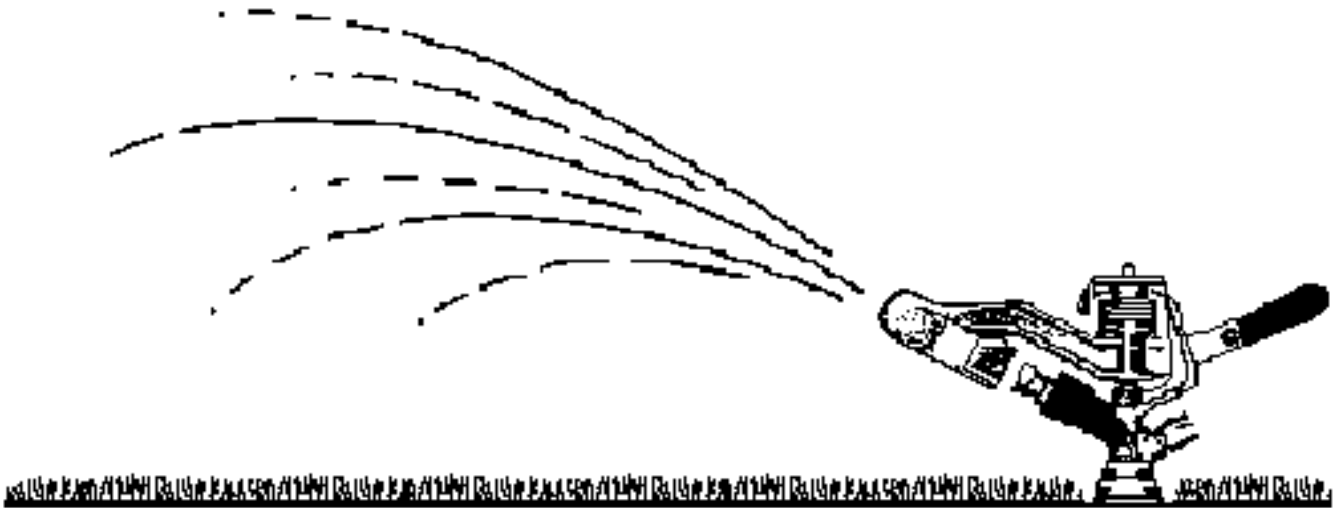


LANDSCAPE IRRIGATION AUDITS

Guidelines and procedures used to conduct a Landscape Irrigation Audit and instructions for the use of EZ-Audit V1.01, irrigation scheduling software.



**Southwest Florida Water Management District
Resource Projects Department
Conservation Projects Section**

November 1993

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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

LANDSCAPE IRRIGATION AUDITING PROGRAM

BACKGROUND/OBJECTIVES: A large amount of Florida's water is used to irrigate landscapes. Although the water management districts promote Xeriscape™, large irrigated turf areas will most likely remain commonplace in the foreseeable future. The objective of a landscape irrigation audit (LIA) is to reduce the quantity of water used in irrigation to the absolute possible minimum without damaging the aesthetic quality or health of the landscape. This is accomplished by a water budgeting method whereby depletion of the available water in the root zone from such natural processes as evapotranspiration (ET) is balanced by natural rainfall and supplemental irrigation.

PROCEDURE: A landscape irrigation audit consists of three distinct steps: preliminary site inspection, data collection and follow-up.

PRELIMINARY SITE INSPECTION: The first step is to observe the irrigation hardware in operation. The intent of the inspection is to ensure that the irrigation hardware is in peak operating condition prior to the data collection phase. Missing, broken, blocked, and improperly sized or adjusted heads are common problems. The presence of thatch is a good indicator of over-watering or excessive fertilization. Any deficiencies noted during the inspection are referred to the site manager for correction prior to the data collection phase. If possible, the auditor schedules a date with the site manager to accomplish the data collection phase. In some instances, system design may be so obviously flawed that only major alteration will produce the **efficiency** required to make an LIA cost effective.

DATA COLLECTION: The **distribution uniformity** of the system hardware is measured during the data collection phase. Distribution uniformity is a measure of the evenness of application throughout the irrigated area. Uniformity is adversely affected when hardware is not operating at peak efficiency or when the system has been improperly designed. Distribution uniformity is measured by placing catch-cans throughout the irrigated area and operating the system for a known period of time. The volumes of water in each catch-can will be entered into a computer program that calculates the **run-time** for each **irrigation zone** necessary to provide the turf or landscape plantings with sufficient water. Run-times are based on **crop coefficients** (measured transpiration rates) for the specific species and local **historic rainfall** data. Run-times are specified on a month-to-month basis. Although not needed to generate an irrigation schedule, the auditor measures **head-to-head distances**, sprinkler **head pressure**, sprinkler **throw** (upwind and downwind), **soil type** and **rootzone depth**, which can be useful in explaining lower than expected system efficiencies when writing the audit report. Data collection may have to be rescheduled in the event of inclement weather (rainy or extremely windy conditions). In the interest of efficiency, the data collection phase should be conducted by two individuals. See Appendix "A" for a list of equipment needed to perform an LIA. Appendix "B" describes the suggested catch-can placement in an irrigated area.

