Abstract:
A watershed management plan is being developed for the Kingston Lake Watershed, located within the Waccamaw River Basin in northeastern South Carolina. This watershed contains the only urban area in the river basin and is currently undergoing rapid development. Hence, it has been selected as a pilot site to demonstrate the utility of watershed planning in northeastern South Carolina. To help formulate and implement the plan, the US Fish and Wildlife Service and Environmental Protection Agency have funded development of a habitat assessment tool. This tool will be used to: (1) prioritize land parcels for conservation protection and (2) evaluate the success of the watershed management plan in sustaining critical habitats.

Habitat protection is a recommended element of watershed management plans for many reasons, including positive impacts on water quality and maintaining biodiversity. The habitat tool under development uses native bird diversity and abundance as an indicator of ecosystem function with ecosystems being identified by vegetation, soils, topography and hydrology. Bird and vegetation data are being collected via summer point count and winter field surveys. Ecosystem delineation is being done in a GIS framework from existing aerial photography and other available datasets. This project will also provide an assessment of the SC GAP Analysis landcover maps (Figs. 1, 2). In addition, the habitat map will also be useful in adapting the EPA’s Avian Richness Evaluation Method (AREM) for wetlands to the Kingston Lake Watershed.

Methods:
Breeding bird data within the watershed is being collected during the period of May through June utilizing standard point count protocols (Hamel, et al. 1996) for the region. Number and location of count sites are generated by computer on a stratified, random basis. Sites are then navigated to using handheld GPS receivers and compass to perform counts. Non-breeding season bird data is being collected via a combination of roadside and site-specific observations. Point count site plant communities are being assessed by observed species dominance and categorized according to NatureServe’s classification system (2001). Shapetiles of landcover types (Figs. 3 and 4) are being hand digitized in ArcMap from 1999 Digital Ortho Quarter Quadrant (DOQQ) false color infra-red photography obtained from SC Department of Natural Resources GIS database (2007). The shapetile polygons are being classified by remote sensing according to landcover type, with plant communities classified according to NatureServe’s system, and subsequently ground-truthed (when possible) for verification.

Results:
Thus far 88 breeding bird species have been observed in Kingston Lake Watershed, including Wood Stork (federally endangered), Red-cockaded Woodpecker (federally endangered), Swallow-tailed Kite (SC state endangered), Least Tern (SC state threatened), and Loggerhead Shrike (SC state threatened). Several Neo-tropical Migratory Bird species of concern have been noted, including Swainson’s Hawk, Northern Parula, Prothonotary and Yellow-throated warblers, Wood Thrush, and Eastern Wood-Pewee. Uncommon or rare winter bird species include American Pipit, Horned Lark, Spotted Sandpiper and Vesper Sparrow. A list of bird species with their occurrence as resident, breeding, transient or winter resident will be compiled and added to the natural resource inventory of Kingston Lake Watershed.

These images depict a few of the species whose futures in Kingston Lake Watershed depend upon water quality and natural resource management of the watershed.

Fig. 1 shows the SC GAP landcover map and the location of Kingston Lake Watershed. Fig. 2 depicts Kingston Lake Watershed’s landcover as classified by SC GAP. GAP analysis maps are a “coarse-filter” approach intended to be used at a minimum scale of thousands of hectares (2001). Given the scale of these maps, using them for finer scale projects may result in a loss of accuracy with regard to landcover classifications. For example, the KLW sub-map shows an area to the southwest classified by GAP as salt-marsh. Creation of a more accurate habitat map will minimize error and provide a more accurate tool for watershed conservation parcel identification.

Fig. 3 Kingston Lake Watershed boundary overlaid on 1999 DOQQs. Figs. 3 and 4 demonstrate the development of a digital landcover shapetile. From digital aerial photographs (DOQQs) overlaid with the Kingston Lake Watershed boundary, polygons delineating surface features are digitized using Geographic Information Systems (GIS) software. Expert knowledge of various landcover-type color signatures, along with familiarity of topography and associated plant communities in an area allows for “remote sensing” or classification of an individual polygon’s landcover type. Ground-truthing, i.e. field site visits, provides verification of the classification ascribed to individual polygons.

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SC Dept. of Natural Resources GIS Data Clearinghouse. Accessed online March 13, 2007 at: https://www.dnr.sc.gov/pls/gisdata/download_data.login