Extracted From:
Reconnaissance Report
Aabama River Below Claiborne Lock and Dam, Alabama
July 1996
US Army Corps of Engineers, Mobile District

ECONOMICS

Initial hydraulic studies for the development of navigation design on the Alabama River were based on historical flows with no major storage reservoirs on the Coosa River, and with Alabama Power Company's (APCO) Lake Martin on the Tallapoosa River operating to meet minimum flows near Montgomery, Alabama. During the same period that the Corps was building projects on the Alabama River, APCO was building two large storage projects on the Coosa and later modified the operating plan at Lake Martin. Therefore, the present low flow regime for the Alabama River is different from the historical period prior to the mid 1960's.

Since the completion of the projects on the lower Alabama River complicating factors have contributed to unreliability of a full 9-foot depth for navigation. Hydropower produced at Millers Ferry and Robert F. Henry is sold by the Southeastern Power Administration (SEPA) on a peaking basis rather than the runoff-the-river type of operation as described in the Basic Hydrology Design Memoranda for these projects. Claiborne Lake does not have sufficient storage to provide needed releases during weekend shutdowns at upstream peaking hydropower plant operations.

The purpose of this analysis is to evaluate the Federal interest in an alternative that could provide dependable year round navigation on the Lower Alabama River. The economic analysis conforms to the current requirements set forth in Engineering Regulation (ER) 1105-2-100 that incorporates the Economic and Environmental Principles and Guidelines (P&G) for Water and Related Land Resource Implementation Studies (Water Resources Council, 1983). P&G specifies that Federal projects are to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.

The Alabama River is a terminus on the inland waterway system. It is accessed by the Black Warrior Tombigbee Waterway and the Gulf Intracoastal Waterway. It's major value as a water transportation resource is its ability to carry traffic to and from inland waterway points in Mississippi, Louisiana, and Texas. Barge navigation is provided by a series of three locks and dams. Claiborne Lock and Dam is the lowermost structure at navigation mile 117.5 above the Bankhead Tunnel, at Mobile, Alabama. It has a lift of 30 feet. Millers Ferry Lock and Dam is upstream of Claiborne at navigation mile 178 and has a lift of 45 feet. Robert F. Henry Lock and Dam is upstream of Millers Ferry at navigation mile 281.2. It has a lift of 45 feet. All three lock chambers have dimensions of 84 by 600 feet. Table I shows historical tonnages at each lock.

The Alabama River is bounded on all fronts by navigable waterways; the Tennessee River on the north, the Apalachicola-Chattahoochee-Flint River (ACF) on the east, the Gulf Intracoastal Waterway on the south and the Black WarriorTombigbee River (BWT) to the west. It competes with other waterways and other modes of transportation. Cost disadvantages that arise when barges must be light loaded for low water conditions plus the lack of backhaul cargoes have limited the opportunity for sustained growth and diversification of the Alabama's cargoes. The bulk of the traffic on the Alabama River is linked to resources originating along the river, which makes barge transportation essential and convenient for moving those resources.

Due to river bends and shoaling at the bends, typical tow size is a four-barge tow, except during very low water conditions when tow sizes may be reduced to two barges. Coast Guard regulations restrict tow widths

to one-half of the 200 foot channel width. These restrictions would still allow most Gulf Intracoastal Waterway tows to navigate the Alabama River, with full navigation, without breaking up tows.

Table 1
Alabama River Commerce by Lock 1989-1995
(thousands of tons)

	1989	1990	1991	1992	1993	1994	1995
Claiborne	1290.2	1268.0	1321.3	124	954.2	792.6	503.7
Millers Ferry	1219.3	1027.3	641.0	937.7	947.4	734.8	473.6
Robert F. Henry	122.3	34.5	22.2	422.0	306.4	40.2	13.4

Facilities along the Alabama River are numerous and strategically located. The Alabama State Docks maintains three public terminals, Claiborne, Selma, and Montgomery at river miles 74.4, 227.6 and 305.0 respectively on the Alabama River. Tables 2 and 3 display the private and public terminals.

