

Perspectives on Prairie Droughts – Wildlife



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Outline: 4 areas to touch on...

- Mandates
- Concerns
- Current activities
- Interactions with DRI

Mandates

- Wildlife! - especially migratory birds
- Species at risk
- Water quality
- Transboundary water
- International agreements: Kyoto, Biodiversity



Habitat/species concerns

- Invasive species (plants, diseases)
- Water quality and quantity
- Conservation investments:
 - Habitat stewardship under Species at Risk program
 - Prairie Habitat Joint Venture (wetlands and ducks/waterbirds)

Wetlands constitute a key landscape element,
one that defines the Canadian prairies



Wetland loss - Canadian Prairies:

- 70% of wetlands have been destroyed or degraded
- >1 million ha of wetland area has been lost or degraded
- Half of this amount has been converted to another landuse



Shorebird Species



Cheri Gratto-Trevor



Fred Greenslade



Cheri Gratto-Trevor



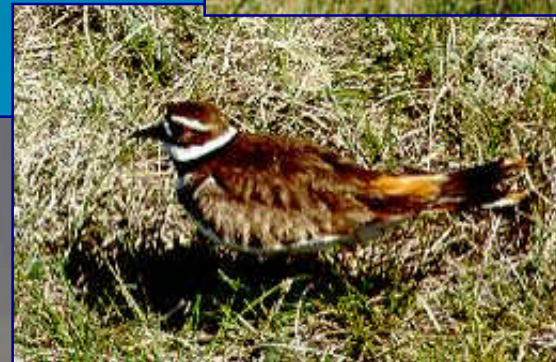
Cheri Gratto-Trevor



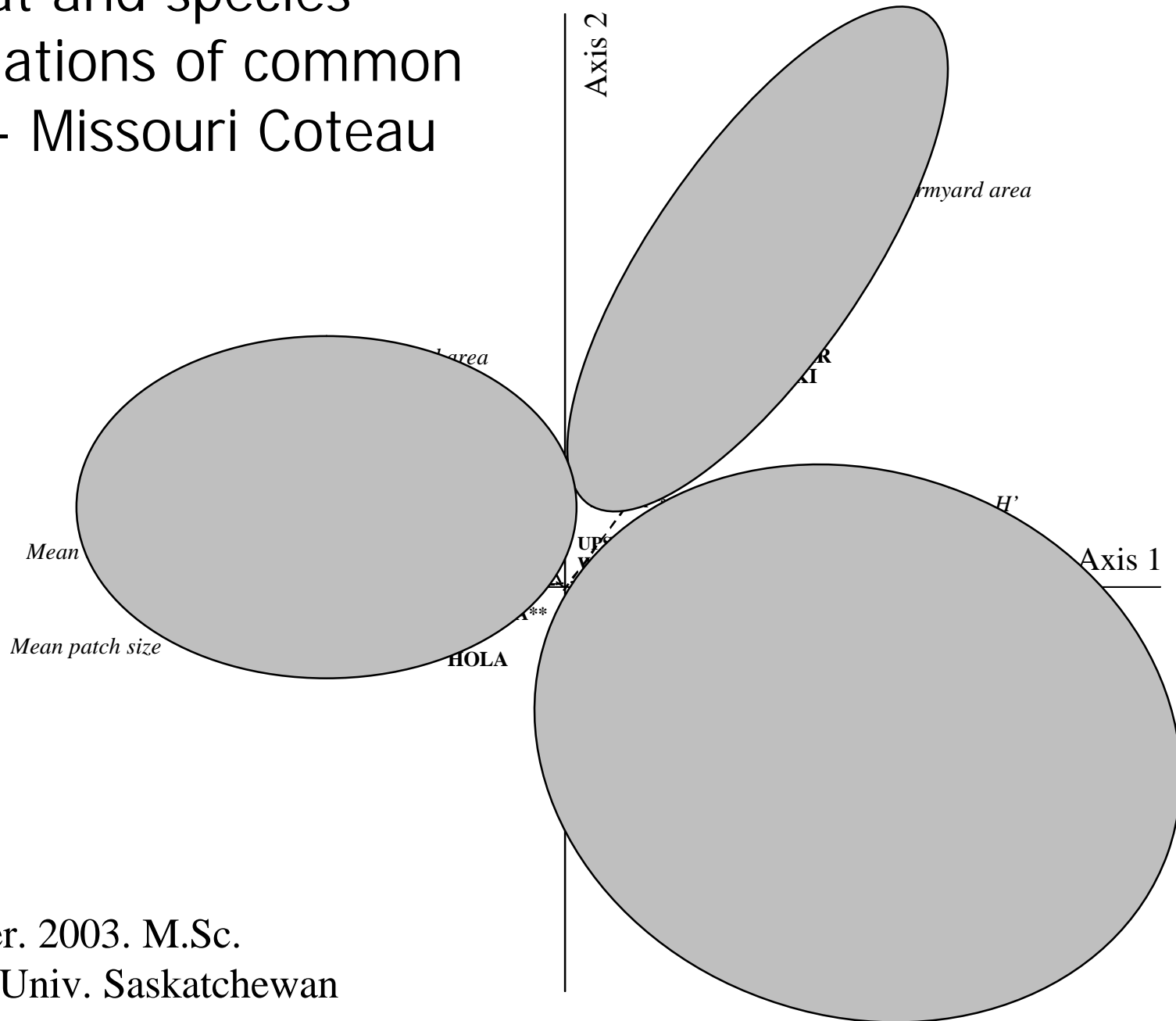
Cheri Gratto-Trevor



Photo by George Jameson

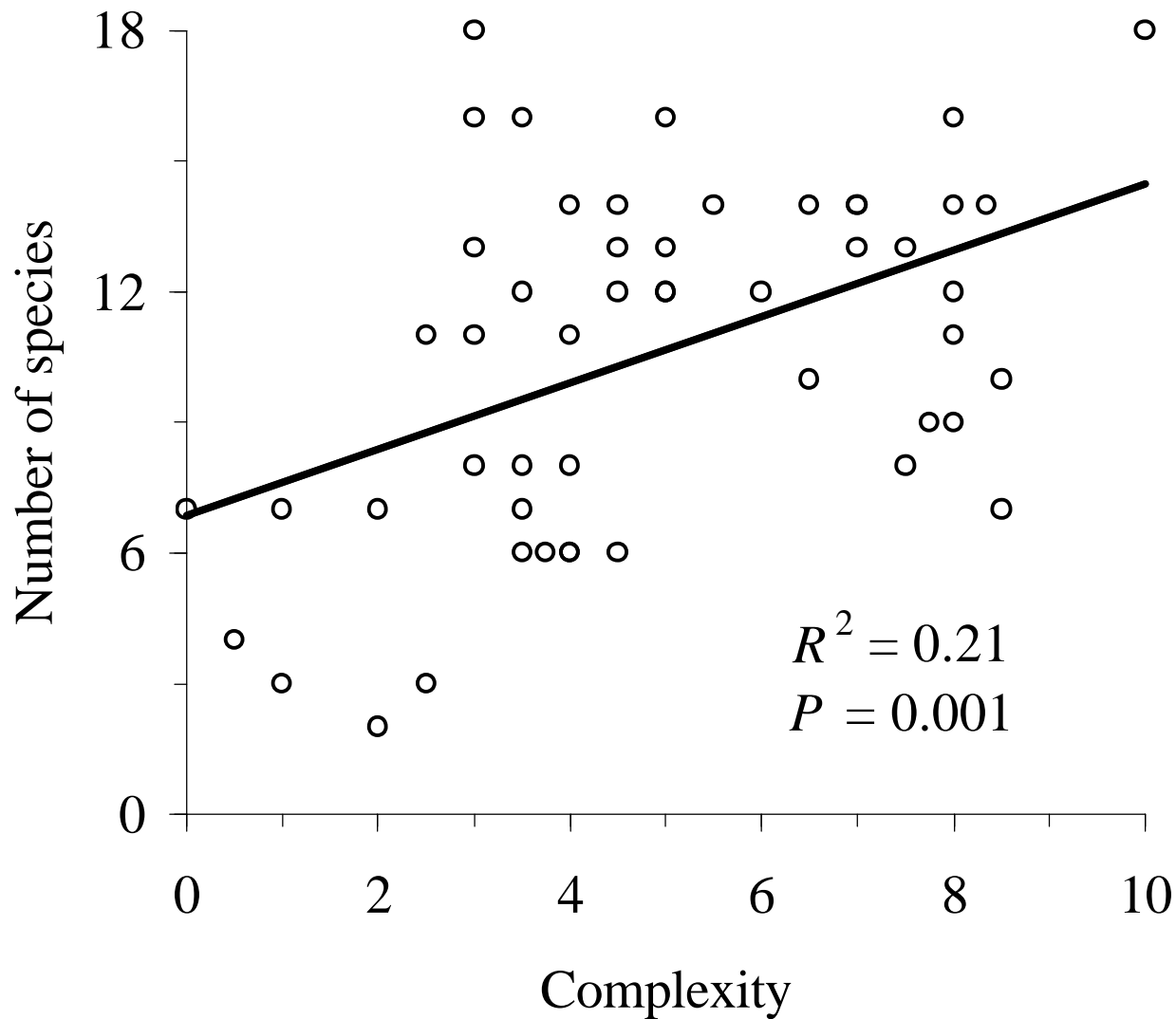


Habitat and species associations of common birds - Missouri Coteau



S. Skinner. 2003. M.Sc.
Biology, Univ. Saskatchewan

Wetland complexity and *terrestrial* bird species in margin habitat adjacent to wetlands (n = 48).

