

# DWR Presentation: Options for a Path Forward

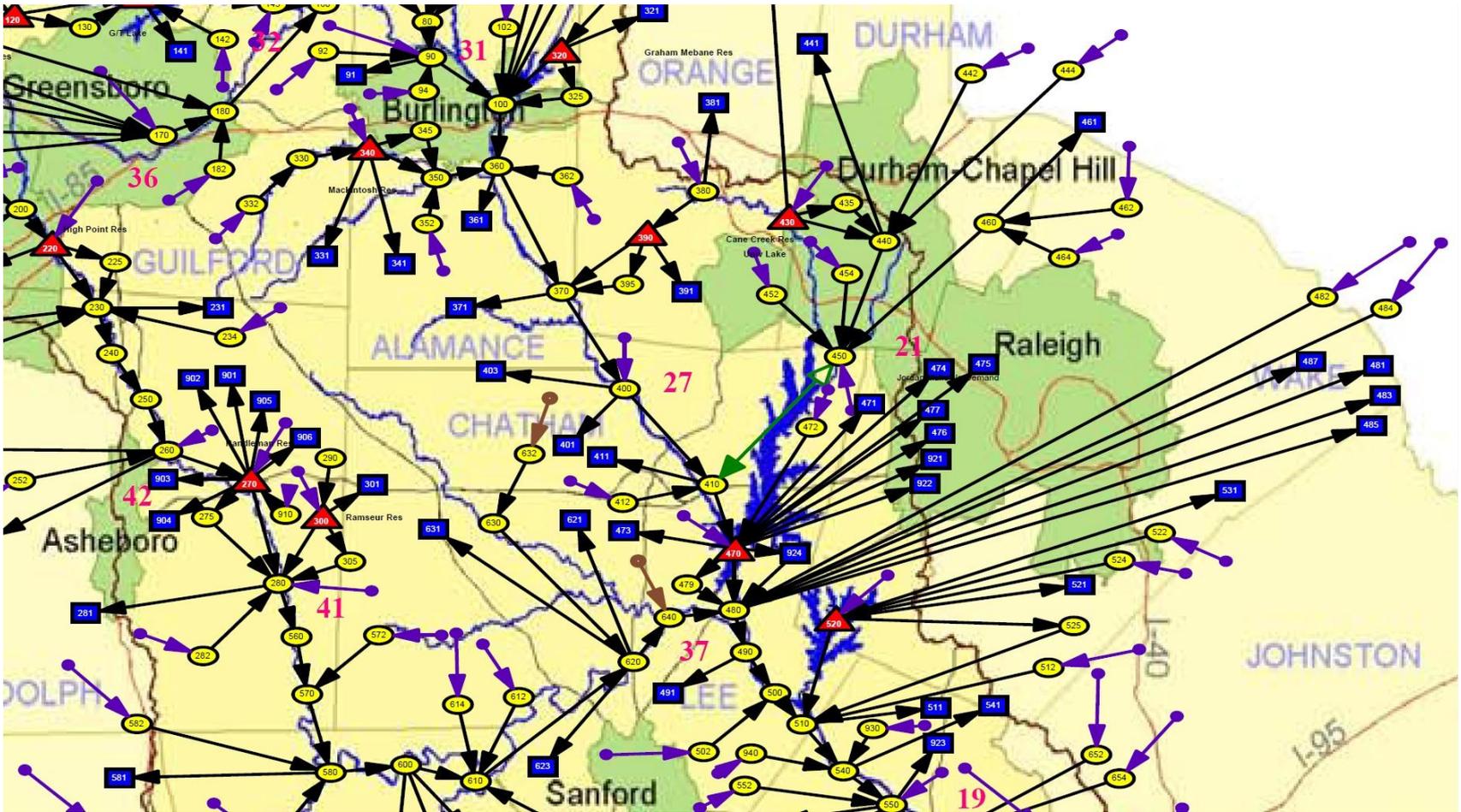
Fred Tarver

08-28-2012

# EFSAB Charge

- Identify flows necessary to maintain ecological integrity
- Characterize the aquatic ecology of different river systems

