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Groundwater Management Under the Florida Water Resources Act

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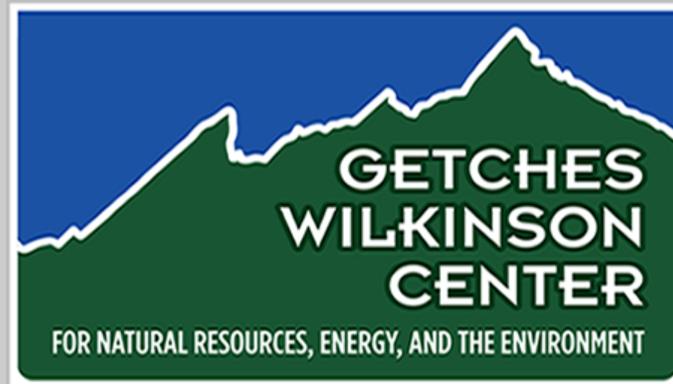
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GROUNDWATER MANAGEMENT UNDER THE FLORIDA
WATER RESOURCES ACT

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I. The Groundwater Resources of Florida

(Sources: Northwest Florida Water Management District, Ground Water in Florida: Proceedings of the First Annual Symposium on Florida Hydrogeology (1982); R. Heath and C. Conover, Hydrologic Almanac of Florida, USGS Open-File Report 81-1107 (1980).

A. Hydrology

1. Florida is rich in water resources. Rainfall averages 53 inches/year (150 billion gal/day), ranging from 40 inches in the Keys to 66 inches in the Northwest Panhandle. 110 billion gal/day returns to the atmosphere by evapotranspiration.
2. Rainfall is highly variable. There are normal seasonal variations, and yearly rainfall ranges from 50% above to 50% below normal. For example, Pensacola received over 90 inches in 1953 and in 1954 it received 28 inches.

B. Hydrogeology

1. The peninsula is geologically stable. Thousands of feet of limestones and dolomites have accumulated, with smaller amounts of sands, clays and silts. Soils are relatively thin.
2. The state is like a giant sponge. There are high rates of recharge and extensive aquifer

- systems, both artesian and water table.
3. There is a close connection between surface and groundwater systems.
 - a. In South Florida, wetlands (the Everglades) lie on top of important aquifer systems.
 - b. In North Florida, rivers and creeks commonly disappear into cavernous, limestone sinkholes, sometimes reappearing miles away.
 - c. Also there are numerous sites of natural discharge, i.e. springs. Florida has 27 first magnitude springs ($>100/\text{ft}^3/\text{sec}$). The largest, Silver Springs, discharges .5 billion gal/day. The combined flow of all Florida springs is about 7 billion gal/day, 6 times the amount delivered by public water systems in 1975. Much of this water is of high quality and crystal clear.
 4. The Florida Aquifer is the principal artesian aquifer. In Central Florida it is about 2,000 feet to the base of potable water.
 5. The Biscayne Aquifer, lying beneath Dade and Broward counties in Southeastern Florida is one of the most productive aquifer systems in the world. Wells yield up to 7,000gal/min.

The limestones forming this aquifer are extremely porous--riddled with solution holes. Transmissivities may be as high as ten mgd/ft. The Biscayne Aquifer is about 160 feet thick along the coast, thinning to just a few feet in the Everglades. It comes to the surface and is virtually unprotected by soils.

6. There are other locally significant non-artesian aquifers, e.g., the sand and gravel aquifer of extreme western Florida, the Turnpike aquifer of southern Palm Beach County and others. (See Figure 1).

II. Groundwater Problems

(Sources: Report of the Speaker's Task Force on Water Issues, Florida House of Representatives, March, 1983; Advisory Committee on the Future, Florida House of Representatives, An Overview of Florida's Water System (June, 1982).

- A. Rainfall is highly variable, therefore storage mechanisms are important. Because the land is flat and evapotranspiration rates are high, the best storage is groundwater.
- B. Floridians depend on groundwater to an extraordinary degree. (See Figure 4). 92% of Florida's residents drink groundwater and 20% use untreated well water. The combination of individual wells

and septic tanks is common.

- C. Florida is a peninsula, virtually surrounded by salt water. In many places aquifers are underlain by heavily mineralized waters. Although aquifers are thicker toward the northern, interior parts of the state, (See Figures 2 & 3), the population is concentrated along the southern coast. Population continues to increase at a rapid rate. (See Figure 5). By 1994 Florida will probably have 13 million residents and 58 million visitors annually. 85% of the population will be concentrated in coastal areas.
- D. Drainage of wetlands and lowering of water tables for land development reduces groundwater recharge. (See Figure 6). Lowering hydrostatic pressure induces salt water intrusion. (See Figure 7). Salt water can also invade coastal canals. Over-drainage leading to salt water intrusion is a major threat to Florida's groundwater.
- E. Overpumping can occur. There is no danger of mining groundwater. Rather, pumping too much water, too rapidly can induce lateral salt water intrusion or opening of mineralized waters that lie under some potable waters. Large, public water supplies located close to the coast have been the major threat in this regard (e.g. Pinellas County), but high density, smaller users

are also a problem (e.g., Brevard County water to air heat pumps and 2" lawn irrigation wells at densities greater than 1,000/sq. mile)

- F. Abandoned artesian wells can also mix mineralized with potable water by breaching confining layers that separate aquifers of differing quality. About 25,00 artesian wells were drilled between 1900-1950. Most are uncased or casings have rusted. They are discharging approximately 1 billion gal/day.
- G. Drainage wells have been constructed to dispose of excess surface waters (often contaminated) and wastewater. There are 7,000 drainage wells discharging directly to potable aquifers. The discharge of runoff to sinkholes is also common.
- H. Septic tanks are common despite generally high water tables. 40% of the population is on septic tanks. 50,000 per year are installed. Densities as high as 16 per acre have been allowed.
- I. Package sewage treatment plants are proliferating. There are 120 sewer connection moratoria in effect. Most package plants are not operating properly. Operators are required to spend 2 hours per week supervising the operation of the plants.
- J. Florida has identified 6,000 surface impoundments. 1,300 are industrial and 90% of those are unlined. There are 200 known uncontrolled hazardous waste

sites; 25 are on the Superfund priority list (Florida is 5th in the nation).

- K. Underground storage tanks, especially gasoline, are deteriorating and leaking with alarming frequency in Florida's acidic, sometimes saline soils.
- L. Enormous quantities of pesticides are used in Florida.

III. History of Water Management in Florida

(Sources: N. Blake, Land into Water - Water into Land: A History of Water Management in Florida (1980); L. Carter, The Florida Experience: Land and Water Policy in a Growth State (1974)).

- A.
 - 1. Early settlers viewed the vast surface waters of Florida as a nuisance. The goal of early water management was to drain wetlands and convert them to productive uses.
 - 2. The Swamplands Act of 1850 gave the state 20 million acres of swamp to finance drainage projects. Various private individuals and drainage districts dug ditches and raised dikes, particularly in the Everglades of South Florida the upper St. Johns River. Rich soils were uncovered.
- B.
 - 1. Hurricanes in 1926 and 1928 overtopped the dikes around Lake Okeechobee, killing over 2,000 people. During subsequent dry periods in the 30s and 40s, muck soils oxidized,

leading to soil subsidence, or caught fire and burned more quickly. Salt water moved up the new canals and contaminated well fields miles inland.

