


**Roads, Pipelines, and Seismic Lines...**  
**What Might They Mean for Western Boreal Ducks?**



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 Ducks Unlimited Canada

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**Acknowledgements**

- Alberta Conservation Association
- Alberta Environment and Parks
- Alberta North American Waterfowl Management Plan
- Environment Canada/ECCC
- Prairie Habitat Joint Venture/NAWCA
- Numerous Individuals
- AEMERA/JOSM/OSM

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**WBF Duck Status**

Species	Long-term average (1955-2014)	% Difference From LTA
Mallard	2,627,617	-16
Green-winged Teal	1,100,561	40
American Wigeon	1,202,099	-20
Dabbling ducks	4,930,277	-4
Scaup	2,984,904	-26
Ring-necked duck	522,721	49
Bufflehead	627,768	53
Scoter	825,877	-23
Goldeneye	380,980	45
Canvasback	207,937	4
Diving ducks	5,550,187	-4
All ducks	10,480,464	-4

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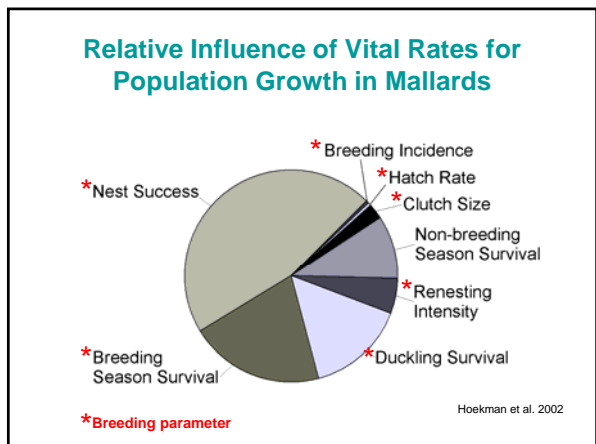
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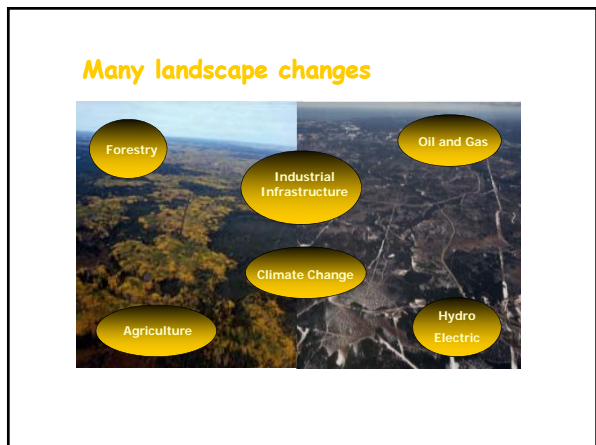
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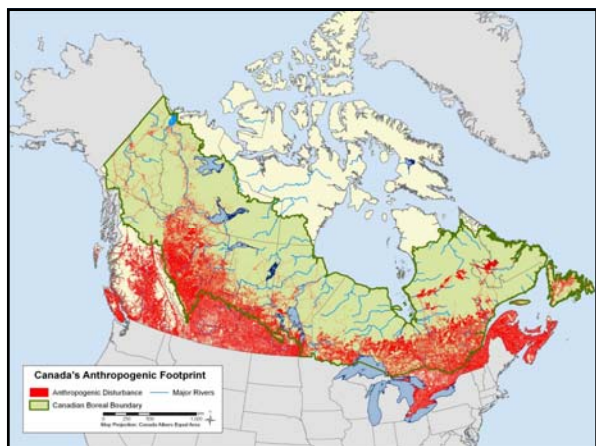
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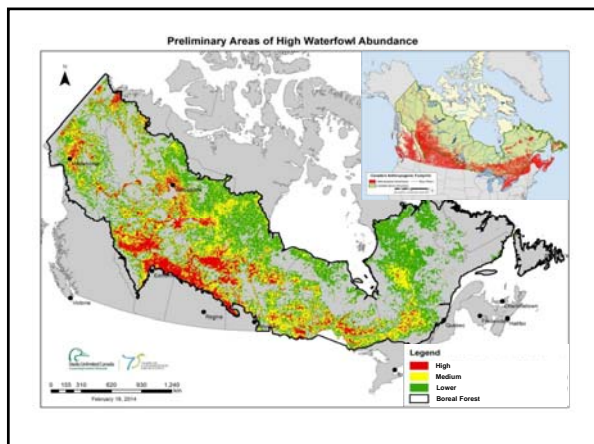
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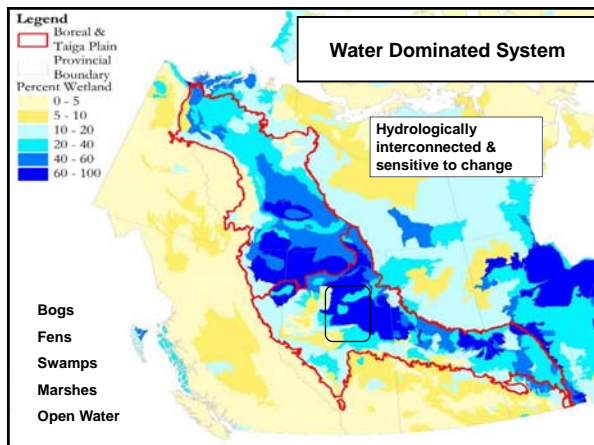
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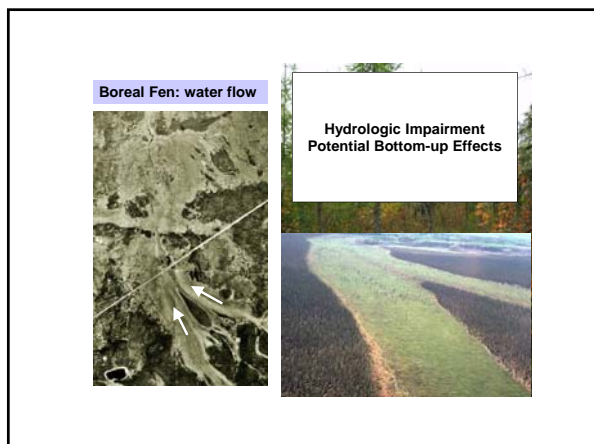
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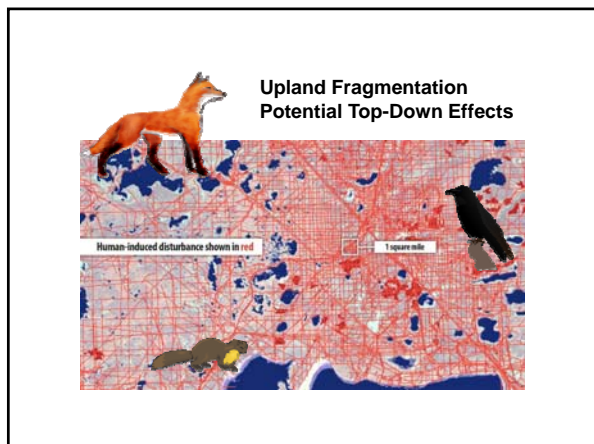
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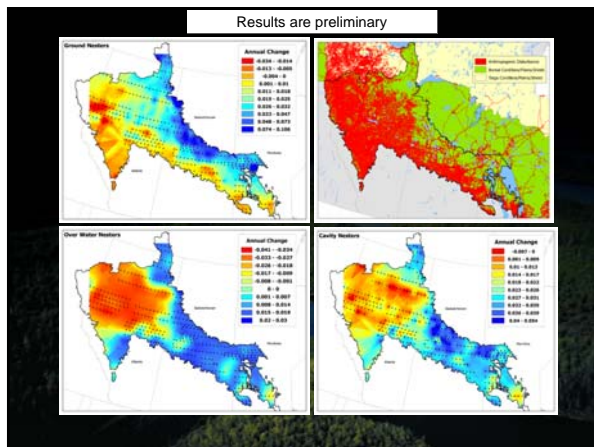
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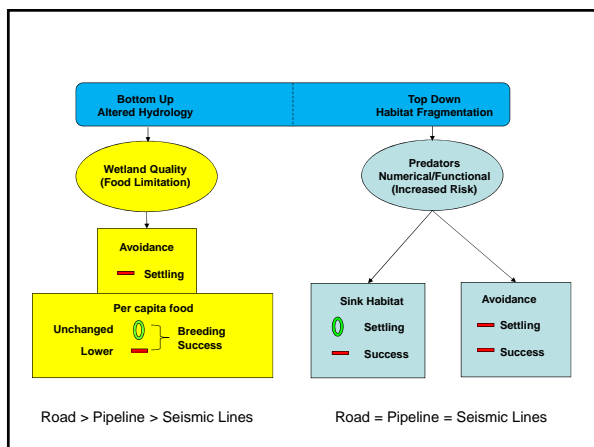
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### Prediction Matrix

