POLLUTION CONTROL ASPECTS OF WATER MANAGEMENT

by

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The Central and Southern Florida Project was authorized by the Congress in 1948. The Project's "bible" is House Document 643 of the 80th Congress, 2d Session; essentially the Corps of Engineers comprehensive plan report. The full title of the project, printed on the cover of House Document 643, is "Central & Southern Florida Project for Flood Control and Allied Purposes." The "allied purposes" mentioned in the report run the gamut from water conservation through enhancement of fish and wildlife values to navigation. But one must look very close indeed, and then with little success, to find water pollution control or water quality control listed as a project purpose. The prevention of saline water encroachment along the lower east coast was set out as an objective. This is certainly water quality control of considerable importance; but beyond that the authorizing document was silent on pollution control.

This is by no means an indictment of the Corps of Engineers, the State of Florida or the Congress of the United States of 1947 and 1948; the years of project formulation and authorization. But it is indicative of the dynamics of water resource planning, development and management. It is indicative of the changes in national and local priorities which come with time. Twenty-five years ago only a comparative handful of people were concerned with water pollution and water quality control. Today water quality control is everyone's concern. Twenty-five years ago the Federal government did not conceive pollution control to be a matter of over-riding national interest; it was a local matter. Today it is a major program effort of the national government and national

reputations are being made by Senators and Congressmen who legislate in this field. Twenty-five years ago you may have been able to find perhaps a dozen people in this State who would deliver a talk to you this morning on my subject. Today you can undoubtedly get between two and three hundred, of all persuasions.

Now, even though our project authorization was generally silent on the matter of responsbility for water quality control, new priorities resulting from new concerns have required the assumption of certain new responsibilities. Some of these new responsibilities have originated from sources external to the District and its management. Others have been assumed as a result of internal decisions, made by the District Governing Board and Staff.

Perhaps it would be best to start with those actions in the field of water quality initiated by the District internally, since these antedate externally imposed responsibilities by several years. General District concern with questions of water quality arose from the statute which gives the District the authority to regulate water levels and flows in its system. From this statute is derived the District's permit authority which, in its application, requires that all facilities for withdrawal of water from, or discharge of water into, the District system be under a revokable District permit. This means, of course, that the owner of any wastewater discharge facility must apply for, and be issued, a District permit before connection to the District system can be made.

Starting in the mid-fifties, with the State Board of Health's agressive emphasis on domestic sewage treatment plant construction, a considerable number of such permits were processed and issued. The modus

operandi was rather simple. The Board of Health approved the treatment plant and advised the owner that a permit from the District would be required; the District issued its permit based on State Board of Health treatment plant approval.

In the late fifties, as permits continued to be issued on this basis, the District became concerned that adequate recognition was not being given to the water quantity-water quality relationship. In Dade and Broward Counties in particular, where under certain conditions and for comparatively long durations canal flow approaches or equals zero, it was felt that inadequate dilution could result in overloading of any given canal. This despite the rather high degree of treatment at the individual plants.

Several discussions were held with the State Board of Health staff over the course of a few years, and to some degree available stream flow was taken into consideration. This was generally expressed in terms of requiring a higher degree of treatment in certain instances. Nevertheless, the general impression received was that the State Board of Health's main thrust was toward placing greater numbers of the increasing population on sewers. The condition of, and the effect on, the receiving body, although important, was seemingly considered secondary to the major goal of sewering as much of the States population as possible with systems having a high degree of treatment. This was, and is, a commendable goal and by no means is any criticism implied.

Despite our continued concern with the quantity-quality relationship, the District continued its "rubber-stamp" issuance of permits. The lack of agressiveness in more or less forcing the issue in the mid-sixties

stemmed from two sources. First was the District's unwillingness to put itself directly into the business of water quality control with its requirements for developing staff expertise and its implications of possible conflict with another agency whose statutory responsibilities were quite clear. Second, rightly or wrongly, was our view that the essential problem was one of enforcement. Nevertheless, one positive step was taken. In the 1963 Legislature we succeeded in getting the language of our statute changed to include water quality control as a purpose of the District. Basically this was done to permit the District to take enforcement action in the event such was required but was not taken by the State Board of Health. However, this statutory change was never applied by the District, either in enforcement action or otherwise.

This, then, records the history of the Flood Control District in matters of water quality control, or pollution control, up until about the end of 1966. At best it shows an early grasp of the inseparable quantity-quality aspect of true water management, some initiative in developing a rudimentary permit procedure applied to wastewater discharges, and a sufficient interest in water pollution control to obtain enforcement capability. At worst it shows an unwillingness to go the whole way on complete water management, considerable hesitation in taking unilateral enforcement action, and undue deference toward the sensibilities of a sister State agency. In all honesty the record is not too good. After all due allowances are made for the very real constraints under which the District and the State and County pollution control agencies operated, the District must share responsibility for the degraded condition of some of

the waterways under its jurisdiction. We may deserve an "A" for "concern"; but we rate a "D" for "effective action."

