

# Poniendo disponibles los recursos de los humedales para las aves que dependen de estos

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Manejo de humedales para técnicos en México II

Laguna Mexicanos Chihuahua

Club Raramuri

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# ABIOTIC FACTORS

- **HYDROLOGIC**
  - WATER PRESENCE/ABSENCE
  - WATER DEPTH
- **CLIMATIC**
  - TEMPERATURE
    - HABITATS AVAILABLE
    - THERMOREGULATION
  - PRECIPITATION
  - WIND

# BIOTIC FACTORS - HABITAT

- **HABITAT**
  - **FOOD**
    - **QUALITY/TYPE**
    - **ABUNDANCE**
    - **AVAILABILITY**
  - **COVER**

# BIOTIC FACTORS – THE ANIMALS

- **WATERBIRD**
  - **SEX**
  - **AGE**
  - **LIFE CYCLE EVENT**
    - **PAIRING**
    - **MOLT**
    - **BREEDING**
    - **MIGRATION**

# GENERAL TIMING OF USE

- **SUBARCTIC**
  - SEASONAL – TEMPERATURE DRIVEN
- **N TEMPERATE**
  - SEASONAL – TEMPERATURE DRIVEN
- **TEMPERATE**
  - SEASONAL – TEMPERATURE AND PRECIPITATION
- **SUBTROPICAL**
  - CONTINUOUS – PRECIPITATION DRIVEN
- **TROPICAL**
  - CONTINUOUS – PRECIPITATION DRIVEN

# PREFERRED WATER DEPTHS OF WATERBIRDS

- 81 SPECIES REQUIRING FLOOD WATER FOR USE OF HERBACEOUS WETLANDS
- >25 CM (10 IN)                      19 SPECIES
  - 10 REGULARLY USE WATER < 10 IN
- 5-25 CM (2-10 IN)                      24 SPECIES
- <10 CM (< 4 IN)                      34 SPECIES

# INVERTEBRATE CONSUMPTION

	# SPECIES	AQUATIC	TERRESTRIAL
<b>GREBES</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>BITTERNs</b>	<b>2</b>	<b>2</b>	<b>1</b>
<b>HERONS</b>	<b>5</b>	<b>5</b>	<b>0</b>
<b>EGRETS</b>	<b>3</b>	<b>3</b>	<b>1</b>
<b>IBIS</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>SWANS</b>	<b>2</b>	<b>1</b>	<b>0</b>
<b>DUCKs</b>	<b>23</b>	<b>23</b>	<b>3</b>
<b>SHOREBIRDS</b>	<b>24</b>	<b>24</b>	<b>6</b>
<b>RAILs</b>	<b>7</b>	<b>7</b>	<b>6</b>
<b>CRANES</b>	<b>1</b>	<b>1</b>	<b>1</b>

# SHOREBIRDS







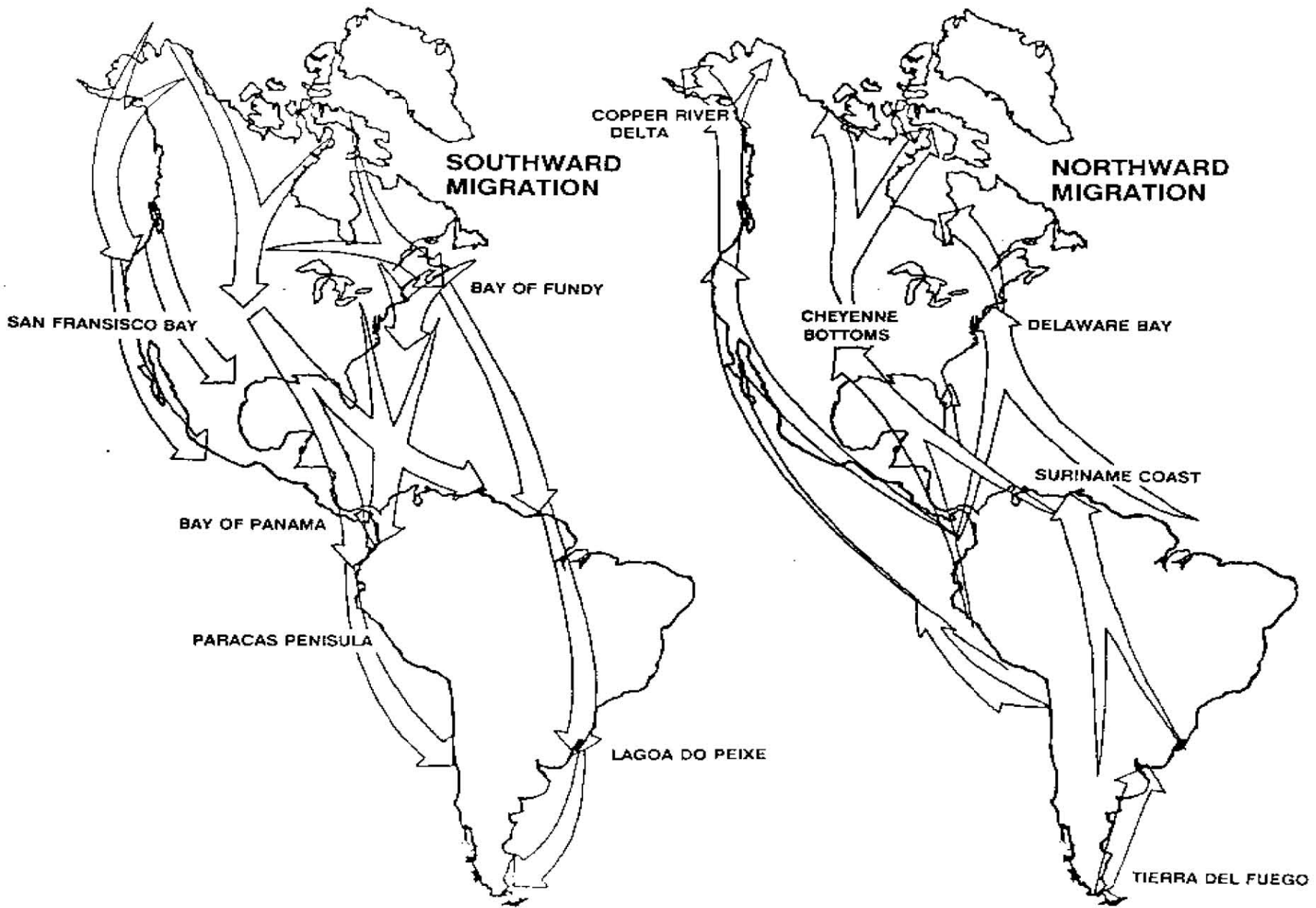












**SOUTHWARD  
MIGRATION**

**NORTHWARD  
MIGRATION**

COPPER RIVER  
DELTA

BAY OF FUNDY

SAN FRANCISCO BAY

CHEYENNE  
BOTTOMS

DELAWARE BAY

BAY OF PANAMA

SURINAME COAST

PARACAS PENISULA

LAGOA DO PEIXE

TIERRA DEL FUEGO



# SHOREBIRD HABITAT

- OPEN CONDITIONS FOR MOST SPECIES
  - SHORT VEGETATION
  - SPARSE VEGETATION
- SHALLOW WATER
  - LARGE OPEN EXPANSES
  - VARIABLE WATER DEPTHS
- ABUNDANCE OF INVERTEBRATES

# Shorebird habitat - Floodplain

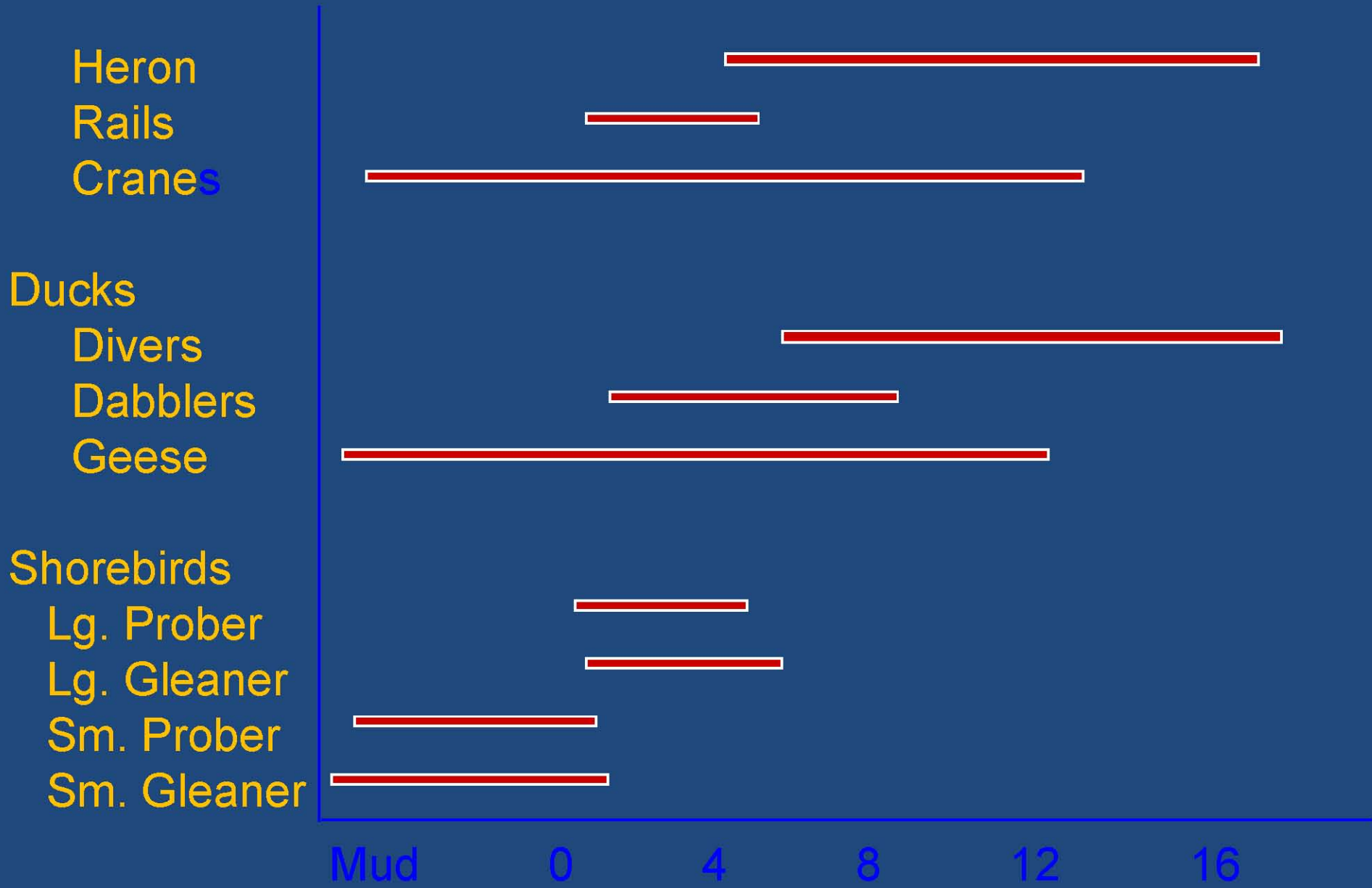
## Historic

- Wide floodplain systems
- Braided Channel

## Contemporary

- Restrictions of river and active floodplain
- Single narrow, sinuous channel
- Upstream dams

