Quantity and Quality of Stormwater Runoff Recharged to the Floridan Aquifer System Through Two Drainage Wells in the Orlando, Florida, Area

United States Geological Survey Water-Supply Paper 2344

Prepared in cooperation with the Florida Department of Environmental Regulation

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By EDWARD R. GERMAN

Prepared in cooperation with
the Florida Department of
Environmental Regulation

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By Edward R. German

Abstract

Quantity and quality of inflow to two drainage wells in the Orlando, Fla., area were determined for the period April 1982 through March 1983. The wells, located at Lake Midget and at Park Lake, are used to control the lake levels during rainy periods. The lakes receive stormwater runoff from mixed residential-commercial areas of about 64 acres (Lake Midget) and 96 acres (Park Lake) and would frequently flood adjacent areas if the wells did not drain the excess stormwater. These lakes and wells are typical of stormwater drainage systems in the area.

Lake stages were monitored and used to estimate quantities of drainage-well inflow. Estimated inflow for April 1982 through March 1983 was 62.4 acre-feet at Lake Midget and 84.0 acre-feet at Park Lake. Inflow to the drainage wells was sampled periodically. The quality of water prior to inflow to the drainage wells was estimated from samples of stormwater runoff to the lakes. The quality of formation water near the wells was estimated from samples pumped from the two drainage wells. A reconnaissance sampling of inflow at seven other drainage wells in the Orlando area was done, once at each well, to broaden the areal coverage of the investigation. The laboratory analyses included determinations of selected nutrients, bacteria, major constituents, trace elements, and numerous organic compounds, including many designated priority pollutants by the U.S. Environmental Protection Agency.

Comparison of quality of drainage-well inflow with State criteria for drinking water supply indicated that color and bacteria were excessively high, and pH excessively low, in some samples. Constituents that exceeded the criteria were iron, in 10 of 21 inflow samples, manganese, in 1 sample, and lead, in 1 sample.

The priority pollutant dibenzo(a,h)anthracene was present in one of two samples pumped from the Lake Midget drainage well (concentration of 370 micrograms per liter). The presence of this compound in that high a concentration is puzzling because it was not detected in any samples of stormwater runoff or drainage-well inflow.

Pesticides, especially diazinon, malathion, and 2,4-D, were the most frequently detected organic compounds in stormwater runoff, drainage-well inflow, and Floridan aquifer system water samples. The priority pollutant bis(2-ethylhexyl)phthalate was detected in seven samples from five sites, probably because of widespread use of the compound in plastic products. Polynuclear aromatic compounds (fluoranthene, pyrene, anthracene, and chrysene) were found in stormwater runoff or inflow to drainage wells at Lake Midget or Park Lake and may be associated with runoff containing petroleum products.

Estimated annual loads to the Floridan aquifer system through drainage-well inflow in the Orlando area, in pounds, are dissolved solids, 32,000,000; total nitrogen, 100,000; total phosphorus, 13,000; total recoverable lead, 2,300; and total recoverable zinc, 3,700.

INTRODUCTION

Drainage wells are used in several areas of Florida to supplement natural drainage or to lower water levels in a shallow aquifer by injecting the water into an underlying aquifer. These drainage wells provide a necessary function; however, they are of concern where the injected water could contaminate a public water supply.

The UIC (Underground Injection Control) sections of the Safe Drinking Water Act (Public Law 93–523, as amended by Public Law 95–190) require the USEPA (U.S. Environmental Protection Agency) to develop and publish regulations on underground injections through wells that may endanger sources of drinking water. The FDER (Florida Department of Environmental Regulation) has assumed responsibility for these regulations in Florida and has set criteria and standards for all types of underground injection, including drainage wells (Florida Department of Environmental Regulation, 1982b). The regulations authorize the FDER to require monitoring of drainage wells and to prohibit a well that "causes or allows movement of fluid containing any contaminant into underground sources of drinking water; the presence of that contaminant may cause a violation of any primary drinking water regulation under

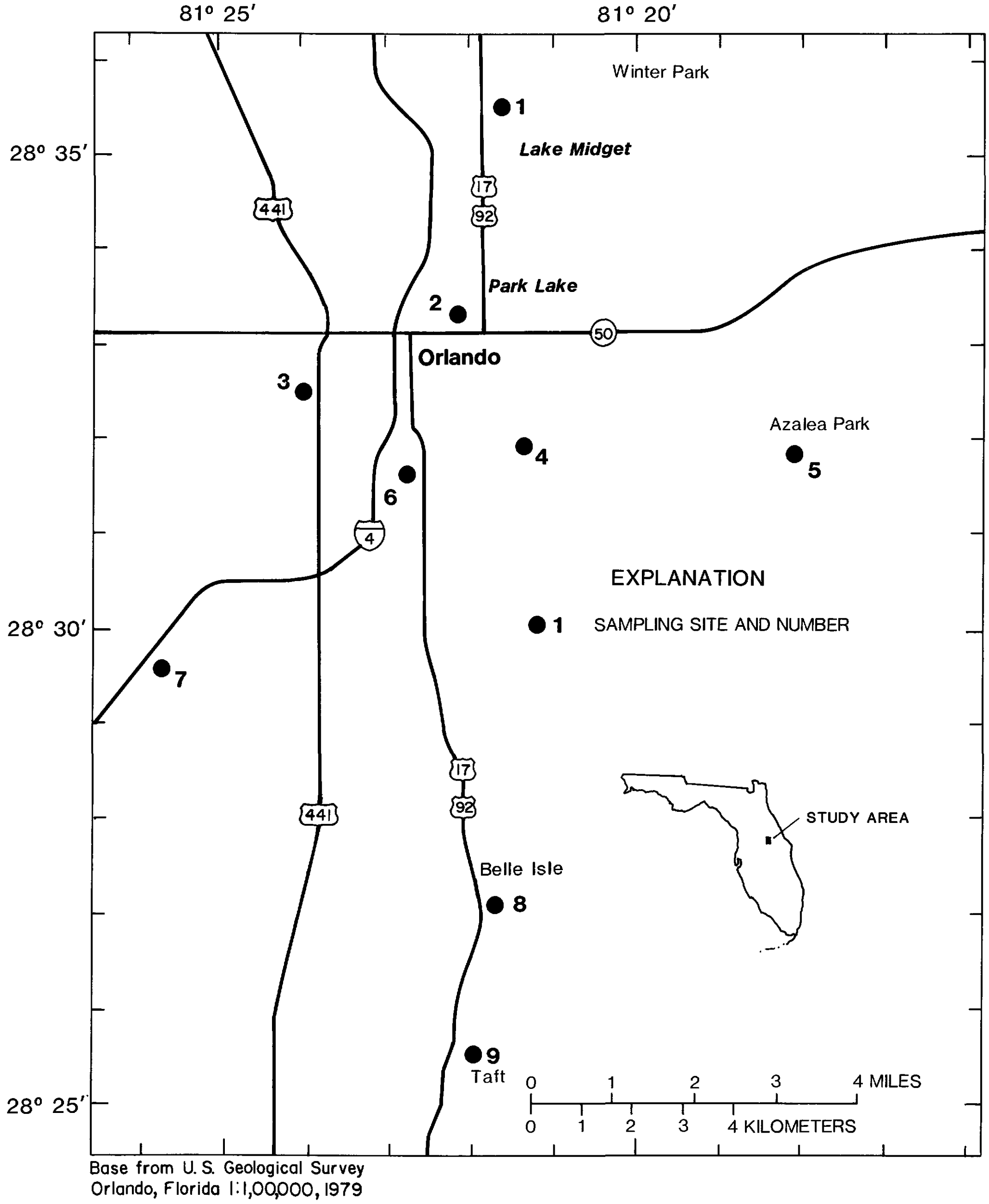

Figure 1. Orlando, Florida, area, showing location of Lake Midget, Park Lake, and other sampling sites.

Chapter 403, Florida Statutes, and Chapter 17–22, Florida Administrative Code, or which may adversely affect the health of persons" (sec. 17–28.61, para. 2).

Purpose and Scope

The purposes of this report are to (1) provide estimates of the quantity of inflow to drainage wells at selected sites in the Orlando area, (2) provide data on the quality of stormwater runoff, inflow to drainage wells, and water in the Floridan aquifer system, in the immediate vicinity of the drainage wells, and (3) provide estimates of loads of selected constituents in drainage-well inflow.

Two sites were chosen for the quantitative study of inflow to drainage wells—Lake Midget and Park Lake (sites 1 and 2, fig. 1). Lake stages at these two lakes were monitored and used to estimate quantities of drainage-well inflow for April 1982 through March 1983. Inflow to the drainage wells was sampled periodically. Inflow quantity, together with inflow quality, was used to estimate loadings of selected constituents to the drainage wells.

The quality of water prior to inflow to the drainage wells was estimated from samples of stormwater runoff to the lakes. The quality of formation water near the wells was estimated from samples pumped from the two drainage wells.

Drainage-well inflow was sampled once at seven other sites (sites 3–9, fig. 1) to provide broader areal coverage in order to assess drainage-well inflow quality more accurately.

The laboratory analyses included determination of selected nutrients, bacteria, major constituents, trace elements, and numerous organic compounds, including many designated priority pollutants by the USEPA.

Previous Investigations

The U.S. Geological Survey has been investigating drainage wells throughout the State, in cooperation with the FDER, and also as part of a federally funded study of subsurface injection in Florida. To date (1985), these investigations have been mainly of a reconnaissance type.

Kimrey (1978) traced the history of drainage wells in the Orlando area and discussed geohydrologic aspects of drainage wells. Hull and Yurewicz (1979) sampled stormwater runoff to drainage wells in Live Oak, Fla. (about 160 miles (mi) northwest of Orlando); their study is the only known investigation of the water quality of inflow to drainage wells prior to this study. Schiner and German (1983) evaluated quality of Floridan aquifer system water from drainage wells and supply wells in the Orlando area. Kimrey and Fayard (1984) made a statewide survey of drainage wells and published water-quality analyses for selected wells.

These investigations have described the occurrence and geohydrologic setting of drainage wells and have provided water-quality data for drainage wells on a reconnaissance basis. Quantitative data on amounts of water that recharge drainage wells are lacking, though it has been estimated that recharge in the Orlando area may average 50 million gallons per day (Mgal/d) (Kimrey, 1978). Also, data are not available for most of the toxic organic compounds on the USEPA's list of priority pollutants.

DESCRIPTION OF THE STUDY SITES

Lake Midget and Park Lake were selected for study because of their suitability for continuous monitoring of rates of inflow from lakes into drainage wells and because both are in typical urban lake settings where drainage wells are used to control lake stage. Both lakes receive direct runoff through stormwater sewerage systems that drain streets servicing mixed residential-commercial developments. Surface drainage is not adequate to dispose of the runoff, and without the additional drainage provided by the wells, the lakes would spill over their banks during rainy periods.

Lake Midget

Lake Midget, with a surface area of about 0.6 acre and a drainage basin of about 64 acres, is a landlocked lake in a mixed residential-commercial area of Winter Park (fig. 2). The basin contains mostly single-family dwellings, retail stores, and automobile sales and repair facilities and is crossed by heavily traveled streets. Stormwater runoff is collected in a stormwater sewerage system and is discharged into Lake Midget through four outfalls. Most runoff enters the lake through a large culvert at the east side. Outflow is through the drainage well at the west side of the lake.

Because of the large drainage area compared with the size of the lake and the large amount of impervious area (streets, parking lots, roofed areas), response of lake stage to stormwater runoff is rapid and extreme. Figure 3 shows the relation between lake stage and rainfall for selected storms. Lake stage rises about 27 inches (in) for 1 in of rainfall.

The drainage well is 12 inches in diameter and 372 feet (ft) deep and is cased to a depth of 170 ft. Thus, inflow to the well is emplaced, by gravity, into the upper producing zone of the Floridan aquifer system (Kimrey, 1978). Water from the lake enters the well casing from a well pit after passing through a horizontal 12-in inlet having a vertical submerged opening near the bottom of the lake (fig. 4). The submerged intake helps prevent weeds and other floating debris from entering the system. However, inflow to the well has been observed on occasion to be severely restricted by weeds packed in the entrance culvert, and periodic clearing of the intake system is necessary.

The Lake Midget drainage well is capable of rapidly reducing the lake stage. Figure 5 shows response of lake stage to rainfall and subsequent decline in lake stage following a storm on September 26, 1982. Within about 32 hours of peak lake stage (0900 on September 26, 1982), the stage declined nearly 4 ft.

Inflow to the well is not continuous but occurs only when the lake level exceeds the elevation of the horizontal entrance culvert. During dry periods, the lake stage may remain below the culvert for weeks or even months at a time.

Park Lake

Park Lake, with a surface area of about 10 acres and a drainage area of about 96 acres, is a landlocked lake in a predominantly residential area near downtown Orlando (fig. 6). The basin contains mostly single-family dwellings, apartment buildings, and small offices. Colonial Drive (State Highway 50), along the south shore of the lake, is a major traffic route through the area. Stormwater runoff is collected in stormwater sewerage systems and discharged to

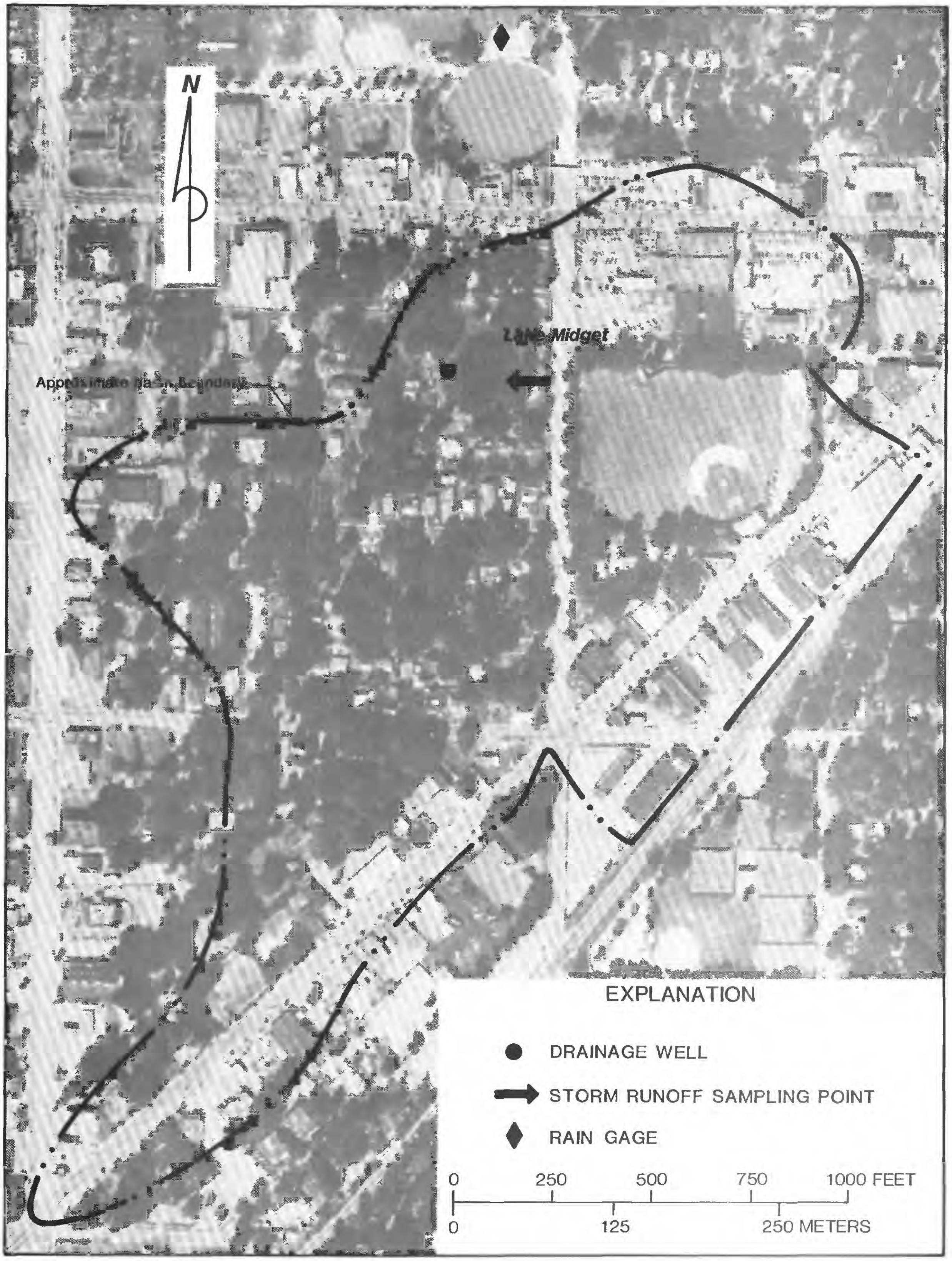

Figure 2. Lake Midget area. (Photo furnished by U.S. Department of Agriculture.)