2. Hurricane flooding of South Florida in 1947 led to the creation in 1949 of a large scale flood control district. But the Central and South Florida Flood Control District was given comprehensive authority to manage water resources.
 3. Flooding of Tampa by Hurricane Donna in 1960 resulted in the creation in 1961 of the Southwest Florida Water Management District. Unlike the C & SFFCD, this district was granted authority to regulate the use of ground water.
- C.
1. In the mid-1950s, the Legislature rejected proposals to adopt a prior appropriation system.
 2. A commission was appointed to study the possibility of establishing a workable regulatory system based on riparian law.
Florida Water Resources Study Comm'n,
Florida's Water Resources, A Report to the Governor and the 1957 Legislature (1956).
 3. The 1957 Florida Water Resources Act (Ch. 57-380, Fla. Laws) established a statewide administrative agency authorized to:

- a. issue permits for the capture and use of excess surface and groundwaters; and
 - b. establish rules for the conservation of water in areas of the state where over withdrawals were endangering the resource.
- D. A major drought in 1971 (the most severe of record at that time) led to examination of Florida's growth management problems by a conference convened by Governor Askew. The Governor's Conference on Water Management in South Florida determined there was a water crisis in South Florida and recommended such measures as:
- 1. Prohibition of wetlands drainage
 - 2. Restoration of certain drained land (e.g., The Kissimmee River Valley)
 - 3. Protection of water recharge areas
 - 4. Implementation of a comprehensive land and water use plan; and,
 - 5. Development of comprehensive water management legislation.
- (South Florida Water Management District, Water Management Bulletin 5 (Dec.-Jan., 1971-72)).
- E. When the Legislature convened, it discovered the late Dean Frank E. Maloney and several associates at the University of Florida College of Law had been working on comprehensive water management

legislation for two years and had available A Model Water Code. It was modified and adopted as the Florida Water Resources Act of 1972 (Chapter 373, Florida Statutes). The Water Resources Act continues to serve, 10 years later, as our basic water management law. It has largely succeeded and is widely recognized as a good, workable model. (Nat'l water Comm'n, Water Policies for the Future 1-579, 280-298 (1973); R. Clark, Arizona Water Resources Management Act of 1977, A Proposed Water Resources Code or Statute, 1-116, 4 (1977). But see, Trelease The Model Water Code: The Wise Administrator and the Goddam Bureaucrat, 14 Nat. Res. J. 207 (1974)).

III. The Florida Water Resources Act of 1972

(Sources: F. Maloney, S. Plager, R. Ausness, B. Canter, Florida Water Law 1980, University of Florida Water Resources Research Center Publication No. 50.)

A. Overview

1. Common law follows the riparian, reasonable use doctrine for resolving both surface and groundwater disputes. (Koch v. Wick, 87 So. 2d 47 (1956))
2. The Water Resources Act replaced the common law with a comprehensive administrative system that includes authority to issue permits for water use.

3. A state agency supervises five regional water management district with authority to:
 - a. Conduct studies and develop water management plans.
 - b. Establish minimum flows and levels and set salt water barrier lines.
 - c. Build and operate water management structures and purchase water management lands.
 - d. Regulate well construction and license well drillers.
 - e. Permit consumptive use of water.
 - f. Restrict use of water during water shortages and emergencies.
 - g. Regulate surface water management facilities.
 - h. Control artificial recharge.

B. Administration

1. The Florida Department of Environmental Regulation (DER) has state level responsibility for implementation of the FWRA. Under DER are five regional water management districts. DER, however, has only a vague "general supervisory authority" over the districts. Delegation of authority to the districts is strongly encouraged by the statute. Only the Governor and Cabinet (a unique collegial

executive body of independent, elected officers) has authority to review, rescind or modify rules and orders.

2. The water management district boundaries largely conform to surface water hydrologic units, which are often different from both county boundaries and groundwater units.
3. The two existing districts were preserved, although their boundaries were modified and the Central and Southern Florida Flood Control District was renamed the South Florida Water Management District. These new districts were created. (See figure 9).
4. Each district has a nine member Governing Board appointed by the Governor and an Executive Director. Governing board members serve without compensation.
5. The Districts levy ad valorem taxes to finance their operations. A constitutional amendment passed by Florida voters in 1976 gave taxing authority to the districts. The two existing districts, which include the most populous parts of the state, had existing taxing power. Votes from those districts carried the amendment. Millage caps were set that severely limited the Northwest Florida Water Management District (home of a powerful,

conservative legislator) and the Suwannee River Water Management District (which has little property value to levy against). (See figure 8). These districts thus depend on general revenues appropriated by the Legislature.

C. Planning

1. The FWRA provides for development of a State Water Plan, by combining a State Water Use Plan with state water quality standards and classifications. (Section 373.039, F.S.)
2. DER is directed to undertake studies of existing water resources, existing and contemplated uses and needs for water, and such other subjects as drainage and flood plain zoning. Then DER is "progressively to formulate, as a functional element of a comprehensive state plan, an integrated, coordinated plan for the use and development of the waters of the state. . ." (Section 373.036, F.S.)
3. DER is to give "due consideration to":
 - a. the attainment of maximum reasonable-beneficial use of water . . .
 - b. the maximum economic development of the water resources consistent with other uses.

- c. the control of such waters for such purposes as environmental protection, drainage, flood control, and water storage.
 - d. the quantity of water available . . .
 - e. the prevention of wasteful, uneconomical, impractical or unreasonable uses . . .
 - f. presently exercised domestic use and permit rights.
 - g. the preservation and enhancement of the water quality of the state . . .
 - h. the state water resources policy . . .
4. DER is further specifically directed to ". . . give careful consideration to the requirements of public recreation and to the protection and procreation of fish and wildlife." In addition, it may ". . . prohibit or restrict other future uses on certain designated bodies of water which may be inconsistent with these objectives or designate undesirable or desirable uses for particular bodies of water and either deny permits or grant preferences on that basis.
5. Development of the State Water Use Plan has not proceeded as envisioned by the statutory drafters. The legislature failed to appropriate funds for the state to undertake

planning. The two existing water management districts began to develop plans on their own and when DER attempted to assume control in 1976, it was met with strong political resistance. The districts had developed entrenched notions about how water should be managed within their respective areas.

6. A compromise that has been adopted is a State Water Policy, developed by DER and the water management districts working together, and adopted by DER as Rule 17-40, FAC. Although the State Water Policy is clearly not as detailed as the State Water Use Plan was intended, it offers policy guidance for the development of more detailed plans and regulations by the districts.
7. The policy addresses many important water management issues. A section of General Water Policy establishes such goals for water management as to "Assure availability of an adequate and affordable supply of water for all reasonable beneficial uses" and to "Mitigate adverse impacts resulting from prior alteration of natural hydrologic patterns and fluctuation in surface and ground water levels." A Water Use Section identifies criteria to be considered in

determining whether a proposed use is a reasonable beneficial use. The difficult issues involved with transporting water from one district to another are addressed in the policy. Approval of each district is required and criteria for each District to use in evaluating the request are listed. Other major sections set standards for the regulation of surface water management facilities and the establishment of minimum flows and levels.

8. In 1982, the Legislature mandated additional planning to develop "groundwater basin resource availability inventories." Each inventory is required to include:
 - a. A hydrogeologic study to define the groundwater basin and its associated recharge area.
 - b. Identification of specific areas that are prone to contamination or overdraft resulting from current or projected development.
 - c. Prime groundwater recharge areas.
 - d. Criteria to establish minimum seasonal surface and groundwater levels.
 - e. Areas suitable for future water resource development within the groundwater basin.

- f. Existing sources of wastewater discharge suitable for reuse as well as the feasibility of integrating coastal well-fields.
- g. Potential quantities of water available for consumptive uses.

The inventories are to be considered by local governments in the revision of local comprehensive plans (required by Chapter 163, F.S.) and the Legislature stated its intent "that future growth and development planning reflect the limitations of the available groundwater or other available water supplies." (Section 373.0395, F.S.(1982 Supp.)).

D. Minimum Flows and Levels

- 1. The districts are required to set minimum flows and levels for surface waters and minimum levels for aquifers. (Section 373.042, F.S.)
- 2. Minimum groundwater levels are to be the level at which further withdrawals would be significantly harmful to the water resources of the area.
- 3. Minimum flows and levels are to be set using the best available information; may reflect seasonal variations; and, may provide for the protection of nonconsumptive uses.

