A
PROPOSED WORK PLAN
ON
NON-CONVENTIONAL
WATER SUPPLY ALTERNATIVES

RESOURCE PLANNING DEPARTMENT

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SYNOPSIS

Non-conventional water supply alternatives were evaluated in the past as a means of augmenting regional water supplies. Regional water supply development is an expensive venture, and in the past federal assistance was available for such programs; however, with reduced federal assistance, increased emphasis on local water supply projects is anticipated.

The South Florida Water Management Disrict is committed to provide assistance to local governments on water resource related matters. Due to economy of scale, large scale regional non-conventional water supply alternatives designed in the past have only limited transfer value at a local level. Several sources from which water is withdrawn for local supplies are showing signs of stress, and additional withdrawal may not be feasible. It is therefore imperative that the District develop programs for non-conventional water supply alternatives on a local level to assist the local governments with their water supply problems.

This document contains the work plan needed for the above.

INTRODUCTION

The goal of the recent Florida State Comprehensive Plan dealing with water resources states that "Florida shall assure the availability of an adequate supply of water for all competing uses deemed reasonable and beneficial and shall maintain the functions of natural systems and the overall present level of surface and groundwater quality." The goal also states that "Florida shall improve and restore the quality of waters not presently meeting water quality standards."

To achieve the above goals, policies for both conventional and non-conventional water resources have been set forth in the plan (Appendix A). The major non-conventional water supply policies set forth in the Florida State Comprehensive Plan are as follows:

(1) Ensure the safety and quality of drinking water supplies and promote the development of reverse osmosis and desalination technologies.

(2) Ensure that new development is compatible with existing local and regional water supplies. (Engineering Cost Analysis of Alternatives).

(3) Promote water conservation as an integral part of water management programs as well as the use and reuse of water of the lowest acceptable quality for the purposes intended. Identify and develop alternative methods of wastewater treatment, disposal, and reuse of wastewater to reduce degradation of water resources.

(4) Encourage development of gray-water systems to extend existing sewerage capacity, and

(5) Encourage conservation, wastewater recycling, and other appropriate measures to assure adequate water resources to meet agricultural and other beneficial needs.

DISTRICT EFFORTS ON NON-CONVENTIONAL WATER SUPPLY ALTERNATIVES

The SFWMD has had programs (started in the early 1970's) covering most of the non-conventional water resource policies set forth in the Florida State Comprehensive Plan. The non-conventional water supply alternatives, including alternative cost analyses, were addressed on a regional basis in the SFWMD Water Supply and Development Plans for the Lower East Coast and Okeechobee (LEC), Lower West Coast (LWC), and the Upper East Coast (UEC) Planning Areas. A report entitled "Data Information to Access the Feasibility of Meeting Water Supply Needs in South Florida" was prepared for the Corps of Engineers by DSS Engineers and Missimer Associates, Inc. This report explores the application of desalination on a regional scale for the South Florida Water Management District area. The study area, excluding the Kissimmee River basin, covered approximately 12,100 square miles and was divided into three sub-areas, as follows:

I. Lake Okeechobee Service Area
II. The Lower West Coast
III. The Lower East Coast

The report states that desalination may be an alternative in providing regional water supplies in the future. Lake Okeechobee, the Water Conservation Areas, and the wellfields, according to the report, may not be able to provide adequate supplies in the future due to water quality requirements, economic, and environmental considerations. Even

though the report is an excellent source of reference material, its immediate application is unclear.

Regional water supply storage and delivery systems were built with Federal government assistance in the past. It is not clear from the report whether the Federal government will assist in building large scale desalination plants to meet the future regional water requirements. Desalination plants addressed in the report were in excess of 10.0 MGD capacity.

The District has previously disseminated information on advanced water supply options to governmental agencies and consulting engineers as well as to the general public in the form of seminars and technical publications. (Three seminars on desalination, one on water reclamation, and one on dual water systems). After the publication of the above documents and the seminars, non-conventional water supply alternatives continued to be worked on as a function of the District's list of priority works. Additionally, technological breakthroughs have taken place since the 1970's for membrane processes in terms of lower pressures required to desalt brackish water. This reduces the cost of the product water and it's application in removing organics, bacteria, and viruses from raw water. Also, the new membranes have longer durability and higher resistance to fouling, collapse, etc. Ozonation (ultraviolet radiation) is also being commercially used for bacteria and virus eradication from reclaimed water.

In light of the above, the District has recently started to provide more emphasis on these non-conventional water supply alternatives for total water resource management of the 16 county area on a local basis. For example, reclaimed water from wastewater treatment plants needs to be used for golf course irrigation whenever and wherever feasible

before it can be disposed of underground. This requirement came as a direct by-product of the District's Technical Publication 84-6 entitled "An Evaluation of Wastewater Reuse Policy Options for the South Florida Water Management District." The publication identifies potential suppliers and users within the SFWMD and compares them on a county-by-county basis to obtain a preliminary indication of the potential for reclaimed water uses within the District. Further, the report evaluated the feasibility of reclaimed water systems for golf course irrigation for eastern Palm Beach County using the existing stringent DER criteria.

