

EVG 6

Interviewee: Tom MacVicar

Interviewer: Brian Gridley

Date: May 20, 2001

G: This is Brian Gridley interviewing Tom MacVicar at his office in West Palm Beach. The date is May 20, 2001. Mr. MacVicar, what are the two or three most important contributing factors that have led to the present problems in the Everglades?

M: I guess it depends on what you define the problems to be. I think under the most common definition of the problem, the factor would be population growth more than anything. That brings with it land-use changes, but I think it is pretty inevitable that the population growth that we have had will have had a lot of land-use modifications associated with it, and those bring what people classically consider problems for the Everglades.

G: In what ways does the population growth create a problem for the Everglades?

M: If you assume your vision of the Everglades was the Everglades before anyone got here, which sounds like the perspective you are taking, then population growth, [which] requires land and the consumption of land, especially where the people live, was probably the most unique feature of the Everglades that is no longer there and impossible to restore. The coastal ridge and the interface with the Everglades that was probably the most important for wildlife is now where people live. I think it is mostly just the disappearance of the land that was an important part of the Everglades.

G: John DeGrove once characterized the ecological problems in South Florida as being the product of "innocent ignorance." Would you agree with this characterization?

M: No. Looking back, it is a change in the value-system today versus what was in place when a lot of the changes to the Everglades were made. I do not know how innocent they were. If you read the early documents before the major canal system was built, for instance, or [before] many of the major levees were built, the problems that we are now dealing with were foreseen by the design people and documented in a lot of the early design reports. What you did not have was a value-system in place that made people stop what they were doing because of those impacts. There were a lot of, let us say, honest mistakes that were made, but there were not any mistakes or big projects built that the outcomes were not fairly well-understood. It is just that the [value-]system at the time accepted those when balanced against the benefits they perceived they would get.

G: To what extent does the current restoration initiative embodied in the [Army] Corps [of Engineers] comprehensive plan and the state's Everglades Forever Act represent a change from earlier management efforts?

M: The Everglades Forever Act represents, I would say, the most dramatic change from the earlier efforts because it was a state initiative. It was derived and probably promoted through litigation, as opposed to deliberation, so its role in the process and the process itself that shaped it was quite a bit different. It was a plan put together driven by litigation, consummated by legislation, and there was a lot of design and technical analysis during that process, but the process was quite a bit different. The state was clearly in the lead, as opposed to the comprehensive federal plan that is now being proposed. And it included a much different set of incentives and funding mechanisms than we have seen in any other large-scale water project. It was different in almost every respect.

G: Briefly, tell me about your professional background, including education and career positions, up to the time when you joined the Water Management District.

M: I joined the Water Management District right out of graduate school. I had a bachelor's degree in political science and a bachelor's degree in engineering, and I got a master's degree in water-resource engineering at Cornell [University; Ithaca, New York] and then came directly from there to the Water Management District. I was born and raised in South Miami. I grew up in South Florida. I lived on a canal. I watched them dig a canal that went through my backyard as a kid. I have had a lot of life experiences related to water management in South Florida.

G: Could you describe the process that led to the development of the Water Management District's 2x2 hydrological model in the mid-1980s?

M: When I came to the District, there was a small team, actually two or three individuals, working on computer-modeling. They had constructed a large-scale electrical analogue model, which was a series of resistors, capacitors and transistors and voltage-regulators, and [had] built an actual physical model of the Biscayne aquifer. It took up a large wall, probably ten by twelve feet, with thousands of wires running to computers - that was a way to use the laws of electricity, which are very analogous to the laws of fluid dynamics, to simulate flow in the Biscayne aquifer. When I came here for the interview, they were just beginning to transfer modeling from hardware analogues to software numerical models. The District staff had tested some ideas and put together an early flow-chart for a model. In 1979, I believe, the Corps of Engineers undertook what was called the Shark River Slough Survey Review Report. The goal of that report was to try and restore Shark River Slough, [and was] primarily focused on introducing flow into Northeast Shark River Slough. Since Northeast Shark River Slough was

all private property at the time, there was no analytical tool to evaluate what would happen if you re-flooded Northeast Shark River Slough, so the Corps signed a contract with the District to develop the 2x2 model. It was, I do not know, a \$300,000-dollar, two-year contract. I was the project manager and primary software developer for the model at that time. The idea was [that] they [the Corps of Engineers] paid the money to develop the model and then the model would be used as a tool in the restoration of Shark River Slough, and that is pretty much how it worked out. The model came together with several key technical staff at the District working on it. The report was produced, never really went anywhere beyond the survey review, but the modeling never stopped. After the survey review, the experimental program began in 1983, so the model was needed to document the environmental impacts of the experimental water deliveries to Everglades National Park. In 1985, the Modified Water Deliveries Project was first proposed, and that model, again, was the tool. Once the model was developed in the 1981 time frame, [the] survey review for Shark [River] Slough was produced, and then the model has never been dormant since then. It has been applied to virtually every project that has been handled by the District relative to South Florida, especially relative to the Everglades. Each team of scientists who have come in and taken on the projects has enhanced the model, so the model that is in use to today is similar in structure, but it includes much more content and capability than the early model we had in the mid-1980s.

G: Was it the introduction of the model that led to a movement to shift towards rain-based delivery to the [Everglades National] Park?

M: No. The model was just there for a tool to give comfort to the managers who had to make complicated decisions. They wanted more information on which to base their decisions, especially in the Everglades, because the direction was clearly in terms of flooding parts of the Everglades that the government did not own. So, the quantification of potential impacts to private property became a real key element. The rainfall-delivery formula for the Park really grew out of the experimental water-delivery program that was not related at all to the modeling.

G: Could you explain what that was and why there was an effort to go to a rain-based approach?

M: In 1983, there was a very strong El Nino [name for atmospheric conditions that create extreme weather]. There were fifteen or sixteen inches of rain in the first six weeks of the year, in January and early February. That was an extreme amount of rain for that time of year. Lake Okeechobee went way over its schedule, and large quantities of water were dumped in the ocean. The conservation areas were way over schedule, so a very large quantity of water

was released into the [Everglades National] Park in what is normally the dry season - normally being non-El Nino years here. El Nino always produces a wet winter in Florida. The Park was very frustrated with the floodgates coming open in February, and so they came to the Water Management District with a seven-point plan [in regard] to changing the flow of water to the Park. One of the key elements of the plan was to try and re-flood areas that were outside the Park that were still Everglades, primarily the east Everglades. The private-property owners on the periphery of the east Everglades were very nervous about that. They actually litigated pretty early on. The first attempt to release water into that area led to immediate litigation by the south Dade agricultural interests. To settle the litigation, we devised a series of experiments where the District would release water into the east Everglades and document the impacts of it. A lot of instrumentation was installed. Reports were produced on the results of each experiment. The first experiment to release water outside the Park was a thirty-day experiment in the dry season. It turned out to be a quite dry season - this was in 1984, not 1983 - so the results were not typical. The goal was always to put water in there when it is wet, not when it is dry. After the thirty-day experiment in the dry season, we followed up in the summer of 1984 with a ninety-day experiment in the wet season. Again, there was a lot of instrumentation. We measured water levels all around the periphery of the Everglades, measured the water quantities that were put there and produced a report. That came out in late 1984. We really did not know what to do next. No one wanted to go back to the old way of delivering water to the Park. As part of the seven-point plan, one of the things the Park asked for in 1983 was to just open the gates north of the Park and leave them open, and so the District did that, and then each month we would revisit the decision. Each month, the Park said, we want them left open, and so they were left open. When we got into late 1984, it stopped raining, we were in a typical dry season, and Area Three drained pretty severely because the gates were open. But the Park did not want the gates closed, so we came up with the idea of, rather than going back to the old congressional formula of flow to the park, which was like an accounting scheme where you got the same amount each month, we would develop a way to make the monthly water deliveries responsive to the climate and hydrology and the rainfall. We developed a formula that was based on flow into the Park in the 1940s and 1950s before the federal project was built. The flow was uncontrolled. It was not a natural Everglades, but it was a much more natural and much less managed Everglades than existed in the 1980s. We developed a formula - you measure rain at ten gauges north of the Park, you measure evaporation in four evaporation-pans north of the Park, you plug it into a formula, and it tells you how much water should go into the Park that week. The early simulations of the impact showed a lot of benefits. Rainfall basically tells you when to start and how fast to start flow to the Park and when to stop and how to step down the flows. In wet periods, all the gates are going to be open, so the water management

system still overrides the rainfall formula, but it became an effective formula for [the] timing of starting the annual flow and stopping the annual flow or defining a recession. That was developed in 1985; actually, in January of 1985, an environmental analysis was done, and it was put in place that summer. But modeling was not an issue there. It was the experimental program that drove us there.

G: Why did the Fish and Wildlife Service express reservations about the adoption of the rain-based approach?

M: They did not express reservations at the time about the rain formula, but they did have a problem with the way the Modified Water Delivery project operated under the formula. At roughly the same time, the Shark [River] Slough survey review got put on the shelf. The experimental program was going along, and by 1985, we knew we had to do some structural things because of the private-property impacts, and we had to do some modifications to allow water to flow properly. So we developed the Modified Water Deliveries Project, where we would remove some of the impediments to flow in the southern Everglades - build a levee and install a pump around the Eight-and-a-Half-Square-Mile [Area] and eventually put the Slough in public ownership. There was a regular Corps design document that came out then, and there were questions over how you would operate the project when you built this - when you took out the levees on the Everglades and put in the levee around the Eight-and-a-Half-[Square-Mile Area], how would you operate the system? At that time, every Corps design manual also had the operations defined in it - since then, they have not always done that - so there were two operating plans, one which was basically the rainfall formula that we had been using and began using in 1985. The Fish and Wildlife [Service] wanted more water to stay in Conservation Area 3 for the snail kite [endangered species]. They objected to what was called the Rainfall Plan and wanted the Modified Rainfall Plan, [in] which the difference was you would keep more water in Conservation Area 3 for the snail kite. Area 3 has a persistent pool of water in the south end, and that became a favorite habitat for snail kites. So, it was a single endangered species act review kind-of-thing. It was not that they were opposed to the Rainfall Plan. It was they were opposed to the idea of an open-flow system between the [Everglades National] Park and Conservation Area 3.

G: What is the relationship between the [Water Management] District's 2x2 model and the natural-system model?

