

*Cape Fear River Partnership  
Annual Progress Report  
2013-2014*



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**Note:** Cover photo courtesy of Alan Cradick. Photograph of Kemp Burdette, Cape Fear Riverkeeper, throwing rocks in the Cape Fear River at the site of the habitat enhancement project below Lock and Dam No. 2, February 2014



## Executive Summary

Since the release of the Cape Fear River Basin Action Plan for Migratory Fish in April 2013, the Cape Fear River Partnership compiled a list of potential funding sources and established an Implementation Team that will track progress towards the goals established in the plan, seek solutions to obstacles, and adjust the plan as necessary. The Cape Fear River community will be able to connect to this process through the team's published annual progress reports, updated [Partnership website](#), socially-engaging video, academic research and other venues such as outreach events and partner websites. This first annual progress report summarizes completed actions since April 2013 through December 2014, current challenges and future priorities of the Partnership.



*Photo credit: Alan Cradick*



## Background

The Cape Fear River Partnership was formed in 2011, under the leadership of NOAA, with a vision of a healthy Cape Fear River for fish and people. The Partnership's mission is to restore and demonstrate the value of robust, productive, and self-sustaining stocks of migratory fish in the Cape Fear River. Building on the momentum of the newly constructed fish passage at Lock & Dam No. 1, this partnership of key federal, state, local, academic, and other organizations in the region is working closely together to implement a multi-year action plan that was finalized in 2013, the ***Cape Fear River Action Plan for Migratory Fish***. Using a broad range of tools and capabilities, the Partnership seeks to provide long-term, habitat-based solutions for the most pressing challenges for migratory fish within the Cape Fear River.

The Partnership strives to measure achievement of our mission with the following targets: increased fish populations (as measured by catch-per-unit efforts, improved age structure, and other techniques), increased recreational fishing success for shad, striped bass, and river herring (as measured by creel surveys), and a re-opened striped bass and river herring harvest in the Cape Fear River.



*Photo of striped bass in the Cape Fear River.  
(Photo credit Captain Jason Dail).*

In the Cape Fear River basin, species such as American shad, striped bass, and sturgeon are born in the upper freshwater reaches of the river, and then swim to the Atlantic Ocean to spend several years before attempting to return upstream to spawn and begin their life cycle again. There are many different problems that migratory fish can encounter that alter their life cycle, from obstructions blocking their access to spawning and nursery grounds, to flow regimes – quantity, quality, and timing of stream flow – that are significantly altered from the “pre-development” conditions, to degraded habitat. These problems have not evolved from one event in one location, but from a suite of human activity over time within the whole Cape Fear River basin.



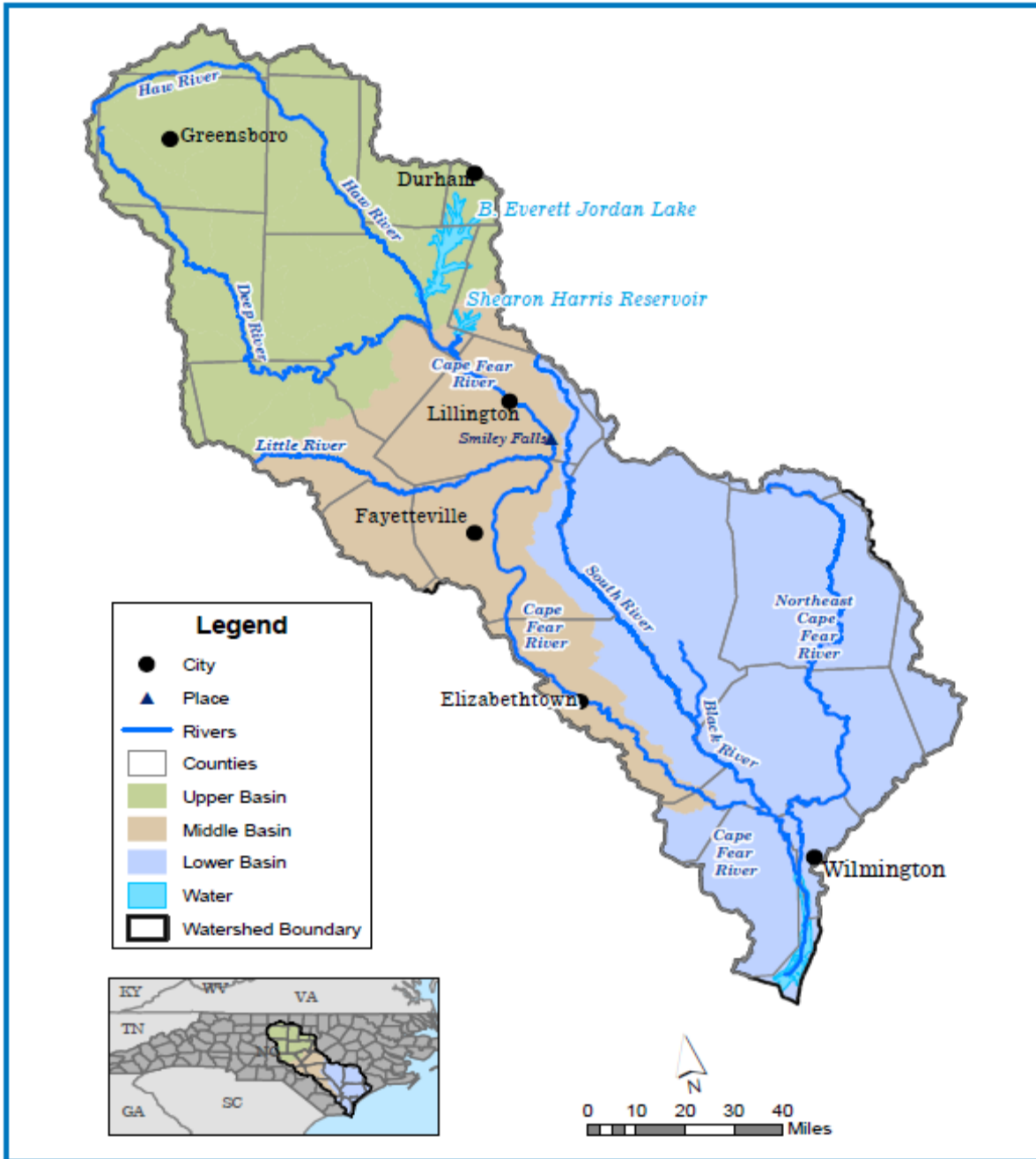
## Background

The Cape Fear River basin (Figure 1) contains numerous drivers that led to the formation of the Cape Fear River Partnership including diverse habitat problems and needs, momentum of fish passage progress at the US Army Corps of Engineers Lock and Dam No. 1 in Riegelwood, NC (below photograph), the presence and status of protected and managed species, active partners and stakeholders engaged in the restoration of migratory fish populations, and future opportunities to improve migratory fish habitat with protection from future threats.