In eastern Palm Beach County, a total of 84 potential golf course users were identified. These golf courses covered an irrigated acreage of 11,580 acres. Out of the 84 potential users, only 13, with 8% of the irrigated acreage, were found to have cost-effective usage of reclaimed water. The data used in the report reflected only the estimate of cost savings of the golf course participants, but excluded the benefit derived by the county in terms of wellfield expansion costs. Benefits derived by the county in terms of using the reclaimed water is still to be investigated.

Technical Publication 84-6 recommends 1) similar local level preliminary feasibility design studies for the other counties, 2) dual system evaluation for new unit developments, and 3) District participation as a facilitator in bringing reclaimed water suppliers and users together.

Presently there is a major influx of citrus and other agricultural producers into south Florida. With the limited amount of fresh water available and the high water demands from these users, consideration of

using reclaimed water for these applications must be investigated as soon as possible.

A position paper is being prepared by the Florida DER (Tallahassee) to recommend changes which would allow more reclaimed water applications in south Florida through the modification of current regulations. This position paper should be out in early 1986.

Additionally, the District has provided grant money to investigate different manufacturers' latest reverse osmosis membranes and examine their effects in removing various contaminants (both organic and inorganic) from water, and recovering the water rejected for reuse.

FUTURE WORK PLAN

A two year work plan has been designed to bring the District up-to-date on non-conventional water supply alternatives, and to guide the technical/scientific direction of the Resource Planning Department. The work plan presented here represents the "baseline" that can be changed or modified appropriately as new or better inputs become available. Two sets of work plans, one for an expanded scope of study and the other for status-quo options, have been developed.

The major purposes of these work plans are to:

1. Provide the necessary leadtimes to help meet District objectives on non-conventional water supply alternatives,
2. Furnish a basis for annual program documentation, progress reporting, and project evaluation;
3. Continue to enhance District efforts towards developing significant programs for non-conventional water supply systems;

4. Recommend a decision path for the total water resource management of a planning area based on a logical set of ground rules and assumptions incorporating non-conventional alternatives.
5. Address the issue of non-conventional water supply alternatives in meeting the potable water needs of local governments and assist local governments in their comprehensive planning process.

RESOURCE PLANNING DEPARTMENT OBJECTIVES

Resource Planning Department objectives for non-conventional types of water supply alternatives are designed to meet all higher level District and State policies. These objectives are broad statements of the direction the Department must take to support the higher level requirements. The objectives are listed as follows:

A. Conduct a broad level of scientific and engineering applied research and analysis to increase the general understanding of non-conventional water supply alternatives on a county level and their cause and effect relationships which are critical to south Florida's total water resource management.

B. Develop and maintain basic data acquisition, storage and retrieval capabilities on non-conventional alternatives.

C. Perform evaluations, advise other governmental agencies, and provide assistance to planners, engineers, and local governments on types of non-conventional alternatives.

To meet the above stated objectives, the following six programs are proposed.

PROPOSED PROGRAMS ON NON-CONVENTIONAL ALTERNATIVES

A. Desalination for both quality enhancement and increase in potable water supplies using:
   1. Reverse Osmosis (RO) - for brackish water, seawater conversion, water quality improvement and enhancement, water reclamation and softening (for dissolved material separation from water).
   2. Electrodialysis - for brackish water conversion to potable and industrial quality water.

B. Reclaimed Water - for flood, drip/trickle, and spray irrigation for agricultural, landscape, and other beneficial needs.

C. Deep Aquifer Storage - for storage of both storm water and reclaimed water.

D. Other Alternative Methods for Water and Wastewater Treatment - water hyacinths, silvaculture, oxidation ponds, and aquaculture.

E. Engineering Cost Evaluation - for the selection of the most cost-effective alternatives, or combination of various alternatives.

All the above stated non-conventional water supply options need to be evaluated, together with conventional options for total water management of selected priority areas on a county wide basis.

JUSTIFICATION AND REASONING FOR EXAMINING NON-CONVENTIONAL WATER SUPPLY OPTIONS IN THE DISTRICTS LOCAL GOVERNMENT PLANNING SUPPORT EFFORT

