Managing Ponds for Sportfish Stockings

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Sportfish Market Benefits

- Product within one growing season
- Provide a variety of species for stocking ponds and lakes
- Provide a variety of sizes per species
- Provide large catchable species in a short time period
- Provide the potential of record size fish

Sportfish Market Concerns

- State regulations can limit species distribution
  - Interstate transportation
- State stocking programs
- Effect of periodic drought conditions
- Sizes of fish not always available to meet market needs
- Stocking for fry needs to be done with great care
  - Fragile animals
  - Cool overcast days
  - Careful attention to water pH and temperature

Species-Specific Culture Recipe

- Pond Culture Methods
  - Traditional sources of fry
    - Source of fry: pond stocking of broodstock or general use of fry
      - Broodstock discussed if they are actually stocked into ponds
  - Fingerling culture
    - Timeline for growth
    - Estimated production

Species/Taxa Discussed

- Sunfish
  - *Lepomis* – bluegills and their hybrids
  - *Pomoxis* – crappies
  - *Micropterus* – largemouth and smallmouth bass
- Percids
  - Yellow perch
  - Walleye
- Sea basses
  - Hybrid striped bass
- Catfish
  - Channel catfish
  - Flathead catfish

Lepomis Culture

NCRAC Culture Series 102; SRAC
200, 201, 722, 724 & 7205

Historical Overview

Key component in farm pond balance

- Popular sport fish
- BG/LMB Pond Stockings
  - Swingle and Smith (1938)

Biology Review

- Reproduction
  - Ponds
    - Spawning activity 70-80 F
    - Male attracts female to nest, fertilizes eggs and drives female off
    - Females may produce more than 80,000 eggs/yr in several successive spawns

Biology Review

- Sex determination

Bluegill Pond Culture

- Fingerling Production
  - Stock 20-40 pairs/acre
    - At least 1-2 years of age
    - 1:1 sex ratio
    - Expected yield
      - ~ 100,000 fish/acre
      - Variety in sizes
      - 1-3 inches depending of length of culture
    - Pond fertilization

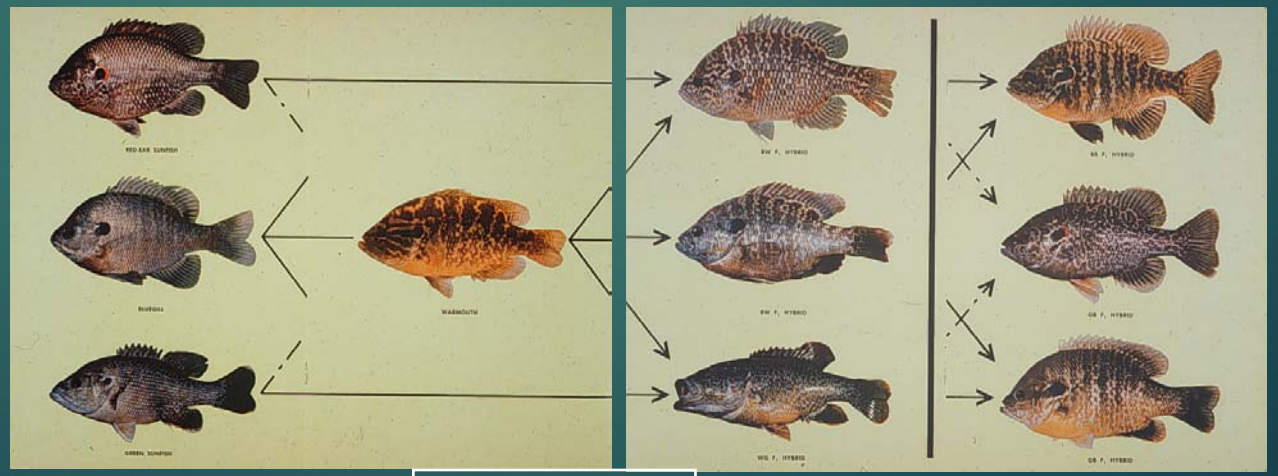
Pond Culture

- Cages to control reproduction
  - Initial work done by Missouri Fisheries Commission and continued work by Iowa DNR staff