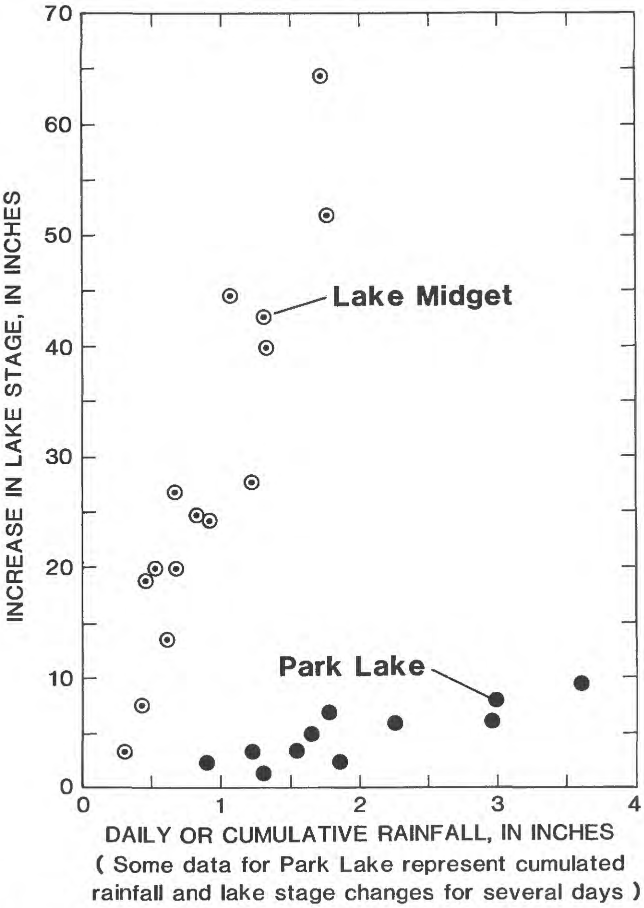

Figure 3. Relation of Lake Midget and Park Lake stage increases to rainfall for selected storm events.

the lake through several outfalls along the lake perimeter. Outflow is through a drainage well on the north shore of the lake.

Park Lake, being much larger than Lake Midget, does not receive nearly as much runoff in relation to lake area as does Lake Midget and, therefore, is probably more typical of other Orlando area lakes. Stage at Park Lake rises about 2.2 in for 1 in of rainfall (fig. 3).

The Park Lake drainage well is 8 inches in diameter and is cased to a depth of 88 ft. The well was logged in April 1982, and, at that time, the maximum depth obtainable was 170 ft. This depth is shallower than most drainage wells (Schiner and German, 1983, p. 11), and it seems likely that the well was blocked or had caved in at that depth. Water from the lake flows, by gravity, into the well from a well pit after passing through a 12-in inclined culvert set into a concrete wall at the lakeshore (fig. 4). The lake end of the culvert is not screened, but a littoral zone of rooted aquatic weeds helps screen floating debris from the intake. The well was occasionally observed to become periodically and momentarily blocked, possibly by entrained air, and then to spray water several feet above

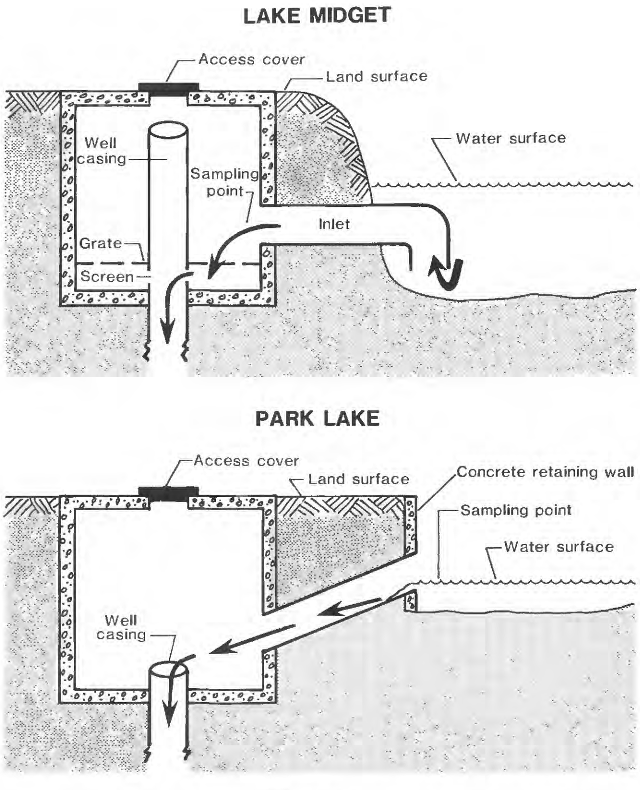

Figure 4. Lake Midget and Park Lake drainage-well intakes.

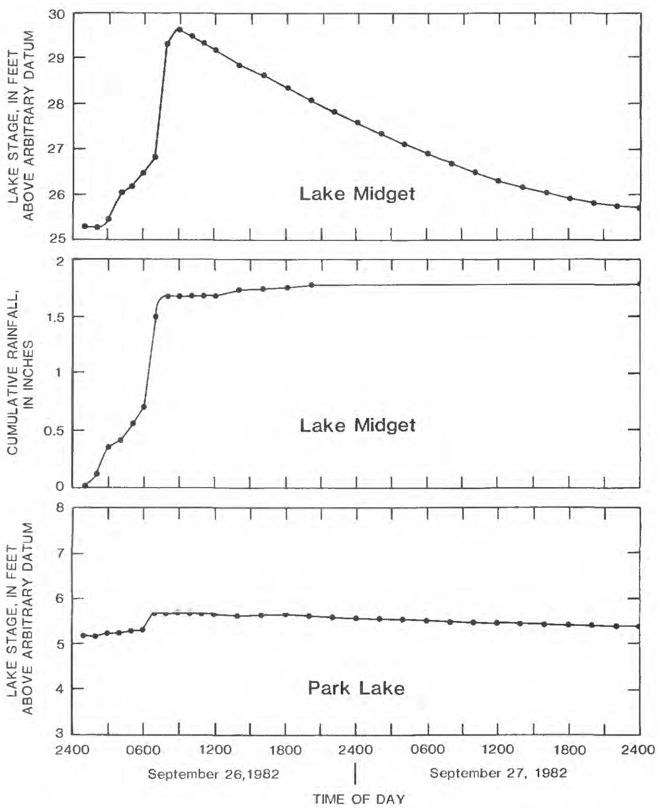

Figure 5. Cumulative rainfall at Lake Midget and stage at Lake Midget and Park Lake, September 26 and 27, 1982.

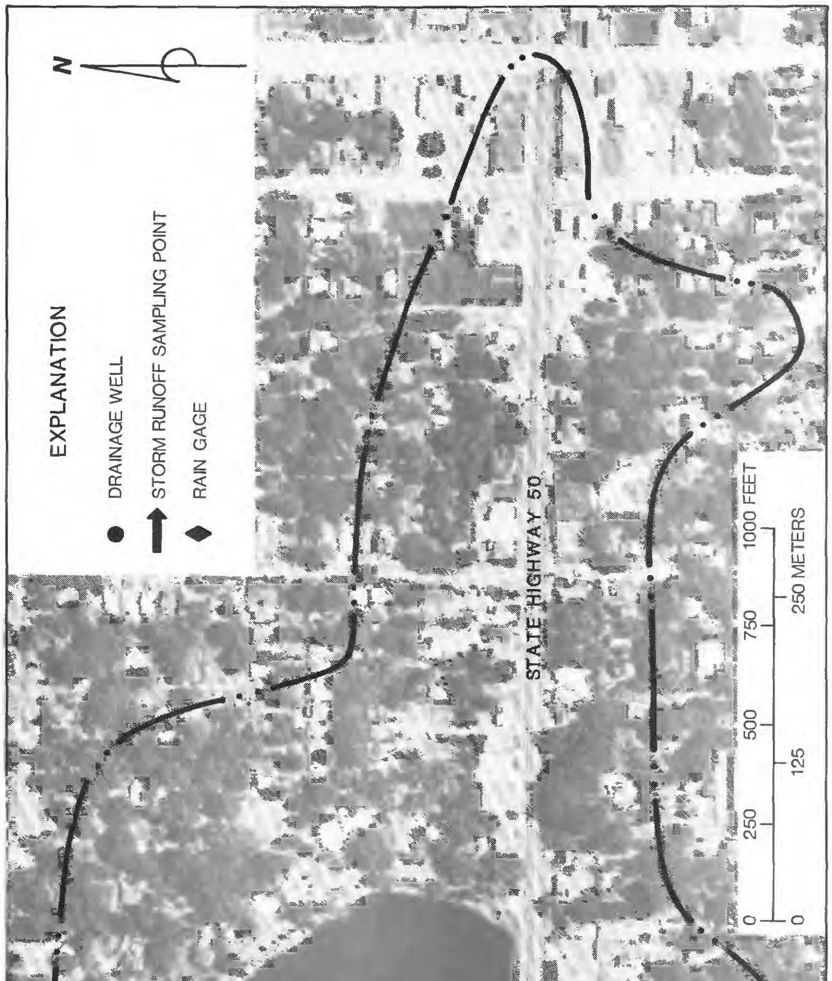

Figure 6. Park Lake area. (Photo furnished by U.S. Department of Agriculture.)

Table 1. Number and type of water-quality samples

[Nutrients include dissolved and total nitrogen and phosphorus species. Bacteria include fecal coliform and fecal streptococci. Major constituents include calcium, magnesium, sodium, potassium, chloride, sulfate, and alkalinity. Trace elements include arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, silver, and zinc. Trace organics include insecticides and herbicides, and acid-extractable, base-neutral, and volatile compounds]

Map No.	Site identification No.	Site type	Number of samples for: Nutrients	Bacteria	Major constituents	Trace elements	Trace organics
1	283530081214300	Inflow to Lake Midget drainage well	8	4	7	8	6
1	283529081214200	Storm runoff to Lake Midget	4	0	1	4	4
1	283530081214301	Lake Midget drainage well	2	1	2	2	2
2	02234210	Inflow to Park Lake drainage well	7	4	7	7	6
2	283312081222200	Storm runoff to Park Lake	3	0	1	3	3
2	283314081222201	Park Lake drainage well	2	2	2	2	2
3	283232081241200	Inflow to Lake Lorna Doone drainage well	0	0	0	1	1
4	283201081213400	Inflow to drainage canal drainage well	0	0	0	1	1
5	283157081180402	Inflow to drainage canal drainage well	0	0	0	1	1
6	283146081224900	Inflow to Lake-of-the-Woods drainage well	0	0	0	1	1
7	282945081255000	Inflow to drainage canal drainage well	0	0	0	1	1
8	282704081214300	Inflow to Bear Head Lake drainage well	0	0	0	1	1
9	282534081220602	Inflow to drainage canal drainage well	0	0	0	1	1

land surface before inflow resumed. This happened only at relatively high inflow rates.

Park Lake stage is less affected by runoff and drainage-well inflow than is Lake Midget because of its much larger size in relation to the area drained. Figure 5 shows that for the storm of September 26, 1982, the rise and subsequent decline in lake stage is relatively small.

Inflow to the drainage well is not continuous, but it persists longer at Park Lake than at Lake Midget. The inflow occurs whenever the lake level exceeds the elevation of the mouth of the entrance culvert. During dry periods, the lake stage may remain below the culvert mouth for weeks or even months at a time.

Reconnaissance Sampling Sites

In addition to Lake Midget and Park Lake, seven sites where inflow to drainage wells occurs frequently or continuously during most years were sampled once for specific conductance, trace elements, and trace organic compounds. This was done in order to provide a broader areal assessment of the quality of drainage-well recharge waters. The sites, listed in table 1 and located as shown in figure 1, include three lake overflow sites and four drainage canal sites.

The lakes (map numbers 3, 6, and 8 in table 1 and fig. 1) are in a mixed residential-commercial setting and receive direct runoff from stormwater sewers draining nearby streets. The drainage canal sites (map numbers 4, 5, 7, and 9) are different from the lake sites because the canals drain larger areas and may contain significant quantities of ground-water seepage.

METHOD OF INVESTIGATION

Hydrologic Data Collection

Data collected include water quality of stormwater runoff to Lake Midget and Park Lake, inflow to the drainage wells, and water pumped from the drainage wells. Reconnaissance sampling of inflow to seven other drainage wells in the Orlando area was also done. Rainfall quantities were recorded and continuous records of stage at Lake Midget and Park Lake were maintained. All data-collection sites are shown in figure 1. Water-quality sampling and types of analyses are summarized in table 1.

Stormwater runoff samples were taken from stormwater sewer outlets at the lakes and represent an instantaneous assessment of water quality once during each sampled event.

Samples of drainage-well inflow at Lake Midget and Park Lake were taken at intervals of about 2 to 6 weeks from June 1982 through March 1983; however, no sampling was done from September 2, 1982, through January 21, 1983, because the lakes were not overflowing during most of that period.

Drainage-well samples were taken after pumping the wells until at least three casing volumes of water had been removed. Samples were then collected from the pump discharge.

The reconnaissance sampling of other drainage-well inflows was done once at each site (sites 3–9) at the points of inflow to the wells. This reconnaissance sampling was done in August 1982 or August 1983, a normally wet time of year.

The major groups of organic compounds selected for analysis from the USEPA list of priority pollutants include the volatile compounds, the acid-extractable compounds, and the base-neutral-extractable compounds. Other compounds analyzed, but not on the list of priority pollutants, are organophosphorus insecticides and chlorinated phenoxy acid herbicides. All of these compounds pose a health threat if ingested in sufficient quantities, although maximum allowable concentrations for most have not been established.

Organochlorine insecticides and industrial compounds (such as PCB) were not analyzed, though some of these are listed by the USEPA as priority pollutants. These compounds were not analyzed because they are relatively insoluble and generally are not found in water. Moreover, they have been frequently sampled in previous surface-water and ground-water studies. This study was aimed at the more soluble, more commonly detected pesticides and at the compounds not sampled in previous investigations in the study area. A complete list of organic compounds for which analyses were made is given in table 2.

Samples were processed at time of collection using standard U.S. Geological Survey procedures. Samples for dissolved constituents were filtered through a 0.45-micrometer membrane filter; samples for trace elements were acidified with nitric acid, a mercuric chloride preservative was added to nutrient samples, and samples for nutrients and organic compounds were packed in ice. Bacteria samples were transported to the Orlando office of the Geological Survey within 6 hours after collection and prepared for counting by using membrane-filter techniques (Greeson and others, 1977). Samples for nutrient analyses were shipped on ice and analyzed by the Geological Survey Water Quality Service Unit in Ocala, Fla. All other samples were analyzed by the Geological Survey Water Quality Laboratory in Doraville, Ga. The analytical procedures used are described in Fishman and Brown (1976), Skougstad and others (1979), and Wershaw and others (1983).

Rainfall was measured from July 1982 through February 1983 by using a tipping-bucket rain gage with a 1-hour recording interval. The gage was installed about 800 ft north of Lake Midget (fig. 2). A rainfall collector, read manually after most rainfall events, was installed about 15 ft offshore at the north end of Park Lake (fig. 6). Lake stages were recorded from April 1982 through March 1983 at both lakes using a continuous analog recorder.

