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The Carolina Heesplitter and Overlay District





Outline

- Status
- Biology
- Threats
- Recovery Actions
 - CHOD and Bank





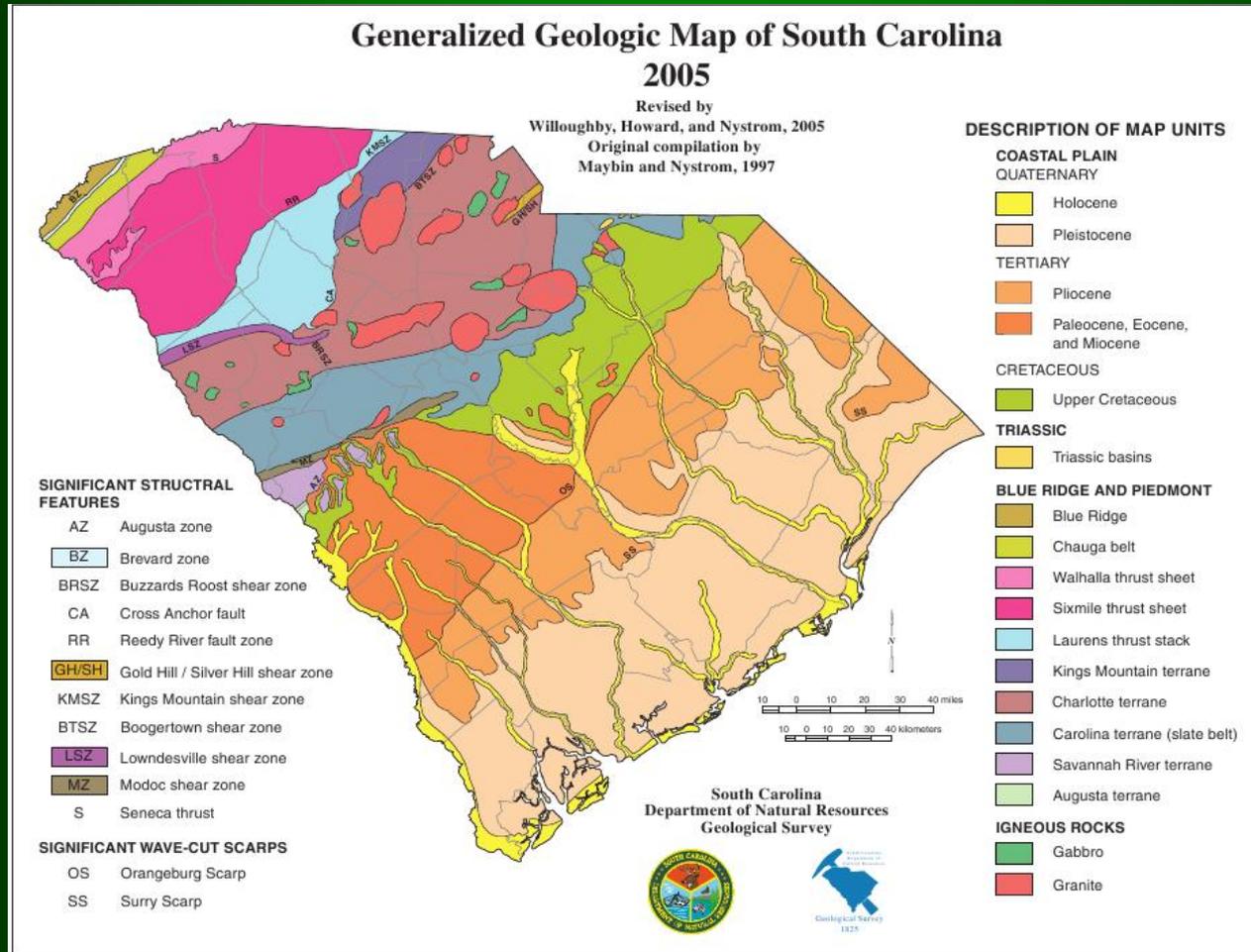
Federal Status

- Listed as endangered in 1993
- Critical habitat- 2002
- Historically found in streams in the Catawba, PeeDee, Saluda, and Savannah River systems





Found only in the Carolina "Slate Belt"





Surviving Populations

- Currently 11 populations

– <u>Goose Creek/Duck Creek:</u>	17	Stable
– <u>Flat Creek/Lynches River:</u>	80	Stable
– <u>Waxhaw Creek:</u>	43	Stable
– <u>Sixmile Creek:</u>	1	Declining
– <u>Gills Creek/Cane Creek:</u>	0	Declining
– <u>Fishing Creek/South Fork Fishing:</u>	18	Stable
– <u>Rocky Creek:</u>	10	Declining
– <u>Red Bank Creek:</u>	0	Unknown
– <u>Halfway Swamp Creek:</u>	0	Unknown
– <u>Turkey Creek:</u>	24	Declining
– <u>Cuffeytown Creek:</u>	<u>0</u>	Declining
TOTAL	193	

