



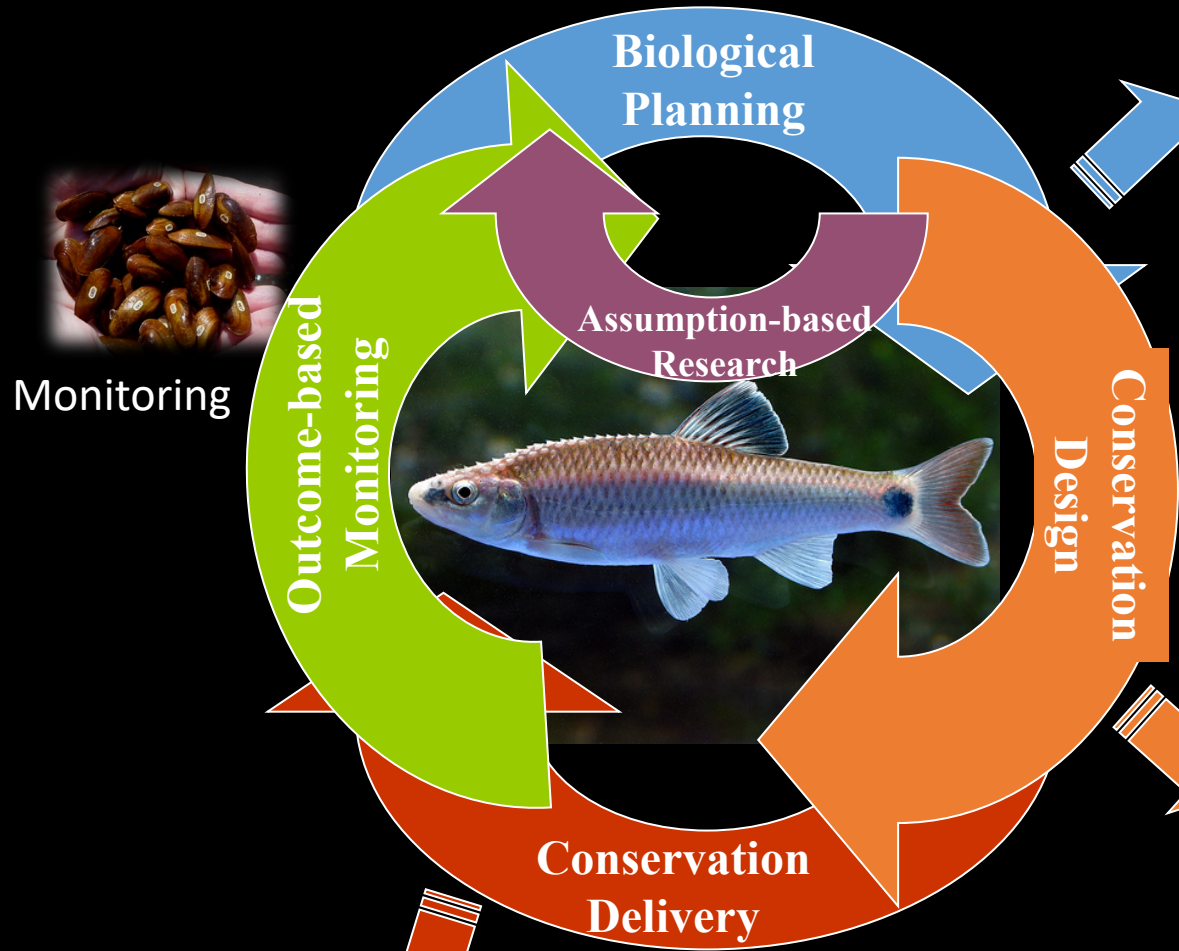
Partnering for Protection:

How Aquatic Species and Water Quality Benefit from a Multidisciplinary Approach to Conservation

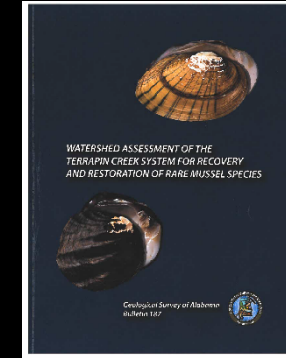
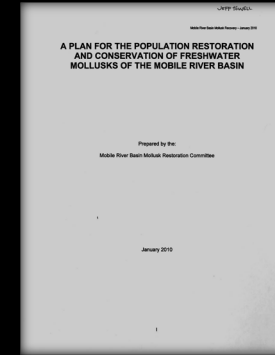
Stuart McGregor (GSA), Rebecca Bearden (GSA),
Daniel West (GSA), Pat O'Neil (retired GSA),
Jeff Powell (USFWS)



Strategic Habitat Conservation in Alabama



- Establishing baseline conditions
- Alabama Aquatic Biodiversity Center
- Propagation & Reintroduction Plan
- Established Priority Species List



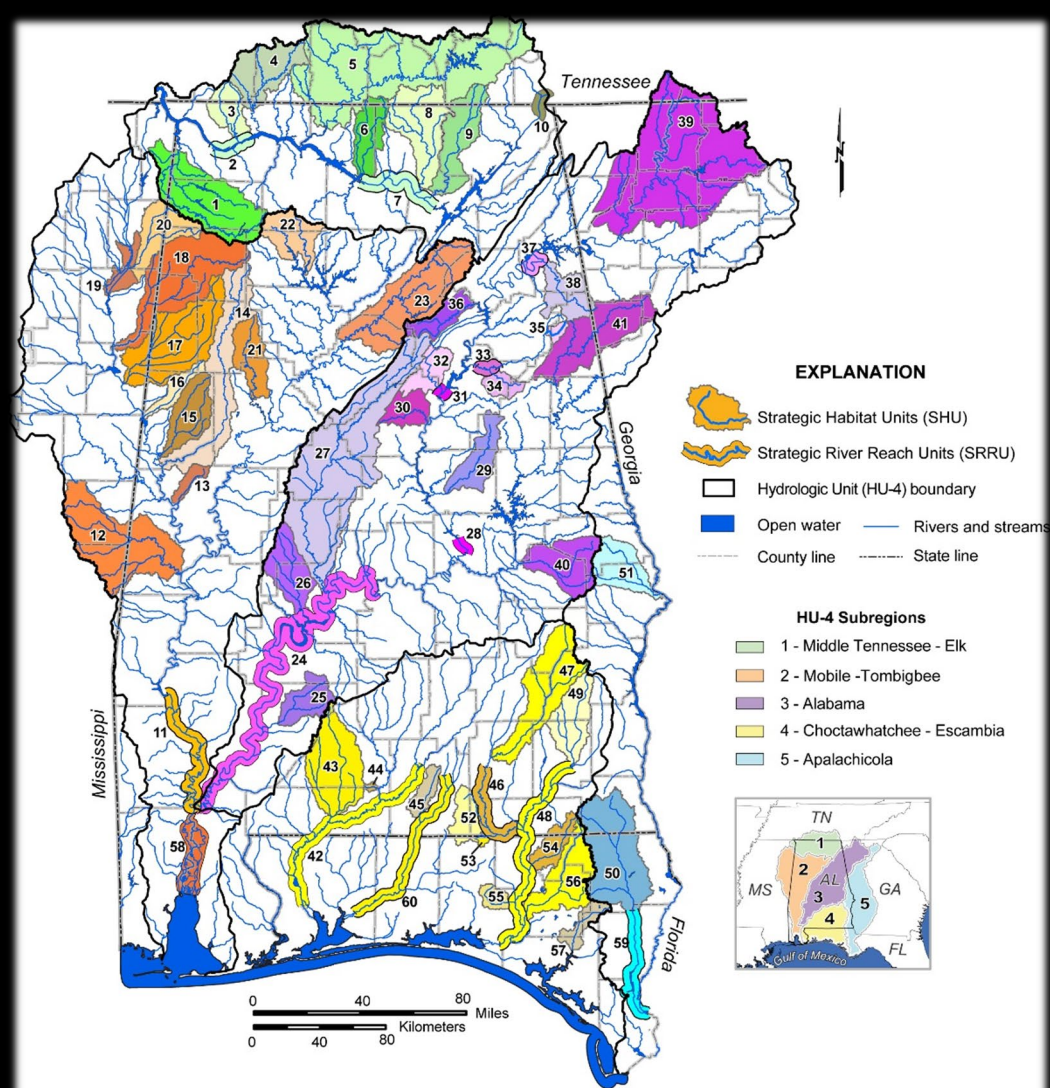
Working toward developing a landscape model that is protective of:

- habitat quality
- hydrology – environmental flows
- water quality
- biotic integrity – e.g., IBI

