Compensatory Stream and Wetland Mitigation: An Evaluation of Regulatory Success

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USEPA Wetland Program Development Grant

Grant for three years (2006-2009)

- Three staff positions for 401 compliance (ROs)
  - Assess compliance with conditions in 401 permits
- Two staff positions for mitigation compliance (CO)
  - Assess compliance with 401 permit mitigation requirements

Federal Highway Administration (FHWA) Process Review (1995)

- Process Review Team
  - FHWA, USACE, USFWS, NCDEHNR and NCDOT
- Evaluated mitigation for highway projects
- Selected convenience sample of seven
  - Permits issued 1986-1992
  - Reviewed permits, plans
  - On-site inspections
- Evaluation asked two questions:
  1) Is site a jurisdictional wetland?
  2) Is site the type of wetland designed?
- Of five sites reported, only one (20%) was successful

Results of 1995 FHWA Process Review

Site	Target WL Type/ Treatment	Wetland? (Y/N)	Wetland Target Type (Y/N)	Success? Y/N
Sneads Ferry	Marsh/ Restoration	Y	Y	Y
Evans Road	BLH[1]/ Creation	Y	N	N
Pridgen Flats Bank	Pocosin/ Restoration	Partial	N	N
US 52 Bypass	BLH[1]/ Rest. & Creat.	Y	NA[2]	N
US 70A	BLH[1]/ Restoration	Partial	N	N