M: The 2x2 model was developed first, and it is really driven by the management structure. The really amazing thing about it, it breaks no new ground on [the] hydrology of surface flow or groundwater flow or evaporation, but it has an incredible superstructure of every well, every levee, every canal and every water

control structure, and it has got operating rules for all of them. It is an awesome package for simulating a complicated water management system. The natural-system model was an attempt to simulate the hydrology before people got here, so it was built by stripping out, basically, this incredible package of management structure that really is the guts, or the superstructure, of the 2x2 model. The relationship between the two [is that] they are both large-scale models that are driven by several key variables and those variables have to be calibrated or adjusted based on field observations. The two really critical key variables are evapotranspiration and sheet-flow, the dynamics of sheet-flow. [In] the water-management model, because it simulates modern time, there is a lot of actual data, so you can calibrate it according to actual data, real observations. [In] the natural-system model, there are no real observations to calibrate it to, so the real critical connection between the two is [in] defining the evapotranspiration function and the sheet-flow hydraulics in the calibrated 2x2 model and then making the assumption that the values obtained through the calibration of the management model apply to the same phenomenon in the un-management model, or the natural-system model. The two are forever linked in that respect. It builds in somewhat of an uncertainty in the natural-system model, because two of the major phenomenon are derived from a calibrated model, and the calibrated model is dominated by the management structure much less than [by] the natural phenomenon. It just adds a little uncertainty when you do that, but that is the key connection. The other thing [they have in common is that] they have the grid, the raw data like rainfall and evaporation that are fed in. Since they simulate the same time period, they have a lot of those things in common. Like the 2x2 model the NSM is much more sophisticated now than when I worked with it, thanks to the work of people like Randy VanZee who have made it much more credible.

- G: In a 1997 news article, you stated in reference to the natural-system model that “I am very frustrated by how it is being used. It was never intended as a design tool, and I am not sure it is going to be good for the Everglades.” Could you expand on those comments?
- M: Yes. I developed the original version of the natural-system model, and it came out of the buildup to an Everglades symposium in 1989. We had worked with a broad cross-section of scientists involved in the Everglades, most of who were biologists, not hydrologists. Biologists tend to do very focused research. You had a couple of people who just studied alligators and a couple who just studied birds and some who just studied fish. They all had these different intellectual models of the species that they studied, and they did not have a framework for defining the common elements that made all of them succeed. In the planning sessions up to this symposium, I had agreed to try to develop a hydrology model of the Everglades prior to development. It became the natural-system model - only as a way to give a common perspective to all the biologists and maybe help them

understand how the different species related to the hydrology. The hydrology was consistent over all the areas, so maybe they could end up understanding better how the whole package fit together. It was never meant to be a blueprint for restoration, and I knew from day one that if we built it, people would jump on it as, well, this is the answer. But the uncertainties are so high, both with the outcome of the model and the hydrology but, also, the ecosystem is incredibly different than it was prior to when we got here. You do not have any of the coastal ridge left. You have a large part of the Everglades in the north end that is now all farmland. To try and impose water levels or flow quantities that are estimated by a model that has got a lot of uncertainty and is only attempting to simulate something that was here before any of [the changes were] done and [to] apply it to a system that is a lot smaller and designed differently and operated differently - there is as much potential to do harm as to do good if it is not done right. At the time of that newspaper article, the issue was flow. There has always been a debate: do you try and replicate the water depths that the natural-system model estimates, or the actual flow quantities? The flow quantity is the most unreliable outcome in the model because very small changes in a couple of the key parameters have big impacts on the flow quantity. There were attempts to impose the flow quantities coming out of the natural-system model onto specific parts of the Everglades, primarily the southern Everglades. Flow quantities are very large, and our history of very large flows in the Everglades is that they cause a lot of harm to wildlife and in some cases to the plant life, with flooding tree islands or that sort of thing. So, I was concerned that the blanket imposition of flow quantities coming out of the natural-system model, although it sounded good and made an easy argument, it would not have been a good outcome for the Everglades.

G: Is the Corps' comprehensive plan too dependent on the assumptions in the natural-system model?

M: In general, I would say yes. What lowers the anxiety a little bit is that their comprehensive plan is so conceptual and many of the technologies are so uncertain that what is actually finally built under that plan will probably look and behave quite a bit differently than what is in the proposal, the concept. So, I think reality still has a number of years to intervene in this process, and I think it will, and hopefully the understanding of how the Everglades will respond will also be part of that, so it will all come out good in the end. That is what we are hoping.

G: Describe the efforts by the Water Management District during your time there to address the problems with Lake Okeechobee.

M: Lake Okeechobee hit the headlines, really. Well, when I came to the Water Management District, there had just been a lawsuit regarding back-pumping of Everglades Agricultural Area stormwater into Lake Okeechobee.

G: Is that the Johnny Jones lawsuit?

M: Yes, the Florida Wildlife Federation [lawsuit], and Johnny was their spokesperson. The District was struggling with [the issue of], if you cannot back-pump, what do you do with the water? There were plans to flood the Holey Land, none of which ended up panning out. What actually did stick, though, was the idea not to back-pump. Now, the federal project, which included the pumps on the lake, require back-pumping under flood conditions. But there are ways to greatly reduce the quantity back-pumped by aggressive pumping to the south, and that is what was settled on. When I got there [to the Water Management District], I was not involved [in back-pumping water into Lake Okeechobee]. I was doing Shark River Slough modeling and those kind of things. The big Okeechobee headline that affected my career was the algae-bloom we had in 1986. There was about a hundred-square mile algae-bloom, very graphic, that covered a lot of lake. There was a lot of media coverage. It focused on water quality in the lake. It focused on aquatic weed management in the lake and primarily what to do with the upstream watershed. So, from 1986 on, the water quality in the lake became the issue and the focus, because the lake's water quality is controlled by what comes into the lake from the north. Even when the back-pumping was going on, it was a such a small part of the water budget [that] it did not really influence the lake-wide nutrient budget. What controlled the nutrient budget was the Kissimmee River, Fisheating Creek, Taylor Creek, Nubbin Slough, Indian Prairie - the big watersheds that provide all the flow into the lake. What had happened to those [watersheds], the water quality had gotten progressively worse, until by 1988, the phosphorus concentration in [Lake Okeechobee], I think, had doubled from what it had been in the 1970s. Where the [South Florida Water Management] District ended up, after a lot of analysis and public-policy debate and research, was a pseudo-land-use plan, which was really a water-quality regulatory program. The biggest concentrated sources of phosphorus were the dairies north of the lake. The District tried to regulate the dairies, but the Department of Environmental Regulation at the time insisted that that regulation should come under them. What was called the Dairy Rule was written by the Department of Environmental Regulation to regulate the way dairies were designed and operated, with the goal of improving water quality. The Water Management District adopted a rule that covered all the land except the dairies. Again, it required certain water quality limits on the runoff from property. There was a goal set for [phosphorus] loading into the lake and a rule put in place upstream to the lake. The presumption was, if you could get everybody following the rule and meeting the goals in the rule, then the lake nutrient budget

would come back into balance eventually. What happened was the rule was clearly not sufficient to control the quantity of phosphorus coming into the lake. In spite of the fact that a third of the dairies were closed down and all the dairies installed very sophisticated water and manure management facilities, the watershed continued to produce a lot of phosphorus into the lake. The Lake Okeechobee SWIM [Surface Water Improvement Management] plan, which was the vehicle for this, was adopted in 1989. I left the District in 1994. There was a pronounced decreasing trend in phosphorus load to Okeechobee when I left. It looked like the combination of the dairy design changes and management practices and the regulatory program were working, because we had a significant decrease in the [phosphorus] loading to the lake from 1989 to 1994. Since 1994, the trend has gone [in] just the opposite [direction] - it has been a substantial increasing trend [of phosphorus loading to Lake Okeechobee] - so there is still a lot of work left to do.

G: Why the reverse in the trend? What happened?

M: It is hard to say. If you look at where the phosphorus increases have come from, you have a couple of key places. The Taylor Creek - Nubbins Slough Basin [phosphorus content], which decreased significantly from 1989 to 1994, has increased dramatically, almost doubled, since 1994, and that is a very large inflow of phosphorus. Surprisingly, the watershed north of Highway 60, which includes Lake Kissimmee, Hatchineha, Cypress, Lake Toho [Tohopekaliga], up to Kissimmee/St. Cloud, has produced a lot more phosphorus than it did prior to then.

G: What is the source of that? Is it still the dairy industry?

M: No. Up there, it is definitely not the dairy industry, and it is unclear exactly what the source [of phosphorus] is. It is not a high concentration of phosphorus up there, but the concentration has gone up enough to where it is a substantial increase in load. I do not know if they know [what the source is]. I have not been [involved] in the Lake Okeechobee issue since I left the District.

G: Describe your involvement with the Kissimmee River restoration during your time with the Water Management District.

M: I really did not get involved in the Kissimmee restoration until I got into the executive office in 1989. The District had done independent design analysis of the backfilling of the Kissimmee with a computer and physical model program out at Berkeley, at the University of California. In the mid-1980s, we hired Kent Loftin, who was the engineer who did the Kissimmee study for the Corps of Engineers. He became the key engineer in charge of Kissimmee restoration at

the Water Management District, and he worked on it continuously, did a lot of real solid engineering analysis of the backfilling concept and proved, to the extent you can, that backfilling would work hydraulically. The biologists also found that backfilling appeared to be the way to get most of what they wanted out of the restoration. So, by 1990, the issue was [whether there] would there be enough political support to have backfilling adopted as the preferred plan. The District and the state were pretty much there, as preferring backfilling, as opposed to a series of intermediate plugs in the river. The Corps had already rejected the idea. Their analysis in the mid-1980s concluded that backfilling might be a desirable alternative but there was not enough federal interest to allow them to participate in the cost share. At that point, the issue became more political, and Senator [Bob] Graham [U. S. Senator, 1987-Present] and Governor [Bob] Martinez [Florida Governor, 1987-1991] at the time lined up and supported backfilling. The issue went to Congress in 1992, and in the Water Resource Act of 1992, backfilling the Kissimmee [River] was authorized, according to the engineering work that Kent Loften had supervised in the late-1980s. My involvement, by then I was in the executive office, so I represented the [Water Management] District in Washington on a few of the hearings and worked on the language in the WRDA [Water Resources Development] Act. It happened to be the same WRDA Act that authorized the Restudy, so I became involved in both. The most substantial remaining issue was on limiting the backfilling plan. We had a full backfilling plan that included most of Pool E, I believe, or D and E. The last part closest to the lake was the most expensive. There were 350 houses that would have had to have been condemned, and it was a whole lot more money than Congress was willing to go with. The Corps was unwilling to support a plan that required condemning that many houses, and they thought, you got 90 percent of the benefits for 60 percent of the money if you [backfilled] the upstream part; they were not going to support the other part [of the backfilling plan]. I got into the process of talking to people down here and discussing the idea of dropping the last increment [of backfilling], the Pool E increment, from the plan. Then we could get Corps support, and then we could get it through Congress. I met with the Corps' people in the Pentagon. They pretty much made it clear that they could not support condemning all the houses or the - I forget what the total cost was - \$600,000,000, but they could support [us] if we stepped back and did not take all the houses and it became a \$400,000,000 project. My role was to come back here and communicate to our board and staff, Mr. Loften and some others, that that was a reasonable compromise. Everyone seemed to think it was. So, with that, the bill went through.

G: So, that was dropped out of the final bill, then, that section [about backfilling Pool E]?