Trays with gravel

Production of Hybrids

- Female green sunfish X male bluegill cross
  - F_1 offspring with skewed sex ratios
    - » reduced reproductive potential



Childers 1967

Pond Observations

- Hybrids voracious surface eaters
- Bluegill ponds overwhelmed with offspring
- Hybrids also produced offspring
- F_1 Hybrids (>100g) consumed F_2 offspring

Crappies

Pomoxis spp

- White crappie
- Black crappie
  - Sexually mature at 1 year
  - Limit size to >~8 inches
  - Spawn 58-64 F
  - Eggs smaller than BG, LMB
  - 60,000 eggs/lb
  - Newly-hatched fry 1-2 mm

Fingerlings

- 40-50 pairs/acre
- 1:1 sex ratios
- Some forage fish
- Additional brush not needed
- Adult removal?
- Harvest when they reach 7.6 mm
  - Variable survival (10-30%) and production (0-20,000 fish/acre)
  - Harvest under cool water temperatures
  - Use of salt for transport

Largemouth Bass

SRAC Publication #201.

Pond Spawning

- Broodstock
  - 2-3 years old and 12-18 inches long
  - 4,400 eggs/lb
  - Spawning at 60 ^{O}F

Fingerlings

- Spawning-rearing system
  - 30-50 lbs of brood fish/acre (10-40 fish/acre)
    - 1+:1 of males : females
  - Adults are left in the pond with the fingerlings until fish are harvested.
  - Fingerlings are harvested using 1/8-inch soft seine after a culture period of 40 - 65 days.
    - 20-50K 1.5 to 2.0 inch fingerlings
  - No control over stocking density of fingerlings other than controlling number of brood fish.

Fingerlings

- Fry-transfer system
  - Up to 125 lbs of broodstock (40-100/acre).
  - More males than females be used.
  - Harvest using a soft fine 1/32-inch mesh seine
    - males guard fry up to 2 weeks post hatch
  - Yield
    - ~200,000/acre possible but often less
  - ½-to ¾ -inch fry are stocked into nursery ponds at 40,000-80,000/acre
  - Need same age animals

Phase II Fingerlings

- Assuming feed-trained fish
  - Fed 2-3 times daily using a 40 - 48% protein diet with 8 - 10% fat.
- Feeding activity is often influenced by variable water temperatures and environmental conditions.
- Reach 6-8 inches by their first fall.
  - At this time, these fish can be used for stocking in the fall or retained for the following culture period.

Smallmouth Bass

Pond Spawning

- Sexually mature 3-4 years
  - Depends more on size than age
  - 0.9-2.2 lb brood fish
- 7,000-9,000 eggs/lb
- Spawn earlier than most centrarchids
  - ~55 F

Fingerling culture

- Fry often collected before they leave the next
  - Removable nests
  - Pumps
- Move to rearing ponds

Walleye

NCRAC Culture Series 101

Fingerlings

- Phase I
  - Stocking recommendation 20,000-30,000 fry/acre-foot or ~100,000 fry/acre
  - Stocked at ~5 days post hatch
  - Culture 4-6 weeks
  - Harvested using soft small mesh seine
  - Expected size is ~1.5+ inch
  - Variable survival depending on pond fertility and size of fish harvested
- Phase II
  - Stock graded fish at 10,00-15,000/acre

Yellow Perch

NCRAC Culture Series 103

Open Pond Spawning

- Perch broodstock are stocked to ponds with substrate (Christmas trees) added
- Broodstock can be removed later, or left in if feed trained
  - Stocking rate is ~60 fish/acre with 2:1 males : females
  - 40,000-100,000 eggs/lb

Female

Male

Fingerlings

- Phase I
  - Ponds fertilized once a week with liquid inorganic fertilizers
  - Culture period approximately 6 weeks (mid-April - end of May)
  - Fry removed and stocked into rearing ponds
    - Stocking rates range (150,000–600,000 fish/acre) depending on production goals; lower densities yield larger fish for the same culture period
- Phase II
  - Fish graded and restocked into ponds for later culture can yield 2-6 inch fish by fall

Figure 5.1. Feeding with lights (photo by Jim Held).