[1]BLH = Bottomland Hardwood

[2]The reason for NA under the Wetland Target Type is unknown

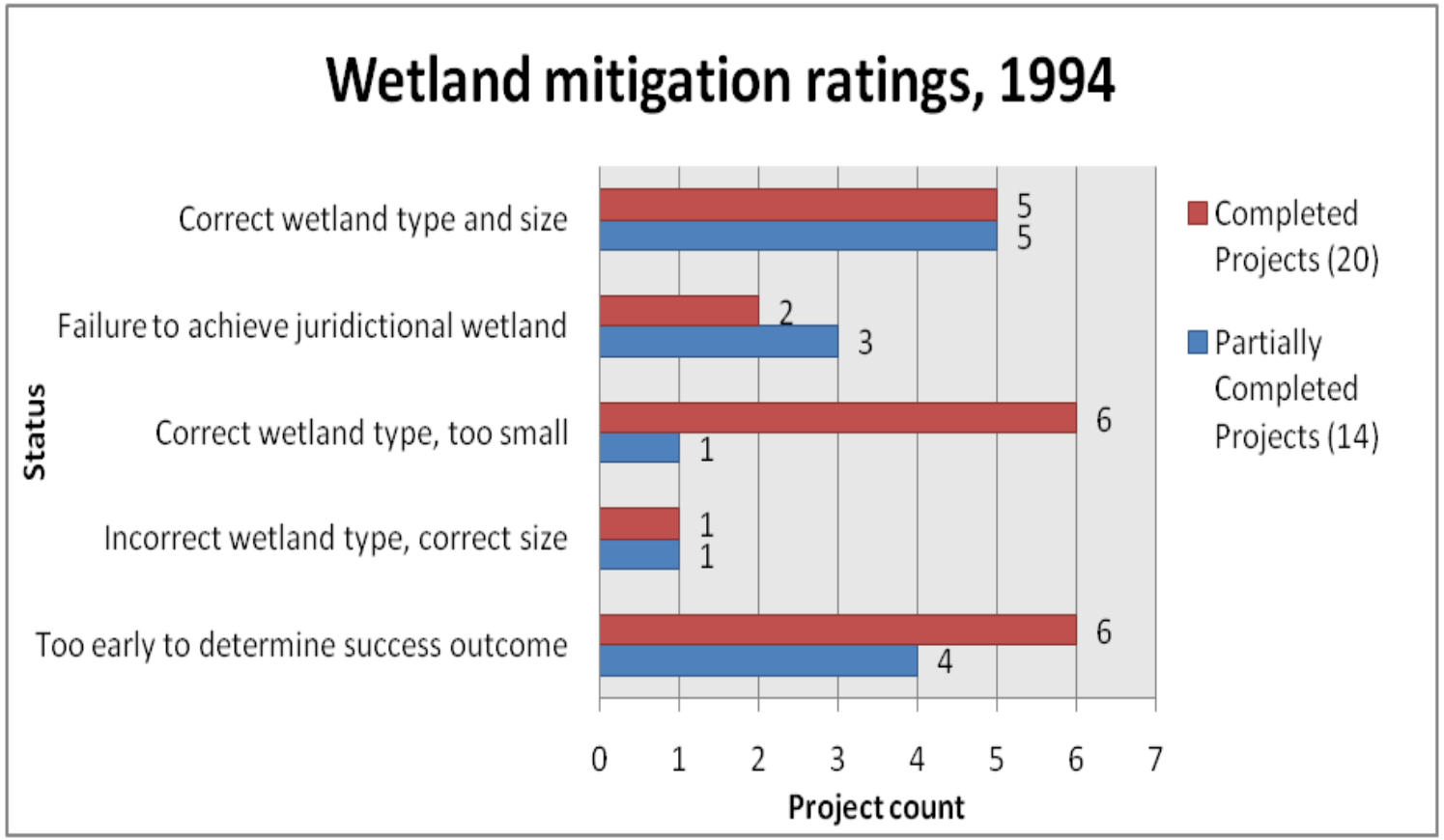
Source: FHWA (1995) Process Review

An Evaluation of Wetlands Permitting and Mitigation Practices in NC

(Pfeifer & Kaiser, 1995)

- 59 permits (82 mit. "actions") reviewed
- Permits issued between 1/91 and 12/93
- 41 projects visited
- 20 projects completed, 14 partially completed
- Same questions asked as previous study
- Also considered target wetland size
- Of 24 projects, only 10 (42%) were successful

Results of Pfeifer & Kaiser Evaluation



Source: Pfeifer and Kaiser (1995)

2006 Implementation Grant Tasks

- Compile and organize mitigation files
- Develop and populate mitigation database
- Develop site inspection forms
- Establish target population for study
  - Projects permitted 1/96 – 12/06

2006-2007 Implementation Grant Tasks

- Determine app. sample size (95% conf.)
- Stratify by proportions
  - Mitigation providers
- Select sample sites (random number gen.)
- Determine sites not evaluated
  - Duplicates
  - Not mitigation projects
  - Projects not constructed yet
  - Projects constructed recently (<1-2 yrs. old)

By the Numbers…….

