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JUNE 24, 1994, LEC COMMITTEE PRESENTATION.

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First, the idea of trying to wrap all of this up by October reminds me of an army recruit who waited six months to write his mom a letter and then sent it airmail. We've known about water quantity problems with the system since at least 1968, 26 years ago, and now that we finally have the computer analysis tool in place, we need to take enough time to properly use it. I suggest that our first step at *adaptive management* be to determine how long it takes to make these computer runs and to give the staff sufficient time to ponder the results and try to optimize the various alternatives. To be perfectly honest, I never took the October deadline seriously.

At the last meeting of the LEC Committee on May 26, 1994, the staff presentation showed if we don't change the system we'll have too many water shortages and cutbacks in urban and agricultural areas as well as severe problems in natural areas. In general we need more water south of the Lake. especially in the dry season.

Conversely, there is concern that dry season Lake levels are too high for wading birds and also that even in the dry season we are dumping too much water down to the Caloosahatchee and St. Lucie Estuaries.

I have evaluated information in the Draft LEC Plan and other sources and I conclude the present system causes unnecessary loss of fresh water from the Everglades. I also conclude that there is no shortage of water in South East Florida, but, there is a shortage of places to store abundant wet season water so it is available in the dry season when water is scarce.

I am therefore proposing that we ask the staff to evaluate what I call the *Storage Alternative*. This *alternative* will be comprised of several of the listed *options* and some new *options* not on the list. Note that the following presumes the Everglades Forever Act mandates for BMPs, STAs, spreaders and etc. will be implemented.

This presentation is a candid expression of ideas and preliminary calculations. It is hoped these ideas can assist the LECWSC process. The enclosed exhibits and statements do not represent final engineering calculations or designs. It is hoped that these ideas can be refined and expanded by working with SFWMD staff and others interested in restoring the Everglades and assuring adequate water supply for the area.

First, I think it's crucial that we understand the hydrology of the historic system, how we've changed the system, and how the system works now.

Exhibit 1. I. Historic System

Exhibit 2. Historic Drainage Basin - Uplands/Wetlands

- Required for traditional hydrologic analysis
- Note: Coastal Areas, Taylor Slough are separate basins
- Area, Approximately 10,000 Square Miles
- Comprised almost entirely of wetlands

Exhibit 3. Variable Annual Rainfall superimposed on Drainage basin

- Coastal Areas get as much as a foot (12") more rainfall than the interior
- Most of the central area gets 50" of rain

Exhibit 4. Variability of Monthly Rain and Variability of Monthly ET

- Rainfall extremely variable
- ET much more constant
- Rainfall variability means we have to live with the extremes of flood and drought

Exhibit 5. Bar Chart showing (R-ET) for the historic Everglades basin

- Historical excess (R-ET) amounted to approximately 2,000,000 Acre Feet

Exhibit 6. Slope of the land

- Greater Gradients North of the Lake increase runoff
- Very flat south of the Lake - runoff is very slow

Exhibit 7. Rock Transmissivity - Historic Case

- Example calculations show 500,000 Acre Foot per year groundwater flow to estuaries from Everglades basin
- There would be additional surface flows from Everglades Basin
- Plus, there would be additional surface and groundwater flows from Coastal area east of the Everglades Basin

Exhibit 8. Historical Water Flows (Before 1880)

- The above are some of the factors involved in a historical description of hydrology, however, this graphic is Based on values in 1993 Draft LEC Report
- Combines Surface and Groundwater Flows

- Presented as a way to visualize a massive amount of information. I'd like the opportunity to refine this by working with the Staff.
- For example, these are average annual flows. It would be interesting to get computer results and prepare similar diagrams for a wet year and a dry year.

Exhibit 9. II. Changes to the System

Exhibit 10. 1950 Land Use (from University of Florida - The South Florida Study)

- Conditions in 1950 were substantially different than in 1880 or in 1994. In the East Coast coastal zone there was much less Urban land and much more agriculture than now. There was much less agriculture in what is now the EAA.
- In the early years, water was the Enemy
- The original drainage plan was simple, route water to the ocean
- This exhibit shows the extent of the drainage system in 1950
- This system was a failure
- It likely worked for an "average" year, but it did not deal with the extremes of flood and drought.
- In dry years, there was severe overdrainage, urban water supplies were threatened by salt intrusion up coastal canals and muck fires burned the muck soils of the Everglades down to the underlying rock.
- The system did not control flooding. The 1947 flood provided the impetus to build a system which had been under development for the prior ten years by USGS, the SCS and others.

Exhibit 11. 1948 HD 643 - How the System Works - NS Levee

- Allowed Everglades to remain flooded
- The East Coast drainage system only had to deal with the lands East of the levee

Exhibit 12. 1948 HD 643- How the System Works - Salinity Gates

- Allowed Fresh water to drain to the ocean
- Kept salt water out when flows were low or nonexistent

Exhibit 13. 1948 HD 643 - How the System Works - Kissimmee, Lake Okeechobee, EAA, WCAs, N-S Levee, ENP

- The Lake functioned as a reservoir. It received water from the North and from pumping from the EAA. It delivered water to the EAA and WCAs during the dry season.
- The EAA pumped water both to the North and to the South in the wet season. It received water from the Lake in the dry season.
- In the wet season the WCAs received water from EAA and from Rainfall and stored it. This water would supply urban areas and the Park during dry periods
- Without this system the Natural system would likely be dead now due to overdrainage and fires. Due to salt intrusion and flooding the pre-C&SFFCD system could support only a small population along the coastal ridge

Exhibit 14. Lands Carved out of the Everglades Drainage Basin

- Area of highest rainfall. (See Exhibit #3)
- These Areas formerly contributed to the system - now flows have been reversed
- Now these areas need to be supplied from the WCA system in the dry season.

Exhibit 15. Drained Wetlands Map

- Perhaps, 1,500,000 acres of wetlands have been drained
- The next graphic show a major effect of that drainage

Exhibit 16. ET vs Water Level - very important, poorly understood

- Adapted from Everglades, Davis and Ogden, page 257.
- Water level affects ET
- When you drain wetlands - ET goes down, If rain stays the same you "produce" more water.
- If you want to keep wetlands drained you have to get rid of the water that formerly flooded the land.
- The historical system was much wetter and ET Losses were higher
- Before they were drained, the present urban areas "produced" much less water - but west of the Coastal Ridge, what surplus water they did "produce" stayed in the system and flowed west into the Everglades. The water that formerly contributed to the Everglades is now routed to the ocean.
- In the EAA, the water that formerly flooded the wetlands is routed to the WCAs. It stays in the system. The EAA "produces" much more water than it did historically. This may be 500,000 acre feet or more.

Exhibit 17. (R-ET) Bar Charts including Urban Areas

- Water from north of the Lake is vital to the system.
- Without inputs from the north, the Lake would be dry in 6 years. Inputs from the North have to make up Lake evaporation loss of approximately 700,000 acre feet per year.
- Nevertheless, Lake Okeechobee is the most efficient reservoir available in the system with 450,000 acre feet of storage per additional foot of lake level. This is because evaporation from the Lake is constant and is essentially unaffected by lake level.
- approximately 700,000 Acre Feet of the water from North of the Lake is discharged to the Caloosahatchee and St. Lucie Canals in an average year
- The EAA "produces" approximately 500,000 acre feet per year. This is approximately double the amount of water produced in all the WCAs.
- Shows the magnitude of excess rainfall available in the urban areas. Most of this water is now discharged and wasted to the ocean
- There is not enough water in the system to increase Everglades flows unless we make fairly radical changes to the system. Obvious possibilities are retention of North Basin waters and Urban waters instead of wasting them to the ocean as at present.

Exhibit 18. Modern Rock Transmissivity

- Shows losses of perhaps 800,000 to 900,000 Acre Feet at the North-South levee
- The Corps created WCA-2B and WCA-3B in an effort to isolate the high transmissivity rock
- Now I understand the Corps has breached the WCA-3B levee in an effort to increase flows to the Park. This will likely raise water levels in WCA-3B and further increase seepage losses at the North-South Levee.

Exhibit 19. Plan View - Effect of Urban Areas

- shows historic system
- shows the location of some modern features of the historic system.
- shows the location of a cross section

Exhibit 20. Cross Section showing the effect of Urban areas

- Steep groundwater gradient created in the vicinity of L-30 levee resulting in enormous seepage to the east in some of the most transmissive rock in the world.
- Enormous areas of wetlands drained for urban purposes

- In the urban areas ground water levels can fluctuate only through a narrow band.
- If Urban groundwater is too high the land will flood as soon as it rains
- If Urban groundwater is too low we'll get salt water intrusion
- So when it gets above 4, for example, you have to discharge to the ocean.
- When is gets down to 2, you have to bring in water from the west to maintain the salinity balance. This drains water out of the Everglades during the critical dry season.

Exhibit 21. Map of Lattice work of Urban Canals

- shows existing system of canals and pumps necessary to provide drainage to urban areas

Exhibit 22. Water Summary - Modern system

- Combines surface flows, groundwater flows, and potable water discharged to ocean outfall or deep well
- Shows enormous losses to the ocean from urban areas
- Again, a way to visually present a lot of information
- I would like to work with the staff to refine this and also to prepare examples of wet and dry years.
- We need to compare this with the historic case presented earlier.
- I have brought boards that show modern and historic system that you can look at more leisurely
- No shortage of water
- But, presently no place to store the water from the wet season so that it is available in the dry season.

Exhibit 23. III. Economic Benefits of Changed System

Exhibit 24. Population growth for Florida

- shows how State's population has changed since the system was designed in 1948.

Exhibit 25. Population growth for Dade, Broward, and Palm Beach Counties

- shows how the three county population has grown since the system was designed in 1948
- Also note the time of the first Corps restudy in 1968

Exhibit 26. 1947 Flood superimposed on 1990 Satellite Image

- This shows lands that were flooded by the 1947 flood - only a 25 year storm
- Whatever value urban development in the flood zone lands have, they owe to the system which provides them with both flood control and water supply.
- Also, the value of the lands along the Coastal Ridge is enhanced because of the population and commerce that occurs in the urban lands to the west in drained wetlands.

Exhibit 27. 1947 Flood, Land Analysis

- 617 square miles of lands in flood prone lands have been urbanized.
- These lands could not exist without the system

Exhibit 28. Value created by the system.

- See Chart
- Money is a delicate issue. The point is that substantial financial benefits flow to both urban and agriculture areas as a result of the C&SFFCD system. These developed lands could not exist without the water control system.
- These benefits may justify substantial expenditures to update the system.

Exhibit 29. IV. Suggested Storage Alternative

I am proposing what I call the "Storage Alternative". Instead of wasting water to the ocean, store as much as possible. Operate these storage systems on a flexible basis over time periods greater than one year. For example, hold water back from a wet year in case the next year is dry.

We need to follow the 1948 advice of the Corps, "Don't unnecessarily waste one drop of water to the ocean". Within the "Storage alternative" we can mix and match a number of *options* to optimize the effect.

Exhibit 30. Map showing the Lake and the Buffer Zone.

- Annual historic Lake levels averaged about 6 feet higher than now (about 20 to 21 feet). Pre-levee lake size was larger, say, 500,000 acres. Thus, historic Lake storage was probably 3,000,000 acre feet more than now.
- Exhibit # 15 showed 1,500,000 acres of drained wetlands in the historic Everglades basin. If average historic levels in these lands averaged 2 feet higher than now, the historic storage was 3,000,000 acre feet larger than at present.
- Therefore, the system has probably lost 6,000,000 acre feet of storage, 1/2 to drainage, 1/2 to lower Lake levels.

- Historically, the antecedent conditions from the previous year ameliorated the effects of a drought year.
- This graphic shows areas that have been identified as available for storage. The buffer area is approximately as delineated by the National Audubon January 12, 1994, Report on Water Supply Preserves. I have emphasized the Dade County Lake Belt Area.
- Please note that ASR is probably infeasible on the necessary scale. Therefore, additional storage will probably have to be above-ground.

Exhibit 31. 1968 Corps Restudy - Syllabus

- The Corps identified problems with water supply to South East Florida 26 years ago.
- Based on 700 Computer runs of a model now called the SFRRM
- The Corps determined that the most practicable way to improve water supply was to raise the levees and allow Lake Okeechobee to fluctuate up to an elevation of 21.5 feet.

Exhibit 32. 1968 Corps Restudy - Paragraph 107

- Allowing Lake Okeechobee to store water, when it is available from the North, has an enormous beneficial effect on the entire system.
- Extreme high and extreme low levels would only seldom be experienced.

The details for raising the Lake are spelled out in the 1968 HD 369. This 1968 Corps restudy found that allowing the lake to fluctuate over a greater range and to store water when it was available, had a substantial positive effect on regional water supply. But before I move on, however, wading bird concerns caused by higher Lake levels could be addressed by:

Exhibit 33. Three Polders

- Wading bird habitat possibly lost to higher lake levels could be replaced by managing these three areas to replace wading bird habitat.

Now, moving on to the Buffer located along the East side of the WCAs

Exhibit 34. Buffer Area Considerations

- See List.

Exhibit 35. Satellite Image showing Lake Belt Area.

- Locates Lake Belt area on Satellite Image

Exhibit 36. Oblique View of Lake Belt Area

- Water Supply
- Land Use
- Wetlands
- Recreation
- Necessary supply of rock to the State of Florida for infrastructure, public (70%) and private.

Exhibit 37. Map showing Existing and Permitted lakes

- 4,600 acres of Lakes existing
- 5,700 additional acres already permitted by the corps of Engineers
- Implementing Committee created by the Florida Legislature
- Next meeting Monday June 27, 1994.

Exhibit 38. Map showing Ownership in lake Belt Area

- Rock Miners own about 27,000 acres (50%) of 54,000 acre total
- Government already owns about 7,000 acres. (13% of total)

Exhibit 39. Step-Down option showing step down areas

- One plan to increase storage and slow seepage losses
- Reducing groundwater gradient reduces seepage losses.

Exhibit 40. Step-Down option showing water level cross section

Exhibit 41. Step-Down option showing possible lake configuration

Exhibit 42. National Audubon recycling option cross section

- Plan to further increase storage and reduce seepage losses utilizing pumps.
- Supply to WCAs via Goundwater flow.

Exhibit 43. Plan View of Seepage Barrier

Exhibit 44. Cross section of Seepage Barrier

- Plan to reduce seepage losses with seepage barrier.
- Water storage would be increased by backpumping.

Exhibit 45. Possible "Trencher" for installing seepage barrier.

- Others have mentioned using explosives and expensive techniques for installing barrier.
- A trenching machine would likely provide a much less expensive technique.

Exhibit 46. Possible Seepage Barrier Benefits

- See List

Exhibit 47. V. Recommendation

The SFWMD has developed a Mod-Flow model of the Lake Belt Area and these ideas could be tested on that model before taking the time to put them on the Big model

Exhibit 48. Storage Options already Discussed - See list

Exhibit 49. Recommendations - See list

Exhibit 50. Recommendation -

- Within the constraints of appropriate hydroperiods for the WCAs and ENP, and necessary fresh water deliveries to the estuaries, mix, match, adjust and evaluate the above new and previously adopted options in order to meet the *Goals* and achieve the *Objectives* as well as comply with the Everglades Forever Act

