

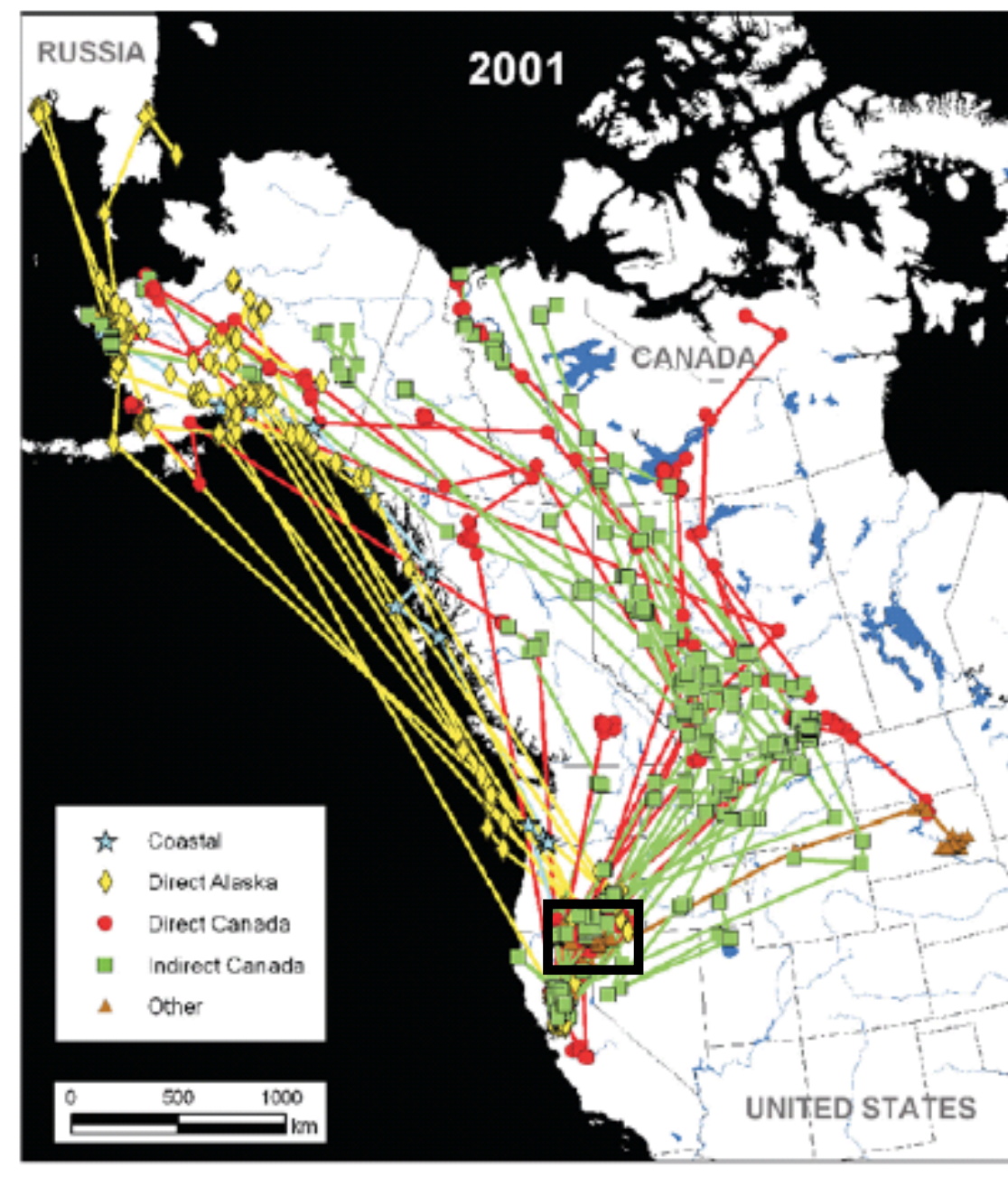
# Ecology of waterfowl and their habitats during spring migration in Southern Oregon-Northeastern California (SONEC)

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## Introduction and Objectives

Miller et al. (2005) defined the SONEC region using locations of the 77–87% of the female northern pintails (*Anas acuta*) from the Central Valley of California equipped with satellite transmitters that staged there during spring migration. To guide conservation, a multi-partner program was developed to understand spring ecology of waterfowl and their habitats. Goals of the program are to: 1) survey waterfowl use, 2) map habitats using Landsat, 3) radiotrack habitat use and duration-of-stay of pintails, 4) determine duck food habits and availability, and 5) measure waterfowl body condition.



SONEC identified as a major spring staging area for Pacific Flyway pintails

## Methods



Pintails (n = 290) were radiotagged in the Central Valley, Dec-Jan.



Radiotagged pintails were tracked in SONEC Feb- May, 2002-2003.



