



U.S. Fish & Wildlife Service

National Wildlife Refuge System

Southeast Region Inventory & Monitoring Branch

Branch Update
Fall 2016

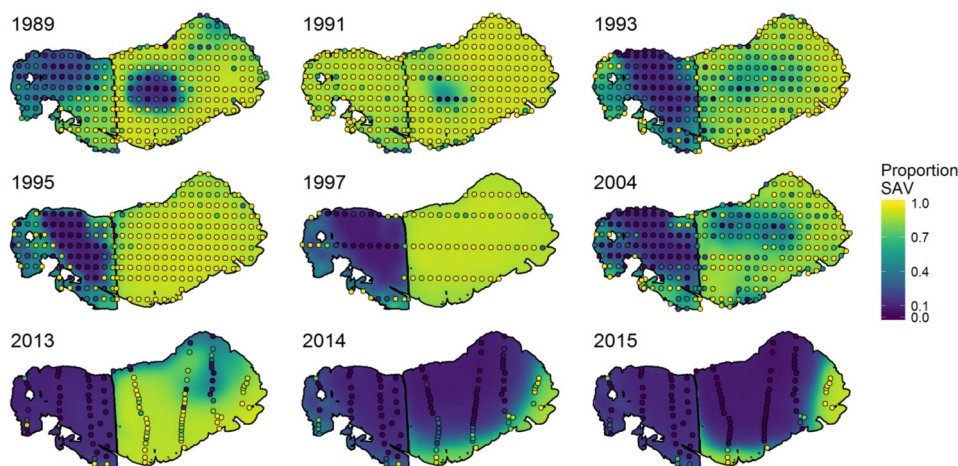
Disappearing SAV and Declining Water Quality in Lake Mattamuskeet

Mattamuskeet NWR, in partnership with R4 Ecological Services, Migratory Birds, and I&M, recently submitted a manuscript to the Journal of Fish & Wildlife Management regarding the disappearing macrophyte beds, also called submerged aquatic vegetation (SAV or “grass”), and declining water quality in Lake Mattamuskeet, which occupies more than 80% of the refuge. Mattamuskeet NWR provides habitat for over 250,000 wintering waterfowl and other migratory birds and the SAV in the lake. SAV, especially wild celery, sago pondweed, southern naiad, and redhead grass pondweed, provide an important food resource for waterfowl and habitat for migratory and game fish.

This work documented declining water quality from the early 1980s through 2015 as measured by multiple parameters (e.g., nitrogen, turbidity, suspended sediments, chlorophyll a). Concurrently, SAV cover in Lake Mattamuskeet has declined dramatically (see figure), although the timeline and magnitude of the loss varies between the two lake basins. In the west basin, the loss of dense and moderate SAV coverage began in the mid-1990s with the loss of dense and moderate SAV now nearly complete — less than 200 ha (of more than 2,000–5,000 ha in the early 1990s) of moderate/dense SAV are estimated to remain. SAV loss in the east basin is more recent and catastrophic in its rapidity and extent. Roughly 7,000 ha of dense SAV converted to sparse and very sparse coverage between 2013 and 2015. As of 2015, the last stands of SAV are located in the east basin on the south and east rims of the lake.

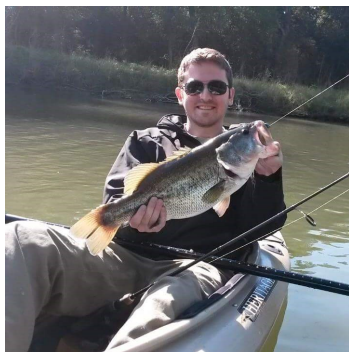
Current water quality conditions are not conducive to SAV survival and recovery and, in some cases, do not meet North Carolina water quality standards for the protection of aquatic life. Moving forward, SAV will serve as the indicator for lake health at Lake Mattamuskeet as monitoring, research, and management efforts focus on the restoration of SAV. For more information about the project, contact Mattamuskeet biologist [Michelle Moorman](#).

Estimated submerged aquatic vegetation (SAV) coverage in Lake Mattamuskeet, North Carolina from 1989-2015. Points indicate location of survey plots and are shaded to indicate the measured SAV coverage.