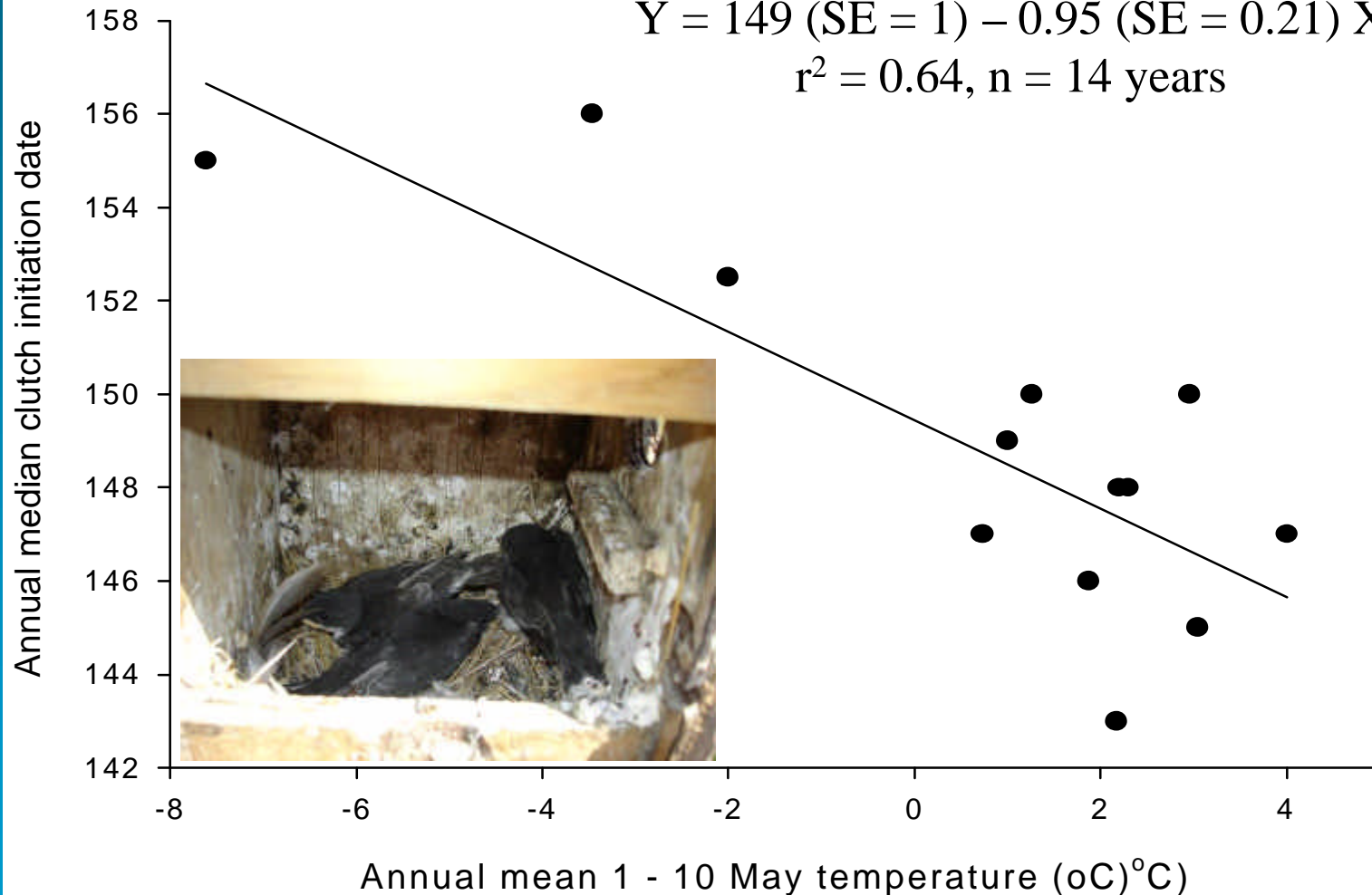


(Clark et al. 2004. Can. Weed Sci.)

Activities: Example 1 – Climate