

NATIONAL
Aquaculture
ASSOCIATION

Introduction to U.S. Aquaculture

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USDA NRCS Webinar
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NATIONAL **Aquaculture** ASSOCIATION

Founded 1991

15 Technical Committees

22 Board of Directors

Association of Associations

Mission

To provide a unified national voice for aquaculture that ensures its sustainability, protects its profitability, and encourages its development in an environmentally responsible manner.

Aquaculture in the United States

DEFINITION

The captive production of aquatic organisms.

MARKETS

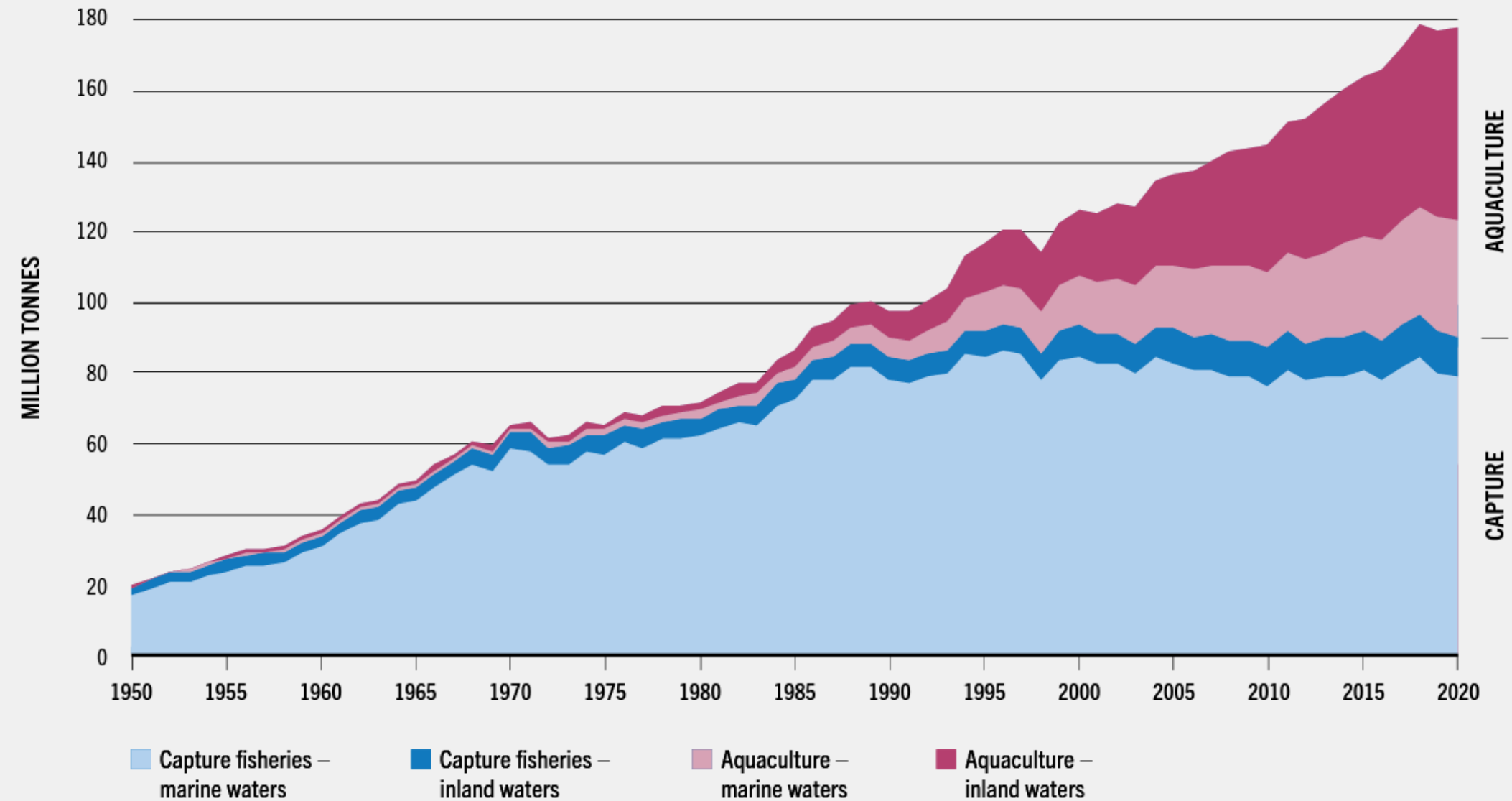
Sold for food, recreational fishing, aquaria and water gardens, cosmetics, high-fashion industry, medical treatment and research, conservation and restoration.

