

Warm Springs National Fish Hatchery



Annual Report FY-2017

U.S. Fish and Wildlife Service
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Project Leader

1/23/18

Date

Aquatic At-Risk Species Recovery:

Gopher Frogs

Warm Springs NFH initiated efforts in partnership with the University of Georgia, Zoo Atlanta, Georgia Department of Natural Resources, The Amphibian Foundation, Inc., and others to expand conservation efforts for gopher frogs, *Lithobates capito*, within its historical native range. The main goal of this multi-year project is to establish a self-sustaining breeding population of gopher frogs on protected lands at the Nature Conservancy's Williams Bluff Preserve in Early County, GA. The species status is currently under review for listing by USFWS, and the state of Georgia lists it as a species of special concern. They are native to longleaf pine ecosystems in Georgia and elsewhere in the southeast. Loss of longleaf pine habitat is the primary threat for this species. They are limited to fewer than ten sites in Georgia.



Planning meetings with our partners got underway with a meeting on November 8th, 2016. Mark Mandica (Executive Director of the Amphibian Foundation in Atlanta), Dr. John Maerz (Professor of Vertebrate Ecology) and Vanessa Kinney (Research Coordinator) with UGA, John Jensen (Georgia DNR biologist), Dr. Joseph Mendelson (Director of Research Atlanta Zoo), and Robert Hill (Assistant Curator of Herpetology Atlanta Zoo) provided excellent advice from their experiences. They have successfully raised and distributed juvenile, fully developed frogs, reared from eggs collected in the wild. We utilized the culture protocols utilized by UGA for our initial effort. Following their recommendations, culture system design and component purchases were initiated for culture operations.

Josh Simmons met UGA staff at Fall Line Sand Hills WMA near Butler, GA on November 14th to collect plant stems of dry madiencane *Panicum hemitomon*, a native plant species within the habitat of gopher frogs. Collected from an empty pond on the Wildlife Management Area, this plant material provides the detritus needed to establish a food chain in the culture tanks that were to be used for the developing gopher frog tadpoles.

A contract was awarded to Border Construction Specialties for twenty 6 foot diameter circular tanks to be used for culture of gopher frogs. The tanks shipped during the last week of January. Tank covers were constructed per culture protocols obtained for the species, in part to prevent access by predatory insects, and the possible introduction of diseases from other native frog species accessing the tanks.



Filling tanks with spring water; Chad & Josh making covers from mosquito netting. Credit: USFWS

The madiencane was then added to the 5 ft. diameter tanks that were filled with approximately 216 gallons of spring water weeks ahead of stocking with tadpoles to develop an organic basis and microflora communities within the tanks upon which the tadpoles feed. Before placing tadpoles into these tanks, eggs were received and hatched in aquariums.

Vanessa Terrell, Research Coordinator at Warnell School of Forestry and Natural Resources, UGA and James Hunt, research technician provided valuable assistance throughout the program. Vanessa visited Warm Springs on February 14th and 17th delivering egg masses to us, following an earlier conference call with her on January 28th.



Vanessa Terrell with Carlos and Josh observing a gopher frog egg mass. Credit: USFWS

One egg mass was obtained February 14th and two more on the 17th. Following hatch out in the spring water filled aquariums, 19 of the 20 circular tanks were stocked at a rate of 75 tadpoles per tank on March 3rd. James Hunt, Research Technician at UGA assisted in this inventory and transfer operation. The culture tanks were provided small amounts of low energy pelleted animal feed periodically in March through the last week in May as the tadpoles began to grow when the first fully transformed frogs were removed from the tanks, weighted and placed into individual containers over a bed of moistened orchid moss beginning May 20th.



Tempering tadpoles before releasing them in the tanks; James Hunt (left) with Josh, Carlos, and Brian Hickson. Credit: USFWS

The outdoor culture tanks were then inspected multiple times a week to catch and remove additional newly transformed frogs through June and into July.



Steve Jackson, Deputy ARD Fisheries and Carlos Echevarria teaming up to feed live crickets to frogs held individually in containers of moistened orchid moss. Credit: USFWS

Live juvenile crickets were ordered from a local bait supplier in Winder, GA, and then dusted with calcium and other minerals as a vitamin supplemental before figuring out how to add live crickets to a container with a frog that wants out. No frogs got away, but we did have a few escaped crickets about the lab area where we held the gopher frogs.

Our thanks to all our partners who provided valuable insights towards our first year raising gopher frogs!

Mark Mandica with The Amphibian Foundation posted additional photos and an article online showing gopher frog culture at Warm Springs NFH and release photos at Georgia DNR's Fall Line Sandhills WMA located near Butler, GA. <http://frogpodblog.blogspot.com/2017/06/gopher-frog-conservation-partners-usfws.html>



Juvenile gopher frog over moistened orchid moss, and at the release site. Credit: USFWS

We distributed the last of our gopher frogs on July 7th at the Fall Line Sandhills Wildlife Management Area in Butler, GA. Warm Springs NFH distributed or transferred a total of 855 gopher frogs during this first year of production.

Date	Location	Number	Wt. (lbs.)
June 7 th , 2017	Fall Line Sandhills WMA, GA	746	7.77
June 16 th , 2017	The Amphibian Foundation, Inc., GA	45	0.46
June 28 th , 2017	Fall Line Sandhills WMA, GA	51	0.44
July 10 th , 2017	Fall Line Sandhills WMA, GA	13	0.14



Gopher frog wetland and longleaf habitat at Fall Line Sandhills near Butler, GA. Credit: USFWS

Freshwater Mussel Research

The goal of our augmentation and reintroduction program is to restore freshwater mussel biodiversity and their ecological functions to appropriate free-flowing reaches of the ACF; and to assist the recovery of federally listed mussels, by augmenting existing populations with hatchery propagated mussels. Hatchery biologists developed a plan with implementation aspects that include: developing technology through research, construction of facilities for holding listed mussel species, continued refinement of existing propagation techniques, augmentation and reintroduction plans for ACF listed mussel species. The hatchery continues holding mussels and host fish from previous studies that include several species from the ACF and Altamaha River basins. Mussels are held in tanks using pond water treated via the alkalinity enhancement building. They are fed with microscopic algae and organics present in pond water supplied to the tanks. The hatchery also holds several native small ACF riverine fish species along with largemouth bass and bluegill for host fish studies.

Volunteer Nathan Griffin, student at Columbus State University, completed an internship and his research paper, and presented a power point presentation for the work he conducted at Warm Springs in summer 2016. His paper is titled: Host fish identification trials for the unionid mussel *Toxolasma paulum* in January 2017.