Six aerial surveys of SONEC were conducted in 2002 & 2003, to measure abundance and distribution of all waterfowl species during spring.



Ducks feeding in flooded pastures were collected in 2008 to determine food habits and body condition.



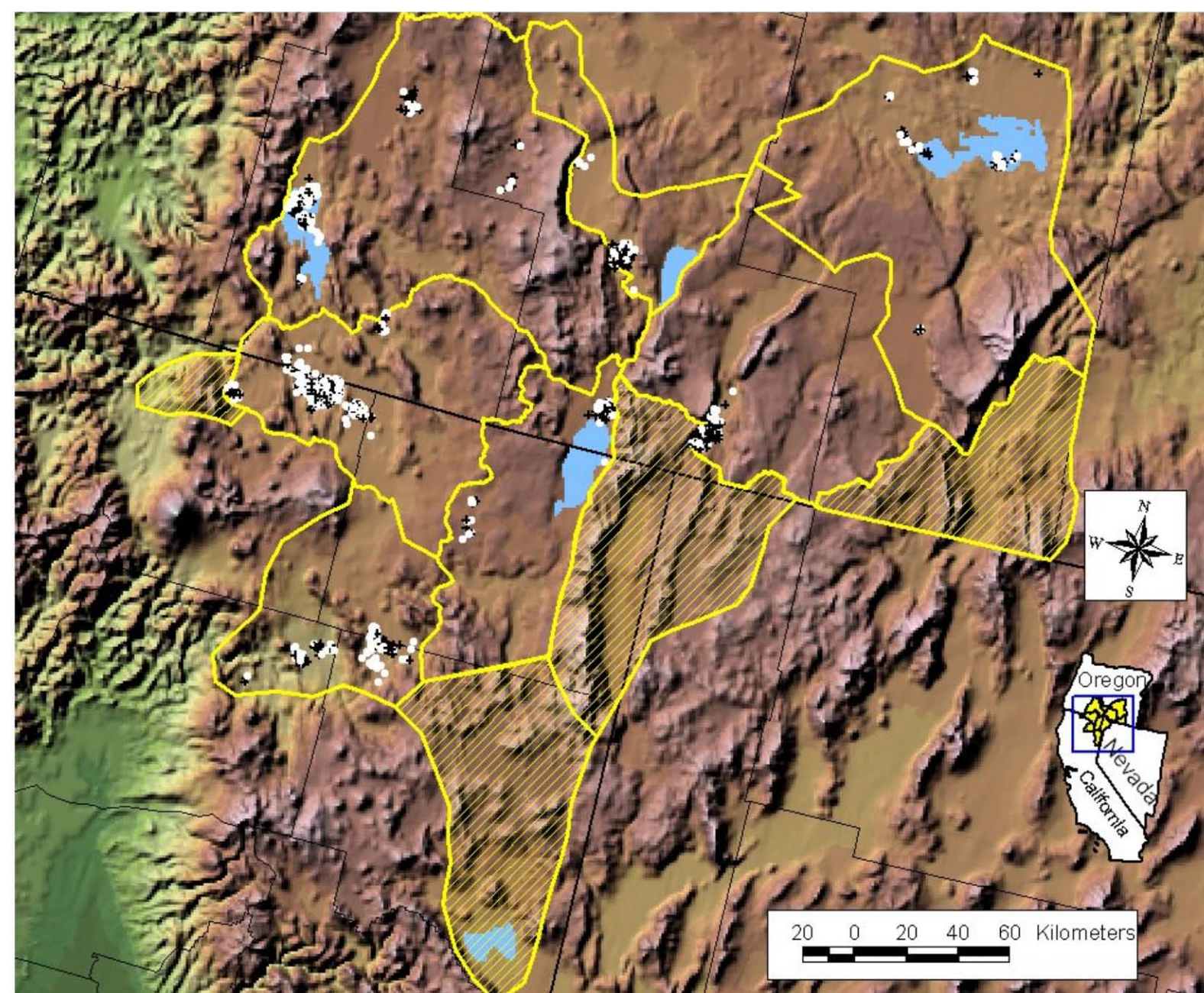
Body composition of pintails, wigeon, and shovellers was analyzed.



Core and water column samples were collected in key habitats throughout SONEC to measure density of waterfowl foods during Feb-May, 2008 and 2009.

