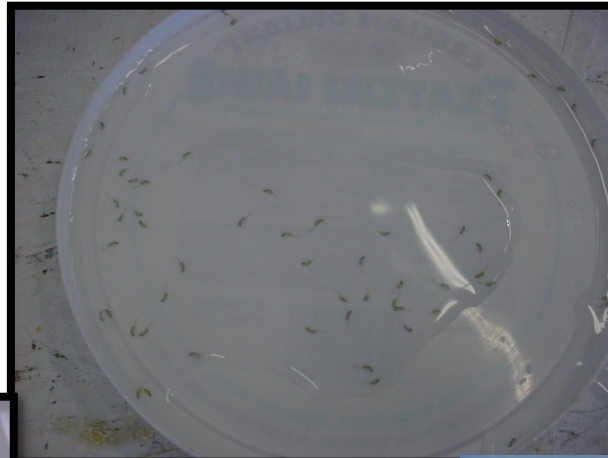


Fry Collection and Stocking



Fish Management

Number of fry stocked



Rule of Thumb:
50-100K per acre



?????

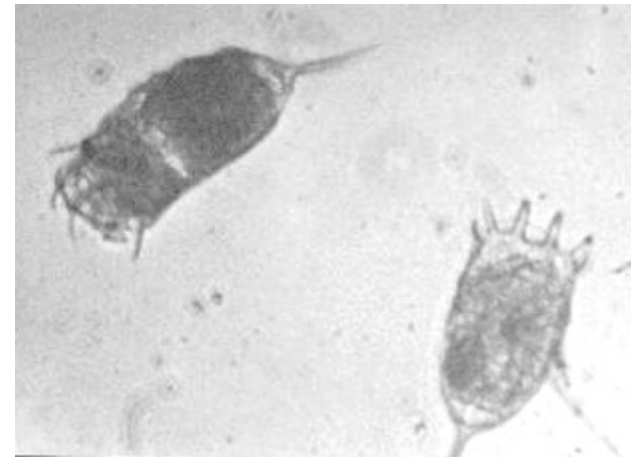
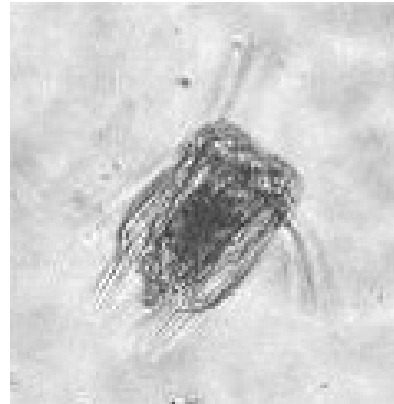


Rotifers

- Rotifers

Females parthenogenetic

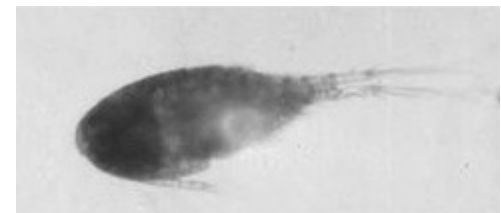
Allows fast multiplication



Zooplankton

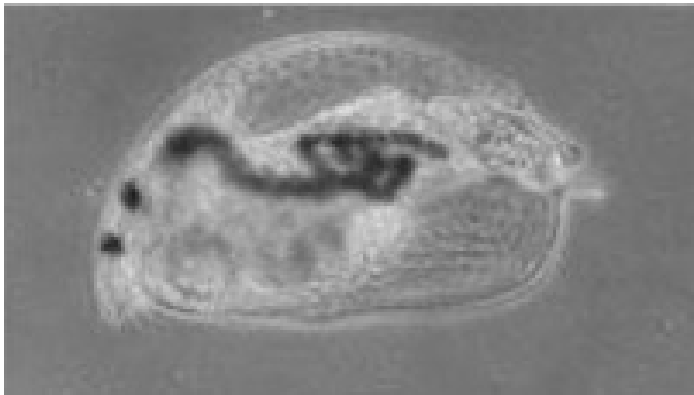
Types of Copepods

Subclasses Calanoida & Cyclopoida



Cladocerans(Daphnia)

