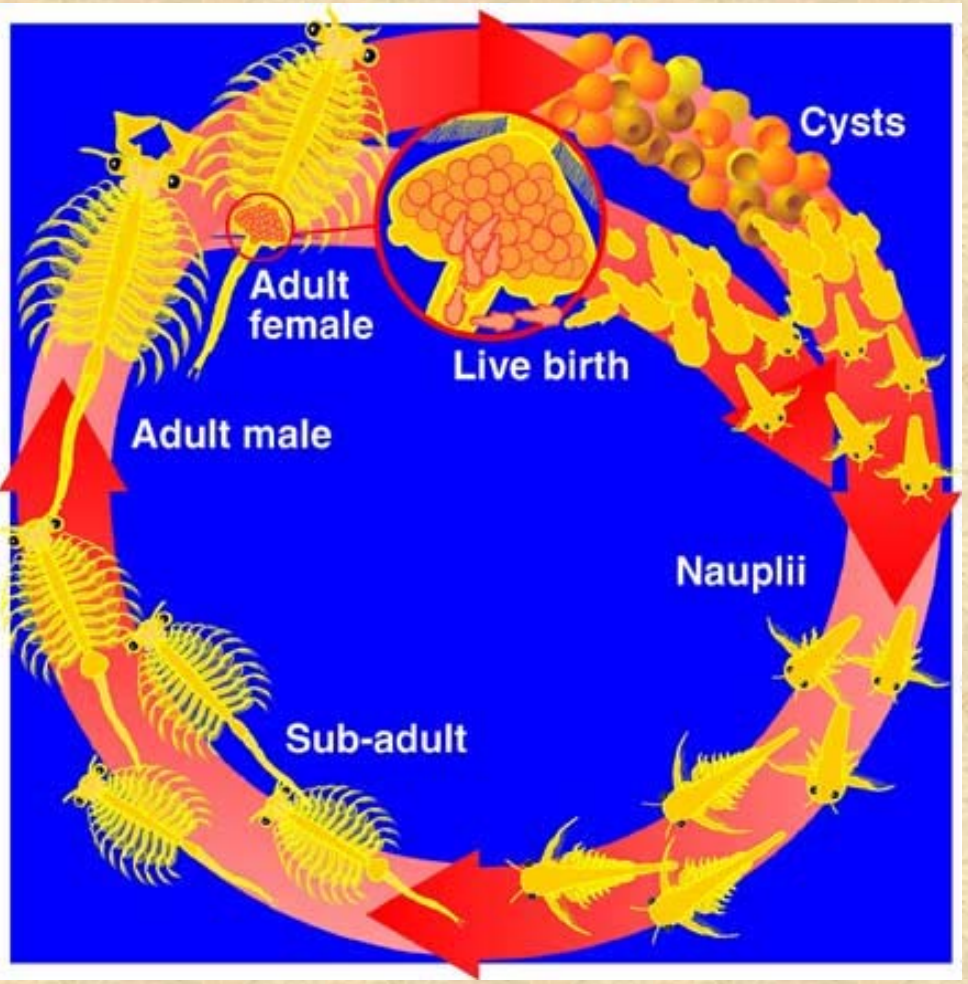
Great Salt Lake Ecosystem Program - An overview

Phil Brown
Utah Division of Wildlife Resources
Great Salt Lake Ecosystem Program

Brine shrimp (*Artemia franciscana*)