4. The districts have been slow to set minimum flows and levels due to a lack of technical information regarding appropriate flows and levels.

E. Consumptive Use Permitting

1. The districts were originally given the option of implementing consumptive use permitting programs; it is not mandatory, although permitting thresholds are not specified. (Section 373.216, F.S. (Supp. 1982)).
2. Local governments are prohibited from permitting the use of water. (Section 373.217, F.S.).
3. Existing legal users are entitled to receive a permit if they apply within two years of implementation of consumptive use permitting. (Section 373.226, F.S.).
4. The permit applicant must show the proposed use of water:
 - a. Is a reasonable beneficial use (as defined in the statute)
 - b. Will not interfere with any presently existing legal use of water; and
 - c. Is consistent with the public interest. (Section 373.223, F.S.).
5.
 - a. A reasonable beneficial use is

defined as ". . . the use of water in such quantity as is necessary for economic and efficient utilization for a purpose and in a manner which is both reasonable and consistent with the public interest." (Section 373.019 (4), F.S.).

- b. This standard is intended to combine the reasonable use standard of riparianism with the beneficial use standard of prior appropriation to gain the benefits of both. (Maloney, Capehart & Hoofman, Florida's 'Reasonable Beneficial' Water Use Standard: Have East and West Met? 31 U. Fla L. Rev. 253-83 (1979)). In practice, the standards do not appear to result in contrary decisions (Id.).
6. State Water Policy establishes factors to be considered in determining whether a water use is a reasonable beneficial use. These are:
 - a. The quantity of water requested for the use;
 - b. The demonstrated need for the use;
 - c. The suitability of the use to the source of water;
 - d. The purpose and value of the use;
 - e. The extent and amount of harm caused;

- f. The practicality of mitigating any harm by adjusting the quantity or method of use;
- g. Whether the impact of the withdrawal extends to land not owned or legally controlled by the user;
- h. The method and efficiency of use;
- i. Water conservation measures taken or available to be taken;
- j. The practicality of reuse, or the use of waters of more suitable quality;
- k. The present and projected demand for the source of water;
- l. The long term yield available from the source of water;
- m. The extent of water quality degradation caused;
- n. Whether the proposed use would cause or contribute to flood damage; and
- o. Whether the proposed use would significantly induce salt water intrusion.
- p. The amount of water which can be withdrawn without causing harm to the resource.
- q. Other relevant factors.

(Rule 17-40, FAC)

- 7. Permits are granted for a fixed term of 20

years or less. Public facilities that require a longer term to retire debt may receive up to 50 year permits. (Section 373.235, F.S.) Permits issued to date, however, have been relatively short term, 3-10 years. The districts are unwilling to make commitments on the basis of insufficient data and planning.

8. Competing applications are evaluated in terms of which use best serves the public interest. If all else is equal, a renewal takes precedence. (Section 373.233, F.S.)
9. Permits may authorize the transport and use of water beyond overlying lands or outside of the watershed from which it is withdrawn. (Section 373.223(2), F.S.)
10. The constitutional validity of the consumptive use permitting system was upheld by the Supreme Court of Florida in Village of Tequesta v. Jupiter Inlet Corporation, 371 So. 2d 663 (Fla. 1980). The Village of Tequesta had been drawing its potable water supply from a shallow aquifer that also extended under land owned by the Jupiter Inlet Corporation. The withdrawal and use were permitted by the South Florida Water Management District. Jupiter decided to build

condominiums on its land. It requested the Village to extend water services to the project and was refused. It then sought to withdraw water from the shallow aquifer, but was denied permission to do so by the District because further withdrawals would have exacerbated an existing problem with salt water intrusion. In order to build the condominiums, Jupiter therefore had to drill a much more expensive, deeper well and use another aquifer.

Jupiter brought suit against Tequesta alleging that by depriving it of the use of the shallow aquifer the Village had unconstitutionally taken private property. No action was taken to contest denial of the permit by the SFWMD. A summary judgment for Tequesta was entered by the circuit court and reversed by the Fourth District Court of Appeal. The District Court determined that the shallow aquifer beneath Jupiter's land was "a form of private property," the beneficial use of which could not be "divested" without payment of full compensation. It then certified to the Supreme Court of Florida as a matter of great public interest the question:

"Can a municipality be held responsible through inverse condemnation for a taking, from private ownership for public purposes, of underground shallow aquifer water, to the extent that the owner is deprived of the beneficial use of the aquifer?"

The Supreme Court reversed the District Court and held no taking of protected property rights had occurred. At common law, the court declared, a landowner does not own the water beneath his land until it has been reduced to his actual possession. A landowner has only a right to use the water. Other landowners have a right to use the water also, however, through pumping on their own lands. Conflicts between users are resolved on a case by case basis by reference to considerations of "reasonableness" such as "the reasonable demands of other user; the quantity of water available for use; [and] the consideration of public policy." Further, the right to use water may be limited by legislation. The Florida Water Resources Act of 1972 established a permit system for allocating the use of water. Without a permit, Jupiter had no judicially recognized right to

use water. Without a right, there could be no taking.

F. Water Shortages and Emergencies

1. The permitting system may be superseded during times of drought by implementation of a water shortage plan or, if a water emergency exists, by the issuance of emergency orders.
(Section 373.246, F.S).
2. Each district is required to adopt a water shortage plan by October 1, 1983. The plan must classify permits by:
 - a. source of water supply
 - b. method of extraction or diversion
 - c. use of water
 - d. or, a combination of the above.
3. A water shortage may be declared when,
 - a. "insufficient water is available to meet the requirements of the permit system", or
 - b. "conditions are such as to require temporary reduction in total use within the area to protect water resources from serious harm."
4. The water shortage plan may impose restrictions on "classes of permits" as necessary to protect and restore water resources.
5. A water emergency may be declared if implementation of the water shortage plan is

insufficient "to protect the public health, safety, or welfare, the health of animals, fish or aquatic life, a public water supply, or recreational, commercial, industrial, agricultural, or other reasonable uses. . ."

6. Emergency orders may be issued requiring such action as "apportioning, rotating, limiting, or prohibiting" water use. Emergency orders may be issued to individual users, as opposed to classes of users.

7. The South Florida Water Management District has adopted a complex, trend-setting water shortage plan. (Rule 40E-21.001(2), F.S.). Four levels of restriction may apply. A Phase I Moderate Water Shortage may be declared when less than a 15% reduction in overall use is required. A Phase IV Critical Water Shortage would be imposed to reduce demand between 45-60%.

G. Well Construction Standards and Licensing of Well Drillers

1. The FWRA provides for the licensing of water well contractors (Section 373.323, F.S.) and the establishment of standards for well construction (Section 373.308, F.S.).

2. DER licenses water well contractors and has adopted minimum construction standards (Rule

17-21, FAC). Contractors are required to file well completion reports that include geohydrologic data that has been valuable for water management. The depth, size and location of wells can also be inventoried. The districts may adopt more stringent criteria.

H. Water Management Structures and Lands

1. The water management districts are authorized to build and operate water management structures.
 - a. Central and Southern Florida Flood Control Project may cost 1 billion dollars when completed.
 - b. Suwannee River Water Management District, in contrast, has no structures. "God built it, gravity runs it."
 - c. The St. Johns River Water Management District is spending millions to restore portions of the upper basin that were structurally altered.
 - d. Other needed restoration projects include the Kissimmee River, Golden Gate Estates, Shark River Slough, East Everglades and the Loxahatchee River.
2. A Water Management Lands Trust Fund was created in 1981 (Save Our Rivers Act, Ch. 81-33, Laws of Florida) for the water management districts to purchase lands "necessary for

water management, water supply, and the conservation and protection of water resources." (Section 373.59(3), F.S.). A documentary stamp tax on real property transfers of \$.45/\$100 value funds the program, which is expected to raise \$320 million over a 10 year life. Revenues are below expectations because of the recession. Varying percentages of the fund are allocated to each of the water management districts, which must pay 20% of land purchase costs.