The year 1967 marked the turning point in the District's approach to its responsibilities. There is no single thing which can be identified as the motivating force for such change; but a number of things were happening in 1967 which together created favorable conditions for germination of the District staff's concept of total water management. It was an idea whose time had come. In 1967 there was a new Governor and new membership on the District's Governing Board. In 1967, with considerable input from our staff, the Corps of Engineers was completing its water resources plan for our Project. In late 1966 and early 1967 hearings were being held throughout the State in response to the Federal Water Quality Act of 1966. In 1967 the question of pesticides and the environment was becoming of large concern. In 1967 the word "eutrophication" had just been added to the common lexicon. In this atmosphere of change, and changing concerns, the District started moving toward the development and implementation of its concept, which is still developing, of total water management.

This concept derives from the basic premise that there is a definite water quantity-water quality relationship. This is a fact. But of course it is an over-simplification in that not <u>all</u> water quality problems are capable of solution in terms of manipulation of flows, nor are changes in flows responsible for <u>all</u> changes in water quality. Nevertheless, it is a logical point of departure. The District felt strongly enough about the validity of this view that it recommended to the Governor's Committee in the 1966-1967 hearings that existing "water management"

districts be given the responsibility for water quality and water pollution control in their areas of jurisdiction under guidelines established by a central, State authority. This recommendation was not adopted and, instead, all authority and responsibility was vested in a central agency, which eventually became the Department of Air & Water Pollution Control.

Despite this, a quite satisfactory operating relationship has now been worked out between the Department of Air & Water Pollution Control and the District. By administrative action of the Department, the District is considered to be an approved "local program" for water pollution control. We thereby have the opportunity to review and comment on all permit applications for construction and/or operation of all wastewater sources within the District area. The applicant's engineers are required to submit to us the application and all required supporting data at the same time this material is submitted to the Department's regional engineer. This provides us with the opportunity to evaluate each potential wastewater source in terms of type and degree of treatment and means of wastewater disposal, related to our knowledge of available stream flow and general condition of the receiving body.

In addition, this relationship with the Department of Air & Water Pollution Control has enabled us to take an affirmative position regarding further degradation of quality in waterways under our jurisdiction. This was expressed in an action taken by our Governing Board in October of last year which declared that the District would no longer issue permits for discharge of wastewater into a rather long list of canals and natural streams under its jurisdiction. The basic criterion used in formulating

the recommendation on which the Board's action was based was, again, the direct relationship between water quality and water quantity. This action, then, was an example of implementation of the developing concept of total water management.

The relationship with the Department of Air & Water Pollution Control, and some of its more immediate results, which I have described is one aspect of the District's new approach to water management. This aspect is more or less a matter of good housekeeping and is, of course, of considerable importance and impact. There is, however, another aspect of the concept of total water management which must be addressed if meaningful water management is to be achieved. This, too, has its roots in the quantity-quality relationship.

From the outset the major objectives of our work have been flood control and water conservation. It is obvious that the achievement of these objectives requires modification of the natural water regimen. Stream flows are regulated, channels are rectified, water impoundments are created and lake stage fluctuations are stabilized. In short, water quantities in time and space are manipulated. When the water quantity-water quality relationship is recognized, then, it becomes apparent that these quantity manipulations can, and will, have some effect on water quality. These effects, therefore, must be assessed and the specific quantity-quality relationships must be determined if good water management is to be realized. This evaluation must be made in terms of both project design and project operation.

The initial step in the process is the collection of data, and when we first decided to move forward in this new direction we found it

necessary to start pretty much from scratch. On our own initiative, as a result of internal decisions and not external pressures, we embarked on a program of baseline data procurement in 1967.

Water quality data procurement and baseline studies were undertaken as cooperative programs with other agencies. In 1967 we started negotiations with the Plant Pest Control Division, USDA, for an intensive pesticides sampling program. In mid-1968 the program was started. It involved water and sediment pesticides sampling and analysis on the land and in the surface water system. Test areas in St. Lucie and Palm Beach Counties were selected, and in the latter case sampling extended into water Conservation Area No. 1. In the current year, the program was expanded to include biological sampling and analysis.

