

North Carolina Draft 2021 Chowan River Basin Water Resources Plan Public Comment Document NC Division of Water Resources

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Commenter: Ulrich and Mary Alsentzer

Ulrich and Mary Alsentzer
103 Cabana Rd.
Belhaven, NC 27810
October 20, 2020

Division of Water Resources
Department Forest Shepherd,
Basin Planner of Environmental Quality
1611 MSC
Raleigh, NC, 27699

Re: Chowan River Basin Plan

Dear Mr. Shepherd:

With regard to Chowan River Basin Plan currently available for public comment:
We would like to express our concern regarding the described ill effects of non-point source pollution in the basin which contribute directly to the impairment of the waterways and swamps in the watershed area. We support any future rule-making that would attempt to tackle some of the issues aptly described in the Executive Summary by putting real “teeth” into your recommendations. We would also hope that in circumstances where existing rules, in particular those related to logging operations, are known to be violated, those individuals and companies responsible will be aggressively targeted and fined in addition to being required to re-vegetate where transgressions have occurred.

We thank you and your department for your extensive work on this plan and hope that your recommendations will become plans for action in the near future!

Sincerely,
Mary Alsentzer
Ulrich Alsentzer

Commenter: North Carolina Coastal Federation



North Carolina
Coastal Federation
Working Together for a Healthy Coast

October 19, 2020

Forest Shepherd
Basin Planner
Division of Water Resources (DWR)
1611 MSC
Raleigh, NC 27699

RE: Comments of Draft 2020 Chowan River Basin Plan

Dear Forest,

Please accept these comments on the draft 2020 Chowan River Basin Plan from the North Carolina Coastal Federation.

In the "North Carolina Nutrient Criteria Development Plan" dated May 16, 2019, the N.C. Department of Environmental Quality (DEQ) made the following statement on Page 11:

"Data reviewed as part of APNEP's Ecosystem Assessment indicated that chlorophyll-a concentrations, as reported by the DWR in STORET, do not show trends in the Albemarle Sound between 1980 and 2010. However, sampling data collected by the USGS during 2012 and 2013 indicate the presence of algal blooms throughout the growing season and academic researchers have noted continued increases in nutrient and chlorophyll a concentrations. Furthermore, episodic cyanobacteria algae blooms in the Chowan River have been regular occurrences since 2015 with some blooms producing cyanotoxins at levels that may impact human health."

While the basin plan's downstream boundary is located near Edenhouse and does not include Albemarle Sound, it's obvious that downstream impacts of nutrient levels that are too high in the Chowan River have a direct impact on water quality and fisheries habitats both within the river and the downstream sound. This was recognized by DEQ's Nutrient Criteria Development Plan which links the Chowan River with Albemarle Sound. This linkage between water quality in the river and to downstream impairments should be documented in the basin plan.

While the draft plan does a good job of describing water quality impacts of high nutrient levels within the Chowan River watershed, it's silence on the impact of these nutrient rich waters discharging into Albemarle Sound needs to be corrected. In the past year, as the Coastal Habitat Protection Plan (CHPP) has been updated, DEQ staff documented significant declines in

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North Carolina Coastal Federation

submerged aquatic vegetation in the Chowan River and Albemarle Sound due to nutrient levels that are too high.

Submerged aquatic seagrass are among our most productive fisheries habitats. In the process of updating the CHPP, strong scientific consensus has emerged that the declines in aquatic grass acreage now taking place are caused by water quality impairments caused by nutrients. Simply put, when the water becomes too turbid or cloudy for light to penetrate, these plants don't get enough sunlight to thrive and/or survive. The causes of turbid or cloudy water are mostly related to nutrient levels that are too high in our estuaries. Hydrologic modifications of watersheds upstream of estuaries result in more surface runoff that contains unacceptably high levels of nutrients. There may also still be too many nutrients discharged from wastewater treatment plants that ultimately cause these estuarine water quality problems.



waters.

The update to the Coastal Habitat Protection Plan has produced a map that shows the historical extent of aquatic grasses in the Chowan River and Albemarle Sound. The information collected as part of the update of CHPP indicates that historically (1981 to 2015) there was approximately 117,773 acres of submerged aquatic vegetation habitat (areas where grasses have grown) in the Chowan and Albemarle Sound. DEQ staff estimates that there has been a loss of 52.06 percent of those grasses due to high nutrient levels in these

Given that the information collected to update the CHPP documents that water quality impairments caused by too many nutrients are a significant concern for why there is now a measurable decline in the acreages of submerged aquatic vegetation, this basin plan should address the issue of declining aquatic grasses in the Chowan River and Albemarle Sound caused by downstream flows containing high nutrient levels from the Chowan River. The plan should recommend that this issue be addressed as part of DEQ's Triennial Review.

The U.S. EPA requires that the Commission review its approach to water quality protection at least once every three years. In specific, the review should take into account whether existing water quality standards and regulations are sufficient in light of any new information that helps the state to more fully address the purposes of the federal Clean Water Act. Under the Clean Water Act as well as state water quality standards, aquatic habitats such

North Carolina Coastal Federation

as submerged aquatic vegetation in Albemarle Sound are a protected "existing use" under federal and state Antidegradation Policies.¹

The existing Chlorophyll-a standard for the Chowan River is obviously not sufficient to prevent algal blooms. Such blooms indicate that the existing standard is set too high to prevent blooms as well as downstream impacts on aquatic grasses. The plan should recommend that the waters in the Chowan (as well as Albemarle Sound) be listed as legally impaired on the state's 303(d) list because of the loss of aquatic grasses which is a violation of the state's Antidegradation Policy. In addition, action is needed to either revise the Chlorophyll-a standard and/or devise more effective management measures to reduce nutrients to prevent future blooms as well as to recover downstream aquatic grasses.

Given the legacy of nutrient inputs now in the Chowan River and Albemarle Sound, work should begin immediately to reduce nutrient inputs by any practical and cost-effective means possible. In reality, any input of nutrients above natural background levels to the estuary is bad, and thus we need to do everything that's economically and technically feasible to reduce the loading of these nutrients to natural levels (which is probably near zero). That should be the philosophy underpinning all point and nonpoint source control programs that serve to protect these estuaries.

There is existing authority to enact management plans based upon the Antidegradation Policy without waiting on the development of new numerical nutrient standards. Pursuant to 15A NCAC 02B.0227 (Water Quality Management Plans), authority currently exists to implement numerical and narrative water quality standards to protect water quality and "existing uses" such as aquatic grasses. This provision enables DEQ to develop a water quality management plans (i.e., watershed plans) and to adopt specific management actions deemed necessary to protect water quality and "existing uses."

DEQ should use this existing authority to address this urgent water quality impairment by asking the N.C. Environmental Management Commission to direct it to develop a watershed management plan for the Chowan River hydrologic unit. This plan should determine the extent that hydrology has been modified since November 28, 1975 (the date that existing uses are protected pursuant to the Clean Water Act). Based upon these estimates of changes in the volume and rate of runoff, the plan should then identify cost-effective management measures that seek to restore or replicate natural hydrology to the maximum extent practicable. In

¹<https://www.epa.gov/sites/production/files/2018-10/documents/questions-answers-antidegradation.pdf>:

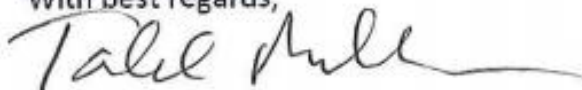
1. Aquatic plants that provide fisheries habitat are an "existing use" that is protected by the Antidegradation Policy.
2. An existing aquatic community composed entirely of plants must be protected by applying a set of water quality standards necessary to safeguard its ability to thrive and propagate.
3. An "existing use" (i.e. submerged aquatic vegetation) can be established by demonstrating that it actually occurred since November 28, 1975.

North Carolina Coastal Federation

addition, nutrient inputs from all sources should be clearly estimated, and management measures that reduce those inputs either by restoring or replicating natural watershed hydrology or by source or treatment reductions recommended.

Thank you for considering these comments.

With best regards,

A handwritten signature in black ink, appearing to read "Todd Miller", with a long horizontal flourish extending to the right.

Todd Miller
Executive Director

cc: Marion Deerhake, Chair, Water Quality Committee

Commenter: Gary Perlmutter

In the Chowan 2020 Fact Sheet:

- "thethe" in the last sentence on the first page should be corrected to read "the"

In the Executive Summary:

- On page 1, lower half - "Consequently, the mixing of water in the Chowan River is typically driven by meteorological, wind and storm, tide rather than astronomical tides." is confusing, and might be easily corrected if the "," after "storm" is removed to read "storm tide".
- Page 2, 2nd paragraph, 2nd line - remove "the North Carolina Department of Environmental Quality's (NCDEQ) -" and insert it in the second paragraph on Page 1 where DWR is defined.
- Page 3, under Story Map, first line - "StoryMap" should be two words.
- Page 3, under Water Quality Monitoring - the second sentence lacks a verb.
- Page 3, under Biological Sampling - "macroinvertebrate community" should be plural for consistency with other sampled parameters in this sentence.

Chapter 5

- 5.4 .1, 2nd line before numbered list: "facility" should read "facilitate".

Chapter 6

- 6.1.2: the "CEEG" link returns a 404 error message

Chapter 7

- 7.1.1: "NPDES Complex Permitting and NPDES Compliance and Expedited Permitting branches" should be combined as "NPDES Wastewater Permitting branch" to reflect recent reorganization of the permitting units; the linked website shows this.
- 7.1.2: the PERCS unit has been absorbed into the NPDES Municipal Permitting Unit, which is a part of the NPDES Wastewater Permitting Branch, in recent reorganization. This section needs to be updated, including the embedded link.

Commenter: Full Circle Crab Company, INC.



October 25, 2020

The water as I see it:

I buy fish and crabs from over 100 fishermen a year on the southern rim of the Albemarle Sound as well as having spent the last 30 years fishing and crabbing these waters. Here is my report:

Despite the best of intentions from some very good and dedicated people the conditions of our water have become degraded to the point where its sole purpose is to carry the waste of human abuse to where it can become diluted with sea water.

The skeleton fish populations are a bare ghost of what was once one of the most fecund estuaries of our continent. Just as the frag, alligator weed, and other "invasive species" have invaded our shores and ditches so too has the blue cat which now dominates the ecosystem. These fish, introduced into the James River, now make a mockery of the efforts to restore herring and other once prolific populations despite moratoriums and fishing restrictions that the public and commercial fishermen have been tasked with. Their dominance

illustrates the general situation in addressing the management of this watershed. Not nimble and no hammer.

It is my experience having served on the Marine Fisheries Commission, Chair of the Water Quality and Habitat sub committee, Advisory Committee member of both regional and species specific groups, APES, and more do-gooder groups than I can remember, that the system is broken. Oh, it will fix itself to some different balance but not rise to potential of the days before man's pernicious influences without a change in our value system that puts the life of our waters on an equal footing with our own lives. We are 60% water, our blood is closely related to sea water, and yet we don't value this relationship.

The first steps in our recovery of substance abuse is to admit we have a problem, and we do. This is not a shame and blame report. The good people who are charged with the "management" of our river systems are well intentioned and deserve our support. It is incumbent on us to ask for the truth, get good believable science, and demand of our elected officials the necessary financial and political will to prioritize the life of our waters.

Sincerely,

Willy Phillips

Commenter: Cypress Group of the NC Sierra Club



SIERRA CLUB
NORTH CAROLINA

**Cypress Group of the NC
Sierra Club**

Mr. Forest Shepherd
Division of Water Resources
NC Department of Environmental Quality
1611 MSC
Raleigh, NC 27699
forest.shepherd@ncdenr.gov

From: Cypress Group of the NC Sierra Club
Re: Comments on the draft Chowan River Basin Plan.
Date: 28th October 2020

Dear Mr. Shepherd,

There are three huge wood pellet plants in the Chowan River basin that are driving massive clear-cut logging of bottom-land hardwood forests. Two plants are in North Carolina and one in Virginia. This map maintained by Heather Hillaker and her team at Southern Environmental Law Center shows the economic logging radiuses of those plants in the basin (<https://tinyurl.com/yys4lpeb>).

