# Cape Fear River Partnership
# Fish Passage

**Wilmington**

**May 21, 2018**


RiverBank ECOSYSTEMS

THREE OAKS ENGINEERING

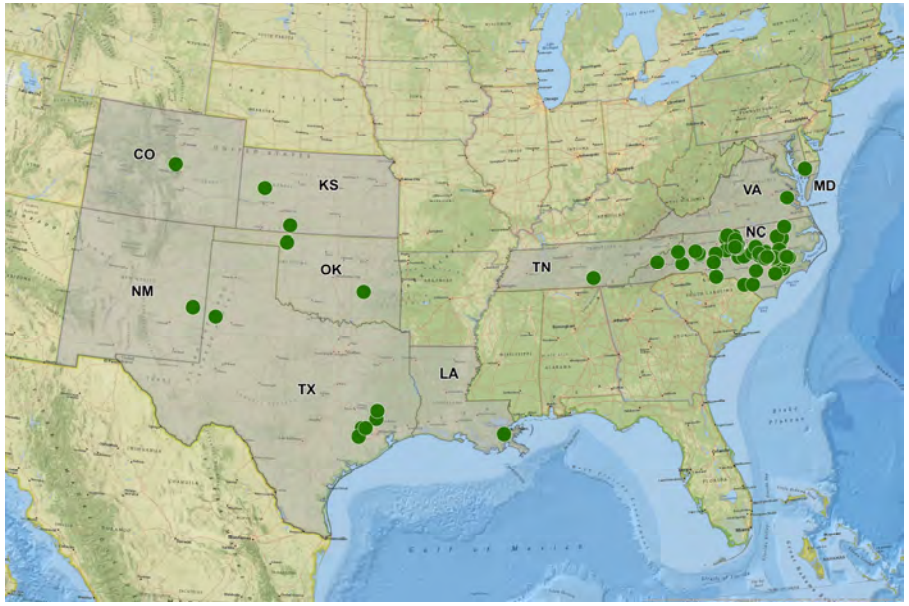
Duke UNIVERSITY

Stantec

BACKWATER ENVIRONMENTAL
www.backwater.biz
Specializing in Environmental Restoration

# Restoration Systems

- North Carolina's first mitigation company
- 20th Anniversary
- 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

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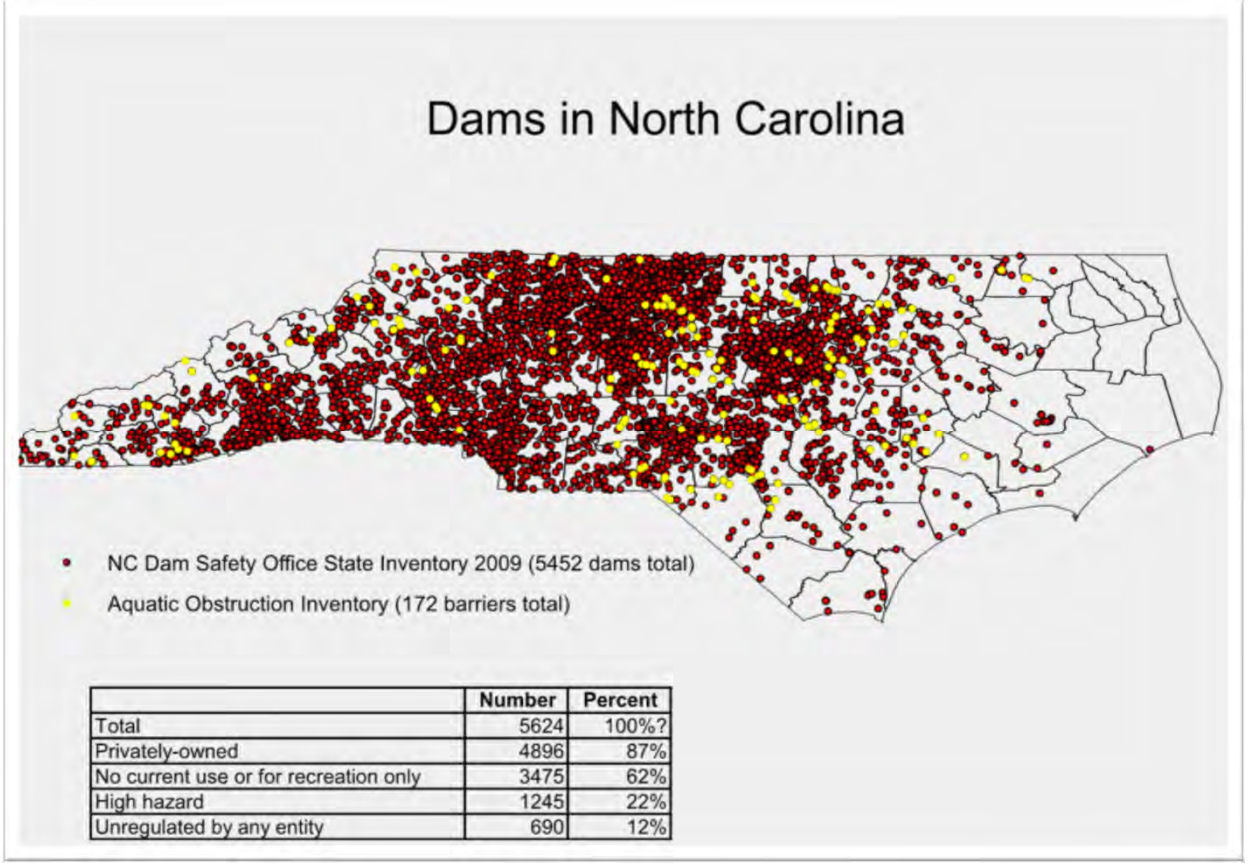
# State of Dams

- 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




| | Number | Percent |
|---|---|---|
| Total | 5624 | 100%? |
| Privately-owned | 4896 | 87% |
| No current use or for recreation only | 3475 | 62% |
| High hazard | 1245 | 22% |
| Unregulated by any entity | 690 | 12% |

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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 DWS

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, NCDCM; Dave Timpy, USACE; John Alderman, NCWRC; Mike Wicker, USFWS; David Cox, NCWRC; Mike Street, NCDMF; Ron Sechler, USNMFS; and Dave Schiller, NCDOT.