- PFW
- County-level planning
- Reintroductions
- CAWACO RC&D



Alabama Strategic Habitat Unit Map



- 60 SHUs
- 4 HUC 4 sub basins
 - Alabama River
 - Mobile-Tombigbee
 - Middle Tennessee
 - Choctawhatchee-Escambia
- Focused restoration and recovery efforts on highest priority areas that yield the greatest benefit

Unit	Name	Unit	Name	Unit	Name
1	Bear Creek	21	North River	41	Upper Tallapoosa River
2	Tennessee River at Wilson Dam	22	Upper Sipsey Fork	42	Conecuh- Escambia River
3	Cypress Creek	23	Locust Fork	43	Murder Creek
4	Shoal Creek	24	Lower Alabama River	44	Amos Mill Creek
5	Elk River	25	Big Flat Creek	45	Five Runs Creek
6	Limestone Creek	26	Bogue Chitto Creek	46	Lower Pea River
7	Tennessee River at Guntersville Dam	27	Cahaba River	47	Upper Pea River
8	Flint River	28	Coosa River at Jordan Dam	48	Lower Choctawhatchee River
9	Paint Rock River	29	Hatchet Creek	49	West Fork Choctawhatchee River
10	Tennessee River at Nickajack Dam	30	Yellowleaf Creek	50	Upper Chipola River
11	Lower Tombigbee River	31	Coosa River at Logan Martin Dam	51	Uchee Creek
12	Sucarnoochee River	32	Kelly Creek	52	Flat Creek
13	Trussells Creek	33	Lower Choccolocco Creek	53	Limestone Creek
14	Sipsey River	34	Cheaha Creek	54	Wrights Creek
15	Lubbub Creek	35	Shoal Creek	55	Bruce Creek
16	Coalfire Creek	36	Big Canoe Creek	56	Holmes Creek
17	Luxapallia Creek	37	Weiss Lake bypass (Old Coosa River)	57	Econfinia Creek
18	Buttahatchee River	38	Terrapin Creek	58	Mobile - Tensaw River Delta
19	East Fork Tombigbee River	39	Oostanaula River	59	Lower Chipola River
20	Bull Mountain Creek	40	Uphapee Creek	60	Yellow River

Network Mission Statement ...to study, manage, and develop our water resources in a scientific and comprehensive way to minimize their degradation, maximize their availability for all users, and restore and recover aquatic species.

Species list contains ~250 Federally threatened, endangered, candidate, and State P1 and P2 species of concern

Strategic Habitat and River Reach Units for Aquatic Species of Conservation Concern in Alabama - Species List

PAUL E. OWEN, RAND W. MCGREGG, E. ANNE WYSE - Geological Survey of Alabama; JEFFREY R. POWELL, JENNIFER M. PHELPS, and ARTHUR D. FORD - U.S. Fish and Wildlife Service; and PAUL D. JOHNSON and JEFFREY T. OSWEN - Alabama Department of Conservation and Natural Resources

Species	Conservation status	Middle Tennessee-Elk (0603) subregion										Mobile-Tombigbee (0316) subregion										Alabama River (0315) subregion										Apala	Choctaw (03																		
		Bear Creek	Tennessee River-Wilson dam tailwater	Cypress Creek	Shoal Creek	Elk River	Limestone, Piney, Beaverdam Creeks	Tennessee River-Guntersville dam tailwater	Flint River	Paint Rock River	Tennessee River-Nickajack dam tailwater	Lower Tombigbee River	Succumoochee River	Trussels Creek	Sipsey River	Lubbub Creek	Coalfire Creek	Luxapallia Creek	Buttatchee River	East Fork Tombigbee River	Bull Mountain Creek	North River	Sipsey Fork	Locust Fork	Alabama River	Big Flat Creek	Bogue Chitto Creek	Upper Cahaba River	Coosa River-Jordan dam tailwater	Hatchet Creek	Yellowleaf Creek	Coosa River-Logan Martin dam tailwater	Kelly Creek	Lower Choccolocco Creek	Cheaha Creek	Shoal Creek	Big Canoe Creek	Weiss Lake bypass (Dead River)	Terrapin Creek	Upper Coosa tributaries	Uphabee, Choctawhatchee, Chewacla Cr.s	Tallapoosa River	Conecuh River	Murder Creek							
Scientific name	Common name	USFWS	Alabama	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				
Mussels																																																			
<i>Actinonaias ligamentina</i>	Mucket		P1	X	H			H		H			X	H																																					
<i>Alasmidonta triangulata</i>	Southern Elktoe		P1																																																
<i>Alasmidonta viridis</i>	Slippershell Mussel		P1								X	X	H																																						
<i>Anodonta hartfieldorum</i>	Cypress Floater		P2																																																
<i>Cumberlandia monodonta</i>	Spectaclecase	E	P1		X			H		X																																									
<i>Cyprogenia stegaria</i>	Fanshell	E	P1		X			H		H																																									
<i>Elliptio arca</i>	Alabama Spike		P1											H	H		X		X	X		X																													
<i>Elliptio arctata</i>	Delicate Spike		P1											H	H		X			X																															
<i>Elliptio dilatata</i>	Spike		P1		X			H	H	H	X		X	H																																					
<i>Elliptio fumata</i>	Gulf Slabshell		P2																																																
<i>Elliptio mcMichaeli</i>	Fluted Elephantear		P1																																																
<i>Elliptio purpurella</i>	Inflated Spike		P1																																																
<i>Epioblasma brevidens</i>	Cumberlandian Combshell	E	P1	X	H					H																																									
<i>Epioblasma metastriata</i>	Upland Combshell	E	Ex																																																
<i>Epioblasma othcaloogensis</i>	Southern Acornshell	E	Ex																																																
<i>Epioblasma penita</i>	Southern Combshell	E	P1											H																																					

X-present, E-endangered, T-threatened, C-candidate, Ex-extirpated, H-historic, I-introduced, P1-highest conservation concern, P2-high conservation concern



Alabama Rivers and Streams Network



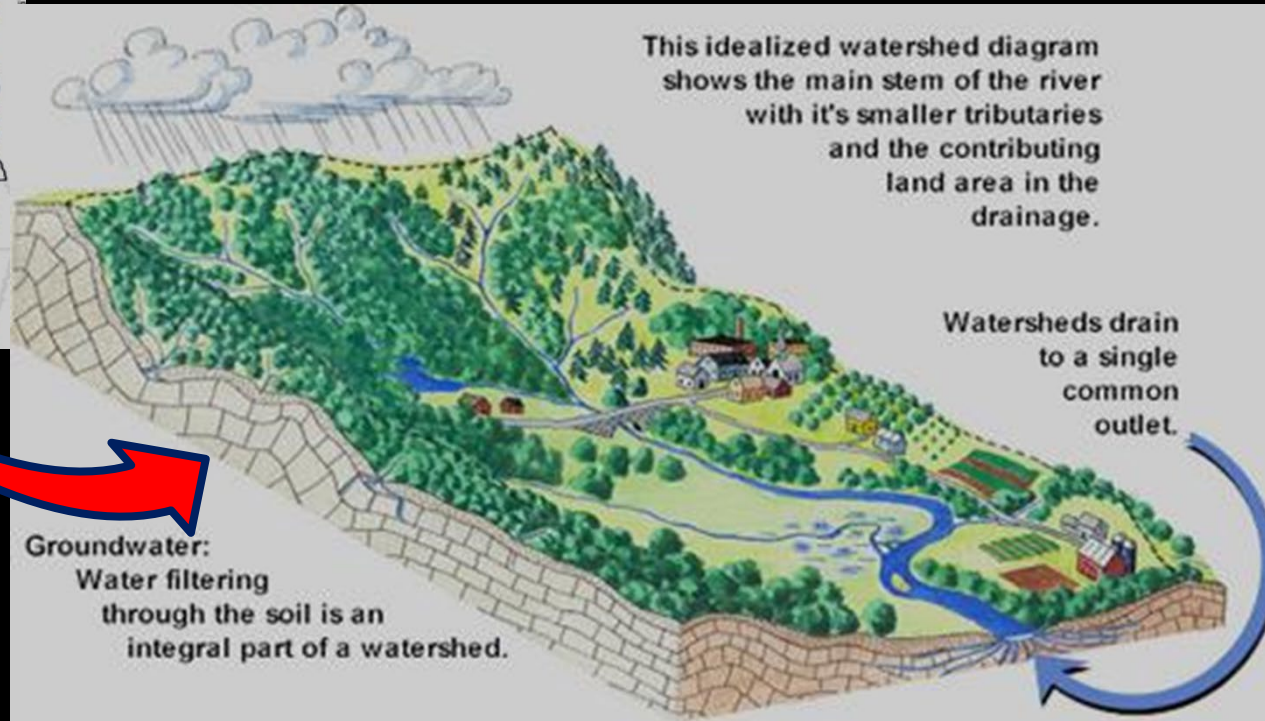
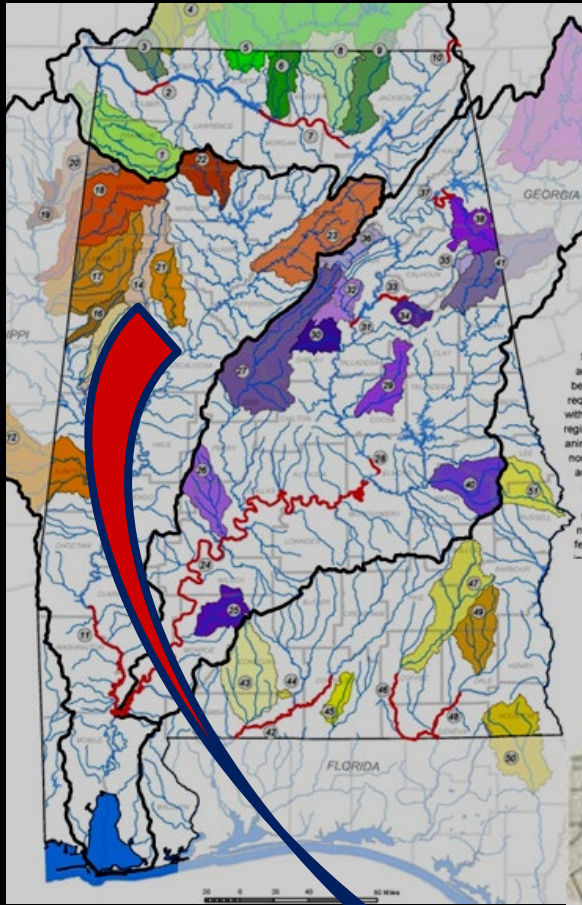
ncasi