Carlos provided culture information to Illinois Department of Natural Resources personnel looking to develop capabilities into mussel and other non-game species work.

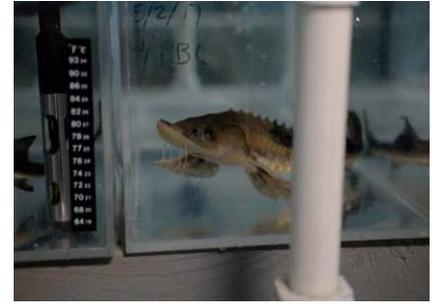
Trent Mitchell, obtained largemouth bass for additional host fish studies this spring from the Georgia Go Fish Hatchery. Trent along with Carlos Echevarria and Andrew Hartzog from the Panama City Field Office collected purple bankclimbers in the Flint River from near Albany, GA for work this season. The most successful host fish for the purple bankclimbers observed during preliminary trials were from lake sturgeon reared at Warm Springs National Fish Hatchery and blackbanded darters collected from Hannahatchee Creek near Lumpkin Georgia. Juvenile mussels collected from aquariums holding individual fish were fed daily and inventoried to evaluate survival of the young mussels.



Trent Mitchell, evaluating the viability of packets before infecting host fish. Credit: USFWS

He produced a video of purple bankclimbers, *Elliptioideus sloatianus*, releasing glochidia as part of fish host trials conducted at the hatchery this year. Trent was able to produce approximately 500 and 2000 transformed juveniles from 7-inch, and 18-inch hatchery-reared lake sturgeon, respectively.

This was with a medium-light inoculation rate, and we feel that during future trials we can inoculate at a much higher rate while still maintaining fish health.



Lake sturgeon during infection, after infection, and during metamorphosis of juvenile mussels with purple bankclimber glochidia. Credit: USFWS

While lake sturgeon appear to be the most successful host fish during our 2017 inoculations, the blackbanded darter also proved successful, yielding 1600 transformed juveniles from nine wild caught darters collected from Hannahatchee Creek in April of this year. Trials with speckled madtoms and various shiners yielded no transformed mussels post inoculation with purple bankclimber larvae.

Juvenile mussels collected from host fish trails fish were fed daily and inventoried to evaluate survival of the young mussels through August. The adult mussels were then returned to the collection sites after the work with them was completed.



Glochidia release from adult female purple bankclimber, Blackbanded darters and shiners during inoculation period. Credit: USFWS

Trent attended the Freshwater Mussel Propagation for Restoration course at the National Conservation Training Center, Shepherdstown, WV September 18th - 22nd.

Pollinator Habitat Project

In response to the Service's initiative to implement conservation efforts that will benefit monarch butterflies, Warm Springs NFH staff developed a project to provide forage and reproductive habitat for monarchs and other pollinators on the station.



Observation deck above pollinator area, Gulf Fritillary butterfly, and the final stages of the butterfly/pollinator garden. Credit: USFWS

Establishing native plants beneficial to monarch butterflies is a continuing goal at Warm Springs NFH. A section of the pond was replanted May 8th, 2017, with butterfly milkweed. As the 100 plus plants grew regular visitors, such as bees, Gulf fritillary and monarch butterflies were observed after the plants established themselves. Most of the plants started to bloom and attracted more pollinators through the summer and fall.

Aphid infestations were an ongoing problem that was controlled using a non-toxic spray of mild hand soap and water sprayed on the infected areas. The aphids killed or stunted growth among some of the plants. Additional plants were planted in the fall to supplement the butterfly weed and other

existing annual and perennial plant species as we continue to culture those critical for monarchs. Alex Londono cared for the newly planted butterfly weeds greatly assisting the plants establish themselves.



Butterfly/Pollinator garden at WSNFH in the beginning stages, Monarch butterfly in the garden. Credit: USFWS Image

Sicklefin Redhorse



Sicklefin redhorse. Credit: S. Fraley, North Carolina Wildlife Resources Commission

Sicklefin redhorse is a *Moxostoma* species currently listed by USFWS as a Candidate species (for elevated listing) throughout its entire range. We work to address conservation goals established within the Sicklefin Redhorse Conservation Committee. Partners include fisheries programs at Warm Springs, the Eastern Band of Cherokee Indians, USFWS Ecological Services (ES), Asheville, NC, Conservation Fisheries Inc. (CFI), North Carolina Wildlife Resource Commission (NCWRC), Tennessee Valley Authority (TVA), University of North Carolina, Duke Energy, and others. Sicklefin redhorse conservation efforts are important not only for the species but their significance in Native American culture. Carlos attended the annual sicklefin redhorse meeting at USDA's Southern Research Station, Asheville NC on Feb. 8th. Haile and Carlos participated in a follow-up conference call on March 21st.



Going into our fourth year of active participation, we actively support stocking and research programs within the species historical range. We are currently rearing a few 2014 and 2015 year class sub-adult sicklefin redhorse for evaluation of prospective formulated rations and for marking and tagging studies. A few of the larger fish are approaching 14 inches in length.

This year, boat crews from NC Wildlife Resource Commission conducted multiple sampling and collection efforts April 17th through the first week of May. Cold weather with lows in the 30 – 40-degree range (F) and heavy rains through this critical time resulted in fluctuating water temperatures and turbid waters which adversely affected the development of good spawning runs by sicklefin into collection areas. As a result, only a few females were collected, and very few fry were produced this year. Warm Springs NFH and RFC staff remained on standby to assist with spawning and propagation work throughout this period but were not called upon due to limited numbers of potential good broodfish being caught in sampling efforts. NCWRC biologists do report collecting juvenile sicklefin redhorse in areas previously stocked by Warm Springs NFH and CFI.



Sicklefin redbreast raised in captivity at WSNFH. Credit: J. Schmerfeld, USFWS

An additional supply of custom mixed diet formulated for use with razorback redbreast suckers was donated to our program by Manuel Ulibarri, Director, Dexter National Fish Hatchery, and Technology Center, New Mexico. We are top coating this feed with dried spirulina to provide additional vitamins to the diet for the 2014 and 2015 year class sicklefin being reared for tagging studies.

Aquatic Species Restoration Programs:

Alligator Gar

Warm Springs NFH participates in the alligator gar restoration program covering the Mobile River Basin in Alabama and the Mississippi River Basin in Tennessee. Alligator gar are a valued sports fish, the second largest freshwater species in the USA, and a top-level predator, capable of consuming non-native species such as Asian carp. The following link provides some background on alligator gar conservation work on-going in tributaries along the Mississippi River. <http://ualrpublicradio.org/post/return-gar>

Warm Springs NFH began involvement in regional conservation efforts for the species in 2005. All of Warm Springs alligator gar culture work falls within the Gulf Coastal Plains & Ozarks Landscape Conservation Cooperative Region. We work in cooperation with Private John Allen NFH, along with other State and Federal agencies under American Fisheries Society (AFS) Alligator Gar Technical committee guidance to achieve management objectives for this top-level predator.