Nesting Guild	Bottom Up		Top Down	
	Settling	Success	Sink Habitat	Avoidance
Overwater	-	-	0	0
Cavity	-	-	0	0
Ground	-	-	0	-
	Avoid/Per Capita Same		Avoidance	
	Settling	Success	Settling	Success
Overwater	-	0	0	0
Cavity	-	0	0	0
Ground	-	0	-	-

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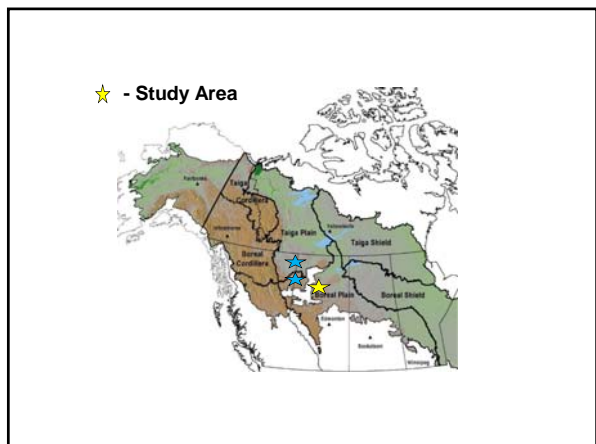
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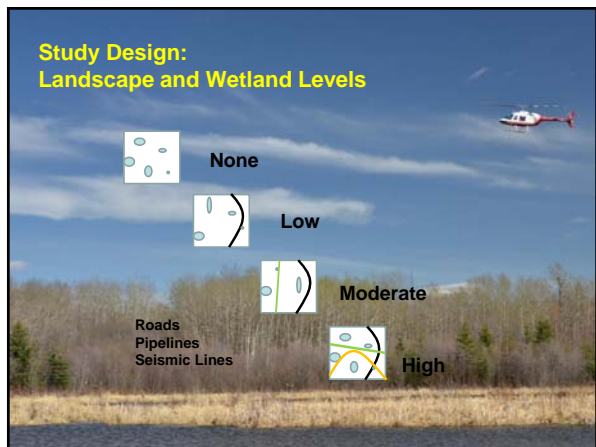
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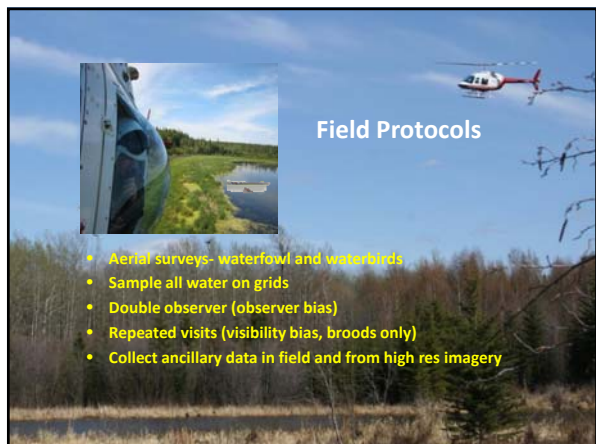
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### Field Protocols

- Aerial surveys- waterfowl and waterbirds
- Sample all water on grids
- Double observer (observer bias)
- Repeated visits (visibility bias, broods only)
- Collect ancillary data in field and from high res imagery