and breeding performance of birds

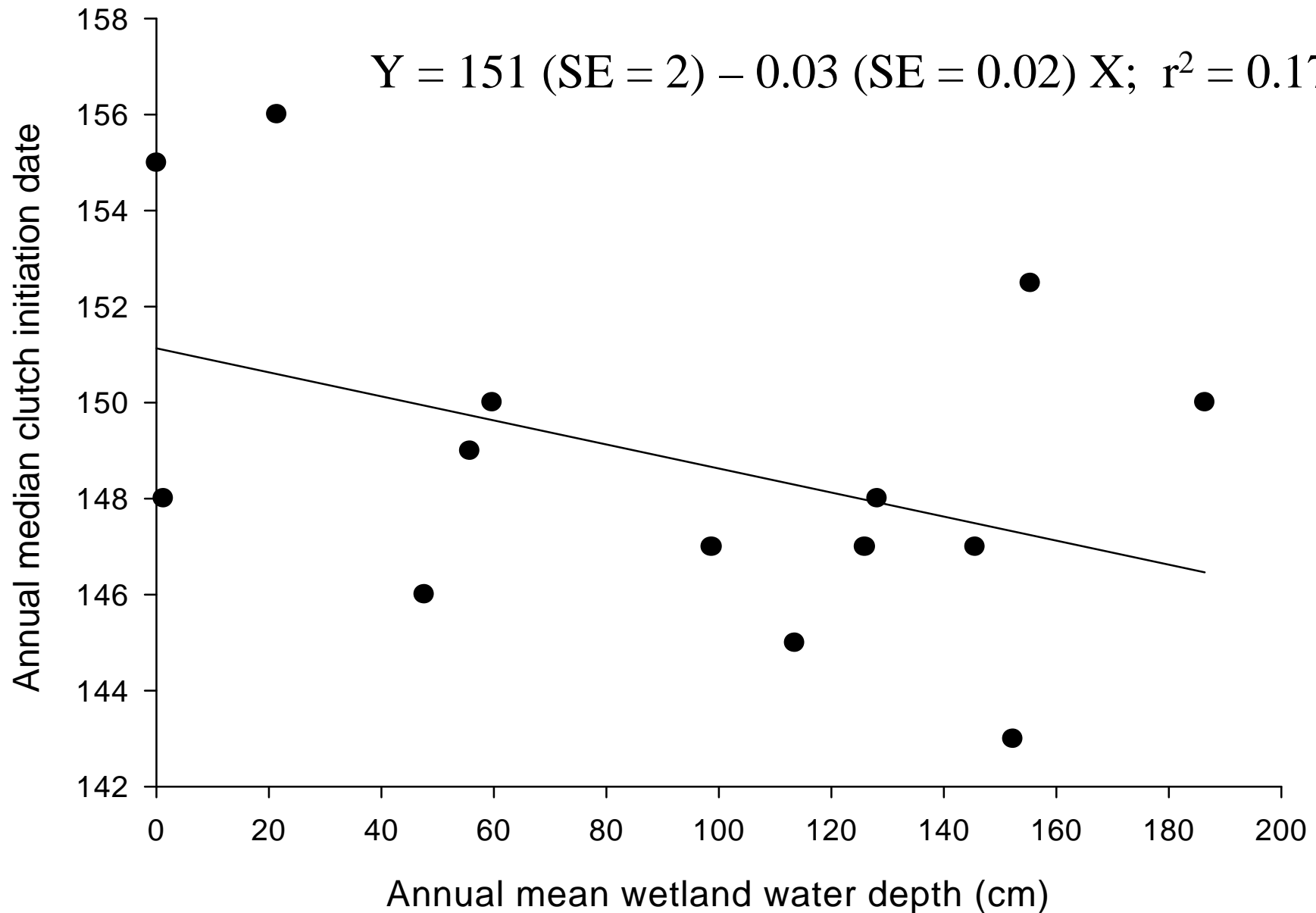
(M. Fast, Biology, Univ. Saskatchewan)

