Live bird sampling efforts

Variation within and among species and years

Multiple goals

- FWS funded goal is strictly to conduct a surveillance program.
  - Yes/no did we detect HPAI H5N1
    - If ‘No’, does this conclusion have reasonable statistical power.
- USGS goals include a research component designed to test assumptions and inform future sampling programs
- Both research and management issues relative to bird migration, movements, fidelity, survival, specific management issues, refuge priorities and ongoing studies, ect.

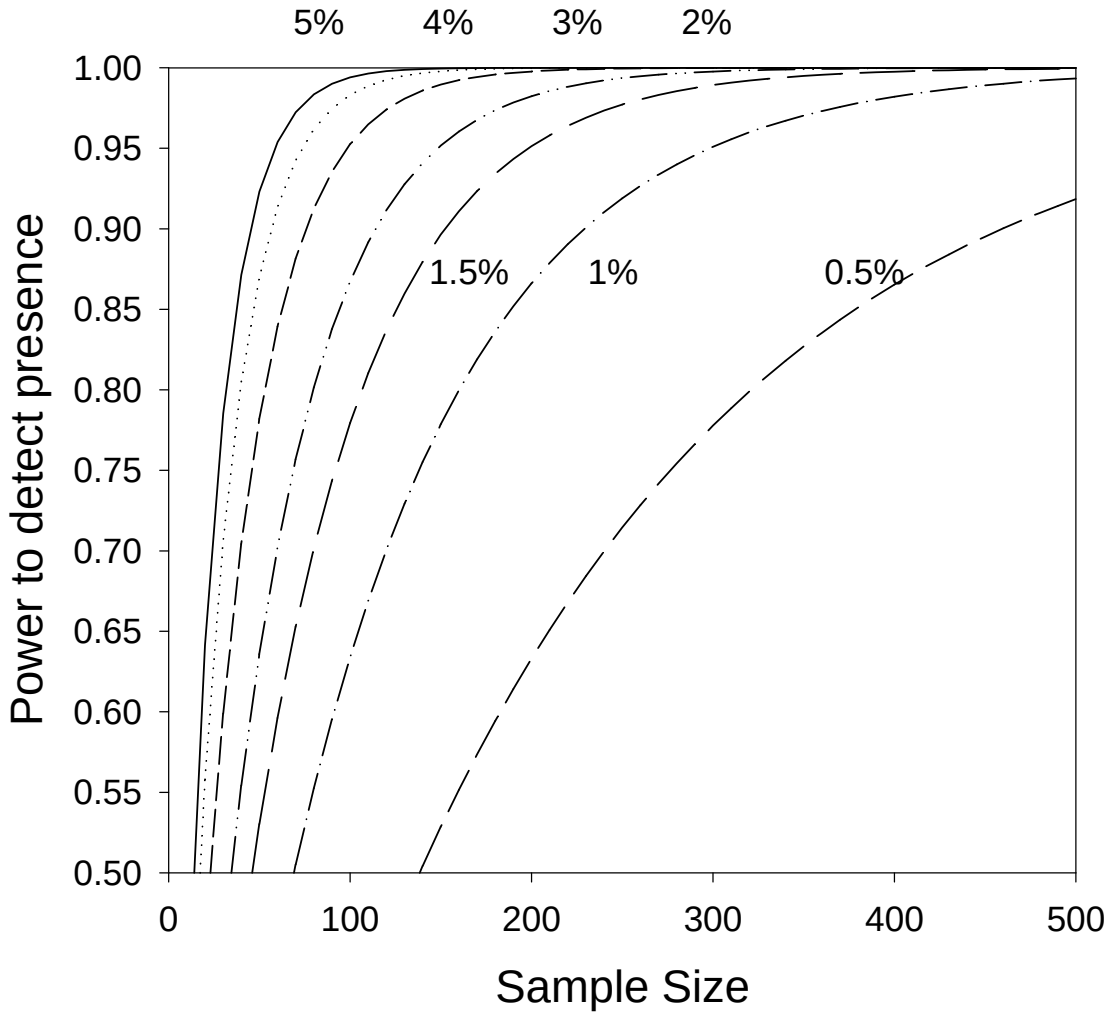
Our goal is to detect a ‘rare’ event

- AI viruses in general, and highly pathogenic viruses in particular, occur in only a small percentage of a population at any particular time.
- Therefore, any sampling scheme designed to detect a rare event, will likely report many ‘negative’ outcomes.
- To interpret such negative outcomes, we must consider the functional statistical power.

