The fish caught in the Nottoway must not be lost sight of. Some of the finest shad caught in Virginia waters are caught in that river.

There are marl beds along the whole course of the river as far as we surveyed it, some of them of fine quality, and might be made valuable as fertilizers and remunerative to boats as freight.

General William B. Shands, a prominent citizen of Southampton, told me that he believed the cotton crop of his county would be, for the year 1878, 5,000 bales, and that the peanut crop would amount to 250,000 bushels. Capt. Thomas Pollard, commissioner of agriculture for the State of Virginia, in a letter furnishing me with statistics, puts the cotton crop of Southampton County at 15,000 bales, and that of Sussex at 3,000 bales. If the crops of Sussex are as good in proportion to the size of the county, and we take into consideration the corn and other crops, and the timber trade, it is evident it would pay a boat very handsomely, even admitting she could only get one-fourth of the trade.

I have been unable to obtain any very satisfactory information on which to base an estimate of the probable value of the products which would seek the river as an outlet. I am, however, fully satisfied that a boat drawing 3 feet water, if the river is cleared of obstructions, would be able to run for nine months in the year and do a good business, and that it might build up a remunerative trade.

I would recommend, however, the use of boats drawing only 2 feet water, and that the river be cleaned out as far as Freeman's Bridge, 1 mile from Hawkinsville on the old plank road, 5 miles from Sussex Court-House.

In talking with citizens of the county they suggested lock and dam navigation. It may be well for me just here to state that in my opinion such an undertaking would be entirely incommensurate with the advantages to be derived.

In the first place the two counties most benefited by the improvement lie in a triangle formed by the three following railroads: Petersburg Railroad, Atlantic, Mississippi and Ohio Railroad, and Seaboard and Roanoke Railroad. Farmers living near these roads would ship by them, and if we allow that all the farmers within a triangle formed by taking its sides 5 miles from each of these roads would use the river, the amount of freight that would seek the river would not justify such an expensive work.

PLAN OF IMPROVEMENT.

It only remains for me now to suggest a plan of improvement in accord with the ideas expressed above, and to estimate its cost.

I would suggest clearing the river of snags, fish-traps, leaning trees, and such other obstructions as cause bars to be formed, whether natural or artificial. I believe removing these obstacles would render the river navigable for nine months in the year for boats drawing from 3 to 4 feet water, and for the balance of the year for boats drawing 2 feet water.

It would also be advisable to dam up some of the chutes which have been cut by the river, and thereby force the water into its natural bed at ordinary tides. This would have the effect of increasing the depth of water on the sand-bars by washing them down, giving a more uniform inclination to the bed of the river, and, as a consequence, a more uniform depth of water. Such an improvement would, I believe, meet the demands of the people.

The following is an estimate of the cost of such an improvement.

The dams, estimated at 50 cents per linear foot, on section 2 are intended to prevent the water at its ordinary stages from running through the numerous cut-offs, and to force it into the natural bed of the stream.

Section 1.

44 snags to be removed, at $10	$440
Removal of leaning trees	50
Removal of Confederate obstructions	1,000

Section 2.

188 snags to be removed, at $10	1,880
Removal of leaning trees	350
2,000 linear feet low brush-and-stake dams, at 50 cents	1,000

Section 3.

77 snags to be removed, at $10	770
Removal of leaning trees	100
	5,590
Add for superintendence, engineering, and contingencies, 20 per cent	1,118
Total	6,708

I annex a statement furnished me by Mr. James F. Manpin, agent Seaboard and Roanoke Railroad, showing the amount of freight transported over that road from the three stations nearest the Nottoway River, viz, Franklin, Handsomes, and Nottoway. I think it probable, if the river was opened to navigation, that most of this freight would be shipped at Nottoway Station, and that a great deal more, which is now hauled to other depots, would seek the river as an outlet.

A statistical statement of the freights transported from Franklin, Handsomes, and Nottoway by the Seaboard and Roanoke Railroad during the year 1878.