Table 2
Private Terminals - Alabama River

Canton Oil & Gas Co.	Carlton, Alabama	Mile 18.5
Alabama River Pulp	Claiborne, Alabama	Mile 67.5
MacMillan Bloedel United	Millers Ferry, Alabama	Mile 121.9

Table 3
Public Terminals - Alabama State Docks - Alabama River

Terminal	Products Handled	Storage	Barges Handled	Operations	Connections
Claiborne	Grain	Concrete Elevator 427,000 bu.	1 worked, 2 held	As required	
Selma	General Cargo, Grain Dry Bulk	Open, unpaved Elevator 302,000 bu.	1 worked, 2 held	As required	
Montgomery	General Cargo, Grain Dry Bulk	Open unpaved Elevator 594,000 bu.	1 worked, 2 held	As required	L&N Rail

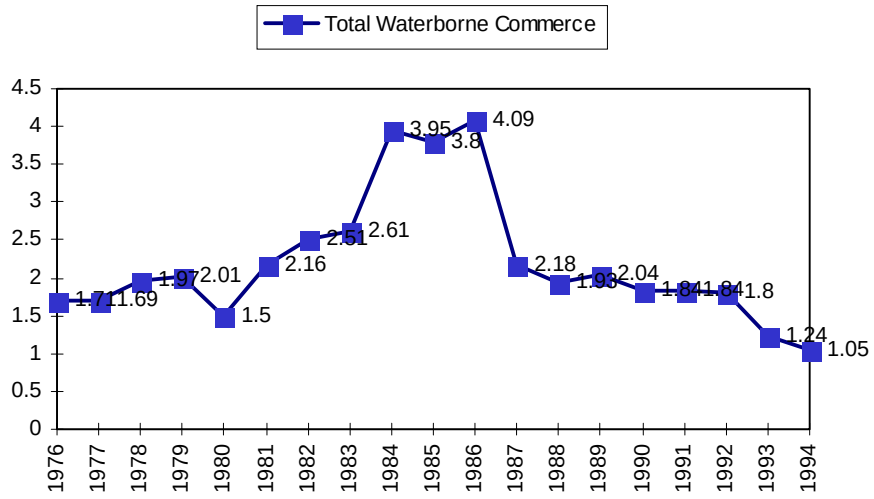
The U.S. Waterborne Commerce Statistics Center in New Orleans has identified about 300 docks on the Alabama River from its junction with the Tombigbee River up to the head of navigation around Montgomery, Alabama.

Historical Alabama River waterway traffic was aggregated into nine major commodity categories to facilitate an analysis of current and future potential. Major categories are: farm products, metallic ores and products, coal, crude petroleum, non-metallic minerals and products, forest products and pulp, industrial chemicals, agricultural chemicals and petroleum products. Alabama River traffic is almost entirely related to use of natural resources, and is dominated by just a few large cargo shippers. A more diverse traffic base would occur if the river served the heavy industry above the present head of navigation at Montgomery, but that can only be realized by constructing the authorized Coosa River navigation improvements. Traffic peaked in the mid 1980's at four million tons, then fell to the present level, about one million tons. The decrease in commerce on the river since 1985 is probably attributable to competitive rates offered by other

modes and low reliability of the river during the mid 80's drought. Though a relatively significant proportion of the time full navigation is not available, the data reveals that there are few instances of sustained barge lightloading (drought years). Virtually all tows full load to eight and one half or nine feet. Sand and gravel that move on flat deck barges load to seven feet.

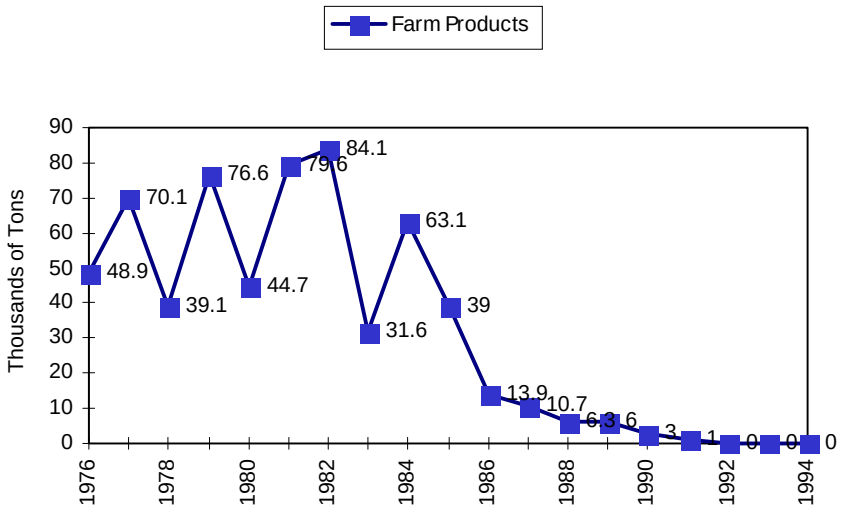
Figure 1 shows Alabama River Waterborne Commerce for all products from 1976 to 1994 as reported by the Waterborne Commerce Statistics Center, U.S. Army Corps of Engineers, New Orleans, Louisiana.

