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INTRACOASTAL WATERWAY—ACROSS FLORIDA SECTION

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, UNITED STATES ARMY, WITH ACCOMPANYING REPORTS, RELATIVE TO A SURVEY OF THE INTRACOASTAL WATERWAY—ACROSS FLORIDA SECTION

JANUARY 2, 1925.—Presented by Mr. Jones of Washington, referred to the Committee on Commerce, and ordered to be printed

WAR DEPARTMENT,
Washington, December 8, 1924.

Hon. W. L. JONES,
Chairman Committee on Commerce,
United States Senate.

MY DEAR SENATOR: I am transmitting herewith a letter from the Chief of Engineers, United States Army, of the 3d instant, together with copy of a report dated October 10, 1924, by the Board of Engineers for Rivers and Harbors, and copy of a report dated May 4, 1923, by the district engineer, Jacksonville, Fla., on review of report on survey of intracoastal waterway, across Florida section, printed in House Document No. 233, Sixty-third Congress, first session, called for by a resolution of your committee.

Sincerely yours,

JOHN W. WEEKS,
Secretary of War.

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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, December 3, 1924.

Subject: Review of report on survey of intracoastal waterway, across Florida section.

To: The Secretary of War.

1. Referring to letter of the chairman of the Committee on Commerce, United States Senate, dated May 27, 1921, quoting resolution of the committee requesting the Board of Engineers for Rivers and Harbors to reexamine and review the report on survey of intracoastal waterway, across Florida section, submitted in House Document No. 233, Sixty-third Congress, first session, I inclose herewith the report of the board in response thereto.

2. The proposal for a waterway across Florida was considered in 1911 by a special board of engineers, whose report is contained in the above-mentioned House document. Consideration was given to five alternative routes, of which the most satisfactory appeared to be that known as the Lake Harris route. The estimated cost at that time was about $16,500,000 for a 12-foot waterway following this route, and about $13,300,000 for a 7-foot waterway. The special board felt that the project would have value in developing the country, in furnishing a route for pleasure boats, and in serving as a feeder to the ports of Jacksonville, Fernandina, and Savannah. It considered, however, that the benefits were not commensurate with the costs and recommended against the work. This recommendation was concurred in by the Board of Engineers for Rivers and Harbors and by the Chief of Engineers.

3. In his accompanying report the district engineer states that the Lake Harris route still appears to be the most desirable. He estimates its present cost, with a depth of 12 feet, at $26,650,000. He estimates a potential commerce of about 500,000 tons annually either consumed or transshipped at the termini of the waterway, an additional 100,000 tons of local traffic having both origin and destination along the waterway, and a considerable through movement of pleasure craft. He discusses also another class of potential traffic, consisting of through commerce between the Atlantic Ocean and the Gulf of Mexico. From a careful study of the possible movements of such traffic, he feels that this is unlikely of development on a large scale. He concurs with the view expressed by the special board as to the strategic unimportance of the waterway, considering that this view is even more valid to-day. He recommends that the work be not undertaken. The division engineer concurs, with the qualification that the selection of a suitable route across the State of Florida can best be made after there shall have been provided an inland waterway from Beaufort, N. C., to Georgetown, S. C., and possibly after additional future developments in the inland waterway system along the Gulf of Mexico east of Mobile.

4. The Board of Engineers for Rivers and Harbors feels that the proposed waterway would be of some benefit to the territory bordering it, on account of its utility for local commerce or for traffic between interior points and the termini. It does not, however, consider likely the development of an important through business. It points out that if traffic is to move between the Atlantic Ocean and the Gulf of

Mexico over such a route without transshipment, the carriers, being limited by the 12-foot depth of the waterway, would be so small as to be uneconomical in operation compared with ordinary coastwise vessels, and would be much less safe in the open ocean. Upon the other hand, if the hauls in the Atlantic and Gulf were to be by seagoing vessels and the haul across Florida by barges, there would be required a transshipment at each end, the additional cost of which would probably nullify any economy resulting from the shortening of the present route around Florida. The board foresees no important strategic advantages in the project. It therefore concludes that the benefits would be almost entirely local and too limited to justify the very large expenditure involved, and reports that the provision by the Federal Government of a continuous inland waterway across the State of Florida, between suitable points on the eastern and Gulf coasts of said State, with a maximum depth of 12 feet, is not justified at the present time.

5. After due consideration of the information presented, I concur in the views of the board.

H. TAYLOR,
Major General, Chief of Engineers.

WAR DEPARTMENT,
THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., October 10, 1924.

Subject: Intracoastal waterway, across Florida section.
To: The Chief of Engineers, United States Army.

1. The board submits its report in response to the following resolution:

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors created under section 3 of the river and harbor act approved June 13, 1902, be, and it is hereby, requested to reexamine and review the report on survey of intracoastal waterway across Florida section, submitted in the House Document No. 233, Sixty-third Congress, first session.

2. House Document No. 233, referred to above, contains the report of a special board of engineers made in 1911. The special board considered five routes for a waterway across Florida, known, respectively, as the Okefenokee, the Santa Fe, the Lake Orange, and the Lake Harris routes, and a route through the Everglades, Lake Okeechobee, and the Caloosahatchee River. The board found the Lake Harris route to be the most desirable of the five, on account of its less cost and its abundant water supply. Its estimated cost, with a navigable depth of 12 feet, was $16,538,000, and with a navigable depth of 7 feet and a like depth over lock sills, $13,278,000. The board was of the opinion that the waterway would be of little value as a through route or from a strategic point of view; that it would be of considerable value as a feeder to the ports of Jacksonville, Fernandina and Savannah, as a means of developing the country, and as a route for pleasure boats and other light-draft craft; but that the prospective benefits were quite insufficient to justify the work. The Board of Engineers for Rivers and Harbors and the Chief of Engineers concurred in these views.

3. The accompanying report of the district engineer discusses the development of navigable channels in Florida since 1911 as bearing on a possible modification of the department's view as to the desirability of the Lake Harris route. He states that there has been an increase in the controlling depth of the St. Marys River, and that the work of the State of Florida in draining the Everglades, together with the Government improvement of the Caloosahatchee River, will within a year produce a series of shallow-draft navigable channels entirely across the State. None of this work is, in his opinion, such as to cause a change in the view previously held by the department, that the Lake Harris route is the best one available for a through waterway designed for barge traffic. He finds, however, that the increase in dredging and construction costs since 1911 requires that the estimate for the Lake Harris route be increased to about $26,650,000 for a depth of 12 feet.

4. The district engineer next considers the potential commerce of such a waterway. His estimates for this are as follows, based upon possible traffic in 1930.

(*a*) Outbound commerce destined for consumption or transshipment at the termini of the waterway, about 200,000 tons annually, with a freight saving of $575,000.

(*b*) Inbound commerce transshipped to the waterway at its termini, about 300,000 tons annually, with a freight saving of $375,000.

