

DISTRIBUTION AND ABUNDANCE OF DIVING DUCKS AND OTHER WATER BIRDS ON LAKE ST. CLAIR AND W. LAKE ERIE



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UPPER MISSISSIPPI RIVER & GREAT LAKES REGION
JOINT VENTURE

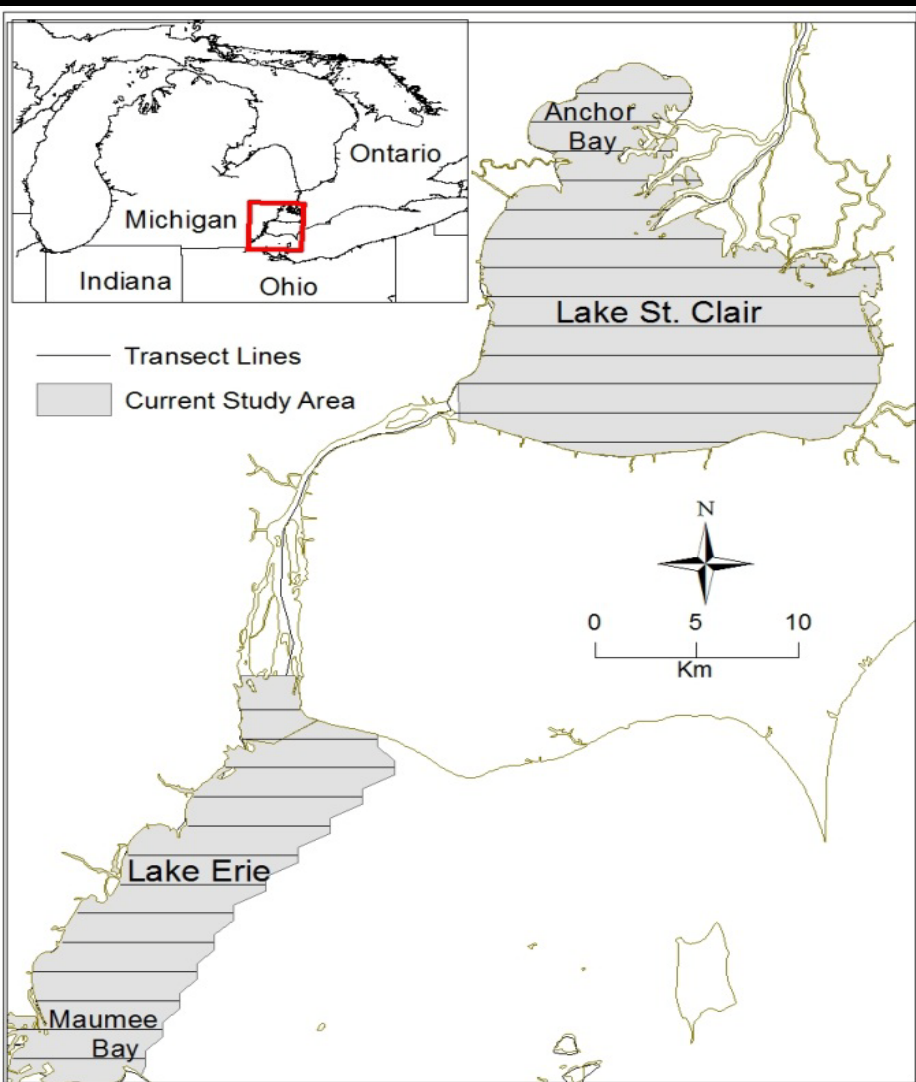
Delivering bird conservation through partnerships

Importance of Lake St. Clair and western Lake Erie

- Areas of continental significance for migratory birds
 - N.A . Waterfowl Management Plan 2004 and 2012
- Priority area/species for monitoring and conservation during migration
 - UMRGL Region Joint Venture
 - State wildlife action plans
 - Detroit River-Western Lake Erie Basin Indicator Project
- Multiple ecosystem stressors potentially affecting birds
 - Invasive species (e.g., zebra and quagga mussels)
 - Boating and other human disturbances
 - Shore and offshore developments (e.g., wind energy)
 - Water quality
 - Climate change

