

S.A.L.T.

SHARKS AQUACULTURE LIFE TRAINING

Food Fish Culture

Florida Aquaculture Food Fish



Produced by the Division of Aquaculture - 2017



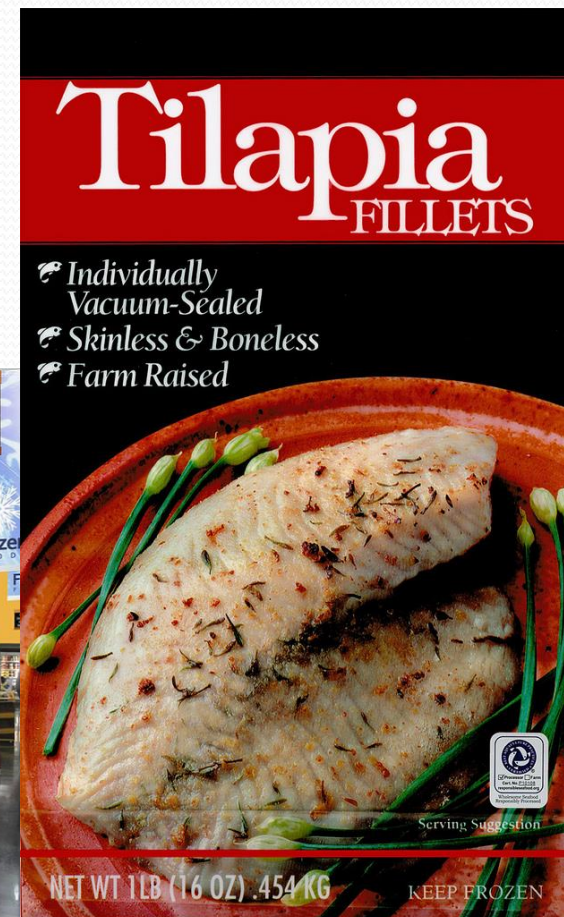
Introduction

- This presentation will cover.....
 - Where food fish come from
 - Global food fish industry
 - U.S. food fish industry
 - Florida's food fish industry
 - Common production methods
 - Catfish pond culture
 - Marine shrimp breeding



Where do food fish come from?

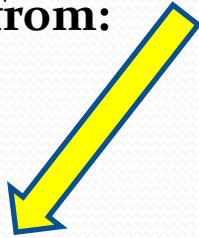
- If you said grocery store, you are not alone.
- Many people forget that their food has a history before arriving in a neat frozen package at your local store.



Where do food fish come from?

Wild capture from:

- Oceans
- Lakes
- Rivers



Aquaculture Farms

- Ponds
- Tanks
- Pens



No matter where you are in the world, the fish you consume are either captured from the wild or produced at an aquaculture farm.



Brief History of Food Fish

- Fishing has always been a critical food source for humans worldwide.
- Even today, some 1 billion people worldwide depend on fish as their primary source of protein (meat)(FAO 2000).
- However, as the world's population increases the oceans alone cannot sustain the demand for food fish....



Wild fisheries: Yield maximized

- Fish are the last wild food
- Global consumption of fish greater than what the oceans can provide
- Maximum Sustainable Yield = 90 million tons per year
- Aquaculture is rapidly growing to meet this supply shortage
- Aquaculture is the most efficient form of animal agriculture

