

## CHAPTER SIX

# The Liquid Heart of Florida: Lake Okeechobee and the Kissimmee River in the 1970s

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By the end of 1971, environmentalists had a few successes to celebrate in Florida. They had halted construction of the Cross-Florida Barge Canal and forced proponents of a proposed jetport to rethink their Big Cypress Swamp location. But other problems loomed on the horizon, ones that would not see such immediate resolutions. “There is a water crisis in South Florida today,” a group of academic, government, and environmental scholars told Florida Governor Reubin Askew in September 1971, predicting a dire future for the region unless the state instituted land and water planning.

One of the major reasons for this pessimism was the condition of Lake Okeechobee. By the early 1970s, many scientists were forecasting the imminent demise of the lake because of a heavy influx of nutrients, especially from the Kissimmee River, which the U.S. Army Corps of Engineers had channelized in the 1960s for flood control. All of these problems led Florida state officials to take major action in the early 1970s. During the 1972 legislative session, the Florida legislature passed several land and water planning measures, including authorization of a major study on the eutrophication of Lake Okeechobee. At the same time, environmentalists called for the restoration of the Kissimmee River, believing that this was one of the best ways to heal the lake. Despite all of these measures, little firm action had been taken to resolve the river and the lake’s problems by the end of the 1970s. The state had authorized additional studies and had formed a coordinating council to deal with Kissimmee restoration, but the river remained channelized and nutrient-rich water continued to pour into Lake Okeechobee, in part because of disagreement among environmentalists, state, and Corps officials as to the best remedy for the lake’s sickness.

In 1970, environmentalists such as Arthur Marshall predicted that Florida would soon suffer from a water shortage if development continued at its current pace. “It became common, and indeed fashionable,” scholar Robert Healy has argued, “to question the value of growth itself” in 1970s Florida because of the state’s tremendous growth.<sup>1</sup> Florida as a whole had doubled in population every 22 years since 1920, while South Florida counties had doubled every 14 years in that same time span, adding at times an average of 110,000 people a year for an average annual growth rate of 3.08 percent.<sup>2</sup>

Compounding South Florida’s expansion was the construction of Disney World in Orlando on the northern border of the C&SF Project. Walt Disney Productions had secretly purchased approximately 27,000 acres near Orlando in the 1960s for \$5 million, desiring to build a park five times larger than southern California’s Disneyland and to sequester it from the rest of the region. Construction began in the mid-1960s; the corporation hoped to have the amusement park in place by the end of 1971, as well as hotels, motels, and boating and golfing facilities. The company also planned on building an industrial park, an airport, 2,500 additional hotel and motel units, and a 50-acre shopping and recreation complex. In order to maintain water levels in the development and to prevent flooding, Disney also constructed a water conservation system of 40

miles of canals and 16 structures, using Major General William E. Potter, a former District and Division Engineer for the Corps, as its supervisor. As the construction occurred, the population of Orlando began climbing rapidly in the late 1960s, reaching 100,000 in 1970. Residents, as well as the new facilities, demanded not only water, but also dumped sewage and other wastes into existing waterways, creating water quality problems.<sup>3</sup>

Concerned by these conditions, scientists and environmentalists wondered what the future held for South Florida, both in terms of water quantity and quality. By the 1970s, ecologists had begun to focus research efforts on an aspect of the science known as systems ecology. An outgrowth of the study of ecosystems, systems ecology, in the words of ecologist George Van Dyne, was “the study of the development, dynamics, and disruption of ecosystems.” Interdisciplinary in nature, systems ecology tried to integrate mathematics, engineering, and social science in its studies, which primarily focused on “large-scale biological communities or ecosystems of very great complexity.” Because it examined “inanimate processes of the ecosystem,” those involved in systems ecology had to have a “knowledge of physics, chemistry, geology, geochemistry, meteorology, and hydrology beyond that of traditional ecologists.” Thus, systems ecology differed in five major ways from more general ecology:

- it examined “ecological phenomena at large spatial, temporal, or organizational scales;
- it used methodologies from other disciplines;
- it emphasized mathematical models;
- it used digital and analog computers in its modeling;
- it embraced “a willingness to formulate hypotheses about the nature of ecosystems.”<sup>4</sup>

One of the areas that seemed well suited to the application of systems ecology was South Florida, an ecosystem of immense complexity. Therefore, scientists in the 1970s, such as Arthur Marshall, began to embrace the methods of systems ecology in their examinations of water issues in South Florida.



**Arthur R. Marshall. (Source: The Florida Memory Project, State Library and Archives of Florida.)**

As Marshall continued his studies, he did not see bright prospects. An employee of the U.S. Fish and Wildlife Service for 20 years, Marshall joined the University of Miami in 1970 because, according to some observers, his position with the FWS did not allow him to voice publicly his true convictions about South Florida’s ecosystem. Having removed those constraints, Marshall began speaking frequently to private groups and organizations, state officials, and the media about his concerns with man’s destruction of the Everglades in South Florida.<sup>5</sup>

Marshall promulgated his views as a member of the Special Study Team on the Florida Everglades, a group formed by the FCD and the Florida Game and Fresh Water Fish Commission in 1970 to investigate wildlife issues within the region. The genesis of this report stemmed from

issues involving deer and water levels in Conservation Area No. 3. As explained previously, heavy rains in the spring and summer of 1966 had imperiled the deer herd in that region, and the same situation occurred in 1968 and again in 1970 despite attempts to provide long-term solutions to the problem, such as the Corps' construction of 315 islands for refuge. Although the endangerment of deer did not seem to have any direct correlation to water quality in South Florida, the issue involved water management in the region in general, especially since the water conservation areas were storage areas for excess water. As the water rose in Conservation Area No. 3, the Corps again faced criticisms and attacks from the media and environmental organizations that it and the FCD placed agricultural and municipal interests over those of wildlife. This was especially prevalent in 1970 because high water in Conservation Area No. 3 that year was caused in part by the pumping of large amounts of excess water from the EAA, which experienced heavy rainfall in March. Although, in the words of a press release from the Florida Wildlife Federation, the preservation of the Everglades was a "more far reaching [problem] than saving the deer herd," environmentalists considered deer to be "an indicator animal" signifying the health of the region. The fact that deer had suffered in both 1966 and 1970 because of high water levels showed, according to the Federation, that "the ecology of the Everglades is being altered."<sup>6</sup>

At the same time, wildlife problems occurred in the Loxahatchee National Wildlife Refuge (Conservation Area No. 1), albeit from fluctuating levels of water, rather than from an excess of the resource. In May 1970, FWS officials investigated the effects of a rapid drop in the water level of interior and exterior canals (estimated as a decline of over three feet in 30 days) and discovered that the drawdown might have harmed fledgling populations of the Everglades Kite, an endangered bird. By July, it was clear that fluctuating water levels in the refuge – caused by the Corps' regulation of water – had adversely affected several other species as well, including the rare Florida Sandhill crane, the gallinule, and the alligator. John R. Eadie, manager of the refuge, emphasized that the problem was not that periods of high and low water existed, but that man had "artificially manipulate[d] the water levels in a short period," leaving nature to "react violently to try to adjust the animal population to the reduced carrying capacity of the land."<sup>7</sup> Clearly, environmentalists believed that water management of the water conservation areas was significantly harming Everglades wildlife.

These problems led the FCD and the Florida Game and Fresh Water Fish Commission to ask the Florida Chapter of The Wildlife Society to commission a special study team in March 1970 to investigate the problem and to propose solutions. This team consisted of George W. Cornwall, a professor of wildlife management at the University of Florida; Robert L. Downing, a wildlife research biologist with the FWS; James N. Layne, director of research at the American Museum of Natural History in Lake Placid, Florida; Charles M. Loveless, assistant director of the FWS's Denver Wildlife Research Center; and Arthur Marshall, director of the Laboratory for Estuarine Research at the University of Miami. Because the team's primary goal was to examine wildlife problems in the Everglades, the majority of its final report, issued in August 1970, dealt with wildlife matters, including the problems that fluctuating water levels in the water conservation areas had on deer. Along with specific recommendations about how to manage Conservation Area No. 3 to preserve deer life and about revisiting the regulation schedules for all of the conservation areas, the document related that concern for any individual species had to be

“viewed in the context of the total problem.” It therefore suggested that the natural hydroperiod of the Everglades be restored, or at least be approximated as closely as possible, and it recommended that an interagency coordinating committee be established to allow for “interaction and information exchange” between those “agencies and groups” responsible for natural resource management in the Everglades.<sup>8</sup>

The report also examined the effects of poor water quality on flora and fauna in the Everglades. As such, the group mirrored larger concerns in the United States about water quality. As urban areas expanded, especially in the eastern United States, Americans became more concerned about how urbanization affected the quality of water. Therefore, in 1965, Congress passed the Water Quality Act to increase the amount of federal funding available for sewage treatment plants and to charge states with developing water quality standards. Shortly thereafter, jurisdiction over the Federal Water Pollution Control Administration shifted from the Department of Health, Education and Welfare to the Department of the Interior. By the early 1970s, some states, such as Maine, had already enacted significant measures to deal with water quality. Other programs were not as strong, perhaps in part because scientific technology had not yet advanced to the stage where it could accurately test and measure the “toxicity of chemicals to aquatic organisms.” Instead, administrators focused more on biological observations to determine where water quality problems existed.<sup>9</sup>

In Florida, the upper Kissimmee River Basin – the headwaters of the entire Florida watershed – exhibited water quality problems in the early 1970s. The Kissimmee chain of lakes, especially Lake Tohopekaliga, faced pollution from the dumping of cattle excrement and fertilizers into the water by dairies, ranches, and farms. These pollutants subsequently flowed down the Kissimmee River into Lake Okeechobee. Backpumping from the Everglades Agricultural Area (EAA) also contributed nutrients and pesticides to the lake. “It is therefore imperative that the quality of the water in the Everglades ecosystem be continually monitored,” the special study team’s report declared, “and that steps be taken to maintain high water quality standards.”<sup>10</sup>

Over the next few months, Marshall developed some of these ideas in his own speeches. At a state water resources conference in January 1971, he told Governor Askew and his cabinet that South Florida’s ecology was under “stress” from a variety of factors. “I view environment – human ecology – as the number one problem of Florida,” he declared.<sup>11</sup> In June 1971, he produced a paper entitled “Repairing the Florida Everglades Basin,” claiming that drainage had wreaked devastation on Everglades ecology, not only because it had reduced the amount of water flowing through the area, but also because it had shortened the basin’s hydroperiod. This caused saltwater intrusion, salinity concentration in estuaries, and soil subsidence. Almost more damaging, however, was that drainage allowed farming and settlement in vast areas of South Florida, creating a water shortage by increasing demand while reducing supply. Marshall also expressed concern for the quality of water in Florida, especially the overenrichment of Lake Okeechobee and the Kissimmee lakes.<sup>12</sup>

To deal with these concerns, Marshall proposed a series of measures for the state of Florida to take. These included improving the quality of water in the Kissimmee lakes, restoring the channelized Kissimmee River, slowing the Kissimmee’s run-off into Lake Okeechobee, setting Lake Okeechobee’s water levels at 15.5 to 17.5 feet (rather than the 17.5-21.5 feet schedule proposed by the Corps), restoring coastal bays such as the St. Lucie Estuary, preventing waste

and nutrients from flowing to Lake Okeechobee, and establishing constraints on urban and agricultural settlement in South Florida. “We must change direction,” Marshall pleaded. “Our exploitive and technological orientation must be re-directed in favor of more considerate uses of natural systems.” Otherwise, South Florida would continue to face “accelerating impoverishment of its natural and human resources.”<sup>13</sup>