Computation of Drainage-Well Inflow Quantities and Water-Quality Loads

Inflow to Lake Midget Drainage Well

Inflow rates could not be directly measured at Lake Midget using current velocity meters because the culvert connecting the lake to the well pit was often completely submerged and inaccessible. Therefore, indirect methods were used to determine inflow. Two different methods were used—one for times when lake stage was declining and the other for times when stormwater runoff to the lake and inflow to the drainage well were occurring simultaneously and lake stage was rising.

Lake stage at Lake Midget rises rapidly during periods of stormwater runoff and declines rapidly after the storm because water from the lake flows into the drainage well (fig. 5). Decline of lake stage is so rapid that water losses from seepage and evaporation are small compared with amount of water removed from the lake by the drainage well. Therefore, most of the decrease in storage can be assumed to represent inflow to the drainage well.

A stage-area relation was determined by using a tagline to measure the diameter of the approximately circular lake at three equally spaced points on the lake's circumference at a stage of 24.95 ft (0.13 ft below the stage of zero drainage-well inflow) and a bankfull stage of about 31 ft (arbitrary gage datum). Average diameters were computed from the three diameter measurements at each of the two lake stages, and average diameters at intermediate stages were estimated by linear interpolation. The area of the lake at a given stage is, then, approximately the area of a circle having the estimated diameter. Measurements of the lake at the two stages are given in table 3.

The procedure for estimating inflow to the drainage well during periods of zero runoff (declining stage) was to compute average stage for half-hour intervals, estimate average lake diameter and then area for the interval, and, finally, multiply average area by the change in stage to get change in storage, in acre-feet, for the half-hour interval.

Table 2. Organic compounds for which analyses were made

Type and name of compound		
Volatiles	Base-neutral extractables	Pesticides
Benzene	Acenaphthene	Diazinon
Bromoform	Acenaphthylene	Ethion
Carbon tetrachloride	Anthracene	Malathion
Chlorobenzene	Benzidine	Methyl parathion
Chlorodibromomethane	Benzo(a)anthracene	Methyl trithion
Chloroethane	Benzo(a)pyrene	Parathion
2-chloroethylvinyl ether	Benzo(g,h,i)perylene	Silvex
Chloroform	Benzo(k)fluoranthene	Trithion
1,2-trans-dichlorethylene	Benzo(b)fluoranthene	2,4-D
Dichlorobromomethane	4-bromophenyl phenyl ether	2,4-DP
Dichlorodifluoromethane	Butyl benzyl phthalate	2,4,5-T
1,1-dichloroethane	Bis(2-chloroethoxy)methane	
1,2-dichloroethane	Bis(2-chloroethyl)ether	
1,1-dichloroethylene	Bis(2-chloroisopropyl)ether	
1,2-dichloropropane	2-chloronaphthalene	
1,3-dichloropropene	4-chlorophenyl phenyl ether	
Ethylbenzene	Chrysene	
Methyl bromide	Dibenzo(a,h)anthracene	
Methylene chloride	Di-n-butyl phthalate	
1,1,2,2-tetrachloroethane	1,3-dichlorobenzene	
Tetrachloroethylene	1,4-dichlorobenzene	
Toluene	1,2-dichlorobenzene	
1,1,1-trichloroethane	3,3'-dichlorobenzidine	
1,1,2-trichloroethane	Diethyl phthalate	
Trichloroethylene	Dimethyl phthalate	
Trichlorofluoromethane	2,6-dinitrotoluene	
Vinyl chloride	2,4-dinitrotoluene	
	Dioctylphthalate	
Acid extractables	Bis(2-ethylhexyl)phthalate	
	Fluoranthene	
p-chloro-m-cresol	Fluorene	
2-chlorophenol	Hexachlorobenzene	
2,4-dichlorophenol	Hexachlorobutadiene	
2,4-dimethylphenol	Hexachlorocyclopentadiene	
4,6-dinitro-o-cresol	Hexachloroethane	
2,4-dinitrophenol	Indeno(1,2,3-cd)pyrene	
2-nitrophenol	Isophorone	
4-nitrophenol	Napthalene	
Pentachlorophenol	Nitrobenzene	
Phenol	N-nitrosodi-n-propylamine	
2,4,6-trichlorophenol	N-nitrosodimethylamine	
	N-nitrosodiphenylamine	
	Phenanthrene	
	Pyrene	
	1,2,4-trichlorobenzene	

These interval inflow quantities were summed to get daily totals. This procedure cannot be used to determine inflow to the drainage well during storms, when the lake stage rises, because quantities of water both to and from the lake cannot be determined using only change in lake storage.

Table 3. Diameters and approximate areas of Lake Midget at low and bankfull stages

[Lake stages in feet above arbitrary gage datum]

Azimuth, in degrees, of diameter	Diameter, in feet	
	Lake stage[1] 24.95	Lake stage[2] 31.0
0-180	187	218
60-240	155	175
120-300	173	210
Average diameter	172	201
Area of equivalent circle	23,200 ft^2, or 0.54 acre	31,700 ft^2, or 0.73 acre

[1]Stage is 0.13 feet below stage of zero drainage-well recharge.

[2]Approximate bankfull stage.

During periods of stormwater runoff, when lake stage was rising, a different procedure was used to estimate inflow to the drainage well. This procedure is more uncertain than that used between storms, but because storm events are of relatively short duration, the inflow quantity during storms is relatively small compared with that following storms.

Ratings of inflow rate were developed as a function of lake stage. These ratings were then applied to determine inflow rates and total inflow during periods of stormwater runoff to the lake. Inflow rates for development of the ratings could not be measured directly, so the ratings were developed using observed changes in lake storage as a function of lake stage after rainfall and runoff had ceased. Most of the uncertainty in this procedure results from shifts in the rating function caused by debris blocking the inlet culvert. Occasionally the inlet was almost completely plugged.

Rating functions were developed by plotting drainage-well-inflow rates for selected lake stages, as shown in figure 7. The wide range in inflow rates at a selected lake stage is caused by the blockage of the inlet

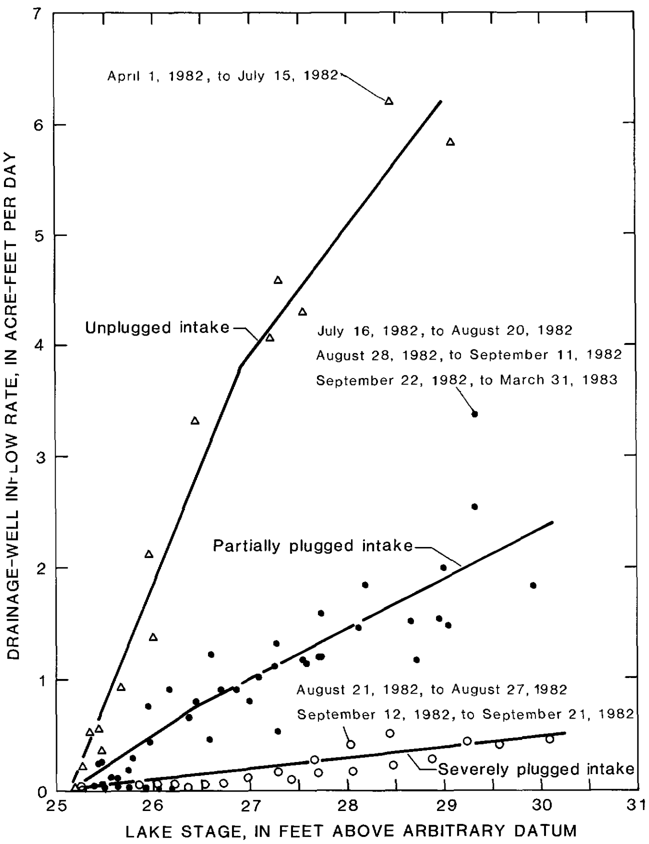

Figure 7. Relation of Lake Midget drainage-well inflow rate to lake stage at selected lake stages.

culvert. However, functions for the inflow rate computations can be defined, though no single function can be used for the entire April 1982 through March 1983 period. Three different rating functions were necessary, and, as shown in figure 7, each function was approximated by one or more linear relations.

Summarizing the computation process, the analog records of lake stage were digitized for computer processing. At half-hour intervals for the period April 1982 through March 1983, the lake-stage record was used to compute volume of inflow to the drainage well directly from the change in lake volume if the stage was declining, or from the appropriate function relating inflow rate to lake stage if the stage was rising. The half-hour-interval volumes of inflow were summed to get daily totals.

Inflow could not be computed when runoff to the lake and inflow to the well were occurring simultaneously during periods of declining stage, because record of lake stage cannot, by itself, be used to separate change in storage into inflow and outflow components. This situation generally occurred only at the end of intense storms when rainfall and runoff were diminishing, or during periods of light rainfall, and would probably account for relatively small quantities of water.

The total inflow to the drainage well during rising stages was compared with total inflow during declining stages for April 1982 through March 1983 to determine how much the relatively imprecise rising-stage method could influence the total. The data indicated that about 13 percent of the total inflow occurred during rising stages. Therefore, errors caused by undetected shifts in the inflow-lake stage rating functions should have little effect on total computed inflow for the year.

Inflow to Park Lake Drainage Well

The procedure used to compute inflow to the Park Lake drainage well was the same as that used for Lake Midget, except that the change in lake area with lake stage was not considered. A constant area was used for computations at Park Lake because the lake stages fluctuated only about 1 ft during the study. Changes of area within a 1-ft range of lake stage are probably negligible compared with other measurement errors.

The inflow rate-lake stage relation, determined from hydrograph analysis and field measurements, was relatively constant at Park Lake compared with Lake Midget (fig. 8). A major shift in the relation occurred only once during the study, when inflow to the well was severely restricted by a piece of wood lodged in the inlet.

Uncertainty in the inflow rate-lake stage function for a rising stage has little effect on accuracy of total recharge estimates because most inflow occurs between storms. Inflow during rising stages for April 1982 through March 1983 was only 6 percent of the total.

Computation of Drainage-Well-Inflow Water-Quality Loading

Total loads of selected water-quality constituents in the inflow to the Lake Midget and Park Lake drainage wells for April 1982 through March 1983 were computed by multiplying total inflow quantity by mean constituent concentration. Though this approach does not take into account the many factors that affect variable loading rates, it provides an estimate of chemical loading of the Floridan aquifer system through drainage-well inflow.

Loadings were computed only for constituents sampled frequently enough to define mean values adequately. Organic constituents were sporadic in occurrence, so mean concentrations were not estimated.

QUANTITY OF DRAINAGE-WELL INFLOW, APRIL 1982 THROUGH MARCH 1983

Concurrent rainfall and lake stage records at Lake Midget and Park Lake for July 1982 through February 1983 were used to determine the ratio of rise in lake stage to amount of rainfall. These ratios were then used to estimate total rainfall at the two lakes for the entire April 1982

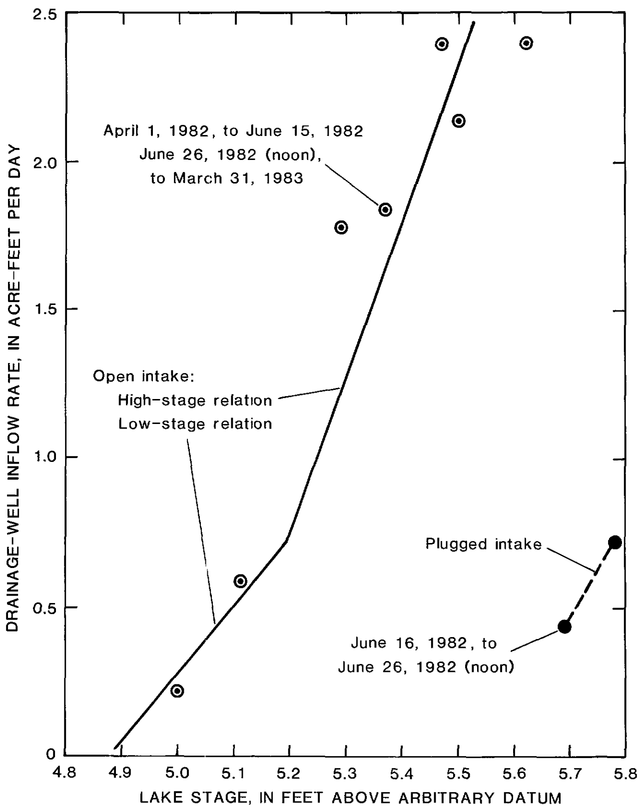

Figure 8. Relation of Park Lake drainage-well inflow rate to lake stage at selected lake stages.

through March 1983 study period. The ratio of lake-stage rise to amount of rainfall was about 27 at Lake Midget and about 2.2 at Park Lake. The sum of stage rises was 122.3 ft at Lake Midget and 12.3 ft at Park Lake. Estimated rainfall, therefore, was 54.4 in at Lake Midget and 67.1 in at Park Lake for the period April 1982 through March 1983. Recorded rainfall at the Orlando International Airport (fig. 1) for that period was 59.5 in. Normal rainfall at the airport is 51.21 in (U.S. Department of Commerce, 1982).

Estimates of evaporation and seepage loss from the lakes were based on observed lake-stage declines during periods when the lakes were not overflowing to the drainage wells. The rate of lake-stage declines during these periods averaged about 0.1 foot per day (ft/d) at Lake Midget and 0.01 ft/d at Park Lake. These evaporation and seepage loss estimates were used to correct daily estimates of drainage-well inflow. During some days when lake stages were slightly above the drainage well inlets, decline in lake stage was less than the average rate of decline during no-overflow periods. For these days, the decline in lake storage was divided equally between drainage-well inflow and evaporation and seepage. The average evaporation and seepage losses for April 1982 through March 1983 were 0.07 ft/d at Lake Midget and 0.0075 ft/d at Park Lake.

Table 4. Water budget for Lake Midget and Park Lake, April 1982 through March 1983

[In acre-feet]

		Lake Midget	Park Lake
Inflow:	Rainfall	2.9	55
	Runoff and seepage	75.4	66
Increase in storage		.6	10
Outflow:	Evaporation and seepage	15.3	27
	Drainage-well inflow	62.4	84

A budget of inflow and outflow quantities at the two lakes for April 1982 through March 1983 is given in table 4. Inflow from runoff and seepage are not separated; however, seepage into the lakes is probably small compared with surface runoff. Lake Midget received about 78 acre-ft of water, and Park Lake received about 121 acre-ft. Runoff quantities were similar in magnitude at the two lakes (about 70 acre-ft), but rainfall directly to the lake contributed much more water at Park Lake (55 acre-ft) than at Lake Midget (2.9 acre-ft) because of the much larger surface area of Park Lake.

Inflow to the drainage wells accounted for most of the water loss in both lakes (62.4 acre-ft at Lake Midget and 84 acre-ft at Park Lake for the period April 1982 through March 1983). Estimated annual inflow, adjusted to the normal rainfall of 51.21 in, is 59 acre-ft/yr at Lake Midget and 64 acre-ft/yr at Park Lake.

Daily inflow for the two wells (fig. 9) was as great as about 3.8 acre-ft/d at Lake Midget and about 2.4 acre-ft/d at Park Lake.

QUALITY OF RUNOFF, INFLOW, AND WATER PUMPED FROM DRAINAGE WELLS

Stormwater Runoff

Properties, Major Constituents, Nutrients, and Trace Elements

A summary of properties, major constituents, nutrients, and trace elements in grab samples of stormwater runoff to Lake Midget and Park Lake is given in table 5. Quality of stormwater runoff is variable, but the runoff may have low specific conductance (which is proportional to the amount of dissolved solids), high color and turbidity, and high nitrogen, phosphorus, and trace element concentrations. Any differences between the two sites in stormwater-runoff quality are probably not detectable because of the small number of samples (four at Lake Midget and three at Park Lake) and the large variability in stormwater-runoff quality. However, the higher specific conductance of Lake Midget samples may be indicative of more highly mineralized water in the stormwater sewerage system, perhaps because of ground-water seepage.