Statistical Power

- In this instance, power is the ability to ‘detect’ a virus that is likely present at a low rate in a sampled population.
- The overall population size is not particularly relevant
- The factors which influence power of detection are (1) prevalence rate, and (2) sample size.

Detection = 1 or more positive samples



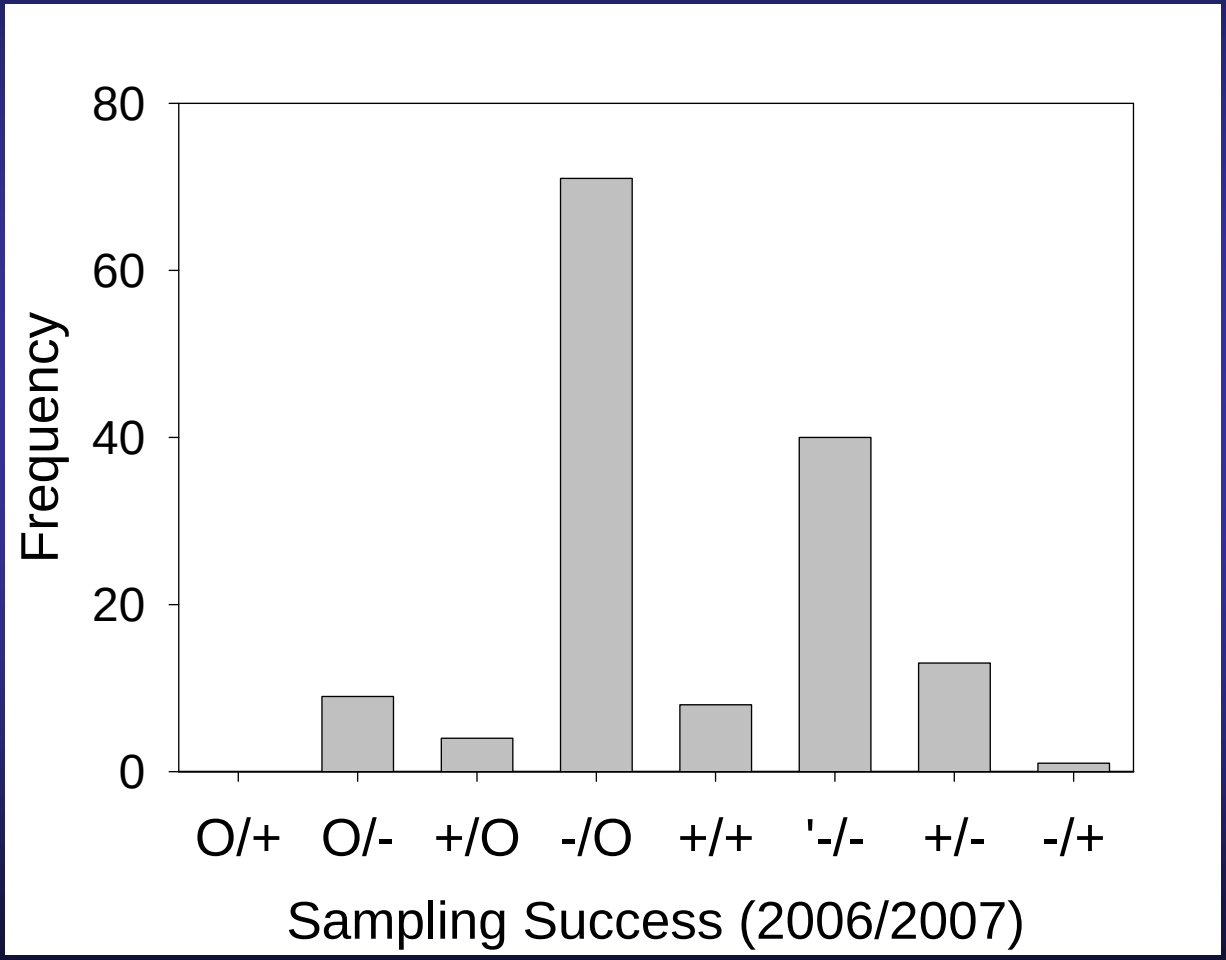
Probability of detection was positively related to sample size