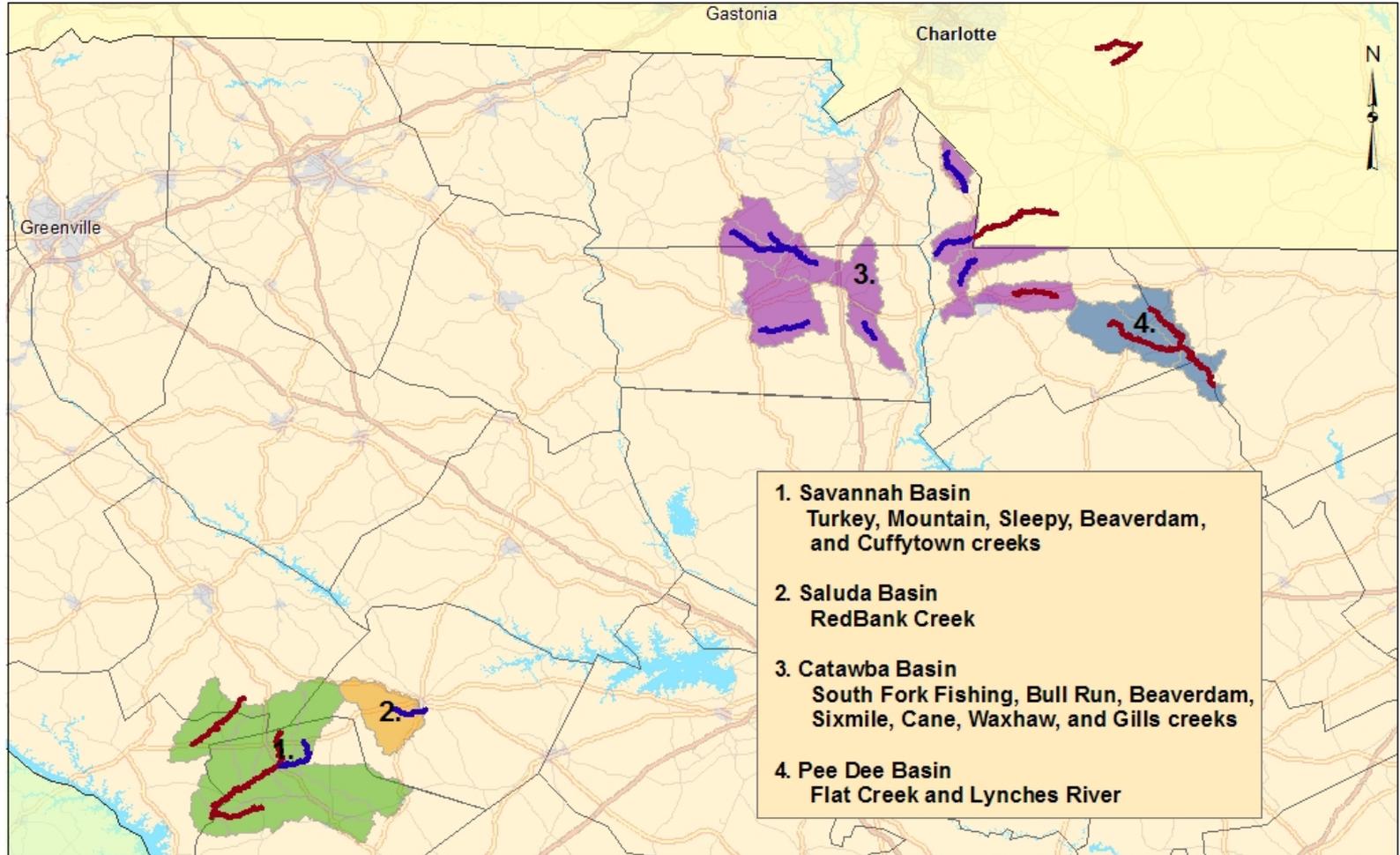


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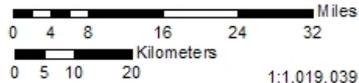


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SOUTH CAROLINA WATERSHEDS CONTAINING CAROLINA HEELSPLITTER



Produced by:
Charleston Ecological Services Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29412
January, 2007



Red = populations with designated Critical Habitat
Blue = populations without Critical Habitat designation



