Waterbird Populations in

Western Great Basin Terminal Lakes

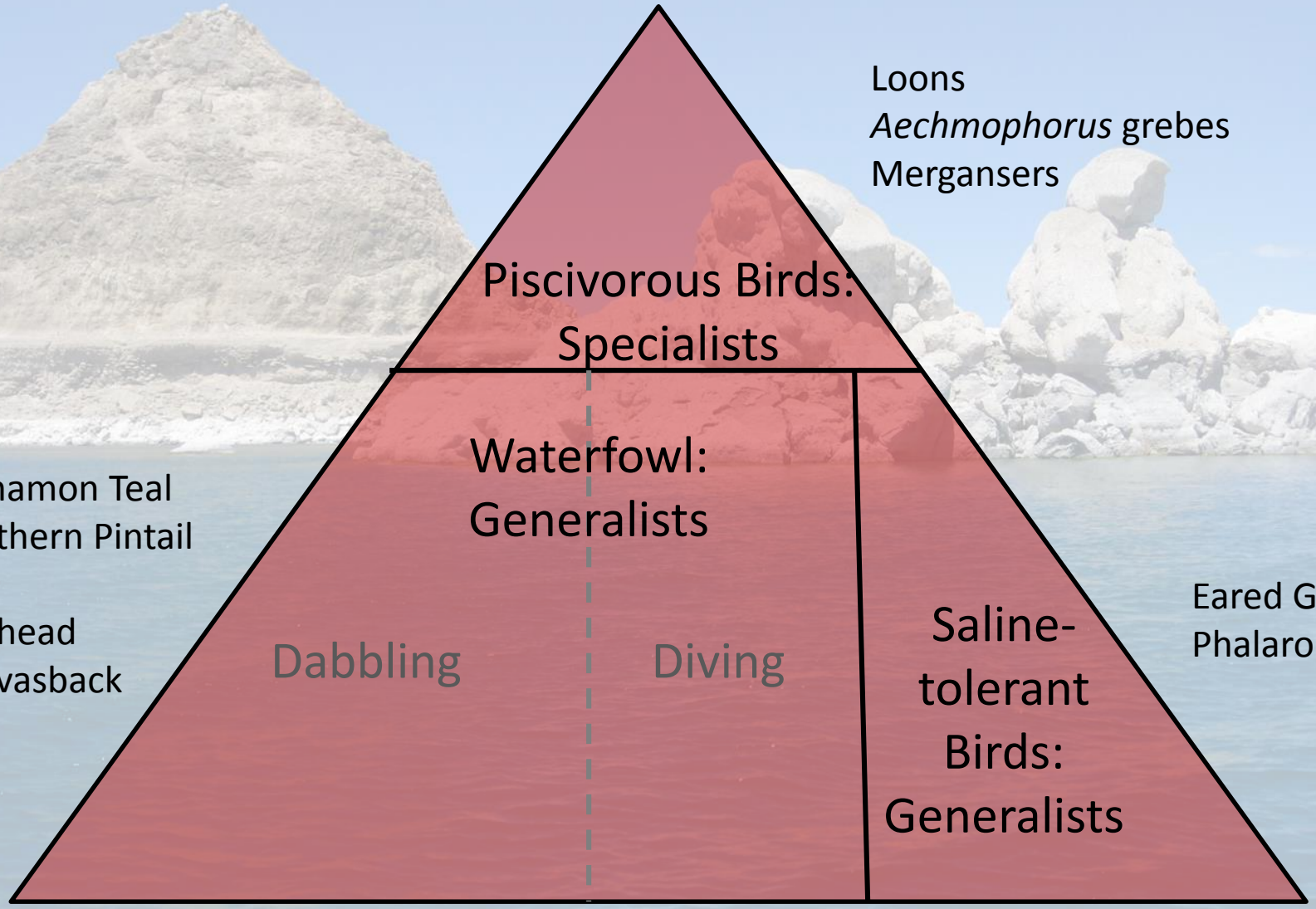
Elisabeth Ammon, John Boone, and Susan Merideth

