

Hatchery Highlights

U.S. Fish & Wildlife Service Warm Springs NFH News and Updates



April – June 2019

Aquatic At-Risk Species Recovery:

Gopher Frogs

The Warm Springs NFH engaged in a multi-year project with our partners to establish a self-sustaining breeding population on protected lands at the Nature Conservancy's Williams Bluff Preserve in Early County, GA. Gopher frogs are native to upland habitat, particularly longleaf pine ecosystems in Georgia and elsewhere in the southeast. The loss of longleaf pine habitat is the primary threat for this species. They are currently limited to fewer than 10 sites in Georgia. This rare species is now under review for formal listing by USFWS, and Georgia documents the species as vulnerable.

We had excellent hatch and survival from the three egg masses received in February collected from Fall Line Sandhills Wildlife Management Area in Taylor County, GA. As in preceding years, dried maidencane served as an organic fertilizer for the culture tanks. Periodically, small amounts of rabbit/guinea pig chow are fed until the tadpoles become fully metamorphosed frogs and are removed from the tanks. Every day, staff inspected the 25 culture tanks each stocked with 75 tadpoles, removing all metamorphosed frogs. Frogs are then weighed and placed into individual deli containers containing moistened orchid moss to await transfer.



Juvenile gopher frog awaiting release.
Credit: Jessica Radich/USFWS



Jessica releasing gopher frogs at the Sandhills release site.
Credit: James Hunt/UGA



Juvenile gopher frog awaiting release.
Credit: Jessica Radich/USFWS

This year we collected a record number of frogs. Of the 1875 tadpoles stocked in the culture tanks, 1607 metamorphosed, giving an 86% success. Of the 1607 frogs, 627 were stocked at Williams Bluff Preserve and 851 were stocked at Sandhills WMA. Six of the frogs were fitted with radio tags to monitor movement by University of Georgia (UGA) graduate student James Hunt, and 84 were used in a mesocosm experiment by UGA graduate student Angela Burrow. The remaining 45 frogs were transferred to our partners at the Amphibian Foundation in

Atlanta to become a part of the captive breeding population study being conducted there.

Through the end of June, 1607 gopher frogs and 18 tadpoles were distributed from Warm Springs NFH.

| Date | Location | Number | Length | Wt. (lbs) |
|----------------|-------------------------|---------------|---------------|------------------|
| June 7, 2019 | Williams Bluff Preserve | 1290 | N/A | 14.13 |
| June 25, 2019 | Sandhills WMA | 317 | N/A | 3.36 |
| Totals: | | 1607 | | 17.49 |

Gopher Tortoise

Gopherus polyphemus is a federally listed “candidate species” for populations east of the Mobile and Tombigbee Rivers; they are also state listed by Georgia as “threatened.” Gopher tortoises are an indicator of longleaf pine ecosystem health; their burrows provide vital habitat and shelter to other imperiled species such as gopher frogs and indigo snakes.

WSNFH conducted its first release of head-started gopher tortoises this quarter. Sixty 2017 and 2018 year-class tortoises were weighed, measured, and differentially marked in a process called marginal scute notching. Biologists use a small triangle file to notch scutes in different locations as a method to identify individual tortoises. Staff fed the tortoises daily on a diet of greens fortified with a commercial pellet containing essential vitamins and minerals. They gained 0.65 grams per day during the final few months of culture at Warm Springs NFH, reaching an average weight of 0.34 pounds at release.

Fish Biologist, Jessica Radich, distributed these tortoises with the Georgia Department of Natural Resources (GADNR) at the Lanahassee Wildlife Management Area in Webster County, GA. These juveniles brought the current Lanahassee population up from 80 individuals to 140. Partners in this expanding effort currently include GADNR, The Georgia Conservancy, and Zoo Atlanta.



Weighing tortoises prior to release at Lanahassee WMA.
Credit: Jessica Radich/USFWS



GADNR Senior Wildlife Biologist, John Jensen, using marginal scute notching as marking method.
Credit: Jessica Radich/USFWS

John Jensen, Senior Wildlife Biologist with GADNR, delivered a new clutch of eggs to Warm Springs on _____ collected from a location in *Baker County* date, 2019. We are incubating these eggs at 84.7°F and around 88% humidity in a controlled commercial incubator. Eggs typically take 90 days to hatch out.

| Date | Source Location | Number | Weight |
|---------------|------------------------|---------------|---------------|
| June 24, 2019 | Lanahassee WMA | 60 | 20.4 lbs. |

Jessica prepared a draft head-starting program plan for gopher tortoises that outlines the necessity, goals, and methods Warm Springs NFH intends to utilize in order to accomplish work goals set for this species.