Figure 1



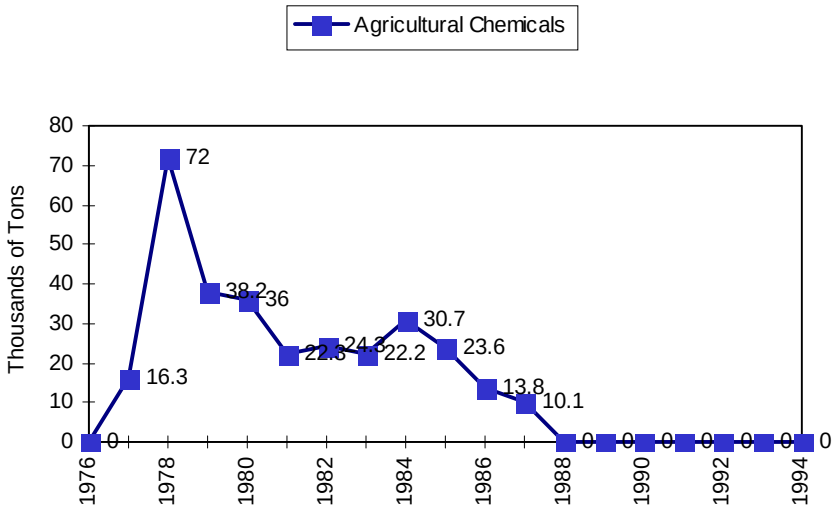
Farm Products. Figure 2 displays recent trends in shipments of farm products on the Alabama River. From 1974 to 1985, farm products: corn, wheat and soybeans accounted for between 31,000 to 84,000 tons of commerce. In 1986 tonnage dropped to 13,882 and continued to decline until in 1991 when only 1,000 tons were moved. The following three years there were no farm product shipments. This decline mirrored what was taking place throughout the southeast, a shift from grains and oilseeds production to cotton. The decrease was also noted in Alabama agricultural production statistics. In 1985 2,000,000 acres of Alabama farmland was in soybeans compared to only 250,000 acres in 1994. Since cotton does not move by barge, future short run increases in barge farm products are not likely.

Figure 2



Agricultural Chemicals. Until 1985 fertilizer shipments on the Alabama River averaged about 25,000 tons. When the drought in the mid to late 1980's occurred tonnages declined each year until 1988 when they stopped altogether. The assumption is that this traffic found another mode; most likely rail. The demand for agricultural chemicals is directly correlated to the shipments of farm products. As the acreage of beans, corn and wheat decline, reductions in demand for agricultural chemicals usually follow. Figure 3 shows the decline in agricultural chemical shipments. The prospects for this commodity depends upon the return of lost farm products to the waterway.