While admitting that South Florida had serious water problems in need of resolution, some scientists believed that Marshall was unnecessarily foisting “doomsday predictions” on Floridians and that the situation was not as dire as he forecasted.<sup>14</sup> Others criticized him as not being realistic, of wanting to eliminate all human occupation of South Florida. William Storch, chief engineer of the FCD, called Marshall a polemicist and accused him of taking “immoral” actions to scare the public. “You seek to polarize rather than unite,” Storch said.<sup>15</sup> But Gerald G. Parker, a longtime hydrologist in South Florida, agreed with many of Marshall’s conclusions and had an even more extreme solution. “The only way to save [the Everglades],” he asserted, “is to move man off them, keep them flooded, and let nature, in her implacable way, start all over again.”<sup>16</sup>

Marshall’s statements came during a year of severe drought in Florida, when rainfall amounts were 22 inches below normal, forcing the FCD to pump surface water into Miami’s wells and causing fires in the Everglades that burned 500,000 acres. Marshall therefore caught Governor Reubin Askew’s attention, and the governor decided to call a special conference on water management in South Florida in September 1971. He asked some of the top scholars in ecological and water issues to congregate in Miami for discussions of what the state could do to maintain water supply and quality as the region continued to grow. Participants included John M. DeGrove, dean of the College of Social Sciences at Florida Atlantic University who chaired the conference, Marshall, State Senator Daniel Robert (“Bob”) Graham, Florida Wildlife Federation president John Jones, environmentalist William Partington, many scientists and engineers from Florida universities, and representatives from Everglades National Park, the Florida Game and Fresh Water Fish Commission, the U.S. Geological Survey, and the U.S. Sugar Corporation. In his opening remarks, Askew told the gathering that he wanted answers – “stated clearly, bluntly and forcefully” – to five questions: how muck fires and saltwater intrusion could be halted; how an impending shortage of high quality water could be prevented; how soil subsidence could be curbed; whether there should be a limit on South Florida’s population growth; and who should manage South Florida’s natural resources. “I realize that no study and no three-day conference on Miami Beach is going to solve our water management and pollution problems,” Askew said, but – adopting a phrase first coined by landscape architect and regional planner Ian McHarg in 1969 – he wanted the meeting to mark “the beginning of a new ‘design with nature’ for South Florida.”<sup>17</sup>

After studying the issues, conference participants developed a statement of solutions for the governor; Marshall served as one of the prime authors. “There is a water crisis in South Florida today,” the statement proclaimed, recommending that the state immediately institute “an enforceable comprehensive land and water use plan” to limit population in certain areas. To solve the water quality issues, the statement suggested that Kissimmee marshes be restored and that backpumping from the EAA into Lake Okeechobee be eliminated, or at least not continued until backpumped water could be treated. It also recommended that, in order to preserve the

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## Five Major Problems Listed By Governor

Governor Rubin Askew posed five major problems facing central and south Florida in his opening remarks at the recent Governor's Conference on the Everglades held in Miami Beach.

Governor Askew told the more than

100 persons on the panel that "We must build a 'peace' in South Florida, a peace between the people and their place, between the natural environment and the man made settlement, between the creek and the canal, between the works and

needs of men and women, and the life of mankind itself.

It was hoped that a full text of the panel's recommendations would be available for publication in this issue of the Water Management Bulletin. However, at press time the final text was not completed. We hope that the full findings and recommendations be printed in the next Bulletin.

## Reed Praises FCD., Calls for Redirection

Recent actions by the Central and Southern Florida Flood Control District (FCD) received praise from a Washington source at the recently held Governor's Conference on the Everglades.

Nathaniel Reed, assistant Secretary of the Interior, speaking during the closing hours of the three day Miami Beach meeting told the more than 100 delegates: "In recent years there has been a considerable shift in the management philosophy of the FCD. The new policy to reflood portions of the Kissimmee floodplain is but one example among many of a proper direction in rethinking project goals."

He warned, however, that the FCD Governing Board must exercise caution to insure that any corrective action taken alleviates rather than compounds the situation in the Kissimmee Basin and Lake

Okeechobee. He urged the Board to let the biologist take another crack at the restoration proposal before moving headlong into a well meant effort to make sure that the specifics are correct and will accomplish the desired goals prior to tampering further with an already disturbed situation.

The Assistant Secretary then commented: "Lest these last comments be construed as damning with faint praise, let me say here that Bob Padrick (Chairman of the FCD Board) and his colleagues on the Board deserve the public's respect for having gone further than any previous Board in facing up to the tremendous problems of the project. I respect their courage and wisdom. I do not know of a more sensitive Board on which to sit. The decisions are all tough, there are no easy (Continued on Page 2)



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Cover of the FCD's *Water Management Bulletin* detailing Governor Askew's conference on Florida water issues.

animal and plant life immediately around the lakeshore, the lake's level not exceed 17.5 feet, even though the U.S. Army Corps of Engineers had believed that the maintenance of a higher level, coupled with backpumping, could provide more water for South Florida. The statement asked that the state establish an agency or board comprised of nine gubernatorial appointees to manage Florida's land and water use plan, and that the board assume a wide range of responsibilities, including "managing water quality and quantity for the long term benefit of the environment of the region and the State" and "establishing policy and guidelines for such activities as drainage, water use, well drilling, land use, estuary protection, watershed management, flood control and soil conservation."<sup>18</sup>



**Governor Reubin Askew. (Source: The Florida Memory Project, State Library and Archives of Florida.)**

After reading the statement, Askew established a Task Force on Resource Management to draft legislation implementing the recommendations. This committee had several key members, including DeGrove, who had written his Ph.D. dissertation on the C&SF Project; Marshall; and Graham, whose background in Miami real estate, coupled with his desire for environmental preservation, allowed him to see issues from both sides. Fred P. Bosselman, an attorney from Chicago who had been instrumental in the preparation of the American Law Institute's Model Land Development Code, served as a consultant. Largely influenced by the institute's code, which outlined how states could designate environmentally unique regions as areas of critical concern, the task force developed several bills for introduction, including an environmental land and water management act, a comprehensive planning act, a water resource act, and an act asking for a \$200 million bond issue to purchase environmentally endangered lands.<sup>19</sup>

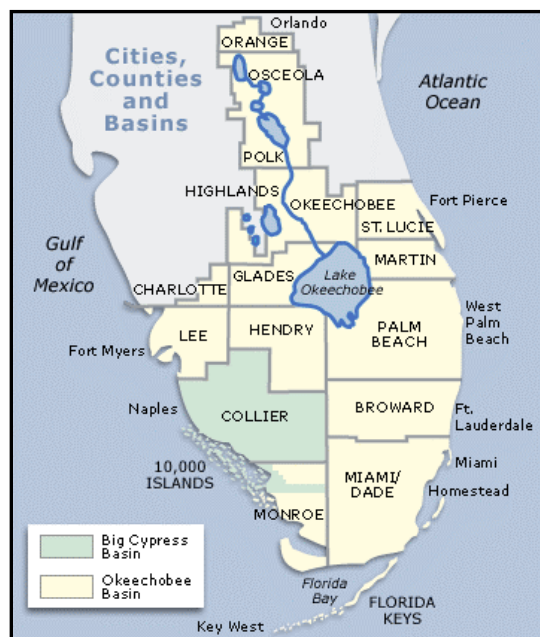
These bills were not without controversy; many special interests and large-scale developers did not agree with the proposals and lobbied hard for their defeat. But the proposals had the backing of several prominent individuals, including Governor Askew, who sent summaries of the "highest priority" bills to interested parties, telling them to inform their senators and representatives of their "strong support" for the legislation.<sup>20</sup> Other important supporters included members of Conservation 70s, an organization formed in 1969 by Lyman Rogers, an environmental adviser to Governor Claude Kirk, to lobby environmental measures in the Florida legislature. Consisting of many state officials and legislators, the group had a great deal of influence in the early 1970s, and during the 1972 session, according to journalist Luther Carter, a well-known environmental reporter, it "was working the capitol corridors full time."<sup>21</sup> Senator Graham and Representative Richard Pettigrew, who sponsored the environmental land and water management legislation in their various chambers, also expended a great deal of effort, as did Representative Jack Shreve, who helped to usher the measures through Florida's House of Representatives. Due to these exertions, the Florida Environmental Land and Water

Management Act passed in 1972, as did the Water Resources Act, the Land Conservation Act, and the Florida Comprehensive Planning Act.<sup>22</sup>

These laws implemented many of the measures desired by Askew and the task force. The Land Conservation Act created a \$200 million fund for the purchase of environmentally endangered lands, while the Comprehensive Planning Act formed the Division of State Planning and authorized it to prepare a comprehensive land and water plan for Florida. The Florida Environmental Land and Water Management Act, according to Graham, provided “a strong state role in those land use decisions which transcend the jurisdiction of individual local governments.”<sup>23</sup> It allowed the governor and the cabinet, upon recommendations from the Division of State Planning, to designate regions as areas of critical state concern if they met environmental or historical standards. In such cases, local governmental agencies would compose and administer land development regulations, subject to the approval of the governor and cabinet. The state also had the power under the law to declare certain land developments as developments of regional impact when they affected more than one county in terms of health, safety, or welfare. The local government would then have to ensure that any construction conformed to the state land development plan.<sup>24</sup>

The Water Resources Act of 1972, meanwhile, created five regional water management districts to make all water resource decisions – be they flood control, drainage, water supply, or whatever else – in the counties over which they had jurisdiction. As part of this, the FCD was reorganized as the South Florida Water Management District (SFWMD) – although this did not officially occur until 1977 – and the Northwest Florida, Suwannee River Basin, St. Johns River Basin, and Southwest Florida water management districts were established. When the FCD became the SFWMD in 1977, several significant changes were made. For one thing, it fell under the supervision of the Florida Department of Environmental Regulation (formerly the Department of Pollution Control), although the governor and the cabinet still had the ability to rescind or modify district policies. For another, it received the responsibilities of maintaining water supply and water quality as well as ensuring flood control. The importance of that change cannot be

overemphasized, as it meant that the water management district would now be in a position to manage water in ways that did not harm the environment. Indeed, according to Executive Director John “Jack” Maloy, the district established an Environmental Sciences Division soon after the reorganization “in order to understand the effects of the (drainage) system.”<sup>25</sup> All of these pieces of legislation greatly impacted water management in South Florida. According to



**Boundaries of the South Florida Water Management District. (Source: South Florida Water Management District.)**



Luther Carter, environmentalists were “jubilant” over the acts, but their effectiveness remained to be seen.<sup>26</sup>

