I. OVERVIEW

The land and water resources of a river basin serve many different functions. The water itself, with adequate quality, helps maintain the life processes of plant and animal populations, including humans. Wetlands within a basin help filter polluted waters, slow flood waters and provide habitat for different types of wildlife. Certain areas within the basin may provide good soils for agricultural production. There are of course many other resources and processes that may affect the healthy functioning of the watershed.

Almost any human activity in a river basin will have an impact on the functioning of that system, so there are always trade-offs inherent in the use of a watershed. If there is significant urban development in an area, the water taken from surface and ground water sources for drinking water will impact wetlands and other surface water systems, affecting pollution levels, and wildlife and fish populations. Increased amounts of impervious surface will increase flooding and water pollution. Large amounts of agricultural or industrial pollution and sewage dumped in the river basin will affect plant and animal populations and the health of humans. If wetlands are developed or damaged, flooding may increase and animal and fish populations will decrease.

Ideally, human activities and natural resources in a river basin will be managed in an integrated, coordinated manner in order to balance human uses of the basin with the natural functions provided by the basin in its undisturbed state. This approach is gaining importance in the United States, and this paper will address some of the efforts being made to manage ecosystems and watersheds in Florida. However, although Florida has a good program of water resource regulation, it is still somewhat fragmented, and is carried out by different agencies with different responsibilities. There are many institutions with effects on water management in Florida. Addressing the functions and effects of all of them are beyond the scope of this paper, which will confine itself to the more important regulatory agencies and programs.

Water resources in Florida are regulated by several federal, state, regional and local agencies, producing moderate levels of overlap in both geographic and subject matter jurisdiction. At the federal level, water resource regulation is focused in two agencies, the Environmental
Protection Agency (EPA) and the U.S. Army Corps of Engineers (ACOE). Both are very large bureaucracies, with many thousands of employees, and several field offices in Florida. In the area of water regulation, the most important responsibility of the EPA is controlling the discharge of pollutants from point sources under the Clean Water Act (CWA). The Act allows states with certified regulatory program to take responsibility for this program, and it appears that Florida will be delegated this responsibility in the near future. The EPA also has responsibilities for managing nonpoint stormwater pollution under the CWA and has authority to veto permits for impacts to wetlands under another CWA program.

The ACOE has a long history of involvement in dredging and draining the southern portions of Florida, including the construction of approximately 1700 miles of canals, levees and pumps to control surface and subsurface water in and around the Everglades. With the input of many other agencies, it is currently working on a complete redesign of the operation of this system, in an attempt to restore lost ecosystem functions. The ACOE also has primary responsibility for regulating the discharge of dredged or fill material under the CWA, and plays a major role in controlling the conversion of wetlands to other uses.

The Florida Department of Environmental Protection (DEP), recently established by consolidating the former Department of Environmental Regulation and Department of Natural Resources, is the lead state agency in water quality planning and regulation. The DEP has permitting jurisdiction over many installations and activities with effects on water pollution, water consumption, wetlands, land use and wildlife. The DEP is one of the larger state agencies. In addition to its Tallahassee headquarters, it maintains several district offices throughout the state. The standard setting body for the DEP is the Environmental Regulation Commission (ERC), a group of citizens and professionals appointed by the Governor to assist in the process of setting many types of environmental permitting criteria for the DEP. The ERC normally conducts public hearings around the state, at which it receives and discusses information relevant to the issues it is considering.

In addition to the DEP, the state is divided into five Water Management Districts, based on hydrologic boundaries. The WMDs are responsible for many of the water related planning and permitting programs in Florida, including consumptive uses of water, the permitting of stormwater and agricultural water management systems, water-related environmental impacts, District Water Management Plans, and programs for improving water quality in certain prioritized water bodies within each District.

Each District is governed by non-paid board members appointed by the Governor, subject to confirmation by the Florida Senate. Governing board members are appointed to four year terms, and are selected according to criteria in the Act, based primarily on residency within designated hydrologic units or within certain political jurisdictions. A district may also be divided into basins, each governed by a basin board composed of three to five members who are responsible for the planning of primary water resource development projects, and secondary water control facilities for guidance of local government and private local owners.
Water management district governing boards are responsible for the overall planning and administration of district programs, including those of basin boards, as well as preparation of a water use plan and implementation of the regulatory programs addressed in the Water Resources Act. They are authorized to employ an executive director, technical staff and legal staff to assist in the planning and administration of their programs. Recent legislation requires that the appointment of an executive director be confirmed by the Florida Senate.

Generally, the districts may gather information and develop plans; construct and operate works; acquire lands for water management; regulate well construction and license well drillers; regulate surface water management facilities; and regulate the consumptive use of water through permitting, water shortage plans, and water emergency orders. Permits may be required for the consumptive use of water; location, construction, repair, or abandonment of water wells; utilization of works or lands of the district; construction of projects involving artificial recharge; and construction, alteration, maintenance and operation of dams, impoundments, reservoirs or appurtenant works (surface water management and storage systems). District funding is derived from four sources: 1) direct state appropriations, 2) permit application fees, 3) ad valorem taxes, and 4) issuance of bonds. Permit application fees may not be more than a district's costs in processing, monitoring and inspecting for compliance.

In addition to the regulatory and planning programs instituted by state and regional agencies, Florida requires local governments to play a role in managing water resources. The Local Government Comprehensive Planning and Land Development Regulation Act (Growth Management Act) requires that local governments devise comprehensive plans to guide and control future development. Comprehensive plans are long range policy documents which provide guidance for local government regulatory activities. Local governments must implement and enforce the objectives of the comprehensive plan through land development regulations. The Act requires that land development regulations and development orders must be consistent with the validly adopted local government comprehensive plan.

Local comprehensive plans must be consistent with the goals and objectives expressed in the State Comprehensive Plan, codified at Chapter 187, Florida Statutes. The state comprehensive plan general goal for water resources is to “assure the availability of an adequate supply of water for all competing uses ... and maintain the functions of natural systems and the overall present level of surface and ground water quality.” The plan contains many policies and objectives related to protection of water supplies, water quality and natural systems. The Act requires that local government comprehensive plans include the following elements relating to protection of water and environment: 1) capital improvements element; 2) future land use element; 3) general sanitary sewer, solid waste, drainage, potable water, and natural groundwater aquifer recharge element; and 4) conservation element.

This paper does not address local environmental and land use regulatory programs which affect water resources. There are 67 counties in Florida, and several hundred municipal governments, many of which have one or more planning and regulatory departments to implement...
local programs for environmental and land use control related to water resources.

II. WATER QUALITY PROTECTION

A. Federal Clean Water Act

1. Point Source Pollution Control

In 1972, in response to growing concerns over water quality and environmental quality, Congress enacted amendments to the Federal Water Pollution Control Act in order to better restore and maintain the "chemical, physical and biological integrity of the nation's waters." The act became known as the Clean Water Act (CWA). Section 301(a) of the Act prohibits the "discharge of any pollutant" by any "person" or entity into "waters of the United States," except in compliance with specified provisions of the CWA. Most important among these are the National Pollutant Discharge Elimination System (NPDES) permit program of Section 402 and the dredge and fill program of Section 404.

The Section 402 NPDES program, administered by the Environmental Protection Agency (EPA), requires a permit for industrial and municipal point source discharges of pollutants into waters of the United States. A "point source" includes discrete conveyances like pipes, ditches, channels and wells, but also landfill leachate collection systems, boat discharges, and overflow from mining operations. Agricultural stormwater discharges and return flows from irrigated agriculture are not included in the definition of a point source and do not require a permit under this section. There are also several categories of discharges which, even though they may fit the definitions of the permit program, are excluded from having to obtain a permit. Among these are nonpoint agricultural or silvicultural pollutants including runoff from orchards, crops, pastures and forest lands.

"Pollutants" are broadly defined to include almost any type of chemical, biological agent, liquid, gas or solid waste. "Waters of the United States" are also very broadly defined to include almost any category of surface water which has any relationship to interstate commerce, including many wetland systems. The definition does not include waste treatment ponds or lagoons. The CWA includes provisions which allow states to take over the permitting program. As long as EPA controls the program in a state, the program does not apply to discharges to groundwater. However, EPA's approval of a state NPDES program is conditioned on the state having legal authority to control the disposal of pollutants into wells. So while EPA cannot require an NPDES permit for discharges to groundwater, states are required to do so in order to take over the NPDES program from EPA. Florida is now in the process of taking over responsibility for the NPDES program.

