Aquatic Life in Intermittent Streams

And its Mitigation Implications

Stream Mitigation and EMC Rules

- 401 Certification and Isolated Wetland rules require stream mitigation that "provides for replacement of existing uses through mitigation…" [NCAC 2H. 0506 (b) (6) and 15A NCAC 2H. 1305 (c) (6).
- Present Policy – only require mitigation for perennial streams (>149 ft per project) (except ORW, HWQ, WS I & II and Trout waters) since DWQ was unsure whether intermittent streams have "existing uses".

Information Item

- Research over past four years has documented existing uses in intermittent streams.
- Purpose of presentation
  - Inform EMC of recent research
  - Inform EMC of permitting implication
  - Inform EMC of public input schedule

Stream Types in NC

- Ephemeral - Only has water during or just after rainfall.
- Intermittent - Has water for a significant part of an average year, but dry for part.
- Perennial - Has water (but not necessarily flow) all year.

Ephemeral Stream

Intermittent Stream

Perennial Stream

Study Characteristics 2002 - 2009

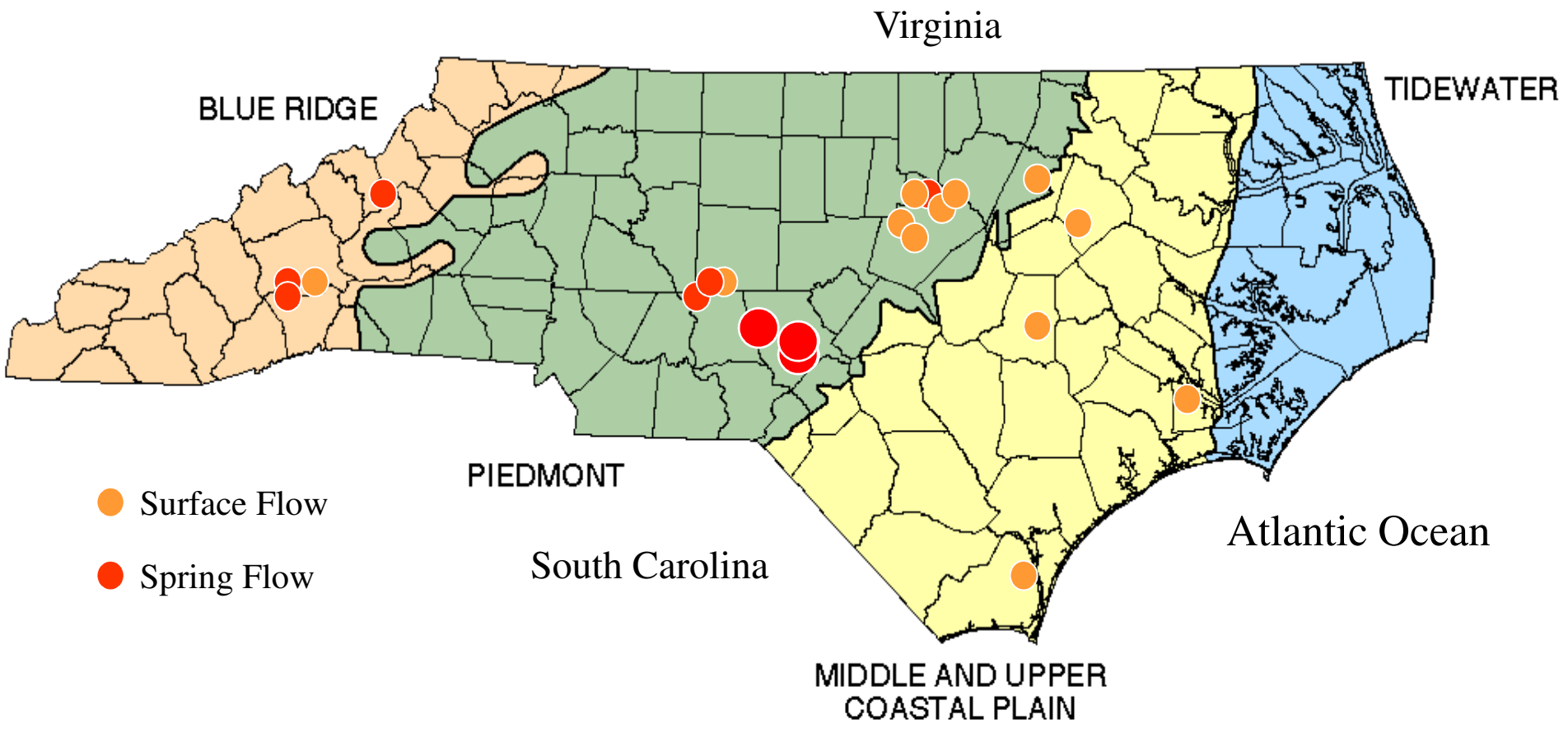
- 21 Streams within Parks or Forests in Mountains, Piedmont and Coastal Plain.
- All streams have been undisturbed for > 50 years

