

GIS ANALYSIS OF BALD EAGLE NESTING HABITAT

ON THE
UPPER MISSISSIPPI RIVER NATIONAL
WILDLIFE AND FISH REFUGE

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Upper Mississippi River National Wildlife and Fish Refuge

- Est. 1924
- 261 miles long
- Pools 4-14
- 4 Districts
 - Winona
 - La Crosse
 - McGregor
 - Savanna



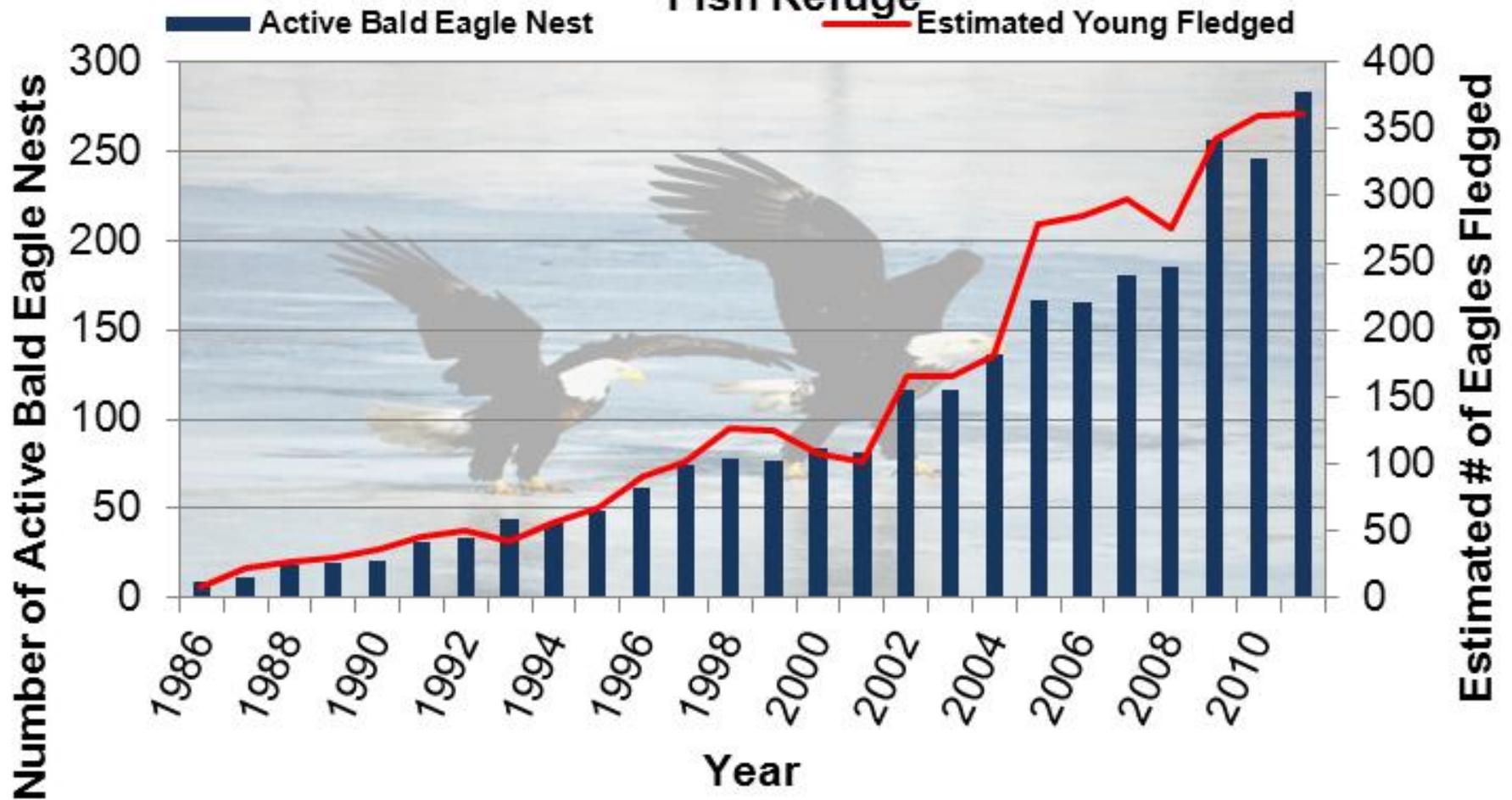
Bald Eagles

(Haliaeetus leucocephalus)

- Endangered: 1967
- Threatened: 1995
- Delisted: 2007
- Upper Mississippi River ***possibly*** has the highest concentration of nesting eagles in the lower 48.



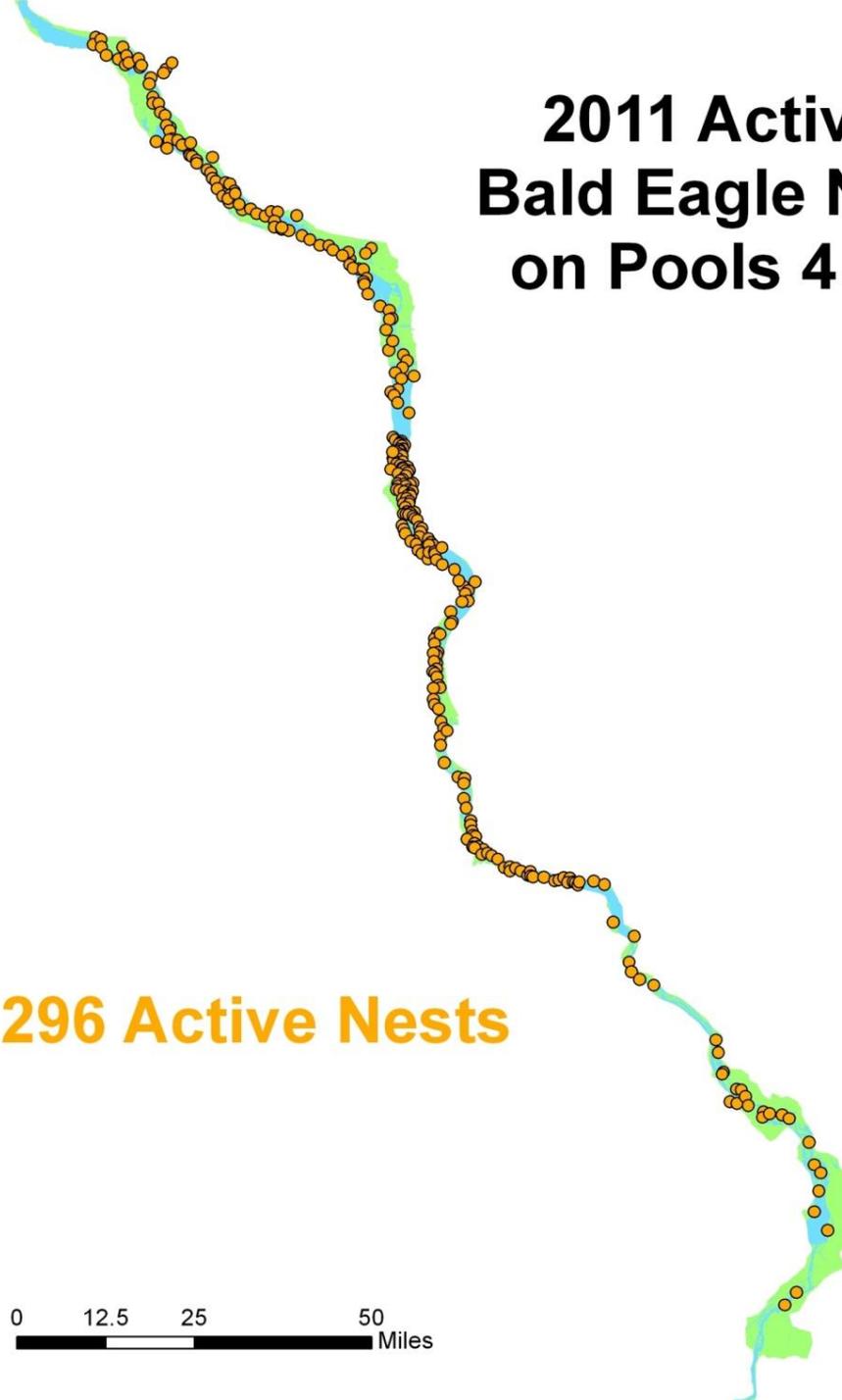
Active Bald Eagle Nests and Estimated Number of Eagles Fledged on the Upper Mississippi River National Wildlife and Fish Refuge