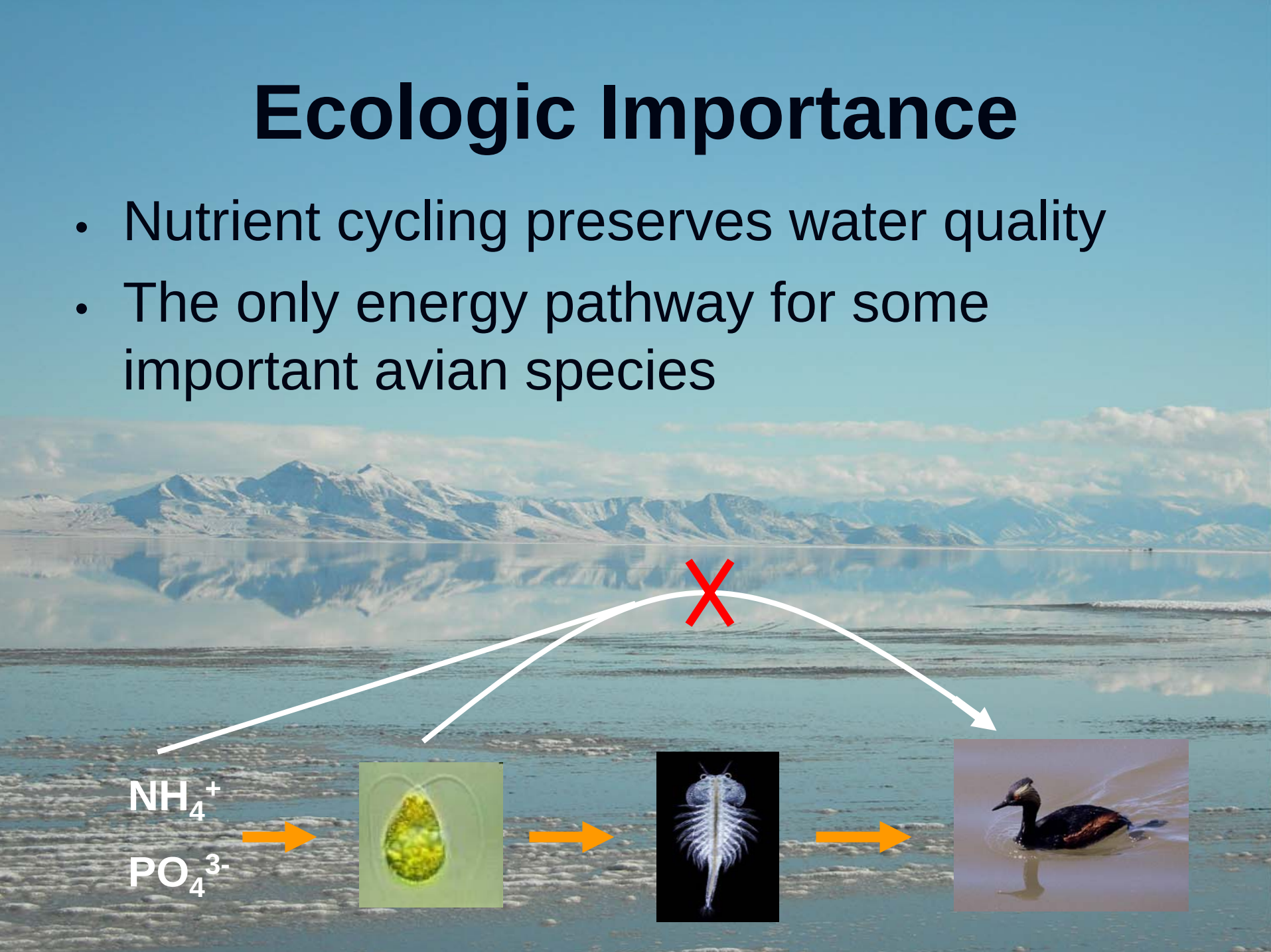


- 5-10mm length
- Filter algae
- Several generations per year
- Winter die-off
- Produce resting eggs (cysts)

Doyle Stephens, USGS

Ecologic Importance

- Nutrient cycling preserves water quality
- The only energy pathway for some important avian species