What are the conditions attached to a permit? Permits generally have five components: technology-based limitations, water quality-based limitations, monitoring and reporting requirements, standard conditions and special conditions. Technology-based limitations are industry-specific and are based on technological and economic capabilities. Any more stringent limitations necessary to insure that a discharge complies with applicable state water quality
standards must also be included in NPDES permits. These limitations are designed to protect the quality of receiving waters, and are not based on technological or economic factors. Monitoring requirements are the primary means for determining whether permit limitations are being met. Among other things, the permit-holder must monitor discharges at designated frequencies, using designated analytic techniques, and must report the results to EPA. Standard conditions for NPDES permits include provisions such as the duty to minimize or prevent permit violations which are reasonably likely to damage human health or the environment; the duty to properly operate the maintain all facilities and equipment; and the duty to report any planned changes to the facility, any anticipated non-compliance, and transfers to new owners or operators. Special conditions to address site-specific conditions may also be attached to NPDES permits.

2. Non-point Source Pollution Control

The original CWA accomplished very little relative to non-point source pollution, the type of diffuse pollution that washes off of roads and parking lots, agricultural and forestry operations, construction activities, etc. Non-point source pollution has been identified as a significant problem in surface waters, but it cannot be addressed by the same technological controls imposed on point sources through the NPDES program. It is more appropriately addressed through land use planning and production controls which are politically unpopular and therefore difficult to implement. Originally, the CWA required that states address non-point pollution through an area-wide planning and management process, which actually made very little difference in the amounts and rates of non-point source pollution.

Section 208 of the Act required states to identify areas which as a result of urban-industrial concentrations or other factors, have substantial water quality control problems, and to designate an organization to develop an area-wide waste treatment management plan for those areas. At a minimum, these plans had to address agricultural and silvicultural pollution sources, mining-related sources, construction-related sources and salt water intrusion into rivers and lakes resulting from human activities. Based on the priorities identified in these plans, the states are required to develop strategies, including Best Management Practices (BMPs), for controlling the non-point pollution. BMPs are methods and practices for controlling such pollution. They include structural and non-structural controls and operation and maintenance procedures, which can be applied to reduce or eliminate the introduction of pollutants.

Section 319 of the Act enacted in 1987, also addresses non-point source pollution. The section first requires states to identify waters which are in particular need of actions to control non-point source pollution in order to attain applicable water quality standards. It also requires states to identify the types of non-point sources which contribute to such pollution. These assessment reports are then to be used to prepare a state management program for controlling non-point pollution. The program must be implemented in the four years after being submitted to EPA. These management programs must be developed in cooperation with any local, regional or interstate entity that is planning for the implementation of non-point source pollution controls. The act includes grant funding to states to assist them in implementing the management programs, and requires states to submit reports every two years which describe the nature and extent of nonpoint sources of pollution and the programs being implemented to eliminate those sources.
B. State of Florida Permit Programs

1. Surface Water Pollution Control
   Chapter 403 and DEP rules (Title 62, F.A.C.) establish the state’s program for regulation of surface water pollution. Basically, the act provides that no installation that is reasonably expected to be a source of water pollution will be operated, maintained, constructed, expanded or modified without an appropriate and current permit, unless exempted by rule. An installation is defined as any structure, equipment, facility or operation that may emit water contaminants. The act also says that: No person, without written authorization of the DEP, shall discharge into waters within the state any waste which, by itself or in combination with the wastes of other sources, reduces the quality of the receiving waters below the classification established for them.

   "Waters" are very broadly defined to include almost every type of water in the state, whether on or underneath the surface. The DEP has classified all surface waters in the state into one of five classes. Class I waters are those designated for use as potable water supplies; Class II are designated for use in shellfish propagation or harvesting; Class III are designated for use as recreation, propagation and maintenance of healthy, well-balanced populations of fish and wildlife; Class IV are designated as agricultural water supplies; and Class V are designated for navigation, utility and industrial use. The classifications are in order of protection required, with Class I waters having the most stringent water quality criteria and Class V the least stringent criteria.

   Minimum water quality standards applicable to all surface waters require that they be "free from" domestic, industrial, agricultural or other human-induced thermal and non-thermal components of discharges at all times and in all places. Basically, these criteria prevent the creation of nuisance conditions or the discharge of acutely toxic discharges that could cause cancer or birth defects in humans or significant wildlife or fish populations, or pose a serious danger to public health, safety or welfare. In addition to these minimum criteria, there are "general water quality criteria" which apply to all surface waters. The general criteria include standards for arsenic, biochemical oxygen demand, chlorides, chromium, copper, detergents, fluorides, lead, nutrients, oils and greases, pH, phenolic compounds, radioactive substances, turbidity and zinc among others. Each classification of surface water also has water quality criteria specific to that classification.

   Discharges to surface water are normally allowed a "zone of mixing," within which the general water quality criteria do not apply. A zone of mixing is an area adjacent to points of discharge where the water quality may be temporarily degraded in order to allow the discharge to meet standards. However, the minimum water quality standards may not be violated within these zones. Zones of mixing must be requested during the permitting process, and must be specifically limited in size and shape. The DEP also recognizes that in certain areas, because of natural conditions or human factors that cannot be controlled, dissolved oxygen levels or other water quality criteria might not meet applicable standards. Under these circumstances, the background conditions for dissolved oxygen can become the applicable criteria, though this may only occur after public hearings. For other water quality criteria, the existing levels may become what are
known as "site specific alternative criteria," after an affirmative documented demonstration that the proposed levels are more appropriate due to natural background conditions or human factors that cannot be controlled. This process may not be applied to alter the minimum criteria, nor to many of the general water quality criteria.

At present, the DEP has classified all surface waters as Class III (recreation, propagation and maintenance of healthy, well-balanced populations of fish and wildlife), except for certain waters placed in other classifications. Additionally, certain waterbodies are also designated as Outstanding Florida Waters, or Outstanding National Resource Waters, which allows little or no lowering of water quality. Generally, these types of waterbodies are required to have exceptional recreational or ecological significance. They can be designated as special waters after public fact-finding workshops, an economic impact analysis, and a finding that the environmental, economic and social benefits of the designation outweigh the environmental, economic and social costs.

During the surface water permitting process, if the DEP finds that a proposed discharge will reduce the quality of the receiving waters below the classification established for them, it must deny the application and refuse to issue a permit. If the department finds that the proposed discharge will not reduce the quality of the receiving waters below the classification established for them, it may issue an operation permit if it finds that such degradation is necessary or desirable under federal standards and under circumstances which are clearly in the public interest.

In insuring that discharges will meet the designated water quality standards, the DEP enforces technology-based effluent limitations applicable to industrial waste discharges. These are minimum waste treatment requirements, based on particular treatment technologies. Many federal effluent limitations, guidelines and standards are incorporated by reference. No state permit may contain an effluent limitation that is less stringent than one contained in an NPDES permit issued by the EPA. Generally, all domestic wastewater facilities must at a minimum, provide secondary treatment of wastewaters. All new facilities and modifications of existing facilities must be designed to achieve an effluent after disinfection containing no more than 20 mg/l BOD and 20 mg/l total suspended solids, or 90% removal of each of these pollutants from the wastewater effluent.

The DEP also requires that all discharges meet water quality-based effluent limitations when necessary to meet water quality standards. These are limitations which are necessary to ensure that water quality standards in a receiving water will not be violated. They are determined by application of scientific methods, including modeling.

2. Groundwater Pollution Control

The DEP's authorizing legislation for permitting of discharges to groundwater is contained in Chapter 403, Florida Statutes. Chapter 403, F.S. requires that all discharges to groundwater go through a permitting process unless exempted, and that they comply with technology based effluent limitations (TBELs), such as secondary treatment for domestic waste, and water quality based effluent limitations (QBELs), such as the treatment necessary to meet water quality
standards and protect beneficial uses.

a. **Applicable Groundwater Quality Standards**

DEP's groundwater rules contain several important provisions, which are somewhat similar to the approach taken in surface water permitting. First, they establish the "minimum criteria" water quality applicable to all groundwater. These are also known as "free froms," since the language of the rule states that all groundwater at all times and places must be "free from" any humanly induced, nonthermal components of discharges in concentrations which alone or in combination with other components:

a. "Are harmful to plants, animals, or organisms that are native to the soil and responsible for treatment or stabilization of the discharge relied upon by Department permits."

b. "Are carcinogenic, mutagenic, teratogenic, or toxic to human beings, unless specific criteria are established for such components in Rule 17-3.404..."

c. "Are acutely toxic to indigenous species of significance to the aquatic community within surface waters affected by the groundwater at the point of contact with surface waters..."

d. "Pose a serious danger to the public health, safety or welfare..."

e. "Create or constitute a nuisance..."

f. "Impair the reasonable and beneficial use of adjacent waters."