$$Y = 149 \text{ (SE = 1)} - 0.95 \text{ (SE = 0.21)} X$$
$$r^2 = 0.64, n = 14 \text{ years}$$



Independent, additive effect of “wetness” index:

$$Y = 151 \text{ (SE} = 2) - 0.03 \text{ (SE} = 0.02) X; r^2 = 0.17$$



“Competing” demands on water supplies

- Water quality (people, livestock, fish)
- Water distribution/allocation
- Use of water for wildlife objectives

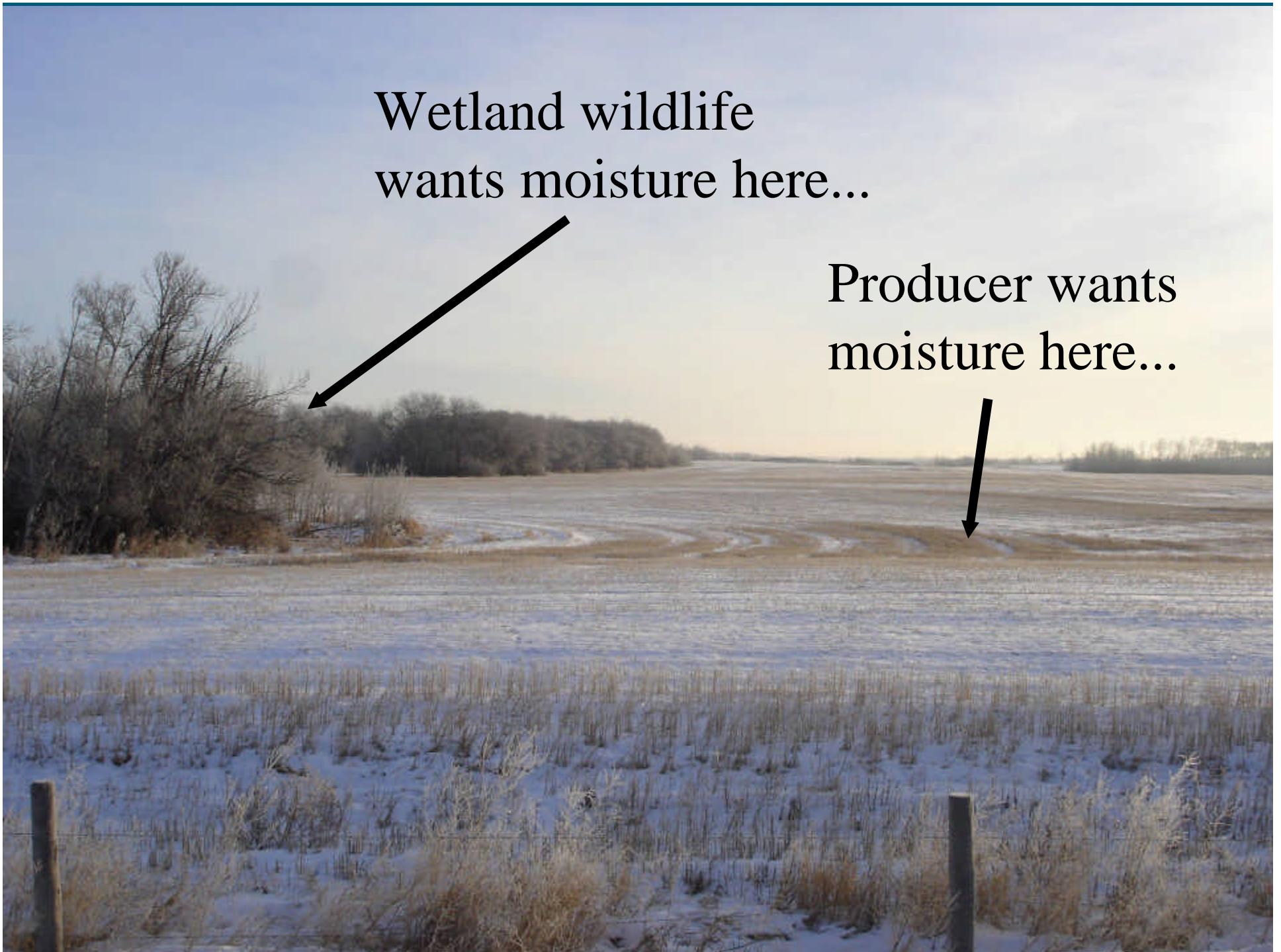
Example 2 – Agriculture and wetlands

- Stubble retention – moisture for crops or water in wetlands?
- Plowing of small wetlands during dry periods.

Wetland wildlife
wants moisture here...



Producer wants
moisture here...



Variable wetland flooding!



St. Denis National Wildlife Area, SK, early May wetlands, 1982-2002

Conversion of wetlands to cropland during droughts...