Figure 3

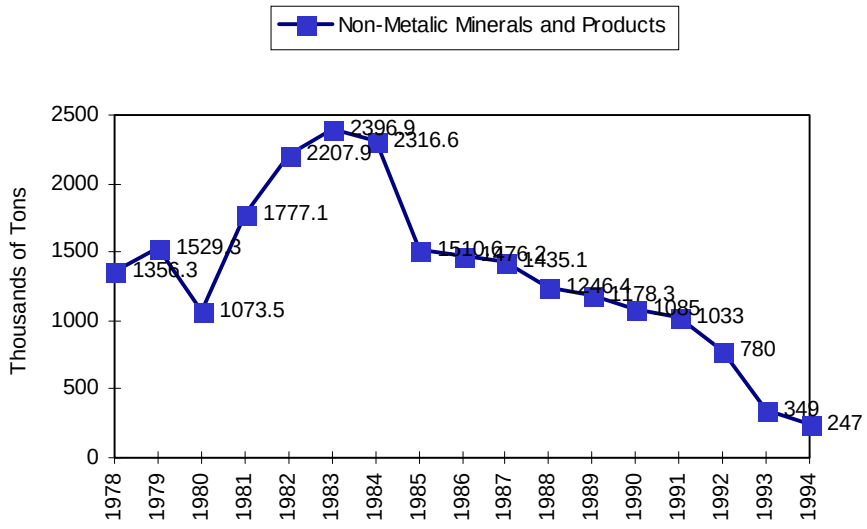


Non-Metallic Minerals. Sand and gravel was at one time the largest commodity moving on the Alabama River. During the twelve year period from 1976 to 1987 sand and gravel shipments on the river averaged 1.3 m 1.5 million tons. Two of the years saw tonnage go over 1.5 million tons. In the 1970's tonnage almost topped 2.0 million tons. Martin Marietta Materials, formerly Dravo Basic, mines or buys sand and gravel from independent landside pits located on the river. Until recently, sand and gravel moved both outbound to Mobile and upstream to Selma and Montgomery. In late 1992 Martin Marietta shifted the source for the Montgomery market to a new inland operation at Mount Meigs, Alabama. They cited increasing costs of operating barges and towboats as contributing factors, rather than channel depths or condition. The Montgomery shipment was about 450,000 tons of the total shipments. Today tonnage has fallen to less than 300,000 tons. Representatives from Martin Marietta Materials relate that shipments on the Alabama, for the near future will likely remain constant or show a moderate increase.

The Geological Survey of Alabama reported in 1993 that 23.1 million tons of limestone and 10.7 millions tons of sand and gravel were produced in Alabama. The state production for both commodities has decreased steadily over the 1988-1993 period, 12% for limestone and 24.5% for sand and gravel. It is not likely that a significant increase of these movements will occur in the near future.

Other non-metallic commodities which recently moved on the Alabama River have been: limestone, clay, gypsum, building cement, slag, waterway improvement material, and marine shells. From 1981 through 1984 there were significant shipments of limestone on the river, averaging over 1.0 million tons, hitting a peak in 1983 of 1.44 million tons. A limestone deposit along the lower Alabama River was developed by Ideal Basic to serve its cement plant in Mobile that accounted for the large shipments in the 80's. Holnam Incorporated, the present operator of the plant, disclosed that the lime source was shifted to Crystal River, Florida as a backhaul to Mobile by the coastwise coal barges serving Florida. Figure 4 plots the non-metallic minerals tonnage.

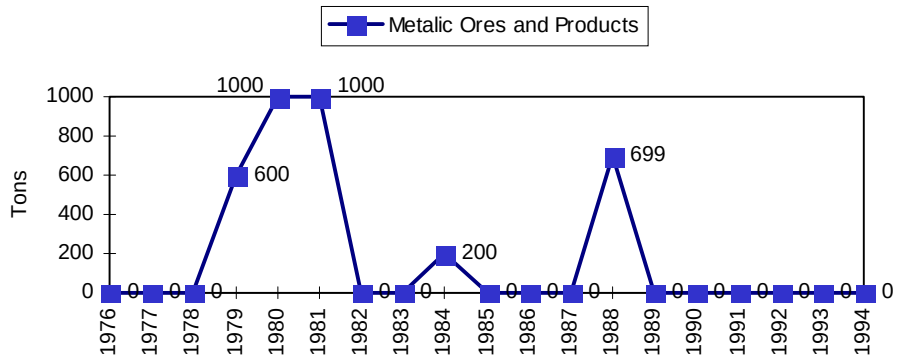
Figure 4



Metallic Ores and Products. The metallic ore movements, Figure 5, are infrequent and usually small in volume when shipped. Often shipments are of fabricated metals and scrap. A majority of the metallic ore

resources are located to the northeast or central Alabama in the Birmingham-Anniston area, and thus out of the present project 's market area. The steel industry in the Birmingham area would be a potential market for barge commerce but cannot become a reality until completion of the Coosa River extension.