In 1968 a cooperative program with the U. S. Geological Survey to determine the enrichment characteristics of Lake Okeechobee was developed. Chemical and physical characteristics, including nutrients, have been sampled at 15 locations throughout the area of the Lake. Water balances and nutrient loadings have been determined. Phytoplankton have been sampled, counted and identified. Benthic organisms have been collected and identified. Surveillance at 6 stations is being continued while the initial evaluation report is being written.

In July 1969 a baseline water quality survey of the Upper St. Johns River and its tributaries was initiated. This, again, was undertaken in cooperation with the U.S. Geological Survey. Chemical and physical characteristics, including nutrients, were determined along the main stem and in major tributaries. Phytoplankton, benthic organisms, and larger aquatic invertebrates and vertebrates were sampled and identified. Surveillance is being continued and some special studies on artificial

impoundments are being expanded. The preliminary report is now nearing completion.

In the current year a long-term investigation with the U. S. Geological Survey was started in water Conservation Area No. 3. This is a nutrient loading, nutrient movement, and vegetative change study. Five test plots have been established, aerial photos taken and vegetative characteristics have been determined. These hydro-biological studies will be carried forward for 3 years in cooperation with the U. S. Geological Survey. Subsequently our own forces will continue with the monitoring and evaluation of any observed vegetative changes.

In view of future plans for back-pumping additional quantities of water into the conservation areas from the lower east coast the District decided last year to initiate a program for evaluating effects at an existing back-pumping facility. The study site selected was Pumping Station 9 in the South New River Canal, Broward County. Again in cooperation with the U. S. Geological Survey, we are sampling water quality both in the South New River Canal upstream of Station 9 and in Conservation Area No. 3 downstream. Pumping operations are arranged so that quality samples can be taken downstream to observe the fate of certain constituents as discharge water spreads out over the marsh.

Finally, in connection with the Game Commission's drawdown study on Lake Tohopekaliga, we are making a nutrient loading study of that lake in cooperation with the U. S. Geological Survey.

All of this work is pointed at procuring essential data, making a determination of existing water quality, and evaluating the effects of project construction and operation on both the existing water quality and the natural environment in general. It was undertaken at the District's

initiative because of the recognition that the goal of total water management has to be realized first of all through a thorough and honest evaluation of the impact of our system on the environment.

As I have indicated, the first expression of this initiative came in 1967. The next major jump forward came in 1970 with the addition and augmentation of staff capability in the fields of biological sciences and environmental engineering. There will be further expansion in these areas later this year, plus the establishment of a complete water chemistry laboratory with the necessary staff. Our cooperative programs with other agencies will, of course, continue. But staff expertise in environmental engineering, the biological disciplines, and hydrochemistry will enable us to undertake our own multi-disciplinary environmental investigations, as well as to meaningfully supplement those of others. In short, we are prepared and expect, to take a leading role in matters dealing with water quality and the environment in our area. We must do os if we are to discharge our responsibilities for intelligent development and management of our water resources. It is our job to do so by Statute. And we have shown our willingness to do the job properly by demonstrating the initiative in these areas which no other agency appeared capable of assuming.

Externally to the District other forces have been moving and have exerted pressures in the same direction taken by the District as a result of internal decisions. These forces have been generated by the Federal Government and by the government of the State of Florida. Insofar as our Project is concerned the national government has exerted its pressure through the Congress, both directly and indirectly.

Congress has acted directly as a result of its interest in Everglades National Park. From the attention given the Park question in the media one might have reasonably thought that the sole matter of concern was that of water quantity; in simple terms, a guaranteed minimum annual volume of water to be delivered to the Park. This was not strictly the case. In the same act which set the terms and conditions of water deliveries to the Park, the Corps of Engineers was instructed to prepare a report on what would be necessary to ensure that the quality of the water being delivered would not be impaired. The implications are obvious. Insofar as the Congress is concerned the questions of water quantity and water quality in relation to the Park are simply somewhat different aspects of the same entity. Water quality as well as water quantity must be managed. This, of course, is the same view which is held by the District.

As a result of this Congressional directive the Corps engaged a consultant, and its report to the Corps was completed in April. In summation, its findings were:

1. The quality of the water entering the Park is good.
2. Water entering the Conservation Area system is of good quality, but somewhat poorer than that reaching the Park.
3. The Conservation Areas act as a filtering or purification system in times of overland flow.
4. Major threats to impaired water quality for the Park are increased flows of poorer quality water from the urban areas to the east and agricultural areas to the north.
5. Continued surveillance and certain special investigations are required.