(*c*) Local traffic, having both origin and destination on the waterway, about 100,000 tons, with a freight saving of not over $50,000.

(*d*) A considerable through movement of pleasure craft, amounting to perhaps 150,000 to 200,000 tons a year, on which no figures of financial benefits can be given.

In addition to these there is a fifth class of potential traffic, consisting of through commerce between the Gulf of Mexico and the Atlantic Ocean. Regarding this, the district engineer points out that vessels which could navigate a 12-foot waterway would frequently have difficulty in operating safely on the Atlantic Ocean or the Gulf of Mexico, and would furthermore be more expensive to operate per unit of cargo than are large seagoing vessels. The development of through commerce would therefore require either that such vessels operate between Atlantic and Gulf ports with considerable risk while in the open sea, and with a higher unit operating cost to offset the reduced mileage; or that the water hauls on the Atlantic and the Gulf be by large ships, with transshipment at the termini of the waterway to and from barges, involving two additional handlings. The district engineer makes a special study of the possible movement by this route of coal from the Alabama fields to points on the Atlantic coast, giving consideration to existing rates and to methods and cost of transportation. His conclusion is that there would be little or no through movement of coal or other important commodities.

5. In its report of 1911 the special board was of the opinion that the proposed route would offer no advantages in the movement of troops or of naval vessels between the Atlantic and the Gulf of Mexico, except for a possible transfer of torpedo craft. In the present report the district engineer states that these advantages would be even less to-day, in view of the increased size of submarines and other auxiliary naval vessels.

6. The district engineer concludes that, while the proposed waterway would be of considerable benefit to local commerce, this benefit would not be commensurate with the large cost. He believes that the present needs of the State of Florida can more properly be met by a continuous development and full use of the waterways now existing than by a heavy expenditure of Government funds for the project now under consideration. He therefore considers that the work should not be undertaken.

7. The division engineer concurs in the opinions of the district engineer, except that he feels that the selection of a route across the peninsula of Florida can be made with greater certainty after provision shall have been made for the inland waterway from Beaufort, N. C., to Georgetown, S. C., and possibly after determining the extent to which the inland waterway system along the Gulf of Mexico is to be developed east of Mobile.

8. Interested parties were informed of the tenor of the district engineer's report and given an opportunity of submitting their views on the subject. Careful consideration has been given to the information presented.

9. A waterway across the State of Florida of a depth adequate for economical barge service would be very expensive. It would doubtless be of some benefit to the adjacent sections of Florida by furnishing an economical route for local commerce and for commerce between the terminals and interior points. These benefits would, however, be in no way commensurate with the expenditure. While the project would provide an all-water route between Gulf and Atlantic coast points materially shorter than that now followed around the southern end of Florida, this route could be utilized for freight movements only by two extra handlings of goods or by the through operation of seagoing vessels of a less safe and less economical type than those now generally in use as cargo carriers. It is unlikely that there would be any material diversion of such traffic to the waterway. No important strategic ends could be served by a channel of such limited dimensions. The benefits would accordingly be almost entirely local, and too limited in scope to justify the very large cost. The board therefore concurs with the district and division engineers in the view that the provision by the Federal Government of a continuous inland waterway across the State of Florida, between suitable points on the eastern and Gulf coasts of said State, with a maximum depth of 12 feet, is not justified at the present time.

For the board:

H. C. Newcomer,
Colonel, Corps of Engineers, senior member present.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Jacksonville, Fla., May 4, 1923.

Subject: Report on intracoastal waterway, across Florida section.
To: The Chief of Engineers, United States Army, Washington, D. C. (Through the division engineer, southeast division, Charleston, S. C.).

SYLLABUS

The district engineer is of the opinion that the across Florida section of the intracoastal waterway will not offer sufficient advantages to commerce to attract any considerable portion of the present or immediately prospective traffic between the Gulf of Mexico and the Atlantic Ocean. He believes, furthermore, that the anticipated benefits to local commerce, although considerable, are not reasonably commensurate with the large initial expenditure and annual cost of maintenance. He accordingly reports that the project is not now worthy of adoption by the United States.

1. Authority: On May 26, 1921, the Committee on Commerce of the United States Senate adopted the following resolution:

Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors created under section 3 of the river and harbor act approved June 13, 1902, be, and it is hereby, requested to reexamine and review the report on survey of intracoastal waterway, across Florida section, submitted in the House Document No. 233, Sixty-third Congress, first session.

Pursuant thereto the Chief of Engineers directed the district engineer of this district to submit a report on the subject matter of the resolution and instructed him that "as the item of law under which the report was submitted limited the maximum depth to be considered to 12 feet, that depth should not be exceeded in the reconsideration." In compliance with the instructions cited the following report on the intracoastal waterway, across Florida section is submitted:

PREVIOUS REPORTS

2. The report named in the resolution of the Senate Committee on Commerce was submitted on November 9, 1911, by a special Board of Engineers in compliance with an item in the river and harbor act of March 3, 1909, calling for a report in the following language:

Survey for the construction of a continuous inland waterway across the State of Florida, between suitable points on the eastern and Gulf coasts of said State, for the purpose of ascertaining the cost of a channel with a maximum depth of 12 feet, or such lesser depths along any section or sections of said waterway as may be found sufficient for commercial, naval, and military purposes. Such survey shall include an examination of all practicable routes, the preparation of plans, and estimates of cost along the most available route, and a report upon the desirability of utilizing as a part of such waterway any existing public or private canal, or any part thereof, and the probable cost of acquiring the same.

3. In submitting this report the special board stated its conception of the problem as follows:

The board, after study of the wording of the act directing the survey, the physical features of the country to be traversed by the canal, and the uses which could be made of a waterway having a maximum allowable depth of 12 feet, adopted the following preliminary conclusions, which, taken as a whole, represent the board's conception of the problem before them:

(*a*) That the canal proposed is a barge canal.

(*b*) That its dimensions (within legal limits), water supply, and facility of operation should be such as would safely, conveniently, and expeditiously handle a commerce commensurate with the magnitude of the project.

(*c*) That the line of location should be as far north and as straight as practicable.

(*d*) That its termini, both on the Gulf and eastern coasts, should be harbors available to ocean shipping, or localities susceptible of improvement to that extent, at reasonable cost.