2011 Active Bald Eagle Nests on Pools 4 - 14

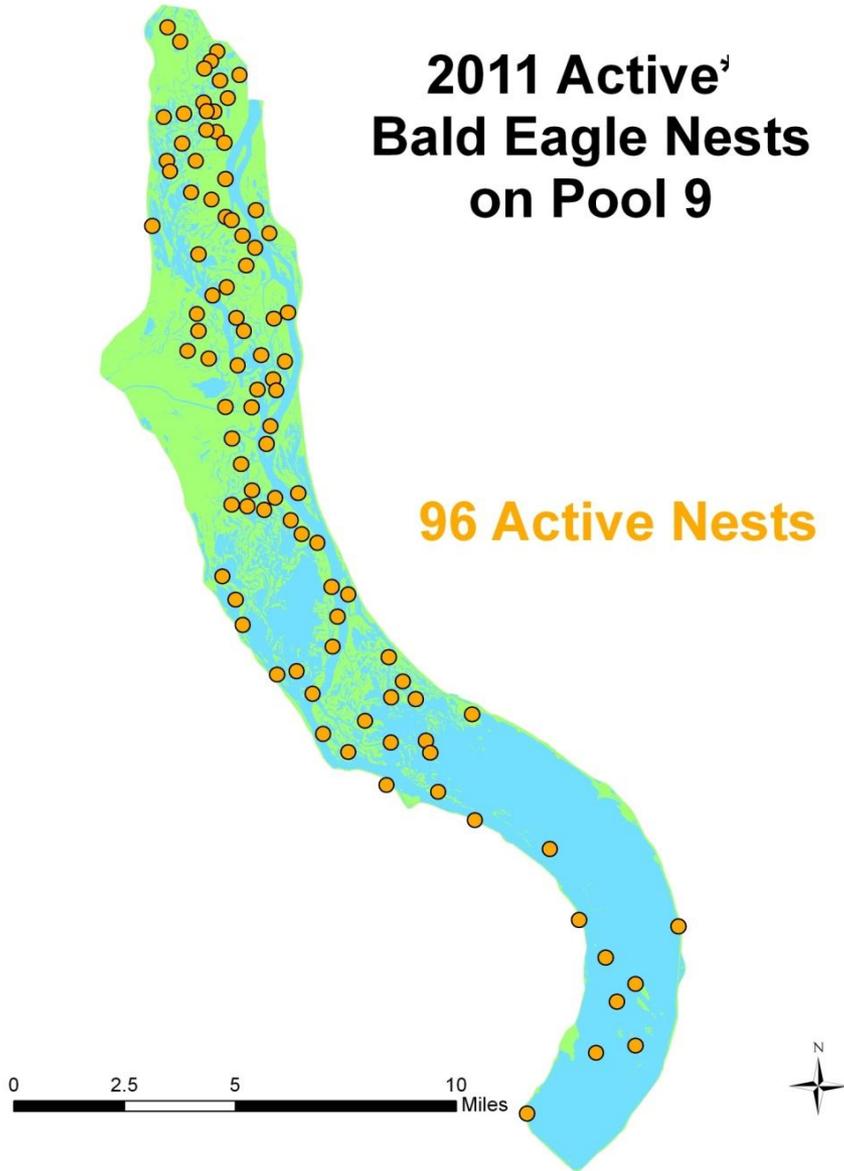
296 Active Nests

0 12.5 25 50 Miles



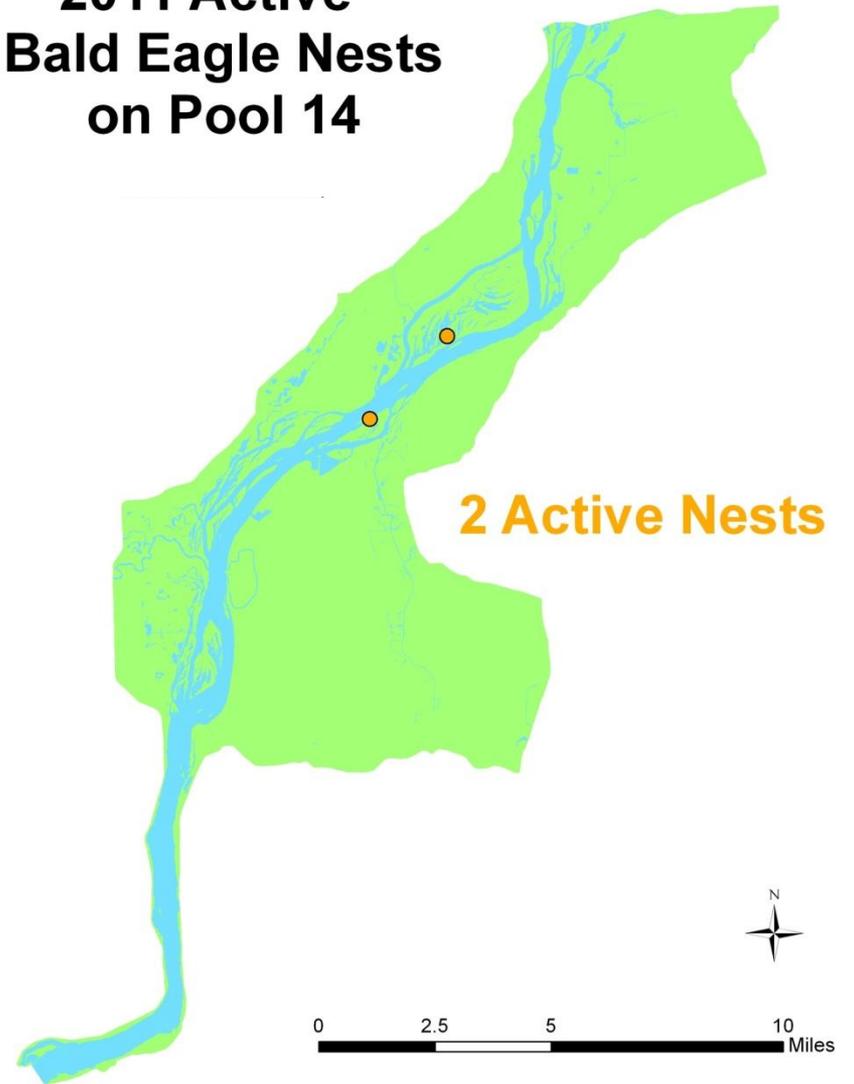
2011 Active Bald Eagle Nests on Pool 9

96 Active Nests



2011 Active Bald Eagle Nests on Pool 14

2 Active Nests



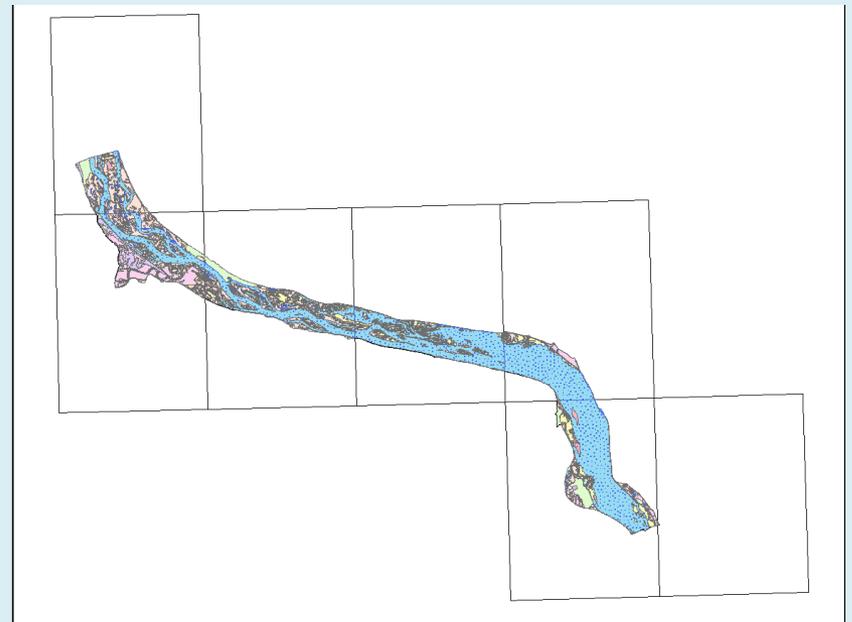
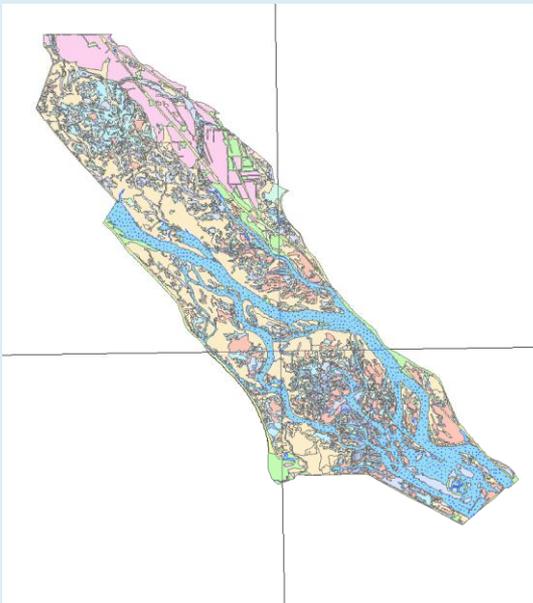
Objectives

- Is there an association between Bald Eagle nest locations and land cover type?
 - How does this inform distribution among and abundance in Refuge pools?