2006	+	n	%	2007	+	n	%
<30	2	89	2.2%		2	41	4.8%
>30 <200	3	24	12.5%		3	17	17.6%
>200	18	25	72.0%		4	10	40.0%
	23	138	16.6%		9	68	13.2%

Sample size requirements

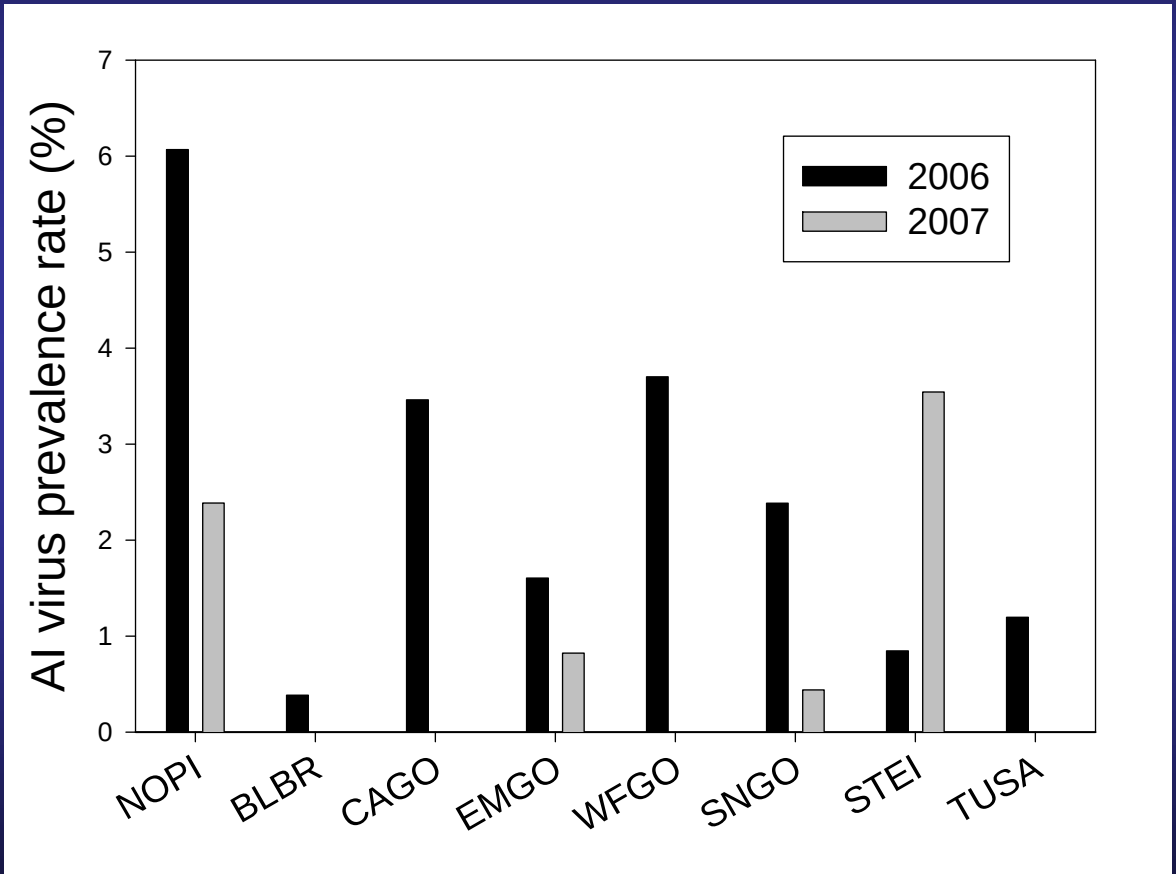
- Overall Exposure Rates
  - 2006 = 1.73%
  - 2007 = 0.78%
- Given these prevalence rates, sample size required to have 95% detection rates would be:
  - 2006 = 171
  - 2007 = 380

Consistency in sampling success (n=200)

