

North Carolina Sandhills Conservation Partnership

Quarterly Meeting Minutes

“The State of Sandhills Depressional Wetlands”

1:00-4:30 PM, Wednesday, September 13, 2023



Land acknowledgement

- The NC Sandhills are the traditional territory and ancestral homelands of the Tuscarora, Coharie, and Lumbee peoples, the latter of which has still not been granted tribal sovereignty. Each of these groups were forcibly displaced through governmental policies. Despite this, many of these tribal members still live here today as active community members, and that fact challenges us to think creatively about how we can better involve them in our work and become better involved in theirs. We accept a responsibility to continually support and advocate for the sovereignty of the native nations as both conservation practitioners and as individuals living in a settler state.

Attendance

TNC: Sarah Hecoeks (TNC/USFWS), Jeff Marcus, Matt Greene, Deb Maurer, Alan Teed, Erick Rietschier, Dana Carpenter, Emma Gwyn

USFWS: John Hammond, Pete Benjamin, John Ann Shearer

SEI: Kerry Brust, Andy VanLanen, Phil Doerr

NCWRC: Brady Beck, Mike Martin, David Mattocks, Tim McFayden, Gabriella Garrison

TRLT: Barry Hull, Emily Callicutt

Fort Liberty: Brian Williams, Stacy Huskins, Jackie Britcher, Jessie Schillaci, Kevin Crawford, Kayla Silva, Brian Ball

Sandhills PBA: Jesse Wimberley

Dr. JH Carter III and Associates: Jay Carter, Alicia Jackson, Jan Goodson, Tracy Rush

Quail Forever: Jake Comer

NCNHP: Scott Pohlman, Nathan Shepard

USFS: Susan Miller, John Langdon

Fayetteville PWC: Zach Hardwick, Wendy Dunaway, Josh Junot

Ember Alliance: Matthew Buice, Killian Farrell, Nathan Dominey

LLA: Ryan Bollinger, Jennie Haskell, Lisa Lord, Sarah Crate

SCT: Melvin Ezzell

NCARNG: Jason Lautenschleger

NC State Parks: Jimmy Dodson, Susan Campbell, Zachary Lunn, Jason Haywood, Jessie Jordan

Public Works Commission of Fayetteville: Wendy Dunaway, Zach Hardwick

NCSU: Clyde Sorenson (SEI/NCSU), Lauren Pharr

NC Museum of Natural Sciences: Jeff Beane

NC Office of State Archaeology: David Cranford

Eastern NC Sentinel Landscape: Mary Lou Addor

Southern Conservation Trust: Jesse Woodsmith

Appalachian State University: Elijah Thompson

Southern Conservation Partners: Julie Moore

Fort Stewart Altamaha Partnership: Wendy Ledbetter

Other: Pete Campbell, Caroline Krom, Rick Studenmund, Aubrey Greene

Total attendees: 70

Number of partners represented: 26+

Summary of the optional morning field trip:

- 25 NCSCP members visited two wetland locations in the southern half of the Sandhills Game Lands prior to today's meeting. The first wetland (photo below, credit to Brady Beck), identified during the mapping project completed this year, is in a degraded state and in need of restoration (sweetgum removal and fire). Attendees discussed depressional wetland detection, wetland indicators, hydrology, and management needs.



- The second location (photo below, credit to Brady Beck) has received significant restoration action over the years and is close to being in maintenance class condition, aside from ongoing challenges including sweetgum encroachment on the wetland edge and invasive fire ants. Attendees discussed the wetland's restoration history (photos showing before, during, and after were displayed on a poster), SGCN amphibian reintroduction efforts, and ongoing management.



Working Group overviews & updates

RCW Recovery (Kerry Brust):

- SEI & Partners intensively monitored ~400 of est. 800 Sandhills RCW Groups
 - Kerry Brust, Andy Van Lanen, Anna Prinz (SEI)
 - Jan Goodson and Deven Davidson (JCA)
 - Lauren Pharr (NCSU)
 - Brady Beck (WRC) Support on A-Block
- Work made possible thanks to:
 - Army @ Ft. Liberty - Jessie Schillaci & Jackie Britcher
 - The Nature Conservancy - Jeff Marcus
 - NC Dept of Agriculture - Robert Ross
 - Private Donations
- 2023 nesting season recap:
 - 20 New RCW Groups Regionwide
 - Ft. Liberty (10), SGL (5)
 - Moss Foundation + Private Lands (4)
 - High nest failure rate at BLUE (6/10) and western Ft. Liberty (30/119)
 - Poor year / low fledging success Coastal RCWs - Camp LeJeune/ Sunny Point