4. In its discussion of the problem the special board considered five possible routes for the location of a canal conforming to the above requirements. In its report the board described these routes briefly in order of their geographical location from north to south substantially as follows:

(*a*) The Okefenokee route follows in general the St. Marys River from its mouth in a northwesterly direction for about 27 miles, thence through Okefenokee Swamp and enters St. Marks River near the latter's point of discharge into Apalachee Bay. This route has a summit elevation of 125 feet and a total length between Gulf and Atlantic termini of 215 miles. The termini are, respectively, St. Marks, on Apalachee Bay, and Fernandina, at the entrance to Cumberland Sound. The latter port is a well established deep-water harbor, but the St. Marks River is not navigable to the town of St. Marks for craft drawing more than 7 feet. This route would utilize for its summit level supply the vast natural reservoir of Okefenokee Swamp as developed and improved along lines suggested by General Gilmore in his report on a trans-Florida canal in 1880. The preliminary estimate for this route was $41,938,000 not including the cost of a deep-water harbor at St. Marks. The board considered a more southerly location for the eastern terminus by utilizing Bay Swamp for the summit level supply and the St. Johns River for the Atlantic harbor. The preliminary estimate for such a route was $44,478,000, also exclusive of the cost of a deep-water harbor at St. Marks. The Okefenokee route possesses the advantage of being the most direct route for through commerce between Gulf and Atlantic ports, but has the disadvantage of excessive cost of construction and questionable adequacy of water supply.

(*b*) The Santa Fe route has its Atlantic terminus in the St. Johns River and its Gulf terminus at the mouth of the Suwannee River and would receive its water supply from Santa Fe, Little Santa Fe, and Alto Lakes. The total length of this route is 217 miles and its summit elevation is 138 feet. The preliminary estimate, exclusive of the cost of the construction of a deep-water harbor at the western terminus, was given as $17,208,000. While possessing the advantage over more southerly routes of shorter distance between Gulf and Atlantic ports, the Santa Fe route was eliminated from serious consideration because of its inadequate water supply.

(*c*) The Lake Orange route has the same termini as the Santa Fe route, but contemplates the utilization of Orange and Lochoosa Lakes as a source of water supply for the summit level. The length of this route is 245 miles and the summit elevation is 57.5 feet. The water supply was considered sufficient for the probable commerce at the time of the original report but not sufficient to permit of further enlargement of the dimensions of the proposed canal or further commercial expansion. The cost was estimated at $16,485,000.

(*d*) The Lake Harris route, although farther south than any of the routes seriously considered by the board, was selected as the most advantageous because of its abundant water supply which was sufficient to accommodate the commerce then existing and to permit of further commercial expansion, and improvement and enlargement of the canal. It possesses the additional advantages of relatively smaller cost of construction and desirable location of its Gulf and Atlantic termini.

(*e*) In addition to the four northern routes above mentioned the special board considered a route through the Everglades, Lake Okeechobee, and the Caloosahatchee River. This route was dismissed as unworthy of serious consideration at that time because of its extreme southern location, by reason of which it would possess little advantage to Gulf-Atlantic commerce over the present route through the Florida straits. At that time also the drainage canals which now connect Lake Okeechobee with the Atlantic Ocean and the Gulf had not been begun, and the effect in reducing construction costs was accordingly not taken into consideration by the special board.

5. The Lake Harris route, which the board believed to be more advantageous than any other, may be more fully described as follows: Beginning with the St. Johns River there is a navigable channel 30 feet deep from the entrance to Jacksonville, a distance of 28 miles; a navigable channel 13 feet deep from Jacksonville to Palatka, a distance of 55 miles; from Palatka to the mouth of the Oklawaha River, a further distance of 22 miles, there is a navigable depth in excess of that of the proposed canal, except at four points, aggregating a length of about 1,500 feet. From the St. Johns River the canal follows the valley of the Oklawaha River through Scrub Lake, Lake Jumper, Deep Lake, Half Moon Lake, Long Lake, Lake Griffin, Lake Harris, and Lake Okahumpka, thence to the Withlacoochee River, which it follows to the mouth. The total length of this route is 237.2 miles and the summit elevation is 54.6 feet. A total of 15 locks will be required. Whereas the other routes were surveyed only in a preliminary way to determine the most suitable, the Lake Harris route, after selection, was made the subject of a very careful detailed survey with numerous borings. The estimated cost of a canal over this route with a navigable depth of 12 feet was given as $16,538,005, the annual maintenance being placed at $375,000. In a subsequent report submitted July 30, 1913, the board reported that the cost of a canal along this route having a navigable depth of 7 feet with locks designed for the same depth would be $13,277,626, and that for a canal 7 feet deep with locks designed for a depth of 10 feet the cost would be $14,444,869. After a detailed investigation as to the probable benefits to be derived from the construction of the proposed canal and after a careful consideration of its probable costs, the special board arrived at a conclusion which it stated as follows:

> The board is of the opinion that a canal such as is proposed would have no great value as a through route between Gulf and Atlantic ports; that its value from a strategic point of view is small; that from a purely local standpoint the canal would be of considerable value as a feeder to the ports of Jacksonville, Fernandina, and Savannah, and would also have considerable value in developing the country through which it is designed to pass. It will also be a convenient route for pleasure craft, dredging plants, tugs, empty barges, and occasional light-draft craft of all kinds between the Gulf and the Atlantic. These latter uses are, however, in the opinion of the board entirely insufficient to justify the large expenditure required for the construction of the canal and its maintenance, and therefore the board is unanimously of the opinion that the project is one not worthy of prosecution by the United States at present.

The Board of Engineers for Rivers and Harbors and the Chief of Engineers concurred in these conclusions of the special board.

6. In addition to the report of the special board of engineers reviewed herein, certain other reports on various waterways in the State of Florida have a bearing upon the question of an Intracoastal waterway across the State. These reports are listed as follows:

Previous reports on intracoastal waterway and connecting waterways

Locality	Preliminary examinations		Surveys		Recommendation	Recommendation of Chief of Engineers	Where published					
							Congressional documents				Annual reports, Chief of Engineers	
	Date of report	Recommendation	Date of report	Estimated cost			H. or S.	No.	Congress	Session	Year	Page
Intracoastal waterway, Beaufort, N. C., to Key West, Fla.			July 1, 1911	$31,054,000	Favorable	Favorable	H.	229	63	1		
St. Johns River to Sanford	June 3, 1907	Favorable	Oct. 1, 1908	$109,000	Favorable	Favorable	H.	1111	60	2		
St. Lucie Inlet and River	July 19, 1907	Unfavorable	do	1,400,000	do	do	H.	1312	60	2		
	Mar. 7, 1910	do					S.	423	61	2		
	Aug. 29, 1911	do				Unfavorable	H.	675	62	2		
	Oct. 6, 1915	do				do	H.	370	65	1		
Withlacoochee River, Fla	July 24, 1905		Dec. 29, 1906	215,400	Favorable	Favorable	H.	483	59	2		
	Feb. 6, 1911	Unfavorable					H.	395	62	2		
			Aug. 27, 1914		Unfavorable	Unfavorable	H.	1020	64	1		
	Nov. 20, 1919	Unfavorable				do						
Suwanee River, Fla			1879	55,000	Favorable	Favorable	H.	82	45	3	1879	857–863
	1909	Unfavorable				Unfavorable	H.	427	61	2		
	1913	do				do	H.	108	63	1		
Caloosahatchee River, Fla	1902	do				do	H.	176	57	1	1902	1225
	Aug. 1, 1905	do				do	H.	180	59	1		
	July 29, 1907	do				do	H.	347	60	1		
	Oct. 4, 1912	Favorable	Dec. 18, 1912	119,000	Favorable	Favorable	(1)	8	61	2		
	Apr. 24, 1917	Favorable for survey.				Unfavorable	H.	756	65	2		

[1] River and Harbor Committee.

