



POND CULTURE

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Pond environment

- Typically has little short term water exchange.
- Microscopic algae produces dissolved oxygen (D.O.) in the presence of sunlight, but consumes D.O. through respiration.
- Fish feed and waste provides pond nutrients which stimulates algae or “algae blooms.”
- Pond cycles nutrients – most importantly phosphorus for algae production.
- Algae and fish populations must be managed at the same time.

Ponds: recreational or extensive or intensive aquaculture pond



Grow only what you can sell, eat or use! Find a market first!

You will need:



- A good pond site
- Proper soil types
- Adequate water supply or watershed to fill the pond
- Proper permits? Keep it legal!
- Reputable excavator
- Cost may be \$2,000 - \$7,000 per acre

Water source?

- Groundwater is best!
Contains the least contaminants and usually provides a consistent supply.
20 – 50 gal./min./acre is best.

Surface water from rivers, streams, reservoirs.
Water should be filtered.

Watershed, or runoff sources – are often not available year round.



Pond type, size and depth?

- Levee style
- Watershed
- Hybrid of these
- Type of pond depends on site topography
- Water source
- Species grown



Pond construction

- Lined with compacted clay soils to retain water.
- Proper sub-soils with at least 20%–30% clay content
- Full pond access
- Road access
- Electricity
- Drain structure



Levee ponds

- Require relatively flat land : 2 to 5% slope is best
- Has minimal watershed
- 4 to 6 feet deep to allow seining and help manage water quality.
- May be 1/2 to 20 surface acres.



Watershed ponds

- Tend to be deeper than levee ponds
- Must allow seining
- Drawdown may be required to seine
- Water source is less reliable
- Reduce fish stocking accordingly



Approximate grow-out stocking rates of various fish species per acre



- Channel catfish: 5,000 – 7,000
- Hybrid striped bass: 3,500 - 4,500
- Largemouth bass: 5,000 - 6,000
- Freshwater shrimp juveniles: 16,000 - 24,000

Fish feeding



- Fingerlings (small fish) and adult fish are typically grown in separate ponds
- Fish are fed a diet that may range from 22% to 50% protein
- Daily feeding rates in ponds may be 1% to 10% of fish body weight or, all of the floating feed larger fish will eat in 20 - 30 minutes.

Aeration in aquaculture ponds

- Feeding >30 lbs/acre/day
- Some aeration will be required



Pond water aeration

- Aeration may be used during day or night when D.O. gets below 5 to 3 mg/L depending on the species grown.
- Aeration forces air into the water to create a D.O. zone for fish.



Fish production example: KY multi-batch channel catfish



- Fish stocked: 5,000/acre
- Annual yield ~ 5,000 lbs per acre
- Annual mortality 10%?
- Food conversion ~3:1
- Maximum feed rate: 130 lbs/acre/day
- 28 - 32% protein feed fed daily

Split ponds

- 10 acre pond – fish culture section occurs in 2 acres.
- 2 acre section is aerated at night – 8 acre section is not
- Water is circulated between ponds during the day



Advantages and disadvantages of split pond construction

Reduce cost of feeding and harvest

Better manage water quality and inventory

Economics?

Energy, construction costs?

Hybrid or channel catfish, other species?

Will it be profitable?

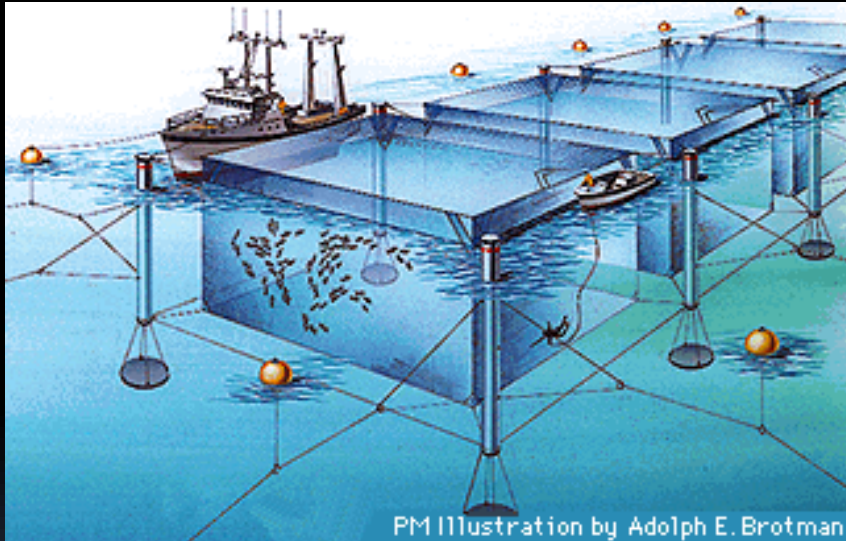


Cage culture: Where fish could not be harvested otherwise

- Feed about 25 lbs of feed per acre per day in a wind exposed pond without aeration
- Raise about 1,000 lbs of fish per acre in a wind exposed pond without aeration



Marine and freshwater net pens = bigger cages



In-pond raceways

- Bringing water to the fish
- Dependent on aeration/circulation
- Increased feed and harvest efficiency
- Culture separate size groups limiting competition
- Control predation
- Improve inventory
- Increased disease problems?



Other: Freshwater shrimp pond

- With drain and internal or external catch basin
- Shrimp are fed a prepared feed
- Shrimp must be harvested by draining the pond



Crawfish pond



- Shallow ponds ~ 2 feet average depth
- Rows of flooded forage and harvest traps
- Crawfish eat the invertebrates feeding on microbes associated with the decaying vegetation.

Some disadvantages of pond culture

- Land costs/availability?
- Land intensive practice
- Construction costs
- Ponds may need renovation every 8 to 10 years
- Difficult to keep track of fish inventories
- Subject to predators and pathogens
- You must compensate for weather events, temperature, water quality and algal blooms while managing the fish.

Some advantages of pond culture

- Can be a low tech method of fish culture
- May be more forgiving than other , more intensively stocked production systems
- Pond culture works well with other farm crop operations
- Minimal labor can manage a lot of pond acreage
- Non-productive farm land may be converted to fish production ponds.

Thank You!