A recent edition of GADNR's Georgia Wild (March / April 2019 issue) has an article about conservation efforts underway for gopher tortoises. The media also covered the release of the tortoises; a link of the coverage is included below.

<https://www.walb.com/2019/06/25/baby-gopher-tortoises-return-wild/>



Jessica Radich releasing gopher tortoises in the Lanahassee WMA.
Credit: Ashley Bohle/WALB News

Staff began rehabbing a metal building formally used for lake sturgeon culture for future work with gopher tortoises, gopher frogs, and future work with amphibian species of concern.

Shortnose sturgeon

Shortnose sturgeon are an endangered species with a historical range along Atlantic Basin Rivers southward from Saint Johns River in FL, north into Canada. WSNFH accepted shortnose sturgeon from the University of Georgia June 2018 for continued culture and possible future work with the species. Staff monitored culture conditions for the fish daily and fed them a commercial diet specially formulated for sturgeon. We inventoried and sampled the fish June 19th, 2019. Over a year's time the 23 fish on hand added on average 2.56 inches in length and 4.7 pounds each. They are currently average 34.45 inches in length and weigh 11.0 pounds each.

Freshwater Mussels Research

Jessica reorganized portions of the mussel holding systems to increase capacities for holding host fish before the start of this year's propagation work. Three 4 ft. diameter tanks were added to existing facilities to provide this capability. Staff collected largemouth bass and bluegill sunfish for host fish work from production ponds and

obtained red breast sunfish from Orangeburg NFH in June. These efforts are components within a work plan developed this year attempting to differentiate two closely related mussel species, the Chipola Slabshell and the Winged Spike, both endemic to the watershed of the ACF basin of GA and FL. Largemouth and bluegill collected will also be used in propagation techniques with the Rough Fatmucket mussel.

Pollinator and Native Plants Habitat Project

Staff and volunteers continued watering established plants within the landscaped area and renovated the undeveloped portion of the pollinator habitat area this spring. Staff tilled the undeveloped portion several times and treated it with herbicides prior to reseeded.



Landscaped portion of the pollinator habitat area.
Credit: Jessica Radich/USFWS

Sicklefin Redhorse

Sicklefin Redhorse are a USFWS listed candidate species. Warm Springs NFH staff work in cooperation with state, private and tribal partners to meet conservation goals established by the Sicklefin Redhorse Conservation Committee.

The 2018-year class of sicklefin redhorse (SFRH) were sampled each month, collecting length and weight data. The fish were fed three times per day using multiple diets depending on life stage and size of fish. Fry were fed a dry larval feed (powder) and brine shrimp, fingerlings were fed a formulated Rio Grande silvery minnow diet (crumble) plus powdered spirulina. As their growth increased, the feed transitioned to a formulated razorback sucker diet (pellet) mixed with powdered spirulina, along with frozen bloodworms. Deformities have unfortunately been a common issue in sicklefin redhorse culture. About 80% of mortalities displayed some type of deformity, and nutrition may potentially be the cause. A diet study has been approved and will be conducted with the 2019-year class to hopefully find a proper diet for this species.

System temperatures were maintained at levels that approximated those encountered in their native North Carolina

watersheds. The fish were treated in 2018 with an oxytetracycline bath treatment as a means to mass mark the fish. The fish were also marked with coded wire tags (CWT) prior to distribution on May 29th. Biologists Jaci Zelco with Warm Springs Fish Technology Center, Carlos Echevarria and Ian Paige with Warm Springs NFH facilitated training using CWT marking techniques to fisheries management technicians Nick Reed and Dallas Bradley. On May 29th a total of 632 sicklefin redhorse were distributed at three sites within the Tuckasegee watershed in NC.



Nick Reed, Jaci, and Ian coded wire tagging 2018 year-class sicklefin prior distribution.
Credit: Carlos Echevarria/USFWS

This year Carlos Echevarria, Chad Shirey and Ian Paige traveled to NC on May 6th to assist with collection and spawning of sicklefin redhorse. Variable temperatures and river flows in the watersheds have provided challenging broodstock collection conditions in the past, and this year was no exception. Working in cooperation with members of the Sicklefin Redhorse Conservation Committee, boat crews operated electrofishing equipment to collect potential ripe broodfish and bring them to the staging area setup on the Oconaluftee River. The staging area was located near the Oconaluftee and the Tuckasegee River confluence behind the Two Rivers Lodge in Bryson City, NC.