From.	Cotton, bales.	Peanuts, bags.	Pease, bags.	Merchandise, pounds.	Lumber, cars.	Shingles, cars.	Staves, cars.
Franklin	469	9,044	541	144,330	353	.....	.....
Handsomes	368	1,240	34	14,376	63	.....	.....
Nottoway	269	3,136	48	21,675	93	1	3
Totals	1,106	13,420	623	180,381	509	1	3

JAMES. F. MANPIN, *Agent.*

Very respectfully, your obedient servant,

W. G. WILLIAMSON,
Assistant Engineer.

Capt. C. B. PHILLIPS,
Corps of Engineers, U. S. A.

H 16.

EXAMINATION OF PEDEE RIVER FROM CHERAW, S. C., TO THE MOUTH OF THE UWHARIE RIVER, NORTH CAROLINA.

UNITED STATES ENGINEER OFFICE,
Norfolk, Va., January 16, 1879.

GENERAL: An act of Congress approved January 18, 1878, provided for an examination or survey of the Pedee River from Cheraw, S. C., to the mouth of the Uwharie River, North Carolina.

On the 13th of August last I had the honor to report to you that a mere examination of the river between the points indicated seemed to be all that could be done with the limited amount of funds at my disposal, and recommended that an examination only be made. This having met your approval, I put the field-work in the hands of my assistant, Mr. W. B. Page, who made the required examination between the 12th and 23d of November last. His report, accompanied by 5 sheets, showing in plan and profile the results of his work, is transmitted herewith. Mr. Page deserves credit for having done so much in so short a period and with such limited means.

The examination was commenced at the mouth of the Uwharie, where the river takes the name of the Pedee, it being called the Yadkin above that point, and was continued down to Cheraw, S. C., a distance (by river) of 67 miles.

The total fall of the river in this distance is about 325 feet. No plan for the improvement of this river can be contemplated which does not propose the introduction of locks and dams.

Mr. Page estimates that 15 in all will be required, and his total estimate for the cost of these, together with other work required for clearing the channel, amounts to $1,124,301.

I cannot think that the amount of commerce which would be benefited by such an improvement would be at all commensurate with the amount

of money required to effect it, and I should also be inclined to withhold any recommendation for the expenditure of so large an amount as that above specified without a previous careful instrumental survey of the entire river.

Mr. Page has divided the portion of the river examined into sections, the lower one of which is susceptible of improvement without the use of locks and dams. This section is 20 miles in length, extending from Cheraw up to the crossing of the Carolina Central Railroad. The total fall in this distance is about 40 feet, the river having a general average width of 350 to 500 feet. Eleven shoals occur in this distance.

The bottom consists mostly of bowlders, which would require blasting in order to be removed. Mr. Page estimates that to clear a channel 40 feet in width and 4 feet in depth at the lowest stage of water over this distance of 20 miles would require the expenditure of about $163,000. If Congress should appropriate this amount for the purpose it would open up a large tract of fertile country adjacent to the river, the products of which and amount of same, as nearly as they could be ascertained, are set forth in the report of Mr. Page.

One-half the amount specified above, or $82,000, could be spent to good advantage in the course of a single fiscal year.

The Pedee River is in the collection-district of Georgetown, S. C.

I am, general, very respectfully, your obedient servant,

CHAS. B. PHILLIPS,
Captain of Engineers.

Brig. Gen. A. A. HUMPHREYS,
Chief of Engineers, U. S. A.

REPORT OF MR. WILLIAM BYRD PAGE, ASSISTANT ENGINEER.

NORFOLK, VA., *December* 20, 1878.

CAPTAIN: I beg leave to report as below the result of the reconnaissance of the Pedee River from Cheraw, S. C., to the Uwharie River, North Carolina, made in obedience to your instructions of November 6, 1878.