FIGURE 13

GLOBAL TRENDS IN THE STATE OF WORLD MARINE FISH STOCKS SINCE 1974

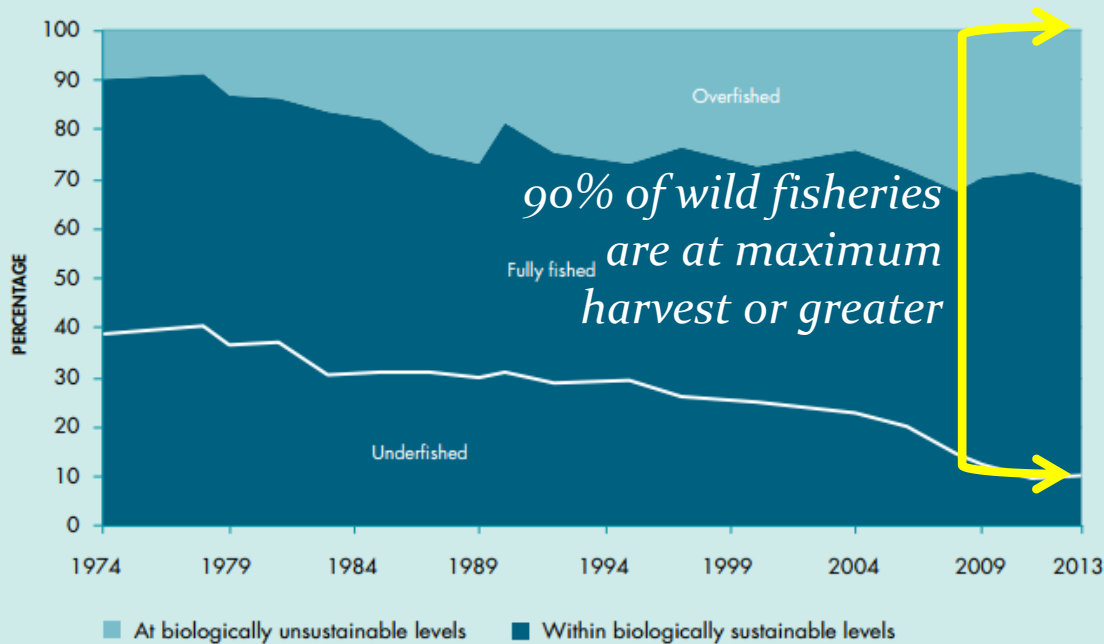
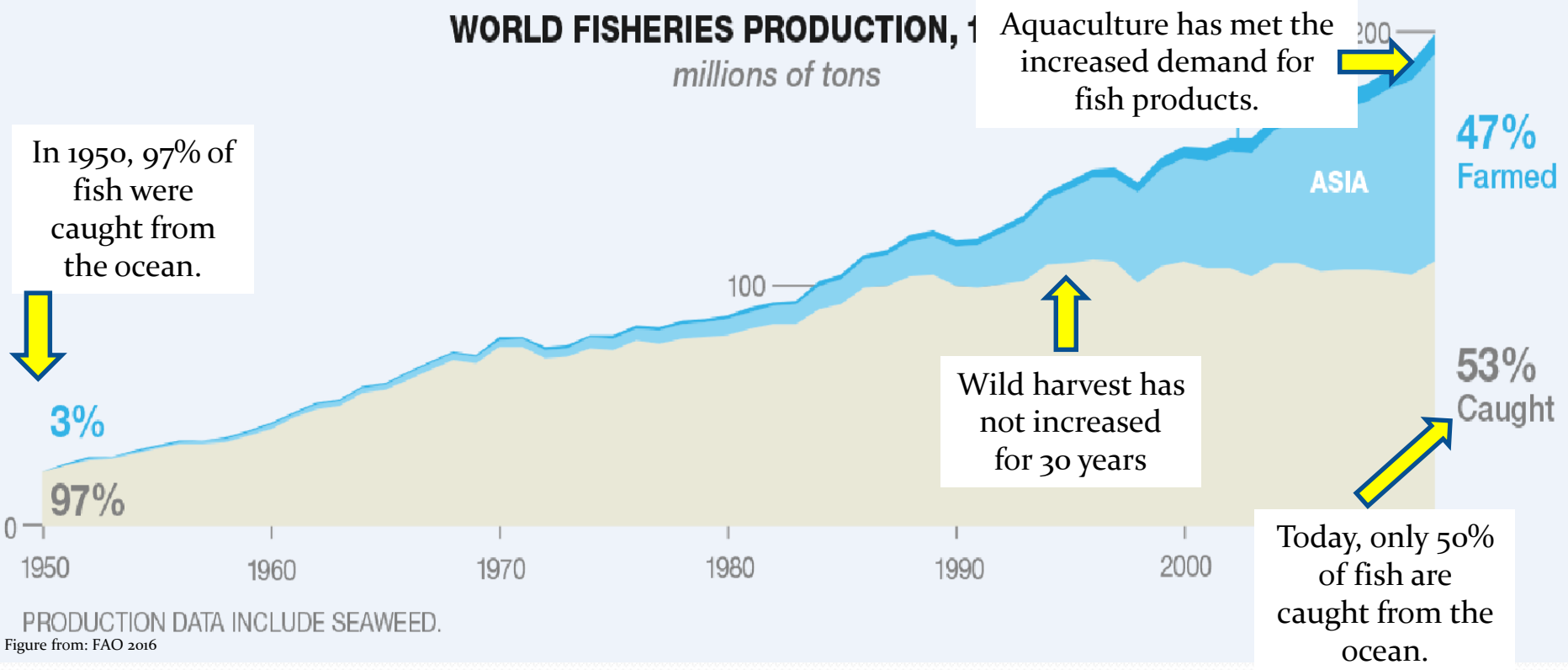


Figure from: FAO 2016



Problem: capture fisheries at maximum harvest rate

WORLD FISHERIES PRODUCTION, 1950-2016 *millions of tons*



Aquaculture will soon be the norm

GLOBAL FISH PRODUCTION

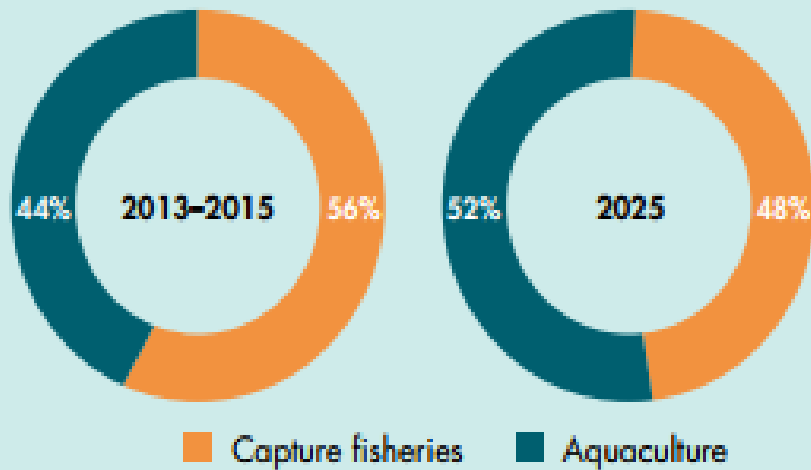


Figure from: FAO 2016

To put fish farming growth in context, as of 2013 more fish is farmed globally than beef each year!