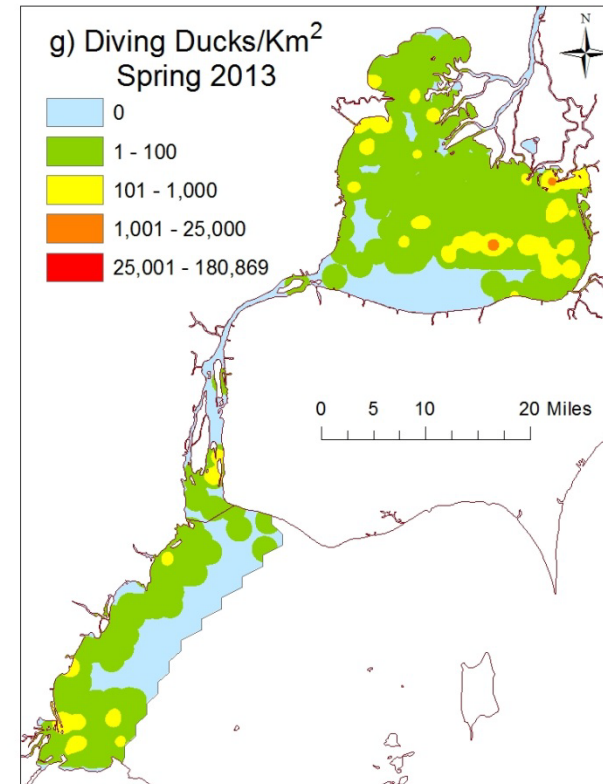
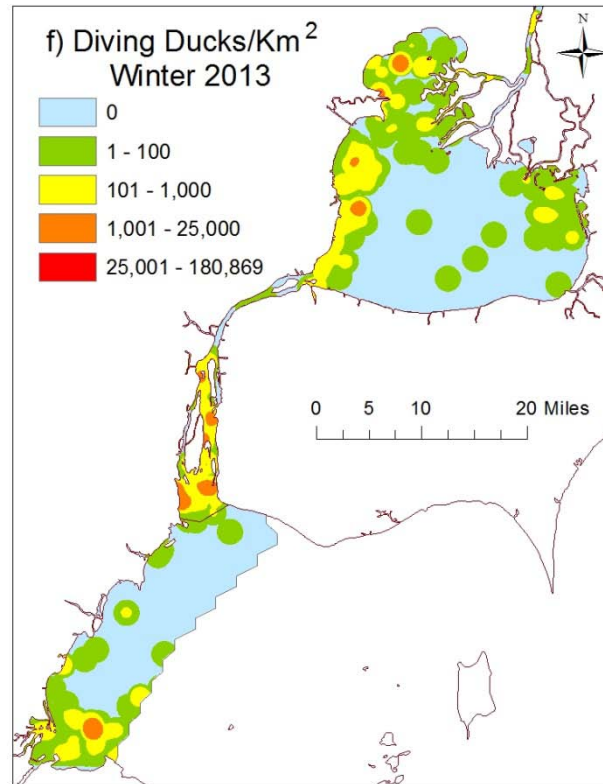
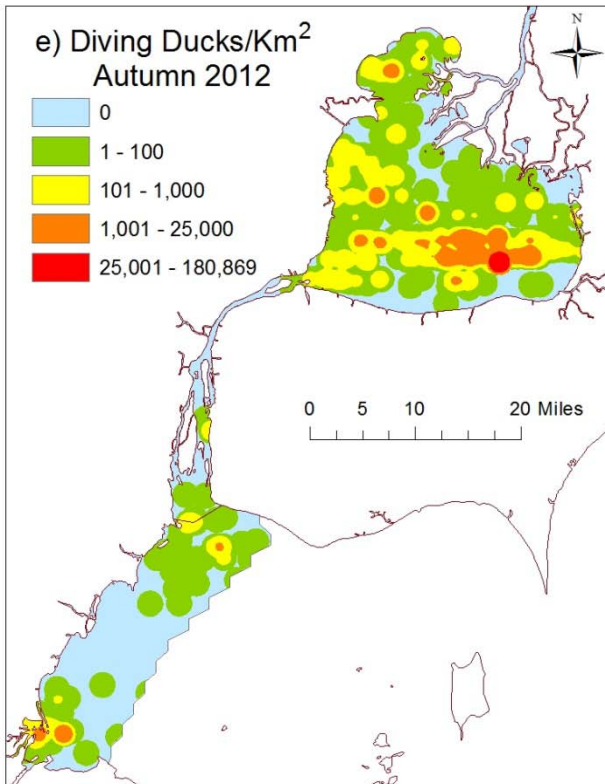