# OASIS Basin Model: What's the EF?

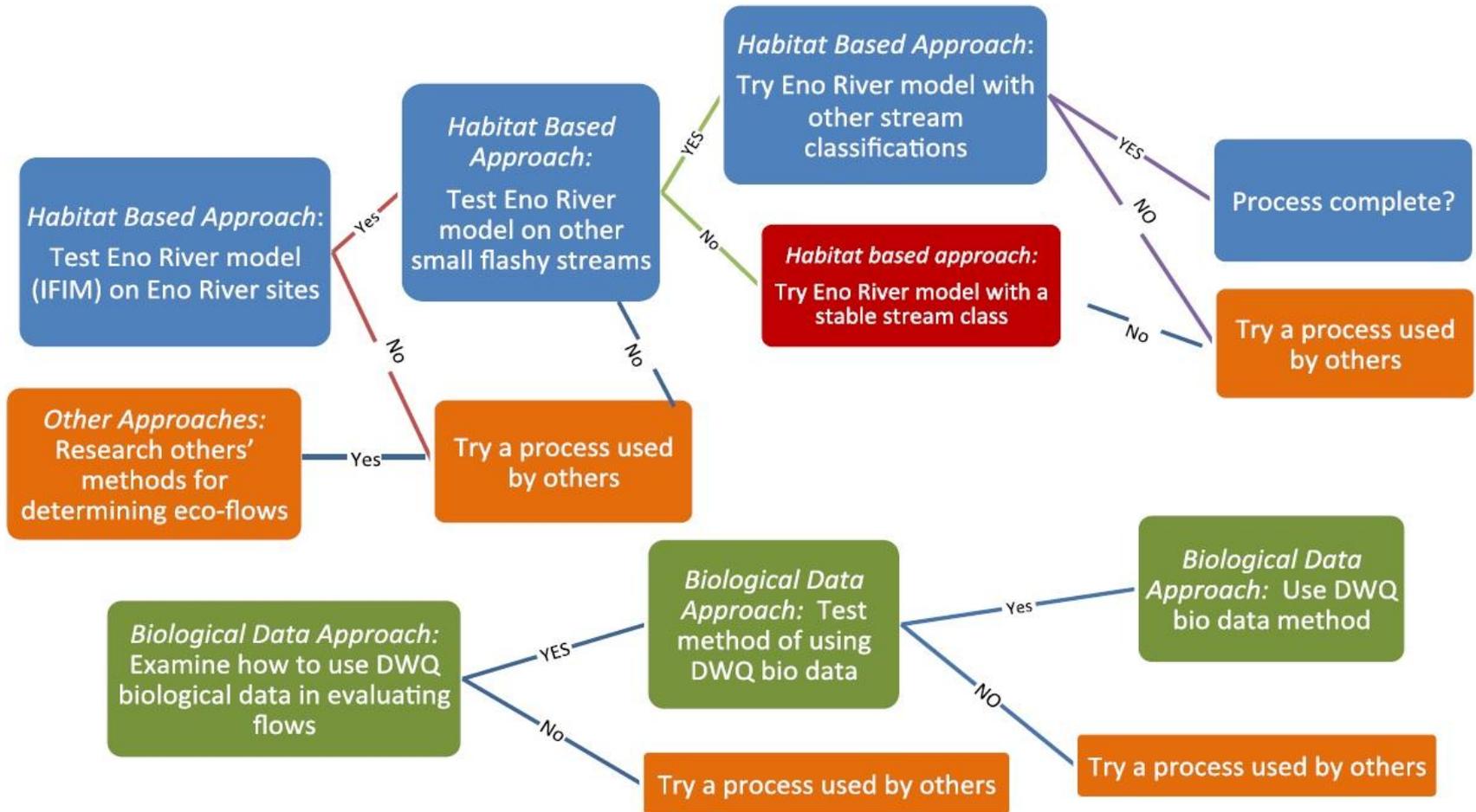


**Completion****Year****River Basin Hydrologic Models**

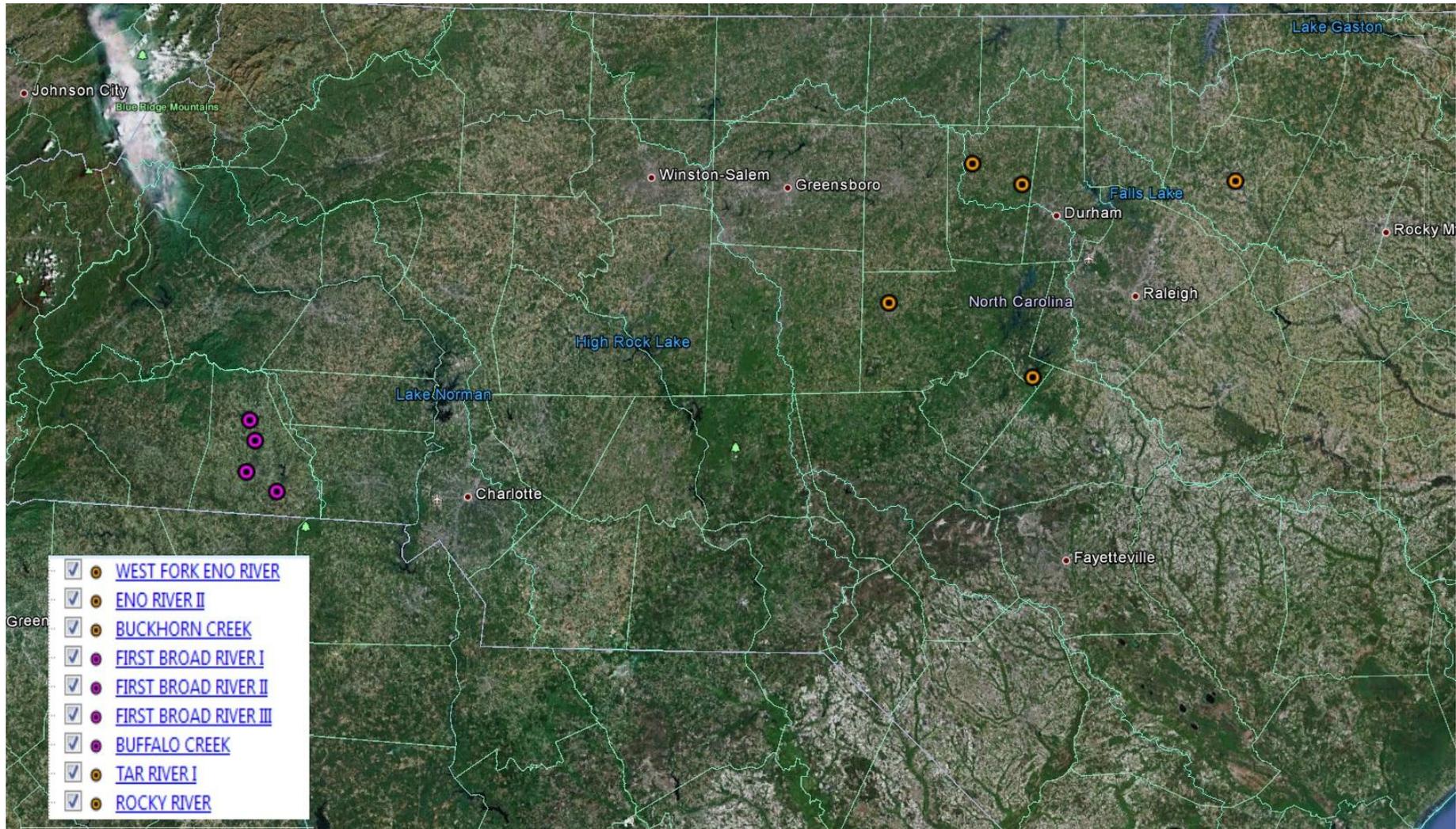
<b>2011</b>	<b>Tar and Broad</b>
<b>2012</b>	<b>Cape Fear, Roanoke and Neuse Updates</b>
<b>2013</b>	<b>Hiwassee and Little Tennessee</b>
<b>2014</b>	<b>French Broad and Lumber</b>
<b>2015</b>	<b>New and Watauga</b>
<b>2016</b>	<b>Catawba and Savannah</b>
<b>2018</b>	<b>Albemarle Sound, Chowan and Onslow Bay</b>
<b>2019*</b>	<b>Yadkin-Pee Dee</b>

\*The Yadkin-Pee Dee is scheduled for completion in 2019, but if the Federal Energy Regulatory Commission issues new licenses for the Yadkin and Yadkin-Pee Dee Hydroelectric Projects in that basin, priority for model development for the Yadkin-Pee Dee would be elevated and the basin model completed