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I. HISTORIC SYSTEM



Historic Everglades Basin

Scale in Miles
0 50

UPLANDS 
WETLANDS 
OPEN WATER 



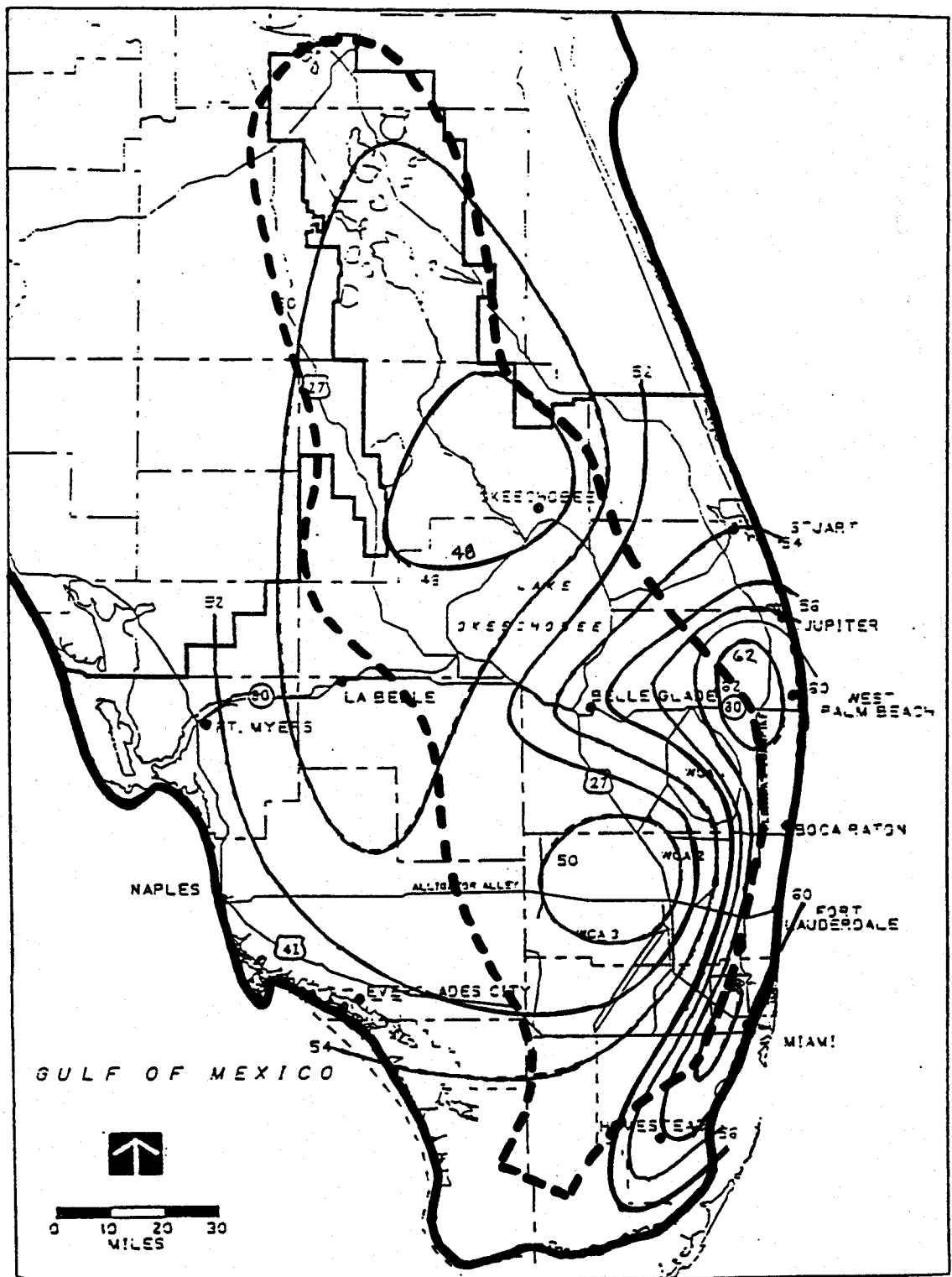
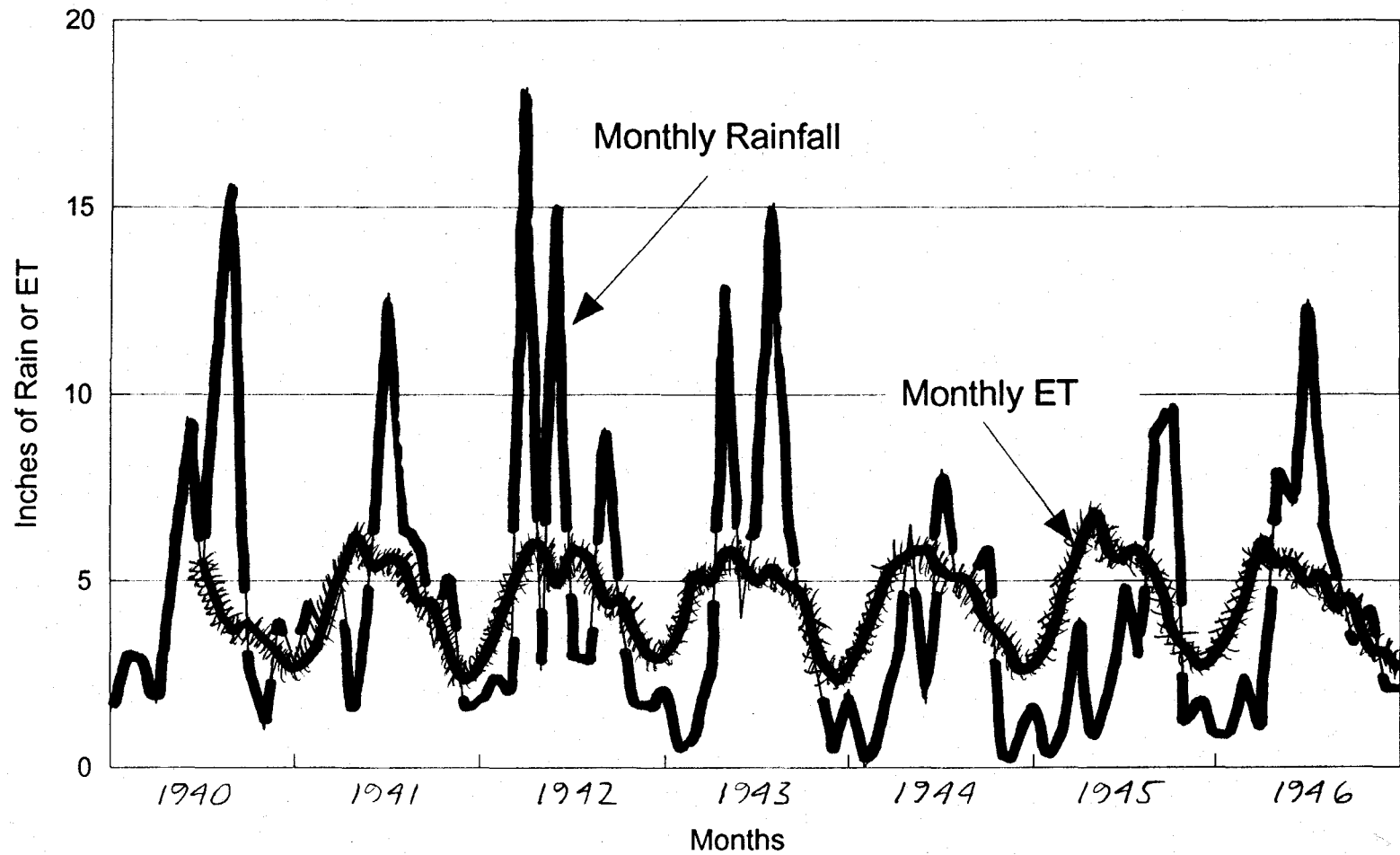
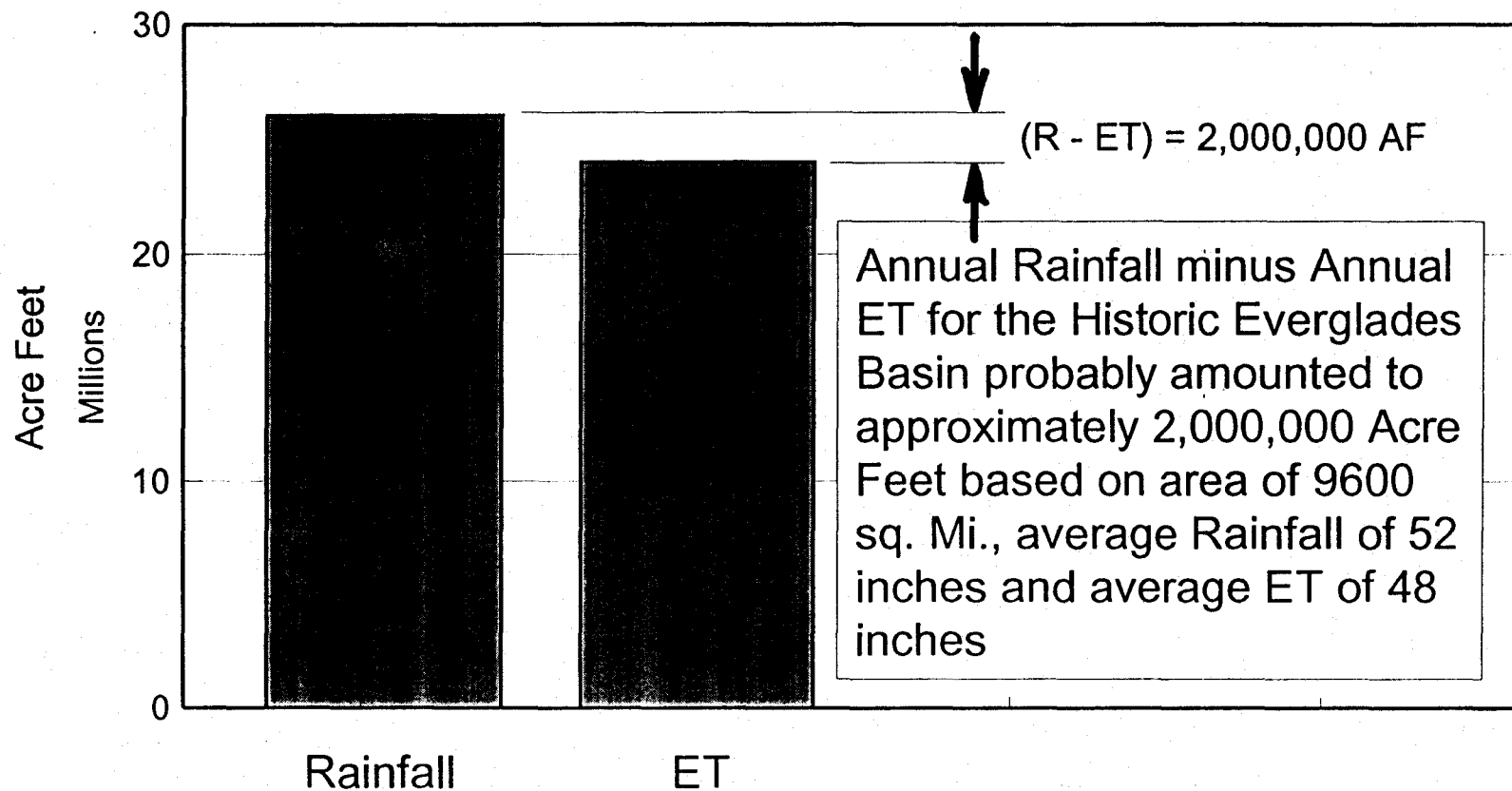


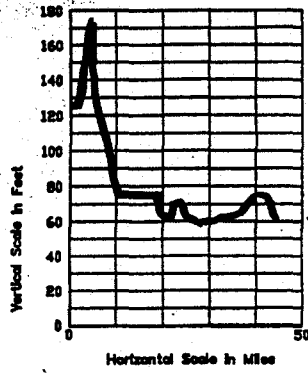
Figure 4.12 Average annual rainfall in District (after MacVicar, 1982)

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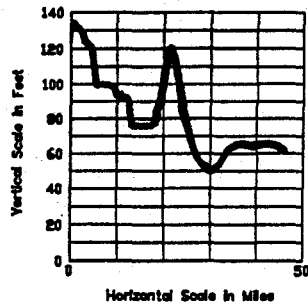
Rainfall and ET for Hialeah 1940 to 1947



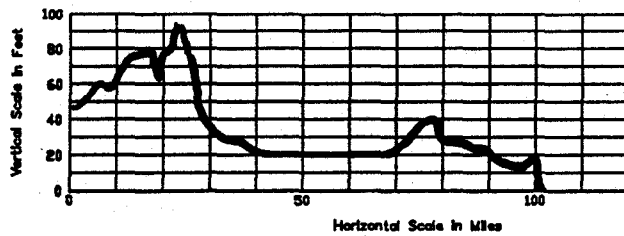




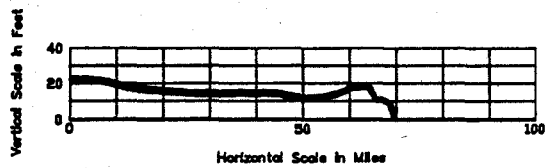
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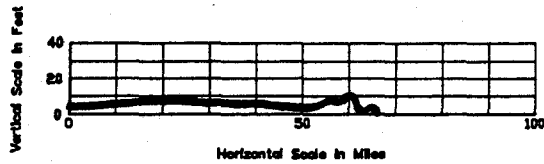
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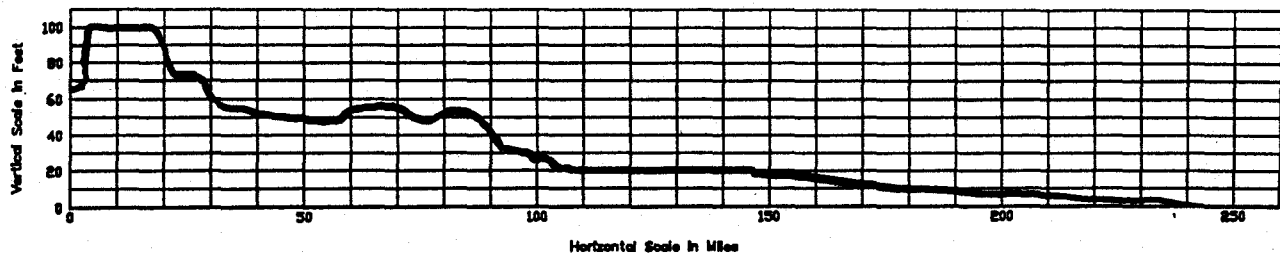
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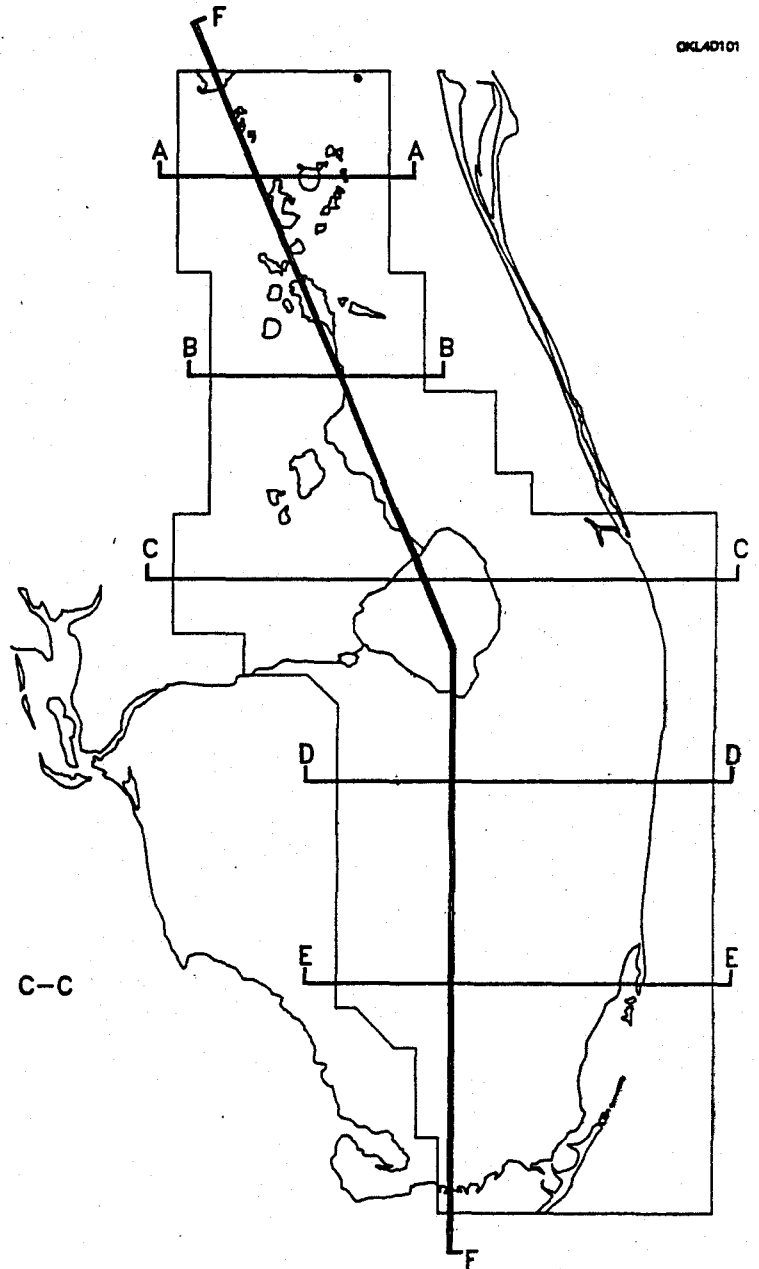
D-D



E-E



F-F



Generalized Transmissivity Historic Conditions $\text{ft}^2/\text{day} \times 1,000$

Palm Beach Co.

sfc4f231

Broward

Dade

$$Q = T W I$$

Q = Groundwater Flow
(ft^3/day)

T = Transmissivity
(ft^2/day)

W = Width of Section
(ft)

I = Slope of Water Table
(ft/ft)

Example

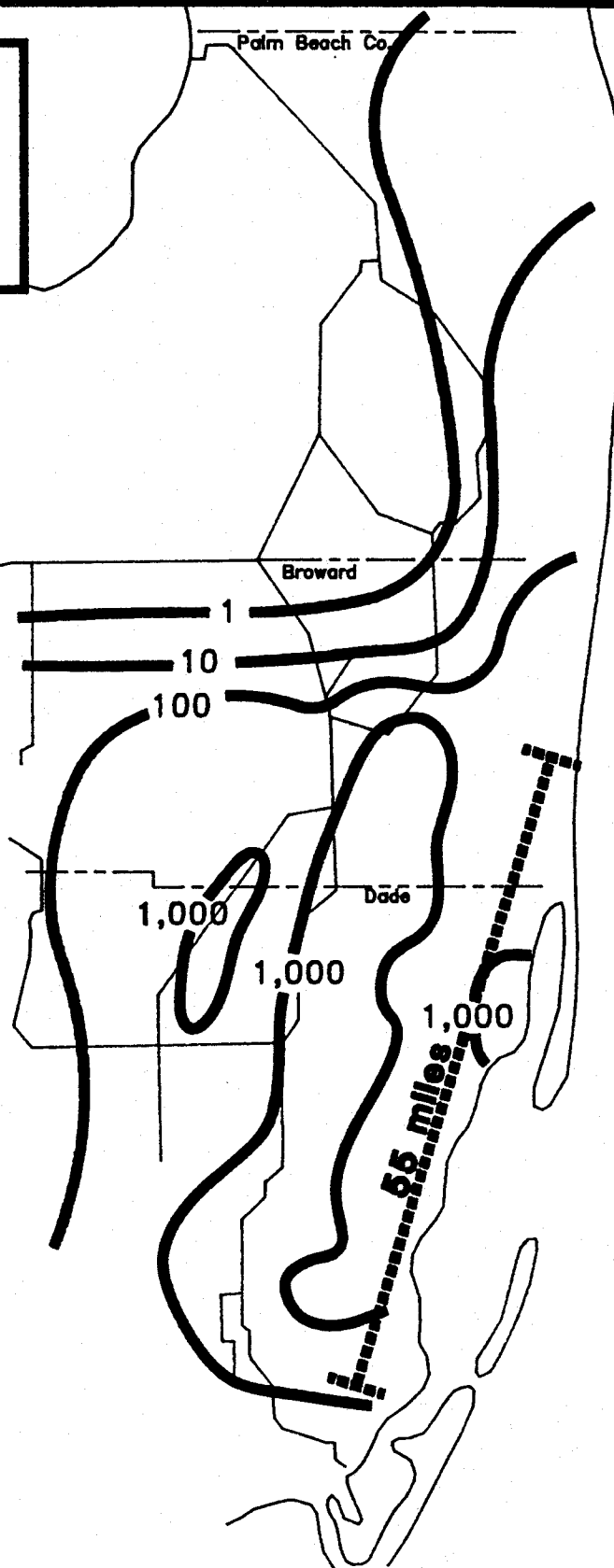
$$T = 800,000 \text{ ft}^2/\text{day}$$

$$W = 55 \text{ miles} = 55 \times 5,280 \text{ ft}$$

$$I = 6 \text{ ft} / (5 \times 5,280 \text{ ft})$$

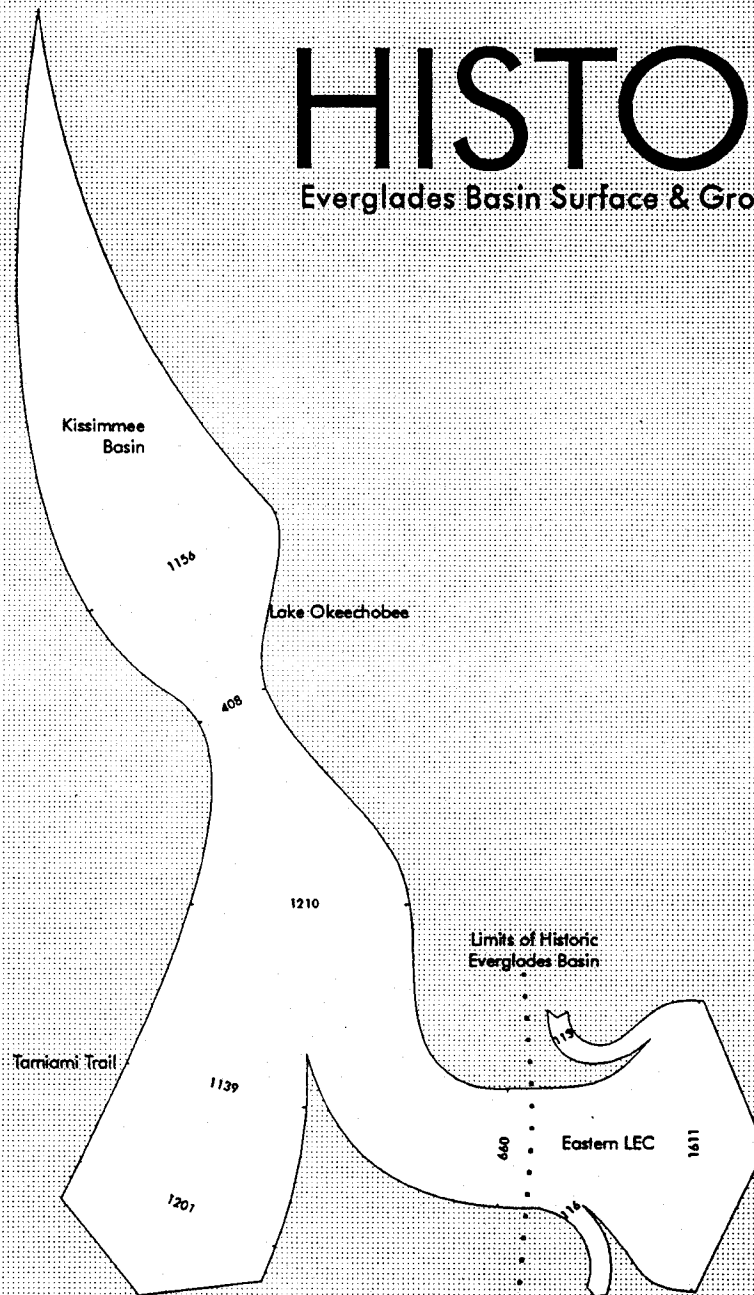
$$Q = 800,000 \frac{\text{ft}^2}{\text{day}} \cdot \frac{11}{55} \times \frac{5,280 \text{ ft}}{5 \times 5,280 \text{ ft}} \cdot \frac{6 \text{ ft}}{5 \times 5,280 \text{ ft}} = 53,000,000 \frac{\text{ft}^3}{\text{day}}$$

$$= 1,217 \frac{\text{AF}}{\text{day}} = \boxed{440,000 \frac{\text{AF}}{\text{yr}}}$$