M: It was not dropped out of the bill; it was converted from a part of the recommended plan to what they called an LPO, or Locally Preferred Option. LPOs are totally funded by the local sponsor, so there were no financial obligations on the Corps in any way. They did not have to revise the plan because that would have taken a lot of time, so they just changed that designation; rather than [being] part of the recommended plan, it became an LPO. The District's governing board passed a resolution accepting it as an LPO, but declaring their position would be not to ever do it, because we had a lot of land-owners, home-owners, who were opposing the Kissimmee [River restoration] plan if that stayed in there. It was easy to cut the Corps out; it was a little harder to convince the local people that our way of cutting the Corps out protected them, so the board passed a resolution, it is my recollection, that declared that the District would not sponsor the LPO either. It became an obsolete part of the design document.

G: How important is the Kissimmee River restoration to the overall Everglades restoration effort?

M: In terms of the hydrology and the biology, I do not think there is much connection at all. They are far apart from each other, and there are not any direct hydrologic connections. It became a very important policy precedent. The 50-50 cost share for the Kissimmee restoration was a huge precedent. The idea that it was an environmental restoration project, not a flood control and water supply project, was a huge precedent. The fact the District or the local sponsor did the engineering analysis that became the plan approved by Congress was a huge precedent. What it showed was the Water Management District could take the initiative in proposing ideas, could do the engineering work, and could sell it to Congress under the Public Works Program with a 50 percent federal cost-share. Florida gained the initiative and the ability to promote its own project and to design its own project. The price Florida paid was the higher cost share, 50 percent, [as] the original Corps project down here was roughly 80, 85 percent federal. Having a local sponsor, that had the funding that South Florida did, step up and say, okay, we will pay 50 percent, but you [have] to let us, A, make the goals purely environmental and not economic, and let us drive the train in terms of what we do and [how] the engineering [is done]. Those are all kind of hallmarks of the Kissimmee [River restoration plan] that have sort of been the model for CERP [Comprehensive Everglades Restoration Plan] and for some of the other programs since then. The biology and the hydrology [of the Kissimmee River restoration plan and the Everglades restoration plan] do not connect at all, but the policies [of the Kissimmee River restoration plan] became the forerunner.

G: How important was the passage of the Surface Water Improvement and Management [SWIM] Act in 1987?

- M: Well, it has been a disappointment. It was very important at the time for Lake Okeechobee because it defined a process which I thought was a real good process, a process that required a lot of public involvement and also a lot of documentation. The SWIM program was statewide and had a different impact in the other districts, [but] I can only speak in terms of the South Florida obviously, [and] in South Florida, it had a big impact on the way we did business because the lake was a huge issue then. SWIM was the vehicle we used to define our participation in the lake restoration process. Very public, it is driven by producing planning documents that are backed up by technical documents. It became a framework for the state to do stuff totally on its own. There was no concept that this [SWIM] was going to be a federal project. This was a state project. The state invented a process that was, we hoped, a lot more streamlined than the (Corps') public works process but kept the best parts of it such as the public access, the public participation and the science in planning documentation. Also, because in the state process, the legal entry points, I guess, what lawyers like to call them, were there, [and] it gave people more comfort in that if [SWIM] really went nuts they could go in with lawyers and have their day in court. That is a great incentive for agencies to get it right the first time because litigating is so painful. I think it worked reasonably well. The first one out of the box was one of the hardest, which was Lake Okeechobee. But the legislature never followed up with consistent funding to, more or less, obtain the promise that the SWIM Act held out there. There was a whole lot of process in terms of identifying SWIM priority water bodies and doing other SWIM plans, and they were never funded. The thing just kind of withered away after the lake plan really got approved and in gear. So, at the time, it was important; looking back, it was real important for Lake Okeechobee from about 1987 to 1991, and since then, it has been a frustrating - probably failure, I guess you would say, to South Florida.
- G: Why did the [Water Management] District make the decision to do an Everglades SWIM, even though they were not required to do so?
- M: The Everglades lawsuit was filed the year after the SWIM Act was passed. We had the framework in place to do SWIM plans for Lake Okeechobee. It was a process we understood and could control. You have to have a process. For agencies to do anything big, they have got to have some kind of a process or blueprint to follow. We knew we had to do something for the Everglades. I mean, the lawsuit was not totally frivolous, obviously, so we got into that. The District was full of people who worked there because they wanted a chance to be a part of restoration. It was not a place full of engineers who wanted to do flood control and water supply - those people were there in the 1960s, [they] were not there in the 1980s. In the 1980s, you had a lot of people who had gone to college in the 1960s and 1970s and wanted to be part of restoration. I grew up in South Florida

and saw it develop. Many childhood recreational memories are [from the] Everglades or Biscayne Bay or some kind of outside experience. So, you had people like that who were committed to it, and they wanted to work on the Everglades. The District had the most thorough pool of Everglades technical expertise on staff. We also thought we could put something together like the Lake [Okeechobee] plan, only more ambitious, but that also had enough broad support that it would be implemented. That is always the objective, to get something out there you can actually do, as opposed to something that all you do is litigate or put on the shelf. SWIM, at the time, was the planning vehicle to accomplish that. In the litigation context, federal courts are probably the worst place in the world to try technical cases. They just do not have the framework to deal with the huge factual base of data. The Florida administrative process was viewed as a little better at that and the SWIM plan, by requiring the technical documentation and a planning document, and then the Florida administrative process for dealing with disputes over the basis of the plan. It just became a framework that was better than federal court. But it gave people their day in court, so that is why I think we stuck with SWIM.

G: Why was the development of the Everglades SWIM so contentious?

M: Because of the litigation.

G: The federal litigation?

M: Federal litigation, and because the sugar industry is big and it is easy to put a black hat on the sugar industry, and a lot of people do that because it is so easy. You need a big issue to get the kind of attention that is going to allow you to get the resources you need to solve a problem. But with the Everglades lawsuit, you had the mix of politics and media and science, and science was usually the junior partner in that trio. It became contentious more because of the politics and the litigation than the science.

G: What were the major issues of contention?

M: The basis for the lawsuit was that Florida had not exercised its regulatory responsibility to control the quality of the water flowing into the Everglades. That was kind of the basis of filing the suit. One issue was, from the farmer's perspective, they were farming on land that the state and federal government had decreed should be farmland. They had designed their farms to match the design of the federal water control project. There were all kinds of references in the early design documents. That is why the project up there was built - they knew the water would go to the Everglades, they knew the water would have nutrients in it. All of these things were known when the project was built, but the

context in which they were designed and approved was a context where the Everglades was burning up every year and they needed the water and were willing to accept the impacts of the water quality. Of course, they had not seen the impacts, so it made it easier for them to accept. By the late 1980s, we had all seen the impacts and did not like what we saw, so the [Water Management] District got into the SWIM planning mode, the Justice Department got into the litigation mode.

G: What was your reaction to the filing of the federal lawsuit by Dexter Lehtinen?

M: I am not sure I remember my initial reaction. We had already started the SWIM plan, and I was in Tallahassee trying to get Cabinet approval to give us a 4,000-acre farm in the [Everglades] Ag[ricultural] Area. We were going to build an experimental marsh treatment area on the farm. It was 4,000 acres the state owned, but it had been leased to the Sam Knight family to convert it to agriculture. What struck me as most ironic is the original lease had a penalty in it: if he did not eliminate the sawgrass and convert it to crops, he was penalized and he would forfeit the lease. He had a twenty-year lease with the understanding that he would convert the land at productive use in those terms. By the time the lease expired, we were in front of the Cabinet asking them not to lease it again, to give it to the District to convert it back to a wetland. Just one twenty-year lease, the Everglades had gone from something you had to get rid of to something you had to restore. I remember being in Tallahassee and talking to the Cabinet aides about the District obtaining the lease when the lawsuit had just been filed, and no one really knew what to make of it. Most people at the District, I think, were offended because we were working very hard to produce an Everglades SWIM plan. We were getting a lot of resistance from the family that farmed the land on the idea of the District taking over this 4,000-acre farm and turning it into a marsh. We felt like we were out in front of an issue and were not quite sure what to make with the lawsuit. It was filed a month before a federal election, and there was a lot of posturing going on, and we could not tell. Dexter [Lehtinen] was a politician, not a scientist, so when it was first filed, we did not know what to make of it.

G: Do you think the lawsuit was politically motivated?

M: No, not totally. I mean, you cannot ever separate that [politics] from [environmental policy]. There was a very aggressive superintendent of Everglades National Park who was frustrated with [the] Water Management [District] on another issue, a south Dade farming issue related to the place called the Frog Pond. The District had a number of people very legitimately concerned about water quality in the Everglades. That is why we were doing the SWIM plan. That is why we were in Tallahassee taking over the lease. There were a lot of

legitimate issues. I was always with the school [of thought that] you can get a lot farther, sooner, without litigation, but that was just my feeling at the time. It turns out we got pretty darn far. It took us five ugly years, but we got pretty far with the Everglades Forever Act as a result of the litigation.

G: Do you think the Water Management District was unfairly singled out in the lawsuit as being responsible for pollution problems in the Everglades?

M: Yes, I would say they were. I cannot help but say it was a little bit unfair. But unfair may not be the right word. When you work for an agency that is out in front of an issue like that, and it is an agency with a big budget and a lot of financial authority, you are going to be a target for that sort of thing. It sort of goes with the territory. I felt it was a little unfair at the time, but only because we had been working so hard to try and get some things done in the Everglades.

G: Could you describe your role in representing the District during this [Dexter Lehtinen] lawsuit?

M: The lawsuit had two phases, really. The first phase was when the federal government was suing the state and there was active prosecution of the case between those two. The [Water Management] District hired a national law firm. I was the senior technical person. I was brought to the executive office specifically to deal with the Everglades in 1989. I was theoretically in charge of the technical issues. I oversaw the SWIM plan, and then I was also overseeing the litigation technical side. The SWIM planning and the technical support fell under me. The legal stuff was under Steve Walker, who was [the Water Management] District counsel. That was sort of our team. I went to the negotiations with the federal scientists. Richard Harvey, who worked at DER [Department of Environmental Regulation] at the time, was sort of my peer on the DEP [Florida Department of Environmental Protection] side. Carol Browner [head of the Environmental Protection Agency under President Clinton] represented the Agency. Richard Harvey was the senior technical person. He and I were in charge of negotiating a technical solution for the lawsuit between the federal government and the state.

G: Could you characterize the working relationship between the governor's office, the Water Management District and the Department of Environmental Regulation, as you tried to respond to the lawsuit?