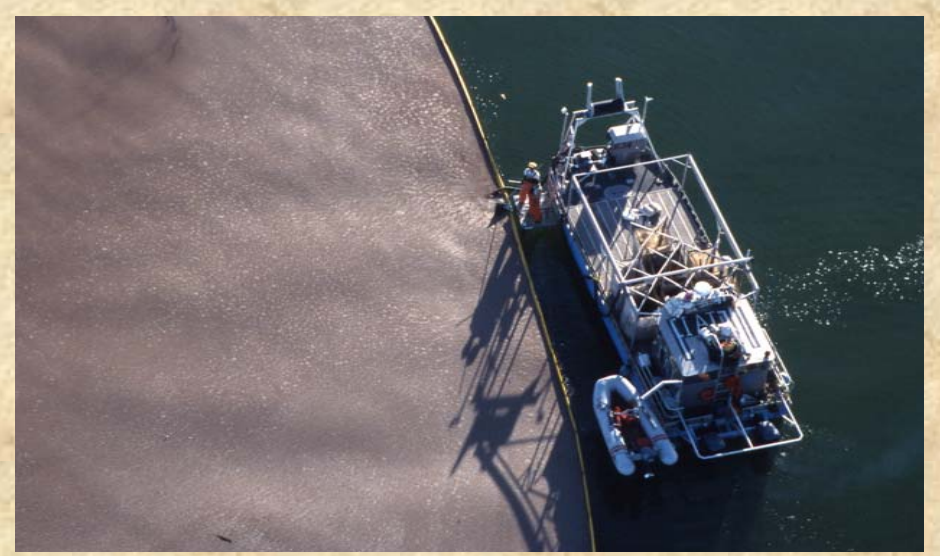
Up to 2 million Eared Grebes

140,000 California Gulls

100,000-500,000 Wilson's Phalaropes

Brine Shrimp Harvest

- Adults harvested in small numbers—1950s
- Expanded global aquaculture (shrimp, finfish) in 1980s led to harvest of cysts
- Only cysts are targeted now, collection of adults only allowed as bycatch



Brine Shrimp Harvest

- Rapid expansion in harvest—1990s
- Number of harvest companies rose from 4 to 32 by 1996
- Overharvest of resource was a concern

Great Salt Lake Ecosystem Program

- Established in 1996
- Utah Division of Wildlife is authorized to manage wildlife species
  - Title 23 of the Utah Code
    - Establishes DWR and Wildlife Board, powers and responsibilites
    - “The Division of Wildlife Resources is the wildlife authority for Utah…(and) shall protect, propagate, manage, conserve and distribute protected wildlife throughout the state”

Great Salt Lake Ecosystem Program

Provides management to fulfill:

- Utah Division of Wildlife Resources Rule 657-52 (Commercial Harvesting of Brine Shrimp and Brine Shrimp Eggs)
  - Rules regarding Certificates of Registration
  - Harvest season and locations
  - Requires harvest reporting to DWR
  - Penalties for violations

Great Salt Lake Ecosystem Program

- Allow for a commercial harvest after the ecosystem needs are met
- First program of its kind—no one else had studied a natural brine shrimp population
- Hired aquatic and avian biologists
- Required specialized field equipment
- Needed outside expertise
- Needed to move quickly

Responsibilities

- Issue Certificates of Registration (CORs)
  - CORs are required to harvest
  - Company vessels must display COR number
  - Transfer of COR between companies requires approval
- Limited to 79, though a company can hold more than one
- Renewed annually; fees support GSLEP efforts

Responsibilities

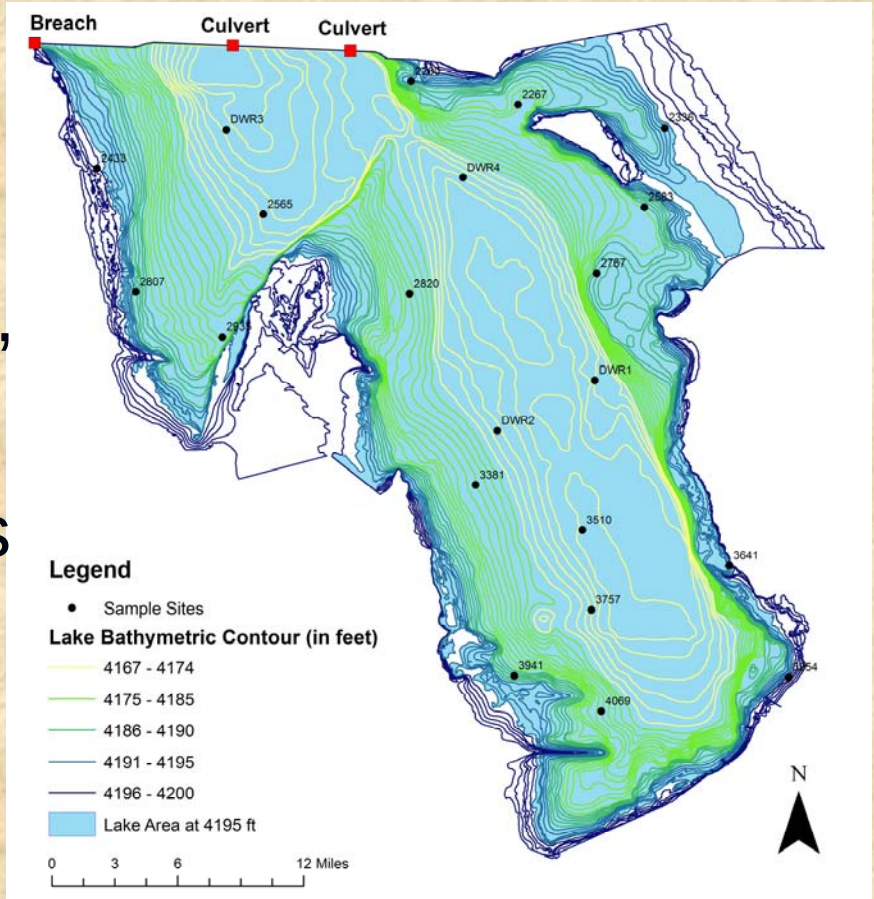
- Monitor brine shrimp harvest and report numbers to Utah State Tax Commission
  - Harvest companies are taxed based on raw biomass taken from the lake system
  - Harvest totals for each day are posted on the program website (wildlife.utah.gov/gsl)