SCOPE OF PRESENT REPORT

7. In the preparation of this report the project has been considered from the following angles:

(*a*) Physical improvements since the submission of the report of the special board which might influence choice of routes or reduce the cost of construction.

(*b*) Possible changes in engineering features which might reduce the cost of construction or operate to affect the selection of the most advantageous route. (In compliance with instructions dimensions considered have not been varied from those indicated in the original report.)

(*c*) Changes in the labor and material markets which might affect the original estimates.

(*d*) Possible increase in the commercial, military, and naval uses of such a canal which might justify the United States in entering upon the project.

PUBLIC HEARING

8. In order to ascertain the present sentiment as to the most advantageous route and to obtain the latest data upon the probable commercial uses of the canal, a public hearing was held at Leesburg, Fla., on November 16, 1922. Notices of the public hearing and questionnaires designed to bring out complete statistics on the present and prospective commerce of the various sections of Florida and between Gulf and Atlantic ports were distributed throughout the State and amongst civic organizations at the principal ports on the Gulf and Atlantic coasts. It was intended to give local organizations from the various sections of the State of Florida a full opportunity to present data in support of any particular route favored by them and to obtain the fullest possible data on Gulf-Atlantic commerce and therefrom deduce the probable commercial value of the trans-Florida canal. Representatives from the southern and central portions of the State presented considerable data in support of the Lake Harris and the Okeechobee routes. There were no representatives present supporting any of the three more northerly routes, but supporters of the Okefenokee route submitted by mail several petitions and telegrams requesting that that route be given full consideration. No replies to the questionnaires were received from interests located at Gulf and Atlantic ports outside the State of Florida, and no data were submitted at the hearing or subsequent thereto to show the value of the proposed canal to commerce between cities on the Gulf of Mexico and those on the Atlantic coast. With a view to obtaining an expression of opinion as to the probable utilization of the canal for through traffic between Gulf and Atlantic ports, letters were sent subsequent to the hearing to trade organizations at New Orleans, Mobile, Pensacola, Apalachicola, Fernandina, Savannah, Charleston, and Norfolk. The fact that no replies to these letters have been received is interpreted to mean that these ports do not consider that such a waterway across the State of Florida would be of any material benefit to them.

PHYSICAL IMPROVEMENTS SINCE THE SUBMISSION OF THE PREVIOUS REPORT

9. Inasmuch as the proposed trans-Florida canal is to be a link in a projected continuous inland waterway from Boston to the Rio Grande, the extent to which this proposed continuous waterway has been developed since the submission of the former report is thought to have a particular bearing on the construction of the canal at this time. The following table indicates in a general way the improvement of various sections of the intracoastal waterway between the years 1912 and 1921, and the present adopted projects relating to these sections:

Section	Mean low water draft 1912	Mean low water draft 1921	Project depth	Remarks
New York to Delaware Bay	7	7	7	
Delaware Bay to Chesapeake Bay	9	9	12	
Chesapeake Bay to Beaufort, N. C.	8	9		Via Dismal Swamp Canal.
Do	9	10	12	Via Albemarle and Chesapeake Canal.
Do	4	4	7	Via Core Sound and connecting waterways.
Beaufort, N. C. to Bear Inlet	4	4	3	At high tide only.
Bear Inlet to New River Inlet	3	3	3–4	Do.
New River Inlet to Wrightsville Inlet	2	1½		Do.
Wrightsville Inlet to Cape Fear River				Outside passage only.
Cape Fear River to Winyah Bay				Do.
Winyah Bay to Charleston, S. C.	4	3	4	
Charleston, S. C. to Fernandina, Fla.	6	6	7	Existing waterway from Charleston, S.C. to St. Johns River only 6 feet from Charleston to Beaufort, S.C.
Fernandina, Fla. to St. Johns River, Fla.	3	6	7	
St. Johns River, Fla. to Biscayne Bay	3	4	5	Privately owned waterway. No United States project. P. E. directed by river and harbor act.
Biscayne Bay to Key West, Fla.	10	10		
Key West to Coon Key	7	7		Partly outside.
Coon Key via Big Marco River and Pass	4	4		
Big Marco Pass to San Carlos Bay				Outside passage only.
San Carlos Bay to Boca Grande entrance	6	5		
Boca Grande entrance to Tampa Bay entrance.				Do.
Tampa Bay entrance to Anclote Keys	5	4	5	
Anclote Keys to Cedar Keys entrance				Do.
Cedar Keys entrance to St Marks entrance				Do.
St. Marks entrance, via Crooked River to Carrabelle.	3	3		
Carrabelle to Apalachicola	8	8		
Apalachicola to St. Andrews Bay entrance	5	4.5	5	
St. Andrews Bay entrance to Choclawatchee Bay entrance.				Do.
Choclawatchee Bay entrance to Pensacola Bay entrance.	6	4	6	
Pensacola Bay entrance to Mobile Bay				Do.
Mobile Bay via Pass aux Herons to Mississippi Sound.	6	7	10	
Mississippi Sound via Lake Borgne Canal to New Orleans.		5.5		Privately owned canal.
New Orleans to Sabine Pass	3	5	5	5-foot projects now under progress.
Sabine Pass to Galveston				Outside passage only.
Galveston to Corpus Christi	4	4.5	5	

10. The available depths in 1912 and 1921 are taken from published editions of the Inside Route Pilot for 1913 and 1922 and from the annual reports of the Chief of Engineers. While these publications do not agree in all respects, the figures in the table are considered sufficiently accurate for the purpose intended. It appears that,

although the United States is committed in a general way to the development of a continuous inland waterway from Boston to the Rio Grande, various sections have not yet been found worthy of improvement, and others have been found economically impossible of development. That a standard depth for the entire route has not been adopted would indicate that the various sections have been developed because conditions in each particular section appeared to warrant the improvement being undertaken by the United States for the benefit of local commerce and that through traffic has not been deemed sufficiently valuable to warrant a general improvement of the route for that purpose.