World production Tonnes, m

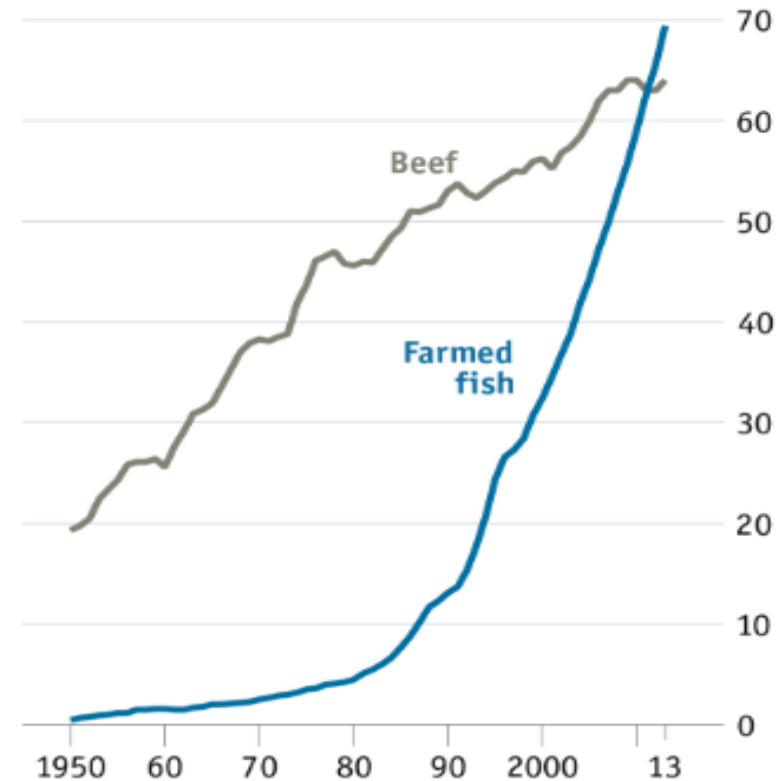


Figure from: FAO 2014



Where do our food fish come from?

NORTH AND CENTRAL AMERICA



22% domestic production

50% from Asia

22%

8%

50%

1%

18%

1%

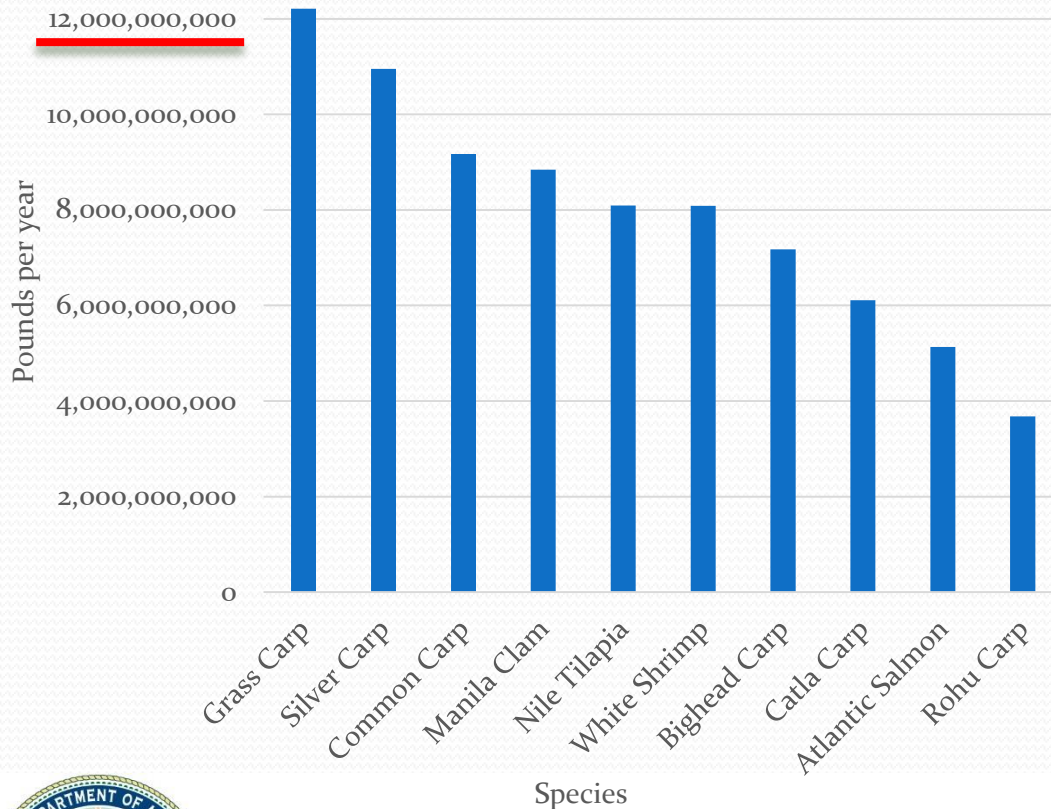
Figure from: FAO 2016

Nearly 80% of seafood is imported into the U.S., resulting in a \$14 billion dollar trade deficit, second only to the U.S. oil deficit.