While the most abundant populations of alligator gar occur in Texas and Louisiana, inland numbers are in decline. As of 2008, the species is considered vulnerable in many reaches. Our stocking efforts are directed to the Hatchie River, a tributary of the Mississippi River in TN. The state of TN lists alligator gar as critically imperiled.



On May 8th, 2017 we received 6,474 alligator gar fry hatched at Private John Allen NFH. Following early losses typically experienced in transitioning the fry to commercial feeds, we obtained a 41% return through June. Once we trained the fish to take high-quality commercial rations, good growth and survival rates were obtained by providing the fish with near-constant access for feeding through scheduled feedings and use of 24-hour automatic feeders. Water temperatures were maintained at levels which reduced chances for bacterial disease outbreaks among the fish.



Alligator gar in raceways for tagging and inventory, Chad Shirey, Trent Mitchell and CSU volunteer Cherish Jordan coded wire tagging . Credit: USFWS

Alligator gar were sampled, coded-wire tagged and then distributed July 13th ahead of scheduled demolition of the Holding House. On July 13th, a total of 2,642 gar averaging 6.01” in length, and 16.8 grams in weight. A total of 97.8 lbs. were delivered by Chad Shirey to two locations on the Hatchie River, a TN tributary within Mississippi River Basin.

Gulf Coast Striped Bass

Warm Springs NFH distributed Gulf coast striped bass fingerlings in support of restoration objectives set for the species within several river basins in the Southeast. Gulf coast striped bass populations have declined significantly due to loss of habitat that includes blocked access to historical spawning areas and summer thermal refuges, and water quality degradation. As the need arose for conservation measures, agency directors and commissioners from Florida, Georgia, Alabama, and the U.S. Fish and Wildlife Service signed a Cooperative Agreement in 1987, to establish by mutual consensus the restoration of striped bass in the Apalachicola-Chattahoochee-Flint (ACF) River system. The goal of the agreement was “to restore a self-sustaining stock of striped bass to the maximum extent possible.



ACF Gulf Striped Bass. Credit: USFWS

Preparing for the striped bass season, Carlos and Josh attended the Georgia Warm Water Hatchery meeting February 8th at Eufaula, AL. A topic discussed was a review of the 2016 restoration efforts by the participants and setting goals for the 2017 production cycle.

While production ponds were empty during the winter, they were seeded with ryegrass. Air diffusers utilized to provide supplementary aeration during the culture season were also cleaned, pressure washed and stored until they were reinstalled in the ponds. Ponds scheduled to produce fingerling striped bass were made ready in preparation for filling with water in early April. Sediment was removed from in and around harvesting basins of the 12 ponds typically used for producing striped bass.

Working in cooperation with our state and federal partners, the fry received were stocked into ponds, reared, harvested and distributed between April and May 2017.



Fingerling striped bass ready for distribution. Credit: USFWS

This year was a difficult year production wise. We received fry from Blackwater SFH, FL on April 11th and from Welaka NFH on April 16th. While we produced nice sized fish for distribution, the return from the six ponds we stocked was low. We only used half the available space set aside for phase I fingerling production this year as fry were also hard to come by. After harvesting, production ponds utilized for striped bass were refilled and managed to prevent erosion, some ponds were second cropped as forage ponds, producing goldfish for other station programs.

Date	Location	Number	Length	Wt. (lbs.)
May18, 2017	Lake Seminole, GA	29,701	1.38”	29.1

Lake Sturgeon

Warm Springs NFH works collectively with numerous NGO's, universities, state and federal agencies cooperating within the Southeastern Lake Sturgeon Working Group to meet restoration goals for this species in the southern portions of their historical range.



TENNESSEE
AQUARIUM



Annually, hatchery personnel undertake tasks ranging from spawning, rearing and marking fish before distribution by scute removal, to assisting in post stocking assessments and evaluation of habitat used by stocked lake sturgeon. We are into the 17th year of producing lake sturgeon for distribution into headwaters of the Tennessee River, typically near the confluence of the Lower French Broad River and Holston River in Tennessee. We distributed the last of our 2016 year class lake sturgeon in Oct. 2016 then produced and distributed 2017 year class fish beginning May 2017. We also produced both eggs and fingerling lake sturgeon for other hatcheries involved with restoring lake sturgeon in both the Tennessee and Coosa River Basins. Assessment work continued for a fifth year with hatchery crews assisting with surveys on sections of the Coosa River stocked by Georgia Department of Natural Resources (GDNR) and those stocked by partners in the Tennessee River Basin.

Propagation, Culture, and Stocking Activities

The last of our FY 2016 year class lake sturgeon were distributed during two October 2016 trips. Before distributing the lake sturgeon, all fish were marked at Warm Springs by removal of the left side, first and second lateral scutes. Chad Shirey distributed 1,320 sturgeon, weighing 66.15 lbs. and averaging 7.24 inches in length at the Nances Ferry access on the Holston River, TN, October 6th, 2016. The second distribution was conducted on October 22nd, 2016 at the Seven Islands State Birding Park, a site providing access on the Lower French Broad River in Knox County, TN., concurrent with the annual Lake Sturgeon Festival taking place at the access area. "The Sturgeon Fest is a partnership between the Tennessee Valley Authority, The Tennessee Clean Water Network, US Fish and Wildlife Service, natural resource agencies, government, industry, scientists, and anglers in order to highlight the ecosystem approach to managing native fish and wildlife populations in Tennessee and to increase interest in restoring the sturgeon to higher levels of abundance". Chad Shirey distributed a total of 2,071 marked sturgeon, weighing 114.23 lbs. and averaging 7.74 inches in length.



Chad Shirey WSNFH, explaining the tempering process as lake sturgeon are prepared for release. Credit: USFWS

Lake sturgeon distributions at other sites on the French Broad River also received publicity. The Smoky Mountain News located in Waynesville, NC published a November 9th, 2016 article of a lake sturgeon distribution from Edenton NFH, which were hatched at Warm Springs earlier in the year.

<http://www.smokymountainnews.com/outdoors/item/18794-welcome-home>

Carlos participated in the annual Southeastern Lake Sturgeon Working Group meeting held February 22nd at the Tennessee Valley Authority office in Knoxville, TN. Participants reviewed 2016 production and assessment accomplishments then coordinated tasks to be undertaken in 2017.