HISTORIC

Everglades Basin Surface & Ground Water Flows



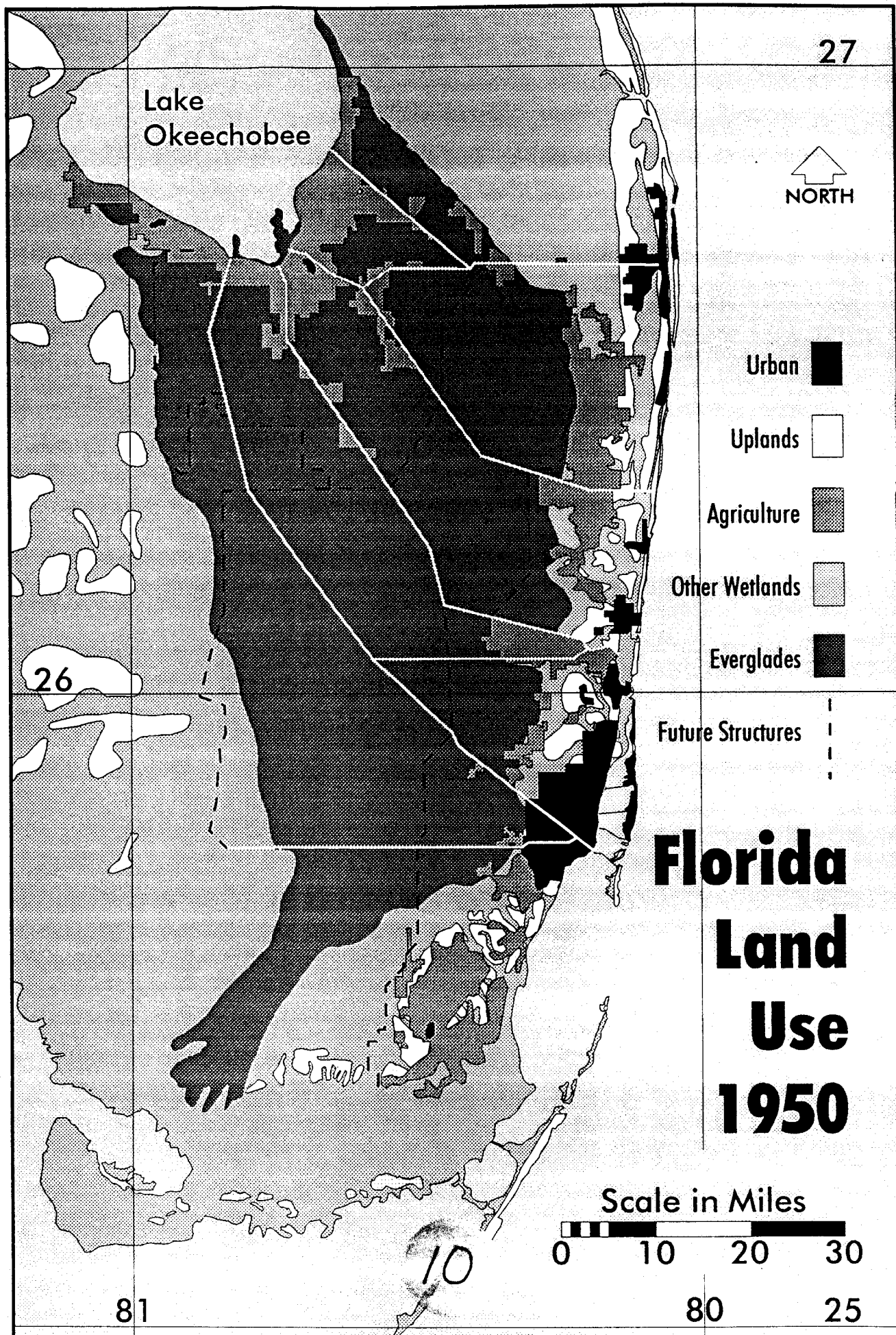
1,000,000 Acre Feet / Year



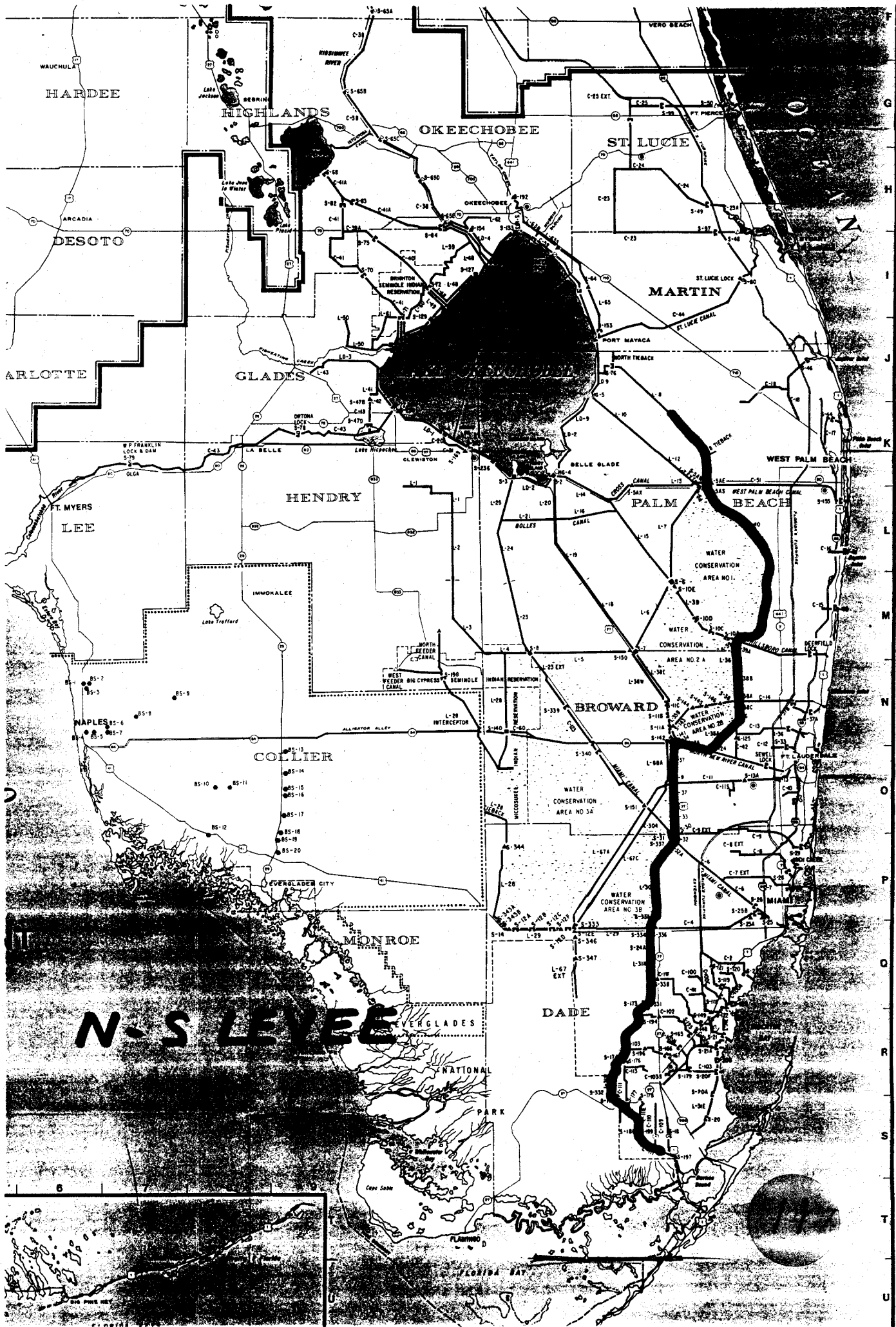
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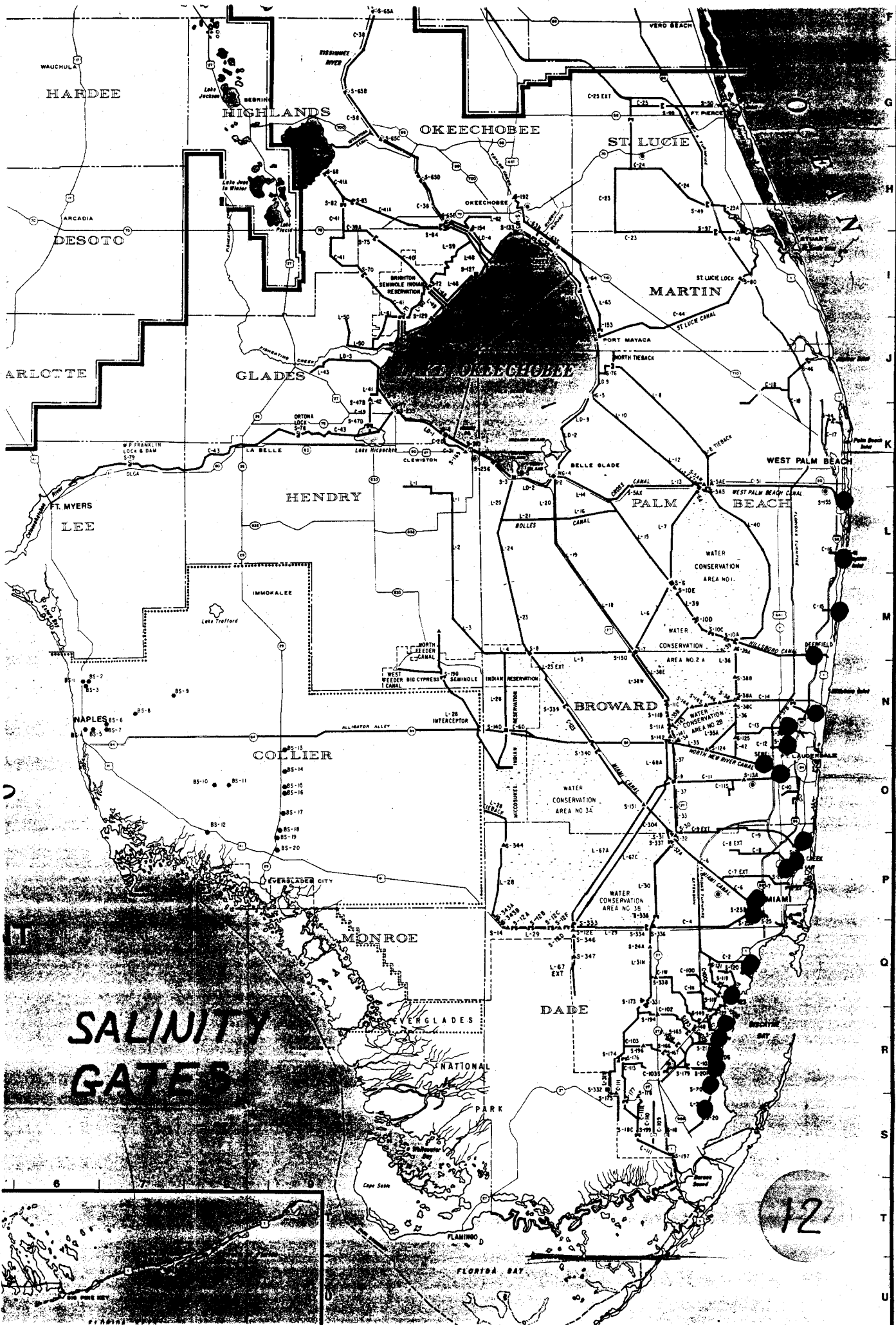
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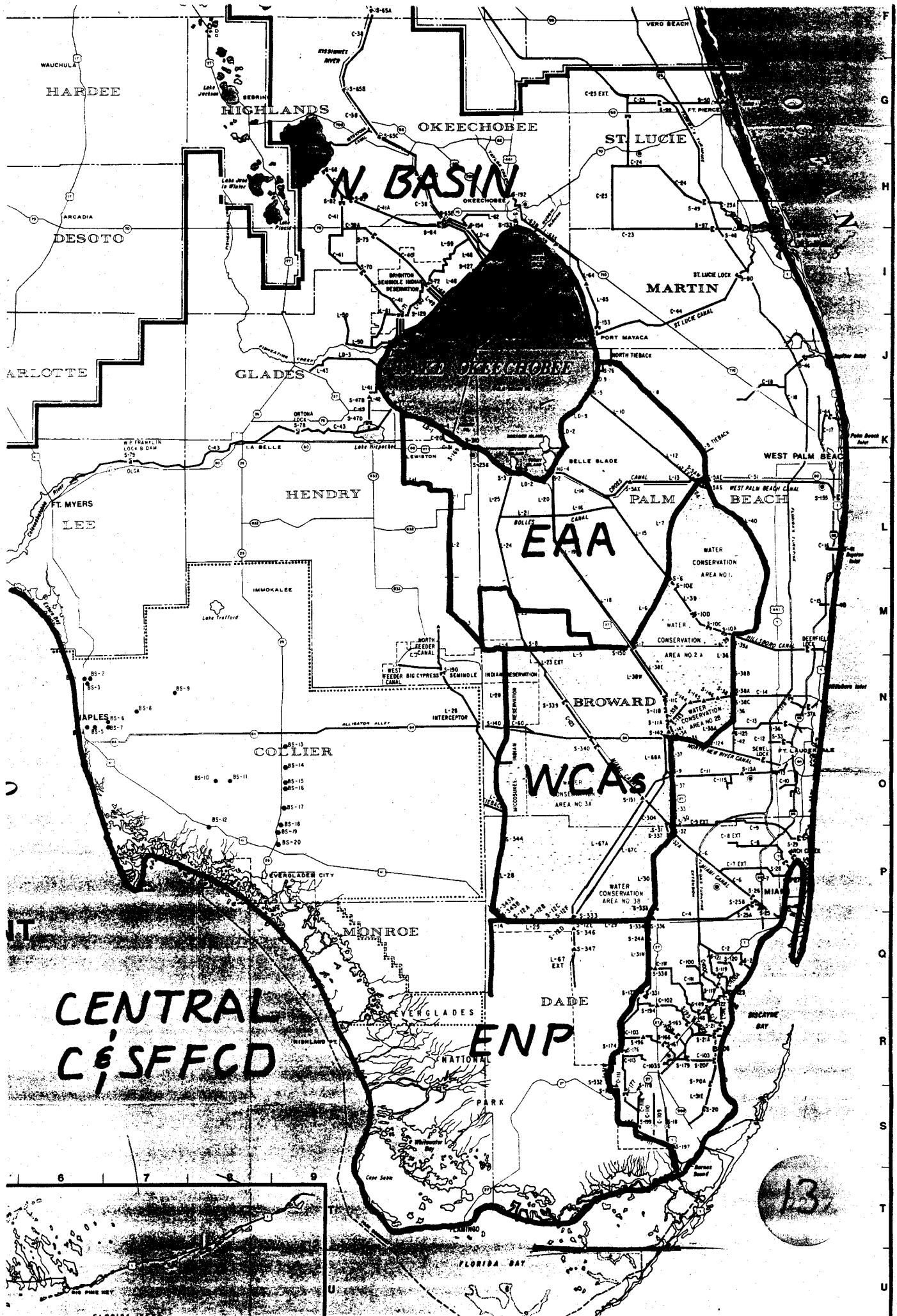
II. CHANGES TO SYSTEM