The party, necessarily small, was organized and the outfit obtained near the initial point of the reconnaissance of the Uwharie River. The examination was undertaken November 12, and the field-work closed November 23. Little instrumental work was possible in the time and with the means at hand, but the information obtained is submitted below. I would especially mention Professor Kerr's geological report of North Carolina, from which, by permission, data were obtained. Accompanying this report are sketches in plan and profile, compiled in part from instrumental work and from the most reliable information obtainable.

The examination, although not so close or in as much detail as is desirable, it is hoped is sufficient for the determination of the nature of any future operations that may be decided upon.

GENERAL DESCRIPTION.

The Pedee River assumes this name at the Uwharie River, the upper point of the survey; above this point it is known as the Yadkin.

The length of the river examined is about 67 miles; about 9 miles of this length is in South Carolina. Portions of four counties of North Carolina—Stanly, Montgomery, Anson, and Richmond—border upon the river, and are naturally tributary to it in the shipment of produce; the first two are gold-bearing districts, producing also a little cotton; the lower counties and the area in South Carolina to the southward of them are considered within the cotton-belt, and this staple is the principal product.

Through these lower counties passes the Carolina Central Railroad to Charlotte to the west, a cotton-market of note, and to Wilmington to the east.

The river is considered without reference to other adjacent streams, although a continuation of the Yadkin is so connected with it at the "Narrows," 4 miles above the Uwharie, that the two streams appropriately bear different names. Of the Narrows, Professor Kerr says: "It constituted an obstruction of a sufficiently formidable

character to defeat the enterprise undertaken by the State for the improvement of the river, and at this point the whole immense volume of the waters of this the largest river in the State is suddenly compressed into a narrow rocky gorge of the Uwharie Mountains, a broad navigable expanse of more than half a mile contracted into a defile of about thirty feet breadth. The total descent of the Narrows and the rapids in a distance of some 2 miles is not less than 50 or 60 feet. The immediate area bordering the river, and nearer to it than the neighboring railroads, is about 1,200 square miles. It was ascertained that the cotton as a rule was sold at the nearest station or market, and not shipped to any great distance; this would not probably be the case were water transportation available."

From the above statements I should judge that the advantages likely to accrue from the improvement of the navigation of the river between the points examined would be of a local nature and limited to a comparatively small area. An exception to this may be the case as far as the Carolina Central Railroad, the estimate for the improvement of this portion of the river being much less than for the same length higher up (see estimate below), this being taken in connection with the fact that the river is at present navigable to Cheraw. No boat, however, was running at the time of the survey. (See Report of Chief of Engineers, 1873, Appendix S 7, page 753.) The river for most of its length has cut itself a channel in the older and harder rock formation; the rocks are for a great part granite in their nature, and the nearest approach to loose material met with are bowlders, in some cases of large size, containing 300 cubic yards.

The excavation necessary would require blasting in every instance cited. The local fall in the 67 miles is 325 feet, distributed as stated below for each division or section into which the river is divided for convenience or discussion.

SECTIONS.

1st. Cheraw to railroad, distance of 20 miles.
2d. Railroad to Little River, distance of 16 miles.
3d. Little River to Rocky River, distance of 11 miles.
4th. Rocky River to Shankle's Mill, distance of 11 miles.
3d. Shankle's Mill to Uwharie River, distance of 9 miles.

1st. *From Cheraw to the Carolina Central Railroad Bridge*, distance 20 miles. Total fall for this distance about 40 feet; good water for 16.5 miles and shoals for about 3.5 miles. Number of shoals 11, carrying over them from 2 to 5 feet water. Estimates for each shoal shown below. Depth of good water varying from 4 to 20 feet; width of river from 500 feet to 350 feet; the latter width at Cheraw. Greatest rise at Cheraw above ordinary low-water is about 34 feet; volume of water, as measured November 23, was 417,000 cubic feet per minute, the river at the time being 0.5 foot above low-water mark. Estimate made for a channel-way through the shoals in this section.