GLOBAL GROWTH

From 1990–2020, global aquaculture production expanded 609%.

Driven by increasing protein consumption and seafood demand.

FIGURE 1 WORLD CAPTURE FISHERIES AND AQUACULTURE PRODUCTION



NOTES: Excluding aquatic mammals, crocodiles, alligators, caimans and algae. Data expressed in live weight equivalent.
SOURCE: FAO.

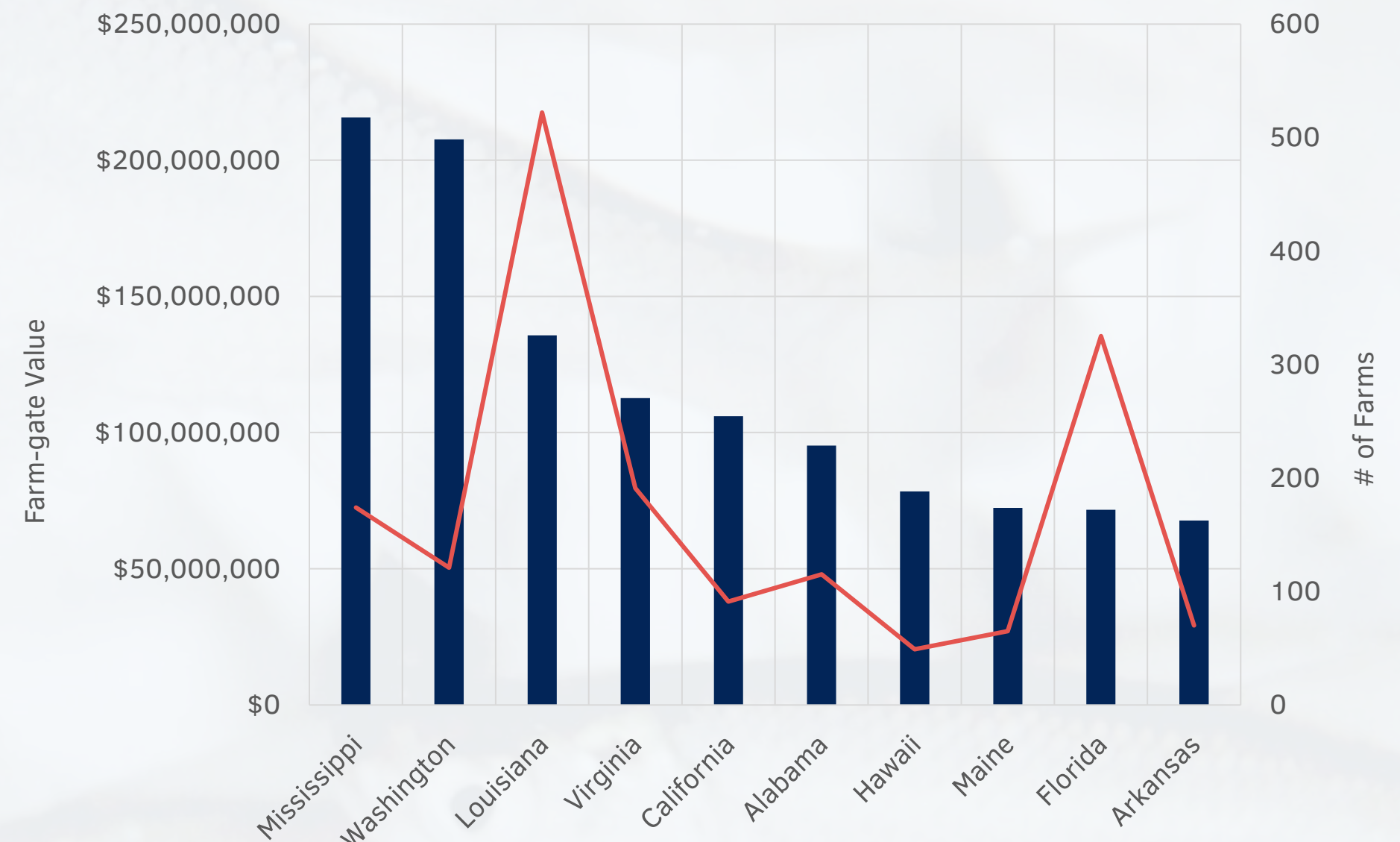
In 1950, 97% of seafood came from wild capture.