Top Food Fish Produced Globally

Top 10 Food Fish Worldwide

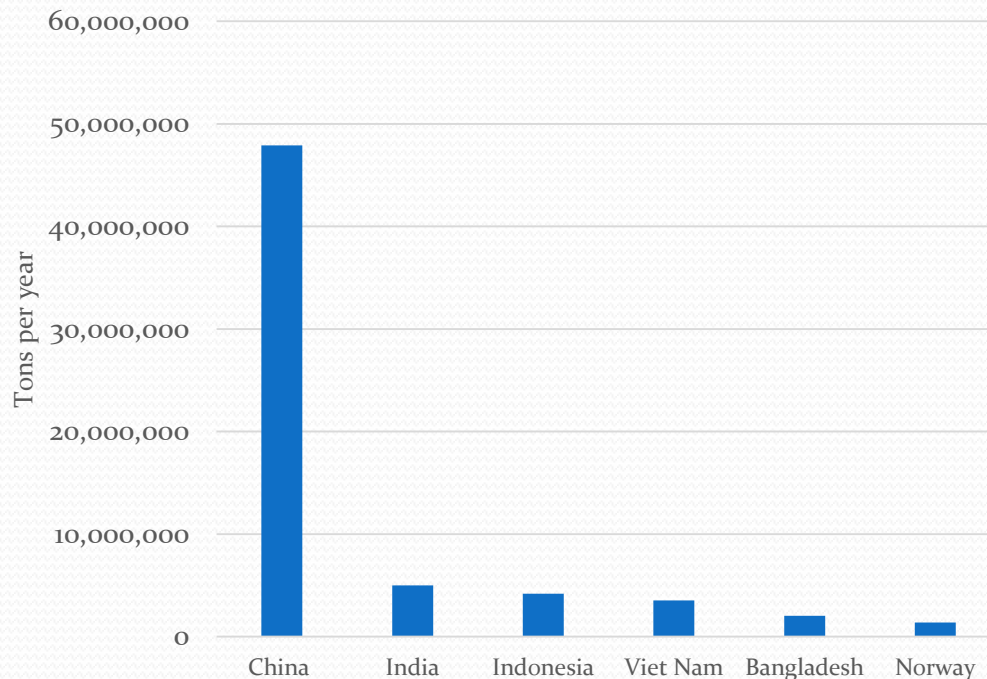


- 6 of the top 10 are carp!
- While most of these species aren't popular in the U.S., they are a staple food source for SE Asia, China and India.
- That's a lot of zeros.....
 - 49.3 BILLION pounds of the six major carp species are produced annually!



Top Food Fish Produced Globally

Top Six Food Fish Aquaculture Countries by Production Volume



China produces 62% of the world's food fish, more than all other nations combined.

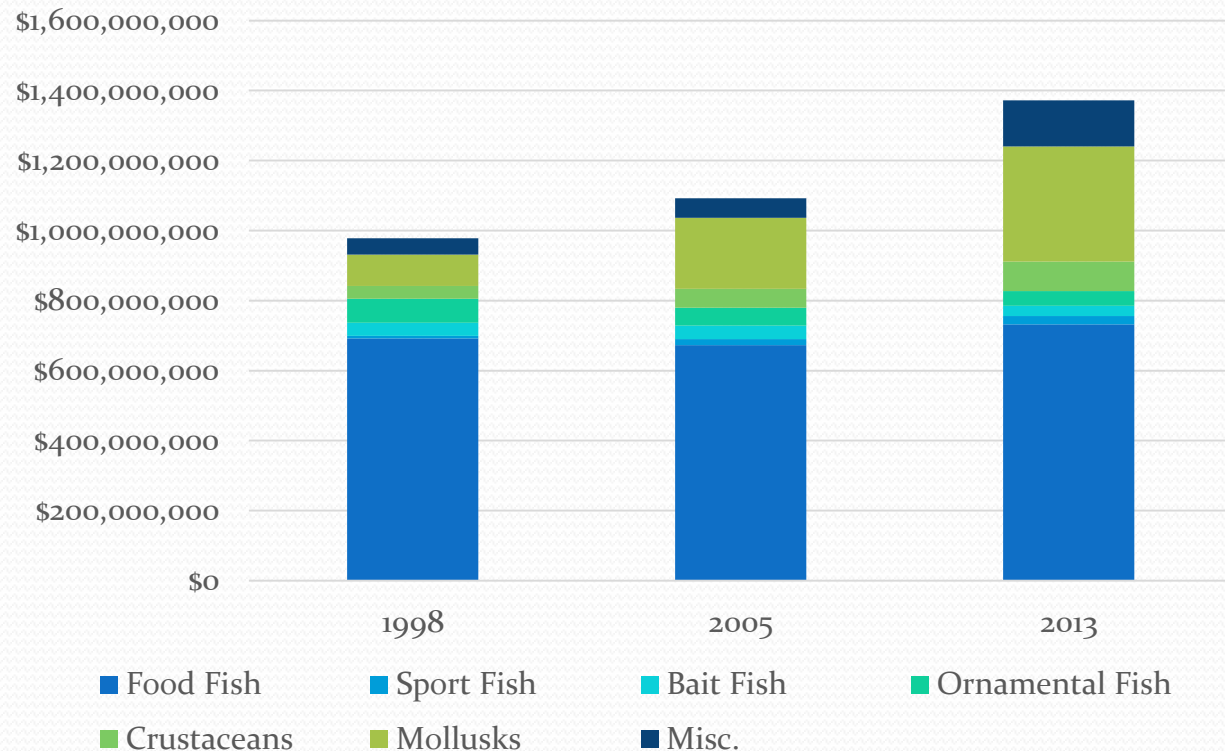
- 60.1% of inland food fish
- 94% of inland crustaceans
 - Primarily shrimp
 - USA is #3!
- 83% of mollusks



U.S. Food Fish Industry

- Food fish are the primary product cultured in the U.S.
- 71% of industry in 1998
- 53% of industry in 2013
- Although, market share has declined by 18% in 15 years, production has increased 6%.

