<table>
<thead>
<tr>
<th>WaterFALL Hydrologic Modeling</th>
<th>BIO-FIDELITY TEST HYDROLOGIC STREAM CLASSIFICATION</th>
<th>RTI INTERNAL RESEARCH &amp; DEVELOPMENT PROJECT</th>
<th>THE NATURE CONSERVANCY’S FOUR-BASIN ENVIRONMENTAL FLOW PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 30 to 40-year climate data</td>
<td>• 30 to 40-year climate data</td>
<td>• 30 to 40-year climate data</td>
<td>• 30 to 40-year climate data</td>
</tr>
<tr>
<td>• 2006 land cover</td>
<td>1. 30 to 40-year climate data, plus any flow alterations</td>
<td>1. 2006 land cover, plus any flow alterations</td>
<td>1. 2006 land cover, plus any flow alterations</td>
</tr>
<tr>
<td>• Minimize upstream flow alteration and water quality effects by site selection</td>
<td>2. Potential natural vegetation (PNV) or 1970 land cover, and no flow alterations</td>
<td>2. 1970 land cover and no flow alterations</td>
<td>2. 1970 land cover and no flow alterations</td>
</tr>
<tr>
<td>Flow Analysis</td>
<td>BIO-FIDELITY TEST HYDROLOGIC STREAM CLASSIFICATION</td>
<td>RTI INTERNAL RESEARCH &amp; DEVELOPMENT PROJECT</td>
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</tbody>
</table>
| • Stream Classification using EFS and McManamay systems | • Compare #1 to #2 for degree of flow alteration  
• Focus more on mid- and low flow metrics for water management | • Compare #1 to #2 for degree of flow alteration  
• Evaluate full range of flow metrics | |
| 1. 2006 land cover, plus any flow alterations  
2. Potential natural vegetation (PNV) or 1970 land cover, and no flow alterations | | | |
<table>
<thead>
<tr>
<th>Biological Data</th>
<th>BIO-FIDELITY TEST HYDROLOGIC STREAM CLASSIFICATION</th>
<th>RTI INTERNAL RESEARCH &amp; DEVELOPMENT PROJECT</th>
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</tr>
</thead>
</table>
| • Benthos, fish & Natural Heritage Program data  
• Individual species (RTI) and community-based analysis approaches (USGS-Tom Cuffney) | • Fish: up to 20 species from a “hydrology” guild  
• Guilds based on Persinger et al., 2010  
• Fish metric based on count | • Fish – similar guilds to RTI  
• Plus EPT, crayfish and mussels  
• Fish metric based on count |
<table>
<thead>
<tr>
<th>Sites</th>
<th>BIO-FIDELITY TEST HYDROLOGIC STREAM CLASSIFICATION</th>
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<tbody>
<tr>
<td></td>
<td>• Separate mountain, piedmont &amp; coastal</td>
<td>• ~600 sites associated with fish sampling data (NC Fish Community and USGS NAQWA)</td>
<td>• Cape Fear, Tar, Roanoke and Little Tennessee basins</td>
</tr>
<tr>
<td></td>
<td>• Filter eliminates sites with upstream flow alteration if total drainage area at the monitoring site is less than twice the total drainage area of the upstream alteration.</td>
<td>• Focus on sites with multiple samples over time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Within region, stratified by yes/no upstream flow alteration</td>
<td>• Greater detail on fewer sites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• For each region randomly select ~200 sites rated excellent to good-fair</td>
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<tr>
<td>Results</td>
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<td>---------</td>
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<td></td>
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<tr>
<td>BIO-FIDELITY TEST HYDROLOGIC STREAM CLASSIFICATION</td>
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<tr>
<td>• How well do the stream classes describe the spatial distribution of aquatic biota (i.e., a higher probability of a species or community being present in one stream class over another)</td>
<td></td>
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<tr>
<td>• Does the classification system need revision?</td>
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<tr>
<td>RTI INTERNAL RESEARCH &amp; DEVELOPMENT PROJECT</td>
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<tr>
<td>• Ecological response curves: x-axis = % flow alteration y-axis = fish metric based on species level count</td>
</tr>
<tr>
<td>• Uses space (multitude of sites with varying amounts of flow alteration) as surrogate for change in flow in (same site) over time</td>
</tr>
</tbody>
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<tr>
<th>Results</th>
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<tbody>
<tr>
<td>THE NATURE CONSERVANCY’S FOUR-BASIN ENVIRONMENTAL FLOW PROJECT</td>
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<tr>
<td>• Ecological response curves: x-axis = % flow alteration y-axis = fish metric based on species level count</td>
</tr>
<tr>
<td>• Uses flow changes over time from multiple samples</td>
</tr>
<tr>
<td>• Also will include descriptive analysis of basin conditions</td>
</tr>
<tr>
<td>Timeline</td>
</tr>
<tr>
<td>---------------</td>
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<tr>
<td>Complete by</td>
</tr>
<tr>
<td>9/30/12</td>
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