Today, aquaculture represents 52% of global seafood production.

U.S. Aquaculture by the Numbers

- Farms = 2,932
- Farm-gate value = \$1,515,680,000 (USD)
- U.S. farmers produce some 1,500 different species.

Top Ten States by Total Aquaculture Farm-gate Value (USD)



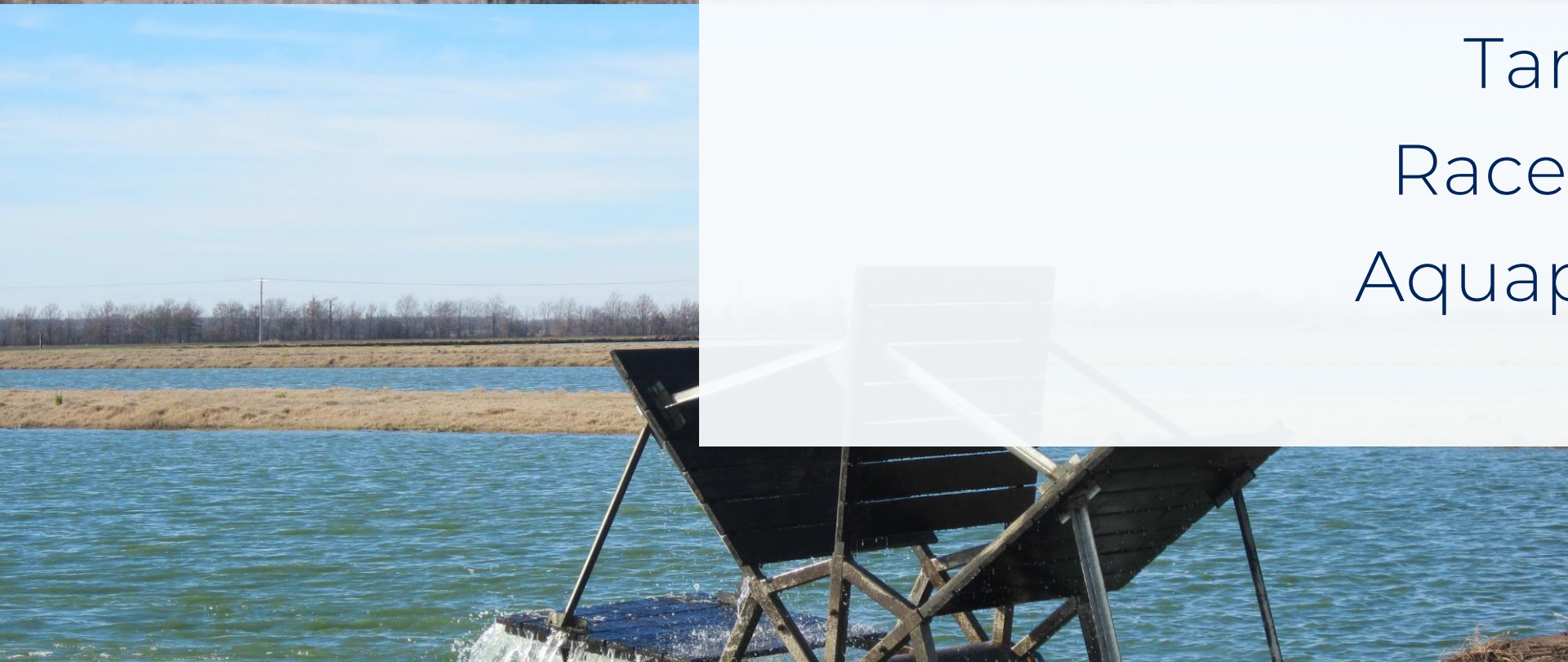
Data: USDA Census of Aquaculture 2018



U.S. Product Types

Fish (catfish, trout, tilapia)
Crustaceans (crayfish, shrimp)
Shellfish (oysters, clams)
Plants (seavegetable, mangrove)
Reptiles (alligators, turtles)