U.S. Aquaculture Production by Category (1998-2013)



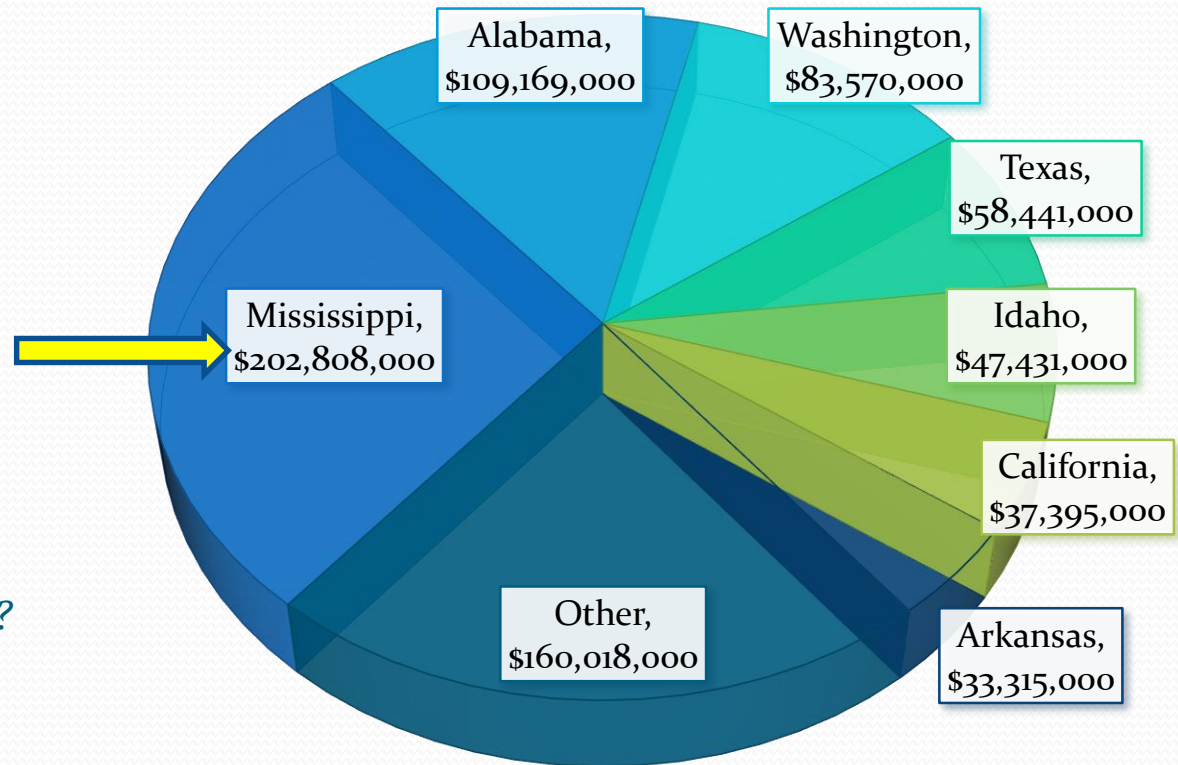
U.S. Food Fish Industry

Top Annual Food Fish Sales by State (*Census 2013*)

- Florida represents ~5% of the U.S. food fish industry

Mississippi is still the #1 food fish producer in the U.S., although sales have declined by 30% since 1998.

*Why have sales declined?
International import
competition*



What's the #1 food fish produced in the U.S.?



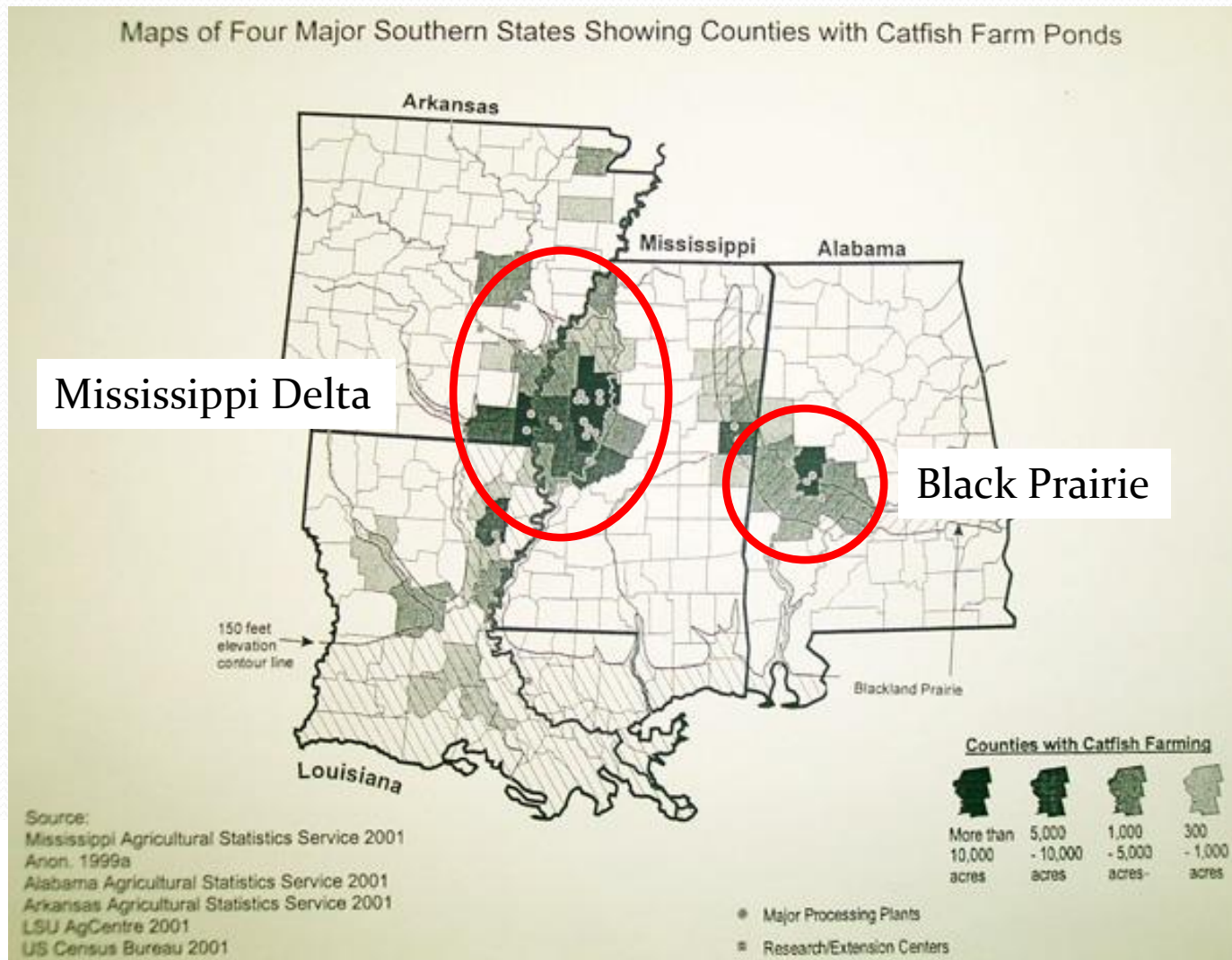
What's the #1 food fish produced in the U.S.?