Population

- 130 wetland sites
- 193 stream sites

Sample Size

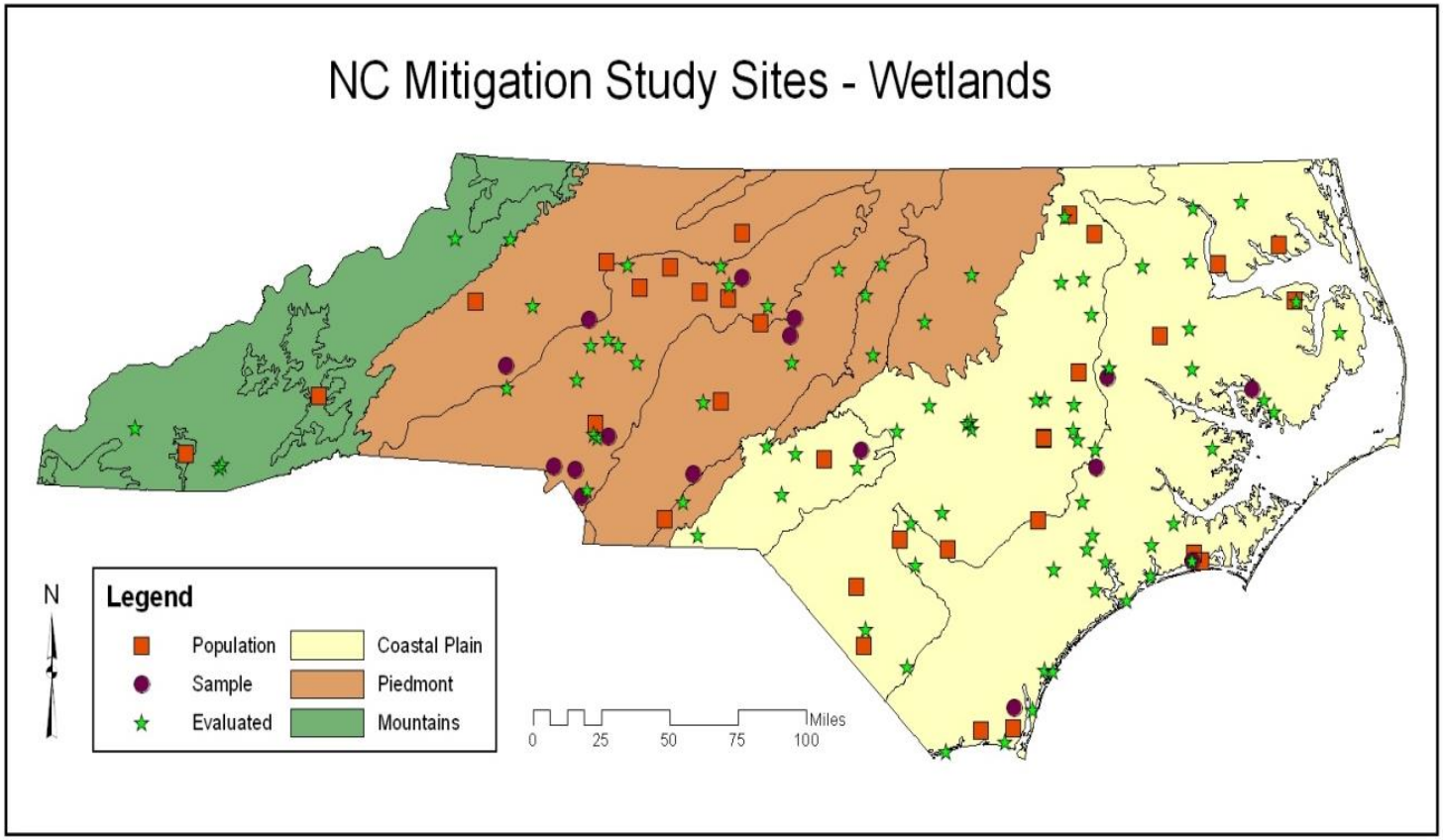
- 98 wetland sites
- 129 stream sites

After removal of sites not evaluated…..