The wood pellet industry has boomed. Biomass exports have increased tenfold since 2009, according to the U.S. International Trade Commission. In 2010, the U.S. Southeast exported about 500,000 metric tons. By 2018 that had surged to 6.5 million metric tons (about 7.1 million U.S. tons). Thousands of southern forest acres are literally being burned, albeit, in Europe

The pellet industry has expanded across coastal North Carolina, fueled by the European subsidies and the indirect benefit that EU carbon accounting rules allowed, not having to count the carbon dioxide that came out of their smokestacks.

The air quality permits issued by our NC DEQ to the Ahoskie and Northampton pellet plants have not addressed the cumulative environmental impacts of clear-cut logging on water quality, flood control, biodiversity, marine habitat or fish populations.

Even if a new tree is planted for each one burned, the scientists say it would take decades for a new tree to absorb the CO2 released by burning the old one. The consensus among climate scientists is: We don't have that much time.

Cypress Sierra wants clearer guidelines from state officials in North Carolina as to which trees or tracts of land can be harvested. In the absence of clear guidelines what is left is anecdote, but the anecdotal evidence is mounting that there is increased flooding in many watersheds due to fewer trees to pull water from the rivers.

The Sierra Club has had a longstanding concern about the maintenance of riparian buffers. Such naturally occurring structures play a critical role in modifying the runoff of fertilizers and other chemicals from farms, lawns and other entities. Buffer zones, consisting of trees and vegetation litter, alter the composition of the chemical run off making them less harmful for the environment. Regulations that were developed some twenty years ago required a buffer zone of at least 50 feet. This requirement was been systematically altered as part of legislative “regulatory reform” so that now trees of economic value can be cut down right up to the river’s edge. The role of buffer zones in maintaining clean water in rivers has been severely weakened; as this has occurred there has been a concomitant return of annual algae blooms, particularly in the Roanoke River. Maintenance of wide buffer zones is the most effective way of ensuring clean healthy rivers.

Cypress Sierra would also like to see an equal emphasis on the fresh waters of the Albemarle Sound system by NC DEQ and other environmental organizations versus the water quality and marine habitat in the saltwater sounds of North Carolina. We need more robust water quality monitoring technology for the water in the Chowan and the Albemarle Sound, the largest freshwater sound in the world.

Thank you for considering our comments.

Tom Brennan, Member, Cypress Group of the NC Sierra Club
David Ames, Chairperson, Cypress Group NC Sierra Club.

Commenter: North Carolina Poultry Federation



4020 Barrett Drive, Suite 102
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Phone: 919-783-8218

October 29, 2020

VIA EMAIL

Forest Shepherd, Basin Planner
Division of Water Resources
1611 MSC
Raleigh, NC 27699
Email: forest.shepherd@ncdenr.gov

Re: Public Comment Submission by the North Carolina Poultry Federation in Opposition to Certain Portions of the “2020 Chowan River Basin Water Resources Plan” as drafted August 21, 2020

Mr. Shepherd:

I am the executive director for the North Carolina Poultry Federation, Inc. (“the Federation”). In that capacity, I send these Comments representing the Federation’s opposition of the proposed 2020 Chowan River Basin Water Resource Plan Draft (the “Proposed Plan”) as published. The Federation believes that the Proposed Plan will, among other things, significantly inhibit poultry operations in the region if the recommendations made therein are brought into effect.

The Federation is a membership organization composed of poultry integrated processors, family farm growers, service providers, vendors and other interested parties. The Federation is the voice of the poultry industry in North Carolina. The poultry industry is the #1 agricultural commodity in North Carolina and agriculture remains the #1 industry in North Carolina. Unquestionably, the poultry industry is a major segment of North Carolina’s progressive economy.

North Carolina is fortunate to have representation from both North Carolina based and national and international companies producing poultry products. At this time, North Carolina is home to seven of the nation’s largest Broiler integrators, two of the nation’s major turkey integrators and three major commercial table egg operations. Several thousand contract growers manage live production under contract with these major companies. Specifically, within the Chowan River Basin, we are aware of at least one major broiler integrator located in Lewiston-Woodville.

The Federation takes particular issue with the “Agriculture Best Management Practices (BMPs) and Waste Management Recommendations” as found on page 17 of the Executive

NC Department of Environmental and Natural Resources
October 29, 2020
Page: 2

Summary. Specifically, the recommendation that NCDEQ should evaluate existing regulatory requirements for poultry operations, particularly the recommendation regarding implementation of any kind of further registration program, is not necessary or advisable.

The Federation takes such strong opposition for several reasons. First, as you may be aware, the bio-security concerns at poultry production facilities at all levels are significant. Many of our members face regular harassment, threats, and demonstrations from organizations and individuals. Beyond the fact that these actions inhibit the financial viability of a significant portion of our state's largest industry, these actions put the physical safety of the community, farmers, and demonstrators at stake. Any requirement which would create a registry of poultry farming operations that may be subject to public record further exacerbates these concerns. Moreover, such a registry is unnecessary. Current law already requires certain unpermitted dry litter poultry systems to complete and maintain an animal waste nutrient management plans in a manner that adequately addresses the concerns of the Proposed Plan. Specifically, NC Gen. Stat. § 143-215.10C(f) requires poultry facilities of a certain size comply with many of the same testing and record-keeping requirements, including the requirement that the information be made available to the Department upon request.

The Federation is similarly unconvinced by the Proposed Plans justification in these recommendations. Without any real basis, the Proposed Plan implies the need for an invasive administrative oversight scheme for poultry operations, which, if implemented, would exacerbate the concerns outlined above. The Proposed Plan concedes that the overall number and impact of poultry related activities in the region is small. The Federation can confirm this. Accordingly, we remain unable to see the connection between the proposed benefits of these recommendations and the administrative burden that would be felt.

In light of these considerations, the Federation would again like to express its opposition to the suggestion that the Proposed Plan presents a tenable solution for issues within the Chowan River Basin.

Thank you for the opportunity to submit these comments. Please submit the foregoing comments for consideration. Additionally, please feel free to contact the undersigned if you have any questions or need any further information regarding the Federation's position.

Sincerely,

NORTH CAROLINA POULTRY FEDERATION

Robert L. Ford

Robert L. Ford, Executive Director.

RLF/pm

CC: Henry Weldon Jones, Jr., Counsel

Commenter: Chowan Edenton Environmental Group

Date: October 29, 2020

To: Mr. Forest Shepherd
 Division of Water Resources
 NC Department of Environmental Quality
 1611 MSC
 Raleigh, NC 27699
forest.shepherd@ncdenr.gov

From: Chowan Edenton Environmental Group

RE: Combined Comments from all Chowan Basin Plan Chapters:

Topic: Chowan Basin Story Map:

- The executive summary states “The plan also includes interactive components. Using online tools available through ESRI, a StoryMap and a Web Application were developed specifically for the Chowan River basin. Because the interactive components provide a better view of where monitoring locations, permits and streams are located in the basin, only a few locational maps are included in this basin plan.” The only Chowan Basin Story Map that we are able to find on the web does not include permits, streams etc. – it is mostly a lovely documentary of the basin with landscape pictures and commentary. (<https://data-ncdenr.opendata.arcgis.com/datasets/0b2211a41bee4b77a4e822d59ad332dc>). Is there another website to access?

Topic: AMS sampling:

Questions and comments below are mostly in response to text from Chapter 2 in the Basin Plan.

- While it is understandable to not want to place a body of water on the impairment list, it is a suggestion that there might be an intermediate designation to alert DWR of potential problematic areas within a watershed. Many of the waterways (large and small) experience a large variance in conditions, so that the once a month AMS sampling may not be capturing the true nature of the water quality at a sample location. For example, Potecasi Creek has a number of data parameters that indicate a stream that may be impaired. Potecasi Creek should be considered as an area of concern for anyone using these waters as secondary recreation. Perhaps, an informal survey or assessment should be conducted to assure that these waters with potentially elevated fecal coliform counts are not being used for extended human contact in recreational activities.
- It appears that turbidity in some locations may be need to be monitored more frequently to protect habitat for the aquatic plants and animals. If water clarity is compromised due to a variety of factors, sunlight necessary for healthy SAV’s is not able to penetrate the water column.
- One other comment about all the AMS WQ data (pH, temp, DO, etc.) – none of this data is easily available from STORET and it is not physically listed in this report so, at best, the public needs to feel confident that the once a month sampling at the designated stations are showing little

variance from the norms and therefore, do not warrant any special classification of a water segment. Consider sharing (perhaps with an interactive GIS) specific datasets on the story map for the Chowan Basin so that an interested citizen could not only understand changes but could track changes over time.

Topic: Septic systems:

Questions and comments below are mostly in response to text from Chapters 2, 4 and 7 in the Basin Plan.

- There is local concern that some of the waterfront communities may have older, poorly maintained septic systems and that the state may not be doing enough to assure that the waters near these communities do not have high coliform counts. We question if sampling for coliform bacteria is being done once a month at the regular AMS stations; does any sampling for fecal coliform occur near the shoreline areas in this basin?
- Stated in this plan (Table 2-2), AMS and bio-classification data from local waterways is interpreted into categories to determine surface classification. If placed in Category 3, this indicates there is insufficient available data and/or information to make a use support determination. Many states in this scenario place these waters in IR (Integrated Report) Category 5 which states that "Available data and/or information indicate that at least one designated use is not being supported or is threatened", and a TMDL is needed". The most recent 2015 data from many segments of the Chowan River and associated streams classify these waters as not rated (data inconclusive and/or less than 10 samples were collected in NC). Are we ignoring a potential problems with high coliform counts by indicating that there is insufficient data? As local citizens who use these waters for recreational activities, we are concerned that this could be a public health problem.
- From Chapter 4, we understand that while AMS standards are based on long-term averages to determine significant change in a HUC, it seems that the Chowan lower basin is experiencing some rapid shifts in water quality and biological diversity. Two samples per year (Ten samples over a five year period) and once a month AMS point samples seem hardly able to describe the stability or instability of this ecosystem. The RAMS recommendation is that there is a significant lack of data from this system. Only ONE location (Cricket Swamp) was tested from the 2011-2012 RAMS program and this collected data is nearly 10 years old. No chlorophyll or nutrient data was collected from this once a month RAMS sampling.
- A comprehensive study of the number and quality of local septic systems that have the potential to contaminate groundwater or surface water needs to be conducted in the Chowan River basin particularly the lower basin where there are older waterfront communities. In Chapter 7, the statistics used in this report from a 1990 census are clearly out-of-date. Based on 1990 data, an estimated 515,707 lbs/year of Nitrogen is going somewhere. We are concerned that these numbers have changed significantly in 30 years. Is there a way to monitor what might types of pollutants might be moving through groundwater and directly into the local waterways?

Topic: Bioclassification:

Questions and comments below are mostly in response to text from Chapters 2 and 4 in the Basin Plan.