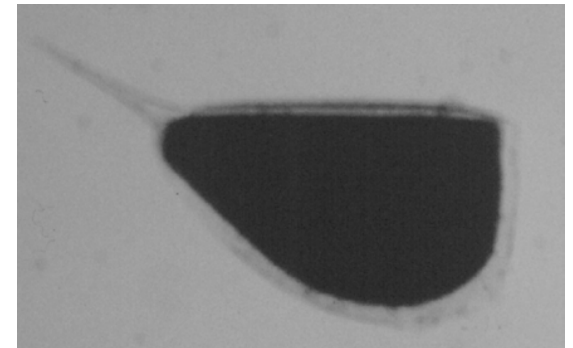
- Types of Cladocerans



Similar to Rotifers

Females parthenogenetic

Produce amictic eggs (diapause eggs)



Produces resting egg (ephippium)



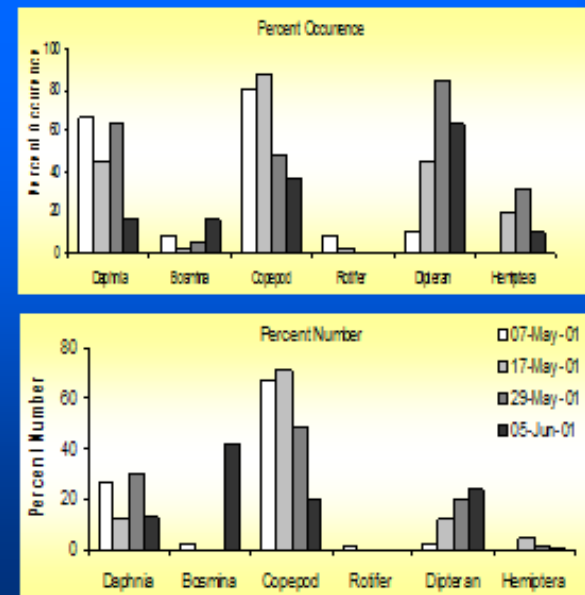
Fish Management-Fry-Phase I

Feed

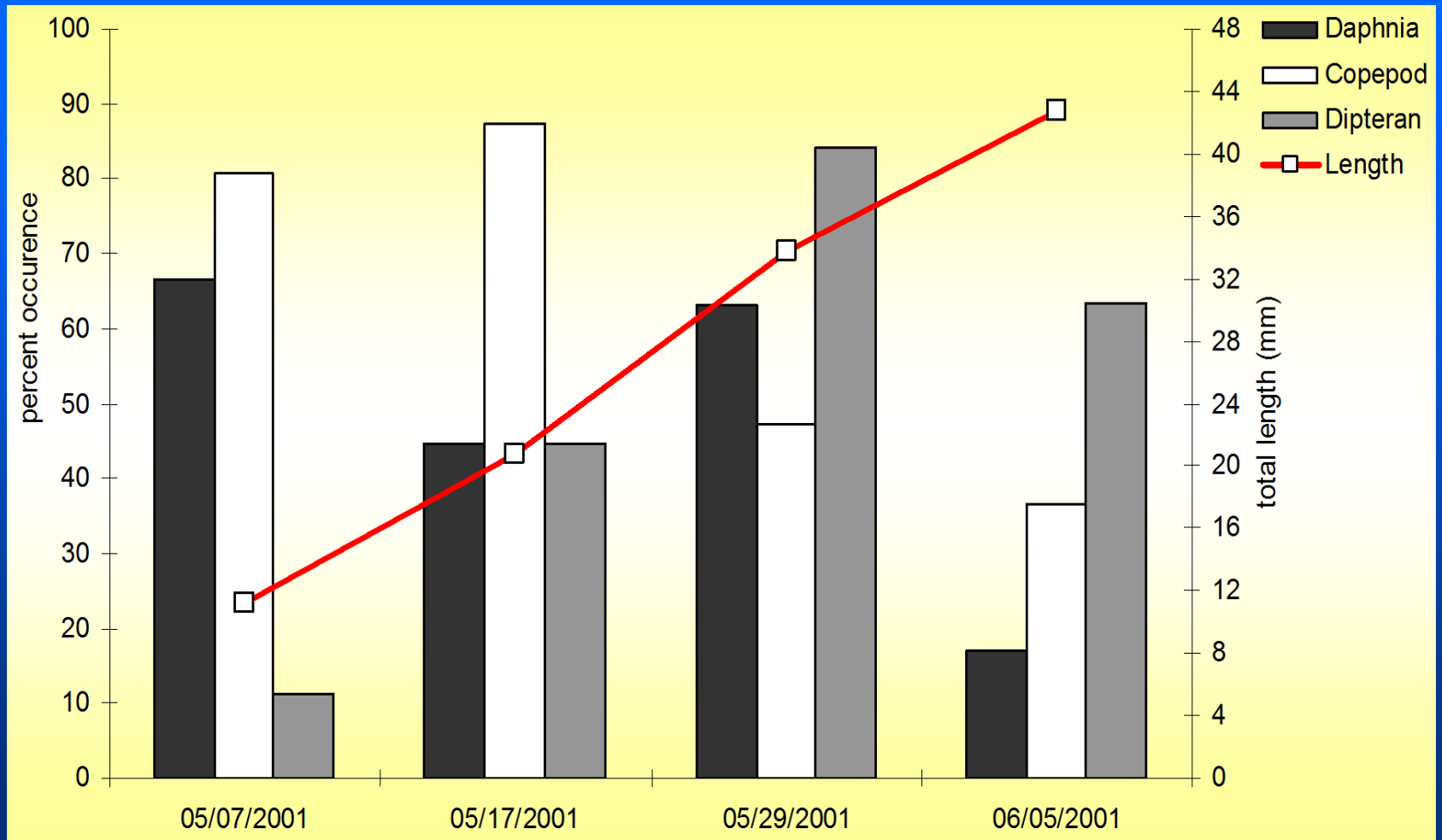
- Walleye
- Fry are eating zooplankton first 30-40 days
- Start with rotifers-copepods-daphnia
- End by day 30 remove from pond and switch to minnows
- Start with Tuffies
- Crappie size fatheads
- Regular fatheads

Results - Stomach Contents

- Copepods and cladocerans important early
- Dipterans become increasingly important beginning 17 May

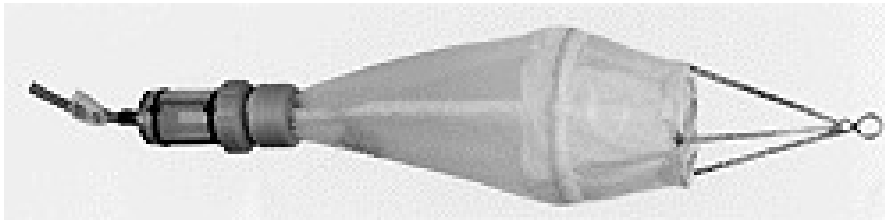


Growth and Selectivity



Pond Management

- Regular Plankton Sampling
- Wisconsin plankton net



Pond Management

- Goal of Hatchery or Pond Manager
- **Produce Quality Zooplankton for the size of the fish**



