The following has been extracted from an internal document we utilize for monitoring anadromous species on the Cape Fear River. It outlines our objectives and describes our sampling methods. Along with lock and dams 1-3 and Buckhorn Tailrace, it mentions sampling in the vicinity of Smiley Falls near Erwin. While we did make it up there a couple times and did collect a few American Shad this spring, we were unable to sample it weekly and did not include it in our results. We are hoping to pick this site up again next year.

Wildlife Resources Commission Striped Bass and American Shad sampling protocol for the Cape Fear River

Objectives: The primary objective is to determine relative abundance, hatchery contribution (only Striped Bass), and size, sex and age distribution of Striped Bass and American Shad to better understand each fishery and the impacts of current management strategies within the Cape Fear River. Secondary objectives are to 1) determine predation of Striped Bass and American Shad by Flathead Catfish *Pylodictis olivaris* during anadromous species sampling; 2) assist other state and federal agencies, academic universities and all other stakeholders in ongoing research and management.

Approach: Striped Bass and American Shad will be collected weekly in spring 2014 from the Cape Fear River at five proposed sample sites (Figure 1). A boat-mounted electrofishing unit (Smith-Root 7.5 GPP) will be used (1 dip netter) to capture fish. Directed sampling effort will begin in March, and end when spawning appears complete. A suite of environmental parameters will be measured at each sampling site including; surface water temperature (°C), dissolved oxygen, pH, and salinity. Sample sites will be established downstream of each lock and/or dam and at historical spawning grounds (i.e., Smiley Falls; Figure 1). To minimize size selection during sampling, fish will be netted as they are encountered. Actual electrofishing time (seconds) will be recorded for each sample site. Each site will be electro-fished for 30 minutes of pedal time.

Each fish collected will be measured for total length (mm) and weighed (kg). Sex will be determined for male and female fish by applying directional pressure to the abdomen toward the vent and observing the presence of milt or eggs. American Shad with no milt expressed will be classified as female. Striped Bass with no milt or eggs expressed will be classified as female or unknown depending on fish size. Striped Bass greater than 400 mm and not exhibiting milt are classified as females whereas Striped Bass less than 400 mm and not exhibiting milt are classified as unknown. Otoliths will be removed from a subsample of American Shad (target maximum of 5 fish per 10-mm length bin by sex), while scales will be removed from a subsample of Striped Bass (target maximum of 15 fish per 25-mm length bin by sex) on the left side of the fish between the lateral line and the dorsal fins for aging purposes. Fin clips will be collected from Striped Bass and archived for genetic analysis (parentage assignment) to evaluate hatchery contribution. Broodstock genotypes are available for annual stockings in the Cape Fear River since 2010.

Striped Bass and American Shad will be scanned with an Agrident AWR 100/200 PIT tag reader to document previously tagged fish and to prevent removal of sonic tagged individuals from concurrent studies. American Shad utilized for aging will receive an individual numbered zip tie under the operculum and through the mouth then placed in a cooler so otoliths can be pulled at a later date. American Shad not utilized for aging will be released untagged. Striped Bass will be tagged with individual numbered internal anchor tags and PIT tags as a cooperative effort with the ongoing North Carolina Division of Marine Fisheries Striped Bass tagging program and released. Any recaptured, tagged Striped Bass will be identified by tag number, and scales will be removed from the right side of the fish if the fish was tagged in a previous year. Illegible tags will be cut from the fish, and a new tag will be inserted. Recaptures from the current sample year will be recorded in the site capture unless the recapture occurred on the same day as tagging.

Relative abundance of American Shad and Striped Bass for each sample will be indexed by catch-per unit-effort (CPUE) and expressed as number of fish captured per hour (∑ fish collected/∑ hours of electrofishing effort) each week. To determine age, otoliths will be examined with a stereomicroscope and scales will be examined with a microfiche reader. Annuli on both structures will be counted by two independent readers. All American Shad otoliths will be read by two independent readers, while a subsample of 15 Striped Bass scale sets per 25-mm length bin per sex (as available) will be aged by a primary reader, and a 20% subset of scales (3 fish for every 25-mm size group by sex), at a minimum, will be aged by a second reader. Differences between readers will be resolved during a concert read to establish 100% agreement between readers. Proportions of each age class within each 10-mm (American Shad) or 25-mm (Striped Bass) length bin will be computed and expanded to the total number of fish collected within each length bin by sex. Mean lengths at age will be calculated for the entire sample. All field data will be collected and recorded utilizing a Trimble Yuma within an Excel spreadsheet. Data will then be imported into existing BIODE projects for further analysis.