# DRTF: Dam Removal Priorities

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.

| | Threatened & Endangered Species Value | | | | Water Quality Value | | | | Anadramous Fish Value | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dam | NCWRC | NHP | USFWS | Mean | DWQ-Pen | DWQ-D | EPA | Mean | NCMFS | NCWRC | NMFS | USFWS | Mean | Mean of Means |
| 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)

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# DRTF: 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 |

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# Lowell Mill Dam, Little River

2005

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# DRTF: 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 |

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# Carbonton Dam, Deep River – Cape Fear

2005

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# DRTF: 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


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# Milburnie

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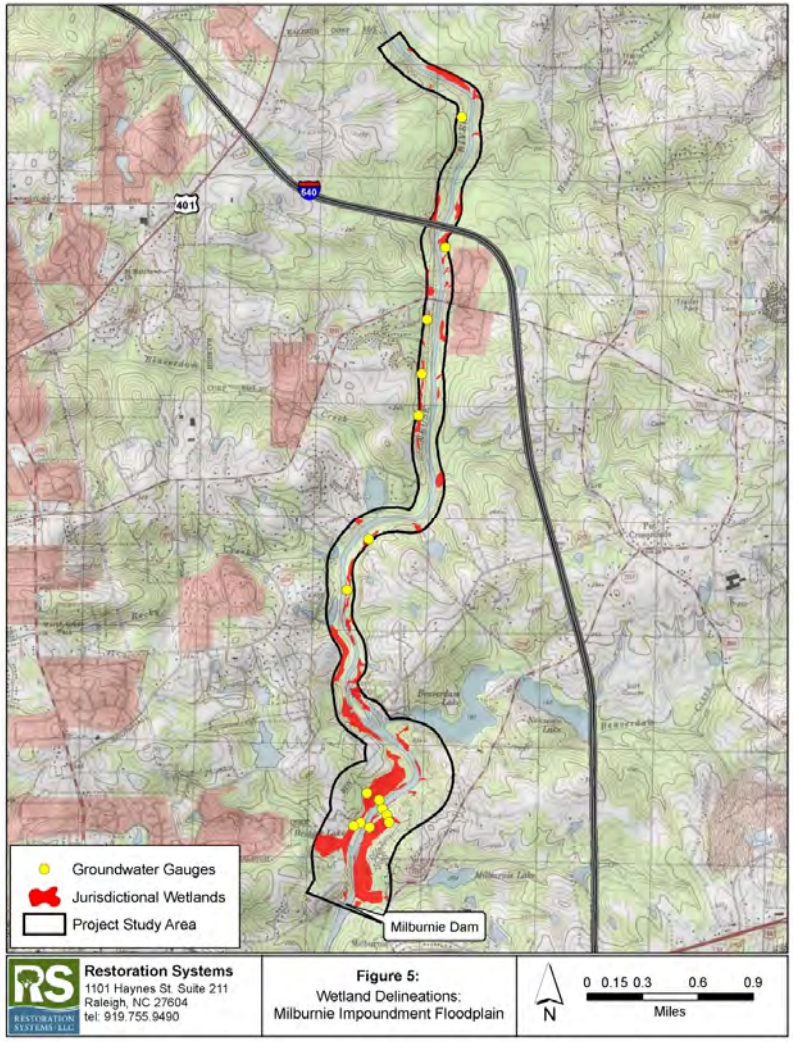


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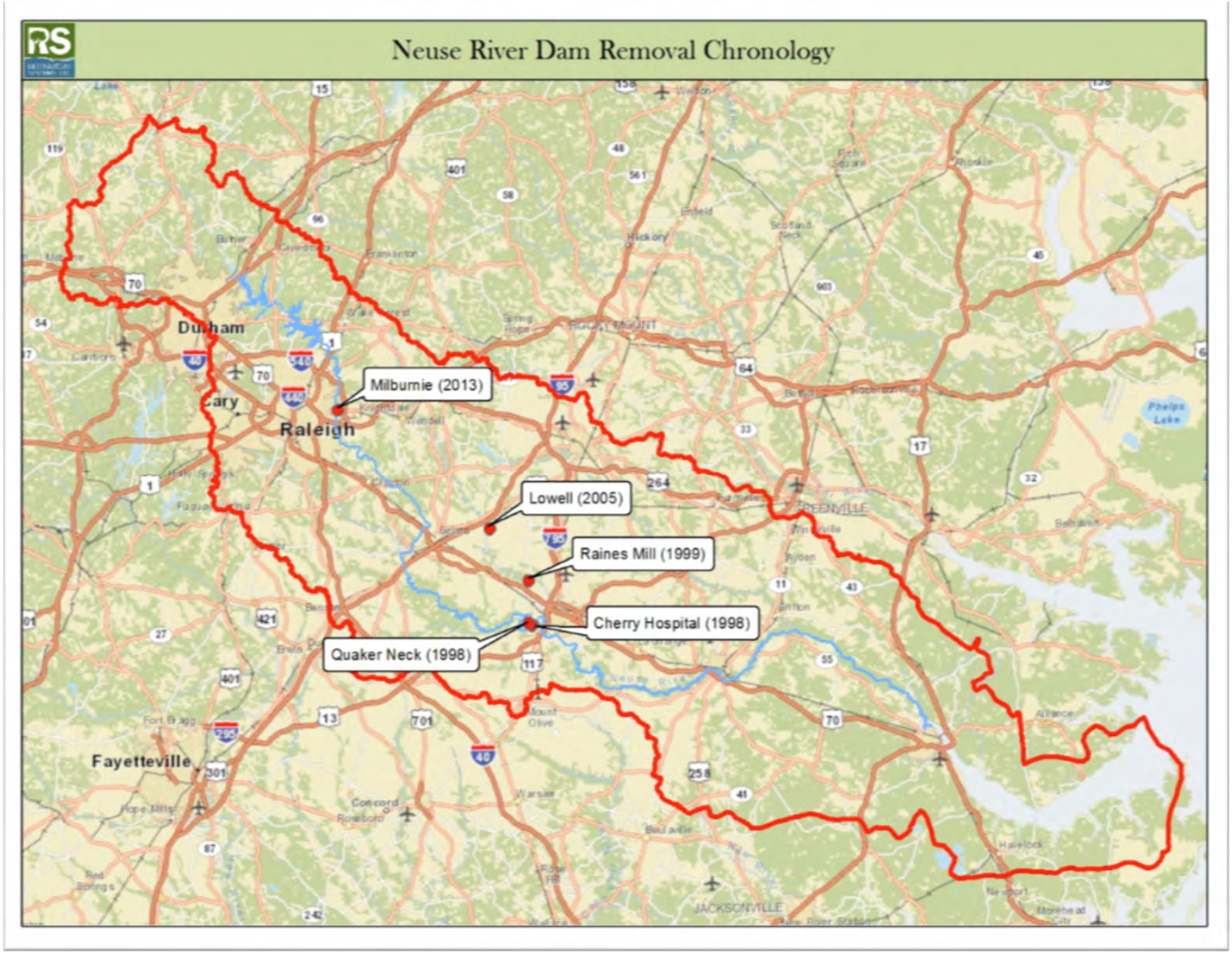
Neuse River Dam Removal Chronology
Milburnie (2013)
Lowell (2005)
Raines Mill (1999)
Cherry Hospital (1998)
Quaker Neck (1998)
Durham
Cary
Raleigh
Fayetteville
GREENVILLE
JACKSONVILLE