# GROUP FORAGING DEPTHS FOR WATERBIRDS



Baird's  
Sandpiper



Semipalmated  
Sandpiper



White-rumped  
Sandpiper



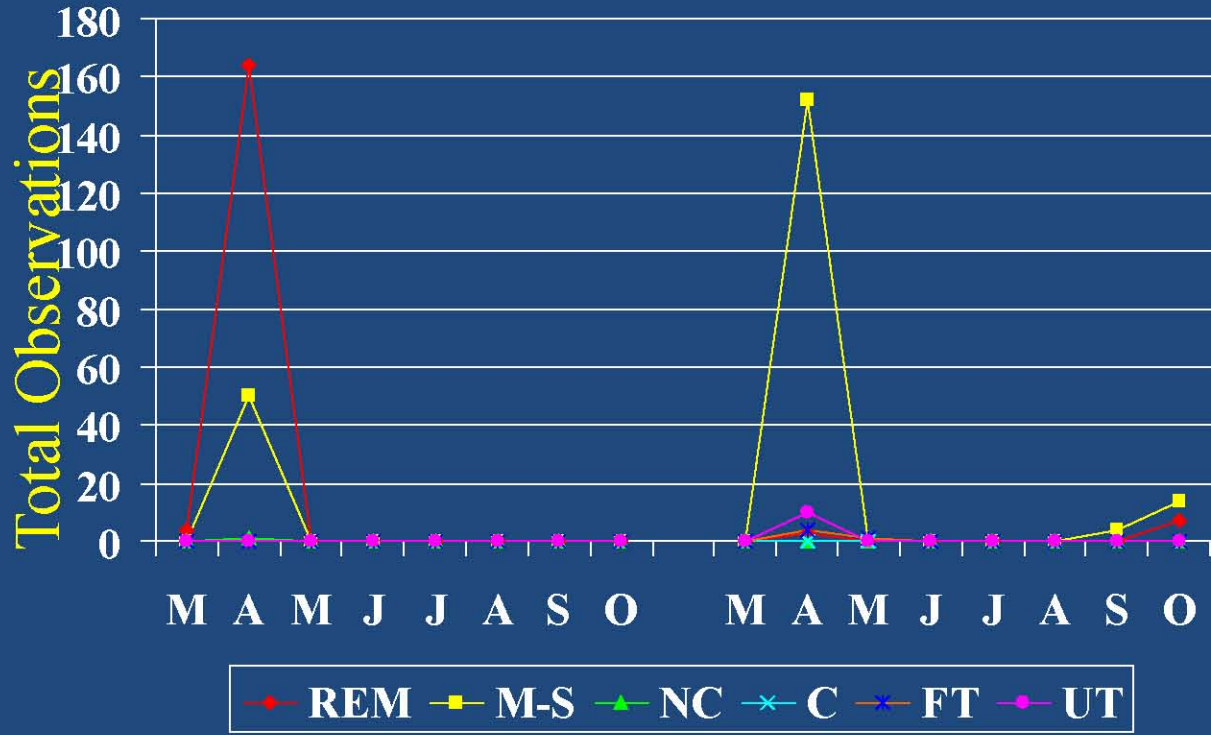
Mar

Apr

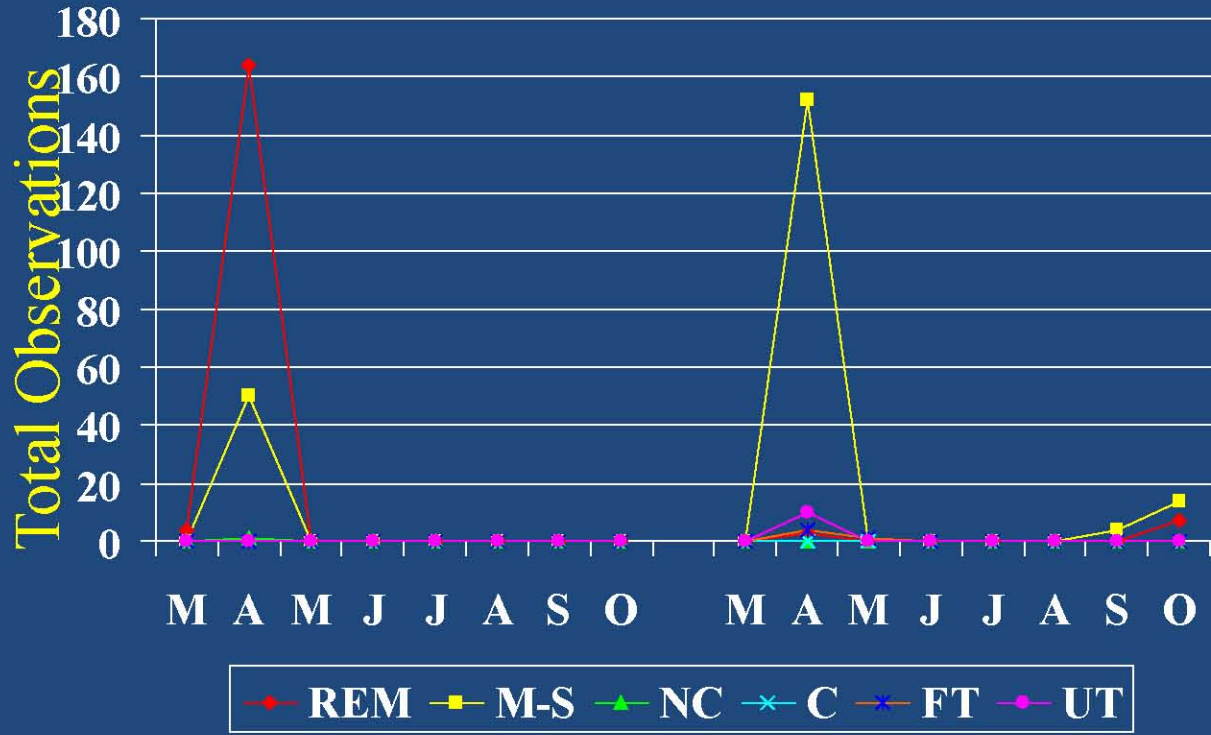
May

Jun

# COMMON SNIPE



# COMMON SNIPE





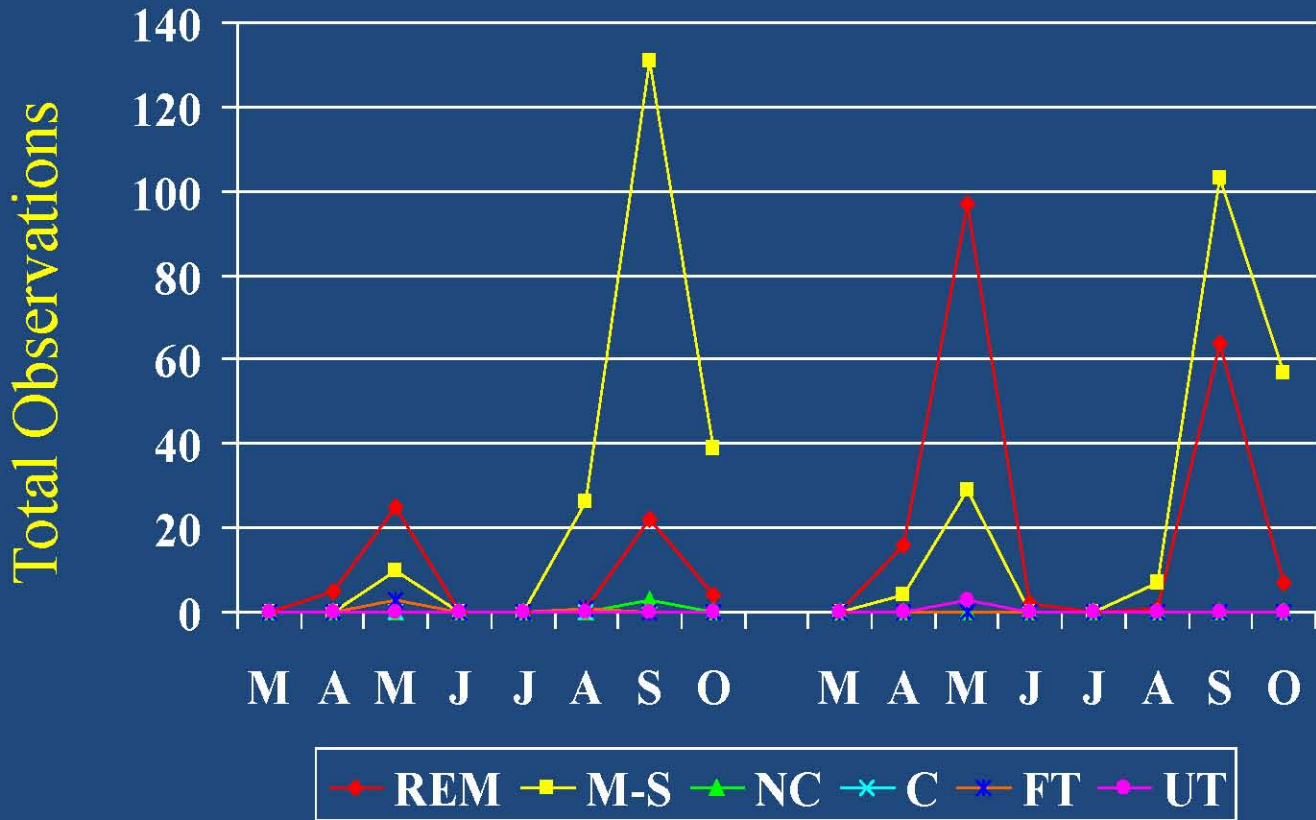
**RAILS**



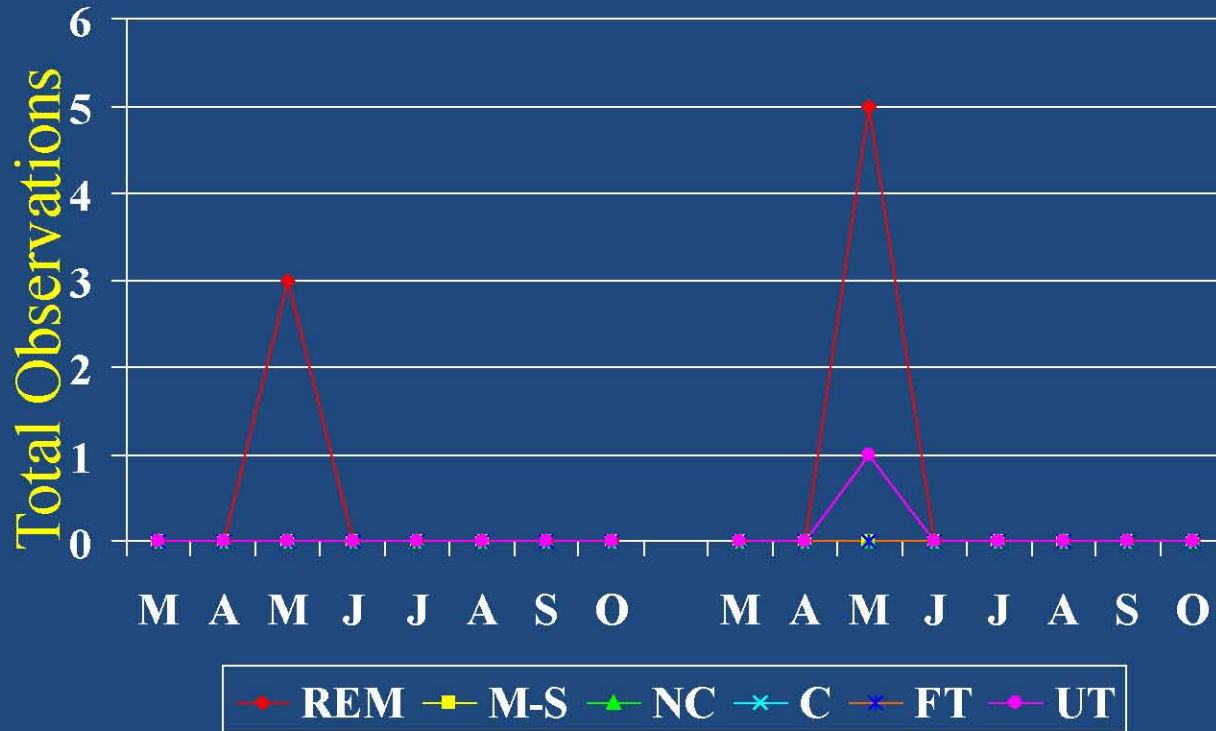




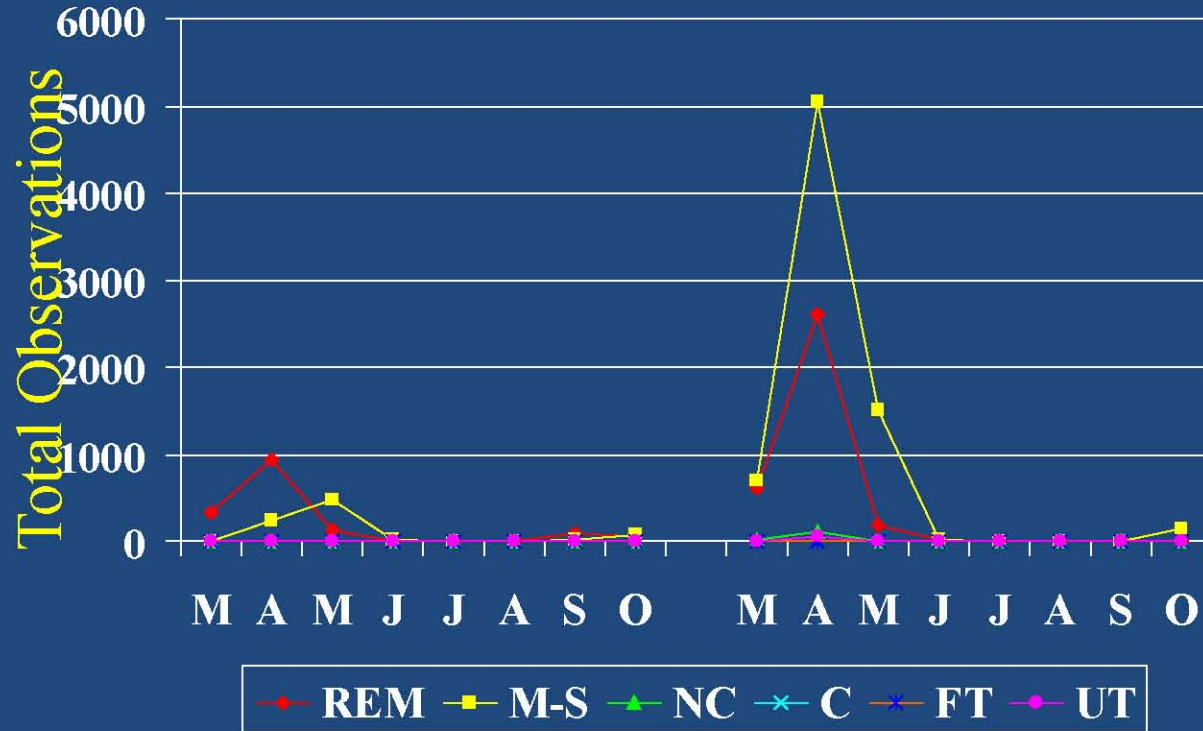
# SORA



# VIRGINIA RAIL

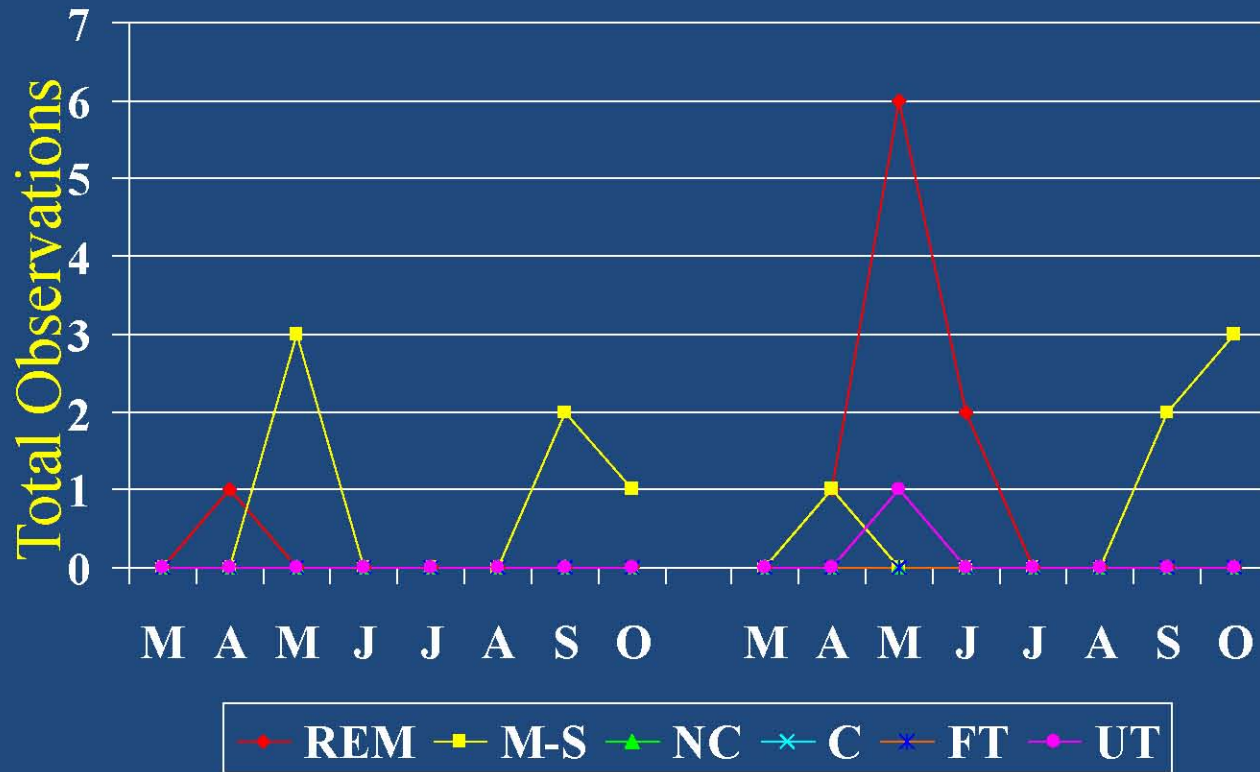