Upland Production Systems

Ponds

Tanks

Raceways

Aquaponics

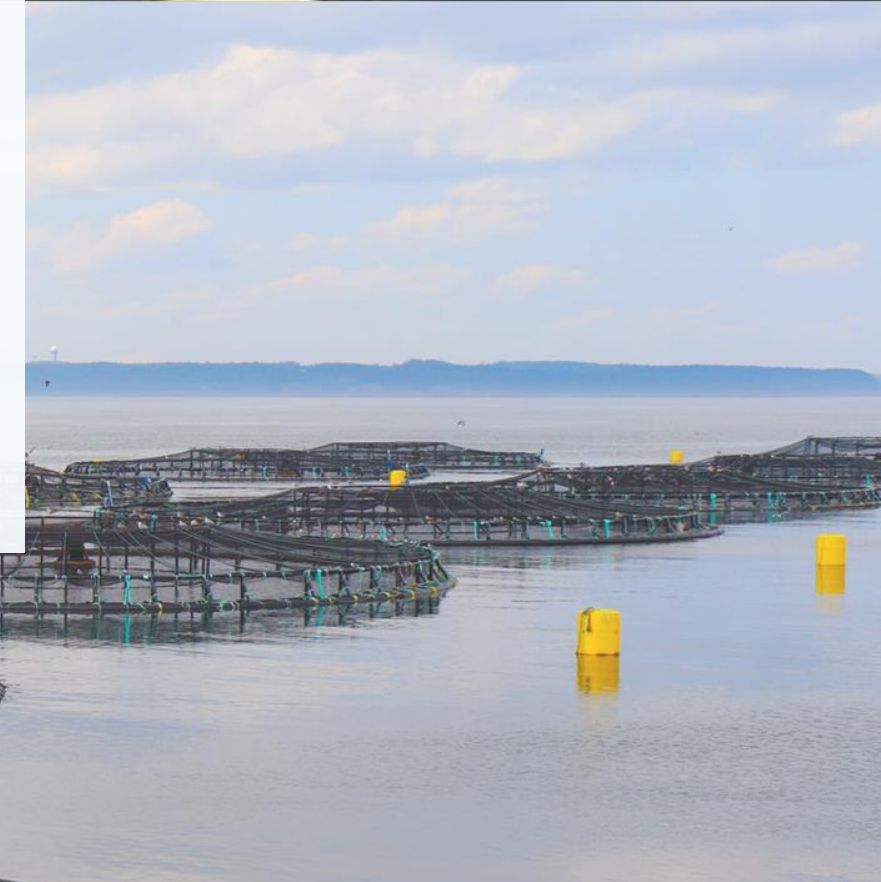


Coastal Production Systems