*Photo credit: Alan Cradick*





Source: Final Cape Fear River Basin Action Plan, 2013

Figure 1. Cape Fear River Basin



The Cape Fear River Partnership has been working since April 2013 towards the alignment and implementation of the 95 goals and targets identified within the Cape Fear River Basin Action Plan for Migratory Fish via an intra-organizational review and agreement. Actions identified within the Action Plan have a shared responsibility across partners and provide a unique approach to implement region-wide solutions to threats within the basin. Five committees were developed with representative Team Leads to facilitate the framework in which action items are implemented (Table 1). The Team Leads engage team members in quarterly committee calls and face-to-face discussions to advance action item completion. Updated spreadsheets identifying status and progress of action items will be provided annually to the Partnership on a dedicated website developed by The Nature Conservancy and funded by NOAA (<http://capefearriver.wix.com/communitybenefits>).



*Photo credit: Dawn York, paddling on Sturgeon Creek*

### Funding Acquired for Partnership Actions

Cape Fear River Watch in collaboration with Dial Cordy and Associates Inc. requested funds from NOAA's FY13 Coastal and Marine Habitat Restoration program for the construction of a rock arch ramp at Lock and Dam 2 and 3. These funds were not awarded, however, Lock and Dam 2 was ranked #21 and Lock and Dam 3 was ranked #25, bringing national awareness to the Cape Fear River basin. These grant applications worked towards implementing Action Items 1.3, 1.6 and 1.7.

Cape Fear River Watch received \$95,000 from NOAA-SARP for the enhancement of 0.5 acres of anadromous spawning habitat below Lock and Dam 2. This project supports Action 5.

NCDMF in collaboration with SCDENR received funding via a NOAA Endangered Species Act Section 6 grant to assess Atlantic and shortnose sturgeon in the Cape Fear River. This project implements Action Item 4.9.

The Nature Conservancy in collaboration with NCDMF was awarded a \$100,000 NOAA grant in 2013 for the [evaluation of the economic importance of fisheries and anadromous fish populations in the Cape Fear River](#). This project implements Action Item 18.7.



**Table 1. List of Implementation Team Leads for each Partnership Committee.**

Team Lead	Organization	Email Address
<b>Habitat Committee</b>		
Dan Ryan	The Nature Conservancy	dryan@tnc.org
<b>Water Quality/Water Quantity Committee</b>		
Dr. Mike Mallin	University of NC at Wilmington	mallin@uncw.edu
Dr. Larry Cahoon	University of NC at Wilmington	cahoon@uncw.edu
<b>Fish Passage Committee</b>		
Fritz Rohde	National Marine Fisheries Service	Fritz.rohde@noaa.gov
Mike Wicker	US Fish & Wildlife Service	Mike_wicker@fws.gov
<b>Socioeconomic Committee</b>		
John Hadley	NC Division of Marine Fisheries	john.hadley@ncdenr.gov
Dr. Tom Hoban	Cape Fear River Assembly	drtomhoban@gmail.com
<b>Funding Committee</b>		
Frank Yelverton	Cape Fear River Watch	frank@cfrw.us
*Dawn York	Dial Cordy & Associates	dyork@dialcordy.com

*\*Dawn York, Dial Cordy and Associates, serves as the Coordinator of the Cape Fear River Partnership.*





## Partnership Accomplishments

An overall accomplishment brought on by the development of the Cape Fear River Partnership Action Plan includes the relationships achieved through the integration of action items and collaboration across agencies and organizations within the basin focused on a singular mission of restoring the migratory fish populations. The first annual meeting of the Partnership, since the completion of the Action Plan, was held in Wilmington May 2014 and engaged over 31 partner representatives. In conjunction with the first annual meeting of the Partnership, a joint collaborative conference was held with the Cape Fear River Assembly which provided an opportunity to engage supplementary partners, including municipality and industrial partners within the middle and upper river basin on the goals and mission of the Partnership.

### CURRENT STATUS OF ACTIONS

The Partnership worked together over a two-year timeframe to develop the [Cape Fear River Basin Action Plan for Migratory Fish](#), which was finalized in April 2013 (Cape Fear River Partnership 2013). A wide variety of [stakeholders](#) are currently participating in the prioritization and implementation of the plan, including representatives of the federal and state government, universities and non-profits and industry in the basin. The Plan itself contains a diversity of actions, and is organized around three goals of restoring access to historic migratory fish habitat, improving habitat conditions for migratory fish, and engaging new stakeholders and communicating socioeconomic values of habitat improvements. Collectively, the actions span across the watershed and represent a comprehensive approach to restoring migratory fish species in the basin.

A variety of actions have been launched since spring 2013, as summarized in the below table (Table 2). There are over 95 action items in-progress with approximately 25 action items completed since December 2014. A major driver, although not identified in the Action Plan as it was under construction during the development of the plan, was the completion of a natural rock weir fish passage structure at Lock and Dam No. 1. This fish passage structure is the first of its kind on the Atlantic Coast and is being used as a model for design of a fish passage structure at Lock and Dam No. 2 and 3. The Cape Fear River fisheries enhancement project was constructed downstream of Lock and Dam No. 2 in February 2014 to create additional spawning habitat for migratory fish.



