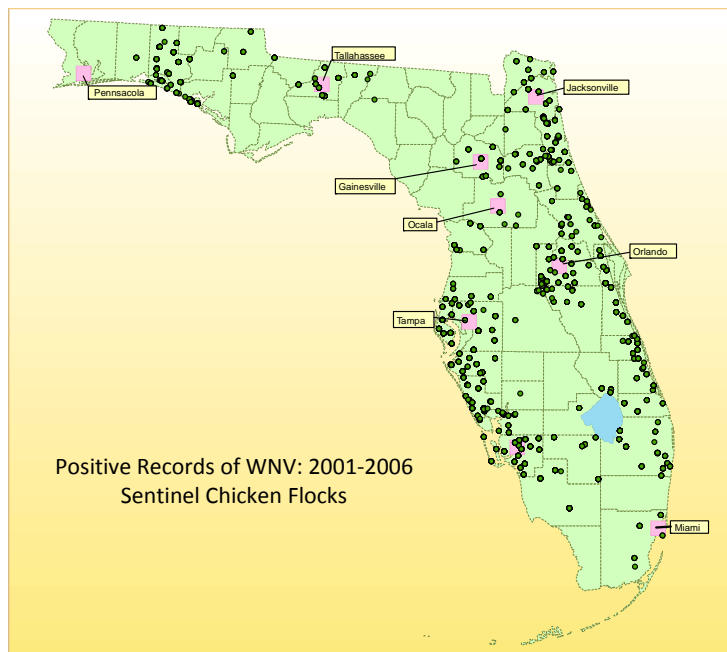
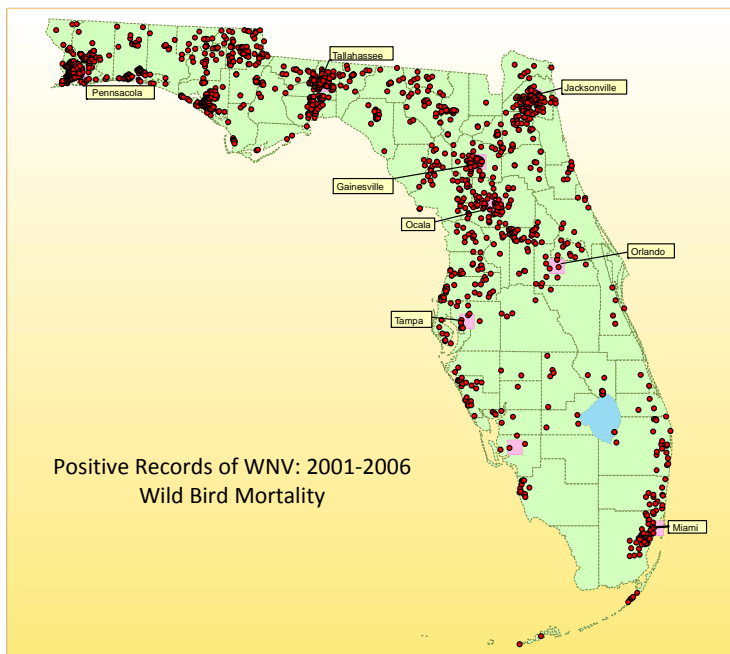
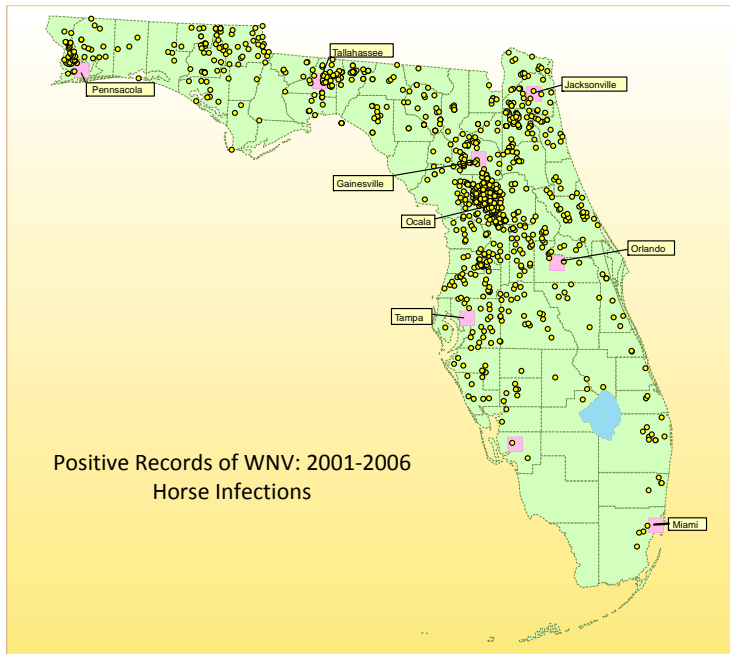