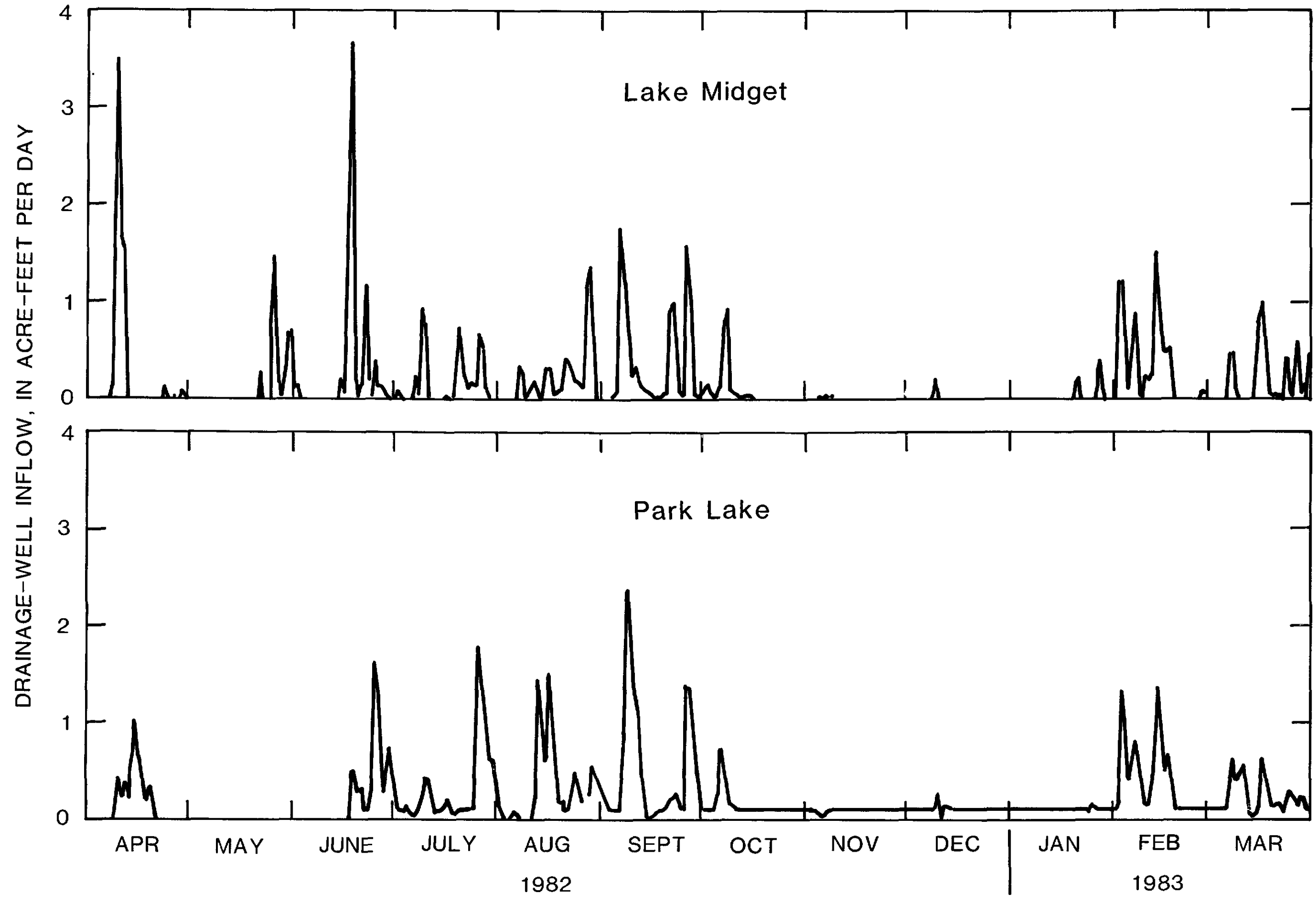

Figure 9. Inflow to Lake Midget and Park Lake drainage wells, April 1982 through March 1983.

Comparison of the stormwater-runoff quality with potable-ground-water and public-supply criteria (table 6) shows that the stormwater runoff exceeded the criteria for color, chromium, iron, lead, and manganese in at least one sample of stormwater runoff, and was lower than the minimum pH criteria in one sample. Color, iron, and total recoverable lead exceeded criteria in all, or in all but one, of the samples.

Organic Compounds

Occurrence of organic compounds in stormwater runoff was sporadic during this study, and only a few of the compounds listed in table 2 were present in detectable concentrations. Pesticide compounds, specifically diazinon and malathion, occurred more frequently than any of the other compounds.

Stormwater runoff was sampled four times at Lake Midget and three times at Park Lake. Five pesticides and 12 priority pollutants were detected in at least one of seven samples (table 7). Malathion, detected in six samples, and diazinon, detected in five samples, were the most prevalent organic compounds. Priority pollutants were not detected as frequently; fluoranthene and pyrene, the most frequently detected priority pollutants, were found in four samples of stormwater runoff.

Organic compounds were much less prevalent in stormwater runoff at Park Lake than at Lake Midget. Only three of the pesticides and two of the priority pollutants detected at Lake Midget were also detected at Park Lake.

The herbicide 2,4-D is the only organic compound detected that is specified in State potable-ground-water and public-supply regulations. One sample of stormwater runoff at Lake Midget contained 0.47 microgram per liter (μg/L) of 2,4-D, well below the criterion of 100 μg/L.

Although this sampling was not extensive enough to accurately assess the organic compounds in stormwater runoff at either site, the data do indicate that stormwater quality with respect to organic compounds is highly variable and may contain at least the compounds listed in table 7. Ten of the 17 organic compounds detected in stormwater runoff samples were detected in only one of the seven samples. A sample taken January 21, 1983, at Lake Midget was unique because of the large number (10) of priority pollutants detected. This may have been the result of an extended period of dry weather, during which the compounds accumulated on the land surface and in the sewerage system prior to the January 21, 1983, rainfall. Interestingly,

Table 5. Properties, major constituents, nutrients, and trace elements in stormwater runoff

[Values represent total recoverable concentrations in micrograms per liter, unless designated. Other units are μS/cm (microsiemens per centimeter) and mg/L (milligrams per liter). A dash indicates no data. Total recoverable concentrations represent all readily digestible material and may include less than 95 percent of the material. Dissolved concentrations represent material passing through a 0.45-micrometer filter]

	Storm runoff to Lake Midget	Storm runoff to Park Lake	All storm runoff sample		
	Median	Median	Range	Median	Samples not meeting criteria/ total number of samples[1]
Specific conductance (μS/cm at 25 °C)	148	64	38-210	123	--
pH (units)	7	7	6-7.9	7.1	1/4
Color (Platinum-cobalt units)	35	60	20-100	35	5/5
Turbidity (nephelometric units)	5.3	22	2.5-25	17	--
Calcium, dissolved (mg/L)	38	26	(2)	(2)	--
Magnesium, dissolved (mg/L)	1.1	1.7	(2)	(2)	--
Sodium, dissolved (mg/L)	3.0	6.4	(2)	(2)	0/2
Potassium, dissolved (mg/L)	.6	3.6	(2)	(2)	--
Alkalinity (mg/L as $CaCO_3$)	99	84	(2)	(2)	--
Sulfate, dissolved (mg/L)	9.0	20	(2)	(2)	0/2
Chloride, dissolved (mg/L)	2.5	13	(2)	(2)	0/2
Nitrogen, total (mg/L)	1.4	2.4	1.2-8.1	2	--
Nitrogen, dissolved (mg/L)	.62	1.4	.6-6.5	.7	--
Phosphorus, total (mg/L)	.28	.37	.09-.67	.37	--
Phosphorus, dissolved (mg/L)	.10	.15	.05-.41	.14	--
Arsenic	1	1	1-1	1	0/7
Barium	<100	100	<100-100	100	0/7
Cadmium	1	1	1-2	1	0/7
Chromium	10	10	<10-610	10	1/7
Copper	11	36	3-59	15	0/7
Iron	500	570	370-1,200	550	7/7
Lead	120	170	24-430	120	6/7
Lead, dissolved	17	58	1-76	37	3/7
Manganese	20	40	10-60	20	1/6
Mercury	<.1	<.1	<.1-.2	<.1	0
Selenium	<1	<1	<1-<1	<1	0
Silver	<1	<1	<1-<1	<1	0
Zinc	80	140	40-360	120	0
Zinc, dissolved	16	30	10-140	20	0

[1]Criteria for potable ground water and public drinking water systems (Florida Department of Environmental Regulation, 1982a).

[2]Insufficient data—only two samples for these comparisons.

the sample did not contain detectable amounts of any pesticide, perhaps because of lesser pesticide use during winter months.

Drainage-Well Inflow

Properties, Bacteria, Major Constituents, Nutrients, and Trace Elements

Quality of inflow to the Lake Midget and Park Lake drainage wells and the seven reconnaissance sites is summarized in table 8. These data show that the drainage-well inflows have many similar chemical and physical properties and are characterized by specific conductances of generally less than 200 microsiemens per centimeter (μS/cm) at 25 °C, pH that varies from acidic to basic, generally low color and turbidity, and, in some samples, high bacteria counts. The inflow waters at Lake Midget and Park Lake were dominated by calcium and bicarbonate (bicarbonate accounts for most of the alkalinity). Total nitrogen concentrations generally were less than 1 milligram per liter (mg/L), and total phosphorus concentrations generally were less than 0.2 mg/L. Trace element concentrations generally were below or near analytical detection limits, except for copper, iron, lead, and zinc.

Lake Midget and Park Lake are effective traps for many constituents, as seen by comparing median values for stormwater runoff samples (table 5) with median values for inflow to the Lake Midget and Park Lake drainage wells (table 8). Median values of color, turbidity, nitrogen, phosphorus, copper, iron, lead, and zinc are higher in stormwater runoff than in drainage-well inflow from the lakes by factors ranging from about 2 to 7 at Lake Midget and from about 3 to 18 at Park Lake. These data indicate that lake storage of stormwater runoff improves water quality, and that drainage wells receiving direct stormwater runoff probably accept much higher loads of some constituents than wells receiving lake overflow.

Inflow to drainage wells did not meet the criteria for potable ground water and public drinking supply (table 6)

Table 6. Selected water-quality criteria for potable ground water and public drinking water systems

[In micrograms per liter, except as noted; mg/L, milligrams per liter; cols/100 mL, colonies per 100 milliliters. From Florida Department of Environmental Regulation, 1982a]

	Maximum value
Secondary regulations	
Chloride (mg/L)	250
Color (Platinum-cobalt units)	15
Copper	1,000
Iron	300
Manganese	50
pH (units)	no maximum (minimum = 6.5)
Sulfate (mg/L)	250
Zinc	5,000
Primary regulations	
Elements and bacteria	
Sodium (mg/L)	160
Arsenic	50
Barium	1,000
Cadmium	10
Chromium	50
Lead	50
Mercury	2
Selenium	10
Silver	50
Total coliform (cols/100 mL)	1 (monthly average)
Organic compounds	
[Ethylene dibromide is also listed in the regulations, but was not analyzed for during this study]	
Trichloroethylene	3
Carbon tetrachloride	3
Vinyl chloride	1
1,1,1-trichlorethane	200
1,2-dichloroethane	3
Benzene	1
Tetrachloroethylene	3
2,4-D	100
2,4,5-TP (Silvex)	10

for pH, color, and iron in several samples (table 8). Lead was higher than the criterion in one sample of inflow to the Lake Midget drainage well, and manganese was higher than the criterion in the reconnaissance sample at site 6. Drainage-well inflow was noticeably better than stormwater runoff with respect to these criteria, except perhaps for pH. The pH of drainage-well inflows was less than the criterion of 6.5 in 7 of 17 (41 percent) samples. The pH of stormwater runoff was less than 6.5 in one of four (25 percent) samples. However, the small number of pH determinations for stormwater runoff makes conclusions tentative. Overall, 25 of 116 (22 percent) determinations for drainage-well inflow did not meet the criteria for pH, color, chromium, iron, lead, or manganese. In stormwater runoff, 24 of 36 (67 percent) determinations of the same variables did not meet these criteria.

Dissolved concentrations of many constituents may be more significant than total concentrations in drainage-well inflow because the suspended part of the inflow load is probably removed by settling and filtration and, thus, remains near the point of injection. For this reason, nitrogen, phosphorus, lead, and zinc were determined in both total and dissolved concentrations. Lead and zinc were selected because they affect the potability of water, are often present in relatively high concentrations in stormwater runoff, and are not found naturally (except in trace amounts) in the Floridan aquifer system.

Comparisons of median dissolved with median total concentrations showed that for many constituents dissolved concentrations were much lower than total concentrations. Dissolved nitrogen accounted for 38 percent of the total nitrogen in drainage-well inflow at Lake Midget and 68 percent of the total nitrogen at Park Lake. Dissolved phosphorus accounted for 62 percent of the total phosphorus at Lake Midget and 50 percent of the total phosphorus at Park Lake. For lead and zinc, the dissolved to total-

Table 7. Organic compounds in stormwater runoff

[Concentrations in micrograms per liter; µg/L, micrograms per liter]

	No. of detections			Maximum concentrations
	Lake Midget	Park Lake	All samples	(all samples)
	Pesticides			
2,4-D	1	0	1	0.47
Diazinon	2	3	5	1.2
Ethion	1	1	2	.44
Malathion	3	3	6	26
Methyl trithion	1	0	1	5.4
	Priority pollutants			
Acenaphthene	1	0	1	3
Anthracene	1	0	1	5
Benzo(a)anthracene	1	0	1	5
Bis(2-ethylhexyl)phthalate	1	0	1	20
2-chlorophenol	1	0	1	8
Chrysene	2	0	2	6
2,4-dimethylphenol	1	0	1	1[1]
Fluoranthene	3	1	4	17
Fluorene	1	0	1	4[1]
Phenanthrene	2	0	2	13
Pyrene	3	1	4	11
Toluene	1	0	1	3[1]
No. of samples	4	3	7	

[1]Reported concentrations are less than established reporting unit (5 µg/L) and, therefore, are estimated values.

recoverable ratios were smaller. Dissolved lead accounted for 33 percent of the total recoverable lead at Lake Midget and 40 percent of the total recoverable lead at Park Lake. Dissolved zinc accounted for 27 percent of the total recoverable zinc at Lake Midget and less than 20 percent of the total recoverable zinc at Park Lake.

Differences in the inflow waters from the two lakes are probably due largely to difference in the size of the lakes compared with their drainage areas. Lake Midget, being small compared with the area drained, provides a short retention time for stormwater runoff compared with Park Lake. The longer retention time at Park Lake allows more time for particulates washed into the lake during storms to settle, and a longer time for assimilative processes to act. This could account for the generally lower concentrations of bacteria, nutrients, and trace elements in the drainage-well inflow from Park Lake. The higher specific conductance (dissolved solids) of the inflow from Park Lake could be because of more evaporation during the longer retention time.

Organic Compounds

Organic compounds were detected in some samples of inflow to the nine drainage wells, but as was noted for stormwater runoff, occurrence was sporadic except for pesticide compounds. Of the 21 organic compounds detected, 16 were detected only once.

A total of 19 drainage-well-inflow samples were collected at Lake Midget, Park Lake, and the seven reconnaissance sites. A summary of detection frequency and maximum concentrations of organic compounds is given in table 9. Diazinon was the most frequently detected compound, occurring in all but four samples. The diazinon concentration in one sample of inflow to the Lake Midget drainage well was 840 µg/L. Other frequently detected pesticides were 2,4-D (in 10 samples) and malathion (in 8 samples). Only one priority pollutant (bis(2-ethylhexyl)-phthalate) was detected in more than one sample of drainage-well inflow.

The herbicides 2,4-D and silvex are included in the list of primary regulation criteria for potable ground water and public water supply systems. The maximum concentration of 2,4-D in drainage-well-inflow samples was 0.75 µg/L, and the maximum silvex concentration was 0.03 µg/L. These concentrations are well below the maximum allowed by the criteria.