## Partnership Accomplishments

**Table 2. Completed Actions by Partners as of December 2014.**

Action No.	Action Item	Lead	Deliverable
1.2	Continue discussions with Duke Energy and the regulatory agencies about mitigation for proposed Shearon Harris nuclear plant expansion	USFWS and NOAA	No expansion planned at this time
1.3	Identify mechanism to provide funding for fish passage at Lock and Dams No. 2 and No. 3. Then approach potential funding sources for support.	USFWS, CFRW, Dial Cordy and Assoc.	Grant application with further funding efforts continuing
1.9	Work with industry to identify potential location of impingement/entrainment issues and reduction technologies associated with power plant National Pollutant Discharge Elimination System (NPDES) permits.	NCDWR and NOAA	<u>Final 316(b) rules published</u> incorporating avoidance and minimization measures of entrainment/impingement
2.2	Apply prioritization tool for North Carolina to Cape Fear and barrier removal projects that will benefit migratory fish	SARP, American River, NOAA, USFWS, Dial Cordy and Assoc.	Priority List of dam removal projects that will be used to pursue priority projects
4.3	Compile existing survey data for American eels to determine distribution within the Cape Fear River basin, with the goal of determining where eel passage efforts are needed	NOAA	Map will be used to pursue priority projects



## Partnership Accomplishments

**Table 2. (continued)**

Action No.	Action Item	Lead	Deliverable
4.5	Monitor fish passage past Lock and Dam No. 1 (striped bass, sturgeons, shad, flathead catfish) to determine effectiveness of full rock ramp structure	NC State and USACE	Data and Final Report will be used to make necessary design improvements to benefit fish passage at Lock and Dam No. 1.
5.1	Continue enforcement compliance with North Carolina state rules and permit conditions for projects impacting migratory fish habitat in the Cape Fear River	NCDWR	100% inspection of compliance on all waste water discharges
6.1	Create map of remaining inland freshwater wetlands and flooded hardwoods in the Cape Fear watershed.	City of Wilmington	GIS Map will be used to evaluate high priority river herring spawning habitat
7.1	Determine the underlying causes of wetlands loss in the coastal watershed of the Cape Fear River Estuary	NOAA	Coastal Wetland Loss Map and draft report that will be used to compile nationwide recommendations for addressing coastal wetlands loss
9.1	Federal agencies (NOAA and NRCS) develop a better cooperative exchange of information in order to better understand any similar land based programs with funding for conservation	NOAA-NMFS	NOAA to attend NRCS State Technical Committee meetings



## Partnership Accomplishments

**Table 2. (continued)**

Action No.	Action Item	Lead	Deliverable
11.1	Develop NCDMF guidelines for best practices in design and siting of energy development and infrastructure projects to minimize negative impacts to fish habitat, avoid new obstructions to fish passage, and, where possible, provide positive impacts	NCDMF (Jessi Baker) with help from NCWRC, NOAA, and USFWS	Interagency Team available for review
11.3	Verify current in-stream work moratorium window is adequate for protecting Atlantic sturgeon during spawning periods and recommend changes as necessary	NOAA – NMFS	Conservation Measures continue to be modified
11.4	Review existing guidelines on snag removals	NCWRC	Guidelines updated; Section 10 permit required for snag removal
12.1	Model historic current and future flows using the WaterFALL modeling study and other available data to model flows on the Cape Fear River and its main tributaries	TNC and Research Triangle Institute	Freshwater Resilience Assessment for NC systems that will be used to assess water quantity within the Cape Fear River
12.2	Environmental Flows Science Advisory Board determine species environmental flow needs on the Cape Fear and incorporate environmental flows into existing Neuse and Cape Fear joint River model	NCDWR, TNC, North Carolina Natural Heritage Program	Report and training session on combined Neuse-Cape Fear model will be used to prioritize needs



## Partnership Accomplishments

**Table 2. (continued)**

<b>Action No.</b>	<b>Action Item</b>	<b>Lead</b>	<b>Deliverable</b>
12.3	Identify flow requirements for Cape Fear River that are necessary for successful spawning, egg development, and larval transport to nursery grounds	TNC, NCDMF, NCWRC, and NOAA (Fritz Rhode)	Updated Fisheries Management Plan that will be used by resource agencies as a decision-making tool
12.5	Identify, map and quantify all current withdrawals as a baseline to create a map format that can be easily shared with other agencies and organizations.	NCDWR (Fred Tarver)	OASIS Model that will be used to capture water balance
13.4	Continue to assess the relationship between blue-green algal blooms and BOD downstream of Lock and Dam No. 1	UNCW and CFRW	Completed analysis and report that will be used to document sources
14.3	Map wastewater land application fields (NCDWQ), septage land application fields (Division of Solid Waste) and Class B residual land application sites (NCDWQ).	UNCW and CFRW	GIS map will be used to evaluate non-point source pollution
14.6	Correlate land-use changes throughout the basin and bordering the Cape Fear River and its tributaries to water quality parameters (DO, Nitrogen, Phosphorous, chlorophyll a and fecal coliform)	Dr. Jennifer Alford and UNCW	Land Use Change Analysis Dissertation and Published Paper
*18.4	Identify major audiences/players in commercial and recreational fisheries both for purposes of data collection but also results dissemination	NCDMF/TNC	Outreach materials, website and video will engage stakeholders



## Partnership Accomplishments

**Table 2. (concluded)**

<b>Action No.</b>	<b>Action Item</b>	<b>Lead</b>	<b>Deliverable</b>
*18.6	Develop possible methodologies for estimation of benefits to recreational fisheries	NCDMF/TNC	Report that will be used to provide a baseline economic analysis of recreational fisheries occurring in the Cape Fear River. Developed methodologies can also be used to provide future updates on the economic performance of these fisheries to identifying trends over time.
*18.7	Determine and estimate all other related values associated with increasing commercial and recreational fisheries	NCDMF/TNC	Analysis and report that will make projections using a baseline economic assessment of fisheries occurring in the Cape Fear River, focusing on net benefits and economic impacts that may occur from improving the fishery resources.
*20.1	Research and analyze current status of water quality and quantity (including pattern of water flows)	NCDMF/TNC	Literature review and report that will be used to assess the linkage between water quality and quantity with fish health and survival. Research is expected to aid in efforts of the Socioeconomic Committee and other Partnership teams.
*20.7	Develop possible methodologies to quantify benefits to water storage/availability from Partnership actions	NCDMF/TNC	Economic report that will be used to provide a baseline economic assessment of the net benefits of the Cape Fear River in regards to water storage and availability. Developed methodologies can also be used for future updates of these benefits to identify trends over time.