- Personal
 - GIS
 - Refuge Dataset



GIS Layers

- Land Cover Type: 2000 UMESC pool map
- 562 eagle nest locations (Refuge Database)
- 562 random points (GME)



Class 15: Land Cover Type

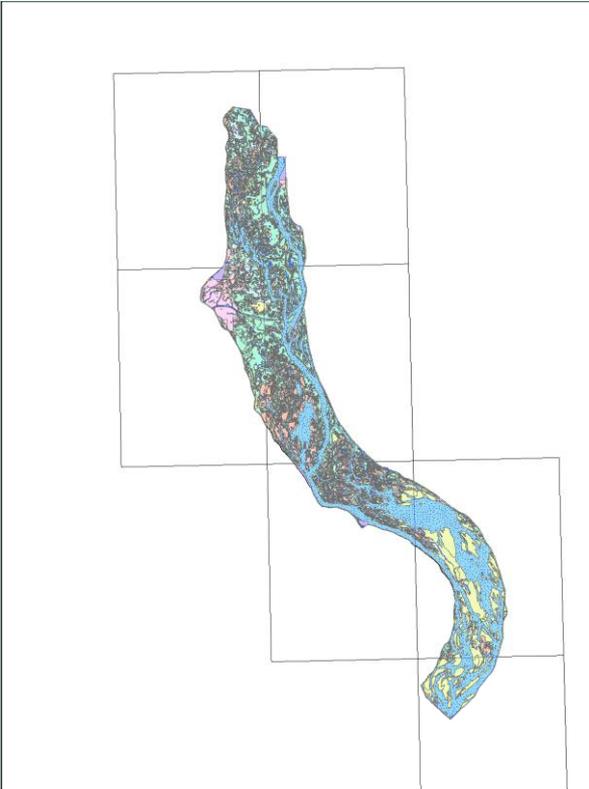
- Agriculture
- Deep Marsh
- Developed
- Grass/Forbs
- Open Water
- Road/levee
- Rooted Floating Aquatics
- Sand/Mud
- Scrub/Shrub
- Shallow Marsh
- Submerged Aquatic Vegetation
- Upland Forest
- Wet Forest
- Wet Meadow
- Wet Shrub

Land Cover (%)