Great Basin Bird Observatory

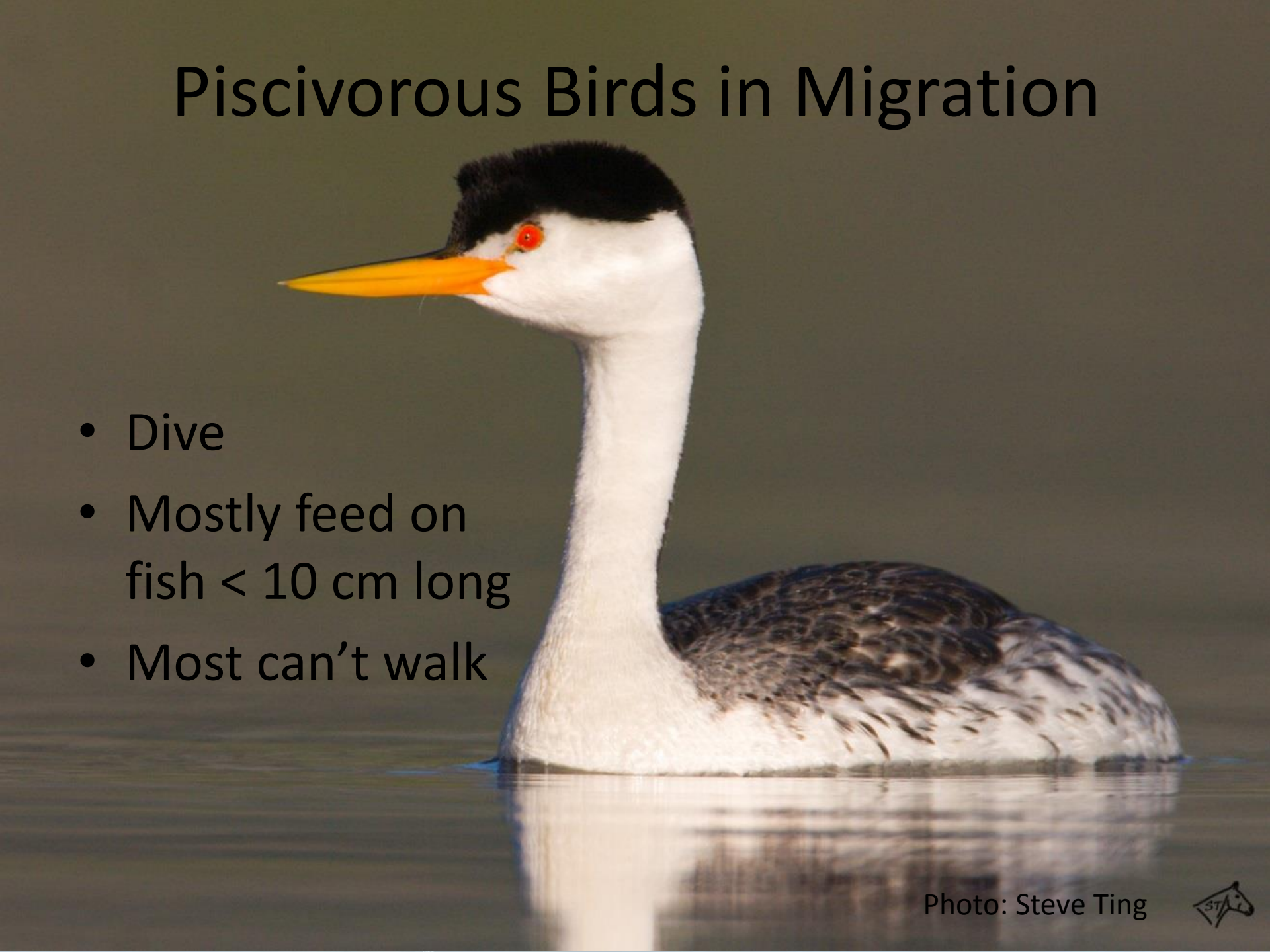
Acknowledgments

- Funded by USFWS Lahontan Fish Hatchery Complex through USBR Terminal Lakes funds
- Collaboration with Nevada Department of Wildlife, National Fish and Wildlife Foundation, Walker Lake Paiute Tribe, and Otis Bay Consultants

Major Types of Aquatic Birds



Piscivorous Birds in Migration



- Dive
- Mostly feed on fish < 10 cm long
- Most can’t walk

Photo: Steve Ting

OREGON
IDAHO
Great Basin
Sierra Nevada
NEVADA
Wasatch Range
UTA
Colorado
CALIFORNIA
ARIZONA