# AMERICAN COOT



**BITTERNS**

# AMERICAN BITTERN

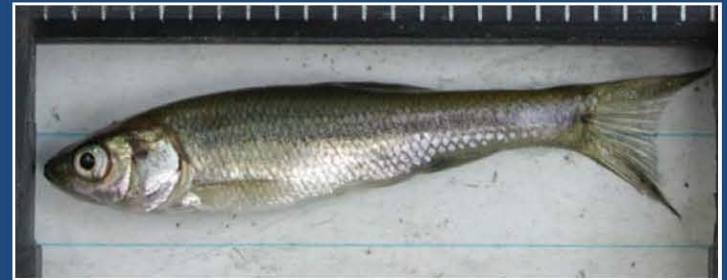


# Least Bitterns

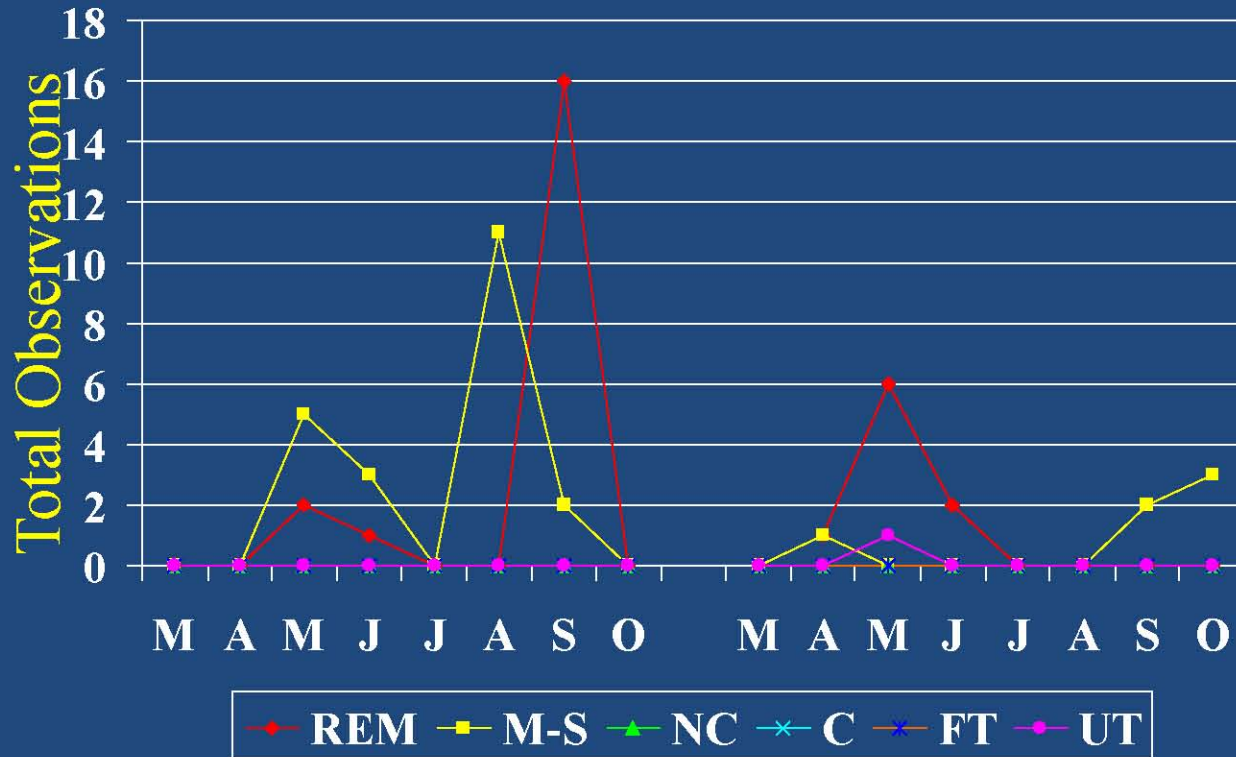




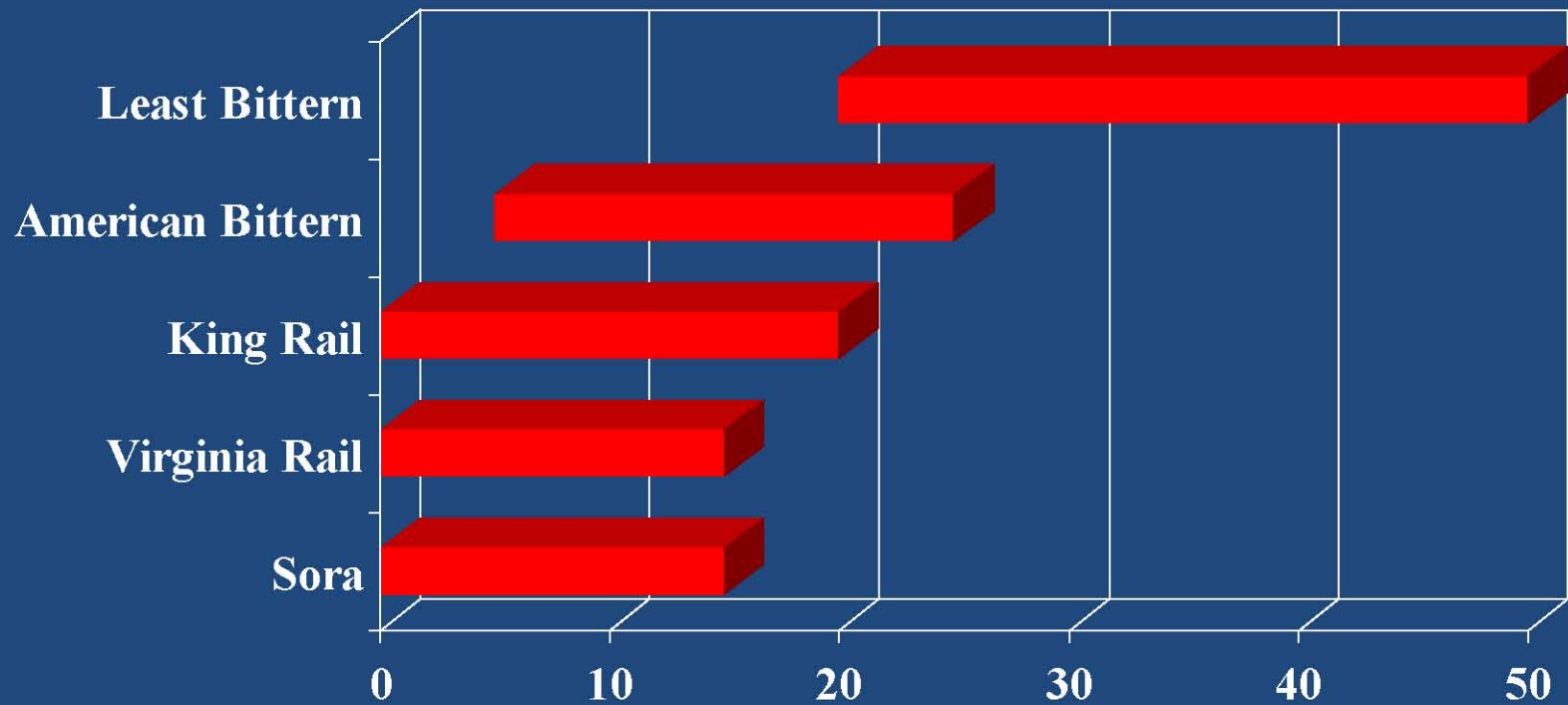
# Food Resources



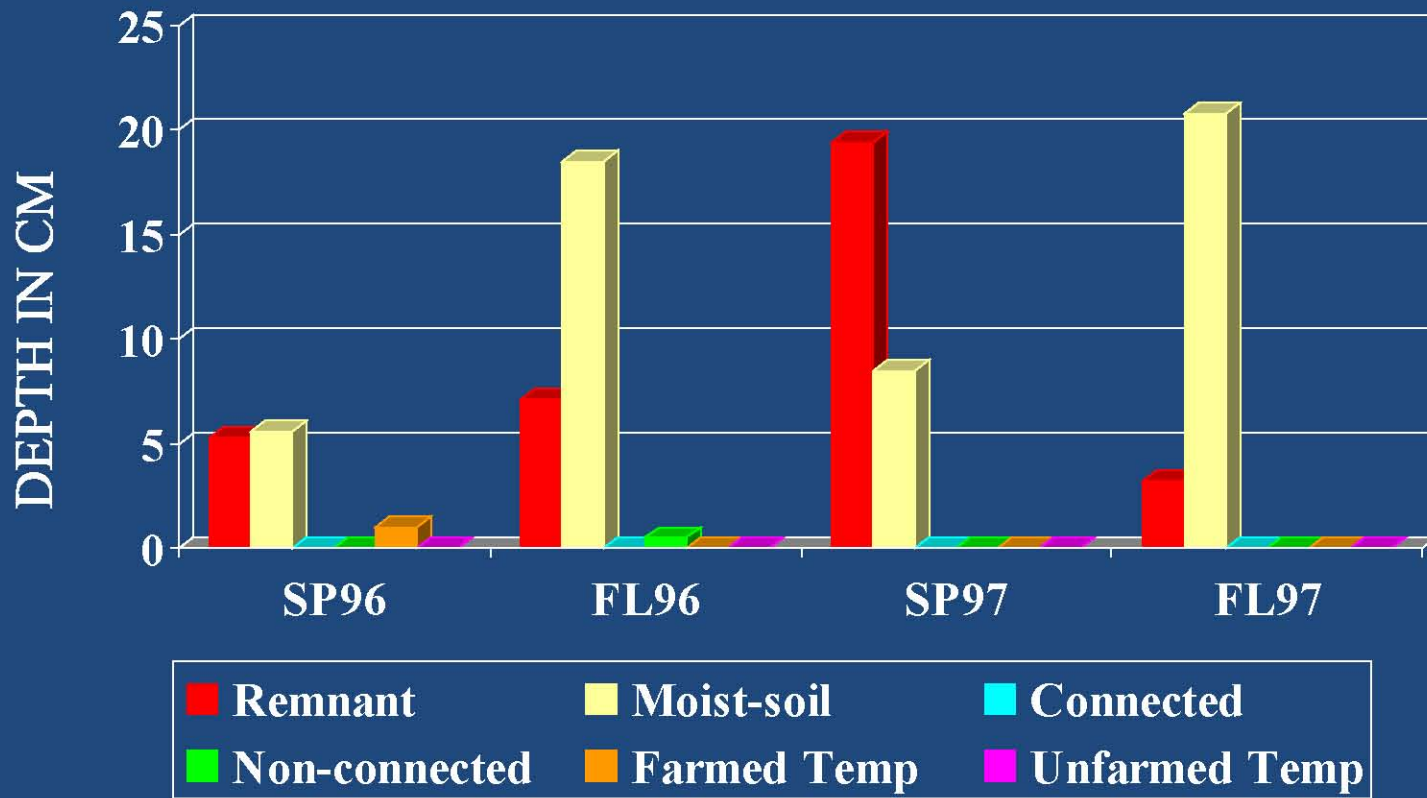
# LEAST BITTERN



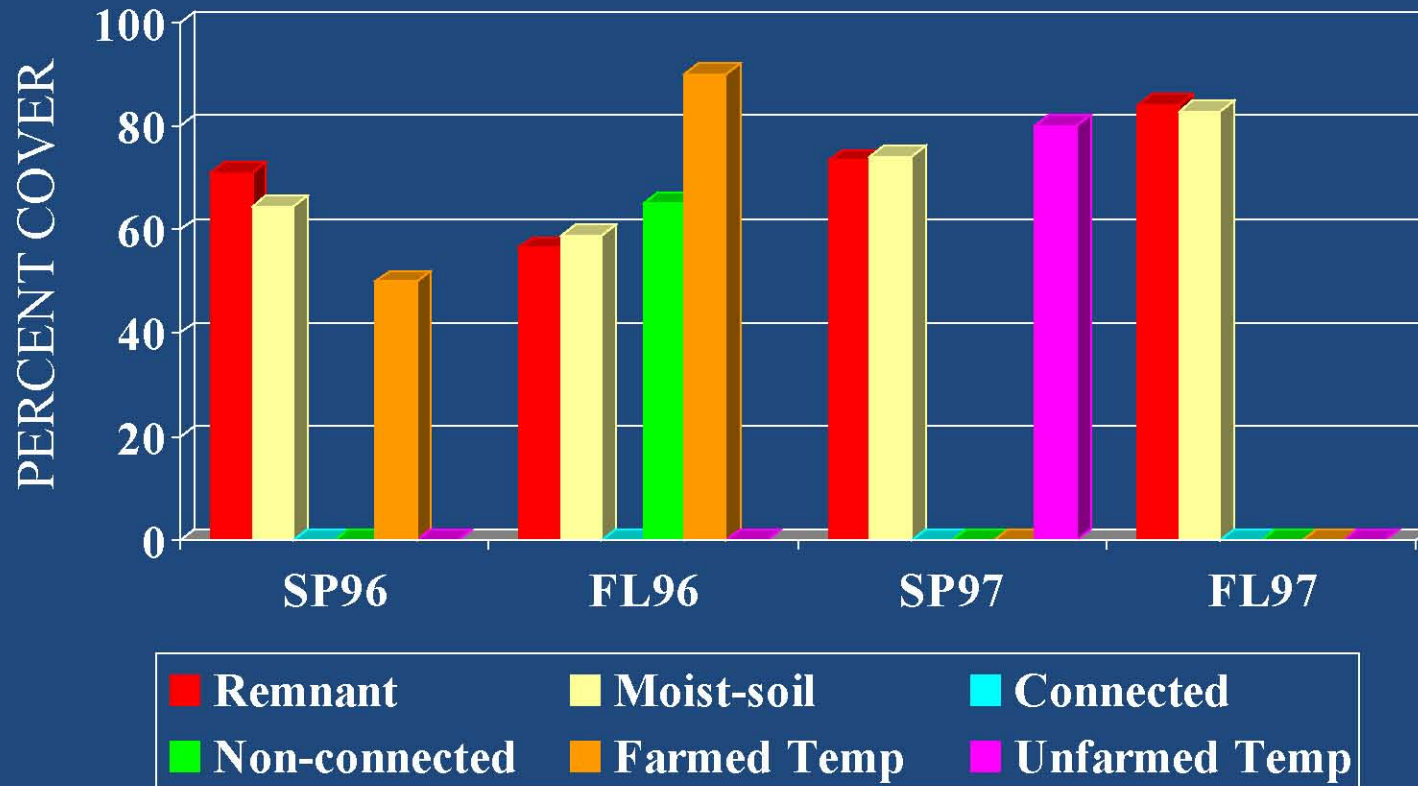
# WATER DEPTH



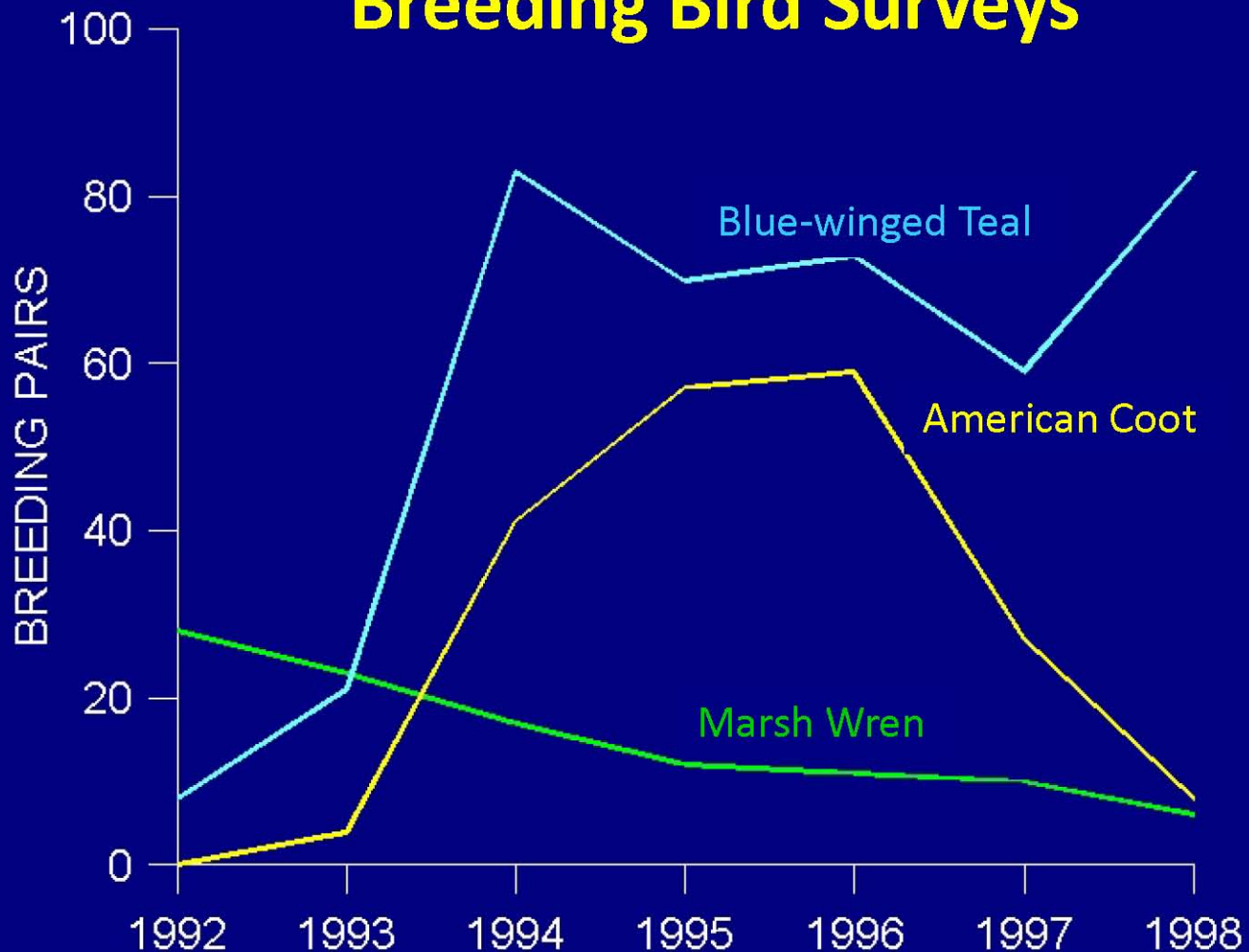
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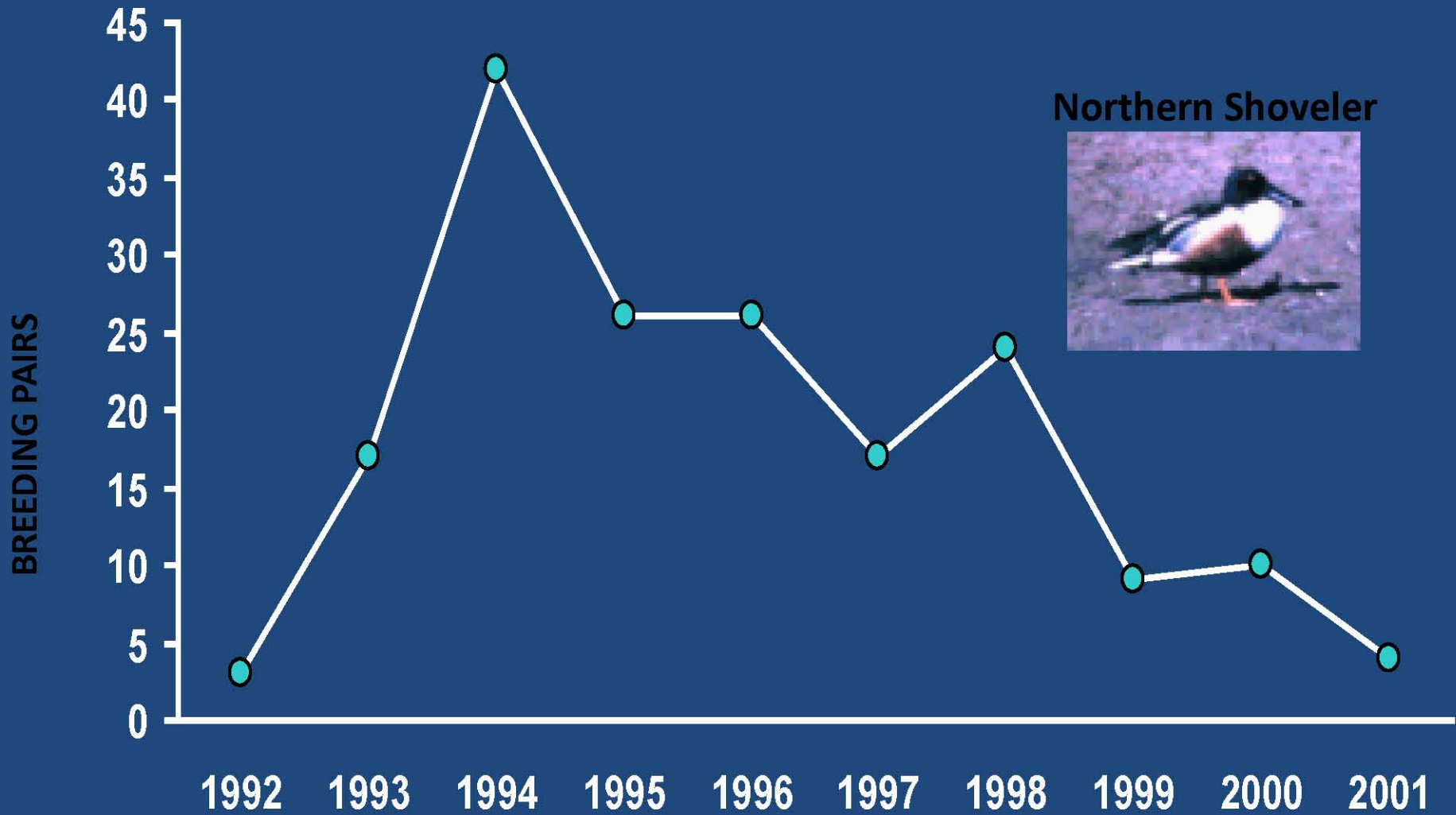
# TOTAL COVER