On May 7th, fertilized eggs were obtained from a single female sicklefin and crossed with five different males. The eggs were then split with Conservation Fisheries Inc. with 1800 fertilized eggs transported to Warm Springs NFH that evening. Staff remained on site in NC through May 9th but were unable to attain anymore eggs from newly collected females. The eggs reared at Warm Springs were incubated in hatching jars operating with a minimal water exchange through the jar, averaging around 3,000 mL / minute. Temperatures were maintained at 19°C to 20°C through May 15th when the eggs began hatching. Staff transferred the eggs into an aquarium to complete hatch out. Virtually all eggs received had hatched, and there were very few deformities observed as the fry grew. The first presentation of feed occurred on May 26th as the fry began to swim up in the aquarium.

Approximately 1,700 sicklefin redhorse from the 2019-year class were averaging over 0.75 inches in length at the end of June.

| Date | Location | Lot | Number | Length | Wt. (lbs.) |
|----------------|-----------------------|-----------------|---------------|---------------|-------------------|
| May 29, 2019 | Soco Creek, NC | 2018 year class | 222 | 3.39" | 3.40 |
| May 29, 2019 | Raven Fork, NC | 2018 year class | 190 | 3.39" | 2.90 |
| May 29, 2019 | Oconaluftee River, NC | 2018 year class | 220 | 3.39" | 3.30 |
| Totals: | | | 632 | | 9.60 |

Aquatic Species Restoration Programs:

Alligator Gar Restoration Program

Nothing to report

Gulf Coast Striped Bass Restoration

Pond fertilization got underway the first of April ahead of anticipated arrival of fry from Southeastern State and Federal hatcheries spawning striped bass. Multiple states and federal hatcheries work together to conserve striped bass through a long-standing effort. Ponds were started up beginning on April 15th. The only fry available this year were received from Marion SFH, AL. A total of 368,000 five-day-old fry were received in excellent condition. We tempered and stocked them into eight of our ½-acre production ponds at 84,000 to 100,000 fish per surface acre of water.

Following approximately one month of pond culture, the ponds were harvested, inventoried and distributed. We distributed 93,946 fingerling striped bass in two trips to Lake Seminole, part of the ACF river basin. We obtained a 25.5% return between stocking and distribution.



Ian Paige and Josh Simmons harvesting striped bass fingerlings from the kettle of a drained production pond.
Credit: Carlos Echevarria

| Date | Location | Number | Length | Wt. (lbs.) |
|----------------|----------------------------------|--------------------|---------------|------------------|
| May 21, 2019 | Lake Seminole, Faceville Landing | 54,506 | 1.22'' | 41.8 |
| May 23, 2018 | Lake Seminole, Faceville Landing | 39,440 | 1.00'' | 15.4 |
| Totals: | | 93,946 fish | 1.12'' | 57.2 lbs. |

Lake Sturgeon Restoration

Warm Springs NFH participates in a long-standing effort to restore lake sturgeon in the southern watersheds of its historical range. In our 19th year of propagating lake sturgeon, Carlos Echevarria and Chad Shirey from WSNFH and Bill Wayman of the WSFTC, traveled April 22nd to spawn lake sturgeon in WI. Working in cooperation with WIDNR staff, we spawned six female lake sturgeon, each crossed with five males on April 23rd. Fertilized eggs were maintained onsite in a special built egg transportation trailer. Staff then assisted WIDNR personnel on May 24th with their annual sampling efforts before returning to Warm Springs on April 26th. Extremely high water levels and fluctuating water temperatures made for difficult broodstock collections. Variable fertilization rates were obtained among five of the six females spawned and ranged from 11% to 70%. We discarded one of the six females' eggs that were not viable. A total of 134,655 eggs were transferred to Warm Springs NFH.



Adult lake sturgeon in spawning condition observed during extreme high water levels in Wisconsin.

Credit: Carlos Echevarria/USFWS



Lake Sturgeon Fry
Credit: Jessica Radich/USFWS

Eggs hatched out in the same system as used in previous years with the exception that it was relocated into the newly constructed holding house this year. With only a few glitches, the system worked fine and the fry were reared using established protocols.

Following one month of culture, we transferred fingerling lake sturgeon the week of June 4th – 6th to other FWS hatcheries for continued culture and eventual distribution into the Upper Tennessee and Cumberland rivers in TN. FWS hatcheries received 32,889 fry for culture. Two GADNR hatcheries also received 12,009 fingerlings for eventual distribution to the Coosa River. Warm Springs NFH retained approximately 5,098 fingerlings for continued culture. A total of 49,996-lake sturgeon were transferred to other stations or maintained onsite through June.