M: The governor's office pretty much depended on Carol [Browner], from our perspective anyway. You know, I was never involved in any discussions up there. We met with the governor probably two or three times, and my impression was he depended almost exclusively on Carol for guidance in the Everglades litigation. From the governor's office, that is about the extent of it. Carol was new

to Florida. I mean, she was born here, but her career had been in Washington. She had never been so immersed in an on-the-ground issue in Florida the way she got immersed in that one. We had a very good relationship on the working level that I dealt with. The director of the District at the time, John Wodraska, hired one of our former board members, Timer Powers, who was a genius for getting people to work together, and he established a strong relationship with Carol, and he became kind of a senior, I do not know if mentor is the right word but something close to that, for a number of people in the case - me, for sure, - and there was a very senior person in the Justice Department who played a similar role for the feds. But Carol controlled the state team. Her lawyer, Dan Thompson, and our lawyer, Steve Walker, worked well together. Both understood the law and tried to do the best they could on the legal side. Richard Harvey and I concentrated on trying to come up with a technical solution. But on the policy level, it was pretty much Carol. Once [Lawton] Chiles [Governor of Florida, 1991-1999] came in and Carol was appointed, she took charge. I think we functioned as a good team. We had a lot of common interests.

G: To what extent did the lawsuit affect the working relationship between the [Water Management] District and the Corps [of Engineers] on other issues, like the Kissimmee River restoration?

M: I do not think it affected anything appreciably on the Kissimmee because it is in a different watershed. The District had pretty much wrapped up what it needed to do by 1990. The fact that it was authorized in 1992 is more a scheduling issue with how Corps projects got authorized. I do not remember any conflict there. It seriously complicated the relationship on other projects, especially the Everglades Park Expansion project. It became another big problem for Modified Water Deliveries. Not so much that they acknowledged water quality was a big issue at that stage, but it became very hard to work collaboratively with the Park Service because the superintendent of the Park was one of the champions and most aggressive sponsors of the litigation, and that relationship went pretty sour. Because most of our Corps projects were really three-way projects - Corps, District and Interior - the projects kind of floundered a little, I guess.

G: How important was the decision by Governor [Lawton] Chiles to "surrender" before Federal Judge William Hoeweler in May of 1991?

M: It completely changed everything. I do not know how you define important, but it was an event that completely changed the process. My recollection is that that is not why [Governor Chiles] went there that day. The state team went there, and we had progressed way down the road on our Everglades SWIM plan. We had a plan that Carol [Browner] seemed comfortable with and we thought was responsive to the issue of water quality. It was not as big as the Everglades

Forever Act, but this was 1991. If we could have started the SWIM Plan then, it would have made a huge impact on the Everglades. We were in Court asking for a one-year stay to get our SWIM plan through the process and begin constructing stormwater treatment areas. We had the money, we had the backing of the state. [The] agriculture [industry] would probably not have litigated it. But once the court hearing started there, there was just a lot of theatrics, and the governor [Chiles] decided on his own to say that. [It caused] complete bedlam in the courtroom. Depending on which side of the aisle you were on, there were groans or sighs. I do not know how to describe it, but there was definitely some audible reaction. The judge [Hoover] immediately declared a recess because he knew it changed the whole context of everything. He declared a recess, [and] everybody in the courtroom jumped up. All the government people went over to their corner, and Carol and the state team got around Lawton trying out to figure out what to do. The feds were ecstatic. They had just won the case. It had just ended right there. We reconvened, and [Judge] Hoeveler said, I sense that we need to continue this for awhile and let you all talk. We did. We started very serious settlement negotiations with the federal team. That resulted in the consent decree that was accepted by the Water Management board in August of 1991, I believe.

G: You did not know Governor Chiles was going to do that on that day?

M: No. We had a plan, and the plan asked for a one-year stay so we could pass our SWIM plan. I think all the attorneys on the state side were on board with that, but Lawton changed the plan on the fly.

G: Why do you think he did that?

M: He was an expert at reading what would work or not work politically. He knew the state being on the wrong side of the Everglades issue would never work politically. He saw some theater transpiring. Dexter [Lehtinen] was very theatrical in his approach to the judge. Lawton saw the theater, knew that Florida could not win if the feds stayed with that kind of conflict. If we had gotten a stay, it was clear we did not have the relationship with the feds that they were ever going to accept anything we proposed. Even if we could get it through the state process and maybe convince a state judge, we would have an ugly relationship with the federal government. Lawton kind of just processed all that, I assume. Obviously I did not talk to him about it, but I am assuming he processed that and went for it. No one had any clue what the settlement would look like. But the process was not working, and he knew he had to change it, I guess.

G: Why was the sugar industry so strongly opposed to the initial federal-state settlement?

M: I am sure you will get some comments from them on that. At the time, I was on the state side. There were so many flaws with the state-federal settlement. It was not a settlement to end the case. It was a settlement to put the state and the federal attorneys on the same side of the courtroom against sugar. There was no prospect at all that the 1991 settlement between the state and the federal government would end the litigation. It was designed to put the litigation in a posture where the government could win it, not to end it, because it did not deal with any of the sugar issues, it did not deal with any of the very legitimate scientific debate that was still raging over every single aspect of it, and, most importantly, it did not deal with financing. [The litigation] proposed doing things that no one [had] identified where the money would come from. It was not a complete plan. It certainly was not a complete package because the science was not done. The legal authorities, in terms of [whether] the [Water Management] District [could] even do this - this [action] being [to] condemn farmland [and] build 30,000 or 35,000 acres of treatment areas. The District did not have the legal authority at the time to do it, there was no funding mechanism available to do it, and I think the sugar industry had been offended by this process all along because it was played out in the politics and media with them as the bad guy.

G: Could you describe the next phase of negotiations that led to the Statement of Principles Agreement announced by Interior Secretary Bruce Babbitt in July, 1993?

M: Yes. After the August 1991 settlement, we went through a year - I do not know exactly how long it was - of really hard-core litigation. The sugar industry and the Justice Department were throwing huge dollars at this case, and the state and the District were trying to keep up in terms of throwing staff at it. After about a year of that, it became clear it would not work. There were marathon depositions of scientists and huge boxes and boxes of data and statements and transcripts. I was deposed for fifteen days by a bank of lawyers, that, in my opinion, never covered one bit of useful ground. It [came] almost [to the point where] the process itself was the end. It was going to torture everybody until they were desperate enough to do something different, and finally we got to that point. Actually, it came after a governing-board meeting. We had the preliminary design document of the 1991 settlement. The preliminary design document had the levees and the pumps and showed where they would be, and we presented that to the board in a way that the Justice Department did not like. They were not happy. We met with Suzanne Ponzoli, and I was not alone - Tony Federico, the top District scientist was with me, [and] we brought other scientists in. We went down to Miami to their war room - they had an Everglades [war] room - and suggested, why don't we bring in a mediator and involve all the parties. [Suzanne Ponzoli] said, well, I guess so; this is not working. We came back and called

around [to] people to find out some names of potential mediators. We located a couple, brought them in, had everyone meet with them privately. They met with the sugar industry and the U. S. Attorney and Justice Department privately. They met with the Water District and the state. We picked a mediator, Jerry Cormick from Seattle, and then we began mediating. The first stage of the mediation was [to] let us revisit the technical plan that was the basis of the 1991 consent decree, and everyone could participate. The sugar industry had scientists there, the District, the Interior Department, the Corps, Indian tribes, environmental groups, everybody. Under the leadership of the mediator, everyone redesigned the plan to deal with the Everglades. One of the things they decided early was [that] phosphorus is not the only problem; that let us design a plan that deals with more than phosphorus. Let us try and fix some of the other problems. They mediated the technical issues for half of 1993, I guess, and came up with what was called a technical mediated plan, which they had pretty much in place by May or June of 1993. What it did was it made the STAs [stormwater treatment areas] bigger, brought in more watersheds so you could put more water in the Everglades [and] tried to address all the water flowing in the Everglades. The 1991 settlement was an anti-sugar thing; it was only going to deal with the water coming from the sugar farms - we are not going to deal with all the water that is coming into the Everglades from other places because our fight was only with the sugar industry. So, the mediated plan was bigger in scope, did a lot more for the Everglades, cost more money, but brought more people into it. Then where do you go when [you have] the mediated plan? Once you have that, you have to have a plan for what comes next. We all worked on a Statement of Principles, which would define how we would try and bring it to closure, because you still have to finish. Plans, you know, there are a million plans that are on shelves, but you [have] got to build it, especially in litigation. The Statement of Principles came out of the fact that we were optimistic because the scientists had developed a mediated plan that there was broad consensus for. It was not one that was crammed down people's throats, sort of the way the 1991 settlement was. This one was developed in the open with all the interest-groups, and people liked it and wanted to build it. The Statement of Principles sort of defines the playing field to bring it to closure [and] the key things that had to be part of it - money from the industry, a regulatory program on the industry, the roles of the Corps and the [Water Management] District and the Interior Department and all that.

G: Who are the key individuals who were involved in these negotiations?

M: On the technical side, the technical mediation, by this time, [Steve] Walker and [John] Wodraska had left the District and I was in the executive office, not as the technical guy so much as the last man standing, maybe, or the policy guy, so I did not do any of the technical mediation then. You had a couple of key players on the technical mediation. Two federal consultants turned out to be extremely

key - Bill Walker, a statistician from Boston, or Cambridge, and Bob Kadlec, a civil engineering professor from the University of Michigan, who specialized in wetland-treatment systems. They became Bob - the design guru [and] Bill - the statistician and standard-setting guru. On the state side, it was really Tony Federico for the Water Management District who led the District team of scientists; Richard Harvey from DEP, but he leaned more and more on Frank Nearhoof, who was on his staff at DEP. On the federal side, you had Mark Mafae from the Loxahatchee Refuge, Bob Johnson from Everglades National Park. But the federal team leaned more on their two consultants, Bill Walker and Bob Kadlec - that is my recollection. The environmental groups had Paul Parks and there were numerous other people. On the policy side, the legal side, the District's team was: I kind of represented the District on the policy side along with Valerie Boyd, who was the chairman of the board of the Water Management District. Irene Quincy was deputy District counsel [and] really understood the law and was great at drafting complicated legal documents. The DEP team, Dan Thompson was their key lawyer. Lieutenant Governor MacKay was involved on an almost daily basis by then. Jerry Cormick, the mediator, I think, in the final analysis, did a great job. There are so many opportunities for a process like that to just implode, and people get angry and insult each other and walk away and never come back and all of that. But he did a real good job on the technical mediation. When we got to Washington, you had the Clinton team in Washington who wanted to be in charge, and they sort of put [Jerry Cormick] in the background. You had two Assistant Secretaries of Interior who played the key role on the federal side, George Frampton and Bonnie Cohen. They spent a ton of time on this. After the Statement of Principles, the whole entourage went to Washington [D.C.] for six months. We lived in a hotel in Crystal City [area in Arlington, Virginia] and met virtually every day. It was amazing how much time people like George Frampton and Bonnie Cohen and the Justice Department lawyers [put in]. Keith Saxe was their main lawyer, and Suzanne Ponzoli of the U.S. Attorney's Office in Miami was totally involved. We just worked and worked and worked. After six months, we were real close to everyone, all the big players, agreeing. But one thing we all had agreed on was [that] we would never get a settlement that everyone would sign. There were farmers and environmentalists and others who would never agree, just on principle, and they were not going to sign an agreement. If you have a settlement agreement that not all the parties sign, it is not a settlement agreement, so everyone agreed you had to pass a law. Right before Christmas, 1993, the mediation ended in Washington. It was portrayed [that] talks broke down and all that, but, really, it was just an acknowledgment that it had to be finished with a new law, not a court settlement agreement.