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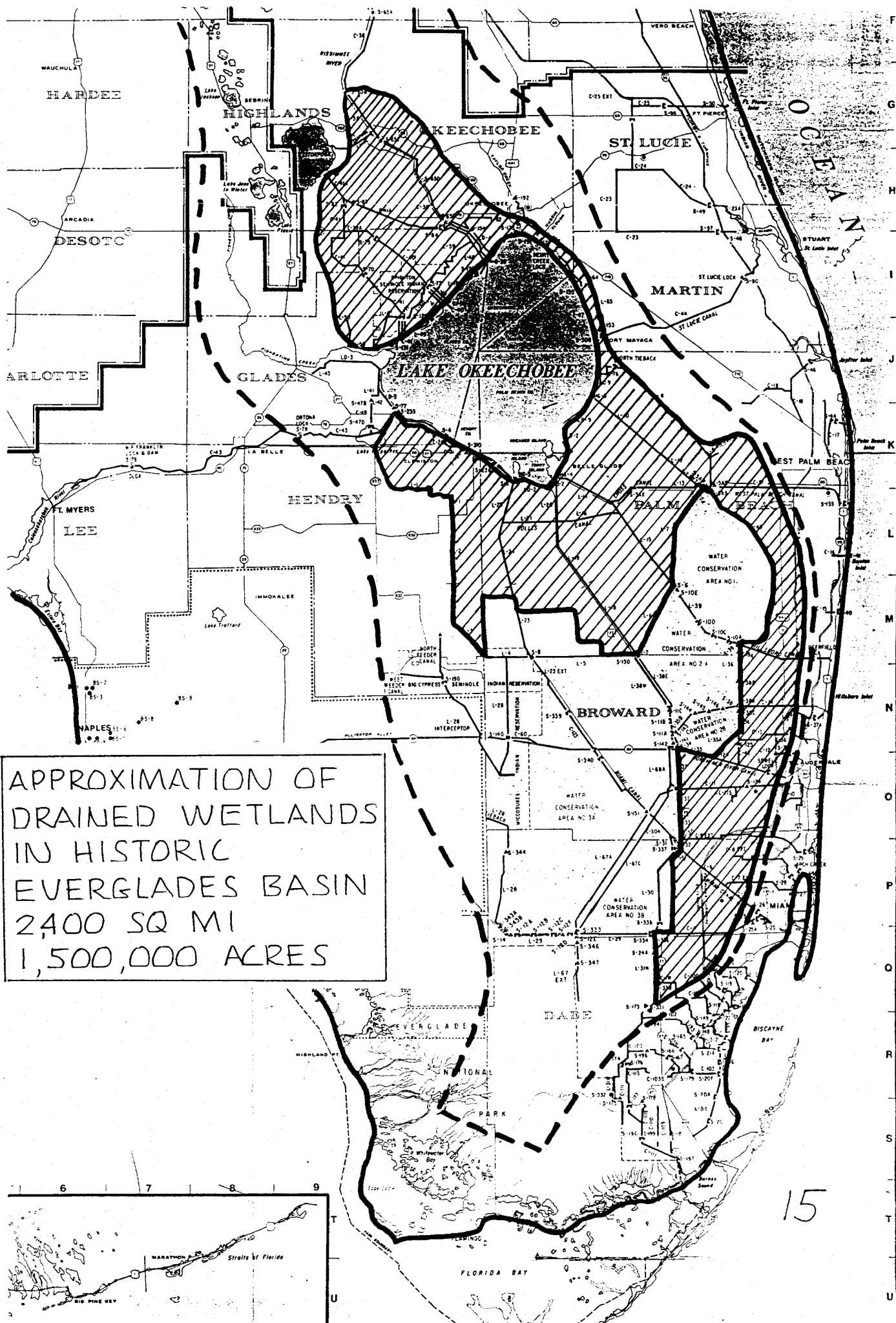


SOUTH FLORIDA ATER MANAGEMENT DISTRICT



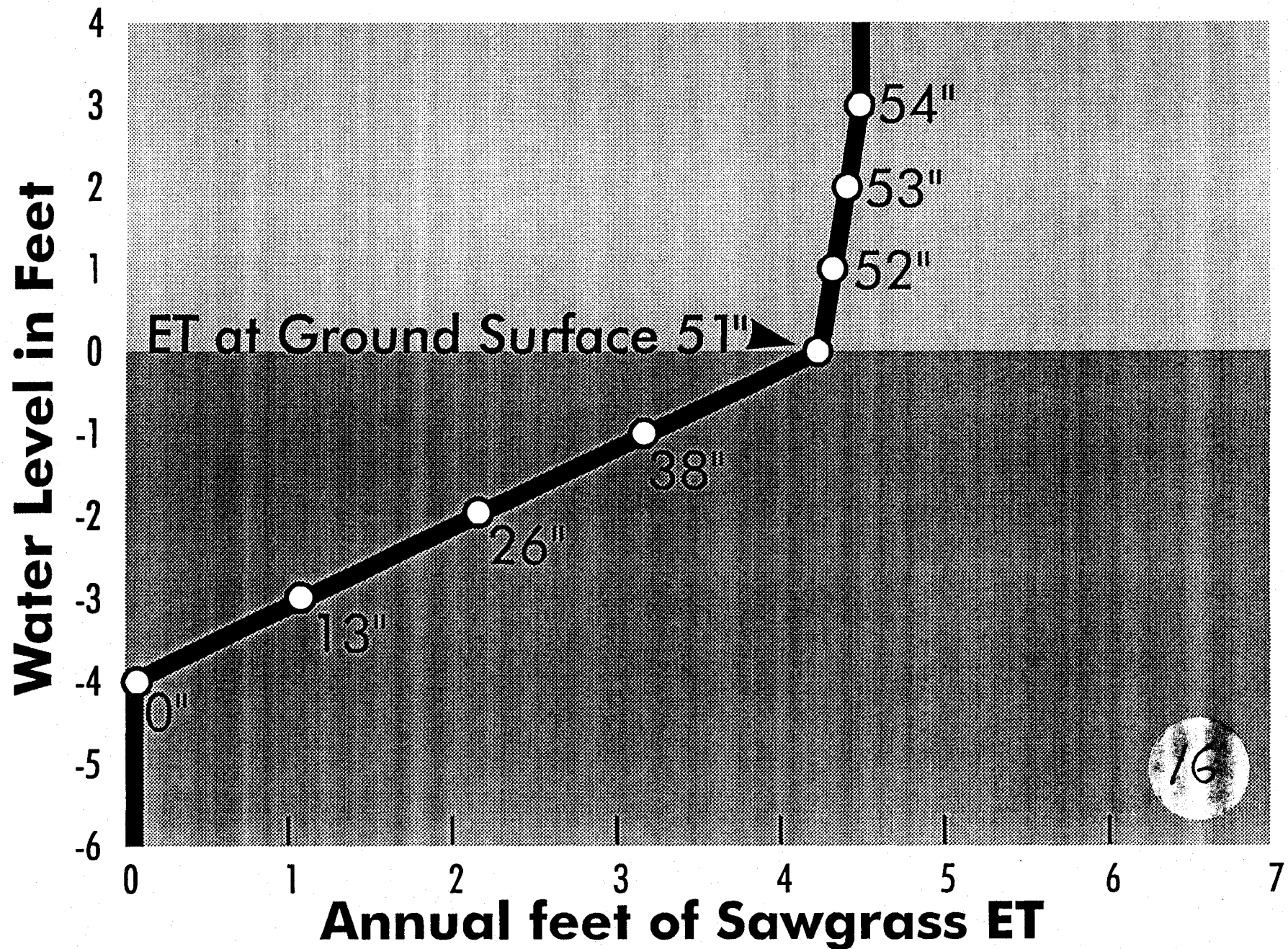
LEGEND	
DISTRICT BOUNDARY	—————
S-2 CYPRESS BASIN	—————
CANALS & LEVEES	—————
SPILLWAY	—————
LOCK & LOCK	—————
GRAVEL CULVERT	—————
PUMP STATION	—————
PUMP STATION & LOCK	—————
WATER	—————
FIELD STATION	—————
WATER TREATMENT PLANT	—————

AREAS CUT OUT
OF HISTORIC
DRAINAGE BASIN



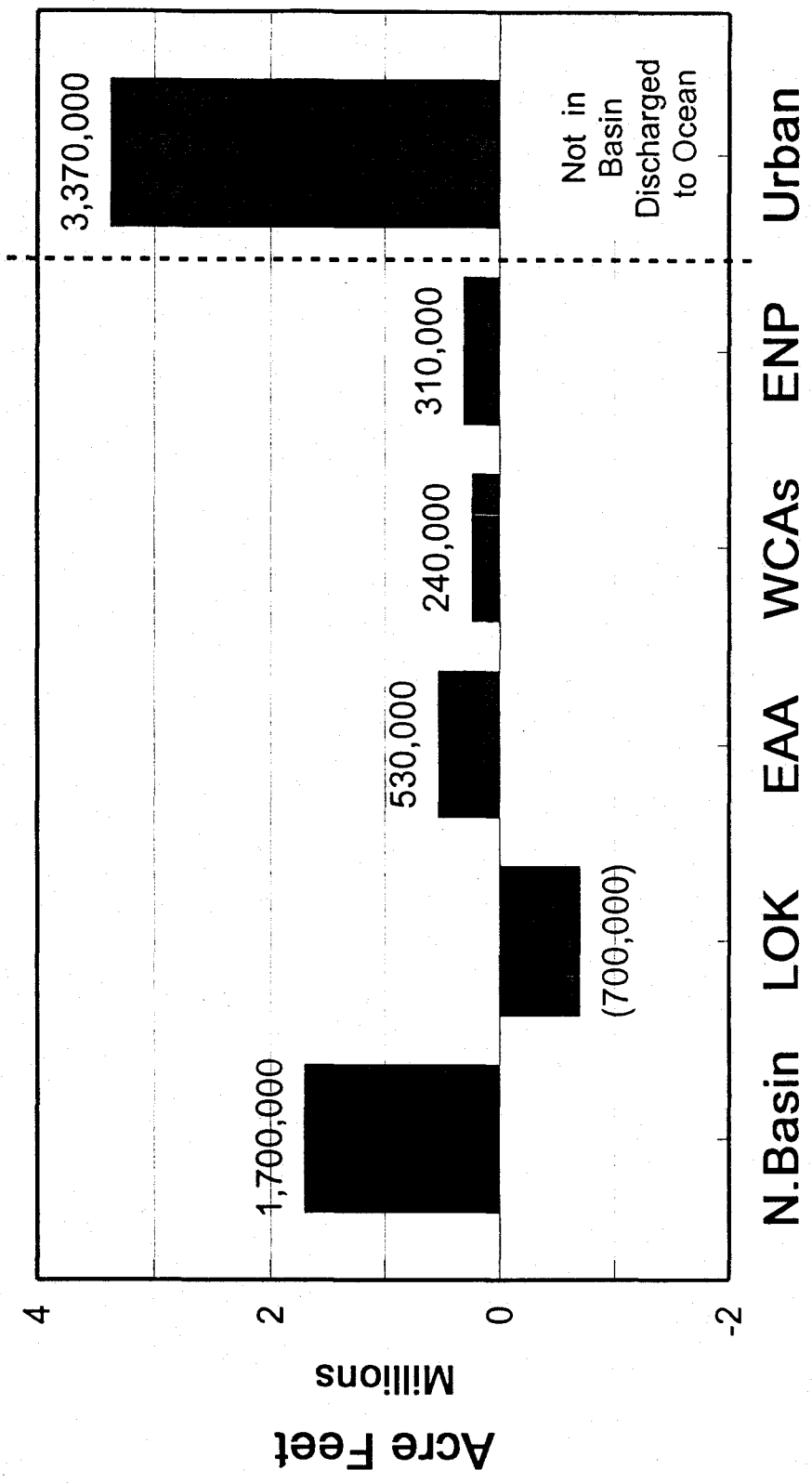
APPROXIMATION OF
DRAINED WETLANDS
IN HISTORIC
EVERGLADES BASIN
2,400 SQ MI
1,500,000 ACRES

Evapotranspiration vs. Water Level



Based on Annual Pan Evaporation of 67" and annual average crop coefficient of 0.765

Rainfall minus Evapotranspiration



Because the
have been
drained

**Generalized
Transmissivity
Modern Conditions
 $\text{ft}^2/\text{day} \times 1,000$**

$$Q = T W I$$

Q = Groundwater Flow
(ft^3/day)

T = Transmissivity
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W = Width of Section
(ft)

I = Slope of Water Table
(ft/ft)

Example

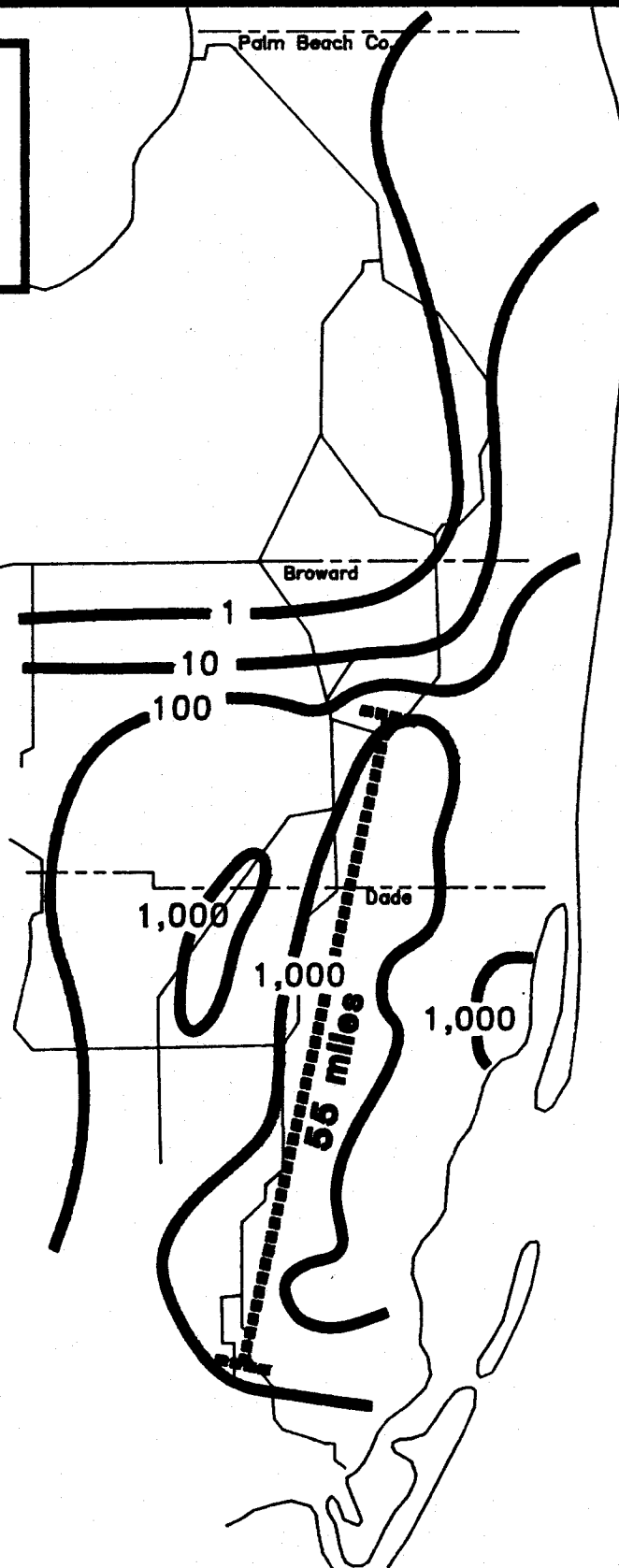
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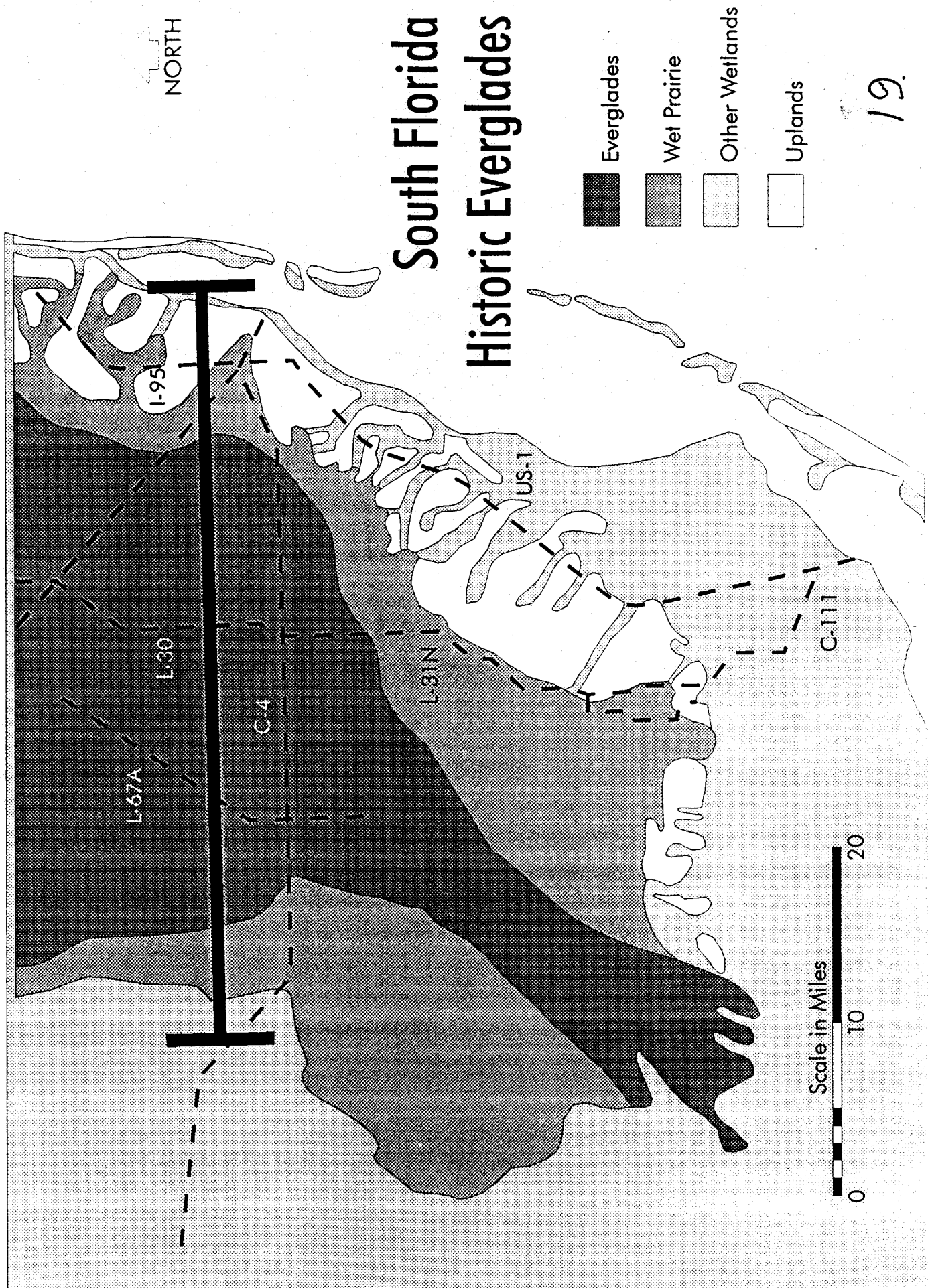
$$W = 55 \text{ miles} = 55 \times 5,280 \text{ ft}$$

