



Trading and Off-Sets Workgroup Dam Removal for Mitigation Webinar

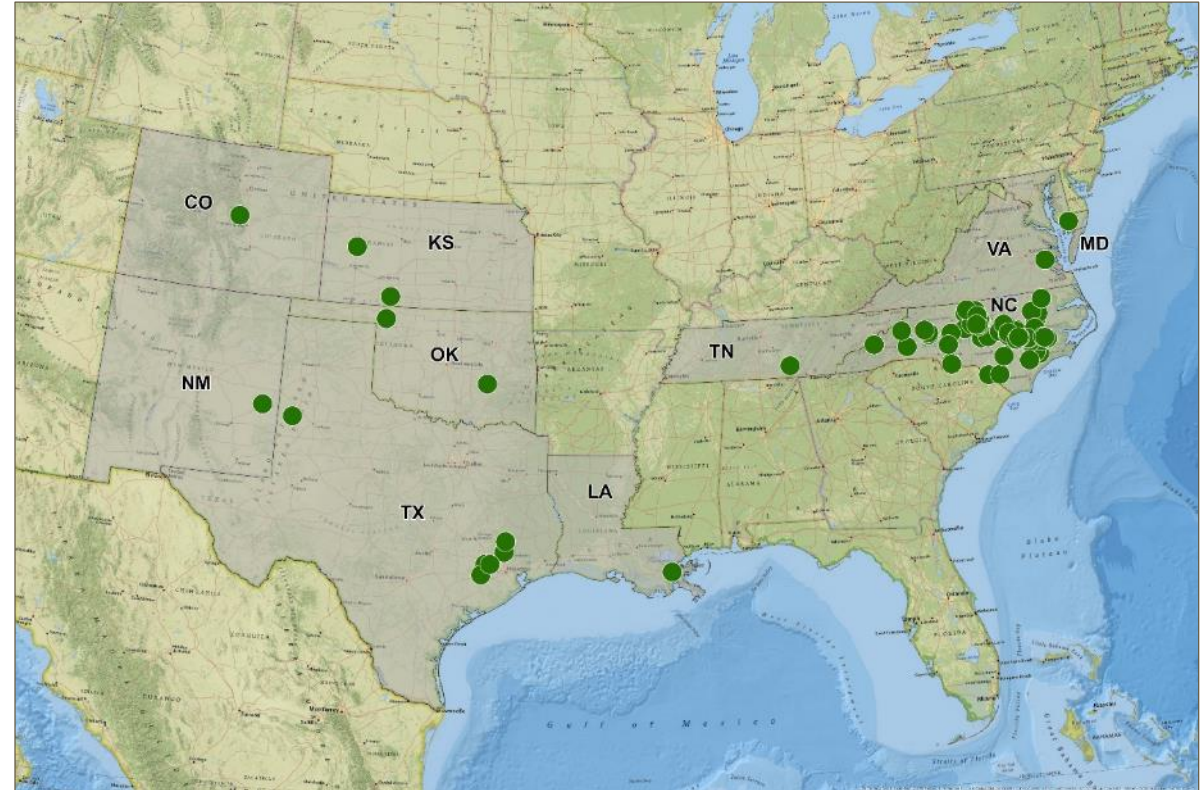


December 19, 2018

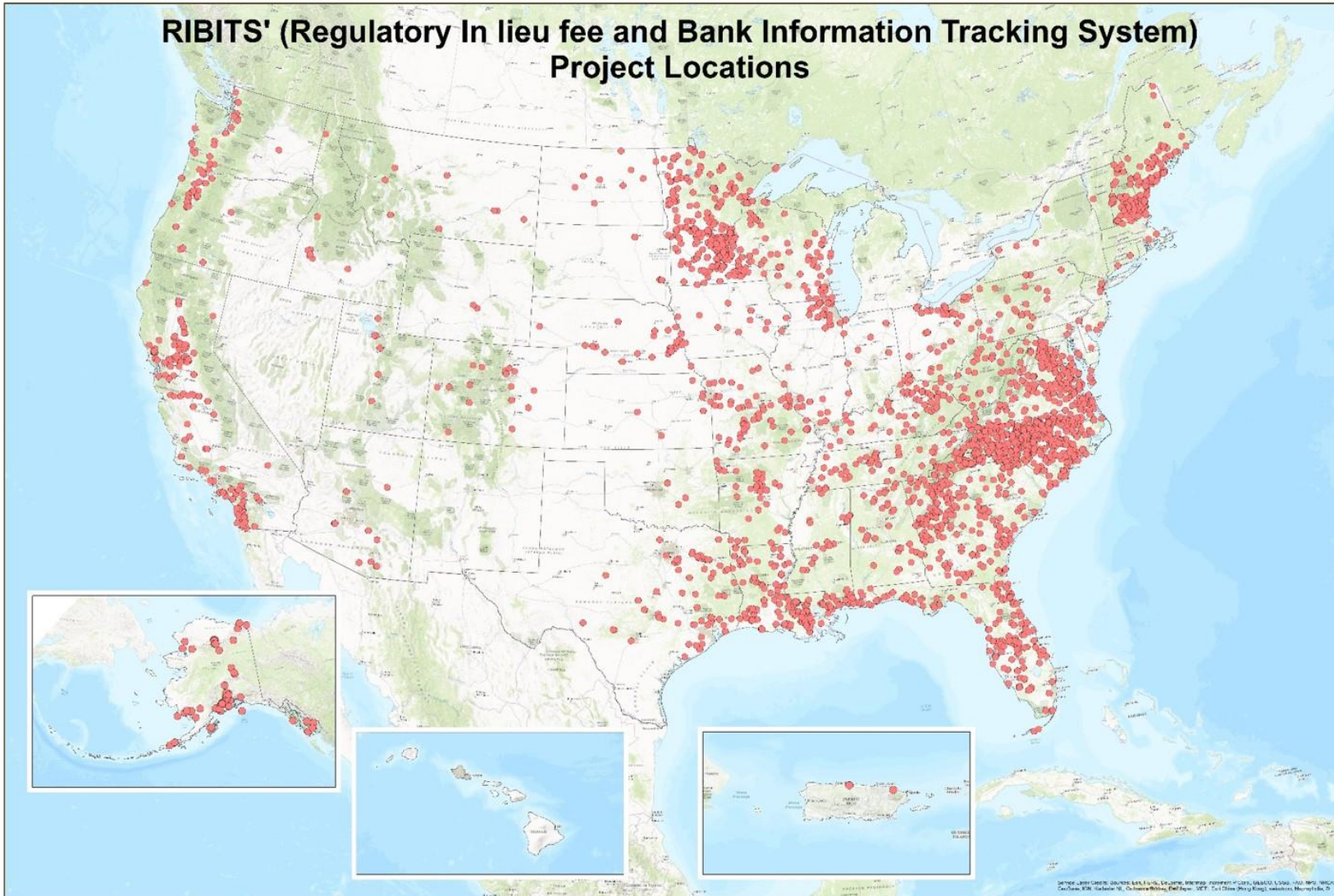


Restoration Systems

- North Carolina's first mitigation company
- 20th Anniversary, May 19
- Established 70+ mitigation sites
- 115,000+ acres of wetlands and prairies
- 75+ miles of creeks, streams, rivers and bayous.
- Planted more than 2,000,000 trees
- Three dam removals for mitigation



RIBITS' (Regulatory In lieu fee and Bank Information Tracking System) Project Locations