G: How important was Secretary [of the Interior, Bruce] Babbitt's involvement?

M: From my perspective, Secretary Babbitt was kind of like Governor Chiles. I mean, he was involved occasionally. We met with him a couple of times as part of a large group just to more or less keep him informed. I think he was important in talking to the very highest levels of people in either the sugar companies or Congress or the administration or the governor's office. He had a good relationship with Lawton. But he had a real solid team negotiating it day-to-day, and he had senior political appointees, Bonnie [Cohen] and George [Frampton], who he trusted with everything. [Babbitt] was not a figurehead but he only got in at the highest levels. We did not see him at the working level very much. The federal staff probably saw him a lot more than I am aware of.

G: Why did the Statement of Principles Agreement break down in December?

M: Because we could not figure out how to finish it and keep everybody there. Once the plan was in place, it became an argument over money - who paid how much and why and how - and legal authorities in terms of the regulatory program and taxes. There were some people who felt they never had their day in court on the science [issues], and so they were not going to be part of any settlement that involved millions of dollars when they had not even had a hearing on the science. The science was packaged through these mediated sessions and a consensus plan developed. Well, unless you accept the consensus plan, it is not a consensus. We always had a few parties who did not trust the science we used. There were environmentalists who were just horrified with the idea that Babbitt would ever sign an agreement with the sugar companies, regardless of how good it was for the government. We heard a lot of that. Some environmental groups did not favor any agreement. Not all of them, certainly; some of them wanted to solve this. We had some real productive environmental groups on the mediating team, but there was a large, very vocal group that would never accept any settlement.

G: Which group, in particular, are you referring to?

M: The Everglades Coalition, I believe, which is a large collection of groups, did not support it. I would have to go back and really look to come up with other individual groups.

G: The sugar industry also backed out of the agreement for a time. Is that correct?

M: My recollection is [that] when it was clear it [the settlement] would not come to closure, U. S. Sugar went home first, but I cannot remember all the details around that. In the end, none of the companies backed out.

G: How were these issues finally resolved?

M: They were resolved in Tallahassee in the negotiations over the Everglades Forever Act. The Everglades Forever Act started with the mediated technical plan. It did not try to undo the plan; it only tried to finish what the settlement negotiations had almost finished, which is provide a legal framework to build the plan and to fund the plan and to regulate agriculture, and then do some of the research and stuff. But the things you really had to do, you had to have the legal authority to build the plan, you had to approve the plan itself, you had to provide the money to build the plan, and then you had to regulate agriculture so that they improved their own water quality as much as they could. Those were the three things that you had to have to make the settlement work. You could not get that in a courtroom. Breaking up the negotiations was really an admission that you could not get there in court; let us go to Tallahassee and do it. There were not any major attempts to undo any of the big features in Tallahassee. The broad team had negotiated it, negotiated the actual EFA, Everglades Forever Act, language, and it held together remarkably. Not that everyone was happy, and there were critics in the sugar industry and in the environmental groups and probably in government, but it all got done.

G: How would you compare and contrast the provisions of the Everglades Forever Act to the SWIM plans that had been advanced earlier by the Water Management District?

M: The SWIM plans did not have as big a hammer, so you were much more - this is my impression - dependent on consensus to develop a SWIM plan that would actually become approved and final. The other big thing is money. The SWIM program died for lack of funding. The Everglades program knew that it could not die, so it was not going to be a plan until it had the funding as part of it.

G: Could you discuss the controversy over the Frog Pond area that nearly prevented the passage of the Everglades Forever Act?

M: The Frog Pond was a tomato farm outside Everglades National Park. It was basically across on the private side of the levee and canal that formed the boundary of Everglades National Park. Many of the farmers in the Frog Pond used to farm inside the Park in a place called The Hole in the Donut. They were moved out of the Park in the 70s, and they ended up in the Frog Pond [which] supposedly [served as] their place to farm without bothering the Park. It is a real complicated history of why it became controversial. There was a project called the South Dade Conveyance System. The idea of the South Dade Conveyance System was [to provide a way for] the south end of the Park [to] get water from Lake Okeechobee in a drought. In order to make that possible, you had to greatly

enlarge the canals between Lake Okeechobee and Florida City, and that was done in the late 1970s. When that was done, what used to be relatively small ditches in western Dade County became great big deep canals, and when they made them bigger and deeper, it turned out they intercepted such a huge amount of groundwater flow that the canal system did not know what to do with it [the water]. All the groundwater flow collected in the canal had to be sent to south Dade to get out of the system. The only way out of the system was through the C-111 Canal into Florida Bay or Barnes Sound or through L-31W into the Park. The last piece of the South Dade Conveyance System was Pump Station S-331 that became operational in February of 1983. That is the year of the big El Nino. The Park was flooded, the south Dade tomato farmers were flooded, and we began the experimental program. The experimental program brought even more water into south Dade. The way the tomato farmers in the Frog Pond used to operate, whether it was [in] The Hole in the Donut or in the Frog Pond, they would wait until the winter dry season, and then as the water table receded, they would go in and plant. Once the canals were over-excavated and the S-331 pump was put in, there was so much water coming from the north that you never had a [water table] recession in the canal system and the Frog Pond. There was a gate there, and all the water coming from the north, if the gate was not opened, the water levels in the Frog Pond never went down, so they could not get in and plant. If they got in and planted and then there was rain without the gates being open, they would flood, even with a little bit of rain, in the dry season. It was the Frog Pond tomato farmers who filed suit against the experimental program, and the condition of the suit was [that] the District could send a lot more water to south Dade but we had to open the gate and let it out the bottom, so it did not just pool up under the farms. We did that from 1983 until 1989. [There was] a big seagrass die-off in Florida Bay in the late-1980s. People were not sure what caused it, but there was a need to find a cause, so they focused on the experimental program, the outcome being a very politically active, vocal group in the Keys wanting to eliminate farming in the Frog Pond. They did not know what to do about Florida Bay; they thought that would help, and they thought that was at least one thing you could do. The District and the Corps were in a bind because the Frog Pond was surrounded by federal canals that were supposed to provide flood protection. With the experimental program, they were operating the conveyance system in a way that [it] was never expected to be operated in the design documents. Everyone was [working] outside the range of the original design and kind of operating the best they could to help the park without killing the farmers. Mike Finley, the superintendent of the Park, was totally opposed to the compromise that the previous superintendent had worked out on the experimental program, which was, if you are going to send all that water to south Dade, you can let it pass through rather than backing it up; he wanted to back it up, he wanted to keep the water table high to help Taylor Slough. He was adamant that you had to do that. If you did that, you could not farm. The farmers

wanted to farm. His solution was, let us take their land. So, several Florida Bay activists latched on to the Everglades Forever Act and tried to fix part of the Florida Bay problem in that act by dealing with the Frog Pond. As I remember, it was a section that allowed the District to condemn the western half of the Frog Pond. [It] required an interim plan to put more water in Florida Bay. Florida Bay was actually getting more water than it ever had, but in the wrong location. It was just [that] people did not know what to do, [and] it was easy to blame the canal system for the problems in Florida Bay. But anyway, the end result, I think, was [the incorporation of] language that allowed the board to condemn the western half of the Frog Pond, which is where most of the tomatoes were growing; it was where the best soil was. [It was] very controversial. The Frog Pond people were always active in court to protect themselves and active in Tallahassee, so it was not an easy thing to get through.

G: And that was actually done? The land was condemned by the District?

M: Yes, in 1995, I think, and by then, I was no longer at the District.

G: Marjory Stoneman Douglas refused to have her name placed on the Everglades Forever Act. Why were so many of the environmental groups critical of this agreement?

M: They were opposed philosophically with any agreement between the government and the sugar companies. It is not fair for me to trivialize their position on that, but that was the perception. We had one national environmental group who came into Florida at the time of all this controversy with water quality as the issue. They went door-to-door collecting money from people using water quality as the issue, which is kind of an easy issue to get people's attention on. They collected, I do not know how many millions of dollars, and then left. They did not stay and were not active in the process after that. I do not know how any and all of that works, but there were a lot of just strong, basic philosophical beliefs that farming did not belong in the Everglades, [that] government should never agree with the sugar industry, and [that] you will never fix the system until the farmers are gone. There are some strongly-held beliefs among a lot of individuals, and they just never got beyond that.

G: What are the most important obstacles that will need to be overcome in order to meet the new phosphorus water-quality standards, perhaps as low as ten parts per billion by 2006?

M: One obstacle is the public perception that there is something you can do that makes sense to create ten parts [of phosphorus] per billion [parts of] water and that that is something you have to do. In other words, there is no doubt the

technology is available to produce water at ten parts per billion. It is a matter of money, and maybe if we have enough time to do the science right, it may not even be a whole lot more money. Maybe we can do it with fine-tuning the stormwater treatment areas. But you got to remember, the Everglades is a big system; phosphorus is one issue. You are going to have to spend a lot of money to fix all the issues. If the STAs are producing water at twenty-five parts [phosphorus] per billion [water] and you are going to have to spend another \$500,000,000 to get it to ten [parts per billion], and possibly create other water quality problems in the process, would it make more sense [instead] to spend that money fixing some of the other Everglades issues? I think the biggest thing about the ten, it is a lightning rod, it is easy to trivialize the effort it would take to get it, and it is easy to exaggerate the problems associated with not achieving it. It may be very important, but a sort of blind adherence to a ten parts per billion standard could easily force government to do things that are not in the best interests of the Everglades, such as build big chemical-treatment plants north of the Everglades. The obstacle is that [the number] ten has become symbolic, and there are a lot of camps that are entrenched on one side or the other at ten. That is a setup for gridlock and lack of progress and maybe even some going backwards.

G: How would you characterize the relationship between the Water Management District governing board and staff during your time there?