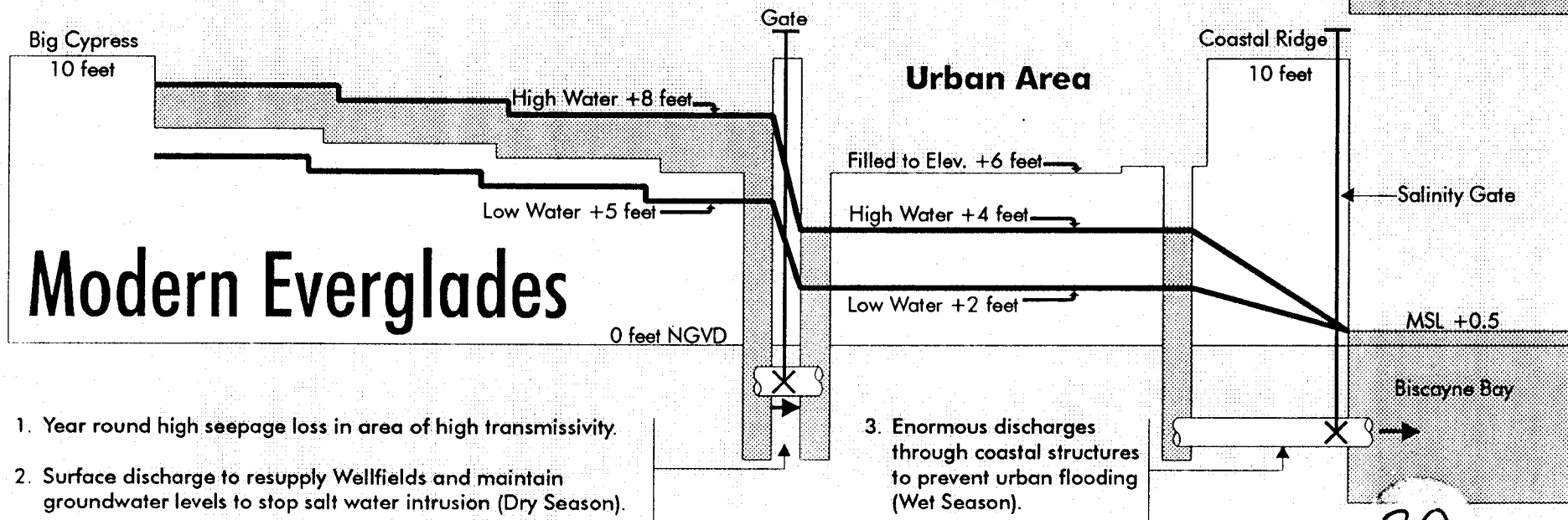
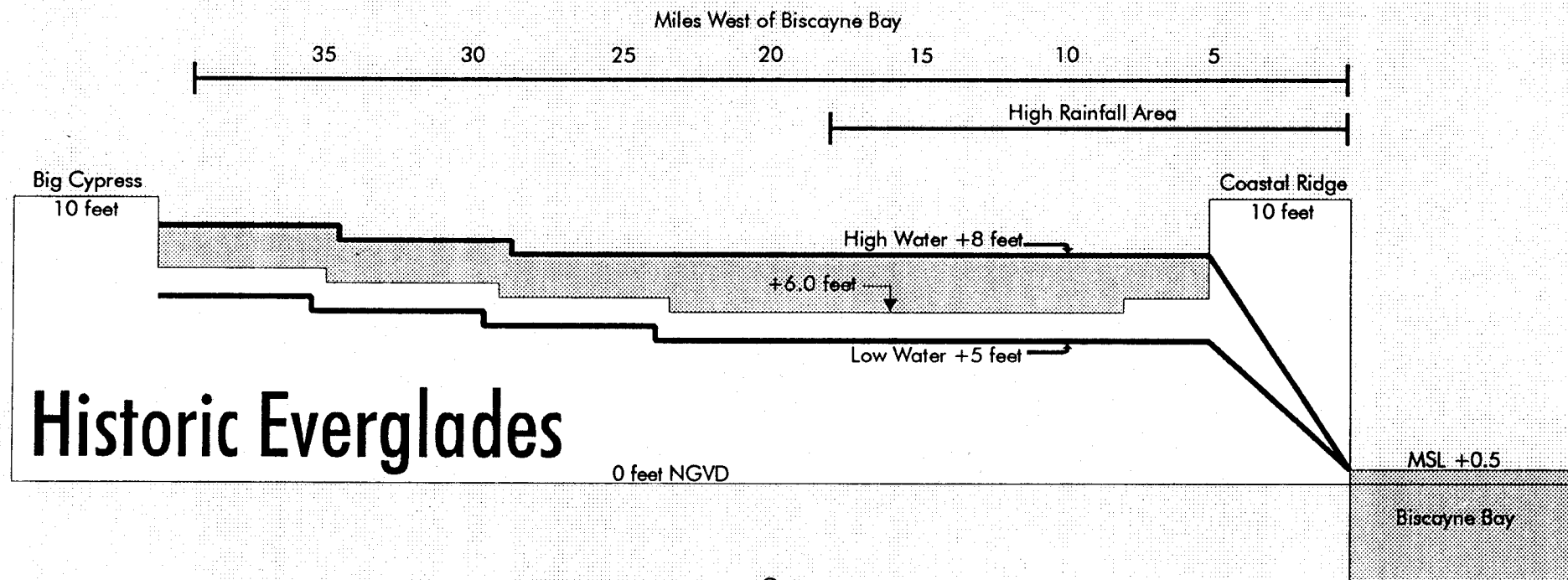
$$I = 2 \text{ ft}/5,280 \text{ ft}$$

$$Q = 1,000,000 \frac{\text{ft}^2}{\text{day}} \cdot 55 \times \cancel{5,280 \text{ ft}} \cdot \frac{2 \text{ ft}}{\cancel{5,280 \text{ ft}}} = 110,000,000 \frac{\text{ft}^3}{\text{day}}$$

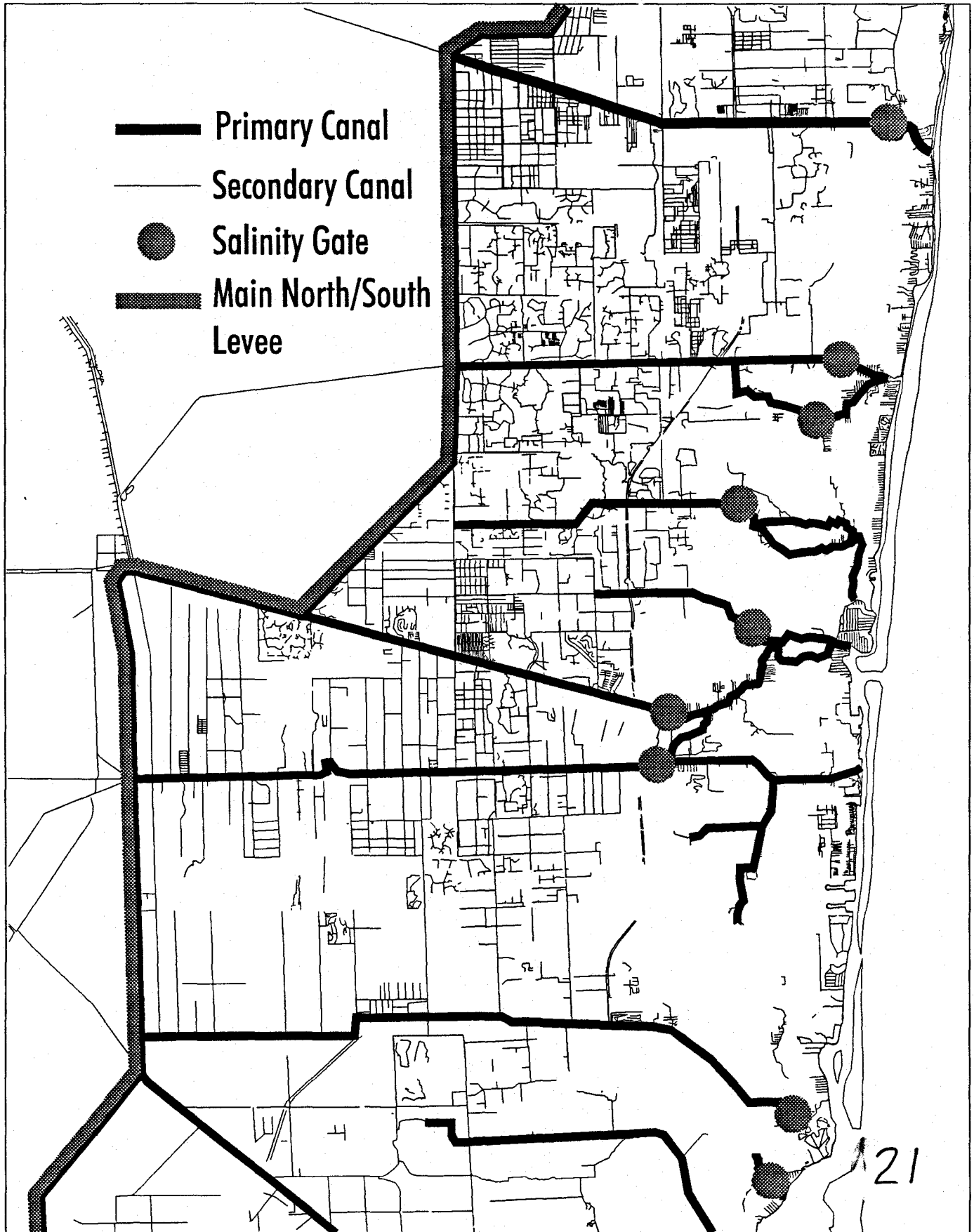
$$= 2,525 \frac{\text{AF}}{\text{day}} = \boxed{922,000 \frac{\text{AF}}{\text{yr}}}$$