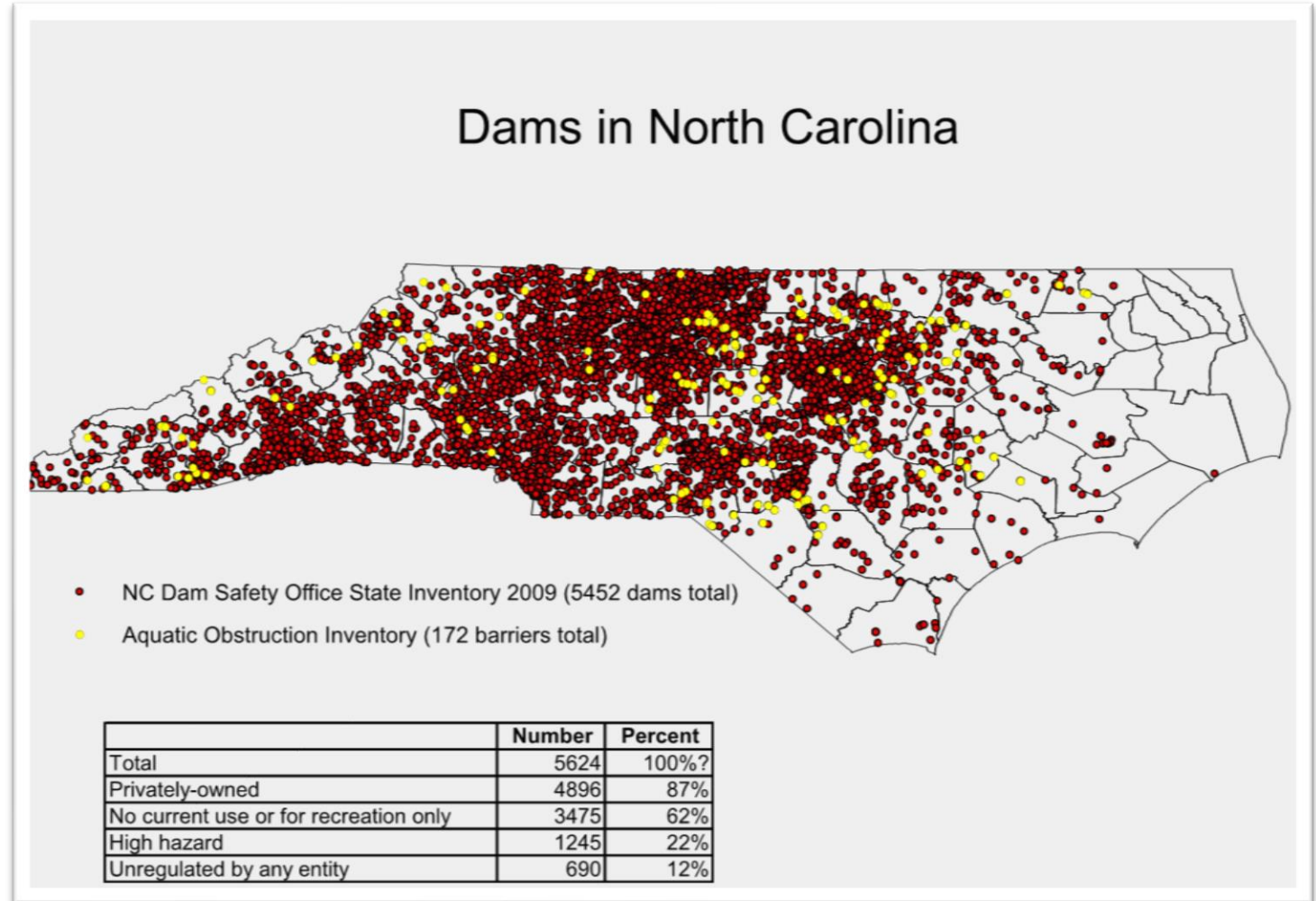
Wetland and Stream mitigation

- NC undisputed national leader in mitigating streams
- Wilmington District and agencies led the way in '96
- 2008 Mitigation Rule required stream mitigation nationally
- Only mitigation method used today is “Natural Channel Design”



State of Dams

- Officially, there are ~5,424 dams in NC (NC Dam Safety)
- 87% privately owned
- 62% have no current economic use
- High Hazard, 1,245 (22%)
- ~250 regulated dams per dam safety employee



02/05/02 TUE 17:10 FAX 1 919 856 4556

USFWS-RALEIGH, NC

002

NCDOT/P&E BRANCH

Fax: 919-733-9794

Feb 26 '02 12:14 P.02

856-4556



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

February 25, 2002

Memo To: Dam Removal Task Force

From: Dave Schiller *DAS*

Subject: Minutes of Meeting

The Dam Removal Task Force met on February 21, 2002 in the Transportation Building in Raleigh. Those in attendance were: John Dorney, NCDWQ; Cathy Brittingham, NCDOT; Dave Timpy, USACE; John Alderman, NCWRC; Mike Wicker, USFWS; David Cox, NCWRC; Mike Street, NCDMF; Ron Sechler, USNMFS; and Dave Schiller, NCDOT.



NC Dam Removal Task Force

Table 1. Preliminary Dam Prioritization through Rankings of Environmental Advantages of Dam Removal. These ratings have been performed by agency representatives involved in the Dam Removal Task Force of North Carolina.

Dam	Threatened & Endangered Species Value				Water Quality Value				Anadromous Fish Value				Mean of Means	
	NCWRC	NHP	USFWS	Mean	DWQ-Pen	DWQ-D	EPA	Mean	NCMFS	NCWRC	NMFS	USFWS		Mean
Lowell	4.0	4.0	4.0	4.0	4.0		3.5	3.8	3.0	5.0	3.0	3.0	3.5	3.75
Lock & Dam #2	3.0	3.0	4.0	3.3	1.0		4.0	2.5	4.0	4.0	5.0	5.0	4.5	3.44
Lock & Dam #3	3.0	3.0	3.0	3.0	1.0		4.0	2.5	4.0	3.0	5.0	5.0	4.3	3.25
Carbonton Dam	5.0	5.0	5.0	5.0	4.0		4.0	4.0	0.0	0.0	1.0	1.0	0.5	3.17
Atkinson's Millpond	4.0	4.0	4.0	4.0	3.0		4.0	3.5	2.0	4.0	1.0	1.0	2.0	3.17
Fishing Creek Millpond	4.0	4.0	5.0	4.3	3.0		3.5	3.3	3.0	0.0	2.0	2.0	1.8	3.11
Buckhorn	3.0	3.0	4.0	3.3	2.0		3.5	2.8	2.0	2.0	4.0	4.0	3.0	3.03
Rocky Mount Millpond	3.0	3.0	1.0	2.3	4.0		4.5	4.3	2.0	1.0	2.0	2.0	1.8	2.78
Milburnie	1.0	1.0	2.0	1.3	0.0		4.6	2.3	2.0	5.0	5.0	5.0	4.3	2.63
Wiggins Millpond	1.0	1.0	1.0	1.0	3.0		4.5	3.8	2.0	3.0	2.0	2.0	2.3	2.33
Hoggards Mill	0.0	0.0	0.0	0.0	3.0		3.5	3.3	4.0	5.0	2.0	2.0	3.3	2.17

DRTF agencies include U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (ACE), U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), N.C. Division of Water Quality (DWQ), N.C. Wildlife Resources Commission (WRC), N.C. Division of Marine Fisheries (DMF), N.C. Division of Coastal Management (DCM), and the N.C. Natural Heritage Program (NHP)

NC Dam Removal Task Force

Dam Removal Priorities

Dam

~~Lowell~~

~~Lock & Dam #2~~

~~Lock & Dam #3~~

Carbonton Dam

~~Atkinson's Millpond~~

~~Fishing Creek Millpond~~

Buckhorn

Rocky Mount Millpond

Milburnie

Wiggins Millpond

Hoggards Mill

NC Dam Removal Task Force Dam Removal Priorities

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Hoggards Mill

NC Dam Removal Task Force Dam Removal Priorities

Dam

- ~~Lowell~~
- ~~Lock & Dam #2~~
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- ~~Carbenton Dam~~
- ~~Atkinson's Millpond~~
- ~~Fishing Creek Millpond~~
- ~~Buckhorn~~
- Rocky Mount Millpond
- Milburnie
- Wiggins Millpond
- Hoggards Mill



“Traditional” Stream Mitigation by Natural Channel Design

USACE SOP

Mitigation credit awarded based on monitoring over seven years of *subjective and inferred* functional improvements to ecology in two categories:

Geophysical stability
Vegetation survival



Dam Removal Mitigation using the NC Guidelines

Issued in two brief windows

2004 – 2005

2008 – 2010

Mitigation Credit awarded based on monitoring over seven years of *objective and measured functional improvement* in four categories:

Water Quality

Appropriate Aquatic Community (Insect, Fish, Mussels)

Rare, Endangered And Threatened Aquatic Species

Anadromous Fish

AFTER MILBURNIE DAM REMOVAL

As a Mitigation Bank, the project will receive close attention and extensive monitoring for years to come. "Credits" are only released upon successful monitoring of the improved ecology of the project area behind the dam.