I&M Staff Update

Welcome, Grant Graves, Water Resources Inventory & Monitoring Specialist



Grant Graves is the newest member of the R4 Inventory and Monitoring Team, replacing Lee Holt. Grant brings experience and training in hydrologic monitoring to the regional program. He is stationed at Wapanocca NWR where he can keep his feet wet on a daily basis, benefit from the company and experience of the Central Arkansas Complex staff, and has direct travel routes to many refuges in Arkansas, Tennessee, Kentucky, Mississippi, and Louisiana. Just 2 months into his new job, Grant has been working closely with FWS hydrologist, John Faustini, in oversight of a cooperative agreement with University of Georgia to develop R4 water resource inventory and assessments for refuges. He has drafted a summary report capturing the current status of our refuge water monitoring in the region to begin guiding future efforts, and he looks to complement that information by better understanding your refuge water resources and monitoring needs.

Grant obtained his B.S. and M.S. in Environmental Science (Watershed Management) from Oklahoma State University. He has since been employed as a hydrologist for the USGS and OK Department of Agriculture. His professional interests are water quality, sediment and contaminant fate and transport, environmental remediation and aquatic ecosystems.

I encourage you to give Grant a ring – get to know him and how he can help you in your needs related to water resources. I am pleased and proud to have Grant Graves on board as a new member of your regional team of inventory & monitoring experts! - Janet E.

Coastal Wetland Elevation Monitoring Vegetation Monitoring

In summer 2016, I&M and refuge staff resampled 57 permanent vegetation monitoring plots across 19 sites on refuges in Florida, Georgia, South Carolina, and North Carolina as part of the Coastal Wetland Elevation Monitoring project. This marked the second iteration of this long-term monitoring project. The plots, originally established and inventoried in 2013, are monitored every 3 - 5 years to determine the status of and trends in vascular plant composition and structure. Staff use the [Carolina Vegetation Survey Level 5 protocol](#) to monitor biotic and abiotic conditions at each plot. Five new plots were established at Cape Romain NWR in 2016 to expand monitoring at the site. The 2016 sampling effort detected 150 vascular plant taxonomic concepts compared to 137 detected in 2013. Species richness was examined at three scales: full-plot (100 m²), mid-plot (10 m²), and small-plot (0.01, 0.1, and 1 m²). Refuges with the highest species richness at each level included Roanoke River NWR (~37 species; full-plot), Waccamaw River NWR (~13 species; mid-plot), and Mackay Island NWR (~3, 5, and 9; small-plot, respectively). The sampling effort was led by Cassie Cook, a R4's 2016 Directorate Resource Assistant Fellowship Project fellow. Cassie's leadership and hard work were instrumental to a successful monitoring season. Contact [Nicole Rankin](#) for additional information.



Larry Hartis and Cassie Cook sampling a vegetation plot at ACE Basin NWR. Credit: Nicole Rankin/USFWS

I&M Piloting an Improved Process to Field Requests for Assistance

The I&M branch has drafted a new process to handle incoming requests for inventory, monitoring, and analysis assistance from southeastern refuges and partners. Through this process, we will work with refuges and partners requesting significant I&M assistance to identify the specific overarching question or problem of interest as well as the potential scope of I&M assistance needed.

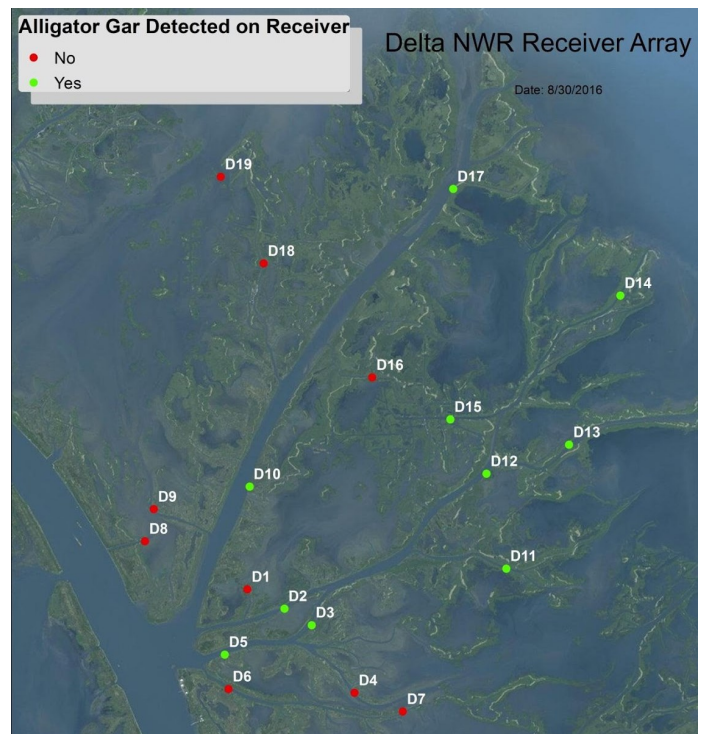
We generally expect that requests for assistance based on this process will produce tangible information (e.g., a summary of project, problem, and specific objectives/outcomes) and recommended actions for the requester. Ultimately, we expect that this process will help us better address requests for technical support. As always, I&M staff are here to get you the help you need. For more information, contact [Adam Smith](#).