Final Numbers - Wetlands

82 Wetland Sites

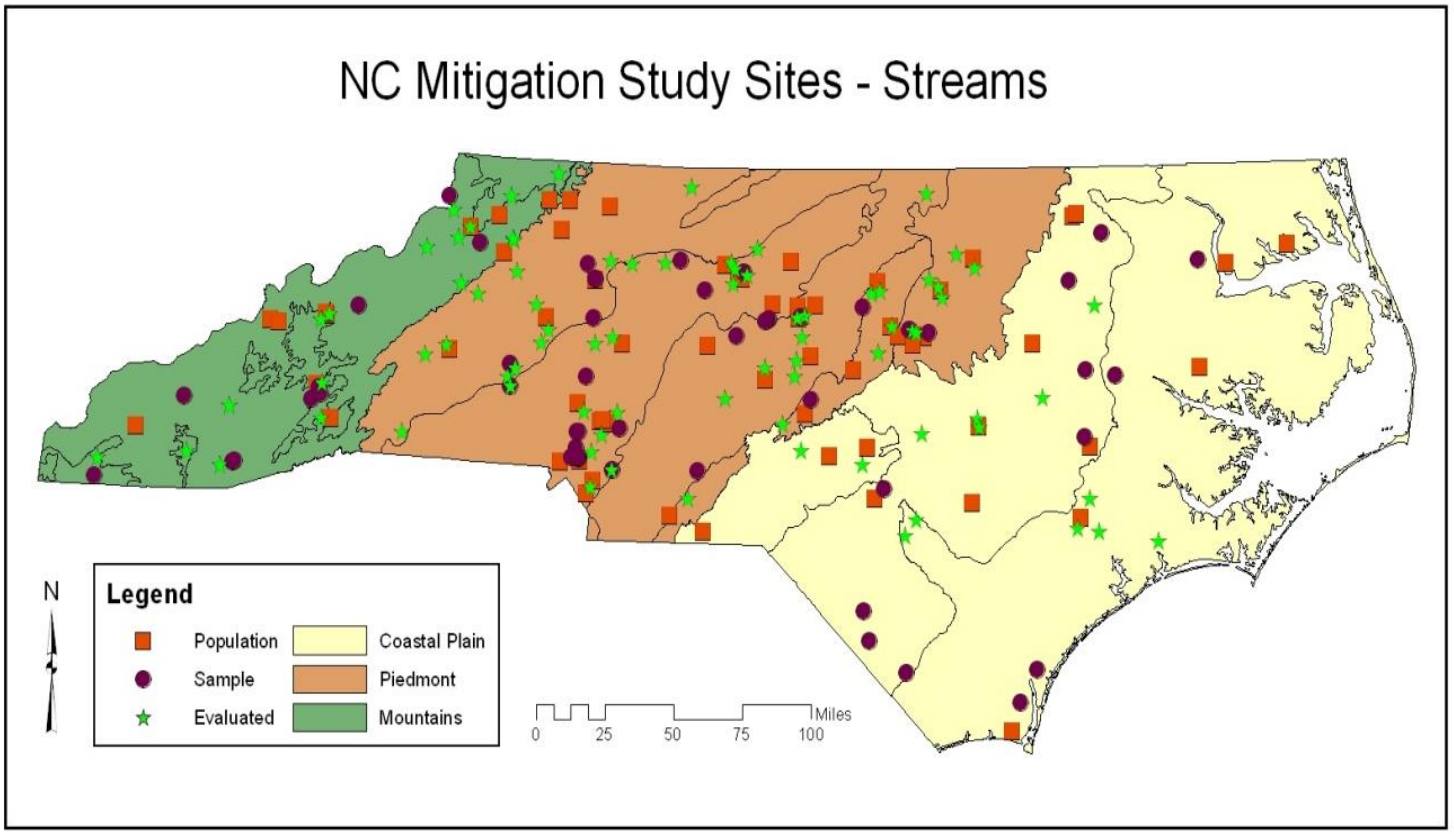
- 205 components; >20,000 acres



Final Numbers - Streams

79 Stream Sites

- 136 components; ≈600,000 linear ft



"Regulatory" Success

- Problem: Defining "Success"

- Decision: At the time of the site visit, the site was meeting the success criteria approved in the original restoration plan

Overall Success Rates

Mitigation Components (numbers)

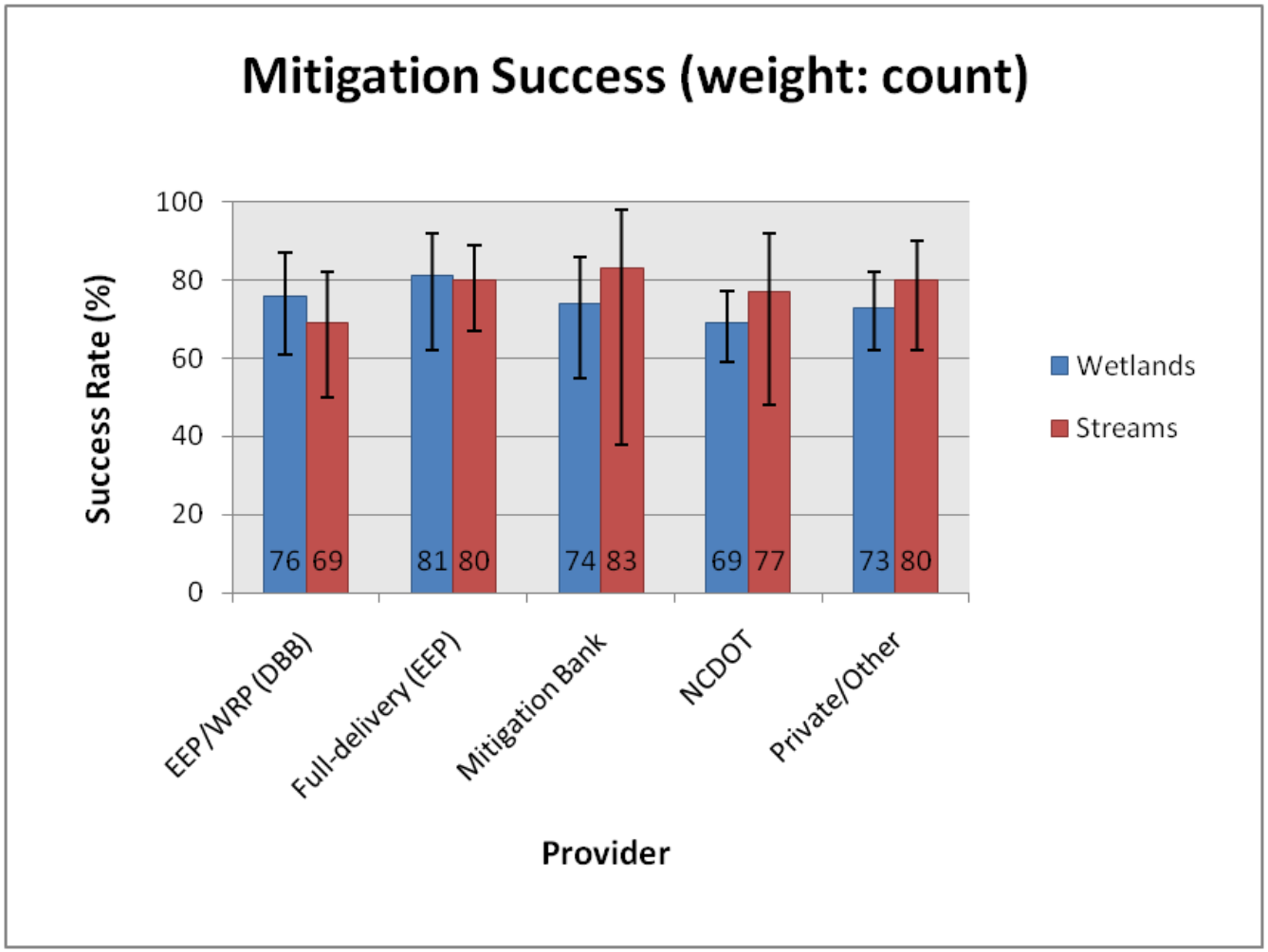
- Wetlands 74% (70% excluding P)
- Streams 75% (74% excluding P)