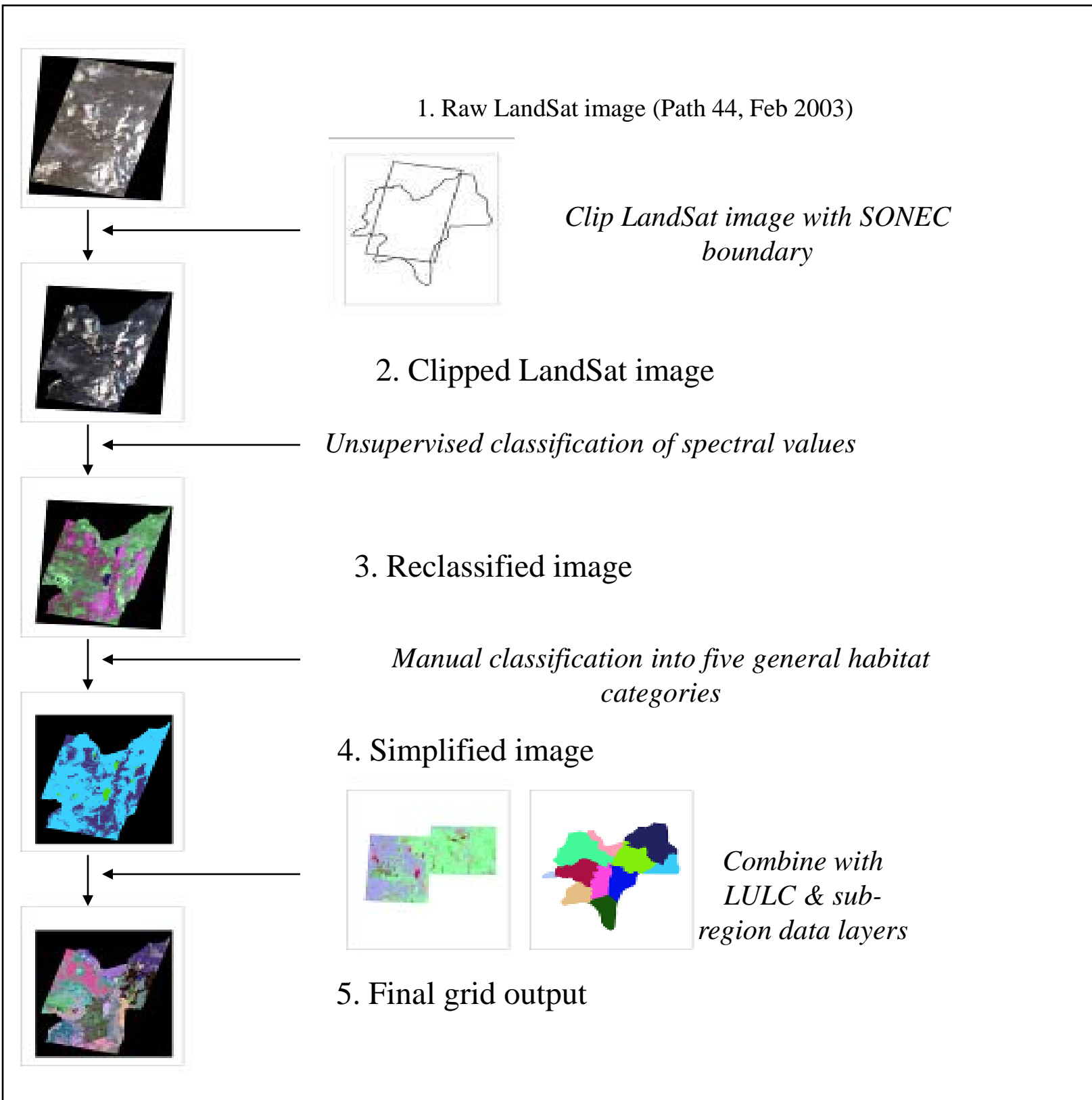


## Study Area



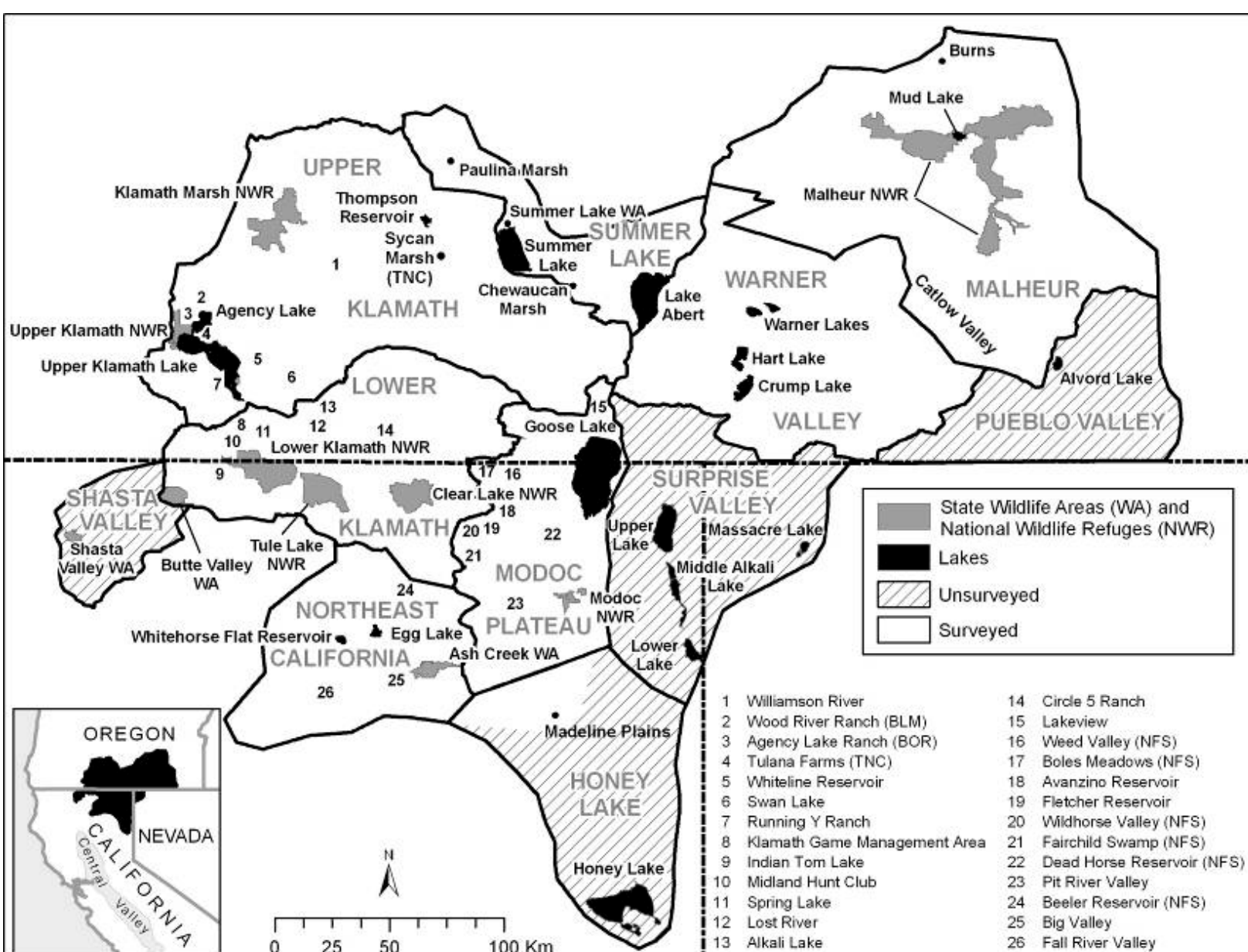
SONEC region, showing day (white dot) and night (black +) locations of radiotagged pintails staging there in spring.