M: It was very collegial. When I first came to the District, there were several very experienced board members. The core of the board was there for a long time. The chairman when I got there was Bobby Clark. He had been chairman for twelve years. The vice chairman was Bob Padrick, who had been on the board for something like seventeen years. There was a good close working relationship with the key board members and staff. In Bob Graham's second term, he pretty much - not cleaned house - but made a large block of appointments that gave an immediate new majority to the board. And anytime the board changes, there is a lot of anxiety, because people who have never been on the board, or who have never really worked with water management, do not know what to expect when they get on the board; they bring their background to the board, and it takes them a while to fit [into] it. My recollection is [that] every time there was a major change in the board majority, when you get five new members at once - which happened with Bob Graham, Bob Martinez, [and] Lawton Chiles - there is a certain period where there is a lot of anxiety and feeling each other out and getting board members oriented. Generally, what happened as long as I was there, was no matter what board members thought they were going to be when they were appointed, whether they came in with an agenda to lower taxes or make it easier to get permits or to restore the Everglades, they very quickly became impressed with how complex the issues were and how capable the staff was and how

exciting it could be to be part of something where you were really changing Florida. Usually within a year, they developed a strong relationship, a team-like relationship with staff, and it was very collegial, supportive. I think that really was responsible for one of the most positive periods of water management, which was the 1980s and early 1990s, when we were able to attract a lot of really bright people and energize a lot of smart, dedicated board members who believed in public service. That carried through Martinez and through Chiles. Although when Martinez and then Chiles came in, it began to get a lot more political.

G: Was that because of the lawsuit, again?

M: Not just the lawsuit, the Kissimmee Restoration and the Okeechobee SWIM process also attracted a lot of attention. The lawsuit led Carol Browner and later, Buddy McKay, to take a much more active role, and so the District sort of had to share the state playing field with other big players, especially on that issue. As you get into real complicated or controversial issues, if you are going to take people's land or you are going to regulate an industry and make them spend \$12,000,000 to \$15,000,000 a year that they had not spent before, those are huge issues, and there is always controversy, and politics is always drawn into settling those big issues. The higher the sights were set for the District, you know, if you are going to condemn the Frog Pond or condemn 40,000 acres of sugar farms and spend \$700,000,000 on an issue like phosphorus or backfilling C-38 (the Kissimmee River Channel), those are major public-policy and social movements, and you are always going to have a lot of politicians involved in that and it is critical that you do. I guess it was a natural progression, but it has clearly progressed that way in the last decade.

G: How much of a role did the board have directing the agency's position during the negotiations over the lawsuit?

M: They had quite a bit. We had a real strong chairman during the first settlement, the 1991 [settlement], Jim Garner, and we had a majority appointed by Martinez. Chairmen are always very involved in the big issues. It is harder for the other members to get as involved. Jim Garner was very involved. He was followed by Valerie Boyd, who was also very involved. But these people have not done water management their whole career or water law their whole career, so their role is different. Their role as leader is more of a policy leader and outreach to the big players. The board chairman, no matter who it is, has to be on good working-relationship terms with the administration in Tallahassee. Jim Garner certainly had that with Bob Martinez. Valerie Boyd had that with Lawton Chiles and Buddy MackKay [Florida Lieutenant Governor, 1992-1998]. But in terms of content, it did not matter who the chairman of the board was. The content was generally

worked as an issue among staff and presented to the board, usually by the District counsel. Certainly in the first settlement, Steve Walker was key. The chairmen are not equipped to step in and say, okay, we are going to do X in this clause because I know a lot about the law and we are going to do that; that is not their role. But the chairmen are always very active in any of the big issues.

G: In 1994, Sam Poole [Executive Director, South Florida Water Management District] was selected over you for the position of executive director by the Water Management District board in a close and controversial five-to-four vote. Why do you think the governing board made the decision to go with Mr. Poole?

M: Well, we had just had a very tough five years on the Everglades litigation. We had some new board members on the board who were brought in with the idea that things had to change. The Everglades Forever Act was very controversial. A number of high-profile environmental groups were opposed to it. I was the symbol of the Everglades Forever Act on the staff at the District. The Florida Bay issue had been very hot, and, still, people were not sure what caused the seagrass die-off. They thought it was lack of fresh water, and I was perceived as the guy who would not automatically buy in to things like condemning the Frog Pond or whatever they felt was necessary down there. Anytime you finish a very big and controversial project like the Everglades Forever Act, when it is over, you hear from the people who are unhappy, and the governor had heard from a lot of the unhappy people, and Buddy MacKay had heard from a lot of the unhappy people. It is a lot easier just to make a change in leadership in response to that. I have never really tried to overanalyze it. I did not look back once it was done and am very satisfied with how things turned out.

G: How important was the creation of the Governor's Commission for Sustainable South Florida by Lawton Chiles in 1994?

M: It turned out to be pretty important. It was created by Chiles, but I think it was the brainstorm of Buddy MacKay. We had conversations about the Governor's Commission at the end of the Everglades Forever Act process. Because the Everglades Forever Act was really the result of settling litigation and a lot of negotiations in Washington, there were a whole lot of people in Florida who cared a lot about water and a lot about the Everglades who were not in the room when all that was done, and they felt like they wanted to be a part of any process that was that important for what happened in South Florida. But there was no way for them to get involved. You could not have redone the Everglades Forever Act with a much bigger group. So, Buddy - and I am not sure who all his key advisors were up there - came up with the idea of the Governor's Commission as a forum to let everyone who had an interest in the Everglades issues and South Florida environmental and water issues be part of a process where they could be heard

and feel like they had some input that mattered. It probably was a very important thing to do, not so much for the Everglades Forever Act but for the Restudy that was happening about the same time.

G: How would you compare the Chiles Commission with Jeb Bush's Governor's Commission for the Everglades?

M: The Chiles Commission had a mission. They had a goal to achieve, which was [to] represent the local interests in the development of the Restudy plan. They went on a few side-issues early on, maybe not side-issues, but I always considered them sort of filler-issues. They were waiting for the Restudy to get far enough along to where some work product and big issues could be brought before the Governor's Commission. But really, they were set up to make the Restudy plan work and to give it the broad public exposure, from a concentrated group of people who would pay attention to it, over a series of years rather than just go to a couple Corps public hearings. So, they had a goal, they had a mission, a time-frame, an end-product, and they got it, and they did it, and it matched the timetable of the Restudy. The Jeb Bush Commission really does not, did not, have that kind of mission. There is no pressing work-product that they have got to review or participate in, so they really just do not have an issue that can bring them together. When you look at the Governor's Commission, you have to look at Dick Pettigrew. He is a brilliant leader in terms of public policy, and a lot of the success they had was the strength of his personality and just how much he knew about what he wanted to do and what it took to get a big group there. He gets a lot of credit for that. When he left, there was a natural, sort of, air going out of the balloon on the Governor's Commission. But their job was finished, really.

G: How important was the creation of the federal South Florida Restoration Task Force in 1993?

M: I have seen limited value in it, from the outside. The idea was good. We were constantly running into projects that one federal agency wanted and another federal agency did not, and we would get stuck in [the] process over endangered species or environmental policy act reviews. The concept of a group of primarily federal agencies in Florida [that met] to iron out the differences and come out with one federal position, it made sense philosophically. [It] has not seemed to work that way. We have more conflict than we have ever had among the federal agencies. I have a hard time seeing that the Task Force has produced a whole lot of value in terms of moving big things forward. Rock Salt has produced some useful work-products that are necessary considering the scale of the effort down here and he has worked to make the Task Force and Working Group a success. I think the crosscut budget that they do is a real useful document. The process-

oriented things [such as] trying to get an Everglades agenda through Congress, when it involves ten agency budgets, or whatever the number is, I mean, that is a real valuable thing. That is [the] sort of stuff you do not see that is important that goes on, but the Task Force itself or the Working Group, as an outsider, I am not seeing much value added there lately.

G: Why do you think it has been so ineffective?

M: I do not know. It would be hard for me to say. The federal government is designed to be out of control, I guess I would say. That is a little overstatement. Designed to be hard to control. You have a lot of conflicting missions with very strong statutory backup. The Corps [of Engineers] has some real strong statutory justification for everything they do. The Department of Interior has some real strong, but different, statutory justification for everything they do. There is no single accountable person below the White House on those issues, and the issues we need to resolve are much too local and much too complicated to, hopefully, ever raise up to that level. As a result, there is no place to take a decision, and agencies are free to continue their own positions indefinitely.

G: How much of a problem is that going to be as we move forward with the restoration effort?

M: It is a monumental problem right now. Moving forward with the restoration includes doing a bunch of projects that should have already been done. The Modified Water Deliveries Project is the best example. The Corps designed a plan, everyone approved it at the time, Congress approved it and funded it, but it is no longer the preferred plan among the federal [agencies], or at least the Department of Interior. So, it has not gone anywhere, and it has created a whole lot of different logjams that have been tough to break. Unless something a little smoother is worked out in terms of how you resolve those [conflicts], then you cannot be too optimistic about CERP actually building any big things soon.

G: Could you describe your involvement with the Corps of Engineers Restudy?

M: I was involved (when I was at the District) in reviewing the language in the 1992 WRDA that authorized it. Jim Webb was an environmental activist and leader, it was really his brainchild. We discussed his objectives and supported his effort to get his language in WRDA. My more meaningful involvement came as a private consultant after I left the District. I worked for a number of private-sector interests around South Florida, through the Department of Agriculture, through the Everglades Agricultural Area Environmental Protection District, through 298 Water Control Districts on the Caloosahatchee River, the city of Homestead and a bunch of south Dade people. I participated in the process as the plan was

developed, on a couple of the technical teams that put the plan together, reviewed the model results, made comments and kept refining the plan. I would say my involvement was secondary. You really had a strong government team to put the plan together. I participated as a person who went to the meetings and the technical team meetings and reviewed the outputs and made comments where I thought it was useful. I did not have any special role. I was just another technical staff who was somewhat involved throughout the development of the plan.

G: Could you describe the decision-making process that led to the development of the CERP plan?

M: I can describe what it looked like to me. Since I was an outsider, I am not sure what the real decision making process was. You had a very organized and effective leader of the planning team, Stu Applebaum, an extremely capable Corps planner. The idea throughout the plan was never compromise, or at least do whatever you could to avoid compromising, on your objectives of restoration, and ignore cost as you go through it. Keep the restoration goals and objectives as your primary concern. That mind-set made the plan as expensive as it is, because money was not an issue as the plan was put together. It also led to the consideration of what would be, I guess, uncertain technologies in terms of what has been done before. There are a number of uncertain technologies, in the plan that were key to achieving this objective of no compromise on the environmental goal and do not worry about the cost. It led the modelers to put large-scale applications of some uncertain technologies in the plan because they were very effective, if they worked the way they were assumed, in meeting the objectives. The decision was [to] always try to get all your environmental objectives [into the plan]. Now, the approach to that was tempered with the need to meet the water supply and flood protection needs of the economic side of South Florida. The conflicts generally came with [resolving] how [to] make those two work. They could not eliminate cities or agriculture or tear down the water conservation areas, and so it became a process of adding complicated hardware and fine-tuning operations, so that you could get the most out of every square mile in the Everglades, but still provide water and drainage to the people.

G: How responsive did you feel that the people developing the Restudy were to the interests of your clients?