- Early nesting year
 - Specifically SGL , + 2 double brooded groups on SGL (a first), though both failed at nest #2
- Private lands Strategic Plan review:
 - Nurture Relationships with Safe Harbor Landowners
 - Protect legacy working forests and forested corridors
 - Downlisting impacts to general public response and Safe Harbor?
 - Pursue Outreach to nearby Landowners
 - RCW Pioneering on new/ adjacent properties particularly challenging
 - Turn up Dialogue with Golf Course Managers + Local Govt
 - Opportunity at new Southern Pines Park (past Sherman property)

Land Protection (Jeff Marcus):

- No new projects closed since last SCP meeting

Resource Management (Jessie Jordan):

- Upcoming field trip Oct 4 at Blue Farm (Tim Sweeney property managed by Brian Johnson) and TNC Griffin Tract. Group discussions on the following:
- Factors contributing to success of planted longleaf and wiregrass seedlings- what works and what doesn't
- How to write a management plan when your toolbox is limited to fire
 - Burning during the growing season vs. the dormant season
 - To seed or not to seed, when to include native seed mixes in your plans and what grass/forb ratios do you use
- Pine straw raking and understory regeneration, what do you expect to see and when do you decide to intervene?
- Shortleaf and the sandhills, where is it on the landscape and what is its relationship to fire
- Site prep and chemical usage for invasive species, what works and unexpected results

Communications:

- None

Reserve Design (Sarah Hecoeks):

- Recently had a meeting to discuss updating map layers; still a work in progress

Award announcements

- Greensboro Science Center donation to NCSCP of \$5,700 (generated from portion of visitor admission fees) will be used to extend ORISE position funding
- Wildlife Federation Governor's Conservation Award for Young Conservationist of the Year awarded to Lauren Pharr
- Honor Award for Analysis and Planning from the American Society of Landscape Architects awarded to Southern Conservation Trust, Forester Melvin Ezzell, and NC State for the Nick's Creek Longleaf Reserve
- Illustris Palustris Award, given by the NC Longleaf Coalition to recognize outstanding contributions to longleaf conservation, awarded to Jay Carter. Reception held after today's meeting.

Identifying non-floodplain depressional wetlands on the Sandhills Game Lands using remote sensing and geospatial analysis – Sarah Hecoeks, TNC/USFWS

- Sarah Hecoeks is the current ORISE fellow/Sandhills Conservation Planner dedicated to coordinating partnership activities, including research and monitoring relevant to goals set for the 4 conservation targets outlined in the NCSCP's Conservation and Monitoring Plans.
- Recent political decision related to today's meeting topic: Supreme Court ruling strips protections for ephemeral waters that lack "continuous surface connection to navigable waters". Over half of the country's wetlands no longer have federal protection. At the state level, there are also significant challenges. For example, it used to be that a tenth of an acre of wetland could be taken without a permit, but around the mid-2010's, that was increased to a full acre. "Isolated" wetlands *do* contribute to navigable waters, through ephemeral and intermittent streams, and groundwater connections as well. Let's not let this ruling diminish our capability to protect these integral pieces of the longleaf ecosystem.
- This project accomplishes one of the defined goals for the Upland Depressional Wetland conservation target: inventory and assess condition of UDWs in the NC Sandhills.
- Shout outs to key project players: Natalie Papparone & Dr. Jennifer Swenson (Duke University Nicholas School of the Environment), Sarah Hecoeks & Jeff Marcus (TNC), Mike Martin (NCWRC), Dan Hannon (VA NHP; previous Sandhills ORISE fellow)
- Purpose: to increase available habitat for wetland species, primarily winter-breeding SGCN amphibians which are declining at alarming rates in Sandhills
 - Goal 1: Compile known UDW locations into regional database
 - Goal 2: Develop predictive models using GIS to locate new potential UDWs, and then assess them in the field
 - Goal 3: Create a user-friendly tool for model expansion elsewhere in region
 - Goal 4: Take restoration action in prioritized sites
- Study area: WRC Sandhills Game Lands (~65,000 acres)
- Variables used to train model: 116 known wetland locations, topographic data (LiDAR-based DEM), wetness and vegetation indices (calculated using Sentinel 2 aerial imagery from wet and dry months of 2018), and SSURGO hydric soils raster dataset
- While the model was being built, Sarah used the "Depression Analysis Toolbox" for ArcGIS to outline sinks in the LiDAR data that could be wetlands, then filled each sink with a mean value of % hydric soil to identify which sinks were most likely to hold water
- 100% overlap in what the model identified and what was outlined by the toolbox, but the advantage of the model is that it significantly narrows down the list of potential sites by only highlighting the sites of highest likelihood to be wetlands
 - Both methods are great, and the toolbox is more user-friendly for someone just starting out in a project like this
- Field work/ground truthing:
 - 3 weeks Mar-May 2023
 - Collected data on size/location, extent (if holding water), ecological condition, and management needs
 - Incorporated new locations into regional database, and refined model based on field work