US Army Corps of Engineers



So, what do we do in a SHU?





Assess
Restore
Recover
Monitor



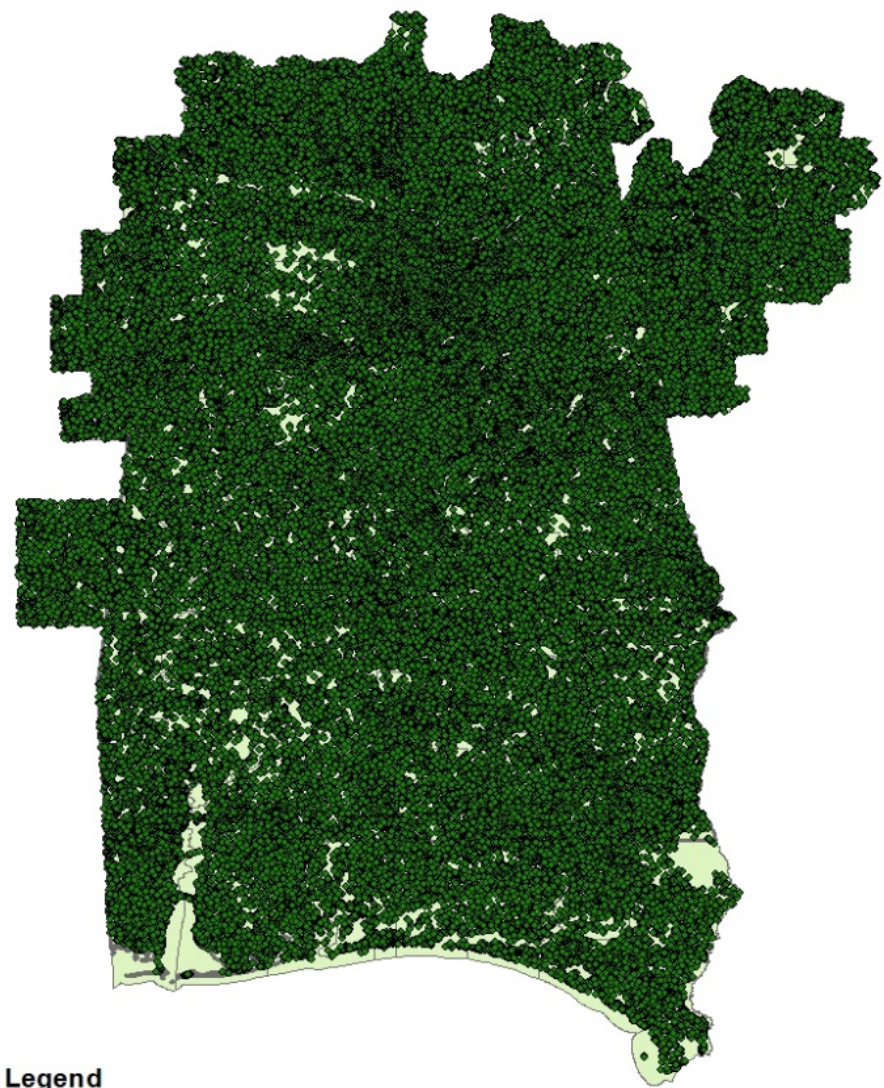
Sedimentation



Streamside Management Zones



Road
Crossings
=
Potential
Fish
Barriers

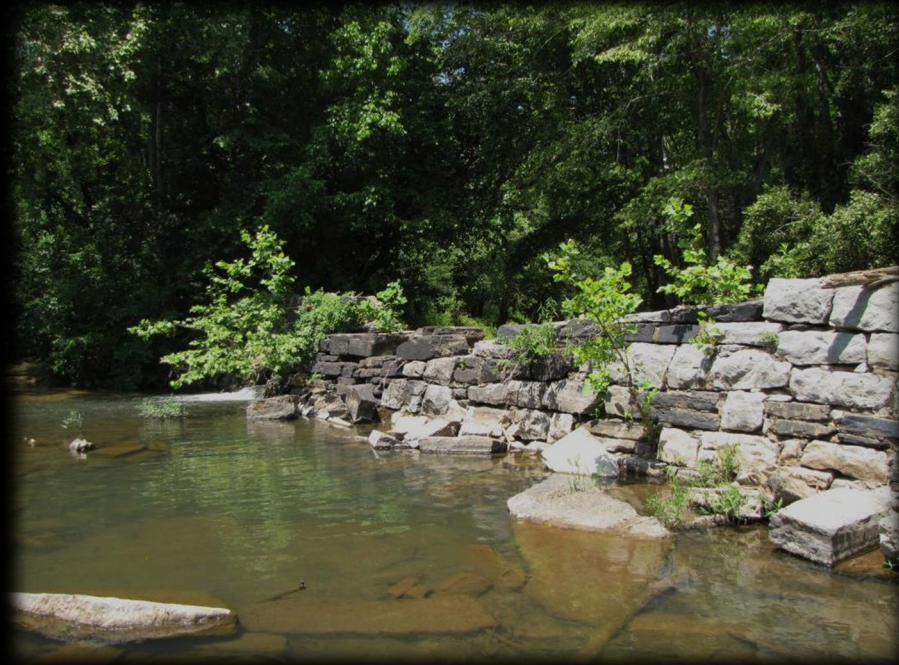


Legend

- ◆ Crossings (153,039)