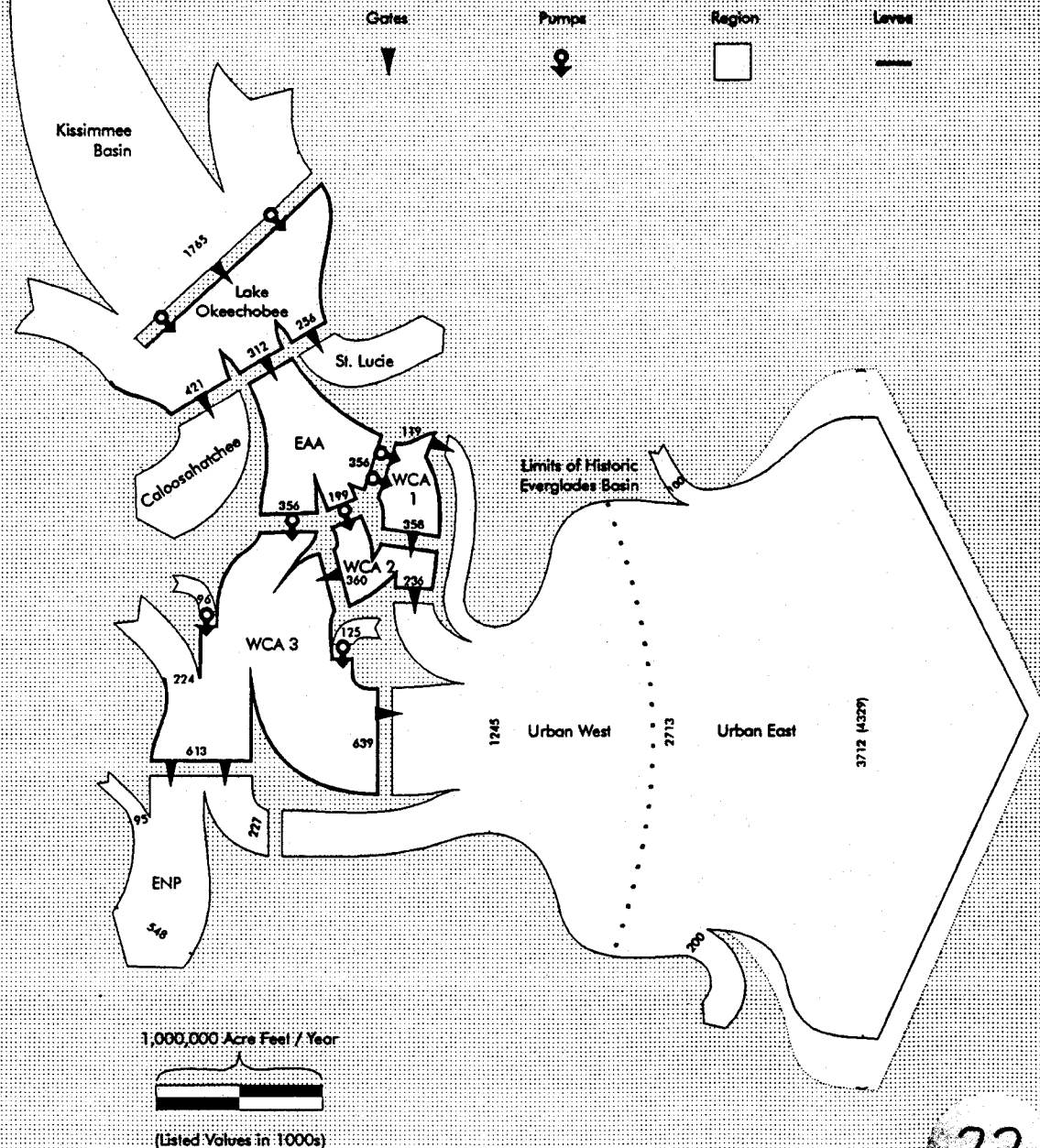


Urban Drainage Canals

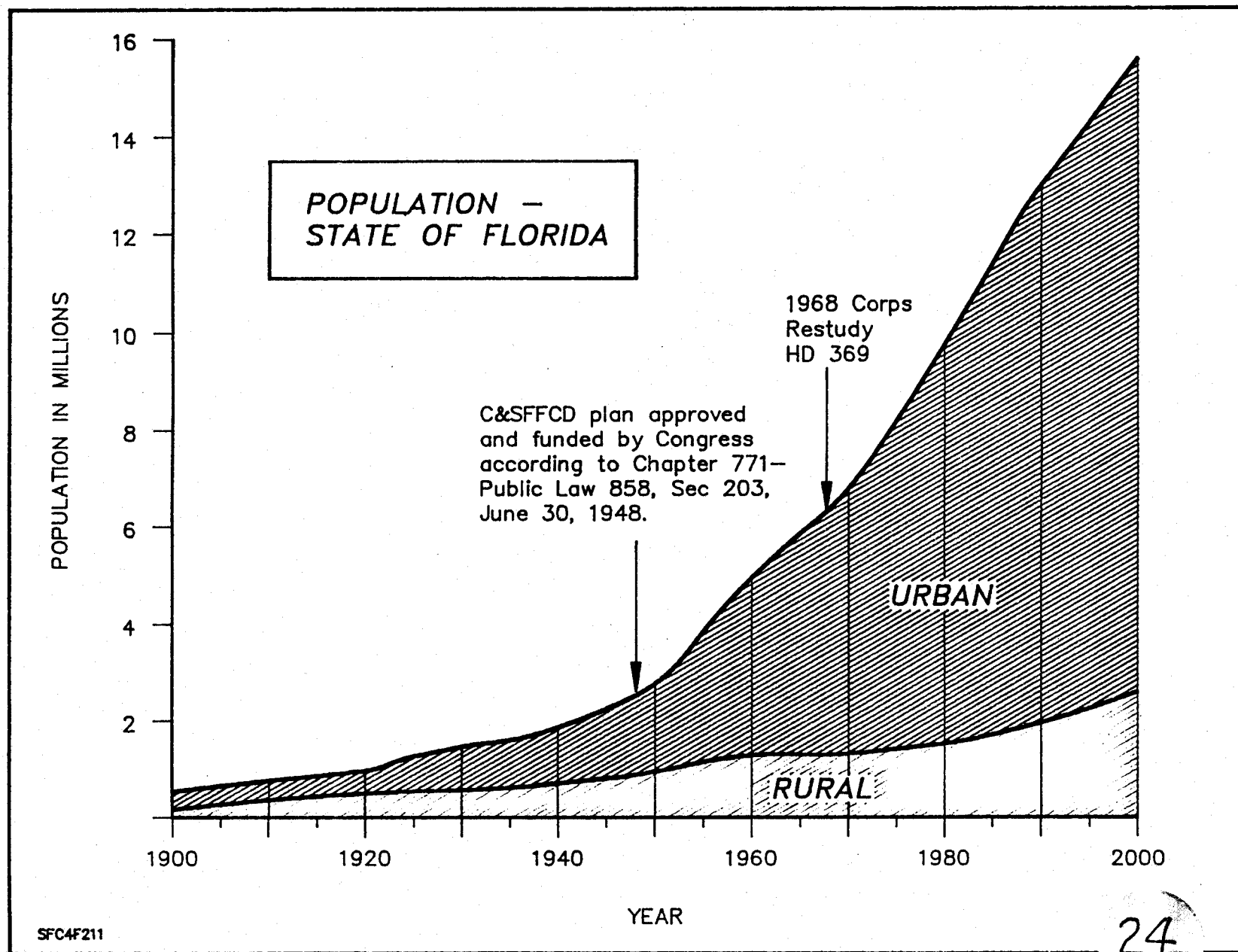


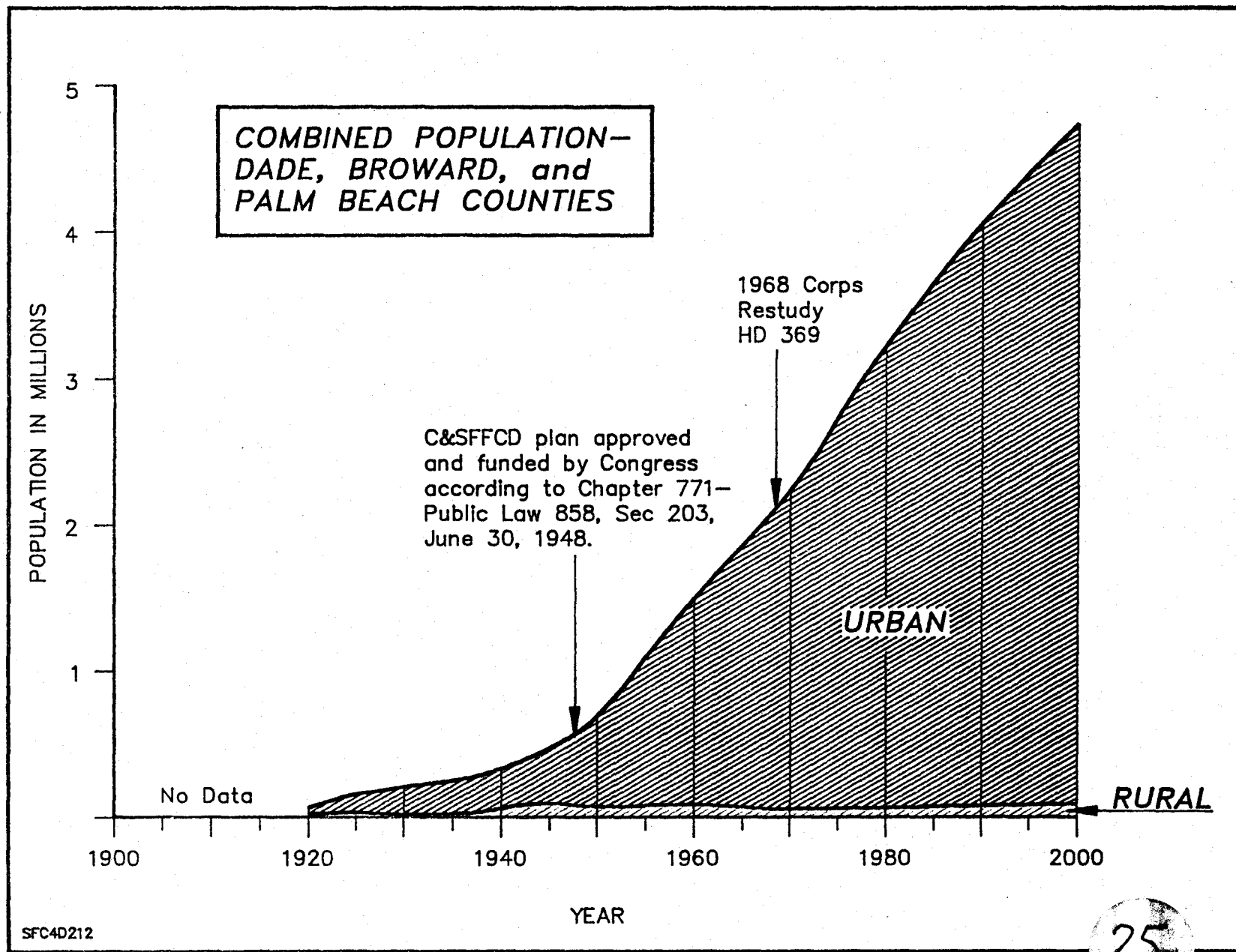
MODERN

Everglades Basin Surface & Ground Water Flows



III. ECONOMIC BENEFITS OF SYSTEM





Lake Okeechobee

Coastal Waterway

Atlantic Ocean

BOCA RATON

1990 URBAN AREAS
INNUNDATED BY
1947 FLOOD

EXTENT OF
1947 FLOOD

FORT LAUDERDALE

HOLLYWOOD

MIAMI BEACH

MIAMI

CORAL GABLES

Key Biscayne

Biscayne Bay

EVERGLADES NATIONAL PARK

HIALEAH

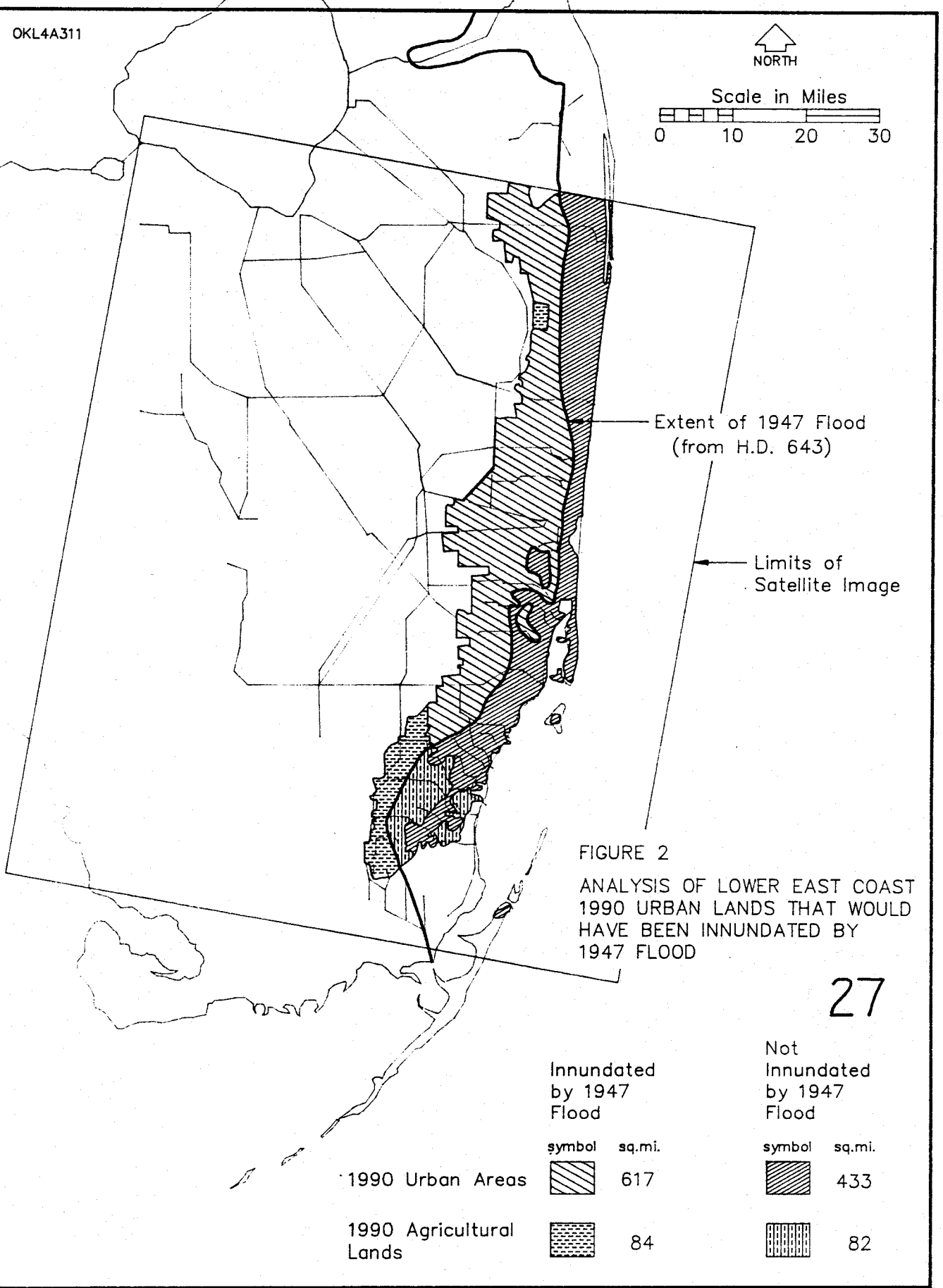
26

Key Largo

OKL4A311



Scale in Miles
0 10 20 30



Extent of 1947 Flood
(from H.D. 643)

Limits of
Satellite Image

FIGURE 2

ANALYSIS OF LOWER EAST COAST
1990 URBAN LANDS THAT WOULD
HAVE BEEN INNUNDATED BY
1947 FLOOD

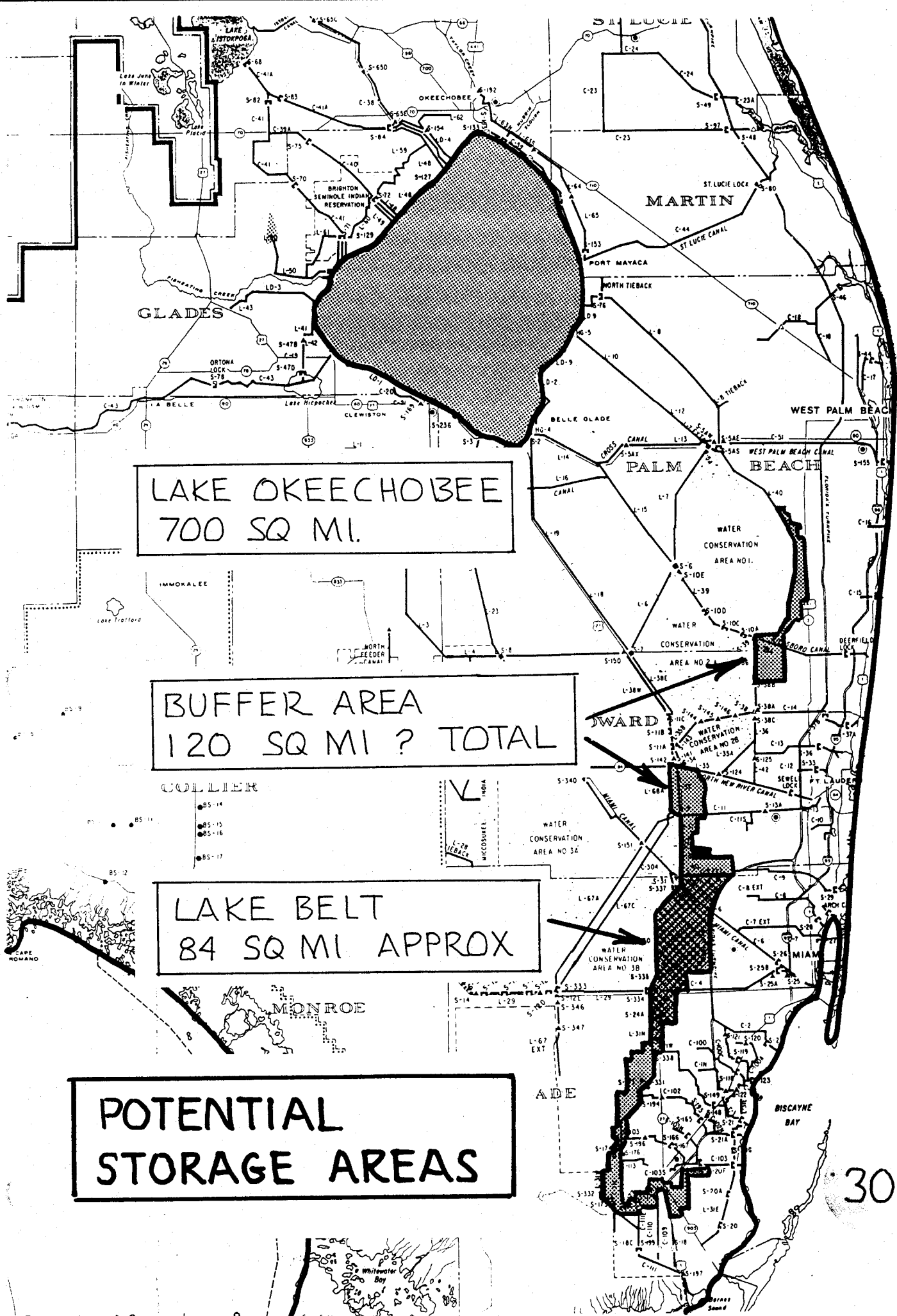
27

Innundated by 1947 Flood		Not Innundated by 1947 Flood	
symbol	sq.mi.	symbol	sq.mi.
	617		433
1990 Urban Areas			
	84		82
1990 Agricultural Lands			

LAND VALUE DEPENDENT ON C&SFFCD SYSTEM

	Urban Value Dependent upon system	EAA Value Dependent upon system
Population	4,000,000	50,000
Developed Land (Ac)	400,000	400,000
Value per Acre	200,000	3,500
Value (\$Billions)	80 -120	1.4 - 3

IV. SUGGESTED STORAGE ALTERNATIVE



90th Congress, 2nd Session

July 30, 1968

HD 369

Syllabus

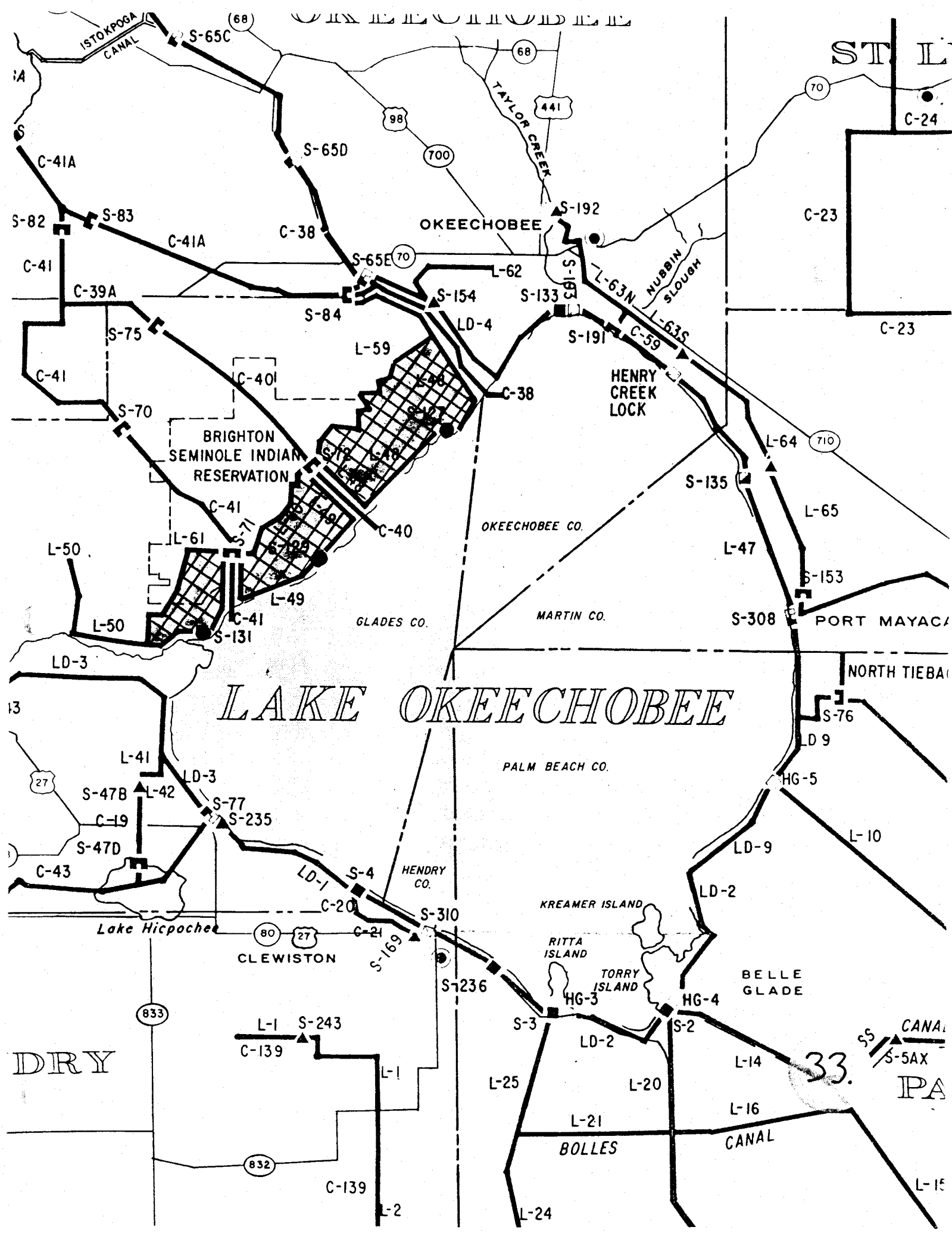
The study determines that the most practicable plan of improvement would involve:

- 1. Raising Lake Okeechobee about 4 feet above the presently authorized levels**

90th Congress, 2nd Session
July 30, 1968
HD 369

Paragraph 107...Effect of recommended
plan on Lake Okeechobee stages

Consequently, the high stages (19.5 to 21.5 feet)... and the extreme low stage would be only seldom experienced..... most of the time the Lake would be at comfortable levels -- well within the range now experienced.



THE BUFFER AREA

- Say, 100,000 acres, 4.5 feet deep = 450,000 AF.
- Lake Belt area totals 53,000 Acres, Rock Miners and Government own 34,000 Acres
- Rock Miners can raise working pads to new level - but would loose 4.5 feet of rock and incur greater costs.
- Probable great reduction in water losses from WCAs - Enhanced water supply to Shark and Taylor Sloughs - possible Backpumping to WCAs
- May provide sufficient storage to meet dry season needs of Urban communities

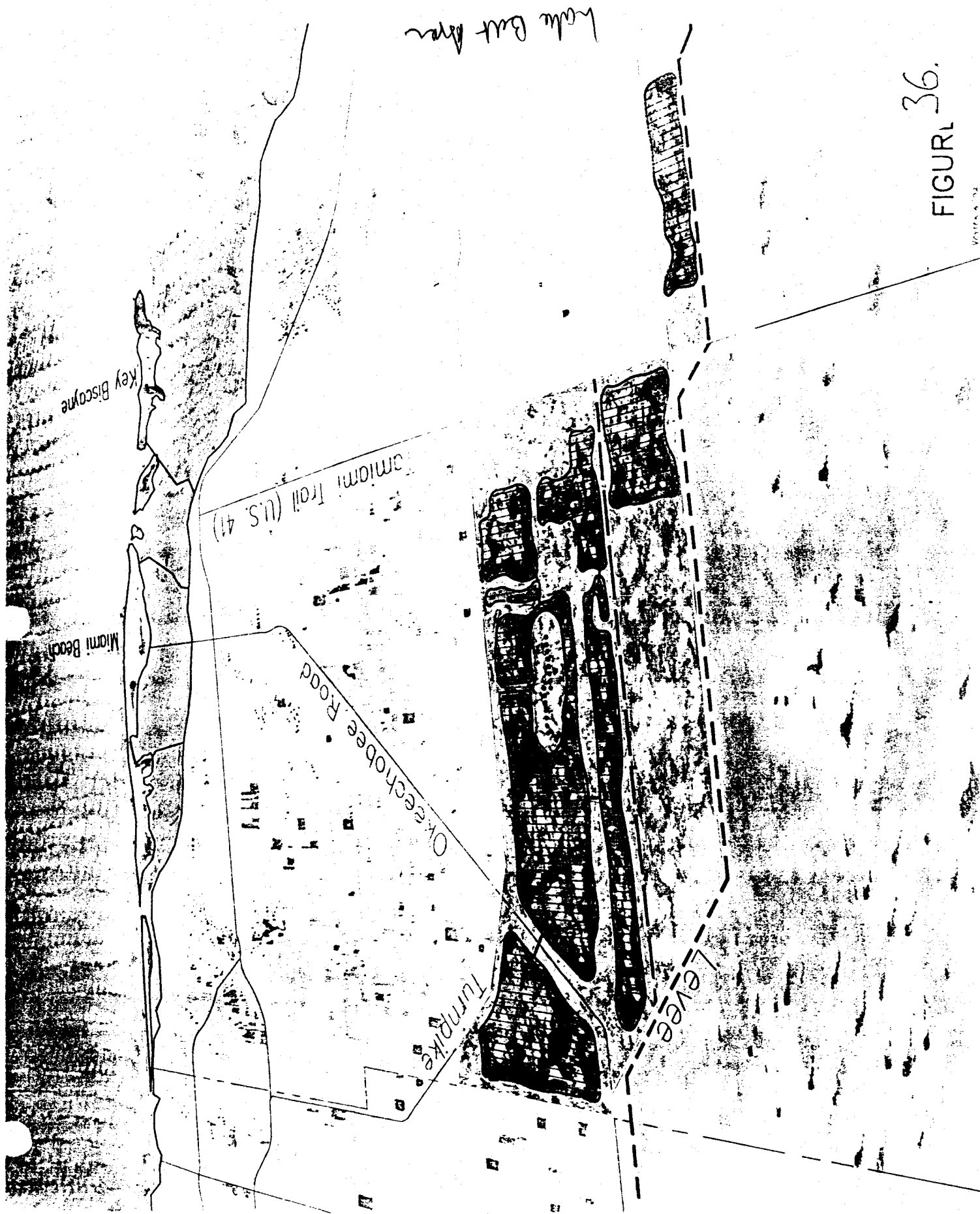


FIGURE 36.