- Model had 45% success rate in identification
 - 461 potential wetland locations produced
 - 211 were confirmed to be wetlands; 116 of those were drainage sections
 - Training dataset included wetlands across types (e.g. seeps, impoundments, bays, etc.). Predictive models are data-hungry, and this is the data we had available. If possible, try to limit training dataset to only the wetland type you hope to find
 - ~13 were previously unknown UDWs
- Known “isolated” wetland regional database:
 - Spans NC coastal plain but is not comprehensive! Lots of data gaps. Need to contact other partnerships and/or expand model outside of SCP boundary if we want to make this a truly region-wide resource
 - Each polygon has data on:
 - Wetland ownership
 - Wetland name (if it has one)
 - Wetland type
 - Restoration history (if any)
 - Year of last visit
 - Current ecological condition (at time of last visit)
 - Management needs (at time of last visit)
 - Most recent year records for 4 target SGCN amphibians (sensitive data that should be removed if/when this dataset is shared more widely)
 - Sandhills Game Lands contain the most mapped wetlands; due to importance in region for this habitat type, but also due to amount of effort gone in over the years to document wetlands. Likely many more wetlands on Fort Liberty and elsewhere in Sandhills (e.g. private lands!)
 - When the database is filtered for wetlands of true ephemeral nature, the database shrinks considerably, reflecting the rarity and importance of these habitats (and the need to find/map more)
- Mike, Sarah, and Jeff Hall produced a list of 22 high-priority sites (4 new locations for 2023) needing restoration action and shared it with WRC land managers
 - Contains wetland name, acreage, block location, specific restoration actions, whether veg and/or soil control is needed, justification for prioritization, prior investment level, level of effort required to reach and sustain in maintenance class, and SGCN herp records
 - Before restoring new sites, priority should always be to maintain existing sites in maintenance class condition. When possible, sites should be managed with frequent growing season fire; not just in wetland basin, but also uplands, especially to create adequate upland refugia for amphibians during rest of year (e.g. stumpholes)
 - Fire first! Then, if fire isn’t feasible initially, use mechanical and/or chemical to get to a point where fire can be the main tool
 - 18/22 need vegetative control, 6/22 need soil control
- Next steps:
 - Expand model and field efforts outside Game Lands
 - Update: model has been run for entire SCP boundary, and it was developed using only truly ephemeral wetlands in the training data; now need to ground truth