Hybrid Striped Bass

NCRAC Publication # 107

Crosses

- Original cross
  - striped bass female (*Morone saxatilits*) X white bass male (*M. chrysops*)
    - Palmetto bass
- Reciprocal cross
  - white bass female X striped bass male
    - Sunshine bass

Fingerlings

- Phase I
  - Fry received from hatcheries
    - Pond preparation
      - Original cross
        - Fill 2 weeks prior to stocking
      - Reciprocal cross
        - Days prior to stocking

Fingerlings

- Phase I Stocking
  - 1-5 acre ponds
  - 100,000 to 250,000 fry/acre
    - Less density, greater size diversity
  - 2-5 days old
- 30-45 days culture
- Feeding
  - Salmon starter diet (mash or #1 crumble after 14 day
  - Feed three times per day
  - 3 pounds per acre
  - Survival (%)
    - Use light to check survival
    - 40-50 for original
    - 10-25 for reciprocal

Fingerlings

- Phase II Stocking
  - 1-5 acre ponds
  - Grade Phase I
  - 1 gram or larger
  - 8,000 to 12,000/acre
- Feeding
  - 40-50 salmon starter
  - 15-30% body weight per day, three times per day
  - Reduce to 3-5% after two weeks

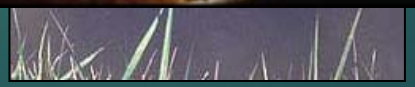
Channel Catfish

NCRAC Extension Publication 444, many SRAC publications

Pond Spawning

- Stock adults 3 to 8 years old
- Stock 1 male to 2 females
- Sexual maturity - 2 to 3+ years
- Preferred spawning water temperatures 70-84 F
- ~4,000 eggs/lb
- Eggs transferred to hatcheries in most operations

Spawning Containers

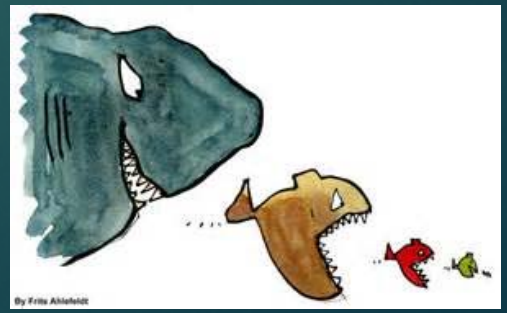


Fingerlings

- 2-5 d fry stocked into fertilized ponds fertilized
  - Want them to be actively feeding
- Stocking density determine sizes of fingerlings
- Stock 10,000-20,000 fry/acre to get 7-inch fish
- Feeding
  - Feed around the pond with size 0-1 mesh feed
  - Feed at 4-5% body weight

Fingerling Target Sizes

- Management needs
  - Larger fish needed for ponds with predator bases
    - 8-inch channel catfish for ponds with established largemouth bass populations
    - May need 4+ inch long bluegills to allow for some minimal production in these same ponds.
- Production goals
  - Large number of small fish are cheaper to produce but yield less value
- Holding tank concerns
  - Move highly predatory fish out quickly
    - Big fish get bigger at the same time fewer smaller fish



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Summary

- Fish marketed as sportfish can be profitable if the producer can meet consumer requests for species and size variety.
- Sportfish markets are susceptible to changes in landowner management goals.
- Many of the fish marketed as predators, e.g., largemouth bass and walleye, in ponds and lakes are very sensitive to stocking stresses of the fry as well as cannibalism.