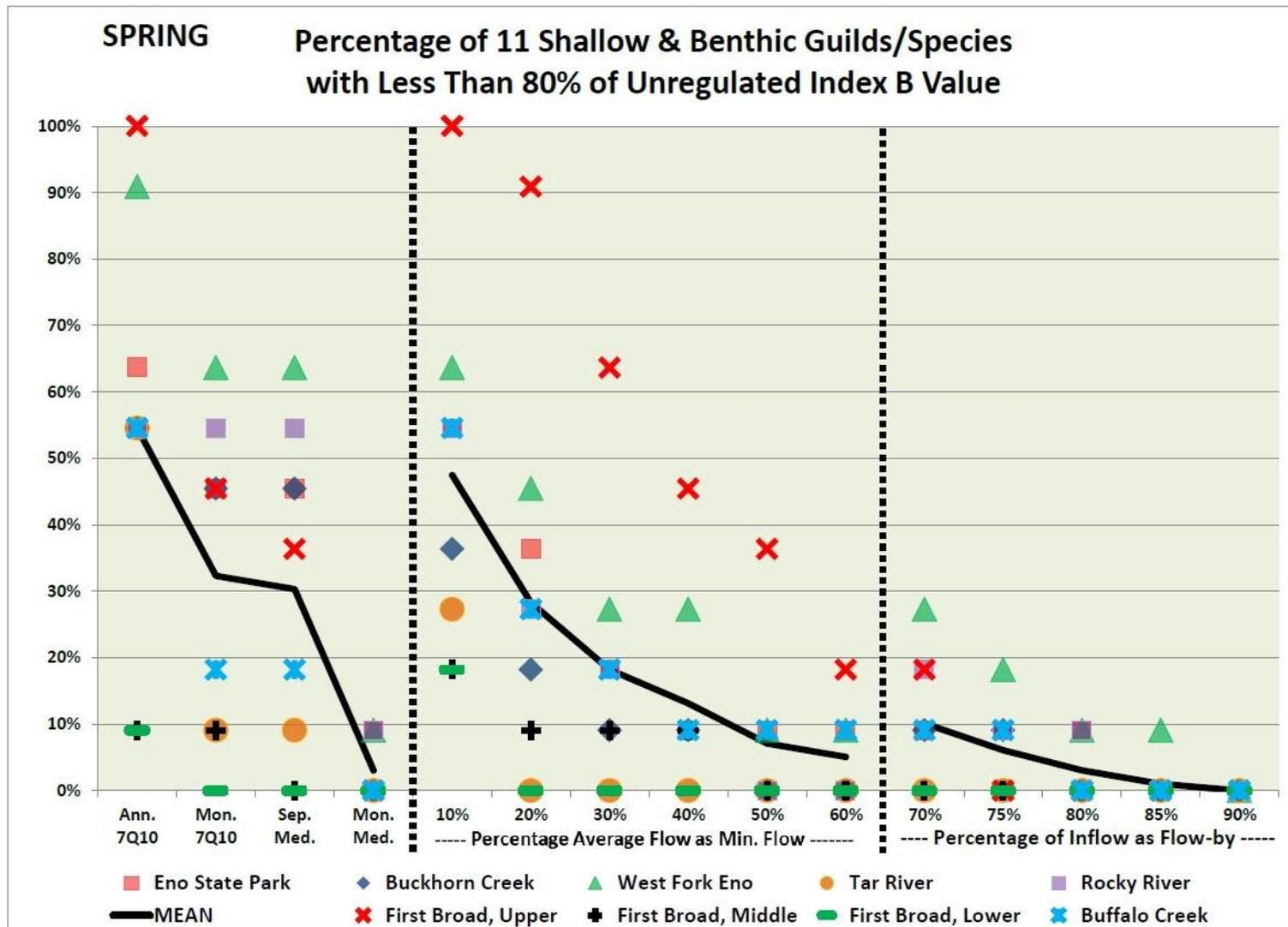
# Process chart: Evaluating methods to determine ecological flow



# Round 1: DWR PHabSim Sites in Basins with OASIS Model – Habitat Response x EFS Class



# Habitat Response To Flow Regimes Based on DWR PHabSim Sites



**NC Ecological Flows Science Advisory Board  
DWR Trial Balloon - April 24, 2012**

**Notes:**

- The approach(es) developed for determining ecological flows will be used as a screening tool in river basin models and plans.
- These models/plans will be used to assess water availability under current conditions and projected 20-year and 50-year water supply demands.
- Red flags raised by modeling/planning will allow water supply systems adequate time to plan for meeting future water needs.
- Specific project proposals and feasibility studies would still utilize site-specific studies to determine ecological flow needs.

**Trial Balloon:**

1. At this point in the work of the EFlows SAB, DWR is proposing that we focus on a smaller set of flow options for consideration. More analysis and review is needed before the SAB can consider a single ecological flow proposal.
2. The habitat modeling results have so far examined flow scenarios for habitat indices that are less than 80% or more than 120% of the habitat available under an unaltered flow regime. The differences between flow scenarios are less pronounced for results above the 120% threshold, and we propose that we focus on habitat results that are less than 80% of unaltered levels for future analyses.
3. Since the ecological flow approach(es) will be used as a screening tool for planning, it is preferable to establish criteria that if in error, are on the side of ecological flows that are slightly too high – a “false positive”. Ecological flow criteria that are too low (“false negatives”) are undesirable because if there is an error that is discovered during a site specific study for a proposed project, there would be much less lead time remaining for a water system to develop options to meet increasing water supply demands.
4. The table below indicates which of the 15 flow scenarios analyzed so far, by season, should continue to be evaluated.