As state legislators enacted measures to ensure better land and water planning in South Florida, the state also worked in cooperation with the USGS to prepare a report analyzing the effects that water control and management had had on South Florida since the establishment of the C&SF Project. Three USGS hydrologists – S. D. Leach, Howard Klein, and E. R. Hampton – studied the matter in cooperation with the FCD and with the financial backing of the Florida Department of Natural Resources, the counties of Broward, Dade, and Palm Beach, the cities of Fort Lauderdale, Miami Beach, and West Palm Beach, the NPS, and the U.S. Navy. This study admitted that “the prime effect of the water-control works in South Florida” was the “changing [of] the spatial and temporal distribution of runoff from the Everglades,” but it also pointed to the positive results of C&SF Project works, including a reduction in the amount of water discharged to the ocean from the Miami, North New River, Hillsboro, and West Palm Beach canals and the successful prevention of saltwater intrusion into the Biscayne aquifer. “Additional improvements in the hydrologic situation in places in southeast Florida can be achieved by applying existing hydrologic management practices to smaller, specific areas of need,” the report concluded.<sup>27</sup>

Yet despite the general positive nature of the USGS’s report on the C&SF Project, controversy swirled around the Kissimmee River and Lake Okeechobee. Marshall had noted in several of his speeches that concerns existed about the U.S. Army Corps of Engineers’ channelization of the Kissimmee River as part of the C&SF Project. Before the 1960s, the river, which began near the town of Kissimmee, meandered along a 92-mile course through central Florida, eventually reaching Lake Okeechobee. A lyrical description of the river in a turn of the century edition of *The Kissimmee Valley Gazette* showed the appreciation that many observers had of the river’s beauty:

It is an extraordinary river in its narrowness, in the rampant growth of water plants along its low banks, in the unbroken flatness of the landscape, in the variety and quantity of its bird life, in the labyrinth of by-channels and cutoffs and dead rivers that best its sluggish course, and above all in the appalling, incredible, bewildering crookedness of its serpentine body. There are bends where it takes nearly an hour’s steaming to reach a spot less than 100 yards ahead of the bow.<sup>28</sup>

But the river flooded often, causing consternation for ranchers who wanted to raise cattle on the floodplain. Hamilton Disston had initially proposed channelizing the Kissimmee in the 1880s, but he had not made much progress by the time of his death. Therefore, when the C&SF Project was authorized, the Corps included flood control for the Kissimmee River Valley in its plans. The 1954 Flood Control Act allowed the Corps to begin its efforts in that basin, including the construction of eight water control structures in the Kissimmee’s upper headwater lakes, the straightening of the river itself, and the building of six water control structures within it. Essentially, the Corps removed the meanders and turns of the river and created Canal 38, a 52-mile waterway running to Lake Okeechobee with five different pools, each containing a water control structure and a lock.<sup>29</sup>

Some agencies objected to the channelization almost immediately. The U.S. Fish and Wildlife Service and the Florida Game and Fresh Water Fish Commission both claimed that the Corps’ actions would destroy fish and wildlife in the Kissimmee Valley. They proposed that the

Corps investigate other alternatives, but the Corps believed that channelization was the only effective means of dealing with the flooding problems.<sup>30</sup> Therefore, straightening proceeded, leading to other protests. The Florida Audubon Society passed a resolution in 1966 opposing the project, fearing “further destruction of the Kissimmee river and its wild tributaries,” while several individuals contacted Florida’s congressional delegation, requesting that construction be stopped.<sup>31</sup> “We are aware that a straight, wide, deep canal is not as esthetically pleasing as a winding natural stream,” Jacksonville District Engineer Colonel R. P. Tabb responded, “but it does have distinct advantages where economics and water conveyance are concerned.”<sup>32</sup>

The Corps completed the channelization of the river, which cost approximately \$30 million, in 1971, leaving it as a straight waterway interrupted by five shallow pools along the way. Not long after, the Corps manipulated Taylor Creek, Nubbin Slough, and other tributaries of the Kissimmee located north and northeast of Lake Okeechobee into one basin, totaling 116,000 acres, so that they would all drain into the lake. The Corps lauded these completions, believing that they prevented \$12.1 million in flood damages between 1971 and 1978.<sup>33</sup> But environmentalists were outraged, both because of the destruction of fish and wildlife and because they believed that the Corps had created “a sewer that funneled pollutants and nutrients straight into [Lake Okeechobee,] choking it.”<sup>34</sup>

Indeed, Lake Okeechobee experienced some problems at the beginning of the 1970s. Not only did C&SF Project canals bring EAA farmers lake water in times of drought, they also conveyed water from the farmlands back to the lake in times of excess rain – a process known as backpumping. Because such water contained fertilizers, pesticides, and other nutrients, environmentalists believed it contributed heavily to the eutrophication of the lake.

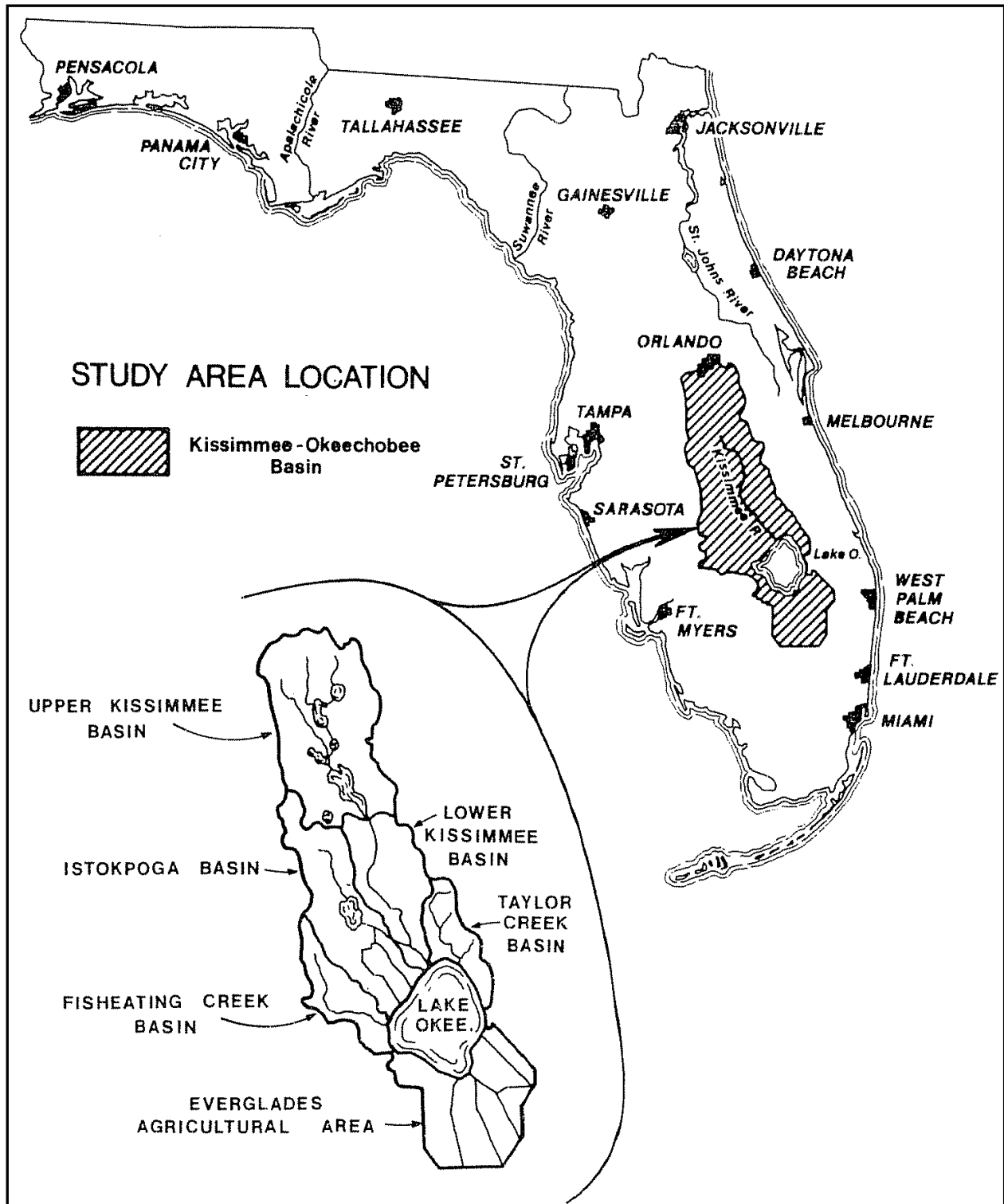


Construction of C-38. (Source: U.S. Army Corps of Engineers, Jacksonville District.)

Eutrophication essentially consisted of the contamination of surface waters by an influx of nutrients, usually nitrogen and phosphorous. It was the process of turning “clear, sandy-bottomed lakes filled with bass” into bodies of water “algae laden and swarming with gizzard shad.”<sup>35</sup> Although all lakes experienced gradual natural eutrophication over an extended time span, cultural eutrophication, or the adding of nutrients by human land use, accelerated the process, killing lakes in a relatively short time. Florida’s Lake Apopka, located some miles west of Orlando in Central Florida, had become hypereutrophic through human interference, for example, and in the late 1960s and early 1970s, algal blooms indicated that Lake Okeechobee was on a path to the same fate. Many thought that the channelization of the Kissimmee compounded Lake Okeechobee’s problems, mainly because straightening the river had eliminated nutrient-filtering marshes in the Kissimmee Valley and had greatly shortened the basin’s hydroperiod, meaning the amount of time that water actually stood on the land.<sup>36</sup>

Critics pointed to another problem that, they claimed, channelization of the Kissimmee had exacerbated: regulatory releases from Lake Okeechobee to the St. Lucie and Caloosahatchee estuaries. Under the C&SF Project, the Corps had enlarged the Caloosahatchee River and had constructed additional canals facilitating the flow of water to the St. Lucie estuary. The Corps then used these structures, as well as the existing St. Lucie Canal, to regulate the level of Lake Okeechobee, sending water down the waterways when the lake got too high. Although the Corps enlarged the Caloosahatchee River in 1970 to allow more water to flow down to the Gulf of Mexico, the St. Lucie estuary bore the brunt of the releases. Channelization of the Kissimmee River, some stated, worsened the situation by forcing the Corps to send even more “mud-laden” and polluted water to the estuaries.<sup>37</sup> Residents of Martin County and FWS officials especially protested such releases, charging that they damaged estuary life, both because of the increased sedimentation that they caused and because the unnatural quantities disrupted the balance of fresh and salt water, driving fish from the estuaries. Because of these conditions, the Corps revisited the lake’s regulation schedule in the 1970s and informed interested parties that it was “constantly” pursuing ways to “alleviate the situation.”<sup>38</sup>

Although concerns about Lake Okeechobee estuary releases had existed since the 1950s, Arthur Marshall was one of the first to raise the alarm about the effects of Kissimmee channelization on Lake Okeechobee. Because the lake served as the “liquid heart” of South Florida’s water system, he explained, any problems with its water quality affected the region as a whole. Marshall called channelization “an abuse of the public’s water supply and wildlife resources,”<sup>39</sup> while claiming that “re[c]ent analyses of algal content in Okeechobee waters clearly indicate approach of eutrophication. There is no question as to whether this will occur,” he continued, “it is a question of when.”<sup>40</sup> To halt the process, the state of Florida could reflood Kissimmee marshes, thereby slowing the rate of runoff and allowing cleansing to occur. The final report of the Governor’s Conference on Water Management in South Florida suggested the same thing, recommending as well that backpumped water either be treated before flowing into the lake or not allowed at all. Meanwhile, the results of a USGS study, published in 1971, explained that Lake Okeechobee was in an early state of eutrophication and that many tributaries draining into the water body contained excessive amounts of nutrients.<sup>41</sup>



The Kissimmee-Okeechobee Basin. [Source: State Department of Administration, "Findings and Recommendations from the Special Project to Prevent the Eutrophication of Lake Okeechobee" (1976).]