Milburnie Dam Mitigation Bank

MITIGATION BANKING INSTRUMENT

June 2016

MBI applied for 2010

MBI approved March 14, 2017

- IRT – USACE, USEPA, USFWS, NMFS, NCDWR, NCWRC, NCSHPO

401 permit received August 24, 2017

404 permit went ‘statutory’ August 9, 2017

Mobilization begin September 2017

RS

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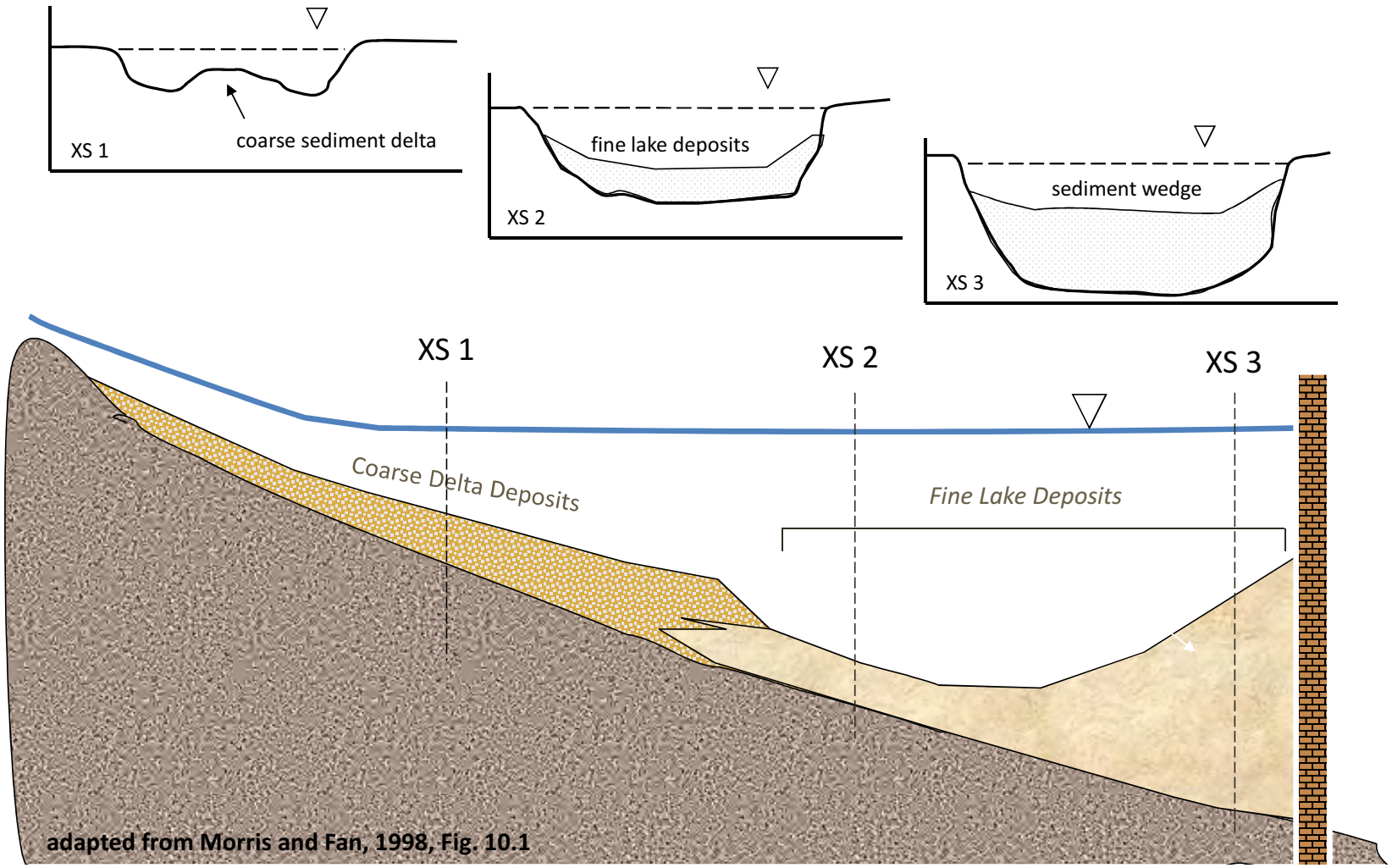
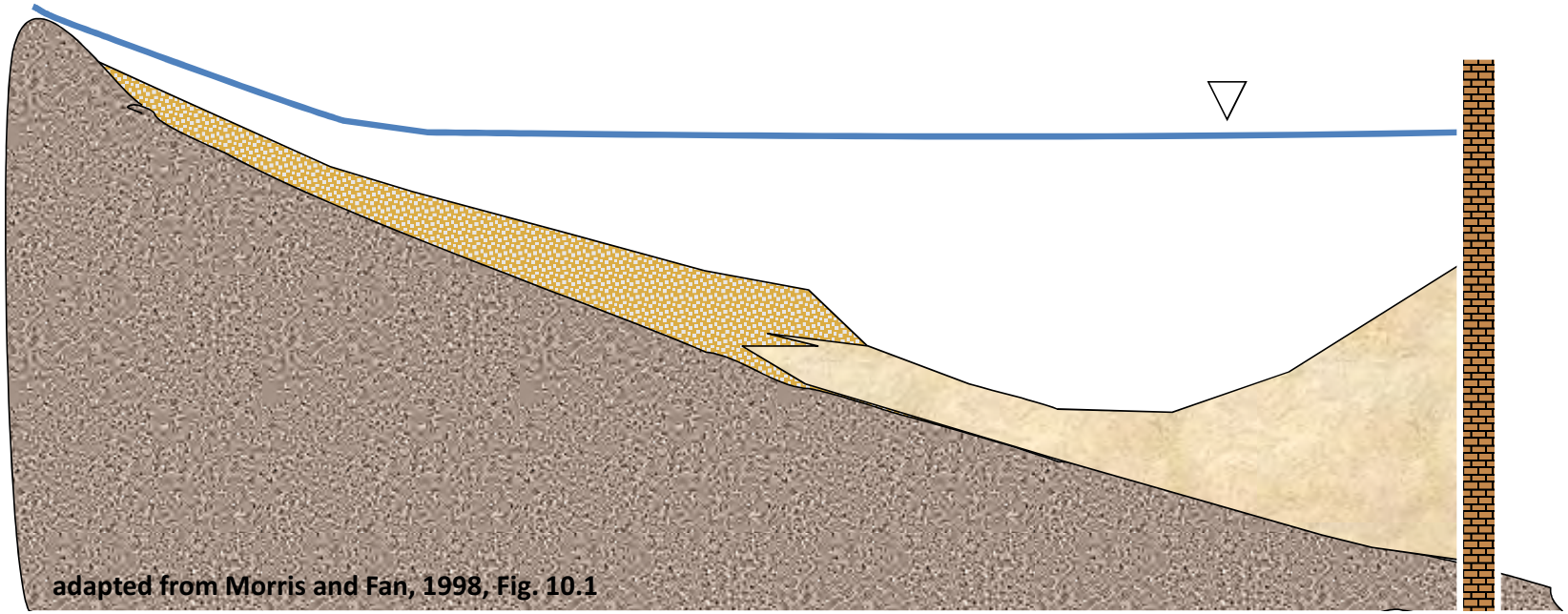
# Milburnie Removal Timelapse