Channel catfish



Where are catfish produced in the U.S.?



U.S. Food Fish Industry



Catfish



Crawfish



Trout

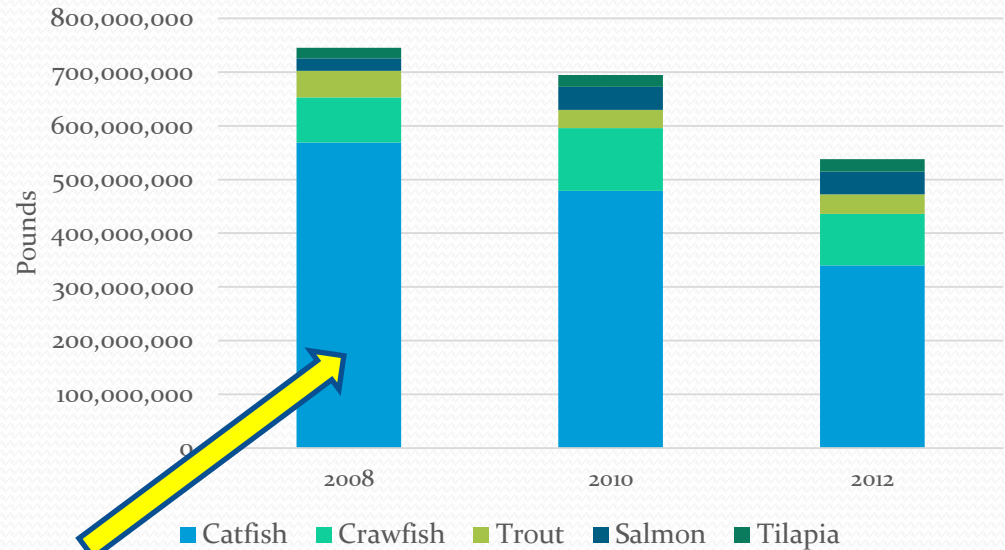


Salmon



Tilapia

Annual Food Fish Production in U.S. by Species



Catfish represent
~75% of the industry.



How are these species produced?