- From Chapter 2, data presented (5 years old data at best) shows a bioclassification change for the Chowan Basin as a 13% loss (not improved) --almost 20% of the area was not sampled in the most current survey. As local citizens, we often hear about localized fish kills particularly as they occur following a substantial algal bloom. For example, in 2019, there were numerous fish kill reports in the Chowan Basin and associated waters made by citizens, yet none of these reports made the official DWR Official Fish Kill Reports. The state needs a more refined way of verifying citizen fish kill reports – some could be small incidents, but others could be significant. Who is checking?
- The biological diversity of the coastal swamps is an important portion of maintaining the integrity of this ecological community. When one or more components of the system disappear due to changes in the system, the long-term effects are not predictable. It is clear that the Chowan lower basin is experiencing water quality stressors that may or may not be able to be reversed, and these are affecting the biological community. No mention has been made Chapter 4 about the invasive hydrilla that plagued the shorelines of the lower Chowan for better than 5 years (the hydrilla disappeared when the cyanobacteria blooms reappeared in 2015). As a monoculture, the growth and proliferation of hydrilla replaced any native aquatic vegetation growing in shallow shoreline waters. To date, most of old hydrilla beds have little or no growth of aquatic vegetation.
- Several AMS stations in the lower Chowan Basin had chlorophyll a concentrations that exceeded standards over the past 2 years and algal blooms have been prolific in these areas. Along with a lack of biological data (no samples taken) and a low EPT from benthic samples, it seems likely that this part of the Chowan is undergoing rapid changes (some may be irreversible). In our opinion, to continue to say (as from the 2018 IR reports) that the water quality in the Chowan River at stations D8356200 and D8950000 is Meeting Criteria is misleading and irresponsible.
- As indicated in Chapter 4 from the 2018 IR, most of the major tributaries on the eastern side of the Chowan River (lower basin) are not rated, so essentially we know nothing about what these substantial tributaries contribute to the main body of the lower Chowan River. Would it be possible for a local community (citizen scientists) to aid in identifying areas for monitoring and restoration?

Topic: Surface and Groundwater:

Questions and comments below are mostly in response to text from Chapters 2, 4 and 8 in the Basin Plan. Many of the below are questions that we had while reading through these chapters indicating the need for a more detailed explanation.

- We have several questions from Chapter 2 regarding the surface water temperatures: If the lower Chowan has seen a shift in average surface water temperatures from 1981 – 2015, it would be good to know what the temperature status is from 2015 to 2019. Is the same statistical trends holding?

- As citizens of Chowan County, we are wondering about procedures and outcomes in testing private wells for chemical contaminants. How can the public access the data from well testing or is this data private between the land owner and DHHS? Does the state monitor any well contaminates for movement through the groundwater to streams? Have the number of residential groundwater wells/basin population changed from the 2015 data that is used in this basin plan?
- Chapter 4 indicates the presence of Ammonia in MW-08 near Avoca – what would be the potential source of that ammonia? Would it be possible to include a link to a map showing the positions of these of these groundwater wells by Avoca?
- There are no stream gauges in the lower Chowan River basin, and it appears that base flow has been calculated from historical data (from upstream gauges) – other data was taken from nearly 20 year old calculations. It would be of interest to know what the current status of the base flow and recharge rate is in this system since so much of our local economy is dependent on a healthy water supply from the surface aquifers. It appears from the map included in this Basin Plan, that there is only one lower Chowan River monitoring site just west of Ahoskie. It would be nearly impossible to understand groundwater flow, including contaminants, without any means of monitoring the groundwater in these locations. The CEEG is also concerned that local water supply plans (LWSP) may not include any seasonal water supply use from the summer beach communities at Arrowhead and Chowan Beach (Murfreesboro is mentioned as being included) and the number of residential groundwater wells compared to basin population has probably changed since the 2015 data used for this draft plan.
- The need for monitoring with gauges is not only important for understanding our available water budget, but also for ecological monitoring. The CEEG currently maintains a HOBO datalogger for conductivity at Arrowhead Beach and there are notable differences in the conductivity of the water over the past few years – of course, the commercial crabbers know this since they had crab pots set in 2018 at locations even north of Arrowhead Beach. We need to understand more about how and why patterns of increased conductivity (from an encroaching salt wedge) change.
- Without question, the ability to understand local and specific agricultural water withdrawal is essential to protecting our water resources. It seems that we have little understanding about how much water is being removed from the groundwater system, what the recharge rates may be, or the impact of any changes in water quality within these surface water supplies (no data is reported from Agricultural water use in Bertie and Chowan counties). Nor, do we have data on what types of chemicals or other dissolved particles such as algal toxins may be moving laterally within the groundwater supply ending up in the streams and rivers or vice versa. According to a recent local interview with Chowan County, dewatering has occurred in both county and town wells, yet there is little data reported about dewatering in this plan. Much more needs to be done regarding a better understanding of our finite water supply– the suggestions in this Basin Plan need to be taken seriously.
- From 2000-2008, droughts in this basin ranged from mild to severe. Data is not presented in this report about drought conditions or excessive rainfall from 2008 -2020. With respect to more severe extremes of drought and/or heavy rainfall events, there should be an examination of any correlation between drought and/or rainfall events to the extent and severity of algal blooms in the lower Chowan Basin?

Topic: Forested and Conservation Lands/Agricultural Lands

Questions and comments below are mostly in response to text from Chapters 4, 6 and and 7 in the Basin Plan.

- Table 4-1 displays land cover in the Chowan lower basin and shows that the last 3 years of data are not represented on this table. It appears that forested acres declined from 2001 to 2011 but since then more forested area is being reported. We would like more specific data concerning this increase in forested area – are these areas replants of areas that were clear cut? What contribution to the canopy coverage is being made by this relatively new acreage especially near waterways? Since most of public probably is not aware of conservation lands and natural heritage areas, a map or a weblink reference to these lands could be included.
- The CEEG strongly supports ways to engage our youth as caretakers of their local place. The CHPP referenced in Chapter 6 should include specific strategies for outreach education including ways to reach K-12 students and teachers.
- From Chapter 6, it is clear that the NCFS provides a good way to assure that timber harvest includes a positive environmental component. More publicity and awareness of the NCFS stewardship plan opportunities would likely increase participation in this program.
- The Agricultural Cost Share program outlined in Chapter 6 is an excellent way to help farmers save money while, at the same time, reducing nutrients (N and P) applied to the land. Table 6-6 shows that from 2015 to 2020 considerably less acres in the Chowan and the Meherrin HUC's were impacted by BMP's compared to the earlier 5 year period, and thus, a much reduced amount of N and P saved overall. Comparison of the same time frame to the earlier 5-year period showed almost 3 times as much waste nitrogen managed and 2.5 times waste Phosphorus managed. Where is this waste N and P coming from – an explanation would provide greater understanding of this issue.

Topic: Poultry and Animal Operations:

Questions and comments below are mostly in response to text from Chapters 7 and Appendix v-III in the Basin Plan.

- A date on Figure 7.1 would be a good addition. Since the CEEG members live in Chowan County, we see more and more chicken farms being constructed (3-4 barns at a time) in Chowan County (not sure about the other counties in the basin), and it seems that no maps or tables are capturing these changes. A similar question comes from the reporting in Appendix v-III – do these poultry operations all count as one operation if they are contracting with a large industry such as Perdue? While dry-litter application from poultry operations does have specific regulations, there is no explanation of how these regulations may be monitored for compliance.

Chapter 6 – Chowan River Basin Plan Funding and Initiatives

Please see these specific additions and edits to the section in Chapter 6 about the Chowan Edenton Environmental Group.

6.1.2 Chowan-Edenton Environmental Group (CEEG) (Check link) The Chowan-Edenton Environmental Group (CEEG) is a local non-profit group of citizens working together to address environmental matters and to educate residents of Chowan County on how to be good stewards of the Earth. The CEEG's (Check link) mission since 2007 is to encourage discussion related to community and regional environmental issues, to provide expertise and current research pertaining to critical environmental concerns, and to support actions that serve to reduce or correct local environmental problems. In 2014, the CEEG partnered with NC Sea Grant to collect information about the presence of hydrilla (*Hydrilla verticillata*), an invasive aquatic plant, in the Chowan River. As a result, CEEG developed the Hydrilla Citizen Science Project, a model project that can be replicated by other rural counties bordering North Carolina's sounds and rivers. The CEEG is currently volunteering their time with the ARCD to collect samples in the Chowan and Pasquotank river basins to identify areas of excessive nutrients. Volunteers are collecting weekly samples from Arrowhead Beach, the Chowan River Bridge, Edenton Town Dock, and the fish and wildlife dock near Edenton Airport to send to NOAA Phytoplankton Monitoring Network (PMN). Digital micrographs as well as water samples (when the blooms are extreme) are sent for analysis. The CEEG also works with the North Carolina NOAA lab at Morehead City to send tissue and water samples for analysis, as well as chlorophyll-a filters from the sampling points listed above. In 2019, the CEEG, along with university and local partners, were awarded two Community Collaboration Research Grants (CCRG) in 2019. "Using Citizen Science to Understand Nutrient Limitation of Algal Blooms on the Chowan River: Filling Critical Data Gaps and Promoting Community Engagement" is responding to community questions about the resurgence of blue-green algal blooms in the Chowan River. The project aims to use citizen science, as well as samples collected by universities, to determine the nutrient status of the cyanobacteria blooms in Edenton Bay. Partners include University of North Carolina (UNC) – Chapel Hill, UNC Institute of Marine Sciences, CEEG, APNEP, the Town of Edenton and North Carolina State University (NCSU). The "Food Web Transfer of Cyanobacterial Toxins in the Chowan River and Western Albemarle Sound" will examine cyanotoxin accumulation within common fish and shellfish in the Chowan River. Findings will help determine if there is a risk to toxin exposure for people who consume seafood from the Chowan River. Partners include NCSU, NC Department of Environmental Quality (DEQ), North Carolina Sea Grant and CEEG. In the summer of 2020, the CEEG partnered with researchers from the Paerl Lab at UNC-IMS on an APNEP and NC Sea Grant funded project to examine the extent of aerosol toxins present when cyanobacteria blooms occurred in local waters.

The CEEG works collaboratively with citizen groups in Perquimans and Pasquotank counties to provide citizen science training and research opportunities, as well as planning and promoting local environmental awareness events. We actively encourage other local counties to establish citizen monitoring groups.

Chowan/Edenton Environmental Group

P.O. Box 271

Tyner, NC 27980

ceeq2007@gmail.com*A 501(3)(c) non-profit local community organization*

October 29, 2020

Mr. Forest Shepherd
 Division of Water Resources
 NC Department of Environmental Quality
 1611 MSC
 Raleigh, NC 27699
forest.shepherd@ncdenr.gov

Dear Mr. Shepherd,

The Chowan Edenton Environmental Group (CEEG) appreciates the work of the basin planners in assembling the many documents, data and displays that are necessary to convey the status of our river basin. As a local group, we have read the plan, taken many notes, and would like to offer some suggestions to the Chowan River Basin plan draft. Some of our comments are more in the form of questions as we wish to more thoroughly understand the policies and procedures in place regarding various topics.

The Albemarle Pamlico system is the 2nd largest estuary in the United States providing unique habitat for many plants and animals. The Chowan River is part of this unique ecosystem; conservation efforts to preserve the integrity of the Chowan River will depend on local as well as state/national programs and legislation. The CEEG understands that maintaining water quality through management of ground and surface water, precise nutrient monitoring, and promoting best management practices for soil and forested areas is essential to ensure the rich biodiversity of this system. This region has an economic dependence on water; farming and fishing are a way of life for many. The Chowan River is an ecotourism attraction for boaters and other recreational water activities. The severe cyanobacteria blooms over the past few years have challenged what was assumed to be relatively stable ecosystem. We are greatly concerned about the potential effects of long-term water quality degradation in the Chowan River on the economy and on our way of life. Because we have seen so much change in the past five years, we support strong action plans to begin to offset some water quality parameters that are falling below standards.

www.chowanedentonenvironmentalgroup.org

The Chowan River Basin Plan is a dynamic document that carries many excellent recommendations for action to protect the valuable water resources of this river and surrounding waterways, but does not include a plan for implementation. Of the 10 major categories of recommendations made in this plan, only 5 have been identified as priorities by the Basin Planning Branch (and some of these only partially). The Chowan Edenton Environmental Group is willing to work collaboratively with NC Department of Environmental Quality (NCDEQ) Division of Water Resources, our county, state and federal legislators, research institutions, local businesses and concerned citizens to assure this plan becomes the guiding document for immediate action. The Chowan River cannot afford to wait another 10 years for these recommended actions to become reality. It is imperative that we have up-to-date quality data on ground water supply and movement, surface water and nutrient flows from all parts of the watershed, better reporting on anoxic events and algal blooms (toxin loads), bio-surveys to determine potential habitat changes, and consistent AMS reporting at more locations including chemical groundwater monitoring for building a baseline profile of this system for future management decisions.

