Update for the research project "Validation of NEXRAD data and models of bird migration stopover sites in the Northeast US" 12 September, 2014:

PI: Jeff Buler Univ of Delaware, coPIs: Eric Walters, Old Dominon University, Deanna Dawson, USGS

Project initiated on 1 July 2013.

Other funding sponsors for the larger collaborative project now include Virginia Department of Game and Inland Fisheries, NASA (in kind), USGS, Maryland Department of Natural Resources, Virginia Coastal Zone Management Program, University of Delaware.

The following is a summary of progress on USFWS sponsored activity only:

1) Ground surveys for birds, insects, and fruit:

We obtained permissions from numerous landowners (private, state, federal) and established 24 transect sites within the approved counties of MD, DE, and VA around the KDOX and KAKQ radars (12 sites per radar station).

We hired 3 technicians for the 2013 fall survey season (15 August – 7 November) and 1 MS graduate student at University of Delaware (Tim Schreckengost) to coordinate data collection. They conducted 417 surveys and detected over 9000 birds. Sites were visited about 18 times during fall 2013. Fruit and insect counts were also conducted during every visit.

We hired 3 technicians and Tim Schreckgost is coordinating data collection for the 2014 fall survey season. One of the original 24 sites has been relocated due to permission changes from last year. Data collection began on Aug 15 2014 and will continue through 7 November 2014.

2) NEXRAD radar data screening. As of 12 Sep 2014:

Data screening and target identity (birds vs. insects) assessed from fall 2010 -2013 is complete for 15 NEXRAD sites. We have 4 TDWR and 1 NEXRAD yet to complete. We are rescreening KBUF to improve sample size. Radars are averaging about 16 usable sampling days per season, which is close to the ground surveying frequency.

We have summarized mean radar reflectivity from 2008 to 2013 for 6 NEXRAD sites and plan on completing all of the NEXRAD data processing including fall 2014 by January of 2015.

3) Predictive modeling:

We have compiled all covariate data (land cover and distance metrics, NDVI data from 2008-2013) up to the current season.

We have explored using GWR4 software (released March 2014) to produce mixed models of geographically-weighted regression models on the original 2008-2009 dataset.

We have advertised for a post-doctoral researcher to conduct the modeling analysis beginning January 1 2015 at the latest.

Data Analysis: We have begun comparing radar and ground survey data analysis. Bird densities have been estimated using distance-sampling estimates of detection probabilities. We found significant positive correlations between NEXRAD data and migrant ground density for 17 sites around the KDOX radar during 2013. Analyses are ongoing.

Products:

Here is a list of 6 oral scientific presentations that have been made about the project. The presenter/s is underlined: Note that Andrew Arnold is the Master's student at Old Dominion University that is working on the project through support from Maryland DNR.

2013. Buler, J. J. Recent applications of weather radar for understanding the stopover ecology of migrating birds, Old Dominion University, Department of Biological Sciences, Norfolk, VA

2013. Arnold, A., J. J. Buler, T. Schreckengost, and E. L. Walters. Using radar-based data to predict forested hardwood habitat use by migrants along the Eastern Shore of Virginia and Maryland: A preliminary report, Coastal Upland Management Meeting, Eastern Shore of Virginia National Wildlife Refuge, Cape Charles, VA

2014. Arnold, J.A., E. L. Walters, T. Shreckengost, and J. J. Buler. 2014. Migratory bird use of forested stopover sites on the lower Delmarva Peninsula and a comparison with radar-based predictive models. Virginia Coastal Avian Partnership Meeting, Eastern Shore Community College, Melfa, VA

2014. Buler, J. J. Some revelations of bird migration and stopover ecology from weather surveillance radar observations, Villanova University, Department of Biology, Philadelphia, PA

2014. Arnold, A., T. Schreckengost, J. J. Buler, and E. L. Walters. Assessing habitat use and quality of stopover sites during fall migration, North American Congress for Conservation Biology, University of Montana, Missoula, MT

October 2014. Buler, J. J., D. Dawson, D. La Puma, J. Smolinksy, T. Schreckengost, A. Arnold, E. Walters. Broad-scale mapping and monitoring of migratory landbird stopover sites using the national network of weather radars, Joint Meeting of the Northeast and Southeast Partners in Flight, Virginia Beach, VA