## Partnership Accomplishments

***As summarized below and within the above Table 2, progress has been made throughout several themes within the Action Plan including but not limited to data analysis, research and on the ground projects.*** Data analysis at a landscape scale has been a major focus of early actions including the efforts by the City of Wilmington who took the lead in creating a Geographic Information Systems (GIS) map of remaining inland freshwater wetlands and flooded hardwoods in the entire Cape Fear watershed. This data will be provided to conservation organizations to help prioritize land acquisitions. In addition, an interagency team, led by NOAA, is working on determining the underlying causes of wetland loss in the coastal watershed of the Cape Fear River estuary. The group has completed an initial review of the coastal wetland loss data from National Wetlands Inventory and the Coastal Change Analysis Program. They are analyzing the different ways that coastal wetlands losses are mapped and presented and are engaging regional and local experts to determine accuracy.

Research and data collection have also been major foci of the plan. A flow analysis for the Cape Fear River to identify requirements necessary for successful spawning, egg development, and larval transport to nursery grounds has been completed. Academic partners have conducted intense sampling to identify potential causes and impacts of harmful algal blooms in the river, and also studied water quality in key tributaries with heavy agricultural usage.

A dam removal subgroup, comprised of representatives from Southeast Aquatic Resources Partnership, American Rivers, NOAA, USFWS and Dial Cordy and Associates Inc., has been using outputs from the Barrier Prioritization Tool along with aerial photos and other data to explore high priority dam removal/fish passage projects in the basin. The group plans to focus on the lower Cape Fear, highlighting dams below Lock and Dams 1 and 2, as well as those higher



in the watershed in anticipation of passage at the mainstem dams in the future. Presently the group is exploring fish passage options for Dodd's Millpond Dam (see above photo). Appendix – 2015 Committee Updates provides a list of priority action items to be taken by the dam removal subgroup.

These and additional activities will continue throughout the basin over the coming years as part of the holistic approach for restoring migratory fish species.



## Challenges and Benefits

### BENEFITS OF USING A WATERSHED-SCALE APPROACH

Forming a partnership among the many federal and state governments, scientists, utilities, and non-governmental organizations active in the Cape Fear River watershed has resulted in increased capacity and a broader range of tools and capabilities to provide long-term habitat-based solutions for the migratory fish in the basin.

By creating the Cape Fear River Basin Action Plan for Migratory Fish, the partnership pushed the concept of watershed planning beyond solely restoring fish passage over large dams in the river, to identifying a broad suite of actions that partners could take in the basin to restore fish populations. New stakeholders, including the Southeast Aquatic Resources Partnership, Wilmington Watertours and the NC Beach and Inlet Waterway Association, have increased interest in improving fish passage and habitat conditions for migratory fish.

“When all presented fisheries data are analyzed together, the findings indicate that the fisheries of the Cape Fear River supported an estimated 467 jobs, \$14.2 million in income, and \$35.7 million in business sales”, indicates John Hadley, NC Division of Marine Fisheries.

The successful completion of a quantitative and qualitative assessment linking water quality and migratory fish passage to economic contributions of fisheries and water use in the Cape Fear River by the Nature Conservancy and

#### Partnership benefits include:

- Increased capacity
- Partners provide broad range of technical resources
- Engage new stakeholders

NC Division of Marine Fisheries are being effectively communicated to the public and through the Partnership. Future phases of the socioeconomic study will be underway to further evaluate the economic importance of migratory and coastal fisheries in the Cape

Fear River, evaluate the relationship between water quality and fish health and survival, model the effects of improvements in water quality, estimate financial benefits to drinking water utilities of water quality improvements, and create outreach documents based on findings. Recently a website and video (The Nature Conservancy 2014) were produced by several partners including The Nature Conservancy, North Carolina Division of Marine Fisheries and NOAA to engage and educate the users and stakeholders on the significance of restoring the



Mike Wicker (FWS) presents a gift to Dr. Joe Hightower (NC State) for his extensive efforts within the Cape Fear River basin at the 2014 Partnership meeting.





## Challenges and Benefits

Cape Fear River fisheries. This website and video will continue to provide a platform for Partners to showcase their continued efforts in the Cape Fear River basin (<http://capefearriver.wix.com/communitybenefits>).

Using a landscape or watershed-scale approach and engaging with groups such as the Cape Fear River Assembly during the annual meeting has built new connections and increased awareness. By working at the larger basin level, partners have been able to identify broader needs and additional partners to form collaborative working groups that would not have been apparent at a smaller and narrower scale. For example, the socioeconomic project was a joint effort by the Division of Marine Fisheries and The Nature Conservancy. Bringing all of the partners into one room (including the water and electric utilities, state fisheries biologists and economists, and nonprofit groups) to talk about related issues and make connections important for protecting the watershed is extremely valuable.

In addition, by convening partners together there are more consistent conversations about working together on funding additional projects in the basin to better characterize habitats of value to migratory fish populations and restoration of habitat.

### CHALLENGES OF USING A WATERSHED-SCALE APPROACH

Equally important to the partnership's back story and success are the challenges the group faced and continues to tackle. The creation of an Action Plan for Migratory Fish that all Cape Fear River partners supported was an initial challenge and resulted in many months of open meetings, correspondence, and the full vetting of over 200 goals and targets. The Partnership action plan started as solely a plan for getting migratory fish over dam blockages in the river, but quickly became much more when a watershed approach was used to identify and address problems in the basin. The migratory fish passage focus broadened to include looking at water quality and quantity, and fish habitat throughout the entire basin. This approach, while offering many new opportunities for relevant programs to be involved in

*New partners include the Southeast Aquatic Resources Partnership, Wilmington Water Tours, and the North Carolina Coastal Federation.*

### Partnership challenges include:

- Communicate funding opportunities effectively for prioritized Action Item.
- Challenges of the construction of a rock arch ramp.
- Communicate results of Partnership efforts to increase awareness outside of the Partnership.
- Seek sustainable funds to support a Coordinator position.
- Align current partners with identified goals (especially in changing political environment).
- Difficulty in prioritizing a large scope within a far-reaching geography.