FOR THE NEXT SEVEN YEARS MONITORING WILL BE CONDUCTED AS FOLLOWS:

MONITORING SCHEDULE FOR MILBURNIE DAM MITIGATION BANK

Monitoring Category	Monitoring Years						
	1	2	3	4	5	6	7
Mussels	-	-	-	+	-	+	+/-
Fishes	+	+	+/-	+/-	+/-	+/-	+/-
Aquatic Insects	-	+	-	+/-	-	+/-	+/-
Anadromous Fish	+	+/-	+/-	+/-	+/-	+/-	+/-
Scientific Research	+	+	+	+	+	+	+
Wetland Hydrology	+	+	+	+	-	-	-
Channel Geometry	+	+	+	+	+	+	+
Vegetation	+	+	+	-	+	-	+

+ = Monitoring planned; - = Monitoring not planned;
 +/- = Monitoring may proceed if performance standards are not met



During this period and into perpetuity the site will be permanently protected by conservation easement to be held by Sound Rivers, a Neuse River non-profit advocacy and protection organization.



Dam Removal vs. Natural Channel Design

- Direct ecological measurements \ Indirect proxies
- Discreet opportunities \ Unlimited locations
- Strategic \ Random
- Universally praised \ Somewhat controversial
- Permanent \ Questionable time frame
- Far reaching benefits \ localized benefits
- Recreation \ Next to none
- Public Safety benefits \ None

Reasons for guideline retractions

Hearsay Warning! Nothing in writing from USACE

Dam removals would displace Natural Channel Design

Too large improvements > 30 linear feet

“Too many credits” produced from dam removal

No “buffers” protected

Too much \$\$\$ could be made

Permanently Protected Buffers?

Appropriate for NCD

- Small scale channels
- Project features vulnerable to crossing and culverts
- Vegetation vulnerable
- Need protection from farming
- Buffers assumed to provide WQ benefits
- Feasible since few landowners

Inappropriate for dam removals

- Large scale channels (4th or 5th river order)
- Large rivers never culverted and rarely newly bridged
- New buffer created by lowered river levels
- Infeasible since landowners in the hundreds (240 at Carbonton and 170 at Milburnie)

Too many credits?

- Should be celebrated!
- These are better credits rivers – not creeks – restored
- Least expensive credits ever sold
- Carbonton and Milburnie exceptional (96,000 and 39,000 credits)
- No other dams known to be on this scale

Wetlands?

Milburnie and the White House CEQ

- Associated wetlands are impounded by dam and manmade “creation”
- Endless delay and angst over their “fate”
- Obama White House CEQ intervened
- Created new Nationwide Permit #53 to address
- Corps issued #53 but denied mitigation waiver
- RS responsible to potentially mitigate 15.5 acres
- Maintain \$1.2 million surety bond for five years (nearly impossible)

Pending Dam Removal Regulatory Guidance Letter

- Announced at the Mitigation Banking Conference in May
- One of two pending Regulatory Guidance Letters
- Somehow came out of a cabinet meeting!
- White House OMB call last Wednesday
- Content unclear but strongly supportive

NC potential national leader in dam removal for mitigation



WALTON FAMILY
FOUNDATION



GREENWIRE

THE LEADER IN ENERGY AND ENVIRONMENT NEWS

SEARCH: go!

<< Back to Greenwire index page.

INFRASTRUCTURE

Clean Water Act may offer 'magic key' for dam removal

Jeremy P. Jacobs, E&E News reporter • Published: Monday, December 11, 2017

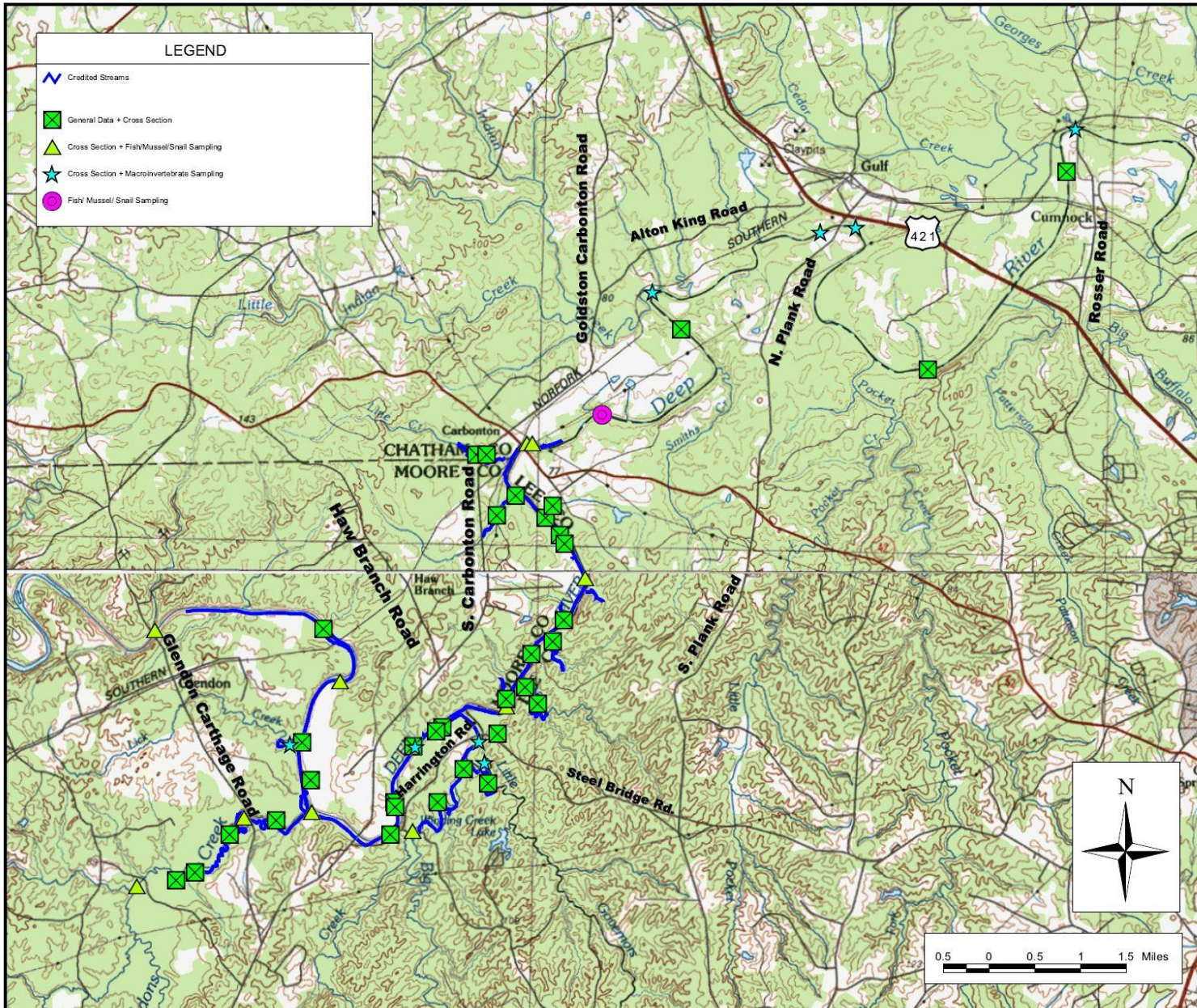


An environmental mitigation firm, Restoration Systems, tearing down the Milburne Dam on the Neuse River outside Raleigh, N.C. The company will turn a profit on the credits it sells from the removal, and advocates say their model could fund dam removals across the country. Restoration Systems