The Chowan Edenton Environmental Group has demonstrated our commitment to this region through our collaboration with strong partners on various research initiatives and through community environmental education (website references). Along with many other concerned stakeholders, we continue to work toward conservation of our waterways. We expect, from NCDEQ, an organized action plan as part of this 10-year basin plan with a workable timeline and proposed budgets for implementation of the many recommendations. We appreciate your willingness to hear our voices during the process of writing this plan and through consideration of the attached specific comments.

"There is no power for change greater than a community discovering what it cares about."

– Margaret J. Wheatley

Best regards,



Colleen Karl

Chair, Chowan Edenton Environmental Group

<https://www.chowanedentonenvironmentalgroup.org/>

<https://www.facebook.com/CEEG2007>



Commenter: Southern Forests Conservation Coalition



29 October 2020

Mr. Forest Shepherd, Basin Planner
Division of Water Resources (DWR)
1611 MSC, Raleigh, NC 27699

Dear Mr. Shepherd:

This letter is in reference to the Chowan River Basin Plan and is being submitted on behalf of the Southern Forests Conservation Coalition (SFCC) and its diverse members including North Carolinians residing within the Chowan River Basin. As its name implies, SFCC is a coalition of natural resource conservation organizations and individuals, working to protect forests from harms including environmental and human harms created by the wood pellet to energy industry.

While we understand the Chowan River Basin Plan (CRBP) is still in draft form, SFCC is taking this opportunity to request the plan include meaningful recommendations implemented to reduce negative impacts resulting from the industrial wood pellet industry currently expanding its operations within the Chowan River Basin; an industry annually clearcutting thousands of acres of Chowan River Basin bottomland hardwood forests to feed an unsustainable energy scheme.

The CRBP Executive Summary highlights the importance of forestry in the basin, noting that "Nearly 36 percent of the land use in the Chowan River basin in NC is identified as forested. Forests often play a significant role in protecting water quality by absorbing and filtering precipitation, anchoring soil, intercepting particulate matter, and reducing instream water temperatures. Special attention is needed to ensure that water quality is protected while timber is being harvested in the basin."

The Executive Summary continues with: "Properly planned and executed forest management plans facilitate the sustainable harvest of forest products while protecting water quality." SFCC considers the operative word in this statement is "sustainable," because science and economics-based research proves industrial-scale wood pellet to energy schemes are not sustainable, ecologically-valid strategies for solving climate change globally or protecting human health and safety locally.

Furthermore, the industrial logging of North Carolina's forestlands disrupt natural forest carbon cycles by reducing the buildup of carbon stored in vegetation and soils, reducing carbon sequestration capacity and generating major quantities of greenhouse gases.

With this letter, SFCC also requests the CRBP include a statement of purpose (the reason for which something is done or made) and statement of intent (something planned), to clearly and unequivocally acknowledge the CRBP has everything to do with protecting the health and wellbeing of people who benefit from ecosystem services provided by Chowan River Basin's creeks, freshwater marshes, coastal swamp forests, and other habitats that clean our air and water while also protecting a community's characteristic natural heritage.

While a plan in name, the CRBP will be a more relevant tool for regulatory agencies if the plan includes meaningful goals and measureable objectives.

Thank you Mr. Shepherd, for considering SFCC's comments and requests.

Sincerely,

Andy Wood
Southern Forests Conservation Coalition

SFCC
c/o Clean Air Carolina
PO Box 5311
Charlotte, NC 28299
www.southernforestsconservation.org

Commenter: Chowan River Basin Citizens

October 29, 2020

Mr. Forest Shepherd

Division of Water Resources

NC Department of Environmental Quality

1611 MSC

Raleigh, NC 27699

forest.shepherd@ncdenr.gov

Comments on the draft Chowan River Basin Plan

Dear Mr. Shepherd

We appreciate the opportunity to comment on the draft plan for the Chowan River Basin which you have circulated.

We care greatly about all aspects of water quality, flood control, biodiversity and migratory and resident fish populations in the Chowan River system. We are also very aware that these issues in the Chowan directly impact the same issues in the Albemarle Sound, the largest freshwater sound in the world. These are not just isolated issues but issues that have huge impact on commercial and recreational fishing, hunting, bird watching, boating, safe swimming, camping, property values, county drinking water systems and all the small businesses that rely on these activities and services.

One has only to look at the massive Menhaden kill underway in the Neuse River to know how vulnerable the Chowan and the Albemarle are to the same issues that have caused the Neuse to be in such a desperate situation.

This plan has great potential to rally your NC Department of Environmental Quality, our NC Legislature, local governments in the basin, environmental organizations and ordinary citizens to take actions to protect the Chowan and the Albemarle. By all rights this plan should be a strategic plan.

A fundamental element, if not the most important element, of any effective strategic plan are its goals and the time lines for achieving those goals. These standards for strategic planning are not just applicable to for-profit businesses. The standards apply equally to organizations as diverse as educational institutions, arts organizations, health care organizations, charitable organizations, public agencies and churches.

Such quantified goals with related timelines can and should be developed as arguably the most important part of this draft plan for the Chowan River Basin. If DEQ needs special assistance with that aspect of making this plan complete, such assistance is surely available from strategic planning practitioners and university professors in our state.

We recommend that after such goals are added to this plan, that it be recirculated for further comments. We are confident that the interest in such a complete strategic plan will be huge, and that all stakeholders will feel a special obligation to do their parts to help insure that the goals are achieved.

Thank you for considering our comments. We stand ready to assist you with all aspects of this process.

Jack Spruill

Spruill Farm Conservation Project

www.facebook.com/spruillfarm

jspruill@spruillfarm.org

Julia Townsend

Artist, Owner

The Peanut Factory

<https://thepeanutfactory.org/>

Spanish and art teacher

Gates County Schools

Bonnie Monteleone

Co-founder

Plastic Ocean Project

<https://www.plasticoceanproject.org>

Emily and George Henson

Farm and woodland owners

Pauline Endo

Cape Fear Group

On Kendrick Creek

NC Sierra Club

Washington County

Robert Alexander

Farm owner

Dr. Jinchun Yuan

Professor

Albemarle Sound front

Elizabeth City State University

Washington County

(See note below)

Heber Coltrain

Owner

Donna Riley

Roanoke Outdoor Adventures

<http://www.roanokeoutdooradventures.com/>

Andy Wood

Director

Coastal Plain Conservation Group

<https://www.coastalplainconservationgroup.org/>

Willy Phillips

Owner

Full Circle Crab Company

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Dr. Robert Parr

Emergency Physician

Biological Oceanographer

Medical Advocates for Healthy Air

Clean Air Carolina

www.cleanaircarolina.org

Tom Brennan

President

Edenton Farmers Market

<http://www.edentonfarmersmarket.org/>

Artist

Plymouth

Nikki Jones

Founder and Director

Avon Needs Trees

<https://www.avonneedstrees.org.uk/>

Dr. Stan Riggs

Coastal and Marine Geologist

Professor Emeritus

East Carolina University

www.nclandofwater.org

Mary and Ulrich Alsentzer

Belhaven

malsentzer@rsnet.org

ualsentzer@rsnet.org

Note added by Robert Alexander:

This farm has been in my Alexander family for over a century with the house having been built in the 1830's. The Albemarle Sound has been a source of wonder and beauty since I can first remember being a boy on our farm. We must treat the great estuary with humility and respect always with an eye to preserving it for posterity.

Chowan River Basin Water Resources Plan –
Public Comments Document

Commenter: Alliance of Native Seedkeepers, North Carolina Commission on Indian Affairs, Woman's Earth Alliance and Sierra Club, VA Chapter of the Sierra Club, Nottoway Indian Tribe of VA

Good morning, Forest.

Thanks so much for your work on the Chowan River Basin Plan. I am excited to introduce myself and invite any further discussion on how to partner.

While I'm not educated in water issues on a technical side, I am a long time public historian and natural resources interpreter (many years working for VA Dept of Conservation and Recreation). I spent 4 years managing grants for the James River Association and now I'm leading a Tribal Resilience project for the NC Commission on Indian Affairs in partnership with APNEP and NC State. I recently moved from Richmond to Bertie County, east of Windsor.

As a Nottoway woman, I have been deeply interested in the Chowan River Basin as it relates to our tribal communities within it and with regards to how this watershed crosses state lines (bringing forth unique challenges). Please note the correct spelling of Nottoway. There are several places in the plan which are listed as Nottaway, this is a common mistake. Our tribe engages in annual river cleanups and paddles. We are very interested in learning how to be even better partners with river stewardship.

I work with the Meherrin and Tuscarora folks in this watershed and would love to see us engage in dialogue around the health and history of the watershed. I would love to see how our stories can be interwoven with future plans for the watershed. Attached is a draft flyer for the social media campaign that we have created for the facebook presence of the project, Tribal Coastal Resilience Connections. In the spring, we will have a skills building workshop that will hopefully lead to a pilot project in the next phase. This initiative is studying coastal adaptation plans in tribal communities throughout the US.

A great first step could be hosting a talk with interested tribal members to share what your office does and how we can become involved. The waters carry deep meaning for all of us and we would benefit from mutual dialogue and understanding. Please let me know how we can proceed forward together!

Looking forward,

Beth

--

Beth Roach

Co-founder, Alliance of Native Seedkeepers

Tribal Resilience Program Director, North Carolina Commission on Indian Affairs

US Grassroots Accelerator Program Lead, Women's Earth Alliance and Sierra Club

Development Associate, VA Chapter of the Sierra Club







Tribal Councilwoman, Nottoway Indian Tribe of VA

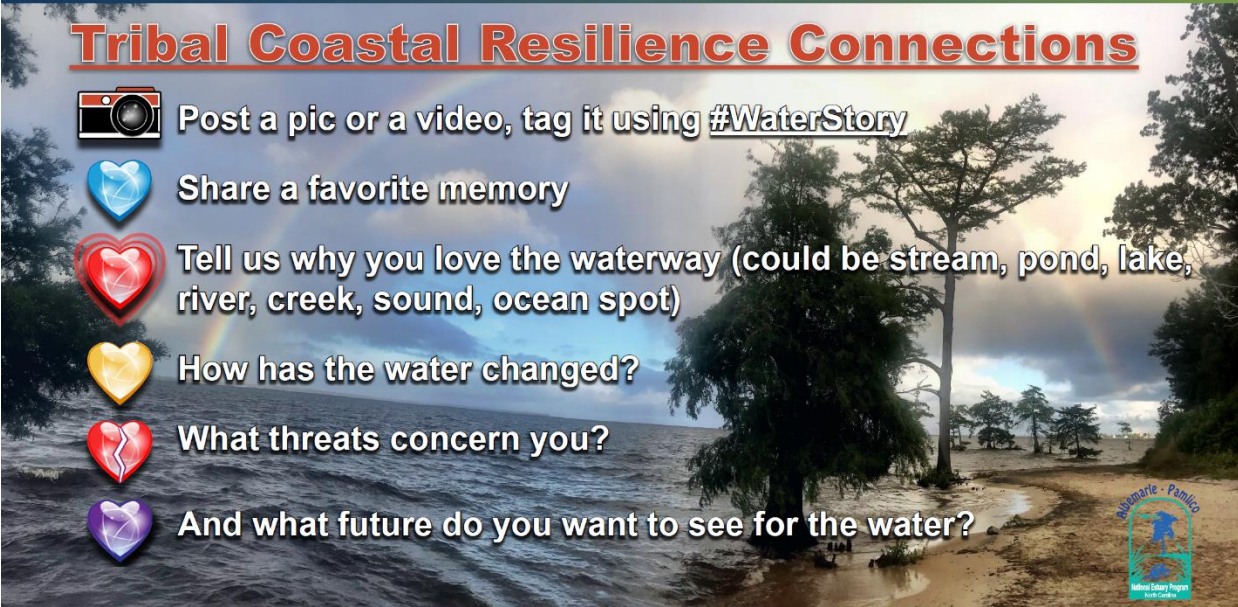

252 325 5651

<https://www.allianceofnativeseedkeepers.com/>

Share your #WaterStory with

Tribal Coastal Resilience Connections

-  Post a pic or a video, tag it using #WaterStory
-  Share a favorite memory
-  Tell us why you love the waterway (could be stream, pond, lake, river, creek, sound, ocean spot)
-  How has the water changed?
-  What threats concern you?
-  And what future do you want to see for the water?