# Reservoir Sedimentation



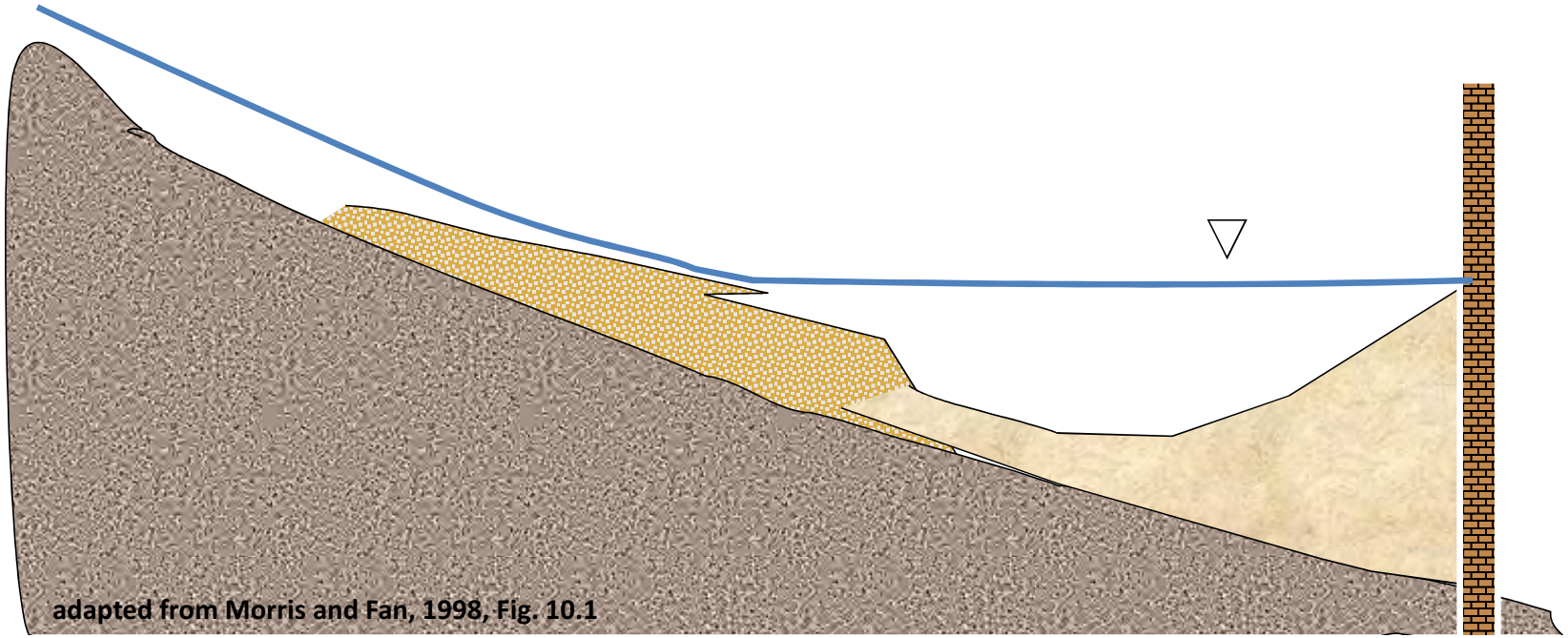

**adapted from Morris and Fan, 1998, Fig. 10.1**

# Impounded



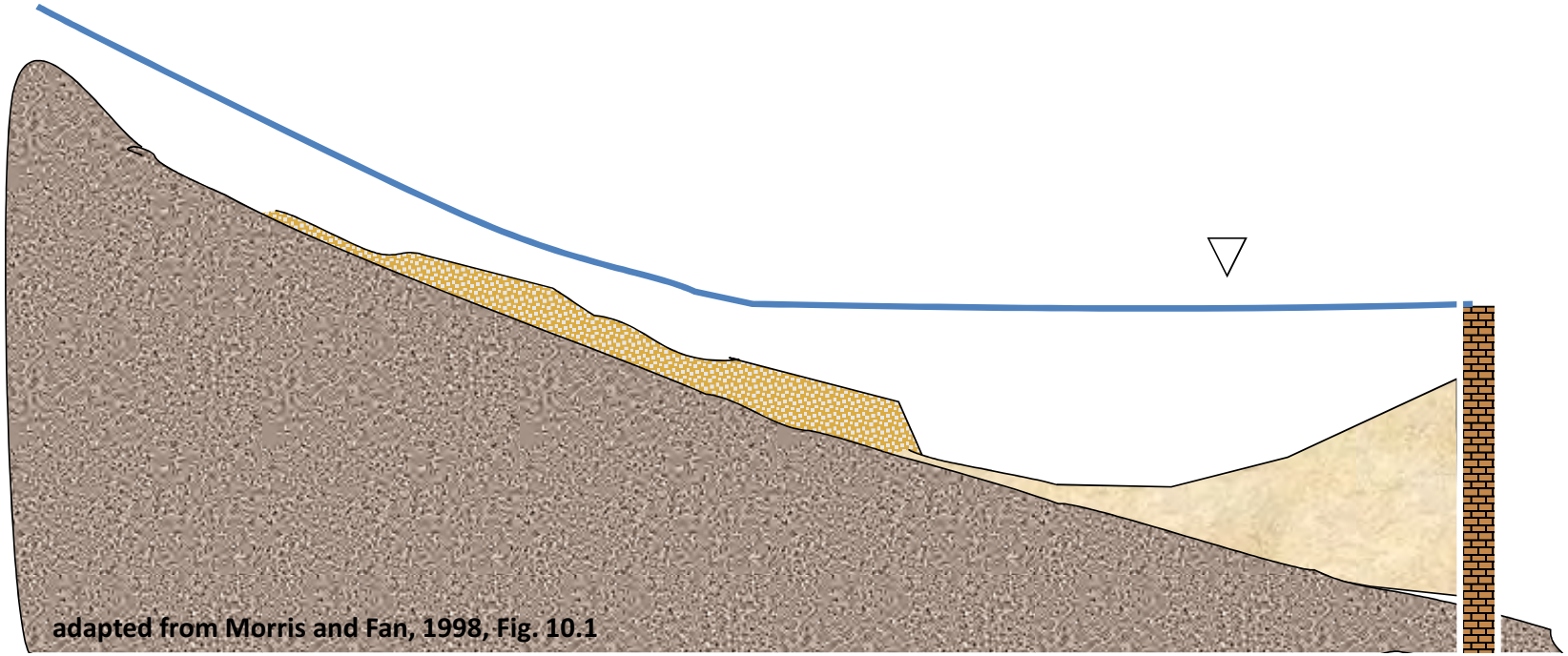
adapted from Morris and Fan, 1998, Fig. 10.1