The second set of applicable groundwater quality standards are the primary and secondary drinking water standards for public water systems established pursuant to the Florida Safe Drinking Water Act. Primary drinking water standards are those necessary to prevent an adverse effect on the health of persons. The rule specifies maximum contaminant levels for several types of organics, volatile organics, inorganics, turbidity, microbiological agents and radionuclides. Secondary drinking water standards are oriented more to protection of the public welfare, including factors such as taste, odor and color. The list of maximum contaminant levels includes those for chloride, color, copper, corrosivity, fluoride, foaming agents, iron, manganese, odor, pH, sulfate, zinc and total dissolved solids. The ERC normally adopts all federal Environmental Protection Agency standards in these areas.

b. **Groundwater Classifications**

Chapter 62-520.410 F.A.C. classifies all groundwater according to its designated use, level of confinement and level of dissolved solids. Class G-I is identified as potable water use groundwater in a single source aquifer with total dissolved solids (TDS) of less than 3000 mg/l. No aquifers have been classified as G-I. Class G-II is potable water use groundwater in aquifers with TDS content of less than 10,000 mg/l, unless otherwise classified by the Environmental Regulation Commission (ERC). Most of Florida's accessible groundwater is classified in this
category. Class G-III is nonpotable groundwater in unconfined aquifers with TDS of over 10,000 mg/l, or which has TDS of 3,000 to 10,000 mg/l and has either been reclassified by the ERC as having no reasonable potential as a future source of drinking water or has been designated as an exempt aquifer. Examples of this classification are coastal aquifers with substantial saltwater intrusion, saline water below the fresh water in the Floridan Aquifer and below the Biscayne Aquifer in South Florida. Class G-IV is nonpotable groundwater in confined aquifers with TDS of 10,000 mg/l or greater. An example of this classification is the so-called "boulder zone" lying deep below all other aquifers in the South Florida area.

Reclassification of an aquifer or aquifer segment can be initiated by any substantially affected person or one of the water management districts by filing a petition with the DEP. The DEP can also pursue reclassification by initiating rulemaking under procedures established by rule. After a petition is filed or rulemaking is begun, generally the rule requires published notice, written notice to affected local governments, and public hearings. To reclassify, there must be an affirmative finding that the reclassification will establish the present and future most beneficial use of the groundwater, and that the reclassification is clearly in the public interest. There are additional procedures required for designating G-I single source aquifers, though no aquifer has been reclassified to G-I.

c. Permitting Zones of Discharge

In addition to classifying aquifers and setting the groundwater quality criteria applicable to each classification, the DEP's groundwater rules establish permitting and monitoring requirements. The DEP attempts to incorporate groundwater permitting considerations into other appropriate permits, and attempts to coordinate its permitting with that of the water management districts. Basically, the rule states that unless exempted, no installation may directly or indirectly discharge to groundwater any contaminant that causes a violation of any of the water quality criteria and standards, except within a "zone of discharge," (ZOD) which is similar to a zone of mixing for surface water discharges.

No ZOD is allowed for direct discharges into wells or sinkholes that connect to G-I or G-II groundwater, except for recharge projects from surface water or other groundwater of comparable quality. In addition, no ZOD is allowed for discharges that may cause an imminent hazard to the public or environment through contamination of groundwater supplies of drinking water or surface water affected by groundwater.

Outside of a ZOD, Class G-I and G-II must meet the primary and secondary drinking water standards. Within a zone of discharge located in a G-I or G-II area, the primary and secondary drinking water standards do not apply, although the "free from" minimum criteria remain applicable. If natural background levels of any of the listed constituents are higher than the stated maximum, the background value becomes the prevailing standard for a particular G-I or G-II aquifer. Class G-III groundwater only has to meet the "free from" criteria, and Class G-IV
criteria are established on a case by case basis.

Installations discharging to G-III groundwater are exempt from obtaining a ZOD permit as long as the discharge does not threaten to impair the designated use of adjacent waters, such as G-I or G-II groundwater.\textsuperscript{19} Installations discharging to G-IV groundwater are also generally exempt from ZOD permit requirements.

For G-I and G-II groundwater, the rule includes specific criteria for the location and size of a permitted ZOD. Generally, the only ZOD allowed in a G-I area will be for domestic wastewater and stormwater sites. The ZOD will extend no more than 100 feet from the site boundary or to the installation property boundary, whichever is less.\textsuperscript{20} If a smaller ZOD is necessary to protect designated uses of adjacent waters outside the ZOD, then the smaller zone will be required.\textsuperscript{21} Other discharge sites in G-I areas may be granted the same sized ZOD if the discharge generally is as clean in chemical, physical and microbiological quality as secondarily treated domestic wastewater. The ZOD may be modified at the time of permit renewal or modification, and any increase or change in the waste stream must meet the requirements applicable to new discharges.\textsuperscript{22}

For new installations discharging into Class G-II and for discharges into Class G-III groundwater that might affect a G-II aquifer, the owner must first demonstrate that a discharge will not impair the designated uses of contiguous waters outside a ZOD.\textsuperscript{23} If the applicant chooses, it can allow the DEP to establish the ZOD, 100 feet from the site boundary or to the installation's property boundary, whichever is less, unless a smaller zone is necessary to protect the designated uses of contiguous waters.\textsuperscript{24}

Several types of installations are automatically permitted by rule, unless a permit defining a ZOD is otherwise required by DEP. These include: agricultural fields, ditches and canals; livestock waste lagoons exempted from permitting under Rule 17-6.300 (limiting the number of livestock permitted in an area);\textsuperscript{25} and stormwater facilities.\textsuperscript{26} These types of installation are permitted a ZOD 100 feet from the site or to the property boundary, whichever is less. If the discharge threatens to violate groundwater standards at the boundary of the ZOD, or threatens to impair the designated uses of contiguous waters, the DEP requires the owner to obtain a groundwater permit, define or modify an appropriate ZOD, and institute appropriate monitoring.\textsuperscript{27}

d. Monitoring

The DEP requires monitoring and reporting programs for any installations discharging to groundwater, though monitoring plans required by a local ordinance may be substituted if the requirements are in substantial compliance with the DEP's requirements.\textsuperscript{28} Monitoring plans must show the location of the wells proposed for measuring background and downgradient levels of groundwater quality. The plans must also include construction details, a water sampling and chemical analysis protocol to determine background quality of the groundwater and any deviation of groundwater quality in the downgradient wells. Information supplied must include
hydrogeological information on the characteristics of the aquifer; the waste disposal rate, and frequency and method of discharge; the characteristics of the waste; and other potential pollution sources within one mile.29

At a minimum, monitoring wells must be located as follows: one upgradient well to determine natural unaffected background quality of the groundwater; one well at the edge of the ZOD, downgradient from the discharge site; one intermediate well downgradient from the site and within the ZOD, in order to detect the chemical, physical, and microbiological characteristics of the discharge plume; and other wells required as necessary, based on the complexity of the hydrogeology, size or toxicity of the plume, threat to public health, etc.30

Discharges to Class G-III groundwater must be monitored for compliance with the minimum "free from" criteria, or the permittee may establish a groundwater monitoring program which must demonstrate that the criteria are not being violated. Installations which discharge to Class G-IV groundwater have monitoring requirements established on a case by case basis by the DEP.31 Exemptions to monitoring include:

1.) Domestic sewage treatment installations with less than 100,000 gallons per day (GPD) design capacity;
2.) stormwater facilities;
3.) agricultural fields, ditches and canals; and
4.) livestock waste lagoons exempted under old Rule 17-6.300 (limiting the number of animals).
5.) wastewater ponds, cooling ponds or other discharge waters meeting the minimum "free from" criteria and the applicable standards for the receiving groundwater and contiguous surface waters are also exempted.

The first four exemptions apply only so long as the discharges present no potential hazard to human health, the environment, or a source of drinking water, and as long as the facilities do not discharge directly to groundwater.32

III. WATER QUANTITY PROTECTION

A. State of Florida

Water quantity protection refers to the necessity for balancing the human needs for water use and the control of water flow with the needs of natural systems. Industrial, agricultural and domestic needs are the primary categories of consumptive uses of water, while almost any form of development requires that the flow of rain water from that development be controlled. Natural systems such as rivers, lakes, forests, wetlands and estuaries have all evolved with certain amounts of water generally being present at certain times of year. The biological components of
these systems have also evolved based on the dominant water regime in those systems. When humans take large amounts of water out of a system, or otherwise manipulate the quantity, rate, timing and distribution of water flows in that system, the system will not function as it has evolved.

Florida's approach to these issues is generally embodied in legislation known as the Water Resources Act. The Water Resources Act was adopted in 1972 as a comprehensive approach to water planning and management. The general purposes of the Act are to provide for management of water and related land resources; promote conservation, development and proper utilization of surface and groundwater; provide water storage; prevent damage from floods, soil erosion and excessive drainage; preserve natural resources, fish and wildlife; and promote recreational development. The Water Resources Act granted most regulatory authority to the state Department of Environmental Regulation, but directed it to delegate authority to regional water management districts to the maximum extent possible. As mentioned earlier, the Act divides Florida into five regional water management districts (WMDs), generally established along hydrological boundaries. There are several planning and regulatory programs established by the Act.