2d. *From the Carolina Central Railroad Bridge to Little River*, distance 16 miles. Total fall f or this distance about 100 feet. Good water for 7.5 miles and shoals for 8.5 miles. Number of shoals 3, carrying from 0 to 2 feet of water. Estimates for each shoal given below. Good water varies in depth from 5 feet to 15 feet. Width of river varies from 627 feet at Little River to 554 feet at Wall's Ferry. Greatest rise on record at Little River is 19.77 feet above low-water. Volume of flowing, as measured on 18th of November, 1878, was 353,040 cubic feet per minute. Banks at Little River are 17 feet above low-water. River at the time of gauging was 0.5 feet above low-water. Estimates made for locks and dams.

3d. *From Little River to Rocky River*, distance 11 miles. Total fall of about 60 feet. Good water most of the stretch. Four shoals needing improvement, as per estimate below. Depth of good water varies from 4 to 10 feet. Shoals are short and carry from 2 to 10 feet of water. Plan of improvement estimated for is a channel-way through the shoals.

4. *From Rocky River to Shankle's Mill*, distance 11 miles. Total fall is 65 feet. Water for most of the route shallow, varying from 2 to 4 feet, with a few exceptions of deep holes; these holes do not hold their depth for any distance.

Three miles up from Rocky River an estimate is made for excavation of channel; beyond that, locks and dams are considered necessary. For the first 3 miles of this section the rise is 50 feet, leaving for locks and dams 40 feet. The width of the river in this section at Allentown Ferry is 995 feet. The highest rise known 14.2 feet, the banks being 10 feet. The volume of water as measured on the 16th of November was 162,000 cubic feet per minute, the water being at the time 1 foot below low-water.

5th. *From Shankle's Mill to Uwharie River* the distance is 9 miles, the fall about 55 feet; the water generally flowing from 2 to 3 feet above the bed of the stream and at the shoals from 0 to 1 foot.

At Swift Island there are shoals 1 mile in length, and at Greenville Shoals the rocks over much of the surface of the river above the water. In extent, these shoals are 2 miles.

The estimate for this section is for locks and dams for the entire length. The width of the river at the Uwharie is 1,155 feet and the greatest rise about 12 feet. The volume of water as determined by gauging on November 14, 200,790 cubic feet per minute, the river at the time being at low-water mark, what was designated the ordinary summer level.

ESTIMATES FOR A CHANNEL 4 FEET DEEP AND 40 FEET WIDE AND LOCKS AT AN AVERAGE COST OF $50,000 EACH.

First section.

Name of shoals.		
Fish Trap	200 cubic yards of rock excavation, at $3 per yard.	$870
Whieleier Falls	1,777 cubic yards of rock excavation, at $3 per yard.	5,331
Head of Island	147 cubic yards of rock excavation, at $3 per yard.	441
White Rocks	58 cubic yards of rock excavation, at $3 per yard.	174
Pegues's Ford	4,444 cubic yards of rock excavation, at $3 per yard.	13,332
6 in	18,000 cubic yards of rock excavation, at $3 per yard.	54,000
7 in	6,000 cubic yards of rock excavation, at $3 per yard.	18,000
8 in	9,000 cubic yards of rock excavation, at $3 per yard.	27,000
9 in	300 cubic yards of rock excavation, at $3 per yard.	900
10 in	4,500 cubic yards of rock excavation, at $3 per yard.	13,500
11 in	1,000 cubic yards of rock excavation, at $3 per yard.	3,000
		136,548

Second section.

First	Bluill's Falls, one lock and dam (9 feet lift)	50,000
Second and third	Grassy Island Shoals, four locks and dams (9 feet lift each)	200,000
		250,000

Third section.

1st, shoal	Water sufficient.	
2d, shoal	30 cubic yards of excavation, at $3 per yard	90
3d, shoal	150 cubic yards of excavation, at $3 per yard	450
4th, shoal	3,000 cubic yards of excavation, at $3 per yard	9,000
5th, several shoals	6,110 cubic yards of excavation, at $3 per yard	18,330
		27,870

Fourth section.

1st, several shoals	7,500 cubic yards of rock excavation, at $3 per yard	22,500
2d, shoal	Five locks and dams	250,000
		272,500

Fifth section.

