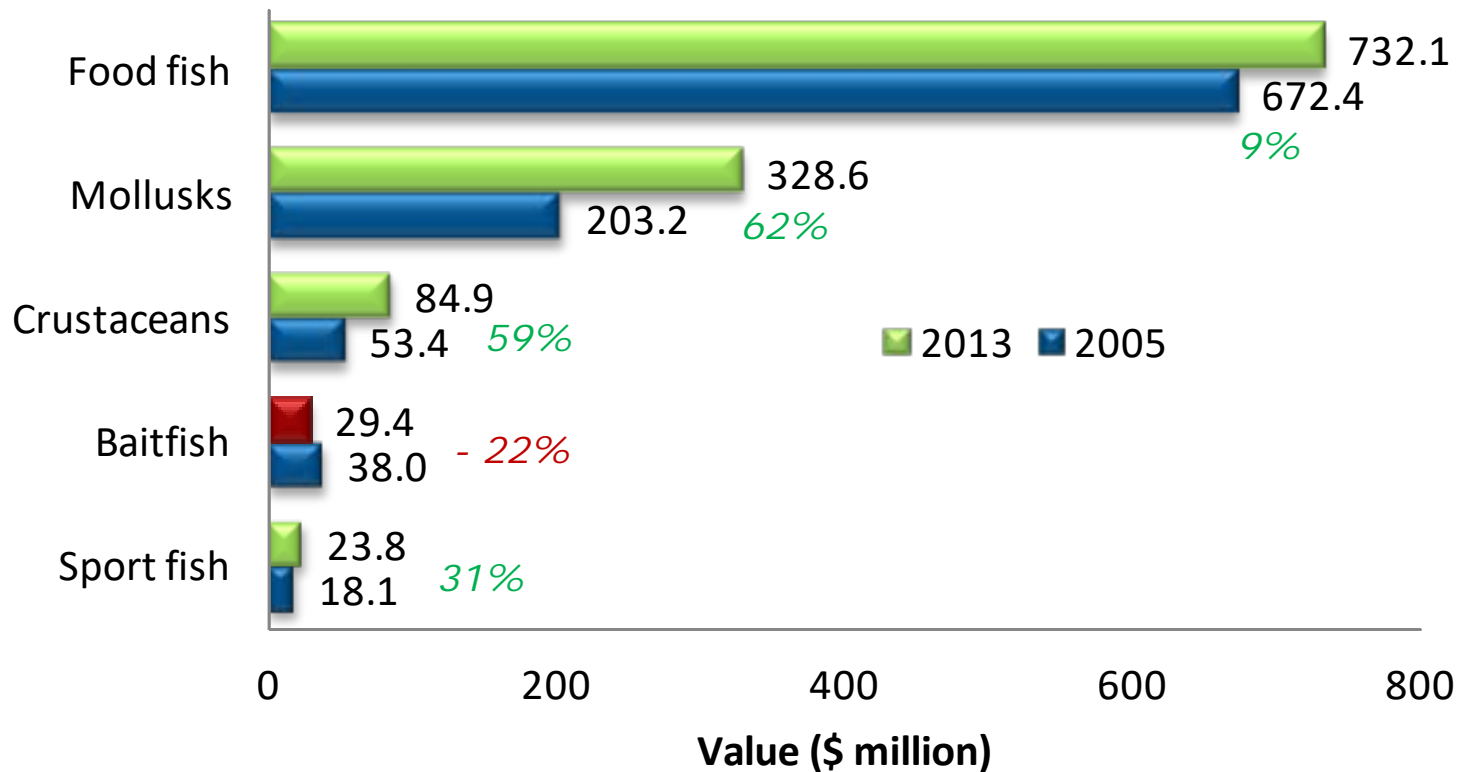
Recirculating



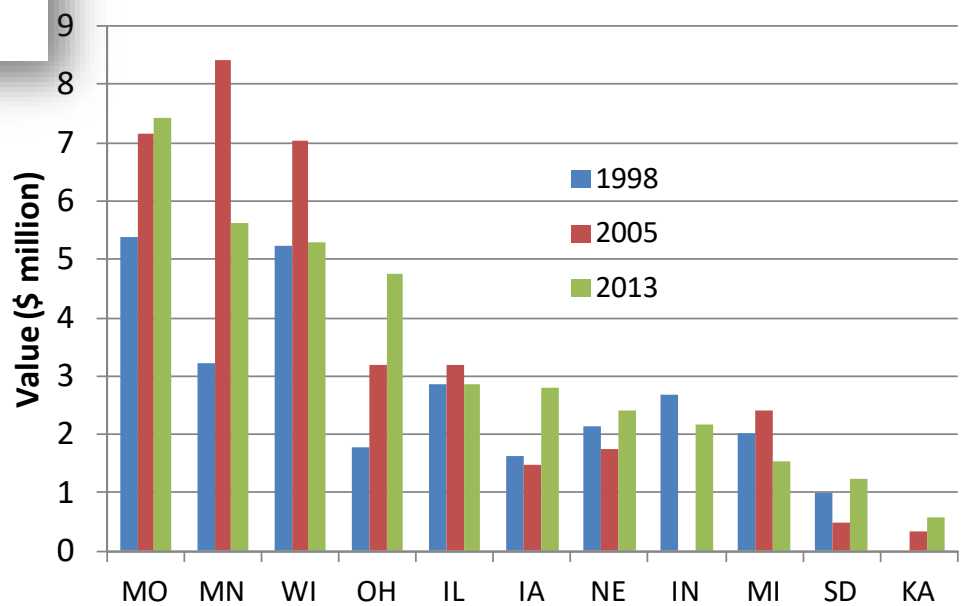
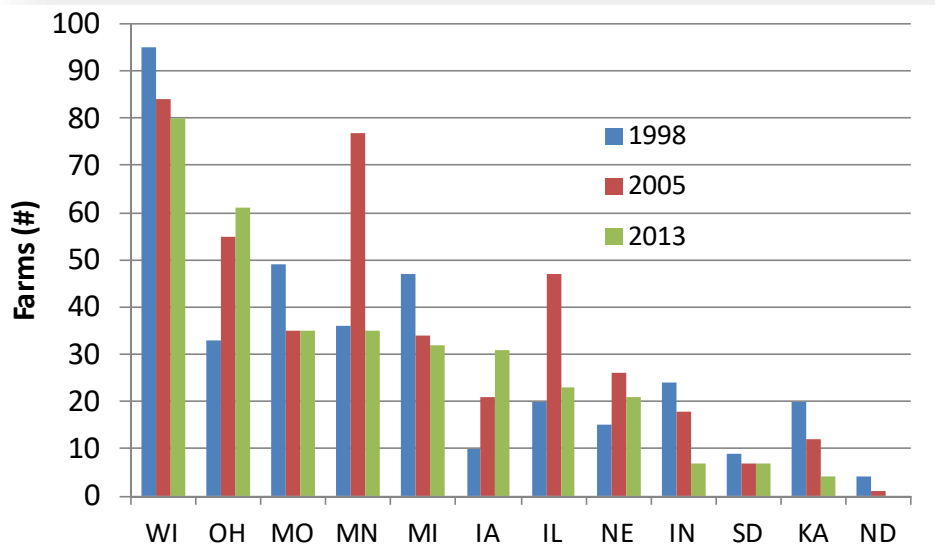
<https://www.extension.org/mediawiki/files/e/e0/HPIM1901.JPG>

US Aquaculture

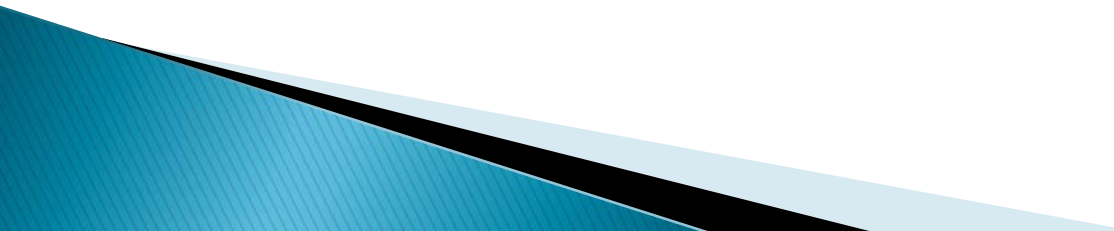
US Aquaculture 2005 / 2013



NCR Aquaculture



Constraints to U.S. Aquaculture

- ▶ Basic aquaculture principles
 - Genetics/nutrition/health/brood stock
 - ▶ Complex and poorly coordinated regulatory environment
 - ▶ Not recognized as agriculture
 - ▶ Aggressive foreign programs
 - ▶ Shortfalls in technical knowledge and education
- 

Iowa Aquaculture

- ▶ 60+ producers
- ▶ Iowa aquaculture is highly diverse ranging from growing small numbers of fish in ponds to raising larger numbers of fish in high-tech recirculating systems.