Large catfish have been anecdotally collected during sampling for anadromous species and have been found to have foraged on American Shad. As a secondary objective to better understand predation rates of Flathead and Blue catfish on shad and Striped Bass, all catfish greater than 9.1 kgs (20 lbs) will be collected while electrofishing. The catfish will be identified to species, total length (mm) will be recorded and a visual assessment will be conducted to determine if the catfish has swallowed a shad or Striped Bass. Typically a shad or Striped Bass is large enough that if swallowed by a catfish, the tail will protrude out of the throat and be visible by looking into the mouth. Fish that obviously have eaten something but it is not visible from looking into the mouth may be gastric lavaged.

In 2014, Commission staff will assist NC State University in collecting American Shad to be implanted with sonic transmitters as part of a study to determine the effects of the rock arch ramp constructed at Lock and Dam 1 on fish migration. This effort will be conducted downstream of Lock and Dam1 (Rock Arch Ramp) and completed concurrently with primary sampling objectives. Data collected from these fish will be included in our dataset.

Location: Cape Fear River Buckhorn Dam tailrace, Smiley Falls, and the tailraces of Lock and Dams 1, 2, and 3 (Lee, Harnett and Bladen counties)

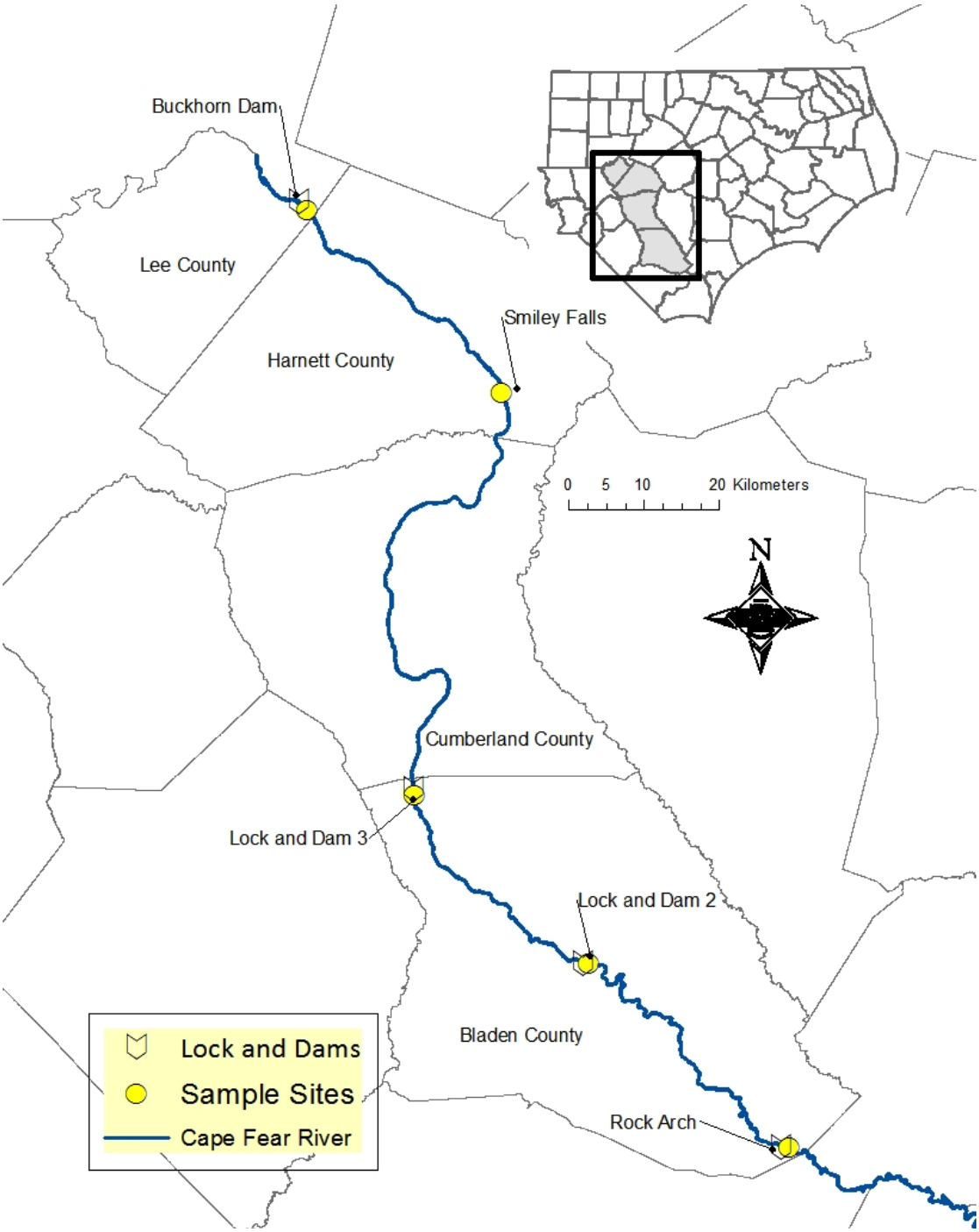

Figure 1.—Proposed electrofishing sample sites for 2014 Cape Fear River American Shad and Striped Bass stock assessment surveys.