OREGON
IDAHO
Great Basin
Pyramid Lake
Sierra Nevada
NEVADA
Topaz Lake
Walker Lake
Wasatch Range
UTAH
Colorado
CALIFORNIA
ARIZONA

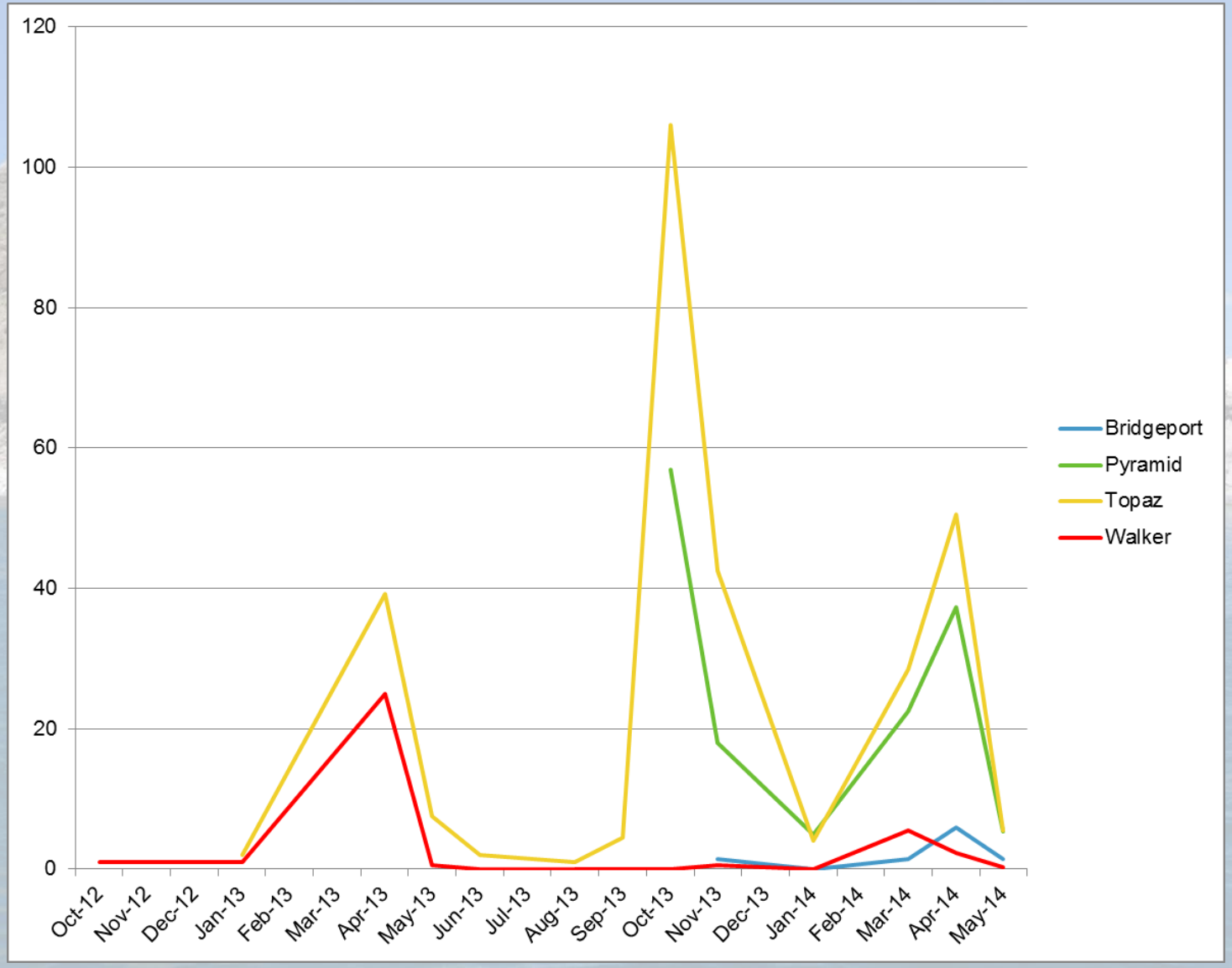
Four Lakes

- Walker Lake: large (> 130 km^2) terminal lake, declining water, increasing TDS levels
- Pyramid Lake: large (> 130 km^2) terminal lake, stable water and low TDS levels
- Topaz and Bridgeport Reservoirs: small (< 10 km^2) fresh-water reservoirs in the upper Walker Basin