## Challenges and Benefits

creating solutions for the basin, also added layers of complexity to understand how all the parts of the system work together. The Partnership has overcome the challenge of identifying the actions; it is now apparent time is of the essence to implement the goals set forth with appropriated funding sources.

### **Partnership Coordinator tasks include:**

- Provide monthly updates on upcoming events/research opportunities;
- Facilitate inter-committee correspondence;
- Manage Team Lead Committee and provide clearinghouse for committee minutes;
- Develop grant applications in collaboration with Partnership stakeholders that directly lead to implementation of specific goals and targets outlined in the Final Action Plan (2013);
- Update grants database;
- Coordinate action plan updates between all Team Leads, including developing a standardized system for updates; and
- Lead and facilitate an Annual Meeting.

Additional challenges include the development of mutual leadership without dedicated funding sources from one specific entity or without generous funds to develop a watershed prioritization approach/planning effort. Local leadership development takes time and support; handing off leadership to a specific working group, such as the Cape Fear River Partnership's Implementation Team was challenging as there is still a need for an individual leader or coordinator to ensure movement is made. Ensuring information transfer in the process of leadership was challenging on the Cape Fear since partnership building can be very strongly tied to the organization a person represents versus a broader watershed partnership effort.

In an effort to maintain momentum and energy within the Partnership, a Coordinator position was funded for approximately 5 months beginning January 2014 by the Nature Conservancy. The Cape Fear River Partnership Coordinator, located within the Cape Fear River watershed, works directly with each Team Lead Committee including Fish Passage, Habitat/Water Quality, Communications, Funding and Socioeconomic Committees to ensure a focused collaboration to meet the goals and targets set forth by the Partnership and the Final Action Plan. Specific tasks and

responsibilities have been developed to ensure momentum of the Partnership initiatives. The Coordinator position is part-time and is currently funded (approximately \$12,000/year) by NOAA through July 2015. The USFWS Coastal Program has also provided financial support for the Coordinator position through August 2019.

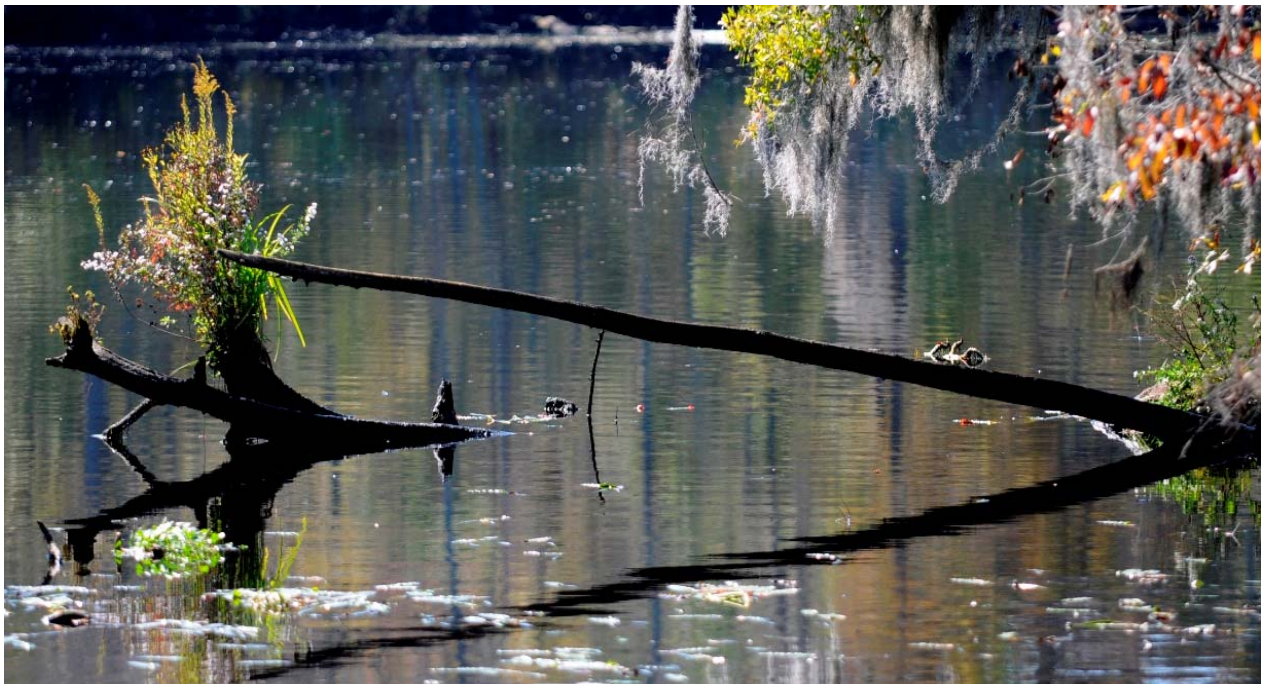


## Challenges and Benefits

### LESSONS LEARNED

A key lesson learned in the first few years of implementing the Partnership was to adjust expectations regarding timelines. The Cape Fear River Partnership and Action Plan took a little more than two years to put into place. It took this much time to develop confidence among partners and the initial leadership, and for all of the partners to gain a full understanding of the needs of the Cape Fear River basin's migratory fish. The Implementation Team now knows that the development of partnerships and well-thought out plans takes time and that schedules should recognize this limitation as project timelines are developed and projects implemented.

In summary, while working at a large scale with multiple stakeholders and projects added significant complexity to the effort, the comprehensive solutions and widespread support for restoring migratory fish species would not have been possible without the watershed approach of the Cape Fear River Partnership.