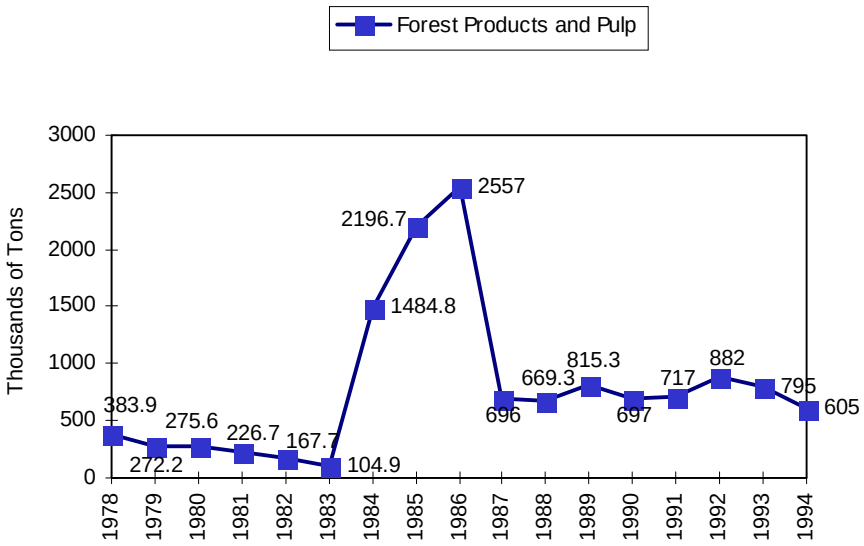
Figure 5



Forest Products and Pulp. Pulpwood and hardwoods, along with sand and gravel, are the mainstay commodities that make up waterborne commerce on the Alabama River. Alabama forests are made up of hardwoods and softwoods. Hardwoods are used by light industry to manufacture products such as pallets. One user is Buchanan Lumber with plants in Mobile and Montgomery. Softwoods are used in the pulp papermaking industry. International and Scott Paper companies have used the river for their pulpwood movements. Scott Paper Company's mill near Mobile accounts for the majority of the pulpwood traffic. International Paper Company moved all it's Alabama River equipment to the new TennesseeTombigbee waterway. The Alabama River Pulp Company also uses the river to move pulplogs.

Three other pulpmills located in the Alabama River hinterland, along with International Paper Company, are considered to be potential users of the river. The outlook for growth in this commodity is good. Figure 6 plots Alabama River tonnage for forest products.

Figure 6



Crude Petroleum and Petroleum Products. There are three major factors that influence these traffic levels. They are channel conditions, government regulations and transportation alternatives.

Light oils, diesel, and gasoline move more economically by pipeline than barge. The latest three years of the data shows distillate fuel movements around 20,000 tons. The company that receives most of this shipment relates that receipts are expected to increase about 5 percent over the next five years.

Heavy oils and asphalt are easily moved in barges equipped with heating coils and heating plants. Heavy oil boiler fuel is shipped to the Alabama River Pulp Mill because of relatively few channel problems. Asphalt is not shipped on the Alabama because there are refineries in the market area that distribute direct to their customers. Figures 7 and 8 graph historical petroleum movements.

Figure 7

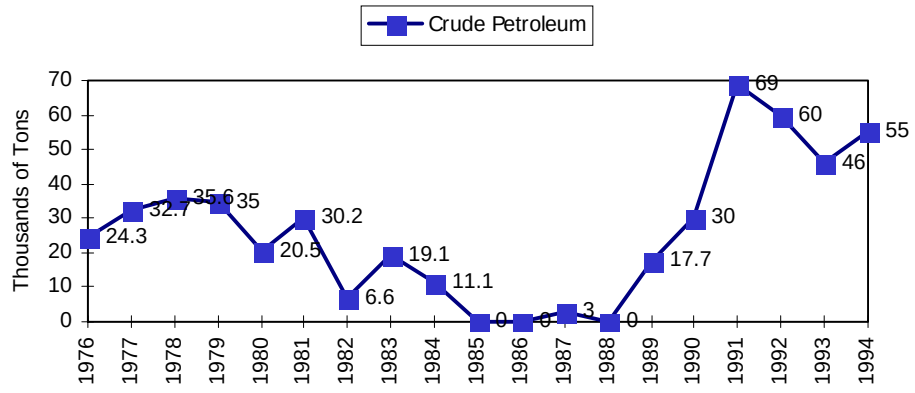
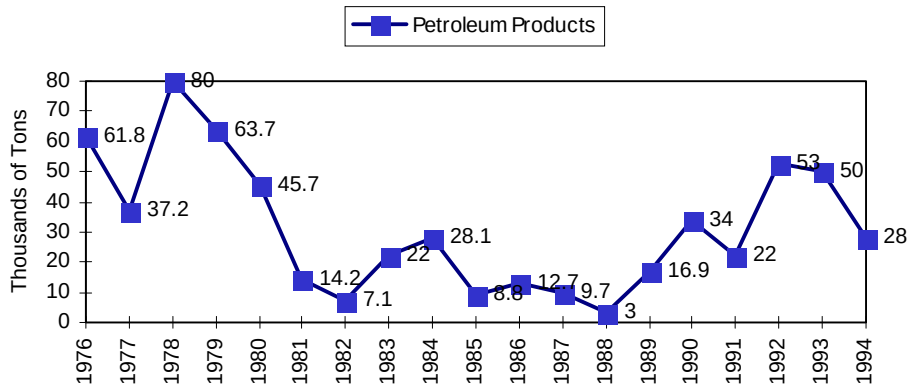
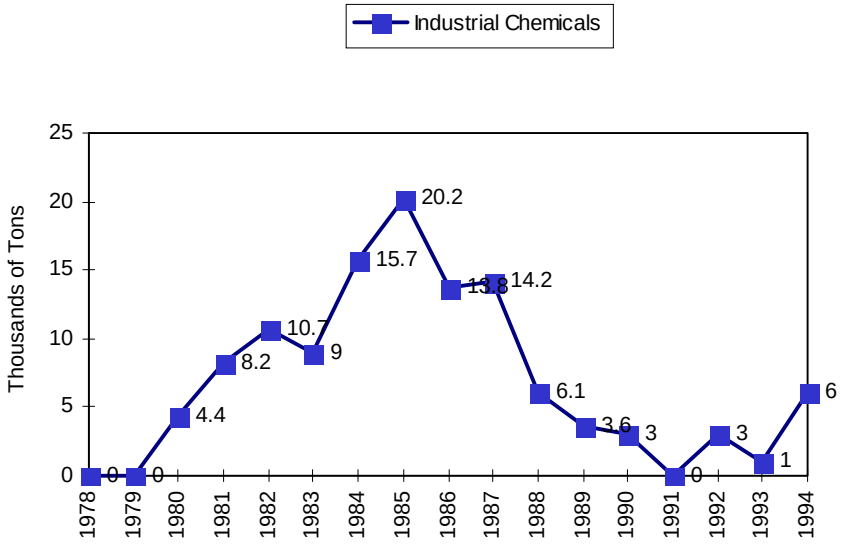