Site Locations

- MOUNTAIN
- Blue Ridge Parkway, Avery Co
- Bent Creek USFS Research Watershed, Buncombe Co.
- PIEDMONT
- Uwharrie National Forest, Montgomery Co
- BW Wells State Recreation Area, Wake Co
- Umstead State Park, Wake Co
- Schenk Forest NCSU, Wake Co
- COASTAL PLAIN
- Cliffs of the Neuse State Park, Wayne Co
- Weymouth Woods State Park, Moore Co
- Croatan National Forest, Craven Co
- Ev-Henwood Nature Preserve, Brunswick Co

STATE OF NORTH CAROLINA

Physiographic Provinces



NORTH CAROLINA CENTER FOR
GEOGRAPHIC INFORMATION & ANALYSIS

August 1997

50 0 50 100 Miles

N

Stream Assessment

- Each stream divided into 7-12 stream segments
- Each segment rated using NCDWQ Steam Classification Form by 2 people to identify stream type.
- Wells installed at each segment in Wake Co. and monitored weekly for 1 year

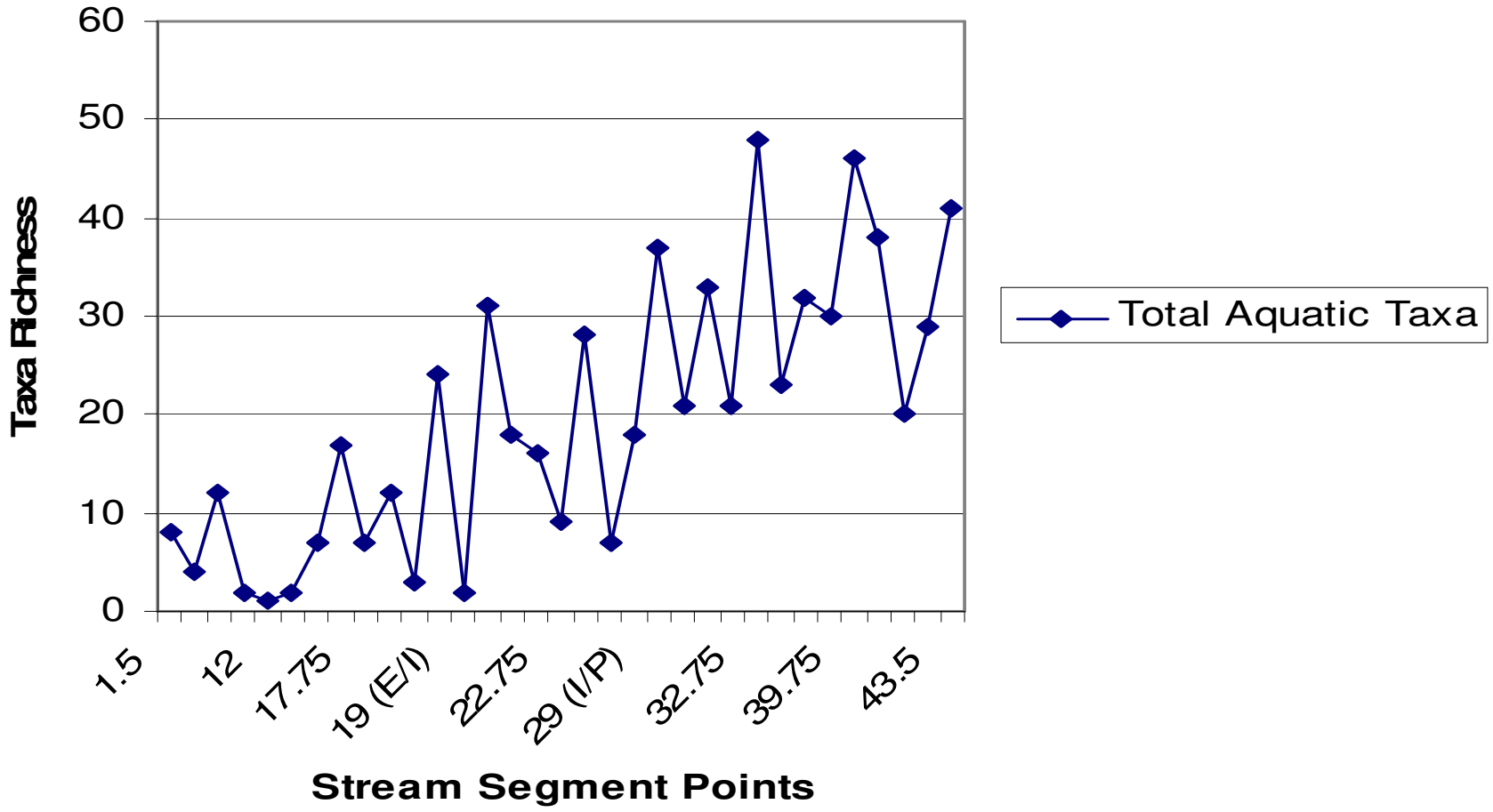
Sampling Design

For each stream, 4 biological samples were collected 3 times/yr (W/Sp/Su).

