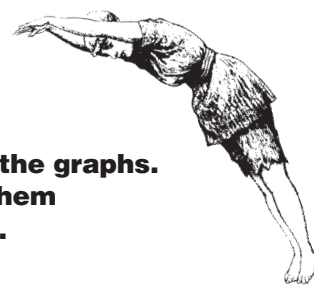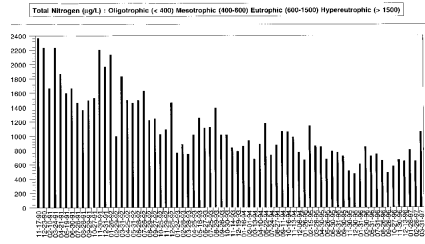# Diving Into Data

Match bar graphs A through F with the six trends listed below the graphs. Write your answers in the spaces provided and check them with the answer key in the right margin of this page.
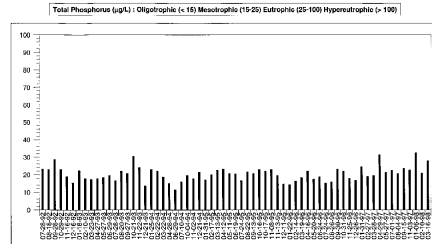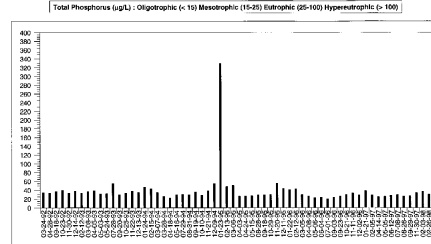
Graph A

Total Nitrogen bar graph for
Lake Lawsona in Orange County
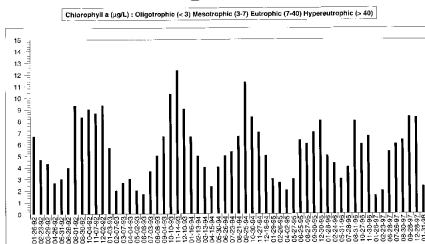
Graph B

Total Phosphorus bar graph for
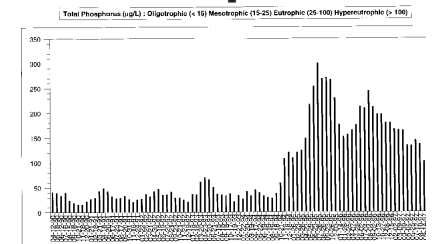Lake Bennett in Orange County

Graph C

Total Phosphorus bar graph for
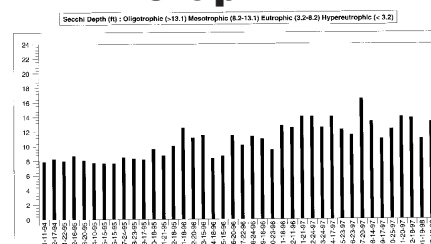Lake Estella East in Orange County

Graph D

Chlorophyll *a* bar graph for
Lake Little Bear in Seminole County

Graph E

Total Phosphorus bar graph for
Lake Redwater in Putnam County

Graph F

Secchi Depth bar graph for
Lake Isleworth in Orange County

Trends

____ **1** A slight gradual increase

____ **2** An unusual event (sometimes called a "spike")

____ **3** A steady decrease

____ **4** Minimal overall change

____ **5** Seasonal cycling

____ **6** An abrupt increase followed by a gradual decrease

Answers: **(1)** F **(2)** C **(3)** A **(4)** B **(5)** D **(6)** E

How LAKEWATCH Data Can Be Useful to You (continued from page 1)

quality standards that may be applied to present or future discharges into your waterbody.

♦ LAKEWATCH bar graphs create a visual picture of the data and what patterns, trends, cycles, or abrupt changes have occurred over time.

♦ LAKEWATCH data can provide clues to understanding the cause-and-effect relationships between water quality and other parameters.

When you see a big change in your data , the real detective work begins. What was happening during that period that might possibly account for the change? If you are the LAKEWATCH volunteer, you can look back at copies of the LAKEWATCH data sheets for clues. Potential causes of change might include large numbers of birds roosting on the shore, boating activity, changes in stormwater runoff, unusual weather conditions, fires or massive land clearing in the watershed. If you can find out what factors affect your water quality, you have discovered a powerful tool that can be used for effective management.

**For more information call:
1-800-LAKEWATCH** (1-800-525-3928)**. We appreciate your comments, questions, and suggestions anytime.**

Florida LAKEWATCH Data —
What does it all mean?

This handout is your guide to the LAKEWATCH data packet. We'd prefer to look at this material with you in-person, especially if you're seeing it for the first time. However, a one-on-one review isn't always possible. So we're sending along this basic explanation in our place and relying on you to call us if you have questions or want to talk with us about it.