Date	Location	Release / Transfer	Number	Length	Wt. (lbs.)
	2016 Year Class Lake Sturgeon:				
Oct. 6 th , 2016	Holston River, TN, Nances Ferry	Release	1,320	7.24"	66.15
Oct. 22 nd , 2016	Lower French Broad River, Seven Islands	Release	2,071	7.74"	114.23

		Sub Total:	3,391	fish	180.38
	2017 Year Class Lake Sturgeon:				
April 21, 2017	Summerville SFH, GA	Transfer	69,128	Eggs	N/A
May 31 st , 2017	Orangeburg NFH	Transfer	10,458	1.19"	3.21
May 31 st , 2017	Private John Allen NFH	Transfer	8,228	1.21"	2.13
June 1 st , 2017	Table Rock SFH, NC	Transfer	2,423	1.23"	0.71
June 1 st , 2017	Edenton NFH	Transfer	9,109	1.23"	2.57
June 2 nd , 2017	TN Aquarium, TN	Transfer	2,359	1.34"	0.83
June 2 nd , 2017	Coosa River, GA (GADNR)	Release	5,721	1.26"	1.74
June 5 th , 2017	Go Fish Center SFH, GA	Transfer	4,100	1.11"	0.81
June 6 th , 2017	Mammoth Springs NFH	Transfer	8,682	1.53"	4.53
		Sub Total:	51,080	fish	16.53
Aug. 28 th , 2017	Univ. of West Georgia	Transfer	30	5.28"	3.31
Sept. 9 th , 2017	Watts Bar Reservoir, Upper TN River	Release	2,805	7.24"	134.34
Sept. 23 rd , 2017	Lower French Broad River, Seven Islands	Release	2,939	7.00"	123.49
		Sub Total:	5,774	fish	261.14

A video link was made available by Jason Henegar, Assistant Chief of Fisheries, TN Wildlife Resources Agency, of a PBS program featuring work undertaken by partners within the working group to restore lake sturgeon. The program was initially aired February 3rd, 2017.

<http://www.tnuncharted.com/season-3-episodes/2017/1/18/episode-308-cold-water-and-hardtack>

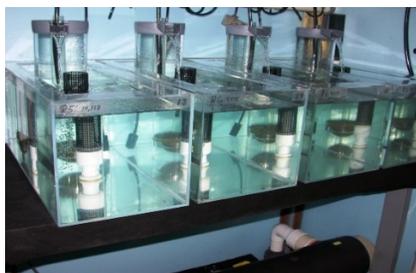
WSNFH staff traveled on short notice April 18th to the Wolf River in Wisconsin, below the Shawano Dam to spawn lake sturgeon and return the fertilized eggs to Georgia for culture. Our program supports restoration programs by Georgia DNR for the Coosa River, and work in Tennessee and North Carolina on the Lower French Broad, Holston and Cumberland Rivers under guidelines of the Southeastern Lake Sturgeon Working Group.



Wisconsin crews collecting mature lake sturgeon spawning below the Shawano dam assisted by Warm Springs NFH staff. Credit: USFWS

The timing of their arrival was spot on as Carlos Echevarria, Chad Shirey and Bill Wayman (WSFisheries Complex) arrived the next day and fertilized eggs from 6 females each with five different males. The following link highlights this spawning operation and the public's interest and support involved in seeing full-grown lake sturgeon.

<http://fox11online.com/news/local/northwoods/sturgeon-spawning-below-shawano-dam-attracts-spectators-and-scientists>



Incubating lake sturgeon eggs, quarantine period approaching 30 days old ready for transfer at Warm Springs NFH. Credit: USFWS

A batch of fertilized eggs was transferred directly to GADNR staff upon the crews return to Georgia. The remaining lots of eggs were incubated at Warm Springs following genetic, culture and quarantine production protocols established for the species. Fertilization rates varied among the

different batches of eggs, but plenty of fry were produced for continuing culture work by all the partners working together for the benefit of the species.

Between May 31st and June 6th we transferred 45,359 lake sturgeon to participating FWS hatcheries, state and university partners for continued culture and eventual distribution later in 2017. An additional 5,721 were transferred to GADNR for direct release into the Coosa River. A total of 51,080 lake sturgeon were distributed or transferred with a balance of 6,084 lake sturgeon held at Warm Springs for distribution later in September 2017.

All lake sturgeon hatched in 2017, and reared for distribution to the TN river basin were marked by the removal of the 1st and 2nd right lateral scutes. Thirty lake sturgeon averaging 5.28” in length were transferred to the University of West Georgia on August 28th for an investigation of water chemistry impacts on the development of hatchery-reared sturgeon vs. those raised in the river (ex. natural recruitment). Also, 100 smaller lake sturgeon were held back at Warm Springs for mussel host fish work next spring.



Fish Health Lab, Tech Center personnel, and volunteers assisted hatchery staff with coded wire tagging and marking by scute removal all lake sturgeon. Credit: USFWS

Two locations along the Upper TN River: Watts Bar Reservoir and Seven Island Refuges were stocked with 2017 year class lake sturgeon concurrent with two outreach events. The first coincided with the Muir Festival in Kingston on September 9th. This 150th-year festival was a celebration of naturalist John Muir’s walk through the area known now as Kingston. The hatchery stocked a total of 2,805 fish averaging 7.24” in length, weighing 134.34 lbs., and averaging 22.5 fish/lb.

The 2nd stocking occurred during the 2017 Sturgeon Fest at Seven Island Refuges on September 23rd. The Tennessee Valley Authority (TVA) and the Tennessee Clean Water Network sponsored this environmental program. The festival featured outdoor educational exhibits along the shores of the French Broad River. Adults and kids had the opportunity to release live sturgeon provided by Warm Springs as was the case during 2016 with releases at this same site. The hatchery delivered a total of 2,939, averaging 7.0” in length, weighing 123.49 lbs., and averaging 23.8 fish/lb. in weight.



Muir Festival at Kingston stocking site. Credit: J. Henegar, TWRA; Carlos Echevarria tempers lake sturgeon before releasing fish in the river at Sturgeon Fest. Credit: J. Monroe, Freshwater Illustrated

An additional, 60 lake sturgeon were sent to the Warm Springs Fish Health Center for PCR testing and screening for herpes virus which was detected among adult lake sturgeon in the Wolf River, WI this year. The test is to evaluate if a vertical transfer of the virus from brood lake sturgeon through the eggs had occurred. WSNFH maintains standardized egg disinfection and quarantine protocols for other viruses which may be transferred in this manner. Two fish were preserved and frozen, then sent to Janine M. Ziermann, Ph.D., at Howard University College of Medicine, Washington, DC to study head, neck, and heart muscle development and evolution in vertebrates, and its unique phylogenetic position. Staff began the long process of preparing to relocate culture equipment currently located in the lake sturgeon building into a new holding house whose construction is currently scheduled early in FY 2018.