*Photo credit: Alan Cradick*

## Priority Future Action Items

Each Implementation Team or Committee is striving to complete Action Items within the committed timeframe as described in the Action Plan. A list of priority future action items, identified by each Committee, is listed below in Table 3 as well as Appendix 1 – 2015 Committee Updates. These future priority action items will be updated and discussed further at the [2<sup>nd</sup> Annual Partnership meeting](#) scheduled for May 14, 2015 in Wilmington, NC.

**Table 3. Priority future Action Items to be implemented in 2015 and beyond.**

Action Item	Goal	Lead
1.1	Actively seeking material to fill the scour hole at Lock and Dam No. 1. Continue conversation with NCDOT and others	USFWS
1.9	Continue to work with industry to identify potential location of impingement/entrainment issues associated with NPDES permits	NOAA-NMFS
2.1	Field investigation and discussions with Fort Bragg regarding the removal of the unnamed dam has been initiated	Dial Cordy and Assoc.
2.3	Discussions regarding fish passage at Lockville have been initiated	USFWS and American Rivers
4.1	Compile history of migratory fish in the Northeast Cape Fear River	NOAA-NMFS
4.5	Fish passage monitoring at Lock and Dam No. 1 is ongoing by NC State and USACE	NC State and USACE
4.6	Working on barrier prioritization with ASFMC Fish Passage Work Group	NMFS
4.8	Update of Primary Nursery Areas and Spawning Habitat Map	NCDMF and NMFS
17.2	Initiate research on levels of EDCs and assess effects on migratory fish	Fayetteville PWC



### FUTURE FUNDING OPPORTUNITIES

The Cape Fear River Basin Action Plan compiled a list of funding opportunities that may support the work outlined in the Action Plan and this list has grown as new funding opportunities are identified. As summarized in the above sections, several partners have successfully been awarded funds from organizations including NOAA, SARP, FWS and others to complete specific action items. Below describes a recent source of funds that may provide for future restoration projects within the Cape Fear River Basin.

#### Tronox Funding

Environmental damage in the Navassa region, which includes the Cape Fear River watershed, was the result of creosote-based wood treatments that occurred on the site from the mid-1930s until 1974. As a result of this industrial activity, hazardous substances such as polycyclic aromatic hydrocarbons have been found in on-site soils, groundwater, and Sturgeon Creek marsh sediments, which provide important habitat for fish, birds and other wildlife.

A fund administered by NOAA, the U.S. Fish and Wildlife Service, and the North Carolina Department of Environment and Natural Resources, in their capacity as natural resource trustees, has received a disbursement of more than \$13 million and anticipate receiving an additional estimated \$9 million to restore natural resources harmed by the activities of Kerr-McGee Chemical Corp. as part of the largest environmental settlement in U.S. history.

The jointly recovered funds will be used in a multi-year effort to restore natural resources and habitats injured within the Cape Fear River basin by the release of hazardous substances from the former Kerr-McGee Chemical Corp. wood treatment facility in Navassa, North Carolina. The trustees also received an earlier disbursement of \$915,836 for the site.

It is anticipated a public scoping meeting will be held in summer 2015 with funds becoming available for restoration projects in fall 2015.



**Figure 2. Aerial map showing the restoration site at the Kerr-McGee former wood-treatment processing plant in Navassa, North Carolina (Credit: NOAA)**

## Conclusion

In summary, while working at a large basin-wide scale with multiple stakeholders and active projects added significant complexity to the implementation of the Partnership's efforts, the comprehensive solutions and widespread support for restoring migratory fish species would not have been possible without the watershed approach of the Cape Fear River Partnership. Extensive progress has been made in all action areas as indicated by the long list of completed action items (Table 2) and includes highlighted projects such as the enhancement of 0.5 acres of spawning habitat, continuation of fish passage monitoring, dam removal prioritization, and toxic algae source analysis.

While a primary reason the Cape Fear River watershed was selected by NOAA as a focus area was because of the many constructive relationships already working toward complementary ends, these partnerships became even stronger through the Cape Fear River Partnership designation. The success the partnership achieves is due to all of their efforts, and is shared success for all involved.

We encourage other stakeholders within the Cape Fear River basin to join the Partnership and support its mission of ***“Restore and demonstrate the value of robust, productive, and self-sustaining stocks of migratory fish in the Cape Fear River”***.



***Photo credit: Alan Cradick***



## 2015 Committee Updates



## **2014/2015 Action Items**

- Actively seeking material to fill scour hole at L&D 2
- Fish passage monitoring at L&D 1 ongoing
- Sturgeon movements ongoing
- Worked on spawning and nursery area delineation
- Worked on barrier prioritization with ASFMC Fish Passage Work Group
- American Shad spawning study at L&D 1 and L&D 2 ongoing

## **2015 Goals and Targets**

- Compile history of migratory fish and their fisheries in the Northeast Cape Fear River
- Revise NC DOT road crossing guidelines
- Continue searching for target blockages (dams, culverts) to find matches between priority structures and willing owners with continued refinement of barrier prioritization tool
- Continue ongoing studies listed above
- Seek funding for priority projects

## **Challenges and Issues**

- Funding for rock weir construction at L&Ds 2 and 3.
- Tweak weir on L&D 1 to provide a seam or seams with streaming flow to enhance Striped Bass passage. Define process within COE and proceed with funding and implementation.