What are data?

Data are measurements, or numbers, generated from samples that Florida LAKEWATCH volunteers diligently provide each month. The samples are analyzed in the water chemistry laboratory at the University of Florida, and the measurements are recorded in a computerized data base. Every year we provide these data to our volunteers, in the form of tables and bar graphs.

It's true that data are generally collected and intended for use by professionals who have the training necessary for interpreting the numbers. However, lay people willing to invest a little time can learn the story behind the numbers too. So read on to find out how you can use LAKEWATCH data in a variety of applications. By reading this handout you can learn:

* how LAKEWATCH data can be useful to you;
* how to read LAKEWATCH data tables; and
* how to read LAKEWATCH bar graphs.

How LAKEWATCH Data Can Be Useful To You

♦ LAKEWATCH data can be used to establish a baseline — a long-term record — that provides a basis for comparison with future data.

In nature, change is the rule. Your waterbody will change naturally over the course of its lifetime. It may even change with the seasons or in response to natural environmental conditions. Only by knowing what changes have been normal in the past, can you determine those that are abnormal and possible cause for concern.

In addition to documenting individual events, the bar graphs provided in your data packet make it easy to spot whether baseline values themselves have changed significantly over time.

Changes in baseline values may indicate a change in the basic ecology of the waterbody, perhaps even a change in its trophic state. For example, baseline changes have been observed when a significant amount of aquatic vegetation has been removed from waterbodies; or when a major source of nutrients (such as sewage treatment plant effluent) has been removed.

♦ LAKEWATCH data provide an "insurance policy" in that it can be taken to different experts for their opinions. Because you have

the data in hand, you won't have to rely on the judgement of an individual but can use these numbers to get multiple opinions — as you may do with your medical records.

♦ LAKEWATCH data are trusted by the scientific community and can be used to document conditions credibly. You will not have to rely on anecdotal observations that are often viewed with skepticism by the regulatory and governmental communities.

♦ LAKEWATCH data can be used to red flag potentially alarming situations in the early stages when they may be corrected more readily and economically.

♦ LAKEWATCH data can be helpful in obtaining funding for restoration or preservation efforts.

♦ LAKEWATCH data can be used to monitor restoration or preservation efforts to see if your management strategies are working effectively.

♦ LAKEWATCH data can be used to establish water

UNIVERSITY OF FLORIDA
Institute of Food and Agricultural Sciences
Department of Fisheries and Aquatic Sciences

Tables

The first section of your data packet contains tables, which display your data in full detail. These tables might not be as interesting to look at as the graphs in this packet, but they provide data in its most basic and useful form — rows and columns of numbers.

Not interested in studying all those numbers? No problem. File these tables away and feel good that you have them if you should ever need them in the future. Want more information about your packet? Read on.

Graphs

The second section of your data packet contains bar graphs — one of each for the four parameters that LAKEWATCH monitors. Graphs are among the most valuable tools we have for telling a waterbody's story. When several year's worth of bars are shown together in one graph, they compress reams of data into a visual image that can reveal patterns and trends at a glance.

Anatomy of a Table

Every table in your data packet is presented in the same format:

(A) The heading at the top of the page tells you the name of the lake or waterbody and the county in which it's located.

(B) There should be a separate table for each of the four LAKEWATCH parameters. This heading tells you which one is being presented:

♦ Total Phosphorus is a combination of the many forms of phosphorus found in sediments and dissolved in the water.
♦ Total Nitrogen is a combination of the many forms of nitrogen found in the water.
♦ Total Chlorophyll is measured by LAKEWATCH. You will see "Chlorophyll *a*" in your table heading.
♦ Secchi Depth represents water clarity (not water depth).

(C) Sampling dates (month-day-year) are listed in the column with the "Date" heading.

(D) Columns with a "Station #" heading display the actual measurements for that station on the particular date to its left. (in the date column).

(E) The column with the heading "Lake Average" displays the average of all the individual stations monitored for a particular sampling date. These lake average numbers are represented as individual bars in the LAKEWATCH bar graphs.

Black Dots —Sometimes a black dot is printed instead of a number. This means that LAKEWATCH data were not available on the computer at the time the data packet was printed . When a dot appears for an individual station, no value is used from that station in the calculation of the lake average for that date.

Secchi Depth Averages— If the Secchi disk was visible on the bottom (never disappeared) or disappeared into the weeds, the value entered for that particular station was not used to calculate the Lake Average for that date. In this way, we use only values that give an indication of water clarity.

(F) The footer includes the date the report was printed as well as the page number. If you have more than one page for each table, it simply means that your lake has been monitored for many years and has more data than one page will hold.