Assess Restore Recover Monitor



Goodwin's Mill Dam Removal



Pre dam removal



Demolition



Post dam removal

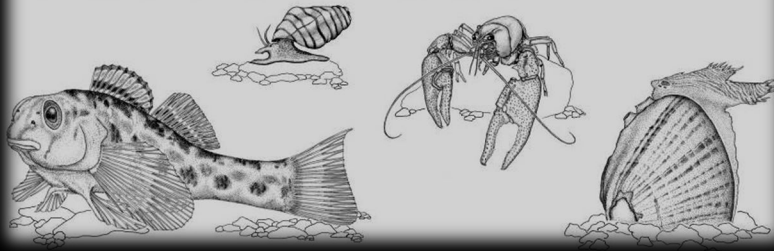
Habitat Improvement



Slackwater Darter, Limestone Co, AL



Assess
Restore
Recover
Monitor



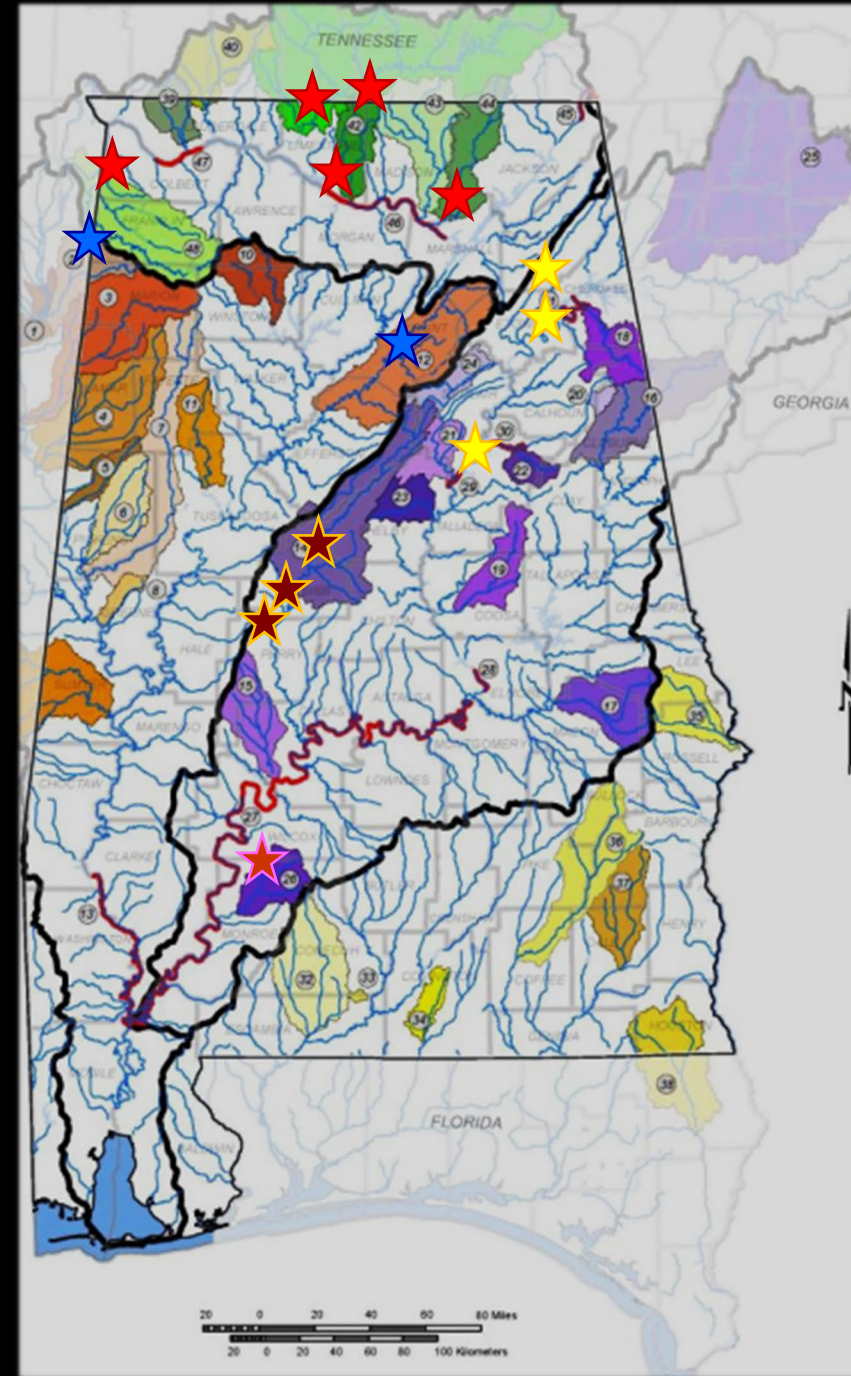


Mollusk Reintroductions 2010-2018

18 Species Released
Total Animals Released
179,437
2010-2017



Dr. Paul Johnson, Program Supervisor
Alabama Aquatic Biodiversity Center



Assess
Restore
Recover
Monitor



Example of Successful Partnerships

- **ALDOT / FHA / USGS / USACOE**
- **NRCS**
- **Toyota**
- **North River SHU**
- **FERC / Alabama Power Co & Southern Co**
- **PFW / Fisheries Program**
- **Cross-Region Coordination**





- ABOUT US
- RIVERS AND CREEKERS
- RESOURCES
- HOW TO GET INVOLVED

Alabama Rivers and Streams Network

Browse By Topic

- Mission Statement
- Interactive Map
- Strategic Habitat Units
- Educational Materials
- Success Stories

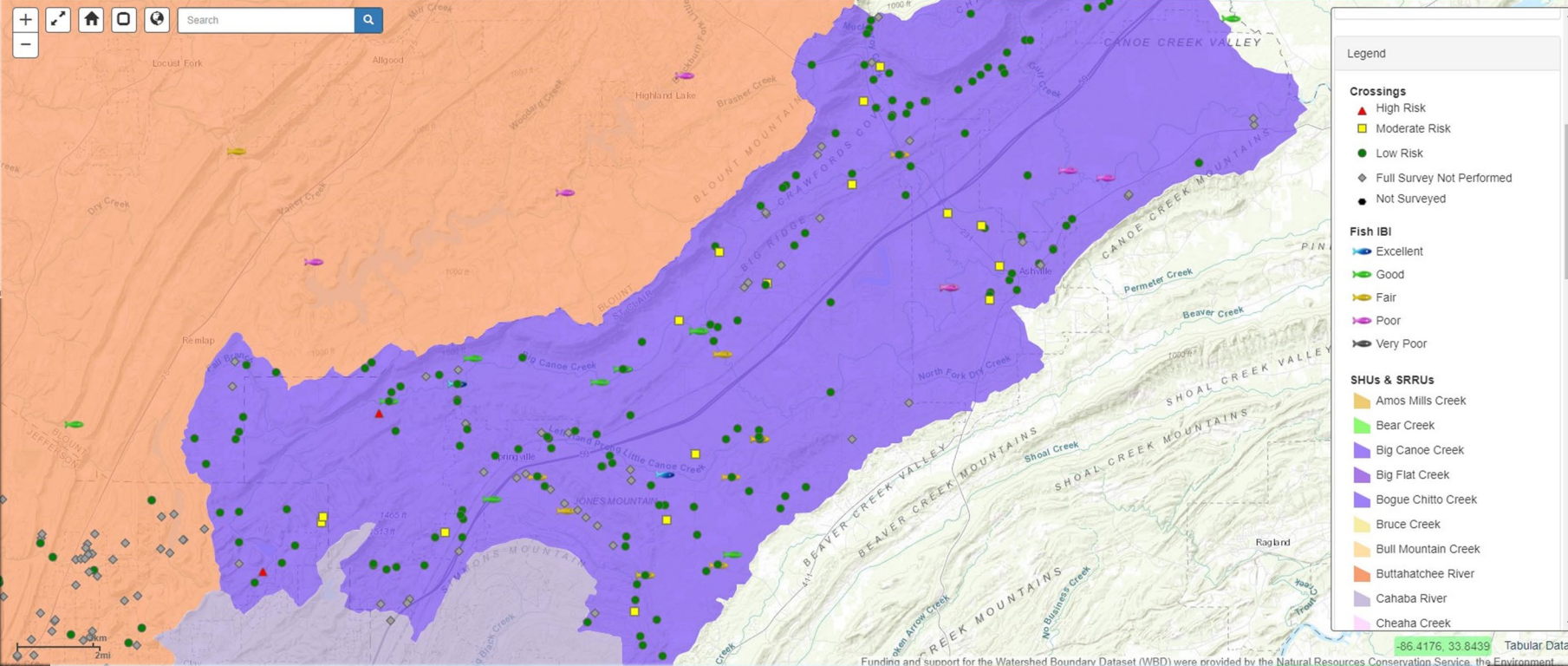


Alabama DOT Federal Highway Admin



- SCIENCE: Topics, centers, missions
- PRODUCTS: Maps, data, publications
- NEWS: Releases, I'm a reporter
- CONNECT: Contact, chat, social media
- ABOUT: Organization, jobs, budget