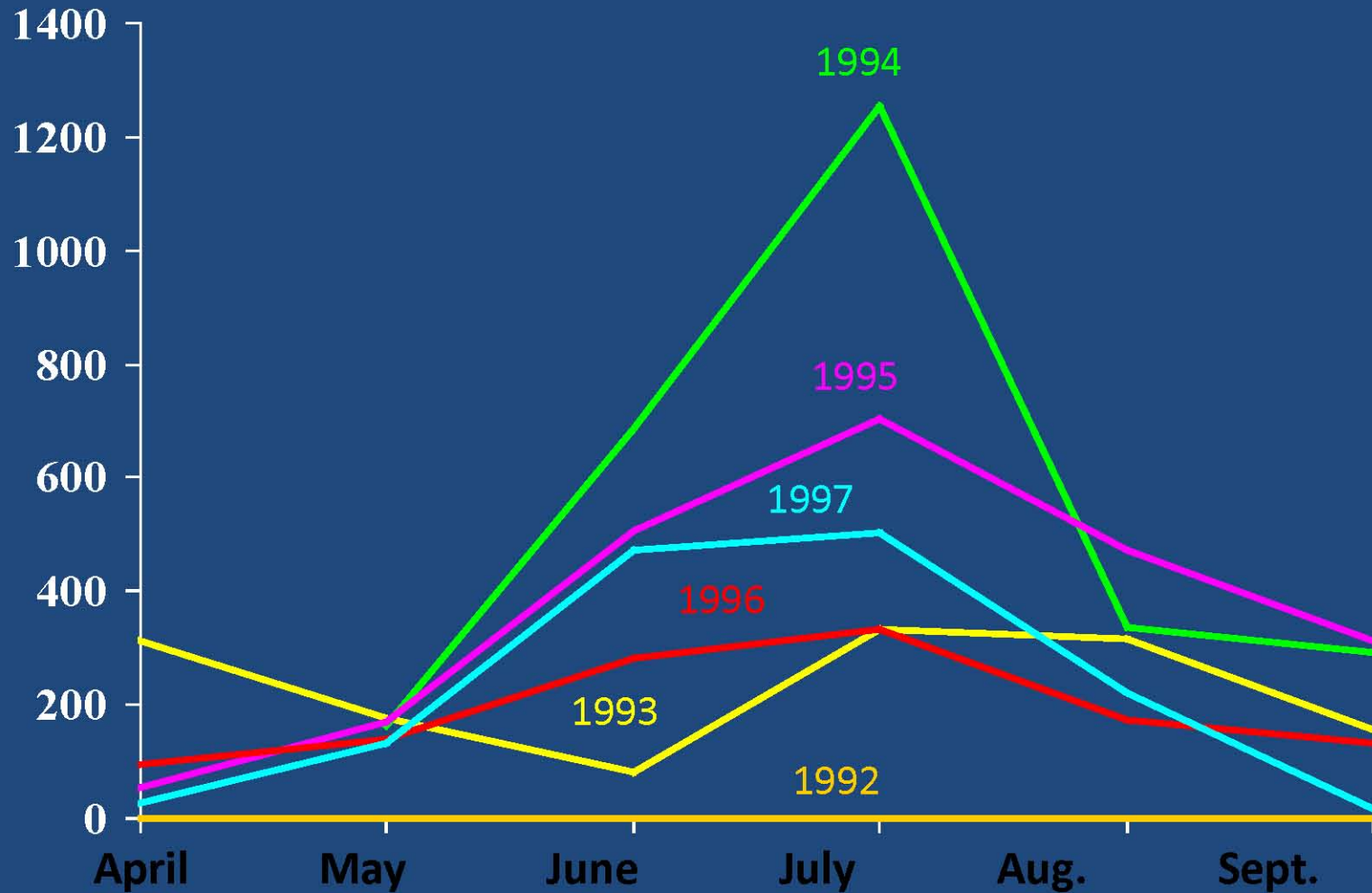
# Breeding Bird Surveys



# COTTONWOOD LAKE STUDY AREA

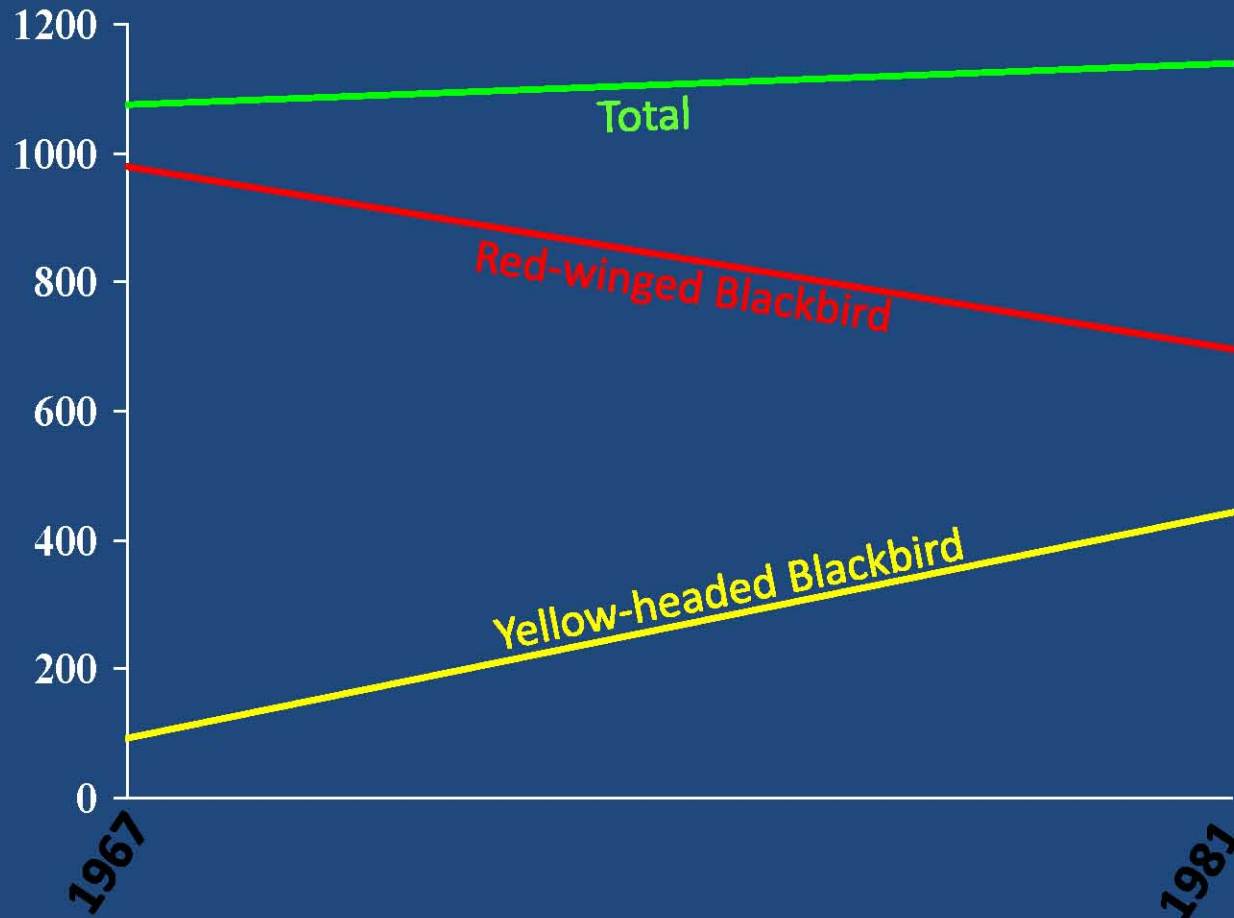


# Invertebrate Biomass (grams x 100)



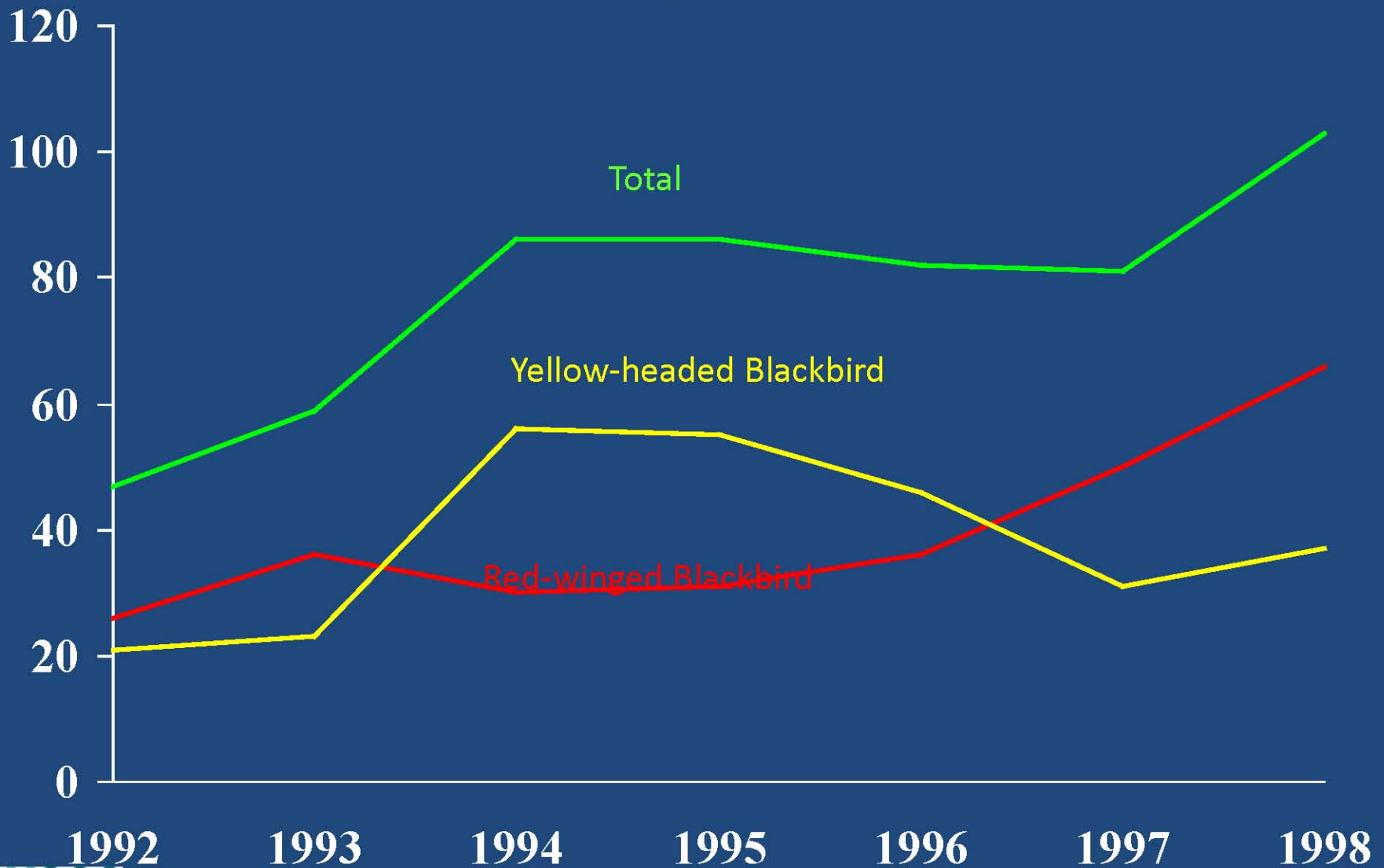


# Blackbird Number in North Dakota

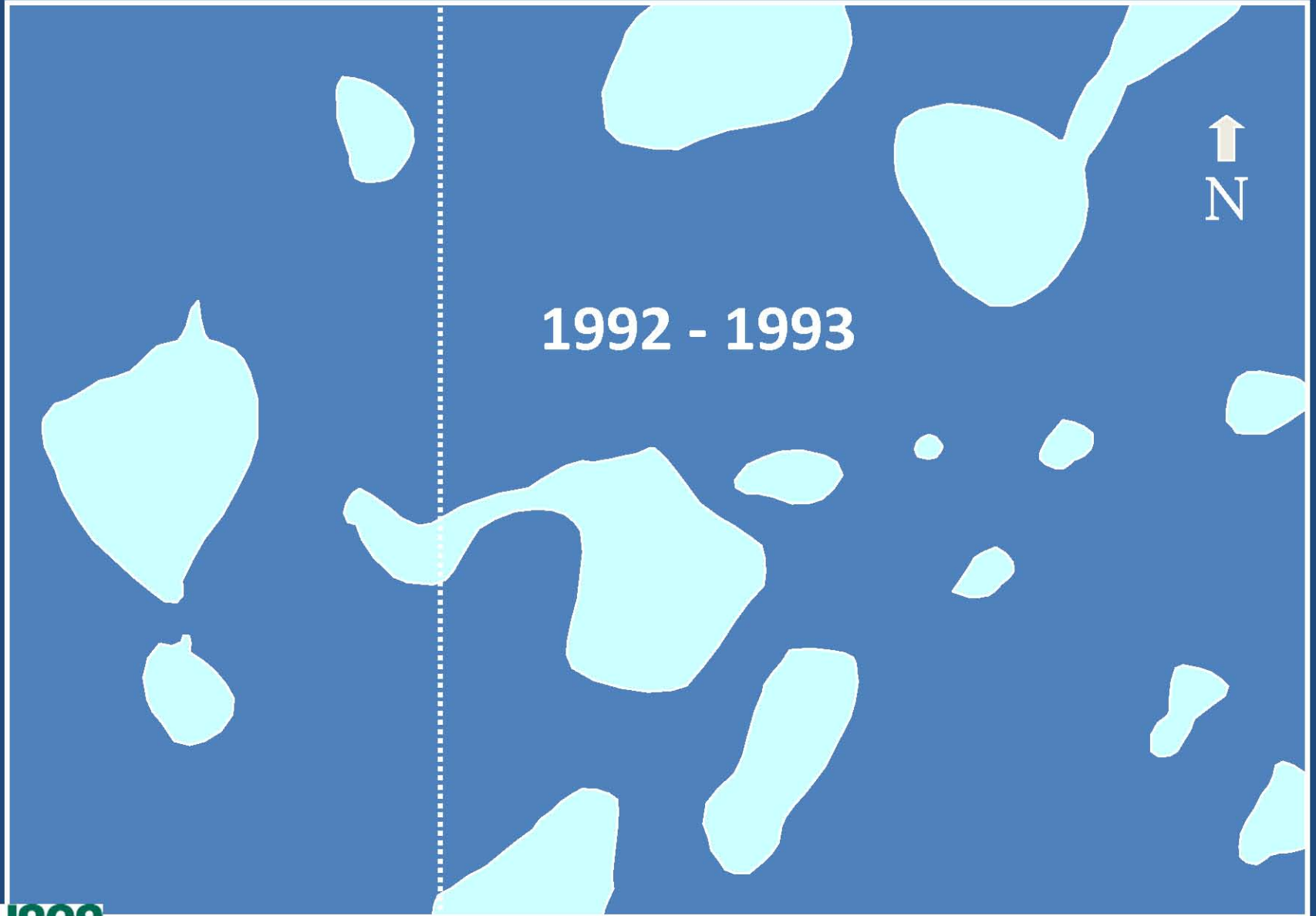


“the census data suggests that yellowheads are probably replacing red-wings in North Dakota marshes” Besser, J. F. 