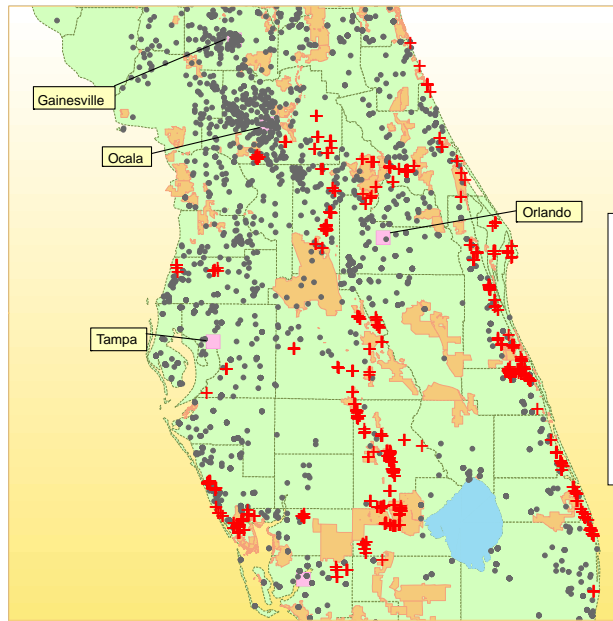
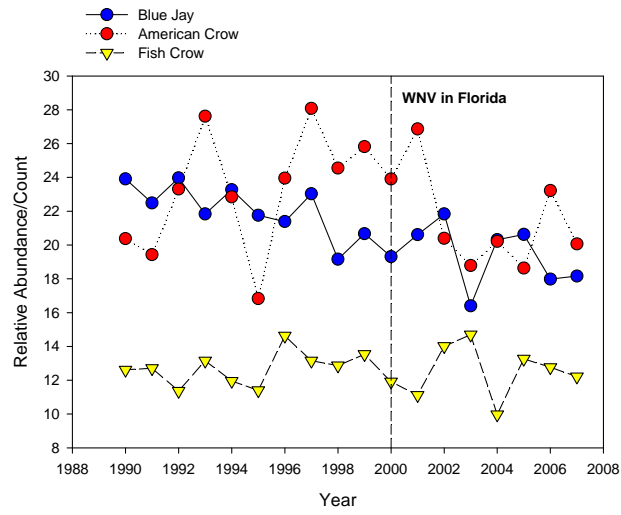
Potential emergent diseases that could affect Florida birds (and humans)

- Encephalitic viruses
 - Eastern Equine Encephalitis - ~ 25% FSJs have antibodies
 - St. Louis Encephalitis ~ 3% FSJs have antibodies
 - Highlands J ~ 15% FSJs have antibodies
- West Nile Virus ~ 10% FSJs have antibodies
- Avian Flu
- Malaria
- Lyme Disease





BBS data on other Florida corvids: Mixed impacts



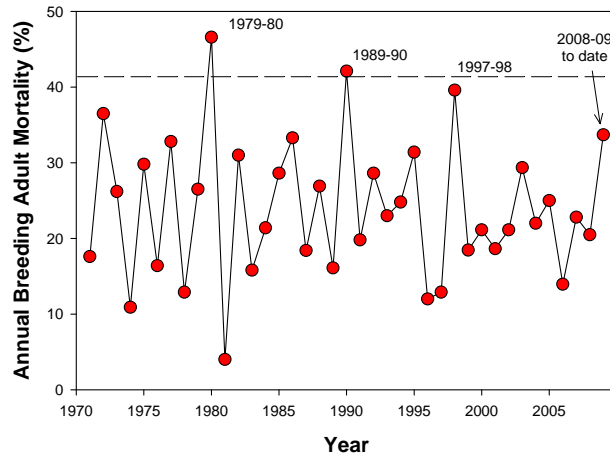
WNV Surveillance for FSJ

>1300 blood samples
obtained state-wide

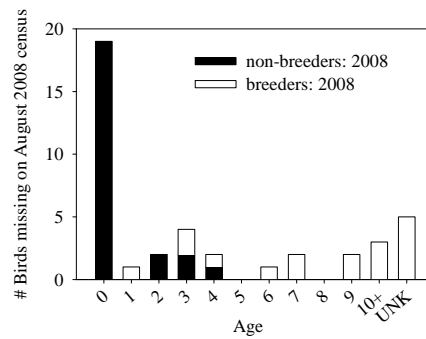
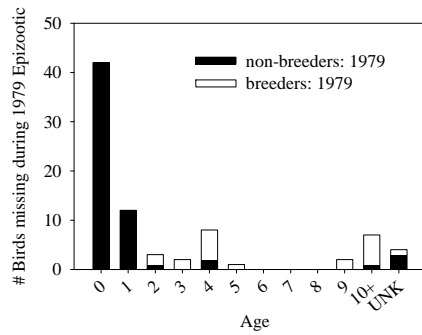
60 samples w/in 1 km of
positive WNV records