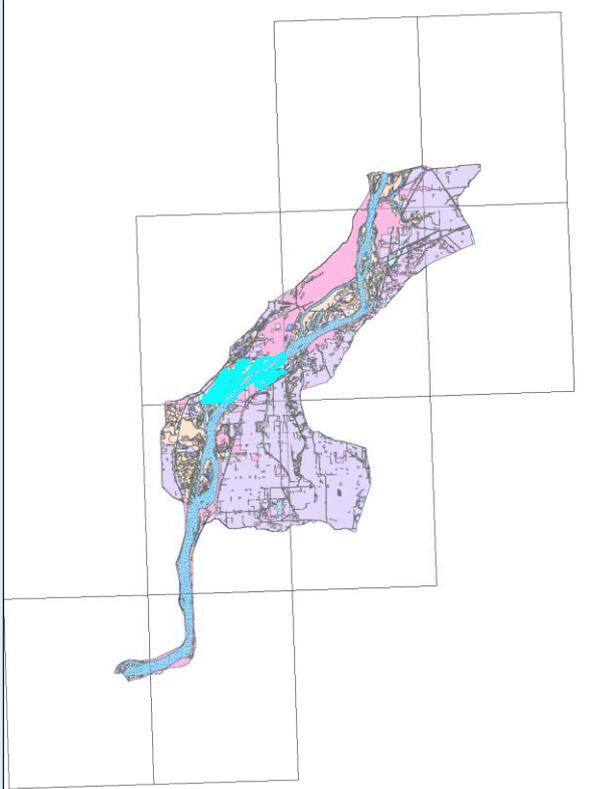
Pools 4-14



Pool 9

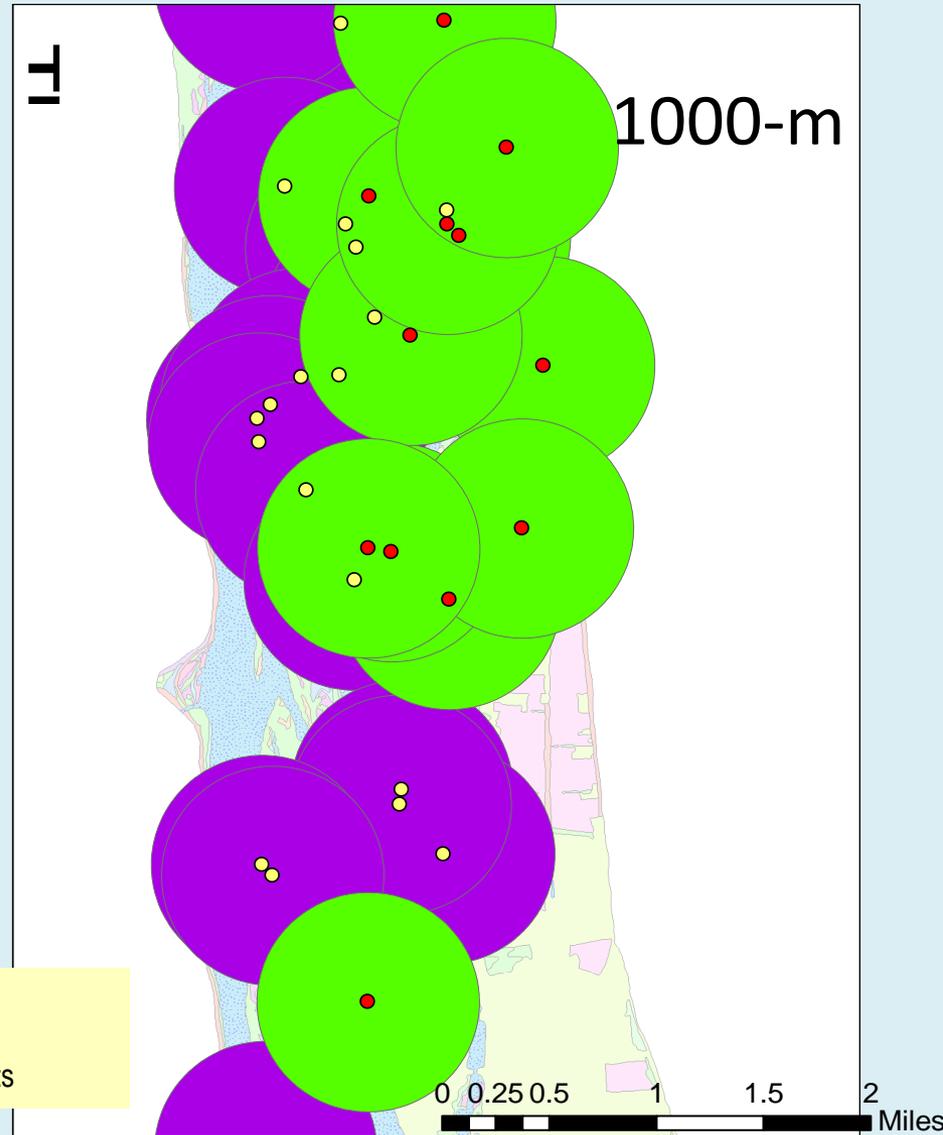
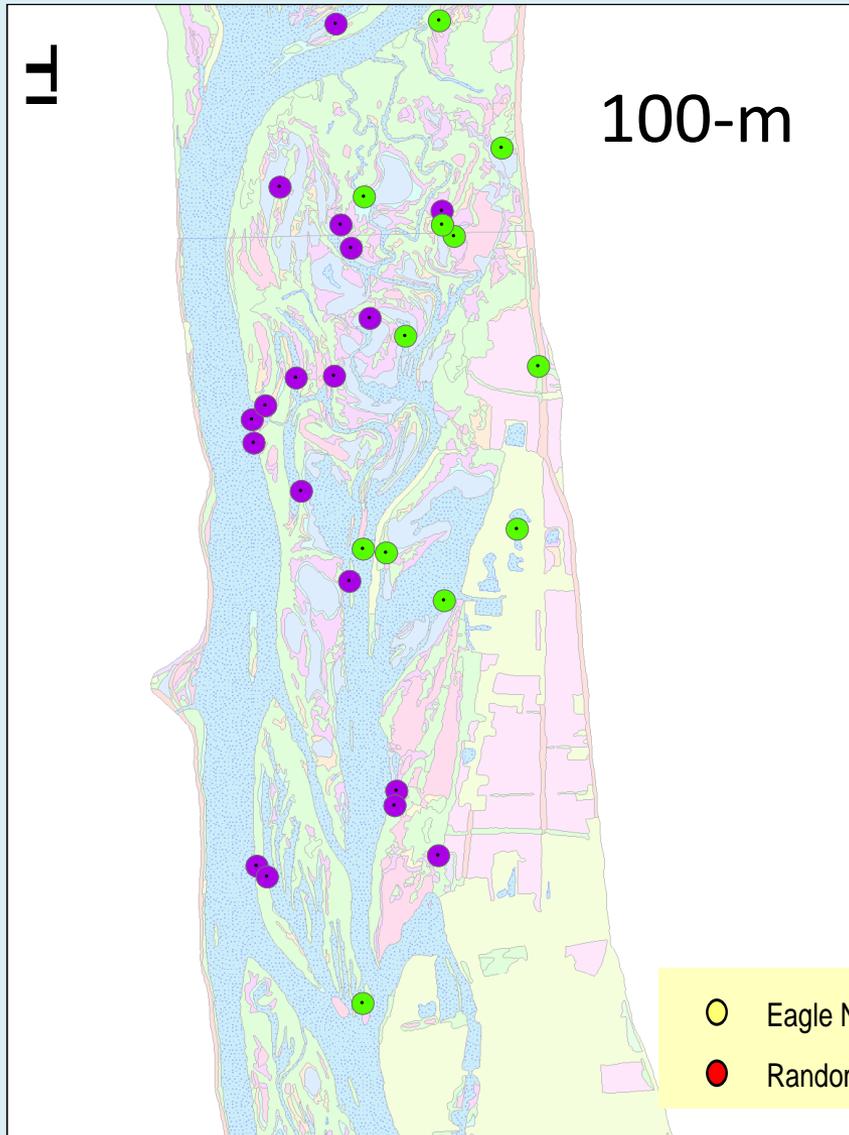