# Dewatering



adapted from Morris and Fan, 1998, Fig. 10.1

# Lowering Phase I



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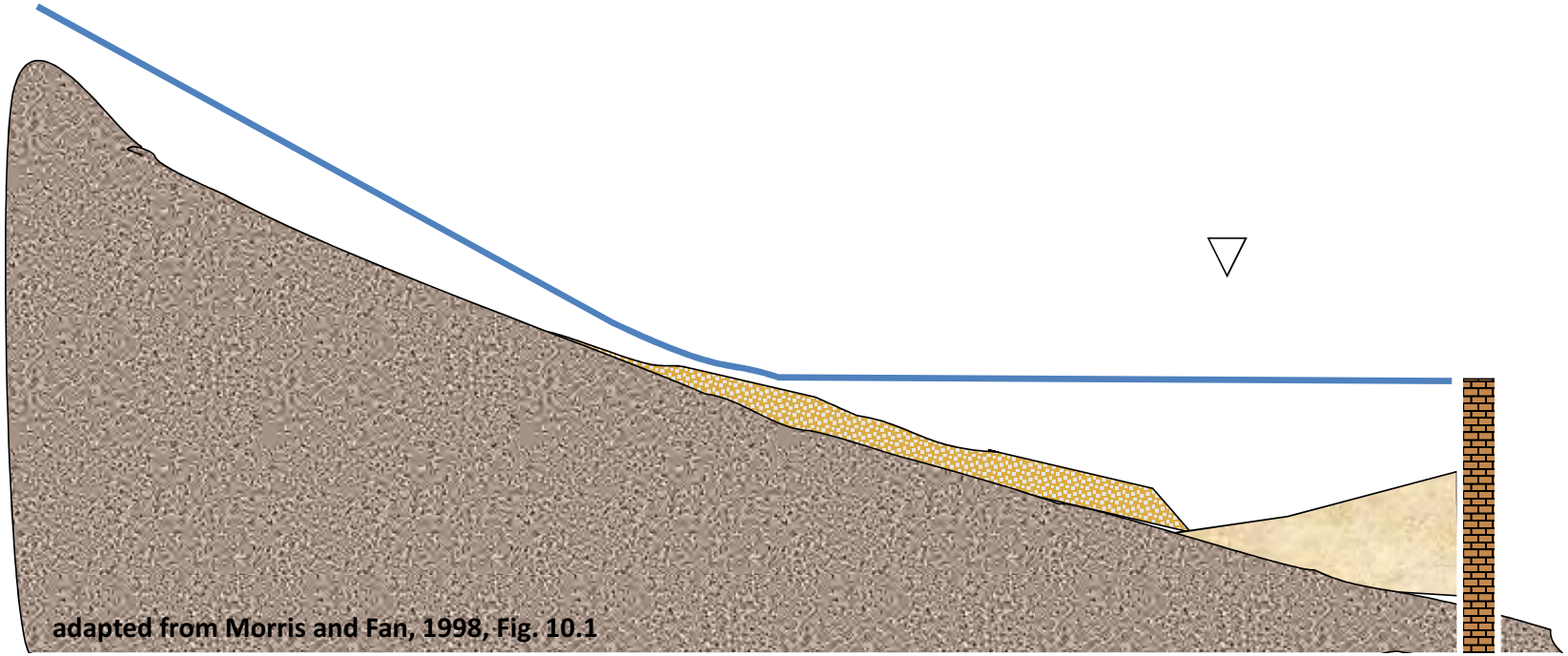
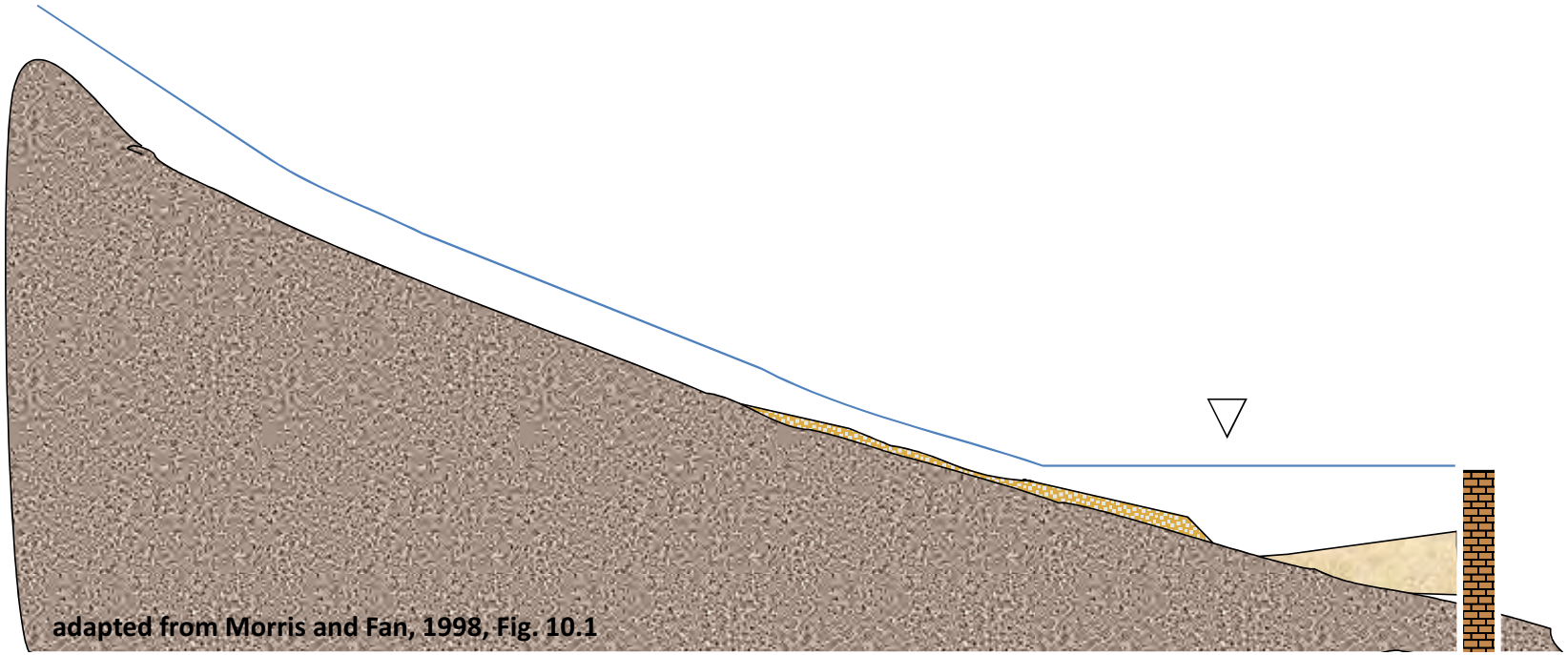
# Lowering Phase II