10% show past exposure

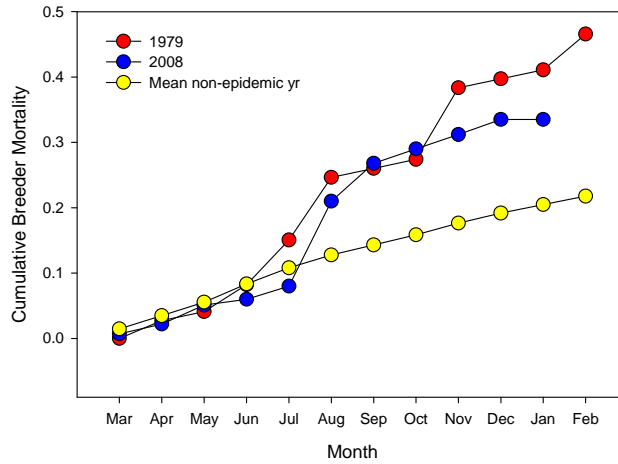
Does disease regulate Florida Scrub-Jay populations?



Age-specific patterns of mortality consistent with disease

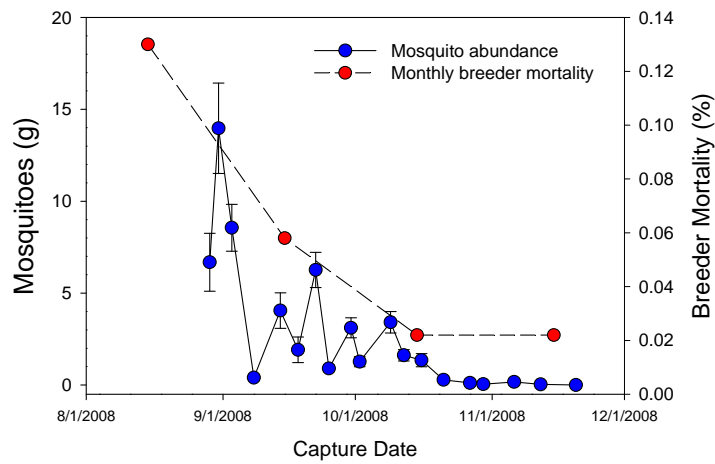


Does disease regulate Florida Scrub-Jay populations?

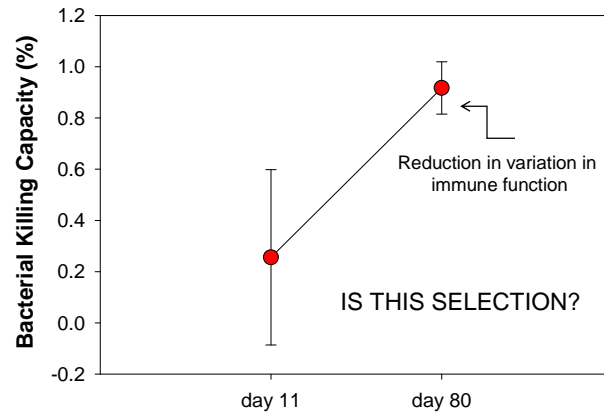


Oct-Nov 1979: warmer and wetter with lots of rain in early November
 Oct-Nov 2008: cooler and drier, no rain at all since Oct 26

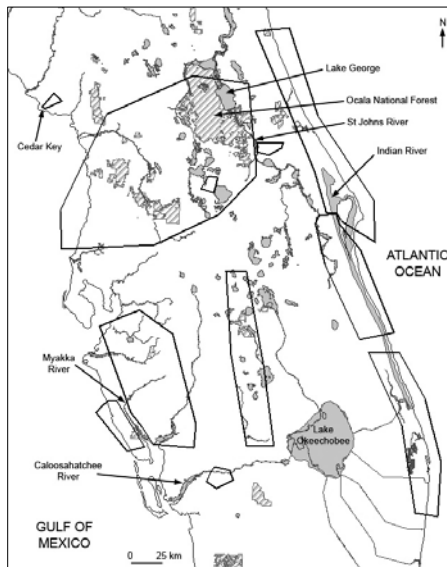
Does disease regulate Florida Scrub-Jay populations?



Does ability to resist disease vary among individuals?

