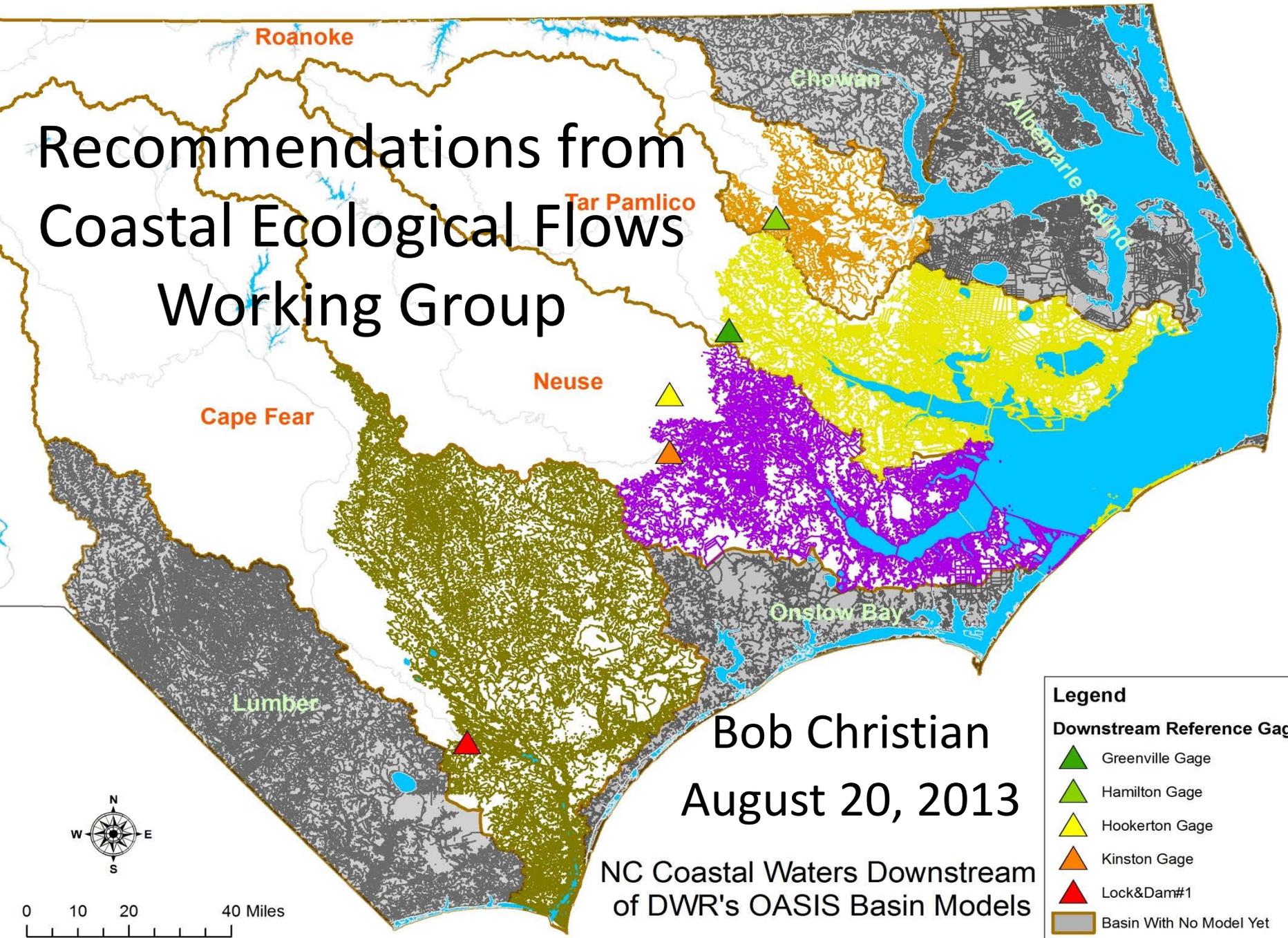


Recommendations from Coastal Ecological Flows Working Group



Roanoke

Chowan

Albemarle Sound

Tar Pamlico

Neuse

Cape Fear

Lumber

Onslow Bay

Bob Christian

August 20, 2013

NC Coastal Waters Downstream
of DWR's OASIS Basin Models

Legend

Downstream Reference Gage

- Greenville Gage
- Hamilton Gage
- Hookerton Gage
- Kinston Gage
- Lock&Dam#1
- Basin With No Model Yet