Alabama Rivers and Streams Network SHU Mapper



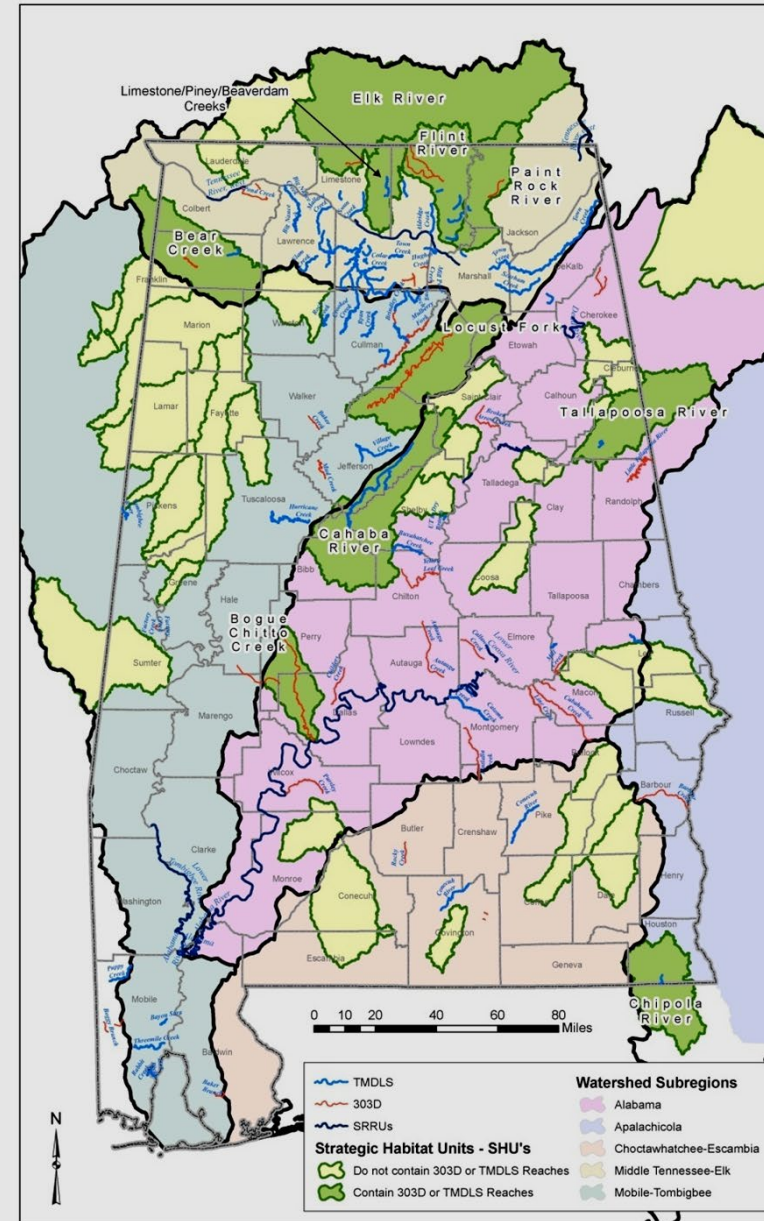
NRCS

NRCS uses SHUs to prioritize and rank potential Farm Bill Program funds

We focused on 4 watersheds and used the 374 species list to identify opportunities for conservation activities



303D/TMDLS From Ag Sources Over USFWS SHU's



North River SHU Project

GEOLOGICAL SURVEY OF ALABAMA

Aquatic Species Conservation in the Mobile River Basin The North River Strategic Habitat Unit

by Patrick E. O'Neil, Stuart W. McGregor, and E. Anne Wynn of the Geological Survey of Alabama and Jeffrey R. Powell of the U.S. Fish and Wildlife Service



Berry H. (Nick) Tew, Jr.
State Geologist

- Explanation**
- Streams
 - Major roads
 - County lines
 - 300(d) listed segments
 - Critical habitat segments
 - Towns
 - Mussel sampling stations
 - Recent IBI monitoring site
 - Historic IBI monitoring site
- Geology Map Units**
- Coker Formation
 - High terrace deposits
 - Pittsville Formation (upper part)
 - Wadebeds

BIOLOGICAL CONDITIONS

The North River watershed encompasses an area of 425 square miles and includes Lake Tuscaloosa, a public water supply reservoir that services Tuscaloosa County. The North River flows through two physiographic sections, the Cumberland Plateau and the East Gulf Coastal Plain. The northern and eastern parts of the North River and Lake Tuscaloosa basin lie in the Western

WATER QUALITY

Water quality in the North River/Lake Tuscaloosa watershed is controlled by interaction of the surface and groundwater hydrogeologic system. Shale and sandstone in the Pittsville Formation and sand and gravel in the Coker Formation have different controlling influences on surface and groundwater flow, which affect the transport of pollutants into Lake Tuscaloosa. Low-flow sampling during

Watershed Management Plan

<http://www.northriverwatershed.org/>

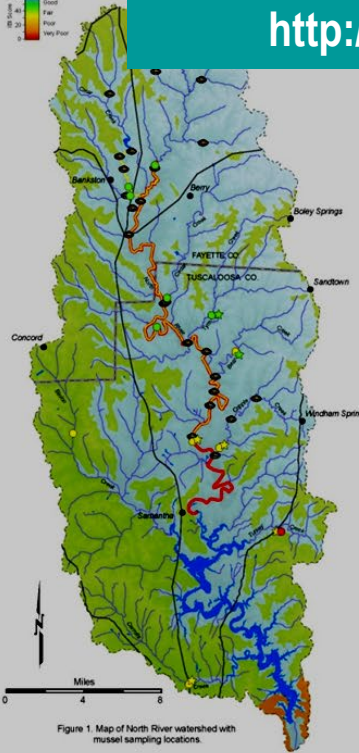


Figure 1. Map of North River watershed with mussel sampling locations.

federal protection, the Dark Pigtoe (*Pleurobema fursum*) and the Orange-nacre mucket (*Hamiota peovialis*) were collected live. Other protected species previously reported from the North River, the Alabama Moccasinshell (*Mediodon aculeosinus*) and the Triangular Kidneyshell (*Pygocorbanchus greenii*) were not collected, nor was *Pleurobema fagoti*, a species known from the drainage prior to 1920 but considered extinct by the U.S. Fish and Wildlife Service (USFWS).

During the spring and summer of 2008, mussel sampling in the North River system yielded 15 species, with 13 represented by live animals or fresh dead shells and two represented by weathered dead shells only (McGregor and Wynn, 2008). A total of 149 mussels either live or fresh dead were collected. One live and one fresh dead specimen of *Pleurobema fursum* were collected at one tributary station and one live or fresh dead specimen of *Hamiota peovialis* was collected at each of three stations, two in a tributary and one in the main channel. Shallow bed sediment quality was also determined from a composite grab sample from each of four stations. Low concentrations of constituents potentially toxic to freshwater mussels suggested no immediate concern to the health of the mussel population.

The biological condition of selected streams was evaluated by calculating the Index of Biotic Integrity (IBI) using fish community sampling data. The IBI is a biological assessment tool based on the health and ecological stability of the resident fish community (O'Neil and Shepard, 2000). Both historic (1979-88) and recent (2008-09) sampling data was used to calculate IBIs for the North River watershed. For biological condition overall, most streams rated in the fair IBI range with a few sites in the good IBI range. Biological condition has improved with time at some sites and declined at other sites.

The declining status of mussel populations and the general overall fair biological status for fish communities is attributable primarily to degraded habitat conditions in the upper watershed. Excessive sedimentation from poor land use practices can be observed throughout the upper watershed and is a common link between degraded mussel populations and impaired fish communities.

Table 1. Comparison of mussel population status between two sampling periods in the North River system.

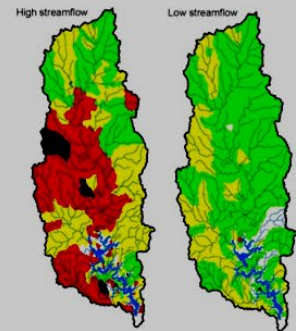
Species	Conservation	North River Status	
		1979-88	2008, 2009
<i>Ambloplita pilosula</i> - Threestripe	P4	1	1 wd
<i>Ambletocheilus radiatus</i> - Royal Crabshell	P2	1	4
<i>Elpistia alba</i> - Alabama Shole	P1	1	4
<i>Elpistia arcata</i> - Delicata Sole	P1	2	34
<i>Hamiota peovialis</i> - Orange-nacre Mucket	T, P2	13	3
<i>Hamiota conata</i> - Southern Puddinstone	P4	10	2
<i>Lampisila shrammii</i> - Southern Fatmucket	P3	31	23
<i>Lampisila latera</i> - Yellow Slatemucket	P5	1 wd	2
<i>Pleurobema fursum</i> - Dark Pigtoe	E, P1	25	2
<i>Pleurobema grandis</i> - Giant Flower	P5	1	1 wd
<i>Quadrula asperata</i> - Alabama Crb	P5	20	12
<i>Quadrula venosus</i> - Pinkie	P4	3	12
<i>Strophitus subvittatus</i> - Southern Creakmucket	P3	60	27
<i>Musculista lateralis</i> - Flanthon	P6	-	-
<i>Villosa lenae</i> - Life Scaleshell	P5	6	17
<i>Villosa ubera</i> - Southern Rainbow	P5	12	10
TOTAL		199	149

1 - Endangered; 2 - Threatened; P1 - Highest conservation concern; P2 - High conservation concern; P3 - Moderate conservation concern; P4 - Low conservation concern; P5 - Lowest conservation concern.

2 - Total live animals and fresh dead shells; except wd = weathered dead shells, not included in totals.

3 - From McGregor and Pierson (1999).

Figure 2. Occurrence of *E. coli* bacteria in the North River watershed during high and low streamflows (O'Neil and others, 2006).