1. State Water Use Plan
   The Water Resources Act requires the Department of Environmental Protection (DEP) to "study existing water resources in the state; the means of conserving and augmenting such waters; existing and contemplated needs and uses of water for protection and procreation of fish and wildlife, irrigation, mining, power development, and domestic, municipal, and industrial uses; and all other related subjects...." The DEP must cooperate with the Office of the Governor to formulate an "integrated, coordinated plan for the use and development of the waters of the state, based on the above studies." The plan is to be known as the State Water Use Plan, which is intended to serve as a functional element of the state comprehensive plan, and to aid in the guidance of the district governing boards and other agencies in the administration and enforcement of the Act.

   In preparing the State Water Use Plan, the DEP must "give careful consideration to the requirements of public recreation and to the protection and procreation of fish and wildlife." On certain designated waterbodies, it may prohibit or restrict other future uses which may be inconsistent with these objectives. The DEP must consult with and carefully evaluate the recommendations of concerned federal, state and local agencies, particularly the water management districts. In turn, each district must cooperate with the DEP in conducting surveys and investigations of water resources, furnish available technical data, and advise the DEP in formulating those parts of the plan applicable to the district.

2. District Water Management Plans
   The Act also requires the water management districts to prepare District Water Management Plans. The District Plan must include an assessment of water needs and sources for the next 20 years, including specific geographical areas that have water resource problems which have become critical or are anticipated to become critical within the next 20 years. Based
on economic, environmental, and technical feasibility analyses, a course of remedial or preventive action must be specified for each current and anticipated future critical problem. District Plans must also identify areas where data collection, water resource investigations, water resource projects, or the implementation of regulatory programs are necessary to prevent water resource problems from becoming critical. After several years of public hearings and workshops, the Districts recently completed a five year process which resulted in the adoption of final DWMPs. The District Plans must be updated every five years.

3. Minimum Flows and Levels
One of the most significant and least observed provisions of the Water Resources Act requires the WMDs to establish what are termed "minimum flows and levels" for all watercourses, lakes and aquifers. Minimum flows for surface watercourses are defined as "the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area." Note that the definition includes consideration of ecological concerns. Minimum water levels are "the level of ground water in an aquifer and level of surface water at which further withdrawals would be significantly harmful to the water resources of the area." It is not clear why this definition does not include ecological considerations, and there has never been a concentrated effort to rectify the differences.

The importance of this requirement is that setting these limits implies setting a baseline standard beyond which withdrawals for consumptive uses will not be permitted. Florida is a water rich state, and until recently, there has been very little pressure to fulfill this requirement. A few such standards have been set in special cases, but recent concerns over the state's rapid population growth and increasing demand for consumptive uses of the resource have increased the pressure on the WMDs to establish minimum flows and levels in order to protect minimal amounts of water for nonconsumptive, ecological purposes.

4. Water Shortage Planning
The Water Resources Act also requires the WMDs to plan for water shortage emergencies that occasionally result from droughts. All districts have established these plans, which normally include phased responses to such occurrences. These generally begin with simple restrictions on the times and days during which water may be used, and usually include actual cutbacks or cutoff of water for certain non-essential uses during the most extreme periods of drought.

5. Consumptive Use Permitting: Ch. 373, Part II

a. Generally

Florida takes over 90% of its drinking water from underground sources, but surface water sources are becoming increasingly important. The Water Resources Act preempted the traditional common law for allocating water in Florida, and in its place substituted a comprehensive administrative system for creating and apportioning water rights. All water in Florida is now subject to regulation, whether diffused or defined, on the surface or below the ground, percolating
or flowing in defined channels. The water management districts are authorized to require
permits for any consumptive use of water except individual domestic use. The districts can
impose reasonable conditions on permits to ensure the use is "consistent with the overall
objectives of the district" and "not harmful to the water resources of the area." The permit
applicant must establish that the proposed use is a "reasonable-beneficial" one, that will not
interfere with any presently existing legal use of water, and that is consistent with the public
interest.

Although each of the water management districts has implemented a consumptive use
permitting program, not all users are required to apply for a permit. The districts have varying
thresholds, based on actual use, withdrawal capacity, or well size, above which users are required
to seek individual permits. Other users may qualify for general permits or exemptions. The only
statutory exemption is for domestic consumption of water by individual users, defined as
"individual personal household purposes of drinking, bathing, cooking, or sanitation." Users
exempted from the permitting system presumably continue to be subject to common-law duties.
Consumptive use permits are granted for fixed periods of time. Duration may not
exceed 20 years, except that public facilities may be permitted for up to 50 years if necessary for
bonding. In practice, permits have been issued for much shorter durations because the districts
have lacked the information needed to commit the resource for longer periods of time. If
insufficient water is available to meet the needs of competing applicants, the use that best serves
the public interest will be favored. Water use may also be restricted during times of water
shortage. Permits are revocable only for material false statements, for willful violation of permit
conditions of the Act, and for nonuse of the water supply. Thus, except during times of water
shortage or emergency, permittees have certainty of use. The districts generally allow free
transfer of permits, provided the use and conditions of withdrawal remain the same.

b. Protection of Natural Systems in Permitting Criteria

One policy of the Water Resources Act is "to preserve natural resources, fish and
wildlife" and the criteria utilized in the consumptive use permitting process evidence concern for
the protection of the quantity and timing of water deliveries to natural ecosystems. The permit
criteria which require reasonable-beneficial use, and consistency with the public interest,
icorporate consideration of the needs of natural ecosystems. The districts are also required to
reserve water from use by permit applicants for the protection of fish and wildlife and are
required to establish minimum flows and levels.

One component of the reasonable-beneficial use standard involves the integrity of natural
systems and fish and wildlife habitat. The Act also addresses protection of instream and inplace
water needs for habitat purposes by authorizing the DEP and each district governing board to
reserve from permitted uses "water in such locations and quantities, and for such seasons of the
year, as in its judgment may be required for the protection of fish and wildlife or the public health
and safety." Provision for such reservations must be made by rule or regulation and must be
subject to periodic review and revision in light of any change in conditions.

Similarly, as a basis for its review of district programs, the DEP rule on State Water Policy
asserts that, district programs, rules and plans shall "seek to reserve from use that water necessary
to support essential non-withdrawal demands, including navigation, recreation, and the protection
of fish and wildlife." As part of the consumptive use permitting process, "(w)ater shall be
reserved from permit use in such locations and quantities, and for such seasons of the year, as is
required for the protection of fish and wildlife or the public health or safety."  

The Act requires consideration of the public interest in making initial permit decisions,
determining which of two otherwise equal competing applications should be permitted, and in
deciding whether to allow for transport of water beyond overlying lands, outside of a watershed
or across county boundaries. There is little direct interpretation of what constitutes the public
interest for permitting decisions. To a certain extent, public interest considerations are inherent in
the structure and processes established by the Act. Water management district governing boards
are composed of lay persons, who make subjective, case by case determinations of the public
interest in the permitting process, a process which allows for input from the public and the
consideration of a potentially broad number of factors.

One problem with the Act is that certain WMDs provide less consideration of riverine and
estuarine habitat values in their consumptive use permitting requirements and water shortage
plans. There are also large differences among the districts in the ability to address the impacts of
a proposed use on environmental values. The Water Resources Act does not require that the
districts engage in dialogue with, or accept comments or modifications from any other federal or
state agency with expertise in environmental matters, as does the state's Surface Water
Improvement and Management (SWIM) Act. Such a requirement would clearly allow for more
scientifically informed decisions, and provide for better representation of the public interest in the
permitting process.
Another weakness in the existing regulatory scheme involves the process by which impoundments and instream water withdrawals are permitted. Generally, the water management districts do not have permit systems addressing dam and reservoir operations. Though occasionally subject to general requirements concerning dam operations, water withdrawals are often permitted without express consideration of the manner in which the dam is operated relative to instream flows. The current approach makes it difficult to separate an diversion’s impacts on the downstream river from the more basic, and usually more significant, impact of the dam and reservoir.

IV. WETLAND REGULATION

A. Federal

1. Rivers and Harbors Act of 1899

Prior to 1972, the most significant federal law regulating development activity in waterbodies and wetlands was Section 10 of the Rivers and Harbors Act of 1899, which requires a permit from the U.S. Army Corps of Engineers for any activity, including excavation and construction, which alters the "course, location, condition, or capacity of a navigable water of the United States." As interpreted over the years, and finally adopted under the Corps' regulations, "navigable waters" have come to be defined as: "...those waters that are subject to the ebb and flow of the tide, and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce."

According to its regulations, the Corps has jurisdiction over navigable waters that extends laterally to the mean high water mark in tidal areas, and to the ordinary high water mark in freshwater areas. Problems associated with precise location of the ordinary high water mark however, have meant that in most cases it cannot be used to accurately establish jurisdiction. Even then, by limiting the Corps' jurisdiction to those lands within the mean high, or ordinary high water lines, the Act usually fails to protect adjacent wetlands, which can easily stretch well beyond those jurisdictional limits.