I. Regional Water Supply Authorities

1. Water management districts do not generally operate well fields, pipelines or other water supply facilities. (The Florida Keys Aquaduct Authority, operated by the SFWMD, is an exception.)
2. Regional water supply authorities may be created by agreement of local governments to operate water supply facilities and wholesale raw water to local distributors. (Section 373.1962, F.S.).
3. Regionalization of water supply facilities appears to offer the best means of supplying water in an efficient, environmentally sensitive manner.

J. Surface Water Management

1. The districts may require permits for the construction and operation of surface water management works. (Sections 373.403-.443, F.S.). Parking lots and other impervious surfaces may be permitted under this section.
2. Significant exemptions exist:
 - a. natural persons
 - b. agriculture
 - c. agricultural closed systems (Section 373.406, F.S.)
3. Broad statutory criteria (i.e.-"harmful to water resources of the district"; "inconsistent with the overall objectives of the district") have been supplemented by detailed criteria adopted as rules by the districts.
4. The South Florida Water Management District has the most detailed criteria (Rule 40E-4, FAC). The St. Johns River Water Management District is developing a comprehensive rule. Both rules recognize the close functional relationship of ground and surface waters.
 - a. Effects on groundwater quality of infiltrating polluted surface waters.
 - b. Lowering of ground water levels by over-drainage.
 - c. Salt water intrusion.

5. A related program is the authority of the districts to require permits for connection to their canals and other "works". (Sections 373.085(1), .019(15), F.S.) Many rivers, lakes and other natural waterbodies have been adopted as "works of the district".
6. The DER has adopted a stormwater rule, intended to protect water quality, that closely parallels surface water management permitting. (Rule 17-25, FAC). Stormwater permitting has been delegated to the South Florida Water Management District (Rule 17-25.09, FAC) and appears likely to be delegated to the other districts.

K. Aquifer Recharge

1. Artificial recharge or other intentional introduction of water into underground formations must be permitted by water management districts. (Section 373.106, F.S.)
2. Drainage wells, injection wells, percolation ponds and land spreading of sewage effluent are activities that may be subject to such permitting.
3. The districts have not vigorously implemented this section, tending to view the problems as water quality, not water quantity.
4. DER has an underground injection control

rule. (Rule 17-28, FAC).

L. Evaluation

1. Florida has a legal and administrative system in place that is capable of protecting the state's groundwater resources from depletion, overdraft and salt water intrusion if it is vigorously implemented.

2. Over-allocation of groundwater supplies is possible. When supplies are abundant it is difficult to deny permits. When periodic dry periods recur, it is then necessary to resort to the water shortage plan to resolve water use conflicts. As the state grows and more and more of the available supplies are allocated, it may become necessary to resort to the water shortage plans more frequently.

(Compare Rea, Drought in Florida: Nature's Response to "Comprehensive" Planning, 57 Fla. Bar J. 266-69 (April 1983) with Niego, Water Management in South Florida: Setting the Record Straight, 57 Fla. Bar J. 337-42 (May 1983).)

3. There is concern that environmental factors are given insufficient weight in water management decisions. Minimum flows and levels should be established to protect wetlands, estuaries, base flow of rivers and other

natural systems.

4. Water management should be more closely linked to land use controls. (Maloney and Hamann, Integrating Land and Water Management 1-134, University of Florida Water Resources Research Center Publication No. 54 (1981); Final Report to Governor Bob Graham, Resource Management Task Force (January 1980)).
5. Drainage of wetlands and conversion of important groundwater recharge areas to other uses is continuing. (Hamann, Wetlands Loss in South Florida and the Implementation of Section 404 of the Clean Water Act, Report to the Office of Technology Assessment (September 1982)).
6. The ability to correct errors of the past is limited. Restoration of damaged systems, for example, is extraordinarily difficult. The status quo has clout. It will be difficult to reallocate water from existing users when permits are renewed.
7. Water quality degradation is the major groundwater problem. (Report of the Speakers Task Force on Water Issues, Florida House of Representatives (March 1983)). Water quality programs must be strengthened and adequately funded.

IV. Recent Groundwater Quality Initiatives

A. The Speaker of the Florida House of Representatives identified groundwater quality as a major issue and appointed a task force to study the problems and recommend solutions. The final report of the task force contains numerous recommendations.

These include:

1. Hazardous Waste Management
 - a. increase funding
 - b. facilitate siting of needed hazardous waste treatment facilities
 - c. identify hazardous waste generators
 - d. regulate underground storage tanks
2. Sewage
 - a. strengthen regulation of septic tanks and package treatment plants
 - b. enforce package treatment plant regulations
 - c. prohibit platting of new unsewered industrial parks
 - d. provide financial assistance to build new sewage treatment facilities
3. Pesticides
 - a. monitor groundwater for pesticide contamination
 - b. strengthen regulation of pesticides
4. Abandoned Artesian Wells - inventory and plug

all abandoned or freeflowing wells.

5. Monitoring - develop a more comprehensive, coordinated program to monitor groundwater quality.
6. Water as a public resource - enact a constitutional amendment stating "the waters of the state are a public resource that shall be managed as a public trust for the use and benefit of all citizens and the maintenance of natural ecosystems."
7. Funding
 - a. development of new funding sources to clean up hazardous waste sites
 - b. increasing the millage caps on water management districts

B. New Groundwater Quality Regulations

1. New groundwater quality regulations were adopted by DER in August, 1982. (Rules 17-3, -4, FAC)(See Green, Florida's New Groundwater Regulations, in The Florida Bar, CLE, 1983 Water Law Seminar, April, 1983)
2. Groundwaters are classified as follows:
 - a. G-I - single source aquifers of potable water
 - b. G-II - <10,000 mg/l TDS (i.e. - potable water)
 - c. G-III - >10,000 mg/l TDS

- d. G-IV - >10,000 mg/l TDS in confined aquifers
- 3. a. Primary and secondary drinking water quality standards must be maintained in Class G-I and G-II groundwaters.
(Existing sources must comply by July 1, 1985)
- b. "Free from" prohibitions apply to G-I, II, III. Discharge must be "free from" chemicals in concentrations that are "carcinogenic, mutagenic, teratogenic, or toxic to human beings." (Rule 17-3.402 (1)(b), FAC)
- c. Virtually no standards apply to Class IV.
- 4. Zones for discharge
 - a. Zones of discharge will normally not be allowed in G-I groundwaters.
 - b. No zone of discharge is allowed for freeforms
 - c. Zones of discharge may not extend beyond property boundary or 100 feet from site of discharge. (Rule 17-3.021(31), FAC)
- 5. Monitoring
 - a. Existing and new dischargers must monitor ambient groundwater quality, the quality of the discharge and the effect on water quality.