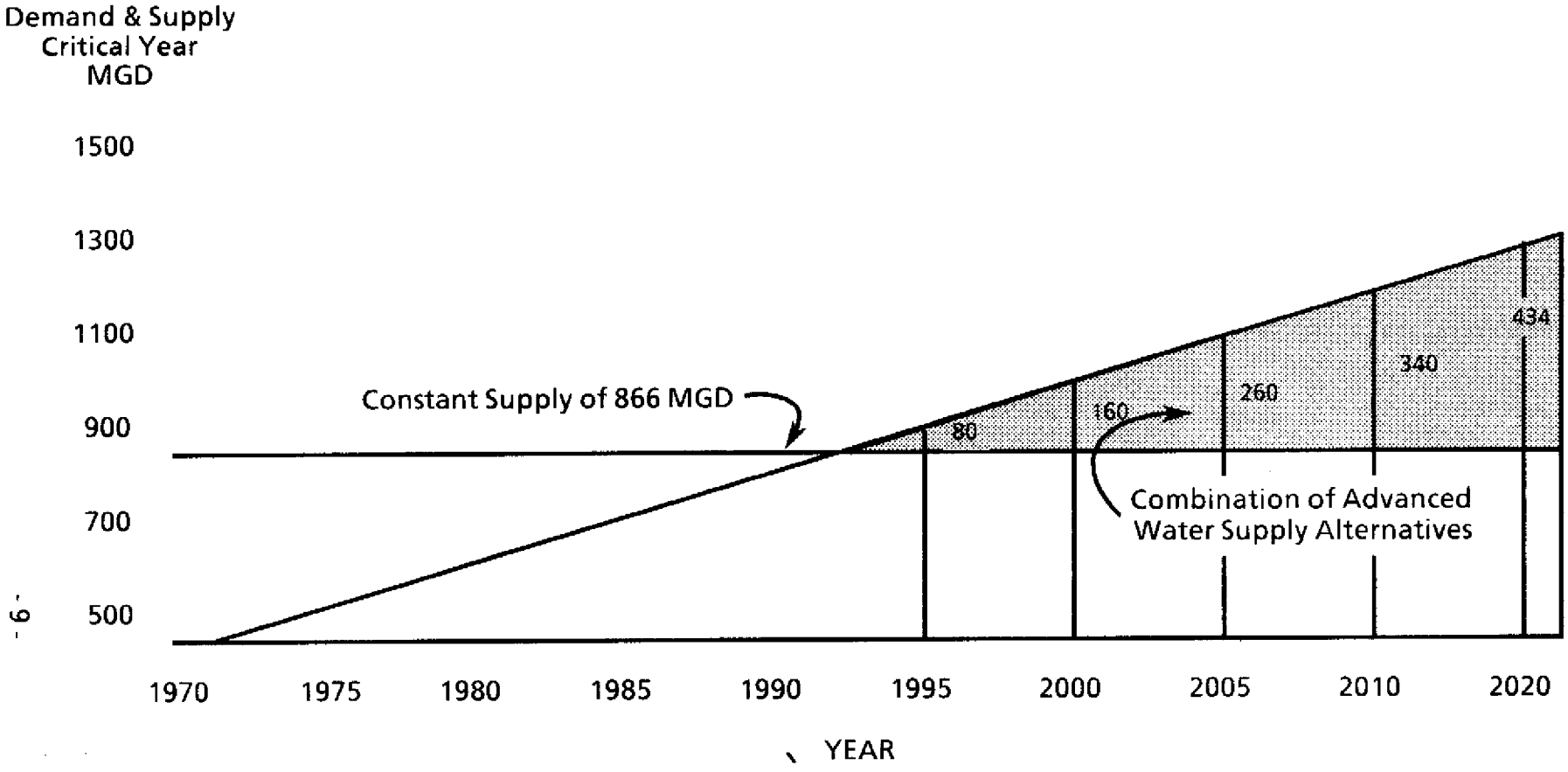
LEC Planning Area

The District's Water Supply and Development Plan Executive Summary for this area, published in 1978, clearly demonstrated water demand exceeding supply during drought periods by the year 1990. By

1995, the Executive Summary showed that an additional 80 MGD (Million gallons per day) of water will be needed. By the year 2015, an additional 434 MGD water requirement was projected (Figure 1).

Concerning the supply side, a constant supply of 866 MGD was estimated to be available during drought periods. The LEC Water Supply and Development Plan indicated that the capability to expand existing surface water supply areas will be very limited. The plan also stated that new regional scale systems (e.g., new conservation areas, reservoirs, etc.) would be prohibitive from both cost and environmental points of view. This, in turn, means that future water supplies (whether of large or small capacities) may have to be provided by a combination of conventional supplies and non-conventional sources on a local basis.

For example, in the LEC Planning Area, the city of Boynton Beach is already planning ahead to meet its future buildout water requirements of 16 MGD using the low pressure reverse osmosis process. Pheasant Walk has been supplying desalted water using reverse osmosis for some years. From the quality standpoint, some of the wells and wellfields in the LEC Planning Area (Seacoast Utilities, Cities of Riviera Beach, Boynton Beach, Hollywood, and Pompano) are already showing signs of contamination (both organic and salt water intrusion). If these wells or wellfields need to be shut down, then the quantity of water available in the whole LEC Planning Area will diminish. Water from these wellfields can be treated, however, using the reverse osmosis process and brought back to drinking water standards. In addition, some utility supplied water in the LEC Planning Area is showing signs of THM contamination (trihalomethane, a class of chemical that includes the carcinogen chloroform). The US EPA has set standards for THM for public drinking



SOURCE: JUNE 1978 EXECUTIVE SUMMARY WATER USE SUPPLY & DEVELOPMENT PLAN

Figure 1. LOWER EAST COAST PLANNING AREA

water supplies of 0.1 mg/l. A few of the utilities' potable water exceeds the above THM levels. THM can be removed effectively either by use of granular activated carbon added in series to the conventional water treatment systems, or by reverse osmosis alone (with other than cellulose acetate membranes).