In 1968, the Corps expanded its limited navigational review of Section 10 permits with a "public interest review," that includes consideration of economics, historic values, general environmental concerns, aesthetics, land use, flood damage prevention, effect on wetlands, and fish and wildlife values. During the early 1970's federal authorities began vigorously enforcing Section 10 to protect tidal wetlands in Florida from massive dredge and fill projects, primarily located in the Florida Keys and Tampa Bay area. The success of those enforcement efforts certainly discouraged developers from attempting similar dredge and fill activities in the salt marsh wetlands further north on Florida's coast. However, jurisdictional limitations and lack of a citizen suit provision combine to render the Rivers and Harbors Act relatively ineffective in the effort to protect wetlands.

2. Clean Water Act: Dredge and Fill (Section 404 Program)
Under the Clean Water Act, the discharge of most pollutants is subject to regulation by the U.S. Environmental Protection Agency (EPA) and the states. The discharge of dredged or fill material, however, is primarily regulated by the Army Corps of Engineers (ACOE) under Section 404 of the Act, with some authority given to EPA. Under Section 404, a permit from the Corps is required before discharging dredged or fill material into "navigable waters," an all inclusive term that covers almost every natural aquatic and wetland system. The criteria for evaluating Section 404 permits applications give the EPA the authority to deny or restrict a permit for dredge or fill activity that would have an adverse affect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife or recreational areas.

Section 404 applies to many wetland systems, defined as: "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

A direct connection to navigable waters is not necessary for jurisdiction. A wetland is "adjacent" to such water, and thus regulated, if it is: "bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands."

The decision whether to issue a Section 404 permit is based on the application of public interest review criteria adopted by the Corps and guidelines adopted by EPA under Section 404(b)(1) of the Act. Public interest review requires evaluation of the "probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest." A permit will be denied if issuance is determined to be contrary to the public interest after considering and balancing all relevant factors, including:

"conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people."

In addition, the Corps considers the need for the structure; the practicability of using alternatives; the extent and permanence of effects; cumulative effects; and the effects on wetlands. According to the Corps, wetlands are "a productive and valuable public resource, the unnecessary alteration or destruction of which should be discouraged as contrary to the public interest." Special protection is given wetlands that: "serve significant natural biological functions"; are set aside for study or as sanctuaries or refuges; are significant to "natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics"; shield other areas from wave action, erosion or storm forces; are valuable flood water storage areas; are important for groundwater discharge to maintain baseflows or for recharge; which purify water; or are unique or scarce resources.
The Section 404(b)(1) guidelines, adopted by EPA, must also be followed by the Corps. In general, the guidelines prohibit the discharge of dredged or fill material "which will cause or contribute to significant degradation of the waters of the United States," after considering individual and cumulative effects. All "appropriate and practicable steps" must be taken to "minimize potential adverse impacts of the discharge on the aquatic ecosystem." Discharges that would violate state water quality standards or jeopardize an endangered or threatened species are prohibited.

If there is a practicable alternative to the proposed discharge that would have less adverse impact, then the permit must be denied. A practicable alternative is one that is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." The use of other property may be considered in determining the availability of practicable alternatives if it could "reasonably be obtained, utilized, expanded or managed to fulfill the basic purpose of the proposed activity." If an activity is not "water-dependent," then "practicable alternatives...are presumed to be available." An activity is not "water-dependent" unless it requires "access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose."

For projects that are water-dependent, such as marinas, or for which there are no practicable alternatives, there is the possibility of receiving Section 404 permits, provided impacts to aquatic resources can be reduced to acceptable levels or mitigated. Mitigation is controversial, but commonly used in permitting. The concept refers to a variety of measures used to reduce the adverse impacts of a project. The Council on Environmental Quality has adopted rules defining mitigation that are widely used by federal agencies. These might include using an upland area instead of a wetland or redesigning a project to reduce impacts. More controversial are measures that compensate for the destruction of wetlands by constructing new wetlands or restoring degraded wetlands.

Section 404, and regulations that have been developed to support the Clean Water Act would appear to address most of the problems related to the protection of wetlands and wildlife. Jurisdiction has been increased to include most wetlands. Wildlife values are to be considered in making the decision whether to issue a dredge and fill permit, and the Corps' regulations also require that the Fish and Wildlife Service be consulted in regard to the impact that an activity would have on fish and wildlife related resources. The National Marine Fisheries Service has the opportunity to comment on any potential impacts to marine resources. The Act also contains policy sections in the Code of Federal Regulations that recognize the valuable functions of wetlands, discourage unnecessary alteration or destruction, and include the consideration of cumulative loss from many minor impacts.

However, several factors serve to weaken the Clean Water Act's effectiveness in preserving wetlands and the endangered species that depend on them. First, Section 404(f) allows significant exemptions from the permit process, including any discharges for "normal" farming, silviculture, and ranching activities; for maintenance or repair of dikes, dams, bridges and transportation structures; for the construction or maintenance of farm drainage or irrigation.
ditches or ponds; for temporary sedimentation basins on upland construction sites; and for building farm or forest roads, or temporary roads for moving mining equipment.\(^{108}\)

Section 404(e)\(^{109}\) allows the Corps to grant general permits on a national, regional or statewide basis, for certain activities that it determines will have minimal adverse environmental effects, either singly or cumulatively.\(^{110}\) Regional and statewide permits are developed on a district by district basis, and usually reflect the orientation of the particular district to wetlands protection.\(^{111}\) Though some districts are concerned with wetlands values, most pay more attention to water development projects than to careful permitting.\(^{112}\) The general permit process also eliminates the normal public interest review, as well as the opportunity for other agencies to comment on a particular permit, and probably contributes to cumulative loss of wetland habitat to small-scale development.\(^{113}\)

Under nationwide permits,\(^{114}\) discharges of dredge and fill may occur in several potentially important categorical areas, without authorization from the Corps. These areas include: wetlands adjacent to non-tidal rivers, and streams located above the headwaters (with less than 5 cubic feet per second average annual flow); lakes and adjacent wetlands (under 10 acres) that are not part of a surface or river stream; and isolated wetlands that are not part of a surface tributary system to interstate or navigable waters.\(^{115}\) Critics of nationwide permits have argued that the Corps has no authority to categorically exempt areas, rather than specific activities.\(^{116}\)

Discharges under such permits are required to meet several conditions: 1) they must not threaten an endangered species, 2) they must not occur in a component of the National Wild and Scenic River System, 3) they must be free from toxic pollutants in toxic amounts, and 4) fill must be maintained to prevent erosion and other erosion and other non-point sources of pollution.\(^{117}\) Such discharges must also meet best management practices (BMPs) to the maximum extent "practicable."\(^{118}\) However, the Corps does not consistently monitor activities for compliance with these conditions,\(^{119}\) nor does it regulate filling for urban development or agricultural conversion in headwater areas, activities which could easily damage wetlands.\(^{120}\)

**B. State of Florida**

Florida's regulation of impacts to wetlands has matured from early pro-development approaches to the passage of the Henderson Wetlands Protection Act in 1984,\(^{121}\) to the Environmental Reorganization Act of 1993. Before passage of the Environmental Reorganization Act of 1993, impacts to wetlands were addressed by the DEP under the Henderson Act, and by the WMDs under the Water Resources Act. The Henderson Wetlands Protection Act prohibited any dredging or filling in surface waters without a permit.\(^{122}\) Exemptions were granted to phosphate mining and certain agricultural activities. Permit applicants had to provide reasonable assurances to the DEP that state water quality standards would not be violated, and that the project was not contrary to the public interest.\(^{123}\) If a project would affect or be located in certain areas known as Outstanding Florida Waters, such projects were required to be clearly in the public interest.
Determining the public interest required consideration of:
1. Adverse effects on public health, safety, welfare, or property of others.
2. Adverse effects on conservation of fish and wildlife, including endangered or
   threatened species or their habitats.
3. Adverse effects on navigation, the flow of water, harmful erosion or shoaling.
4. Adverse effects on fishing, recreational values, or marine productivity in the vicinity of
   the project.
5. Whether the project is temporary or permanent.
6. Adverse effects on or enhancement of significant historical and archeological resources.
7. Current condition and relative value of functions being performed by areas affected by
   the proposed activity.

If a project could not pass both water quality and public interest tests, the DEP was
required to explore various project modifications that would reduce or eliminate the adverse
impacts and allow the issuance of the permit. After consideration of practicable alternatives, the
project could still not meet requirements, the DEP could accept mitigation to offset any remaining
adverse impacts. For water quality impacts, the DEP was required to consider mitigation
measures proposed by or acceptable to the applicant that generated net improvement of water
quality. For public interest test problems, the DEP was required to consider mitigation to offset
the effects that would occur as a result of the project. Mitigation was defined as an action or
series of actions that would offset the adverse impacts on the waters of the state that prevented
the permitting of the project. These could not include cash payments unless specified for use in a
designated restoration project.