But some remained skeptical about Lake Okeechobee's condition. William Storch, the FCD's chief engineer, for example, claimed that the USGS study actually showed that the lake was not in danger of dying and that its nutrient concentrations were not excessive. The study did highlight that poor quality water flowed into the lake, Storch explained, but that did not mean that the lake was in imminent danger. In addition, Storch and other FCD officials, as well as the Corps, disputed whether Kissimmee River channelization really had a detrimental effect on the lake.<sup>42</sup>

Despite these doubts, the FCD did agree that the restoration of some Kissimmee marshes was desirable, mainly for fish and wildlife purposes. Accordingly, in the spring of 1972, the FCD's board approved a restoration plan of approximately 9,000 acres, costing \$400,000 in land acquisition costs. Because the FCD did not have any eminent domain authority, it needed the approval of the governor and cabinet in order to implement the proposal, and in the summer and fall of 1972, it prepared a presentation for the cabinet.<sup>43</sup>

In November, the FCD held a public hearing about the matter in West Palm Beach, obtaining testimony from those interested in Kissimmee restoration. Although admitting that marsh restoration was important, many environmentalists were disappointed at the small scale of efforts proposed by the FCD. FCD board member Don Morgan responded that it was "the best we can do with a flood control program," but Marshall and other ecologists, including Dr. Robert Harris of the Florida State University Marine Laboratory, averred that more was necessary to prevent Lake Okeechobee's eutrophication. On the other hand, Andrew Lamonds of the USGS contended that Kissimmee River channelization was not the only thing causing problems in Lake Okeechobee; population increases in the 1960s would have resulted in nutrient addition regardless of the channelization. "The rate of flow is not the primary concern," he insisted. But others, including Marshall and O. Earle Frye, director of the Florida Game and Fresh Water Fish Commission, disagreed. "Channelization has worsened conditions for fish and wildlife, and has reduced the buffering effect of marshes," Frye stated. "We would like to see as much of the river put back in a natural state as possible." John Jones, representing the Florida Wildlife Federation, agreed, calling river restoration the first step in restoring water quality to Lake Okeechobee. Most participants realized, however, that financing and land acquisition were obstacles in any reflooding plan. Representatives of landowners in the Kissimmee Valley, who vehemently opposed marsh restoration, emphasized these issues, declaring that alternative measures for improving Lake Okeechobee's water quality should be studied.<sup>44</sup>

At the conclusion of the hearing, the FCD's governing board finalized their findings and recommendations for the governor and the cabinet. Lake Okeechobee water quality, the statement began, was a "serious and perplexing problem" that required more authority and responsibility than any existing agency had. "Total restoration of the Kissimmee River marshes," it continued, "may or may not be an effective solution by itself, in view of other possible grave consequences, especially flood control."<sup>45</sup> Because acquiring all of the lands in the river's floodplain would require \$88 million, the board recommended that its limited program be implemented and that polluted water be treated before entering the lake. Then additional studies could be made to discover whether or not complete restoration was necessary or possible.

On 12 December 1972, the FCD presented these findings and suggestions to Governor Askew and the cabinet at a four-hour hearing where representatives from the FCD, the Corps,

and environmental groups testified on the condition of Lake Okeechobee and the channelization of the Kissimmee. After the FCD made its presentation, Marshall reported on analyses that the Center for Urban and Regional Studies at the University of Miami had conducted, stating that these showed that the state needed to take immediate action, including restoration of the whole Kissimmee River, in order to prevent further water quality loss in Lake Okeechobee. “The water quality situation in Lake Okeechobee is tending rapidly toward irrevocable misfortune,” he argued.<sup>46</sup> To curb the destruction, Marshall wanted the governor to appoint a water quality master for the Kissimmee-Okeechobee Basin to oversee nutrient-removal efforts. Marshall also presented the governor and cabinet with a copy of the center’s report, entitled *The Kissimmee-Okeechobee Basin*. Colonel Emmett Lee, District Engineer of the Jacksonville District, however, opposed wholesale restoration, believing that it would return flooding problems to the Kissimmee Basin. After hearing these different viewpoints, the cabinet voted to implement a program to correct existing pollution in the Kissimmee Valley, to monitor water quality in the Kissimmee Basin and Lake Okeechobee, and to establish an interdisciplinary team of scientists to study whether or not restoration was necessary.<sup>47</sup>

The Florida legislature passed measures during its 1973 session to implement the governor’s and cabinet’s requests, including one creating a “Special Project to Prevent the Eutrophication of Lake Okeechobee” to conduct a study of the lake’s water quality problems. The Division of State Planning received the responsibility of overseeing the effort, while the Florida Department of Pollution Control and the FCD were charged with water quality and quantity data collection and analysis. Federal, state, and local agencies, universities, and private consultants also contributed; Dale Walker, a critic of Kissimmee channelization who had worked for the Florida Game and Fresh Water Fish Commission, was appointed project leader. The study’s main goal was to comprehend “the Lake Okeechobee ecosystem sufficiently to derive a land and water management plan which, when implemented, will prevent further cultural eutrophication of the lake.”<sup>48</sup>

As the study commenced, Corps leaders decided that an objective examination of the Kissimmee River Basin and the effects of channelization on water quality was necessary. Fearing that Floridians did not have sufficient emotional detachment to make an objective analysis, the Corps hired Atlantis Scientific, an environmental auditing firm in Beverly Hills, California, to conduct the study. In April 1973, Atlantis filed its report with the Jacksonville District after concluding two months of fieldwork and consultations in Florida. It found little evidence that the channelization of the Kissimmee had adversely affected Lake Okeechobee’s water quality and no definitive results as to how well marshlands would remove nutrients from water. Besides, the report argued, marshlands would serve only as a holding place for nutrients; any nutrients removed from the water would merely sit in the vegetation or soil until a future inundation released them back into water. This was a conclusion that seemed to fly in the face of assertions by environmentalists and scientists such as Marshall that the marshes acted as “scrubbers” to prevent nutrient-loaded water. The report also claimed that the most polluted water reaching Lake Okeechobee came from EAA backpumping. Finally, Atlantis stated that no clear evidence existed that Lake Okeechobee was in an accelerated eutrophic state. “Eutrophication is the natural aging process of bodies of water,” the report related, and “every body of water is in some stage of eutrophication.” Although “components or constituent matter



contributing toward eutrophication” all existed in the lake, “there is no evidence of the synergism necessary to supposedly expedite the process.”<sup>49</sup>

Supporters of Kissimmee restoration severely criticized Atlantis’s report, claiming that it had no objectivity because it was performed at the Corps’ bequest. Others saw the study as “a quiet effort [by the Corps] to discredit environmentalists’ proposals for restoring the channelized Kissimmee River.”<sup>50</sup> Atlantis, which referred to its work as an “environmental audit,” insisted that it had no responsibility “to sustain the judgment of our client nor to refute the testimony of concerned citizens” and that its “first obligation” was “to our own professional integrity to provide an impartial and qualified assessment,” but its actions in Florida belied that statement.<sup>51</sup>

David S. Anthony, a biochemist with the University of Florida, for example, claimed that the Atlantis team had employed “deliberately deceptive behavior” in order to deflect attention from its relationship with the Corps. “I, personally, was given an evasive answer which contained no mention of the Corps when I asked one of the team what his mission in Florida was,” Anthony related. Two other scientists, he continued, “were given an answer that was a flat untruth when they asked the same question of one of the consultants.”<sup>52</sup> It seems unlikely that the Corps pressured Atlantis to mirror the Corps’ own conclusions, and, indeed, scientists eventually came to accept some of Atlantis’s conclusions, including its contention that the Kissimmee River was not the major polluter of the lake. However, other findings, which directly contradicted conclusions reached by prominent Florida scientists (who had been studying the issues for years), indicate that the California firm may have been unqualified to analyze the pertinent subjects. Since the company based its conclusions on already-existing scientific literature, interviews with “a broad spectrum” of individuals, and an inspection of the area, rather than any scientific studies it conducted itself, this view seems justified.



**Cattle grazing around Lake Okeechobee. (Source: South Florida Water Management District.)**

Meanwhile, the FCD conducted additional studies of Lake Okeechobee and the Kissimmee River, including one examining how manipulating water levels in impoundment pools on the river might affect vegetation. After extended observations, the report concluded that raising water levels two feet above their normal control stage would help to reproduce natural marsh conditions and enhance survival rates of the fish and birds.<sup>53</sup> The FCD also studied how it could reduce nutrient loads in water flowing into Lake Okeechobee, especially from three sources: the Taylor Creek/Nubbin Slough drainage area (the location of numerous dairies and cattle ranches), the north-central part of the EAA, and areas in the lower Kissimmee Basin including and below pools S-65D and S-65E. The FCD recommended that Taylor Creek/Nubbin Slough and Lower Kissimmee Basin farmers use land and water management techniques to prevent large-scale concentrations of nutrients, and that EAA agriculturists store runoff water for reuse in land between the Miami and North New River canals known as the Holey Land tract. This was a 55-square mile area in southwestern Palm Beach County that served as a kind of wildlife buffer zone for Conservation Area No. 3, protecting wildlife in that area from development. “The time has come to begin to move out of the study phase and into the action phase,” the FCD concluded, but “there must be assurance that action is not taken just for the sake of action,” especially since another FCD study had determined that nitrogen and phosphorous levels in Lake Okeechobee had not significantly increased in the last five years.<sup>54</sup>

As different agencies performed their own analyses, some environmentalists, eager for concrete action, became angry. Lyman Rogers, environmental adviser to Governor Claude Kirk and a founder of Conservation 70s, complained that despite the clear recommendations of the Governor’s Conference on Water Resources in South Florida, the state had implemented only “studies” and “studies to study the studies.” In the meantime, he argued, “Lake Okeechobee is DYING” and would “continue to eutrophicate, until it becomes a giant sized Lake Apopka.” Rogers called Askew an environmental phony, saying that he promised Florida “all kinds of cures, and has given us none.” Askew needed to provide specific solutions to Lake Okeechobee’s problems, Rogers declared, rather than just commission more studies.<sup>55</sup> Lieutenant Governor James H. Williams responded that Askew was “deeply committed” to finding a cure for Lake Okeechobee, but that “simple solutions do not solve complex problems.” He counseled patience, explaining that the report by the Special Project to Prevent the Eutrophication of Lake Okeechobee would contain detailed management plans to reduce Lake Okeechobee’s nutrient content.<sup>56</sup>

Before the publication of the Special Project’s findings and recommendations, the Florida Sugar Cane League, which represented the major sugar producers in Florida, commissioned its own examination of Lake Okeechobee’s problems, specifically focusing on backpumping. Black, Crow & Eidsness, Inc., a Gainesville firm, completed this study, which claimed that backpumping from the EAA supplied only 7.7 percent of the lake’s phosphorous and 20.2 percent of its nitrogen. The Taylor Creek/Nubbin Slough watershed, on the other hand, contributed 33.7 percent of phosphorous and 7.7 percent of nitrogen, while the Kissimmee River supplied 30.5 percent of phosphorous and 36.4 percent of nitrogen. Citing studies of eutrophication in the Great Lakes, Black, Crow & Eidsness argued that phosphorous, and not nitrogen, was the limiting nutrient for algal and plant growth. Since the EAA was not a heavy supplier of phosphorous, the company recommended that backpumping continue while more



investigations were performed to determine whether phosphorous or nitrogen served as the limiting nutrient in Lake Okeechobee. If phosphorous played the most important role, state officials should examine ways of reducing input from the Taylor Creek/Nubbin Slough. If nitrogen was the critical element, backpumping from the EAA should be reduced or eliminated.<sup>57</sup>