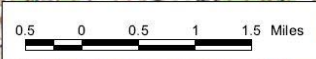
Carbonton Dam, Deep River





LEGEND

-  Credited Streams
-  General Data + Cross Section
-  Cross Section + Fish/Mussel/Snail Sampling
-  Cross Section + Macroinvertebrate Sampling
-  Fish/Mussel/Snail Sampling



EcoScience Corporation
Raleigh, North Carolina

CLIENT:



Natural Resources
Restoration & Conservation



PROJECT:

**Deep River
Caribnton
Dam
Restoration
Site**

Chatham, Lee
and Moore Counties,
North Carolina

TITLE:

**Monitoring
Station
Locations**

Drawn By:	Ckd By:
JDG	MTC
Date:	Scale:
SEP 2006	AS SHOWN
ESC Project No.:	
	06-288.02

FIGURE

3



Cape Fear Shiner Success story on Deep

Could be significant part of delisting!

Dam removal good news for endangered fish

September 10, 2007 / in Press (RS in the News) / by RS

Dam removal good news for endangered fish

■ The Cape Fear Shiner is re-emerging less than two years after an old dam near Carbondon came tumbling down.

By TAFT WIREBACK
Staff Writer

CARBONTON — The Cape Fear Shiner is a yellowish minnow with black stripes, pointed fins and a hard-luck past.

But with the help of an environmental firm that has offices in Greensboro, the fish that seldom exceeds two inches in length is becoming one of North Carolina's biggest ecological success stories.

Biologists working for Restoration Systems have found the endangered species in a 10-mile stretch of the Deep River it hadn't inhabited in 85 years or perhaps even longer, thanks to the removal of an old dam near Carbondon in southern Chatham County.

"The speed at which this recovery has taken place is what stands out," said Adam Riggsbee, an environmental scientist



Courtesy of Restoration Systems
The Cape Fear Shiner is a tiny, yellow-and-black minnow that was unknown until 1971.

with the company, which has headquarters in Raleigh and a branch in Greensboro.

Restoration Systems coordinated demolition of the dam through early 2006 in partnership with the N.C. Ecosystem Enhancement Program. It continues to monitor 58 sites along the Deep River as part of the

See Fish, Page A5

Fish

Continued from Page A1

project, keeping track of what happens to a once-impaired river when restored to its flowing state.

The project has benefited life into what had been a sluggish, beaver-strewn river, said company co-owner George Howard.

"Unfortunately, it's such a lonely part of the world, not many people get to see it," said Howard, a Greensboro native. "But it really is a wonderful thing to see."

You can think of the tiny yellow-and-black minnow as a sort of river's canary that warns, a bellwether for the health and restored vigor of the water that surrounds it.

The tiny minnow was unknown to science until 1971, when it was identified in a very-limited range that included small reaches of the Haw and Deep rivers in just five counties — Randolph, Chatham, Lee, Moore and Harriet.

In September 1987, it already had been placed on the



Courtesy of Restoration Systems
The old dam near Carbondon in Chatham County was removed in early 2006. The site had hosted several dams throughout the 17th century.

federal Endangered Species List because of its dwindling habitat.

The minnow used water of decent quality riffing in shallow depths over gravel, stone and boulder bottom.

The dam that was demolished was a small, hydroelectric operation built in 1921 and shut down in June 2004. But the site, near the line between Chatham and Lee counties,

had hosted a series of dams stretching back into the 17th century.

So biologists couldn't be sure how long two separate colonies of Cape Fear Shiner had been separated by one dam or another and its 10-mile stretch of backed-up water, two days and slow for the minnow's liking.

Meanwhile, on either side of the dam, the isolated populations of Cape Fear Shiner were

dividing. Restoring the dam produced results aimed at fixing that problem faster than anyone had been willing to hope, Riggsbee said.

"If you provide the habitat, the theory is that you should get the species back in place," he said. "That's exactly what has happened here in less than two years. The river re-populated very quickly and so did this key species."

Last year when Riggsbee headed the Shiner, he sampled the numerous nesting sites along the newly reconnected stretch of Deep River above the former dam, he found no Cape Fear Shiner.

But he did see a lot of the riffed habitat starting to form, the faster and shallower water over a rocky bottom that is home to the little minnow.

"This year, we picked up numerous Cape Fear Shiners at multiple sites throughout that 10-mile section," said Riggsbee of the Coon Group, an environmental consulting firm that is helping Restoration Systems with its follow-up studies.

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Restoration Systems works on such projects as the dam with state and federal officials to provide "mitigation credits."

The credits are bought by public and private agencies to offset environmental damage done by such developments as new dams, roads or neighborhoods in the same region.

Among other things, credits from removing the dam at Carbondon allowed the state Department of Transportation to build or expand a number of roads in this part of the state.

Contact Taft Wireback at 312-730 or wireback@news-record.com

NEWS & RECORD, Monday, September 10, 2007 A5

FROM A1

CARBONTON — The Cape Fear Shiner

is a yellowish minnow with black stripes, pointed fins and a hard-luck past.