The Henderson Act also required consideration of cumulative impacts and secondary
impacts from proposed projects. Cumulative effects refer to potential impacts from the additive
effects of many similar projects. The purpose of the analysis was to insure that DEP would
consider the cumulative impacts of similar projects which are existing, under construction, or
reasonably expected in the future. The secondary impact analysis took into consideration impacts
that could result in the immediate future from the proposed project. Activities or impacts that
were too remote in time or only very remotely related to the dredge and fill activity could not be
considered.

The second form of wetlands regulation by state agencies occurred under Part IV of
Water Resources Act. Under the Act, the WMDs were authorized to regulate the construction,
alteration, maintenance, operation, abandonment, and removal of dams, impoundments,
reservoirs, works and appurtenant works. The statutory definitions of these terms encompass a
broad range of development activities which are required to obtain permits for the management
and storage of surface waters (MSSW).

The legislation required a permit for the construction, alteration, maintenance and
operation of most real property improvements designed to control or impound surface waters in
"waters in the state," which included "any and all water on or beneath the surface of the ground or
in the atmosphere, including natural or artificial watercourses, lakes, ponds, or diffused surface
water and water percolating, standing or flowing beneath the surface of the ground, as well as all coastal waters within the jurisdiction of the state." Wetlands are considered one type of "waters in the state" in which activities may be regulated. Regulatory authority for isolated wetlands outside DEP's dredge and fill jurisdiction was given to most of the districts in 1986. This statutory provision required WMDs that had been delegated stormwater permitting authority to adopt rules establishing more specific permitting criteria and size thresholds for isolated wetlands.

The relevant WMDs had adopted separate MSSW rules which varied in many ways. Basically, if the size or impacts of a proposed project fell below certain established thresholds, that project might qualify for a general permit, with very little permit review by District staff. If the proposed project exceeded these thresholds, it would be required to obtain an individual permit, with full review of the project's impacts. There were different definitions of wetlands in each District, separate permitting processes, different approaches to mitigation, and separate thresholds for a general permit. In addition to the authority of the Districts to regulate dredge and fill activities in isolated wetlands, which were outside the jurisdiction of the DEP, the DEP had delegated to certain Districts varying levels of authority to permit other types of dredge and fill activities.

Generally, in order to qualify for a permit, an applicant was required to demonstrate that construction or alteration of a system would not be harmful to the water resources of the district, and that the operation and maintenance of the system would not be inconsistent with the overall objectives of the district or harmful to the water resources of the district. Chapter 373 expressly exempts certain activities from the MSSW permitting program. Normal agriculture, silviculture, floriculture, or horticulture activities are exempt from the MSSW rule unless the sole or predominant purpose of the alteration is to impound or obstruct surface waters. In addition, the MSSW rule does not apply to the construction, operation, or maintenance of closed agricultural systems. However, the "taking and discharging of water for filling, replenishing, and maintaining the water level" of a closed agricultural system is subject to consumptive use regulations, and dams, dikes, and levees must be constructed, operated, and maintained to conform with generally accepted engineering practices.

The Environmental Reorganization Act of 1993 consolidated dredge and fill permits, management and storage of surface water permits, and permits for the alteration of mangroves into a single "environmental resource permit," or ERP. Formerly, the three types of permits were handled by different agencies. The reorganization effort was part of a general movement toward streamlining the environmental permitting process in Florida, based on a growing concern over multiple agencies with overlapping jurisdictions and frequently conflicting requirements. Now, the ERP will be issued by either the DEP or the appropriate WMD. The water management districts have responsibility for all but the most complex dredge and fill proposals. Though the consolidation of the three types of permits into a single permit should help reduce these types of problems, it remains to be seen whether the resulting program will provide a thorough review of permits to assure that all permitted activities are compatible with long-term wetlands protection.
The Act replaces the slightly varied definitions used by the various state and local government agencies with a statutory definition of a wetland, to be used as part of a unified statewide methodology. The definition generally defines wetlands as areas inundated or saturated by surface water or ground water at a frequency and duration sufficient to support a prevalence of vegetation adapted for life in wet soil conditions. The definition lists the different types of areas which are considered wetlands, and specifically excludes a particular type of flatwoods ecosystem which contains longleaf or slash pines. The DEP has adopted rules which refine the general statutory definition, by including specific criteria for soils and hydrological characteristics, and lists of vegetative indicator species. This standardized methodology should reduce some controversies concerning which areas are subject to the permitting process.

The Reorganization Act reiterates much of the operative permitting language of the Henderson Act, and requires that the DEP and WMDs create dredge and fill rules relying primarily on the existing rules. Working together, the DEP and WMDs have developed a set of proposed rules for the ERP, which have been challenged by various groups. When the rule challenges have been decided or settled, the ERP program will take effect.

V. TOWARDS WATERSHED PROTECTION

A. Surface Water Improvement and Management Act (SWIM)

The Surface Water Improvement and Management Act was adopted in 1987 to help address several problems associated with the state’s surface waters. Among the many functions of surface waters recognized by the Act are included: (a) providing aesthetic and recreational pleasure, (b) providing habitat for native plants, fish, and wildlife, including endangered and threatened species, (c) providing safe drinking water, and (d) attracting visitors and accruing other economic benefits. Factors contributing to the decline in these values include point and nonpoint sources of pollution, and destruction of the natural systems which purify surface waters and provide habitat.

The Act requires the water management districts to develop prioritized lists of water bodies in need of restoration or protection, with the highest needs for water quality restoration. Criteria for evaluating waterbodies include consideration of water quality standards violations, nutrients entering the waterbody and its trophic state, existence or need for aquatic weed control, biological condition of the waterbody, reduced fish and wildlife values, and threats to public water supplies.

Once priority lists are established and approved by the DEP, the districts are required to develop surface water improvement and management (SWIM) plans for each listed waterbody. The plans must include a wide range of information involving:

(a) the history and hydrology of the waterbody,
(b) applicable regulatory jurisdictions,
(c) land uses within the drainage basin and those of important tributaries,
(d) a list of pollution sources and their owners,
(e) a description of the existing and potential strategies for restoring or protecting the
waterbody to Class III standards or better,
(f) listings of existing and planned studies of the waterbody,
(g) the research and feasibility studies to be performed to determine the necessary restoration strategies,
(h) measures needed to manage and maintain the waterbody once it has been restored,
(i) a schedule for restoration and protection of the waterbody, and
(j) estimates of the funding needed to carry out restoration or protection strategies.  

Before presentation to the water management district governing board for approval, a proposed SWIM plan must be submitted to the DEP, the Department of Agriculture and Consumer Services, the Department of Community Affairs, the Florida Game and Fresh Water Fish Commission, the Department of Natural Resources, and local governments. After considering the comments and recommendations of these agencies and the public, the governing board must approve the plan and submit it to the DEP for a final review, to assure consistency with the State Water Policy and the State Comprehensive Plan. The changes which DEP recommends in order to achieve consistency may or may not be adopted by the governing board. If they are adopted, the district must publish notice of adoption of the approved plan. If the recommendations are not adopted, the plan must state the reasons for not adopting them. Plans must be updated every three years.

B. Wekiva River Protection Act

In February of 1988, amid intense public concern over increasing development near the Wekiva River, the Governor of Florida issued an executive order creating the Wekiva River Task Force (Task Force). The order directed the Task Force to create a report describing and evaluating existing planning, regulatory, and land acquisition programs of state, regional, and local government which pertain to the management and protection of the Wekiva River. In May of 1988, the Task Force submitted its report which recommended new legislation and changes in current planning, management, and regulatory processes.

In response to the recommendations, state, regional, and local governments provided additional regulatory protection for the Wekiva River System. The Florida legislature enacted the Wekiva River Protection Act (Act) which directed the counties having jurisdiction within the Wekiva River Protection Area (Wekiva Area) to revise their comprehensive plans and land development regulations to protect the Wekiva Area by April 1, 1989. The Act required the counties to adopt goals, policies, and objectives for the Wekiva Area which would protect:

1. Water quantity, water quality, and hydrology
2. Wetlands
3. Aquatic and wetland-dependent wildlife species
4. Habitat of endangered and threatened species, and species of special concern
5. Native vegetation

County comprehensive plans must include:
1. Provisions to ensure the preservation of sufficient habitat for wildlife species which are under pressure.
2. Restrictions on the clearing of native vegetation within the 100-year flood plain.
3. Prohibition of development that is not low-density residential in nature, unless that development has less impacts on natural resources than low-density development.
4. Provisions for setbacks along the Wekiva River.
5. Restrictions on intensity of development adjacent to publicly owned lands.
6. Restrictions on filling and alteration of wetlands in the Wekiva River Protection Area.
7. Provisions encouraging clustering of residential development when it promotes protection of environmentally sensitive areas.