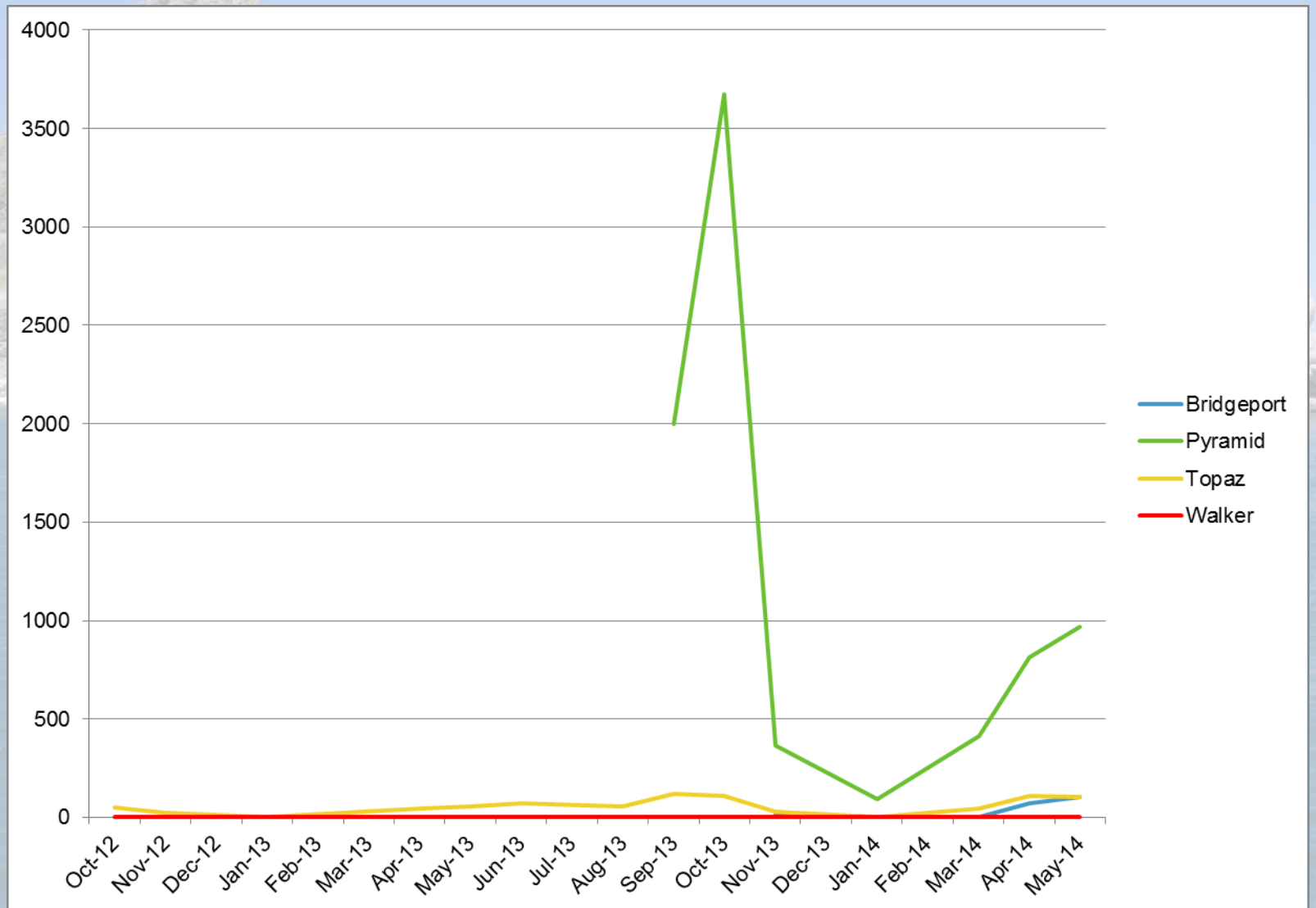
Fish-eating Birds

Photo: Fred Petersen

Common Loon, 2012-2014



Aechmophorus grebes, 2012-2014