In December 1975, the FCD released its findings as to the engineering and environmental feasibility of storing backpumped water in the Holey Land area, stating that such a project could work. It therefore recommended that a reservoir be constructed on the Holey Land and the adjacent Rotenberger Tract and that it have a regulation schedule of 12 to 15 feet. In order to make the plan work, the state would have to acquire private lands on the Rotenberger Tract, and to do so, the FCD suggested that an exchange for state-owned lands be made. In addition, the Corps would have to enlarge the Miami and North New River canals in order to ensure that runoff went to the reservoir instead of the lake. The project would cost approximately \$14 million, but if constructed, would divert 203,910 acre feet of runoff annually away from the lake.<sup>58</sup>

Some disagreed with the FCD's recommendations, in part because they wanted to maintain the Holey Land and Rotenberger tracts as buffer zones for wildlife. Others insisted that the areas were largely void of wildlife, using a report conducted by Ecoimpact, Inc., in 1974, to support their views. Ecoimpact's study, however, was widely panned by environmentalists, in large part because they viewed it as a hatchet job performed at the bequest of sugar interests wanting to use the tracts for cultivation.<sup>59</sup> Still others, such as the Florida Department of Environment Regulation, which had succeeded the Department of Pollution Control, rejected the FCD's suggestions because they wanted a complete cessation of backpumping. The department's *Report of Investigations in the Kissimmee River-Lake Okeechobee Watershed*, which summarized all of the studies the department had performed as part of the Special Project, claimed that EAA backpumping contributed more phosphorous to the lake than the Black, Crow & Eidsness report had indicated. C&SF Project pumping stations S-2 and S-3 alone contributed 10.9 percent of the lake's phosphorous, the department contended, and when one added backpumping from private interests and small drainage districts, the total approached 45 percent. The department also concluded that channelization of the Kissimmee did impact Lake Okeechobee eutrophication because of the elimination of marshes and the development of higher flow rates that caused larger nutrient releases, conclusions that clashed with those presented in the Corps-sponsored Atlantis study.<sup>60</sup>

The Department of Environmental Regulation's report, issued in March 1976, was the precursor to the Division of State Planning's final Special Project report, which was not officially published until November 1976. The Special Project's findings and recommendations, however, were provided to the state legislature in April. The major conclusion of the study was that Lake Okeechobee was "of such eutrophic condition that present nutrient loads must be substantially reduced." Nutrients came from various sources, but EAA backpumping was an especially egregious supplier. To correct this problem, the Special Project recommended that backpumping from the EAA "be eliminated or reduced to the maximum degree feasible," and it suggested that an impoundment reservoir be constructed on the Holey Land Tract in order to store water for reuse. The report did not recommend complete restoration of the Kissimmee River, but it did suggest that marshes be re-established in order to aid upland retention of water.<sup>61</sup>



**Wet prairie lands around the Kissimmee River. (Source: South Florida Water Management District.)**

Despite its moderate findings, or perhaps because of them, the Special Project's report met opposition from all sides. Colonel Donald A. Wisdom, District Engineer of the Jacksonville District, criticized the document for containing many "purely subjective" statements "designed to sell an idea by eliciting an emotional response in the reader." The report did not address what the C&SF Project had done for South Florida in terms of "agricultural and human productivity," Wisdom complained, although it delineated extensively "what has been lost in natural productivity."<sup>62</sup> Agricultural interests in the EAA, including sugar growers, did not like the backpumping recommendation, nor did they agree with the proposal to build a reservoir on the Holeyland, mainly because sugar producers wanted to expand into that area. Hunters did not like the Holeyland suggestion either, as it would eliminate an excellent deer hunting spot. Environmentalists, meanwhile, wanted the full restoration of the Kissimmee River, not just a reflooding of some of its marshes. All of these interests conveyed their displeasure to Florida senators and representatives. Especially vocal was Johnny Jones of the Florida Wildlife Federation, who was convinced that dechannelization of the Kissimmee River was the only way to save Lake Okeechobee. Jones wrote a bill mandating the restoration of the river and, with the approval of Marshall, sent it to the Florida legislature in its 1976 session.<sup>63</sup>

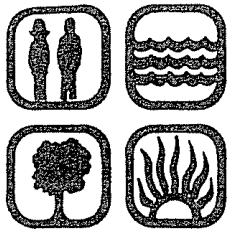
This bill, which was sponsored by Representative A. H. "Gus" Craig in the House and Senator Jon Thomas in the Senate, recognized the findings of the Special Project, but went further in its recommendations. It mandated the restoration of the Kissimmee River to its natural channel, and allowed for the reflooding of natural marshes in the Taylor Creek-Nubbin Slough

basin. It also proposed that cattle and dairy farmers in the Taylor Creek-Nubbin Slough Basin build polishing ponds to remove nutrients before releasing water into Lake Okeechobee. These ponds would hold water for a short period of time, generally one to three days, in order to extract nutrients through biological processes. Moreover, the bill established a four-person advisory council to oversee restoration efforts – the Coordinating Council of the Restoration of the Kissimmee River Valley and the Taylor Creek-Nubbin Slough Basin – composed of the executive directors of the Florida Department of Natural Resources, the Florida Game and Fresh Water Fish Commission, the FCD, and the secretary of the Department of Environmental Regulation. Jones lobbied for the bill incessantly, proclaiming to the media that “the Florida Legislature can pass a Kissimmee River bill or we in South Florida can all move out.”<sup>64</sup> His tactics worked; the Senate and the House approved the measure unanimously, and Askew signed it in June 1976.<sup>65</sup>

The passage of the bill meant that the state now fully supported the restoration of the Kissimmee River. However, there were still a few unresolved issues. For one, the legislation did not clearly define what restoration meant. Thomas believed that it denoted returning the Kissimmee to its natural channel and “recreating the natural marshes and flood plain” in order to “enhance the water storage capabilities” of the Kissimmee Valley, improve Lake Okeechobee’s water quality, and increase wetland vegetation and wildlife.<sup>66</sup> Others were not so certain. Colonel Wisdom, for example, who would have charge of the restoration since Kissimmee channelization was an authorized component of the C&SF Project, was not convinced that dechannelization was either necessary or mandated. “There is a large communication gap between the environmental investigators and the hydrologists and water resources managers,” he explained.<sup>67</sup>

Nowhere was that gap more clearly seen than in two accounts of the debate over Kissimmee River channelization and what the restoration bill actually meant. An article in *ENFO*, a periodical published by the Environmental Information Center of the Florida Conservation Foundation, depicted the initial channelization of the Kissimmee as the product of Corps leaders intent on steamrolling any opposition to straightening the river. “The project was promoted in the name of flood control,” the article argued, “and its opponents never had a chance.” The essay disputed that flood control really resulted from the channelization, claiming that it enabled settlement in the floodplain, an area obviously more prone to flooding, the Corps project notwithstanding. In addition, the article claimed that channelization had changed the Kissimmee Valley from an area with thriving fish populations, “hundreds of thousands of wading birds and waterfowl,” and a “healthy ecosystem” to a place of “stagnant water,” “noxious aquatic weeds,” “foul-smelling gas,” and “a biological desert.” Because the channelization of the Kissimmee sent pollutants from the Upper Kissimmee Valley to Lake Okeechobee, it threatened to give the “liquid heart” a massive “heart attack.” Therefore, the essay concluded, somewhat misleadingly, the Florida legislature had mandated complete restoration of the Kissimmee in the 1976 legislation; any alternative was out of compliance with the law.<sup>68</sup>

Patrick McCaffrey, staff director of the Coordinating Council of the Restoration of the Kissimmee River Valley and the Taylor Creek-Nubbin Slough Basin, had an entirely different perspective. He claimed that initial opponents of Kissimmee channelization, although unable to halt the process, forced the Corps to make major design modifications to accommodate fish and



# ENFO

Wm. R. Barada, Editor

## RESTORING THE KISSIMMEE RIVER MAY BE FLORIDA'S ENVIRONMENTAL ARMAGEDDON

*(Armageddon — "Any great or crucial conflict." Webster)*



CHANNELIZATION OF THE KISSIMMEE RIVER WAS A COLOSSAL MISTAKE. This has been confirmed by virtually every scientific study of South Florida's water problems made since the project was completed in 1970.

A 1976 LEGISLATIVE MANDATE TO RESTORE THE KISSIMMEE RIVER WAS passed unanimously by the Florida House and Senate. It is a precedent-setting action because never before in history has legislation mandated restoration of a major river after it has been channelized by the Corps of Engineers. The manner in which it is implemented will have far-reaching effects on every undammed and unchannelized river in Florida, and in America.

EXECUTED UNDER THE GUISE OF FLOOD CONTROL by the Corps of Engineers, the project actually increases the potential for catastrophic floods.

THE KISSIMMEE DITCH ALSO CONTRIBUTES to a waste of precious fresh water, increased seriousness of water shortages and droughts, degraded water quality, lowered water tables, massive elimination of wetlands, higher costs to cattlemen and agriculture, drastic reduction of fish and wildlife and the annihilation of a beautiful, meandering river.

THIS ENERGY-INTENSIVE WATER MANAGEMENT SYSTEM, which replaced cost-free natural systems, may cost more to maintain, both in energy and dollars, than the initial cost of construction. It has helped reduce South Florida's competitive position to the extent that some urban areas have been termed "economic cripples."

THE SYSTEMS APPROACH is mandated by the legislation. In this approach, state agencies with partial responsibility are brought together for a unified attack on the problem. A Coordinating Council consisting of the heads of five state agencies was established and directed to develop complete plans for implementing the restoration of the entire Kissimmee Valley. Specific problems to be corrected are spelled out in the act.

A BATTLE IS DEVELOPING OVER IMPLEMENTATION. Powerful forces are pushing an alternative to river restoration that is claimed to accomplish the legislative objectives through more structures and higher levees and a change in water manipulation practices. This plan would retain the Kissimmee Ditch and would NOT restore the Kissimmee River.

THIS CONFLICT MAY PROVE TO BE FLORIDA'S ENVIRONMENTAL ARMAGEDDON. Restoring a channelized river will set a precedent that will have far-reaching effects on all undammed, unchannelized rivers in Florida and the United States. Failure to restore the Kissimmee River may also set a precedent by accepting channelization as a viable alternate to a meandering, natural river as long as a portion of the wetlands are reflooded by artificially manipulated water levels behind dams.

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This issue of ENFO presents a review of the water crisis that precipitated Florida's unprecedented legislative mandate and the conflict that is developing over plans for implementing the law.

