Control Methods & Status of Non-native Apple Snails in Threemile Creek, Alabama

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Apple Snails in Threemile Creek, Mobile County, AL

Apple Snail, *Pomacea maculata*

- **Reported & documented in Langan Municipal Lake, June 2008. Incidental report 2004 cursory search found none.**
- **Likely released by aquarium (pet trade).**
- **Exotic, non-native "aquatic nuisance species" (ANS) native to S. America.**

Snail Biology

- **Fecund - Snails mature within growing season; females lay multiple egg on aerial plant stems. Each contain 100's - 1000's of eggs/mass annually.**
- **Burrow into mud during winter or when conditions are poor.**
- **Snails have gills & siphon to breathe.**
- **Voracious feeders of vegetation (Likely compete w native snails, other wildlife).**
- **Few native predators**

Snail egg mass on Giant cutgrass (accounts ~ 80–90% egg substrate)

Why are Applesnails an Issue?

- **Destoyers of wetland habitats, snails consume native aquatic plants driving systems toward algae-based production.**
- **Displace native aquatic life through competition for food, space, and habitat.**
- **Destroyer of agricultural crops (e.g., rice) esp. in Southern U.S., Phillipines, SE Asia.**
- **Disease vector, potential carrier of: rat ringworm, intestinal fluke, rat lungworm, Schistosomiasis (2nd most common tropical disease behind malaria in 70 countries)**

Egg masses concrete wall LMP

Population Control Approach

- "Direct" Control adults: Apply EPA-approved molluscicide - copper carbonate; copper sulfate.
- "Indirect" Control - Reduce egg (substrate) habitat: Apply EPA-approved herbicides to emergent aquatic plants.
- Maintain low water levels in Langan Lake.
- Scraping of egg masses, collect/trap adults.
- Stock Redear sunfish (N=1,222,852; 2867 lbs) to reduce snail hatchling recruitment.

Prep for copper application - BFP

Scraping egg masses - LMP

Infestation Locations- SW AL

- Threemile Creek (TMC) watershed from upper pool Langan Municipal Lake (LMP) downstream through approx 8 step pools to tidal portion of Creek – empties directly into Mobile River!
- Blakeley Forest Pond (BFP) in Bay Minette Creek, a major watershed in Mobile-Tensaw delta system.
- Private Stock pond Coffee County.

Upper Threemile Creek (1 of 8 Step Pools, Elev. ~ 60’)

Infested Site Attributes

- LMP = 40-acres in 2-level pools (147 acre-feet)
  - TMC: From LMP Dam to McClean Park Dam
    4.29 miles stream

    161 surface acres (59.3 acre-feet)