Costwise, there has been a breakthrough in membrane process desalting. The first generation membrane process used in excess of 350 PSI pressure. The newer membrane process uses less than 250 PSI pressure, which reduces the required energy by 30-40%. This, in turn, reduces the final cost of desalted water.

Reverse osmosis and the other non-conventional water supply options need to be investigated fully in the LEC Planning Area, on a local level, from both the quality improvement and quantity augmentation points of view.

UEC Planning Area

The Executive Summary for the Upper East Coast Planning Area (October 1980) shows a yearly additional water requirement in excess of 2.2 MGD. The total water demand, however, including agricultural demands in Martin and St. Lucie Counties, was estimated to increase from 161 MGD from the year 1980 to 192 MGD by the year 2000.

A recent study completed by the District entitled "Martin County Water Resource Assessment" pinpoints the limitation of surface water for potable uses from C-44 during drought periods. The report also states further that additional withdrawals from C-44 will impose greater stresses on Lake Okeechobee. The same report states that surficial aquifers in some localized areas in Martin County will not be able to meet buildout demands. In such areas, the Floridan Aquifer

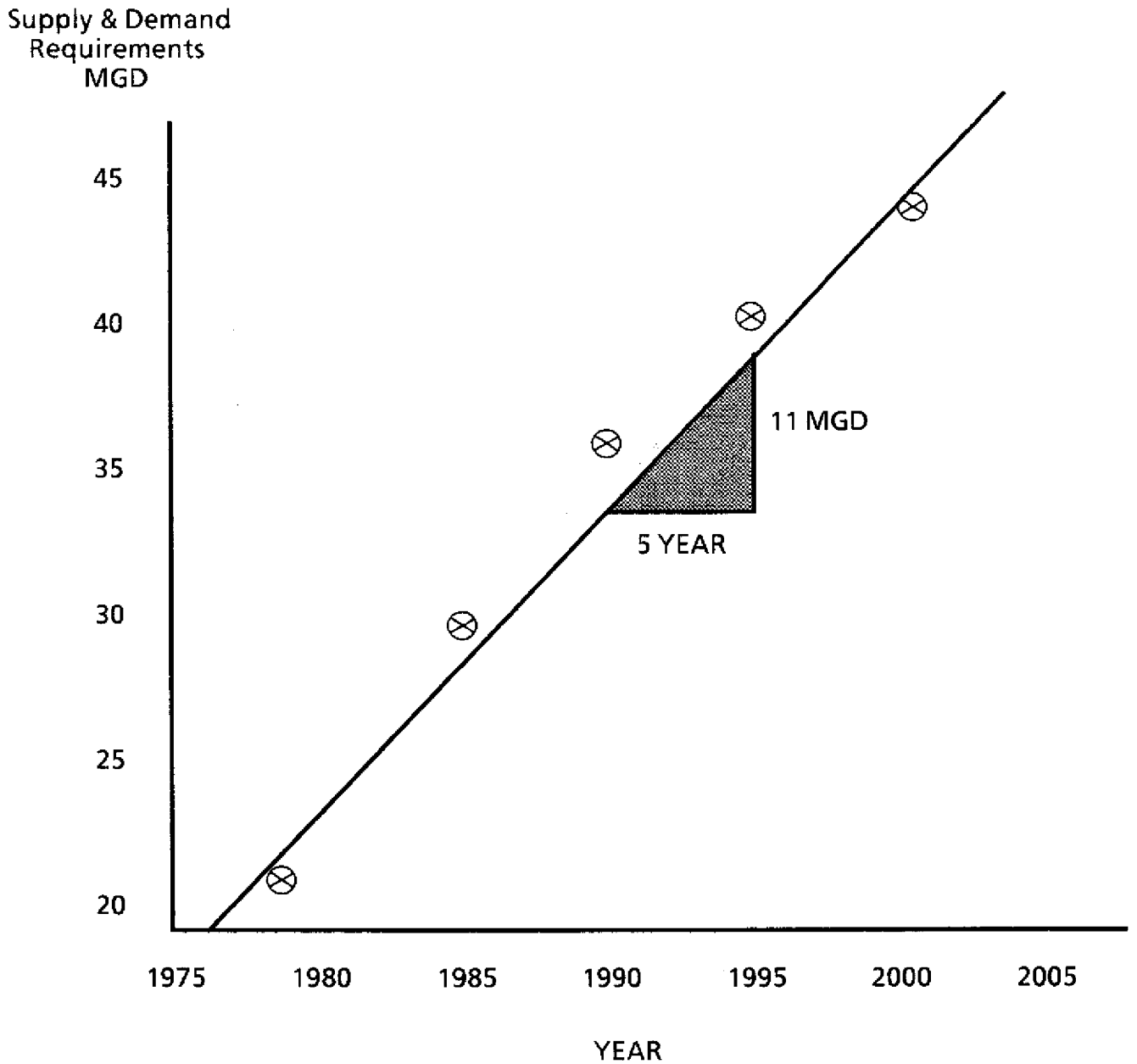
System is a potential source of potable water when treated by desalination systems.

