October 1999

Executive Summary

On the

ECONOMIC ANALYSIS OF THE DISTRICT'S WATERWAYS IN PALM BEACH COUNTY

Submitted to
Florida Inland Navigation District
Jupiter, Florida

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Submitted to

Florida Inland Navigation District
Jupiter, Florida

Submitted by

G.E.C., Inc.
Baton Rouge, Louisiana

Engineering ❑ Economics ❑ Transportation Technology ❑ Social Analysis ❑ Environmental Planning

P.O. Box 84010 ☐ Baton Rouge, Louisiana 70884-4010 ☐ (225) 612-3000 ☐ Fax (225) 612-3016
9357 Interline Avenue ☐ Baton Rouge, Louisiana 70809-1910

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EXECUTIVE SUMMARY

INTRODUCTION AND SUMMARY OF FINDINGS

The purpose of this report is twofold: (1) identify and quantify the total economic impact of the waterways operated, maintained, or within the boundaries of the Florida Inland Navigation District (the District) in Palm Beach County and (2) to estimate the influence of the waterways on property values in the county. For the purpose of this report, the District's waterways include the Intracoastal Waterway and all waterways that are physically connected to it. The expected impacts to the Palm Beach County economy and to property values for three waterway conditions were evaluated: (1) existing conditions; (2) cessation of maintenance of the waterways (resulting in vessel draft restrictions of three feet MLW on the waterways); and (3) increased maintenance of the waterways (resulting in vessel draft restrictions of ten feet MLW). This analysis also addresses the influence that the waterways have had on the construction and renovation of larger, more expensive homes on the waterways.

The results of the analysis are summarized below:

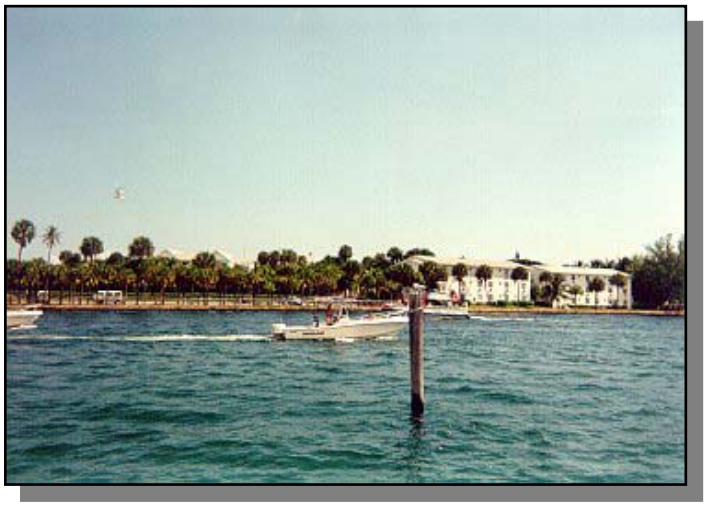
- Impacts of the waterways under existing conditions:
  - $634.7 million in business volume
  - $227.2 million in personal income
  - 7,503 jobs
  - $1.93 billion to $2.19 billion in property values
- Expected impacts of the waterways assuming a cessation of waterways maintenance:
  - Decrease of $332.6 million in business volume
  - Decrease of $116.9 million in personal income
  - Decrease of 3,843 jobs
  - Decrease of $270.2 million to $585.2 million in property values
- Expected impacts of the waterways assuming an increase in waterways maintenance:
  - Increase of $103.3 million in business volume
  - Increase of $36.6 million in personal income
  - Increase of 1,212 jobs
  - Increase of $24.4 million in property values

Background

With reduced Federal funding, the local sponsors of the nation's inland navigation systems are being required to shoulder a larger portion of the maintenance costs of these systems. For example, studies have shown that maintenance of the Atlantic Intracoastal Waterway Project in Florida requires expenditures of $7.8 million each year while Federal funding remains at $3.2 million per year. The District has made a decision not to allow the waterways to deteriorate by deferring maintenance projects and, instead, has elected to fund this budgetary shortfall. This investment by the District may total up to $230 million over the 50-year planning period of the waterway. With such a large potential investment, the District needs to educate the general public as well as Federal, state, and local public officials of the economic importance of expending these monies to meet the needs of the waterways.

Maintaining the waterways within the District's 11-county area, to allow the continuation of boating activities, will cost an estimated $7.8 million annually.