11. As bearing on the possible modification of any of the routes considered and upon the selection of the route now most desirable, the improvement of the various natural waterways embraced by each of the five routes has been considered in detail. Two deep-water harbors were considered as possible eastern termini for the canal, viz, Jacksonville and Fernandina. In 1912 the controlling depths at the docks in Fernandina and in the entrance to Cumberland Sound were, respectively, 20 feet and 19 feet below mean low water. The navigable depth of the St. Johns River from the entrance to Jacksonville has been increased in the same period from 24 feet to 30 feet below mean low water. In 1912 the controlling depth in the St. Marys River from the mouth to the entrance of the proposed canal was 13.5 feet, which depth has since been increased to 15 feet under the project for a 17-foot depth from the mouth of the river to Crandall. The improvements of the upper St. Johns River and of the Suwannee, Withlacoochee, and Oklawaha Rivers have not been of such nature or magnitude as to affect the cost of construction of a canal following the valleys of these waterways.

12. The Okeechobee route, which was dismissed as unworthy of consideration by the special board sitting in 1911, has since the submission of the report of that board been materially improved in consequence of certain drainage operations conducted by the State of Florida. These improvements, soon to be completed, will in fact result in a cross State waterway which may be further improved at a cost considerably less than that which the board deemed prohibitive. The board of commissioners of the Everglades drainage district, in pursuance of its drainage operations in the Everglades region, has under construction a canal 200 feet wide and 10 feet deep from Lake Okeechobee to the St. Lucie River on the Atlantic coast. The completion of this canal within the present calendar year will provide a continuous waterway across the State of the following dimensions: From Punta Rassa to Fort Myers via the Caloosahatchee River, 100 feet wide and 10 feet deep; from Fort Myers to Fort Thompson, a distance of 43 miles, 100 feet wide and 4 feet deep; from Fort Thompson to Moore Haven 3 feet deep and of navigable width; from Moore Haven through Lake Okeechobee to the St. Lucie Canal 12 feet deep; from Lake Okeechobee through the St. Lucie Canal and River to St. Lucie Inlet 200 feet wide and 10 feet deep. This route would afford a through waterway from the Gulf of Mexico to the Atlantic Ocean at a much smaller expenditure than is required by the adoption of any of the more northerly routes. Its acceptance for development by the United States would be contingent upon the cooperation of the State of Florida in altering the design of the locks in the St. Lucie

and Three Mile Canals and in coordinating its drainage operations with navigation interests. While this route might eventually be worthy of improvement by the United States in the interests of the commerce of the Everglades and Caloosahatchee River sections, it has no appreciable value as a connecting link in the continuous inland waterway for reasons set forth in the previous report, in which reasons I concur. Briefly stated, these reasons are:

(*a*) Geographical location too far south to effect a mileage saving of any consequence for Gulf-Atlantic commerce.

(*b*) Absence of possible connection with the intracoastal waterway on the Gulf side, and in consequence involving for through-bound traffic a long hazardous voyage across the open waters of the Gulf.

13. These disadvantages are in my opinion sufficient to eliminate the Okechobee route from further consideration as a worth-while link in an intracoastal waterway designed to economically and efficiently connect ports on the western and central Gulf with ports on the northern and central Atlantic coast.

14. Summing up the general improvements in the intracoastal waterway, and viewing the existing situation in its entirety, it does not appear that this proposed continuous waterway has developed to such a point as to make advisable the establishment of the across Florida section at this time. With reference to local improvements of various waterways which might be utilized in the construction of a canal across the State it is evident that such improvements have not yet been of such nature or magnitude as to dominate or even seriously influence the selection of the most advantageous route or to greatly reduce the cost of construction of any of the routes really capable of construction.

ENGINEERING FEATURES AND ESTIMATES

15. The previous report was complete and comprehensive in its treatment of engineering features and estimated construction costs. The selection of the Lake Harris route was based upon certain engineering and economic features, viz, length of route, adequate water supply, and cost of construction, which were of such a vital nature as to unquestionably justify the choice of this route. Any changes which have occurred in these features have not been sufficient to warrant any change in the general location selected for this route. Minor departures in the detailed location of the Lake Harris route have been considered, especially in view of the suggestions of certain interests that the route would better pass through Lake Panasoffkee and enter the Withlacoochee River some distance south of the location selected by the special board. These interests contend that the canal so located would be more accessible to a fertile section of hammock land surrounding Lake Panasoffkee, and furthermore that by coordinating the project for navigation with existing drainage and power projects the cost of construction would be materially lessened. The question of locating the canal route through Lake Panasoffkee and its outlet to the Withlacoochee River has been fully considered. Such a location is not deemed advisable because of certain engineering features of a vital nature. In considering the detailed location of the canal the route through Lake

Panasoffkee was particularly avoided in view of the fact that the water supply of the canal would be seriously endangered by flooding over the vast territory of the lake and the surrounding swamps. A resurvey of the entire route might disclose advantages in relocating certain parts of the route but such relocation if feasible would not seriously affect the estimated cost of construction.

16. Since the estimates of the special board were made material and labor costs in general have so increased as to necessitate an increase of approximately 66 per cent in the original estimates of cost. A detailed estimate of Lake Harris route based upon the present unit prices of labor and materials, is as follows:

Unit prices	Former estimate	Present estimate
Excavation by hydraulic dredge, per cubic yard	$0.15	$0.25
Excavation by steam shovel (soft material) per cubic yard	.25	.40
Rock excavation (submarine) per cubic yard	.75	1.00
Rock excavation (dry) per cubic yard	.75	1.00
Concrete mass, per cubic yard	12.00	15.00
Bearing piles, per foot	.25	.60
Sheet piling, per thousand	60.00	100.00
Miter sills, timber, etc., per thousand	100.00	100.00
Rip rap, per cubic yard	4.50	5.00
Soft excavation at lock sites, per cubic yard	.50	.40
Rock excavation at lock sites, per cubic yard	1.00	1.00
Heavy clearing, per acre	50.00	100.00
Light clearing, per acre	20.00	20.00
Embankment fill, where borrow pits are necessary	.25	.40
DETAILED ESTIMATE OF COST		
Right of way	200,000.00	400,000.00
Clearing	200,000.00	325,000.00
Hydraulic dredge excavation, 15,100,000 cubic yards	2,265,000.00	3,775,000.00
Steam shovel excavation, 18,800,000 cubic yards	4,700,000.00	7,520,000.00
Rock excavation, 1,800,000 yards	1,350,000.00	1,800,000.00
Locks 1 to 11	4,097,946.00	6,800,000.00
Dams at Deep, Orange, Mill and Eaton Creeks and Oklawaha River crossing	401,150.00	667,000.00
Moss Bluff Dam and controlling gates	57,000.00	94,600.00
Reservoir dams and spillways	175,800.00	292,000.00
Locks and moveable dams, Nos. 12 to 15	1,539,384.00	2,555,000.00
Total	15,034,550.00	24,228,600.00
Engineering, superintendence, and contingencies, including maintenance during construction	1,503,455.00	2,422,860.00
	16,538,005.00	26,651,460.00

17. A rough estimate for the five routes considered is given as follows:

Route	Former estimate	Present estimate
Okefenokee route—Fernandina terminus	$41,938,000	$69,600,000
Okefenokee route—St. Johns River terminus	44,478,000	73,800,000
Santa Fe route	17,208,000	28,560,000
Lake Orange route	16,485,000	26,500,000
Lake Harris route	16,538,005	26,651,460

The above figures are, of course, only roughly approximate, having been calculated upon the original preliminary estimates as a basis, with an increment derived from the comparative increase in material and labor costs. A new estimate on the Lake Okeechobee route has not been made, inasmuch as the recent State improvements have been such as to require a complete new survey before a reasonably accurate estimate can be made.