**Trial Balloon 4-12-2012**

FLOW REGIME	Spring Apr-Jun	Summer Jul - Sept	Fall Oct - Nov	Winter Dec - Mar
<b>Minimum Flow</b>				
Annual 7Q10				
Monthly 7Q10				
September Median		KEEP	KEEP	
Monthly Median	KEEP	KEEP	KEEP	KEEP
<b>Percentage of Mean Annual Flow</b>				
10%				
20%		KEEP	KEEP	
30%		KEEP	KEEP	
40%	KEEP	KEEP	KEEP	KEEP
50%	KEEP	KEEP	KEEP	KEEP
60%	KEEP	KEEP	KEEP	KEEP
<b>Percentage of Inflow</b>				
70%	KEEP	KEEP	KEEP	KEEP
75%	KEEP	KEEP	KEEP	KEEP
80%	KEEP	KEEP	KEEP	KEEP
85%	KEEP	KEEP	KEEP	KEEP
90%	KEEP	KEEP	KEEP	KEEP



### BIO-FIDELITY TEST HYDROLOGIC STREAM CLASSIFICATION

### RTI INTERNAL RESEARCH & DEVELOPMENT PROJECT

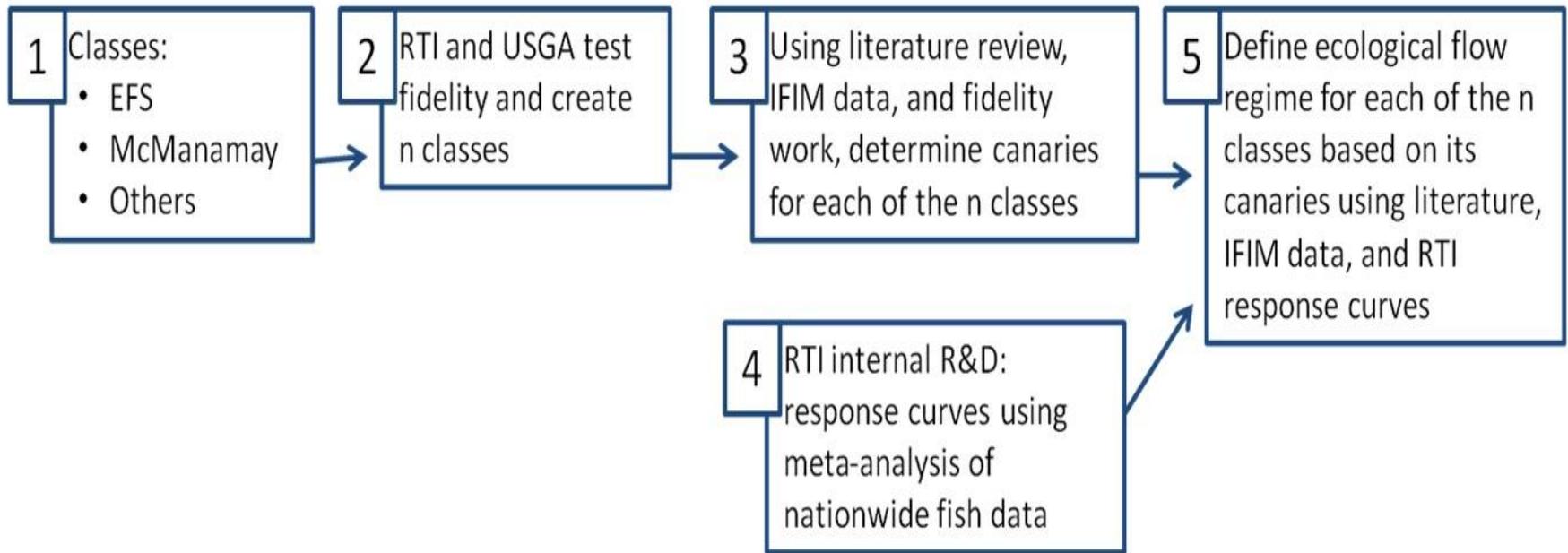
### THE NATURE CONSERVANCY'S FOUR-BASIN ENVIRONMENTAL FLOW PROJECT

#### Results

- 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)
- Does the classification system need revision?

