Progress Report Summary
The King Rail BBN model structure was reviewed by the contributing experts without any grievous concerns and the predictive occupancy maps have been generated for the full ENC-SEVA landscape. While those models were running, I learned to use the new national hydrologic dataset (NHD Plus) and began mapping habitat variables for use in the blueback herring models. Curtis Belyea, a GIS technician in the Southeast GAP group, has been helping me with the creation of new data layers. Nathan Tarr, a former MS student and newest Southeast GAP employee, also helped out for a bit by extracting data from Swainson’s Warbler literature and hiring my King Rail model validation field crew so that I could focus on the modeling work. Now I am working on completing statistics and preparing the reports and publications for the King Rail models.

King Rail Model Validation & Nest Searching
My 2009 field crew was amazing! Catherine Airy and Lesley Handa conducted secretive marsh bird call-back surveys, while David Topolowski and Brooke Kelly did nest searches and set up nest surveillance systems. The 2008 and 2009 call-back survey data were used to calculate the observed detection and occupancy probabilities in program PRESENCE. One use of these field data was to compare the field versus the Bayesian Belief Network model probability of occupancy. We found that 83% of the field values fell within one standard deviation of the BBN model predicted values! Therefore these maps are ready to go out to our experts to have them review the spatial representation of their modeled knowledge (Figure 1). The second use of the data will be to test how well the BBN model updates with new data. This second analysis is still in progress. I have added a power point presentation to my project website, which provides more details on the modeling output for those that would like to see more figures.

Figure 1. Predicted Probability of Occupancy by King Rail in Mackay Island NWR. The range of values shown in the legend refers to the entire ENC-SEVA region.

Figure 2. King Rail on nest at Back Bay NWR.
The nest crew was a last minute addition when we received funding for our Webless Migratory Game Bird Research proposal. This proposal complemented our model validation work by allowing us to evaluate the relationship between occupancy and nest success. This is important because the Southeast regional population objectives for the King Rail not only require conservation of the existing population, but an increase in the total number of breeding pairs. It is therefore necessary to not only available habitat, but to also distinguish between what might be occupied sink habitat from occupied source habitat. Also, we selected our nest search sites to reflect different management histories (year-since-burn), to try to determine how fire management affects both occupancy and nest success. We found and observed seven King Rail nests (Figure 2) and six Least Bittern nests. We were surprised to find all nesting activity in sites burned that same Spring or one year previously, rather than the slightly older and denser vegetation. Of the seven King Rail nests, three were predated (snakes and raccoons), two produced partial clutches (some eggs were infertile), and two hatched all chicks successfully. We have work-study students, volunteers, and our new King Rail grad student, Samantha Rogers, all watching the nest surveillance videos and seeing many interesting behaviors - scattered between long periods of sleeping rail and wavy grass video. Tim Craig (USFWS) is working to provide us with improved burn history data within our study area, which will help immensely to ensure sampling design captures contrasting management histories. Nick Bartok (University of Western Ontario) has volunteered to watch our Least Bittern “bonus data” and prepare a manuscript on that species. Based on the success of our first year nest searching, we have been awarded additional Quick Response funding to monitor nests again in 2010. Further details and preliminary results will be available in the Webless Migratory Game Bird Research Program annual report.

Blueback Herring and Swainson’s Warbler Models
Both of these species present a much different challenge from the King Rail. King Rail had not been closely studied or managed within the ENC-SEVA region and aside from a dependence on freshwater marsh, very little was known of its ecology here or elsewhere. However, most of the variables that experts thought might contribute to King Rail occupancy could fairly easily be linked to available GIS data layers. For Swainson’s Warbler and blueback herring there has been much more local research and, for the fish, population management, and subsequently ecological knowledge of habitat associations is readily available both from the literature and local experts. However, many of the key habitat features are much more difficult to match to available GIS data layers.

For blueback herring, the challenge remains obtaining data layers for the full project extent, yet also at spatial and temporal scale relevant to stepping-down spawning population and habitat objectives. Scott Chappell at NC-DENR sent me the GIS data and metadata from their Region 1 (Albemarle Sound) modeling of fish Strategic Habitat Areas. Scott has spent significant time cleaning up these data and generating new data layers of relevance to fish habitat quality and accessibility. From Alexa McKerrow, I also have the data from The Nature Conservancy’s project to identify priority areas for freshwater conservation.

The Swainson’s Warbler literature review is complete and after Christmas I will pull together a summary similar to what I produced for the King Rail. Neil Chartier (MS student at NCSU) has provided all the nest location data for his research in the Roanoke River National Wildlife Refuge and I have passed these along to Doug Newcomb (USFWS) to see whether these sites might offer unique signatures in his LiDAR data. This species is thought to have specific forest vegetation structure requirements, which might be visible in this high spatial resolution data.