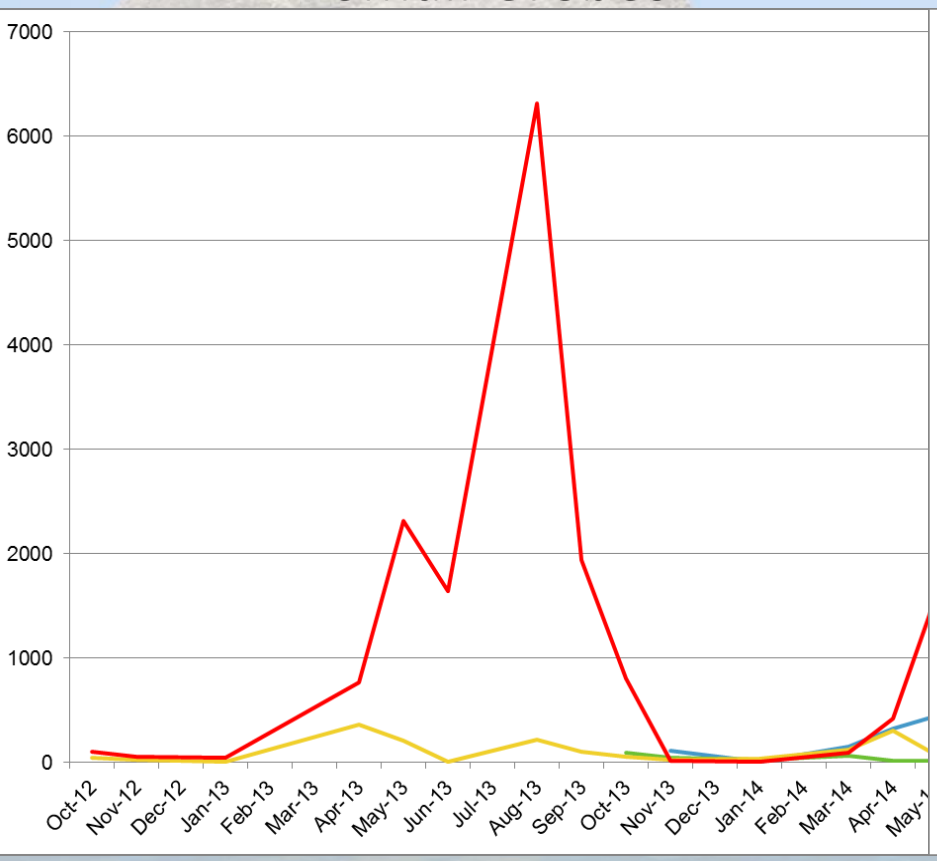
Saline-tolerant Birds

- Surface feeders
- Wide variety of invertebrates
- Wide variety of lake sizes/depths