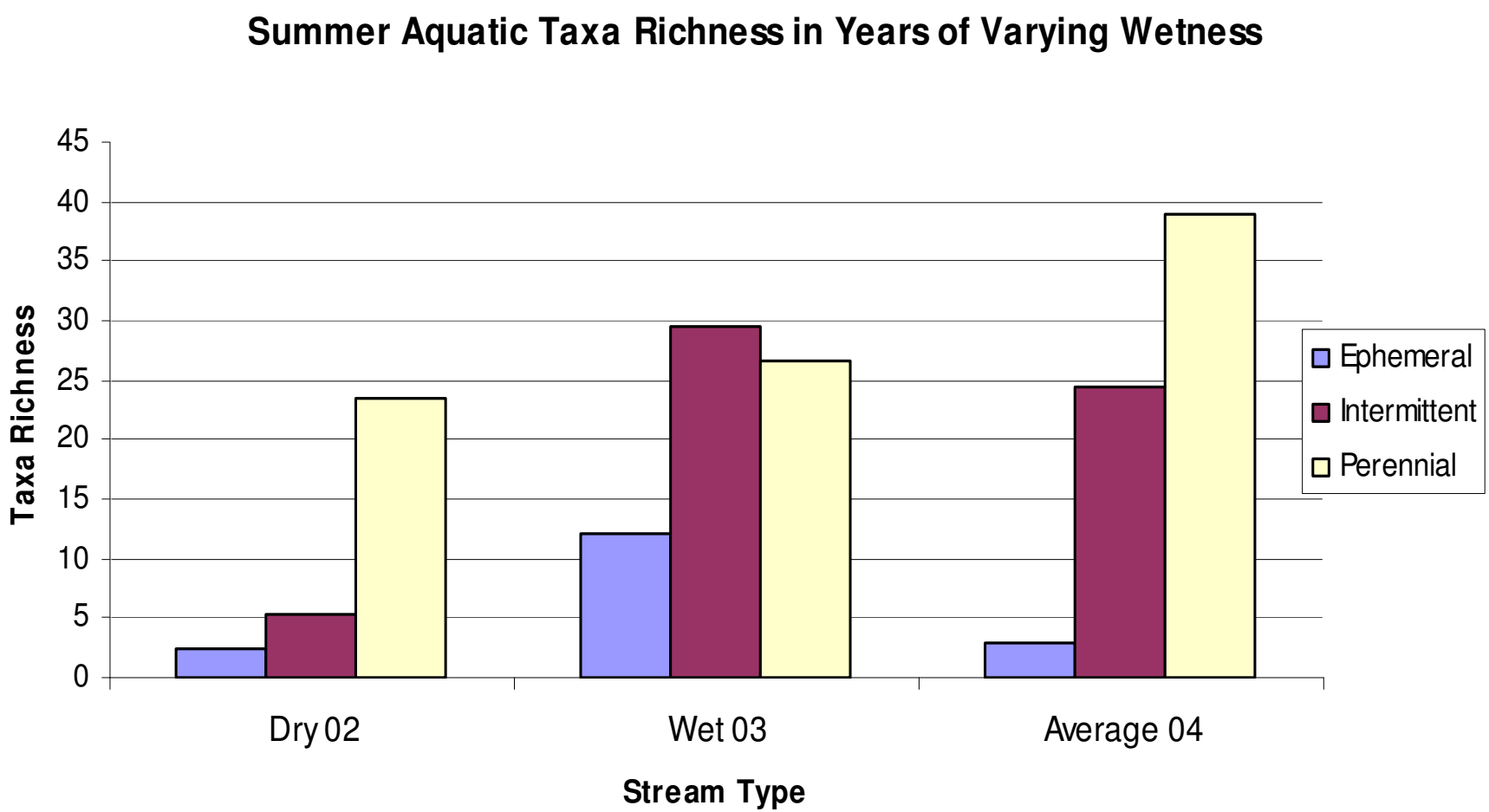
- 1 in Ephemeral reach (0-19 points)
- 1 in Intermittent reach (20-29 points)
- 2 in Perennial reach (>= 30 points)

  one sample was near top of reach (low 30s) and the other near bottom (high 30s - 40s)