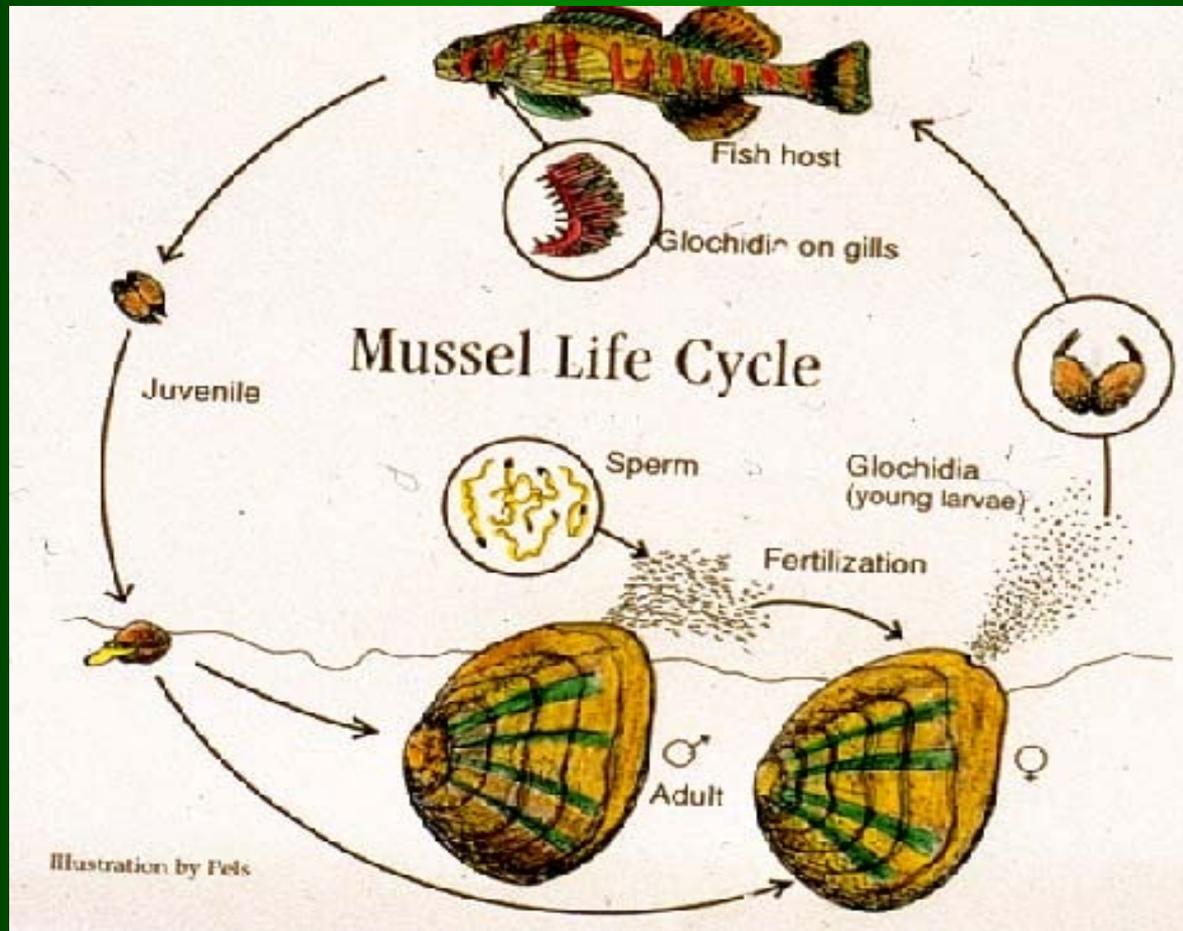
Biology/Life Cycle

- Filter feeders
- Require fish hosts
- Long-term brooders:
Fall through spring





Biology/Life Cycle





Habitat Requirements

- Cool, clean, well oxygenated water
- Stable, shaded stream banks
- Access to numerous host fish



Sixmile Creek



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Flat Creek, Lancaster County



Threats

1) Water Quality Degradation

- Pollution: Ammonia and copper – WWTP, sludge
- Siltation: lack of riparian buffers – agriculture and development



Occupied Habitat – Sixmile Creek



Occupied Habitat – South Fork Fishing Creek



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Threats

2) Drought

- Dramatically lower base-flows
- No flow in summer months
- Deep pool refugia
- Isolation of individuals



Sleepy Creek, Edgefield County 2011

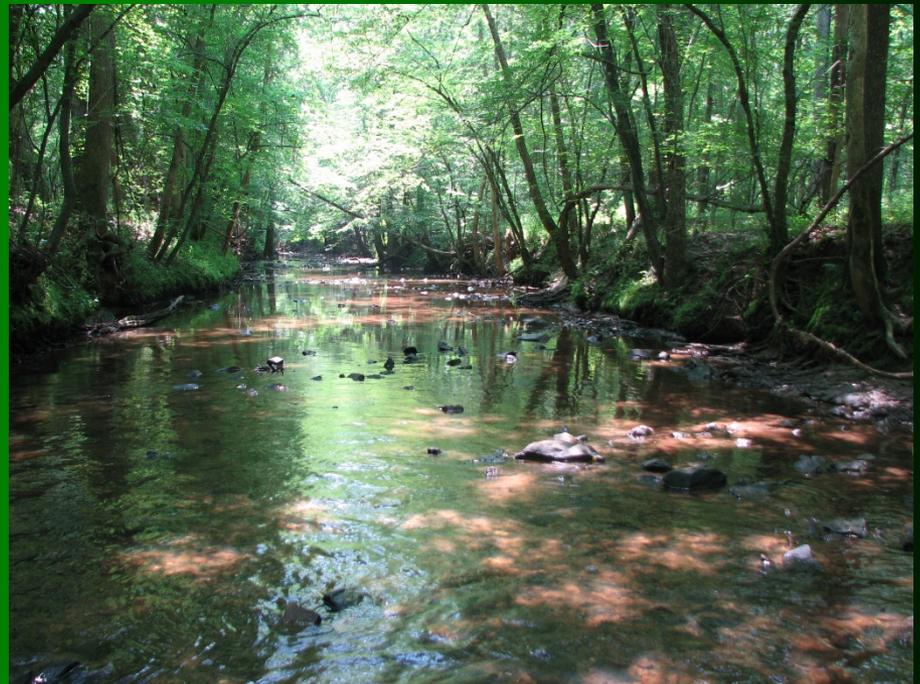


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Threats

3) Physical Habitat Alteration

- Change in hydrology:
Impervious surface;
dams & culverts (fish passage barriers)
- Channelization