The county comprehensive plans must require that development which is permitted on property adjacent to the Wekiva River be concentrated on portions of the property furthest away from surface waters and wetlands of the river system.144

The Act directed the counties to develop land development regulations to implement the Wekiva River protection provisions of their comprehensive plans. The counties must also develop regulations restricting the location of septic tanks within the 100 year floodplain and discharges of stormwater to the river system.145 The Act directed the counties to adopt comprehensive plan revisions and land development regulations for the Wekiva River Protection Area by April 1, 1989 and submit them for review by the Department of Community Affairs (DCA) and the Governor and Cabinet.

In addition to requiring local governments to amend their comprehensive plans and land development regulations, the Act also mandated other regulatory actions. It required that within the Wekiva River Protection Area the numerical thresholds for what are considered large developments requiring special review be reduced by 50 percent.146 It also directed the Department of Natural Resources to pursue acquisitions of conservation and recreation lands within the Wekiva River Protection Area.147

The Act required the St. Johns River Water Management District to adopt rules establishing protection zones along the watercourses in the Wekiva River System.148 The protection zones had to be wide enough to "prevent harm to the Wekiva River System, including water quality, water quantity, hydrology, wetlands, and aquatic and wetland-dependent species" from activities regulated by the MSSW permitting program.149 The Water Management District were required to consider the following factors when determining the widths of the protection zones:150

1. The biological significance of the wetlands and uplands adjacent to the designated watercourses ... including the nesting, feeding, breeding, and resting needs of aquatic species and wetland-dependent species.
2. The sensitivity of these species to disturbance, including the short-term and long-term adaptability to disturbance of the more sensitive species, both migratory and resident.
3. The susceptibility of these lands to erosion, including the slope, soils, runoff characteristics, and vegetative cover.

The Act prohibits the Water Management District from issuing a MSSW permit without first obtaining the appropriate local government's certification that the proposed activity is consistent with the local comprehensive plan and is in compliance with land development regulations. An MSSW permit is required prior to the "construction, alteration, operation, maintenance, abandonment or removal of a surface water management system" within the Basin which 1) serves a project with a total land area greater than or equal to ten acres (4 ha), 2) involves the placement of one half acre (0.2 ha) or more of impervious surface, or 3) is located within the Wekiva River Riparian Habitat Protection Zone.

Projects which trigger the MSSW permitting thresholds within the Wekiva Basin must meet certain restrictive standards related to recharge rates, storage of stormwater, control of erosion and sedimentation, protection of water levels for wetlands, and protection of riparian wildlife habitat. The rule creates a Riparian Habitat Protection Zone which includes 1) wetlands abutting the river and its tributaries, 2) uplands within fifty feet of abutting wetlands, and 3) uplands which are within 550 feet (177 m) of the river's edge.

The Water Management District is also required to inventory groundwater in the Wekiva River Protection Area, and it must establish minimum flows and minimum water levels for surface waters in the Wekiva River System and minimum groundwater levels within the Wekiva Basin.
The following figure illustrates the Riparian Habitat Protection Zone. An applicant must provide reasonable assurance that the construction or alteration of a system will not adversely affect the abundance, food sources, or habitat of aquatic or wetland dependent species provided by the zone. Within the Riparian Habitat Protection Zone, the construction of buildings, golf courses, impoundments, roads, canals, ditches, swales, and any land clearing resulting in the creation of any system is presumed to violate the Riparian Wildlife Habitat standard.

C. Econlockhatchee River Protection Rule

In 1989, the St. Johns River Water Management District funded a study to develop a natural resources development and protection plan for the Econlockhatchee River Basin. At this time, the area surrounding the Econlockhatchee (Econ) River Basin was one of the most rapidly growing areas in the nation and was under intense development pressure. At least 40 major developments involving over 34,000 acres had recently been approved within the Econ Basin. Many proposed developments were adjacent to the Big Econ River, which was relatively undeveloped. The Little Econ River, which is located near the eastern edge of Orlando, provided a good example of what might happen to the Big Econ River if additional regulations were not adopted soon. Much of the land adjacent to the Little Econ River had been intensely developed, destroying many of the recreational and natural resource values of the river ecosystem.

The study was conducted by consultants who were charged with developing a
management plan to insure no net loss of water quality, quantity, or ecological functions of the systems through acquisition, management, and land use regulations. In addition to receiving continual review by the District, the study was evaluated by the Econ River Task Force, a committee with representatives from diverse interest groups. The District and the Task Force endorsed many of the consultant's recommendations, although they condensed the recommendations and modified some of the more controversial provisions.

The study concluded that channelization of streams, rivers and tributaries of the Basin had lowered average water table levels, decreased the residence time of stormwater within the system, and decreased flooding of natural wetlands. Stormwater management systems consisting of open water ponds and straight connecting ditches maximize runoff and do not allow for adequate filtering of nutrients and pollutants. An upland buffer of natural vegetation had been removed along most of the Little Econ and some areas of the Big Econ. These buffers were needed to filter out non-point source pollution and sediments that are carried by surface water flows.

Many of the wildlife habitats within the Basin had already been severely fragmented by land uses and highways. Much of the remaining relatively undisturbed habitat was along the Big Econ. The Basin provided habitat for 39 species which were endangered, threatened, or of special concern. Land uses in the area had cut historic linkages between the Econ Basin and large areas of flatwoods to the east and sandhills to the west. Conversion of native lands into pasture had benefitted common open-canopy species, such as brown-headed cowbirds and Red-tailed hawks that parasitize and compete with remaining forest dependent species. Development also had resulted in predation from dog and cats, and unnatural noises which exert additional pressures on native wildlife. Narrow strips of vegetation which are commonly used in landscaping are of little or no value as habitat for most species of wildlife.

The report found that existing local government plans and regulations did not adequately protect the natural resource values of the Econ Basin because they did not provide for protection of upland habitat adjacent to watercourses and wetlands. In addition, local governments did not protect small isolated wetlands. Environmental regulations were determined to be inadequate, despite a complex array of regional, state, and federal programs which pertained to natural resource values in the Econ Basin.

In developing a management plan for the Econ River, the report recommended the following objectives:

- Maintain or improve water quality in the Econ River.
- Approximate natural surface and groundwater table hydrologic regimes.
- Protect significant ecological communities in the Basin.
- Maintain viable populations of all existing wildlife species.

The study identified critical areas within the basin based on the location, ecological function, or sensitive nature of the area, and then proposed management and development guidelines for each such area. It was recommended that Econ protection provisions be
implemented through existing District regulatory programs and local government planning and land development regulation programs.

Specifically, it was recommended that the District amend its MSSW and stormwater regulations to prevent activities which would adversely affect the natural resources of the Econ Basin. The District rules should be amended to preserve riverine wetlands, establish 550 foot buffers along each side of the river to protect water quality and aquatic and wetland-dependent species, limit groundwater drawdowns, strengthen stormwater permitting criteria, and provide for upland buffers adjacent to isolated wetlands. The study recommended that local governments implement additional protection measures including an additional 550 foot (177 m) buffer to protect upland species. It also recommended that state environmental and growth management agencies take additional actions to protect the river, such as lowering the threshold for state and regional review of certain large developments and classifying the Econ River as an "Outstanding Florida Water."

Despite strong developer opposition, the District ultimately adopted a rule which contains many of the recommendations from the report, and establishes development standards and review criteria similar to those adopted for the Wekiva River. Several local governments also acted quickly. One county has adopted an ordinance which prohibits development in the first 550 feet from the river and limits development between 550 and 1100 feet from the river. Another county amended its comprehensive plan and adopted a river protection ordinance. A third county adopted a temporary moratorium on the issuance of development permits within the headwaters area of the Econ River but has taken no action toward long term protection of the resource. Ultimately, successful protection of the Econ Basin will depend on action by all involved regulatory entities.

D. Department of Environmental Protection: Ecosystem Management Initiative

In response to continuing concerns over the long-term sustainability of water and land resources, as well as fisheries and wildlife populations, the State of Florida has begun a coordinated effort to integrate concepts of ecosystem management into its environmental and land use laws and policies. Beginning last year, the DEP took the lead in recruiting experts from around the state to participate in committee discussions related to almost every aspect of the management of land, water and wildlife resources. The recommendations from the various committees and subcommittees have been collected and are being developed into a strategy which promises to bring much greater coordination and communication between the scores of different agencies, departments and bureaus responsible for resource and land management in Florida.

Though the concept of ecosystem management has been under discussion for over ten years in the professional literature, only recently has the discussion begun to focus on the details of what the concept really means and how it might be implemented. Discussion has centered on the following ten themes:

1. Connectedness
Focusing on any one level of natural systems is not enough. Managers must recognize the connections between all levels. This is known as a "systems perspective."

2. Ecological Management
Ecosystems recognize no artificial boundaries or time constraints. Ecosystem management involves land, water, and air resources and flows across administrative and political boundaries, and large landscapes. Success requires long time frames.

3. Ecological Integrity
Ecosystem management must protect, maintain and restore native diversity, ecological patterns, and the processes that maintain diversity.