Lowell Mill Dam, Little River

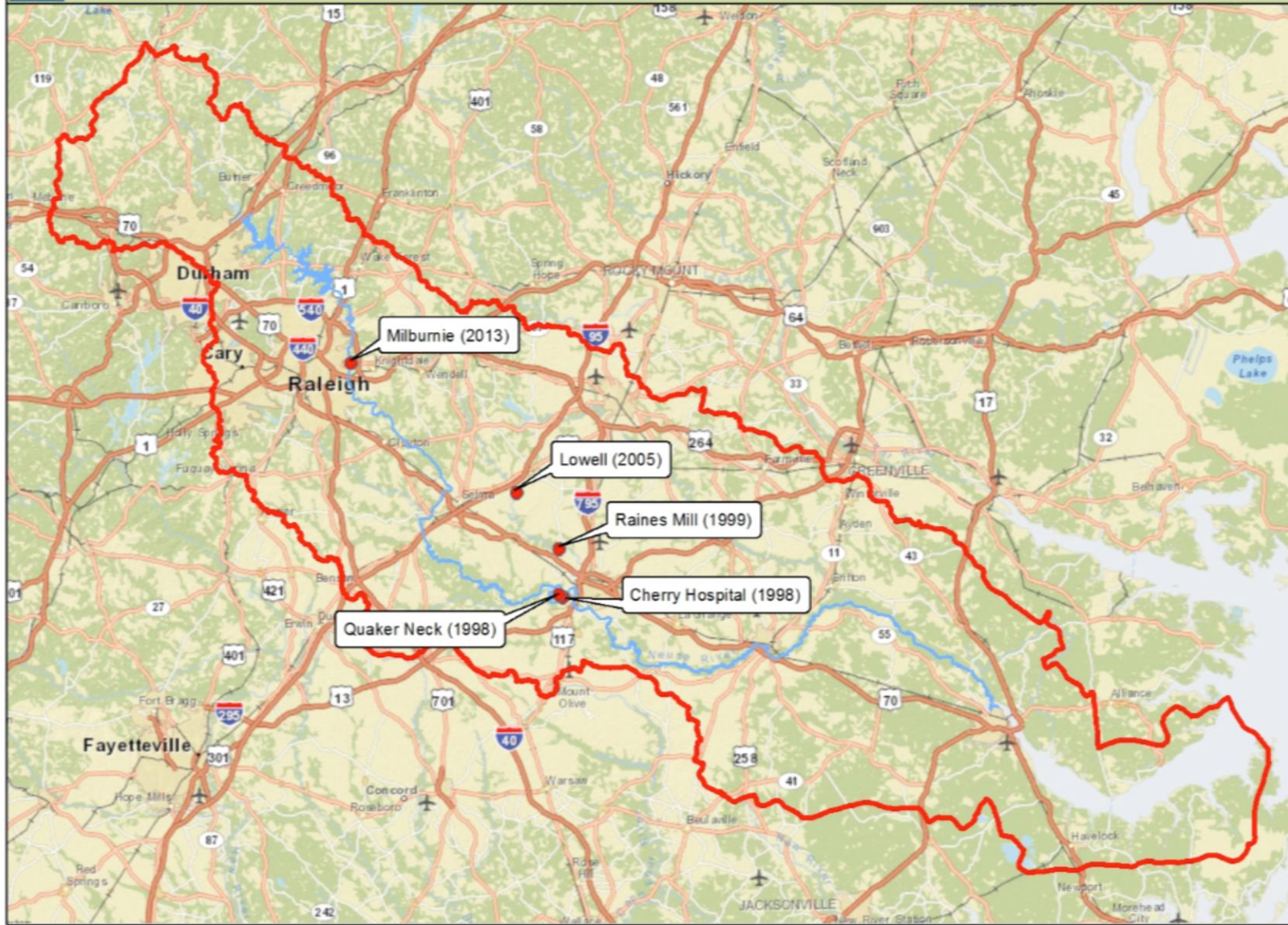


Milburnie, Neuse River





Neuse River Dam Removal Chronology





Milburnie Removal Timelapse





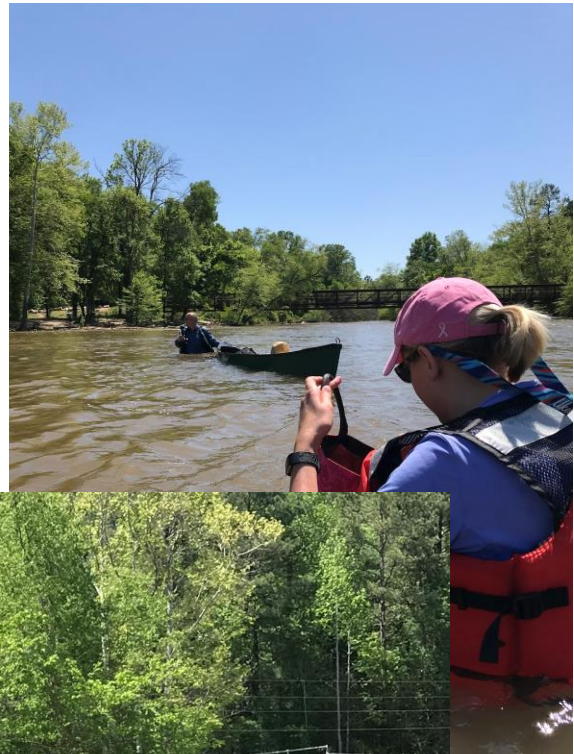










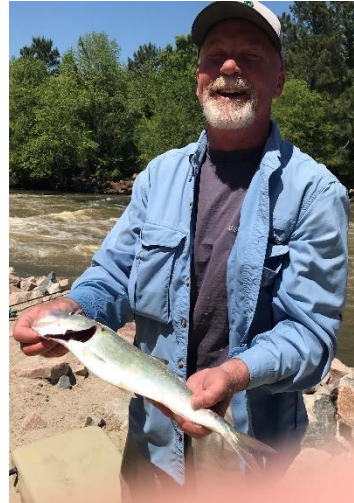


2018 Milburnie Dam Removal Anadromous Fish Monitoring
April 25 – May 1, 2018

American Shad (*Alosa sp.*) caught on the Neuse River at the tail race of the Falls Lake Dam