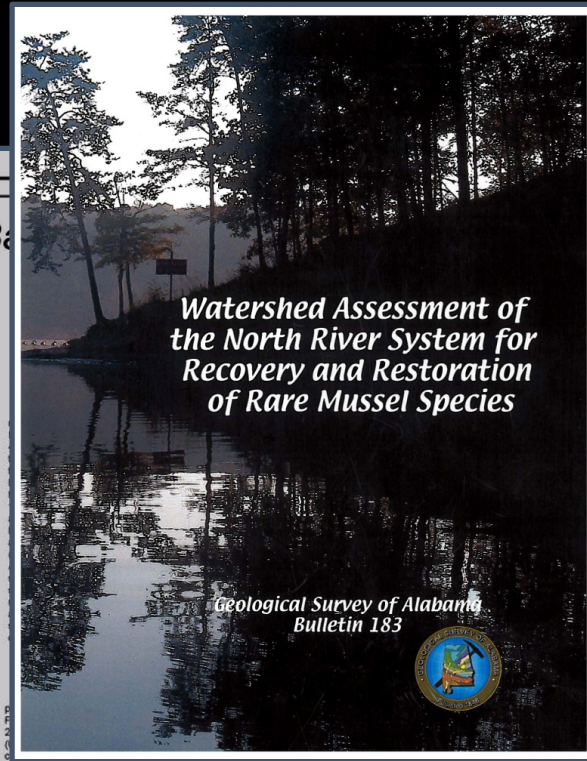


E. coli bacteria concentrations (cfu/100 mL)

- 1-200
- 201-1,000
- 1,001-10,000
- 10,001-20,000

References cited

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- McGregor, S.W., and Pierson, J.M., 1999. Recent freshwater mussel (*Bivalvia Unionacea*) records from the North River system, Fayette and Tuscaloosa Counties, Alabama. *Journal of the Alabama Academy of Sciences*, vol. 70, p. 153-162.
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Watershed Assessment of the North River System for Recovery and Restoration of Rare Mussel Species

Geological Survey of Alabama
Bulletin 183



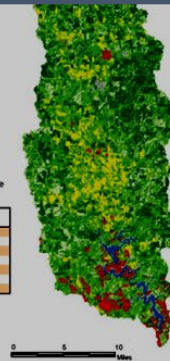
and land cover classes were identified using the spectral properties of the imagery. Urban and mining areas were isolated using historical topographic maps from the 1970s and aerial photography from 2006 (USDA, 2006). Classes were further modified with the aid of ancillary GIS layers. NPDES mining sites (ADEM, 2007) and GNIS (USGS, 2009b) populated areas were digitized and clipped out of the imagery. The USGS National Land Cover Dataset (USGS, 2003) was also referred to during the classification process. Percent coverage of land cover classes is shown in table 2.

Table 2. Percent coverage of land cover classes in the North River watershed, 1974 and 2005.

Category	1974	2005	Percent change
Open water	2.38	1.93	-15.4
Evergreen	20.45	27.44	34.2
Agriculture	6.53	8.38	11.8
Mixed forest	59.56	49.45	-17.0
Developed	1.98	1.62	-8.9
Transitional vegetation	7.29	10.78	47.9
Wetlands	0.29	0.20	-21.4

Explanation

- Open water
- Evergreen
- Agriculture
- Mixed forest
- Developed
- Transitional vegetation
- Wetlands



North River SHU Sediment Pits

45 basins have been installed since 2011 in
Fayette and Tuscaloosa Counties

TOTAL Measurable Sediment Reduction =
500 tons



Recognizing the Economics



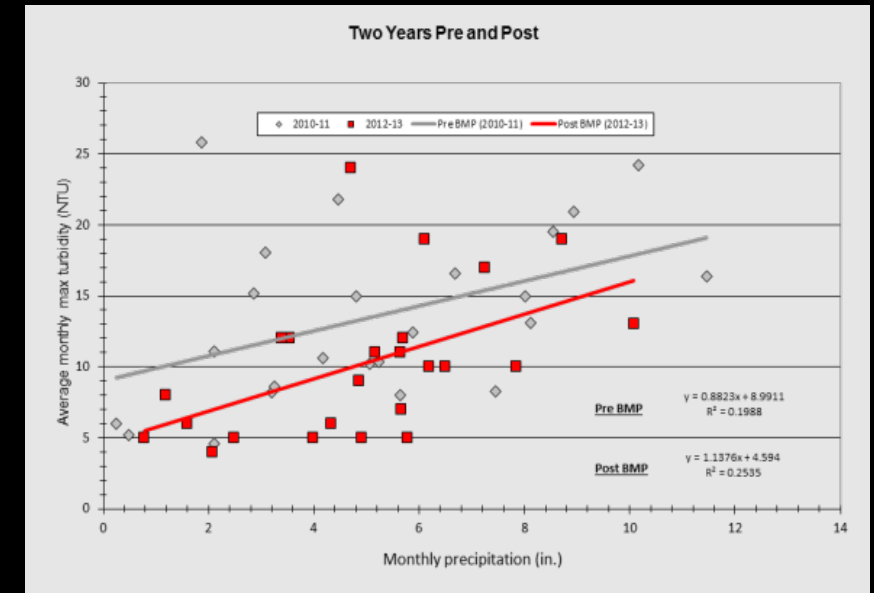
Photo credits to Dr. Guenter Schuster (Eastern Kentucky University - retired)

- In 2010 and 2012, the Alabama Field Office funded 2 studies to assess the populations of 6 crayfishes from the CBD mega-petition list found in AL
- Based on the results, CBD has withdrawn 6 crayfishes from the petition (along with several freshwater snails)
- Combined, the 2 studies cost \$50,000
- Savings of ~\$800K by this early action and working with partners

Ecosystem services

- Since 2011, 45+ sediment pits installed in the North River watershed
- Reduced turbidity in drinking water source
- Saved the Town of Berry ~\$20K/year in chemical costs

Town of Berry, Alabama



Key SHU Accomplishments (2010 - 20)

- 188,400+ individual snails and mussels released
 - *19 species in 16 basins*
- 153,700+ of these were listed species
- 519 Index of Biotic Integrity assessments
- 5,500 stream/road crossing assessments
- 30 reports and papers
- 35 college interns/students have participated
- 60+ ARSN members and cooperators

Key SHU Accomplishments (2010- 20)

- 3 species have been listed
- 1 species has been down-listed
- 4 species have been de-listed
- 13 species have avoided listing
- 41 restoration projects have been completed
 - *16 barrier removals (opened >1,000 miles of stream)*
 - *25 streambank restorations*
- North River project prevented >1,000 tons of sediment from smothering stream habitat

Communication

com·mu·ni·ca·tion
kə ,myoŋnə 'kāSH(ə)n/

1.1. the imparting or exchanging of information or news.

- the successful conveying or sharing of ideas and feelings.

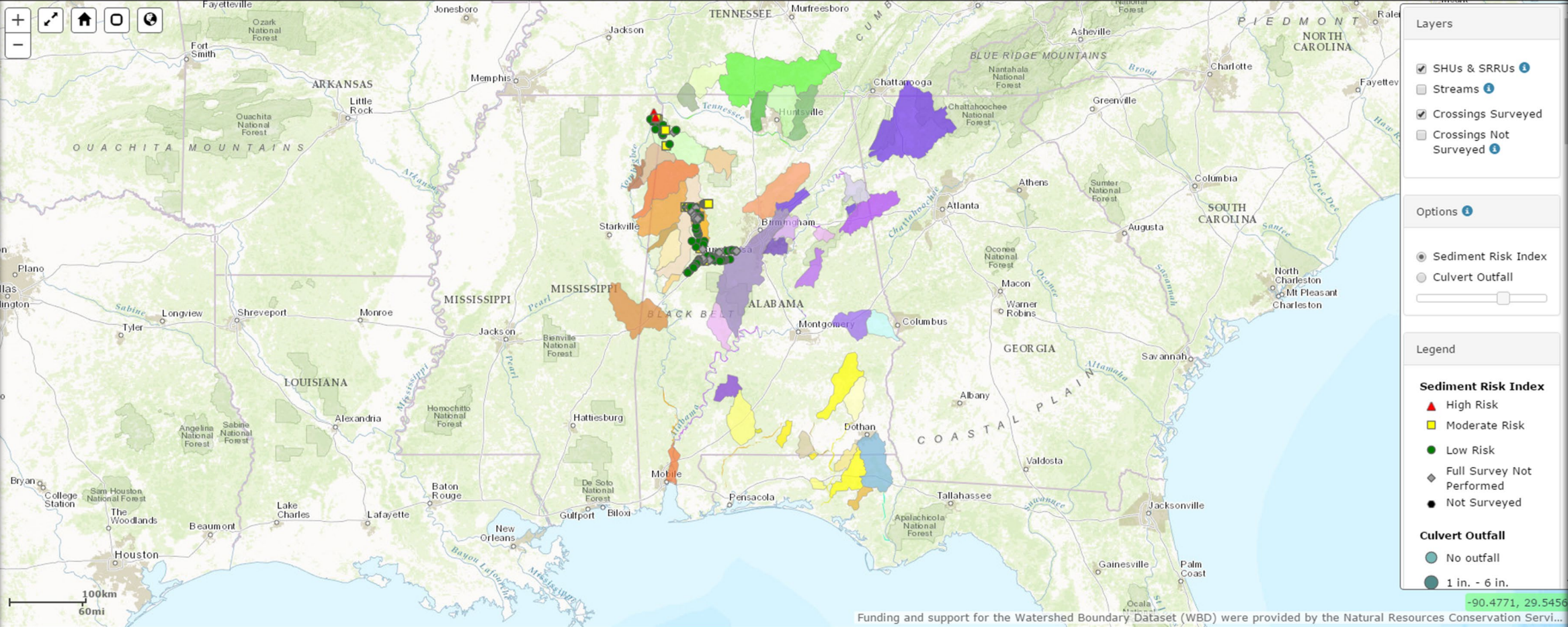
2.2. means of connection between people or places.