In the UEC Planning Area, use of reverse osmosis (RO) for producing potable water started as early as 1972. By December 1979, there were eleven (11) small scale (less than 200,000 gallons/day of product water) RO plants in Martin and St. Lucie Counties producing a total of 250,000 gallons/day of potable water.

A field investigation by the District into the feasibility of storing fresh water in saline portions of the Floridan Aquifer System was made in the early 1980's in St. Lucie County. This investigation was carried out after concluding (from computer model runs, based on existing hydrogeologic data) that as much as 50% of the injected feed water could be recovered after the first cycle. The field investigation encountered some drawbacks. The storage zone/feed water characteristics for ideal injection should be moderate transmisivity (75-100,000 gpd/ft), low chloride (20-50 mg/l), and very low suspended solids. The feed water for this field investigation had a) moderate to high chloride concentration, b) variable, but often high, suspended solids, and c) high iron concentration. This limited investigation showed that only 3.0% of the water recovered had less than 250 mg/l of chloride concentration.

A U. S. Geological Survey solute transport model was run using the above field collected data. The model shows the recovery efficiencies increased significantly after the second cycle of operation.

Controlled and properly engineered projects on deep well storage by CH_2M Hill clearly demonstrate that this is a viable option. According to CH_2M Hill, there are 3 deep well storage water supply systems which have become operational in the State of Florida during the last 3-5 years



SOURCE: WATER USE SUPPLY & DEVELOPMENT PLAN SUMMARY STATUS REPORT, UPPER EAST COAST, OCTOBER 1980

Figure 2. UPPER EAST COAST PLANNING AREA NON-AGRICULTURAL WATER DEMAND

years. Additionally, water supply systems in New Jersey and California have been using this method for the past ten years.

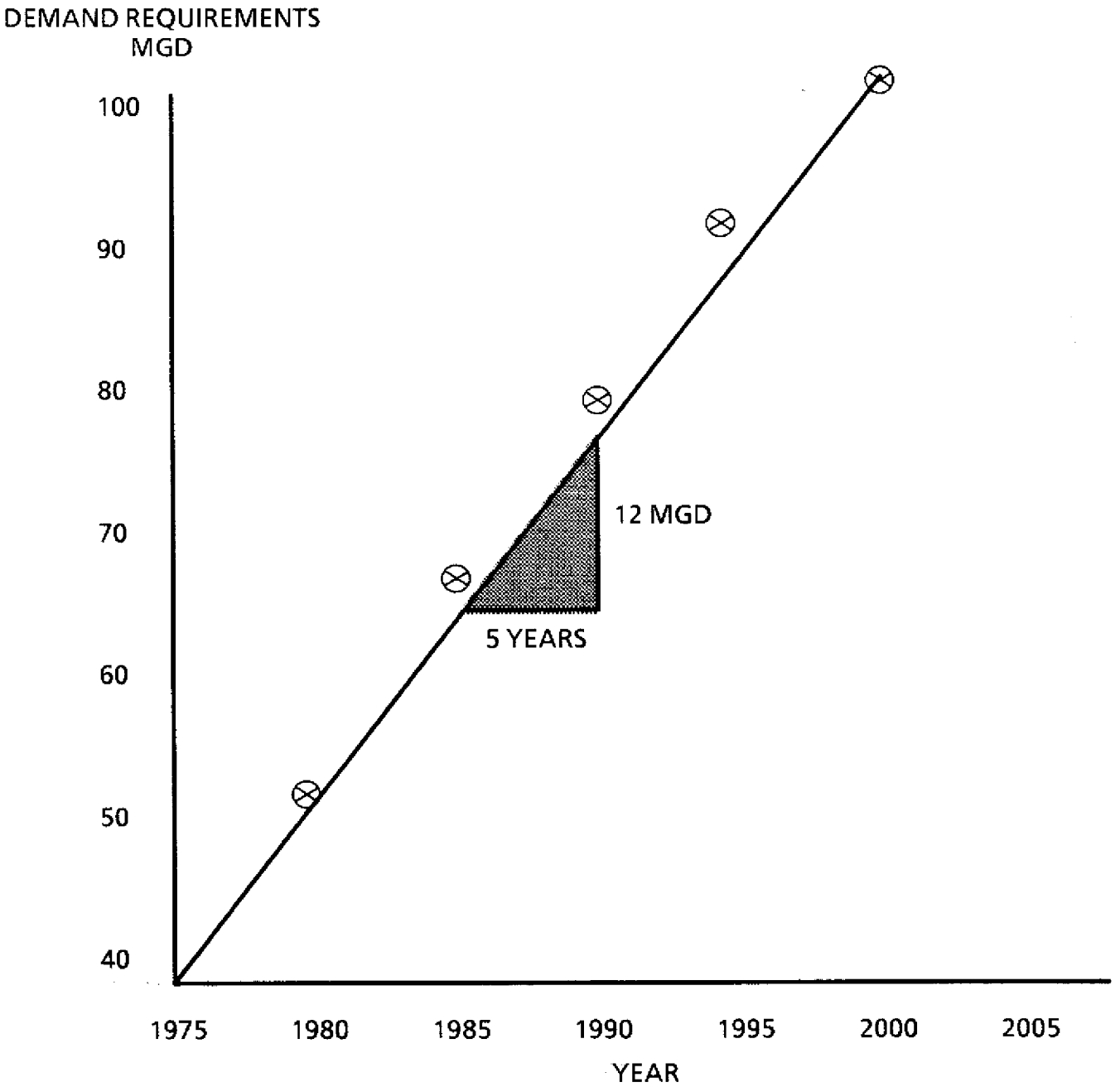
The St. Lucie deep storage project should be revisited with the following: 1) extend the hole to a depth where the transmissivity of the formation is moderate, 2) find an alternate source of water with low chloride, iron, and suspended solids concentration, or pre-treat the above feed water, and 3) run successive cycles of injection and recovery to determine if deepwell storage is a viable local non-conventional water supply option in the UEC Planning Area.