## Dam Removal Subgroup

### **2014/2015 Action Items**

Over the past year, a sub-group of the Cape Fear River Partnership Fish Passage Committee has been actively working to identify high priority barriers in the basin to remove or bypass to benefit anadromous fishes. This group is specifically working towards the completion of Action items:

Action 2.1: Pursue priority dam removal projects on the Little River, including an evaluation of the breached, unnamed dam on Fort Bragg property

Action 2.2: Apply prioritization tool for North Carolina to Cape Fear and barrier removal projects that will benefit migratory fish

Action 2.3: Continue discussions with owner of Lockville Dam about possible opportunities for future removal

Action 2.4: Pursue priority dam removal projects on the Haw and Deep Rivers

Action 3.2: Seek funding for removing priority obstructions or providing passage from analysis of Action 3.1

This group, made up of representatives from the USFWS, NOAA, American Rivers, Dial Cordy and Associates, Piedmont Conservation Council and SARP, has developed a methodology to identify and perform reconnaissance on potential fish passage projects using the [North Carolina Barrier Prioritization tool](#). Below are the steps developed to analyze potential fish passage projects:

#### **1) Export Results from Barrier Prioritization Tool (BPT)**

Together, the group has been running multiple iterations of the BPT on smaller subsets of the Cape Fear River basin. For instance, the tool has been run on the lower Cape Fear (below LD1) as well as the upper Cape Fear (above Buckhorn Dam) including dam removal targets within the Little, Haw, and Deep Rivers.

#### **2) Explore dams on web map or GIS using local data sources and aerial photographs**

The top priority dams are then explored in ArcGIS using aerial base maps, overlaying local data such as the herring habitat GIS analysis performed by Matt Hayes, anadromous fish spawning areas, and more.

#### **3) Explore Several non-map Factors**

If projects are deemed good possibilities given that the appropriate ecological metrics are met (few downstream dams, flow capable of supporting anadromous fishes, NCDOT crossings, etc.), then information about the dam's owner, current use, and owner information is extracted from the data and the web.



## Dam Removal Subgroup

### 4) Perform field visits

Field visits are then performed by experienced staff (i.e. Fritz Rohde, NOAA-NMFS) to assess the passability of the dam and identify if any natural barriers are present.

### 5) Land Owner Contact

Finally, the landowner is contacted by first attempting to find a shared contact. If none exists, other methods include sending a letter or cold calling.

### 2015 Goals and Targets

The process of connecting a top priority project with a willing landowner takes time. However, to this date the subgroup has conducted 6 site visits on potential dams and culverts for bypass. While not all of these sites were given the green light due to low flow or absence of a dam, all information collected informed the barrier database. The top priorities are:

**Dodd's Millpond Dam (Cape Fear River):** The subgroup has identified Dodd's Millpond Dam, located below LD2 on Carver's Creek, as a high priority to bypass for American eel and blueback herring. The landowner at this time is unwilling to remove the dam, as the impoundment is a Natural Heritage Area; however fish passage utilizing an Alaskan steeppass and eel passage is an option. This option will be explored further with the subgroup in 2015.



*Photo by Fritz Rohde, NOAA-NMFS*

**Fort Bragg Unnamed Dam (Little River):** The abandoned dam on the Little River continues to surface to the top of the list for removal. Reaching an agreement with the environmental planning division of Fort Bragg is the next step action for the subgroup. A site visit was conducted in November 2012 by Dial Cordy and Associates and American Rivers. There are several upstream dams as well that may provide additional benefits from removal.



*Photo by Dawn York, Dial Cordy and Associates Inc.*



### Next Steps

- Continue to identify top priority dams in the Cape Fear River basin (Upper and Lower)
- Collaborate with the Piedmont Conservation Council to identify shared priority projects
- Identify culverts that may be a barrier to herring in the lower Cape Fear River Basin
- Continue to refine the process of identifying high priority barriers
- Follow up on projects still “up in the air” to generate active restoration projects
- Develop funding proposals for high priority projects for upcoming funding opportunities (i.e. USFWS Fish Passage Program, Tronox restoration funds, etc.)



***Boney Millpond Dam, natural barrier may make this a low priority. Photo by Fritz Rohde***

# Habitat

## **2014/2015 Action Items**

- The Habitat and Water Quality/Quantity Committee was restructured in 2014 into two separate groups. There are now two committees enacting and monitoring action items associated with habitat and water quality. Dan Ryan ([dryan@tnc.org](mailto:dryan@tnc.org)) is the Team Lead of the habitat committee. Please contact him if you are interested in participating in the habitat committee.
- Matt Hayes, first with the City of Wilmington and later as a private contractor, has created a database of barriers and remaining inland freshwater wetlands and flooded hardwoods for the Cape Fear watershed below L&D 2. Although yet to be validated in the field, these data are important in prioritizing acquisition and restoration projects. This completed activities outlined in Action 6.1.
- With a basin as large as the Cape Fear, it is vital to prioritize projects and scarce funding to have the most effective impacts on improving habitat conditions. Therefore a mapping effort has been pursued to consolidate available spatial data such as the remaining inland freshwater wetlands and other relevant data. This [online map](#), developed by the Nature Conservancy, can be used as a resource by the partnership and in particular those groups pursuing land acquisition as mentioned in Actions 5.2 and 6.2.
- The Coastal Wetlands Cape Fear analysis report, which seeks to determine the underlying causes of wetland loss and identify strategies to abate these threats, is nearing completion and has been reviewed by those in the basin who participated in the planning effort. This work is associated with Action 7.1.

## **2015 Goals and Targets**

- Identify and prioritize basin-wide habitat protection and restoration projects that represent the biggest return on investment.
- Utilize current funding sources as well as the pending NRDA settlement to finance identified projects.

## **Challenges and Issues**

- The primary challenge is the size of the basin and where implementation of projects will have the biggest impact on migratory fish habitat.
- A secondary challenge is keeping committee members engaged and identifying committee work that can be a collective success for both the partnership and the membership's own agency/organizations' work plans.