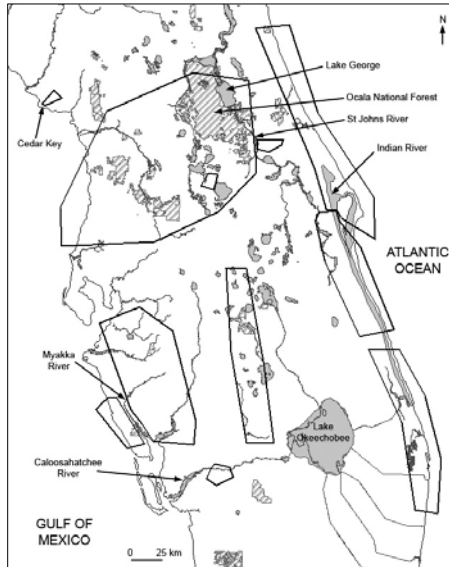


Can we assess the influence of genetic variation on disease resistance?



Coulon et al. 2008. Molecular Ecology

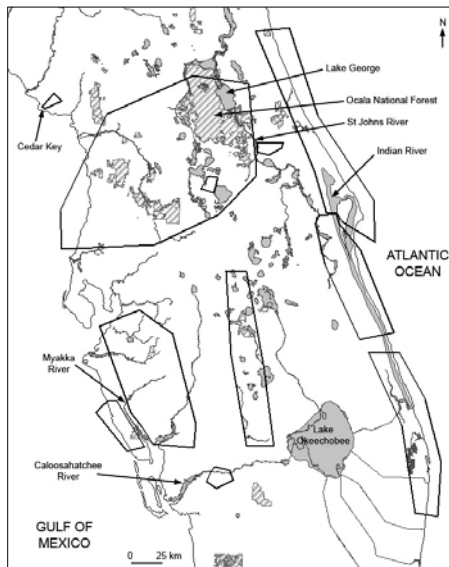
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Coulon et al. 2008. Molecular Ecology

- Habitat fragmentation can lead to loss of genetic diversity
 - Loss of alleles effective against disease
 - MHC and genes that code for immunocompetence

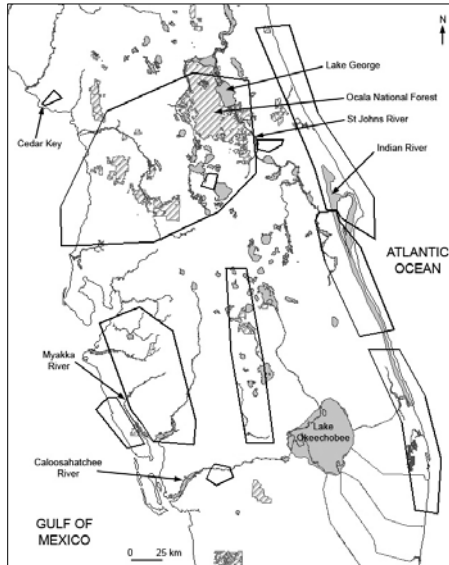
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 - Increased exposure may overwhelm adaptive responses
- Adaptive responses might not be effective for emerging diseases
 - Does resistance to StL Enceph protect against WNV?

Resources and Technology

- >5000 genetic samples, all birds in Demo Tract sampled since 1998, many from earlier
- >1500 genetic samples from entire range
- Provides temporal and spatial variation
- All stored at -80°C
- FSJ has had extensive genome sequencing
 - 37 microsatellite markers
 - On-going development of 45-70 SNP (single nucleotide polymorphisms) markers

Research Responses to Epidemic



Obtain blood samples from as many FSJs as possible

- Isolate viral RNA
- Screen antibodies
- >75 FSJs trapped and bled since August

Three promising patterns

- 1) Birds bled that subs disappeared
- 2) Birds bled that appeared sick
- 3) Birds missed during early censuses that reappeared and were then bled

Research Responses to Epidemic

John Hock mosquito trap



Obtain blood samples from as many vectors as possible

- Isolate viral RNA
- Examine variation among putative vectors
- Examine spatial and temporal patterns of vector abundance

Methods

- 1) Trap biweekly
- 2) 14 traps arrayed in matched pairs
- 3) One trap adjacent to vector source (seasonal pond), one on adjacent scrub ridge

Expected Results

- Understanding the role of genotype and phenotype in disease resistance
- Understanding of the co-evolutionary process between FSJ and viral genomes and its interaction with FSJ demography over time
- Ability to assess disease threat to individual populations, from both a genetic and landscape perspective
- Use of genetic variation as a conservation strategy to minimize threat of disease in populations where resistance has been degraded by human activity

Future Directions

- Awarded Small Grant for Exploratory Research (SGER) from NSF
- Submit larger proposal to NSF Jan 2009
 - Episodic disease as a selective force in birds
 - Genetic and phenotypic correlates of disease
 - Spatial and temporal variability in disease prevalence and resistance
 - Ecological correlates
- Potential to identify populations state-wide at elevated risk of epidemics