Delta NWR Alligator Gar Telemetry

An I&M-funded project on Delta NWR has established an array of 19 underwater acoustic receivers to monitor the seasonal movements and habitat use of 33 alligator gar tagged in April and May 2016. Data has been successfully downloaded from 16 of the 19 receivers, producing more than 1,700 detections of 27 unique gar; 6 gar remain undetected. Detections have occurred at 10 of the 19 receivers, with most detections at the northeastern extent of the refuge (D12-D15 in figure). The northeastern most receiver, located in Bienvue Pass (D14), has collected over 1,000 detections of 19 gar. Nearby receivers (D12, D13, and D15) have detected 8-9 individuals each. Downloads occur every 6 weeks and receivers appear to be working nominally. Contact [Sue Wilder](#) for more information.



Delta NWR Refuge Manager, Shelley Stiaes, with a tagged alligator gar ready for release. Credit: James Harris/USFWS



Underwater acoustic receiver locations on Delta NWR. Green dots indicate locations with alligator gar detections. Credit: Kayla Kimmel/USFWS

Project Updates

Clarks River NWR Fish Survey

An I&M-funded project recently surveyed and assessed the fish communities and their associated habitats, as well as the status of at-risk fish species, on the approximately 9,000 acre Clarks River NWR and proposed expansion areas. The refuge is situated in the Clarks River drainage within the lower Tennessee River basin in western Kentucky. Prior to this most recent investigation by the Kentucky Department of Fish and Wildlife Resources and USFWS, biologists possessed limited information on the fish fauna present in the watershed. Clarks River NWR was selected as the focal area of the project due to its abundant water features, including natural palustrine waterbodies consisting of wetlands, oxbows, and overflow ponds and two major riverine stems. Historical records indicate at least 107 species are expected in the Clarks River drainage. Sampling efforts at 32 sites during the summers of 2015 and 2016 documented 79 (74%) of the 107 expected fish species. Five collected species are considered at-risk or of greatest conservation need. Changes in water quality and habitat degradation due to human-influenced activities were cited as strong inhibitors in the watershed and suggest an increased emphasis on improving land management strategies and long-term monitoring and research. For more information or a copy of the report, contact [Grant Graves](#).

Region 4 Inventory and Monitoring Plans

The landscape-approach to developing Inventory & Monitoring Plans (IMP) for refuges is well underway in the Gulf Coastal Plain. This summer, I&M hosted a series of survey prioritization workshops with the staff of seven refuges comprising similar habitats. By coordinating workshops on refuges with similar habitats, we hope to streamline IMP development and better identify priority protocol needs at the regional and station level. I&M and Black Bayou Lake, D'Arbonne, Felsenthal, Noxubee, Overflow, Pond Creek, and Red River NWR staff considered more than 150 potential inventory and monitoring surveys, eventually identifying 39 priority surveys to carry forward. Shared priorities among the refuges included surveys of forest interior landbird populations, forest stand structure, bats, and wintering waterfowl and waterbird populations. Throughout the coming year, I&M will work with refuge staff to complete IMPs and Initial Survey Instructions for the most highly-rated surveys. Simultaneously, I&M staff will work with refuge and regional staff to develop much-needed protocols for the highest priority monitoring surveys that will benefit these refuges and many others across the region. For more information, please contact [Forbes Boyle](#) or [Tim Fotinos](#).