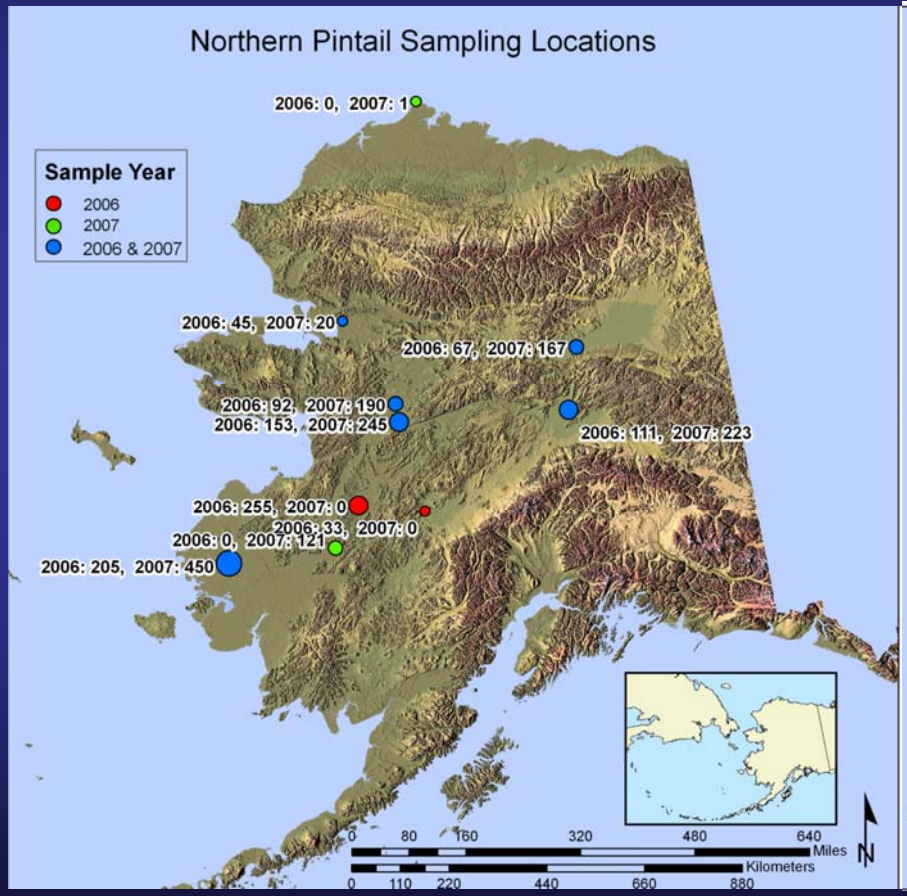


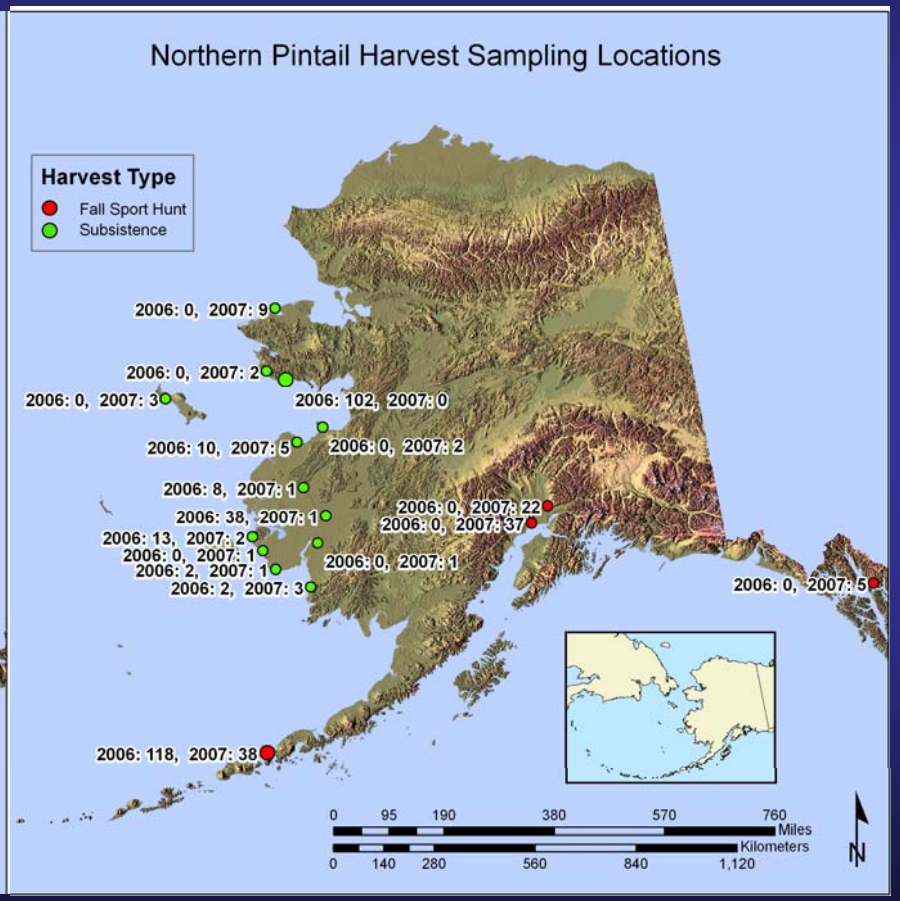
O = not sampled, + = greater than 200 samples, - = less than 200 samples