Group: Rotifers/Copepods/Cladocerans

Species: *Daphnia magna* vs *Daphnia pulex*

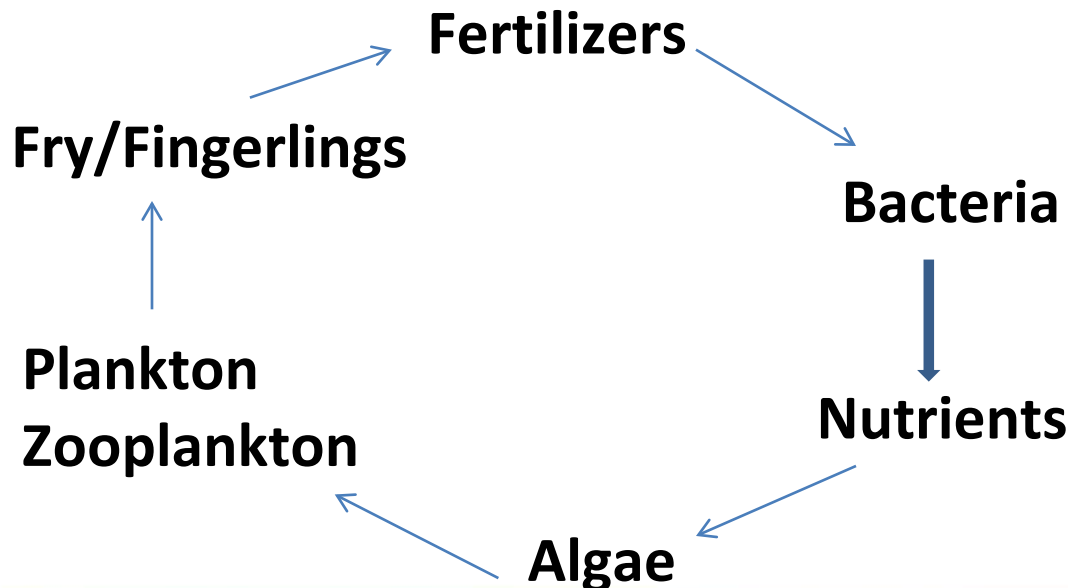
Size: different fish species need different sizes of zooplankton as first prey.



Pond Management

➤ Pond Fertilization-Why ???

- Provides food source for larval fish
- Promotes/ Increases fish production in pond
- Increases quality and quantity of food organisms



Pond Management

➤ Pond Fertilization:

➤ Organic

- Composted plant, animal manure
- Typically alfalfa and soybean meal or pellets
- Good source of low continuous levels of N & P
- Accelerate zooplankton growth
- For new or sterile ponds-can provide direct feed for plankton



Pond Management

➤ Pond Fertilization

➤ Inorganic Fertilizers

- Autotrophic food chain –driven by sunlight
- Man made chemical solutions/pellets for fertilizer
- Good source of N, P, K,
- 20:1 N:P ratio



Pond Management

➤ Pond Fertilization

➤ Combining Organic and Inorganic

- Depends on situation; species, time of year, cost, product availability, ponds production cycle, experience
- Combining is a common practice presently
- Higher production to justify costs
- Fine tune fertilization for specific pond
- General guidelines for combining
- Every pond is different



Pond Fertilization

NADF POND FERTILIZATION SCHEDULE

Initial fertilization (approx. April 20, depending on weather)

- 400 pds Alfalfa meal or Soybean meal
- 18 lbs/1.7 gal liquid Urea (28-0-0 nitrogen)
- 1.0 lb phosphate(0-45-0 liquified)
- Spread organic fertilizer before filling, spray liquid inorganic fertilizer into water

Standard fertilization (approx. every week or as needed)(verify with seechi disk readings and plankton sample tows).

- 100 lbs alfalfa meal or soybean meal
- 3.0 lbs Urea
- 0.5 lbs phosphate
- applied through June, as long as plankton bloom is needed

The most effective pond managers will develop programs that are very site specific to their ponds in order to optimize fertilization rates and schedules to promote good plankton growth and production thus increasing the yield of their ponds with increased fish production. (Anderson, 1993)



Fertilizer Applications

Organic Fertilizers

- apply fertilizers completely around pond edge by hand

Inorganic Fertilizers

- liquid mixed into prop wash or mixed 10:1 (sprayed)
- powder soluble, blown onto pond surface
- granular fairly insoluble- mix with warm water and spray



Fertilizer/Plankton Summary

- Establish large populations of desirable zooplankton prior to stocking larval fish
- Maintain fertilization rates as long as water quality allows
- Difficult to manage both large populations of zooplankton and fish fry
- Assess water quality and plankton populations regularly
- One recipe may not work for all ponds



Water Quality

Goals

- Regulate environmental conditions so that they are within a desirable range for survival and growth of fish.
- Boyd 1982
- Water Quality Management For Pond Fish Culture Book