The Atlantic Intracoastal Waterway is a 1,391-mile federally and locally maintained channel between Trenton, New Jersey, and Miami, Florida. The Florida segment, which was completed in 1965, is 370 miles long, and follows coastal rivers and lagoons past numerous tourism-oriented communities.



The District's waterways are primarily used for recreational activities.

The waterway from the Florida/Georgia border to Miami was constructed and is maintained by the Jacksonville District Corps of Engineers in cooperation with the Florida Inland Navigation District, the local sponsor for the waterway. Continued maintenance dredging is required because the channel is subject to sedimentation from upland erosion and coastal sediment migration through ocean

inlets. A Long Range Dredged Material Management Plan for meeting dredged material management requirements over the next 50 years has been developed and is presently being implemented.

The Intracoastal Waterway in Palm Beach County

The Intracoastal Waterway extends for 47 miles through Palm Beach County. The waterway enters the county one-mile above Jupiter Inlet and then proceeds through the Jupiter River and several land cut sections for 11 miles through a sparsely populated area. At North Palm Beach, it enters Lake Worth Lagoon, an elongated coastal lagoon between the barrier beach and the mainland. The waterway proceeds for 21 miles through the lagoon, passing the major communities of Riviera Beach and West Palm Beach. At Boynton Beach, it leaves the Lake Worth Lagoon and proceeds predominately through a land cut for 15 miles, passing the major communities of Boynton Beach, Delray Beach, and Boca Raton. The waterway in Palm Beach County ends at the Hillsboro Canal, which forms the boundary with Broward County.

Residential and undeveloped property on Intracoastal Waterway in sparsely populated area in northern Palm Beach County.

THE ECONOMIC IMPACT OF MARINE RELATED BUSINESS IN PALM BEACH COUNTY

In general terms, there are two types of economic impacts or benefits associated with an inland navigation system, National Economic Development (NED) benefits and Regional Economic Development (RED) benefits. Inland waterway system have historically been evaluated to determine economic feasibility based on NED benefits, which are economic benefits to the nation and not a

particular region. The purpose of this analysis is to estimate the regional benefits generated by the waterways in Palm Beach County.

Regional benefits can be classified as direct, indirect, induced, and total. The direct impacts of the waterways are the goods and services purchased from marine related businesses in Palm Beach County. Direct impacts include the initial round of spending and employment generated by business activity that is directly dependent on the waterways. Indirect impacts consist of the goods and services purchased by marine related businesses in Palm Beach County. These impacts are the additional "rounds" of spending that result from the initial sales by waterway-impacted businesses. Induced impacts consist of increased household purchases of goods and services (such as food, clothing, and housing) by employees of businesses directly and indirectly impacted by the waterways. In short, navigation on the waterways results in dollars being pumped into the region which generate primary and secondary economic benefits to the area, benefits which include increased business activity (sales), personal income (wages), and employment (jobs).

Many techniques have been developed to estimate the types and levels of regional economic impacts. These models are based on the understanding of a regional economy as an interdependent entity. IMPLAN is a regional impact model that enables the evaluation of the economic impact of specific activities such as construction or operation of public works projects, and retail, wholesale, manufacturing, and service sales within an economy. IMPLAN was used in this analysis to estimate the regional economic impacts of the waterway.

Identifying and Quantifying Current Marine Related Business Volume

A database of 831 marine related businesses in Palm Beach County was developed from various sources. These businesses were surveyed by mail and telephone to obtain information on their marine related business patterns and practices. A total of 262 completed surveys were obtained, resulting in a response rate of 32 percent.

Characteristics of Marine Related Business

Selected findings of the marine related business survey are presented below.

- About 40 percent were located on or adjacent to the waterway.
- 27.5 percent were dependent on being on or adjacent to the waterway.
- The three most prominent lines of business were services, retail trade, and manufacturing.
- 78 percent of the respondent's business volume is marine or water related.

- Most marine industry firms employ less than four people and have annual revenues of less than $500,000.
- 73 percent of the firms believe their revenue would decrease if vessel drafts were restricted to three feet.
- 55 percent of the firms believe their revenue would increase if vessel drafts were 10 feet.

The 831 businesses in the database were aggregated to 34 similar business types, which were classified as generating a commercial benefit or a recreational benefit. Commercial business types were assumed to include commercial shipping activities (port tenants) and boat charters/rentals. The remaining business types were classified as recreational.