Species Highlight

Species: Dollar sunfish
(*Lepomis marginatus*)

Location: Clarks River NWR

Habitat: Small to medium rivers, swamps, vegetated and brushy pools with sandy/clay substrate



Image Credit: USFWS, KDFWR

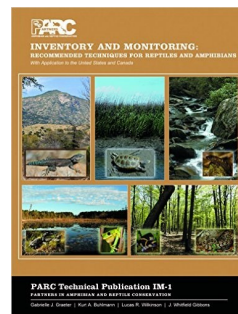
Upper Ouachita NWR Mussel Survey

The Ouachita River in north-central Louisiana runs through Upper Ouachita NWR. The river and its floodplain dominate refuge habitats. In September and October 2016, an I&M-funded project supported a survey of refuge waters as part of a larger multi-refuge project to better understand the distribution and abundance of at-risk mussel species on refuges in NE Louisiana and SE Arkansas. The survey of the Ouachita River resulted in 27 (possibly 28, pending genetic analysis) species of mussels including the primary target of the work, the at-risk pyramid pigtoe (*Pleurobema rubrum*; photo below). The survey effort resulted in the discovery of a continuous mussel bed stretching for at least 1.8 miles with widths occasionally in excess of 40 meters. The exact scale of the bed is pending more detailed analysis but is the largest mussel bed ever discovered by malacologist Dr. John Harris, who is conducting the work, and could represent one of the larger beds of native species known to still exist in North America. Additional surveys as part of this project will occur in late summer 2017 at Overflow, D'Arbonne, and Tensas River NWRs. Contact [Tim Fotinos](#) for more details.



Pyramid pigtoe (*Pleurobema rubrum*), a non-descript but once abundant freshwater mussel now considered at-risk across most of its range. Credit: USDA Forest Service

New I&M Resources



Partners for Amphibian and Reptile Conservation (PARC) has republished their outstanding reference manual *Inventory and monitoring: Recommended Techniques for Reptiles and Amphibians*, the most comprehensive source for inventory and monitoring techniques of herpetofauna in North America. Interested in any inventory or monitoring activities related to frogs, toads, salamanders, lizards, snakes, or turtles? This manual is a must-have reference and a compliment to the regional habitat management guidelines series produced by PARC. The spiral-bound book is available for \$50 (plus shipping) exclusively from the above link.

Greater, G. J., K. A. Buhlmann, L. R. Wilkinson, and J. W. Gibbons (Eds). 2013. *Inventory and monitoring: Recommended Techniques for Reptiles and Amphibians*. Partners in Amphibian and Reptile Conservation Technical Publication IM-1, Birmingham, AL

New I&M Tools

Integrated Waterbird Management and Monitoring Reporting Tools and Database

The [Integrated Waterbird Management and Monitoring \(IWMM\) program](#) began as a grass-roots effort to provide a standardized and coordinated effort to manage wetlands and monitor migrating and wintering waterbirds at multiple scales including local to regional and flyway. and subsequently developed through structured decision-making workshops. The product is an operational framework for management and standardized monitoring of nonbreeding and migrating waterfowl, shorebirds, and long-legged wading birds (i.e. waterbirds). The local-scale monitoring component allows managers to assess effectiveness in management actions in meeting refuge objectives. In addition, this approach provides an adaptive feedback loop to allow managers to adjust their management to address emerging threats, including disturbance issues. IWMM is a collaborative effort with the USFWS, USGS, States, and other NGOs . Recently, [reporting tools for the online IWMM centralized database](#) were released. The database was developed as a node of the Avian Knowledge Network (AKN) and provides informal local decision support, management action tracking, and data reporting tools for bird and vegetation surveys and management unit conditions. Various IWMM training webinars and IWMM newsletters are accessible at the [IWMM website](#). For additional questions, contact [Wendy Stanton](#).



Your R4 Inventory & Monitoring Branch. Back row from left: Nicole Rankin (Coastal Ecologist), Forbes Boyle (Botanist), Adam Smith (Quantitative Ecologist), Tim Fotinos (Plant Ecologist), David Richardson (Terrestrial Ecologist), Steve Holzman (Data Manager), Janet Ertel (Branch Chief), Front row from left: Sue Wilder (Coastal Ecologist), special guest star Melinda Knutson (Branch Chief, R3 Inventory & Monitoring Branch), Wendy Stanton (Terrestrial Ecologist)

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<http://www.fws.gov/southeast/IMnetwork/>

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