4. Data Collection
Ecosystem management requires research on and monitoring of the baseline conditions of natural systems, and better management and use of data and information.

5. Evaluation and Audit of Results
To obtain a quantitative evaluation of success or failure, Ecosystem Managers must continuously track the results of their actions.

6. Adaptive Management
Ecosystem Managers must be able to react to new and improved scientific knowledge and incorporate it into their management strategies.

7. Interagency Cooperation
Protecting and managing entire ecosystems requires cooperation between all levels of government. Managers must work together to resolve conflicting management goals and legal instruments.

Within the existing agency structure, any potentially significant management, permitting or enforcement decisions should require at the least, a formal process of inter-agency review and coordination. This should include criteria to trigger consideration of cumulative impacts. The process might be facilitated using inter-agency standing committees of relevant personnel, or by creation of specific public lands management divisions within each agency, with mandates to create and implement ecosystem management objectives in coordination with similar divisions in other agencies.

8. Organizational Change
Management agencies must be flexible and able to change to meet the demands of new approaches to ecosystem management.

9. Humans are Critical
People cannot be separated from natural systems. We exert a strong influence on and are
influenced by ecological patterns and processes.

10. Values
Human values play a dominant role in Ecosystem Management goals, regardless of the role of scientific knowledge.\(^{157}\)

What are the implications of these themes in the context of environmental and land use policy for river basin management?

1. Programs should include a formal process for incorporating science into creation and implementation of legislation.

2. Programs and policymakers should emphasize a cautionary, conservative approach in the face of less than adequate knowledge regarding ecosystem functions.

3. Programs should include a process for adapting legislation and policy in the face of additional scientific data.

4. Management should take a proactive, not reactive approach. Essentially this implies substantive cooperative planning early in the process.

5. Management policies should include a process to require inter-departmental and inter-agency cooperation and consultation on planning, permitting and enforcement decisions.

6. Programs should include formal, timely, substantive, informed citizen participation.

7. Programs should include incentives as well as restrictions. Examples include streamlined permitting for carefully designed, low-impact projects.

8. Environmental programs should be well integrated with related programs and policies, for example: related types of planning (water, future land use, transportation, capital improvements), taxation policy, land purchase programs, regulatory programs, wildlife harvest policies.

VI. CONCLUSION

Though the state of Florida has developed some of the more well-respected approaches to regulating impacts to water quality and availability, as well as to the environmental aspects of water resources, the state's policies and programs continue to evolve. Generally speaking, regulatory approaches appear to be moving towards consolidation of programs and the streamlining of regulatory review. At the same time, there is growing appreciation of the interrelationships between functions and components of natural systems, and initial attempts at incorporating these insights into planning and regulatory processes. The success of these efforts
will determine whether Florida is able to maintain a superior quality of life in the face of increasing population and development pressures.
ENDNOTES

5. Fla. Stat. § 163.3202 (1991). Local governments must adopt land development regulations within one year after submission of a comprehensive plan for review. Id.
12. 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." Fla. Stat. § 373.19(4). Criteria for determining reasonable-beneficial use are codified in Rule 17-40.401(2), Fla. Admin. Code (1990). The DEP has compiled a booklet entitled Groundwater Guidance Concentrations listing many chemicals and concentrations, and providing guidelines for the review of groundwater quality data for minimum "free from" requirements.


20. A "site" is the "area within an installation's property boundary where effluents are released or applied to groundwater." Rule 17-3.02(28), Fla. Admin. Code (1990).


25. Chapter 17-6, Fla. Admin. Code has been repealed.

26. In Florida Wildlife Federation v. Admiral Corp. (DOAH Case No. 86-3272), the hearing officer ruled that discharges into stormwater ponds that intersect the surficial aquifer may be permitted as a discharge to surface water rather than a direct discharge to groundwater if found to be a pond rather than a well.


35. These include the Northwest Florida Water Management District, the Suwannee River Water Management District, the St. Johns River Water Management District, the Southwest Florida Water Management District, and the South Florida Water Management District.

37. *Id.*

38. The state water use plan, together with the DEP’s water quality standards and classifications was intended to constitute the State Water Plan. This plan has yet to be formally developed. The state comprehensive plan, Chapter 187, Fla. Stat., includes several policies and goals directly supporting the maintenance of adequate freshwater flows, including: (1) establish minimum seasonal flows and levels for surface watercourses with primary consideration given to the protection of natural resources, especially marine, estuarine, and aquatic ecosystems (§187.201(8)(b)4.); (2) protect and restore long-term productivity of marine fisheries habitat and other aquatic resources (§187.201(9)(b)7.); (3) discourage the channelization, diversion, or damming of natural riverine systems (§187.201(8)(b)7.); (4) reserve from use that water necessary to support essential nonwithdrawal demands, including navigation, recreation, and the protection of fish and wildlife (§187.201(8)(b)14.).


41. *Id.*


52. *Id.* § 373.219(1) (1991).


57. *Id.* § 373.239 (1989).


59. *See,* e.g., Pinellas County v. Lake Padgett Pines, 333 So.2d 472 (Fla 2d DCA 1976) (Chapter 373, Florida Statutes, requires consideration of the overall environmental effects of a prospective use, and not simply its effect on the water resource).


68. *Id.* *See* U.S. v. Moretti, 526 F.2d 1306 (5th Cir. 1976).


71. 33 C.F.R. § 322.2(a) (1984).

72. *Id.* § 329.11(a).

74. 33 C.F.R. §320.4(a)-(o) (1984); upheld in Zabel v. Tabb, 430 F.2d 199 (5th Cir. 1970).

75. See, e.g., United States v. Sexton Cove Estates, 526 F.2d 1293 (5th Cir. 1976); United States v. Moretti, 526 F.2d 1306 (5th Cir. 1976).


78. 33 U.S.C. § 1344. See also the Ocean Dumping Act, P.L. 92-532, codified at 33 U.S.C. §§ 1401-1445. EPA shares authority with the Corps for administration of the Section 404 program. Permitting authority may also be delegated to the states.

79. 33 C.F.R. § 323.2(a)-(d) (1978).


81. 33 C.F.R. § 328.3(b). The definition has been held to be sufficiently definite that a person of ordinary intelligence has fair notice of what is prohibited. United States v. Tull, 769 F. 2d 182 (4th Cir. 1985).

82. 33 C.F.R. § 328.3(c) (1984).

83. 33 C.F.R. § 320.4(a); 51 Fed. Reg. 41223 (November 13, 1986).

84. 33 C.F.R. § 320.4(a). The rules further provide that "the specific weight of each factor is determined by its importance and relevance to the particular proposal." Id. § 320.4(a)(3).

85. Id. § 320.4(a).

86. Id. § 320.4(b).


88. 40 C.F.R. § 230. Impacts on navigation and anchorage may also be considered. 33 U.S.C. § 1344(b)(2).


100. 40 C.F.R. § 1508.20.
103. 33 C.F.R. § 320.4(c) (1984).

104. Id.

108. Id.
109. Id. § 1344(e) (1982).

111. Wetlands, supra note 76, at 173. There are 36 separate Corps districts [33 C.F.R. § 320.1(a)(2) (1982)].

113. *Id.* at 174.


119. *See Wetlands*, *supra* note 76, at 172, 177-78.

120. *Id.*


123. *Id.* §§ 403.918(1), (2) (1991).


125. *Id.*

126. *Id.* § 373.406(2).

127. *Id.* § 373.406(3); *Corporation of President of Church of Jesus Christ of Latter-Day Saints v. St. Johns River Water Management District*, 489 So. 2d 59 (Fla. 5th D.C.A. 1986), *cert. denied*, 496 So. 2d 142 (Fla. 1986).


133. Fla. Stat. § 373.453(1)(b) (1989). See also, Rule 17-43.030, Fla. Admin. Code (May 1990). Criteria used in preparing the lists include: (a) the degree to which water quality standards are violated, (b) the nature and extent of the conditions adversely affecting the waterbody, including biological and physical conditions, and reduced fish and wildlife values, (c) threats to water supplies, particularly agricultural and urban supplies, and recreational opportunities, (d) threats to or need for protection of exceptional or outstanding waterbodies which are currently in good condition, (e) extent to which local plans, ordinances and policies are consistent with the district's efforts to restore or protect the waterbody, (f) feasibility of monitoring the success of restoration or protection efforts, and (g) economic and environmental feasibility of accomplishing the restoration or protection goals. Rule 17-43.030(1), Fla. Admin. Code (May 1990).


142. Id. § 369.305(1).

143. Id. § 369.305(1)(a).

144. Id. § 369.305(1)(c).

145. Id. § 369.305(1)(e).

146. Id. § 369.307(2).
147. Id. § 369.307(5).


149. FLA. STAT. § 373.415(1) (1989).

150. Id. § 373.415(1)(a),(b),(c).

151. Id. § 373.415(2).