Pool 14



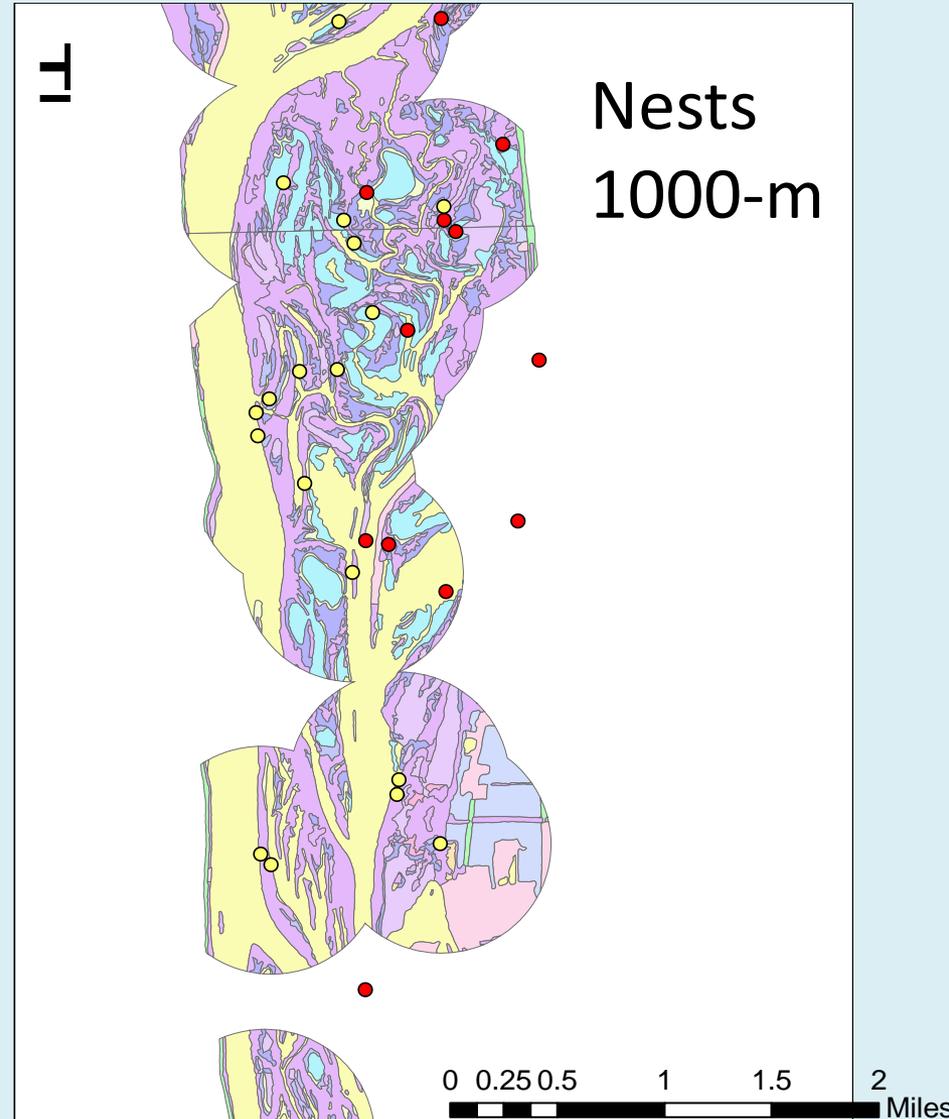
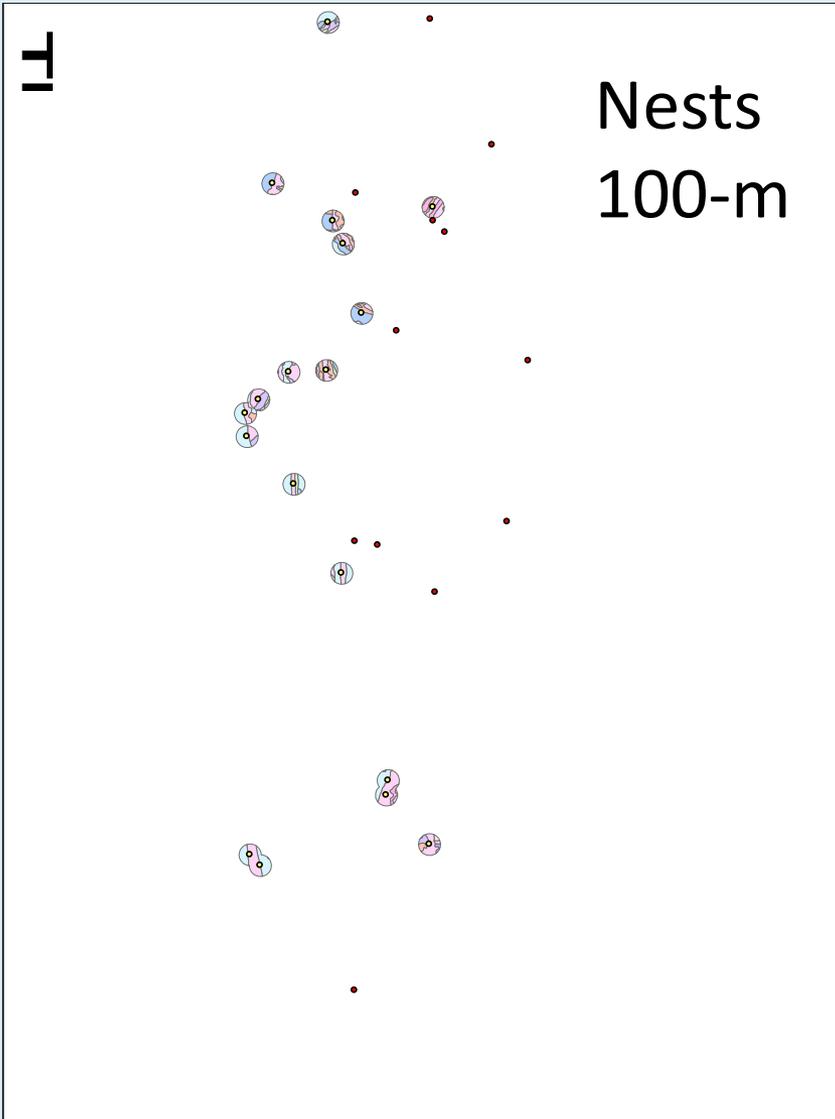
Area Calculations . . .