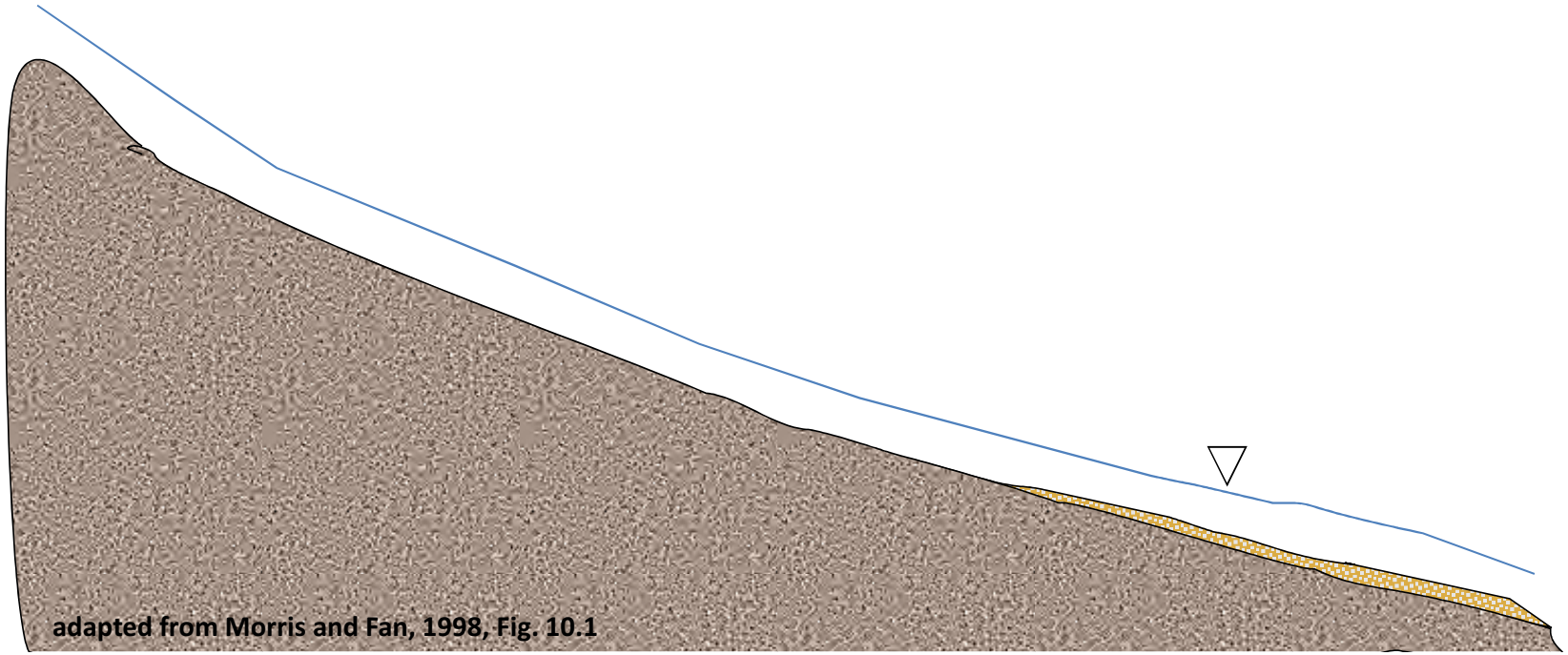
adapted from Morris and Fan, 1998, Fig. 10.1

# Lowering Phase III



adapted from Morris and Fan, 1998, Fig. 10.1

# Complete Removal



adapted from Morris and Fan, 1998, Fig. 10.1

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# Success Criteria

- Anadromous fish passage!!
- Appropriate aquatic community
- Water quality
- Rare and protected species

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# “Traditional” Stream Mitigation by Natural Channel Design

USACE SOP

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

Geophysical stability

Vegetation survival

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# 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!

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# 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

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# 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

SOUND RIVERS

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.

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# Reasons for guideline retractions

Hearsay Warning!  Nothing in writing from USACE

Dam removals would displace Natural Channel Design
Improvements too large > 30,000 linear feet
“Too many credits” produced
No “buffers” protected
Too much $$$ could be made


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July 13, 2005 Natural Vegetated Wetland

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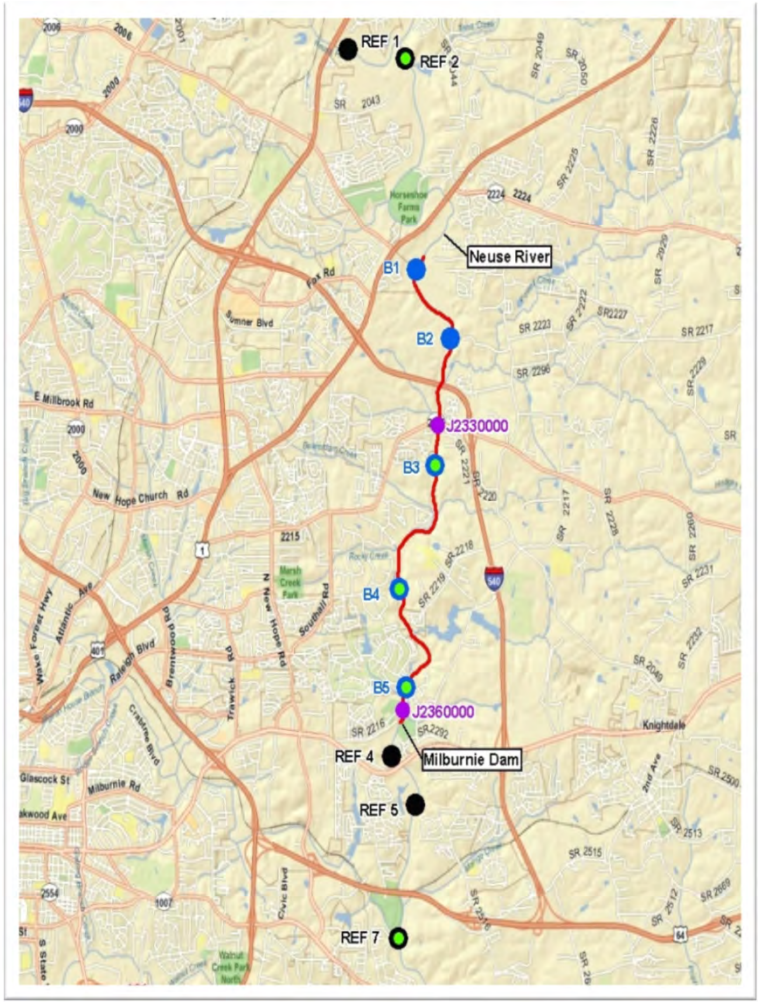
# Water Quality and Benthics