COMMERCIAL STATISTICS

18. In arriving at an estimate of the commercial utilization of the canal, the probable traffic has been divided into the following classes:

(*a*) Exports from the territory tributary to the canal, destined to either terminus for consumption or for shipment thence by rail, ocean steamship, or inland coastal vessels.

(*b*) Imports from all sources brought into the canal by transshipment at either terminus or by through inland waterways.

(*c*) Purely local traffic, consisting of interchange of supplies or products between points on the canal.

(*d*) Through traffic between Gulf and Atlantic ports.

(*e*) Pleasure craft.

19. *Traffic originating on the canal.*—The proposed route traverses the counties of Levy, Sumter, Citrus, Marion, Lake, Putnam, and Clay. The two last named counties are at present served by the St. Johns River, improved to a 13-foot depth as far as Palatka, and their commerce, in so far as eastbound traffic is concerned, is not considered as pertaining to the cross-State canal. The canal route lies, in some cases, at considerable distance from the principal shipping centers of the counties named, but due to the rapid development of motor transportation, coupled with the general improvement of highways throughout this section of the State, the commerce of the above counties may be assumed to have access to the proposed water route.

20. The exports for the year 1921 claimed by various local organizations are as follows:

County	Commodities	Tonnage	Value
Lake	Melons	18,000	$600,000
	Citrus fruits	36,000	2,400,000
	Vegetables	3,600	300,000
	Sand	120,000	200,000
	Kaolin	30,000	500,000
	Brick	12,000	200,000
	Naval stores	45,000	750,000
	Lumber	48,000	1,500,000
	Cross ties	16,000	300,000
	Spanish moss	1,000	50,000
	Livestock and products	12,000	1,000,000
	Miscellaneous	3,600	80,000
Marion	Phosphate rock	355,000	2,307,500
	Lime rock	200,000	800,000
	Burnt lime	27,000	540,000
	Agricultural lime	31,000	620,000
	Mineral dust	12,000	240,000
	Naval stores	4,000	160,000
	Lumber	13,000	375,000
	Livestock	2,400	200,000
	Citrus fruits	17,000	1,275,000
Citrus	Phosphate	100,000	650,000
	Crushed rock	210,000	420,000
	Citrus fruits	12,000	900,000
	Vegetable and melons	32,400	1,296,000
Sumter	Farm products	38,400	1,300,000
Levy	Field crops and fruits	17,600	682,000
Total		1,417,000	19,025,500

The amounts claimed by Lake and Marion counties are believed to be excessive, while those for Citrus, Sumter, and Levy counties are incomplete. As a whole the figures are a fair representation of the exports of the entire section. With the exception of phosphate

rock, which goes by rail to Fernandina and Tampa, and road materials, which are distributed locally by rail, practically the entire exports from these counties go by rail to Jacksonville. From this point 75 per cent goes by rail to northern and eastern markets, and 25 per cent by water to northern ports. It is not possible to accurately estimate what portion of the shipments would take advantage of the canal route, since the method of shipment is dependent upon the nature of the commodity, the transportation service offered, and the destination.

Some authorities claim that citrus fruits will not permit of shipment by water except under refrigeration. This claim is not necessarily correct. Evidence presented at various public hearings in connection with waterway improvements in the citrus section indicates that citrus fruit shipments are regularly made by water and without refrigeration and that such shipments suffer no greater, and in some cases even less, deterioration than is sustained by all-rail refrigerator-car shipments. The modern methods of mechanical washing and packing of citrus fruits subject them to severe handling, which results in bruising or breaking the skin and renders them more liable to deterioration during shipment than was the case under packing methods formerly in use.

The preferred method in shipment is to precool the fruit at the packing houses loading directly therefrom into refrigerator cars for delivery with bulk unbroken at the destination. Because of the lack of an adequate supply of refrigerator cars, fruit shippers have been forced at times to resort to less satisfactory methods. In some cases shipments have been made by box cars to Jacksonville or Tampa, thence by unrefrigerated boats to eastern or Gulf markets. The testimony indicates that, although the deterioration and damage incurred in this emergency method of shipment by water is usually no greater than that occurring in shipments by refrigerator cars, and, although the freight saving is considerable, this method is avoided whenever refrigerator cars are obtainable. This is due to the fact that the established fruit and produce markets in the large cities are located at the railroad terminals and fruits arriving at ship terminals are at a disadvantage and do not command market prices on their own merits.

It may be assumed, in view of the increasing car shortage and the enormous annual increase in citrus shipments, that a fair ratio of the consignments to eastern ports will soon seek the water route. It is estimated that 60 per cent of the entire citrus crop is destined to markets east of Pittsburgh, and 20 per cent of this amount or 12 per cent of the entire crop may reasonably be expected to take advantage of the proposed waterway. In 1922 approximately one-fourth of the citrus exports of the State, or about 3,500,000 boxes were shipped from territory accessible to the proposed waterway. The reports of the State commissioner of agriculture show that the citrus products of the State have increased approximately threefold in the past 10 years. In view of the enormous increase in acreage, it may be safely predicted that the production will increase threefold in the next decade. There can be no doubt that the railroads are incapable of keeping pace with the production. Assuming therefore that 12 per cent of the entire export for the year 1930, or 1,260,000 boxes, will be shipped by the proposed canal at a freight saving of

30 cents per box (approximately the present differential) the annual freight saving for this class of commodity would amount to $378,000.

Local interests claim that a large proportion of the citrus shipments to points west of Pittsburgh would be made by barges or other vessels through the canal to the Gulf of Mexico, thence to New Orleans and via the Mississippi River, were such a route available. Due to the lack of a continuous inland waterway from the Gulf terminus of the canal to New Orleans, it can not be assumed that a through barge service to Gulf ports would be established even if the trans-Florida section were complete. In the absence of an intracoastal canal along the Gulf only small shipments by the trans-Florida canal could be anticipated, and such shipments would be dependent on the establishment of a deep-water harbor at the Gulf terminus of the canal. Furthermore, due to the fact that such a route would be wholly in southern waters refrigerated ships would be unquestionably necessary.

21. The phosphate rock and raw building materials, comprising the major portion of the entire exports are of such a low class freight that they can not bear transshipment costs except when handled by highly efficient mechanical devices capable of loading deep-draft vessels in large quantities at low unit costs. Such devices for transferring phosphates from rail to boat lines are established at Port Tampa and Fernandina and it can not be safely assumed that the creation of a barge line would offer sufficient freight saving on this commodity to overcome this advantage already possessed by the railroads.