Commenter: North Carolina Farm Bureau Federation, INC.



**NORTH CAROLINA
FARM BUREAU FEDERATION, INC.**

PO Box 27766, Raleigh, NC 27611 Phone: 919-782-1705 Fax: 919-783-3593 www.ncfb.org

October 30, 2020

Mr. Forest Shepherd
Basin Planner
Division of Water Resources (DWR)
1611 MSC
Raleigh, NC 27699

Delivered via email: forest.shepherd@ncdenr.gov

Dear Mr. Shepherd:

The North Carolina Farm Bureau Federation is this state's largest general farm organization representing the interests of farm and rural people in North Carolina. This letter is to comment on the Draft 2020 Chowan River Basin Water Resources Plan (Plan) noticed in October 2020 and accessed at: <https://deq.nc.gov/about/divisions/water-resources/water-planning/basin-planning/water-resource-plans/chowan/chowan>

The North Carolina Farm Bureau Federation (NCFB) appreciates this opportunity to comment on the draft Plan. NCFB has comments on the proposed recommendations and some of the text of the Plan. As appropriate we will include Chapter references and/or page numbers.

First there are a couple of items that are incorrectly defined or characterized relating to agriculture in Chapter 1 that we feel need to be corrected.

Why Agriculture is a Nonpoint Source

In Chapter 1, in Section 1.6.1 on page 10, the Plan states that agriculture is considered a nonpoint source because agriculture has certain exemptions under Section 404(f), the Dredge and Fill section of the Clean Water Act. This is absolutely incorrect. EPA defines "nonpoint source" as any source that does not meet the definition of "point source." The "point source" definition is in section 502(14) of the Clean Water Act. Point sources are associated with "any discernible, confined and discrete conveyance." Certain agricultural activities are considered nonpoint source because any pollutants from those activities may reach surface water through diffuse flow of water over the landscape, not from any discernible, confined and discrete conveyance. DWR's own Nonpoint Source Planning webpage mentions farm fields as a possible source of nonpoint source pollution. Please correct this error and revise the text to correctly describe why agriculture is considered a nonpoint source.

What is a Best Management Practice?

In Chapter 1, on page 10, there is a box that describes best management practices (BMPs). The description in the box only discusses BMPs in the context of waste management systems and, in fact, is cited as coming from the North Carolina Surface Irrigation System Operators Training Manual (NCDENR, 2015). That Manual is written to provide guidance to properly operate and maintain a surface irrigation system for the disposal of wastewater. Actually, BMPs are

*Farm Bureau and Agriculture...
We keep North Carolina growing!*

structural and nonstructural practices that address far more than just waste management systems. In agriculture BMPs can be implemented to prevent erosion and sedimentation, prevent pesticide and nutrient runoff, properly manage animal waste, and protect water and air quality. There are also forestry BMPs, and EPA lists a menu of BMPs for stormwater management. In Chapter 5, Section 5.4, on page 63, the draft Plan lists recommendations in a Section titled, “Best Management Practices (BMPs): Agriculture, Forestry and Urban.” Therefore, the draft Plan itself recognizes that BMPs are not just for waste management or agriculture. Please revise the description of BMPs in the box in Chapter 1 to appropriately describe BMPs.

Agriculture Recommendations:

In the Executive Summary (page 16 and 17) and in Chapter 5 (pages 63 – 64) there are several Agriculture Best Management Practices (BMPs) and Waste Management Recommendations. Those recommendations on page 16 of the Executive Summary call for investments in nutrient reducing activities by state and local agencies, as well as individual cooperators and landowners. Briefly summarized, four of the five recommendations address: identifying and expanding educational opportunities to work with private landowners, hiring additional Division of Soil and Water Conservation (DSWC) staff, promoting BMPs to reduce phosphorus loading, and encouraging the use of nutrient management plans. NCFB supports these activities as long as the implementation of the practices by farmers and forest landowners remains voluntary.

An important recommendation needs to be added in the section on identifying and evaluating opportunities to continue promoting and implementing nutrient reducing BMPs (on page 17 of the Executive Summary and needs to be expanded upon in Chapter 5). That recommendation is providing additional funding for voluntary implementation of the BMPs themselves, either through cost-share or grants. This should be in addition to the call for additional DSWC staff and should include funding for local soil and water conservation district staff. The NC Agriculture Cost Share Program for Nonpoint Source Pollution Control (Ag Cost Share Program), administered by DSWC, is seriously underfunded with far more farmers requesting cost-share assistance than is available.

In Chapter 4, Section 4.12, on page 18, the Wiccacon River discussion contains the following Recommendation: “DWR continues to support the recommendation from the 2007 Chowan River Basin Water Quality Plan which encourages the use of nonpoint source BMPs to reduce nutrient and sediment loads. Funds should be appropriated to encourage more traditional BMPs (strip planting, no-till, cover crops) and new technologies. DWR will work closely with other resource agencies to prioritize implementation of efforts to address agriculture impacts within this watershed.”

Such funds are needed in the entire Chowan Basin. The Plan should recommend: Provide sufficient funding for adequate technical assistance and for voluntary implementation of BMPs through the NC Ag Cost Share Program and other federal and state cost share or grant opportunities.

One recommendation on page 16 of the Executive Summary is to identify how to best capture water quality data and BMP benefits to model nutrient loads throughout the entire basin (NC and VA). This recommendation seems to be misplaced and perhaps should be in the Interstate

Cooperation recommendations. NCFB does support additional work to quantify the benefits of agricultural and forestry BMPs.

Animal Operations:

The section in Appendix V-III dealing with hog operations has confusing language and tables. While the numbers are correct, they could give the reader the impression that new hog farms have started in violation of the State's prohibition on new or expanding swine farms over the permitting threshold of 250 head. For example, the second table shows that Bertie County had 22 Hog Farms in 2017, which is an increase from 7 in 2007. However, the USDA-NASS data shows that 20 of the 22 farms have fewer than 50 head, which is far below the DEQ permitting threshold. For context, DEQ should add a column that shows the number of hog farms with DEQ permits in each county.

The explanatory paragraphs for the Poultry and Hog sections in this Appendix are also confusing. The Hog section references Caldwell and Union counties, which are not in the Chowan Basin. The paragraphs also reference the USDA-NASS breakdown of inventory numbers (1 to 24, 24 to 49, etc.), but again, that data is not listed in any of the tables or figures.

Chapter 1.6.1 also contains confusing language about the number of hog farms. The text states, "The number of hog operations also increased between 2012 and 2017 as did the number of animals." It then goes on to state that there are 40 permitted swine operations, giving the impression that the number of permitted swine operations has increased. Similar context should be added here to emphasize that the increase is taking place with very small farms that are well below the DEQ permitting threshold.

Finally, NCFB disagrees with the recommendations in the Executive Summary and elsewhere that increased regulation of poultry operations is needed. As with other non-discharge waste systems, poultry farms are required to apply waste at agronomic rates. In addition, they are required to maintain a Waste Utilization Plan that specifies application rates in each field. The North Carolina Poultry Federation is submitting additional comments regarding the regulation of poultry farms, and NCFB supports those comments.

Nonpoint Source Management Strategy, Buffers, and Filter Strips Recommendations

In Chapter 5 on page 63 (Need for Buffers) and in the Executive Summary on page 25 [implementation of nonpoint source management strategies (e.g. buffer rules)] the Plan calls for buffers with the implication that those would be mandatory buffers. NCFB opposes mandatory buffers on land used for agricultural purposes. If necessary, installation of such mandatory buffers may be appropriate only when land use changes, for example from agriculture to development. Also, we oppose a requirement to maintain existing buffers on agricultural land. If a regulatory program were to require maintenance of existing buffers, landowners should be able to install equivalent controls if some part of a buffer is removed.

Regarding the implementation of the nonpoint source management strategies recommendation on page 25 of the Executive Summary, we oppose farmers in a watershed having to adopt a group of mandated farm BMPs, but would support a voluntary program. If it is found to be necessary to implement nonpoint source management strategies in the Chowan Basin, we would recommend

continuing the successful program of farmers sharing compliance through local advisory committees when needed to meet water quality goals, such as is in place in the Neuse and Tar Pamlico basins.

One recommendation specifically related to agricultural land that is in Chapter 5 on page 63 under “Need for Buffers” is to “Maximize implementation of filter strips on agricultural land.” We oppose this recommendation as written, because it implies a mandatory requirement for installation of filter strips. Installation and maintenance of filter strips should be voluntary and financial incentives should be provided to assist farmers who wish to install filter strips. Additionally, there may be other options besides filter strips that are also protective that the farmer may be able to voluntarily implement with incentives. This recommendation should be revised to say “Maximize voluntary implementation of filter strips or similarly effective practices on agricultural land through financial incentives, such as through the NC Agriculture Cost Share Program for Nonpoint Source Pollution Control.”

Septic Tank Recommendations

In the Executive Summary on page 17 there is a recommendation for financial incentives and /or regulatory options to address failing septic systems. On farms and in rural areas, septic systems are generally the only option due to the distance from wastewater treatment plants and sewer lines. If septic systems are failing, the answer should be incentives and adequate financial and technical assistance to address the problem -- either through repair, management, or alternative systems -- rather than through regulation.

Nutrient Criteria Development Recommendations

The Executive Summary, p. 18, and Chapter 5, pages 61 – 62, address the development of numeric nutrient criteria for the Chowan River. The draft Plan discusses some of the work done by the Albemarle Sound Nutrient Criteria Development Workgroup (NCFB had a member on the Workgroup) and the ongoing work of the Nutrient Criteria Development Plan Scientific Advisory Council (NCDP SAC). The NCDP SAC should be allowed to continue its work and to take the necessary time to develop adequate but reasonable protective response variable-based criteria using appropriate response variables that address actual instream impairments that are tied to designated uses.

Also, there should be added to the draft Plan (in the Executive Summary on page 18 and in Chapter 5 on pages 61 - 62) a discussion of the important role of the NCDP Criteria Implementation Committee (CIC) to review and advise DWR and DEQ on the practical aspects and the fiscal impacts of implementation of any proposed nutrient criteria. Information on the NCDP CIC, on which NCFB has a member, can be found on DWR’s Nutrient Criteria Development Plan webpage.

Groundwater Monitoring Recommendation

In the Executive Summary, page 25 and in Chapter 5, page 63, there is a recommendation to expand/initiate groundwater quality monitoring in the Chowan River basin to understand the contribution of nutrients from baseflow and nonpoint nutrient sources. NCFB opposes DWR mandating farmers to install on-farm monitoring of groundwater, either on crop fields or at animal operations.