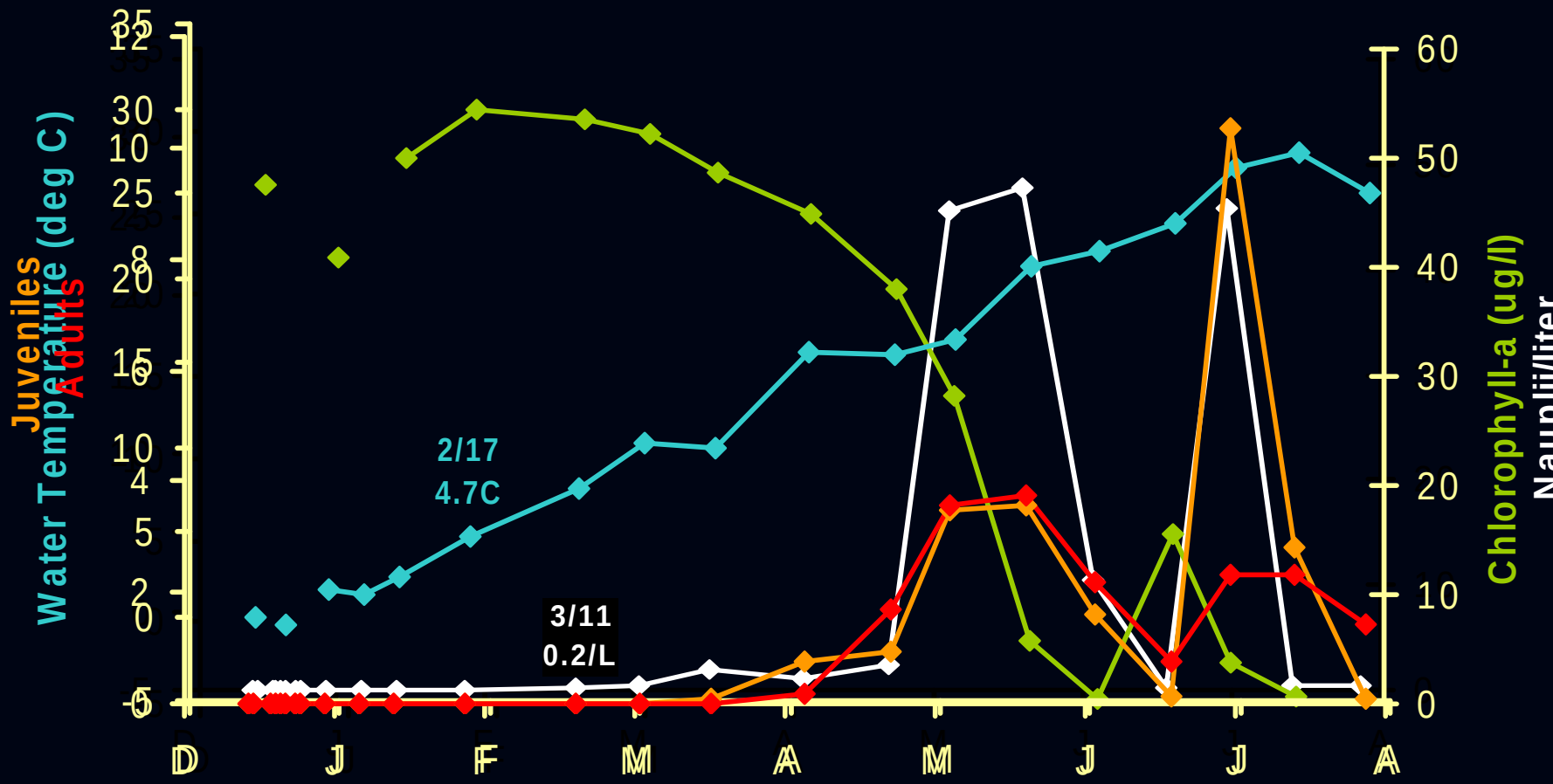
Responsibilities

- Monitor brine shrimp populations and discontinue harvest when necessary
  - Extensive field and laboratory efforts year round

Monitoring the brine shrimp population

- Since 2000, over 430 sampling events
- In 2009, 42 sampling events