Figure 8



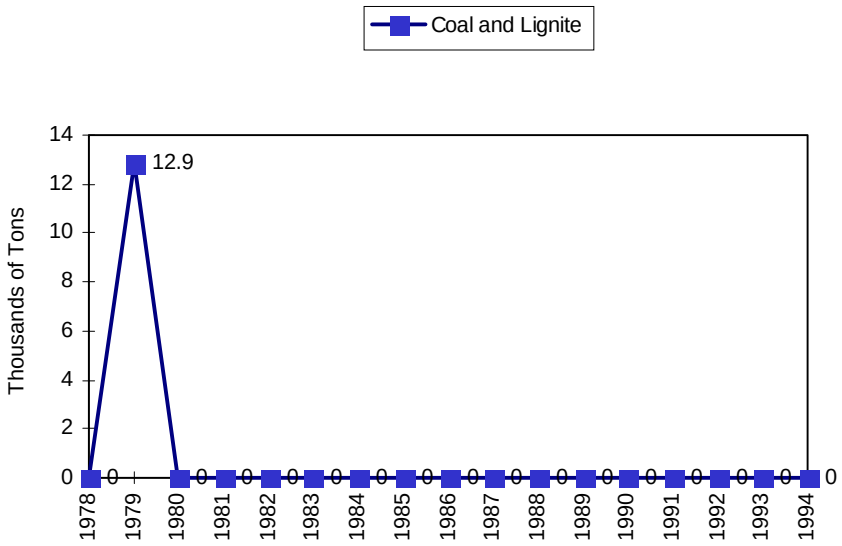
Industrial Chemicals. Figure 9 presents shipments of industrial chemical. Alcohol shipments from Baton Rouge, Louisiana to Montgomery, Alabama accounts for the majority of this category. It began in 1980 and increased to 20,230 tons in 1985, then fell steadily to only 6,000 tons in 1994. Sodium hydroxide shipments were last recorded in 1976.

Figure 9



Coal and Lignite. In 1979, about 13,000 tons of coal was shipped on the Alabama River. Coal usage is limited to industrial boiler fuel use since none of the power plants in the Alabama River market area are coal plants. Therefore the outlook for future coal traffic is unlikely.

Figure 10



Telephone contacts and interviews with past, present and potential users of barge transportation were used to identify interest in developing or using barge transportation on the Alabama River. Those contacted included cargo shippers, barge operators, waterway terminal operators and government development agencies. Respondents who felt that channel availability was a critical factor in the choice of transportation mode were used to derive potential new movements. These new movements would shift their present shipping mode to barge as a result of a waterway improvement measure that would assure 7.5 feet year round navigation. The identified new traffic served as a basis for this benefit analysis.