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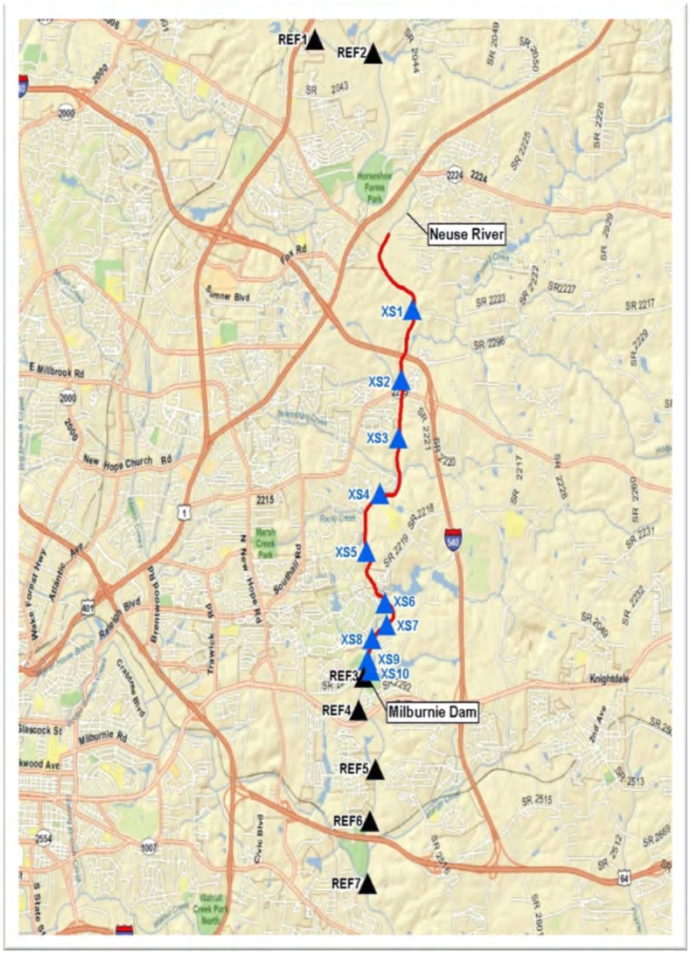
# Geomorphology and Habitat

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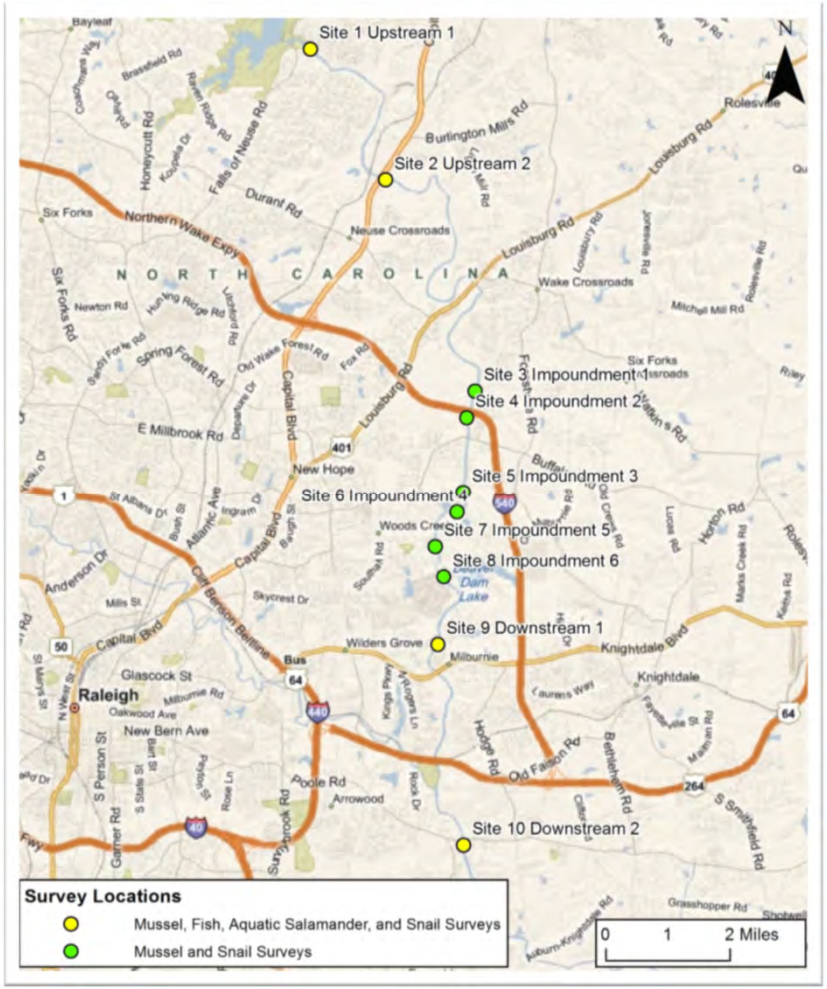
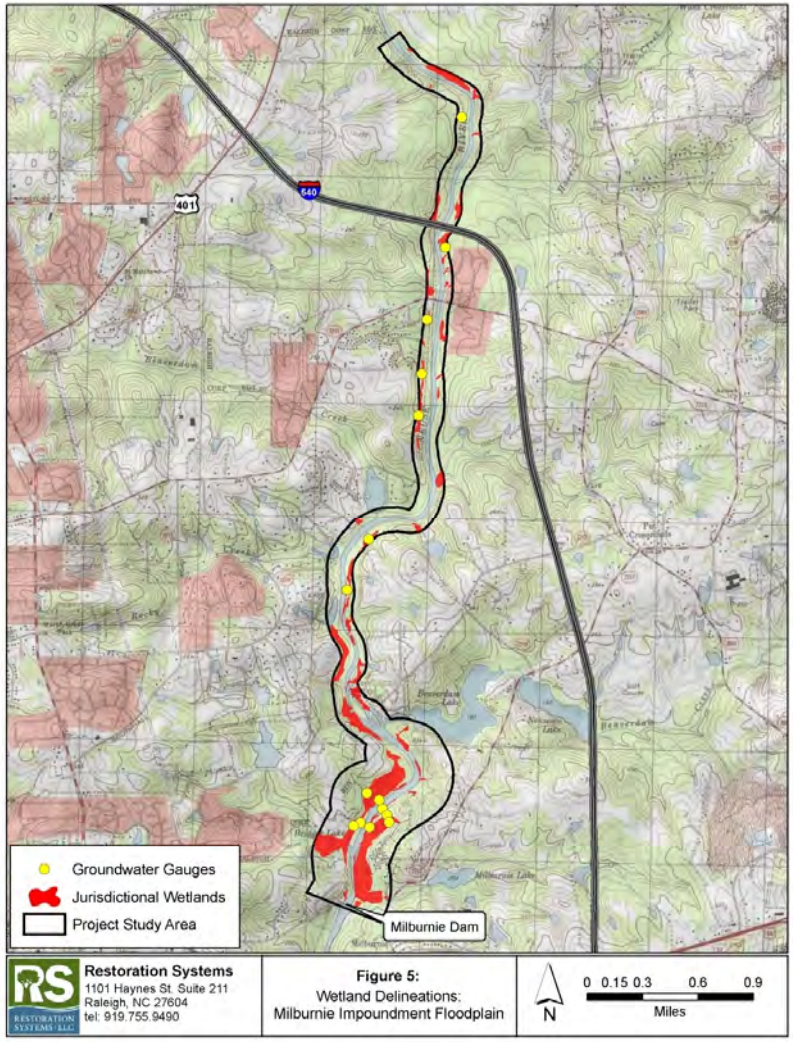
# Biological Survey Locations