Somewhat less directly the Congress has exerted pressure on our Project, as well as on all other water resources projects, through the Environmental Policy Act of 1969. The major thrust of this act derives from the requirement that an environmental impact statement be submitted for all water resources projects. The new Environmental Protection Agency becomes the main reviewing body for such statements, and final decisions concerning water resource development projects, if necessary, are made by the President's Council on Environmental Quality. The responsibility for developing the environmental impact statement for our Project rests with the Corps of Engineers as the responsible planning and construction agency. The District, however, along with other agencies, will have the opportunity to provide input in accordance with the requirements of the act.

At the State level the Governor and Cabinet have moved toward a similar requirement for environmental impact statements. These will be required before requests for funds for any item of Project construction will be considered. It appears now that the District will in some way be involved in preparing the impact statements for its own work. The Department of Air & Water Pollution Control will possibly play the same role on the State level as the Environmental Protection Agency plays on the national level. At this point in time State level action in this matter appears to be compounded in equal parts of true concern with the environment and concern over the availability of revenue to fund State programs. In any event, here again the State level concern with water quality, the environment, and good water management is an expression of the same concern our District has recognized openly for over four years.

The question now is, where do we go from here? There appear to be three related but distinct areas for application of the concept of total water management in relation to water quality and environmental protection.

The first of these is what I have previously termed "housekeeping." This is the whole process whereby applications for construction and operation of new wastewater sources are reviewed and permits are either issued or denied. The factors of type and degree of treatment, pollutant loadings, nature and condition of the receiving body, minimum available stream flows, adjacent land use, and stream classification will be considered. The permitting program of the Department of Air & Water Pollution Control is now being implemented. The District's efforts are being successfully dovetailed with that program.

But this is only a part of the total picture of potential sources of pollution. The permitting procedure deals only with the more readily identifiable point sources of pollutants. Both agricultural and urban storm water runoff can be major contributors of pollutants to our surface water system. Gross pollution, such as may occasionally occur, for example in connection with dairy or feed lot operations, is controllable. However, normal agricultural and urban runoff is another matter. The dimensions of the pollution problem in relation to agricultural and urban storm water runoff should be specifically identified and then related to the assimilative characteristics of the receiving body. To me the major questions appear to be of this type:

1. What are the quality characteristics of storm runoff?
2. Are the effects transitory or long-lasting?

3. Is the ultimate receiving body capable of assimilating the pollutant load?

With answers to these questions some decisions can be made among several possible choices:

1. Make no attempt to control the quality of storm water runoff.
2. Require collection and treatment of storm water runoff prior to discharge into the surface water system.
3. Regulate flows in the surface water system in quantity, time and space to mitigate the pollution impact of storm water runoff.
4. Some combination of treatment and flow regulation.

Each of the last three choices is fraught with technical difficulties and the necessity for making trade-offs between pollution control on the one hand, and flood control, drainage and water supply on the other. But this is what water management is all about.

This leads to the second area for application of the total water management concept. Much of our system has already been built and has been in operation for some time. It operates well for flood control. Can it be operated for water quality control? Are there operational decisions which can be made and general operational strategies which can be adopted which will permit certain water pollution control and general environmental objectives to be achieved? The answer is undoubtedly "yes", but probably in a limited sense. This is the purpose of most of the investigations we have initiated; the work in Lake Okeechobee, that in Conservation Area No. 3, and that at Pumping Station 9, for example. Data is being collected and in some cases evaluation of data has started. Where we go from here is first to continue to obtain information needed to better

define specific quality-quantity relationships, second to attempt to determine if identifiable quality or other environmental problems are amenable to operational solutions, and third to implement and test operational alternatives.

Finally, the third separable area of water management relates to new construction. This is the area now typified by the "environmental impact statement." This now becomes a very important piece of work which the District must undertake. From here on we must be prepared, with our own staff as well as with cooperative programs, to obtain the essential environmental data needed to develop sound environmental impact statements. In short, we must now justify new construction in terms of its effect on the natural environment, including existing water quality, as well as its general socio-economic effect in terms of flood control and water supply related to the usual categories of agricultural and urban benefits. Since we foresaw the need to strengthen ourselves in this area some time ago, we feel well-prepared to handle this task.

I have attempted here to give you some feel for what the impact of changing concerns, needs and values has been on the District. The District has moved toward a greater involvement with questions of water quality and the natural environment in general; movement in the direction of total water management, if you will. This movement was initiated as a result of internal decisions; it has now been re-inforced by external actions. The move in this direction was taken with the full knowledge that there would be considerable difficulty in achieving the objective of total water management; both institutional and physical constraints are rather numerous.

We may never achieve this objective. But, strangely enough, both our critics and our supporters expect us to do this; to somehow be more or less all things to all men. The concept of total water management is a good one, and the objective of total water management is highly desirable. In our view, this is what south Florida needs and unless the District does it, it may not get done.