EJ Stern GoPro Video



Kevin Thomas



Mike Goddard



Chris Gardner



Kevin Thomas

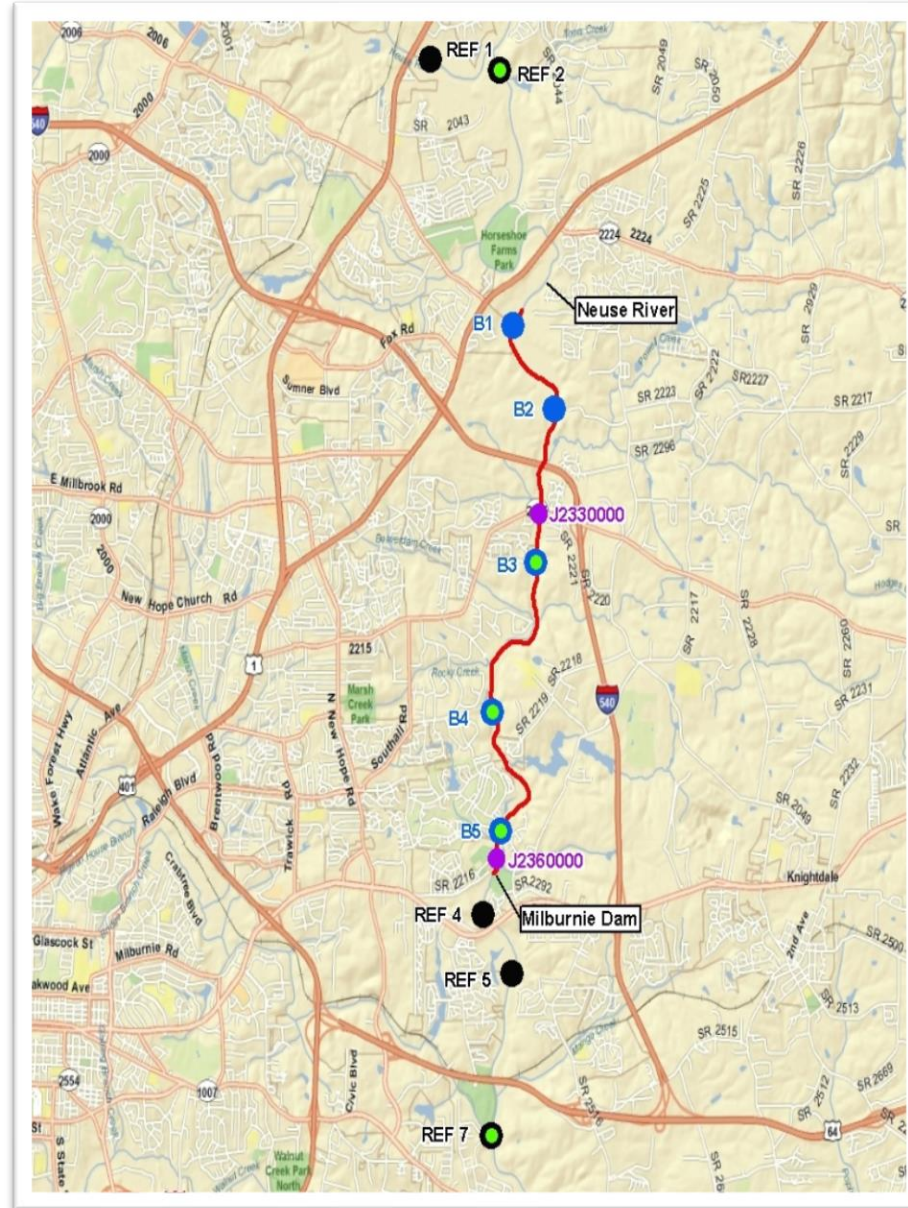


Tyler Tschopp

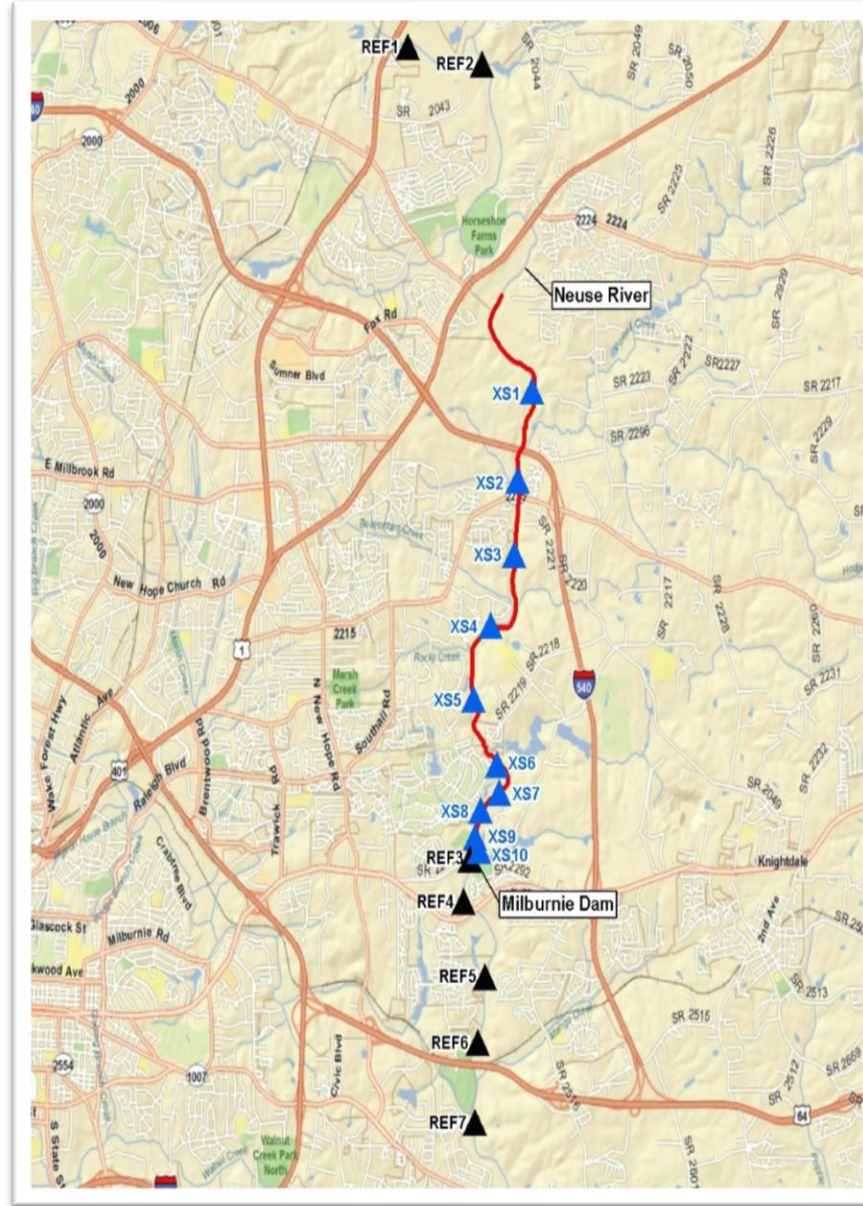


Stacy Gilmore

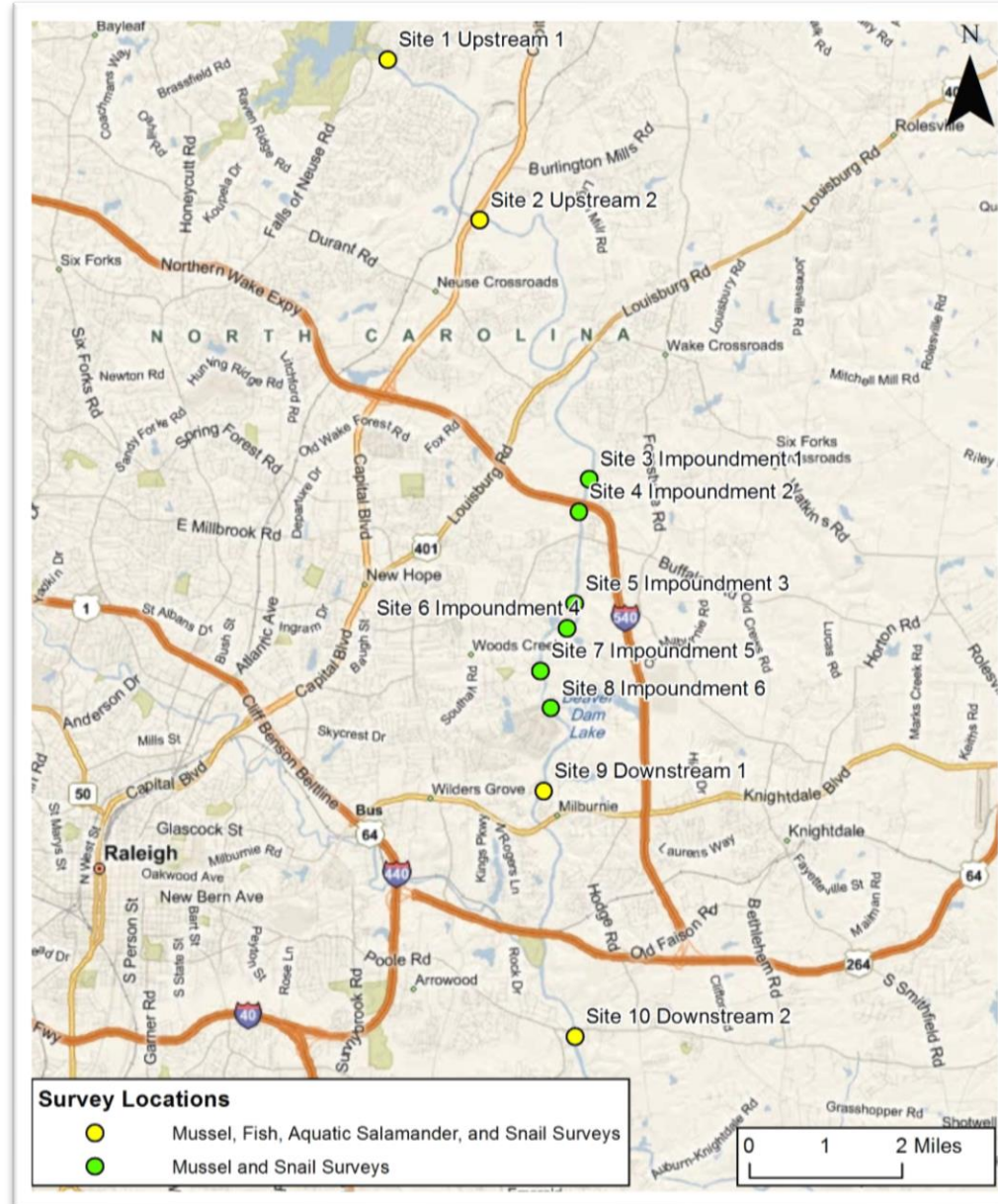
Water Quality and Benthics Surveys



Geomorphology and Habitat Surveys

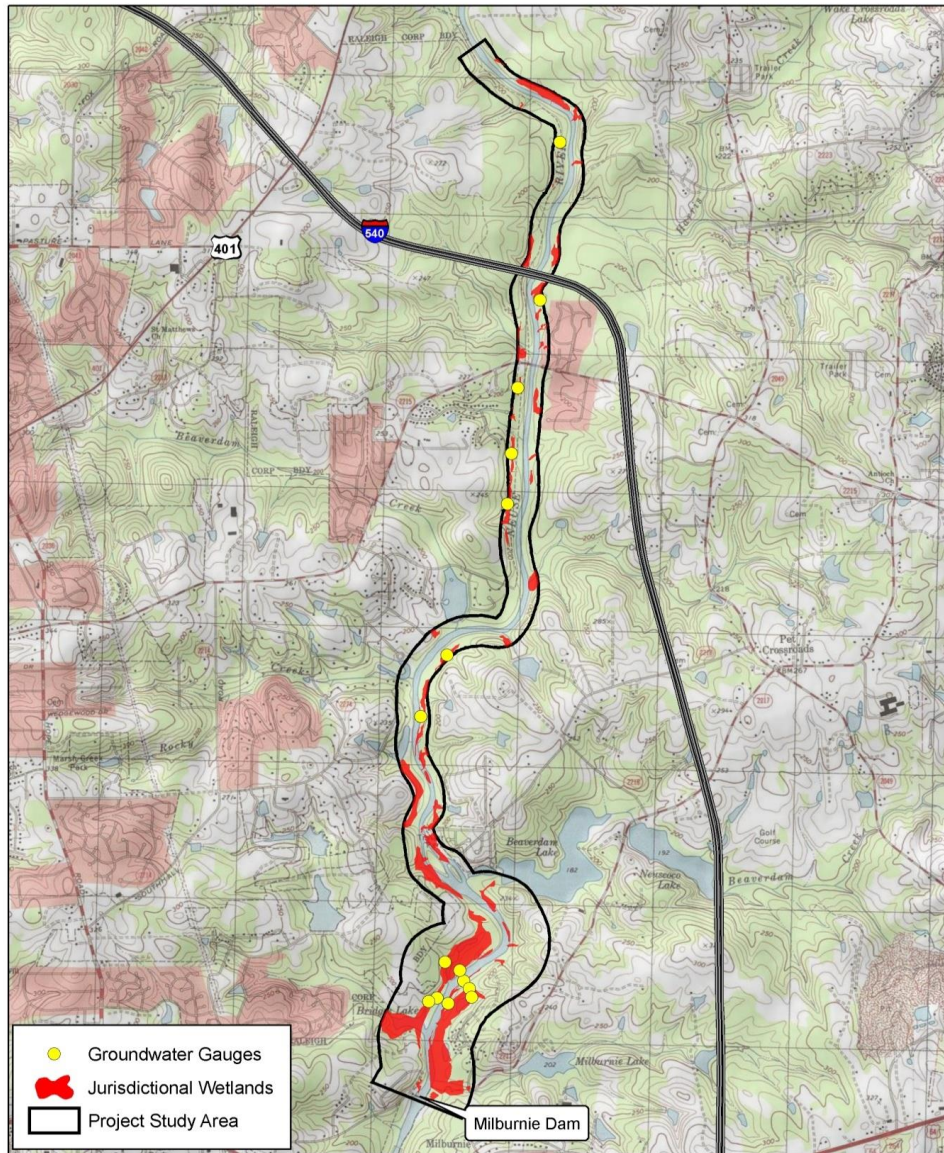