Mitigation Area or Length (size)

- Wetlands 70% (64% excluding P)
- Streams 84% (75% excluding P)

Success Rates by Provider

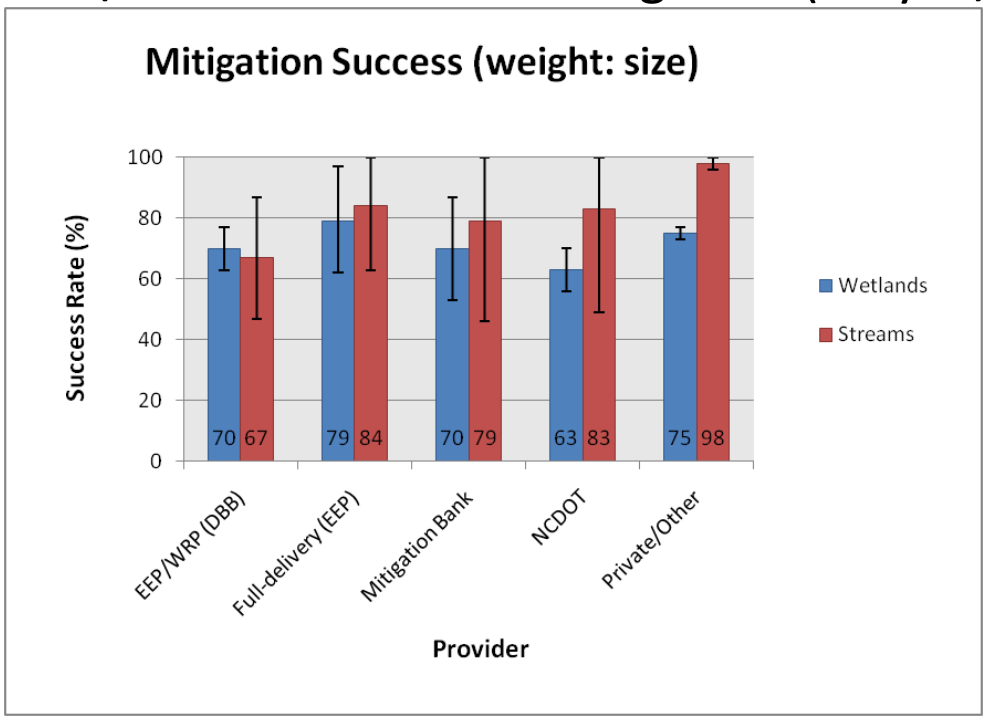
By component counts: No significant difference