M: I think they were very responsive. I think they responded to pretty much everybody they could. Agriculture, for the most part, is not a huge new user of water in the future. Agriculture is actually decreasing in many areas in the future, so we did not have to compete for new water as much. There are some areas of agriculture on the west coast of Florida that are growing or are projected to grow, but for the most part, agriculture is shrinking, not growing. So, they did not have a

huge fight over new water, but they had to be guaranteed that their current allocations would still be there. That did not become a design issue as much as a policy issue that was reflected in the planning document, but not the planning hardware. The other big thing is real estate. You [have] got to have land to farm. [Farmers] do not want all their real estate taken, and they want to make sure that whatever is built for the Everglades next to their property is compatible with what they are doing on their property. But those are basically mainline Corps objectives and requirements in any design process, so they were not hard to get them to agree to. What was more difficult was making sure [the planners] understood what [farming interests] were, because the plan-development team was [an] in-house government team, mostly biologists and wildlife people. Our role was more just explaining to them what the private-sector needed and where. It was never really very controversial, I do not think, to have that reflected in a plan.

G: Why was the chief's report, written by Lieutenant General Joe Ballard, that accompanied the Comprehensive Plan to Congress so controversial?

M: It appeared to be a rejection of a lot of the consensus-protection language that was part of the plan. I guess the most controversial part was where he committed - I would have to go back through [because] there were a lot of controversial parts - [but] one of them [was] where he committed to giving the Park an extra 245,000 acre-feet per year, [when] there was no way in the plan to get it there. You have an \$8 billion-dollar plan, and then you have the chief of engineers committing to something that you cannot do with the \$8 billion-dollar plan. You have to add many more millions on to do it. There were some other things associated with that. It appeared to abandon flood control as a mission, or as an essential mission, of this project. I think the most offensive part, though, was the way it just came out of the blue. The Restudy was a consensus-oriented thing with Pettigrew's commission on the public-policy side and the design group on the design side. We all got to a pretty comfortable place at the end of the day, and then with no warning to have a chief's document come out at the end - it just introduced some huge mistrust in the process.

G: Where did that proposal come from, or where did the chief's report come from?

M: I do not really know. It would be interesting to hear the Corps' take on that. We never really knew. There were a whole lot of people who disavowed any role in it when it was over, but someone had to do it, and I do not know who.

G: Some critics have suggested the Comprehensive Plan is overly dependent on unproved technologies, such as aquifer storage and recovery. How do you respond?

- M: I don't disagree with that. Part of the problem is the name. When you call it a comprehensive plan, it is comprehensive in scope, but it is not comprehensive in design; it is still very conceptual in design. It is really a comprehensive conceptual plan, and a conceptual plan is not a design until you can do the design work necessary to prove that it will work. What hurt the Restudy in the final analysis in 1996 - well, in my opinion, it hurt it - [is that] the time-frames were changed, and there became a requirement to submit a feasibility-report to Congress in 1999. The report that was submitted was not a feasibility-report under the normal Corps definition of a feasibility-report, so they had to invent some new names for future reports. But in order to meet a deadline, not being able to do the engineering, and when your instructions are [to] not back down on any environmental goals, the only real option left was to put some uncertain technologies in the plan on a large-scale, even though you knew you had not proved them and you were not sure the plan would work if they did not prove out. I do not know if it will end up doing any harm in the long run, but the harm it may do in the short run is [that] people's expectations are driven by what they see, and the modeling of the plan with all of the uncertain technologies in there - the planners would not have put those [uncertain technologies] in there if there were any more obvious technologies that they could have put in to do the same thing. If the large-scale ASR [Aquifer Storage and Recovery plan] does not work, there is not another off-the-shelf thing you can do. You probably have to start relaxing your environmental or water supply goals. The harm that may be done is [in that] people's expectations are so high, because the computer says the plan can do all these great things; if the technology that is in the computer model does not pan out in the real world, then you [have] to back off on meeting your expectations, and that is always hard.
- G: How confident are you in the ability to plan and the process that the plan sets up for bringing about the restoration goals that it envisions?
- M: I'm optimistic that the process is a framework that can work if the people in the agencies let it work. I would have to admit to some skepticism at this stage, because we had a consensus on a plan with no uncertain technology for Modified Water Deliveries that Congress approved thirteen years ago where we have yet to break ground on the important parts of it. The relationships among the agencies that have to work together to build and operate any of these things are not as good as they need to be. There have been some issues that have undermined the ability of people to work together. [The issue of] the Cape Sable sparrow has been the most obvious example. At this point, you would have to be pretty skeptical that the agencies could ever work together as hard as they would have to, to get most of these components ready to build, and then you have got to confront Congress on the money.

- G: In recent years, the Water Management District has received a lot of criticism for its handling of flood and drought conditions. Are these criticisms fair?
- M: The criticism on [the handling of] flood conditions arises from the reality that flood protection is not a popular notion. You do not notice shortcomings until you have a flood. [There have been] two Dade County floods in the last two years. The areas flooded that everyone knew were flood-prone. It was just a lack of will to spend the kind of money to upgrade a flood-protection system. Urban flood protection is mostly just money. It is very expensive. The damage is high-value damage, and the solutions are certainly expensive and almost always require environmental compromise. The District would probably merit some criticism for not keeping flood-protection high enough on the agenda, but I would say that is a generic social problem. Dade County did not keep it high on the agenda, and neither did anyone else. Usually, flooding is a local issue that the local interests have to drive, and in this case, county interests would be driving it to the District, the District would have to accept it and drive it to the Corps, and there have not been any drivers on flood-protection. On the water-shortage management, I think there is room for criticism because of the decision to lower Lake Okeechobee last spring, 2000. But, given that, they have been very aggressive and successful in managing the shortage. There is one lake-stage that defines water supply for South Florida, and that is the level of Lake Okeechobee on June 1. It is the most sensitive water supply level in the system. South Florida droughts are caused by low rainfall in the summer. Not low rainfall in the winter - low rainfall in the winter is typical, and the system is designed to where that is fairly routine. Low rainfall in the summer stresses the entire water supply system. There are two sides to managing water supply in a deficit situation. One [side] is the water shortage itself, which is defined by the fact [that] you do not have enough water in storage to meet your needs, so you are short on water, and [the second side is that] you have a drought, which is the lack of rainfall. In South Florida, regional water shortages do not generally happen the same year as the drought. Usually, you have the drought, and then the year after that, you have the shortage, because Lake Okeechobee and the conservation area system gives you a one-year carry-over supply. If you look [at the situation] in the past droughts, usually there is not even any water shortage declared in the drought year. 1980, which was the dry year before the 1981 drought, there was no water shortage declared. 1989, which was the drought year, there was no shortage declared until 1990. The shortage comes the year after the drought when your supplies in storage are low, but, usually, the worst of the drought is over, so you get enough rain to where you can deal with [having] less [water in] storage. By lowering the lake last spring, the District ended up with the shortage and the drought occurring in the same year, which this system is not built to deal with. We are in huge stress right now trying to meet needs in a system that was not designed to operate at these

levels. This is one the Water Management District took the lead on. They are the only agency who speaks for regional water supply. They made what they thought was a good environmental decision a year ago, but it did not turn out that way. In their defense, they have taken some important actions since that have helped both the Lake [Okeechobee] ecology and water users.

G: Why do you think they made that decision at that time?

M: It was a conspiracy of Mother Nature. We had just had five years of high lake-stages. The lake is changing. There had been no progress on improving the water quality in the lake for those five years. There was high water. Things that were very unusual in terms of the plant life in the lake were occurring. Even hydrilla [was] disappearing. In the 1980s, too much hydrilla was the problem. And a lot of the other wetland plants around the edge of the lake suffered with high water. You had that backdrop, and the way to fix that was to get the lake lower to encourage the plants to come back. You also had this, I think, inappropriate reliance on long-term weather forecasting. The District just changed the Lake Okeechobee regulation-schedule to include a climate factor in decisions on operating the lake, but the regulation-schedule includes a climate factor based in actual hydrology in South Florida, not weather forecasts. One of the key things [in the regulation-schedule] is [whether] the Kissimmee Valley [is] wet or dry, and do you have flow from the Kissimmee? That was giving an unmistakable dry signal last spring, which is trouble because that is where the lake gets its water, but you had the NOAA [National Oceanic and Atmospheric Administration] regional climate forecast center predicting a wetter than normal summer. It does not really predict a wetter than normal summer; it predicts actually a 37 percent chance of wetter than normal and a 63 percent chance of normal or below normal. There was too much weight given to that forecast. But because the climate forecast looked like it was predicting wetter than normal, that gave the District staff and board a false sense of security that they could lower the lake and it would fill back up. They downplayed the fact that the Kissimmee Valley was dry. They never mentioned the fact that we rarely, if ever, go ten years in Florida without one of these wet-season droughts and we had just gone twelve without one, or eleven. They gambled with the one thing they control and the one they cannot replace, which is water in storage.

G: How well has the District balanced the needs of the natural environment with those of urban and rural water users?

M: I think they have done a pretty good job, actually. I mean, there might be individual cases on one side or the other where you might think it was too heavy, but they spend a lot of time trying to balance it. They have got legal requirements to try to balance them, and I think they do a pretty good job.

G: What is your perspective on the controversy surrounding the Eight-and-a-Half-Square-Mile Area?

M: My perspective? It is very frustrating. I was the engineer at the District when the Modified Water Deliveries Plan was developed. I was doing the modeling and whatnot. Having been in the executive office when it went to Washington and got through Congress, I was real involved in the testimony and all of that. I also worked for at least two governor's appointed committees that looked at the Eight-and-a-Half-Square-Miles when I was at the District. Governor Graham appointed a committee, and Governor Martinez appointed a committee. Both of them strongly endorsed the plan that Congress adopted. I would say my biggest feeling is frustration that we thought we had solved the [problems by developing the] plan. We had a very open multi-year broad-based discussion where we debated every issue at length, and everyone was there, and we ended up twice at the same place, but we were not able to build it. So, [I felt] frustration more than anything.

G: Do you believe, then, it is possible to restore the flows into Shark River Slough without removing the residents from the Eight-and-a-Half-Square-Mile Area?

M: Yeah. Definitely possible. I think the 1989 plan would have worked. Some of the objectives have changed, so people have constantly tried to go back and change it. One thing you cannot do is just think you can pour all that water into Northeast Shark Slough and not have a plan to deal with it because it all goes east underground. The Eight-and-a-Half-Square-Mile portion of the Modified Water Delivery project was a part of the design that would collect seepage. All of that works to prevent the impacts of restoring the Slough from reaching the populated areas of Dade County. There is this notion [that] when people look on the map, they say, well, the L-31 North is such an obvious divide-line. Well, it was not built to divide the Slough from the people. It would have been built on the west side of the Eight-and-a-Half-[Square-Mile Area] if that was the case, because it would have followed the ground contour, not the political boundary. But you cannot use that levee to separate the slough from the rest of the county because of the south Dade conveyance system. When the conveyance system project enlarged that canal, it opened up the aquifer there, and [the levee] leaks like crazy. So, one thing you cannot do is restore the Park by not building the Eight-and-a-Half-[Square-Mile Area]. If you are not going to build the Eight-and-a-Half-[Square-Mile Area], you [have] to build something much more aggressive to control seepage, either a curtain wall or a bunch of big pumps, and something really manageable, which you do not have. The misconception is that, well, this is just an appendage; we can just take it off the map, and then we [will have] free-flowing east Everglades. That will not work. That will just be another ten- or

fifteen-year delay in the project, because they will not know what to design to deal with the seepage. Hopefully the compromise plan that was recently selected will work.