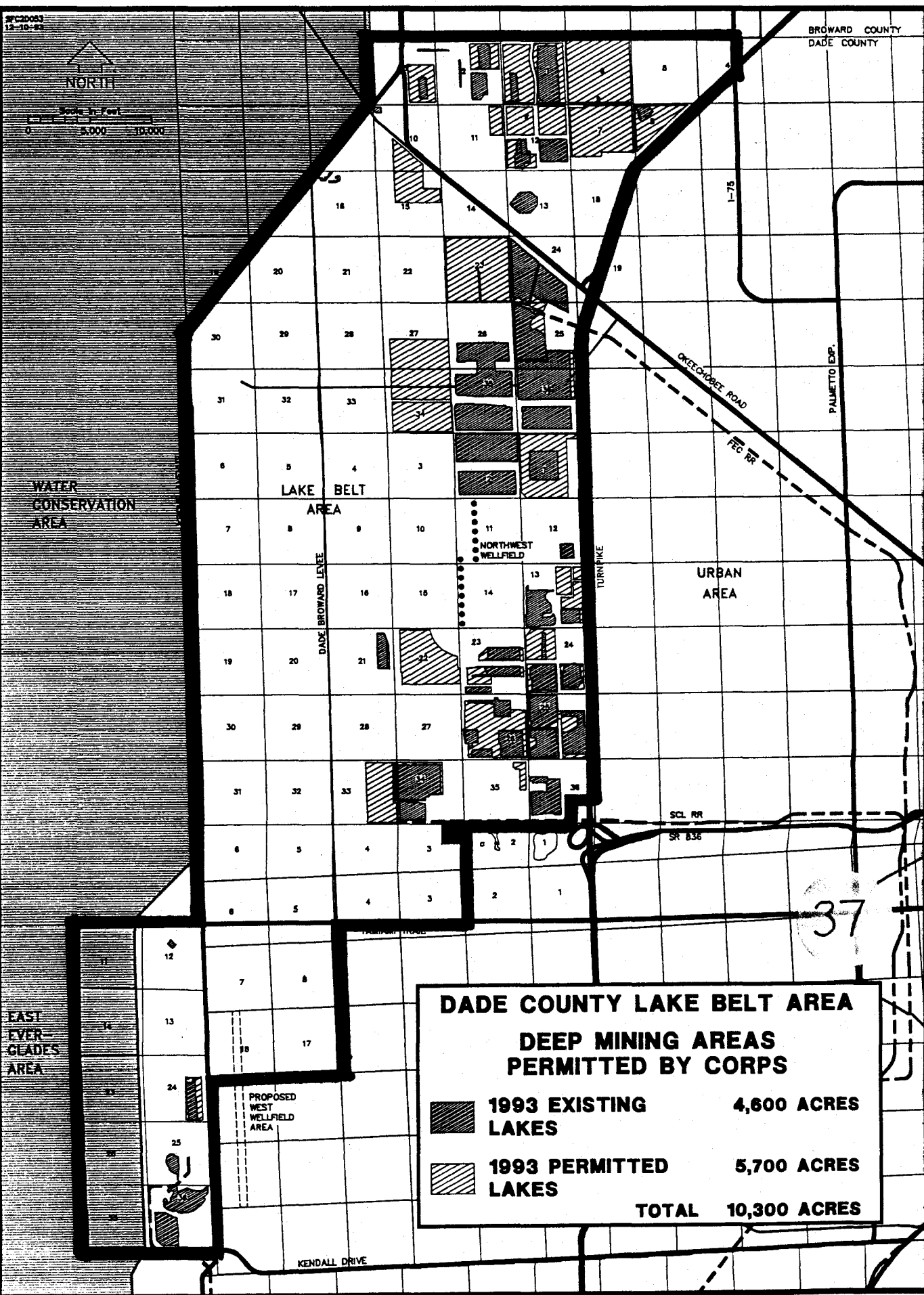
WATER 8-72

SFC20053
12-10-82



Scale in Feet
0 5,000 10,000

BROWARD COUNTY
DADE COUNTY



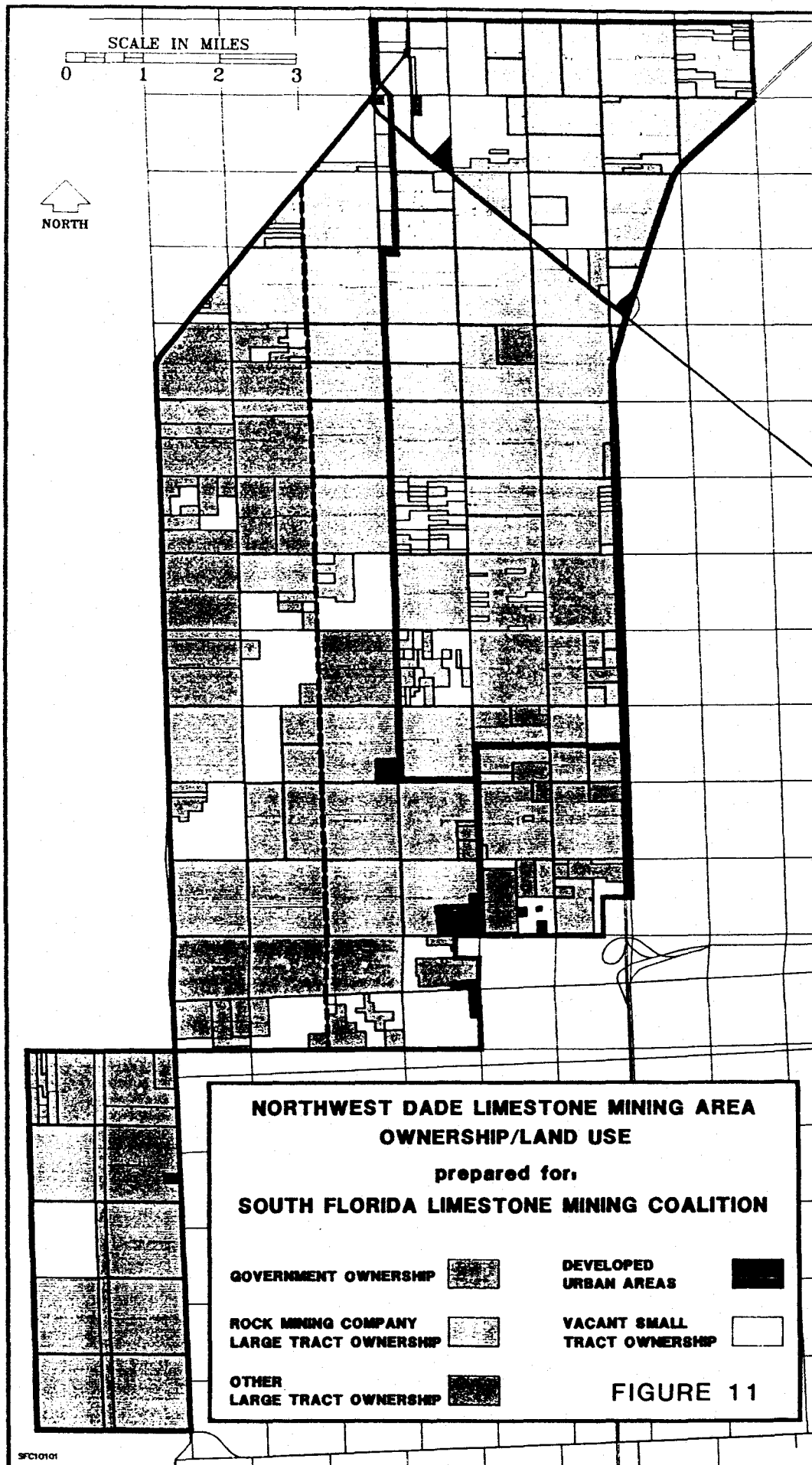
DADE COUNTY LAKE BELT AREA

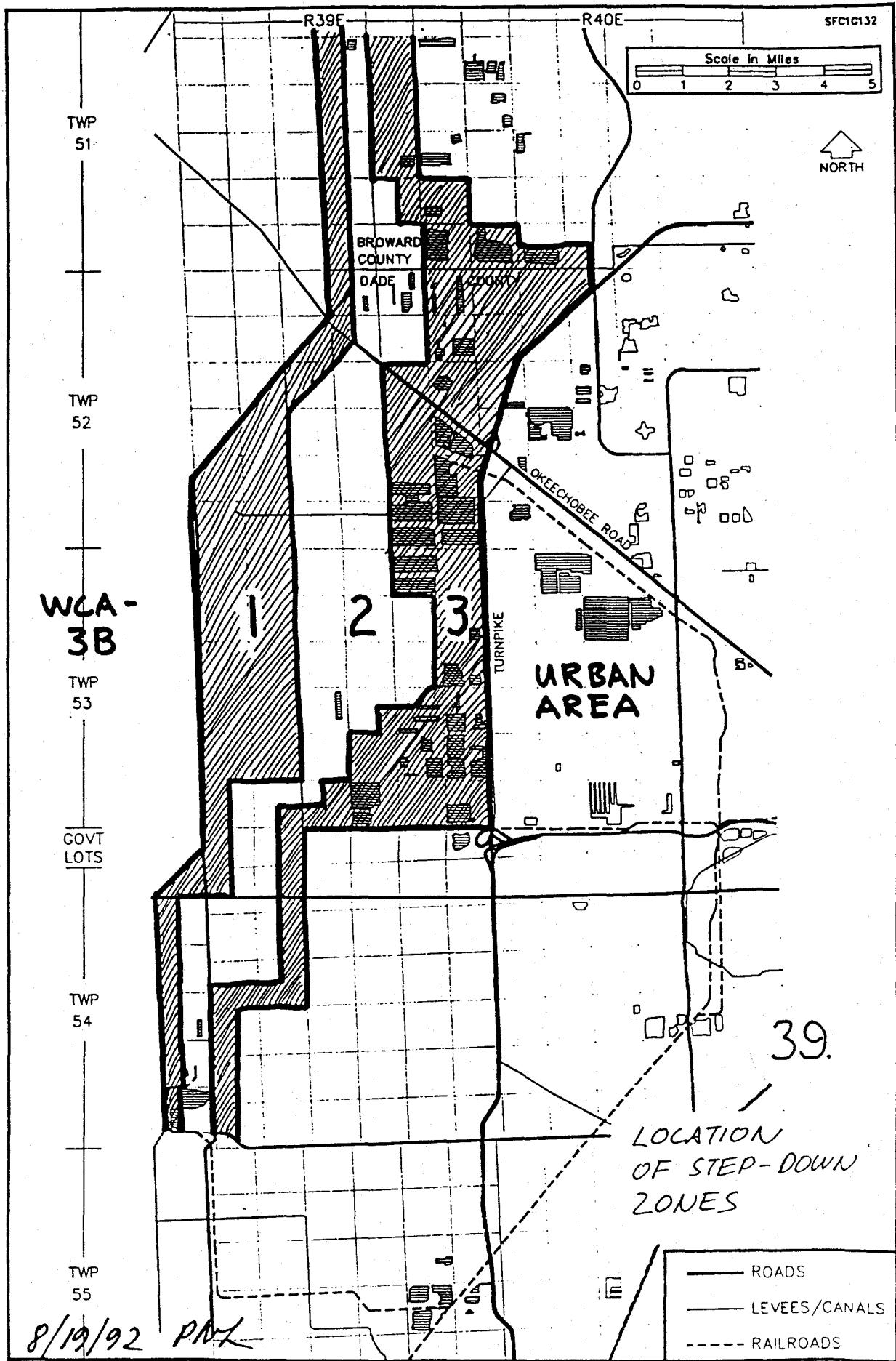
DEEP MINING AREAS PERMITTED BY CORPS

 **1993 EXISTING LAKES** **4,600 ACRES**

 **1993 PERMITTED LAKES** **5,700 ACRES**

TOTAL 10,300 ACRES





National
Audubon

WCA-3B

1

2

3

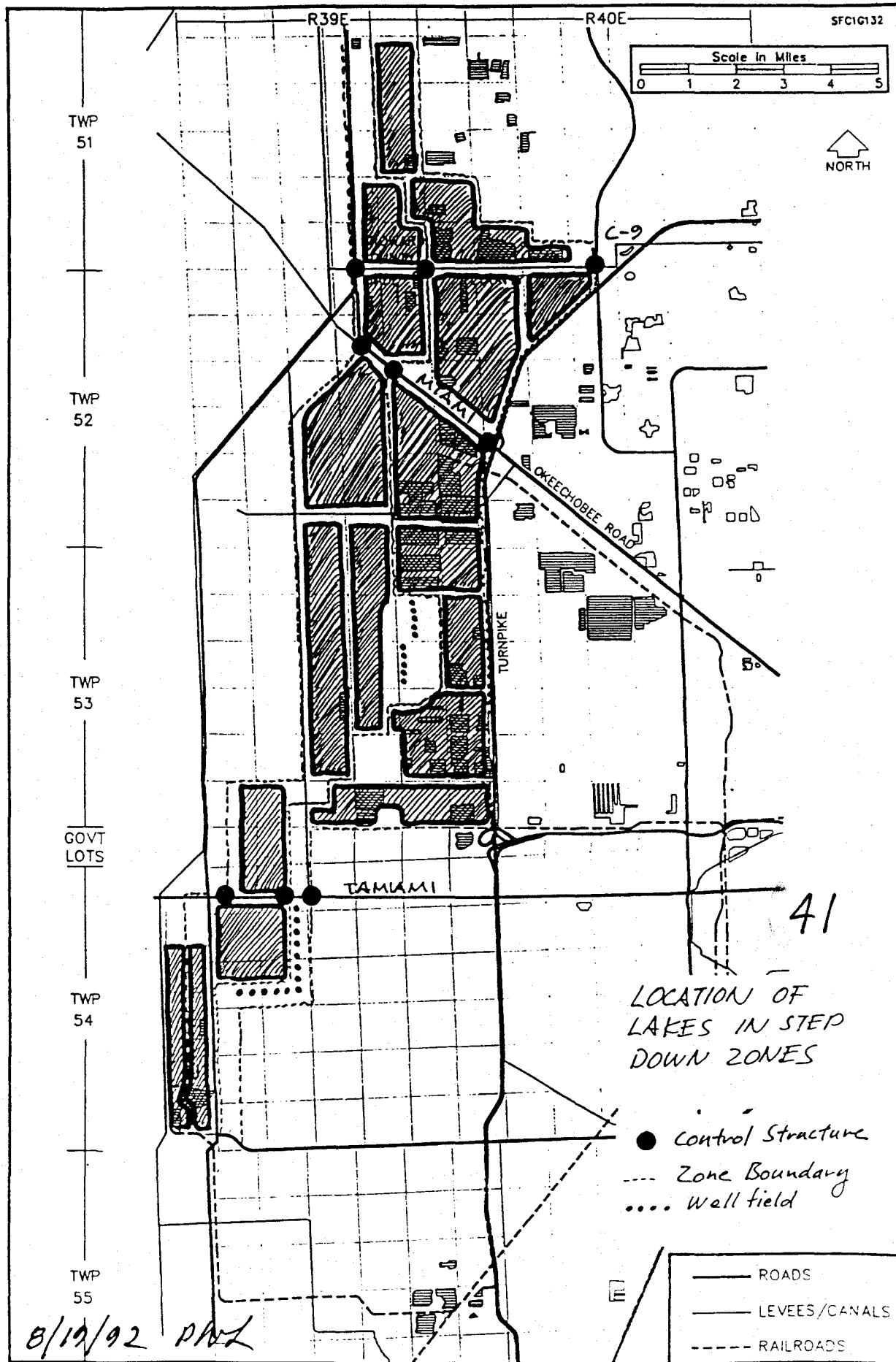
URBAN AREA

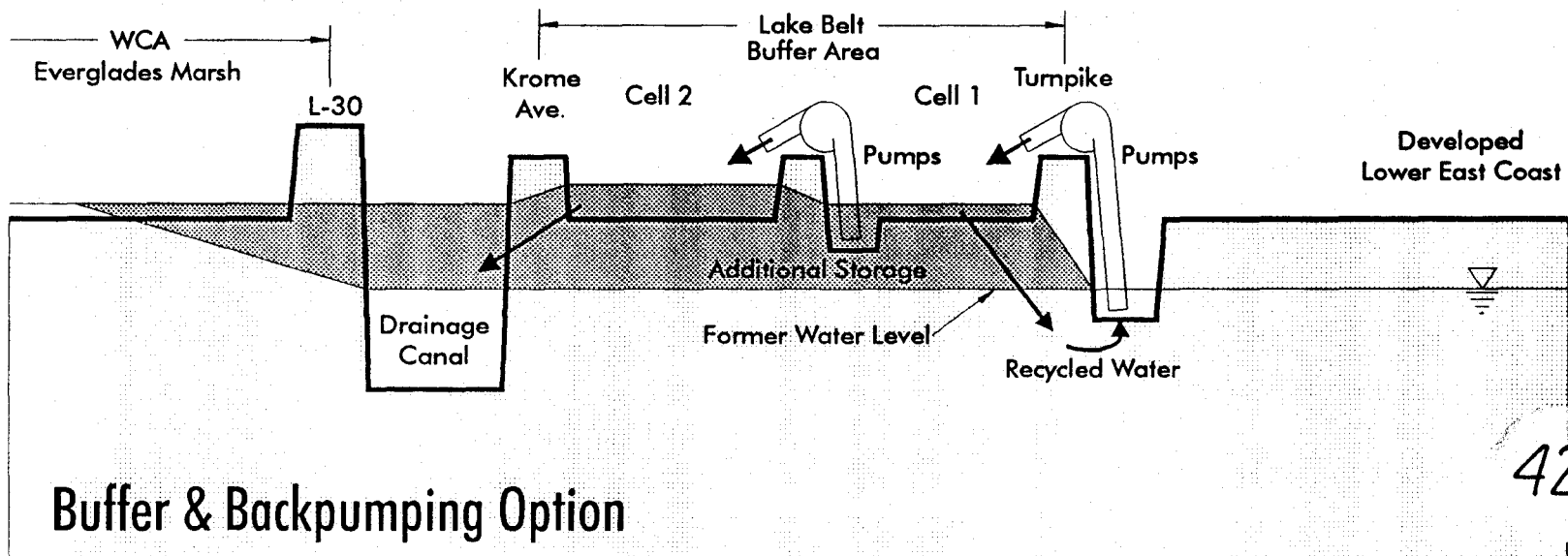
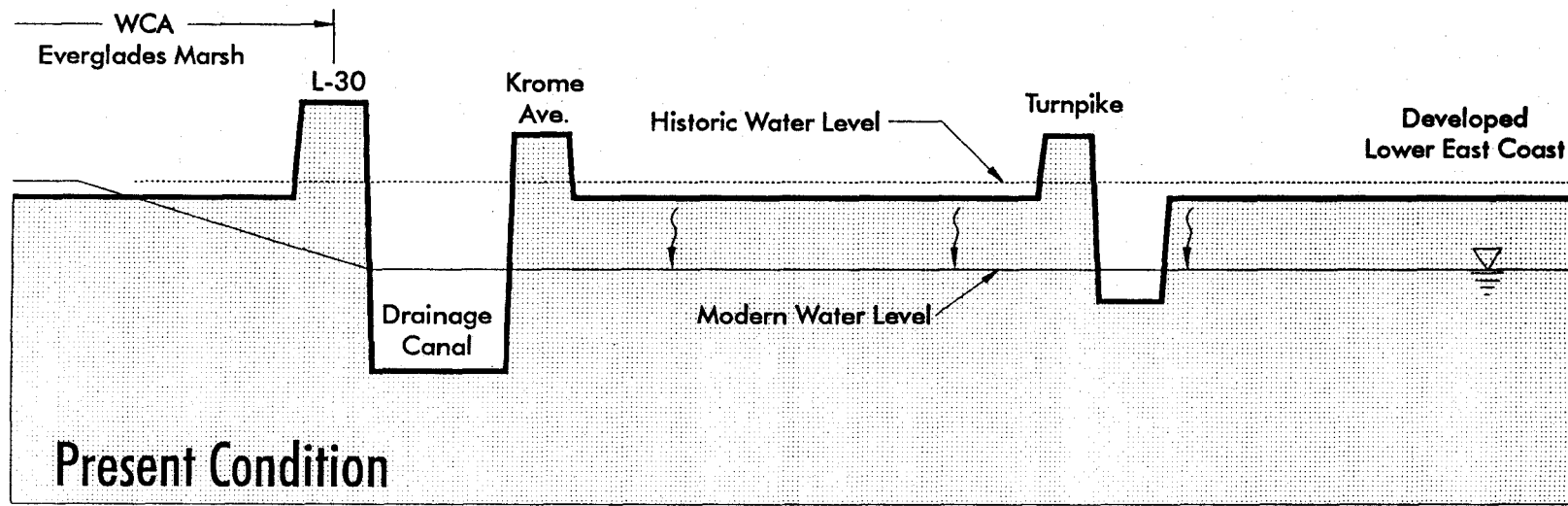
STEP DOWN CROSS SECTION

40

8/19/92 PWD

34.