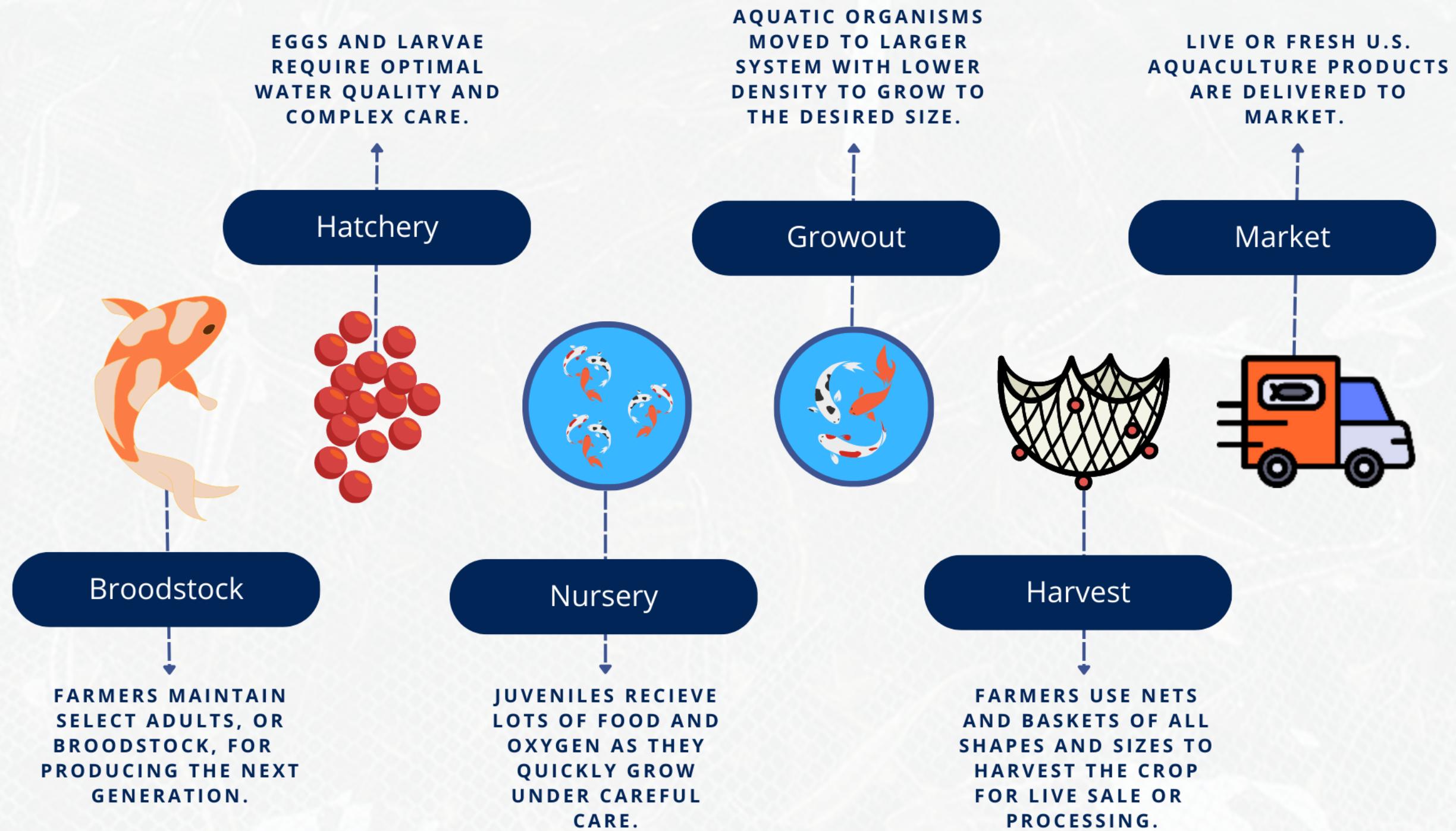
Shellfish Cages and Baskets

Seaweed Arrays

Fish Net Pens