- b. A minimum of three wells will usually be required
- c. The results of monitoring may be used as the basis for ordering corrective action (Rule 17-4.245(7), FAC)

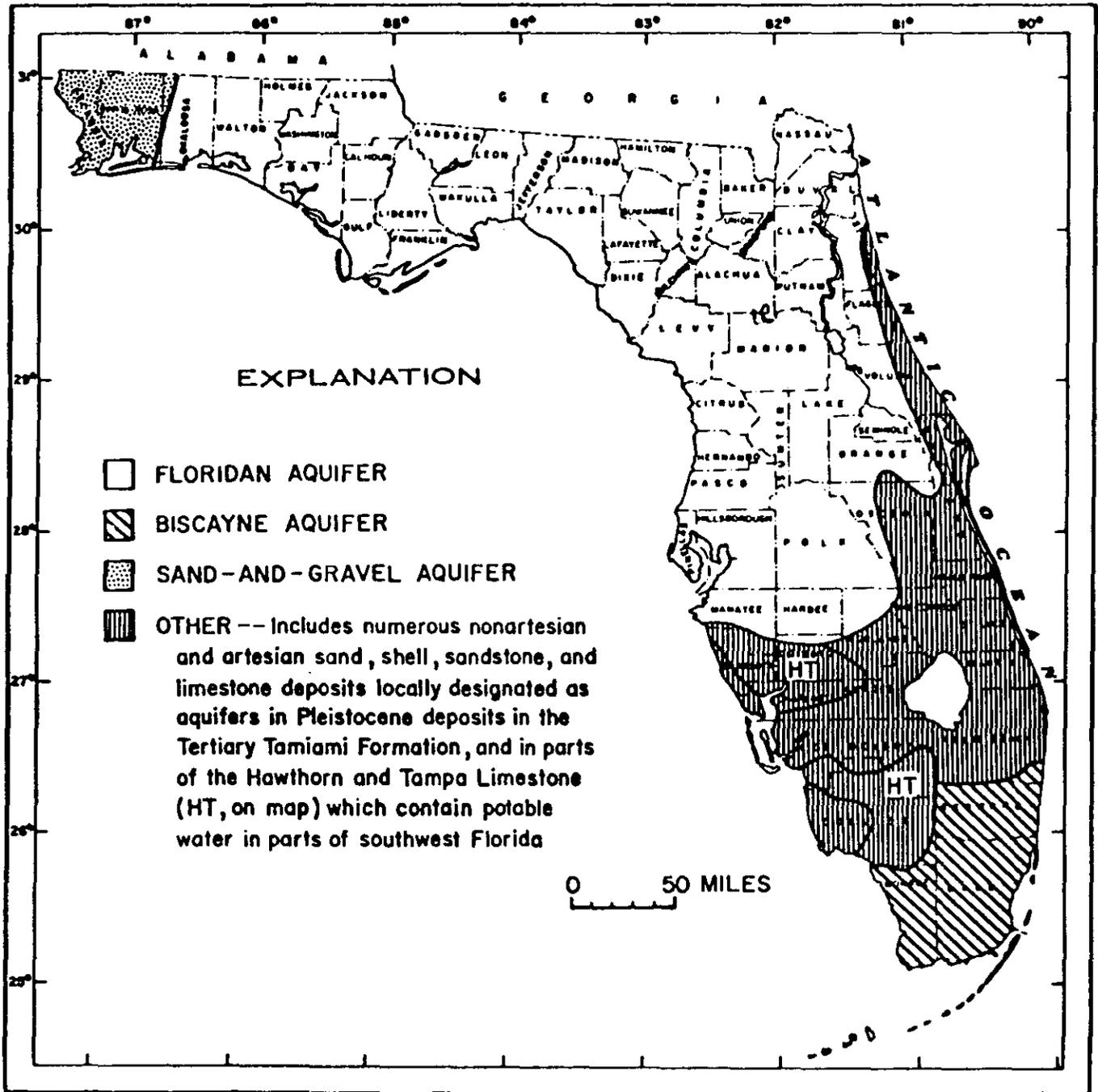


Figure 1 --Sources of ground water for public supply in Florida (modified from Irwin and Healy, 1978).

Source: R. Heath and C. Conover, Hydrologic Almanac of Florida, USGS Open-File Report 81-1107 (1981).

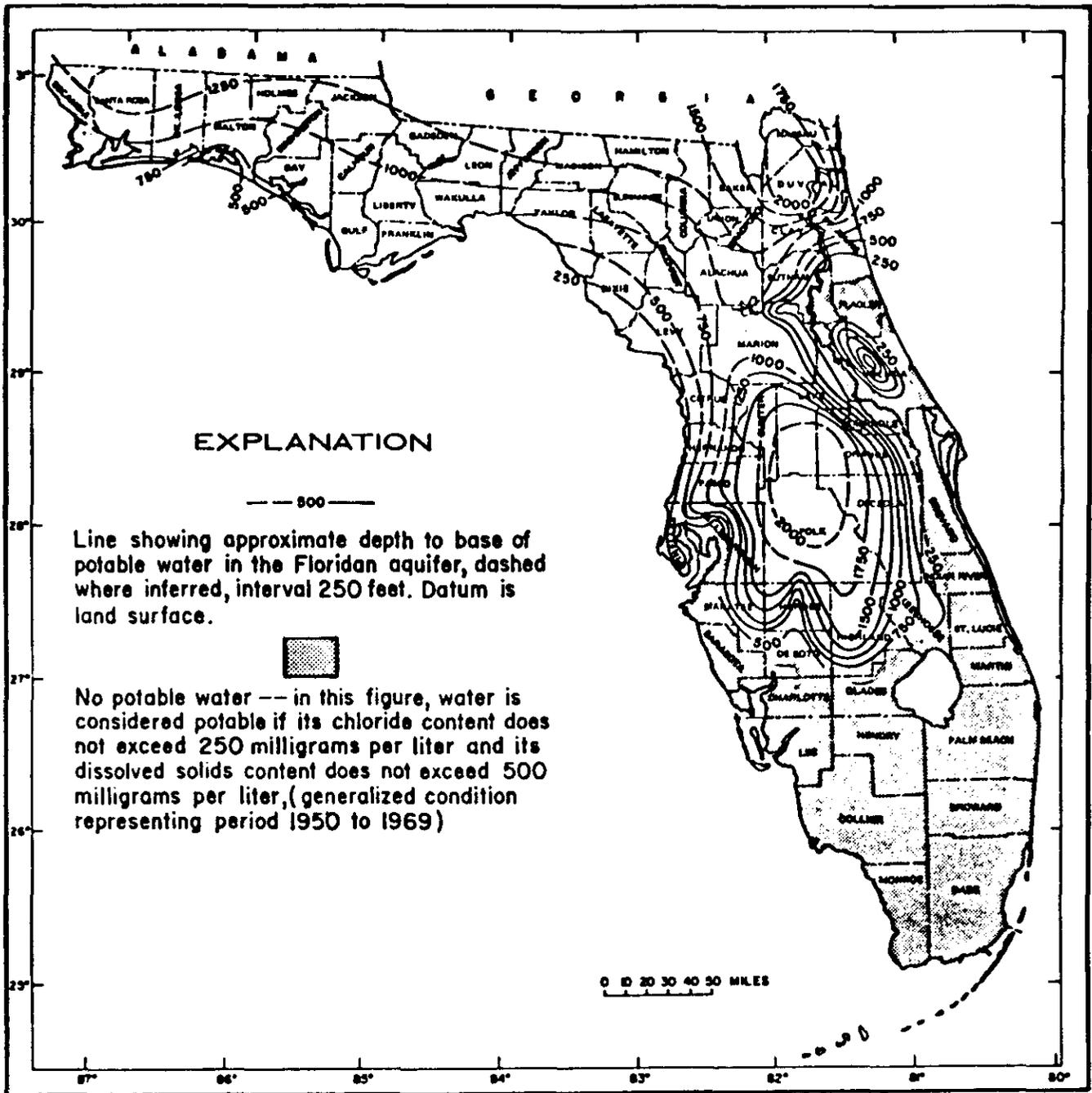


Figure 2 --Depth to base of potable water in the Floridan aquifer in Florida (modified from Klein, 1971).

Source: R. Heath and C. Conover, Hydrologic Almanac of Florida, USGS Open-File Report 81-1107 (1981).