Success Rates by Provider

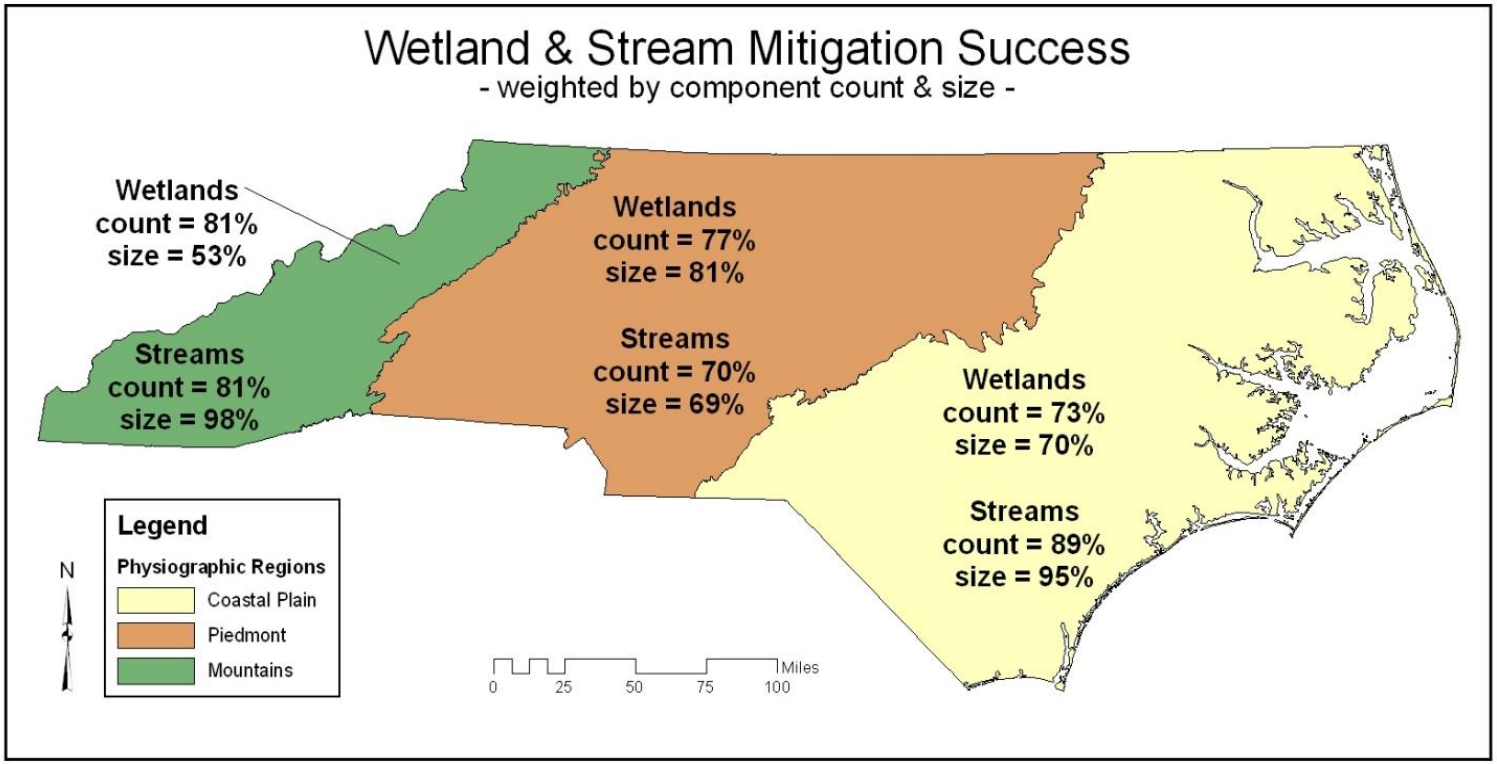
By size, private mitigation had a statistically significantly higher success rate than:

- NCDOT off-site wetland mitigation
- EEP/WRP DBB stream mitigation (only w/ P included)