More organic compounds were detected in the inflow to the Lake Midget drainage well than in the inflow to wells at other sites. It is perhaps significant that, of the 14 priority pollutants detected at Lake Midget, 13 were detected only once, in a sample collected January 21, 1983. As discussed previously, stormwater runoff to Lake Midget on this date

Table 8. Properties, bacteria, major constituents, nutrients, and trace elements in inflow to drainage wells

[Values represent total recoverable concentrations in micrograms per liter, unless designated. Other units are µS/cm (microsiemens per centimeter), cols per 100 mL (colonies/100 milliliters), and mg/L (milligrams per liter). A dash indicates insufficient data for computation of median or no applicable criteria. Total recoverable concentrations represent all readily digestible material and may include less than 95 percent of the material. Dissolved concentrations represent material passing through a 0.45-micrometer filter]

Parameter	Inflow to drainage wells at			All drainage well inflow		
	Lake Midget	Park Lake	Reconnaissance sites			Samples not meeting criteria/total number of samples[1]
	Median	Median	Median	Range	Median	
Specific conductance (µS/cm at 25 °C)	121	156	190	54-224	145	--
pH (units)	7	8	--	5.6-8.8	7	7/17
Color (Platinum-cobalt units)	10	5	--	0-60	10	6/15
Turbidity (nephelometric units)	2	1.4	--	.7-52	2	--
Fecal coliform (cols/100 mL)	1,600	70	--	15-2,700	415	--
Fecal streptococci (cols/100 mL)	420	370	--	96-11,000	400	--
Calcium, dissolved (mg/L)	20	22	--	9.4-29	22	--
Magnesium, dissolved (mg/L)	.6	3	--	.3-4.4	2.5	--
Sodium, dissolved (mg/L)	1.5	4.1	--	.6-5.6	3.3	0/15
Potassium, dissolved (mg/L)	1.1	1.5	--	.5-2.3	1.2	--
Alkalinity (mg/L as $CaCO_3$)	55	66	--	27-87	63	--
Sulfate, dissolved (mg/L)	4	6	--	0-8.2	5	0/15
Chloride, dissolved (mg/L)	2.2	6.8	--	.8-9	5.5	0/15
Nitrogen, total (mg/L)	.82	.53	--	.25-2.4	.67	--
Nitrogen, dissolved (mg/L)	.31	.36	--	.16-.48	.34	--
Phosphorus, total (mg/L)	.13	.04	--	.01-.27	.07	--
Phosphorus, dissolved (mg/L)	.08	.02	--	.01-.12	.04	--
Arsenic	1	1	1	<1-2	1	0/21
Barium	<100	<100	<100	<100-100	<100	0/21
Cadmium	1	1	<1	<1-3	1	0/21
Chromium	10	10	20	<10-30	10	0/21
Copper	5	11	6	4-25	6	0/21
Iron	330	60	590	20-1,900	270	10/21
Lead	18	10	7	5-71	9	1/21
Lead, dissolved	6	4	3	2-31	4	0/21
Manganese	10	10	30	<10-70	10	1/21
Mercury	<.1	<.1	<.1	<.1-.7	<.1	0/21
Selenium	<1	<1	<1	<1-<1	<1	0/21
Silver	<1	<1	<1	<1-<1	<1	0/18
Zinc	30	20	30	<10-130	30	0/21
Zinc, dissolved	8	<4	10	<10-30	4	0/21

[1]Criteria for potable ground water and public drinking water systems (Florida Department of Environmental Regulation, 1982a).

contained detectable concentrations of 10 priority pollutants. The large number of compounds in the stormwater runoff and the drainage-well inflow may be related to the long period of dry weather prior to the January 21, 1983, rainfall.

Water Pumped from Drainage Wells

Properties, Bacteria, Major Constituents, Nutrients, and Trace Elements

The drainage wells at Lake Midget and Park Lake were each sampled twice and the samples analyzed for properties, bacteria, major constituents, nutrients, and trace elements. Data are given in table 10. The quality of water from these wells is typical of other drainage wells in the Orlando area. Except for relatively high color, fecal coliform and streptococci, nitrogen, phosphorus, and iron, the water quality is also typical of supply wells cased into the upper producing zone of the Floridan aquifer system (see Schiner and German, 1983, for a comprehensive summary of water-quality data for drainage and supply wells in the Orlando area).

Water quality did not meet secondary regulation criteria (table 6) for color in one sample from the Lake Midget well and for iron in either sample from the well. Primary regulation criteria were met at both wells. However, fecal coliform and fecal streptococci densities were relatively high in both wells, indicating that the wells might not produce water of acceptable bacterial levels, at least without considerable development. Whether or not the presence of bacteria in the wells is evidence of aquifer contamination by drainage-well inflow is difficult to establish, because of the unknown extent of bacteria populations around a drainage well. Sediments at the bottom of a well bore could contain high levels of bacteria, and, as pointed out by Schiner and German (1983, p. 34), "interpretation of bacteria data should be approached with extreme caution * * * pumping the well could resuspend the bacteria and result in high sample densities not representative of the aquifer."

Table 9. Organic compounds in inflow to drainage wells
[Concentrations in micrograms per liter (μg/L)]

	No. of detections				
	Lake Midget	Park Lake	Recon-naissance sites	All	Maximum concentrations (all samples)
		Pesticides			
2,4-D	3	1	6	10	0.75
Diazinon	6	4	5	15	840
Malathion	5	0	3	8	.8
Silvex	1	0	0	1	.03
2,4,5-T	3	0	1	4	.02
		Priority pollutants			
Acenaphthene	1	0	0	1	4[1]
Anthracene	1	0	0	1	5
Benzo(a)anthracene	1	0	0	1	5
Benzo(b)fluoranthene	1	0	0	1	8
Benzo(b)pyrene	1	0	0	1	3[1]
Bis(2-ethylhexyl)phthalate	2	1	3	6	48
2-chlorophenol	1	0	0	1	84
Chrysene	1	0	0	1	5
Diethylphthalate	0	1	0	1	1[1]
Di-n-butyl phthalate	0	1	0	1	2[1]
2,4-dimethylphenol	1	0	0	1	20
Fluoranthene	1	0	0	1	14
Fluorene	1	0	0	1	4[1]
4,6-dinitro-o-cresol	1	0	0	1	38
Phenanthrene	1	0	0	1	15
Pyrene	1	0	0	1	13
No. of samples	6	6	7	19	

[1]Reported concentrations are less than established reporting unit (5 μg/L) and, therefore, are estimated values.

Comparison of water from the drainage wells with the inflow water (table 8) shows that the well water is more mineralized (higher specific conductance and higher major constituent concentrations) and contains more nitrogen, phosphorus, and iron. Because the well water resembles Floridan aquifer system water more than inflow water with respect to the major dissolved constituents, it seems likely that inflow waters are not contained for long periods in the vicinity of the wells. Instead, the inflow moves downgradient in the aquifer and is, perhaps in a period of days or weeks, dispersed into ambient water. The relatively high color, bacteria, nitrogen, phosphorus, and iron in water from the Lake Midget and Park Lake drainage wells (and drainage wells sampled in other studies) could be due to localized processes related to deposition of particulate material in cavities around the well, and subsequent release of bacteria and some chemical constituents from the solids to the water. Much remains to be learned concerning interaction of solid material, deposited in drainage wells, with aquifer water.

Organic Compounds

The Lake Midget and Park Lake drainage wells were each sampled twice for the organic compounds listed in table 2. The compounds detected are listed in table 11.

Only a few of the compounds were detected in the drainage-well samples, and only one priority pollutant, dibenzo(a,h)anthracene, was identified. The presence of that compound in that high a concentration (370 μg/L) in the May 1982 sample from the Lake Midget drainage well is puzzling because the compound was not detected in any sample of stormwater runoff or drainage-well inflow at any site. Resampling of the well in November 1982 showed no detectable trace of the compound. Therefore, the presence of the compound in such a high concentration in the May 1982 sample is doubtful, and the possibility of contamination of the sample must be considered.

The herbicide silvex was the only compound included in the potable ground water and public drinking water system regulations that was detected in the drainage-well water. However, the silvex concentration of 0.04 μg/L in

Table 10. Properties, bacteria, major constituents, nutrients, and trace elements in Lake Midget and Park Lake drainage wells

[Values represent total recoverable concentrations in micrograms per liter, unless designated. Other units are µS/cm (microsiemens per centimeter), cols/100 mL (colonies per 100 milliliters), and mg/L (milligrams per liter). A dash indicates no sample. Total recoverable concentrations represent all readily digestible material and may include less than 95 percent of the material. Dissolved concentrations represent material passing through a 0.45-micrometer filter]

	Lake Midget		Park Lake	
	05-26-82	11-19-82	05-26-82	09-02-82
Specific conductance (µS/cm at 25 °C)	320	345	320	300
pH (units)	6.7	6.9	6.9	7.4
Color (Platinum-cobalt units)	20	10	5	5
Turbidity (nephelometric units)	.5	2.4	.6	.3
Fecal coliform (cols/100 mL)	750	--	450	20
Fecal streptococci (cols/100 mL)	350	--	130	37
Calcium, dissolved (mg/L)	55	45	43	39
Magnesium, dissolved (mg/L)	3.4	4.7	8.1	6.6
Sodium, dissolved (mg/L)	5.9	2.4	11	7.7
Potassium, dissolved (mg/L)	1.3	1.6	1.5	1.2
Alkalinity (mg/L as $CaCO_3$)	127	147	136	112
Sulfate, dissolved (mg/L)	28	1	8	8
Chloride, dissolved (mg/L)	5.9	3.5	11	9.5
Nitrogen, total (mg/L)	1.17	3.96	.91	.67
Nitrogen, dissolved (mg/L)	.95	3.89	.96	.67
Phosphorus, total (mg/L)	.25	.80	.17	.11
Phosphorus, dissolved (mg/L)	.23	.80	.17	.11
Arsenic	2	1	1	2
Barium	<100	<100	<100	<100
Cadmium	1	<1	1	<1
Chromium	10	10	10	10
Copper	6	4	4	12
Iron	1,300	2,320	130	170
Lead	14	5	4	3
Lead, dissolved	7	1	3	3
Manganese	40	50	10	20
Mercury	<.1	<.1	<.1	<.1
Selenium	<1	<1	1	<1
Silver	<1	3	<1	<1
Zinc	20	20	20	10
Zinc, dissolved	20	10	8	9

the November 11, 1982, sample from the Lake Midget drainage well is much lower than the maximum allowable (100 µg/L).

The presence of the pesticides diazinon, malathion, methyl trithion, and silvex (especially diazinon and malathion) is expected because these compounds were detected in stormwater runoff or drainage-well inflow.

The two samples from each of the drainage wells are not adequate to accurately assess the occurrence of organic compounds, but the analyses indicate that priority pollutants are probably not commonly found in detectable concentrations in the Floridan aquifer system. More sampling is needed to confirm this, however, because the samples of inflow do show that several organic compounds are being introduced into the aquifer.

Table 11. Organic compounds in Lake Midget and Park Lake drainage wells

[Concentrations in micrograms per liter. "A" and "B" indicate concentrations of less than 0.01 and 1, respectively]

	Lake Midget drainage well		Park Lake drainage well	
	05-26-82	11-11-82	05-26-82	09-02-82
Pesticides				
Diazinon	A	0.02	0.05	0.03
Malathion	A	.02	A	A
Methyl trithion	A	.36	A	A
Silvex	A	.04	A	A
Priority pollutants				
Dibenzo(a,h)anthracene	370	B	B	B

Distribution and Origin of Organic Compounds

Of the 94 organic compounds for which analyses were made (table 2), 25 were detected in at least 1 of 30 samples of stormwater runoff, drainage-well inflow, or water from a drainage well (table 12).

The origin of the organic compounds detected in this study cannot be determined with certainty. However, some of the compounds probably can be attributed to obvious sources. Pesticides probably are from pest control activities. The priority pollutant compounds probably are leached from plastic products or asphalt surfaces, or are in runoff containing oil, gasoline, and other petroleum products associated with automobiles.

Table 12. Summary of organic compound detections

Compound	Storm runoff	Drainage-well inflow: Lake Midget and Park Lake	Drainage-well inflow: Reconnaissance sites	Drainage-well inflow: All inflow	Wells	All samples
Acenaphthene	1	1	0	1	0	2
Anthracene	1	1	0	1	0	2
Benzo(a)anthracene	1	1	0	1	0	2
Benzo(b)fluoranthene	0	1	0	1	0	1
Benzo(a)pyrene	0	1	0	1	0	1
2-chlorophenol	1	1	0	1	0	2
Chrysene	2	1	0	1	0	3
Diazinon	5	10	5	15	3	23
Dibenzo(a,h)anthracene	0	0	0	0	1	1
Di-n-butyl phthalate	0	1	0	1	0	1
Diethyl phthalate	0	1	0	1	0	1
2,4-dimethylphenol	1	1	0	1	0	2
4,6-dinitro-o-cresol	0	1	0	1	0	1
Ethion	2	0	0	0	0	2
Bis(2-ethylhexyl)phthalate	1	3	3	6	0	7
Fluoranthene	4	1	0	1	0	5
Fluorene	1	1	0	1	0	2
Malathion	6	5	3	8	1	15
Methyl trithion	1	0	0	0	1	2
Phenanthrene	2	1	0	1	0	3
Pyrene	4	1	0	1	0	5
Silvex	0	1	0	1	1	2
Toluene	1	0	0	0	0	1
2,4-D	1	4	6	10	0	11
2,4,5-T	0	3	1	4	0	4
No. of samples	7	12	7	19	4	30

The most frequently detected compounds were pesticides. Diazinon was detected in 77 percent (23) of the samples, malathion was detected in 50 percent (15) of the samples, and 2,4-D was detected in 37 percent (11) of the samples. Other pesticides (ethion, methyl trithion, silvex, and 2,4,5-T) were detected less frequently.

The most frequently detected priority pollutant was bis(2-ethylhexyl)phthalate, a plasticizer widely used in plastics manufacture. This compound was detected in seven samples and at five sites. The compound can become airborne during incineration of municipal refuse and may be leached from plastic articles. It has been identified in drinking water supplies (U.S. Environmental Protection Agency, 1975) and was identified in 98 percent of the samples of ground water in New York (Schroeder and Snavely, 1981). Other phthalate compounds associated with plastic and other products are also widely distributed, although only two (di-n-butyl phthalate and diethyl phthalate) were detected in one sample of inflow to the Park Lake drainage well. Phthalate compounds were not detected as frequently as in the New York study, but they were present at more than half the sites and are probably common in stormwater runoff and drainage-well inflow at many locations.

The second most frequently detected priority pollutant was fluoranthene. The compound was detected in four samples of stormwater runoff and one sample of drainage-well inflow. Fluoranthene is a polynuclear aromatic compound that may have originated from petroleum products. Fluoranthene was detected in petroleum recovered from urban runoff in a study by Whipple and Hunter (1979) in the Delaware Estuary area.

Other polynuclear aromatics, detected in petroleum-bearing runoff by Whipple and Hunter (1979), were also detected at the Lake Midget and Park Lake sites. These are pyrene, detected in stormwater runoff to both lakes and drainage-well inflow at Lake Midget, and anthracene and chrysene, detected in stormwater runoff and drainage-well inflow at Lake Midget.

The polynuclear aromatic compounds, although not ubiquitous, are probably common in runoff from areas where petroleum products are present. The compounds were more common in stormwater runoff than in drainage-well inflow waters. Therefore, drainage wells that accept stormwater runoff directly from streets or other areas where petroleum products accumulate will probably receive more polynuclear aromatic compounds than wells that accept lake overflow.