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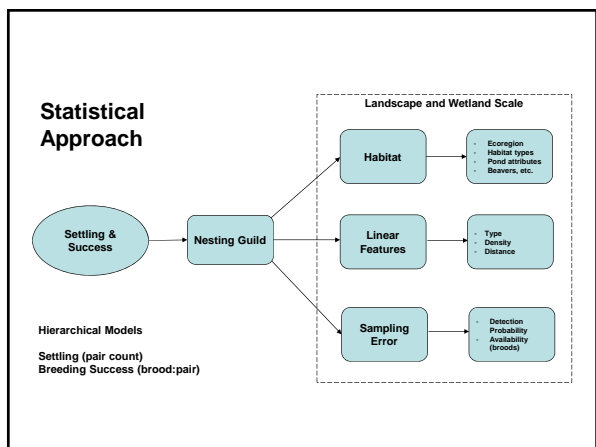
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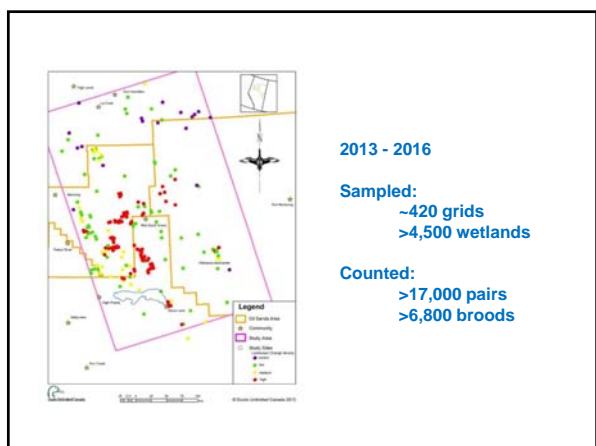
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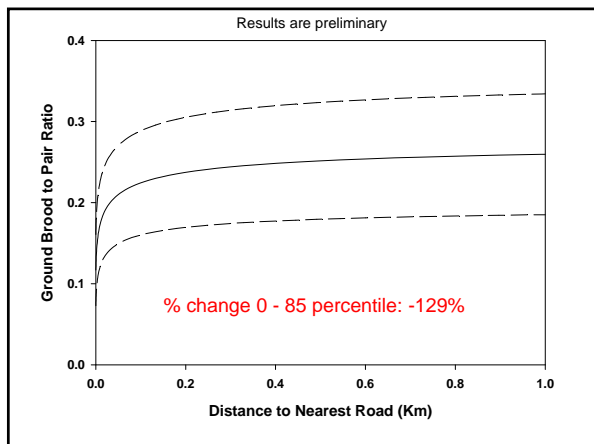
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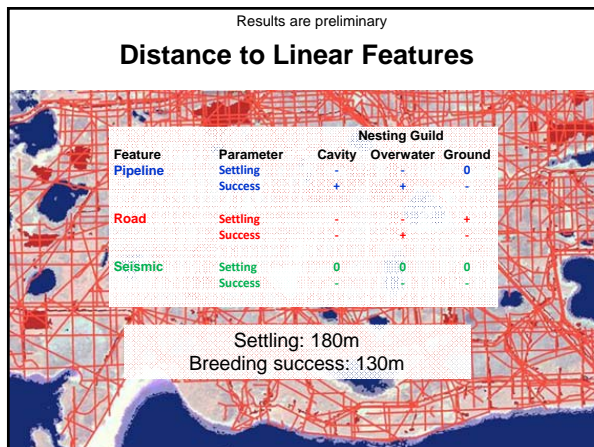
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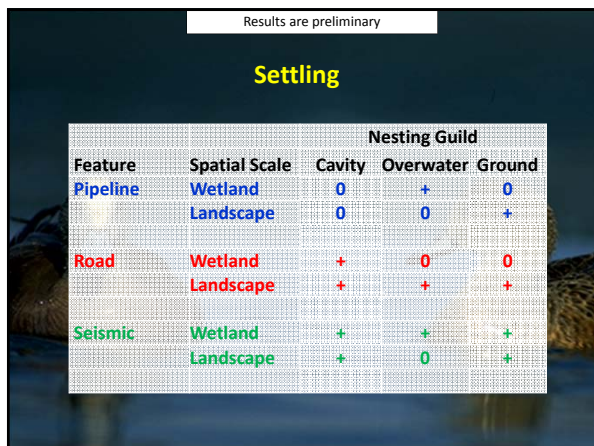
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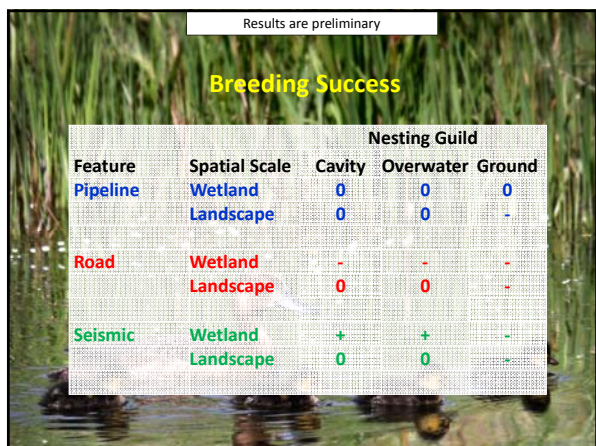
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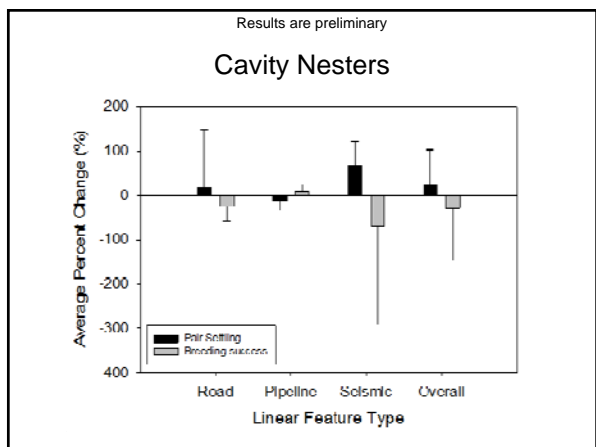
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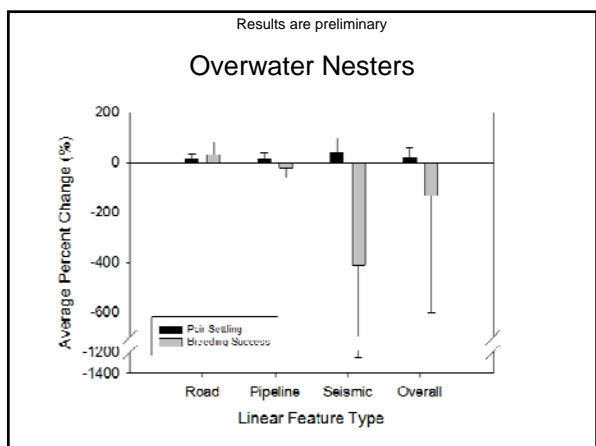
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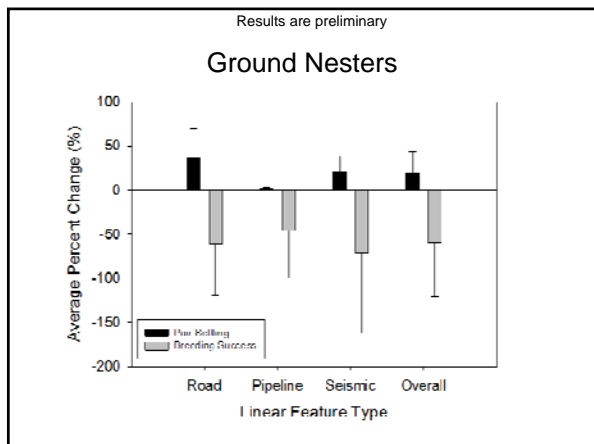
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Results are preliminary