G: Why have the Park Service and environmental groups been so vocal against the idea of keeping the residents in the Eight-and-a-Half-Square-Mile Area?

M: The Park Service is afraid that, once they get in there, the residents will want more flood protection, and that will require lowering canal levels in a way that impacts the Park. You can agree or disagree with that, but that is their feeling, and I think it is a legitimate way to look at it. I think it is overstated a little bit. If they are not there, you are going to have that same issue at L-31 North. But that is their point, and that is a valid point for them.

G: This past March, the Water Management District governing board proposed and then backed away from adopting Phase Three water restrictions. Why do you think the governing board made this decision?

M: I think they were convinced that the technical basis for declaring Phase Three had not been met. The water-shortage plan at the District was, again, developed in the late 1980s with a scientific basis, and a progression through the different phases tied to economic harm. Declaring a Phase Three imposes a lot of economic harm on certain segments of the economy. It is warranted, and the rule was adopted based on it being warranted, under conditions that were severe enough to make it the only reasonable response. But implied in that is the fact that, if the conditions are not met, the shortage is not severe enough, and going into higher phases would not be appropriate because of the economic consequence. I think what happened in March, they had some time to get more feedback from the economically-affected parties, and the staff had more chance to look at the actual conditions. They did that.

G: Why have recent efforts to get the general public to reduce water usage in the current water shortage been unsuccessful so far?

M: I do not think they have been unsuccessful. I think the criteria the media is using is not really a valid indication of the success of the cutbacks. The media likes to focus on the one number, which is the percentage pumpage reduction from the public utility compared to last year for the same week. I mean, why is that a valid percentage? Last year's pumpage is related to last year's weather conditions and a number of other factors. There may not be any relationship at all. We have been a whole lot drier this year. If you can reduce consumption by 15 percent when it has been a lot drier, that is equivalent to a 30 percent reduction if you had a comparable period to look at. But you do not have a comparable period to

look at. The other thing that is unfair is a lot of the easy conservation measures are now required by law, so there is not as much cutback from the wellhead that you will see when you impose a shortage. For example, car washes are required by zoning codes to be water recycling. Home-owners are no longer allowed to water during the daytime. A lot of the things that were conservation measures that you would use in a shortage in the 1980s are now part of the everyday code.

G: Could you compare the current water crisis in South Florida and the District's handling of this crisis to the drought of the late-1980s and early-1990s when you were with the District?

M: There are some parallels. The drought we are in now is comparable to the 1980-1981 drought, because the drought is focused north of Lake Okeechobee and the lake has been receiving the brunt of it and the lake is at the record low. If you look in 1980, the June 1 lake-stage that I talked about was about 15.5, and then we did not get any rain that summer, and we went to 9.7 in the summer of 1981. This year, the lake entered the summer at a level of 12.5 on June 1, and then we did not get any rain, so we are going to go way below 9.7. The 1989 drought was focused south of the lake, with extreme rainfall deficits south of the lake. The Everglades were very dry, the aquifers were very dry, but we had water in Lake Okeechobee, so it became a matter of just managing the distribution of water out of the lake. The great asset was that we had some water in the lake, not a lot, but the lake never got below 10. So, by today's standards, we had enough to get through. The media aspects were the same. There are some additional complications that have been added. The Conservation Area 1 regulation-schedule was changed in 1995, so some of the flexibility was lost to manage during a shortage. But I remember the media being just as excited then as they are now.

G: How confident are you that, when the Comprehensive Plan is implemented, that that will help to alleviate some of these cycles, problems with the drought and flooding that we have seen?

M: I am not very confident of that, because the key component that is going to solve the Lake Okeechobee cycle is the 200 ASR wells around Lake Okeechobee, and that may not turn out to be feasible in the long run. I think Florida has a weather-cycle that goes back and forth. If all the other components work, we will go a long way to dealing with the cycles, but I think it will always be a challenge. When you are on one end of the cycle, whether it is the flood or the drought, there is always going to be stress, whether you build the project or not build the project. In theory, if all the hardware that we talked about in the Restudy works the way it is supposed to work, then we would not have the swings. But that is all conceptual, and it is \$10,000,000,000 and forty years down the road.

G: How much of a problem do you think we will have maintaining public support for the restoration effort, if these problems continue to occur?

M: I think we will have a some problems maintaining public support. It is easy to be negative and very hard to sustain the positive [support], because the positive [support] for a project like this has to be sustained over twenty, thirty years. It is real easy to be negative because that is just a matter of controlling the next new cycle. We had a debate in Tallahassee this spring about a bill designed to make it easier to permit ASR. It turned out to be a chance for a lot of people who do not want to see the Restudy succeed to undermine one of the key components in the Restudy before it had even been tested. To me, that is an example of how easy it is to let a minor distraction become a major negative. It is real hard, and it is going to be hard to point to a major positive anytime soon. So I think that maintaining public support is will be difficult.

G: Looking toward the future, what do you see as being the most important obstacles to Everglades restoration?

M: In the near term I think it could be developing a consensus among the government and the public, but primarily among the government agencies. I may be too close to this process, but recently the agencies are finding it very hard to work together. This is critical at this stage in the plan. With an agenda as high-profile as the Everglades restoration, you cannot have chinks in the armor on the public-sector side, and right now, we have conflict between agencies over who does what, what will work, what will not work, what you should do first, how can I protect my interest in the law. If it was a matter of having a project to design and fund and build, I would be very confident we could do that, but we are not there yet on any of those projects. Government agencies are going to have a find a better way to work together.

G: I would like to mention some specific groups and organizations and ask you to assess their overall contribution to the restoration effort. First, the Corps of Engineers.

M: By the restoration effort, do you mean since 1980, since CERP?

G: From a very broad perspective. Overall.

M: Overall, the Corps is an essential participant. They have not been the leader yet on a project that has been built. Their first real episode that I have seen as the leader of a restoration project has been CERP, and CERP is a long way from having actually accomplished anything on the ground. The Corps has tried to change direction, but it is too early to say whether they have succeeded or not.

They have been an essential element, but up to now, it has been another agency or interest-group on the outside that really drove the Corps there. Kissimmee restoration is a good example. The Corps tried and could not get through their policy road-blocks, so the state took it over and was able to drive it to Congress and then bring the Corps on board.

G: Do you see the Corps of today being different from the Corps of, say, the 1980s or the 1970s?

M: In some ways. They are different in terms of their objectives. I mean, obviously, the Restudy is a restoration project, so the fact that they are spending so much effort on that is different in itself. But the Corps as a functional unit and how they do things and the time it takes and the process they go through, in that part, the change has not been obvious yet.

G: The National Park Service.

M: The Park Service is, again, always involved in the Everglades, especially the southern end of the Everglades. They were involved in the Everglades Forever Act process in a very important way. They have a solid scientific staff in place, but from the outside their contribution has been more noticeable in conflict as opposed to consensus. They have been one of the reasons things have not been done, as opposed to a key reason why things have been done - by been done, I mean things [being] built to fix a problem or changed to fix a problem. I think their effectiveness is limited by how narrow their focus is. The Park Service, by definition, has to have a narrow focus on [the area] inside the boundaries of their park. They reach out to influence issues outside their boundary, but it is from the perspective of protecting or enhancing what is inside their boundary. That is a much narrower focus than [the state of] Florida has. But they are very competent and committed to their mission.

G: The environmental community.

M: The environmental community is always there. They are very diverse, so it is not one interest group. They have a lot of individual interests within the environmental community. Some are more committed to a consensus base, and recognize we need a broad support to do big projects. Others are single-issue and litigation-oriented, and they tend to clog up the process. Obviously, the environmental groups have a huge influence on the political process, and politicians in the end will control what is done or not done for the Everglades. So, again, environmentalists are always a player, always involved, not always consistently and not always among themselves for the same purpose. But they are the most important political activist unit, I think.

G: The sugar industry.

M: The sugar industry was critical in the [passage of the] Everglades Forever Act. They will be much less critical for the Everglades restoration, because they accomplished so much in the Everglades Forever Act with the stormwater treatment areas and their BMP program. They are not a growing water use, so as water supplies continue to get tighter, I think new users will bear the brunt of that, as opposed to existing users. In general, farms are still less intrusive on the Everglades than cities, so I think there will be a need to preserve farming. [The] sugar industry, to the extent it survives, will stay involved in the process, but not nearly as aggressively as they were prior to the Everglades Forever Act, because so many of the Everglades restoration issues now are dealing with the urban cities and fixing design problems in the Everglades themselves.

G: The Water Management District.

M: The Water Management District is also always there now. They are essential. They have been the source of the best technical expertise. That is declining a little bit, not as much because their expertise is declining, as because the Park Service is building their own staff [and] the Corps of Engineers is building some of their own capabilities to match some of the Water Management District's. The District has the money, or access to the money, so they are going to have to be involved.

G: Final question. Looking back at your experiences with Everglades water management, what are the most important lessons that you have personally learned?

M: We're all still learning, so it is probably too early for that question, but I will tell you what I am most comfortable with: I am most comfortable with analyzing the data, learning from the past and trying to make significant incremental improvements. I have never been comfortable with the grand, huge project. In the early [19]80s there was something called the Central and Southern Florida Water Supply Study. It started out as the Restudy of the 1980s. That was going to be a grand scheme - re-evaluate all of South Florida's water issues and fix everything. What came out of it was the Modified Water Deliveries Project and the C-111 Project. They decided, this thing is too big, it is going nowhere, we cannot sustain it, let us spin off the projects we really need and hold off on the rest. To me, by far, the most momentous Everglades restoration project that has been undertaken since 1950 is the Everglades Forever Act - 40,000 acres of wetlands created from productive farmland to buffer the water quantity and quality of flow to the northern Everglades. There are some major incremental

steps that can be taken, and I get a lot of satisfaction out of seeing those work. No one's career is going to span all of Everglades restoration. Like I said, one of the first projects I worked on was modified water deliveries, or what became modified water deliveries. That was twenty years ago, and we have not broken ground on the main part of it yet. My lesson is, if you are going to have a career in the business, especially the restoration side of it, it is nice to be part of these great big esoteric, CERP-like, generational efforts, but if you do not find a few winners that you can go build and have personal input on and affect the outcome of, then it is not going to be a very rewarding career on the technical side. The politics, the policy, the law, the finances - that is all going to go on, [but] that is just not my thing. I am more [interested in] what the data show, how does the system work, and what can we do to put in the ground what's needed to fix it or help it.

[End of interview.]