Working Group Membership

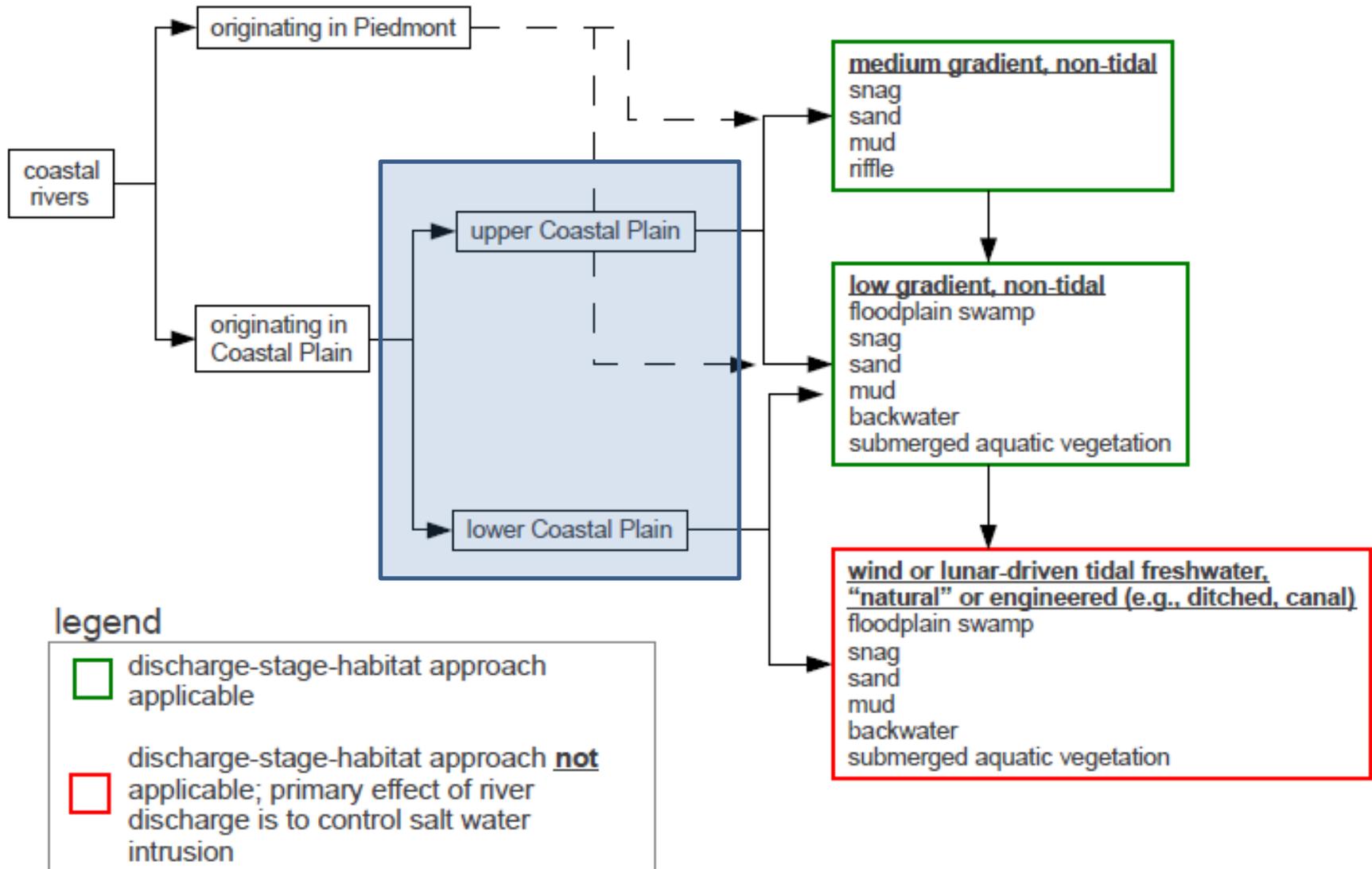
- Bob Christian ECU
- Eban Bean ECU
- Dean Carpenter APNEP
- Scott Ensign Aquaco Consulting
- Mike Griffin ECU
- Kevin Hart NC DMF
- Mike O'Driscoll ECU
- Mike Piehler UNC IMS
- Judy Ratcliffe Natural Heritage
- Fritz Rhode NOAA
- Bennett Wynne NC Wildlife Resources

- With aid of Stan Riggs and Dorothea Ames

Overall Objectives

- Assess applicability of previous coastal work
 - Other states
 - Greenville
- Develop stream typology
- Advance spatial modeling and mapping
- Establish relevant ecological and biological dependencies on flow
- **Develop frameworks for potential coastal EF criteria and protocols if possible**
- **Identify factors limiting EF protocols and needed research within coastal systems**