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Threats

3) Fish passage barriers/ improper designs





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05/18/2011

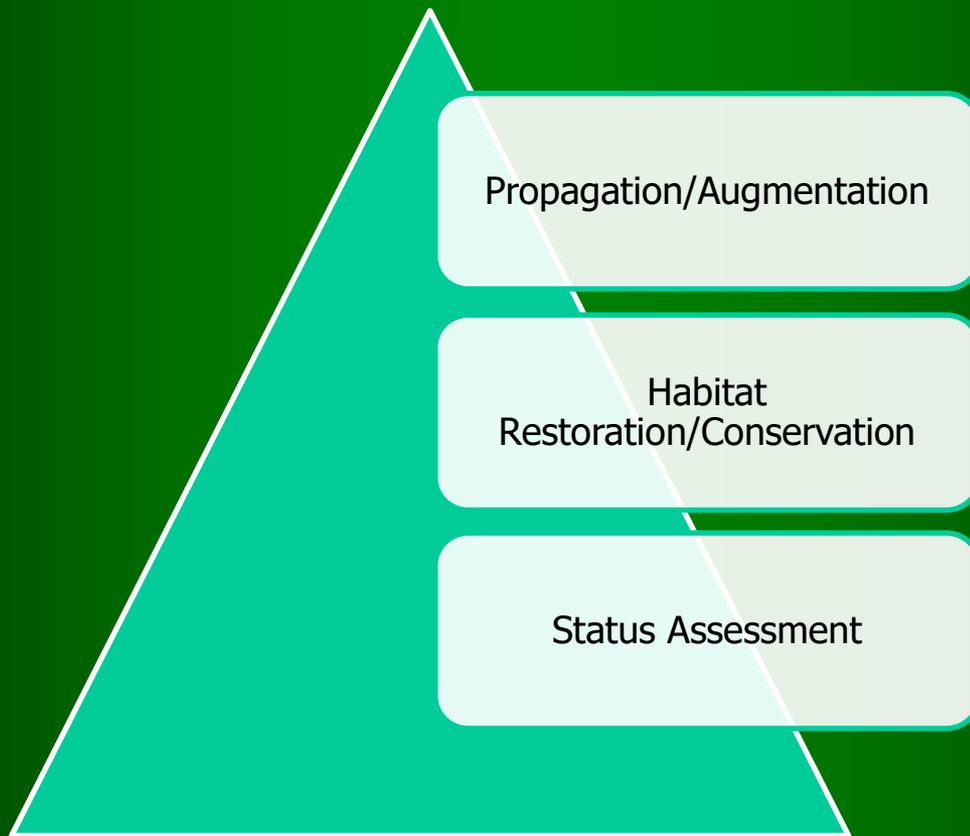


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Recovery Actions





Status Assessment

- Foundational recovery effort
- Both habitat and population
- Completed at least every 5 years





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Status Assessment





Status Assessment

- Semi-quantitative – CPUE
- All mussel species are counted and returned
- Heelsplitter are measured, tagged and coordinates taken
- Habitat analysis (riparian buffer width, land use, bank stability, fish passage)



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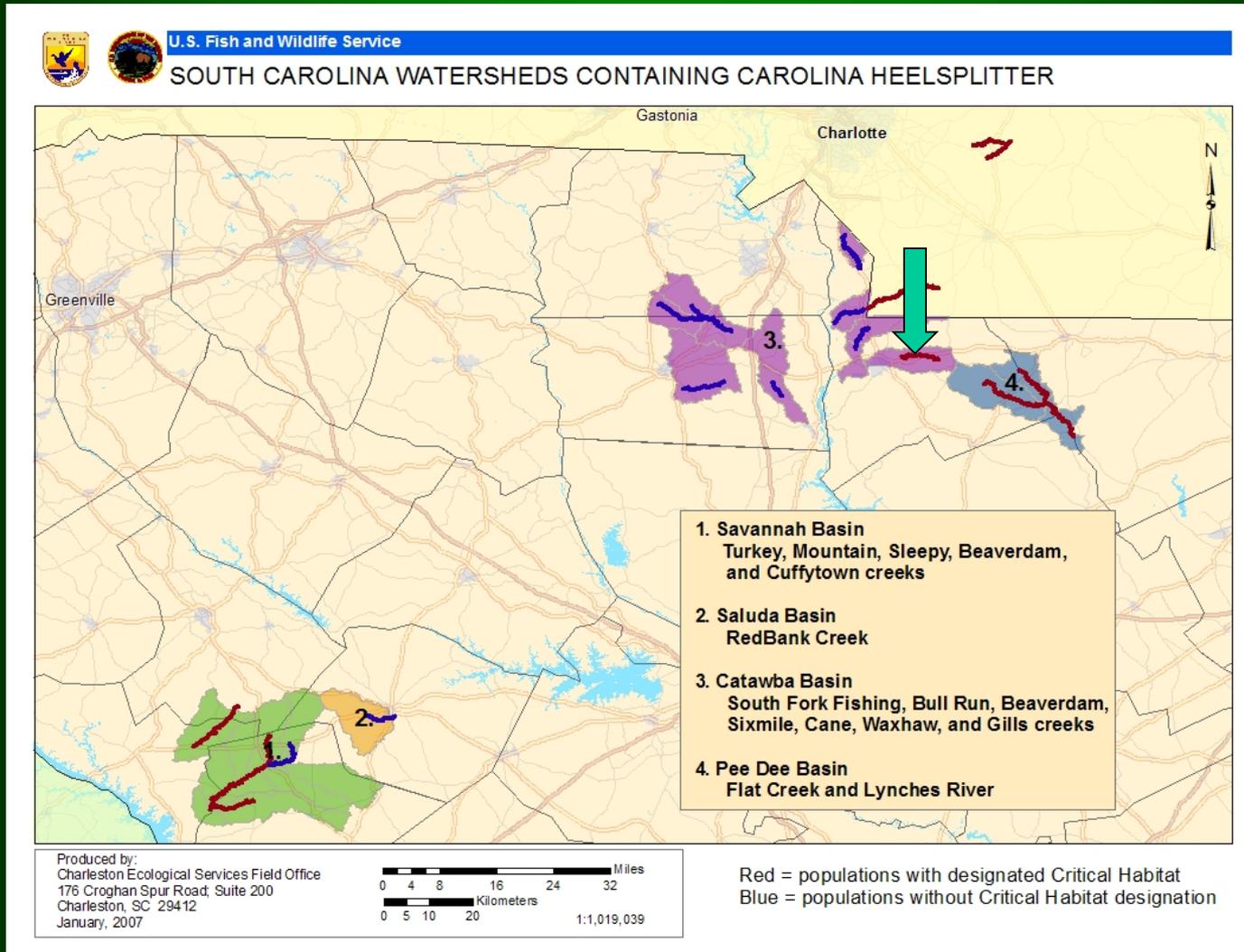