Corn, wheat and soybeans are currently being shipped to Mobile, Alabama by rail. Montgomery, Alabama, situated on the river, could both receive and ship grains and other farm products. A more dependable waterway could initially attract about 25,000 tons of farm products.

Agricultural Chemicals would return to a reliable waterway. About 25,000 tons of ammonium sulfate, phosphatic based and nitrogenous based chemicals could shift to the waterway. These chemicals would ship from Vicksburg, Mississippi to Montgomery, Alabama.

Several sand and gravel companies in the Alabama River hinterland have evaluated the cost of using barge transportation. Limestone once moved on the river; however, the move was shifted to Florida as a return trip commodity for an already existing movement. An improved channel may bring this commodity back. A potential 100,000 tons of non-metallic minerals, mainly sand and gravel, could return to the waterway between Montgomery and Mobile.

Pulpwood and wood chips are two commodities that have strong potential for growth with improved reliability. An additional 200 ' 000 tons of each commodity could initially ship between Montgomery and

Mobile on the waterway. The paper mills in the ACT hinterland identified in Southern Pulpwood Production 1992 suggest great potential for pulpwood. Three companies indicated that woodchips are also a potential source of traffic given the availability of storage facilities in Mobile.

A 50,000 ton shipment of sodium hydroxide and phenol were identified as products that could move to the waterway. Shipments would originate in New Orleans destined for Montgomery.

Shipments of petroleum products are increasing and the potential for an additional 60,000 tons into Montgomery from New Orleans is a possibility. Shipments will comprise both light oils and heavier fuel oils.

Annually about 660,000 additional tons of commerce could potentially shift modes to a more reliable channel on the Alabama River. Table 4 summarizes the potential traffic, given a more reliable waterway.

Table 4
Alabama River Potential Traffic
Origins and Destinations
1995 Base Tons

Commodity	Tons	Origin	Destination
Farm Products	25,000	Montgomery, Alabama	Mobile, Alabama
Non-Metallic Minerals	100,000	Montgomery, Alabama	Mobile, Alabama
Wood Chips	200,000	Montgomery, Alabama	Mobile, Alabama
Pulpwood Logs	200,000	Selma, Alabama	Mobile, Alabama
Industrial Chemicals	50,000	Lower Mississippi River	Montgomery, Alabama
.Agricultural Chemicals	25,000	Lower Mississippi River	Montgomery, Alabama
.Petroleum Products	60,000	Lower Mississippi River	Montgomery, Alabama

Table 5 plots the percent of time a seven and a half foot and a nine foot channel were available from 1971 through 1993. The period between 1982 and 1988 saw a rather large difference between the two depths. The 1980s was a ,period of droughts of uncommon frequency and severity. The most severe -basinwide drought event during this period occurred in 1986. Light loading of barges was the operating alternative employed by operators to continue using the ,,waterway. An analysis of barge drafts in the 1990's reveal minimal light loading and virtually all movements going at eight and one-half or nine feet. The majority of dry cargo movements are very short haul movements, usually no farther than Mobile or Tuscaloosa, in Alabama. The short haul distance allows operators the flexibility to adjust quickly to river depth conditions. Most times operators can await favorable flows that support full navigation. On the other hand, the liquid movements require a longer haul and longer turn around times at the dock getting pumped out. These movements from Mississippi, Texas or Louisiana are affected by river availability. If they decide to load 9 feet, then full depths are required on each leg of the trip. Local knowledge, historical patterns, and the fact that most operators know when channel availability is more likely to be impacted (i.e. during the summer and early fall) helps operators to minimize light loading of barges.

If shippers and operators perceive water transport as undependable they will elect alternate modes even if the former offers transportation cost savings. Rail is the alternative mode of choice given decreased channel reliability or increases in barge rates to shippers. The decrease in commerce on the river since 1985 is partially attributable to competitive rates offered by other modes and experiences with the river during the mid 80's drought.

In the absence of a federal action to increase reliability of the river channel, shippers and operators will continue to use the navigation system to provide cost effective and necessary transportation services to the natural resources industries. Staple commodities that have historically used the river: sand and gravel, forest, agricultural and chemical products will continue to use the waterway by taking advantage of

transportation efficiencies offered by water transport. Only low or moderate growth above historical levels are forecasted without further improvements to navigation on the Coosa River above Montgomery. The future outlook for sizable new movements is not likely for the immediate future. Therefore, the future project condition with or without a federal action, with respect to existing traffic, is one where transportation costs will remain the same.