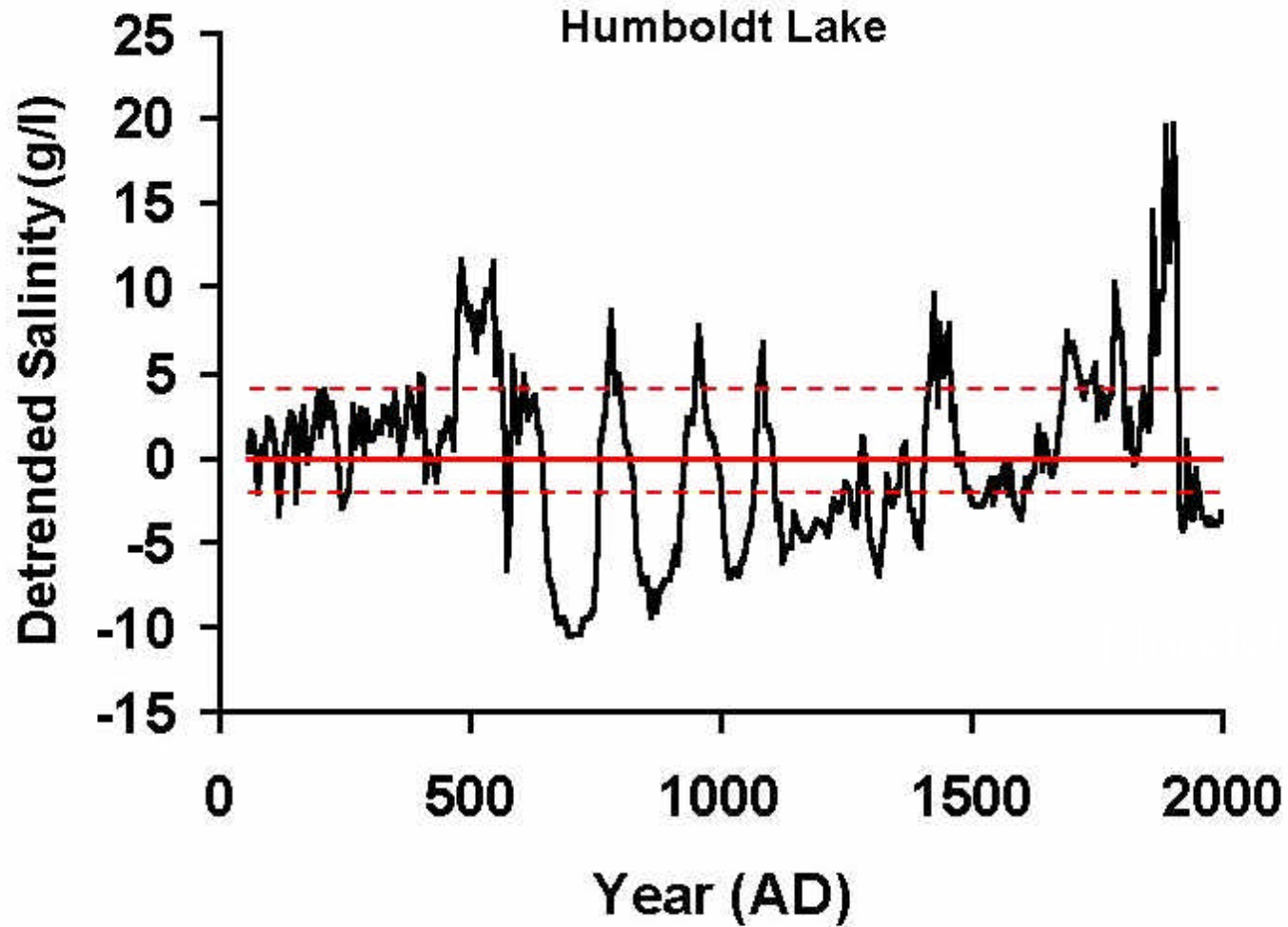
Ongoing research to support wetland conservation (DUC-EC-NRCAN-AAFC)

- Plowing of small wetlands (St Denis NWA)
 - How much carbon is stored in these systems?
 - How quickly is carbon lost as a result of cultivation, in what form(s)?
- Wetland restoration (prairie-wide sampling)
 - How quickly is carbon sequestered?
 - What GHG emissions occur, in what form(s)?

Disturbance “trade-off”

- Prairie region has rich wildlife; coevolution with dynamic wet-dry cycle, and plants adapted to disturbances (e.g., bison and fire).
- Many use wetlands during their annual life cycle or are wetland obligates
- The drought-wet cycle is important for maintaining productivity of these systems – what about scale?

Detrended diatom-inferred salinity (residuals from regression).



Drier



Wetter

P. Leavitt et al., Biology, Univ. Regina,
Prairie Drought Study

Humboldt Lake drought interarrival times and durations

<u>Statistic</u>	<u>Interarrival (yrs)</u>	<u>Duration (yrs)</u>
Mean	117.0	13.3
SD	109.0	23.2

“Severe droughts have not occurred in the last century, but have a 48% probability of occurring by 2030. Severe floods are equally likely.”

P. Leavitt et al., Biology, Univ. Regina, Prairie Drought Study

Conclusions/Opportunities

- Impacts on wildlife habitat, and species abundances and demographic rates strong in some cases, unknown in many others.
- What is projected to occur – precipitation and especially snow?
- Interaction of drought with land use activities is a key concern, especially for wetlands.
- This will help to ensure that conservation planning is guided by the best available climate change science.