Variation by year and species

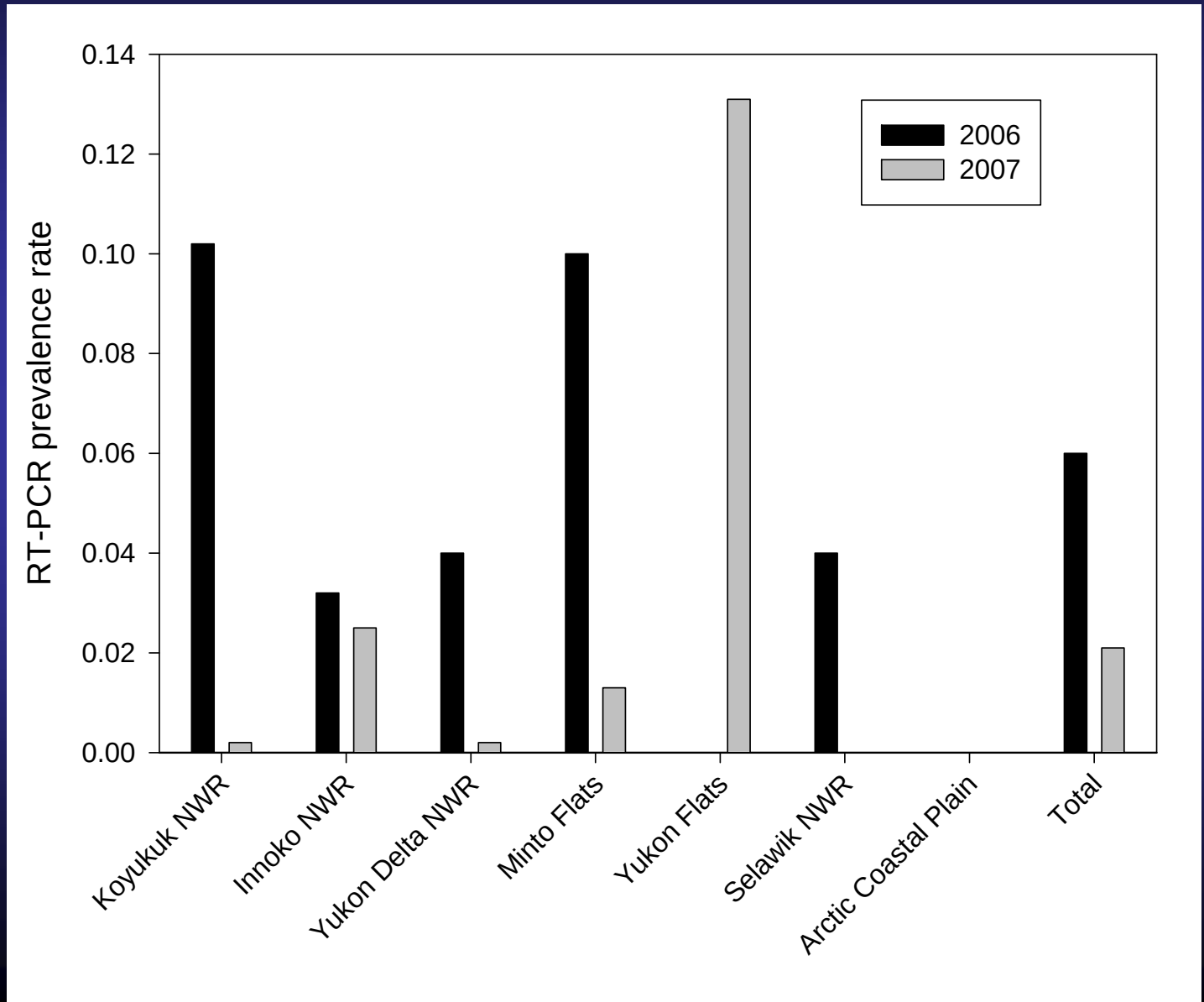


Geographic spread in NOPI sampling

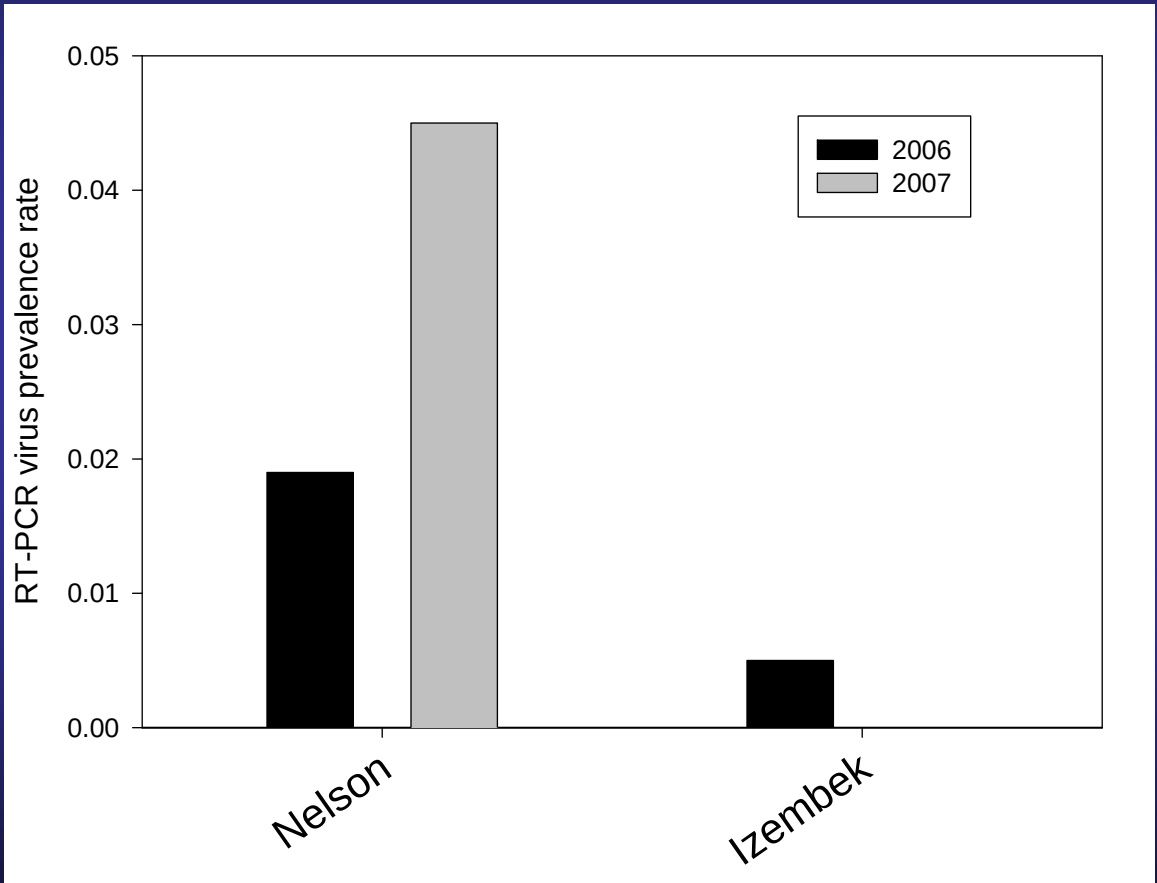




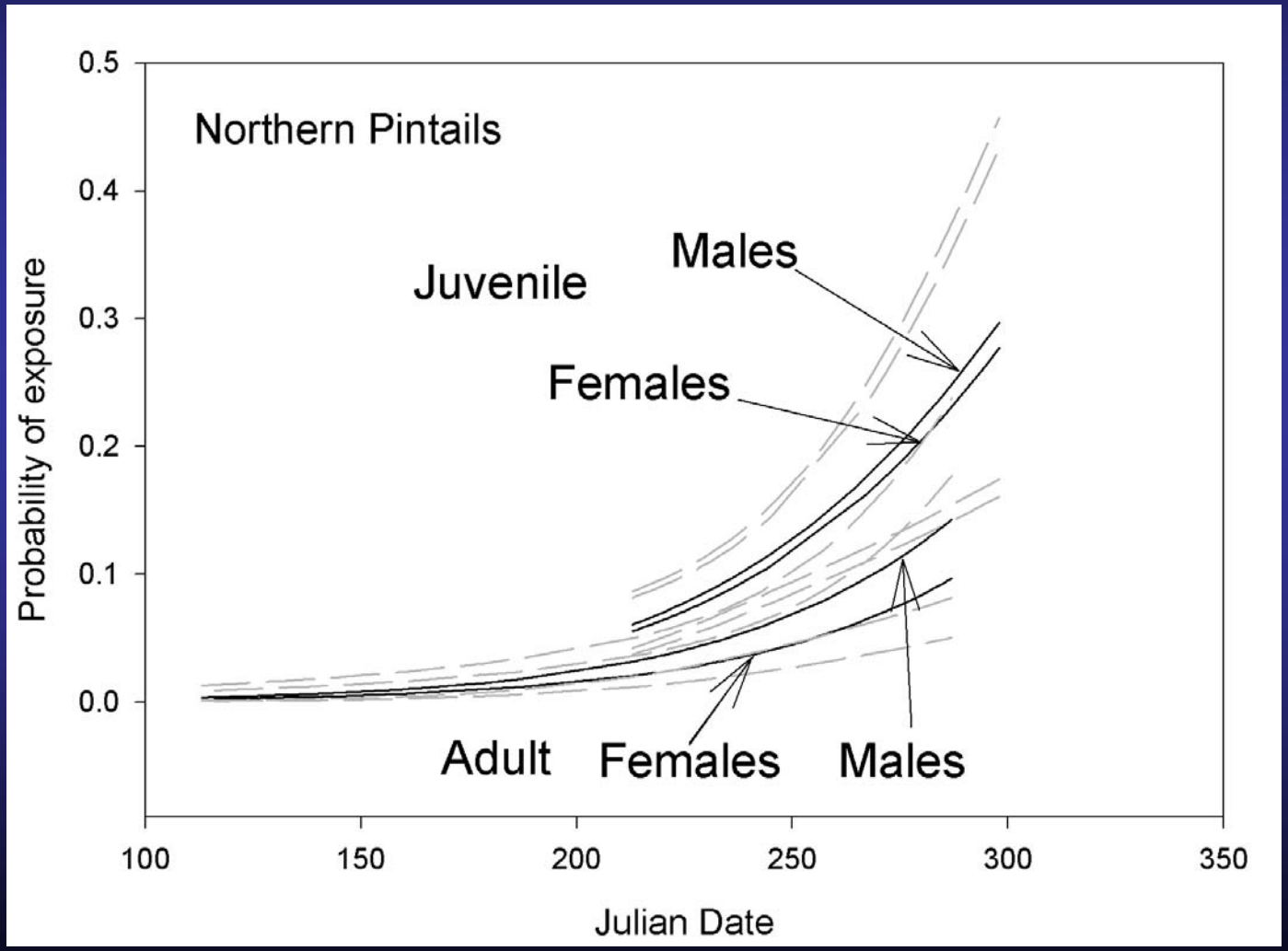
Variation among sites within NOPI



Variation among sites within STEI



Seasonal and age specific patterns of variation



Conclusions

- To meet the goal of detecting H5N1
  - Increase sample sizes in terms of number of species meeting sample size goals
  - Increase geographic coverage
- To meet goals relative to research objectives
  - Increase temporal sampling coverage
  - Increase linkages between harvest sampling and live bird sampling

Conclusions

- Sampling Intensity
  - Increase intensity to sample adequately across all potential covariates, i.e., geography, sex, age, date
  - Allocate sampling intensity systematically, or proportionally to population representation.

Conclusions

- How does the current sampling regime fit with other refuge goals and obligations?
- How can the current program be modified to fit the overall goals stated previously yet still mesh with other refuge goals and obligations?