Non-discharge wastewater systems:

In Chapters 3 and 4, DEQ goes into the compliance history of several non-discharge wastewater systems. As stated by DEQ, many of these systems are run by small towns with tight budgets. As a result, several systems have not been able to deal with long-term compliance problems. As funding permits, DEQ should work with these towns through the Division of Water Infrastructure to upgrade the water and wastewater infrastructure and reduce potential impacts to the Chowan basin.

Water Availability

North Carolina has been and continues to be regarded as a water-rich state even with rapid population growth and increased competition for natural resources. Counties in the Central Coastal Plain have experienced declining water levels in the Black Creek and Upper Cape Fear aquifers in past years, but those levels have rebounded in many parts due to the adoption of a capacity use area rule, users switching to alternative sources of water, innovative water storage, and efforts by a voluntary water user stakeholder initiative. While large metropolitan areas have experienced some challenges in meeting their increasing needs for the future, most of these areas are expected, according to DEQ estimates, to have sufficient supplies to meet their water needs through 2050, with the exception of Raleigh.

Chapter 8, page 1, second paragraph highlights various DEQ programs that provide information on how much water is used in North Carolina. However, this paragraph fails to include a collaborative program by DEQ and the NC Department of Agriculture & Consumer Services to collect information on agricultural water use – the Agricultural Water Use Survey (AWUS). This statewide program collects water use information from farmers who use more than 10,000 gallons per day.

In addition, *Section 8.2.4. Agricultural Water Use* describes the AWUS, but seems to focus more on the gaps in reporting than on the success of this voluntary reporting program that has a 90% participation rate. One of the recommendations in this plan is for information about water use needs to be collected from all water users. However, it is agriculture that is reporting water use at the smallest rates (10,000 gallons per day) compared to other water users who register and report water use at 100,000 gallons per day. This same section does correctly point out that the AWUS indicates that on a statewide level agriculture used an average of 60.2 mgd and in the Chowan basin the average was more than 2.6 mgd average in 2018.

In the *Executive Summary*, the Draft Plan states that North Carolina has only 1,300 square miles of land in the basin, while Virginia has 3,600 square miles of drainage area in the basin. *Chapter 8, Section 8.3. Surface Water Use and Demand: Virginia* states that 2 intakes alone in Virginia withdraw an average of 130 mgd without any limitations. Comparatively speaking, it seems that any impact that North Carolina might have on water quality and quantity in the basin pales in comparison with that of Virginia.

There are several parts in the basin plan that demonstrate that there exists a misunderstanding of agricultural water use in North Carolina. One example is *Section 8.6.2. Localized Agricultural Water Use Data*. This section references USDA's estimate that agriculture accounts for 80% of

the nation's consumptive water use. Therefore, readers are left assuming that the same goes for North Carolina. Instead, the plan should reference NCDA&CS Water Use Survey data that shows agriculture in North Carolina represents less than 2% of the state's water withdrawals. In terms of consumptive use, NC State University researchers estimate 60% of agricultural water use is consumptive. Collectively looking at these numbers for agricultural water use (60% of 2%), readers would get a truer picture of the role of agricultural water use in our state. Often planners and others turn to USGS data to estimate agriculture water use in North Carolina. But, USGS numbers are based on assumptive water use based on the types of crops grown. These same assumptions don't work for North Carolina because our farmers don't irrigate as much because of more favorable climate and soil conditions.

The draft plan in *Section 8.6 Future Considerations*, indicates that compliance with existing, statewide programs dealing with water resources management appears to be reasonably effective at capturing major water withdraws and use for most sectors. But this section and again in *Section 8.6.5. Statewide Water Withdrawal Permitting*, the plan calls for a mandatory water use permitting program. The plan references the recommendations of the 2010 Water Allocation Study (WAS) as a basis for recommending a water use permitting program. But the WAS did not paint an accurate picture of what is already required in North Carolina. The WAS stated that NC doesn't have a water use permitting program. While the state may not have a statewide water use permitting program it does have permitting as needed such as capacity use areas, inter-basin transfers (which operate much like a permitting program), and use of the 401 certification program to limit withdrawals as needed.

NC Farm Bureau has worked with DWR staff for many years in identifying ways to access and report accurate agricultural water use for our state and for ways to protect and preserve water resources. We look forward to continued conversations on these matters.

Ambient Monitoring and Interstate Cooperation:

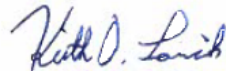
Because approximately 75% of the Chowan basin is in Virginia, it is important to understand the contribution of nutrients and other pollutants coming into North Carolina. DEQ has established ambient monitoring stations on the Chowan River just inside the border, and on the Nottoway River, just north of the border. However, the Meherrin River does not have a monitoring station until just before the confluence with the Chowan River. As a result, DEQ is missing key information about potential sources of pollutants in the Chowan River and Albemarle Sound. The Draft Plan proposes several new regulatory requirements in light of the recent algae blooms such as a nonpoint source management strategy, poultry farm regulation, and potential buffer protection rules. A complete understanding of the sources and causes of nutrient pollution should be a priority before enacting any new regulations.

Along this same line, NCFB agrees with the recommendation that DEQ should increase cooperation with Virginia DEQ, either through APNEP or some other means. Because 75% of the Chowan basin is in Virginia, it is crucial to know the water quality and land-use changes that may impact the Chowan River and Albemarle Sound in North Carolina.

Establishment of a new ambient monitoring station, and an increased understanding of activities in Virginia impacting water quality and water quantity should be a priority for DEQ prior to any new regulations or implementation of a nutrient management strategy.

Thank you for the opportunity to submit these comments. If you have questions or need more information, please contact me at keith.larick@ncfb.org or Anne Coan at anne.coan@ncfb.org.

Sincerely,

A handwritten signature in blue ink that reads "Keith D. Larick". The signature is written in a cursive style with a large initial "K".

Keith Larick
Natural Resources Director

Commenter: Laura Smith

Dear Mr. Shepherd:

Generations of my family have relied on the Chowan River for fishing and recreation. My own children have learned to fish and waterski in the same spots I did as a child. Sadly, in the last few years, our time on the river is extremely limited due to frequent harmful algal blooms.

State water personnel sometimes herald the Chowan as the first successful nutrient plan in the state. Well, it worked for the 1980's and 90's, but now we need a new management plan. It is time for basin-wide riparian buffers of at least 50 feet. We also need closer monitoring of chicken farms to make sure they are not over-applying waste and contributing to nutrient and bacteria pollution. The state should increase funding for monitoring so that they can pinpoint where problems are arising. And there should be full watershed modeling to help figure out where the pollution is coming from and what scenarios will best address it. The modeling should include the Virginia portion of the watershed with close attention paid to older point sources/leaky sewer pipes and ag/forestry non-point sources.

Sincerely,

Laura Smith

Durham, NC

Commenter: [Lloyd Webb](#)

In the last 5-7 years, we have seen an increase in algae near the mouth of the Chowan River. The more algae, the less we can fish and swim with our children and grandchildren. We want to see more enforcement of pollution violations, closer tracking of chicken farms, more funding for monitoring, and buffers to protect the river. The algae has appeared to caused death to turtles we found many shells on the shoreline. When it is at it's peak of bloom the shoreline is often blue green and with a white foam these conditions cause a foul smell. It looks like the inside of a clothes washer when opened mid cycle.

Thank You for your efforts to help clean up this wonderful river.

Sincerely,

Lloyd Webb

251 Steeleplace Lane

P O Box 224

Merry Hill N C

Commenter: Michael O'Driscoll

Thanks Forest, Nora, and Jim,

Great Job! Since you asked, I was thinking that one aspect that may help for a future meeting would be to see how some of the important water quality variables like nutrients, turbidity and chl-a vary over time vs discharge (maybe at one of the lower sites on the Chowan). That approach could help to see how the system behaves during baseflow vs stormflow conditions and if the chl-a problems tend to coincide with very low flow conditions when residence time might be much longer (and if turbidity is more associated with terrestrial inputs- those might be lower during baseflow so wouldn't cause light limitation, so allow better conditions for algal growth). Also, that kind of analysis might show if with the monthly sampling might be more representative of baseflow conditions, I wasn't sure if storm events are sampled directly but they might be represented in some of the monthly samples. Anyways since the turbidity is probably related to flows, more insights on that aspect could be helpful. If you don't have time, I could take a look at that aspect later.

Thanks, have a great weekend!

Mike

Commenter: Green AP

Mr. Shepherd,

I am writing to offer comment on the plan being prepared for the Chowan River Basin. I am concerned about all aspects of water quality, flood control, biodiversity and migratory and resident fish populations in the Chowan River system. I am also aware that these issues in the Chowan directly impact the same issues in the Albemarle Sound. My family has lived on this water for about 300 years. I would like the plan you are making to ensure that these waters will sustain life and livelihoods for another 300 years. To do so effectively, the plan must have specific goals and timelines. I do not see that there is enough rigor as-is and I hope you will make the correction.

Sincerely,

Susan Inglis

--

Susan Inglis, Executive Director / **GREEN AP**
Sustainable Furnishings Council

m) 919 621 2202

www.sustainablefurnishings.org

"Sustaining Healthy Environments, Inside and Outside"

Commenter: Elizabeth City State University

October 30, 2020

Mr. Forest Shepherd

Division of Water Resources

NC Department of Environmental Quality

1611 MSC

Raleigh, NC 27699

forest.shepherd@ncdenr.gov

Dear Forest:

Thank you for your effort on improving the aquatic environment for the Northeast North Carolina. We noted that the current version of the plan is based mostly on monitoring data obtained from selected locations (i.e. AMS, RAMS etc.) that lacked spatial coverage therefore we have following two comments/suggestions.



Figure 1. Algae bloom on the Chowan River on August 12, 2019.



Figure 2. Algae bloom on the Pasquotank River at the Elizabeth City on October 12, 2019.

First, please consider apply unmanned aircraft vehicle (UAV) to monitor the water quality of the Chowan River. UAV can be equipped with RGB camera, infrared camera, and multispectral sensors to acquire images of the river. Fig. 1 is a RGB image of the algae bloom on the Chowan River on the August 12, 2019. Fig. 2 is a RGB image of the algae bloom on the Pasquotank River at Elizabeth City on the October 12, 2019. Fig. 3 is a picture of duckweeds and algae patch on the Spruill Conservation Farm on the southern shores of the Albemarle Sound on March 16, 2019. If it is programmed properly, UAV could acquire images of the river systemically to cover a large area. Additionally, if it is equipped with an infrared camera or multispectral sensor, UAV could acquire images for processing of various aquatic parameters including NDVI to detect submerged aquatic vegetation and/or algae bloom (Fig. 4).



Figure 3. Duckweeds and algae patch on Spruill Conservation Farm on the southern shores of the Albemarle Sound on March 16, 2019.