Lake Sturgeon Habitat & Population Assessment Work

Chad Shirey and Carlos Echevarria worked with other boat crews during annual sampling efforts undertaken along the Upper Tennessee River, November 14th through the 18th. Boat crews on the TN River consisted of staff and volunteers from Tennessee Wildlife Resource Agency (TWRA), Tennessee Valley Authority (TVA), University of Tennessee (UT), Tennessee Technological University, and FWS personnel from Warm Springs NFH, Panama City FWCO, Erwin NFH and Warm Springs Fish Health Center. Limited numbers of lake sturgeon were collected this year. Boat crews collected a total of 24 lake sturgeon. Post-assessment work included upper TN River data analysis and work on the annual production report.



Carlos Echevarria and Byron Hamilton, preparing to deploy trotlines. Credit: USFWS

Chad Shirey and Josh Simmons sampled on sections of the Coosa River in Alabama, December 5th through the 9th. Sampling was conducted on Weiss, Neely Henry, and Logan Martin reservoirs. Alabama scientific collecting permits were completed but not required as Alabama fisheries biologists worked alongside WSNFH staff this year. Working in cooperation with Georgia and Alabama Natural Resource Agency biologists, one lake sturgeon was collected from Lake Weiss.

The working group has developed sampling techniques using trotlines to recapture stocked lake sturgeon. Following sampling efforts, this past fall in the Upper Tennessee and Coosa River systems in TN and Alabama, reconstruction, and repair work was required for the sampling equipment. The Warm Springs NFH staff and volunteers reconstructed trotlines in January.



Josh Simmons, Chad Shirey and volunteer Tony Jankowski rebuilding trotlines used to sample lake sturgeon. Credit: USFW

Smallmouth Bass

Historical smallmouth bass populations in their native Georgia drainages are in decline, influenced by widespread hybridization with introduced spotted bass. Pure strain smallmouth bass are reported to be seriously impacted in Chatuge and Blue Ridge Reservoirs, impoundments within the Tennessee River basin. These reservoirs are state-managed by Tennessee and Georgia DNR's, respectively. Blue Ridge is located at the border of Georgia and Tennessee, and Chatuge is located at the border with North Carolina. According to GADNR biologists, Blue Ridge Lake is known as the last stronghold for smallmouth bass in Georgia.



Credit: USFWS

We are entering our second year working in cooperation with Georgia, Tennessee and North Carolina to produce fish for Blue Ridge and Chatuge reservoirs. We were successful in producing five separate spawns from the 16 broodstock we divided between two secured and water temperature controlled raceways this year. Each raceway held five females and three males. Egg clutches were observed in the raceways on April 22nd, 26th, May 27th, June 3rd and June 8th.



20' Raceway inside the Alligator gar pen was rehabilitated to hold smallmouth brooders; Smallmouth bass eggs laying in the gravel. Credit: USFWS

Each pan with eggs was moved to a secured tank supplied with buffered spring water before the eggs hatching. Of the two types of artificial spawning substrate provided, all nests of eggs were collected from river rock placed into shallow pans. No spawns were collected off of spawning mats. Staff experimented with timing of fry transfer into culture tanks. Fungus control was facilitated by removing the pans with gravel and eggs into secure raceways within a day of observing the nest. Once fry were observed within the submerged pans, they were gently siphoned out and into traditional culture tanks.

As the fry's yolk sacs were absorbed, we began offering feed. A transition of brine shrimp, Otohime feeds, freeze-dried copepods and crumbled freeze-dried krill were accepted by the growing smallmouth bass over the several months we held them prior to distribution.



Smallmouth bass awaiting their rations, they are fed four times a day. Credit: USFWS

Georgia DNR fisheries biologists picked up the first two spawns on June 29th. The last of our 2017 captive produced smallmouth bass were distributed in August and September. On August 2nd, we distributed 2,465 fish to Blue Ridge reservoir averaging 34 mm in length and 581 fish/lb. On September 14th, we distributed 2,653 fish averaging 45.0 mm in length and 340 fish/lb. These were from a single spawn collected earlier this spring. As they grew through the summer, we moved them from 24-inch diameter tanks into three, larger 42-inch circular tanks and fed them a combination of freeze-dried krill, CALA-fin (freeze dried marine copepods) and commercial rations, three to four times a day.



Smallmouth bass averaging 1.25" in length for stocking; Georgia DNR biologist releasing smallmouth bass in Blue Ridge Reservoir. Credit: USFWS

Date	Location	Number	Length	Wt. (lbs.)
June 29 th , 2017	Blue Ridge Reservoir, GA (GADNR)	860	1.18"	1.29
Aug. 2 nd , 2017	Blue Ridge Reservoir, GA (GADNR)	2,465	1.34"	4.24
Sept. 14 th , 2017	Blue Ridge Reservoir, GA (GADNR)	2,653	1.77"	7.80



Weighing and measuring smallmouth bass fingerling; tagging smallmouth bass. Credit: USFWS

Following the end of spawning activities, broodfish were consolidated into a single secured raceway, maintained in cool water and fed goldfish. As water temperatures cooled in the fall, brood smallmouth bass used for production this year were sampled, coded wire and pit tagged on September 15th, then transferred to a screened holding pond stocked with forage goldfish until next year.

Carlos Echevarria traveled to Eagle Bend SFH, TN on September 18th to pick up an additional 19 brood smallmouth bass. They were pit tagged and are currently being held in isolation. We are also rearing 36 FY 2016 year class smallmouth bass as future broodfish. These fish are currently approximately 10.0 inches in length and are being fed forage goldfish.



Juvenile smallmouth bass being reared for future broodfish. Credit: USFWS

Aquatic Habitats:

WSNFH participates in multi-agency landscape-level watershed restoration projects through the southeast. Chad Shirey, the heavy equipment operator at Warm Springs NFH, assisted with multiple culvert and dam removal projects this year as an active member of the Southeast Region Aquatic Habitat Restoration Team.