TYPICAL AQUACULTURE PRODUCTION CYCLE





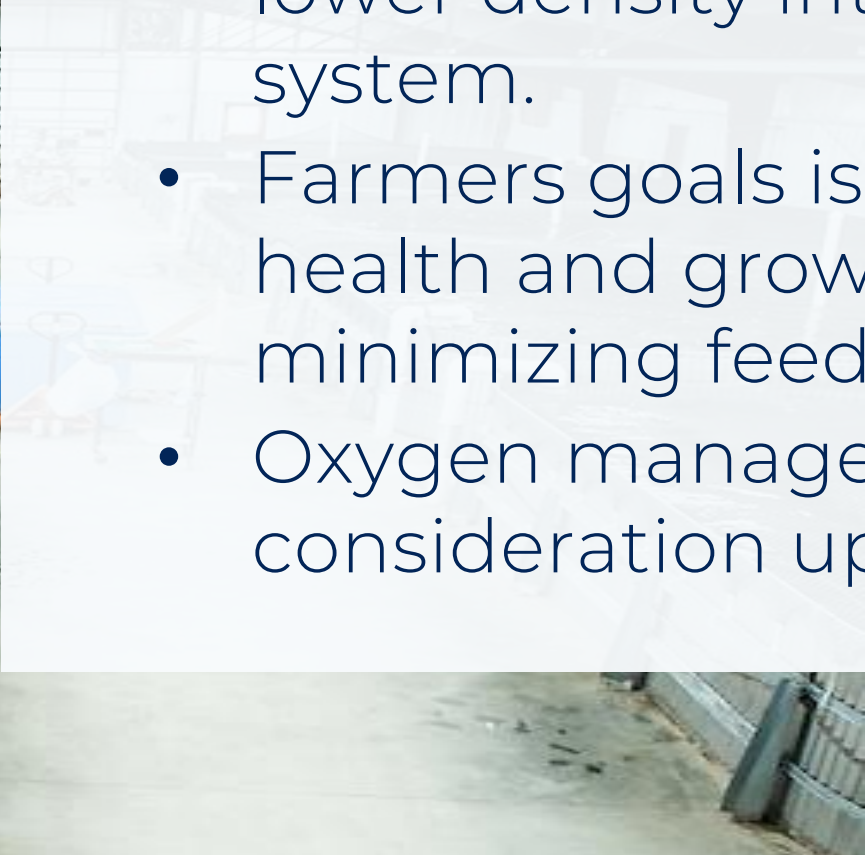
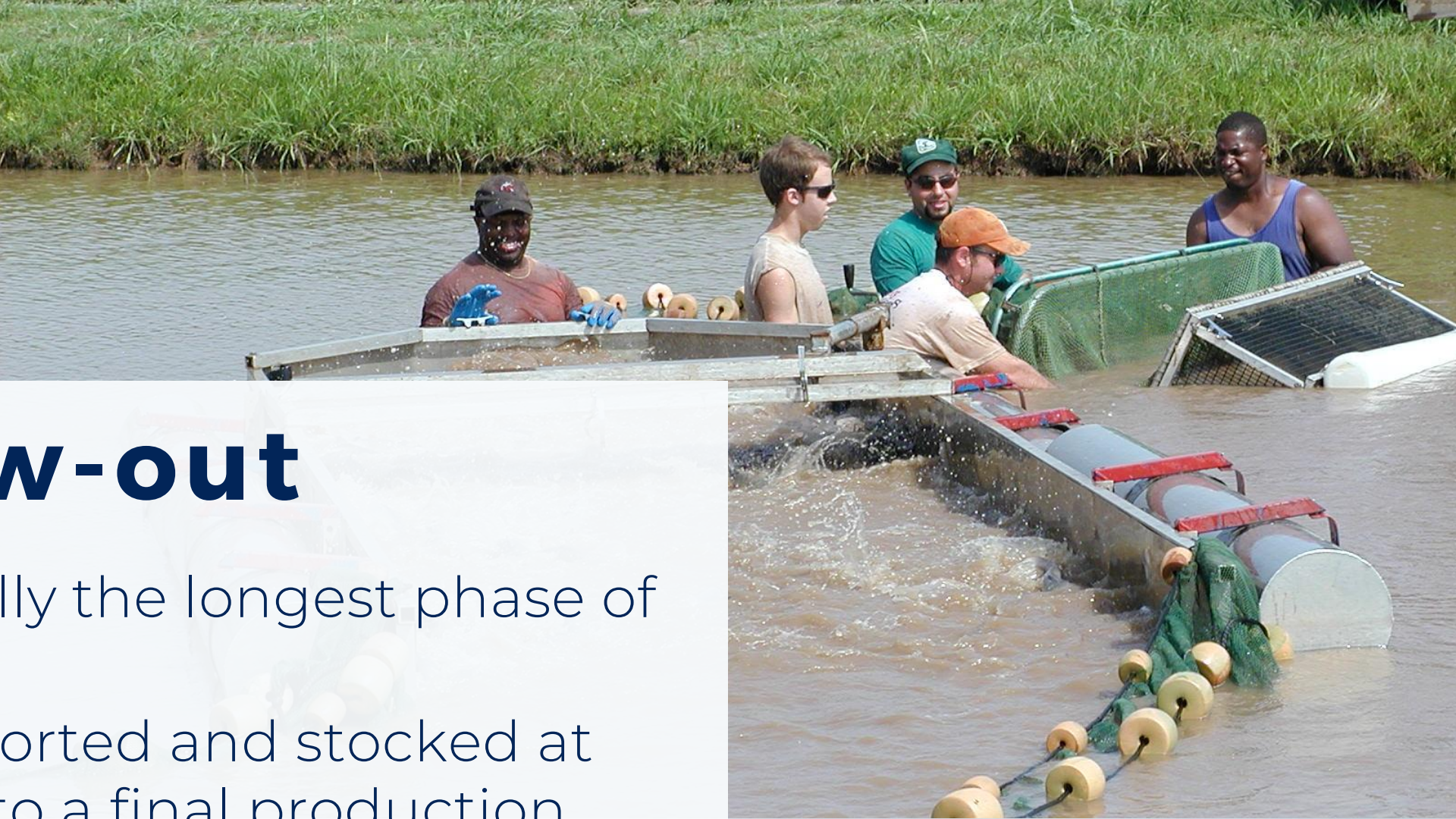
Hatchery