- Distance sampling to estimate abundance
- Gps locations and spatial modeling to analyze distribution
- Eventually lead to phase I and phase II for the GLC

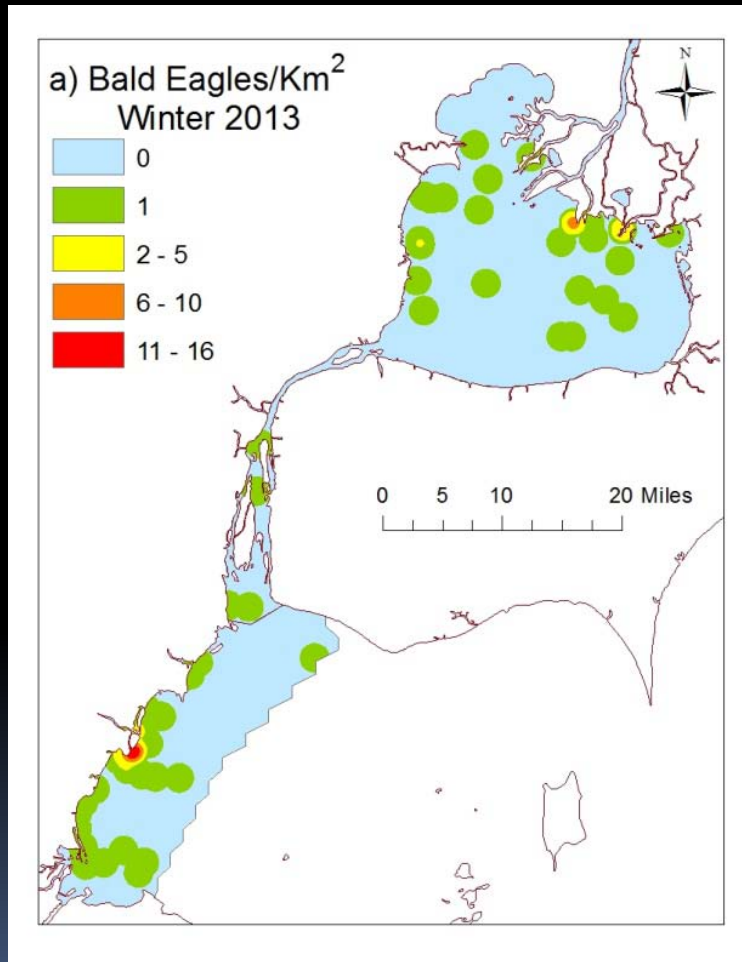


Phase I: Maps

- Peak populations during fall migration—600,000 diving ducks
- 22.5 million diving duck use-days
- Approximately 21% of the diving duck use-days in the Upper Mississippi River and Great Lakes Joint Venture region.
- Continental significance