- Broad scope of data collection
  - Brine shrimp densities, by age class
  - Shrimp food resources
  - Habitat variables

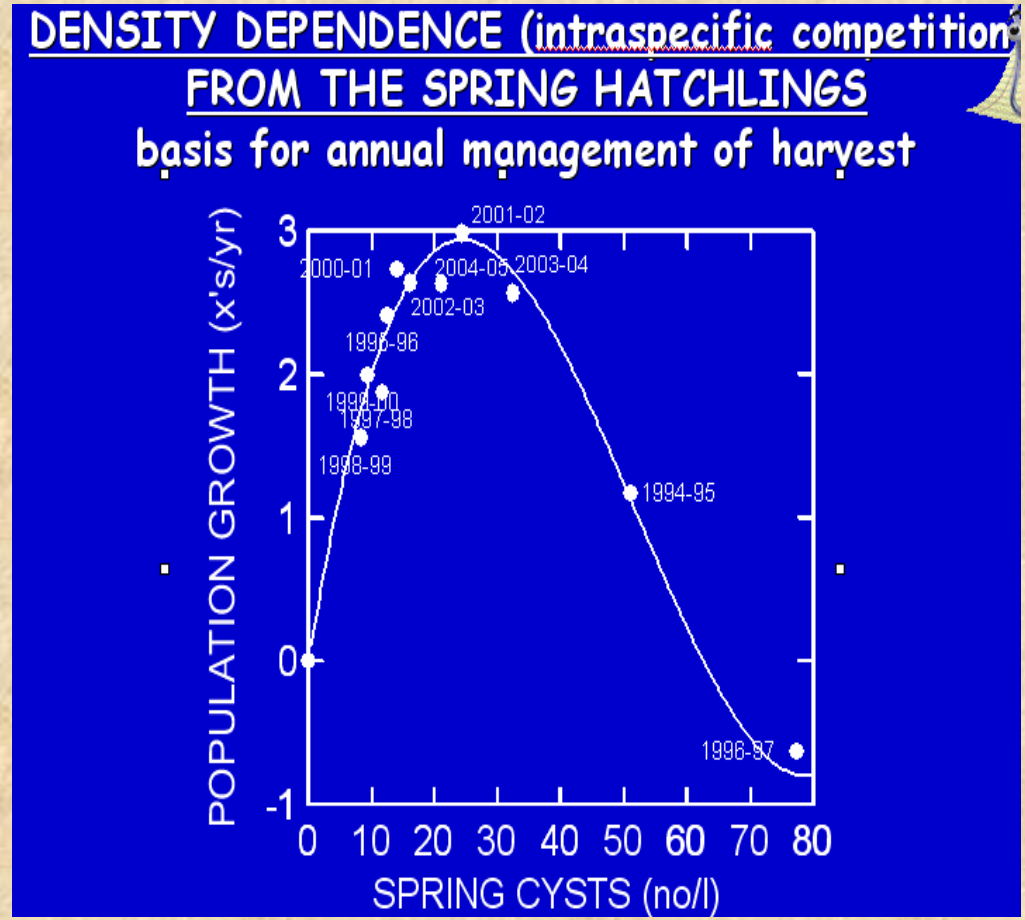



Water Temperature (deg C)
Juveniles
Adults
Chlorophyll-a (ug/l)
Nauplii/liter
2/17
4.7C
3/11
0.2/L
D
J
F
M
A
M
J
J
A