Public and private marinas on the waterways are some of the 831 firms in the county that conduct a total of $627 million in marine related business annually.

The total marine-related business activity in Palm Beach County, as calculated from the survey responses, is estimated at $627.0 million, including $41.0 million that is can be considered to be commercial benefits and $585.9 million that can be considered to be recreational benefits.

The $627.0 million in business activity was distributed by type of activity as follows:

- $25.4 million in construction activity
- $0.8 million in transportation activities
- $124.4 million in retail trade
- $54.2 million in used boat sales
- $71.6 million in manufacturing activities
- $123.1 million in wholesale trade
- $1.9 million in finance activities
- $225.3 million in service activities

Current Purchases of Non-Marine Related Items

To estimate the economic impacts of non-marine related items purchased from businesses not located on the waterways, 350 recreational boaters and fishermen were interviewed on the waterway throughout Palm Beach County. A summary of purchasing patterns of recreational boaters that were interviewed are presented below.

- Survey respondents purchased an average of $45.22 per outing at establishments not located on the waterway.

- Larger boats that are not trailered tend to spend less money at establishments not located on the waterways.

- Smaller vessels spend almost all their expenditures at establishments not located on the waterways.

- Total expenditures on non-marine items at establishments not located on the waterways include $33.2 million for gasoline and $25.4 million for food, drinks, and ice.

Characteristics of Recreational Boaters

Highlights of the results of the interviews of the 350 recreational boaters are presented below.

- The primary local residence of boaters:

    - Palm Beach County - 91.4 percent
    - Martin County - 4.3 percent
    - Broward County - 2.0 percent
    - Other - 2.3 percent

- The primary permanent residence of the boaters:

    - Florida - 88.5 percent
    - New York - 2.5 percent
    - New Jersey - 2.2 percent
    - Other - 6.8 percent

- There was an average of 3.1 persons per boat; the most common occurrence was two persons per boat.

- 22 percent owned a second boat, while 2.3 percent owned two other boats.

- 57.1 percent of boaters used an outboard boat, 27.8 percent used an inboard, and 9.4 percent used “other boat” types.

- Of the boaters that owned more than one boat, the boats that were not being used on the day of the interview were typically personal watercraft.

- The length of boats owned by the boaters ranged between 8 feet to 60 feet, with most being 16 to 26 feet.

- Almost half of the boaters were on half-day trips and half were on full-day or multiple day trips.

- The three primary purposes of the boating trip were fishing, pleasure boating, and other activities.
- 61.1 percent of the boaters intended to stay in inland waters.
- 38.9 percent of boaters intended to access offshore waters.
- More than half of all boats are stored at home on a trailer, and a quarter of all boats are stored at a commercial dry storage facility.
- Boaters that store their boat at a commercial storage facility pay an average of $2,479 per year.
- Boaters annually spend an average of $1,043 on maintenance and $650 on boat insurance premiums.
- 44, or 12.6 percent, of the people interviewed had incurred damage to their boat while using the waterway in the past year.
- The most frequent type of damage was to the hull, followed by propeller damage and damage to the vessel's in/outboard drive.
- The most frequent cause of the damage was due to grounding the vessel, followed by hitting floating objects, and hitting submerged objects.

Current Economic Impact of Marine Related Activities

The $627 million in retail sales of the 831 marine related businesses in Palm Beach County generate a total of $602.9 million in local business volume, $214.3 million in personal income (wages), and 7,029 jobs. The greatest impacts are generated by service type activities, followed by manufacturing and retail trade.

Boating activity on the waterways helps contribute a total of $635 million in sales, $227 million in income and 7,503 jobs to the local economy.

The $58.7 million in retail purchases ($33.3 million for gasoline sales and $25.4 million for food, drinks, and ice) by recreational boaters from establishments not located on the waterways were estimated to generate economic impacts of $31.8 million in business volume, $12.9 million in personal income and 474 jobs.

The current total economic impact of the waterways (marine related businesses and the purchase of non-marine related items) consist of $634.7 million in business volume, $227.2 million in personal income and 7,503 jobs (Table 1).