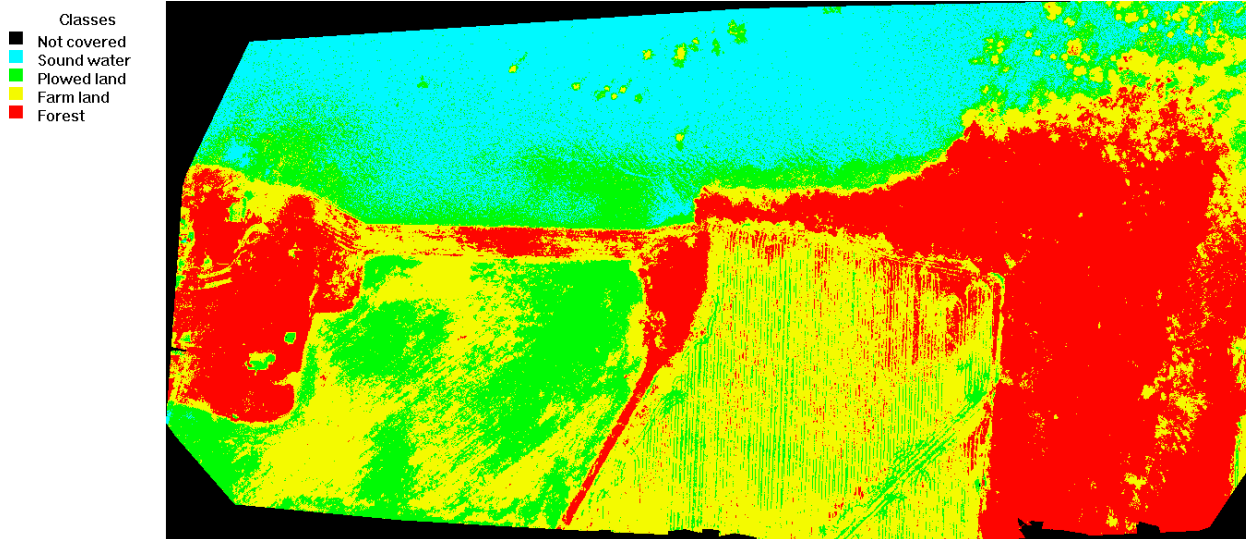


Figure 4. Normalized difference vegetation index (NDVI) at the Spruill Farm determined from a drone based multispectral sensor. Three types of land are detected: forest, farmland, and plowed land. Several trees and submerged vegetation in the Albemarle Sound adjacent to the farm showed similar NDVI signature as farmland and plowed land.

Second, please consider apply satellite remote sensing to monitor water quality of the Albemarle Sound. We noted that one previous study that you quoted (Smith et al., 2015) discounted satellite remote sensing for studying Albemarle Sound, but that study was heavily influenced by *in situ* samples collected near shore. As we pointed out previously (Yuan et al., 2005), satellite pixels in coastal water possess larger in pixel variations that renders one-one correlation between satellite data and *in situ* measurement hard. Surface water *chlorophyll a* can be determined from NASA MODIS sensor aboard Aqua satellite since 2002. It can also be determined with other satellite sensors (i.e. ESA MERIS) at better spatial resolutions.

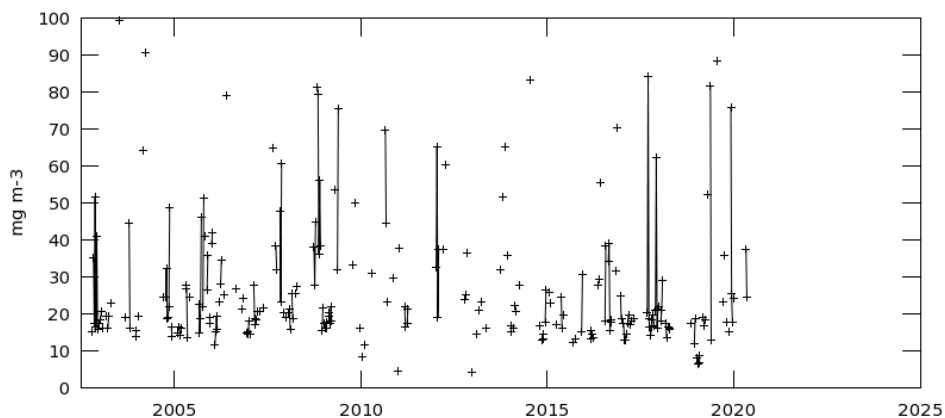


Figure 5. Decadal variation of the surface water chlorophyll a in Albemarle Sound near the mouth of Chowan River (35.937N, 76.6015W, 36.0516N).

We took a quick look at MODIS *chlorophyll a* data for two regions in the Albemarle Sound. For a region near the mouth of the Chowan River (35.937N, 76.6015W, 36.0516N), area-averaged *chlorophyll a* in surface

water appears to spike a few times from 2008 to 2012 and then in the last few years (Fig. 5). For a region near the mouth of the Pasquotank River (76.06W, 36N, 75.9W, 36.15N), area-averaged surface water *chlorophyll a* were significantly higher in the last decade than the previous (Fig. 6). These higher concentrations of *chlorophyll a* might be related to the nutrient fluxes from these rivers.

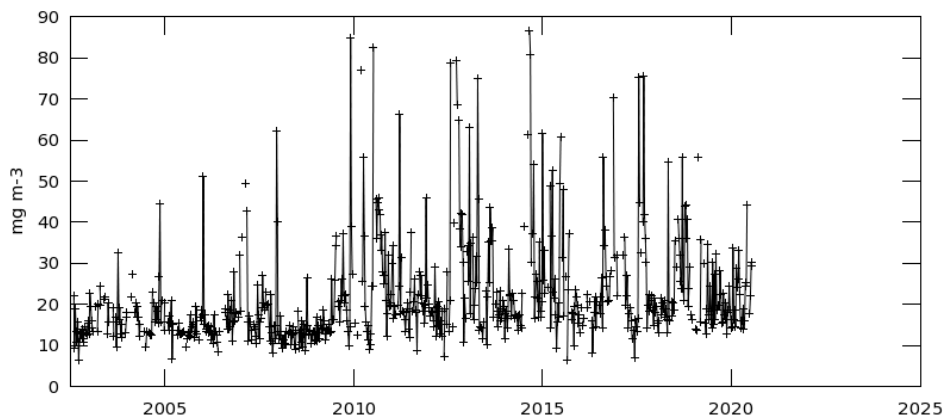


Figure 6. Decadal variation of surface water chlorophyll a in Albemarle Sound near the mouth of Pasquotank River (76.06W, 36N, 75.9W, 36.15N).

Over the years, faculty members and students of Elizabeth City State University has been conducting water quality studies of Albemarle Sound based on discrete samples, *in situ* sensors, sensors aboard UAV, and satellite images. We would be more than happy to assist in implementing the plan.

Reference

Yuan, J., Dagg, M., Del Castillo, C. In pixel variations of chl a fluorescence in Northern Gulf of Mexico and their implications for calibrating remotely sensed chl a and other products. *Continental Shelf Research*, 25, 1894-1904, 2005.

Dr. Jinchun Yuan
 Professor,
 Department of Natural Sciences
 Elizabeth City State University
 A member of the Spruill Conservation Farm Steering Committee.

Dr. Francisco San Juan
 Professor (retired)
 Department of Natural Sciences
 Elizabeth City State University
 A member of the Spruill Conservation Farm Steering Committee.

Jack Spruill
 Spruill Farm Conservation Project
www.facebook.com/spruillfarm
jspruill@spruillfarm.org

Commenter: Melody White

10/30/2020

Mr. Shepherd,

I am responding to the Chowan River Basin Plan, with a copy of one of several emails I have attempted to send. This is a copy of the third. Each Attempt was unsuccessful because of such poor internet service in our rural area - worse than usual as I write.

Unfortunately I did attach photos but they are not indicative of the true colors of the algal blooms. The actual pictures in the emails I tried to send, were much more realistic.

Thank-you for your service. If you did by chance, receive my actual emails, please disregard the hard copies.

Sincerely,

Melody Anne White
Native Chowan County Resident.

From:**Sent:** Friday, October 30, 2020 12:06 AM**To:** forest_shepherd@ncdenr.gov**Subject:** Input on 2020 Chowan River Basinwide Water Resources Plan.

Dear Forest,

Apparently my previous email disappeared during an internet failure, that is commonplace in our community of Tyner, NC. So I write briefly, my concerns on the eleventh hour, of the planning processes involved directly affecting the water quality of the Chowan River, and issues of the river basin.

Please refer to section 7.1 Wastewater Management, 7.1.1 NPDES Wastewater Discharge Permit of the plan. I have concerns regarding permit no. NC0032719, Valhalla Water Treatment Plant located in Chowan County, with no limited flow FGD. The Rocky Hock Creek (Merchant's Millpond) will be the receiving stream. According to plans a new outfall is under construction, with discharge location in the Chowan River.

The entire county of Chowan has great concern that this project, while necessary, should be tabled for further study as we are reexamining the resurgence of algal blooms in the river. Massive blooms plagued the river beginning early in May 2019 and decreasing but not disappearing, in the fall of 2019. Filaments of algae could be seen when looking vertically in the river, when the bloom on the surface had seemed to disappear.

In May of 2020 algal blooms once again appeared, initially in the typical green color. However, in July the algae turned into a color I had not seen before, in previous blooms. The algae was light blue in color and covered much of the river surface. The most concentrated areas seemed to be close to Cannon's Ferry and extended to Arrowhead Beach and even beyond.

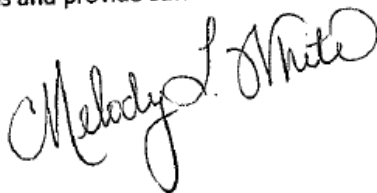
My concern is certainly the health and viability of the river. I am concerned we are adding 'insult to injury' by discharging treated waste water into the river, close to homes and recreational areas. I am not sure this email is even appropriate for this proposed plan; however, it is addressed in the aforementioned area, so it raises alarms that this plan is in an implementation phase, rather than an assessment phase:

I hope you will address my concerns and provide sufficient data to help clarify the information in question.

With kind regards,

Melody White

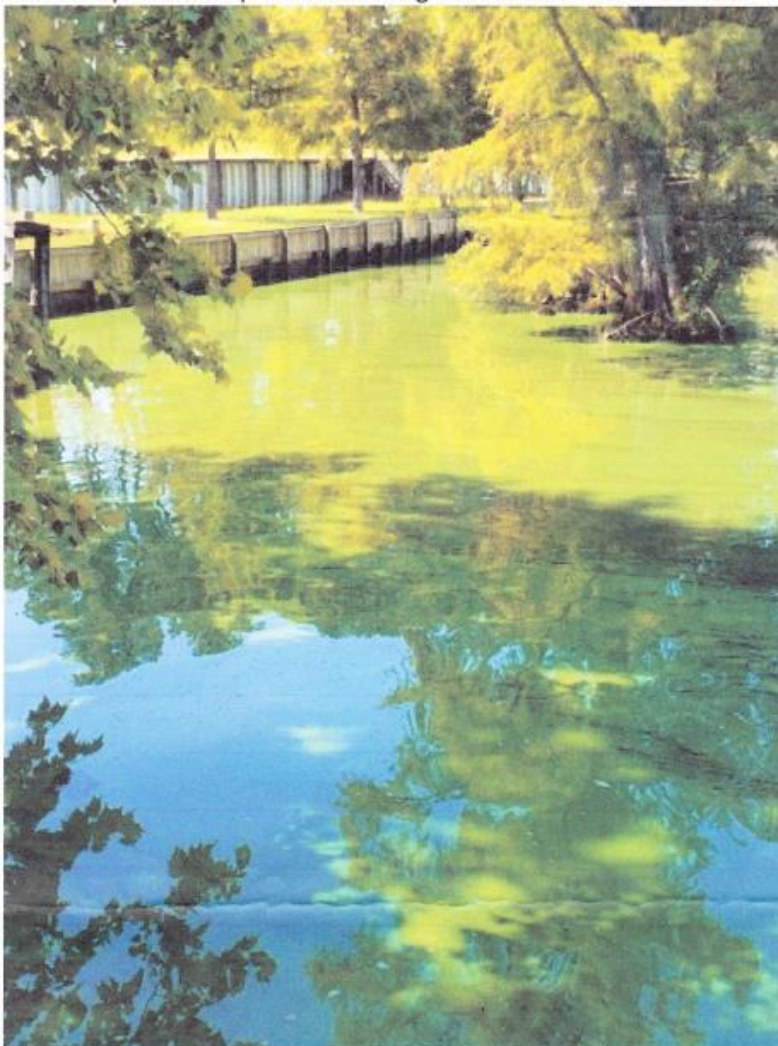
Chowan County Resident - Native



Sent from [Mail](#) for Windows 10

From:
Sent: Friday, October 30, 2020 12:31 AM
To: forest_shepherd@ncdenr.gov
Subject: Input on 2020 Chowan River Basinwide Water Resources Plan (Photos)

Attached please find photos of the algal bloom in summer of 2019



Sent from [Mail](#) for Windows 10

Summer of 2019. The bright green algal bloom persisted the entire summer, beginning in May 2019, and decreasing in coverage only in late September 2019.