- Ecological response curves:  
x-axis = % flow alteration  
y-axis = fish metric based on species level count
- Uses space (multitude of sites with varying amounts of flow alteration) as surrogate for change in flow in (same site) over time

- Ecological response curves:  
x-axis = % flow alteration  
y-axis = fish metric based on species level count
- Uses flow changes over time from multiple samples
- Also will include descriptive analysis of basin conditions



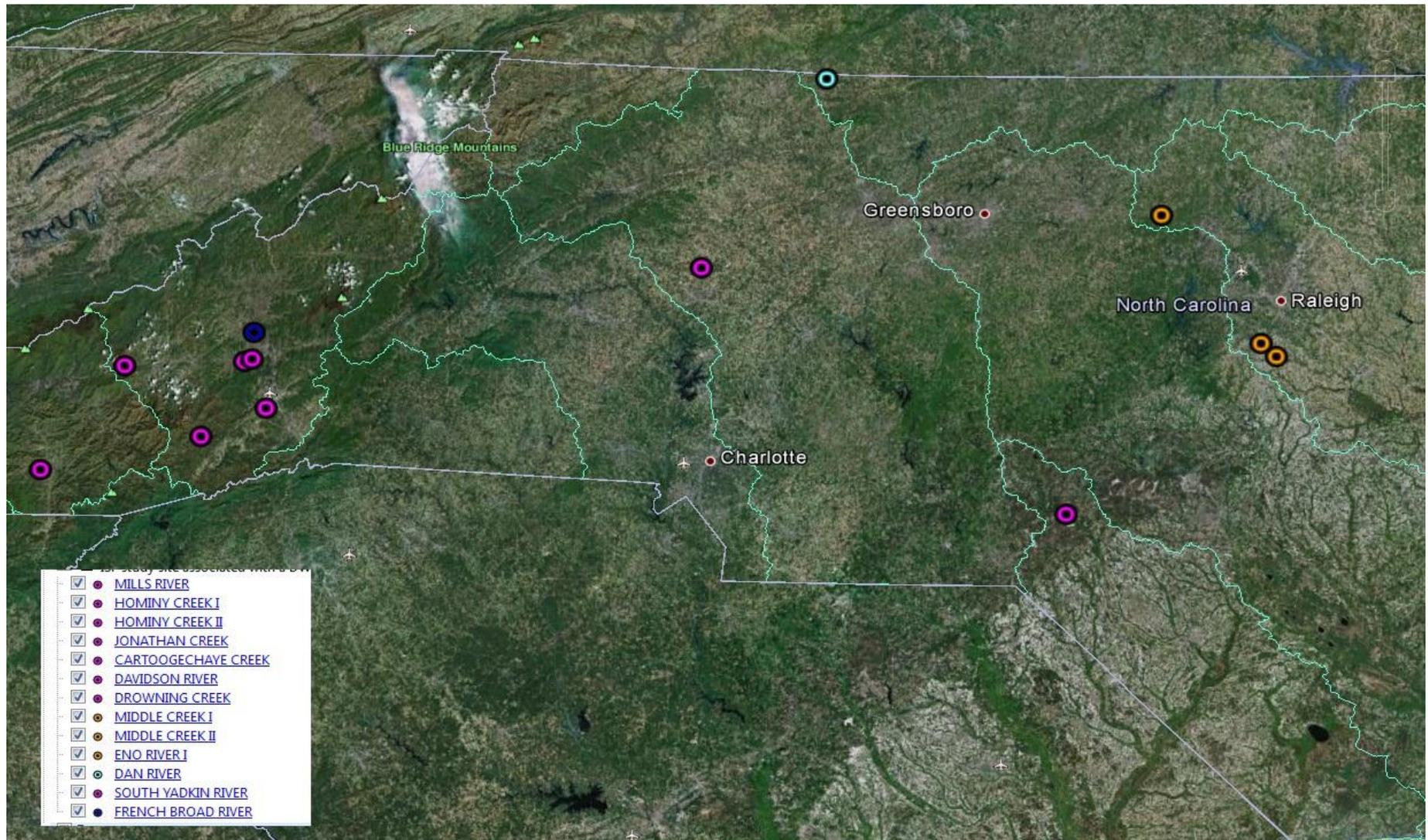
Process flow chart:

Box 2 is the multi step process we are talking about, including all of the RTI work and Tom's work.