Table 1. Summary of Total Economic Impacts Attributable to the Waterways

Activity	Recreational Economic Impacts				Commercial Economic Impacts				Total Economic Impacts			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Business Volume (Millions)	$366.26	$117.75	$125.45	**$609.46**	$14.89	$4.66	$5.72	**$25.27**	$381.15	$122.41	$131.17	**$634.73**
Personal Income (Millions)	$129.03	$41.31	$47.01	**$217.35**	$5.96	$1.77	$2.14	**$9.86**	$134.99	$43.08	$49.15	**$227.21**
Employment	4,321	1,171	1,594	**7,086**	289	55	73	**417**	4,610	1,226	1,667	**7,503**

Economic Impact of a Cessation of Waterways Maintenance

If maintenance of the waterways in Palm Beach County was to cease, it is believed that shoaling would eventually result in an effective vessel draft limitation of three feet. This in turn would result in a reduction of marine related business generated by vessels drafting in excess of three feet.

Based on the responses of businesses surveyed for this analysis, an average of 52.3 percent of marine related business activity would be lost if vessel drafts were limited to three feet MLW. The largest impacts are expected in the service sector, followed by the retail trade sector, the wholesale trade sector, and used boat sales.

The total economic impact expected to be generated with three-foot vessel draft restrictions on the waterways (marine related businesses and the purchases of non-marine related items) is presented in Table 2. The total impact includes $302.0 million in business volume, $110.2 million in personal income, and 3,660 jobs. *This is a reduction of $332.6 million in business volume, $116.9 million in personal income, and 3,843 jobs compared to existing conditions on the waterways.*

Table 2. Summary of Total Economic Impacts Attributable to the Waterways Assuming Vessel Draft Restrictions of Three Feet

Activity	Recreational Economic Impacts				Commercial Economic Impacts				Total Economic Impacts			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Business Volume (Millions)	$175.68	$53.97	$61.21	**$290.86**	$6.47	$2.21	$2.56	**$11.23**	$182.15	$56.18	$63.77	**$302.09**
Personal Income (Millions)	$63.85	$19.07	$22.95	**$105.87**	$2.58	$0.86	$0.96	**$4.40**	$66.42	$19.93	$23.91	**$110.27**
Employment	2,160	543	779	**3,482**	119	26	33	**178**	2,279	569	812	**3,660**

Economic Impact of an Increase in Waterways Maintenance

The full implementation of the District's Dredge Material Management Plan would result in a higher state of maintenance of the waterways and an increase in vessel draft restrictions to 10 feet MLW. This increase in draft allowance would permit deeper draft vessels to fully utilize the waterways in Palm Beach County.

According to marine related businesses surveyed for this analysis, increasing vessel drafts on the waterways to 10 feet MLW is expected to result in an overall average increase in business volume of 17.2 percent increasing from the current level of $627.0 million to $734.6 million (a $107.6 million increase). The increase is expected to be distributed as:

- $4.8 million in construction activity
- $0.1 million in transportation services
- $22.9 million in retail trade
- $13.8 million in used boat sales
- $9.6 million in manufacturing
- $20.4 million in wholesale trade
- $0.3 million in finance services
- $35.3 million in services activities.

Compared to current total economic impacts, the county would realize an increase of $103.3 million in business volume, $36.6 million in personal income, and 1,212 jobs.

This higher maintenance scenario should not significantly impact the sale of non-marine related items by businesses that are not located on the waterways. These impacts should be equivalent to those under current waterways conditions.

The combined total impacts (marine related businesses and purchases of non-marine related items) under this scenario are presented in Table 3. Total impacts include $738.0 million in business volume, $263.8 million in personal income, and 8,715 jobs. *This is an increase of $103.3 million in business volume, $36.6 million in personal income, and 1,212 jobs compared to existing conditions on the waterways.*

Table 3. Summary of Total Economic Impacts Attributable to the Waterways Assuming Vessel Draft Restrictions of 10 Feet

Activity	Recreational Economic Impacts				Commercial Economic Impacts				Total Economic Impacts			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Business Volume (Millions)	$366.27	$117.77	$125.45	**$609.49**	$77.00	$24.80	$26.80	**$128.6**	$443.27	$142.57	$152.25	**$738.09**
Personal Income (Millions)	$129.03	$41.30	$47.06	**$217.39**	$27.54	$8.90	$10.04	**$46.48**	$156.57	$50.20	$57.10	**$263.87**
Employment	4,321	1,170	1,594	**7,085**	1,027	260	343	**1,630**	5,348	1,430	1,937	**8,715**

THE IMPACT OF THE WATERWAYS ON PROPERTY VALUE IN PALM BEACH COUNTY

Current Impact of the Waterways on Property Values

This analysis evaluates the waterways' impact on the value of residential property, condominiums, commercial and industrial property, and boat slips.