1985. Changes in breeding blackbird numbers in North Dakota from 1967 to 1981-82. *Prairie Naturalist* 17:133-142.

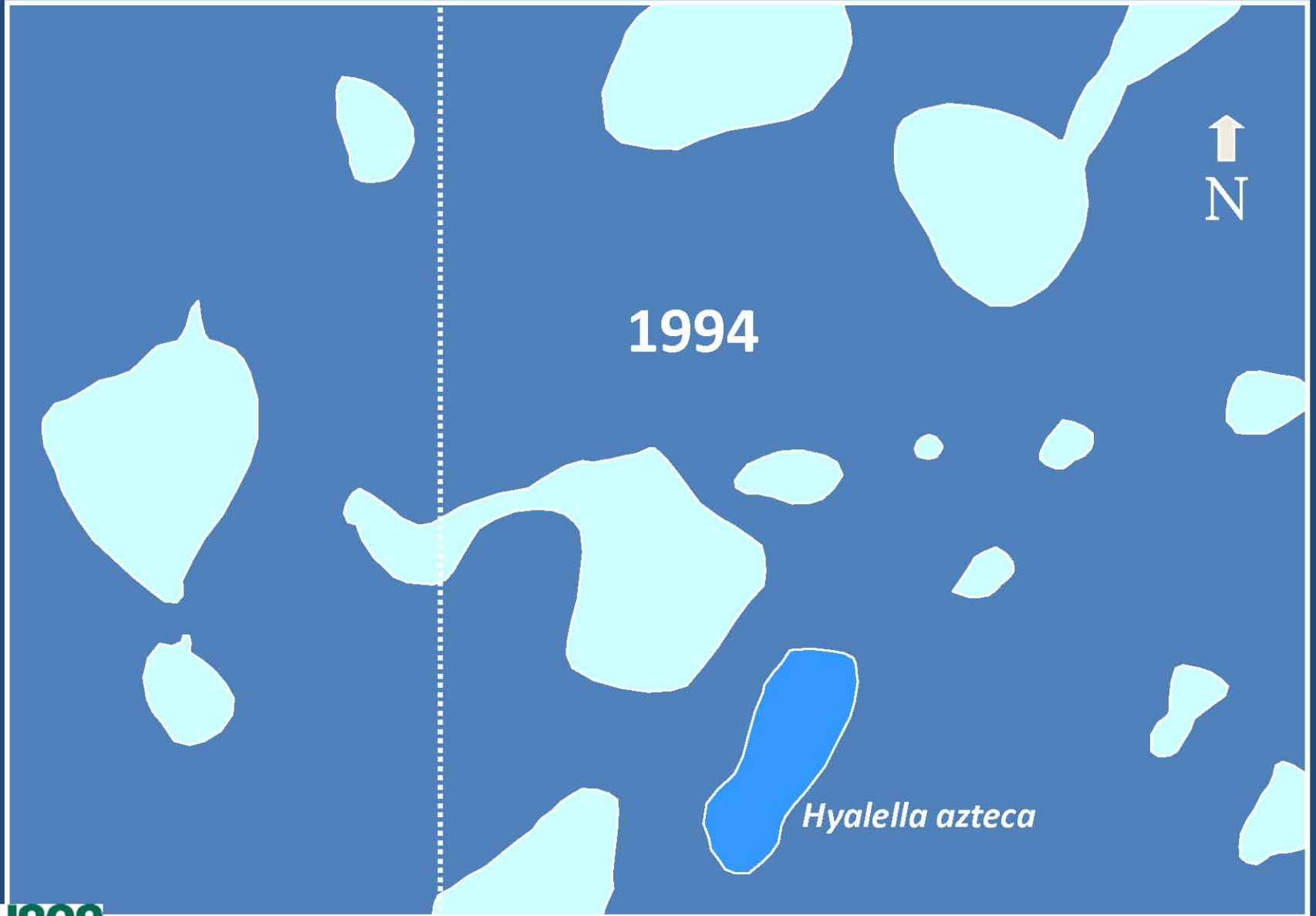
# Blackbird Territories in Cottonwood Lake Study Area Wetlands



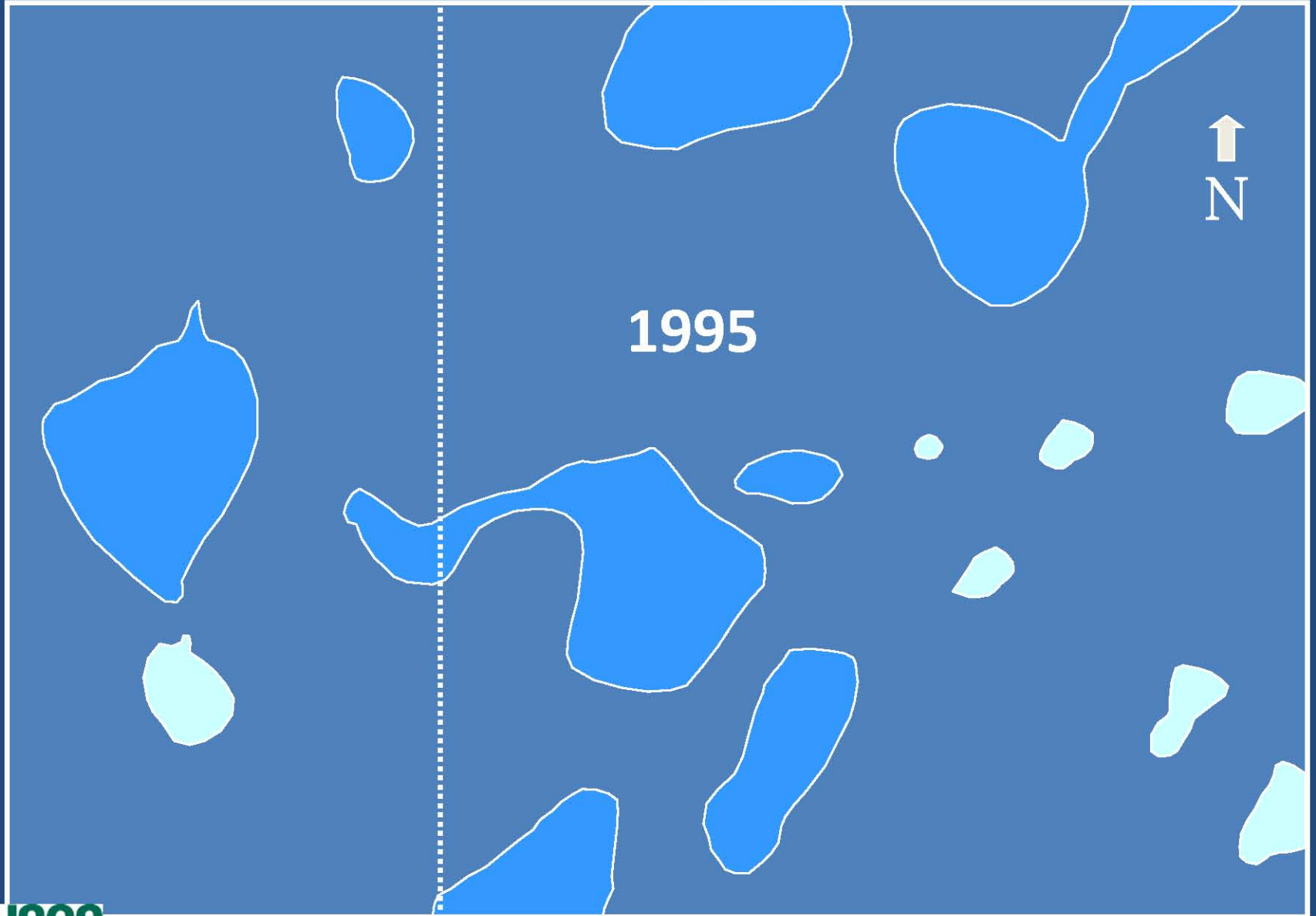
# Amphipods in Cottonwood Lake Study Area Wetlands



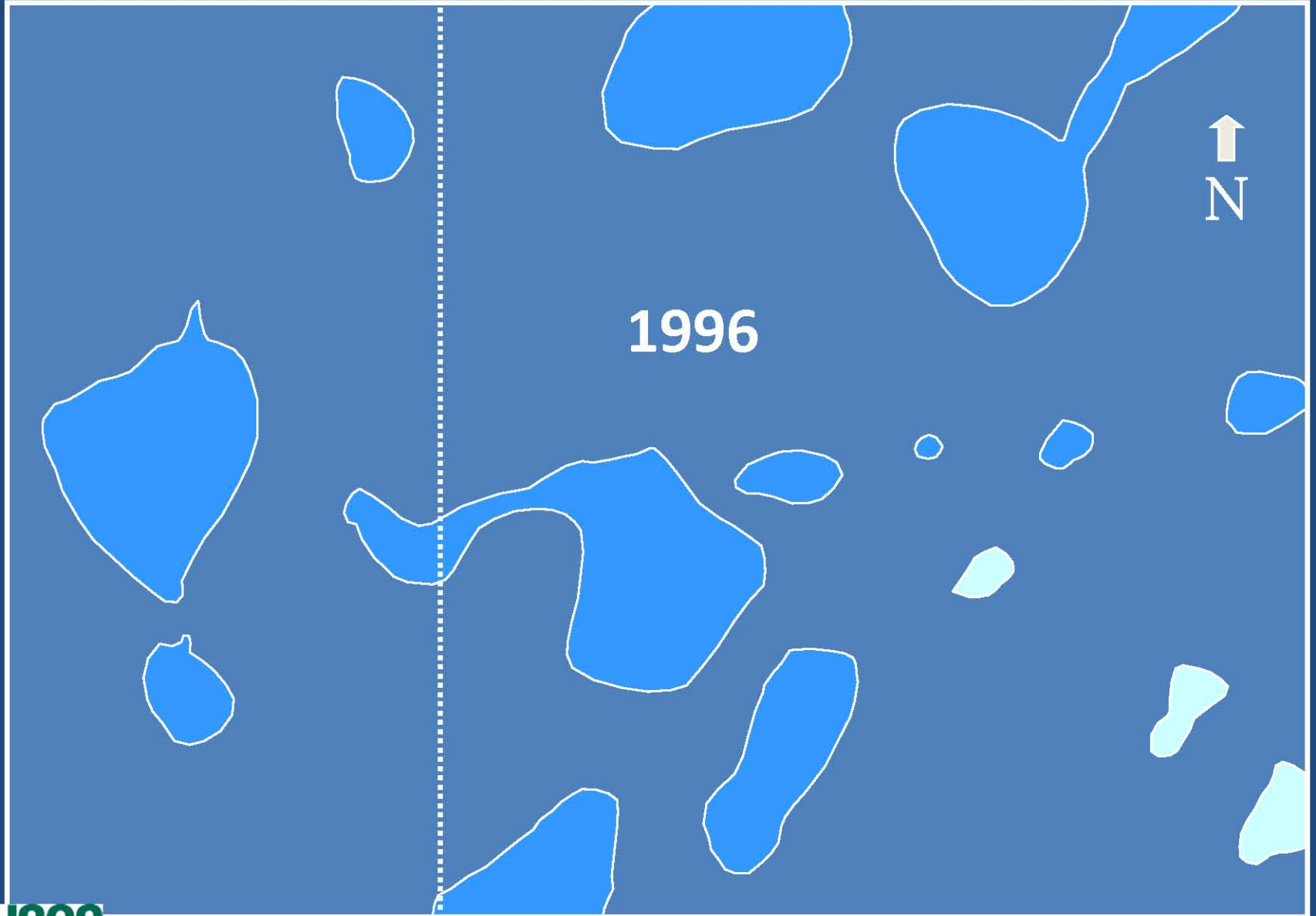
# Amphipods in Cottonwood Lake Study Area Wetlands