“The purpose of communication is to influence and change and behavior”





Alabama Rivers and Streams Network SHU Mapper





Alabama Rivers and Streams Network

@alabamariversandstream
snetwork

Home

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Like Follow Message More

+ Add a Button

Status Photo / Video Offer, Event +

Write something...

Non-Profit Organization

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This Week See All

783 ↑
Post Reach

0
Website Clicks

52 ↑
Post Engagement

0% response rate, day or more to respond
Respond faster to turn on the badge

617 likes +5 this week
Robb Herrington and 122 other friends

783 post reach this week

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Posts from Pages you've liked as your Page

Create an Event for Your Page
Events are a way to organize gatherings and bring people together.

Invite friends to like this Page

Boost Your Page for \$5
Reach even more people in United States

Promote Page

Alabama Rivers and Streams Network
Published by Rebecca Bearden [?] · August 5 at 9:48pm ·

Congratulations to Dr. Pat O'Neil, Deputy Director of the Geological Survey of Alabama, and recipient of the 2016 Water Conservationist of the Year

ABOUT

Add street address Save



ABOUT US

RIVERS AND CRITTERS

RESOURCES

HOW TO GET INVOLVED

ALABAMA RIVERS AND STREAMS NETWORK

BROWSE BY TOPIC

Mission Statement

Interactive Map

Strategic Habitat Units

Educational Materials

Success Stories

Why It Matters

In The News

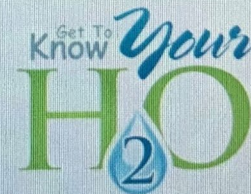


WATER IS AN IMPORTANT PART OF OUR LIVES

Let's **Admit** it...nothing is as refreshing as a glass of cool water on a hot Alabama day. Although most of us don't think about where our water comes from, we expect it to be clean and safe for ourselves and our families.

Doing **YOUR** part to help keep our water clean and safe is easier than you might think. If each person does their part, we can make a huge difference...one person and one drop at a time.

Still unsure? See how water affects our jobs, our economy, our health, our real estate prices, and more.



IN THE NEWS

Conservationists from across the nation attend a SHU-focused watershed restoration class in Shepherdstown, WV

The Terrapin Creek Strategic Habitat Unit was the focus of the 2019 Restoration Policy, Planning, and Partnering course...

Southeast Aquatics Fund to help conservation, species protection in north-central Alabama

Alabama Rivers and Streams Network



Why the SHU Process works

Working together in a non-adversarial manner (i.e., “Conservation without Conflict”) by growing relationships- based on trust, transparency, humility, and ALWAYS searching for common ground and solutions



U.S. Fish & Wildlife Service

Restoration Policy, Planning, and Partnering

Welcome!



Restoring the Terrapin Creek Watershed, Alabama: Template for Developing a Restoration Plan



I. Applying Science and Policy in Restoration Planning

- 1) Natural and cultural resources
- 2) Authorities for restoration
- 3) Purpose and Need for restoration
- 4) Goals and Objectives

II. Collaborating with Partners

- 5) Public outreach and community involvement
- 6) Partners and their roles

III. Generating a Range of Alternatives

- 7) Tools for restoration
- 8) Restoration alternatives to meet the Purpose and Need
- 9) Affected environment and potential impacts
- 10) Barriers/challenges
- 11) Selected alternative

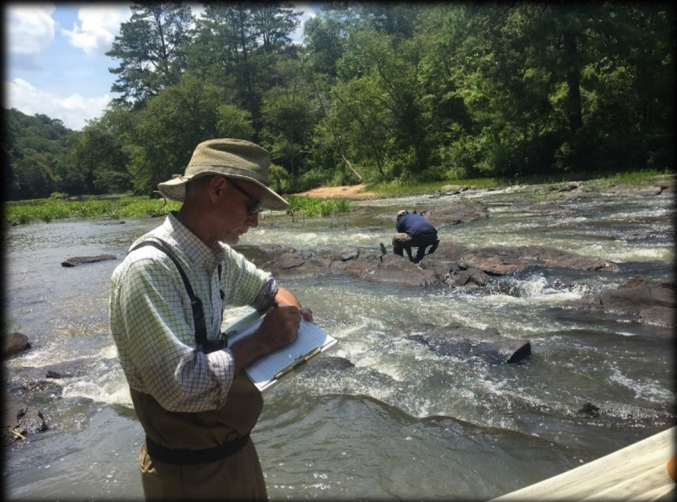
IV. Implementing Restoration

- 12) Monitoring and adaptive management
- 13) Permits and compliance
- 14) Funding sources

GSA Toolkit



- Partnerships
- Faunal surveys
- Habitat assessments
- Water quality surveys
- Knowledge base
 - Biology
 - Hydrology
 - Hydrogeology
 - Water chemistry
 - Fluvial geomorphology
 - Restoration ecology
 - Outreach/communications



Ongoing Projects

- Scarham Creek-Short Creek on Sand Mountain
 - Cooperative agreement with NRCS
 - Water quality surveys to ID areas for best management practices for farmers
 - Regular meetings with local Soil and Water Conservation Districts
- Black Warrior River Mollusk Survey (ADCNR)
- Redstone Arsenal (DOD)
 - Alabama Cave Shrimp
 - Tuscumbia Darter source water protection



Trussells Creek Watershed Assessment

- Road-stream crossing surveys
- WQ for surface water and shallow groundwater
- Mussel surveys
- Fish IBIs
- Habitat surveys
- Crayfish surveys
- Groundwater flow patterns
- Sediment data





**WATERSHED ASSESSMENT OF THE
TERRAPIN CREEK SYSTEM FOR RECOVERY
AND RESTORATION OF RARE MUSSEL SPECIES**



Geological Survey of Alabama
Bulletin 187



**CHANGES IN THE DISTRIBUTION OF FISHES IN THE
LOCUST FORK SYSTEM, ALABAMA , AND A
COMPARISON OF BIOLOGICAL AND HABITAT
CONDITIONS BETWEEN 1997-98 AND 2009-11**



Geological Survey of Alabama
Bulletin 188



**A SURVEY OF FISHES IN THE MURDER CREEK
SYSTEM, ALABAMA**



Geological Survey of Alabama
Circular 204



Lampsilis liosus Con. Bogue Chitto Creek, Dallas Co., Ala. From T. H. Aldrich.
1♂ specimen. Name verified by Walker.