GEOMORPHIC TYPOLOGY AND ASSOCIATED IN-STREAM HABITATS



1st cut recommended designations

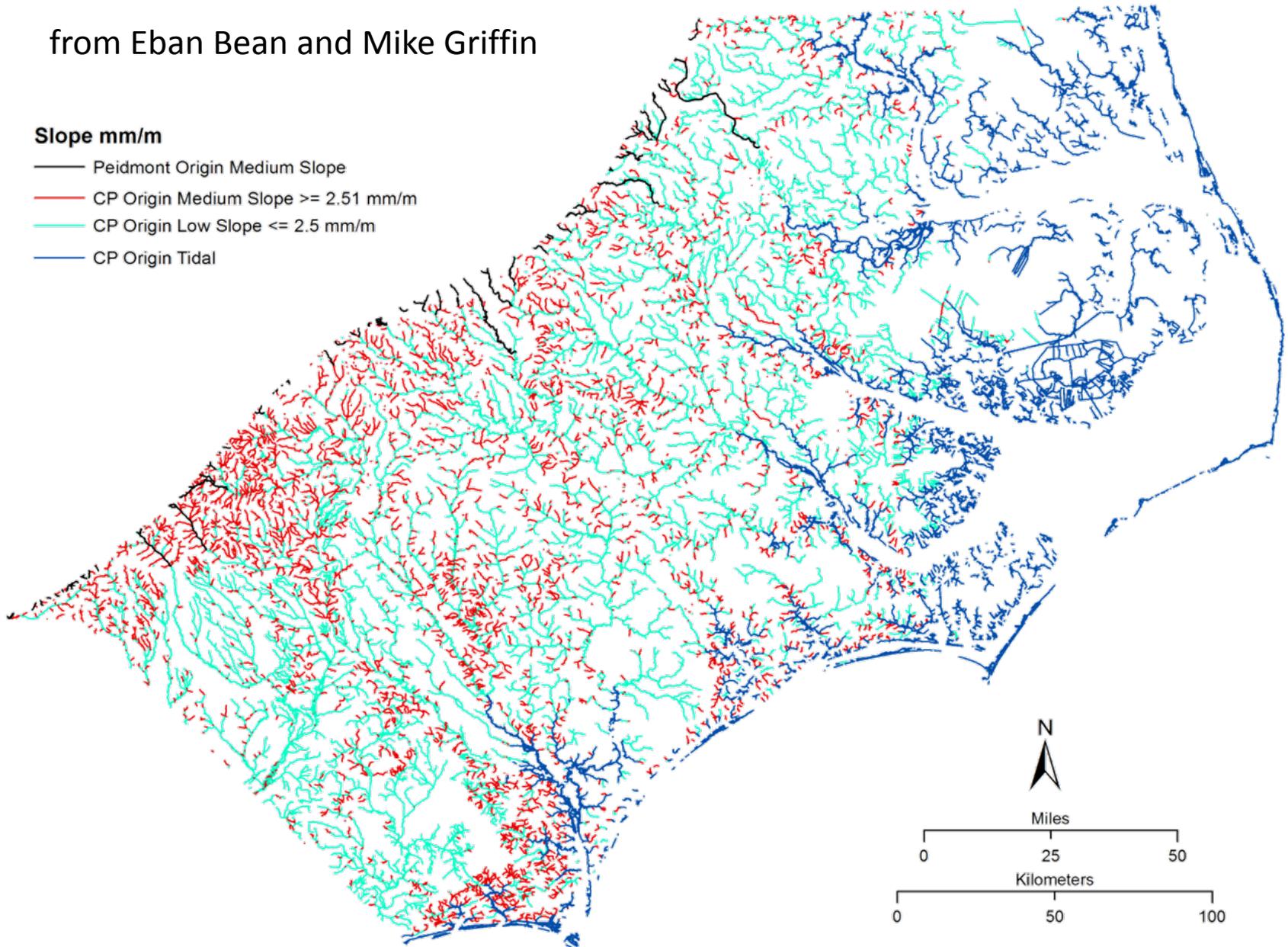
(Eban Bean and Mike Griffin)

- Origin by reach
- Evaluation of medium vs low slope cutoff
 - Medium =>2.51 mm/m
 - Low <= 2.50 mm/m
- Tidal effect is below 1 m elevation

from Eban Bean and Mike Griffin

Slope mm/m

- Peidmont Origin Medium Slope
- CP Origin Medium Slope ≥ 2.51 mm/m
- CP Origin Low Slope ≤ 2.5 mm/m
- CP Origin Tidal



Link of Stream Typology & Potential EF Determination

Origin	Slope	EF determinant			
		EFSAB extension	Discharge & Habitat	Downstream Salinity	Overbank Flow
Piedmont	Medium gradient	X	X	X	
Coastal Plain	Medium gradient	X	X	X	
Coastal Plain	Low gradient		X	X	X
Coastal Plain	Wind or tidal driven flow			X	X

Research Needs

1. Determine correspondence of known discharge patterns with nearby coastal plain stream flow, stage and floodplain inundation patterns.
2. Evaluate juvenile abundance indices vs. flow and salinity/conductivity.
3. Map salinity distribution across coastal plain.
4. Determine the upper-most extent of tidal influence across coastal plain.
5. Quantify stream typology classes.
6. Evaluate Roanoke slabshell and other mussel distributions and abundance as informative of salinity and flow patterns.
7. Determine hydrologic metrics and characteristics of coastal streams.
8. Determine reference flow regimes for each river basin.
9. Assess the balance of withdrawals from and discharges to coastal streams.