## Methods



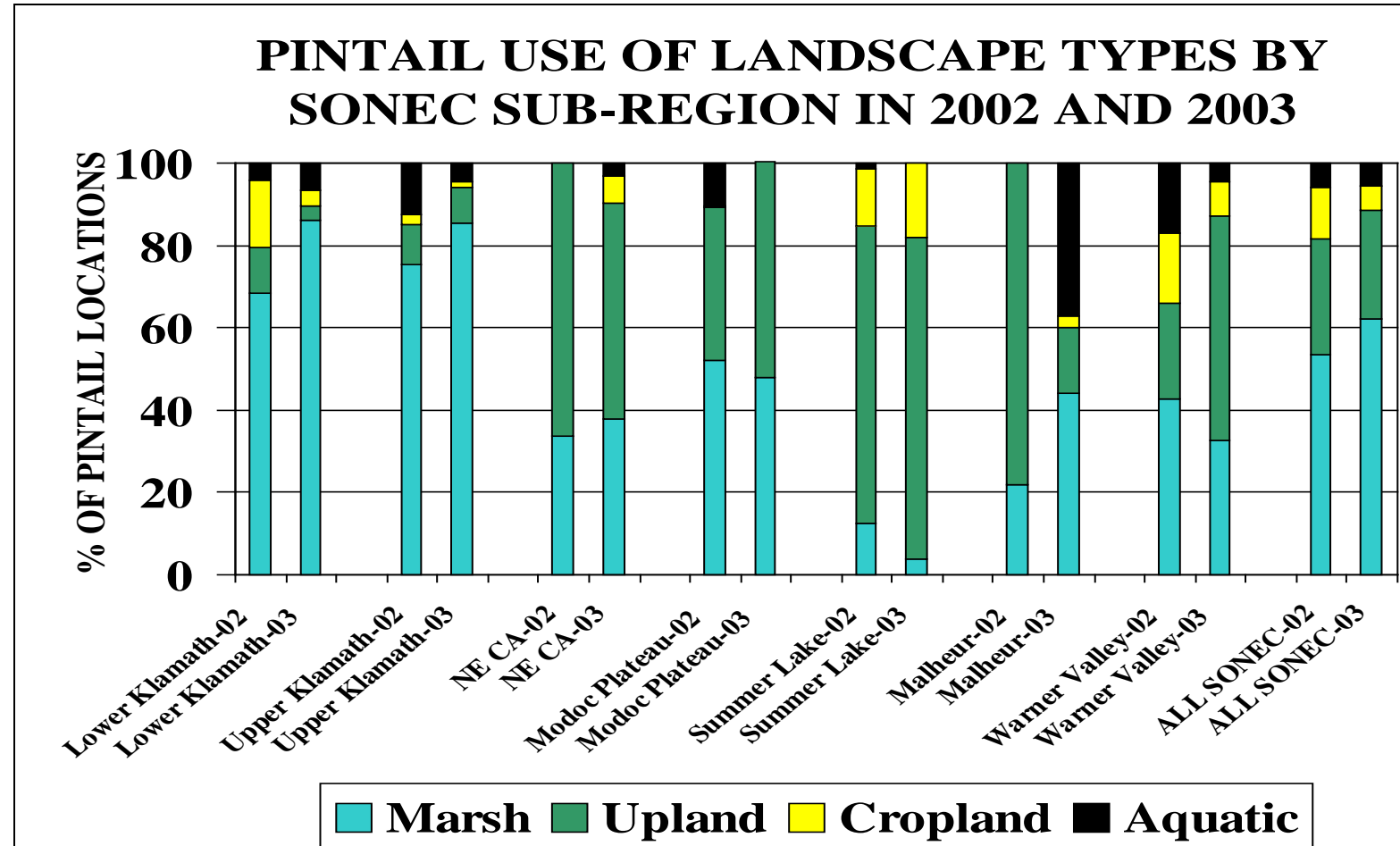
Distribution and dynamics of waterbird habitat during Feb-May, 2002-2003 were mapped using Landsat satellite imagery.