Habitat Restoration/Conservation

- Fish Passage Restoration in occupied habitat
 - Replace non-functioning culverts w/ eco-designs
- Heelsplitter conservation bank and other properties
 - Rainbow Ranch, 40-acre Rock HP
 - Katawba Valley Land Trust Cane, Gills, and Beaverdam Creek conservation easements



Gills Creek Drive Project, July 2017





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Before



After



Propagation/Augmentation

- Method:
 - Adult stocking – 2015
 - Hatchery production: 2015 – 2017
 - Free release: 2016 - 2017
 - Stream-side: future
- Goals
 - Increase numbers; viability
 - Connect fragmented populations
 - Decrease risk of catastrophic event impacts





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Propagation/Augmentation





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Propagation/Augmentation



Gravid heelsplitter; November 2014

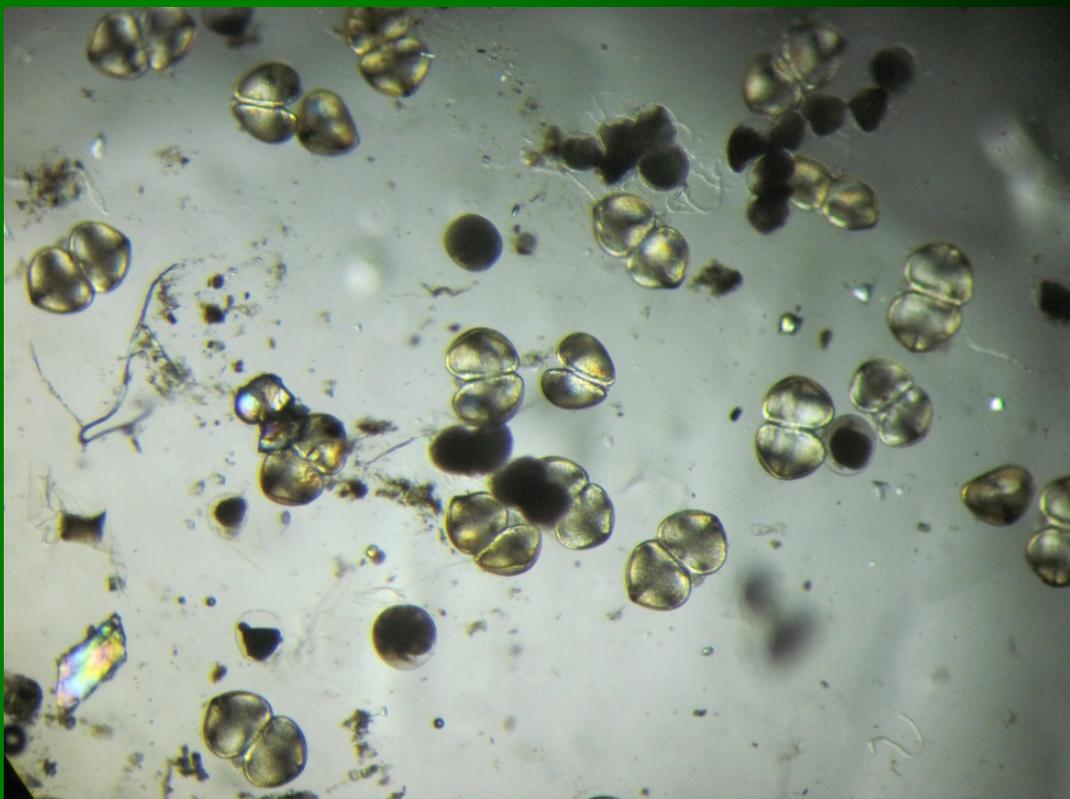


Glochida and interstitial eggs; March 2015-
From Marion Hatchery



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Propagation/Augmentation





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Propagation/Augmentation



Host fish infestation



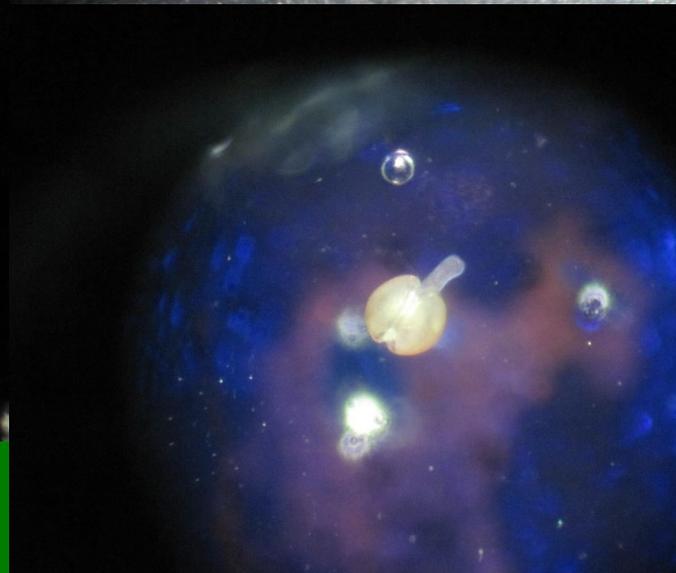
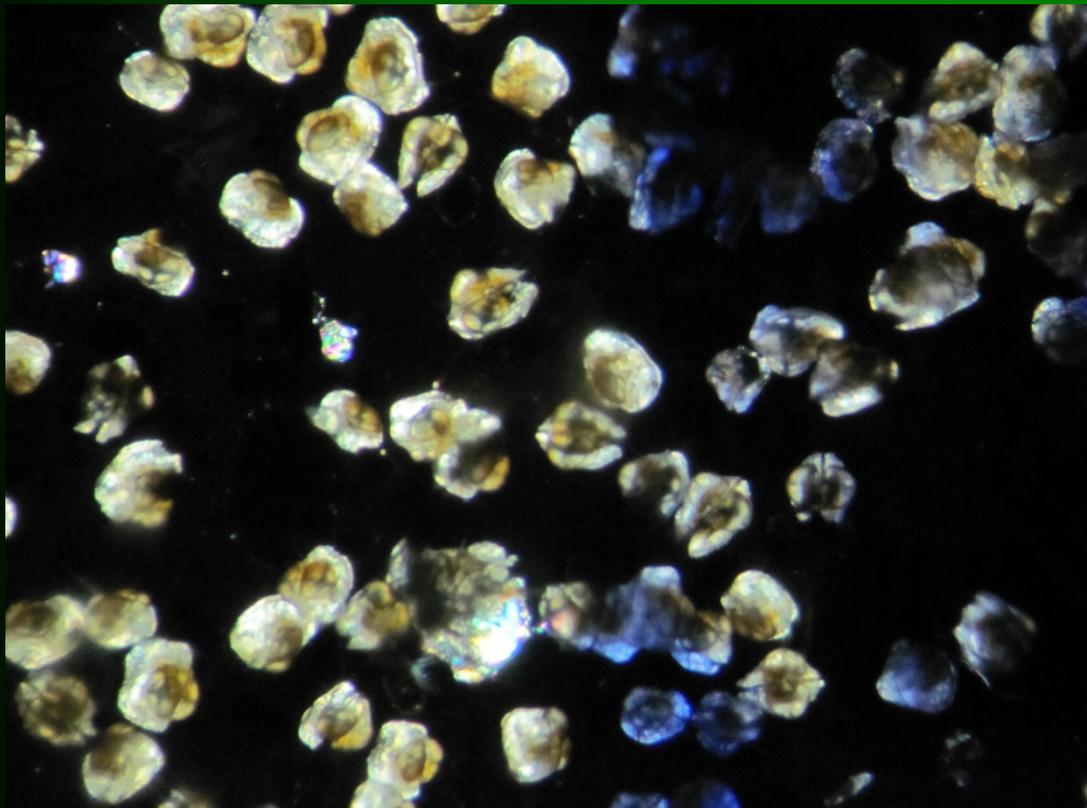
M. C. Barnhart 1998