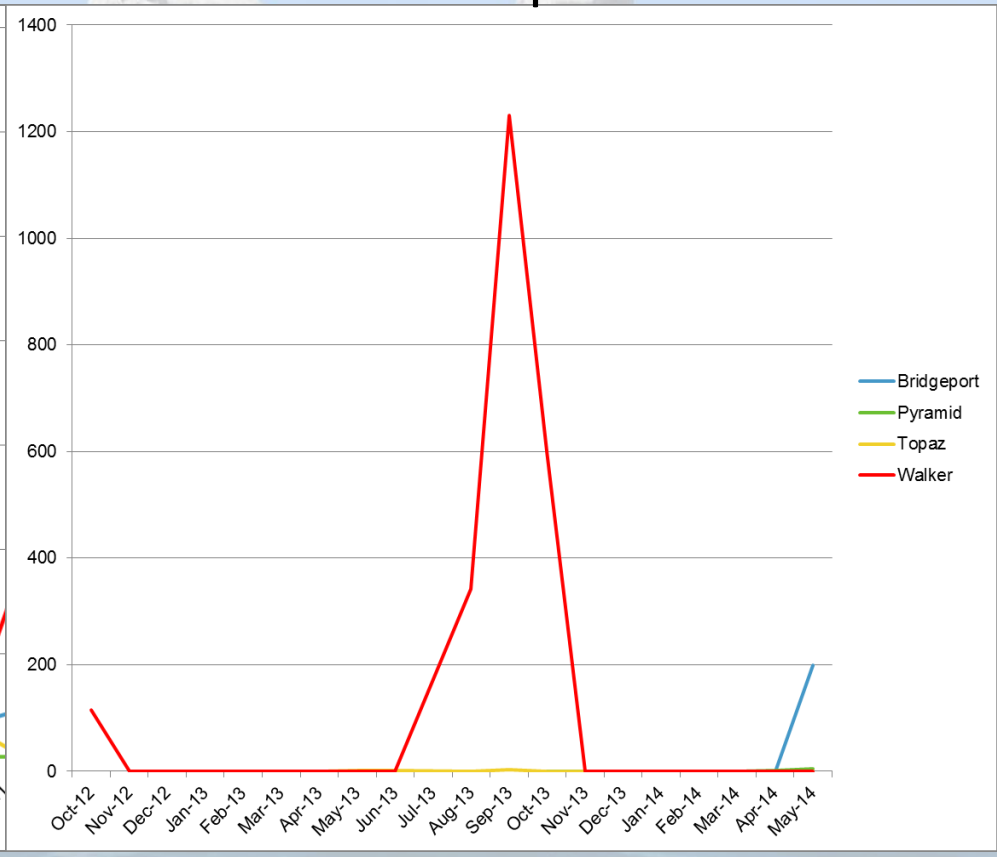
Photo: Steve Ting

Small Grebes and Phalaropes, 2012-2014

Small Grebes



Phalaropes



Conclusions – Part 1

- Walker Lake is approaching the conditions of hypersaline lakes
- It has largely lost all species that eat fish

- Aquatic birds respond extremely quickly to changing lake resources
- That makes them excellent (and cheap) tools for monitoring terminal lake conditions

Waterfowl Response to Droughts

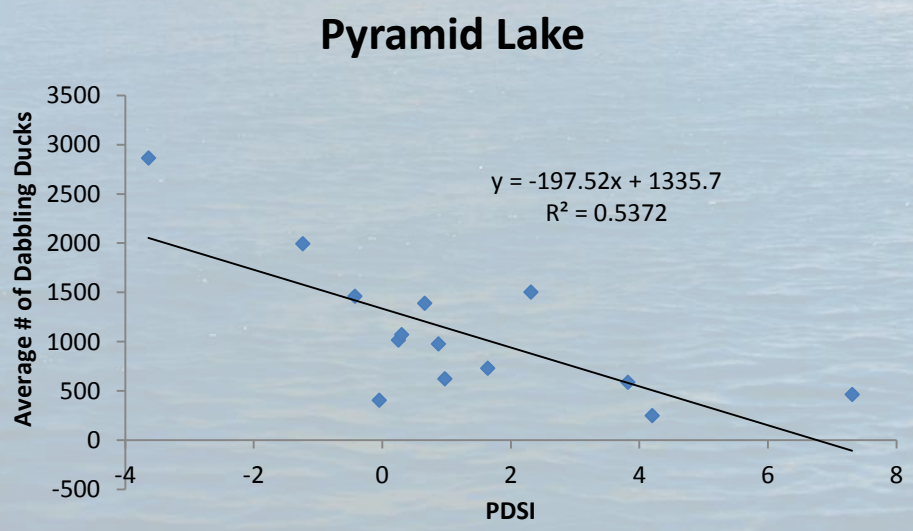
- 15 years of aerial waterfowl surveys (1970 – 1984)
- Same surveyor
- Palmer's Drought Severity Index – PDSI (northwestern Nevada) used for analysis