Residential Property

The impact of the waterways in Palm Beach County on property values was estimated by comparing values of properties located directly on the Intracoastal Waterway to values of properties located on waterways connected to the Intracoastal Waterway that have varying vessel draft restrictions and also to values of properties that have no access to the waterways.

Residential home sites along the Intracoastal Waterway are some of the most prized locations in the county, which is reflected by their average appraised value of $897,166.

Table 4 illustrates the type of residential property, the average appraised value, and the average building size for the residential parcels used in this analysis. The data indicates that the Intracoastal Waterway has a positive influence on residential property values in Palm Beach County throughout the length of the waterways and that an estimate of the influence of the waterways on property values, based upon comparison with neighboring parcels, is not biased by other factors, such as socioeconomic conditions, concentration of parcels in an affluent area of the county, or isolation on an island. Therefore, we can safely assume that if the waterways did not exist, existing properties on the waterways would exhibit the same characteristics (in terms of size and value) of neighboring properties that were developed without waterway access.

Table 4. Characteristics of Residential Properties in Palm Beach County in Subdivisions Containing Properties Adjacent to the Intracoastal Waterway

Type of Property	Number of Parcels	Average Total Appraised Value ($)	Average Building Size (Square Feet)
Other Water Body	610	172,064	2,737
Non-canal (dry parcel)	8,185	194,851	2,521
Connecting Canal	2,688	436,744	3,852
Golf Course*	361	539,067	4,536
Intracoastal Waterway	1,668	897,166	5,177
Ocean View *	214	1,880,088	7,784
Ocean Front *	355	2,718,949	9,559

* Not used to determine the influence of waterways on property values

Alternative methods were used to estimate the impact of the waterways on each property type. The first method used to estimate the impact to residential property assumed that if the waterways did not exist, the land adjacent to the waterways would have been developed as home sites of similar size and value as existing homes that do not have waterway access. Under this methodology, lot sizes and homes would have been smaller than they are currently which would have led to more lots and homes being developed in the same amount of space. If the waterways did not exist the 4,356 home sites on the waterway would have been developed as 8,549 smaller home sites. As a result, the total aggregate market value of residential property would be $1.37 billion less than its current level.

Residents' lots on canals with access to the Intracoastal Waterway are typically 30 percent smaller than lots on the Intracoastal Waterway. Homes on these canals have an average appraised value of $436,744.

The second methodology assumes that the number and size of houses would be the same as they currently are, but the value of these houses, on a per-square-foot basis, would decrease to reflect current values of non-waterway property. The current average per-square-foot value increases from $96.14 for existing dry parcels, to $146.03 for properties on waterways that are connected to the Intracoastal Waterway, to $223.90 for properties on the Intracoastal Waterway.

Adjusting property values to reflect the impact of the waterways, indicates the waterways result in an increase of $1.61 billion in residential property values.

Condominiums

Many condominium developments have been constructed along the Intracoastal Waterway, ranging from high-rise developments with over 100 units to smaller developments of 10 units. There was a total of 65 developments along the aforementioned segment of the waterway, with a total of 6,104 units, that encompass 264 acres of waterfront land (a density of 23 units per acre). The total appraised value of these units was $715.7 million, or $117,259 each. A sample of 15 developments near the waterway included 920 units, encompassed 101 acres (a density of nine units per acre), had a total value of $70.1 million, and value of $76,255 per unit. As indicated by the data, on average, waterfront property contains more high rise developments with units of higher value compared to nonwaterfront property.

Two methods were used to estimate the impact of the waterways on condominium values. The first method assumes that if the waterways did not exist, the densities (units per acre) of existing condominium developments along the waterways would have equaled densities similar to developments that are not adjacent to the waterways. In other words, fewer units would have been developed without the waterways. This methodology assumes that condominium densities would have dropped from 23 units per acre to nine units per acre, and the average appraised value per unit would have dropped from $117,259 each to $76,255 each. As a result, the existing 264 acres along the waterway that contain 6,104 condominium, with a total value of $715.7 million, would have been developed as only 2,376 units, with a total value of $181.1 million, resulting in decrease of $534.6 million.

The second method used to evaluate condominium values assumes that without the existence of the waterways, waterfront condominium developments (valued at $757.7 million) would have been developed as single family residences (valued at $190.7 million), as a result of the total appraised value of condominiums would drop by $524.9 million.