    8 step pools urban/industrialized channels
    Elevation drop approx 70 feet

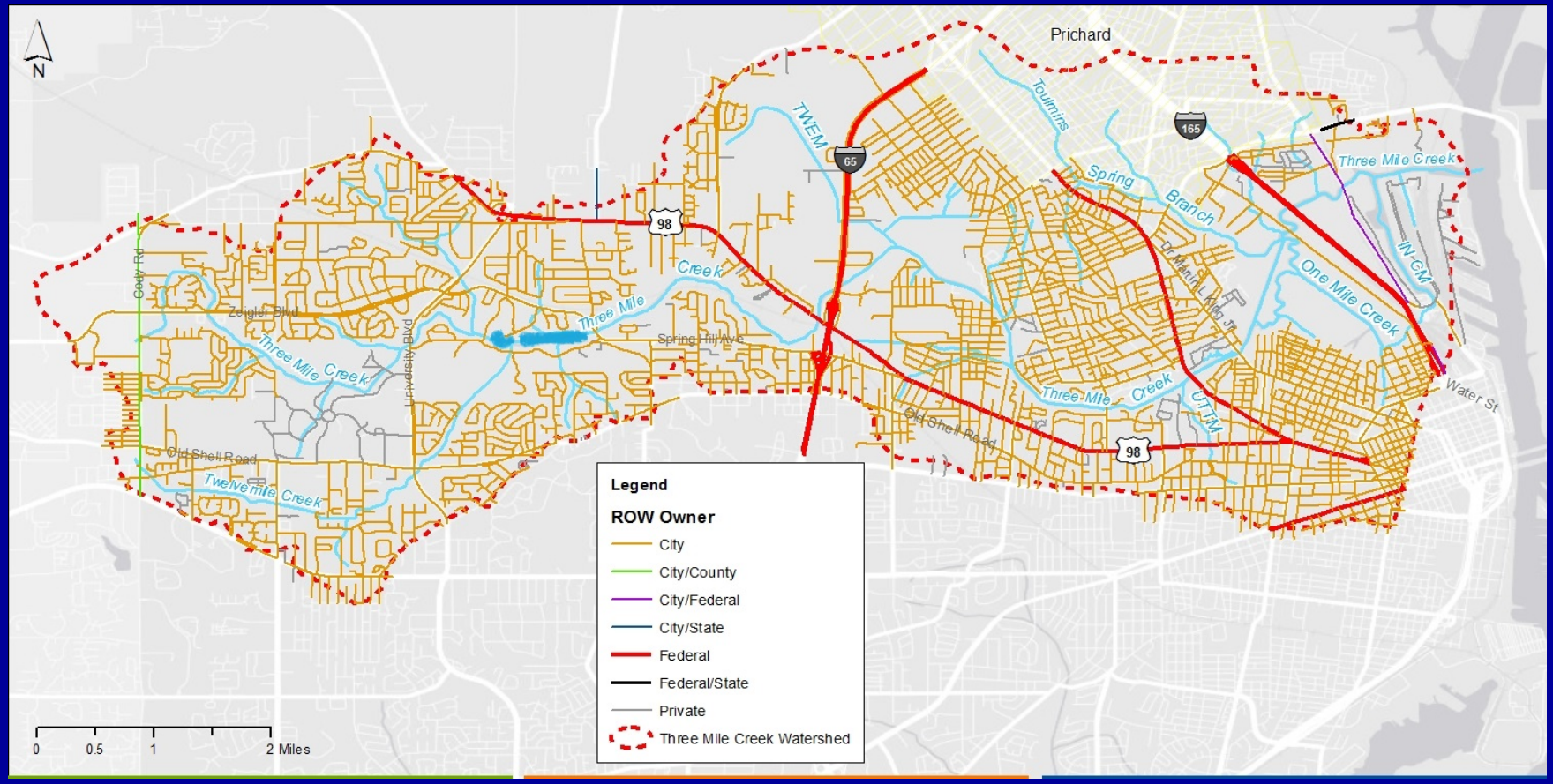
  - TMC “Tidal” 4.67 miles to mouth at Mobile R.

    171 surface acres (366 acre-feet to I-165)

- BFP = 3.0-acres (29.4 acre-feet)

Threemile Creek Watershed

(Map courtesy of Mobile Bay National Estuary Program)



Blakeley Forest Pond, Baldwin CO (3.0 ac residential retention)

Field Efforts 2010-2014

5-Year Summary of Effort & Materials Analysis for District V, Apple Snail Control Project, FY 2010 - FY 2014.

FY ACTIVITY	PROGRAM FUNDING	LOCATION [a]	N STAFF	FIELD DAYS	MAN DAYS	CHEMICAL VOLUME (Gals) or WEIGHT (Lbs) [b]	VEHICLE DAYS	BOAT DAYS	UTV DAYS
2010	USFWS Grants, NGO's, In-kind	LMP, TMC, BFP	1 - 3	**45**	**71**	14412 Lbs, 350 Gals	**60**	**28**	**0**
2011	USFWS Grants, NGO's, In-kind	LMP, TMC, BFP	1 - 3	**91**	**85**	8845 Lbs, 1571 Gals	**91**	**36**	**0**
2012	USFWS Grants, In-kind	LMP, TMC, DL, BFP	1 - 3	**42**	**85**	10150 Lbs, 1280 Gals	**49**	**30**	**4**
2013	CIAP	LMP, TMC	1 - 2	**22**	**60**	517.5 Gals	**22**	**4**	**2**
2014	CIAP	LMP, TMC	2 - 5	**28**	**66**	2366.0 Gals	**28**	**14**	**1**
			1 - 5	**228**	**367**		**250**	**112**	**7**

Copper treatments, 2009 - 2011

BFP - 1 “heavy” treatment Nov 2010 (189 lbs)

FISH KILL – Algae die-off, low D.O.

ADWFF Restocks Pond w Bream, Bass

- 7 tandem “light” copper apps (75 lbs / app ; May, Jun, Jul, Sep 2011). TOT= 714 lbs

LMP - 11 single or tandem apps (475 – 976 lbs / app ; Oct 2009 – Aug 2011). TOT= 9759 lbs

TMC - 9 single or tandem apps (393 – 2814 lbs / app ; Oct 2009 – Sep 2011), TOT= 9780 lbs

Langan Municipal Lake, copper application – air blower w hopper

Snail Direct-Control Agents

- Copper sulfate pentahydrate ($CuSO_4$), “Medium” 5-8 mm crystals (**CHEM ONE Ltd.**). *Rate = 2.54 ppm.*

- Copper carbonate (Cu_2CO_3) liquid algaecide (**NATRIX, SePRO**). *Rate = 0.3 – 0.5 ppm*. This product was granted an SLN label for snails in Mobile & Baldwin Counties ONLY.