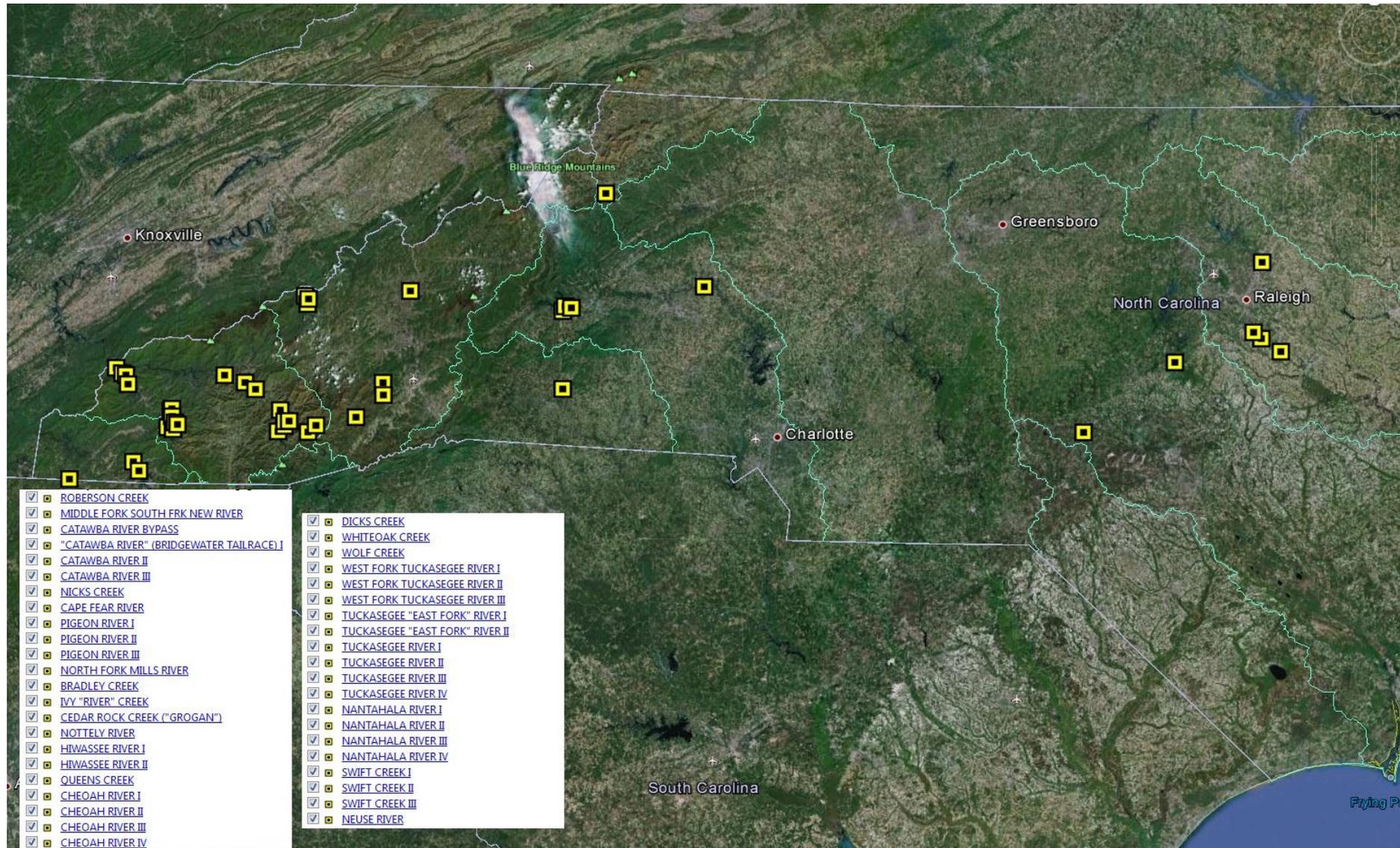
Box 3 and 4 begin the convergence of all the work

