

Land Cover Change

The Uwharrie National Forest and surrounding areas has preserved more of its natural character than the urban areas of Charlotte, Greensboro, Raleigh-Durham, and others that lie within a 2-hour drive of the Uwharrie purchase boundary. Over time, Montgomery County has seen an increase in the number of parcels that have been removed from agriculture and have reverted to forest (USDA Forest Service 2005). However, this change in land use does not necessarily mean there is greater forest cover today than before, since a survey of parcels' land uses would not yield information on how old their forests might be or when they have been harvested.

In order to visually explore the land cover change patterns in this area, we used as our primary data source the National Land Cover Dataset (NLCD) for 1992 and 2001, whose land cover classes were determined from regression tree analysis of Landsat imagery. We reclassified those classes to yield a classification system much like the USGS Anderson system, with all classes having greater than 80% accuracy except for development (72%) and bare land/mining/transitional (52%). Looking at the resulting land cover change maps, we uncovered a strong trend of forest loss adjacent to UNF lands and elsewhere within the purchase boundary within the period from 1992-2001.

At first this seems to conflict with the earlier Forest Service findings that more forests exist in Montgomery County now than before. This is because land use (forest vs. agriculture) does not translate well to land cover (forest vs. open lands such as grassland/agriculture). More lands may be used for forestry, but the forests could be very young or recently harvested, in which case this lower forest density may make their Landsat pixels become classified as being grassland/agriculture instead of pine, hardwood, or mixed forest/shrubland.

We also looked at aerial photos taken in two areas within the Uwharrie purchase boundary in Montgomery County in 1938, 1968, and 1999 to examine land cover changes over a longer period of time. The general pattern was that some agricultural areas would transition to forest between 1938 and 1968, but other areas would transition from forest to agriculture or development from 1968 to 1999. There seemed to be no net change in forest cover over time, but the spatial patterning was very different.

While it is true that these low-density or recently cut forests will mature in the future, providing much more forest cover than suggested by our land cover maps for 2001, it is still the case that the reduction of forest cover between 1992 and 2001 and changes to its spatial patterning has altered the landscape ecology within the most fragmented parcels of the Uwharrie National Forest. The reduction of forest density around many of these parcels has likely benefited edge and open habitat species more than deep forest species through alterations in forest connectivity, edge effects, and matrix effects. This forest density reduction has also likely had effects on the metapopulation dynamics of wildlife living in both forest and open areas.

References

Lamb, David (1998). Large-scale Ecological Restoration of Degraded Tropical Forest Lands: The Potential Role of Timber Plantations. *Restoration Ecology* **6**(3), 271-279.

NC Department of Environment and Natural Resources, Division of Forest Resources. 2002. Working with Wildlife: Bobwhite Quail. <http://www.dfr.state.nc.us/stewardship/wwwildlife/www08.htm>

USDA Forest Service. 2005. Uwharrie National Forest – A Strategic View. July 2005. http://www.cs.unca.edu/nfsnc/uwharrie_plan/uwharrie_cer.pdf