Snail Emergent Habitat Control

- POLARIS, ECOMAZAPYR; Isopropylamine salt of Imazapyr. *Rate = 6 pints/acre*
- RODEO, AQUAMASTER; Glyphosate. *Rate = 6 pints/acre*
- WEEDAR 64; 2, 4-D *Rate = 4 pints/acre*
- SUNENERGY; Methylated Seed Oil, Organosilicones & Emulsifiers Rate = 1-2 pints/acre
- ELITE INFILTRATOR, & CIDE KICK; Oil d' Limonene & nis emulsifiers *Rate = 2 pts/acre*

Aquatic Vegetation Controlled

- Giant cutgrass (*Zizaniopsis mileacea*; 80%+ egg habitat)
- Cattail (*Typha latifolia*)
- Water primrose (*Ludwigia spp*.)
- Smartweed (*Polygonum spp*.)
- Water hyacinth, *Eichhornia crassipes* (non-native)
- Torpedograss (*Panicum hemitomon*)
- Spikerush (*Eleocharis spp*.)
- Sedges (*Carex spp.*)
- Alligatorweed, *Alternanthera philoxeroides* (non-native)
- Parrot Feather (*Myriphylum aquaticum*) (non-native)
- Marsh Pennywort (*Hydrocotyle umbellata*)
- Wild taro (*Colocasia esculenta*) (non-native)
- Arrowhead (*Sagittaria spp.)*

Post-spray of emergent weeds (Giant cutgrass = “Native” plant)

Emergent Weed Treatments, 2010 - 2012

BFP – NO treatments. Residents instructed how to mow, remove brush weed growth at bank edge “without” chemical use.

LMP – 7 emergent weed applications, May - Sep

TMC - 22 emergent weed applications May - Oct,

TOTAL = 3201 Gals emergent herbicide mix

Snail Trapping – Assessing Population Abundance

TRAP DATA, 2009 - 2014

Apple snail trap sample data at Langan Lake, 2009 - 2014 and tidal Threemile Creek (2013 & 2014 only) by staff from ADWFF, USFWS, & USA.

Year	Weeks (Period) Collected	Trap Siting Method	N Traps / Week	Days Trapped	TOTAL Trap Days	N Snails Collected	Trap Catch Rate (S/T/D)
2009	10 weeks (Sep-Dec)	Random	20	75	1500	530	**0.353**
2010	17 weeks (Jan-Dec)	Random	11 - 20	150	2359	214	**0.093**
2011	17 weeks (Mar-Nov)	Random	2 - 18	211	1932	18	**0.009**
2012	3 weeks (Jul-Sep)	Random	4 - 6	9	43	12	**0.279**
2013	4 weeks (Jul-Oct)	Fixed	27	8	216	457	**2.118**
2014	6 weeks (May-Nov)	Fixed	27	12	324	59	**0.183**
6	**57**		**2 - 27**	**465**	**6374**	**1290**	

S/T/D = Snails per Trap Day (i.e., Snails per 24-hour period).

Results to date

- Repeated treatments, emergent plant control, and other methods appear to have substantially reduced snail abundance from since Fall, 2009 based on trap data.

Snail Work through 2015

- Partnerships forged between ADCNR, USFWS, City of Mobile, various NGO's, EMS have helped to fund work and/or provide manpower to continue the work as mentioned above.
- Current funding by CIAP ends December 2015!

Partnerships….Thanks!

- **United States Fish and Wildlife Service**
- **Mobile County Wildlife & Conservation Association**
- **Alabama Wildlife Federation**
- **Alabama Department of Environmental Management**
- **Alabama Department of Agriculture & Industries**
- **Mobile Baykeepers**
- **City of Mobile, Parks & Recreation, Engineering Dept**
- **Alabama Coastal Land Trust**
- **University of South Alabama, Biology Dept.**
- **Alabama Department of Public Health**
- **Alabama Division of Marine Resources**
- **Alabama Lands Division, Coastal Impact Assistance Program**
- **Auburn University, Coop. Extension & Marine Shellfish Lab**
- **SePRO Corporation**
- **Snail Busters & Van Dyke Environmental Services**
- **Estate Management Services**

Current Funding

- **CURRENT grant funding for the apple snail project (AL-36) is funded by the Coastal Impact Assistance Program, U.S. Fish and Wildlife Service and administered by the Alabama State Lands Division. THANKS!**

Mobile-Tensaw Delta