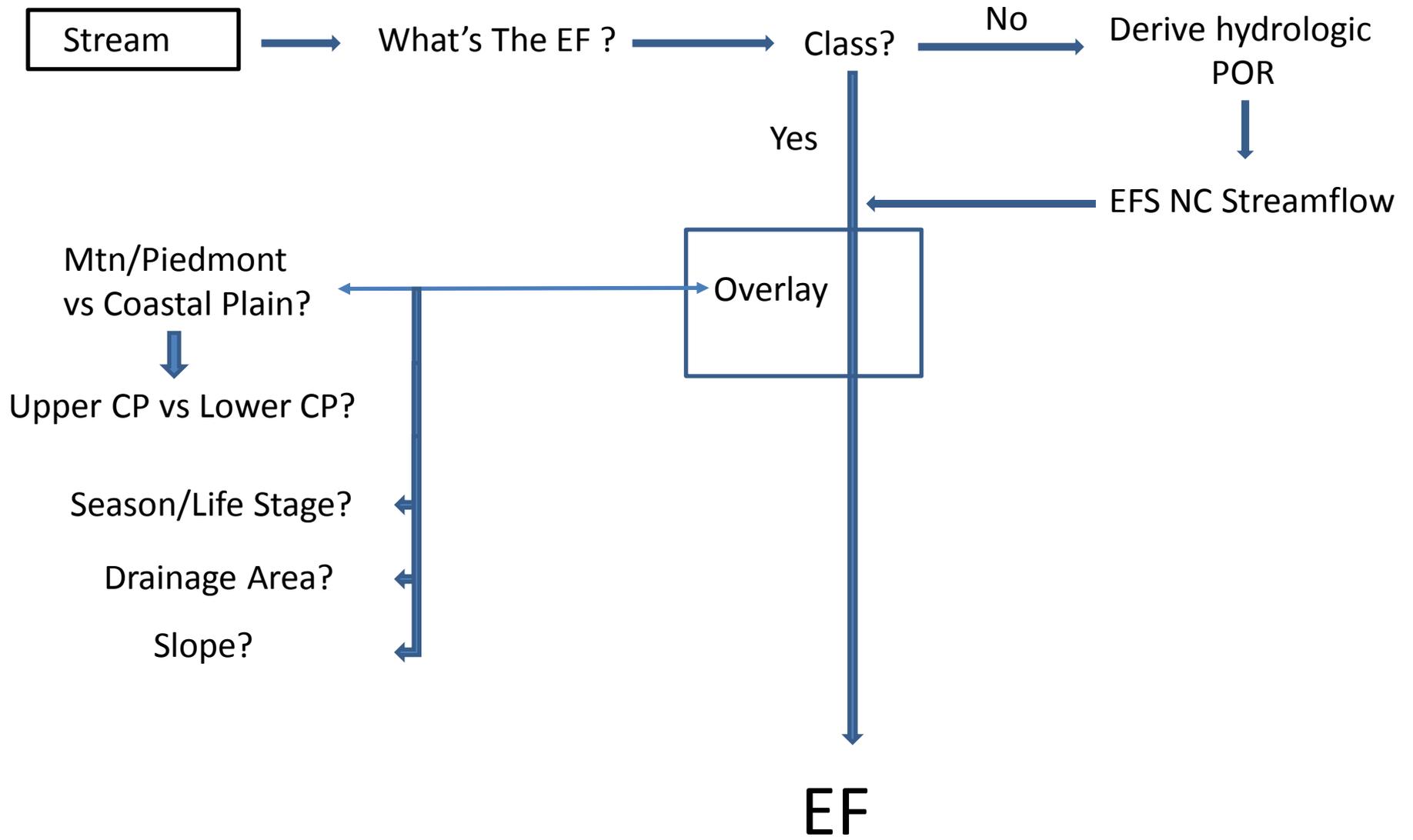
Box 5 is when we take all this and make decisions.

# Round 2?: DWR PHabSim Sites in Basins with No OASIS Model + ~Data Format Issues



# Round 3?: DWR PHabSim Sites in Basins with No OASIS Model & Class + Data Format Issues & Dam Alt.





# Process for Complexity

This is not exactly a linear process, but is often recursive. Step 1 is always first, and is usually repeated throughout.

- Together, gather information about the decision problem
- Together, define the decision problem: frame the issues to be resolved
- Specify what's important: specify interests and objectives
- Create imaginative options
- Evaluate the consequences of selecting any or all options
- Grapple with trade offs
- Clarify uncertainties
- Make recommendations

Agree on information to collect and how gaps or disagreements among technical sources will be handled. Allow stakeholders to build a shared understanding of technical and scientific issues and their implications for decision-making/recommendations. The process can also help resolve disputes about scientific and technical methods, data, findings and interpretations.

# Looking Forward

## October:

- Thomas Payne on Pros and Cons of Habitat Modeling
- Biofidelity Analysis of Stream Classes
  - If Biofidelity breaks down – what are next steps
- How Oasis and Waterfall interact; How Waterfall can server as a preloader?

## November: ?

## February:

- Introduce Conceptual Framework (Flow Chart)
- Outstanding Flow Studies of Habitat modeling runs (what will be possible with Oasis Model (run through). Transferability from Eno to other sites
- TNC Report out on results

# Additional Examinations? When?

- Implications of state/federal policy on e-flows (Threatened and Endangered Species)
- How WaterFALL interacts with Oasis; serve as a preloader.
- Coastal Issues
  - Specific ways to address coastal issues
  - Issues EFSAB will set aside (others to research)
  - Justify issues set aside