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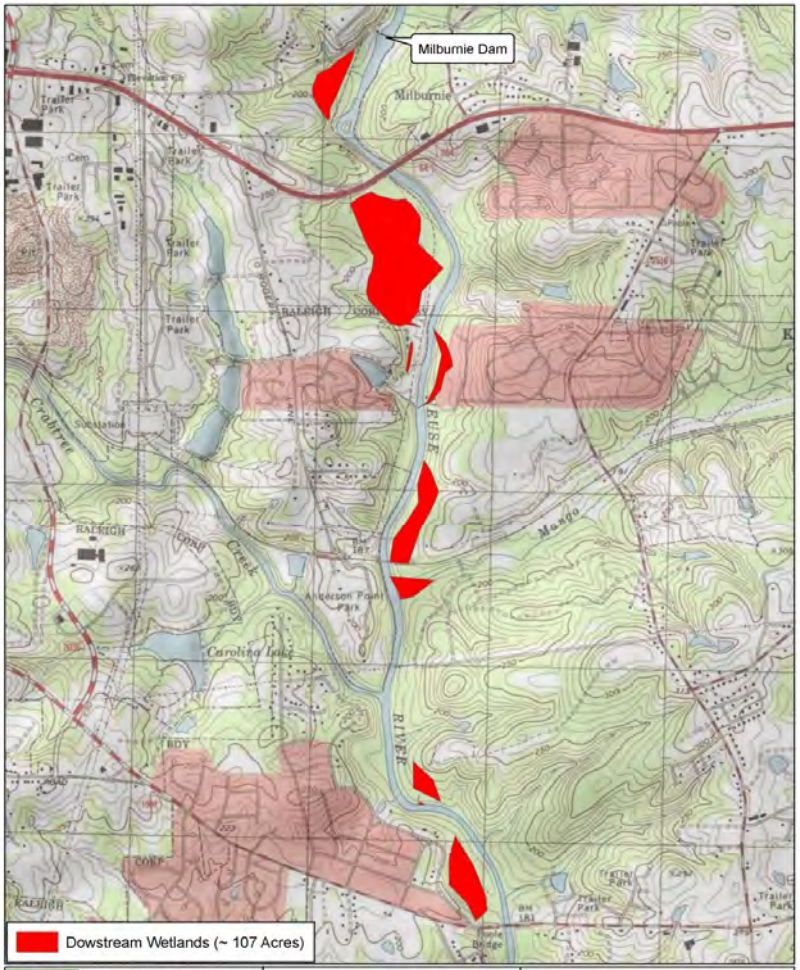
Cardno ENTRIX




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

**Figure 7:**
Delineated Wetland Locations:
Downstream of Milburnie Dam

N

0 0.1 0.2 0.4 0.6
Miles

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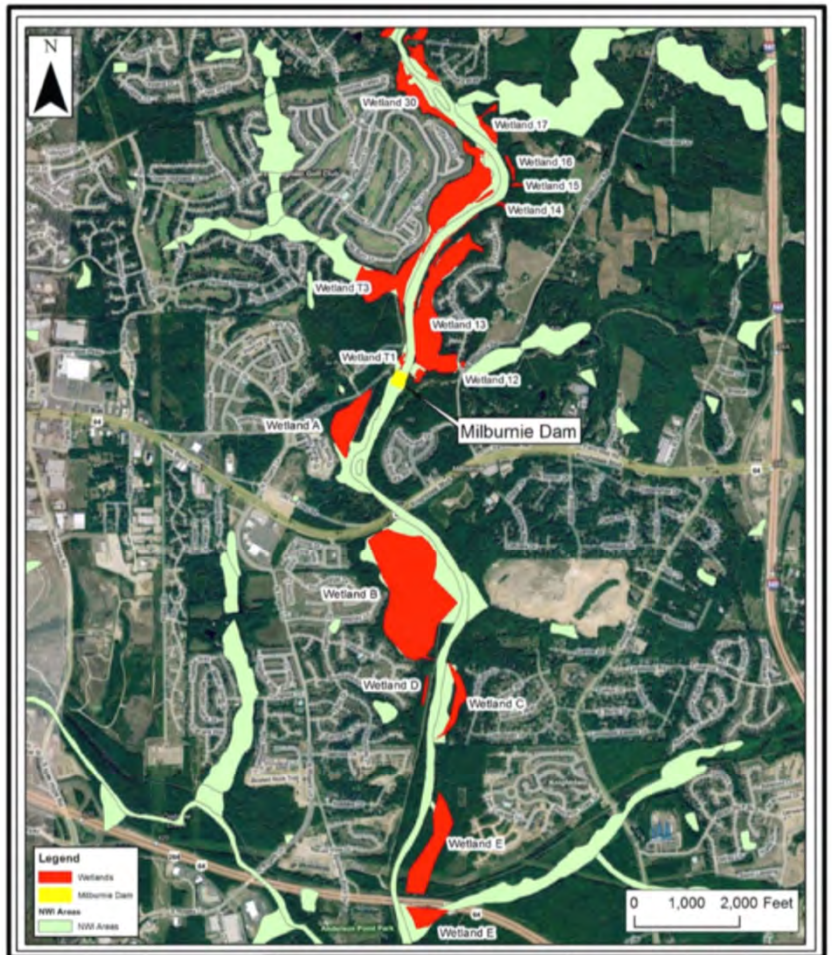


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2018 Milburnie Dam Removal Anadromous Fish Monitoring
April 25 – May 1, 2018
American Shad (*Alosa sp*.) caught on the Neuse River at the tail race of the Falls Lake Dam


EJ Stern GoPro Video


Kevin Thomas




Mike Goddard


Chris Gardner


Kevin Thomas

Tyler Tschopp


Stacy Gilmore


LOCAL

# 'We're going to have a different river.' Without Milburnie Dam, the Neuse comes alive.

# Thank you!