22. Naval stores, kaolin, and a large portion of the manufactured lumber might be expected to move by way of the canal. The total tonnage of these products exported for the year 1921 amounted to 156,000 tons, valued at $3,285,000. This section of the State is rich in standing timber and in kaolin deposits, and it is predicted that the exports of this class of material for 1930 will be double the present tonnage. Estimating that 50 per cent of these shipments will take advantage of the water route, the saving in 1930, based on a differential of $1.25 per ton, would amount to $195,000.

23. Summing up the exports which may be expected to take advantage of the water route the total tonnage for the year 1930 is 206,400 tons, valued at $7,165,000, with a freight saving of $573,000.

24. *Inbound traffic.*—Lake County claims a total of 355,625 tons of imports annually, valued at $11,205,000. These imports consist of lumber and mill stuffs, paving and building materials, automobiles, trucks, and farming machinery, hay, fertilizer, gasoline, oil, groceries, and general merchandise. It is not improbable that these figures are in excess of the annual average, and inasmuch as Marion, Levy, Citrus, and Sumter Counties have not furnished data on imports it is not possible to make an accurate estimate of the total imports of the entire section commercially tributary to the proposed waterway. Statistics compiled in connection with other preliminary examinations where more accurate figures were obtainable indicate that the imports generally exceed the exports in tonnage and value. In the case of the Clyde Steamship Lines operating between Jacksonville and Miami and between Jacksonville and Sanford, it has been

found that these vessels leave Jacksonville fully loaded but ordinarily return with one-half to two-thirds of a full cargo. It is safe, therefore, to say that the tonnage of imports to the section via the proposed waterway in the year 1930 will at least be equal to the exports. On this basis the total imports are predicted at 300,000 tons, valued at $9,300,000, with a freight saving of $375,000.

25. *Purely local traffic.*—Traffic originating within the canal for distribution along its banks would be confined chiefly to road and building materials and lumber moving from mills to settlements along the route. In addition, there would be a small amount of general merchandise moving from wholesale to retail stores, and farm products, fruits, and vegetables moving to towns for local consumption or for collection at warehouses with a view to bulk shipment out of the territory. With the exception of road and building materials the tonnage of commodities of this class is included under the headings of imports to and exports from the territory. The road and building materials are estimated at 500,000 tons for the year 1930, of which 20 per cent, or 100,000, might move by the waterway (if available), with a freight saving of not more than $50,000 per year.

26. *Through traffic.*—To carry any reasonably adequate part of the present commerce between the Gulf of Mexico and the Atlantic Ocean there would have to be established on the canal through barge or light-draft steamer lines capable of successful competition with the more direct railroad lines and with the ocean steamship lines through the straits of Florida. In operating between Gulf and Atlantic ports such barge or steamer lines would be more or less exposed to a hazardous voyage through the Gulf of Mexico to the western terminus of the proposed canal, thence by a devious inland route with many lockages to Jacksonville and by incomplete waterways northward to Fernandina, Savannah, Charleston, and other Atlantic ports still farther north. Experience has shown that commerce prefers to move and can move more economically in deep-draft vessels in which greater cargoes can be accommodated and on which marine insurance rates are not prohibitive. By taking advantage of the canal, vessels bound from the Gulf to the Atlantic would save a distance varying from a maximum of 430 miles, as between Apalachicola and eastern ports, to a minimum of 170 miles, as between Galveston and eastern ports. Because of the numerous lockages required and the slow rate of speed which must of necessity be maintained in a confined channel, it is not believed that merely to save these distances commerce between the Gulf and the Atlantic would abandon the present methods in favor of the inland route.

27. With reference to the value of the proposed canal to through traffic, the special board in its report stated that "in order that the canal may handle the Gulf–Atlantic commerce a revolution in existing water transportation methods would need occur, which would only occur if the canal route were cheaper or more convenient." Since the submission of that report there has undoubtedly been an improvement in transportation methods, but it has not been such as to favor restricted inland routes. The shallow draft ocean steamers and sailing vessels have rapidly disappeared from open waters, being displaced by commodious deep draft vessels capable of greater speeds and more economical operation. As indicative of the rapid

change in ship construction reports of the Bureau of Navigation show that out of 48 steam freighters constructed in 1912 only 10 had a gross tonnage of more than 3,000 tons, whereas, out of 44 steam freighters constructed in 1921, 35 had a gross tonnage of more than 3,000 tons, the average being 5,800 tons. The remaining 9 steamers constructed in 1921 were built especially for freight service on the Great Lakes or other favored inland waters, and had an average gross tonnage of 590 tons. Ten steam-driven tankers were constructed in the year 1912, the average gross tonnage being 4,327 tons, while in 1921, 66 steam-driven tankers were placed in service, the average displacement being 7,410 gross tons. That a similar revolution is occurring in the construction of sailing vessels is shown by the fact that, whereas in 1912 of 30 freight schooners constructed only 3 had a tonnage greater than 2,000 gross tons, in 1921, 13 out of 23 freight schooners displaced 2,000 tons or more. In view of the above figures it is apparent that the modern tendency is not to construct freight-carrying vessels adapted to both inland and ocean service and that within a few years the only type of vessel capable of operating over the proposed canal would be the self-propelled or towed barge.

28. It is a fact that under certain conditions barge and shallow draft steamer lines operate on inland waterways in successful competition with railroads and effect a marked saving in transportation costs. In the usual case these lines serve as feeders to deep water harbors or railroad terminals or transport low class raw materials from concentrated fields of production to large industries located on canal or river banks. Such lines can not be compared with lines operating over the proposed trans-Florida canal in which the conditions are entirely different.

29. *Transportation of coal.*—Inasmuch as coal lends itself particularly well to transportation by water in canal barges, special consideration has been given to the possible utilization of a trans-Florida canal for the movement of coal from the Alabama fields to points on the South Atlantic Coast. This possible use for an intracoastal waterway is discussed in the four paragraphs next following.

30. Two types of vessels are now employed in carrying coal on the Warrior Tombigbee River system, the self-propelled, twin-screw tunnel type steel barges having a coal cargo capacity of 1,500 tons with draft at that tonnage of 7½ feet; and the open type wood and steel barges, 140 by 25 feet by 8 and 10 feet, with capacity of 500 tons and draft of 6½ feet. The latter barges are towed in groups of from 4 to 7 by twin screw, tunnel type, steel hull towboats and Mississippi River type towboats drawing respectively 7 and 4 feet. Vessels of the above types could, under most favorable conditions, traverse the open water of the Gulf of Mexico from Mobile to the mouth of the Withlacoochee River which marks the end of the trans-Florida section of the proposed intracoastal canal. Safe and uninterrupted service by these vessels could be insured, however, only through the construction of an inland route from Port Inglis to Apalachicola Bay and the further improvement of the existing inland passage from the latter place to Mobile Harbor.