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Propagation/Augmentation

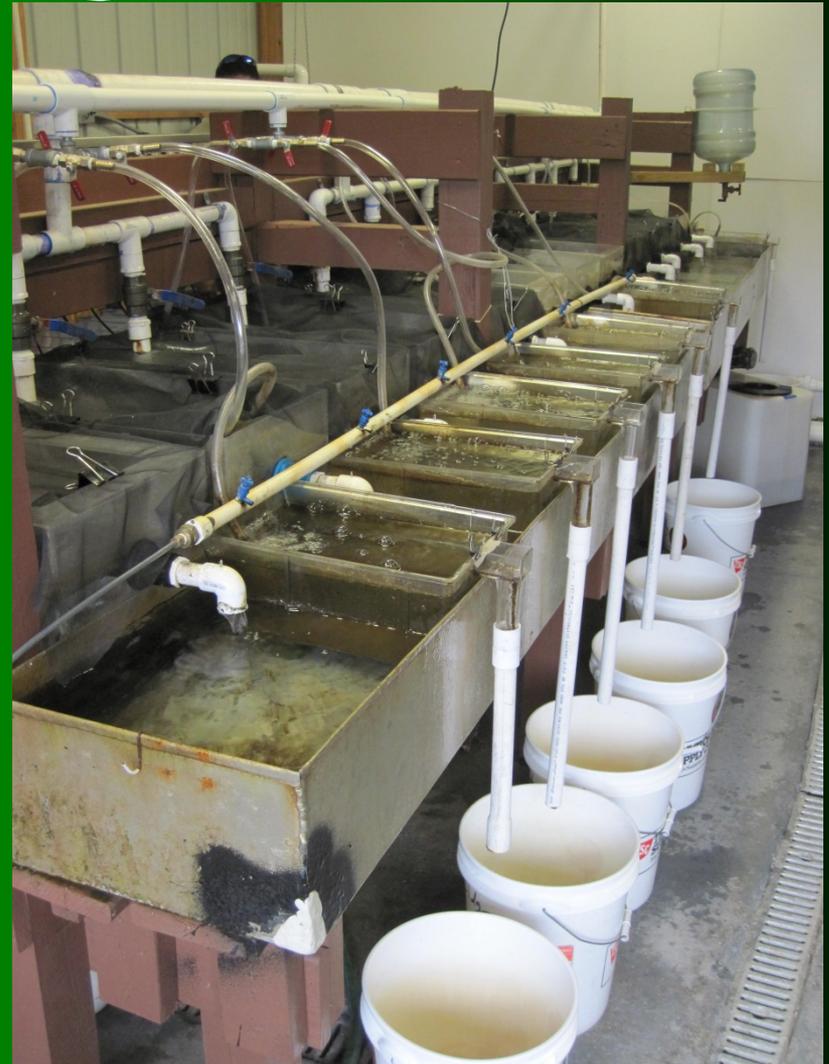


“Transformers”



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Propagation/Augmentation



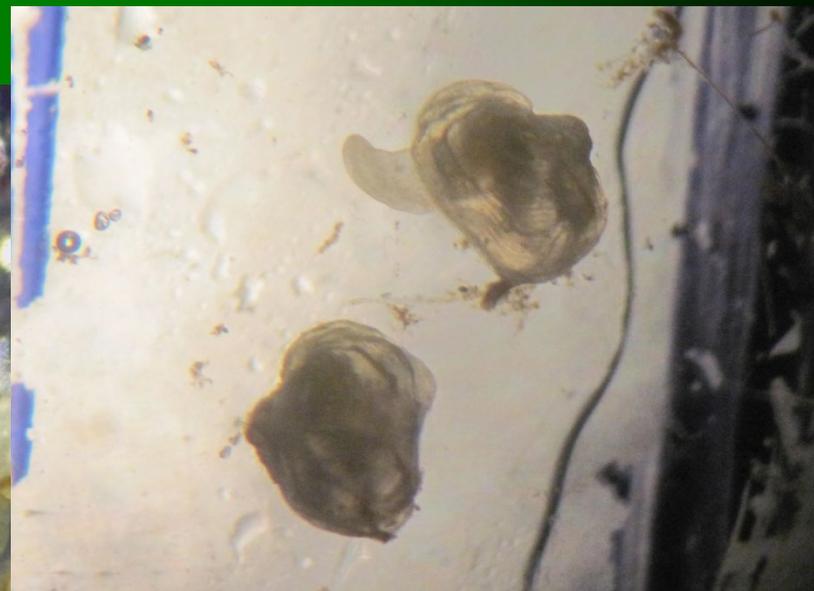


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Propagation/Augmentation



3-4 months old





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Propagation/Augmentation



Sub-adult rearing pans



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Propagation/Augmentation

Free release - 2016





Propagation/Augmentation

In 4 years, OMCC has:

- Produced > 8,000 Carolina heelsplitter
- Grown > 100 to sub-adult status
- Held > 50 adult heelsplitter





CHOD and Conservation Bank

Catalyst:

- Rapid development in Lancaster County (Indianland area)
- Increased impacts to heelsplitter habitat – Sixmile Creek watershed
- Lack of regulatory nexus for USFWS, guidance for County, and certainty for developers



CHOD



- Partners:
 - Lancaster County Council & Planning Commission
 - USFWS, SC Field Office
 - EBX
- Official Enacting Documents:
 - Lancaster County Resolution #601, Ordinance #'s 901 & 963



CHOD



- Goals:
 - Provide developers and the County regulatory predictability/transparency under ESA
 - Enable conservation of high priority heelsplitter habitat
 - Credit purchases fund conservation easements along Flat Creek in Lancaster County.