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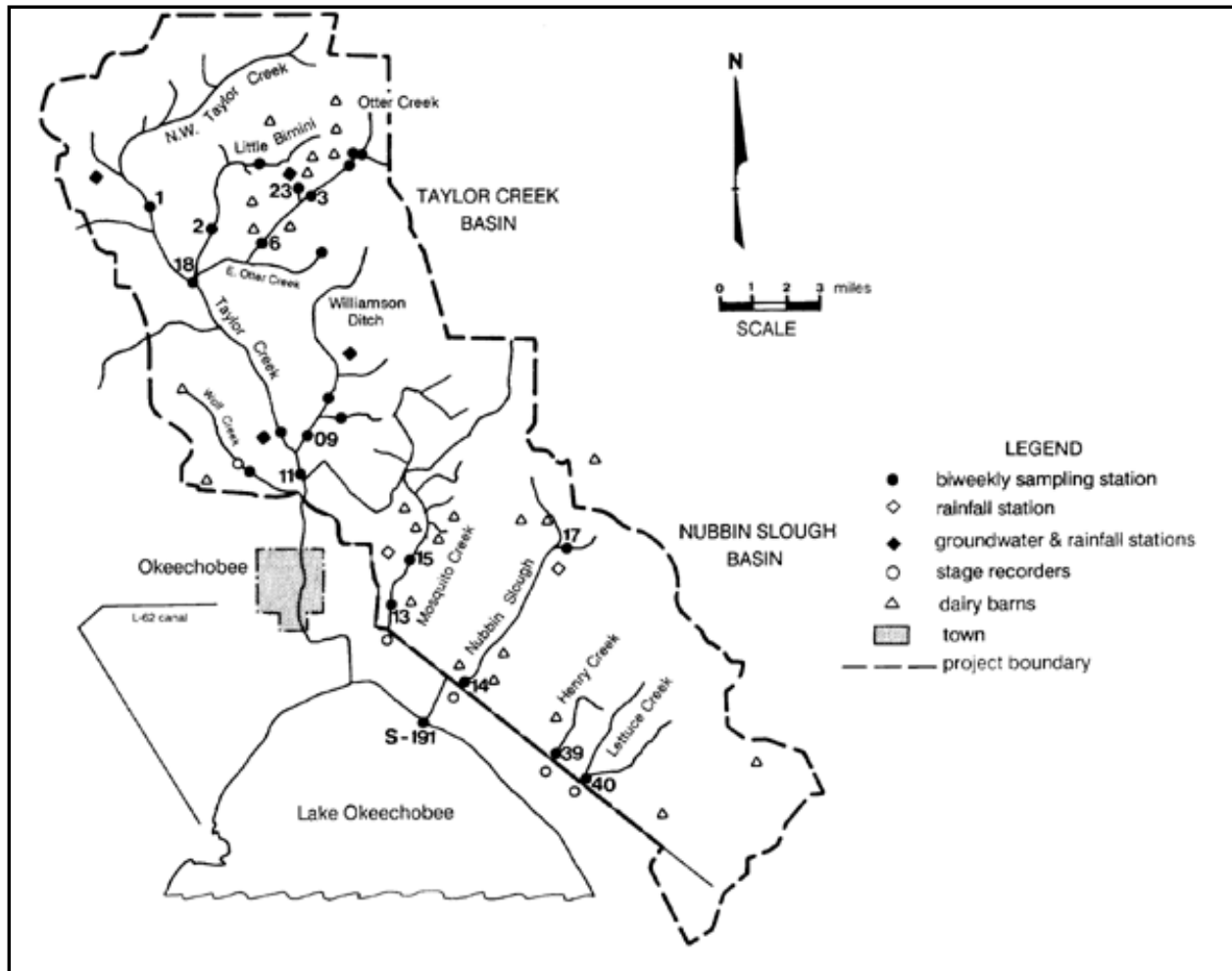
(Make Check Payable to Florida Conservation Foundation, Inc.)

The ENFO publication heavily criticizing the channelization of the Kissimmee River and calling for restoration.

wildlife. The “fruits of their labors may not have been as sweet as expected,” McCaffrey explained, “but in the context of the times they were major concessions by the Corps of Engineers.” McCaffrey also expressed doubts that restoring the river would improve water quality in Lake Okeechobee, a view, he asserted, that the Special Project report supported. Because data showed that routing flows through natural or man-made marshes and nonpoint source control had a greater impact on Lake Okeechobee water quality than Kissimmee River restoration, the Special Project had dismissed reinstating the river as a viable option. Although pro-restoration forces claimed that the 1976 law mandated complete restoration of the Kissimmee, McCaffrey and FCD leaders believed that it merely required the Coordinating Council to “develop measures . . . to restore water quality,” and those measures could consist of marsh reflooding, partial restoration, or other solutions.<sup>69</sup> This, then, was the point of contention: environmentalists (as well as the bill’s sponsors) believed that the law mandated dechannelization, but others, including FCD and Corps officials, interpreted it as requiring the restoration of water quality to the Kissimmee Basin in whatever ways the Coordinating Council deemed necessary, an opinion supported by Florida’s attorney general.<sup>70</sup>

Despite the disagreements, the Coordinating Council began operations in the summer of 1976, believing that it had the responsibility for investigating different options for restoring good quality of water to the Kissimmee Valley. It quickly established an ad hoc advisory committee and an interagency technical committee to provide advice and assistance. The advisory committee contained representatives from environmental organizations such as the Florida Audubon Society and the Sierra Club, as well as members of agricultural groups such as the Florida Sugar Cane League and the Florida Cattleman’s Association. The interagency committee had representatives from the FCD, the Corps, several state agencies, and the U.S. Department of the Interior. With the help of these groups, the Coordinating Council developed 11 actions that the state could take to improve water quality in the Kissimmee Basin. These included dechannelizing the river through plugging the pools in the canal, recreating marshland through pool manipulation and tributary marsh impoundments, and backfilling Canal 38 to restore the river to its natural course. After holding public hearings on the alternatives in February 1977, the Coordinating Council made its recommendations to the state legislature in March.<sup>71</sup>

The Coordinating Council explained that the best way to restore water quality to the Kissimmee River Valley was by treating agricultural pollution at its source in the Taylor Creek-Nubbin Slough basin. This included creating an upland detention/retention project and implementing on-farm monitoring programs. As far as restoring the river was concerned, the Coordinating Council decided to let the legislature decide. If the legislature wanted complete restoration, the council suggested that a partial backfilling method be used, whereby 60 percent of the canal would be refilled, restoring two-thirds of the marshland. The state would need to obtain congressional approval in this case since the Corps did not have authorization to undo a project unless Congress specifically mandated it. If the legislature did not intend for the Kissimmee to be dechannelized, the Coordinating Council recommended that pool stages be implemented in order to create impounded wetlands. The choice, however, solely rested with Florida’s legislators.<sup>72</sup>



Map of the Taylor Creek-Nubbin Slough area. [Source: J. A. Gale et al., *Evaluation of the Experimental Rural Clean Water Program*, EPA-841-R-93-005 (Washington, D.C.: U.S. Environmental Protection Agency, 1993).]

As the 1977 legislative session began, environmentalists moved into action, believing that the impounded wetlands idea was merely, in the words of McCaffrey, “an attempt to prevent dechannelization.”<sup>73</sup> Jones again lobbied hard for the legislature to mandate complete restoration, and initially it looked as though he would succeed, as both houses passed resolutions requiring dechannelization. But when the actual legislation came forward, agricultural interests influenced legislators to kill the bill unless other measures were implemented. With almost no chance of passing an act requiring restoration, proponents had to compromise, and the measure that emerged merely requested that the state ask Congress to authorize a Corps restudy of the river. Several state agencies issued resolutions supporting this action, and Congress authorized the restudy in April 1978, appropriating money for the examination in September.<sup>74</sup> The Corps clearly saw the examination as a way of investigating a variety of options for the river; dechannelization would only be an “alternative” under study, not the main purpose of the analysis.<sup>75</sup>

Likewise, little firm action was forthcoming on other issues pertaining to Lake Okeechobee water quality. Despite the Special Project's recommendation that backpumping from the EAA cease, it continued. Because the pollutants resulting from backpumping exceeded state water quality standards, the Florida Department of Environmental Regulation was required to issue a permit to the South Florida Water Management District (as discussed above, the name and organization had changed in 1977) before backpumping could occur, but the state did not enforce that requirement until faced with litigation. In 1977, the state asked the SFWMD to apply for a permit, and after the district did so, the Department of Environmental Regulation issued a temporary operating permit with the understanding that the SFWMD would develop an Interim Action Plan to reduce nutrients flowing into the lake from the EAA. The plan did not diminish how much water was backpumped from the area, however; it merely redirected some of the backpumped water to the water conservation areas instead of the lake. Environmentalists were livid with the Department of Environmental Regulation for issuing the permit, believing that the state should require stricter measures to curtail backpumping, but agricultural interests, especially the sugar industry, protested that halting backpumping would have detrimental effects on farming activities.<sup>76</sup>

In many ways, the conflicts over Lake Okeechobee and the Kissimmee River in the 1970s represented a failure for the environmental community. Although it had successfully halted jetport construction and forced a halt to the Cross-Florida Barge Canal, the problems with water quality in Lake Okeechobee and the channelization of the Kissimmee River remained. Yet environmentalists had called attention to serious water quality issues in South Florida, and had forced state officials to take significant measures to ensure a clean and adequate water supply for the region in the future. The 1972 legislative session saw the passage of several land and water planning laws, while a plethora of scientific studies on Lake Okeechobee and the Kissimmee River were produced. At the least, environmentalists had set the necessary background for more stringent measures to occur at a later time.

But why was the environmental community not able to stop backpumping to Lake Okeechobee or to force the Corps to restore the Kissimmee River, especially in light of the jetport and barge canal successes? First, the problems surrounding Lake Okeechobee and the Kissimmee River did not receive significant national attention, and there were few in the federal government interested in these endeavors or willing to push legislation to resolve the issues. In addition, it was a different matter to get the Corps to halt a project under construction than it was to destroy a project already completed. Had the cry about the Kissimmee River been stronger during its actual construction (rather than just muted complaints from a few individuals in the U.S. Fish and Wildlife Service and the Florida Game and Fresh Water Fish Commission), it might have been easier to stop channelization. For example, environmentalists in southern California in the late 1960s and early 1970s had successfully prevented the Corps from channelizing the Sierra Madre Wash through numerous protests and through the active efforts of city council personnel opposed to the project.<sup>77</sup> Florida did not see the same scale of efforts when channelization of the Kissimmee River was proposed; instead, as former SFWMD executive director John Maloy related, the hot environmental issues in Florida in the 1960s were the barge canal and the condition of Lake Apopka – “the Kissimmee kind of slipped underneath the threshold and didn't gain a lot of attention.”<sup>78</sup> Finally, state officials, including Governor

Askew, waffled as to their commitment to full restoration of the Kissimmee or to the cessation of backpumping. Although Askew had strongly acted in his first term to preserve Florida's environment, several forces prevented the implementation of stringent measures regarding Lake Okeechobee and the Kissimmee River. For one, the sugar industry, which was increasing in political strength, vehemently opposed the stoppage of backpumping, as did agricultural interests in the Kissimmee Valley. For another, despite all of the studies that had been completed, an air of uncertainty still existed at the end of the 1970s as to whether complete restoration of the Kissimmee was really the best step to take, or whether water quality could be improved through other means. Also important was the issue of funding. Dechannelizing the Kissimmee would require a large amount of money, at least some of which would probably have to come from Florida. It would take several more years of studies, including water quality examinations conducted by the Lake Okeechobee Technical Advisory Committee and some strong gubernatorial support, before Kissimmee restoration and stringent measures to protect Lake Okeechobee's water quality would become a reality.