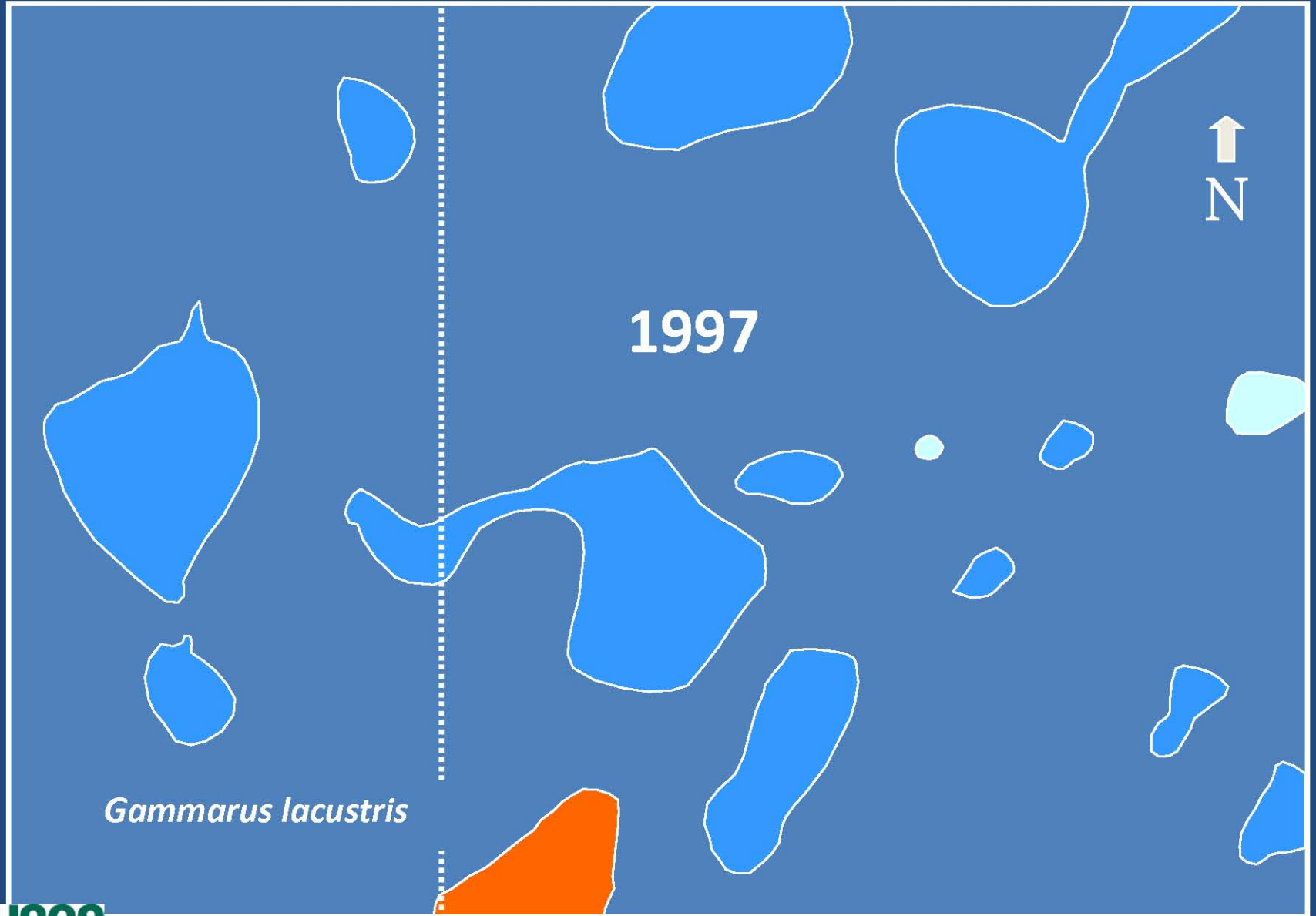
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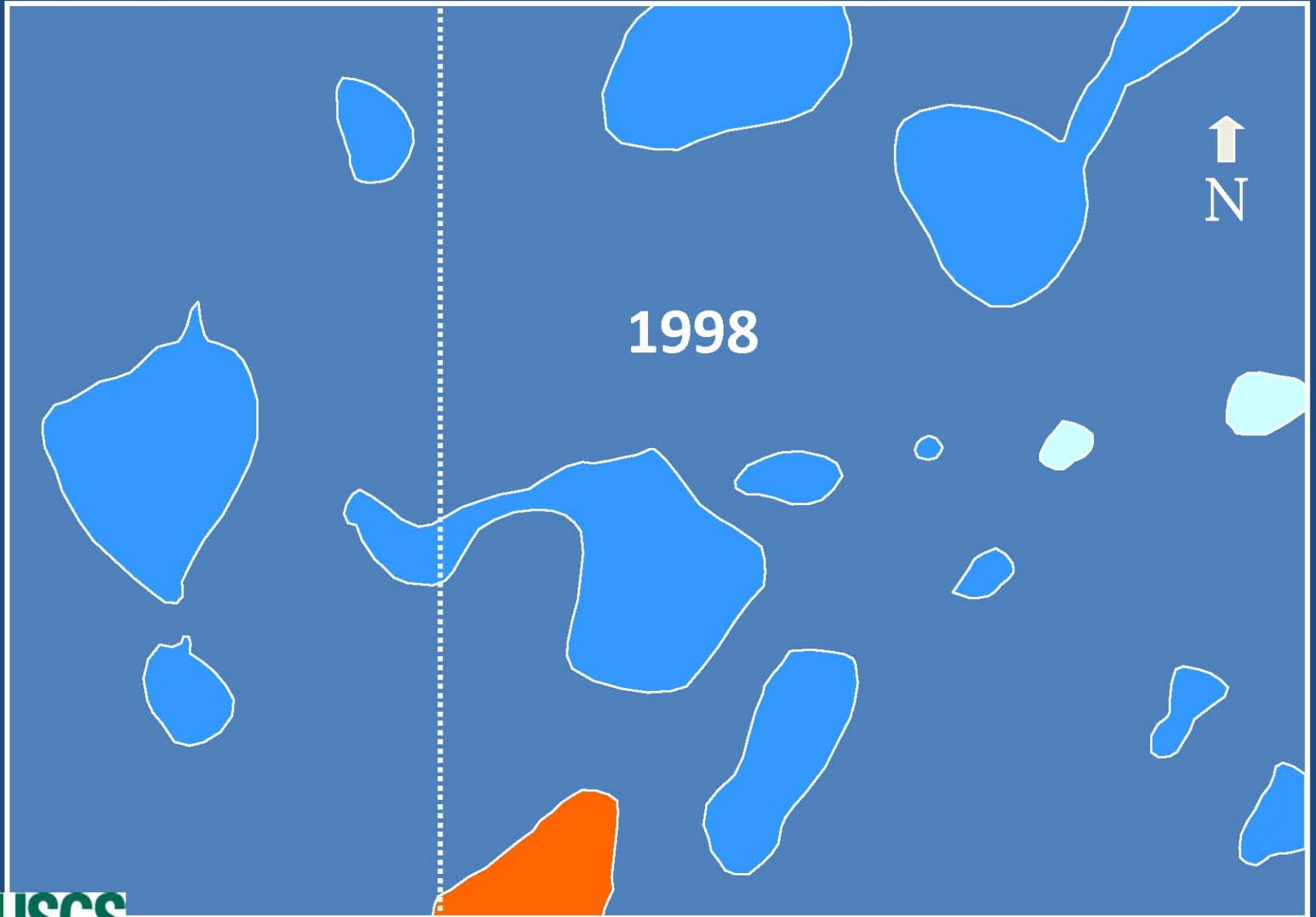
*Gammarus lacustris*

1997

↑  
N

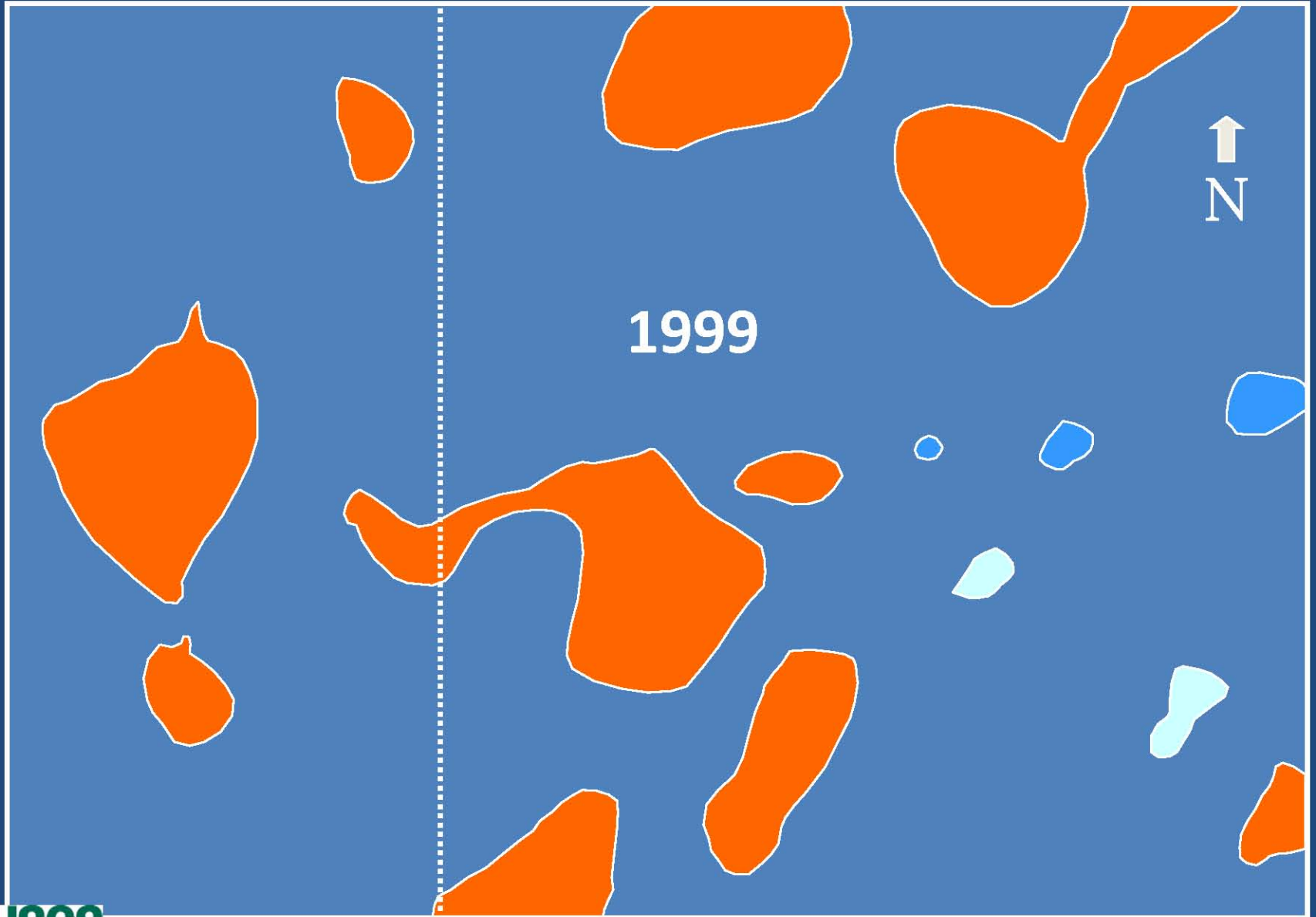
½ Mile

# Amphipods in Cottonwood Lake Study Area Wetlands

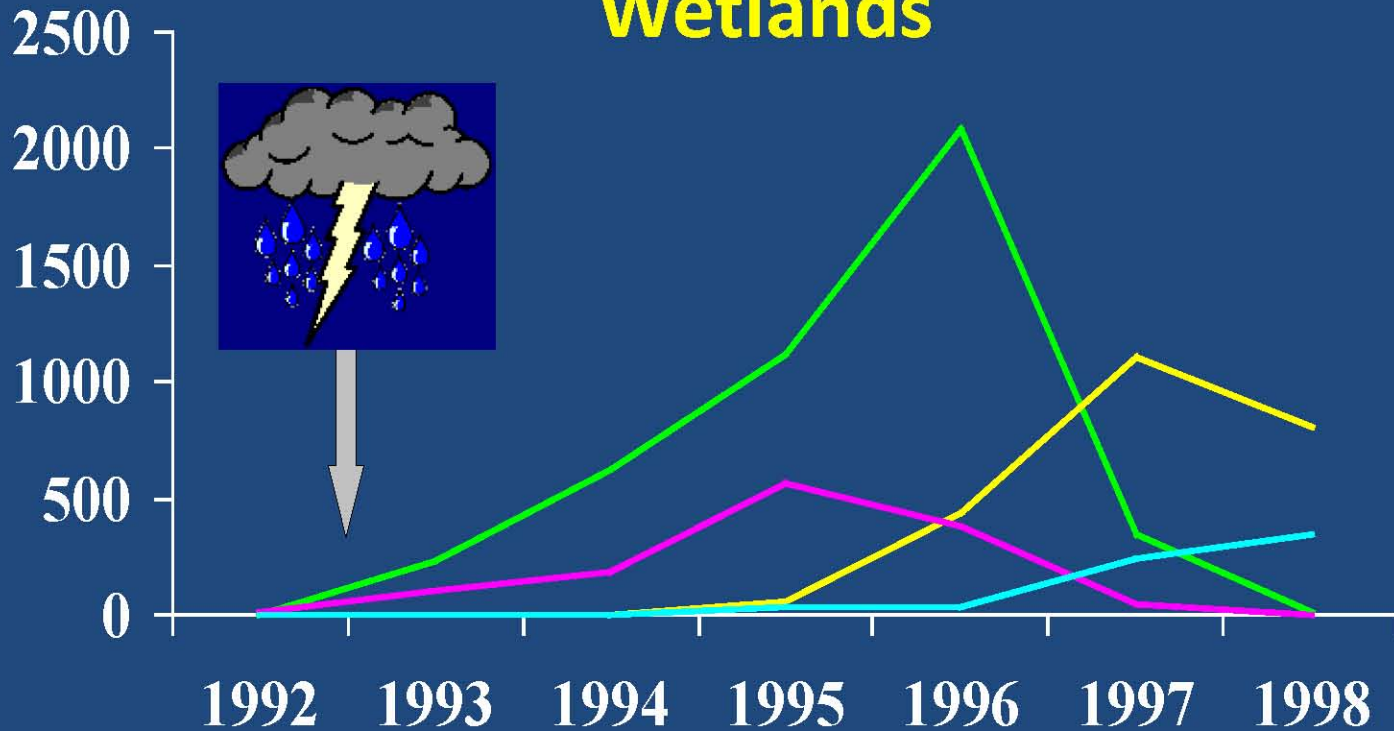




# Amphipods in Cottonwood Lake Study Area Wetlands



# Tiger Salamander Captures in Cottonwood Lake Study Area Wetlands



- Discharge Wetland
- Closed Basin Semipermanent Wetland
- Open Basin Semipermanent Wetland
- Closed Basin Seasonal Wetland

# Wetland Management is an ART

- My experience of 50 years, in 50 states, and 5 countries
- Experienced 300 refuges and untold state and private wetlands
- Worked with the best and worst managers
- Made plenty of mistakes

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# Wetland Management is an ART

- WHAT IT TAKES – The Science
  - An ability and willingness to understand the original hydrogeomorphic setting in which the management occurs and how these conditions determine processes at the site.
  - An ability and willingness to determine the man-induced modifications affecting processes and physical condition on the site
  - A good understanding of the life history strategies of common plants and animals in the system

# Wetland Management is an ART

- WHAT IT TAKES – The Personal
  - Good observational skills and a willingness to keep records that others can use
  - A passion for the land and the processes that determine biodiversity and productivity. Willingness to use new technology as an appropriate tool and not as the answer to successful management.
  - Willingness to work beyond 40 hours a week, on weekends, on holidays, or at inconvenient times because of when natural events occur or to put the extra touch on management efforts.