Commercial Property

The Intracoastal Waterway also influences property values for commercial and industrial properties. To estimate this influence, a list of businesses on the Intracoastal Waterway was developed which primarily consisted of marinas and boatyards. The land side operations of marinas on the waterways had a total appraisal value of $30.1 million, which included improvements valued at $5.4 million. The land side operation of boatyards had a total appraised value of $17.6 million, including $3.6 million in improvements. As can be seen, the land side improvements

of these establishments account for less than 20 percent of total appraised value, indicating minimal improvements. A significant portion of the value of marinas and boatyards can be attributed to their boat slips, which are not included in the value of their land side property.

The first methodology used to estimate the impact of the waterway on commercial property values compared the value of commercial parcels on the waterway to the value of commercial parcels that are near the waterway. The second methodology compared the value of commercial parcels on the waterway to the value of single family residences near the waterway. According to Property Appraiser records, the total appraised value (land side value of land and structures) of marinas on the waterways is $390,000 per acre, the total value of boatyards on the waterways is $529,000 per acre, the total value of commercial property near the waterway is $772,000 per acre, and the total value of single family residential parcels near the waterway is $722,000 per acre. According to these data, the waterway does not appear to have a positive impact on the appraised value of land side commercial property.

The combined appraised value of the 110 acres of marinas and boatyards is $47.7 million. If the waterway did not exist, under the first methodology used in this analysis, the 110 acres of land could have been developed similar to existing commercial property near the waterway and have a total appraised value of $84.9 million, an increase of $37.2 million from the current appraised value. Under the second methodology the 110 acres of land currently classified as commercial would have an appraised value of $79.4 million if developed as residential property, an increase in value of $31.7 million.

Boat Slips

Boat slips are located at condominium developments, private and municipal marinas, and boatyards along the waterways. In fact, the primary impact of the waterways to businesses located on the waterways is the ability to generate revenue through waterside operations such as leasing boat slips. The Property Appraiser's records indicate that these boat slips are valued between $13,000 and $90,000 each, depending on the location and size of the slip. A sampling of boat slips was used to determine the average value of boat slips in Palm Beach County and the number of boat slips was estimated from aerial maps. Based upon these data, the average appraised value of a boat slip in Palm Beach County is estimated to be $31,000. Aerial maps indicated that there are a total of 2,794 boat slips at marinas, condominium developments, and boatyards in the county, resulting in a total appraised value of $86.6 million. All of which would be lost if the waterway did not exist.

Total Current Impacts to Property Values

It is estimated that the waterways in Palm Beach County have resulted in a total increase in property values of between $1.93 billion to $2.19 billion. This total includes an increase of $1.36 to $1.61 billion in residential property values, $524.9 million to $534.6 million in condominium values, a negative impact of $31.7 million to $37.2 million in land side business property values, and $86.6 million in boat slip values at marinas and condominium developments.

Changes in Property Values Due to a Cessation of Waterways Maintenance

If vessel drafts were restricted to three feet MLW, the value of property on the waterways would decrease. In order to estimate the impacts of reduced waterway depths, property values of parcels with access to waterways with varying vessel drafts must be compared to each other. For the purpose of this analysis, it is assumed that properties on the Intracoastal Waterway have access to a channel at least six feet deep. However, the vessel draft restrictions of canals connecting to the Intracoastal Waterway were assumed to vary. A comparison of the difference in property values on restricted draft waterways to property values on the Intracoastal Waterway illustrates part of the expected change in property value if vessel drafts were restricted to three feet MLW on the Intracoastal Waterway.

Residential Property

A comparison of property values indicate that waterway parcels have higher values than non-waterway parcels and that the degree of vessel draft accessibility of the Intracoastal Waterway further enhances property values. Canals with restricted access to the Intracoastal Waterway supply residents of waterway parcels with additional privacy and quiet, and perhaps some aesthetic value. These benefits have a positive influence on property values; however, it is not evident that canals with restricted access to the Intracoastal Waterway increase property values more than canals without access to other waterways. A comparison of respective property values does not indicate that residents place a high value on the ability to dock a shallow draft vessel (with access to other inland waterways) at their residence. On a county-wide basis, properties on canals connected to the Intracoastal Waterway are valued 52 percent higher than the value of properties without waterway access, and properties on the Intracoastal Waterway are valued 132 percent higher than those without waterway access. On average, the difference in value between properties without waterway access and property on the Intracoastal Waterway is 93 percent. The difference between values of properties without waterway access compared to property on connecting waterways and properties on restricted waterways is 77 and 48 percent, respectively.