FOLLOW-UP: In order to evaluate the success of an LIA, the auditor must communicate frequently with the site manager. The site manager should be able to provide comparisons of pre- and post-LIA water usage and, in fact, is the key element in a successful LIA program. The site manager must be dedicated to maintaining the irrigation hardware in the same condition as on the day of data collection and must program the ***irrigation controllers*** at the start of each month if the calculated run-times are to be implemented. Additionally, the site manager should be encouraged to ***trim back***. Software-generated run times are not absolute. By reducing the indicated run times in increments of 10% and watching for signs of stress, additional savings can be realized.

APPENDIX A: EQUIPMENT NEEDED FOR LANDSCAPE IRRIGATION AUDIT

Auditor's Tool Kit:

- 30-60 Catch-cans and Stands
- Graduated Cylinder (if catch-cans are not graduated)
- 1 100' Measuring Tape
- 1 Pressure Gauge with Hose and Pitot Tube
- 1 Soil Probe
- 30 Marker Flags
- 1 Stopwatch

Rain Gear (optional)

IBM or Compatible PC/Printer

Irrigation Scheduling Software:

- EZ-Audit (SWFWMD)
- or
- Water Resource Manager (Cal Poly)
- or
- Mobile Irrigation Lab (IFAS, UF)

SOFTWARE GUIDE

LANDSCAPE MANAGEMENT TOOL V1.01

INTRODUCTION: This guide provides instructions needed to navigate through the screens and functions of the landscape irrigation management software program entitled EZAUDIT. You may wish to print the guide for permanent reference or use it as an on-line source of information.

EZAUDIT was developed by the Southwest Florida Water Management District. The program was written by Ron Cohen, P.E., Agriculture and Irrigation Engineer. The procedures for conducting a landscape irrigation audit were written by Carl Wright, Certified Landscape Irrigation Auditor.

GETTING STARTED: Before starting any computer program, always copy the original disk and work with the copy. Keep the original disk in a safe place in case something happens to the work disk.

There are several ways to run the program. For hard disk drive systems, copy all the files on the distribution disk to your hard drive. The program will also run on floppy disk. To run the program, type:

C>EZAUDIT <Enter> or A>EZAUDIT <Enter>

EZAUDIT's first screen displays the title and program version. Also, it displays a disclaimer about the District and staff liabilities. The program is an auditing tool, provided as is, without support, and without warranties or claims.

SCREEN 1: Title Screen, with Disclaimer

Press return to continue. After you finish typing a name or value press Enter unless otherwise specified.

SCREEN 2: Input

The input screen has 6 variable fields. The date is automatically displayed and updated each time the screen appears. Type your (auditor's) name, press Enter and the cursor will move to the next input field.

Type in the client's name, and press Enter.

The District's 16 counties will appear in a window. The 6 WUCA counties are listed separately. Select the number corresponding to the location being audited. Any number larger than 22 will relist the counties. By selecting a county, EZAUDIT uses historic rainfall and evapotranspiration data to calculate irrigation run times. Press Enter.

Type the Number of Catches (catch-cans used in the field test). The EZAUDIT software requires a minimum of 16 catches to operate properly. This should not create problems because in any field test more than 16 catches should be used. A minimum of 30 catches is recommended. Press Enter.

Type the Test Time, in minutes (how long the system ran). Press Enter.

Type Can Size (the opening), in square inches. This is calculated by multiplying Pi (3.14) times the radius squared ($\pi R^2 = \text{area of circle}$). Press Enter.

A window will appear in which the volume, in milliliters, from each catch-can (as entered in the Number of Catches) used in the field test must be entered. Press Enter after typing each entry.

SCREEN 3: Output

1. **Print Report** will print a hard copy of the report, including suggested irrigation run times, by month. Run times are indicated for the number of days per week that the irrigation system will operate. A copy of this report is given to the client.
2. **Screen Report** displays the report to the screen.
3. **Save Report** stores the report on a disk for future reference. You will be asked to provide a file name.
4. **New Client** returns to the Input Screen.
5. **Shell to DOS** temporarily exits from EZAUDIT to DOS. This allows the user to format data disks or copy files. From DOS, type EXIT and press Enter to return to EZAUDIT.
6. **Documentation** displays the EZAUDIT Software Guide to the screen, or to print a hard copy of the guide.
7. **End Program** exits to DOS from EZAUDIT.