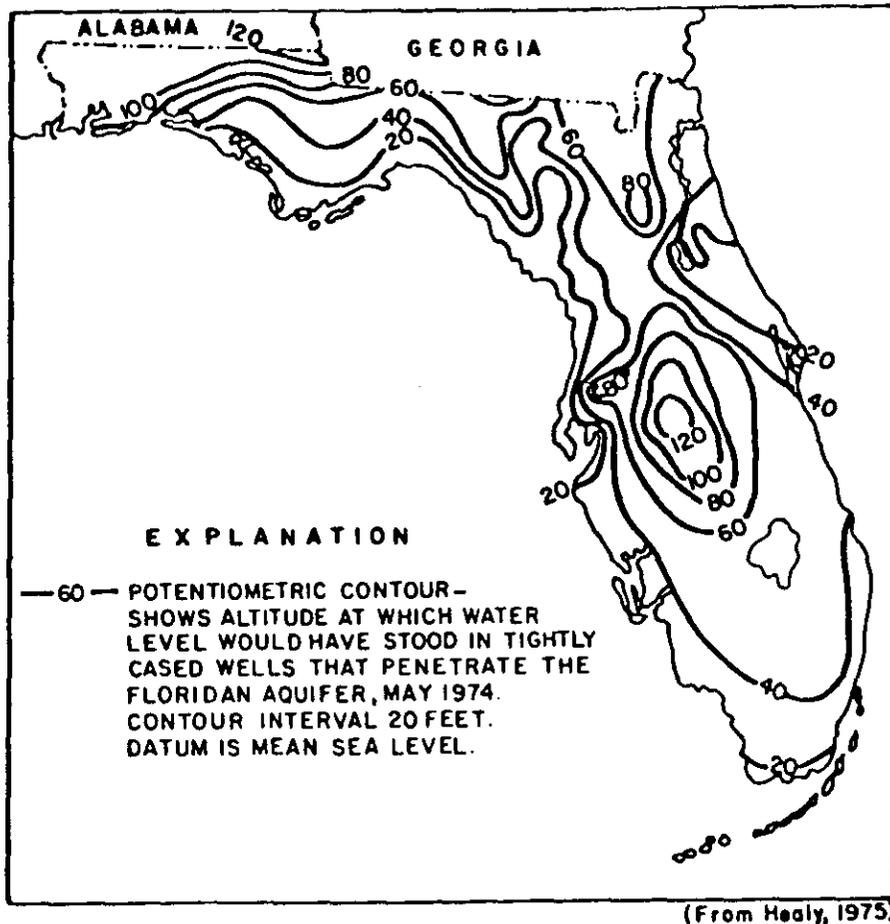


Figure 3 -- Potentiometric surface of the Floridan Aquifer in May 1974

Source: Spangler, Florida's Water Resources, With Particular Emphasis on Ground Water, in Ground Water in Florida: Proceedings of the First Annual Symposium on Florida Hydrogeology, Northwest Florida Water Management District (1982).

WATER USE IN FLORIDA 1980

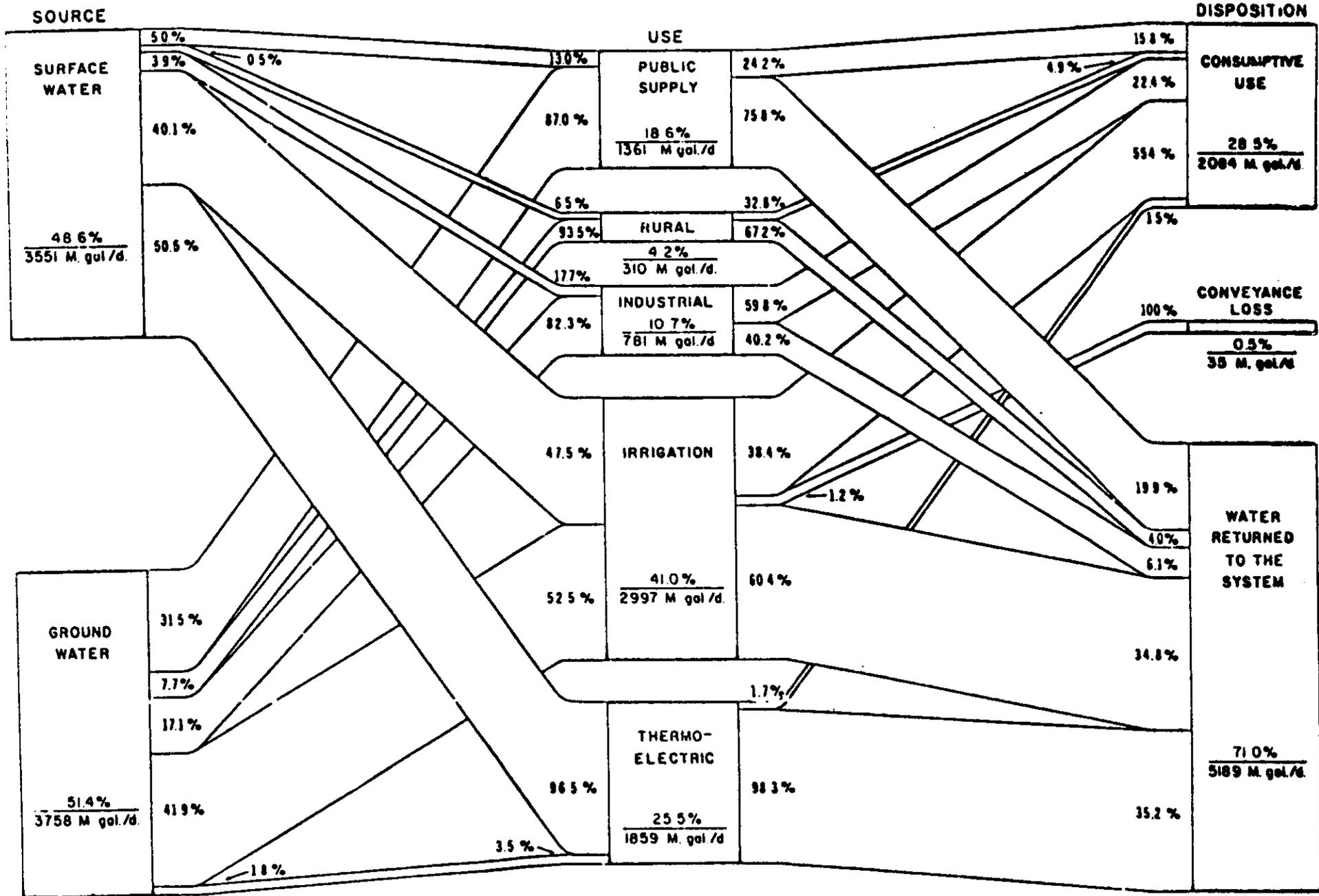


Figure 4

Source: Stanley Leach, U.S. Geological Survey Tallahassee Office, 1982.