Table 13. Loading of inflow to Lake Midget and Park Lake drainage wells for selected water-quality parameters

[In pounds per year. Normalized annual loads are estimated loads adjusted to 51.21 inches of rainfall]

	Loads into			
	Lake Midget drainage well		Park Lake drainage well	
	April 1982 through March 1983	Normalized annual	April 1982 through March 1983	Normalized annual
Dissolved solids[1]	32,000	30,000	55,000	40,000
Calcium, dissolved	3,400	3,200	5,000	3,800
Magnesium, dissolved	100	94	680	520
Sodium, dissolved	250	240	940	720
Potassium, dissolved	190	180	340	260
Sulfate, dissolved	680	640	1,400	1,100
Chloride, dissolved	370	350	1,600	1,200
Nitrogen, total	140	130	120	92
Nitrogen, dissolved	53	50	82	62
Phosphorus, total	22	21	9.1	6.9
Phosphorus, dissolved	14	13	4.6	3.5
Arsenic, total recoverable	.17	.15	.23	.18
Cadmium, total recoverable	.17	.15	.23	.18
Chromium, total recoverable	1.7	1.5	2.3	1.8
Copper, total recoverable	.8	.8	2.5	1.9
Iron, total recoverable	56	53	14	11
Lead, total recoverable	3.1	2.9	2.3	1.8
Lead, dissolved	1.0	.9	.91	.69
Manganese, total recoverable	1.7	1.6	2.3	1.8
Zinc, total recoverable	5.1	4.8	4.6	3.5
Zinc, dissolved recoverable	1.4	1.3	<.91	<.69

[1]Estimated: 0.65 x specific conductance.

At least two of the priority pollutant compounds may originate from asphalt surfaces. These are 2,4-dimethylphenol and toluene, both of which have been identified as constituents in asphalt (U.S. Environmental Protection Agency, 1975). However, other sources of these compounds are possible. These compounds, which are apparently not ubiquitous or even common, were detected only once in stormwater runoff or drainage-well inflow at Lake Midget.

Though only four pesticide compounds and one priority pollutant were detected in water from the Floridan aquifer system at the Lake Midget and Park Lake sites, further study is clearly indicated because 20 other organic compounds were detected in stormwater runoff or drainage-well inflow. Future studies should assess areas having a high potential for petroleum-rich runoff and areas where stormwater runoff flows directly into drainage wells.

WATER-QUALITY LOADING OF DRAINAGE-WELL INFLOW

Water-quality loadings for selected constituents were estimated using mean concentrations and total inflow for April 1982 through March 1983. Because of the small number of samples of inflow quality, the mean concentration, and thus, the loadings, should be regarded as only approximations.

Dissolved solids loading of the Floridan aquifer system for April 1982 through March 1983 was 32,000 pounds (lb) through the Lake Midget drainage well and 55,000 lb through the Park Lake drainage well (table 13). For the same period, total nitrogen loading was 140 lb at Lake Midget and 120 lb at Park Lake. Total phosphorus loading was 22 lb at Lake Midget and 9.1 lb at Park Lake.

Except for iron, trace element loads for April 1982 through March 1983 ranged from 0.17 lb for arsenic and cadmium to 5.1 lb for zinc (both at Lake Midget). Iron loading was much higher, 56 lb at Lake Midget and 14 lb at Park Lake.

An estimate of total loading of the Floridan aquifer system in the Orlando area through drainage-well inflow can be made using normalized annual loads and an estimated 50 Mgal/d (55,800 acre-ft/yr) for total drainage-well inflow (Kimrey, 1978, p. 15). These estimates are made by averaging the normalized annual loads for the Lake Midget and Park Lake drainage wells and multiplying by 55,800/62, or 900, which is the ratio of the total area inflow estimate to the average Lake Midget and Park Lake drainage-well inflow adjusted to normal rainfall.

Estimates of total annual drainage-well inflow loads, in pounds, in the Orlando area for selected constituents are as follows: dissolved solids, 32,000,000; total nitrogen, 100,000; total phosphorus, 13,000; lead (total), 2,300; and zinc (total), 3,700. These are, of course, gross estimates and are intended only to give an indication of amounts of materials potentially conveyed to the Floridan aquifer system by drainage wells in the Orlando area. Refinement of the loading estimates would require determination of quality and quantity of inflow to wells receiving direct street runoff (no intervening lake). Direct runoff could have much higher concentrations of many constituents. The significance of these estimates is unknown; they may be of significance in future studies aimed at determining the assimilative capacity of the aquifer for these materials.

SUMMARY AND CONCLUSIONS

Previous investigations have described the occurrence and geohydrologic setting of drainage wells and have provided reconnaissance-type water-quality data for drainage wells. Data on the amount of water flowing into drainage wells were lacking. Also, previous studies did not include data for the group of organic compounds designated priority pollutants by the U.S. Environmental Protection Agency.

Quality and quantity of inflow at two drainage wells in the Orlando area, one at Lake Midget and the other at Park Lake, were determined for the period April 1982 through March 1983. These drainage wells accept overflow from urban lakes that receive stormwater runoff from surrounding streets and other impervious areas. The drainage areas, 64 acres (Lake Midget) and 96 acres (Park Lake), include a mixture of residential and commercial land use, and both are crossed by heavily traveled streets.

Additionally, stormwater runoff to the two lakes and water pumped from the drainage wells were sampled and analyzed. Reconnaissance sampling of the quality of water flowing into seven additional drainage wells in the Orlando area that frequently receive inflow was done, once at each well, to broaden the areal coverage. Water-quality determinations were made for selected nutrients, bacteria, major constituents, trace elements, and trace organic compounds, although not all types of analyses were done on all samples.

These data provide a basis for estimating chemical loads of inflow to drainage wells at the two sites and, with more uncertainty, over the entire area drained by drainage wells in the Orlando area. The analyses for trace organic compounds also identify some of these compounds that may enter the Floridan aquifer system through drainage wells.

A summary of the major findings and conclusions follows. Because of the short timeframe of the study and the small number of samples, these findings should be regarded as tentative.

- Runoff from an estimated 54.4 in of rain at Lake Midget, and 67.1 in of rain at Park Lake, for April 1982 through March 1983, resulted in drainage-well inflow of 62.4 acre-ft at Lake Midget and 84 acre-ft at Park Lake. The estimated annual inflows, adjusted to a normal rainfall of 51.21 in, are 59 acre-ft at Lake Midget and 64 acre-ft at Park Lake.
- The quality of stormwater runoff to Lake Midget and Park Lake is variable, but the runoff may have low specific conductance (dissolved solids), high color and turbidity, and high nitrogen, phosphorus, and trace element concentrations. Color, iron, and total recoverable lead exceeded State potable ground water and public supply criteria in most samples of stormwater runoff.
- Inflow to drainage wells was characterized by specific conductance of generally less than 200 μS/cm, pH ranging from acidic to basic, generally low color and turbidity, and, in some samples, high bacteria counts. Lake storage of stormwater runoff improves water quality, and drainage wells that receive direct stormwater runoff probably accept much higher loads of some constituents than wells that receive lake overflow.
- Inflow to drainage wells did not meet the criteria for potable ground water and public drinking supply for pH, color, and iron in several samples. The criterion for lead was exceeded in one sample of inflow to the Lake Midget drainage well.
- Water pumped from the Lake Midget and Park Lake drainage wells was comparable in quality to water in other nearby drainage wells. The water in the lake drainage wells was more mineralized and contained higher concentrations of nitrogen, phosphorus, and iron than the inflow water. The relatively high color, bacteria, nitrogen, phosphorus, and iron in water from the drainage wells, compared with water from supply wells in the area, could be due to localized processes related to deposition of particulate material in cavities around the wells.
- The priority pollutant dibenzo(a,h)anthracene was present in one of two samples of water pumped from the Lake Midget drainage well, in a concentration of 370 μg/L. Its presence and high concentration is puzzling because the compound was not detected in any other samples. Priority pollutants are apparently not common in the Floridan aquifer system in the vicinity of Lake Midget and Park Lake wells. More sampling is needed to confirm this conclusion, because several organic compounds were detected in drainage-well inflow.
- A summary of organic-compound occurrence in a total of 30 samples of stormwater runoff, drainage-well inflow, and water pumped from drainage wells shows that pesticides were the most frequently detected of the 94 compounds for which analyses were made. Diazinon was detected in 77 percent of the samples, malathion was detected in 50 percent, and 2,4-D was detected in 37 percent. These pesticides, and other pesticides that were detected less frequently, probably originate from widespread use in the drainage areas.
- The priority pollutant bis(2-ethylhexyl)phthalate was detected in seven samples of stormwater runoff or drainage-well inflow at five sites. It, and other phtha-

lates, are widely used in plastics products and may be common in stormwater runoff and well inflow at many locations.

- The polynuclear aromatic compounds fluoranthene, pyrene, anthracene, and chrysene, commonly associated with petroleum products, were found at the Lake Midget and Park Lake sites. The polynuclear aromatics were more common in stormwater runoff than in drainage-well inflow. These compounds, although not ubiquitous, may be present in runoff from areas where petroleum products accumulate.
- The compounds 2,4-dimethylphenol and toluene, possibly leached from asphalt surfaces, were present in one sample of stormwater runoff or drainage well inflow at Lake Midget. Because they were detected only once, at Lake Midget, they probably are not common in waters flowing into drainage wells.
- Further study of the presence of organic compounds in drainage-well inflow and in the Floridan aquifer system is clearly needed. Although only 4 pesticide compounds and 1 of the priority pollutants were detected in Floridan aquifer system water, 19 other compounds were detected in stormwater runoff or drainage-well inflow.
- Dissolved solids inflow to the Floridan aquifer system was 32,000 lb at Lake Midget and 55,000 lb at Park Lake during April 1982 through March 1983. Trace element loads, excluding iron, ranged from a low of 0.17 lb of arsenic and cadmium at Lake Midget to a high of 5.1 lb of zinc, also at Lake Midget.
- Extrapolation of estimated loads at Lake Midget and Park Lake to the area of Orlando served by drainage wells provides the following gross estimates of annual area loads to the Floridan aquifer system, in pounds: dissolved solids, 32,000,000; total nitrogen, 100,000; total phosphorus, 13,000; lead (total), 2,300; and zinc (total), 3,700.

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SUPPLEMENTARY WATER-QUALITY DATA

The following table lists the water-quality data used in this report. The data are divided into four groups and are listed within each group in order of site identification number. The map numbers refer to locations shown in figure 1. Abbreviations: US/CM, microsiemens per centimeter; NTU, nephelometric turbidity units; COLS./100 ML, colonies per 100 milliliters; UG/L, micrograms per liter. The four groups are

1. Properties, bacteria, and major constituents
2. Nutrients
3. Trace elements
4. Organic compounds

PROPERTIES, BACTERIA, AND MAJOR CONSTITUENTS

DATE	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)

(PRECEDING K INDICATES NON-IDEAL PLATE COUNT)

02234210 - PARK LAKE (INFLOW TO DRAINAGE WELL)
(Map no. 2)

DATE	SPECIFIC CONDUCTANCE	PH	COLOR	TURBIDITY	COLIFORM, FECAL	STREPTOCOCCI FECAL	CALCIUM DISSOLVED
JUN , 1982							
18...	156	5.8	--	.70	>600	K3200	22
JUL							
22...	155	8.0	10	1.0	K120	K190	22
AUG							
18...	139	6.6	50	1.4	K16	--	18
SEP							
02...	145	8.2	5	3.4	K15	370	20
FEB , 1983							
08...	204	6.2	0	1.0	--	--	29
MAR							
18...	186	8.8	5	2.0	--	--	26
31...	192	8.4	5	3.0	--	--	27

282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06)
(Map no. 9)

DATE	SPECIFIC CONDUCTANCE	PH	COLOR	TURBIDITY	COLIFORM, FECAL	STREPTOCOCCI FECAL	CALCIUM DISSOLVED
AUG , 1982							
17...	224	5.7	120	18	880	41	18

282704081214300 - BEAR HEAD LAKE WELL INFLOW (LAT 28 27 04 LONG 081 21 43)
(Map no. 8)

DATE	SPECIFIC CONDUCTANCE	PH	COLOR	TURBIDITY	COLIFORM, FECAL	STREPTOCOCCI FECAL	CALCIUM DISSOLVED
AUG , 1983							
02...	190	--	--	--	--	--	--

282945081255000 - SWAMP NEAR I-4 WELL INFLOW (LAT 28 29 45 LONG 081 25 50)
(Map no. 7)

DATE	SPECIFIC CONDUCTANCE	PH	COLOR	TURBIDITY	COLIFORM, FECAL	STREPTOCOCCI FECAL	CALCIUM DISSOLVED
AUG , 1983							
02...	118	--	--	--	--	--	--

DATE	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)

02234210 - PARK LAKE (INFLOW TO DRAINAGE WELL)
(Map no. 2)

DATE	MAGNESIUM	SODIUM	POTASSIUM	ALKALINITY	SULFATE	CHLORIDE
MAY , 1982						
26...	3.2	5.8	1.8	73	7.0	9.8
JUN						
18...	2.8	3.6	2.3	66	4.0	6.8
JUL						
22...	3.0	4.1	1.2	64	6.0	6.2
AUG						
18...	2.5	3.9	1.0	57	6.0	5.9
SEP						
02...	2.5	3.3	1.1	57	5.0	5.5
FEB , 1983						
08...	4.4	5.5	1.6	87	8.0	8.7
MAR						
18...	4.3	5.6	1.5	84	8.2	9.0
31...	4.2	5.4	1.5	83	7.2	8.8

282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06)
(Map no. 9)

DATE	MAGNESIUM	SODIUM	POTASSIUM	ALKALINITY	SULFATE	CHLORIDE
AUG , 1982						
17...	3.2	21	1.5	41	22	27

282704081214300 - BEAR HEAD LAKE WELL INFLOW (LAT 28 27 04 LONG 081 21 43)
(Map no. 8)

DATE	MAGNESIUM	SODIUM	POTASSIUM	ALKALINITY	SULFATE	CHLORIDE
AUG , 1983						
02...	--	--	--	--	--	--

282945081255000 - SWAMP NEAR I-4 WELL INFLOW (LAT 28 29 45 LONG 081 25 50)
(Map no. 7)

DATE	MAGNESIUM	SODIUM	POTASSIUM	ALKALINITY	SULFATE	CHLORIDE
AUG , 1983						
02...	--	--	--	--	--	--

PROPERTIES, BACTERIA, AND MAJOR CONSTITUENTS, CONTINUED

DATE	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
283146081224900 - LAKE OF THE WOODS WELL INFLOW (LAT 28 31 46 LONG 081 22 49) (Map no 6)							
AUG , 1983							
01...	212	--	--	--	--	--	--
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)							
AUG , 1982							
17...	156	6.4	50	1.7	1300	540	21
283201081213400 - LAKE GREENWOOD WELL INFLOW (LAT 28 32 01 LONG 081 21 34) (Map no. 4)							
AUG , 1983							
01...	191	--	--	--	--	--	--
283232081241200 - LAKE LORNA DOONA WELL INFLOW (LAT 28 32 32 LONG 081 24 12) (Map no. 3)							
AUG , 1983							
01...	145	--	--	--	--	--	--
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)							
AUG , 1982							
12...	38	7.0	30	20	--	--	--
25...	64	7.9	--	--	--	--	--
MAY , 1983							
04...	188	--	100	25	--	--	26

DATE	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)
283146081224900 - LAKE OF THE WOODS WELL INFLOW (LAT 28 31 46 LONG 081 22 49) (Map no 6)						
AUG , 1983						
01...	--	--	--	--	--	--
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)						
AUG , 1982						
17...	1.4	3.9	.40	56	5.0	8.8
283201081213400 - LAKE GREENWOOD WELL INFLOW (LAT 28 32 01 LONG 081 21 34) (Map no. 4)						
AUG , 1983						
01...	--	--	--	--	--	--
283232081241200 - LAKE LORNA DOONA WELL INFLOW (LAT 28 32 32 LONG 081 24 12) (Map no. 3)						
AUG , 1983						
01...	--	--	--	--	--	--
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)						
AUG , 1982						
12...	--	--	--	--	--	--
25...	--	--	--	--	--	--
MAY , 1983						
04...	1.7	6.4	3.6	84	20	13