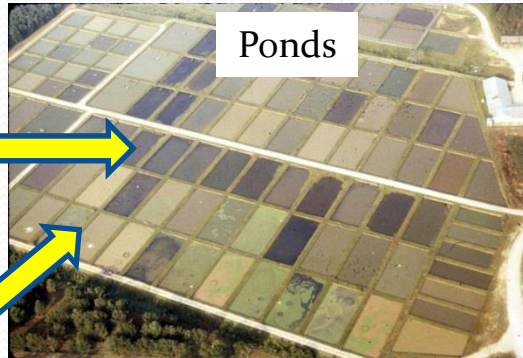
Catfish



Crawfish



Trout



Ponds



Raceways



Tanks



Sea Pens



Salmon



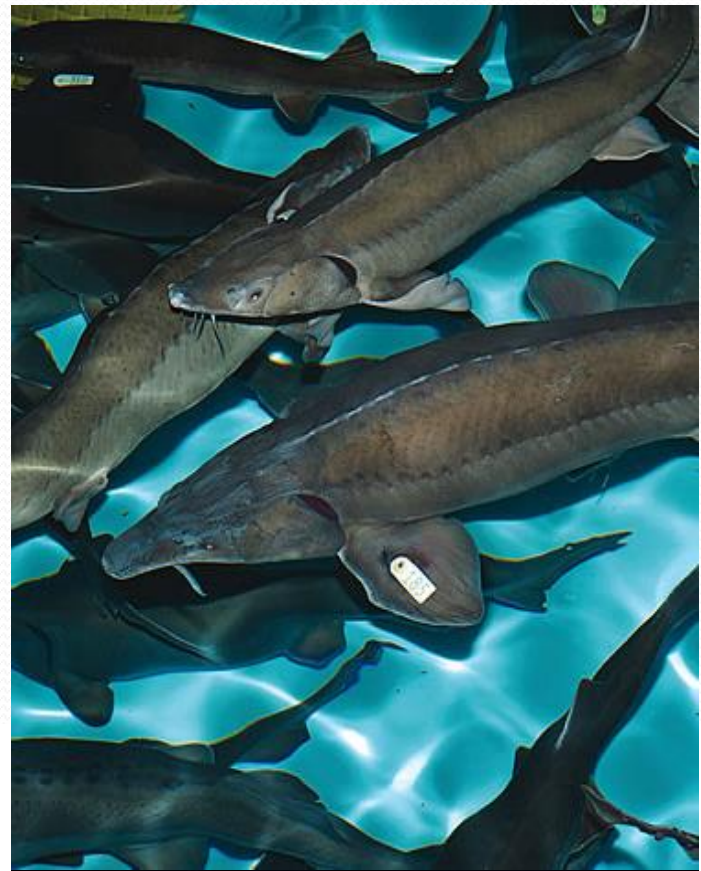
Tilapia

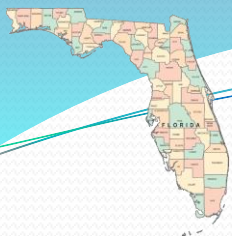


Food Fish Aquaculture in Florida

Food fish species produced in Florida

- Tilapia
- Catfish
- Pompano
- Cobia
- Hybrid Striped Bass
- Sturgeon

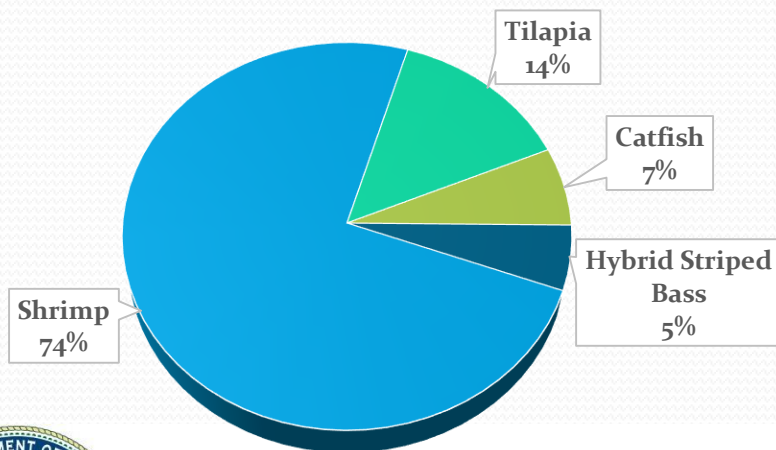




Florida's Food Fish Industry

- 49 farms in Florida (2005)
- 2013 sales in Florida = \$ 19.9 million (including shrimp)
 - \$ 3.6 million excluding shrimp

Top Food Fish Sales by Species in Florida (2013)



- While shrimp are technically not fish, they're included because they are the major aquaculture food product in Florida!
- Florida is 2nd in the nation in shrimp production sales!
- And the shrimp industry is rapidly growing in the state, with 7 farms in 2005 and 20 in 2013!

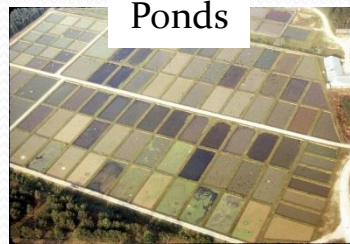


Culture Methods in Florida

- Food fish are primarily produced in either ponds or recirculating tanks throughout the state

- Pond species

- Catfish
- Tilapia
- Shrimp



- Recirculating tank species

- Hybrid striped bass
- Tilapia
- Shrimp
- Sturgeon



Why are two different methods used for tilapia and shrimp?

- *Production method is determined by size of farm, capital investment and annual production goals.*
- *Most food fish can be aquacultured in a variety of different ways depending on the environment and farmer's goals.*



Pond Culture Methods

We will focus on catfish culture for this section....

- Ponds vary in size (generally 10 acres each) depending on the ponds purpose.
 - Broodstock (spawning adults) and larvae ponds are smaller.
- Grow-out ponds are larger.
- Fish are fed by a air power spreader that shoots feed across the pond surface