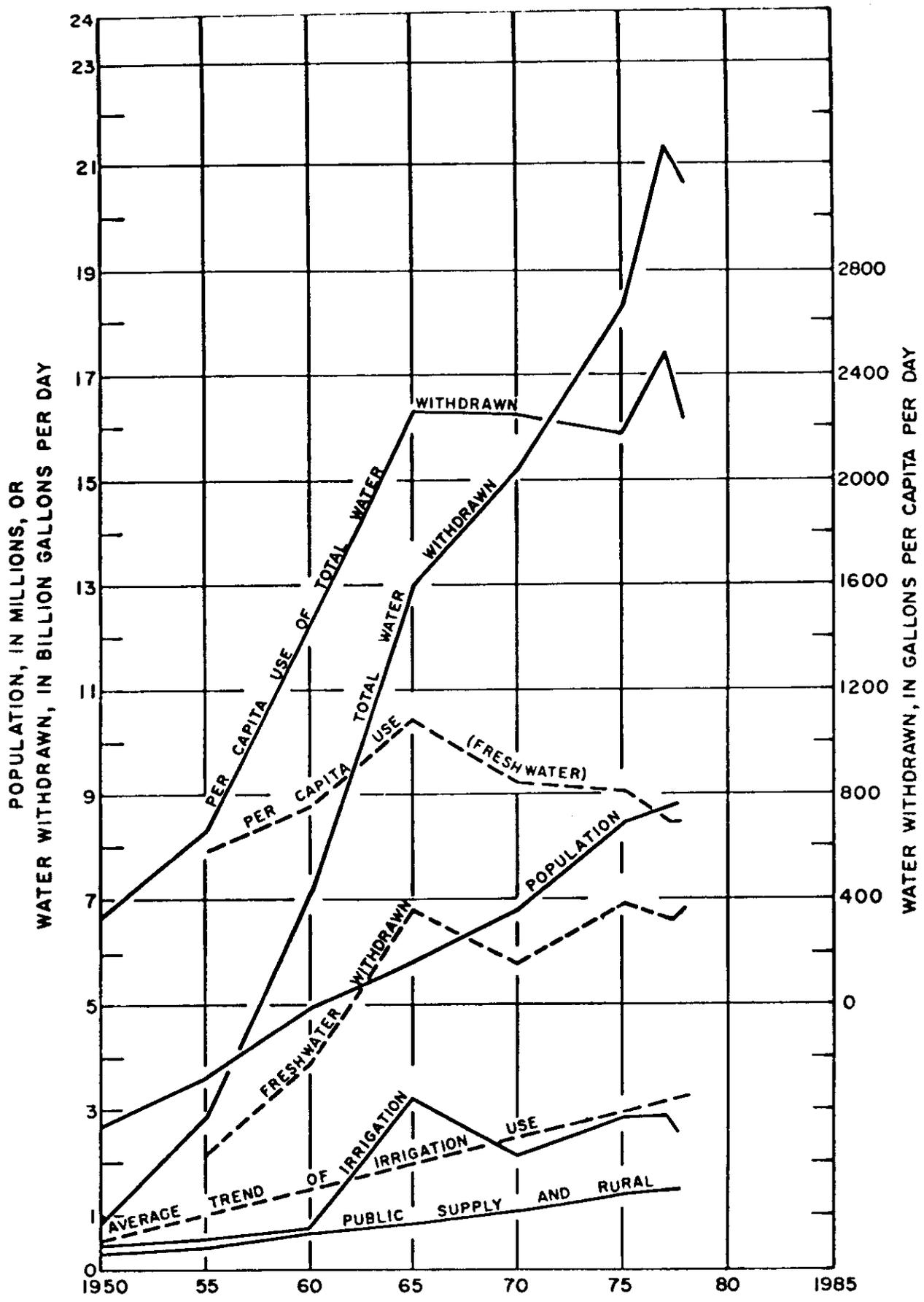


Figure 5 --Trends in population and withdrawals of water in Florida, 1950-78 (modified from Leach and Healy, 1980).

Source: R. Heath and C. Conover, Hydrologic Almanac of Florida, USGS Open-File Reprint 81-1107 (1981).

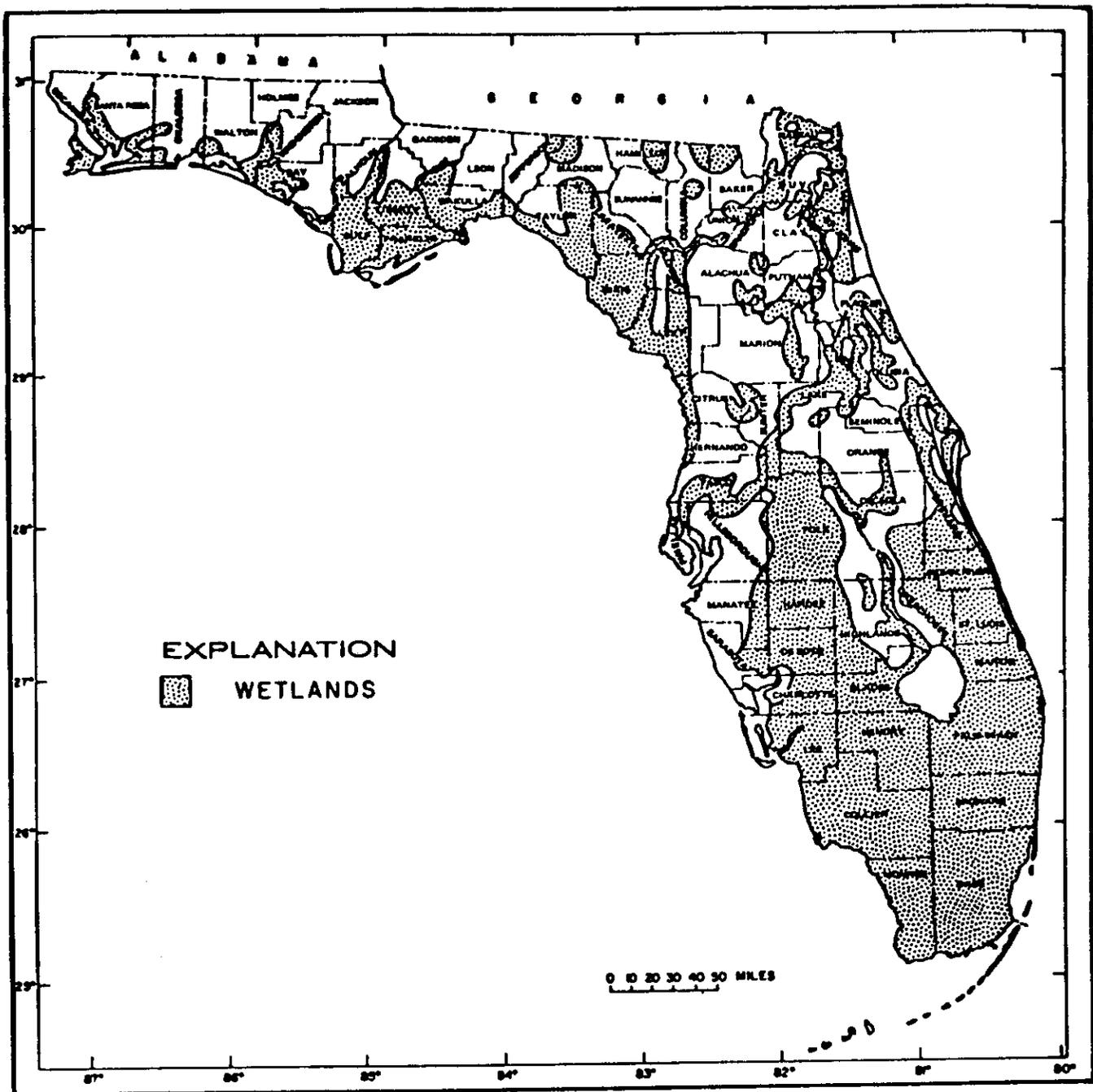
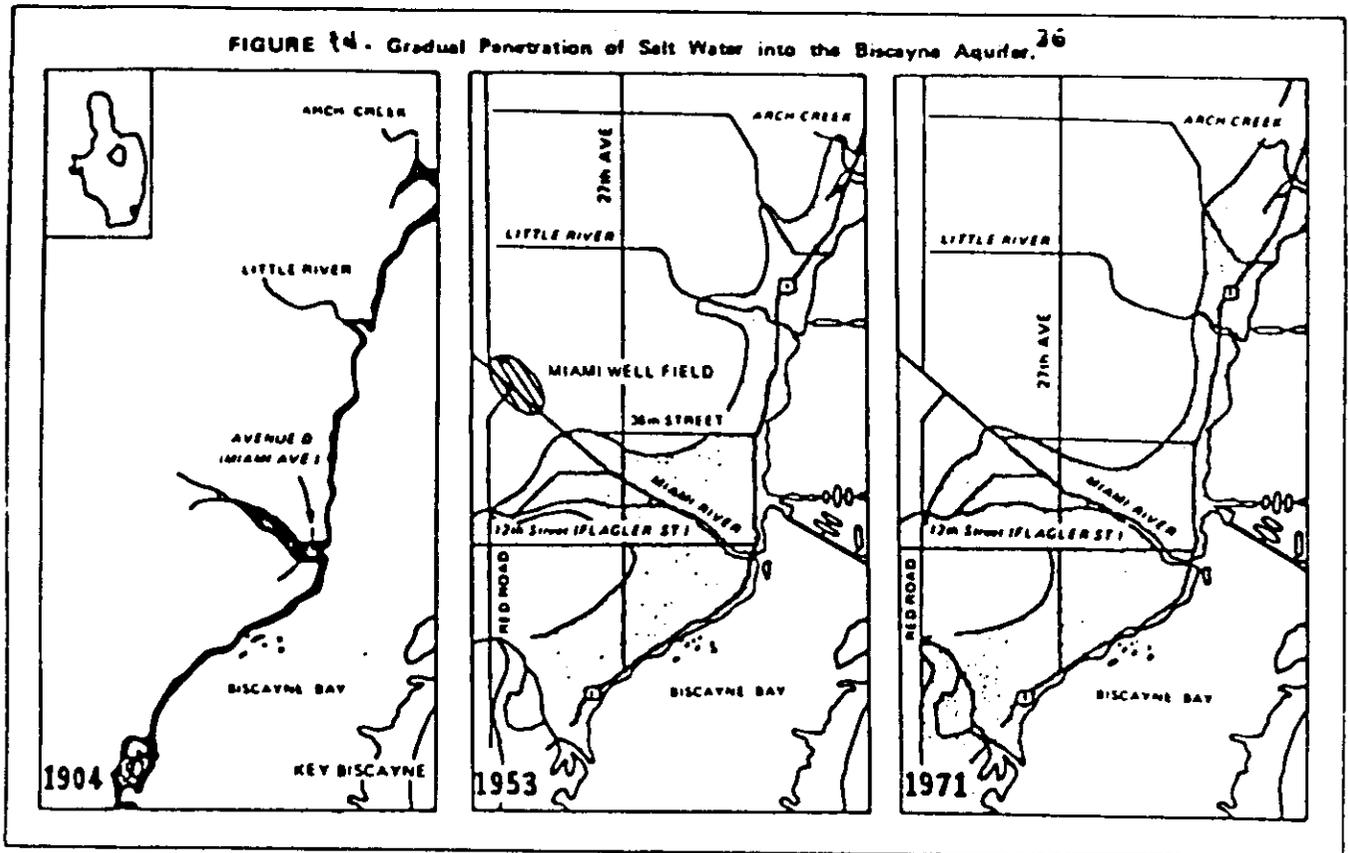