If maintenance of the waterways were to cease, it was assume that values of properties on the Intracoastal Waterway would, on average, approximate the current value of properties on connecting waterways. In other words, property that is currently valued at a 93 percent premium to property without waterway access would only be worth 77 percent more, or 0.83 of the existing differential (77 percent divided by 93 percent equals 0.83). The value of existing property on connecting canals is assumed to approximate the current value of properties on restricted canals. This reduces the differential between the value of property on connecting canals and property without waterway access to a ratio of 0.52 (48 percent divided by 93 percent equals 0.52). These ratios were then applied to the county-wide percent difference between property with access to the Intracoastal Waterway or connecting canals versus property without waterway access.

On a county-wide basis, property on connecting canals is currently valued 52 percent more than property without waterway access. Applying the price differential ratio of 0.52, as calculated above, to the 52 percent results in an adjusted differential of 27 percent (52 percent x 0.52 = 27 percent). Therefore, existing property on connecting canals would only be valued at 27 percent higher than property without waterway access and was assumed to vary between 20 percent to 35 percent. Applying these expected differentials to the value of property without waterway access ($96.14 per square foot of building area) results in an expected value of $115.37 to $129.79 per square foot of building area on connecting canals. The current per square foot market value of property on connecting canals is $146.03. The expected property values of $115.37 to $129.79 per square foot represents a reduction of $16.24 to $30.66 per square foot.

Property on the Intracoastal Waterway is currently valued at 132 percent higher than non-waterway property, on a county-wide basis. Applying the price differential ratio of 0.83 to the 132 percent results in an adjusted differential of 110 percent. Therefore, it was assumed that existing property on the Intracoastal Waterway would be valued at 100 percent to 120 percent higher than property without waterway access. Applying the expected range of price differentials to the value of non-waterway property ($96.14 per square foot of building area) results in an expected value of $192.28 to $211.51 per square foot of building area on the Intracoastal Waterway (Table 5). The current per square foot market value of property on the Intracoastal Waterway is $223.90. The expected value of that property, under the reduced maintenance scenario, ranges from $192.28 to $211.51 per square foot. This represents a reduction of $12.39 to $31.62 per square foot of building area.

Table 5. Adjustment of Market Value Per Square Foot Of Building Area

Category	Market Value Per Square Foot	Adjusted Market Value Per Square Foot ($)	Value Difference Per Square Foot ($)
Non-canal	$96.14	$96.14	-
Connecting Canal	$146.03	$115.37 - 129.79	$16.24 - 30.66
Intracoastal Waterway	$223.90	$192.28 - 211.51	$12.39 - 31.62

As illustrated in Table 6, property values on connecting canals are expected to decrease by $168 million to $317 million, and property values on the Intracoastal Waterway are expected to decrease by $106 million to $273 million. The decrease in total residential property values is estimated at between $275 million and $590 million.

Table 6. Reduction in Residential Property Values Due to Vessel Draft Restrictions of Three Feet MLW

Category	Total Square Feet Of Building Area	Value Difference Per Square Foot ($)	Total Market Value Difference ($1,000)
Non-canal	20,634,385	-	-
Connecting Canal	10,354,176	$16.24 - 30.66	$168,152 - 317,459
Intracoastal Waterway	8,635,236	$12.39 - 31.62	$106,990 - 273,046
Total	-	-	$275,142 - 590,505

Condominiums

If cessation of waterway maintenance results in three-foot vessel draft restrictions, condominium property values would be expected to decline somewhat because of a reduction in the scenic value due to a reduction in the size of vessels on the waterway. However, the scarcity of condominium developments on connecting canals precludes estimating this decline through direct comparison of condominiums on the waterway with condominiums on connecting canals. The expected decline in the value of boat slips associated with these condominiums can be calculated and is presented below.

Commercial Property

Business owners indicated that if maintenance of the waterways ceased, 79.6 percent of existing business volume at marinas and 81.3 percent of existing business volume at boatyards would be lost. Since boatyards and marinas are not likely to remain in business after such a drastic reduction in income, the property will probably convert to other commercial uses. Assuming the property would reflect the appraised value of existing commercial property not impacted by the waterway will result in an increase in property value of $37.2 million.