42.

Collier County

Broward County
Dade County

L-30
LEVEE

LAKE
BELT

Griffin Road

Hollywood Blvd.

SEEPAGE
BARRIER

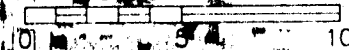
Oklaechobee Road

Tamiami Trail (U.S. 41)

Krome Ave.

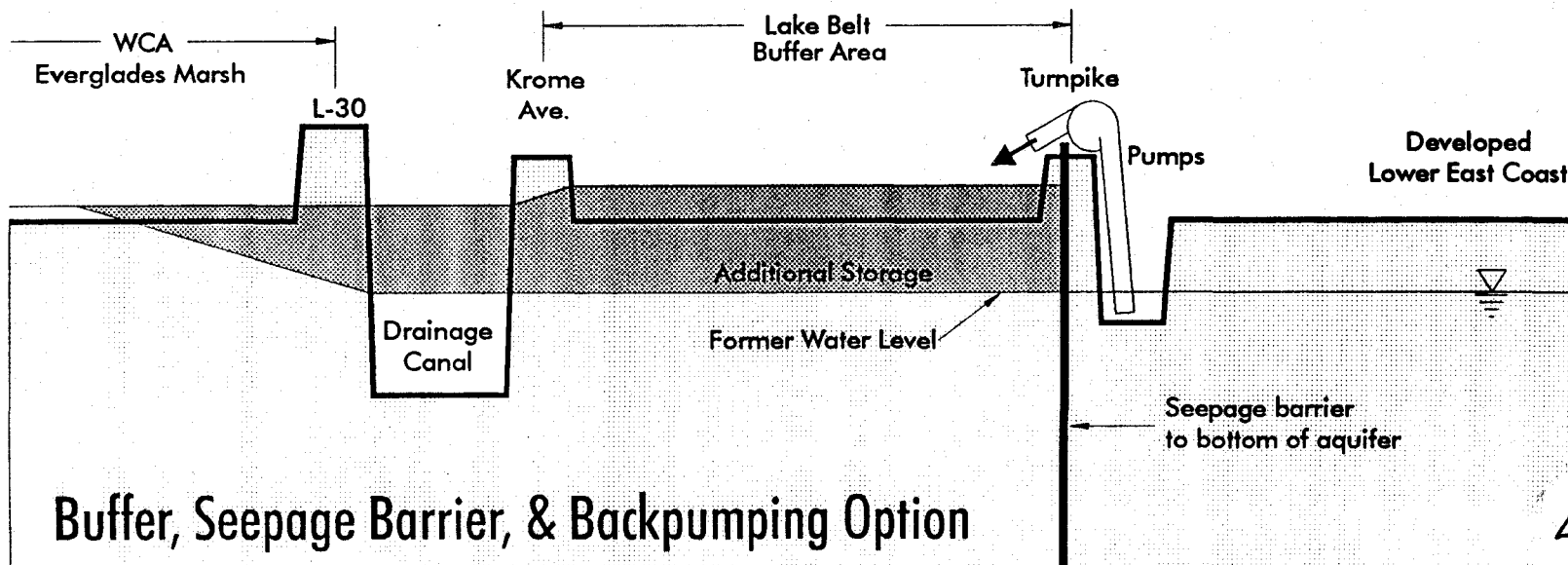
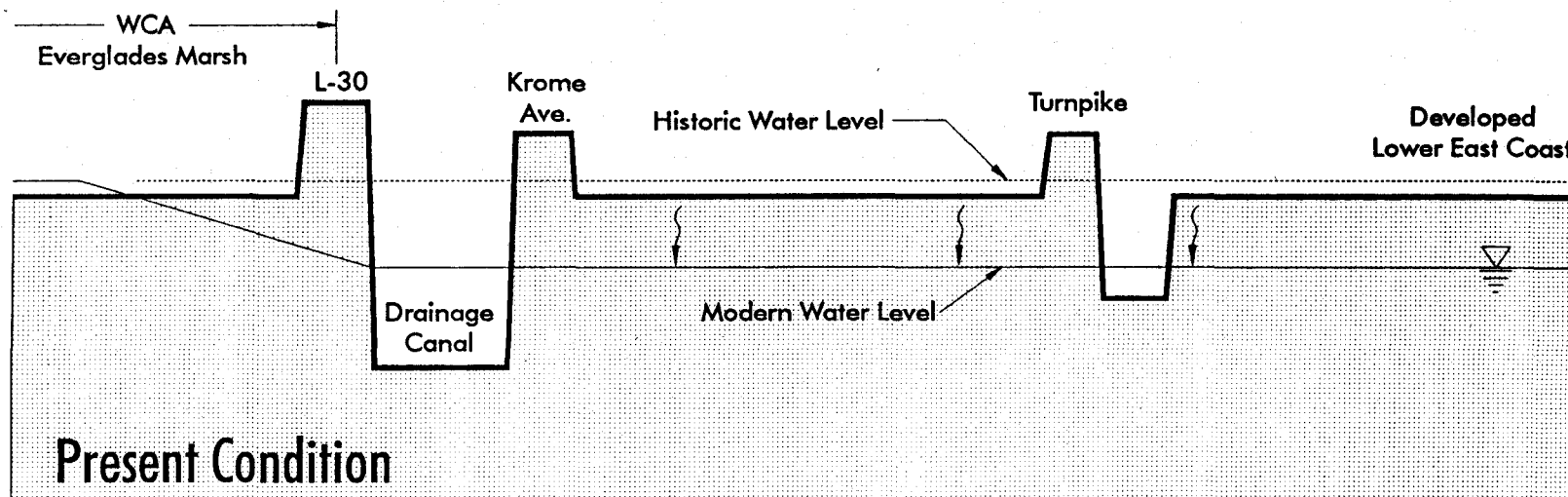


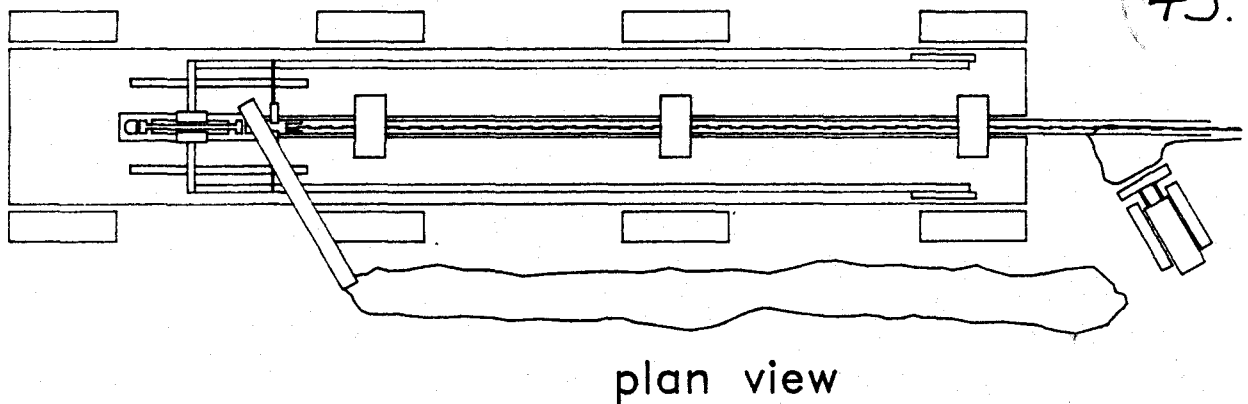
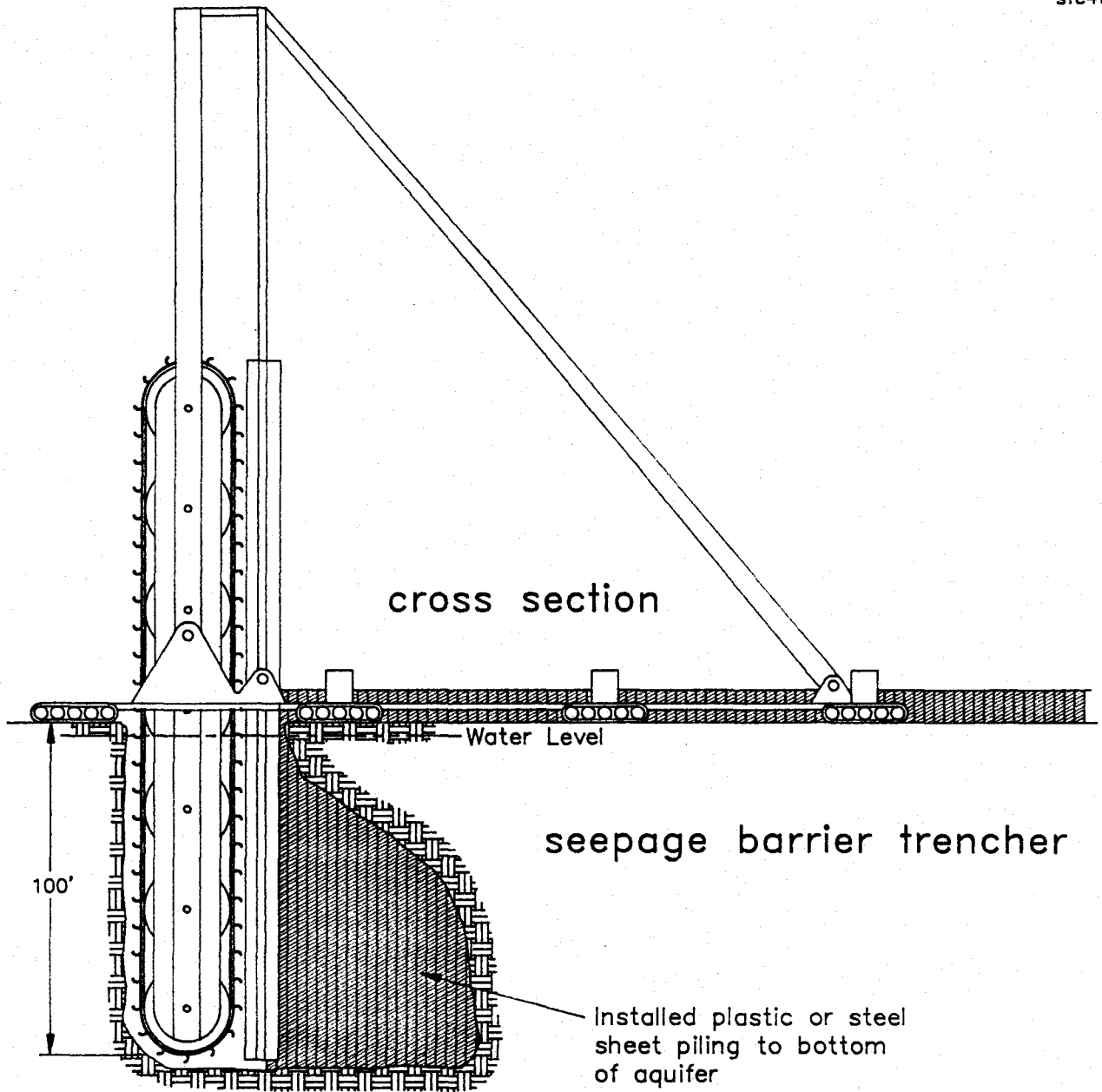
Scale in Miles



FIGURE

43.





POSSIBLE SEEPAGE BARRIER BENEFITS

- **Reduce Pumping Costs**
- **Stop uncontrolled seepage losses from WCAs - now largely lost to the ocean.**
- **Increase storage efficiency of buffer zones which are all located in areas of highest transmissivity**
- **Enhance Urban area water supply self sufficiency**
- **Enhance Urban Flood Protection**
- **Control of necessary water deliveries to urban areas and estuaries**
- **Provide a Boundary**

V. RECOMMENDATION

I recommend the following *options* that have already been adopted:

- Area "B" Detention Basin and Associated Acquisition
- Dade Lake Belt Detention Basin
- East Levee Stair Step Detention Basin
- Lake Belt Plan - Various Configurations
- Everglades Buffer Strip Detention Basin and Associated Acquisition
- Hillsboro detention Basin and Associated Acquisition
- C-51 Detention Basin and Associated Acquisition
- L-8 Detention Basin and Associated Acquisition
- Backpumping to Dade-Broward Levee Area
- LEC Flow-way and Associated Acquisition
- Wastewater Re-use
- Higher Lake Okeechobee Schedules

Recommendation

Provide Staff sufficient time to evaluate alternatives

Use existing Lake Belt Mod-Flow model to screen buffer ideas

Add New Options:

- 3 Lake Polders to replace possible lost wading bird habitat
- East Coast Seepage Barrier
- 1968 Corps Plan to allow Lake to fluctuate up to 21.5 feet

Recommendation

Within the constraints of appropriate hydroperiods for the WCAs and ENP, and necessary fresh water deliveries to the estuaries; mix, match, adjust, and evaluate the new and previously adopted "Storage" options to meet the *Goals* and Achieve the *Objectives* as well as comply with the Everglades Forever Act.

LOCAL

Sun-Sentinel, Thursday, June 9, 1994 Section B

\$1 billion called price to restore Everglades

By ROBERT MCCLURE
Staff Writer

It would cost nearly \$1 billion to pay for an ambitious plan to buy up tens of thousands of acres along the edge of the Everglades and transform them into huge water reservoirs, a report issued on Wednesday shows.

Taxpayers would likely be tapped for most or all of the cost, possibly through an increase in the property tax levied by the South Florida Water Management District.

District planners know the reservoirs would help restore the Everglades, but must do more work to see how much they would increase drinking water supplies. Then members of the water district's governing board will decide whether the project is worth the price tag.

For now, though, the water district's

governing board is taking the proposal seriously.

Today, for example, board members plan to ask the Broward County Commission to hold back a controversial 3,000-home development in Miramar while district planners develop the concept more fully.

Other lands that could be affected later include a portion of the proposed Blockbuster Park in Dade County; the 1,700-acre Site 1 west of Boca Raton, formerly proposed for a landfill and incinerator; and a huge section of Arvida's planned westward expansion of its Weston development in southwest Broward.

The concept of how the reservoirs would function still is developing. But the idea is to stop the westward sprawl of development before it runs right up against what is left of the water-starved

PLEASE SEE RESERVOIRS /5B

51

FROM PAGE 1B

\$1 billion needed for reservoirs to restore Everglades

Everglades.

By keeping lots of water in this buffer area — fresh water that otherwise would drain into the ocean — officials hope to help the Everglades stay wetter.

The reservoirs would also store water to replenish the Biscayne Aquifer, the huge underground water supply from which many South Florida residents get their drinking water.

"The [water-supply] system designed 30 years ago is inadequate," said water board member Alan Milledge, a Miami lawyer. "It leaks. It leaks phenomenally."

The reservoirs could occupy as much as 70,000 acres in the western reaches of Broward, Palm Beach and Dade counties under a map presented to water managers on Wednesday.

The land needed is worth \$1.07 billion. But nearly one-quarter of that land is already owned by one government or another, dropping the cost to \$828 million. Of that, about \$164 million worth already is scheduled to be purchased under environmental-protection programs.

Of the remaining \$664 million, officials hope to get some \$450 million worth of land from rock miners in northwest Dade and southwest Broward counties. The miners would give up the land in exchange for being allowed to continue mining in the wetlands.

Figuring in \$130 million to build earthen berms, pumps and other components necessary to create the preserves, that would bring the amount of needed cash

"The [water-supply] system designed 30 years ago is inadequate. It leaks. It leaks phenomenally."

— Alan Milledge, water board member

down to about \$344 million.

By finally putting a price tag on the water preserves, the water district is embarking on what is sure to be a hard-fought battle.

The first fight will be today, when water board members discuss whether to ask the Broward County Commission to delay the controversial Miramar Rock development in western Miramar. The land sits in the middle of the proposed water-preserve area.

The development already was turned back once by Broward commissioners because of its possible future use for a water preserve.

Valerie Boyd, chairman of the water board, said the district should not step into the issue until it has some way to pay for the reservoirs.

"Once that land is designated [as possible water preserve], people feel like they have this cloud over their land," said Boyd, a Na-

plas developer. "I don't think it fair to do that to landowners unless you have the funding mechanism in place, or, in parallel, you're working on getting that into place."

Other board members, water district staffers and environmentalists noted, however, that development is pushing rapidly westward, making the reservoir harder to put together all the time.

"The public expects us to come up with some answers," said board member Eugene Pettis, a Fort Lauderdale lawyer.

Board member Betsy Krant of Hollywood argued that Miramar Rock has no absolute right to build, yet.

"There is no permission [granted] to develop there," she said. "There shouldn't be that heavy onus on us to ask for 60 days delay."

Skeet Jernigan of the Economic Development Council, which represents large Broward developers, said the longer Miramar Rock's plans are delayed, the more money the company loses.

He said if the water board is going to ask Broward to delay further, "We would appreciate it if they would also call the bank and ask them to hold off on [collecting] the interest payments... That's a terrific cost to the landowner."