### Putting Pieces Together Landscape Scale

Feature	Cavity		Overwater		Ground	
	Settling	Success	Settling	Success	Settling	Success
Pipeline	0	0	0	0	0	-
Road	+	0	+	0	+	-
Seismic	+	0	0	0	0	-

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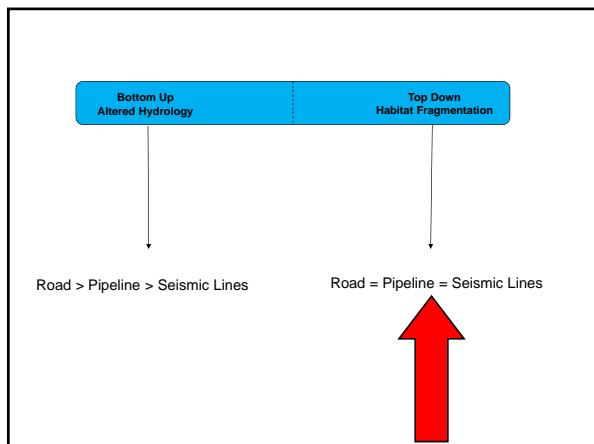
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**Preliminary Speculations...**

- **What might road, pipelines, and seismic lines mean?**
  - **Settling:**
    - Possible preferential settling in areas of high linear density, but may avoid areas close to roads and pipelines
  - **Breeding Success:**
    - Generally reduced at higher densities or closer to linear features
    - Ground nesting guild most consistent negative patterns
    - Seismic lines had strongest negative relationships on average
- **Most consistent with predation hypothesis- sink or ecological trap**
- **A waterfowl monitoring program may need to adequately assess breeding success**

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