

BIOFIDELITY ANALYSIS OF STREAM CLASSES IN NORTH CAROLINA

– 08/28/12 meeting update –

This document provides an update on the Biofidelity Project to evaluate the fidelity of aquatic biota to stream classification systems in North Carolina. Since the Ecological Flows Science Advisory Board meeting on June 20th, 2012, the following have been achieved, modified, or are in progress:

1. Increase in the number of sites included in the analyses:

Based on the results of the preliminary biofidelity analyses (analyses of the fidelity of benthic macroinvertebrates in 106 NHD+ catchments that were presented at the June 20th meeting), it became apparent that the number of records per stream type and the number of records per species are likely to confound or reduce the strength of the analyses. Therefore, the number of NHD+ catchments that will be included in the final analyses will be increased to a maximum of 1,073. This number represents the total number of catchments that meet “minimally altered” (1. benthic water quality condition is excellent, good, and good-fair and 2. drainage area between monitoring station and upstream source of flow alteration is twice the drainage area upstream of the alteration) criteria outlined during the June 20th meeting. The distribution of the 1,073 NHD+ catchments is presented in Table 1.

Table 1. Distribution of NHD+ catchments that will be included in the biofidelity analyses.

| Physiographic Region | Number of NHD+ Catchments |
|----------------------|---------------------------|
| Mountains | 520 |
| Piedmont | 429 |
| Coastal Plain | 124 |
| TOTAL | 1073 |

2. Aquatic Biota and datasets that will be included in the analyses:

The analyses will only examine the fidelity of benthic macroinvertebrates (NCDENR DWQ Benthic Macroinvertebrate dataset) and fish (NCDENR DWQ Fish Community, USGS NAQWA, WRC Trout, and WRC Diversity (Gameland Surveys) datasets). The Natural Heritage Program Inventory of aquatic biota will not be included in the analyses. This decision was made based on additional review of the dataset and concerns regarding:

- i. The dataset consists of observations from a large variety of sources, each with a different methodology and different set of objectives.
- ii. Records consist of single species observations, and therefore do not allow for community-based analyses.
- iii. Samples were not collected using a stratified or random sampling methodology throughout the state. Therefore, the physical distribution and apparent fidelity of a species may be a result of sampling being restricted to a single river or stream.

3. Comparison of EFS and McManamay river classifications using USGS gage and WaterFALL simulated hydrographs

We are currently in the process of determining the EFS and McManamay stream classes at each of the 185 catchments with USGS gages (gages used to produce the EFS classification system). These classes will be based on USGS gage and WaterFALL simulated data. Following the completion of the classifications, we will compare the USGS gage- and WaterFALL-based classes and the EFS and McManamay classification systems.