## Results

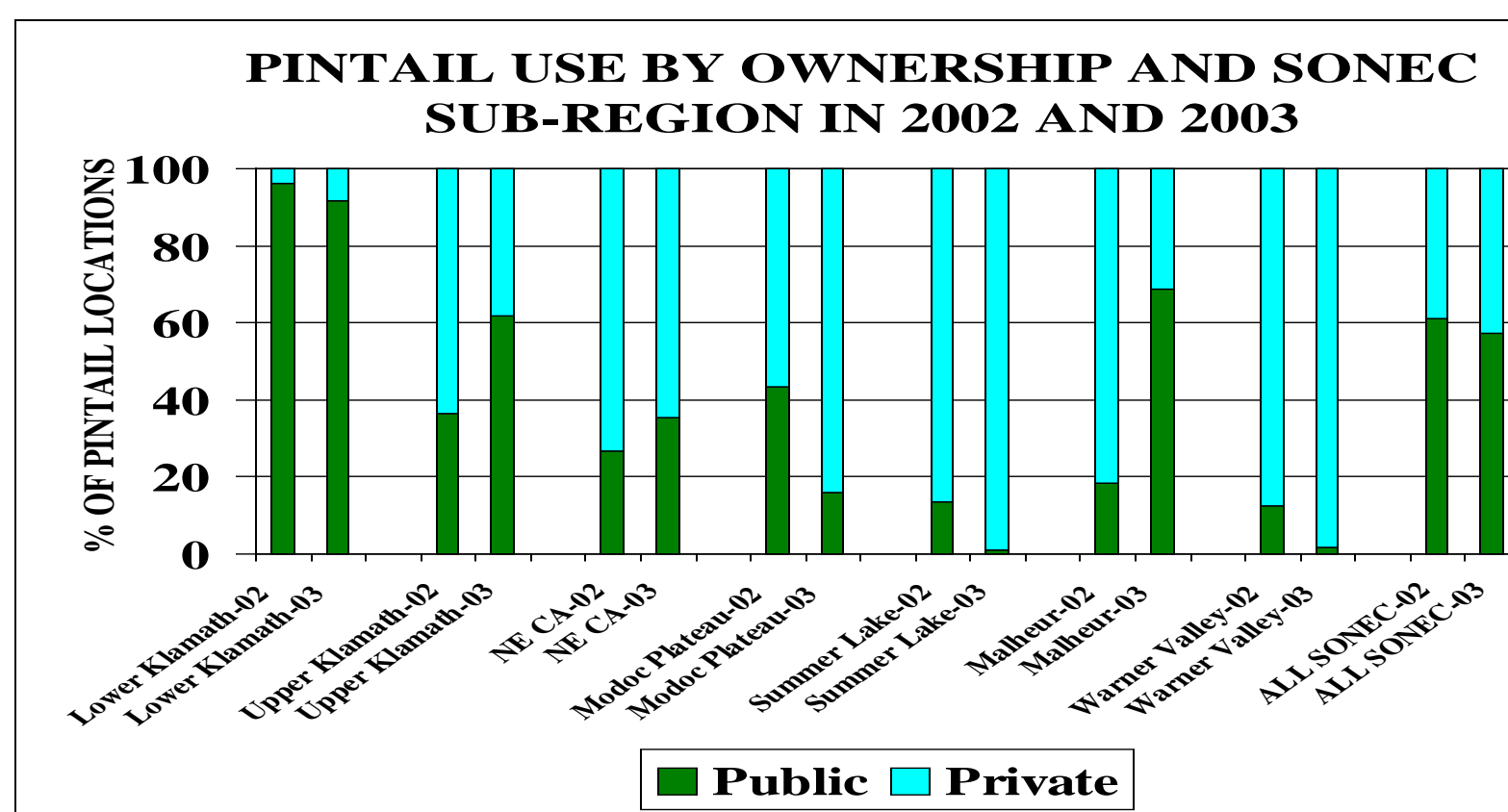


Flooded waterbird habitat (693-1,630 km<sup>2</sup> in Feb; 2,099-2,125 km<sup>2</sup> in Apr) was comprised of open wetland (58-74%), marsh (8-18%), pasture-hay (4-11%), grassland (4-17%), and cropland (3-8%). Area and composition of habitat varied greatly among subregions but < 12% of potential waterbird habitat in SONEC was flooded each spring.