## Chapter Six Endnotes

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<sup>1</sup> Robert G. Healy, *Land Use and the States* (Baltimore, Md.: The Johns Hopkins University Press, 1976), 109.

<sup>2</sup> Senator D. Robert Graham, "A Quiet Revolution: Florida's Future on Trial," *The Florida Naturalist* 45 (October 1972): 146-147.

<sup>3</sup> See "How the Florida Boom is Changing," *U.S. News & World Report* 66 (5 May 1969): 88; "Florida's Land Boom Gets Down to Earth," *Business Week* (6 April 1968): 136; U.S. Army Corps of Engineers, Office of the Chief of Engineers, *Engineering Memoirs: Major General William E. Potter*, EP 870-1-12 (Washington, D.C.: U.S. Army Corps of Engineers, 1983), 189-194.

<sup>4</sup> All quotations (including Van Dyne's) in McIntosh, *The Background of Ecology*, 200, 203, 229.

<sup>5</sup> "Arthur Marshall, Director of the Division of Applied Ecology, The Center for Urban Studies, University of Miami," Folder 8, Box 4, Arthur R. Marshall Papers, Manuscript Series 73, Special and Area Studies Collections, George A. Smathers Library (East), University of Florida, Gainesville, Florida [hereafter referred to as Marshall Papers]. For more information on Marshall, see Grunwald, *The Swamp*, 246-248.

<sup>6</sup> Quotation in Florida Wildlife Federation press release, 8 April 1970, File Everglades High Water & Deer Situation: U.S. Senate Subcommittee Hearing, Box 1, S1719, Game & Fresh Water Fish Commission Everglades Conservation Files, 1958-1982, FSA. For more information about the deer problems in 1970, see "Information Sheet on Spring 1970 High Water Situation – Southern Florida," File 1110-2-1150a (C&SF) Conservation Area Jan 1970-Dec 1970, Box 15, Accession No. 077-96-0038, RG 77, FRC.

<sup>7</sup> Quotations in "Adequate Water Essential for Wildlife Survival," Bureau of Sport Fisheries and Wildlife, South Florida National Wildlife Refuges press release, File Conservation Areas 1, 2, 3, 1970-86, Box 02193, SFWMDAR; see also Joseph D. Carroll, Jr., Acting Field Supervisor, to Regional Director, 7 May 1970, no file name, FWSVBAR.

<sup>8</sup> "Report of the Special Study Team on the Florida Everglades, August 1970," 3, 5-8, 12, 17-27, copy in South Florida Water Management District Reference Center, West Palm Beach, Florida.

<sup>9</sup> Henry B. Sirgo, "Water Policy Decision-Making and Implementation in the Johnson Administration," *Journal of Political Science* 12, nos. 1-2 (1985): 53-58.

<sup>10</sup> "Report of the Special Study Team on the Florida Everglades, August 1970," 13-15. The report did not dwell on the EAA backpumping issue, only listing it as one of the factors contributing to poor water quality in the lake.

<sup>11</sup> Arthur R. Marshall, "Water Problems of South Florida," 26 January 1971, File Water Resources Development Comm. General/Meetings 1957-73, Box 02500, SFWMDAR.

<sup>12</sup> Arthur R. Marshall, "Repairing the Florida Everglades Basin," 11 June 1971, copy in South Florida Water Management District Reference Center, West Palm Beach, Florida.

<sup>13</sup> Marshall, "Repairing the Florida Everglades Basin."

<sup>14</sup> See G. W. Cornwell, "The Everglades—Nature's Yo-Yo," Folder 16, Box 4, Marshall Papers.

<sup>15</sup> W. V. Storch to Professor Arthur R. Marshall, 6 July 1971, attachment to Marshall, "Repairing the Florida Everglades Basin."

<sup>16</sup> Garald G. Parker, Chief Hydrologist, to Dale Twachtmann, Executive Director, 3 August 1971, Folder 5, Box 7, Marshall Papers.

<sup>17</sup> Quotations in "Remarks of Reubin O'D. Askew, Governor of Florida, at the Governor's Conference on Water Management in South Florida, Miami Beach, Florida, September 22, 1971," Folder 4, Box 6, Marshall Papers; see also "Five Major Problems Listed By Governor," *Water Management Bulletin* 5 (October-November 1971): 2; Graham, "A Quiet Revolution," 146-147; Grunwald, *The Swamp*, 260; "Lake Okeechobee Health Center of Rising Dispute," *The Miami Herald*, 20 September 1971. McHarg's book *Design With Nature* (Garden City, N.Y.: Natural History Press, 1969) emphasized the importance of environmental planning in the protection of ecosystems.

## Chapter Six Endnotes (continued)

<sup>18</sup> Quotations in “A Statement to Reubin O’D. Askew, Governor, State of Florida, from the Governor’s Conference on Water Management in South Florida,” September 1971, 1-6, File Wetlands Regulation Federal, State, Local Correspondence/General 1973-75, Box 02500, SFWMDAR; see also “Population, Drainage Limits Urged,” *The Miami Herald*, 25 September 1971; Grunwald, *The Swamp*, 260.

<sup>19</sup> Reubin Askew, Governor, to Friend, 7 March 1972 (with attachment), File L54 Water Resources Jan 72-June 72, EVER 22965, CR-ENPA; Askew to Conference Participant, 30 December 1971, *ibid.*; Carter, *The Florida Experience*, 126-131; Healy, *Land Use and the States*, 110-111.

<sup>20</sup> Askew to Friend, 7 March 1972.

<sup>21</sup> Carter, *The Florida Experience*, 136.

<sup>22</sup> Carter, *The Florida Experience*, 132-136; Grunwald, *The Swamp*, 261; Jones interview, 20.

<sup>23</sup> Graham, “A Quiet Revolution,” 148; see also The Florida Environmental Land and Water Management Act, copy in EVER 22965, CR-ENPA.

<sup>24</sup> “The Florida Environmental Land and Water Management Act of 1972,” summary in File Legislation Environmental Land & Water Management Act of 1972 – General, Box 25, Graham Papers; “Water Management in Florida,” 2 November 1973, *ibid.*; Carter, *The Florida Experience*, 133; Blake, *Land Into Water*, 230.

<sup>25</sup> As quoted in Stephen Glass, “Rebirth of a River,” *Restoration & Management Notes* 5 (Summer 1987): 7; see also Jack Shreve to Senator, 3 April 1972 (with attachment), File Legislative Water Resources Act 1973-1975, Box 38, Graham Papers; “Water Management in Florida,” 2 November 1973, *ibid.*; “Water Management Act of 1972,” File Legislative Water Management Districts 1974-1975, Box 38, Graham Papers; Forrest T. Izuno and A. B. Bottcher, “The History of Water Management in South Florida,” in *Everglades Agricultural Area (EAA): Water, Soil, Crop, and Environmental Management*, A. B. Bottcher and F. T. Izuno, eds. (Gainesville: University Press of Florida, 1994), 21-22; Maloy interview; Carter, *The Florida Experience*, 133; Blake, *Land Into Water*, 230. Because the FCD did not become the SFWMD until 1977, we will continue to refer to it as the FCD until our discussion reaches that year.

<sup>26</sup> Carter, *The Florida Experience*, 137.

<sup>27</sup> Leach, Klein, and Hampton, *Hydrologic Effects of Water Control and Management in Southeastern Florida*, 1-3.

<sup>28</sup> As quoted in M. Timothy O’Keefe, “Cows, Crackers and Cades: Bloody, Muddy and ‘Unbent,’ The Kissimmee River Has Seen Some Weird Goings-On,” *Florida Sportsman* (August 1978): 20.

<sup>29</sup> “Presentation by Colonel James W. R. Adams, District Engineer, Jacksonville District, to the Florida Wildlife Federation, Orlando, Florida, 23 September 1978: ‘Two Rivers—Kissimmee-Oklawaha—Where We Are Today,’” 1-3, Kissimmee Binder, Box 4383, JDAR.

<sup>30</sup> Unsigned letter to District Engineer, 17 December 1958, copy in South Florida Water Management District Reference Center, West Palm Beach, Florida; Blake, *Land Into Water*, 260.

<sup>31</sup> C. Russell Mason to General W. S. Cassidy, Chief Army Engineer, 4 February 1966, File 1110-2-1150a (C&SF) Kissimmee River Valley Study Aug 1965-Feb. 1967, Box 10, Accession No. 077-01-0023, RG 77, FRC.

<sup>32</sup> Colonel R. P. Tabb, District Engineer, to Honorable George A. Smathers, 17 October 1967, File 1110-2-1150a (C&SF) Kissimmee River Valley Study March 1967-December 1968, Box 10, Accession No. 077-01-0023, RG 77, FRC.

<sup>33</sup> “Kissimmee River Survey Review, Town Hall Meetings, Information Packet,” Binder Kissimmee, Box 4383, U.S. Army Corps of Engineers, JDAR; “Presentation by Colonel James W. R. Adams, District Engineer, Jacksonville District, to the Florida Wildlife Federation, Orlando, Florida, 23 September 1978,” 3; James L. Garland, Chief Engineering Division, to Mr. Alexander L. Crosby, 25 May 1973, File 1110-2-1150a (C&SF) Kissimmee River Valley Study Jan 1973-Dec 1973, Box 9, Accession No. 077-01-0023, RG 77, FRC.

## Chapter Six Endnotes (continued)

<sup>34</sup> M. Timothy O'Keefe, "The Kissimmee Problems: Trying to Unmuddle Man's Meddling," *Florida Sportsman* (August 1978): 29.

<sup>35</sup> Carter, *The Florida Experience*, 26.

<sup>36</sup> Carter, *The Florida Experience*, 26, 123.

<sup>37</sup> Arthur R. Marshall, "Water Problems of South Florida," 26 January 1971, copy in File Water Resources Development Commission, General/Meetings, 1957-73, Box 02500, SFWMDAR.

<sup>38</sup> Quotation in Colonel Emmett G. Lee, Jr., District Engineer, to Honorable Lawton Chiles, United States Senate, 27 August 1974, File 1110-2-1150a (C&SF Martin County) Project—General—1968 Authn 1968-1979, Box 1, Accession No. 077-01-0023, RG 77, FRC; see also Donald B. Benedict, Martin County Conservation Alliance, to Mr. Carol White, Corps of Engineers, 3 June 1976, *ibid.*; Joseph D. Carroll, Jr., Field Supervisor, Fish and Wildlife Service, to District Engineer, 4 June 1976, File 1520-03 (C&SF) Water Control Jan. 1976-Dec. 1976, Box 3579, JDAR.

<sup>39</sup> Quotation in Marshall, "Water Problems of South Florida," 1; see also "Report of the Special Study Team on the Florida Everglades, August 1970," 14.

<sup>40</sup> Quotation in Arthur R. Marshall, "Are The Everglades Nearing Extinction?" *The Florida Naturalist* 44 (July 1971): 80-81 (this is a reprint of Marshall's statement); see also Marshall, "Repairing the Florida Everglades Basin," 4.