Aquaponics

- Combination of plants and fish



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Save the Date! February 9-10, 2018

October 6, 2017

SAVE THE DATE! **February 9-10, 2018**

2018 North Central Aquaculture Conference
Embassy Suites KCI Airport
7640 NW Tiffany Springs Parkway
Kansas City, MO 64153

Joint Conference of the North Central Regional Aquaculture Center

Aquaculture Associations of Missouri and Kansas

Producers in western section of the North Central Region

SESSIONS AND TOPICS

| | |
|-----------------------------|--------------------------|
| Nutrition and Feeding | Research and Development |
| BMPs | Fish Health |
| Early Life Stages | Real World Experience |
| Pond Culture and Management | Emerging Issues |
| Regulations | Aquaponics and RAS |

A limited number of rooms are reserved at the Embassy Suites KCI Airport for Friday February 9, under "Missouri Aquaculture Association" for \$115 +tax if booked before January 17, 2018. Reservations can be made by calling 816-891-7788. Information on the agenda and registration will be provided soon. For additional information contact program coordinators:

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Thursday, November 02, 2017

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B.S., Iowa State, 1979
M.S., Texas A&M, 1982
Ph.D., Mississippi State, 1988

Research

Dr. Morris's research focus on two general fisheries topics, aquaculture and pond management. The aquaculture research focuses on the fish species appropriate for the Midwest. Fisheries research focuses on fisheries management, aquatic vegetation management, water quality issues as well as general aquatic ecology questions. A unique aspect of Morris's integrated extension/outreach and research program is his role as Associate Director of the North Central Regional Aquaculture Center (NCRAC) where he manages and leads various extension/outreach programming activities from this important federally supported entity. NCRAC's mission is to enhance aquaculture through education, research, and technology transfer to support a sustainable profitable industry.

Publications

1. Kaatz, S., J. E. Morris, J. B. Rudacille, and R. D. Clayton. In Press. Origin of Chironomid Larvae in Plastic-Lined Culture Ponds: Airborne or Water Supply? North American Journal of Aquaculture.
2. Mulligan, B., J. E. Morris, and R. D. Clayton. Accepted. Chironomid abundance and consumption by juvenile channel catfish in plastic-lined and earthen culture ponds. Aquaculture Research.
3. Clayton, R. D. and J. E. Morris. 2009. Habituation performance for two percids to formulated feed under turbid and clear water culture. Journal of Applied Aquaculture 21:151-159.
4. Bozwell, J. L., R. D. Clayton, and J. E. Morris. 2009. Use of hydrogen peroxide to improve golden shiner egg hatchability. North American Journal of Aquaculture 71:238-241.
5. Rosauer, D. R., J. E. Morris, and R. D. Clayton. 2009. Role of compensatory growth in walleye fingerling production. North American Journal of Aquaculture 71:35-38.
6. Clayton, R. D., J. E. Morris, and R. C. Summerfelt. 2009. Turbidity duration on walleye larvae culture. North American Journal of Aquaculture 71:174-177.
7. Fowler, A. L. and J. E. Morris. 2008. A new stomach sample collection device for fish gastric lavage samples. North American Journal of Fisheries Management 28:1775-1778.
8. Kaatz, S. E. and J. E. Morris. 2007. Effects of formulated feed on water quality in fingerling walleye production ponds. Scientific Papers - Animal Sciences and Biotechnologies 40:29-36.
9. Morris, J. E. and R. D. Clayton. 2007. A benthic sampler for plastic-lined ponds. Journal of the World Aquaculture Society 38:318-321.
10. Rogge, M. L., A. A. Moore and J. E. Morris. 2003. Organic and mixed organic-inorganic fertilization of plastic-lined ponds for fingerling walleye culture. North American Journal of Aquaculture 65: 179-190. Contribution: 30%