Buffering . . .

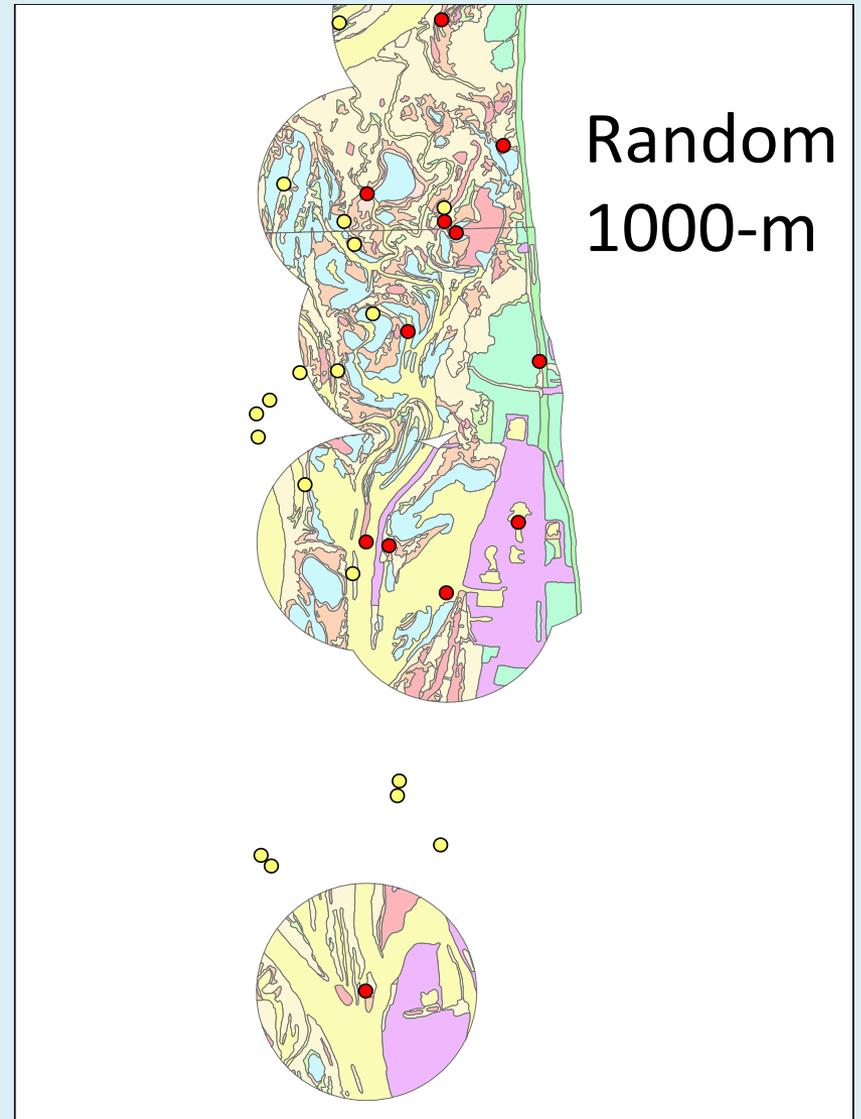
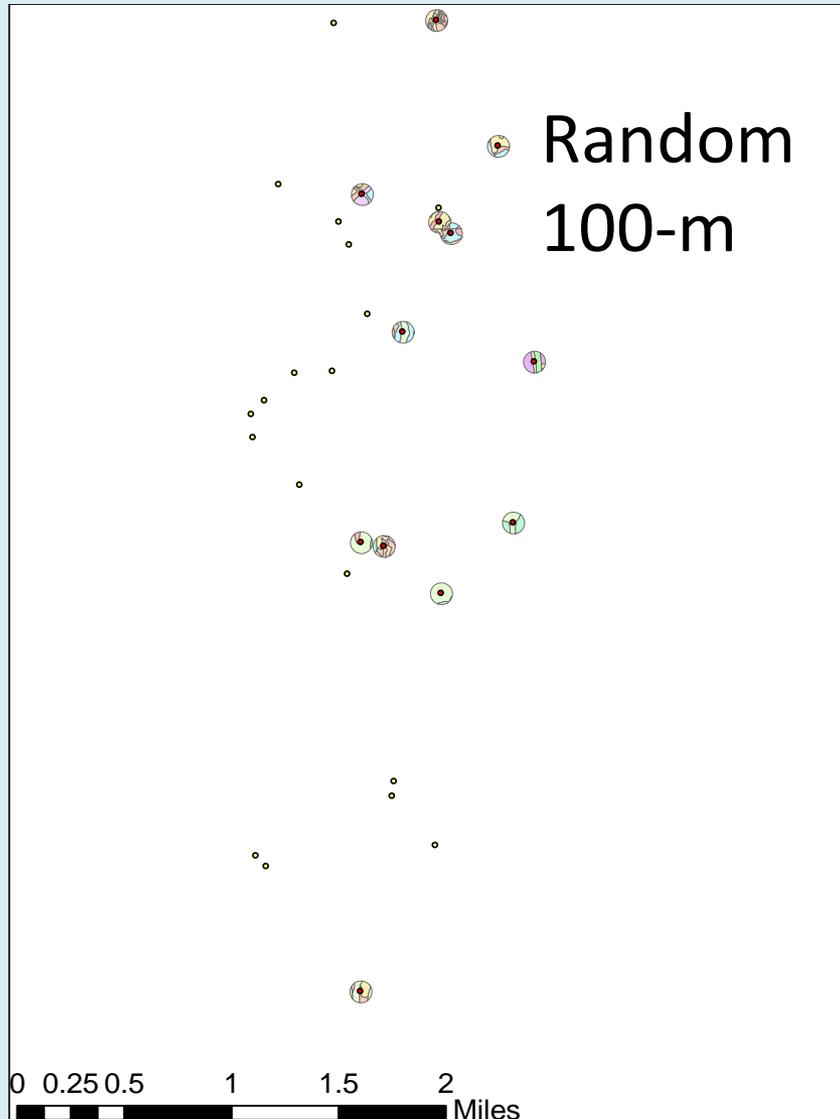


- Eagle Nests
- Random points

Clipping . . .