Monitoring the brine shrimp population

Predictive model for cyst harvest

- What is the harvestable surplus?
- How many cysts must be left in lake to restart the next generation?
- ~ 21 cysts/ liter
- Data used to refine the model



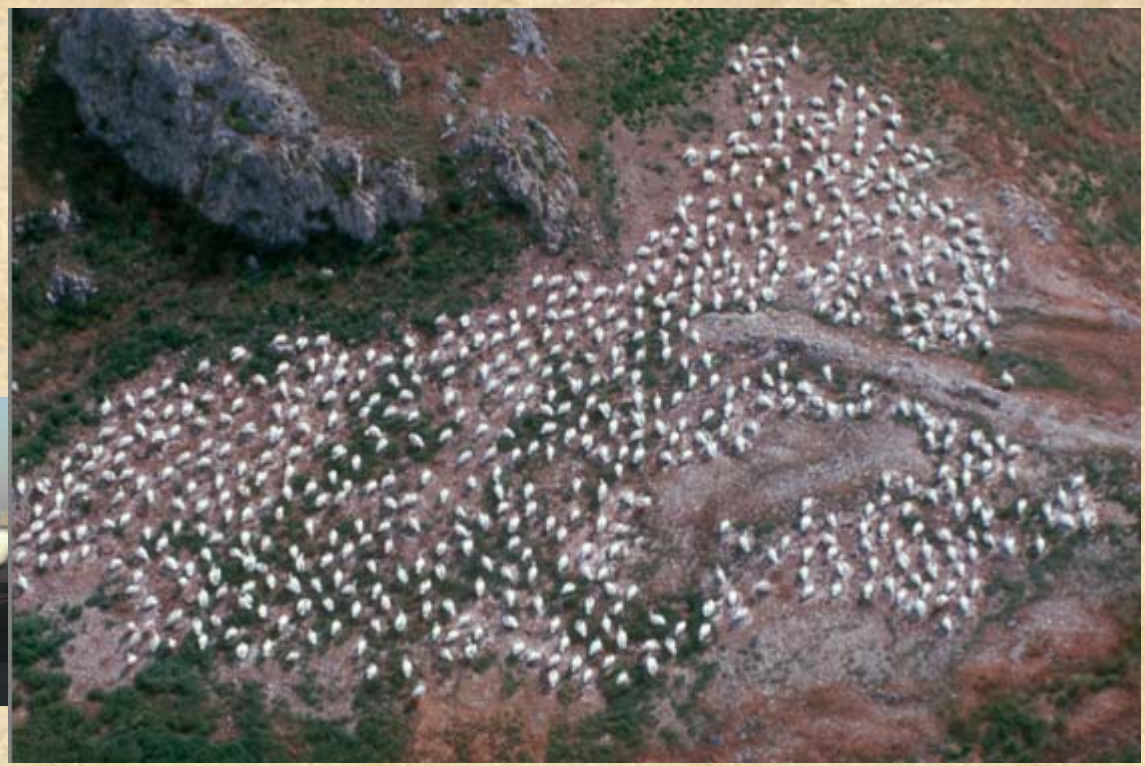
Contracted Research

- We look to researchers to help us answer certain questions that are out of our area of expertise.
  - Population modeling (Notre Dame)
  - Hydrologic modeling (USGS)
  - Phytoplankton speciation (Notre Dame)
  - Avian toxicology and diet analysis (Utah State University)

Avian Monitoring and Research

- Population trends for a large number of species in a variety of habitats
- Aerial Surveys
  - Open water
  - Colonial island nesters

American White Pelicans on Gunnison Island



Avian Monitoring and Research

- Airboat surveys
  - Marshes, shallows
- Secretive marshbird

- Western Colonial Waterbird Survey
  - Funded through USFWS

Wildlife Management Areas

- Farmington Bay
- Howard Slough
- Ogden Bay
- Harold Crane
- Timpie Springs
- Locomotive Springs

- Public Shooting Grounds
- Salt Creek

- Willard Bay Upland Game
- Antelope Island

Wildlife Management Areas

Questions are welcome