<sup>41</sup> "A Statement to Reubin O'D. Askew, Governor, State of Florida, from the Governor's Conference on Water Management in South Florida," 1; see also Lothian A. Ager, Fishery Biologist, to John W. Woods, Fisheries Division, 16 September 1971, File LO Historical Data/Text, Box 18060, SFWMDAR.

<sup>42</sup> "Lake Okeechobee Not Dying, Official Study Shows," *The Palm Beach Times*, 24 August 1971.

<sup>43</sup> J. Walter Dineen to Jack Maloy, 3 August 1971, Folder 5, Box 3, Marshall Papers; "FCD To Seek Restoration of Kissimmee Marshes," *The Palm Beach Times*, 1 December 1972; "Urges Support Be Given To Restoring Kissimmee," *Stuart News*, 19 November 1972. In August 1972, Marshall received an appointment to the FCD's board, but he resigned in 1973 because he believed that other board members did not take environmental matters seriously. See Governor to Mr. Art Marshall, 17 August 1972, Folder 9, Box 4, Marshall Papers; Askew to Marshall, 17 July 1973, *ibid.*

<sup>44</sup> All quotations in "Summary of Kissimmee River Hearing – At West Palm Beach – November 15, 1972," 3, 5-10, File Kissimmee River Restoration History, Box 17166, SFWMDAR.

<sup>45</sup> "Findings and Recommendations of the Governing Board, Central and Southern Florida Flood Control District, as the Result of Public Hearing Concerning Alleged Environmental Damage Resulting from Channelization of the Kissimmee River, November 15, 1972," copy in South Florida Water Management District Reference Center, West Palm Beach, Florida.

<sup>46</sup> *The Kissimmee-Okeechobee Basin: A Report to the Cabinet of Florida* (Miami, Fla.: Division of Applied Ecology, Center for Urban and Regional Studies, University of Miami, 1972), 2, 48-50.

<sup>47</sup> "December 12, 1972, Cabinet Meeting, 9:00 A.M.," 36-37, 53, 57, 67, File Lakes & Streams Kissimmee River Basin (FCD) 1969, Box 1, S1570, Game & Fresh Water Fish Commission, Lake & Stream Restoration Project Files, 1950-1986, FSA.

<sup>48</sup> Quotation in *Interim Report on the Special Project to Prevent the Eutrophication of Lake Okeechobee* (Tallahassee: Florida Department of Administration, Division of State Planning, 1975), 1; see also Blake, *Land Into Water*, 263.

<sup>49</sup> Atlantis Scientific, "An Assessment of Water Resource Management in the Central and Southern Florida Flood Control District: A Review and Evaluation of Environmental Reports on the Kissimmee River and Lake

## Chapter Six Endnotes (continued)

Okeechobee,” 2 April 1973, 49-50, 52, 59-60, 69, 77, copy in Library, Jacksonville District, U.S. Army Corps of Engineers, Jacksonville, Florida.

<sup>50</sup> “Corps Is Quietly Attacking River Restoration Proposal,” *The Miami Herald*, 27 May 1973.

<sup>51</sup> Atlantis Scientific, “An Assessment of Water Resource Management,” 2.

<sup>52</sup> David S. Anthony, “Water Problems in the Kissimmee-Okeechobee Basin in Florida,” 6, File Kissimmee River Restoration History, Box 17166, SFWMDAR.

<sup>53</sup> Robert L. Goodrick and James F. Milleon, *Studies of Floodplain Vegetation and Water Level Fluctuation in the Kissimmee River Valley*, Technical Publication No. 74-2 (West Palm Beach, Fla.: Central and Southern Florida Flood Control District, 1974); “Lake Okeechobee – Kissimmee Basin, Proposals for Management Actions, Central and Southern Florida Flood Control District, March 20, 1975,” copy in South Florida Water Management District Reference Center, West Palm Beach, Florida.

<sup>54</sup> “Lake Okeechobee – Kissimmee Basin, Proposals for Management Actions, Central and Southern Florida Flood Control District, March 20, 1975”; Frederick E. Davis and Michael L. Marshall, *Chemical and Biological Investigations of Lake Okeechobee, January 1973-June 1974, Interim Report*, Technical Publication No. 75-1 (West Palm Beach, Fla.: Central and Southern Florida Flood Control District, 1975). The Division of State Planning published an interim report on the SPPELO in 1975 that noted the FCD’s conclusions, but explained that other studies of vegetation and sediments showed that phosphorous and nitrogen levels had tremendously increased. It expected to have “hard data” about the lake’s eutrophic condition by the end of the study. *Interim Report on the Special Project to Prevent the Eutrophication of Lake Okeechobee* (Tallahassee: Florida Department of Administration, Division of State Planning, 1975), 32.

<sup>55</sup> Lyman E. Rogers to Lt. Governor J. H. ‘Jim’ Williams, n.d., Folder 45, Box 1, Marshall Papers (emphasis in the original); see also Lyman to Art, 28 August 1975, *ibid.*

<sup>56</sup> Williams to Rogers, 11 September 1975, Folder 45, Box 1, Marshall Papers.

<sup>57</sup> Black, Crow & Eidsness, Inc., “Report to Florida Cane Sugar League on Eutrophication of Lake Okeechobee,” December 1975, xii-xiii, xv, 1-2, 2-7, copy in South Florida Water Management District Reference Center, West Palm Beach, Florida.

<sup>58</sup> Central and Southern Florida Flood Control District, “Report on Investigation of Back-Pumping Reversal and Alternative Water Retention Sites, Miami Canal and North New River Canal Basins, Everglades Agricultural Area,” December 1975, i-iv, copy in Folder 12, Box 3, Marshall Papers. The Rotenberger Tract was named for Ray Rotenberger, a man who built a camp and airfield in the area in the late 1950s and early 1960s. The state purchased 6,300 acres of land in the area in 1975. Florida Fish and Wildlife Conservation Commission, “Rotenberger Wildlife Management Area” <<http://www.floridaconservation.org/recreation/rotenberger/history.asp>> (March 22, 2005).

<sup>59</sup> See J. Walter Dineen, Director, Environmental Sciences Division, to Director, Resource Planning Department, 16 September 1974, Folder 35, Box 2, Marshall Papers; Dineen to Director, Resource Planning Department, 19 November 1974, *ibid.*; John C. Jones, Executive Director, Florida Wildlife Federation, to Honorable Reubin Askew, Governor of Florida, 4 December 1974, *ibid.*

<sup>60</sup> State of Florida Department of Environmental Regulation, *Report of Investigations in the Kissimmee River-Lake Okeechobee Watershed* (Tallahassee: State of Florida Department of Environmental Regulation, 1976), 2, 4, 13.

<sup>61</sup> Department of Administration, Division of State Planning, Bureau of Comprehensive Planning, “Findings and Recommendations from the Special Project to Prevent the Eutrophication of Lake Okeechobee,” May 1976, copy in South Florida Water Management District Reference Center, West Palm Beach, Florida. For the full report, see Florida Department of Administration, Division of State Planning, *Final Report on the Special Project to Prevent Eutrophication of Lake Okeechobee* (Tallahassee: Florida Department of Administration, Division of State Planning, 1976).

## Chapter Six Endnotes (continued)

<sup>62</sup> Colonel Donald A. Wisdom, District Engineer, to Honorable John H. Williams, Lieutenant Governor of Florida, 13 April 1976, File C&SF Special Project to Prevent Eutrofication [*sic*] of Lake Okeechobee 1975, Box 3693, JDAR.

<sup>63</sup> Jones interview, 13-14; “Conservationist Urges River Bill Passage,” *The Palm Beach Times*, 24 May 1976; Patrick M. McCaffrey, “Politics of the Kissimmee River Survey Review,” 51-56, Folder 7, Box 3, Marshall Papers.

<sup>64</sup> “Conservationist Urges River Bill Passage,” *The Palm Beach Times*, 24 May 1976.

<sup>65</sup> “New Law May Help Stricken Kissimmee River,” unidentified newspaper clipping, File Kissimmee River News Clippings, Magazine Articles, Box 17166, SFWMDAR; A. H. “Gus” Craig to Mr. Joseph W. Landers, Jr., 21 June 1976, Folder 6, Box 3, Marshall Papers. Most accounts say that the bill passed unanimously, but “New Law May Help Stricken Kissimmee River” reported that two members of the House voted against it.

<sup>66</sup> Jon C. Thomas to Mr. Jay Landers, Secretary, Department of Environmental Regulation, 22 June 1976, Folder 6, Box 3, Marshall Papers.

<sup>67</sup> Colonel Donald A. Wisdom, District Engineer, to Honorable J. H. “Jim” Williams, 4 February 1976, File C&SF Special Project to Prevent Eutrofication [*sic*] of Lake Okeechobee 1975, Box 3693, JDAR.

<sup>68</sup> “Restoring the Kissimmee River May Be Florida’s Environmental Armageddon,” *ENFO*, n.d., copy in Folder 7, Box 3, Marshall Papers.

<sup>69</sup> McCaffrey, “Politics of the Kissimmee River Survey Review,” 51-56.

<sup>70</sup> Robert L. Shevin, Attorney General, to Honorable A. H. “Gus” Craig, Representative, 28th District, 15 April 1977, File 10-1-7a (Kissimmee River Restoration-State Coop Study) May 1977-August 1977, Box 3693, JDAR.

<sup>71</sup> Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basin [Coordinating Council], *Legislative Summary: First Annual Report to the Florida Legislature* (Tallahassee, Fla.: Coordinating Council on the Restoration of the Kissimmee River Valley and Taylor Creek-Nubbin Slough Basin, 1977), 1-1 – 1-4.

<sup>72</sup> Coordinating Council, *Legislative Summary*, 1-5 – 1-8; McCaffrey, “Politics of the Kissimmee River Survey Review,” 57.

<sup>73</sup> McCaffrey, “Politics of the Kissimmee River Survey Review,” 58.

<sup>74</sup> Colonel Donald A. Wisdom, District Engineer, to Honorable J. Herbert Burke, 24 August 1977, File 10-1-7a (Kissimmee River Restoration-State Coop Study) May 1977-August 1977, Box 3693, JDAR; “Kissimmee River Battle Subsidies,” *The Palm Beach Times*, 21 September 1977.

<sup>75</sup> Colonel Donald A. Wisdom, District Engineer, to Arthur J. Fox, Jr., Editor, *Engineering News Record*, 7 July 1977, File 10-1-7a (Kissimmee River Restoration-State Coop Study) May 1977-August 1977, Box 3693, JDAR.

<sup>76</sup> Thomas G. Tomasello, Counsel, to Colonel James W. R. Adams, District Engineer, 28 June 1979, File C&SF Special Project to Prevent Eutrofication [*sic*] of Lake Okeechobee 1975, Box 3693, JDAR; 12; South Florida Water Management District, “Executive Summary: Water Quality Management Strategy for Lake Okeechobee,” 11 December 1981, Folder 16, Box 3, Marshall Papers; Forrest T. Izuno and A. B. Bottcher, “Introduction,” in *Everglades Agricultural Area (EAA): Water, Soil, Crop, and Environmental Management*, A. B. Bottcher and F. T. Izuno, eds. (Gainesville: University Press, of Florida, 1994), 8.

<sup>77</sup> See Jared Orsi, *Hazardous Metropolis: Flooding and Urban Ecology in Los Angeles* (Berkeley: University of California Press, 2004), 134-137.

<sup>78</sup> Maloy interview.