PROPERTIES, BACTERIA, AND MAJOR CONSTITUENTS, CONTINUED

DATE	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
(PRECEDING K INDICATES NON-IDEAL PLATE COUNT)							
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)							
MAY , 1982							
26...	320	6.9	5	.60	450	130	43
SEP							
02...	300	7.4	5	.30	K20	37	39
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)							
AUG , 1982							
11...	65	7.2	60	17	--	--	--
27...	150	--	--	--	--	--	--
JAN , 1983							
21...	146	6.0	35	5.3	--	--	--
MAY							
04...	210	--	20	2.5	--	--	38

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)						
MAY , 1982						
26...	8.1	11	1.5	136	8.0	11
SEP						
02...	6.6	7.7	1.2	112	8.0	9.5
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)						
MAY , 1983						
04...	1.1	3.0	.60	99	9.0	2.5

PROPERTIES, BACTERIA, AND MAJOR CONSTITUENTS, CONTINUED

DATE	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	TUR- BID- ITY (NTU) (00076)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)

(PRECEDING K INDICATES NON-IDEAL PLATE COUNT)

283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW)
(Map no. 1)

DATE	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	COLOR (PLATINUM-COBALT UNITS) (00080)	TURBIDITY (NTU) (00076)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DISSOLVED (MG/L AS CA) (00915)
JUN , 1982							
18...	54	5.6	--	1.0	>600	K11000	9.4
JUL							
22...	125	7.0	20	2.6	2700	440	24
AUG							
18...	140	7.0	60	5.2	2600	96	23
SEP							
02...	135	8.6	5	1.3	K230	400	22
JAN , 1983							
21...	144	6.2	30	3.6	--	--	--
FEB							
08...	95	6.4	0	1.1	--	--	16
MAR							
18...	117	7.2	10	2.0	--	--	18
31...	106	7.0	10	2.0	--	--	--

283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43)
(Map no. 1)

DATE	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	COLOR (PLATINUM-COBALT UNITS) (00080)	TURBIDITY (NTU) (00076)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	CALCIUM DISSOLVED (MG/L AS CA) (00915)
APR , 1978							
26...	290	7.0	10	3.0	650	2	47
MAY , 1982							
26...	320	6.7	20	.50	750	220	55
NOV							
29...	345	6.9	10	2.4	--	--	45
MAY , 1984							
08...	220	7.2	--	--	--	--	37

DATE	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CACO3) (90410)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)						
JUN , 1982						
18...	.30	.60	.50	27	<1.0	.80
JUL						
22...	.59	1.2	.80	63	3.0	1.5
AUG						
18...	.62	1.9	1.1	65	5.0	2.2
SEP						
02...	.54	.90	.70	55	4.0	1.4
JAN , 1983						
21...	--	--	--	--	--	--
FEB						
08...	.65	1.5	1.3	43	<5.0	2.4
MAR						
18...	.68	1.7	1.7	49	5.9	2.4
31...	--	--	--	--	--	--
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)						
APR , 1978						
26...	4.4	4.0	1.8	--	13	4.9
MAY , 1982						
26...	3.4	5.9	1.3	127	28	5.9
NOV						
29...	4.7	2.4	1.6	147	1.0	3.5
MAY , 1984						
08...	2.2	5.3	2.1	101	16	4.5

NUTRIENTS

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
02234210 - PARK LAKE (DRAINAGE WELL INFLOW) (Map no. 2)							
JUN , 1982							
18...	.01	.01	.000	.000	.050	.040	.75
JUL							
22...	.00	.00	.000	.000	.010	.010	2.4
AUG							
18...	.04	.03	.000	.000	.020	.020	.28
SEP							
02...	.00	.00	.000	.000	.020	.020	.32
FEB , 1983							
08...	--	--	<.010	<.010	.040	.040	.46
MAR							
18...	.00	.00	.000	.000	.010	.010	.52
31...	.03	.03	.000	.000	.010	.010	.44
282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06) (Map no. 9)							
AUG , 1982							
17...	.23	.23	.010	.010	.140	.160	1.6
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)							
AUG , 1982							
17...	.01	.00	.000	.000	.080	.080	.33

NUTRIENTS, CONTINUED

DATE	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N) (00607)	NITRO-GEN, TOTAL (MG/L AS N) (00600)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOS-PHORUS, TOTAL (MG/L AS P) (00665)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)
02234210 - PARK LAKE (DRAINAGE WELL INFLOW) (Map no. 2)						
JUN , 1982						
18...	.38	.81	.020	.070	.010	.030
JUL						
22...	.35	2.4	.000	.010	.000	.010
AUG						
18...	.35	.34	.010	.020	.010	.010
SEP						
02...	.32	.34	.010	.040	.010	.020
FEB , 1983						
08...	.15	.67	.030	.050	.030	.030
MAR						
18...	.27	.53	.010	.050	.010	.020
31...	.27	.48	.020	.040	.010	.020
282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06) (Map no. 9)						
AUG , 1982						
17...	.91	2.0	.050	.100	.030	.030
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)						
AUG , 1982						
17...	.23	.42	.080	.110	.120	.130

NUTRIENTS, CONTINUED

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)							
AUG , 1982							
12...	.38	.40	.010	.010	.170	.170	1.8
25...	.51	.51	.010	.010	.190	.190	1.0
MAY , 1983							
04...	1.4	1.4	.060	.040	.850	.800	5.8
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)							
MAY , 1982							
26...	.00	.00	.000	.000	.820	.810	.09
SEP							
02...	.06	.06	.000	.000	.430	.430	.18
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)							
AUG , 1982							
11...	.23	.24	.010	.010	.060	.050	.88
27...	.08	.19	.010	.010	.030	.030	2.2
JAN , 1983							
21...	.08	.08	.020	.020	.020	.020	1.1
MAY							
04...	.01	.01	.010	.010	.020	.020	1.6

DATE	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N) (00607)	NITRO-GEN, TOTAL (MG/L AS N) (00600)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOS-PHORUS, TOTAL (MG/L AS P) (00665)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)

283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22)
(Map no. 2)

DATE	(00607)	(00600)	(70507)	(00665)	(00671)	(00666)
AUG , 1982						
12...	.31	2.4	.190	.370	.140	.140
25...	.66	1.7	.150	.190	.130	.150
MAY , 1983						
04...	4.3	8.1	.420	.670	.320	.410

283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22)
(Map no. 2)

DATE	(00607)	(00600)	(70507)	(00665)	(00671)	(00666)
MAY , 1982						
26...	.15	.91	.150	.170	.150	.170
SEP						
02...	.18	.67	.100	.110	.100	.110

283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42)
(Map no. 1)

DATE	(00607)	(00600)	(70507)	(00665)	(00671)	(00666)
AUG , 1982						
11...	.40	1.2	.130	.160	.110	.130
27...	.40	2.3	.090	.390	.050	.060
JAN , 1983						
21...	.48	1.2	.280	.520	.180	.360
MAY						
04...	.56	1.6	.080	.090	.020	.050

DATE	NITRO-GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)							
JUN , 1982							
18...	.01	.01	.010	.000	.020	.020	.21
JUL							
22...	.00	.00	.000	.000	.010	.010	.73
AUG							
18...	.00	.00	.000	.000	.010	.000	1.2
SEP							
02...	.00	.00	.000	.000	.010	.010	.32
JAN , 1983							
21...	.11	.11	.010	.010	.020	.010	1.2
FEB							
08...	--	.03	<.010	.000	.020	.020	.53
MAR							
18...	.00	.00	.000	.000	.011	.011	1.1
31...	--	--	.000	.000	.011	.011	.79
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)							
APR , 1978							
26...	.00	.00	<.010	<.010	.900	.890	.25
MAY , 1982							
26...	.00	.00	.000	.000	.460	.460	.71
NOV							
29...	.00	.00	<.010	.000	3.30	3.30	.66

NUTRIENTS, CONTINUED

DATE	NITROGEN, ORGANIC DISSOLVED (MG/L AS N) (00607)	NITROGEN, TOTAL (MG/L AS N) (00600)	PHOSPHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOSPHORUS, TOTAL (MG/L AS P) (00665)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) (00671)	PHOSPHORUS, DISSOLVED (MG/L AS P) (00666)
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)						
JUN , 1982						
18...	.14	.25	.050	.080	.030	.080
JUL						
22...	.15	.74	.080	.120	.060	.060
AUG						
18...	.46	1.2	.070	.140	.050	.060
SEP						
02...	.30	.33	.040	.100	.020	.040
JAN , 1983						
21...	.35	1.3	.140	.240	.090	.110
FEB						
08...	.34	.58	.090	.013	.070	.070
MAR						
18...	.23	1.1	.121	.271	.091	.121
31...	.19	.90	.111	.181	.071	.091
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)						
APR , 1978						
26...	.14	1.2	.550	.660	.550	.640
MAY , 1982						
26...	.49	1.2	.190	.250	.200	.230
NOV						
29...	.59	4.0	.700	.800	.700	.800

TRACE ELEMENTS

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
02234210 - PARK LAKE (DRAINAGE WELL INFLOW) (Map no. 2)							
JUN , 1982							
18...	1	<100	1	20	11	60	4
JUL							
22...	1	100	1	10	24	40	3
AUG							
18...	1	<100	2	10	10	20	4
SEP							
02...	2	<100	1	10	21	110	2
FEB , 1983							
08...	1	<100	2	<10	8	40	5
MAR							
18...	1	<100	1	<10	9	80	6
31...	2	100	1	<10	25	100	4
282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06) (Map no. 9)							
AUG , 1982							
17...	1	<100	<1	10	6	1900	3
282704081214300 - BEAR HEAD LAKE WELL INFLOW (LAT 28 27 04 LONG 081 21 43) (Map no. 8)							
AUG , 1983							
02...	1	<100	<1	30	4	180	3
282945081255000 - SWAMP NEAR I-4 WELL INFLOW (LAT 28 29 45 LONG 081 25 50) (Map no. 7)							
AUG , 1983							
02...	1	<100	<1	20	4	890	3

DATE	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
02234210 - PARK LAKE (DRAINAGE WELL INFLOW) (Map no. 2)							
JUN , 1982							
18...	8	10	<.1	<1	<1	4	10
JUL							
22...	13	10	<.1	<1	<1	<4	40
AUG							
18...	6	10	<.1	<1	<1	<4	40
SEP							
02...	5	10	<.1	<1	<1	<4	10
FEB , 1983							
08...	23	10	.2	<1	--	16	10
MAR							
18...	10	<10	.3	<1	--	5	40
31...	17	10	.1	<1	<1	<3	20
282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06) (Map no. 9)							
AUG , 1982							
17...	7	40	<.1	<1	<1	17	40
282704081214300 - BEAR HEAD LAKE WELL INFLOW (LAT 28 27 04 LONG 081 21 43) (Map no. 8)							
AUG , 1983							
02...	7	30	<.1	<1	<1	<10	20
282945081255000 - SWAMP NEAR I-4 WELL INFLOW (LAT 28 29 45 LONG 081 25 50) (Map no. 7)							
AUG , 1983							
02...	5	30	<.1	<1	<1	20	130

TRACE ELEMENTS, CONTINUED

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
283146081224900 - LAKE OF THE WOODS WELL INFLOW (LAT 28 31 46 LONG 081 22 49) (Map no 6)							
AUG , 1983							
01...	2	<100	<1	20	6	590	4
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)							
AUG , 1982							
17...	1	<100	1	10	6	780	2
283201081213400 - LAKE GREENWOOD WELL INFLOW (LAT 28 32 01 LONG 081 21 34) (Map no. 4)							
AUG , 1983							
01...	1	<100	<1	20	4	430	5
283232081241200 - LAKE LORNA DOONA WELL INFLOW (LAT 28 32 32 LONG 081 24 12) (Map no. 3)							
AUG , 1983							
01...	1	<100	<1	20	6	420	4
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)							
AUG , 1982							
12...	1	100	1	10	25	570	58
25...	1	100	1	10	36	450	37
MAY , 1983							
04...	1	100	2	20	59	1200	76

TRACE ELEMENTS, CONTINUED

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
283146081224900 - LAKE OF THE WOODS WELL INFLOW (LAT 28 31 46 LONG 081 22 49) (Map no 6)							
AUG , 1983							
01...	12	70	<.1	<1	<1	<10	30
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)							
AUG , 1982							
17...	5	20	<.1	<1	<1	10	<10
283201081213400 - LAKE GREENWOOD WELL INFLOW (LAT 28 32 01 LONG 081 21 34) (Map no. 4)							
AUG , 1983							
01...	5	50	.1	<1	<1	10	30
283232081241200 - LAKE LORNA DOONA WELL INFLOW (LAT 28 32 32 LONG 081 24 12) (Map no. 3)							
AUG , 1983							
01...	7	30	<.1	<1	<1	<10	40
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)							
AUG , 1982							
12...	110	40	<.1	<1	<1	10	130
25...	170	20	<.1	<1	<1	30	140
MAY , 1983							
04...	430	60	.2	<1	--	140	360

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)							
MAY , 1982							
26...	1	<100	1	10	4	130	3
SEP							
02...	2	<100	<1	10	12	170	3
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)							
AUG , 1982							
11...	1	100	1	10	15	550	27
27...	1	100	1	<10	13	370	7
JAN , 1983							
21...	1	<100	1	610	9	440	61
MAY							
04...	1	<100	1	10	3	550	1
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)							
JUN , 1982							
18...	1	<100	1	10	7	210	6
JUL							
22...	<1	<100	1	20	6	350	3
AUG							
18...	1	100	2	10	5	270	7
SEP							
02...	2	<100	3	10	5	310	3
JAN , 1983							
21...	<1	<100	1	10	6	400	31
FEB							
08...	1	<100	1	<10	4	220	4
MAR							
18...	1	<100	1	<30	5	360	11

TRACE ELEMENTS, CONTINUED

DATE	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG) (71900)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)							
MAY , 1982							
26...	4	10	<.1	1	<1	8	20
SEP							
02...	3	20	<.1	<1	<1	9	10
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)							
AUG , 1982							
11...	200	20	<.1	<1	<1	10	90
27...	120	10	<.1	<1	<1	20	120
JAN , 1983							
21...	120	10	.1	<1	<1	60	80
MAY							
04...	24	20	<.1	<1	--	12	40
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)							
JUN , 1982							
18...	30	<10	<.1	<1	<1	<4	10
JUL							
22...	10	20	<.1	<1	<1	<4	70
AUG							
18...	7	10	.1	<1	<1	6	20
SEP							
02...	12	10	<.1	<1	<1	<4	10
JAN , 1983							
21...	71	10	.1	<1	<1	30	70
FEB							
08...	9	10	.7	<1	--	9	40
MAR							
18...	30	10	<.1	<1	<1	17	30

TRACE ELEMENTS, CONTINUED

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)							
APR , 1978							
26...	2	<100	2	<20	3	1200	2
MAY , 1982							
26...	2	<0	1	10	6	1300	7
NOV							
29...	1	<100	<1	10	4	2300	1
MAY , 1984							
08...	--	--	--	--	--	--	<1

DATE	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)							
APR , 1978							
26...	8	30	<.5	<1	--	ND	<20
MAY , 1982							
26...	14	40	<.1	<1	<1	20	20
NOV							
29...	5	50	<.1	<1	3	7	20
MAY , 1984							
08...	--	--	--	--	--	25	--