- Most complex and sensitive phase of production.
- Indoor culture in tanks is common.
- Rapid growth, typically <30days.
- Specific practices and technology:
 - Hatching jars
 - Algae culture
 - Live feeds and feed training
 - Heaters, chillers and lights



Nursery

- Fast growth in high-density
- Extra care is required to maintain optimal performance:
 - Organism density
 - Water quality
 - Biosecurity and health
 - Feeding rates
- Shellfish farmers often utilize docks



Grow-out

- Grow-out typically the longest phase of production.
- Organisms are sorted and stocked at lower density into a final production system.
- Farmers goals is to maintain optimal health and growth rates while minimizing feed loss and energy use.
- Oxygen management is a key consideration upland systems.



Harvest

- In ponds, fish are captured with seine nets and harvested using baskets.
- Shellfish and seaweed farms utilize boats with cranes or winches.
- Tanks and raceways crowd fish for harvest by hand-net or basket.
- Live-haul trucks are used to deliver fish to market, pond or processor.
- Packaging for air or cargo delivery is also common.



Water Resources

SOURCES

Farms obtain water from wells, artesian aquifers, and surface waters.

Treatment often required.

FARM USE

Water is an expensive and precious resource.

Farms are designed to optimize use, flow pathways and recycling.

CONSERVATION

Effluent water is often retained for crop-irrigation, percolation or evaporation.

EPA NPDES permit required for discharge.

Land and Energy Resources

LAND USE

Levee and watershed ponds

Ditches, artificial wetlands and greenhouses

Docks, pilings and moorings

ENERGY

Energy is a primary expense at many aquaculture farms.

Water pumps, fuel and supplemental oxygen are key energy costs.

CONSERVATION

Aquatic habitats, stock enhancement and restoration

Energy Upgrades:
Variable phase drives, solar water heaters, solar energy, pond covers