The without project future dredging will continue to dispose within banks and in upland disposal areas. The level of dredging activity on the Alabama will probably vary between a million and a million and a half cubic yards. Analysis of training works on this river and others has shown them to be useful in reducing dredging requirements while providing more reliable navigation channel depths. During severe droughts when flows are not available there isn't much that can be done to improve navigation depths.

The authorized project calls for navigation improvements from the mouth of the Alabama River to Rome, Georgia on the Coosa River. Public Law 436, 83rd Congress, approved 28 June 1954, suspended authorization of the comprehensive plan, insofar as it provides for the development of the Coosa River, to permit non-Federal interests to develop the Coosa river by construction of a series of dams in accordance with the conditions of a license issued pursuant to the Federal Power Act and in accordance with certain other provisions and requirements of the aforementioned Public law. Completion of the navigation improvements on the Coosa River would produce a more diverse traffic base and open access to the heavy industries upstream from the present head of navigation at Montgomery. Without substantial modifications, the existing navigation project is not adequate to fully serve the present water resources demands and full navigation depths. Based on economic considerations, it is unlikely that the Coosa River navigation improvements would be constructed.

The usual procedure for making commodity projections involves relating the commerce base traffic to a type of index over time. Projections of the base potential traffic estimates were calculated for a 50 year period of analysis, 201 3 through 2062, correlated to the expected growth in total earnings by Alabama industries. Growth rates (Table 6) were projected from industrial earnings forecasts provided by the Bureau of Economic Analysis within the United States Department of Commerce. Using the projected growth rates, base traffic was projected out through the 50 year period of analysis. These projections are presented in Table 7.

Table 6
Growth in Total Earnings by Industry
Compound Growth Rates

	Years 2000/2005	Years 2005/2015	Years 2015/2062
Farm Products	0.24%	0.64%	0.79%
Non-Metallic Minerals	0.92%	1.45%	1.12%
Pulp	0.65%	1.16%	0.96%
Wood Chips	0.65%	1.16%	0.96%
Industrial Chemicals	0.65%	1.16%	0.96%
Agricultural Chemicals	1.25%	1.56%	1.12%
Petroleum Products	0.65%	1.16%	0.96%

Table 7
Base and Forecasted Traffic

	2005		2013	2023	2033	2043	2053	2062
Movement	Base Tons				Forecast Tons			
Farm Products	25,000	26,308	28,372	30,688	33,193	35,902	38,833	

Non-Metallic	100,000	112,172	126,175	141,009	157,587	176,114	196,820
Pulp	200,000	219,261	242,242	266,614	293,437	322,959	355,451
Wood Chips	200,000	219,261	242,242	266,614	293,437	322,959	355,451
Industrial Chemicals	50,000	54,815	60,561	66,653	73,359	80,740	88,863
Agricultural Chemicals	25,000	28,286	31,888	35,640	39,833	44,519	49,756
Petroleum Products	60,000	65,778	72,673	79,984	88,031	96,888	106,635
Total	660,000	725,881	804,153	887,201	978,877	1,080,081	1,191,809

A determination of shipping costs per ton of base traffic using both the present mode and the improved waterway is necessary to estimate the economic efficiencies of each mode. The cost difference between competing modes gives the gross rate savings per ton. The Reebie Associates, Rail Barge and Truck Costing Software was used to produce comparative barge and rail costs. Table 8 illustrates the shipping costs by mode for each movement along with the comparative gross rate savings per ton shipped.

Table 8
Gross Rate Savings
Per Ton

Commodity	Origin	Destination	Rail/Truck	Barge	Gross Savings
Farm Products	Montgomery	Mobile	$7.19	$3.36	$3.83
Non Metallic	Montgomery	Mobile	$14.92	$4.64	$10.28
Wood Chips	Montgomery	Mobile	$7.40	$4.88	$2.52
Pulpwood Logs	Selma	Mobile	$7.05	$4.15	$2.90
Industrial Chemicals	New Orleans	Montgomery	$10.69	$8.84	$1.85
Agricultural Chemicals	Vicksburg	Montgomery	$24.85	$13.85	$11.00
Petroleum Products	New Orleans	Montgomery	$10.72	$7.27	$3.45