Boat Slips

To estimate the decline in boat slip value, the assumption was made that boats over 25 feet in length require in excess of a three-foot vessel draft. It was estimated that over 75 percent of the existing boat slips are designed to accommodate vessels in excess of 25 feet in length. Therefore, the reduction of the aggregate value of boat slips in the county is estimated at 37.5 percent (25 feet divided by 40 feet) of the current aggregate boat value. As a result, the aggregate value of boat slips, now estimated at $86.6 million, will decline by 37.5 percent, or $32.4 million, to $54.1 million.

Total Impact to Property Values of a Cessation of Waterways Maintenance

In summary, if maintenance of the waterways were to cease and vessel drafts were restricted to three feet MLW, it is estimated that property values along the waterways would decrease by between $270.2 million to $585.2 million. Residential property values are expected to decline by $275 million to $590 million, business property value is expected to increase by $37.2 million, and boat slip values at marinas and condominium developments are expected to decrease by $32.4 million. Any decline in condominium values is expected to be minimal and are somewhat reflected in the expected decrease in boat slip values.

Change in Property Values Due to Increased Waterways Maintenance

Residential Property

Because of the limited amount of the waterways that currently have 10-foot depths, there are few homogeneous neighborhoods or areas in Palm Beach County that can be analyzed to help estimate the impact to residential property values if the waterways were maintained at 10 feet MLW. Based on the small samples of properties on waterways with 10 foot vessel drafts, there appears to be no significant value placed on docking a deep draft vessel at a home site. This is not to say that selected property values would not increase if vessel drafts were increased, but there is no evidence from the available data that it would significantly increase the total value of property in the county. This is probably due to the limited number of properties that would be impacted by a deeper draft channel that would only benefit owners of mega yachts and commercial vessels.

Condominiums

As with residential property, there is no basis for estimating an increase in condominium property values if vessel draft restrictions were increased to 10 feet. The major source of any increase in property value at luxury condominium developments would be the increase in boat slip values if deeper draft vessels could dock at the condominium's facilities.

Commercial Property

A survey of marinas and boatyards indicated expected increases in revenue of 18.9 percent for marinas and 14.6 percent for boatyards if vessels drafting 10 feet could access their facility. It was assumed that a proportional increase in property value would occur.

Marinas are currently valued at $30.1 million. An increase of 18.9 percent in property value, resulting from an increase in business volumes, would equal a $5.6 million increase. Boatyards are currently valued at $17.6 million. An increase of 14.6 percent in their value would result in a $2.5 million increase. The total estimated increase in commercial property value is expected to be $8.1 million.

Boat Slips

If larger vessels can access condominiums and marinas in the county, there may be an increase in demand for boat slips that can accommodate larger vessels. The expected increase in business volume generated at marinas was estimated by marina owners as 18.9 percent. This increase was used as a proxy for the expected increase in boat slip rental revenue and therefore boat slip values. Boat slips are currently estimated to be valued at $86.6 million. An 18.9 percent increase in value would result in an additional $16.3 million in the value of boat slips in the county.

Total Impact to Property Values of Increased Waterways Maintenance

If maintenance of the waterways were to increase and vessel draft restrictions were increased to 10 feet MLW, property values in the county would be expected to increase by $24.4 million. There is no evidence that residential property values or condominium values would significantly increase, commercial property values are expected to increase by $8.1 million, and boat slip values are expected to increase by $16.3 million.

Summary

Current Impacts

The current impacts of the waterways in Palm Beach County include $634.7 million in business volume, $227.2 million in personal income, 7,503 jobs, and $1.93 billion to $2.19 billion increase in property values. Furthermore, the waterways have been shown to result in the construction and renovation of larger, more luxurious homes in the county.

Impacts of a Cessation of Waterways Maintenance

If maintenance of the waterway ceases and vessel drafts are restricted to three feet MLW, there is expected to be a reduction of: $332.6 million in businesses volume, $116.9 million in personal income, 3,843 jobs, and a decrease of between $270.2 million to $585.2 million in property values from current conditions.

Impacts of Increased Waterways Maintenance

If maintenance of the waterway increased and vessel drafts were increased to 10 feet MLW, there is expected to be an increase of $103.3 million in business volume, $36.6 million in personal income, 1,212 jobs, and an increase of $24.4 million in property values from current conditions.