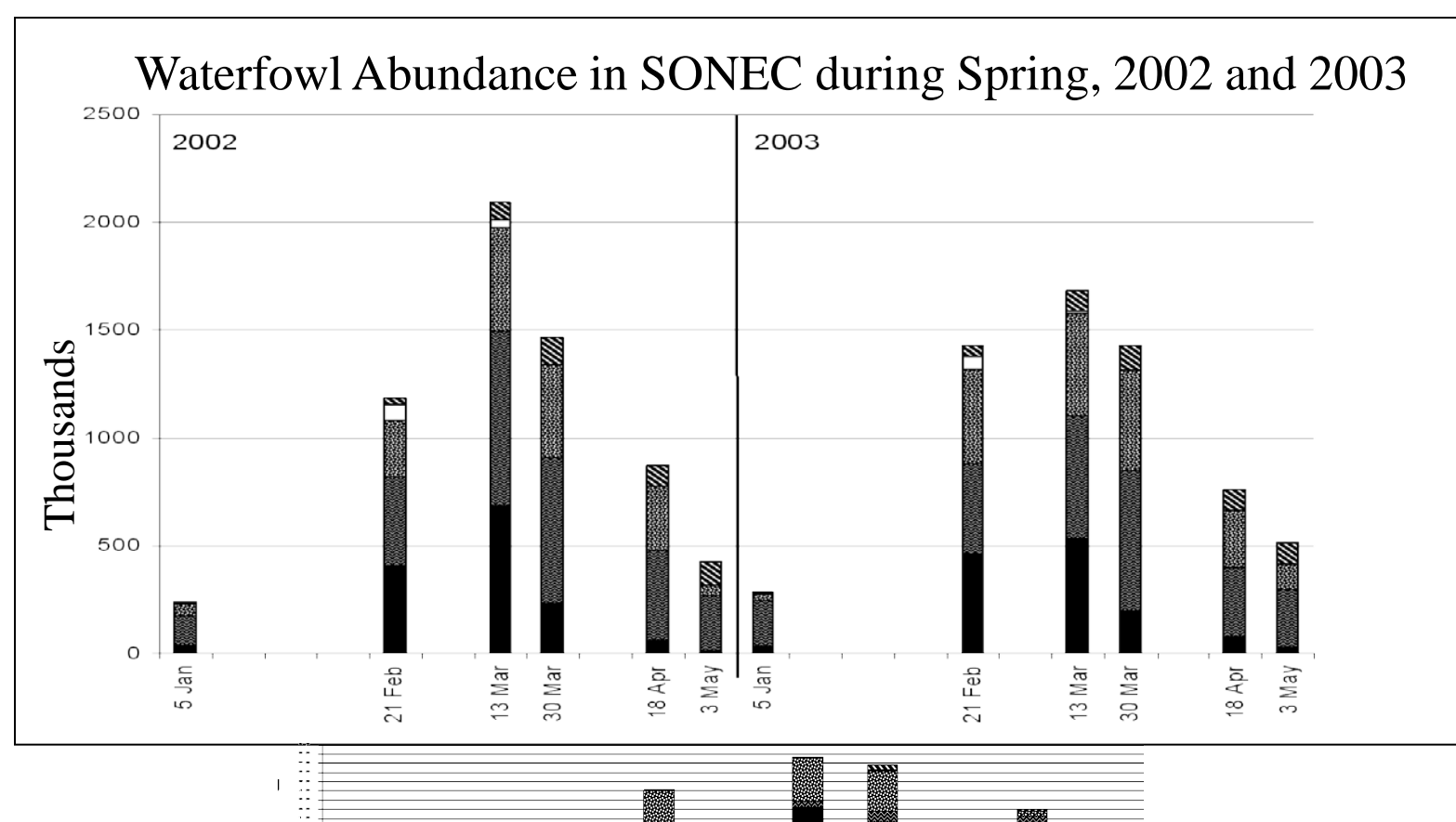
## Results



- Most use was in marsh & flooded upland (mostly pasture).
- Flooded cropland was uncommon but did receive use.
- Importance of landscapes to pintails varied by subregion.
- Habitat use was similar during day and night.



- Relative importance of private/ public varied by subregion
- Overall, ~60% of pintail locations were on private areas.



- Waterfowl abundance peaked in mid-March each spring.
- Waterfowl use days totaled about 128 million each spring.
- Pintails stayed 1-95 days (avg. = 21 d) comprising 28% of all waterfowl use days; other dabblers comprised 27%, diving ducks 11%, geese 26%, swans 2%, and coots 6%.