Working with partners November 6th - 13th, 2016 Chad participated in removing the Shuford Mill Dam impounding the Henry Fork River near Brookford, NC. The dam's removal facilitates fish passage in sections of the river that were impacted by the dam's presence as well as restoration efforts for native mussels and other aquatic species. Several online links showing the dam removal in progress are available including the following American River's website and a YouTube video link. "American Rivers and Carolina Land and Lakes Resource Conservation and Development Council co-managed the project and FWS provided construction/demolition services." Design engineering was conducted by Stantec Consulting. Additional partners included, "North Carolina Wildlife Resources Commission, Appalachian State University, Catawba County Soil and Water conservation district, Western Piedmont Council of Governments, Jeffrey Rich and Freshwaters Illustrated."

<https://youtu.be/q4A2uLLwZRg> Link provided by Hal Jones, FWS.

<https://www.americanrivers.org/2016/08/shuford-dam-removal/>

Chad participated in cooperative efforts to remove Green River's Lock and Dam No. 6 near Brownsville Kentucky March 28th through April 2nd, 2017. The dam presented an immediate safety hazard to the public; its removal is also projected to benefit native mussel and fish species.

"The Army Corps of Engineers Louisville District has coordinated with the U.S. Department of Interior Fish and Wildlife Service, Kentucky Department of Fish and Wildlife Resources, Mammoth Cave National Park, The Nature Conservancy and the Kentucky Waterways Alliance on the dam removal. The lock and dam, built in 1904, closed to navigation traffic in August 1951, more than 65 years ago". (Corp of Engineers Press Release)

http://www.glasgowdailytimes.com/news/removal-of-green-river-lock-and-dam-no-underway/article_09572dbe-140c-11e7-bd56-f7f21e73ed1e.html



Photo credit: Gina Kinslow / Glasgow Daily Time

Chad then participated with other Southeast Region Aquatic habitat Restoration Team members July 22nd through Aug. 3rd, 2017 with a culvert replacement project on Gills Creek (Lancaster County, South Carolina). The new culvert helps restore natural flows and provides native species access to stream reaches.



View of old culverts removed with heavy equipment and the newly installed culverts at Gills Creek. Credit: USFWS

Aquatic Invasive Species:

Nothing to report

Recreational Fishing and Public Use:

Nothing to report

Educate and Engage Public & Partners:

Warm Springs NFH works to uphold and demonstrate the Service's commitment to environmental leadership. To that end, the station provides facilities, kiosks, public access and scheduled events that increase the public's awareness of natural resources, our goals, and accomplishments. Staff also conducted tours and provided (volunteered) time for occasional off-site programs as time permitted.

We annually sponsor two outreach events, an annual open house in October and a June kids fishing rodeo held in support of National Fishing Week activities and additional activities through the year.

The **Annual Open House** sponsored by WSNFH was held for the community Saturday, October 8th, 2016. It featured exhibits and demonstrations from all WSNFH programs. Hatchery staff and Friends Group members cooked hotdogs and provided bottled water to the attendees. The food and water were donated by Friends of Warm Springs NFH. Visitors had an opportunity to view exhibits and to chat with staff members from the entire Warm Springs Fisheries Complex: Warm Springs NFH, Fish Health Lab, and Fish Technology Center.



Energetic young volunteers helped greet visitors. Credit: USFWS



Devin Chappell (Fish Health), Bill Wayman and Nathan Whelan (Technology), and Josh Simmons, WSNFH. Credit: USFWS

Haile Macurdy participated in Pike County's High School STEM science project evaluations on December 12th, 2016. Students developed aquaculture/hydroponics projects in grades 10-12. Working in teams, approximately 100 projects were presented by the students for evaluation of their presentations and of the scientific methods they used. A follow-up visit to Warm Springs NFH was facilitated on Jan. 26th with 30 Pike County 10th grade algebra students. The students undertook activities learning how to calculate stream flows and conduct diversity index calculations.



Students conducting activities to calculate stream flow. Credit: USFWS

WSNFH staff collected locally available display fish for transfer to the Mystic Aquarium, located in Mystic, CT. The aquarium wanted some warm water species, such as longnose and spotted gar, for their exhibits. They were transferred on December 13th, 2016.

Onsite programs and tours were offered through the year to school, community and professional groups and individuals.

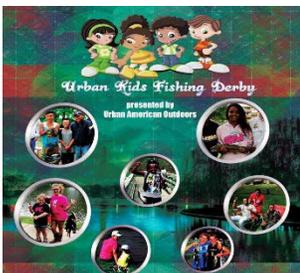


Bus tour group visit Jan. 26th and Manchester High School students' job shadowing Feb. 10th. Credit: USFWS

Haile provided a tour on the 26th for 28 Columbus GA Parks & Recreation Senior Center visitors. We support area schools and interested students in a variety of ways. We participate in job shadowing opportunities such as those with Manchester High School. Warm Springs Program overviews were provided by Bill Wayman, Devin Chappell, and Haile Macurdy for three students this year.

Carlos met with Henry Jackson, Chattahoochee River Warden on March 21st to discuss future collaborative efforts and to see our station.

Visitors to Warm Springs NFH have great opportunities to view a wide variety of wildlife on station. Spring and summer months are a good time to see purple martins and other migratory birds.



We delivered 300 catfish averaging 16 inches in length in our second year of support for Atlanta's Urban American Outdoors fishing derby, held this year on April 3rd at Sweetwater Creek State Park. We wish to ensure the kids' success and to support fishing as an outdoor pastime.

We facilitated two onsite film visits with Jeremy Monroe, Freshwaters Illustrated. He obtained stock footage of catfish seining operations in April then returned to film many aspects of our lake sturgeon and other programs over several days around the first of June.



Carlos speaking with a visiting Auburn University fish culture science class June 20th. Credit: USFWS

We had the opportunity to provide in-depth programs to several groups and visitors. Carlos gave a station tour and answered questions for a visiting Auburn University fisheries science class on June 20th. Haile provided a tour to Mr. Marcus Cloud, a Seminole Tribal ecologist interested in lake sturgeon culture techniques. He also forwarded information on Tribal Educator workshops to Michael LaVoie, a fisheries biologist with the Cherokee Tribe in North Carolina. Online resource information on stream gauge sites, watersheds, and water quality testing equipment were forwarded to Manchester High School science teachers.

National Fishing Week-Warm Springs National Fish Hatchery 2017 Kid's Fishing Day

The ever increasingly popular annual Kids Fish for Fun Day at the Warm Springs National Fish Hatchery went off with a bang on Saturday, June 10, 2017, in conjunction with National Fishing Week. Over 300 enthusiastic and smiling children ages 3 to 12 years old attended, with most catching catfish. Volunteers from our Friends Group, Benning Bass Club, parents, and staff all worked together to ensure the kids had a good time.