In the UEC Planning Area, the potential of non-conventional water supply alternatives, singly or in combination with Surficial aquifer development on a county wide basis, warrants full investigation as recent studies have shown that fresh water may not be available in sufficient quantities to meet all future planned growth.

LWC Planning Area

The Lower West Coast Planning Area perhaps deserves the highest priority in feasibility and field investigation studies of non-conventional water supply systems in terms of total water resource management of the area. The fresh water resources of the area are limited, both in terms of quality and quantity. Aquifers in Lee County (Surficial and Mid-Hawthorn) and the Coastal Ridge aquifer in Collier County are showing signs of stress even during mild drought periods (1-in-3 year drought). Additionally, Lee County, with its limited fresh water resources, has been labeled as one of the fastest growing counties in Florida. In the year 1980 the potable water demand was 30 mgd and it is predicted that this demand will increase to 60 mgd by the year 2000.

Residential, Commercial, and Industrial Demands Supplied by Utility Companies



SOURCE: WATER USE SUPPLY & DEVELOPMENT PLAN SUMMARY STATUS REPORT, LOWER WEST COAST, NOVEMBER 1979

Figure 3. LOWER WEST COAST PLANNING AREA

Lee County is the primaryarea within the SFWMD where brackish water is being desalted to meet potable water demands. Additionally, Lee County is the only area within the District where several thousand abandoned free flowing wells are contaminating fresh water aquifers. These wells could potentially be renovated and potable water produced by use of desalination systems on a local basis.

To conserve its fresh water, Collier County is embarking upon a major water reclamation program. The City Council of Cape Coral has approved a dual water system for the city. This dual plan will use reclaimed wastewater mixed with canal water to irrigate lawns and golf courses..

Such a concept is already operational in Collier County (Pelican Bay) where the brine from reverse osmosis production is mixed with wastewater for lawn irrigation.

SUMMARY OF FINDINGS

Based on findings from the Water Supply Development Plans prepared for the LEC, UEC, and LWC Planning Areas, a great majority of the future water supply system improvements will be of a local nature. These plans also show a limitation of the fresh water resources for the future in all three planning areas. Moreover, drinking water standards can be expected to increase. This could make some of the presently existing wells or wellfields unsuitable. Almost 80% of the potable water being used is not being reused. Technology exists to treat this wastewater to the point of exceeding present drinking water standards.

South Florida receives almost 70% of its rainfall water during the wet season. Due to a lack of surface storage, since storage areas are often full during this period, a majority of the runoff water from this

rainfall is discharged to the ocean. Our flat topography, high evaporation losses, high costs, and environmental constraints essentially preclude the construction of regional or local surface water reservoirs in south Florida.

Based on the above, improving the District's understanding of non-conventional water supply systems appears highly warranted. This includes following the latest state-of-the-art knowledge, compilation of data into a computer data base, analysis of the data to learn how to recommend systems for special local applications (local government support), and knowing enough about the systems to effectively transfer the technological data needed by governmental agencies and consultants. This is the most logical option for the District to currently follow, and will require an increased scope of coverage of non-conventional water supply alternatives. It is estimated that at least 8700 man-hours of effort will be needed for this increased scope.