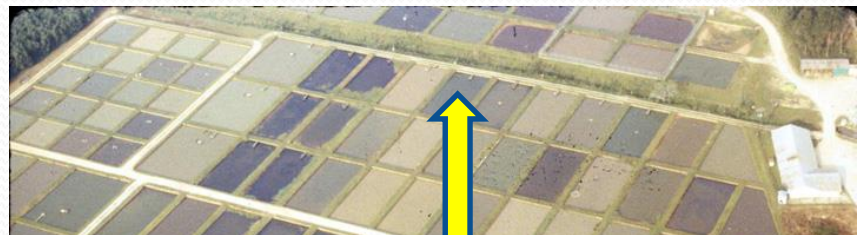


Photo credit: University of Arkansas Pine Bluff



Catfish Culture Methods

Catfish spawning and larval rearing techniques

1. Spawning containers are placed into broodstock ponds

2. Female lays egg mass in container

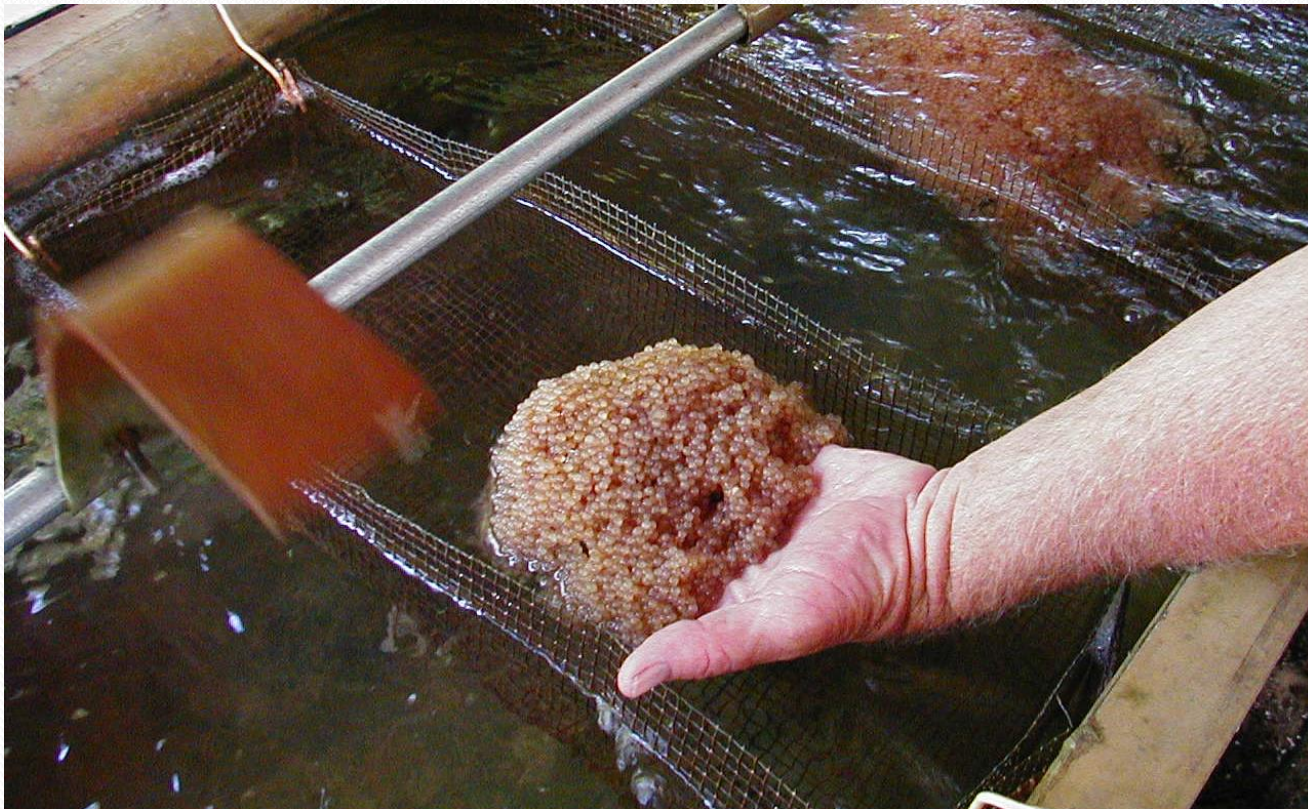
3. Farmer collects the egg mass

4. Eggs are hatched in trough tanks with paddles that mimics male parental care.



Did you know?

Catfish lay adhesive egg masses that stick together in a large clump.



In nature, the eggs stick to woody debris in the cavity where spawning occurs. After females lay the egg mass, males guard the nest and keep the eggs clean by slowly fanning his tail across them.



Catfish Culture Methods

Catfish fry or larvae are raised indoors until they absorb their yolk-sac. They are then stocked into grow-out ponds.



Catfish fry ready for pond stocking.

Photo credit: Mississippi State University Extension Service



Catfish Culture Methods

After about 15 - 18 months of growth, catfish are ready to be harvested.



Photo credit: University of Arkansas Pine Bluff

Harvest starts by running a seine net across the pond, crowding the catfish into a confined area.



The seine net is reduced in size until catfish can be scooped up in a large basket on a crane.



Photo credit: Jim Steebey



Photo credit: USDA

The basket is then dumped into tanks on a hauling truck, and fish are transported to a processing plant.

Marine Shrimp Aquaculture in Florida

Marine Shrimp Breeding Facility



- Marine shrimp aquaculture is rapidly growing in the U.S. and Florida.
- While growing out shrimp from larvae to harvestable adults is relatively simple, spawning marine shrimp is not.
- A large breeding facility in southwest Florida provides post-larvae shrimp to farms all over the world.



Conclusions

- Aquaculture is a sustainable alternative to wild harvest fisheries.
- As the global population grows and demand for fish increases, aquaculture is rapidly expanding to meet this protein demand.
- Shrimp, tilapia and catfish are the main food fish products in Florida.
- Florida produces a wide variety of food fish and is a hotspot for research, innovation and highly technical production methods (marine shrimp breeding).



Conclusion

For questions about this presentation or aquaculture in Florida
please contact the Division at:

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Handouts

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Break Time

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SHARKS AQUACULTURE LIFE TRAINING

Tour: Evans Fish Farm

Host: Brandon McLane

Website: <http://www.evansfishfarm.com/>