31. For the coastwise coal traffic from Mobile two methods are now followed. The Mississippi Warrior service maintains a line of steel hull barges from the United States coal terminal at Mobile to New Orleans via the Mobile Ship Channel, Mississippi Sound, Lake

Borgne, and the New Orleans Industrial Canal. These barges are approximately 220 by 26 feet, with a draft of 6 feet when loaded with 800 tons of coal, and are towed in groups of two and three by tugs drawing 8 feet. This route is direct and for its greater distance it is at sea level. The vessels operating on the Warrior Tombigbee River system discharge their cargoes at the United States coal terminal and do not proceed via the inland route to New Orleans. There are two companies engaged in coal transportation between Mobile and Tampa, Pensacola, Port Arthur, Galveston, and Houston via the outside route. Each company operates two steel hull vessels with covered hatchways carrying 2,000 tons of coal and drawing approximately 22 feet. These vessels are towed by tugs drawing 8 to 12 feet. There is no coal transportation service between Mobile and South Atlantic ports.

32. With the Government coal terminal in operation at Mobile the transfer of coal cargoes from river barges to deep draft vessels is made very economical,. There are no regular loading and unloading charges and no storage charges unless coal remains in storage 30 days, in which case a charge of 15 cents per ton is assessed. The present water rate from Alabama mines to Tampa is about $3.55 per ton. Of this amount, $1.80 covers the transportation from mines to Mobile and $1.75 from Mobile to Tampa. The commercial rail rate is $4.51, or about $1 more than the water rate. The water route in this case is considerably shorter than the rail route. The commercial rail rate from Alabama fields to Jacksonville is $2.82 per ton, which means that in order to compete with rail shipments, a water rate of $1 per ton is the maximum that may be allowed for shipment from Mobile to Jacksonville through the canal. In view of the fact that the present water rate from Mobile to Tampa is $1.75 per ton it is manifestly improbable that a rate of less than $2 could be established between Mobile and Jacksonville. For seaboard points north of Jacksonville the differential in favor of the rail routes would be correspondingly greater.

33. In view of the above facts it is quite improbable that towed or self-propelled barges following the devious inland route which has been proposed for the intracoastal waterway across Florida could successfully compete with the more direct railroad lines or with deep draft vessels following the longer route around the peninsula through the Florida straits, and it is therefore fair to conclude that the proposed intracoastal canal would be of little or no value to the movement of coal from the Alabama fields to the South Atlantic ports.

34. *Pleasure craft.*—At the present time the inland waterways of Florida are utilized to a very large extent by craft designed solely for pleasure purposes. It is beyond question that the construction of a trans-Florida canal would stimulate this class of traffic enormous ly in offering a safe inland passage for pleasure seekers between resorts on the east and west coasts. While the magnitude of this traffic can not be predicted it is safe to assume that it would amount to 150,000 to 200,000 tons annually. The financial benefits to such traffic can not, of course, be estimated.

SUMMARY OF COMMERCIAL USES

35. The benefits to local commerce, i. e., freight savings on imports to and exports from the section of the State contiguous to the canal and on purely local products interchanged between points on the canal are estimated at a maximum of $948,000 for the year 1930. I have not undertaken to predict what saving will accrue to Gulf-Atlantic commerce as I do not believe such commerce will in any perceptible measure abandon the present transportation methods in favor of the proposed transpeninsular route. Local commerce within the canal and a large influx of pleasure craft will undoubtedly contribute to a considerable degree to the value of the canal but not in a measure sufficient to seriously affect the above figure.

36. It is undoubtedly true that the section of Florida to be traversed by the canal under consideration is handicapped by an insufficiency of transportation facilities, and in view of the rate at which new acreage is being opened up in anticipation of adequate transportation facilities, losses by default of such facilities will be keenly felt in the very near future. In so far as the State is concerned the effects will be in all respects similar to those attendant upon overproduction, that is to say, an excess of supply over demand, whereas, at the same time, other sections of the United States will be suffering the effects of underproduction, that is, a demand in excess of supply. Maintenance of the desirable balance between demand and supply to the extent that this may be accomplished by water transportation, lies rather in the full use of the waterways now improved and in the continued development of these natural waterways than in the construction of a canal across the State as a link in the intracoastal canal system projected for the entire Atlantic and Gulf coasts.

37. *Military and naval uses.*—In the previous report the special board expressed itself to the effect that the proposed route would offer no advantages in the movement of troops or for the passage of small naval vessels between the Atlantic and the Gulf of Mexico except in some contingencies, for the possible transfer of torpedo craft. There have been no changes in the naval or military situation since the previous report of such a nature as to warrant a reversal of that opinion. On the contrary, the greatly increased dimensions of submarines and other auxiliary naval craft would render a canal of moderate depth and width not greatly susceptible of use for defensive purposes.

WATER POWER, LAND RECLAMATION, ETC.

38. The section of the State of Florida contiguous to the selected route is making rapid strides in the drainage and reclamation of muck lands, and, in addition, certain water power developments are being undertaken on the Withlacoochee and Oklawaha Rivers. It is possible that such interests could be coordinated with the improvement of the route for navigation purposes, but the saving to the United States by such coordination would be incidental and would not materially lessen the cost of construction.

CONCLUSION

39. For reasons which were originally stated by the board and which are still valid, the Lake Harris route is believed to be the most advantageous of the five routes considered for the proposed trans-peninsular canal. The construction of such canal as a link in the contemplated intracostal waterway which is slowly being developed along the Atlantic and Gulf coasts is not justified at this time, inasmuch as the very important section between Wilmington, N. C., and Georgetown, S. C., has not yet been approved nor is there any such waterway along the Gulf coast of Florida to the north and west of the western terminus of the proposed trans-Florida canal. While it is demonstrable that such a canal would be of considerable benefit to local commerce, it is not believed that the benefit accruing would be fairly commensurate with the initial cost of the improvement and the annual charges for maintenance. In view of the conditions hereinbefore discussed it is my opinion that the project is not at the present time worthy of adoption by the United States and that a survey is not necessary.

GILBERT A. YOUNGBERG,
District Engineer.

[First indorsement]

OFFICE DIVISION ENGINEER, SOUTHEAST DIVISION,
Charleston, S. C., November 1, 1923.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C.

1. The conclusions of the district engineer in paragraph 39 of the within report are concurred in, with the exception that, in view of the rapid development taking place in Florida, it is believed that the selection of the route across the Peninsula of Florida can be made with most certainty after the Beaufort, N. C.–Georgetown, S. C., route has been provided for, and possibly, also, after the determination of the extent to which the inland waterway along the Gulf of Mexico shall be carried eastward from Mobile, Ala.

EDGAR JADWIN, *Division Engineer.*

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