Biological Survey Locations





The
Catena
Group



RS
RESTORATION
SYSTEMS, LLC

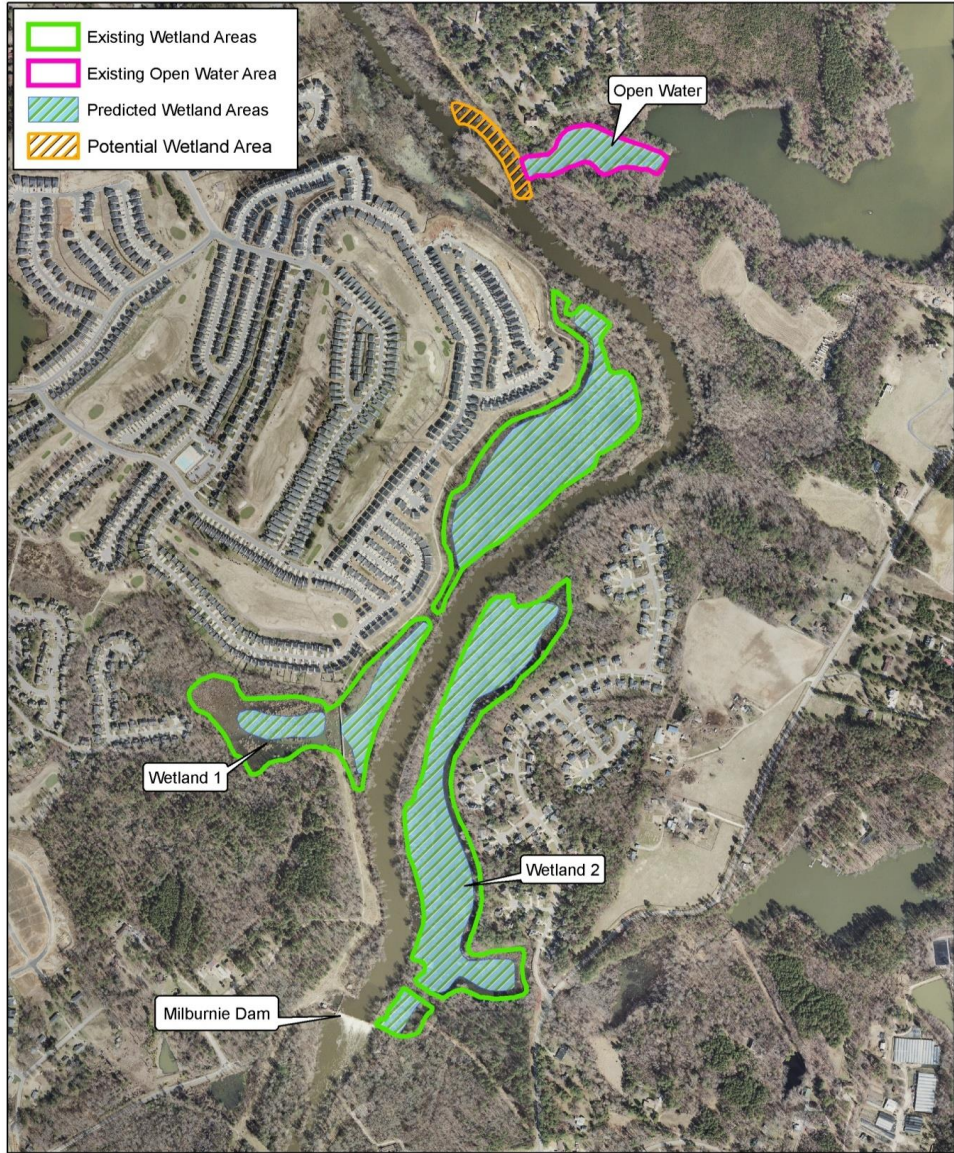
Restoration Systems
1101 Haynes St. Suite 211
Raleigh, NC 27604
tel: 919.755.9490

Figure 5:
Wetland Delineations:
Milburne Impoundment Floodplain



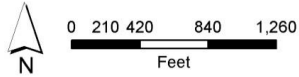
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Miles