From:
Sent: Friday, October 30, 2020 12:50 AM
To: forest_shepherd@ncdenr.gov
Subject: 2020 Chowan River Basinwide Water Resources Plan

Attached please find photos of algal bloom in Chowan River summer of 2020.

Sent from [Mail](#) for Windows 10



*Blue color -
(new printer
needed!)*

The summer of 2020 produced a never before seen, color of blue algae. In early summer the color was bright green. However, in June the color seemingly overnight, turned light blue. The algae did not last all summer as in 2019. By August the water quality had much improved, with only small particles of algae visible in the depths of the water.



*Blue Color
Actually*

Commenter: North Carolina Forest Service

Executive Summary (p. 13-14)

Forestry

Nearly 36 percent of the land use in the Chowan River basin in NC is identified as forested. Forests often play a significant role in protecting water quality by absorbing and filtering precipitation, anchoring soil, intercepting particulate matter, and reducing instream water temperatures. Special attention is needed to ensure that water quality is protected while timber is being harvested in the basin. Inappropriate management practices can impact water quality by altering instream habitat and increasing sediment load. These impacts can also alter the interface of the aquatic and terrestrial ecosystem and change watershed functions. Without appropriate best management practices in place during and after harvests, sediment entering a waterbody can have a negative impact on water quality. Sediment can stem from exposed cuts for skid trails, slopes with bare soil, and improperly constructed stream crossings, forest roads, and log decks. As a result, the majority of regulations and erosion control recommendations pertaining to forestry focus on preventing debris and sediment from entering waterbodies. Properly planned and executed forest management plans facilitate the sustainable harvest of forest products while protecting water quality. Between July 2007 and June 20~~2017~~²⁰¹⁷, the North Carolina Forest Service (NCFS) inspected 1,743~~03~~⁰³ timber harvesting operations on 110,516~~82,064~~^{82,064} acres. ~~Thirty-three~~^{Eighteen} were found to be out of compliance with the Forest Practice Guidelines (FPG). The most common violations were related to streamside management zones (SMZ), debris entering streams, stream crossings, or rehabilitation of the project area. Because landowners are not required to notify NCFS of timber harvesting or related forestry activities, the numbers reported may not be a full representation of the timber harvests in the basin. There has been growing concern in recent years over forest management and its influence on algal blooms in the Chowan River basin. In August 2016, NCFS personnel conducted an aerial assessment via aircraft along the Chowan River to see if algal blooms were emanating from timber harvests. At that time, the NCFS found no visible algal growth originating from past timber harvests of varying ages. NCFS met with stakeholders in the basin, including the Soil and Water Conservation Districts (SWCD) and the Albemarle Resource Conservation and Development Council, Inc. (ARCD), to discuss riparian buffer incentives for landowners wanting to harvest timber adjacent to known nutrient-sensitive waters. Working collaboratively with landowners, state and federal agencies, and researchers, NCFS continues to explore how forest management may influence water quality in the Albemarle region.

Chapter 1 (p. 14-18)

1.6.2. Forestry

Special attention is needed to ensure that water quality is protected while timber is being harvested. Inappropriate management practices can impact water quality by altering in-stream habitat, increasing sediment load, and increasing stream temperature. These impacts can also alter the interface of the aquatic and terrestrial ecosystem and change watershed functions. Without appropriate practices in place during and after harvests, sediment entering a waterbody can have a negative impact on water quality. Sediment can stem from exposed cuts for skid trails, slopes with bare soil, and improperly constructed stream crossings, forest roads, and log decks. As a result, the majority of regulations and erosion control recommendations pertaining to forestry focus on preventing debris and sediment from entering waterbodies. Properly planned and executed forest management plans facilitate the sustainable harvest of forest products while protecting water quality.

Forest Practices Guidelines (FPG) Related to Water Quality

The North Carolina Forestry Service (NCFS) is delegated the authority to monitor and evaluate forestry operations in North Carolina. NCFS staff regularly inspect timber harvests for compliance with the Forest

Practice Guidelines (FPG) for Water Quality. The FPGs are a set of results-based guidelines meant to protect water quality and are mandatory, statewide requirements defined by North Carolina Administrative Code (02 NCAC 60C .0100-.0209). All forestry-related, site-disturbing activities must comply with the FPGs if that activity is to remain exempt from permitting and other requirements specified in the North Carolina Sedimentation Pollution Control Act (SPCA) of 1973 (NCFS, 2017). Inspections often involve NCFS staff visiting the same site multiple times to provide forest operators and landowners technical assistance for BMPs to minimize impacts of forestry on water quality.

Locations of Harvests

Over the last ten years, timber harvests were scattered throughout the entire basin. Compared to other counties, however, there have been relatively fewer harvests in portions of Bertie and Chowan counties, particularly in the Cypress Swamp, Edenhouse Point-Chowan River, and Mount Gould Landing-Chowan River watersheds (Figures 1-7 and 1-8). Between July 2007 and June 2012, the NCFS inspected 569 timber harvests in the Chowan River basin, totaling 37,395 acres (Figure 1-7). NCFS found 12 harvests to be out of compliance, resulting in a compliance rate of 97.9%. The most common violations were related to streamside management zones (SMZ), debris entering streams, stream crossings, or rehabilitation of the project site. Between July 2012 to June 2017, the NCFS inspected 734 timber harvests, totaling 44,669 acres (Figure 1-8). Six harvests were out of compliance, resulting in a compliance rate of 99.2%. The most common violations were related to debris entering streams (Table 1-8). Between July 2017 to June 2020, the NCFS inspected 440 timber harvests, totaling 28,452 acres, and found 15 harvests to be out of compliance. The most common violations were related to stream crossings. Because landowners are not required to notify NCFS of timber harvesting or related forestry activities, the numbers reported here are not be a full representation of the timber harvests in the basin (Coats, 2017).

Table 1-8: Number of Inspections Conducted by NCFS in the Chowan River Basin

<u>Time Period</u>	<u># Inspected Timber Harvests</u>	<u>Total Acres</u>	<u># Out of Compliance</u>
<u>07/2007-06/2012</u>	<u>569</u>	<u>37,395</u>	<u>12</u>
<u>07/2012-06/2017</u>	<u>734</u>	<u>44,669</u>	<u>6</u>
<u>07/2017-06/2020</u>	<u>440</u>	<u>28,452</u>	<u>15</u>

Forestry Best Management Practices (BMPs)

Knowing the soils and hydrology of a site can help with addressing harvest schedules, equipment types, flooding potential, and reforestation options. Silvicultural, or forestry, activities in wetlands, regardless of size, should be conducted in a manner that minimizes adverse impacts on the unique hydrologic and ecological functions of those ecosystems. Implementing forestry BMPs is strongly encouraged to protect the water resources of North Carolina efficiently and effectively. The NC Forestry BMP Manual details specific tools and methods which can be used during forestry operations to reach compliance with the FPGs. From 2013 to 2016, the NCFS carried out surveys across the state to assess the implementation of BMPs on timber harvests. These surveys gave a snapshot of practices used in different areas of the state and helped to understand where additional recommendations may be needed. In the Chowan River basin, the NCFS conducted surveys on seven sites, assessing 542 total BMPs. Seventy-nine percent of the BMPs assessed were implemented successfully. NCFS found that when BMPs were properly implemented, there was no risk to water quality (Coats, 2017). To protect the waters of NC and promote the use of bridgemats, the NCFS allows loggers and timber buyers to borrow the NCFS's bridgemats for use during forestry-related operations. A bridgemat consists of a panel that establishes a temporary

crossing over streams, ditches, or small water channels. Temporary bridges can be a very effective solution for stream crossings since the equipment and logs stay out of the water channel. When installed and removed correctly, bridgemats cause very little soil disturbance. Bridgemats are free to borrow from the NCFS for forestry use in the Chowan River basin and have been for several years. More information about bridgemats is available on the NCFS website.

Forestry and Algal Blooms

In recent years, there has been growing concern over forest management and its influence on algal blooms in the Chowan River basin. In August 2016, NCFS personnel conducted an aerial assessment via aircraft along the Chowan River to see if algal blooms were emanating from timber harvests. At that time, the NCFS found no visible algal growth originating from past timber harvests of varying ages. NCFS met with stakeholders in the basin, including the SWCD and the ARCD, to discuss riparian buffer incentives for landowners wanting to harvest timber adjacent to known nutrient-sensitive waters. NCFS continues to explore how forest management may influence water quality by collaborating with landowners, state and federal agencies, and researchers (Coats, 2017).

Forestry: Next Steps

Several state and local entities are working together to understand forestry's impacts on water quality in the Chowan River basin. SMZs are "an area along both sides of intermittent streams and perennial streams and along the margins of perennial waterbodies where extra precaution is used in carrying out forestry related, land-disturbing activities to protect water quality" (02 NCAC 60C .0102). Per administrative code, the SMZ shall be of sufficient width to "confine visible sediment resulting from accelerated erosion" (02 NCAC 60C .0201). Chapter 4 of the North Carolina Forestry BMP Manual includes information about SMZs and riparian buffers, and it states the general recommendation for SMZ width is "50 feet along each side of intermittent streams, perennial streams and perennial waterbodies" (NCFS, 2006). The width of the SMZ may vary depending on the purpose of the SMZ and the site's conditions. Wider SMZs are needed for sites that exhibit highly erodible soils, soil areas with little or minimal groundcover near the waterbody, and special waters such as trout, water supply watersheds, nutrient-sensitive waters and shellfish waters (NCFS, 2006). Because waters in the Chowan River basin have been designated as nutrient-sensitive waters (NSW), a wider SMZ is recommended for forestry-related, land-disturbing activities in the basin to best protect water quality. A wider SMZ could also minimize the number of trees damaged and the amount of woody debris entering a waterbody after heavy rainfall or extreme storm events. Forestry-related, land-disturbing activities can alter hydrologic processes and influence water quality. It can take months to years for water quality to return to pre-harvest conditions (Ensign and Mallin, 2001), but forestry research studies also demonstrate that properly implemented BMPs effectively protect aquatic and riparian ecosystems (Cristian et al., 2016). More research specific to the Chowan River basin and silviculture in forested swamps is needed to understand the relationship between forestry-related operations, groundwater, nutrients, and algal blooms within the basin. Stakeholders throughout the watershed have acknowledged that there is no one clear source, or cause, of the algal blooms, however, this also does not rule out forestry practices as a significant contributing source. Continued monitoring could help pinpoint some of the point and nonpoint sources of nutrients entering the basin. In addition, NCFS has recommended a "comprehensive water quality study" of forestry-related activities in coastal bottomland swamp forests to help understand the relationship of silviculture and algal blooms. The study would require substantial new funding for five or more years, landowner commitment, and experienced foresters and researchers to conduct the study. "Although not in a position to fund such a project, NCFS has offered to assist with project scoping, selecting foresters and researchers willing to participate in such a project, provide technical expertise on forestry practices, provide applicable references for literature review and general review and oversight" (Brogan, 2018). Local stakeholders

have been working with local foresters to identify ways to protect forested areas in the Chowan River basin. One recommendation is to establish a conservation program for swamp forest buffers similar to existing federal and state cost-share programs for agricultural lands. The program could provide an economic incentive to landowners to conserve and manage swamp forest buffers. Conserving and managing the swamp forest buffers, in turn, could protect critical drainage areas, protect water quality and provide aquatic and terrestrial habitat throughout the basin.