Five locks and dams	250,000
Add for contingencies and possible modifications and additions 20 per centum	187,383
Total	1,124,301

Respectfully submitted.

WM. BYRD PAGE,
Assistant Engineer.

Capt. CHAS. B. PHILLIPS,
Corps of Engineers, U. S. A.

H 17.

SURVEY OF CHOWAN RIVER, NORTH CAROLINA.

UNITED STATES ENGINEER OFFICE,
Norfolk, Va., January 22, 1879.

GENERAL: An act of Congress approved June 18, 1878, directed that an examination or survey should be made of the Chowan River, North Carolina.

Your letter of the 8th of July charged me with the execution of the survey in question.

On the 13th of August last, after having had an opportunity of visiting the river, I reported to you that the only obstructions to navigation occur at what is known as "Stumpy Reach," from Bennett's Creek as low down as Coleraine Landing, a distance of about 7 miles. I also recommended that the survey be confined to this portion of the river. This recommendation having met with your approval, I intrusted the survey to a party in charge of Mr. W. G. Williamson, who was faithfully assisted by Messrs. Moncure and Blow.

The party undertook the work as soon as other surveys which were in hand could be completed. The work occupied from the 3d until the 13th of December last.

The results of the survey have since been plotted, and a tracing from the original chart, accompanied by a report from Mr. Williamson, is transmitted herewith.

The Chowan River is formed by the union of the Blackwater, Nottoway, and Meherrin Rivers. From the junction of these streams to the western extremity of Albemarle Sound, at which point the Chowan empties, is a distance (by river) of about 60 miles. The trade on the Chowan is of considerable importance, consisting principally in the shipment of large quantities of cotton, corn, wheat, tobacco, lumber, and fish.

Mr. Williamson was unable to obtain statistics showing the exact amount of the above-mentioned products shipped annually, but his report upon the survey of the Nottoway River, which is tributary to the Chowan, will give an idea of the large and fertile tract of country which seeks the Chowan as an outlet. The Blackwater, another tributary, has a constantly-increasing trade, which also finds an outlet by the way of the Chowan. The Blackwater is now being improved by the United States Government, an appropriation for the purpose having been made by Congress in June last.

Four steamers run regularly upon the Chowan; two from Franklin, on the Blackwater, to Plymouth, N. C.; one from Franklin to Norfolk, and one from the same point to Murfreesborough, on the Chowan.

Besides these regular steamers, a number of others make occasional trips, principally for the purpose of towing rafts of timber and to transport fish during the season.

Attention is called to the fact that the commerce of the Chowan River and its tributaries is carried on almost exclusively by steamers; and it is not probable that any improvement of "Stumpy Reach" would materially increase the use of sailing-vessels, as the river becomes so narrow above, and as the navigation of its tributaries is absolutely impracticable except by means of warping.

Steamers have no trouble in navigating "Stumpy Reach." A well-defined channel, of ample width and depth, exists over this whole section of the river. The removal of about one-half of the stumps, as suggested by Mr. Williamson, would shorten somewhat the distance that steamers are obliged to run in order to make their regular landings at this part of the river. In no case, however, would this saving in distance exceed one-half mile. Should any attempt be made to clear "Stumpy Reach," I do not see that any less can be done than that proposed in the plan of Mr. Williamson.

I cannot believe that the slight saving in distances that would be effected by this plan would compensate for the outlay, according to the accompanying estimate amounting to $81,450.

Mr. Williamson's recommendation in regard to the buoying of the channel on each side of Holliday's Island is a good one. I join with him in his recommendation, and would suggest that the attention of the proper department be called to the matter.

The Chowan River is in the collection-district of Edenton.

I am, general, very respectfully, your obedient servant,

CHAS. B. PHILLIPS,
Captain of Engineers.

Brig. Gen. A. A. HUMPHREYS,
Chief of Engineers, U. S. A.

REPORT OF MR. W. G. WILLIAMSON, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Norfolk, Va., January 20, 1879.