- Take restoration action on priority sites
 - Update: currently being done!
 - Continue monitoring known sites, including new sites for 2023, and adding data to regional database
 - Integrate known locations from other partners into database
 - Share database and collaborate with relevant partners
 - Share how-to document with other partnerships
 - Work on other UDW goals in NCSCP Monitoring & Conservation Plans
- Question from Elijah Thompson: How many locations picked up by the model were Carolina bays?
 - Zero (or very few, Sarah will need to check again now that the model has been expanded outside the game lands). The model was only run in the Sandhills boundary, which doesn't contain any bays.
- Comment from Jeff Marcus: Some of the REPI funding will be dedicated to a position to do wetland restoration work; WRC also put in a request for America the Beautiful funding for a wetland "strike team".
- Question from Matthew Buice: Is there a size minimum for wetlands to be used by amphibians?
 - No, for the target SGCN amphibians it is a quality minimum. Additionally, even more so than size, connectivity is very important. Example: a small, high-quality wetland that is very far and isolated from other wetlands is used by tiger salamanders. Over time, it is fire-suppressed and becomes degraded. Depending on the level of restoration needed, this site would probably be lower on the priority list. Amphibians are most limited by quality, distance to other sites, and hydroperiod. Small wetlands can be really great, but if they dry early and there aren't other wetlands nearby still holding water, then metamorphosis can be interrupted.
- Question from Julie Moore: What about wetland plants?
 - Yes! There are a lot of herpers in this community, and not enough wetland plant specialists, or invertebrate and insect specialists. We need more!
- Question from Scott Pohlman: Natural Heritage may be getting more staff and could help with field assessments. Is there a good way to prioritize ground truthing the potential wetland locations identified?
 - Zooming in on the aerial view of a location can be helpful to prioritize a visit—once you get an eye for a circle full of sweetgum, seeing one feels like a jackpot because it's almost certainly a wetland. But for other sites that may be full pine canopy, you don't want to skip out on a visit just because you didn't see that classic spectral signature. Visiting clumps of sites can be advantageous. Divvying up sites between agencies is probably the best path forward. Or, visiting sites on an opportunistic basis (e.g. during Safe Harbor landowner visits). One of the most important places to start is definitely Fort Liberty, especially as we think about getting ahead of a potential ESA listing of gopher frog.
- Question from Dana Carpenter: Could this model include layers of known rare species to predict locations they might use?
 - Essentially this model does do that, by using habitat characteristics of sites either currently or previously supporting rare species, and then finding additional locations on the landscape that match those characteristics. This model also finds locations that would not be used by rare species in their current condition, but could be occupied in the future with restoration.

In terms of prioritizing locations based on where species currently are, Mike and I did take that into consideration when making the priority list; this could be calculated on a broader scale by 1. Determining the dispersal capabilities of rare species of interest; 2. Calculating least cost pathways for movement between pools with similar habitat characteristics to those currently being used.

So anyway, I started blasting: Using a pressure washer to save gopher frogs – Mike Martin, NCWRC

- Mike Martin is the Wildlife Diversity Herpetology Technician for the North Carolina Wildlife Resources Commission
- Gopher frogs spend most of their lives in the uplands, inside and just outside of burned out stumpholes. During the breeding season, they use isolated wetlands and lay their eggs on submerged graminaceous cover.
- State-endangered; historically had 32 populations across the state of NC, now have 7 (1 on SGL, another on Fort Liberty)
- Radiotelemetry 2009-10 at 17 Frog Pond: 17 adults tracked moving up to 3.5km from the wetland
 - ~23 miles to nearest breeding site on Fort Liberty
- 2015:
 - Headstarting program in Block T (restored site ~23 miles to nearest breeding site)
 - Zoo raises them till just past metamorphosis, then juveniles are released into pond and uplands
 - Wetland creation (Liner Pond)
 - Wetland restoration
- 2017: radiotelemetry on headstarted gopher frogs
 - 1 month window to track due to battery in tracker
 - Many eaten by snakes, aquatic invertebrates, birds, and invasive fire ants
 - Summary:
 - 5 release batches with multiple frogs in each batch
 - 29 frogs tracked 15 June – 19 July
 - Survival time 1-34 days
 - 6 “escaped” (lost transmitter, failed transmitter)
 - 23 predated (1 avian, 1 invertebrate, 13 snake, 8 fire ant)
 - Fire ant predation occurred at the pond and into the uplands
- Post-telemetry 2017
 - Prescribed burn mid-July
 - Inventory fire ant mounds
 - Classify activity level by kicking mound
 - Classify associated cover
 - Measure height and width
 - Within 4 belt transects from pond into uplands, 478 mounds identified
 - Hurricane Florence 2018: most mounds displaced due to flooding, but several persisted as floating masses of ants even over the winter into 2019
- Similar telemetry results in 2019