Due to budgetary and manpower constraints, however, if the District opts to continue with the existing scope of study, minimal levels of information can be provided in any water management study, whether it be regional or local in nature. Table 1 presents the two options with workload data, advantages, and disadvantages of both options.

PRIORITY AREAS FOR NON-CONVENTIONAL WATER SUPPLY APPLICATIONS - Expanded Scope

Tables 2, 3, and 4 further break down the non-conventional water supply alternatives into different categories with the manhours needed for each. These tables depict the low, medium, and high priority areas within the District's planning areas on a county wide basis, based on

TABLE 1. NON-CONVENTIONAL WATER SUPPLY ALTERNATIVE OPTIONS

OPTION	WORKLOAD DATA (MANHOURS/YR)	ADVANTAGES	DISADVANTAGES	NOTES
INCREASE SCOPE OF COVERAGE	About 8700 manhours would be required to increase scope of reclamation, demineralization, deep well storage, and engineering cost evaluation.	• More balanced treatment of local alternatives for water supply enhancement. • Ability to respond to majority of local government requests. Data Base creation. • More indepth analytical results on specific systems of interest.	• Additional RPD manpower required unless increased work is done externally (contract). • Increased cost.	Would be spread over two to three Fiscal Years.
CONTINUE EXISTING SCOPE	About 2300 manhours are to be spent in FY 1985/86.	• Minimum level of coverage for any input into plan. • No additional RPD resource requirements.	• Marginal ability to respond to local government requests. • Inadequate foundation for expanding programs in future, or taking on additional responsibilities.	For each Fiscal Year.

TABLE 2. EXPANDED SCOPE
PRIORITY CATEGORY: DESALINATION

OBJECTIVE WORKLOADS POTENTIAL STUDIES AND/ OR ASSUMED ITEMS TO BE EVALUATED	PLANNING AREA COVERAGE LEC	LOK	LWC	UEC	KRIP	NOTES
County-wide survey of areas where desalination has some potential 1000	M	L	H	H	L	1. For water supply augmentation. 2. For meeting EPA's drinking water standards. 3. For removing the organic compounds from drinking water.
Inventory of desalt plant location, types, and capacities on a local level 500	L	L	H	H	L	1. Identification of quantity of desalted water available. 2. Type of desalt plants in the county. 3. Cost of desalted water. 4. Problems encountered.
Development of cost factors for comparison with conventional water supply and treatment techniques 500	M	L	H	H	L	Comparison of the cost of 1000 gallons of water produced by the conventional method vs. desalination.
Water quality improvement 1000	H	H	H	H	L	Identification and capability of various membranes to remove inorganics, organics, and micro-organisms.
Total 3000						

L - Low Priority
M - Medium Priority
H - High Priority

TABLE 3. EXPANDED SCOPE
PRIORITY CATEGORY: RECLAIMED WATER

OBJECTIVE WORKLOADS POTENTIAL STUDIES AND/ OR ASSUMED ITEMS TO BE EVALUATED	PLANNING AREA COVERAGE LEC	LOK	LWC	UEC	KRIP	NOTES
County-wide survey of areas where reclaimed water has potential 1500	H	L	H	H	L	Water conservation - golf courses and municipal green areas, location of wastewater plants and their proximity to golf courses and municipal green areas, quantity of water being used on a weekly and daily basis. Also agriculture potential.
Inventory of reclaimed water plants, capacities, and processes, if any. 1000	L	L	H	H	H	Identification and quantification of reclaimed water being used, capabilities, and the different treatment methods being used for various uses.
Development of cost factors for site specific cases. 500						Identification of several component costs and aggregation of those to specific sites, treatment costs, conveyance, and alternative water supply combination evaluations.
OTHER ALTERNATIVE METHODS OF WATER AND WASTE WATER RECLAMATION 500						Thorough literature search on ultra-violet radiation, ozonation, aqua- and silviculture usage in waste water treatment and side benefits and effects.
Total 3500						

L - Low Priority
M - Medium Priority
H - High Priority

TABLE 4. EXPANDED SCOPE
PRIORITY CATEGORY: DEEP AQUIFER STORAGE

OBJECTIVE WORKLOADS POTENTIAL STUDIES AND/ OR ASSUMED ITEMS TO BE EVALUATED	PLANNING AREA COVERAGE LEC	LOK	LWC	UEC	KRIP	NOTES
County-wide survey of areas where deep well storage has potential 1500						This evaluation needs to be based on 1) hydrogeologic properties of the receiving aquifer, 2) proximity to water available, 3) quality of feed and native water, and 4) treatment methods, if needed, for the feed water.
Inventory of plant locations, capacities, and processes used 200						Visits to operating plants in Florida. Exchange of information with CH_2M Hill.
Development of cost factors including pre-treatment costs where needed. 500						Component cost breakdown of items being used, storage of data in the computer for data base development, cost transfer factor from one location to another.
Total 2200						

L - Low Priority
M - Medium Priority
H - High Priority

previous experience with the planning areas. However these priorities are flexible and can be changed and modified as a function of overall District goals. For the expanded scope of non-conventional water supply analyses, approximately 3000 manhours/year is estimated for desalination, 3500 manhours/year for wastewater reclamation, and 2200 manhours/year for deep aquifer storage. This totals to 8700 man hours of effort (approximately 4 personnel). The professionals to be involved with the non-conventional alternatives should be at the Advanced Engineer level due to the need for experience.