Figure 6 —Florida wetlands prior to development (modified from Snell and Kenner, 1974).

Source: R. Heath and C. Conover, Hydrologic Almanac of Florida, USGS Open-File Report 81-1107 (1981)

Figure 7



Source: J. Browder, C. Littlejohn, and D. Young, South Florida: Seeking a Balance of Man and Nature (1977).

Figure 8

**Ad Valorem Capabilities of
Florida's Water Management Districts**

<u>District</u>	<u>Approximate Assessment</u>	<u>Millage Cap</u>		<u>Maximum Annual Revenues</u>
		<u>Constitution</u>	<u>Chapter 373</u>	
Suwannee	2 billion	1 mill	.75 mill	\$ 1.5 million
Northwest	10 billion	.05 mill	.05 mill	\$.5 million
St. Johns	40 billion	1 mill	.375 mill	\$15.0 million
Southwest	50 billion	1 mill	1 mill	\$50.0 million
South Fl.	100 billion	1 mill	.8 mill	\$80.0 million

Source: Report of the Speaker's Task Force on Water Issues, Florida House of Representatives (March 1983)

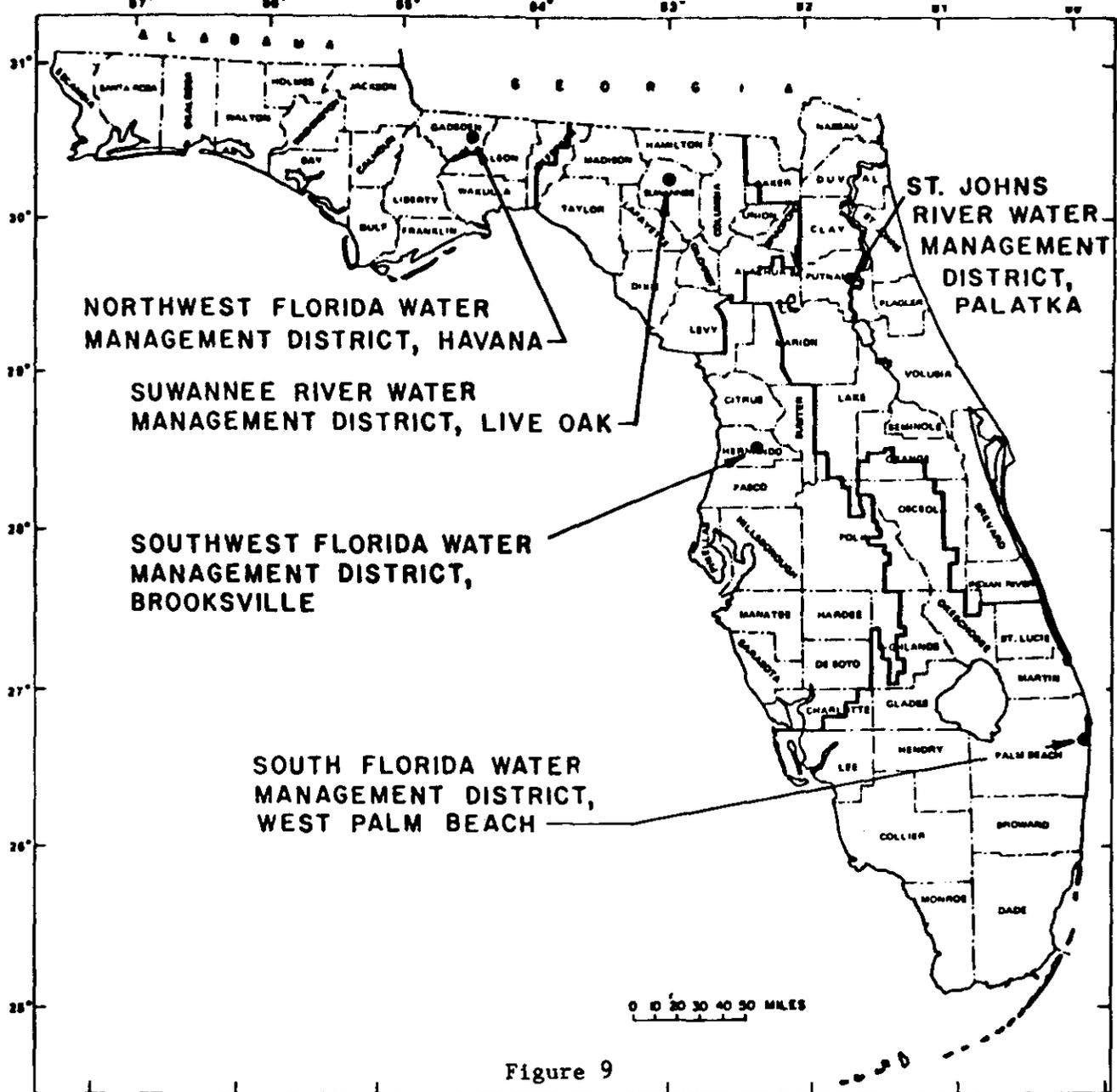


Figure 9

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