Water Quality

- Oxygen and Aeration
- Ammonia and pH
- Turbidity
- Water Temperature
- Water Addition



Water Quality

➤ Aeration Systems

- Helps keep oxygen levels from depleting
- Increase fish production
- Decrease water stratification
- Prevent winter kill
- Aerate at night in summer



End of Phase I Fingerling Rearing

- After approx. 30 days
- Ponds are drained
- Fingerlings are removed and enumerated
- Approx. 30-40 mm
- Ponds are backfilled with water and re- stocked with fingerlings for advanced growout
- Small fatheads(tuffies) are added



End of Phase I fingerling rearing

- Questions- 5 minutes



Fish Management-Advanced Growth *Feed*

- Walleye
- Fry are eating zooplankton first 3-40 days
- Start with rotifers-copepods-daphnia
- End by day 30 remove from pond and switch to minnows
- Start with Tuffies
- Crappie size fatheads
- Regular fatheads



Fish Management

Feeding Minnows

Minnows were fed at
approx. 4:1 ratio to walleye



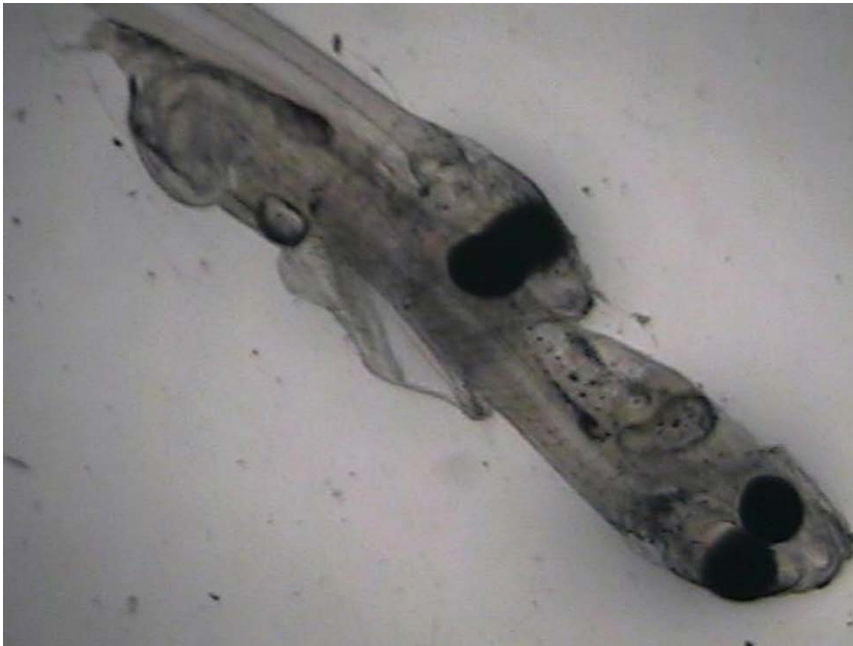
Fish Management *Sampling*

- 1) Sample your fish regularly
- 2) Monitor growth and fitness
- 3) Population in pond



Potential Problems

- Decline of zooplankton prey
 - subsequent cannibalism
- Establishment of aquatic predacious insects



Potential Problems

Unwanted guests

- Frog Fence
- Buried Flashing below ground
Approx. 6 inch
- Minimum 2 ft high
- Keeps out frogs, turtles, and
Some mammalian predators



Potential Problems

Birds



Predation Control

- Interns, Volunteers, Technicians creating turbidity in ponds
- Manually pulling weeds-stirring up pond bottom
- Airlifts keep pond moving
- Add suckers



Weed Control in Pond



Fish Management

- Fish Health Assessment
 - Required for stocking
 - Nice to know how healthy your fish are.
 - Vet sign off



Pond Draining and Fish Harvest

- Ponds are drained in fall for advanced walleye
- Generally end of September- early October
- When water temperatures cool down
- Fish size is 150-200mm