Regional Significance—Bald eagles

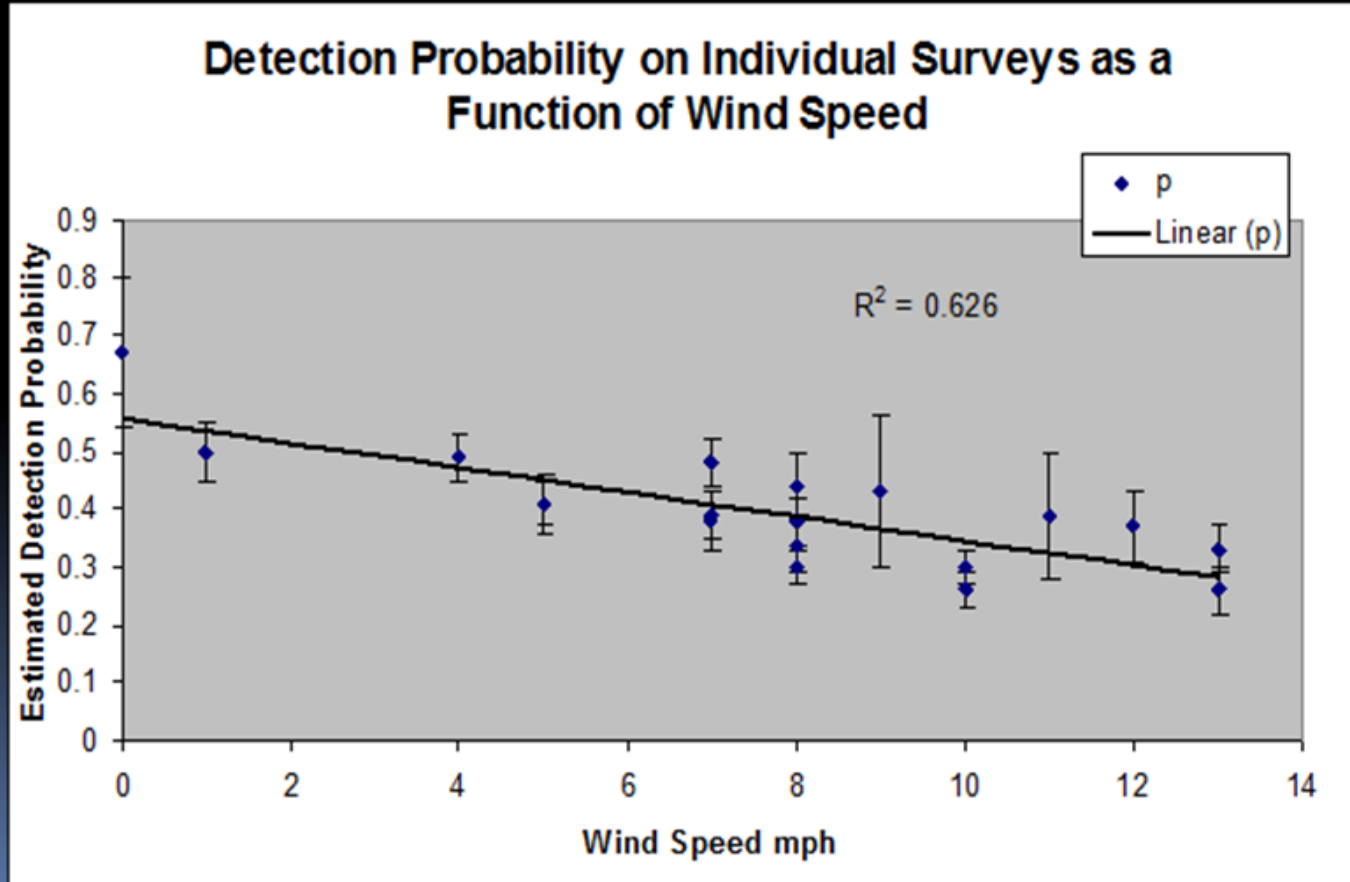


- Minimum peak winter abundance—approx. 50 eagles
- ? use-days



Conclusions

- The limitations of raw observations
- Snapshot in time (nocturnal flight)



Conclusions

The importance of the “why” behind observed distributions

Averaged Bayesian parameter estimates and associated confidence intervals for covariates of interest during Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012, and Spring 2013

Covariates		Fall 2010	Spring 2011	Fall 2011	Spring 2012	Fall 2012	Spring 2013
Intercept	UCL	-2.197	-1.167	-2.44	-1.541	-2.5581	-0.791
	$\hat{B}$	-2.989	-2.016	-3.391	-2.364	-3.439	-1.751
	LCL	-3.781	-2.864	-4.341	-3.187	-4.3199	-2.711
Boats	UCL	-89.428	-71.191	-73.151	-75.028	-23.68	-77.144
	$\hat{B}$	-262.555	-210.155	-211.429	-213.306	-117.7	-215.144
	LCL	-435.682	-349.119	-349.707	.351.584	-211.71	-353.144
Dist. To shore	UCL	0.123	0.08	0.195	0.375	0.30028	0.233
	$\hat{B}$	0.03	-0.047	0.077	0.268	0.165	0.132
	LCL	-0.063	-0.174	-0.041	0.161	0.02972	0.031
Water depth	UCL	0.046	-0.038	0.067	-0.085	0.06084	-0.001
	$\hat{B}$	-0.012	-0.097	0.012	-0.144	-0.007	-0.048
	LCL	-0.07	-0.156	-0.043	-0.203	-0.0608	-0.095
Plant Spec. Richness	UCL	0.439	0.5	0.529	0.439	0.43115	0.356
	$\hat{B}$	0.308	0.365	0.402	0.319	0.289	0.242
	LCL	0.178	0.229	0.275	0.199	0.14685	0.128