CHOD

- How it works:
 - Sixmile Creek watershed
 - Credits must be purchased for A) impervious surface creation and B) riparian buffer encroachment based on the following calculation schedule:

Exhibit A: Credit Calculation Schedule

Mitigation Expense to Developer	Mitigation Ratios	
	Perennial	Intermittent
<u>FWS Mitigation Credit Requirements per Acre</u>		
0-50' buffer encroachment	10	5
50'-100' buffer encroachment	5	2
100'-200' buffer encroachment	2	
impervious surface	1.75	
<u>Stormwater/Land Planning BMP Discounts Available</u>		
Determined in consultation with USFWS	20%	maximum



CHOD

- Sequence of consultation:
 - Developer: is aware or is made aware of CHOD by zoning or planning (?)
 - Developer: calculates acres of impervious surface and buffer encroachment for project based on final plans; submits them to Planning Department
 - Planning: passes calculations and plans to USFWS for review and verbal approval
 - Developer: purchases credits through RES before or at the same time that grading permit is issued
 - RES: sends Planning and USFWS Affidavit of Credit Sale and updated Bank ledger for files



Conservation Bank

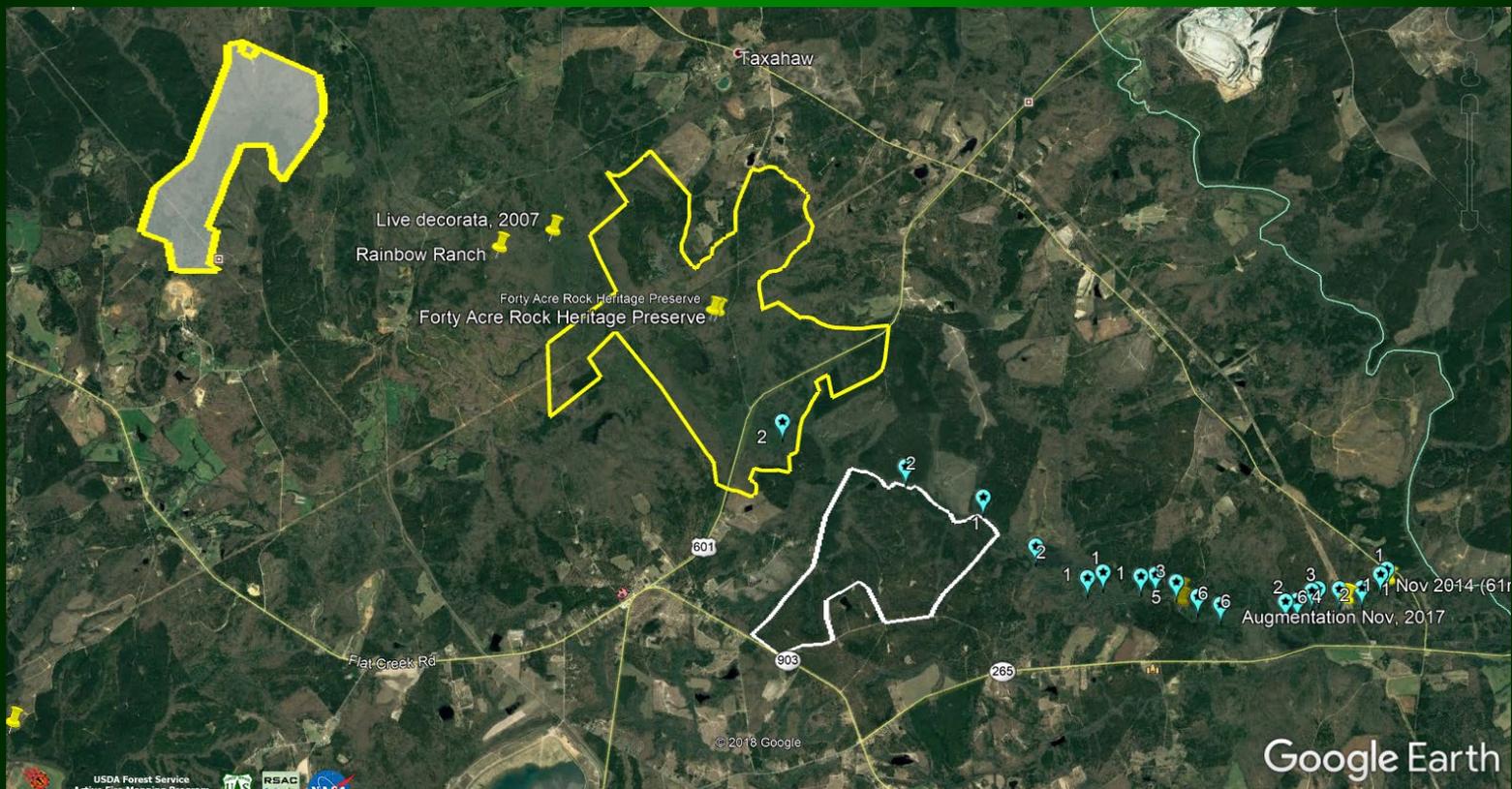
- Established – Dec 2009 via a CBEA w/ USFWS
 - Phase I : 811 acres
 - Phase II (2017) : 528 acres
- Credits:Acres – Riparian buffers = 1.3:1
 - Upland = 0.78:1
- Easement held by KVLT
- Heelsplitter Endowment





Conservation Bank

- Location





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Questions?