# Wetland Management is an ART

- WHAT IT TAKES – The Personal
  - Ability to listen and learn from many individuals regardless of ethnicity, age, gender, area of expertise, level of education, and wide range of experience.
  - Ability to work within the constraints of agencies and their constantly changing emphasis.
  - Good communication skills
  - An unending CURIOSITY

# Wetland Management is an ART

- WHAT IT TAKES – The Social
- Ability to work effectively with many different supervisors, colleagues, and coworkers who may have conflicting perspectives or goals
- Willingness to use new technology as an appropriate tool and not as the answer to successful management.



# Wetland Management is an ART

- WHAT IT TAKES – Recognition of Site Nuances
  - The lack of engineers and contractors with wetland management expertise required for a site sensitive design, multiple year planning, and construction leading to manageable conditions.
  - Equipment, budgets, and personnel
  - Regulations, water rights, land agreements

# My MANAGEMENT EXPERIENCE SUGGESTS

- There has been a Historic Focus on The Biotic and usually a species, a population, or a life history event
- Failure to recognize geomorphic setting, biogeochemistry, subsurface hydrology, and climatic variability
- Failure to monitor the most appropriate variables to understand processes and evaluate how system functions
- The new generation tends to be poor observers, lack taxonomic skills, have little patience, and rely far too much on computers, quantitative models, and technology

# DISTURBING FACTORS

- REFUGE OR SITE CONDITIONS
  - DECREASING WILDLIFE POPULATIONS IN TOO MANY PLACES
  - ACCEPTANCE OF SMALLER POPULATION GOALS, DISRUPTED PLANT COMMUNITIES, AND DISFUNCTIONAL SYSTEMS
  - MONOTYPIC VEGETATION
  - MORE AND MORE EXOTICS
    - MORE SPECIES
    - COVER A GREATER AREA

# A WORST CASE SCENARIO







# Have Some Understanding of

- Abiotic
  - Climatic
  - Geomorphic
    - Landforms
    - Soils
  - Hydrologic
    - Surface/Subsurface
- Ecological
  - Plants
  - Bugs
  - Vertebrates



# Must Understand Time and Space

- Spatial Scale
  - Geomorphic Setting
- Hydrologic Setting
  - Climatic Setting
- Temporal and Taxonomic Scale
  - Short and Long-term Wetland Cycle
  - What is the taxonomic and temporal objective?
- Degree of Modification
  - Physical condition
  - Process disruption

# Perturbations

- Urbanization
- Roads Within and Outside boundaries
- Water Use Urban and Agriculture
- Water Projects Flood Control, Drainage, Etc.
- Invasives Plant, Invertebrates, Vertebrates
- Toxic wastes Dumps and Spills
- Infrastructure Levees, Ditches, Water Control

# FACTORS THAT AFFECT THE TIMING OR COMPLETION OF EVENTS

- WETLAND LOSS AND MODIFICATION
- CLIMATIC VARIABILITY
- LAND USE
- DISTURBANCE

# WETLAND LOSS

- **LESS AREA AVAILABLE FOR USE**
- **REDUCED FOOD PRODUCTION**
- **CHANGES IN PROPORTION OF DIFFERENT WETLANDS REQUIRED**

# WETLAND MODIFICATION

- **LESS FOOD PRODUCED**
- **SOME FOODS NOT PRODUCED**
- **STRUCTURE FOR NESTING LACKING**

# CLIMATIC VARIABILITY

- **REQUIRED TO MAINTAIN WETLAND PRODUCTIVITY**
- **WATERFOWL WELL ADAPTED TO SURVIVE VARIOUS CLIMATIC CONDITIONS**
- **MAKES PRODUCTION AND DISTRIBUTION LESS PREDICTABLE**

# LAND USE

- **NESTING HABITATS REDUCED**
- **PREDATORS HAVE GREATER EFFECT**
- **DISTRIBUTION OF RESOURCES AFFECTED**

# DISTURBANCE

- **INCREASES ENERGETIC COSTS**
- **CHANGES DISTRIBUTION**
- **PREVENTS USE OF CRITICAL HABITATS**



# TYPES OF DISTURBANCE

- AIRCRAFT OVER FLIGHTS
- BIRD WATCHERS
- MANAGEMENT ACTIVITIES
- RESEARCH ACTIVITIES
- HUNTING

Once a wetland ?

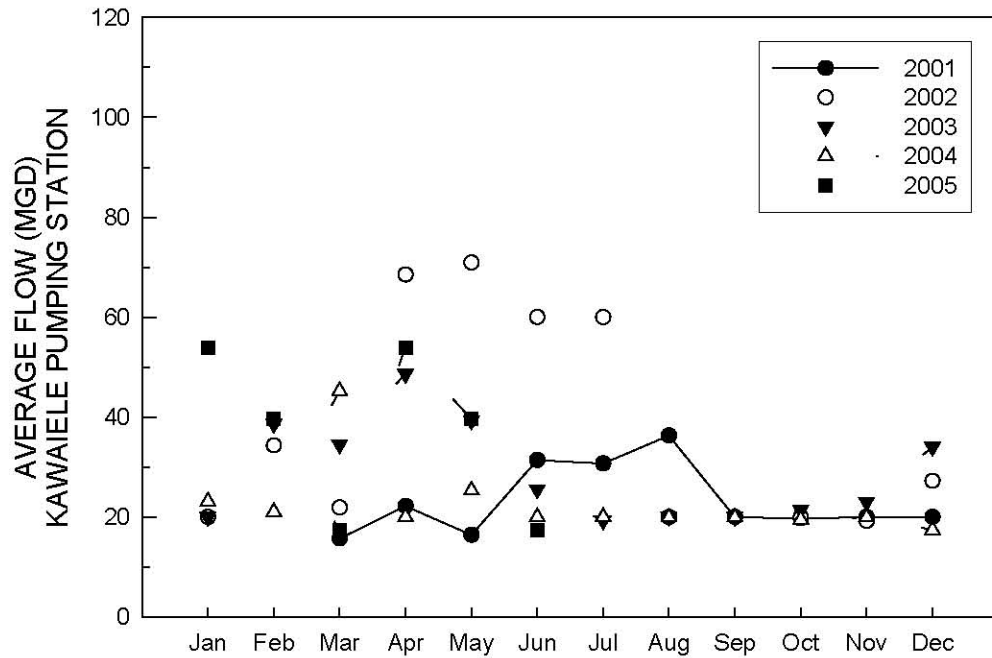


# Maalaea Flats

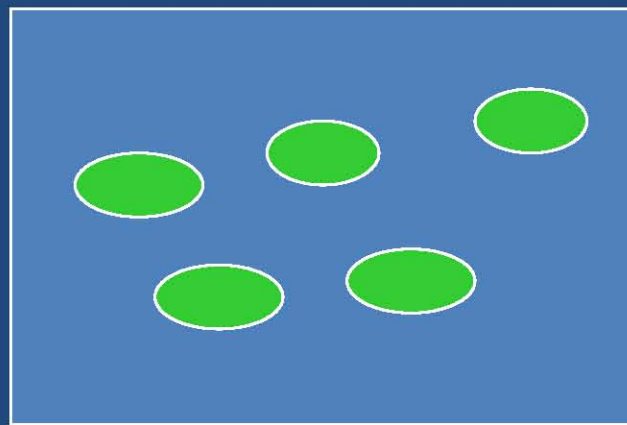


SAND PLUG

# PUMPING RECORDS



# Moats and Islands



# Tilapia Redds

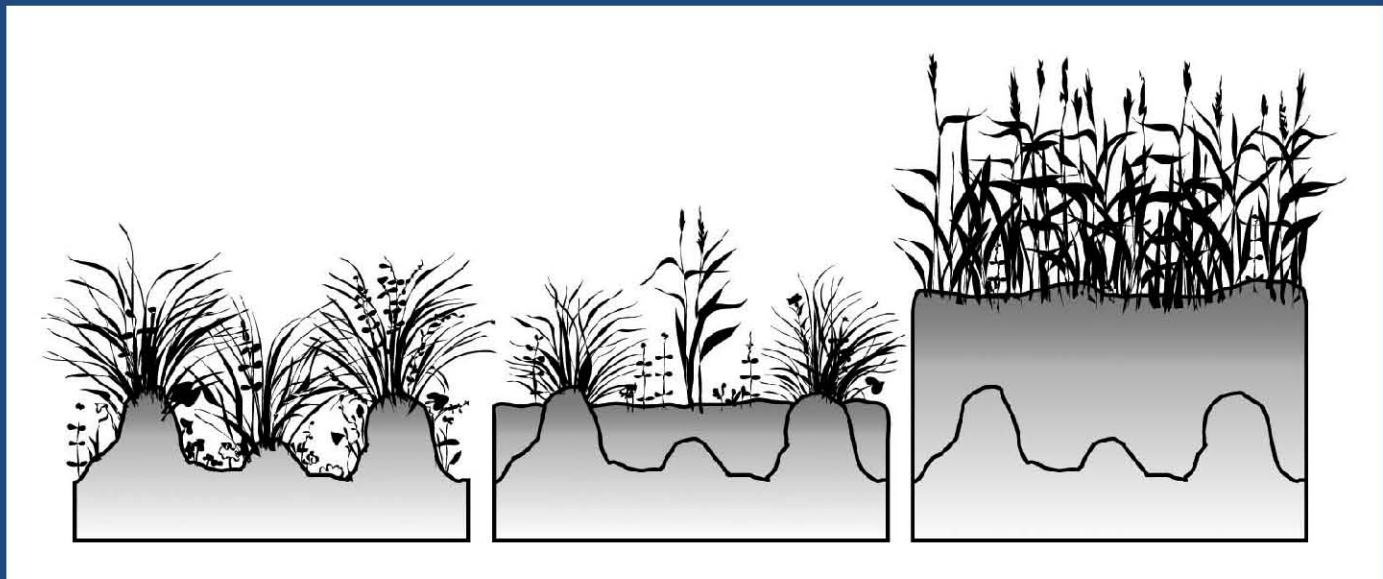


# Tilapia Redds



# Habitat Altered by Invasive Species

- Sedimentation
- Altered hydrology
- Fewer habitat niches



Werner and Zedler 2002; Zedler and Kercher 2004



# ISSUES

- OFTEN ONE OR MORE ISSUES ARE INTERLINKED
- STATE AGENCIES USUALLY HAVE GREATER STABILITY IN PERSONNEL BUT FEW FUNDS
- AGENCY MAY DETERMINE DEGREE A FACTOR INFLUENCES DECISIONS AND ACTIONS
  - Some agencies more bureaucratic
  - State agencies generally more politically driven than federal agencies

# LIFE HISTORY STRATEGIES

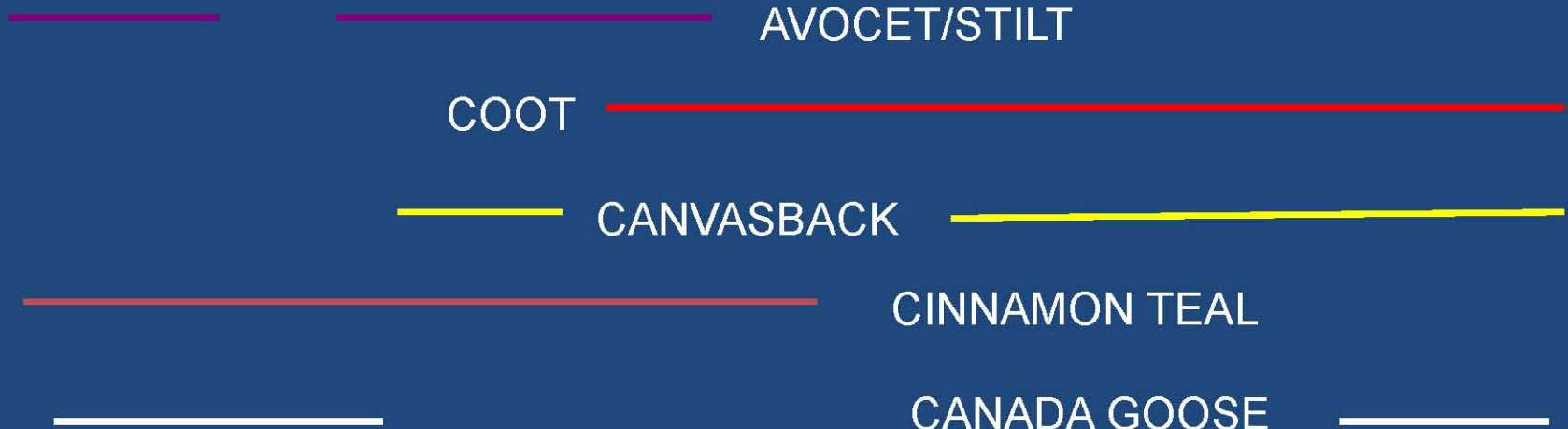
# MONTANE WATERBIRDS VEGETATION/WATER DEPTH