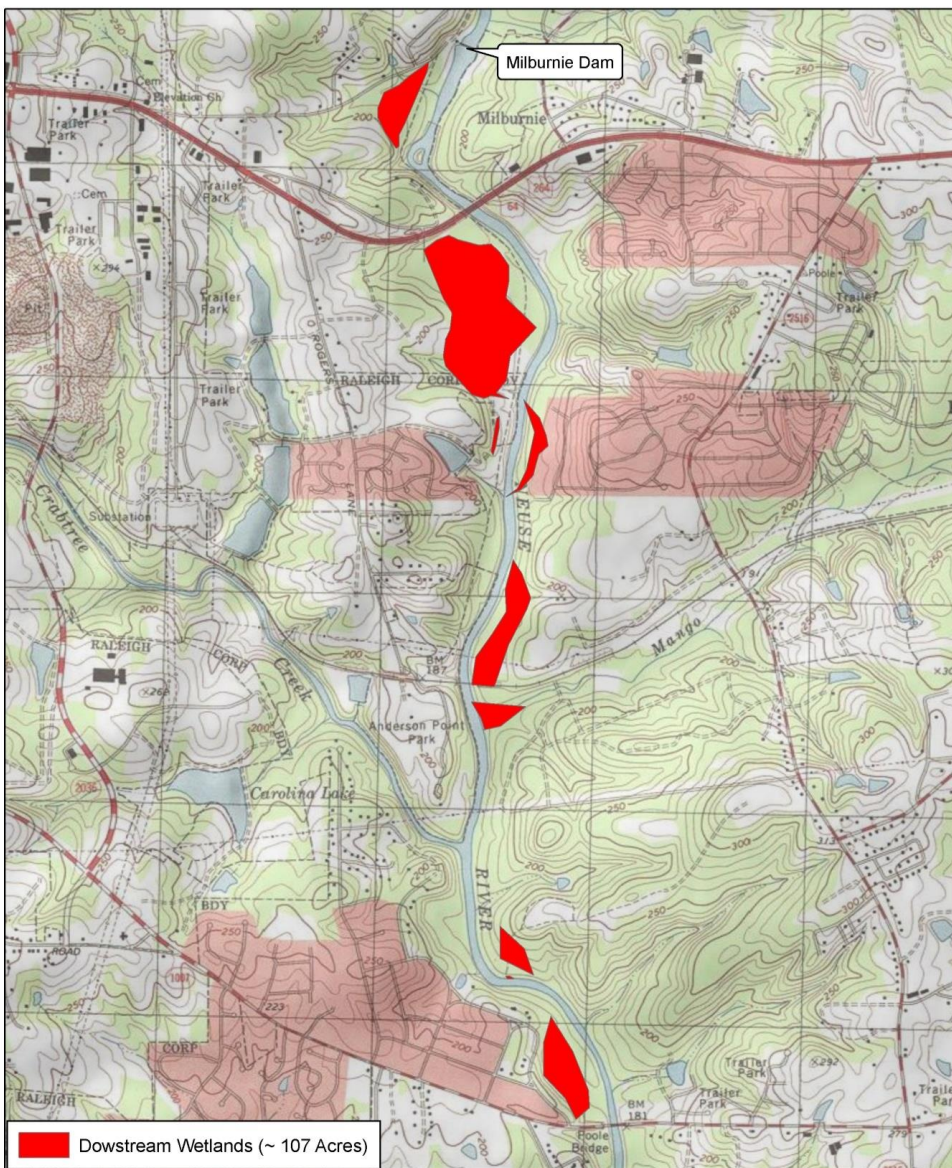





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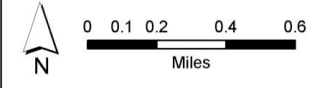
Figure 6:
 Potential Wetland Losses
 and Gains

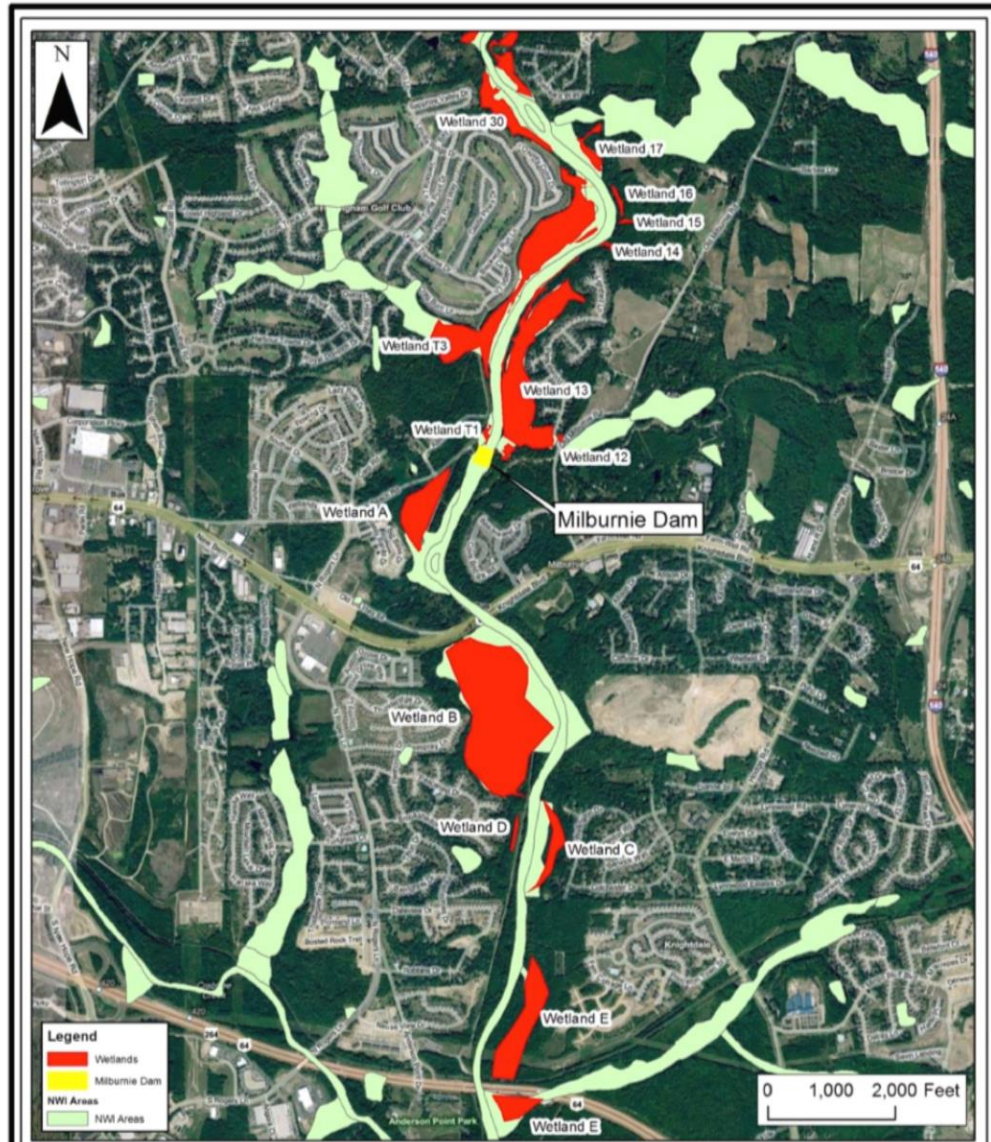





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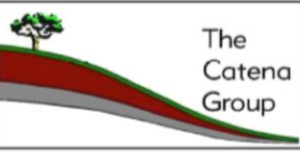
Figure 7:
 Delineated Wetland Locations:
 Downstream of Milburnie Dam





Legend

- Wetlands
- Milburnie Dam
- NWI Areas
- NWI Areas



Milburnie Wetlands
 Downstream Wetland Investigations
 Aerial Orthophotography
 Source: Bing Maps
 Wake County, North Carolina

Date: February 2011
 Scale: As Shown
 Job No.: 2146

Figure
2



The Lowell Dam Wetlands >200 acres



Removed 2005 no mitigation required



February 28, 2005

Impounded Open Water Wetland



April 28, 2005



June 06, 2005



July 13, 2005 Natural Vegetated Wetland

Role for the Policy Makers

- Support call for reissued guidelines
- Support Nationwide #53 waiver for wetlands mitigation
- Oppose permanent protection of buffers
- Consider minimum credit yield (for short, high grade impoundments)

Discussion & Questions

Thank you &
Riverfest



Join Restoration Systems, Sound Rivers & American Rivers
for the 1st Annual Raleigh River Fest
Saturday May 19th from 12pm -3pm
at the new Milburnie Falls
20 Raleigh Beach Road



Parking Locations: Milburnie Park at 5407 Allen Drive, along Raleigh Beach Road
and parking area off Lock Raven Parkway

\$5 per person

****All proceeds donated to Sound Rivers****

For more info please visit:
www.milburniedam.com
facebook.com/RestorationSystems.com
or call Tiffani at 919.334.9123



USGS 8-DIGIT CATALOGING UNITS- NORTH CAROLINA