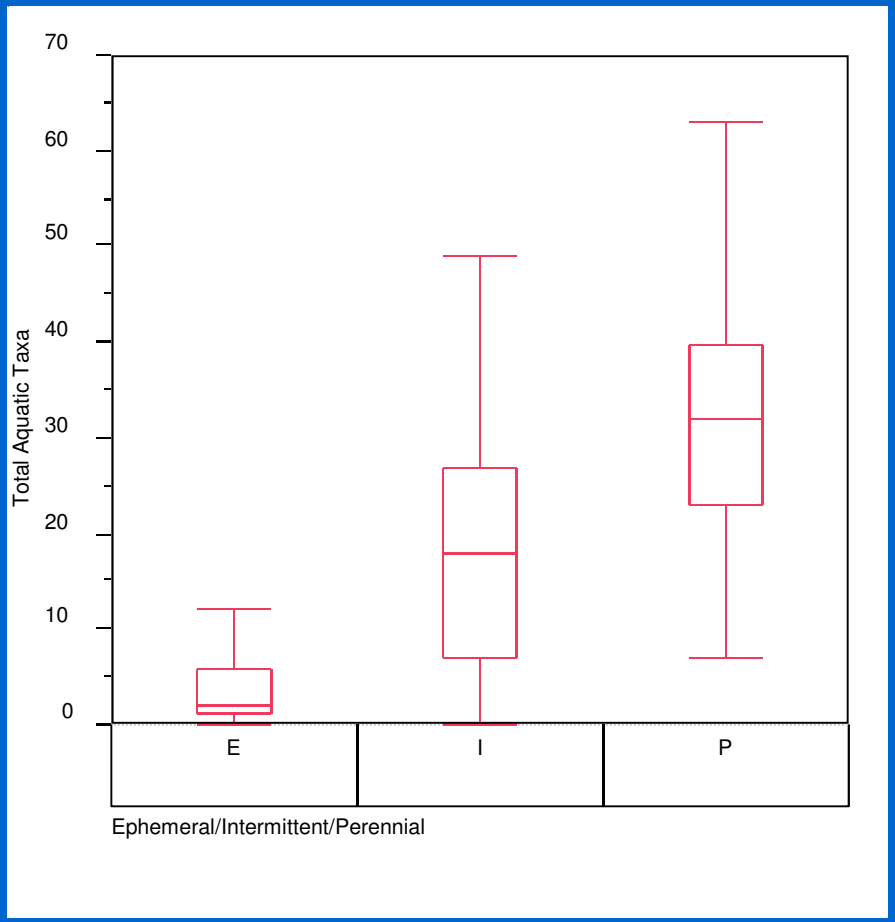
Results - Piedmont



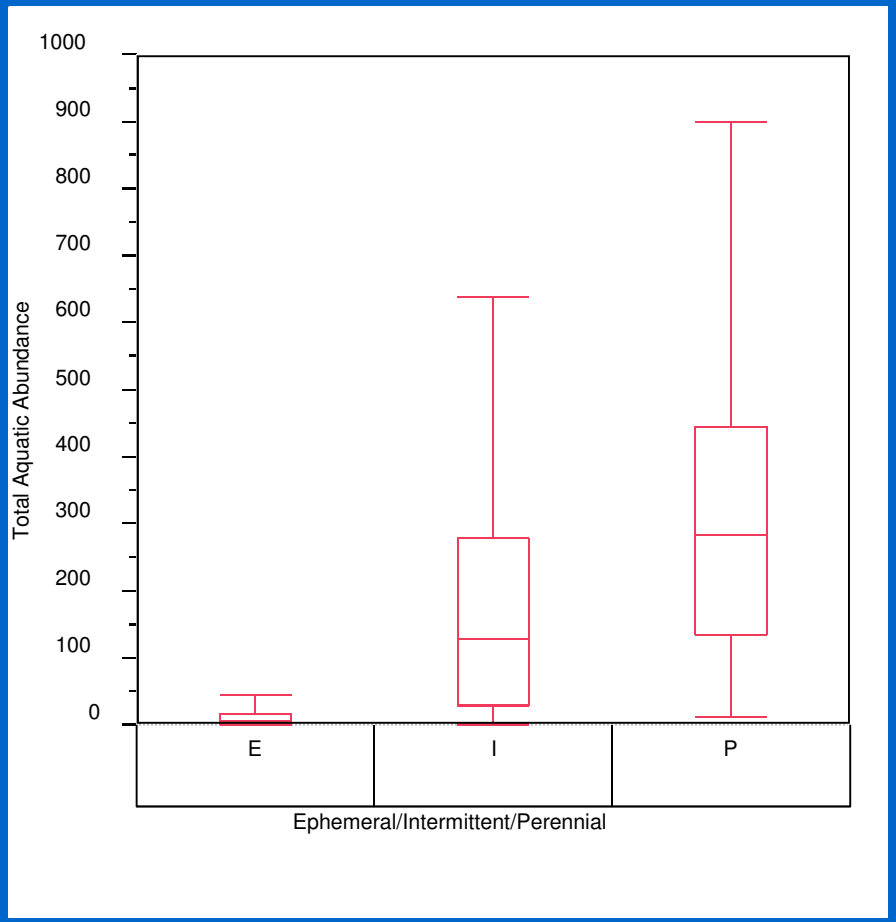
Summer Aquatic Taxa Richness by Weather



Total Aquatic Taxa All Ecoregions



Total Aquatic Abundance All Ecoregions



Aquatic Life Summary

	Aquatic Taxa	Aquatic Abundance
	Mt Pied CP	Mt Pied CP
Ephemeral	9 v 9 v 6	27 v 69 v 21
Intermittent	18 v 22 v 15	273 v 254 v 133
Perennial	37 v 34 v 32	452 v 338 v 205