← DECREASING VEGETATION

INCREASING VEGETATION →

OPEN MUDFLAT

DEEP WATER OPEN



# MONTANE WATERBIRDS

## SALINITY

← INCREASING SALINITY

DECREASING SALINITY →

STILT/AVOCET

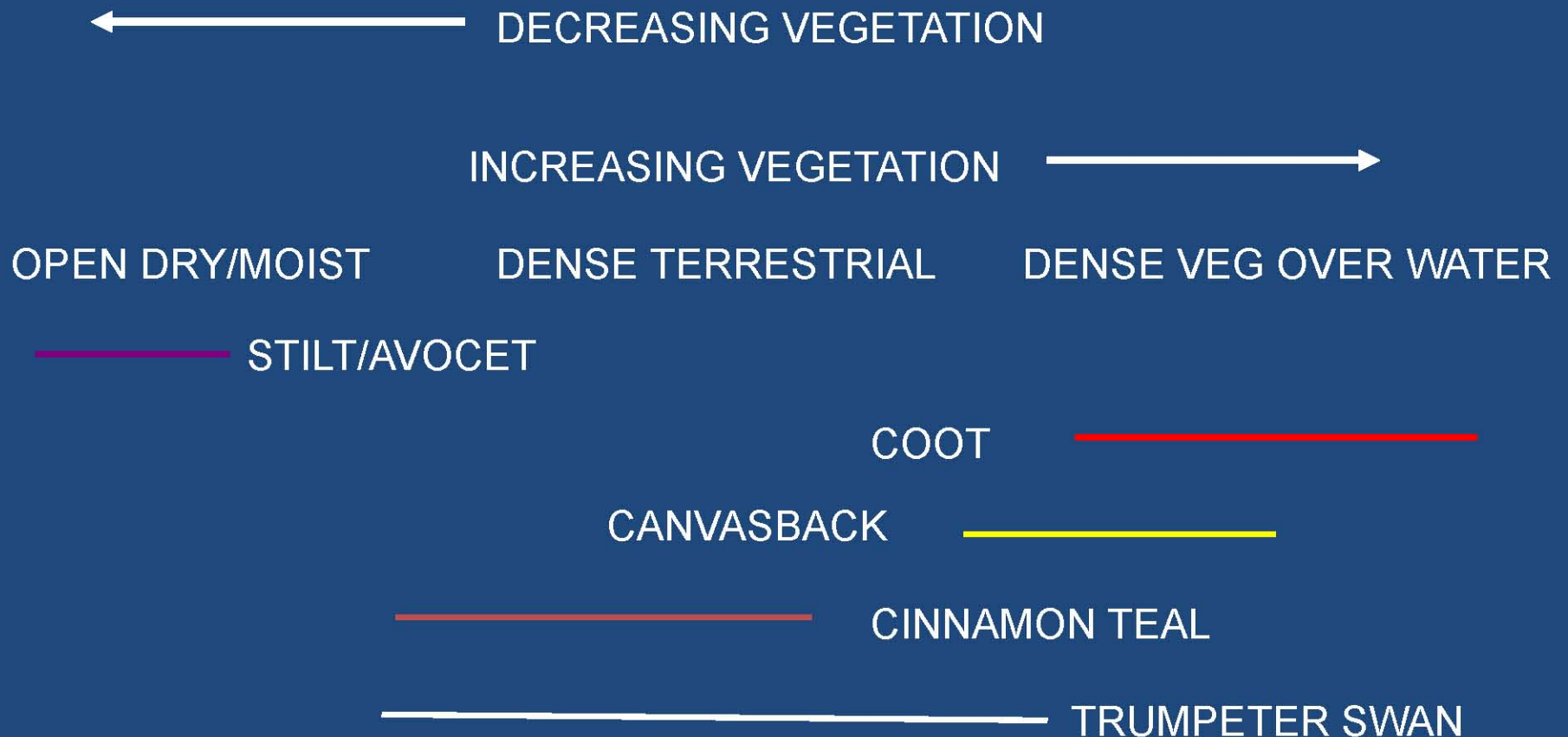
COOT

CINAMON TEAL

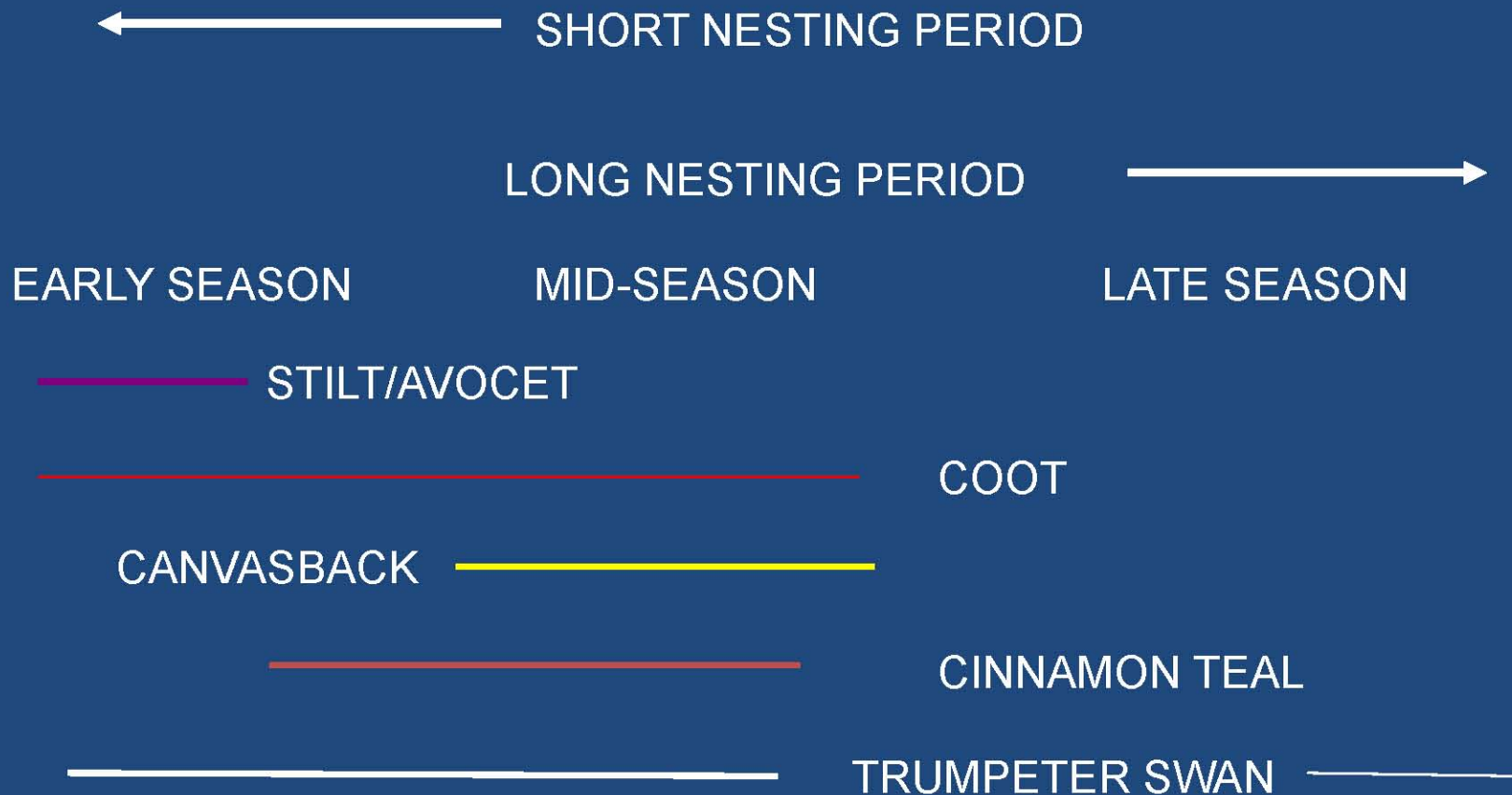
REDHEAD

TRUMPETER SWAN

# MONTANE WATERBIRDS NESTING



# MONTANE WATERBIRDS NESTING DURATION



# MONTANE WATERBIRDS FOODS

← INCREASING ANIMAL

INCREASING VEGETATION →

PREDOMINANTLY INVERTEBRATES

PREDOMINANTLY PLANTS

STILT/AVOCET

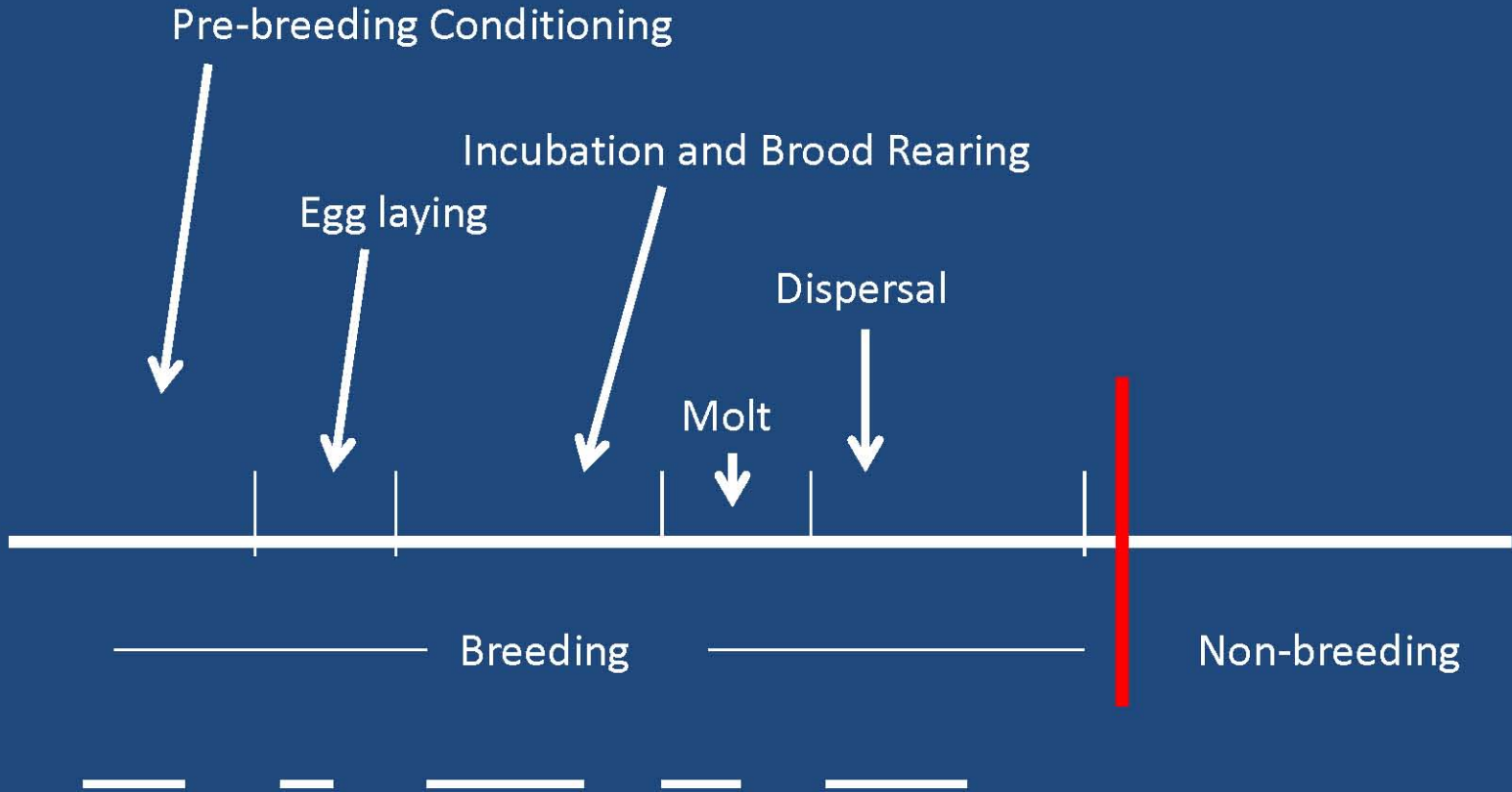
COOT

CANVASBACK

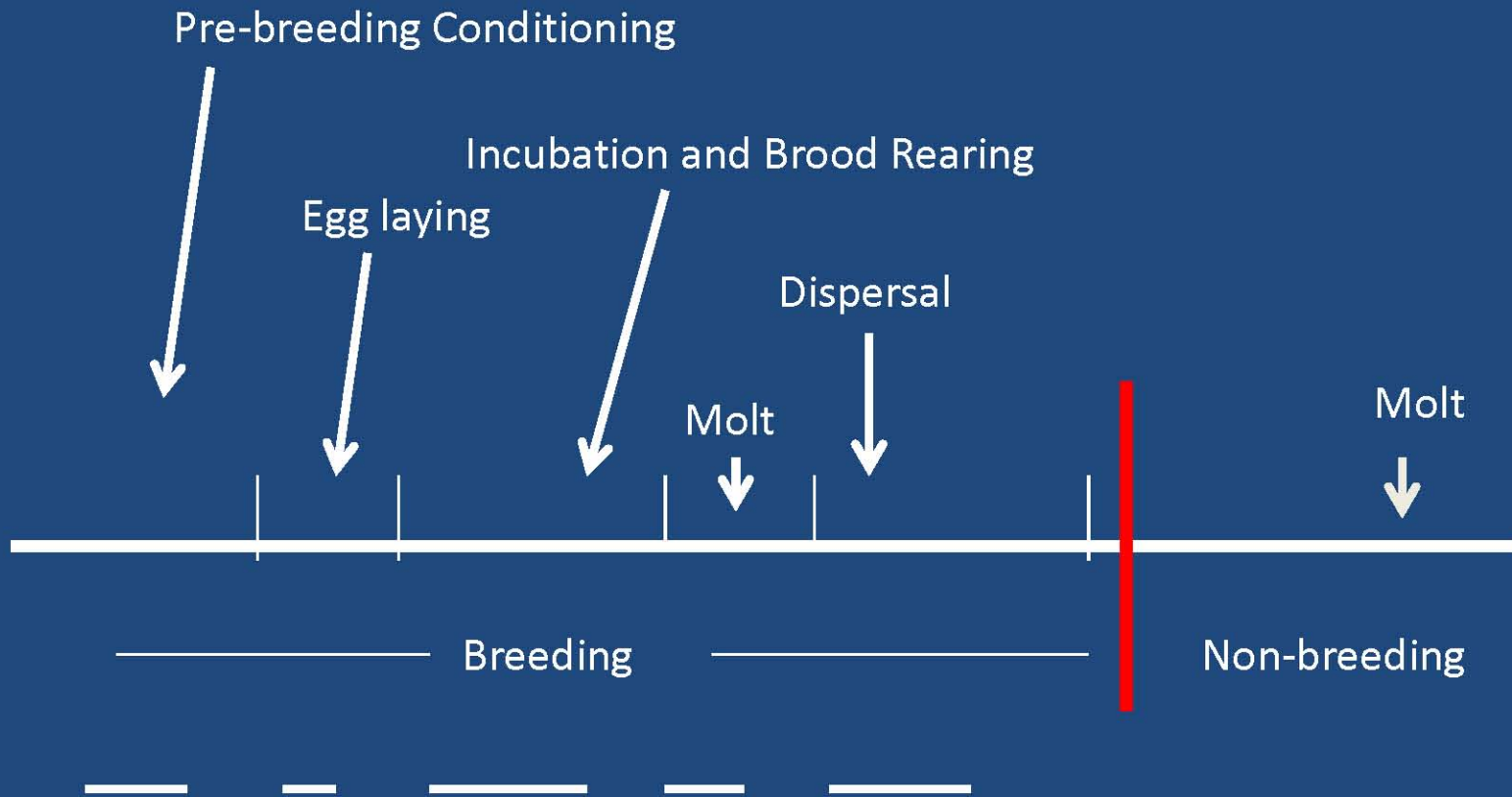
CINNAMON TEAL

TRUMPETER SWAN

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# DOES THIS REALLY WORK??

- OURAY NWR
- HANAIEI, KEALIA POND, AND JAMES CAMPBELL NWRs
- BOSQUE DEL APACHE NWR
- BAYOU METO BASIN (5-OAKS DUCK CLUB AND BAYOU METO WILDLIFE MANAGEMENT AREA)
- RIO GRANDE, HIGEL, AND RUSSEL LAKES WILDLIFE MANAGEMENT AREAS IN THE SAN LUIS VALLEY CO
- TEN MILE POND CONSERVATION AREA
- LACREEK NWR
- HALFWAY CREEK