As stated earlier, due to manpower, budgetary, or other constraints, if the scope of the non-conventional water supply alternatives cannot be expanded, 2300 manhours/year is estimated to be required for maintaining the status-quo option. A breakdown of the workload, on a specific local level project basis for a minimal level of coverage, is as follows:

Reclaimed water feasibility	600
Desalination option	600
Alternate methods of water and wastewater treatment	600
Deep aquifer storage	500
Total manhours	2,300

Three specific potential programs have been designed outlining the key task elements and the final product expected from each of the programs.

Water Reclamation Program

The following will constitute the major tasks for this program:

1. To assess local treatment plant utility user charges and cost distribution for water reclamation systems.

2. To evaluate the potential for "privatization" of water reclamation facilities as a function of individual county/city organizational and functional structures.

3. To develop a computer model to assess water reclamation potential for individual cities and city/county combinations.

4. To develop model ordinances and water quality criteria for local governments' use in implementing their water reclamation programs.

5. To develop sample statements on water reclamation use for the new local government comprehensive development plan.

FINAL PRODUCT FROM THIS PROGRAM WILL BE SPECIFIC PROGRAM OUTLINES FOR SELECTED COUNTIES (WILL INCLUDE TASKS FOR ALL DEPARTMENTS IN THE DISTRICT AS APPROPRIATE), DEFINING HOW EACH OF THE ABOVE ACTION AREAS WILL BE COORDINATED WITH LOCAL GOVERNMENTS.

Deep Well Storage Program

The following will constitute the major tasks for this program:

1. To reevaluate the results of previous testing in St. Lucie and Lee Counties to determine basic criteria for new tests required in south Florida localities.

2. To develop maps based on known aquifer characteristics, feed, and native water quality to identify candidate counties for this application.

3. To develop minimum water quality criteria for use of water stored in brackish aquifers as a function of potential local uses (drinking water, local agricultural irrigation, cement mixing water, etc.).

4. To evalute the organizational and financial structure of selected local water supply utilities to determine optimum integration of water stored in underground aquifers.

FINAL PRODUCT WILL BE SPECIFIC PROGRAM OUTLINES DEFINING HOW EACH OF THE ABOVE RESULTS WILL BE COORDINATED WITH LOCAL GOVERNMENTS (WILL INCLUDE TASKS FOR ALL DEPARTMENTS IN THE DISTRICT AS APPROPRIATE).

Program on Desalination

The following will constitute the major tasks for this program:

1. To assess local desalt plant utility user charges and cost distribution for a desalt system.

2. To evaluate the potential of the potential for "privatization" of desalt facilities as a function of individual county/city organizational and functional structures.

3. To develop a computer model to determine the right quantity of 'blend' water for meeting the drinking water standards.

4. To develop model ordinances and water quality criteria for local governments' use in implementing desalt water supply options.

5. To develop sample statements on desalination for the new local government comprehensive development plan.

FINAL PRODUCT FROM THIS PROGRAM WILL BE SPECIFIC PROGRAM OUTLINES FOR SELECTED COUNTIES DEFINING HOW EACH OF THE ABOVE ACTION AREAS WILL BE COORDINATED WITH LOCAL GOVERNMENTS. (WILL INCLUDE TASKS FOR ALL DEPARTMENTS IN THE DISTRICT AS APPROPRIATE),

APPENDIX A

POLICIES

1. Ensure the safety and quality of drinking water supplies and promote the development of reverse osmosis and desalinization technologies for developing water supplies.
2. Identify and protect the functions of water recharge areas and provide incentives for their conservation.
3. Promote water conservation as an integral part of water management programs as well as the use and reuse of water of the lowest acceptable quality for the purposes intended.
4. Protect aquifers from depletion and contamination through appropriate regulatory programs and through incentives.
5. Protect surface and groundwater quality and quantity in the state.
6. Eliminate the discharge of inadequately treated wastewater and stormwater runoff into the waters of the state.
7. Identify and develop alternative methods of wastewater treatment, disposal, and reuse of wastewater to reduce degradation of water resources. Need R. O. for effluent spray irrigation environmentally sensitive areas. Groundwater recharge along coastal areas for saltwater migration prevention.
8. Protect and restore the ecological functions of wetlands systems to ensure their long-term environmental, economic, and recreational values.
9. Reduce the adverse impacts of waste disposal associated with resource extraction.
10. Encourage development of gray-water systems to extend existing sewerage capacity.
11. Encourage conservation, wastewater recycling, and other appropriate measures to assure adequate water resources to meet agricultural and other beneficial needs.

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