Species in Ephemeral Channels

- Ants
- Earthworms
- Centipede
- Termite
- Weevil
- Terrestrial Beetles
- Terrestrial/Semi aquatic Midges

Species in Intermittent Streams

- Amphipods
- Isopods
- Winter Stoneflies
- Dyticsid Beetles
- Mosquito larvae
- Hemipterans – water boatmen, striders
- Diptera – midges and others
- Worms

Species in Perennial Streams

- Mayflies
- Caddisflies
- Non-winter Stoneflies
- Megalopterans
- Riffle Beetles
- Dipterans, especially midges
- Snails
- Fish, salamanders and large tadpoles

Biological Conclusions

Ephemeral Channel has 10-20% of the aquatic life of a Perennial Stream.

- Intermittent Stream has 50-70% of the aquatic life of a Perennial Stream.
- Paper to be submitted to JNABS pending coastal data.

Policy Decisions and Implications

- Policy Decision: There is significant aquatic life in Intermittent Streams for DWQ mitigation requirements, but not in Ephemeral Channels.
- Policy Implication: DWQ will propose requiring mitigation for impacts to Intermittent Streams above the existing linear threshold.
- Federal (EPA Corps) position: Consider Intermittent Streams to be Waters of the US (RPW or Significant Nexus). Most (all) Ephemerals not.

How Other States Handle Mitigation of Intermittent Streams

State	NC	SC	VA	GA	KY	TN	OH	OR
Treat Intermittent & Perennial same?	N	Y	Y	Y	Y	Y	Y	Y
Require Mitigation for Intermittent?	N*	Y*	Y	Y	Y	Y	Y	Y
Threshold (ft)?	150	0	300	0	@	@	@	@

*Determined by Corps for both Intermittent and Perennial

@Depends on functional value of resource lost

Historic Permitted Stream Loss after Mitigation

Year	% Impacted Streams that are not Mitigated
2000	50
2001	64
2002	58
2003	53
2004	55
2005	60
2006	46
2007	61
Average % Loss	**55**
Mean Annual Loss (ft)	**148,522 (28.1 miles)**

Proposed Policy

- Mitigation for intermittent at same rate as perennial (1:1)
- Mitigation for isolated streams at 2:1 as per rule (15A NCAC 2H .1305 (c))
- Not required for <150 ft impacts of intermittent and perennial streams
- Will accept perennial stream restoration for intermittent impacts or uncredited intermittent enhancement/restoration at existing projects.

Stream Impacts 2004 – 2005
(Data from DWQ, EEP, Corps)

–	Perennial Impact	% Mitigated	Intermittent Impact	% Mitigated
2004				
DOT	183,000	**76**	4,100	**0**
Others	43,000	**40**	19,100	**40**
2005				
DOT	69,300	**78**	10,900	**38**
Others	68,800	**80**	37,000	**97**

Who Is Affected?

- DOT Approx. 1 mi mitigation annually in addition to current 11-20 miles mitigation (<10% increase)
- Private sector already pays for 75% impacts. >1 mi additional mitigation annually.

Public Review/Comment Process

- Met w/ DOT staff 1/18/08
- Meet w/ EEP staff 2/4/08
- Present to WQ comm 11/12/08
- Public Notice (60 days) Nov - Dec 08
  - With Position Paper
- Address Comments Jan – Feb 09
- Final Policy April 09?