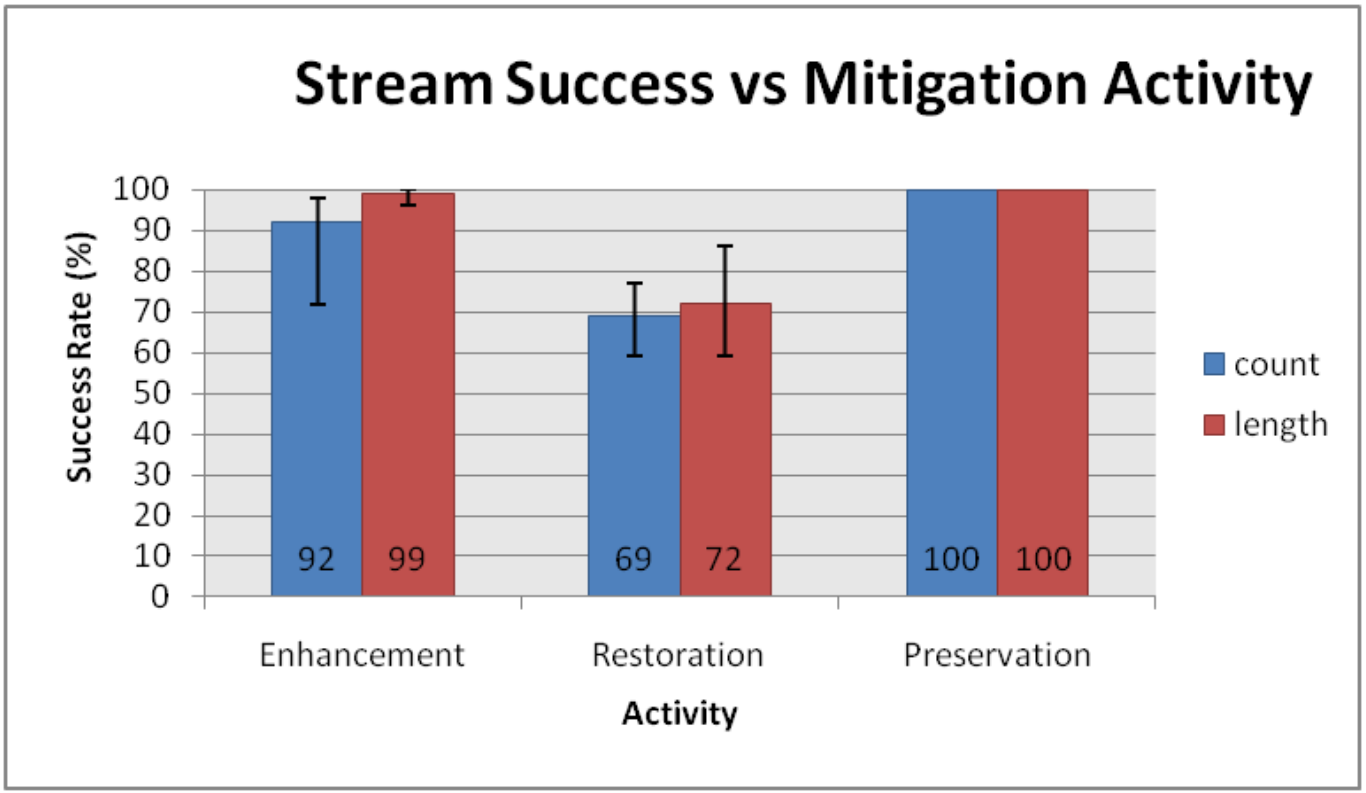
Success Rates by Physiographic Region

- By component count: No significant differences
- By size: Piedmont streams & Mountain wetlands had lower success rates than other regions