### **2014/2015 Action Items**

- NCDENR is requiring a nutrient criteria development plan to be developed for the Middle Cape Fear Basin, and work has been initiated. DENR declined to put any UNCW scientists or anyone else representing the lower basin on the Advisory Board. Partially addresses Action 13.5.\
- NCDENR is assessing all available data, including ambient monitoring and eDMR reports, to assess impacts of wastewater treatment plants on the water quality in accordance with the standards between L&Ds 1 and 3 (will be worked on over the next year or two). Addresses Actions 13.5.
- Drs. Cahoon, Mallin and Bailey of UNCW are overseeing a graduate student who is using genetic techniques to track origins of Microcystis blooms in the river. She is making progress (all summer samples from all locations were positive for Microcystis toxin genes) and the researchers are seeking funding to continue her studies. Addresses Actions 13.3 and 14.7.
- Additional river monitoring by Dr. Cahoon through CFRW continued in summer 2014, looking at nitrogen forms, including urea. Results show that nitrate-nitrogen is by far the most important N form in the river in the relevant reach. Addresses Action 13.10.
- An NCDWR/USGS study of surface water quality associated with swine operations is complete. USGS reported their findings at the Water resources research Institute conference in Raleigh in March 2015. We are now waiting for USGS to finalize their report/publication. Addresses Action 14.4.
- Dr. Jennifer Alford has completed her Ph.D. thesis and is prepared to give a presentation and discuss her results at the upcoming May meeting. Addresses Action 14.6.
- An update re: the CFR Partnership was presented to the Area 7 Soil and Water Conservation Districts (9 counties) at their Spring Meeting on February 26, 2014. Addresses Action 16.11.
- NC Cooperative Extension worked with 476 animal waste applicators in 12 CFR basin counties throughout 2014 on proper waste application and continuing education events that included information about improved practices and technologies. This addresses Actions 16.9 and 16.10.
- In 12 CFR basin counties in 2014, NC Cooperative Extension had 103,498 face-to-face contacts and 480,843 non face-to-face contacts regarding urban and consumer horticulture. These contacts include questions pertaining to proper fertilization and soil testing. Also 1,861 people received pesticide applicator training (certification or continuing education). Addresses Action 16.18.



### **2015 Goals and Targets**

- Persist with completing goals identified in action plan, and revise, edit, or update such goals.
- Funding for study of blue-green algal bloom causes and solutions is a goal; as such Dr. Mallin and Dr. Cahoon from UNCW are actively applying for funds for genetics studies and modeling efforts. Addresses Action 13.2.

### **Challenges and Issues**

- The Water Quality working group has an unwieldy number of action items to complete and track. The action item sheet needs to be shrunk and more focused, and lead agencies need to be changed in some cases.
- NCDWR and the EMC took public comments in Wilmington regarding a proposed reclassification of the lower Cape Fear River and estuary to swamp water status. There were a few supportive comments from industry representatives and a consulting engineering firm. Dr. Mallin, Frank Yelverton, and representatives from Duke University Environmental Law and Policy clinic spoke with a primary focus on the inadequacy of the proposed change to do anything regarding non-point source BOD and nutrient inputs, especially from CAFOs. Dr. Cahoon of UNCW and Dr. Burkholder from NCSU submitted written comments along those same lines.
- Discussions between UNCW administration and Duke Energy lead us to believe that the Duke environmental grant program is not for use in conducting research programs.



### **2014/2015 Action Items**

- The Nature Conservancy in collaboration with NCDMF carried out a project to provide a baseline analysis on the economic importance of fisheries in the Cape Fear River, evaluate the relationship between water quality and fish health and survival, model the effects of improvements in water quality, and estimate financial benefits to drinking water utilities of water quality improvements. The project also helped develop an informational video on the Cape Fear Basin, a brochure that could be used as an outreach document for the Partnership and a website that provided information on the Cape Fear River, the Partnership and housed project deliverables. This project fully or partially addressed Action Items 18.1-18.7 and 20.1-20.8.

### **2015 Goals and Targets**

- Better engage Socioeconomic Committee members and identify subjects or actions that can be actively pursued by the Committee and Partnership. Specifically focus on L&D 2.
- Focus on assessment of other use and non-use values of the Cape Fear River such as tourism, recreation, transportation, and water impoundment to better address Action Items 19 and 20.
- Engage public through surveys and other instruments to identify perceptions, knowledge of current issues, and areas of concern related to the Cape Fear River watershed.
- Engage public, county commissioners, and tourism boards on issues facing the Cape Fear River by relaying information and findings from the Committee and the Partnership.



### **Challenges and Issues**

- Identifying and acting on funding opportunities effectively and with enough time for development of a project directly related to an identified action item.
- Securing resources needed for further gathering and analysis of data that will allow the group to address action items.
- Identifying avenues and creating instruments to best sample public opinion in an effective and manner.
- Identifying and recruiting others who may be interested in involvement with the group.





## **2014/2015 Action Items**

- Tronox trustees are working to develop a scoping document that would describe the criteria for environmental restoration within the Cape Fear River Basin. A public hearing on the scoping document is anticipated in the spring/summer of 2015. Total anticipated funding is about \$22 million.

## **2015 & 2016 Goals and Targets**

- Obtain consensus on the modification needed for the rock arch rapids at L&D 1 that would improve fish passage. Work with the Wilmington District Corps of Engineers to obtain funding for the modification.
- Obtain funding to develop a program similar to Animaps that will have the capacity to handle all the sonic tag data collected in the Cape Fear River. Cape Fear River Watch will apply for a grant to obtain this funding.
- Continue to seek funding for the construction of rock arch rapids at L&Ds 2 and 3. Potential funding opportunities including NOAA restoration program, mitigation claim from Tronox injury, DOT TIGER grant, NCDWR stream restoration grant (\$585K requested as of January 2015 for engineering/design of rock arch rapids at L&D 2). Also, engage senior North Carolina legislative leaders that reside in the Cape Fear River Basin to help designate funding for construction of rock arch rapids at L&Ds 2 and 3.
- Increase awareness within Partnership of potential and available funding opportunities. Cross-delegate potential grants to multiple Partners to increase action implementation.
- Update funding spreadsheet and disseminate. Create a calendar function to assist in tracking available funding opportunities.



## Challenges and Issues

- Communicate funding opportunities effectively and with enough time for development of a project team and design directly related to a prioritized and identified Action Item.
- Challenges of the construction of a rock arch rapids: 1) how can project be broken down into manageable funding pieces? 2) Can material cost be reduced by using other material, such as sand and then cap with rock? 3) Can materials from bridge demo projects occurring in vicinity to Lock and Dams be used?
- How do we communicate results of Partnership efforts (i.e. mapping of critical habitat by species) to increase awareness outside of the Partnership and can we use data to make more effective choices.