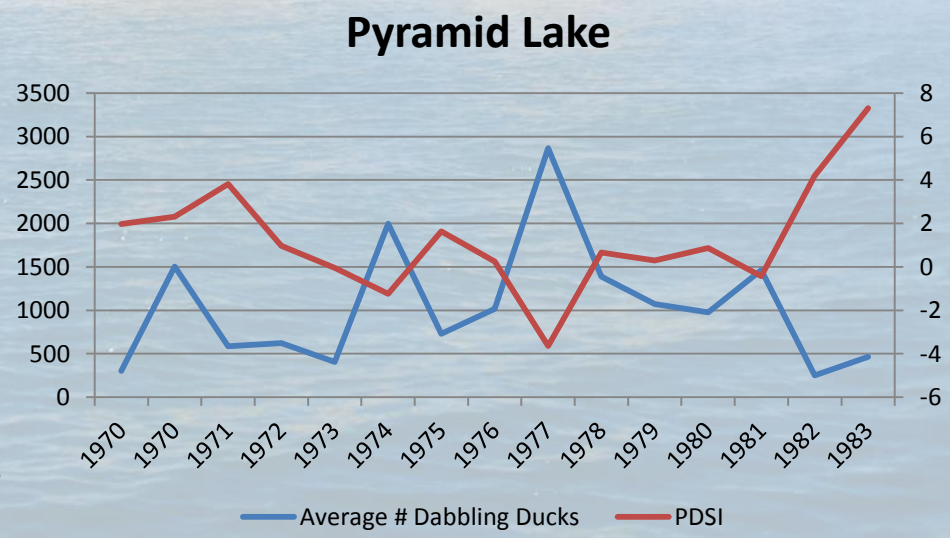
Migrating Dabbling Ducks

Photo: Steve Ting

Dabbling Ducks and Droughts

Large, Permanent Terminal Lake



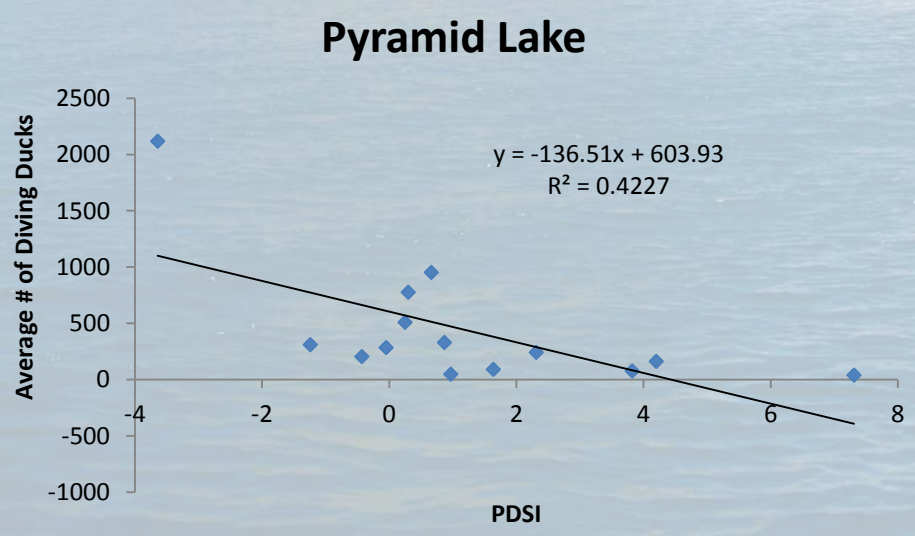


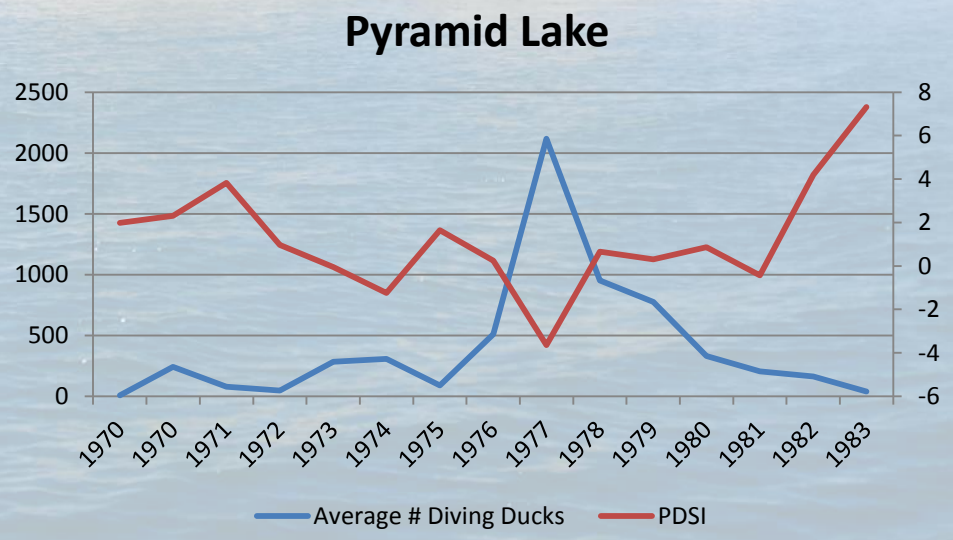
Migrating Diving Ducks

Photo: Steve Ting

Diving Ducks and Droughts

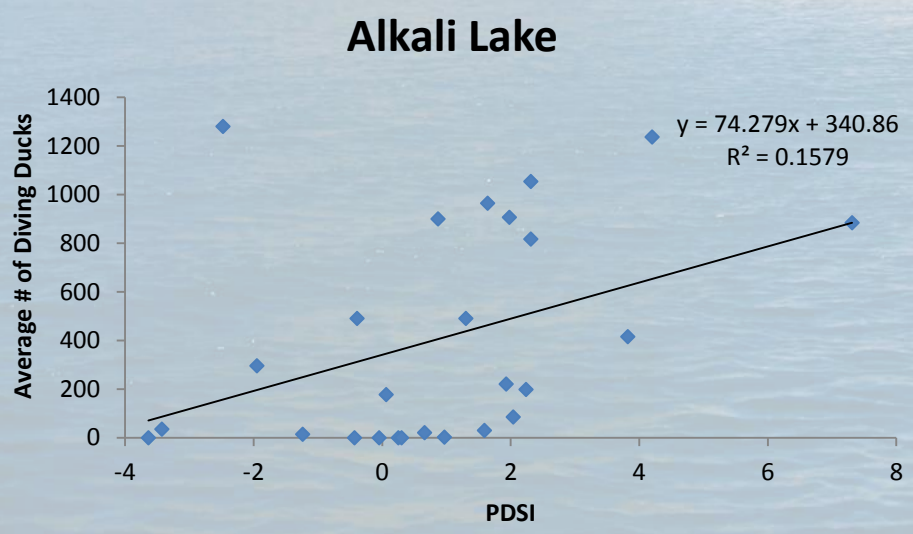
Large, Permanent Terminal Lake

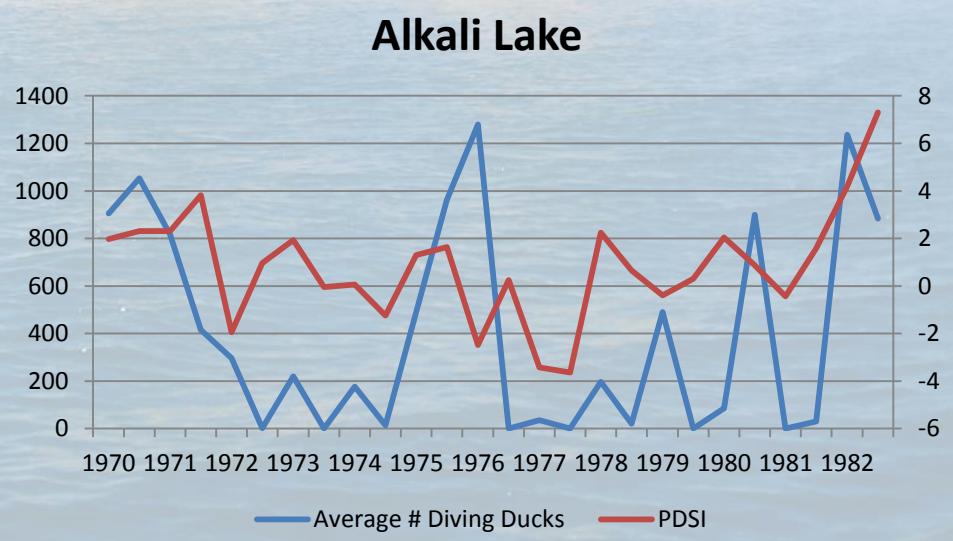




Diving Ducks and Droughts

Ephemeral Terminal Lake





Conclusions – Part 2

- Migrating waterbirds critically depend on permanent terminal lakes during droughts
- They respond very sensitively to lake conditions (depth/size) and regional droughts
- They are a very easy indicator to measure
- Salinity matters – moderate to low levels accommodate the greatest diversity of birds