- Comparing peak SONEC and Central Valley abundance, at least half of all waterfowl wintering in the Central Valley of California staged in SONEC each spring.

## Acknowledgements

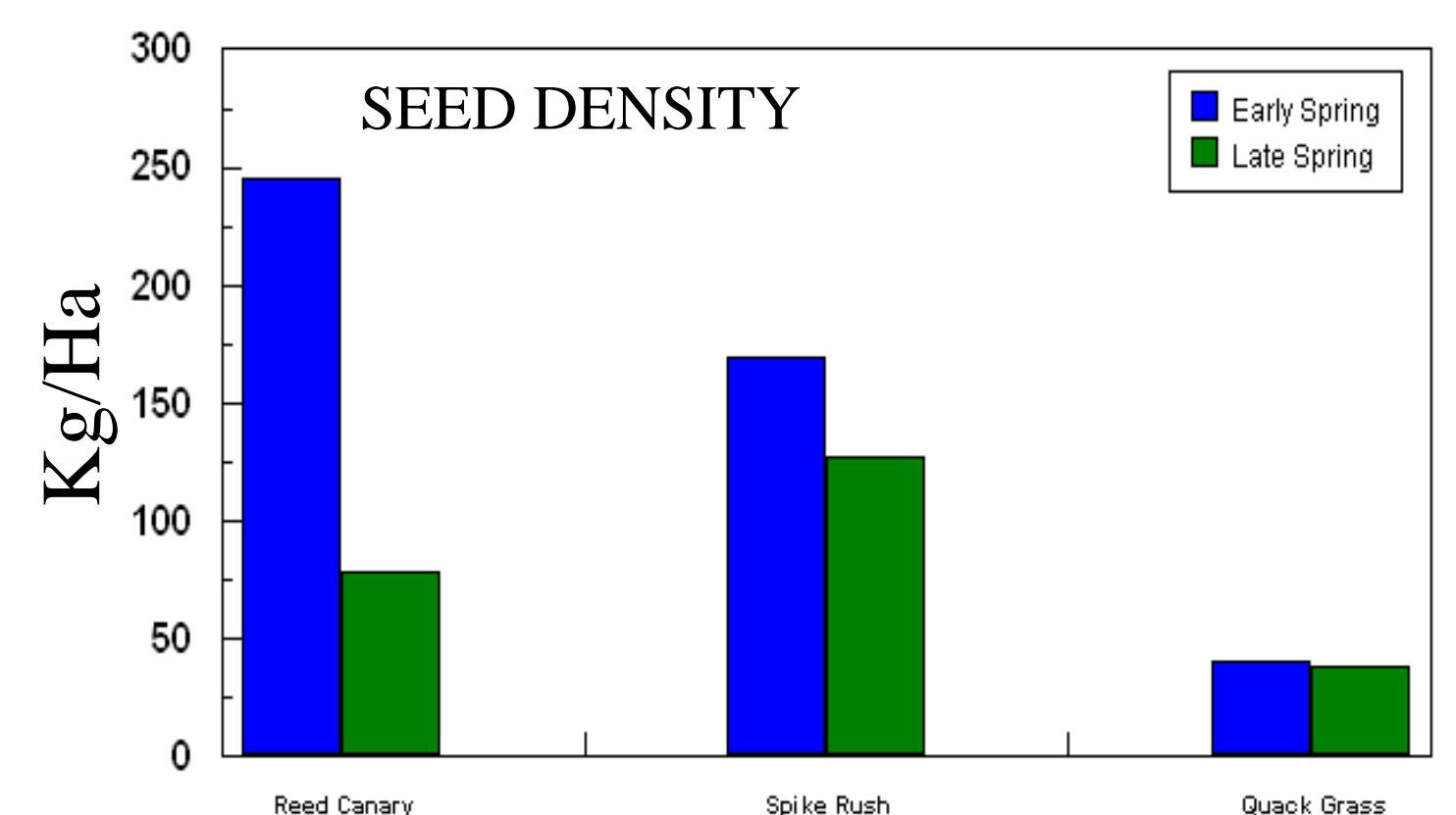
We thank the USFWS, USGS, Intermountain West Joint Venture, Ducks Unlimited, Inc., Tuscany Research Institute, and Calif. Waterfowl Assoc. for funding and support. We thank the PINSAT project team for assistance, Cal. Dept. of Fish and Game, Oregon Dept. of Fish and Wildlife, Univ. of Cal. Davis, Cal. Dep. of Food and Ag. and numerous landowners and private and public area managers for facilitating field and lab work and other cooperation.