CAPTAIN: I have the honor to submit the following report of the survey of that portion of the Chowan River known as "Stumpy Reach," lying between the mouth of Bennett's Creek and Coleraine Landing.

The peculiar formations which give this part of the river its name, "Stumpy Reach," consist of large submerged areas covered with stumps. That these surfaces were once above the water cannot be questioned. When they were submerged must be left to the geologist to determine. A knowledge of the length of time the stumps have been under water would be very interesting to the engineer, as they are remarkably well preserved.

The first of these areas surrounds Holiday's Island. Its extent and form are well defined by the 12-foot contour.

The second is separated from the first by a channel from 13¾ to 15 feet deep and 1,500 feet wide. It extends from this point, which is opposite Woodleyville, to a point at mouth of Indian Creek. The outline of this area, which is also well defined by the 12-foot contour, suggests that it was at one time an island.

The third area lies next the west bank, commencing near the point opposite Halley's new wharf, and known by the river men as "Lower Bluff," extends down the river to a point nearly opposite Coleraine Landing.

The lower portion appears to have been cut up by cross-currents, and the 12-foot contour is broken, as shown on the map, and presents the appearance of separate shoals. The water which separates these shoals is only one or two feet deeper than it is on the other portions of the area, and conceals a number of stumps. The 12-foot contour does not, therefore, as in the previous instances, indicate so clearly the limits of this lower area. I have indicated its outline by marking its salient points and inclosing it by a dotted line. The locations and extent of these stumpy areas can be understood better by reference to the map accompanying this report.

The river is divided into two distinct channels by Halliday's Island, which converge at the mouth of Indian Creek.

These channels may be designated as the eastern and western channels, the latter being the main channel and thoroughfare; the eastern is narrow and difficult to navigate.

The difficulties presented by this "Stumpy Reach" consist in steamers being unable to land at Woodleyville without running the risk of striking stumps, and also in having to run down the river nearly opposite Coleraine before steering for that landing, instead of running directly for the landing from Cedar Point or Armstrong's Wharf, the next landing above Coleraine on the east bank.

The detour necessitates a run of 1,600 or 2,000 feet at most longer than the direct line. The first of these difficulties has been avoided by a wharf built just beyond the limits of the second stumpy area. This wharf was built by Dr. Wooley. Its position is marked on the map.

The second, as stated above, consists of an extra run of from 1,600 to 2,000 feet—a difference of five or six minutes' time. I confess I cannot see the propriety in the national government spending money to clear away obstructions which are such slight hinderances to navigation.

Sail-vessels experience greater difficulty in navigating the rivers than steamers. I am inclined to think very few sail-vessels, except, perhaps, small craft, navigate the river above Coleraine.

From the above description it does not appear that the commerce of that river justifies the great expense which the removal of the stumps would require. It would be

advisable to have both the eastern and western channels marked by buoys, placed in such a manner as to indicate the position and extent of the stumpy areas, and at the same time define both channels, so that vessels wishing to use either would have no difficulty in doing so.

I herewith submit an estimate of the probable cost of such an undertaking should it be desirable. This estimate is based on the supposition that the stumps are to be cleared from only such a portion of these areas as will enable vessels coming down the river to take the most direct route to Woodleyville, thence to Halley's new wharf, thence directly to Coleraine Landing.

Estimate for the removal of the stumps from a portion of "Stumpy Reach," Chowan River," North Carolina.

Number of areas.	Number of stumps.	Cost for each stump.	Total cost.	Remarks.
1	2,460	$7 50	$18,450 00	Cost of 1st west of Halliday's Island.
2	4,120	7 50	30,900 00	About ⅓ of 2d area.
3	4,280	7 50	32,100 00	About ¼ of the 3d area.
			81,450 00	

Very respectfully, your obedient servant,

W. G. WILLIAMSON,
Assistant Engineer.

Capt. CHAS. B. PHILLIPS,
Corps of Engineers, U. S. A.