Staff developed a draft lake sturgeon movement plan that included producing larger sized lake sturgeon for tagging purposes, updating existing Vemco receivers and possible use of lake sturgeon in conjunction with host / fish mussel research.



Ian Paige, Josh Simmons and Jessica Radich boxing up lake sturgeon fry for transfer.
Credit: Carlos Echevarria/USFWS

| Date | Location | Number | Length | Wt. (lbs.) |
|-----------------------------|-------------------------|---------------|---------------|-------------------|
| June 4 th , 2019 | Go Fish Center SFH, GA | 5,117 | 1.16" | 0.915 |
| June 5 th , 2019 | Orangeburg NFH | 7,169 | 1.14" | 1.72 |
| June 6 th , 2019 | Edenton NFH | 9,103 | 1.29" | 3.21 |
| June 6 th , 2019 | Summerville SFH (GADNR) | 6,892 | 1.15" | 2.01 |
| June 6 th , 2019 | TN Aquarium, TN | 2,382 | 1.18" | 0.61 |
| June 6 th , 2019 | Private John Allen NFH | 6,091 | 1.29" | 2.15 |
| June 6 th , 2019 | Table Rock SFH, NC | 3,052 | 1.18" | 0.78 |
| June 6 th , 2019 | Mammoth Springs NFH | 5,092 | 1.18" | 1.30 |
| Totals: | | 44,898 | 1.20" | 12.70 lbs. |

Smallmouth Bass Restoration Program in Georgia

We are into our 4th year working with Georgia and Tennessee producing and stocking 1.5-2.0” fingerlings for distribution into Blue Ridge and Chatuge reservoirs in order to augment existing populations. Native populations of smallmouth bass are affected by the introduction of spotted bass throughout the region.



Volunteers Bennie and Marsh Maynard cornering brood smallmouth bass for sampling.
Credit: Carlos Echevarria/USFWS

Overwintered brood smallmouth bass were moved to the newly built raceways in early April. Staff and volunteers inventoried, sampled, and divided the broodstock into four separate sections of the raceway with male and female pairings. Each raceway section provided ample space for the brooders and contained three spawning pans per section. Staff regulated water temperatures to keep daily fluctuations to a minimum. Each day all sections were monitored for temperature, oxygen, fish condition, and for spawns by checking each spawning pan for the presence of eggs.

The number of spawns continues to increase each year. The 31 spawns collected between April 9th and May 20th, of which 30 produced fry, is a marked increase from the 16 spawns collected last year. Transferred spawning pans with eggs were treated twice in successive days with a 10-minute hydrogen peroxide treatment to control fungus. Newly

hatched fry were collected from the spawning pans typically at three days post spawn and cultured in larger circular and rectangular tanks until distribution.



Biologists Ian Paige, Jessica Radich, and Josh Simmons weighing, measuring, and floy tagging brood smallmouth bass.

Credit: Carlos Echevarria/USFWS



Josh Simmons transferring a pan with eggs from the brood raceway to indoor hatch out tanks.
Credit: Jessica Radich/USFWS



Smallmouth bass eggs in spawning pan.
Credit: Jessica Radich/USFWS

Fingerling smallmouth bass produced at WSNFH are to be distributed to Blue Ridge Reservoir, an impoundment of the Toccoa River in northern Georgia. We transferred two batches to Georgia GoFish Center for continued culture. We also distributed smallmouth to Blue Ridge on June 6th and are holding several thousand additional fingerling smallmouth bass for distribution to Blue Ridge later this year.

| Date | Location | Number | Length | Wt. (lbs.) |
|-----------------------------|---------------------------|---------------|--------|-------------|
| May 7 th , 2019 | Georgia DNR GoFish Center | 11,153 | 0.55" | 1.32 |
| May 24 th 2019 | Georgia DNR GoFish Center | 8,946 | 0.36" | 0.20 |
| June 6 th , 2019 | Blue Ridge Reservoir | 1,279 | 2.08" | 7.30 |
| Totals: | | 21,378 | | 8.82 |

Aquatic Habitats:

Nothing to Report

Aquatic Invasive Species:

Nothing to report.