Benning Bass Club member assisting children during the event. Credit: USFWS Image. Credit: USFWS

The children had the opportunity to fish in one of two of our catfish ponds filled with thousands of fish. We had 17 first time fishers this year. The event continues to increase in popularity as people from surrounding cities, and as far as Auburn, AL continue to attend.

A total of 14 volunteers, Fish and Wildlife Service employees, and Friends of Warm Springs National Fish Hatchery Group participated in the event. This year's event had the Fort Benning Bass Club members teaching children how to bait and cast.



Big smiles all around on Kid's Fishing Day. Credit: USFWS Image.

This year Kevin R. Wiley, Georgia Power Area Manager and Meriwether County Chamber of Commerce Board of Directors member, generously donated over 800 water bottles for the event. The Friends Groups provided all of the snacks and goodie bags for the children.

Other tours and related educational activities are listed below.

Articles were submitted for publication in FAC Highlights and Egrits on mussel, lake sturgeon outreach, smallmouth bass accomplishments. The information and images were forwarded for use by the Regional and Washington offices. Alex also submitted articles for E-Grits on our National Kids Fishing Day and work with gopher frogs up through July. He is updating a station brochure for use at kiosks at the aquarium building and area welcome centers.

WSNFH staff met with Zoo Atlanta's Senior Veterinarian Sam Rivera for a facilities tour and discussion of future partnership opportunities on January 26th.

Carlos met with Henry Jackson, Chattahoochee River Warden on March 21st to discuss future collaborative efforts and to see our station.

Carlos met with Mark Mandica with the Amphibian Foundation March 29th and provided a tour.

LaGrange College Professor Molly Newman and her ecology class visited on March 23rd. They conducted stream sampling activities while here.

We had a chance to visit with John Schmerfeld, USFWS Deputy AD on May 22nd during an afternoon visit while in the region for another meeting.

Tours included visits from area home schools such as the Walker School tour, October 5th 2016 consisting of 13 kids and two adults.

A Boy Scout troop toured the station March 10th, and two school groups toured the station March 22nd and 23rd.

We've upgraded our public use area, replacing some dying weeping willows with Cyprus trees, replacing faded American alligator and cavernous plant display boards with new ones.

Planning was completed for the upcoming FY 2018 annual Open House scheduled for October 14th, 2017. Notices were sent to newspapers in Columbus, LaGrange and Newnan, Manchester and other locations. Staff spread the word through fliers, email contacts, and social media sites.

We provided tours and program overviews on several occasions to visiting Regional Office staff and a few individuals interested in future careers with the USFWS. We also facilitated visits by some homeschool groups as time permitted and often provided catfish feed so the kids could offer some to the always hungry channel catfish held in two of our ponds.

Haile provided information to area teachers on resources available for lesson plans. These included information relevant to hydroponics and water chemistry scenarios encountered in intensive culture systems and pond production. We are also providing information about online resources related to watersheds, and water quality testing equipment.

Volunteers:

The Benning Bass Club, friends of the hatchery and staff, came together to landscape pond slopes and constructed islands in the wetlands display area. The Benning Bass Club supplied the workers; the Friends Group supplied snacks, coffee, and water to the volunteers. The Benning Bass Club has worked annually with the Hatchery on environmental projects for the last five years. These partnerships help leverage funds and workloads to benefit both fisheries and other wildlife. Carlos coordinated with Benning Bass Club member Gilbert Flores for environmental project ideas this fall at Warm Springs NFH. Upgrades and maintenance on our boardwalk are an option for FY 2018.



Carlos thanking club members for their valued assistance. Credit: USFWS

Tony Jankowski, a student at Columbus State University, volunteered for approximately 30 days with us. He completed a course requirement working through the end of January and did an excellent job for us.

Working in cooperation with Easter Seals Disability Center's Community Rehabilitation Program, we provided after-school volunteer opportunities and work experiences for local high school student Tye Bishop. He worked through fall by feeding fish in our ponds and helping with maintenance projects around the station.



Tye, feeding catfish ahead of National Fishing Week activities this spring. Credit: USFWS

New volunteers Cherish Jordan and Garrett Mitchell joined in and greatly contributed to priority programs underway here. Each provided excellent assistance and enthusiasm through their work with mussels, alligator gar, and lake sturgeon culture just to name a few activities.

Staff and perspective new members for Friends of Warm Springs NFH met in May to talk about the upcoming fishing rodeo and other friends group activities. We also sent information and met with individuals with regards to Friends Group membership and other volunteer opportunities here at

WSNFH. Staff hosted a September 14th meeting with Friends of Warm Springs NFH members to talk about upcoming project opportunities and the scheduled Open House in October.

Haile participated in a Region 4, Friends Group conference call April 18th. We also resubmitted volunteer service reports with extra pictures for regional office use Jan. 13th.

General Maintenance and Operations:

Maintenance:

Contracted work was undertaken to add metal roofs to ten buildings at Warm Springs NFH. Victor Bowman, contracting officer, FWS coordinated a preconstruction conference call October 6th, 2016 with WSNFH staff and Larry Bruccoliere, FGM General Contractor and Construction, LLC and Mike Pittman, a roofing contractor. Ten buildings were reroofed under project F16PX02825, beginning on October 20th, and ending on December 21st after the contractors took care of the final punch list items. The following buildings were reroofed: feed house, vehicle storage, wet lab, two pole sheds, welding shop, genetics/cryopreservation lab, fish health lab, old and new pump house buildings. Multiple return visits were required by the contractors to address punch list items identified during the project.



Section of newly installed metal roofing over the wet lab. Credit: USFWS

Planning continued through the year on developing a cost-effective work plan for removing the existing holding house and replacing it with a metal building that will provide needed functionality and capacity to meet future program needs. The new Holding House project will also include building a set of covered raceways 80 foot long, and



Existing building with degraded concrete raceways, scheduled to be replaced. Credit: USFWS

expanding the existing storage capacity of an adjacent water supply pond. Carlos and Regional Office engineer Carville “Billy” Edwards coordinated multiple planning and coordination meetings through the year with contractors from BlueScope Buildings. These included teleconference call on November 21st and an onsite visit December 2nd to facilitate evaluations of the water supplies head pressure and flow rates for the proposed replacement building. A follow-up conference call on December 9th was conducted as part of the scope of work coordination currently underway on the project. A Design Kickoff Meeting was held on May 16th, 2017, and several follow up site visits were facilitated by hatchery staff as contractors dealt with floor plans, electrical supply options, geotechnical surveys and hydraulic profile design tasks. The project neared a 65% design completion as the fiscal year ended.