## References

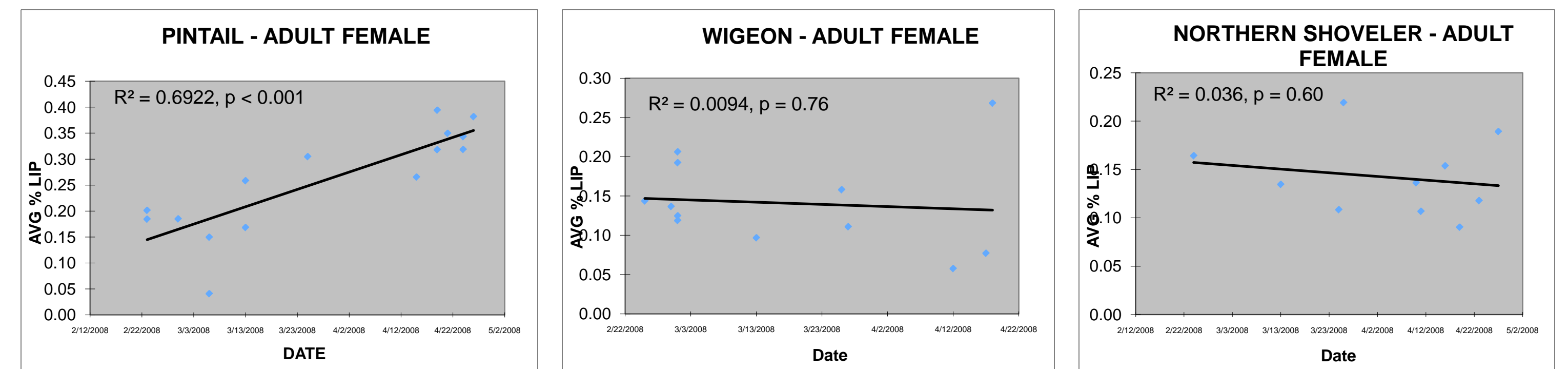
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Flooded pasture and hayfields were very important for migrating waterfowl in most SONEC subregions.



Seed density in early spring was greater in pasture/hay fields dominated by reed canary than in fields dominated by spike rush or quackgrass. By late spring, seeds were reduced 45-75% in reed canary, 13-34% in spike rush, and <3% in quackgrass fields, reflecting differential feeding by pintails and other ducks. Invert density in early spring was greatest in spike rush fields but was similar among fields in late spring.



Percent body lipid increased with date for northern pintails but not American wigeon or northern shovellers.

## Summary

- SONEC is a critically important spring staging region for pintails & other waterfowl in the Pacific Flyway.
- Seasonal marsh and flooded pastures and hay fields are the most important spring staging habitats for pintails.
- Habitat use by pintails in SONEC during spring is similar during day and night.
- In many SONEC subregions, the majority of important spring habitat occurs on private lands.
- Diet varies by species, but seeds, especially reed canary and spike rush, are very important for pintails.
- Density of waterfowl foods varies by habitat type with highest density of seeds in reed canary hay-pastures.
- Body condition improved during spring for pintails but not for American wigeon or northern shovellers.

## Management Implications

- SONEC should be a focus area for habitat conservation programs for pintails and other waterfowl.
- Many important habitats in SONEC are on private lands and currently not protected.
- Management practices that provide key habitats such as spring-flooded pasture would benefit pintails & many other waterbirds.
- Management practices that set back vegetation structure would benefit pintails and many other waterbirds.
- Because spring habitat use during day and night is similar for pintails, daytime surveys can be used in spring to measure relative importance of habitat types, at least for pintails.
- Satellite imagery is a useful tool for tracking availability of open habitats such as spring-flooded pasture and hay fields.
- With < 12% of potential habitat flooded on average during spring, conservation programs have ample opportunity to improve the SONEC landscape for migrating waterfowl and other waterbirds.