Recreational Fishing and Public Use:

Warm Springs currently maintains two ponds dedicated to rearing channel catfish for use with kids fishing rodeos. Our youth fishing events are conducted in support of June's National Fishing Week. One pond contains smaller fish for eventual transfer to other public fishing locations and/or used in our primary fishing pond once they are large enough. This spring we received some jumbo-sized channel catfish from Private John Allen NFH to supplement the fish we had in our primary fishing pond. These fish broke a few lines during the June 15th fishing event. We encountered a week delay due to rain that undoubtedly reduced the number of kids fishing, but those who attended this year all caught fish. Of the 142 kids fishing this year, 14 were fishing for the first time, and a total of 432 fish were caught. Friends of Warm Springs NFH provided snacks and water for the event.



Families lined up around the fishing rodeo pond to assist their kids in catching catfish.
Credit: Carlos Echevarria/USFWS

Educate and Engage Public & Partners:

Freshwater Illustrated produced a nice film showing in selected markets titled "Hidden Rivers of Southern Appalachia". The work featured lake sturgeon conservation efforts of WSNFH and other southeastern FWS hatcheries. The film may eventually be released for conservation and classroom use later in 2019 according to the <http://hiddenrivers.org/> website.

Wisconsin DNR produced a short video of lake sturgeon conservation efforts that features active partner groups and healthy populations of lake sturgeon on spawning grounds. This is an effort we are working to replicate here in the southeast. <https://www.youtube.com/watch?v=cHq4RjaGyXs&feature=youtu.be>

Staff provided a site tour on April 10th to an Auburn University Conservation Ecology and Freshwater Invertebrates class.

We also facilitated several requests for pond management information and site tours. Among schools visiting the station were Harris County's entire 4th grade students on May 14th. In cases where we could not provide scheduled tours, extensive resource materials were provided to teachers for school use. Program assistance was provided for a June 6th outreach event sponsored by the Tri-City Housing Authority, Woodland and for a class station visit on June 12th.

Volunteers:

Cherish Jordan, a volunteer from 2017 returned to help this spring prior to moving with her family to Alaska. She carried forward the good effort put forth by volunteers who are maintaining our bluebird houses, assisting with gopher tortoise care, and feeding our pond fishes. Good luck with the Alaska hatcheries Cherish!

Volunteers Marsha and Benny Maynard continued their seemingly 24/7 support through most of the spring before heading up north to Maine to continue volunteering at Craig Brook NFH. They will be back next year though, and we have really benefited from their service while here.

Benny updated the WSNFH page on <https://www.volunteer.gov/>. Our thanks for a great job! This is part of a larger effort to upgrade our volunteer recruiting package for the hatchery and friends group. We had several inquiries following this upgrade by folks interested in volunteering here. Benny and Marsha also setup an exhibit in support of Earth Day held at the Aflac headquarters building in Columbus, GA on April 18th.

Friends of WSNFH provided financial backing and people power during the annual kids fishing event June 15th.

General Maintenance and Operations:

Our newest employee, Khrystylee Shepperd, joined the crew at WSNFH June 24th, as our Administrative Officer. Khrystylee brings a wealth of experience to this position, and we are sure glad you are here!



Khrystylee Shepperd joined the “shifty bunch” in June as our new office administrator Welcome!!
Credit: Haile Macurdy/USFWS (left); Stephen Jackson/USFWS (right)

We are retrofitting the metal building used for many years with our lake sturgeon conservation work for eventual work with gopher tortoises and gopher frogs. Contractors poured a new concrete floor over the existing gravel as part of this renovation in June (Photo right; credit: Jessica Radich/USFWS). Metal siding, doors, insulation, and heating/cooling units will be added in the coming months to fully enclose the building and provide temperature control.



Haile submitted the 2019 All Hazards Disaster Plan for WSNFH and related programs at Warm Springs ahead of the June 15th deadline. Other reports submitted included information for T & E species take and expenditures, a new volunteer reporting format for 2018, audit questionnaire for stations with Friends Groups, a questionnaire on potassium permanganate use on hatcheries, and the annual personal property inventory. Staff also completed performance progress reviews in April and WSNFH submitted a second quarterly report in April.



Ian Paige (left) and Josh Simmons (right) performing their skills tests in forklift training.
Credit: Jessica Radich/USFWS

Staff completed required training that included the annual computer use policy, (IMT Awareness Training) prior to the May 31st deadline. Chad Shirey provided recertification training for the station's forklifts per service policy on June 13th. Jessica Radich is a FWS certified scuba diver on the Region 4 Dive Unit. She attended the Regional Dive Workshop at Crystal River NWR, Florida April 22nd through the 26th. Ian Paige took MOCC (motorboat operators) training at Grenada, MS, June 25th through the 27th.



Deputy ARD-Fisheries Stephen Jackson presenting Haile his 30 years of Service plaque. Credit FWS



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