During the fall and winter staff winterized culture systems, water supply lines, and buildings to prevent below freezing temperatures from damaging equipment. Ponds utilized for striped bass production were drained as a means of removing unwanted aquatic vegetation over the winter, and air stones were removed for cleaning. Staff worked on leaf removal from landscaped areas and maintained roads and ditches ahead of fall and winter rains. Tree roots were removed from French drains tied into south spring; the water source for culture systems located in the pole shed and wet lab area.

A new aluminum trailer was ordered to replace an existing wooden decked, steel frame trailer on which a 500-gallon capacity circular fish-hauling tank is mounted. The existing trailer’s axle(s) and decking were becoming unsafe for highway use.

Following emptying the sodium hydroxide storage tower, undersized bolts were found to be contributing to observed leaks through the side access cover of the tower. Upon refilling with water for a pressure test, damage to the inner foam insulation and fiberglass containment tank components of the tower were found. Settling of the inner tank means the tank is no longer reliable for storing chemicals.

Two other chemical towers at the wetlab were filled with baking soda and calcium chloride solutions on several occasions through the year as a means of moderating the water chemistry from south spring. The water here has naturally low pH, alkalinity and hardness profiles. The concrete pad

and metal legs supporting these two towers were also sandblasted then covered with fiberglass in August to lessen corrosion of the concrete and metal.

The water supplied from Cold Spring is treated with high calcium content crushed limestone in order to moderate its water chemistry rather than through the use of multiple chemicals. This tower was refilled twice during the year.



A blower truck hooked up and preparing to charge our crushed limestone storage tower Friday, Jan. 20th. Credit: USFWS

We also replaced a faulty pressure gauge to the water storage tower on Jan. The old one had a ruptured membrane. Staff also calibrated digital station meters and refreshed supplies in test kits used to measure water quality.

A large sweetgum tree fell over in March causing damage on the station. The tree damaged a security fence, took out a power line that caused a power surge disabling a generator's transfer switch. Repairs to this switch cost \$3,300 and required alternative emergency start-up procedures to manually transfer power to the sturgeon/mussel building complex during power outages until repairs were made. Staff later met with Georgia Power representative Mark Horne on April 19th to evaluate solutions for dealing with supply line voltage issues.



Damage following a tree fall. Credit: USFWS

Following the devastation among southeastern coastal communities brought on by hurricanes Harvey and Irma, Chad Shirey mobilized from September 8th – 27th with other response team members to work at multiple FWS program sites and other critical staging areas from Mississippi to the Florida Keys. He helped with emergency electrical and mechanical repairs in order to get facilities up and running again.

Hurricane Irma's passing close to Warm Springs caused very little actual damage to our station. Power was restored after approximately 10 hours. The three fixed station generators worked without issues, and one portable generator was used with our aquarium building until power was restored.

Training, Safety, and Administrative:

Lisa Kemper, with the Migratory Birds Program, Regional Office, provided excellent assistance at Warm Springs during a two-week detail here in December.

Warm Springs NFH welcomed new employees Alexander Londono, Office Assistant, and Trent Mitchell, Bio-Technician. Both began work at Warm Springs during the 2nd quarter of FY 2017.

Haile completed an annual refresher course required for station CDSO on January 19th and Alex participated in a CDSO course at Natchitoches NFH August 21st – 25th.

Haile and Carlos completed the Firearms Accountability Course in January and an 8-hour supervisory training course at Atlanta, August 8th.

Chad Shirey certified Josh Simons for agricultural farm tractor operations on February 3rd and Trent Mitchell attended MOCC training at Pascagoula, MS, February 28th – March 2nd.

Chad participated in heavy equipment training at Grand Bay National Wildlife Refuge, near Moss Point, MS February 12th through the 17th.

All fire extinguishers on the station were inspected and any required maintenance conducted during February. New maintenance schedules for the extinguishers were also developed.

A technical paper on chemistry and operation of our water treatment process was submitted by Dr. Barnaby J. Watten on November 9th for publication in the Journal of Aquacultural Engineering.



Philip L. Sibrell (USGS), Dr. Barnaby Watten USGS, Vincent Mudrak (WSRFC) and Carlos Echevarria (WSNFH) working together in Leetown, PA. Credit: USFWS

The manuscript is titled: “**Performance and Application of a Fluidized Bed Limestone Reactor Designed for Control of Alkalinity, Hardness and pH at the Warm Springs Regional Fisheries Center**”: Author: Barnaby J. Watten Co-Authors: Vincent A. Mudrak, Carlos Echevarria, Philip L. Sibrell, Steven T. Summerfelt, Claude E. Boyd. The paper was accepted for publication, and final version of the article with full bibliographic details is now available online: <https://dx.doi.org/10.1016/j.aquaeng.2017.03.003> Information on this treatment process was also forwarded to Steven Summerfelt, Director, Aquaculture Systems Research, The Conservation Fund Freshwater Institute, Shepherdstown, WV.

Staff worked on a variety of administrative projects, training classes, evaluations, budgeting and purchasing activities during the quarter. Carlos participated in several Project Leaders conference calls.

Chad participated in a Wage Grade employee’s meeting at the Regional Office August 9th.

Continuing efforts were applied towards meeting FY 2016 year-end requirements for personnel actions, budgeting, and annual reporting requirements ahead of staff taking time off from the accumulated use or lose vacation time in December. Work included updating staff EPAP’s and developing the station’s PRS targeted goals for 2017 in FIS. Staff submitted new work templates and corresponding 2017 budgets for major FY 2017 fisheries programs on February 23rd.

We submitted quarterly reports for 4th Quarter FY 2016 and first three quarters of FY 2017. Haile completed FIS accomplishments and volunteer service reports for FY 2017. Annual fish distribution records were completed for FY 2016 and FY 2017 in FIS. The FY 2016 Annual Report was submitted on January 31st, 2017.

A negative response on invasive species data collection and a negative Sikes Act report were also submitted in January. We submitted quarterly pollinator reports and Georgia scientific data collection information.

An equipment purchasing plan for computers, printers, and similar items was submitted November 1st. Data was compiled and submitted online in January for all programs at Warm Springs on solid waste management and sustainable use. Data was inputted into the iQMIS Quarters database for 2017 rate calculations.

Pesticide use proposals (PUPS) were submitted for 2017 on December 20th. The proposals were updated to include background information on state and federal listed species. Pesticide usage information was also compiled and submitted for the 2016 use report.

Staff reviewed updated policy for the Aquatic Animal Drug Approval Partnership and responded to Brian Hickson’s WSFHC, request for comments on March 8th. The hatchery is adding the use of inventory control forms for selected antibiotics.

Staffs are reviewing solar panel contract options with Georgia Power as the company discontinues the existing Green Energy Program contract options available to solar panel owners.



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