WATERSHED ASSESSMENT OF THE BOGUE CHITTO CREEK WATERSHED FOR THE RESTORATION AND RECOVERY OF RARE AQUATIC SPECIES



Geological Survey of Alabama
Bulletin 189

Geological Survey of Alabama
Bulletin 189



*BIOLOGICAL AND HABITAT CONDITIONS IN THE
SIPSEY RIVER WATERSHED, ALABAMA, 2011 TO 2013*



*Geological Survey of Alabama
Circular 205*



*BIOLOGICAL AND HABITAT CONDITIONS IN THE
CHOCTAWHATCHEE RIVER DRAINAGE, ALABAMA,
1988 TO 2014*



*Geological Survey of Alabama
Circular 206*





FISHES OF THE CYPRESS CREEK SYSTEM, TENNESSEE RIVER DRAINAGE: HISTORICAL RECORDS, RECENT FISH FAUNA, AND INDEX OF BIOTIC INTEGRITY ASSESSMENT

Geological Survey of Alabama Bulletin 190

FISHES OF THE CYPRESS CREEK SYSTEM, TENNESSEE RIVER DRAINAGE: HISTORICAL RECORDS, RECENT FISH FAUNA, AND INDEX OF BIOTIC INTEGRITY ASSESSMENT



Geological Survey of Alabama
Bulletin 190



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Bulletin 190

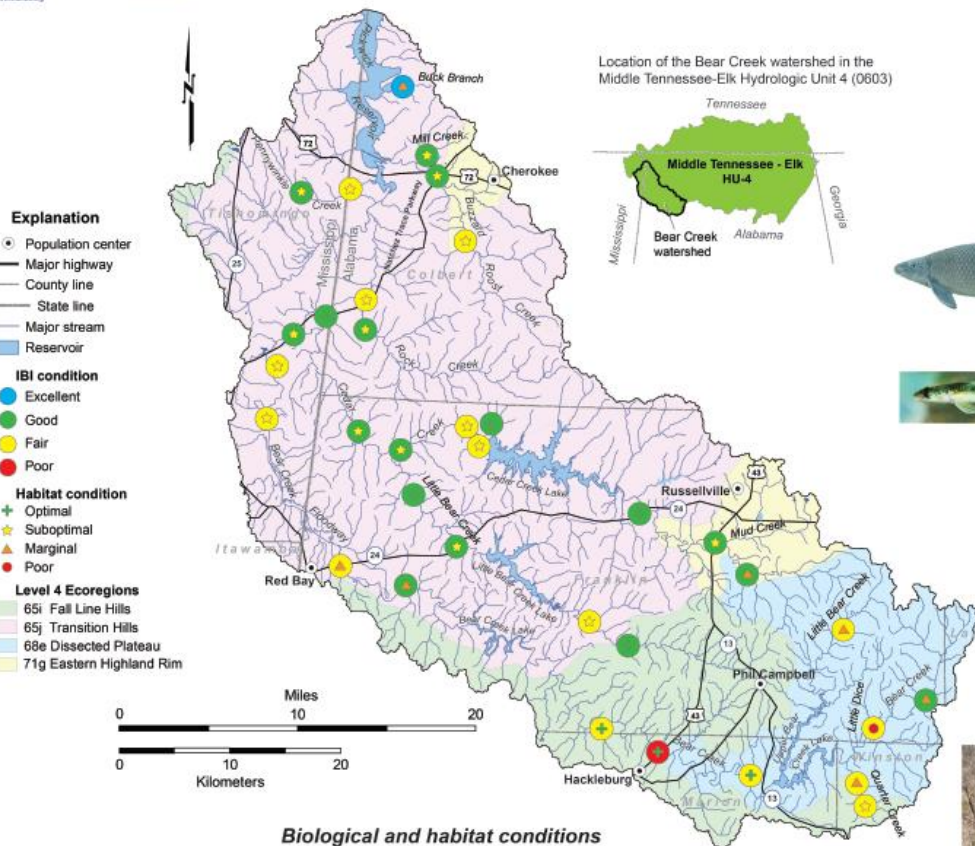


Biological Condition of Fish Communities, Habitat, and Land Cover in the Bear Creek Strategic Habitat Unit

by Stuart W. McGregor, E. Anne Wynn, Rebecca A. Bearden, Patrick E. O'Neil, and Cal C. Johnson
Mapping assistance by Gary A. Hastert



U.S. Fish and Wildlife Service
Alabama Department of Conservation



Biological and habitat conditions

Bear Creek (Strategic Habitat Unit 1) is a 136-mile-long southern tributary of the Tennessee River draining 944 square miles in Colbert, Franklin, Lawrence, Marion, and Winston Counties, Alabama, and Itawamba and Tishomingo Counties, Mississippi, with about 85 percent of the watershed in Alabama, according to the U.S. Geological Survey's (USGS) National Hydrography Dataset (NHD) (2019). Between 2008 and 2013, the Geological Survey of Alabama conducted biological assessments at 38 stations in the Bear Creek watershed. The biological condition of fish communities was assessed using the Index of Biotic Integrity (IBI) while stream habitat quality was evaluated using the U.S. Environmental Protection Agency (USEPA) rapid habitat assessment method. One station scored excellent biological condition (Buck Branch at Colbert Co. Hwy 1), 19 stations scored good condition, 17 scored fair condition, and 1 station scored poor condition (Bear Creek at U.S. Hwy. 43). Over 78 percent of the stations evaluated had suboptimal to optimal habitat quality with 9 stations scoring optimal, 20 scoring suboptimal, 7 scoring marginal, and 1 scoring poor habitat quality (Little Dicoe Creek at Franklin Co. Hwy. 185). The high percentage of stations scoring good (50 percent) or fair (45 percent) biological condition indicates that the Bear Creek watershed is maintaining acceptable watershed conditions to support aquatic animals. However, the observation that one-fourth of the stations scored marginal to poor habitat quality, the occurrence of conservation-concern fish and mollusk species in the watershed, and the persistent imperiled status of some aquatic species through time warrants continued work to restore habitat and stream flow conditions to benefit those populations.

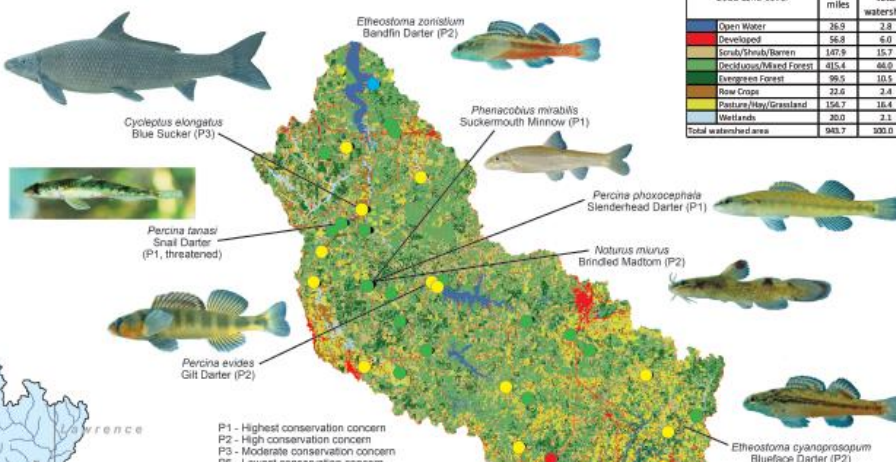
Location of the Bear Creek watershed in the Middle Tennessee-Elk Hydrologic Unit 4 (0603)



Land cover

According to the Tennessee Valley Authority, in the early 1970s approximately 70 percent of the Bear Creek watershed was in forest, 10 percent in agriculture, and 20 percent in miscellaneous urban use. The Forest Riparian Habitat Survey conducted in 1990 by the USEPA reported over 75 percent of the watershed to be forest. Conservation assessment worksheets compiled by local U.S. Department of Agriculture (USDA) Soil and Water Conservation Districts (SWCDs) in 1998 reported the following percentages of land use: forestland-72 percent, pastureland-12 percent, cropland-6 percent, urban land-3 percent, open water-3 percent, mining-2 percent, and other-2 percent. Comparison of 1998 data to the 2011 USGS Landcover Dataset (see map and table below) indicate a slight decline in forest lands (deciduous, evergreen, scrub-shrub), increases in developed-urban land and pasture, and decreases in cropland over a 14-year period.

Rare and uncommon fish occurrences in Bear Creek



2011 Land Cover	Square miles	Percent of total watershed
Open Water	26.9	2.8
Developed	58.8	6.0
Scrub/Decid/Bare	147.8	15.7
Deciduous/Mixed Forest	415.4	44.0
Evergreen Forest	99.5	10.5
Road Crops	22.6	2.4
Pasture/Hay/Grassland	154.7	16.4
Wetlands	20.0	2.1
Total watershed area	944.7	100.0

Marginal to poor habitat



Optimal to suboptimal habitat



Ongoing Projects

- Mobile Delta Sediment
 - ADCNR contract
 - Sediment quality
- Locust Fork
 - NFWF grant partnership with The Nature Conservancy
 - Post-restoration monitoring for stream bank projects
- Butler Creek (Shoal Creek SHU) Fish Sampling/Report
 - University of North Alabama



2021-2022 Projects

- Abandoned Mine Land reclamation project (ALDOL and OSMRE)
 - North Fork Creek in Tuscaloosa County
 - Pre- and post- restoration water quality monitoring
- Forest Habitat Assessment (AFA)
 - Culvert replacement in Winston County—Brown’s Creek
 - Critical habitat for Black Warrior Waterdog
 - Pre- and post-restoration habitat and fish monitoring
- Trispot Darter mark-recapture study (USFWS-CAWACO)
 - Gin Branch—Little Canoe Creek
 - Culvert removal
- Urban Darter Habitat Training and Outreach (USFWS-CAWACO)
 - Minority colleges and universities in Birmingham
 - ARSN promotional video
- Choccolocco Creek Fish Surveys (USFWS-CAWACO)



Questions?