ORGANIC COMPOUNDS

DATE	ACE-NAPHTH-ENE TOTAL (UG/L) (34205)	ANTHRA-CENE TOTAL (UG/L) (34220)	BENZO A ANTHRAC ENE1,2-BENZANT HRACENE TOTAL (UG/L) (34526)	BENZO B FLUOR-AN-THENE TOTAL (UG/L) (34230)	2-CHLORO-PHENOL TOTAL (UG/L) (34586)	CHRY-SENE TOTAL (UG/L) (34320)	DI-AZINON, TOTAL (UG/L) (39570)	1,2,5,6 -DIBENZ -ANTHRA -CENE TOTAL (UG/L) (34556)	DI-N-BUTYL PHTHAL-ATE TOTAL (UG/L) (39110)	DIETHYL PHTHAL-ATE TOTAL (UG/L) (34336)	2,4-DI-METHYL-PHENOL TOTAL (UG/L) (34606)	4,6-DINITRO -ORTHO-CRESOL TOTAL (UG/L) (34657)
02234210 - PARK LAKE (DRAINAGE WELL INFLOW) (Map no. 2)												
JUL , 1982												
22...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.03	<1.0	<1.0	<1.0	<1.0	<1.0
SEP												
02...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.03	<1.0	<1.0	<1.0	<1.0	<1.0
JAN , 1983												
21...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<.01	<1.0	<1.0	<1.0	<1.0	<1.0
FEB												
08...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<.01	<1.0	<1.0	<1.0	<1.0	<1.0
MAR												
18...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.03	<1.0	2.0	1.0	<1.0	<1.0
31...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.02	<1.0	<1.0	<1.0	<1.0	<1.0
282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06) (Map no. 9)												
AUG , 1982												
17...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<.01	<1.0	<1.0	<1.0	<1.0	<1.0
282704081214300 - BEAR HEAD LAKE WELL INFLOW (LAT 28 27 04 LONG 081 21 43) (Map no. 8)												
AUG , 1983												
02...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.02	<1.0	<1.0	<1.0	<1.0	<1.0
282945081255000 - SWAMP NEAR I-4 WELL INFLOW (LAT 28 29 45 LONG 081 25 50) (Map no. 7)												
AUG , 1983												
02...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<.01	<1.0	<1.0	<1.0	<1.0	<1.0

DATE	ETHION, TOTAL (UG/L) (39398)	BIS(2-ETHYL HEXYL) PHTHAL-ATE TOTAL (UG/L) (39100)	FLUOR-ANTHENE TOTAL (UG/L) (34376)	FLUOR-ENE TOTAL (UG/L) (34381)	MALA-THION, TOTAL (UG/L) (39530)	METHYL TRI-THION, TOTAL (UG/L) (39790)	PHENAN-THRENE TOTAL (UG/L) (34461)	PYRENE TOTAL (UG/L) (34469)	SILVEX, TOTAL (UG/L) (39760)	TOLUENE TOTAL (UG/L) (34010)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)
02234210 - PARK LAKE (DRAINAGE WELL INFLOW) (Map no. 2)												
JUL , 1982												
22...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	.01	<1.0	<.01	<.01
SEP												
02...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
JAN , 1983												
21...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
FEB												
08...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	--	<.01	<.01
MAR												
18...	<.01	3.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
31...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	.01	<.01
282534081220602 - CANAL INFLOW TO TAFT DRAINWELL (LAT 28 25 34 LONG 081 22 06) (Map no. 9)												
AUG , 1982												
17...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	.13	.02
282704081214300 - BEAR HEAD LAKE WELL INFLOW (LAT 28 27 04 LONG 081 21 43) (Map no. 8)												
AUG , 1983												
02...	<.01	4.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	.16	<.01
282945081255000 - SWAMP NEAR I-4 WELL INFLOW (LAT 28 29 45 LONG 081 25 50) (Map no. 7)												
AUG , 1983												
02...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	.01	<.01

ORGANIC COMPOUNDS, CONTINUED

DATE	ACE-NAPHTH-ENE TOTAL (UG/L) (34205)	ANTHRA-CENE TOTAL (UG/L) (34220)	BENZO A ANTHRAC ENE1,2-BENZANT HRACENE TOTAL (UG/L) (34526)	BENZO B FLUOR-AN-THENE TOTAL (UG/L) (34230)	2-CHLORO-PHENOL TOTAL (UG/L) (34586)	CHRY-SENE TOTAL (UG/L) (34320)	DI-AZINON, TOTAL (UG/L) (39570)	1,2,5,6 -DIBENZ -ANTHRA -CENE TOTAL (UG/L) (34556)	DI-N-BUTYL PHTHAL-ATE TOTAL (UG/L) (39110)	DIETHYL PHTHAL-ATE TOTAL (UG/L) (34336)	2,4-DI-METHYL-PHENOL TOTAL (UG/L) (34606)	4,6-DINITRO -ORTHO-CRESOL TOTAL (UG/L) (34657)
283146081224900 - LAKE OF THE WOODS WELL INFLOW (LAT 28 31 46 LONG 081 22 49) (Map no 6)												
AUG , 1983												
01...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.06	<1.0	<1.0	<1.0	<1.0	<1.0
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)												
AUG , 1982												
17...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.09	<1.0	<1.0	<1.0	<1.0	<1.0
283201081213400 - LAKE GREENWOOD WELL INFLOW (LAT 28 32 01 LONG 081 21 34) (Map no. 4)												
AUG , 1983												
01...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.05	<1.0	<1.0	<1.0	<1.0	<1.0
283232081241200 - LAKE LORNA DOONA WELL INFLOW (LAT 28 32 32 LONG 081 24 12) (Map no. 3)												
AUG , 1983												
01...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.02	<1.0	<1.0	<1.0	<1.0	<1.0
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)												
AUG , 1982												
12...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.16	<1.0	<1.0	<1.0	<1.0	<1.0
25...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.32	<1.0	<1.0	<1.0	<1.0	<1.0
MAY , 1983												
04...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0

ORGANIC COMPOUNDS, CONTINUED

DATE	ETHION, TOTAL (UG/L) (39398)	BIS(2-ETHYL HEXYL) PHTHAL-ATE TOTAL (UG/L) (39100)	FLUOR-ANTHENE TOTAL (UG/L) (34376)	FLUOR-ENE TOTAL (UG/L) (34381)	MALA-THION, TOTAL (UG/L) (39530)	METHYL TRI-THION, TOTAL (UG/L) (39790)	PHENAN-THRENE TOTAL (UG/L) (34461)	PYRENE TOTAL (UG/L) (34469)	SILVEX, TOTAL (UG/L) (39760)	TOLUENE TOTAL (UG/L) (34010)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)
283146081224900 - LAKE OF THE WOODS WELL INFLOW (LAT 28 31 46 LONG 081 22 49) (Map no 6)												
AUG , 1983												
01...	<.01	7.0	<1.0	<1.0	.04	<.01	<1.0	<1.0	<.01	<1.0	.75	<.01
283157081180402 - CANAL INFLOW TO ENGLEWOOD DRAINWELL (LAT 28 31 57 LONG 081 18 04) (Map no. 5)												
AUG , 1982												
17...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
283201081213400 - LAKE GREENWOOD WELL INFLOW (LAT 28 32 01 LONG 081 21 34) (Map no. 4)												
AUG , 1983												
01...	<.01	<10.0	<1.0	<1.0	.57	<.01	<1.0	<1.0	<.01	<1.0	.04	<.01
283232081241200 - LAKE LORNA DOONA WELL INFLOW (LAT 28 32 32 LONG 081 24 12) (Map no. 3)												
AUG , 1983												
01...	<.01	6.0	<1.0	<1.0	.02	<.01	<1.0	<1.0	<.01	<1.0	.03	<.01
283312081222200 - STORM RUNOFF TO PARK LAKE (LAT 28 33 12 LONG 081 22 22) (Map no. 2)												
AUG , 1982												
12...	<.01	<1.0	<1.0	<1.0	.41	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
25...	.44	<1.0	<1.0	<1.0	.90	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
MAY , 1983												
04...	<.01	<1.0	1.0	<1.0	26	<.01	<1.0	1.0	<.01	<1.0	<.01	<.01

ORGANIC COMPOUNDS, CONTINUED

DATE	ACE-NAPHTH-ENE TOTAL (UG/L) (34205)	ANTHRA-CENE TOTAL (UG/L) (34220)	BENZO A ANTHRAC ENE1,2-BENZANT HRACENE TOTAL (UG/L) (34526)	BENZO B FLUOR-AN-THENE TOTAL (UG/L) (34230)	2-CHLORO-PHENOL TOTAL (UG/L) (34586)	CHRY-SENE TOTAL (UG/L) (34320)	DI-AZINON, TOTAL (UG/L) (39570)	1,2,5,6-DIBENZ-ANTHRA-CENE TOTAL (UG/L) (34556)	DI-N-BUTYL PHTHAL-ATE TOTAL (UG/L) (39110)	DIETHYL PHTHAL-ATE TOTAL (UG/L) (34336)	2,4-DI-METHYL-PHENOL TOTAL (UG/L) (34606)	4,6-DINITRO-ORTHO-CRESOL TOTAL (UG/L) (34657)
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)												
MAY, 1982												
26...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.05	<1.0	<1.0	<1.0	<1.0	<1.0
SEP												
02...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.03	<1.0	<1.0	<1.0	<1.0	<1.0
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)												
AUG, 1982												
11...	<1.0	<1.0	<1.0	<1.0	<1.0	5.0	<.01	<1.0	<1.0	<1.0	<1.0	<1.0
27...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.16	<1.0	<1.0	<1.0	<1.0	<1.0
JAN, 1983												
21...	3.0	5.0	5.0	<1.0	8.0	6.0	--	<1.0	<1.0	<1.0	1.0	<1.0
MAY												
04...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.02	<1.0	<1.0	<1.0	<1.0	<1.0
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)												
JUL, 1982												
22...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.03	<1.0	<1.0	<1.0	<1.0	<1.0
SEP												
02...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.04	<1.0	<1.0	<1.0	<1.0	<1.0
JAN, 1983												
21...	4.0	5.0	5.0	8.0	84.0	5.0	840	<1.0	<1.0	<1.0	20.0	38.0
FEB												
08...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.01	<1.0	<1.0	<1.0	<1.0	<1.0
MAR												
18...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.14	<1.0	<1.0	<1.0	<1.0	<1.0
MAR												
18...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.02	<1.0	<1.0	<1.0	<1.0	<1.0

ORGANIC COMPOUNDS, CONTINUED

DATE	ETHION, TOTAL (UG/L) (39398)	BIS(2-ETHYL HEXYL) PHTHAL-ATE TOTAL (UG/L) (39100)	FLUOR-ANTHENE TOTAL (UG/L) (34376)	FLUOR-ENE TOTAL (UG/L) (34381)	MALA-THION, TOTAL (UG/L) (39530)	METHYL TRI-THION, TOTAL (UG/L) (39790)	PHENAN-THRENE TOTAL (UG/L) (34461)	PYRENE TOTAL (UG/L) (34469)	SILVEX, TOTAL (UG/L) (39760)	TOLUENE TOTAL (UG/L) (34010)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)
283314081222201 - PARK LAKE DRAINAGE WELL IN ORLANDO, FL (LAT 28 33 14 LONG 081 22 22) (Map no. 2)												
MAY , 1982												
26...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
SEP												
02...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
283529081214200 - STORM RUNOFF TO LAKE MIDGET (LAT 28 35 29 LONG 081 21 42) (Map no. 1)												
AUG , 1982												
11...	.17	20.0	11.0	<1.0	.39	<.01	3.0	9.0	<.01	<1.0	<.01	<.01
27...	<.01	<1.0	<1.0	<1.0	.33	5.4	<1.0	<1.0	<.01	--	<.01	<.01
JAN , 1983												
21...	--	<1.0	17.0	4.0	--	--	13.0	11.0	<.01	<1.0	<.01	<.01
MAY												
04...	<.01	<1.0	3.0	<1.0	4.0	<.01	<1.0	2.0	<.01	3.0	.47	<.01
283530081214300 - LAKE MIDGET (DRAINAGE WELL INFLOW) (Map no. 1)												
JUL , 1982												
22...	<.01	<1.0	<1.0	<1.0	.03	<.01	<1.0	<1.0	.03	<1.0	.68	.02
SEP												
02...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	<.01	<1.0	.25	.02
JAN , 1983												
21...	<.01	48.0	18.0	5.0	.80	<.01	15.0	<13.0	<.01	<1.0	<.01	<.01
FEB												
08...	<.01	<1.0	<1.0	<1.0	.08	<.01	<1.0	<1.0	<.01	--	.06	.01
MAR												
18...	<.01	<1.0	<1.0	<1.0	.15	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01
31...	<.01	10.0	<1.0	<1.0	.03	<.01	<1.0	<1.0	<.01	<1.0	<.01	<.01

ORGANIC COMPOUNDS, CONTINUED

DATE	ACE- NAPHTH- ENE TOTAL (UG/L) (34205)	ANTHRA- CENE TOTAL (UG/L) (34220)	BENZO A ANTHRAC ENE1,2- BENZANT HRACENE TOTAL (UG/L) (34526)	BENZO B FLUOR- AN- THENE TOTAL (UG/L) (34230)	2- CHLORO- PHENOL TOTAL (UG/L) (34586)	CHRY- SENE TOTAL (UG/L) (34320)	DI- AZINON, TOTAL (UG/L) (39570)	1,2,5,6 -DIBENZ -ANTHRA -CENE TOTAL (UG/L) (34556)	DI-N- BUTYL PHTHAL- ATE TOTAL (UG/L) (39110)	DIETHYL PHTHAL- ATE TOTAL (UG/L) (34336)	2,4-DI- METHYL- PHENOL TOTAL (UG/L) (34606)	4,6- DINITRO -ORTHO- CRESOL TOTAL (UG/L) (34657)
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)												
MAY , 1982												
26...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<.01	370	<1.0	<1.0	<1.0	<1.0
NOV												
29...	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	.02	<1.0	<1.0	<1.0	<1.0	<1.0
MAY , 1984												
08...	<5.0	<5.0	<5.0	<10.0	<5.0	<10.0	.04	<10.0	<5.0	<5.0	<5.0	<30.0

DATE	ETHION, TOTAL (UG/L) (39398)	BIS(2- ETHYL HEXYL) PHTHAL- ATE TOTAL (UG/L) (39100)	FLUOR- ANTHENE TOTAL (UG/L) (34376)	FLUOR- ENE TOTAL (UG/L) (34381)	MALA- THION, TOTAL (UG/L) (39530)	METHYL TRI- THION, TOTAL (UG/L) (39790)	PHENAN- THRENE TOTAL (UG/L) (34461)	PYRENE TOTAL (UG/L) (34469)	SILVEX, TOTAL (UG/L) (39760)	TOLUENE TOTAL (UG/L) (34010)	2,4-D, TOTAL (UG/L) (39730)	2,4,5-T TOTAL (UG/L) (39740)
283530081214301 - 83512107 LAKE MIDGET DRAINAGE WELL IN W.P. FL (LAT 28 35 30 LONG 081 21 43) (Map no. 1)												
MAY , 1982												
26...	<.01	<1.0	<1.0	<1.0	<.01	<.01	<1.0	<1.0	--	--	--	--
NOV												
29...	<.01	<1.0	<1.0	<1.0	.02	.36	<1.0	<1.0	.04	<1.0	<.01	<.01
MAY , 1984												
08...	<.01	<5.0	<5.0	<5.0	.06	<.01	<5.0	<5.0	<.01	<3.0	.07	<.01

METRIC CONVERSION FACTORS

For readers who wish to convert measurements from the inch-pound system to the metric system of units, the conversion factors are listed below:

Multiply inch-pound unit	By	To obtain metric unit
	Length	
inch (in)	25.4	millimeter (mm)
	2.540	centimeter (cm)
	0.0254	meter (m)
foot (ft)	0.3048	meter (m)
foot per day (ft/d)	0.3048	meter per day (m/d)
mile (mi)	1.609	kilometer (km)
	Mass	
pound (lb)	0.4536	kilogram (kg)
	Area	
square foot (ft^2)	0.0929	square meter (m^2)
square mile (mi^2)	2.590	square kilometer (km^2)
acre	0.4047	square hectometer (hm^2)
	Volume	
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
	Flow	
acre-foot per day (acre-ft/d)	0.0143	cubic meter per second (m^3/s)
acre-foot per year (acre-ft/yr)	1,233	cubic meter per year (m^3/yr)
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m^3/s)

Equations for temperature conversion between degrees Celsius (°C) and degrees Fahrenheit (°F):

$$°C=5/9\ (°F-32)$$

$$°F=(9/5°C)+32$$

Additional abbreviations:

μg/L = micrograms per liter
mg/L = milligrams per liter
μS/cm = microsiemens per centimeter

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