- 7 release batches
- 30 frogs tracked 4 June – 3 July
- Survival time 1-17 days
- 18 frogs unknown fate
- 12 frogs predated (3 racer, 9 fire ants)
- Pesticide treatment on fire ants not advised due to impacts to amphibians
- 2020: Came upon publication using hot water treatment for fire ants
 - Zoo had hot water pressure washer sitting unused, so put that on back of truck
 - Infrequently used road from pond used as treatment area (~6 acres)
 - Got water up to 162 degrees F
 - Mounds surveyed vs mounds treated:
 - Fall 2020: 553 vs 351
 - Spring 2021: 94 vs 149
 - Fall 2021: 438 vs 340
 - Fall 2022: 377 vs 114
 - Result: repeated treatment does reduce overall mound abundance and amount of large mounds and less active mounds, but there is an increase in smaller mounds with lots of activity
- What we've learned:
 - Immediate impact
 - Colony resilience
 - Seasonality of detection
 - Timing of ant dispersal
 - Coordination
 - Equipment upkeep
 - POWER in PARTNERSHIPS!
- Questions going forward:
 - Focus efforts in spring?
 - Focus treatments closer to pond?
 - Rapid follow-up?
 - Fire ant population dynamics?
 - How to best implement on limited spatial scale?
 - Will this improve Gopher Frog recruitment?
- Next steps:
 - Improved study design for long-term monitoring
 - More hot water treatments
 - Improved release & monitoring strategies
 - Telemetry
 - Look into other SGCN species being impacted
- Question from Jeff Marcus: How deep does a fire ant colony extend underground and do we know how far the water is able to reach? What about horizontally?
 - Based on response of colonies (e.g. most but not all individuals die), Mike thinks they must extend considerably deep underground. Would be good to find out whether anyone has made a metal casting of a colony in a similar soil type.

- Question from unknown: Are there chemical treatments available?
 - There are many chemicals available for ant treatment, but we aren't confident that there wouldn't be serious negative impacts on amphibians. Need to dig into the literature.
- Comment from Clyde Sorenson: Increases in smaller colonies might be due to dispersal of colony fragments that persist after treatment. Queens may survive and restart colony very close by.
- Question from Sarah Hecoeks: Because the hot water pressure washer has to be on the back of a truck, this treatment is currently limited to roads and roadsides; is there a more portable way to treat mounds with hot water? Maybe a backpack version?
 - Yes, and we don't want to create more roads to treat fire ants because they are attracted to areas with disturbed soils. Very first treatment they tried was filling buckets with hot water, carrying them to a mound, poking a hole, and dumping the bucket inside; however this was not very efficient or effective at killing the colony. They've thought about putting the pressure washer on a smaller trailer, perhaps pulled by an ATV? Still thinking through options. Hope going forward is to find a way to treat the entire area around the wetland basin all at once, because the mounds do decrease as you get further into the uplands.
- Is anyone looking at effects of fire ants on birds?
 - Not that Mike knows of, but anecdotally we know that ground nesting birds are vulnerable.

Crayfish ecology and distribution in Sandhills wetlands – *Elijah Thompson, Appalachian State University*

- Elijah Thompson is a lab manager for Dr. Michael Gangloff at Appalachian State University. Their lab is focused on the conservation of threatened and endangered species in freshwater ecosystems throughout southeastern United States.
- Research project to assess the effects of invasive *Procambarus clarkii* on native crayfish species
 - Create status assessment for the data-deficient native species *P. pearsei* (Sandhills crayfish)
 - Life history
 - Threats & stressors
 - Invasive species, habitat loss, climate change
 - New localities in relation to historic records
 - Most specimens from 1970-2001, with only 3 collected in last 20 years outside of their surveys
 - Methods: repetitive dipnet surveys across seasons, coupled with habitat assessments
 - Also building an invertebrate collection that has already reached 600+ individuals
- Crayfish identification:
 - *P. pearsei*: blunt rostrum, racing stripe along abdomen, narrow chelae
 - *P. acutus/blandingii*: sharp narrow rostrum, narrow chelae
 - *P. clarkii*: sharp rostrum, bland coloration when young to vibrant red/dark purple, distinct tubercles on carapace and chelae
- Distribution:

- Historic distribution of *P. pearsei* spans from Sandhills Game Lands SE into land just prior to coast
- Current distribution (based on this work): 7 of the historic locations still have *P. pearsei*, and 3 new locations
- *P. clarkii* found at many of the same locations *P. pearsei* still found, and historic *P. pearsei* locations where *P. pearsei* appears to have been extirpated, and several other locations in the region
- Ongoing research into species interactions:
 - *P. pearsei* has been observed 'arresting' *P. clarkii*
 - Future experiments will involve variation in chelae size, size class, food dominance
- Survey effort to 43 total historic sites of *P. pearsei*. Habitat type:
 - 3 borrow pits
 - 4 intermittent floodplain streams/pools (*P. pearsei* present at 2)
 - 5 Ephemeral wetlands
 - 9 Carolina bays (*P. pearsei* present at 1)
 - 22 Roadside ditches (*P. pearsei* present at 7)
 - Why here and not in more natural wetland features?
 - Roadside ditches are not well recognized for their contributions to biodiversity but they're certainly valuable and are frequently maintained
- Future research:
 - Identify additional remnant wetlands and additional *P. pearsei* localities
 - Visit and speak with landowners for private property access
 - Speak about *P. clarkii* and the dangers that they pose to native wildlife
 - Investigate management strategies for anthropogenic habitats (e.g. roadside ditches)
- Question from Sarah Hecocks: Do *P. pearsei* and *P. clarkii* have a similar enough ecological role such that if *P. clarkii* does outcompete *P. pearsei* and shows up in the Sandhills, might it restore some of the ecological function that has been lost by *P. pearsei* being extirpated?
 - Probably not. *P. clarkii* eat many native species (amphibians, fish larvae, other crayfish), reduce water quality, and spread disease.
- Question from Jeff Marcus: Management recommendations for Sandhills crayfish?
 - Prescribed fire in wetlands, especially Carolina bays (*P. pearsei* was found in Hamby's Bay). Still need to learn more about the needs of this crayfish, and part of this project will help identify preferred habitat features, but fire is a good place to start.

Partner updates

- John Langdon, USFS Uwharrie/Croatan: received additional funding to extend Ember Alliance crew for Joint Chiefs Project (additional \$500,000). New partnership forming called the Croatan Fire Partnership which will work on wildfire mitigation measures.
- Susan Miller, USFS: Lots of added capacity through new positions, seasonals to permanent, partnership coordinator, fire crew, etc. Just put together a mobile office unit to provide space for all the new faces. Ember Alliance crew has accomplished a lot of great work, even despite some delays in the beginning out of their control. Provided wildfire support in Croatan NC, Alberta, Quebec, ID, OR, TX, FL. New OHV trail available in Uwharries. Recent visitor from senator.

- Killian Farrell, Ember Alliance accomplishments from the first year:
 - 5 crew members at the start of the season, now down to 3 permanent, but will be bringing on another 2 in January
 - Helped on 33 burn days with various partners for a total of 4733 acres burned
 - 14 of those days were on private lands for a total of >1000 acres
 - 11 miles of trail maintenance
 - 6 trash pick-up days
 - 55 acres of mechanical treatments
 - 30 acres of longleaf planted
 - Assisting with LEO surveys on the Uwharries
 - Where else can Ember Alliance help? Reach out to plug them in!
- Sarah Hecoeks, TNC/USFWS: Starting to update the NCSCP Strategic Conservation Plan. There will be two opportunities for involvement:
 - 1. Gathering a working group to decide on and make the initial edits using feedback from our last SCP meeting. Anyone who wants to be a part of this, let Sarah know. The process will not be nearly as in-depth as the initial process to construct the document. After edits are made and we have a draft ready to share, we will present it at a SCP meeting and
 - 2. Provide the document to the entire SCP and open it up to final suggestions before publishing the final draft on our website.
- Jake Comer, Quail Forever NRCS Farm Bill: Next sign-up will be mid-Oct to end of Oct. If you know of landowners who are interested, help them get ready to sign up because NRCS moves slowly and if they sign up in Nov that's another year they have to wait till the next consideration period. Every longleaf project was funded this past year (!) and NRCS had to send unused money back. Next year there will be even more funding available.
- Jessie Jordan, NC State Parks:
 - New director of State Parks
 - Position open for park planner
 - Carver's Creek Fall Festival on Nov 4
- Pete Benjamin, USFWS:
 - This month, likely final listing of tricolored bat as endangered. We know very little about its life history. They can be found in every month of the year across the Piedmont and coastal plain. White-nose syndrome is the biggest threat. Its conservation could have implications for forestry practices, including prescribed fire; they are known to roost in trees, and like many bats, roost in the winter then tend to pups in the roost during early spring. These periods coincide with the dormant season, when most burning takes place.
 - Jennifer Archambault (previously FWS aquatic biologist) the new Deputy (previously Tom Augspurger)