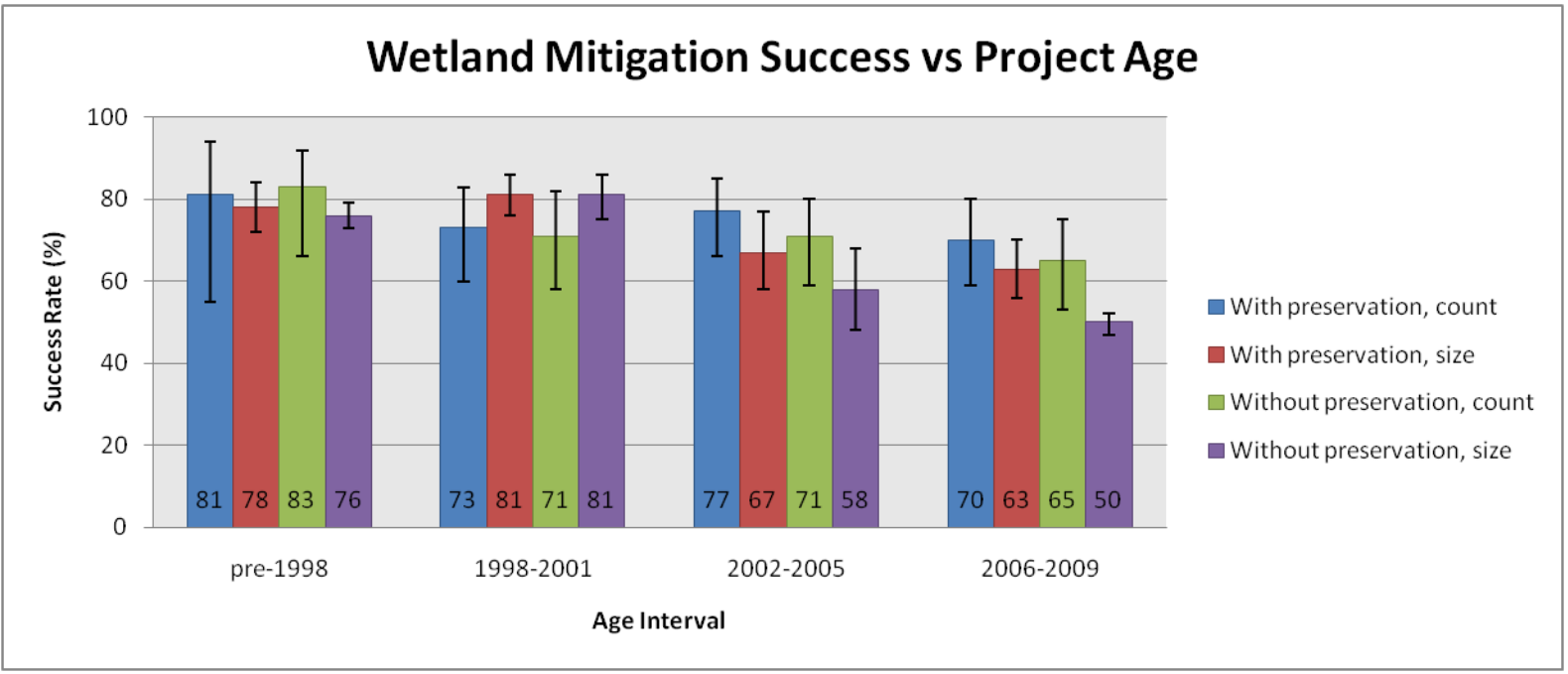
Success Rates by Mitigation Activity

- Preservation most successful (stream & WL)
- Wetlands: no other significant differences
- Streams: Enhancement had a significantly higher success rate than restoration



Success Rates By Age

- Streams: No significant differences
- Wetlands: By size, newer projects less successful than older projects



Other Variables

- Project Size: No statistically significant difference in success rates
- Ecosystem Type (Wetlands): No significant difference between riparian, non-riparian, coastal WL
- River Basins/Ecoregions: Sample sizes too small to yield conclusive results

Statistics Summary

- Wetland success not statistically higher than stream success
- Preservation is very successful
- Stream enhancement more successful than stream restoration
- Piedmont stream mitigation less successful than Mtns and Coastal Plain
- No significant difference between mitigation providers, except as noted

Discussion

- Impractical to assume every acre/linear foot of mitigation will be successful
- Wetland mitigation success much improved since 1995 studies
- Stream success lower in Piedmont
  - More bank erosion/structure failure
  - More difficulty establishing woody veg
  - Particularly observed where site excavation required (e.g. “Priority 2” restoration)

Discussion

- Longer monitoring periods likely warranted
- Updated monitoring and success criteria needed
- Greater regulatory oversight/input needed
- Improved recordkeeping and access to data needed

Comments

- Final report has been posted on DWQ Website:

  http://portal.ncdenr.org/web/wq/swp/ws/401/certsandpermits/mitigation

- Version of report submitted to Environmental Management for publication in October 2011 (still in review).

Questions??