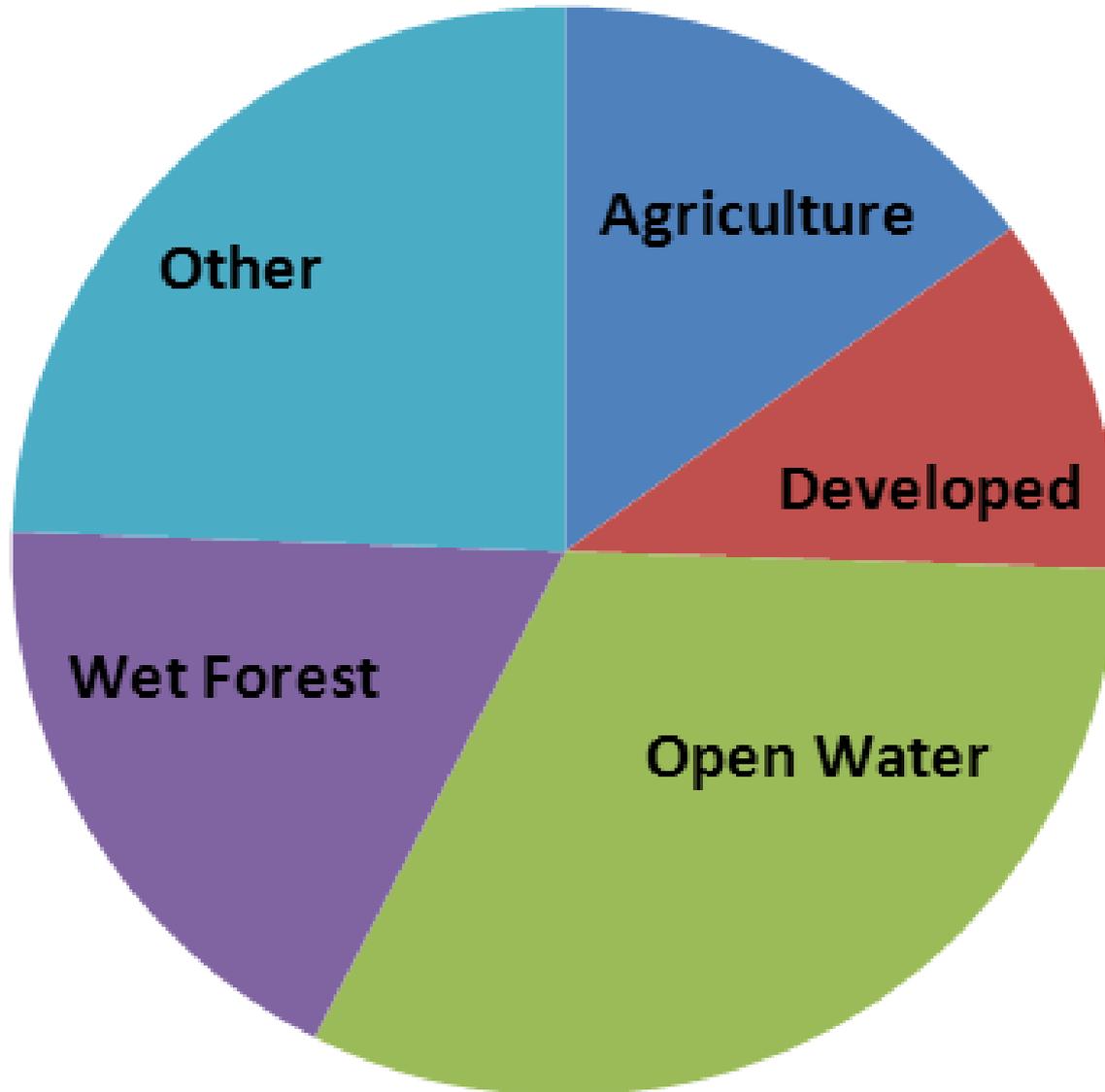
Clipping . . .



Class 15

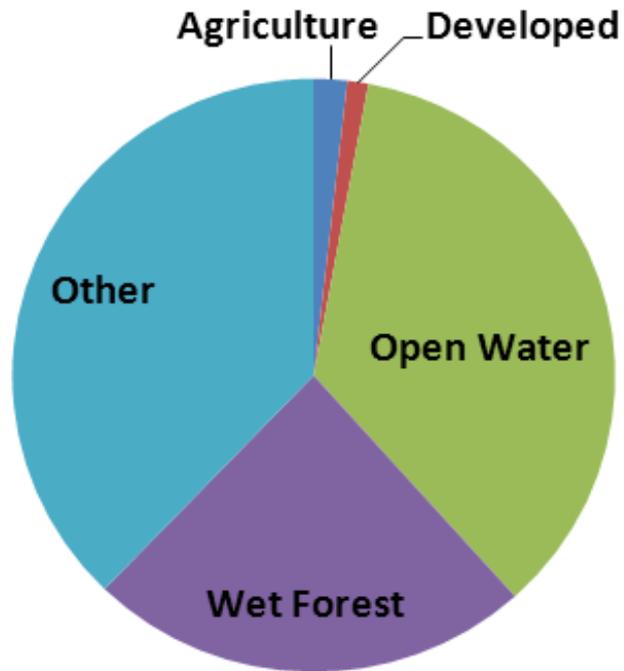
- **Agriculture**
- Deep Marsh
- **Developed**
- Grass/Forbs
- **Open Water**
- Road/levee
- Rooted Floating Aquatics
- Sand/Mud
- **Other**
- Scrub/Shrub
- Shallow Marsh
- Submerged Aquatic Vegetation
- Upland Forest
- **Wet Forest**
- Wet Meadow
- Wet Shrub