Pond Harvest



Note: External Catch Basin

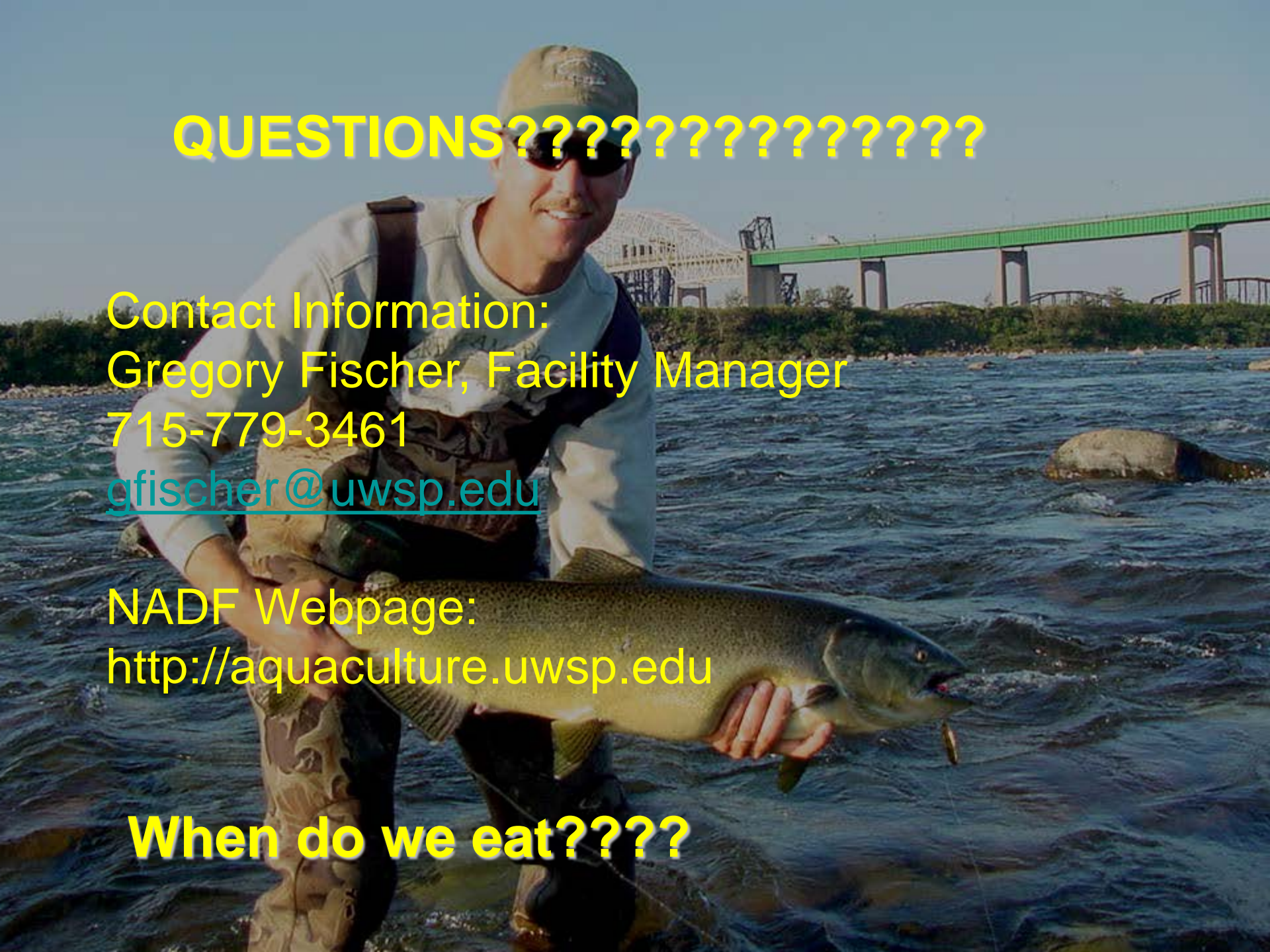


Pond Harvest



Harvest



A man wearing a tan cap, sunglasses, and a light-colored long-sleeved shirt is standing in a river, holding a large, silvery fish. In the background, there is a green bridge and some industrial structures.

QUESTIONS????????????????

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<http://aquaculture.uwsp.edu>

When do we eat????