Pools 4-14 Land Cover %

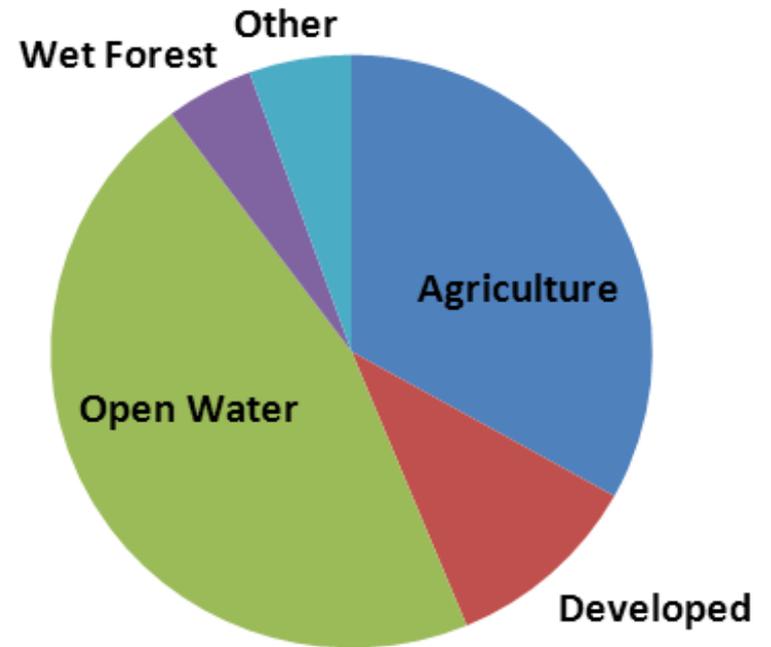


Land Cover %

Pool 9

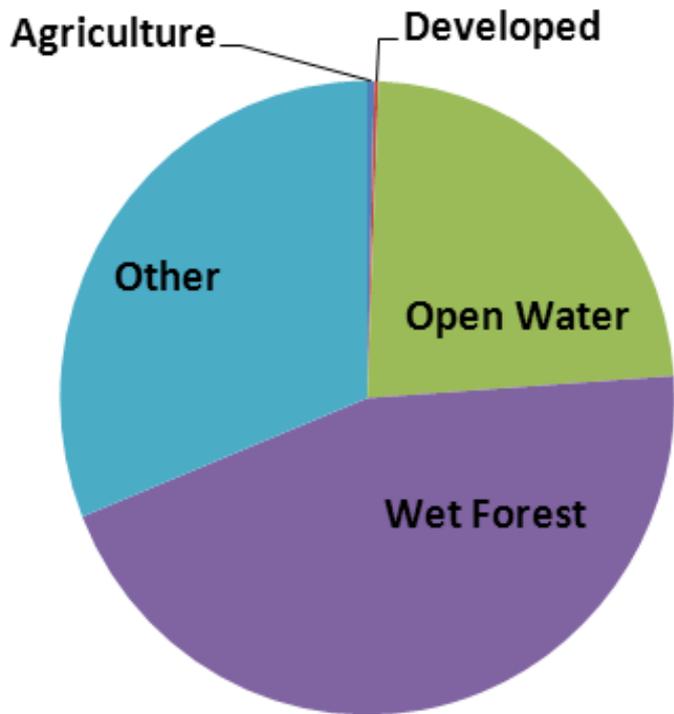


Pool 14

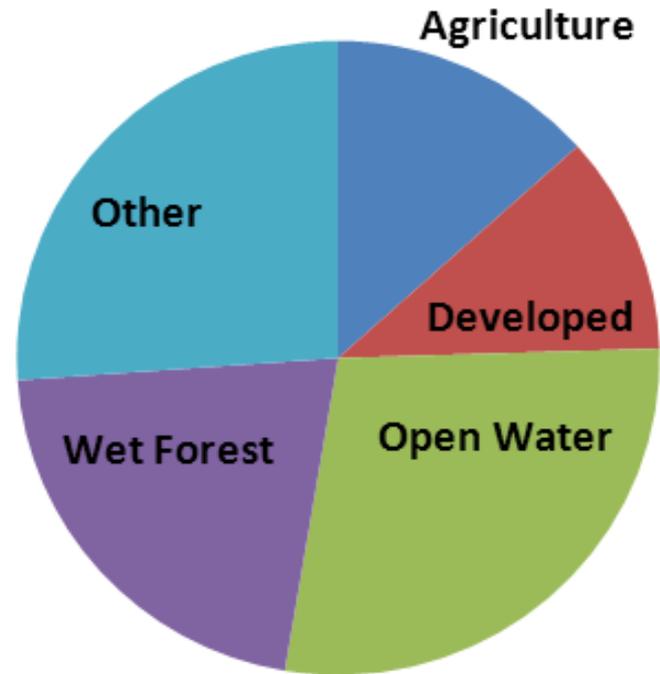


Land Cover %

Eagle Nests 100-m

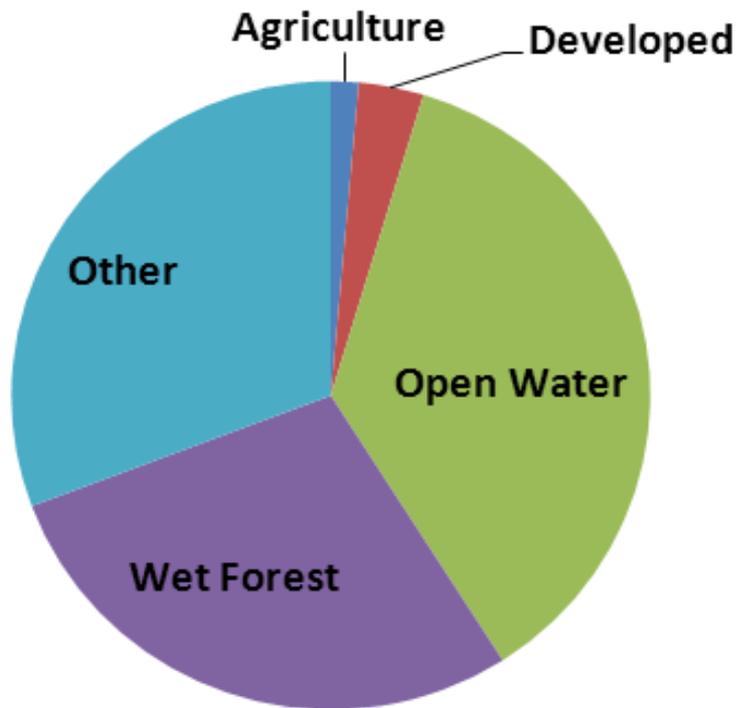


Random 100-m

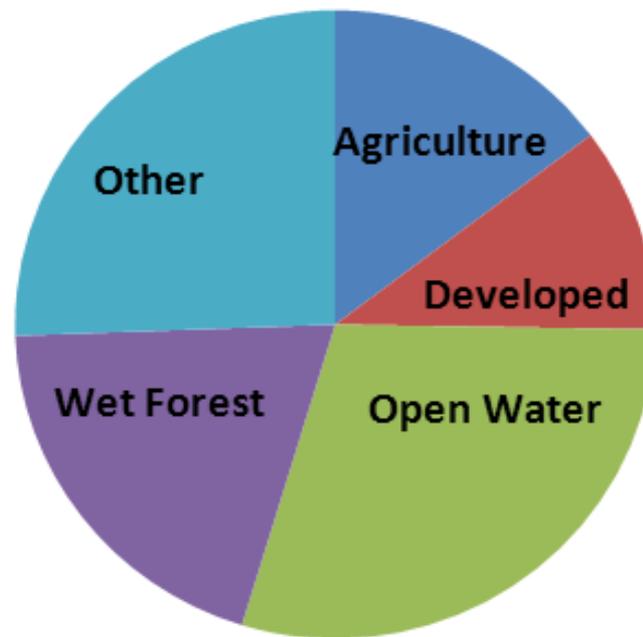


Land Cover %

Eagle Nests 1000-m



Random 1000-m



Conclusions

- **Pool 9 (96 Nests):** ↑ Wet Forest
↓ Ag, Developed
- **Pool 14 (2 Nests):** ↑ Ag, Developed
↓ Wet Forest
- **Eagle Nests:** + Wet Forest
- Ag, Developed



Questions?



Habitat Type (%)

	Agriculture	Developed	Open Water	Wet Forest	Other
All Pools	14.91	10.59	31.98	18.10	24.42
Pool 9	1.78	1.12	35.46	23.85	37.78
Pool 14	33.10	10.65	46.04	4.71	5.51
Nest 100m	0.35	0.24	23.31	45.01	31.10
Random 100m	13.37	11.16	28.14	21.22	26.11
Nest 1000m	1.40	3.28	36.28	28.32	30.72
Random 1000m	14.71	10.54	29.46	19.72	25.57