Anatomy of A Graph

Every graph in this data packet is presented in the same format:

(A) The heading at the top of the graph tells you the name of the lake or waterbody and the county in which its located.

(B) The name of the parameter being illustrated is shown in the long rectangular box at the top of the graph.

(C) The symbol $\mu g/L$ means "micrograms per liter," and is a unit of measure indicating the weight of a substance in one liter of water. A microgram per liter is the same as "parts per billion" (abbreviated " ppb").

(D) Terms in this box refer to the *Trophic State** of the waterbody.

(E) The scale of numbers up the left side shows the value of the height of each bar in the graph (use this as your ruler).

(F) Dates when the samples were taken are listed horizontally along the bottom of the graph (month-day-year).

(G) Each bar represents a number. The number was calculated by taking the average of all the stations monitored on a particular sampling date (these averages are taken from the column on the far right of the data tables).

(H) Ignore the thickness of the bars on your graph. Bars are made skinnier when many of them have to fit on the page.
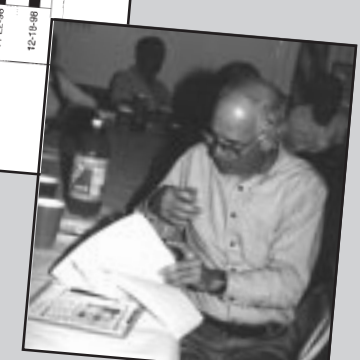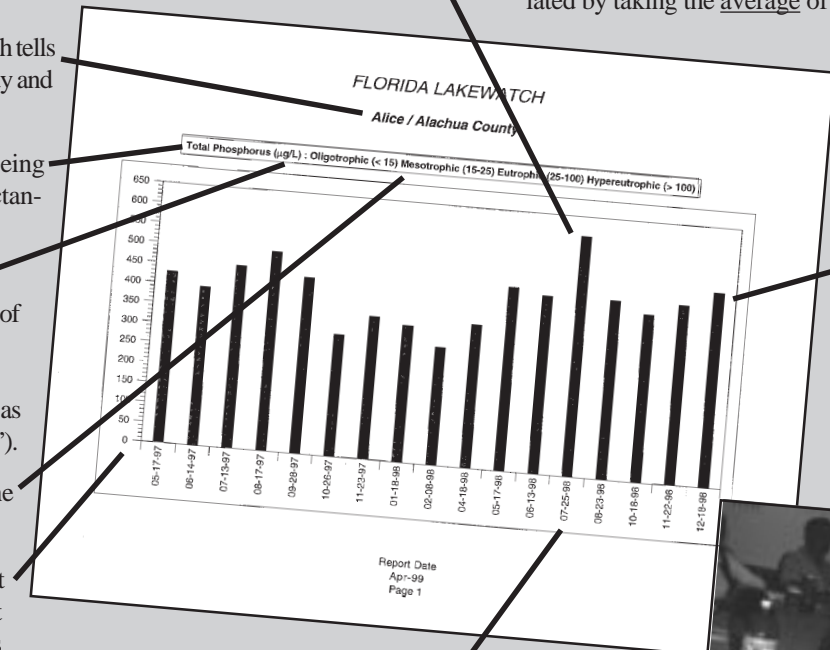
* See the LAKEWATCH handout " Trophic State: A Waterbody's Ability To Support Plants, Fish, and Wildlife."

Table Activities

Check Uniformity. Look to see if one station has higher or lower numbers than others sampled on the same date. For example, as you review your Chlorophyll *a* table, you may see one sampling station has a higher number than the others.

If you do spot a difference, the next step is to try to explain it. In this instance, the higher chlorophyll measurement may have been caused by algae being wind blown to the downwind side of a waterbody. You can look at your LAKEWATCH data sheet entry for wind direction for that day to see if this explanation checks out.

Look for consistency. Check to see if the numbers for one station are consistently higher or lower than at the other stations .

Proofread the data report. Check the Secchi depth measurements from your original data sheets to see if they match those numbers shown in the table. (We do recommend that volunteers keep copies of every data sheet for this reason.)

Graph Activities

Identify Patterns. Can you see patterns in the bar graphs? The heights of the bars may indicate patterns such as a repeating cycle of highs and lows, a steady increase, a steady decrease, an abrupt change, etc. If you've spotted a recurring pattern, consider whether the cycles correspond to something like seasonal changes, periods of heavy rainfall, drought, or other recurring events.

Compare Total Phosphorus with Total Nitrogen. Do the bars rise and fall at the same time? at opposite times? A pattern may tell give you a clue about the source of nutrients in your waterbody.

Compare Chlorophyll with Nutrients. Do the bars rise and fall at the same time? If they are synchronized, it may indicate that nitrogen and phosphorus are fertilizing the growth of algae in your waterbody.

Compare Secchi Depth with Chlorophyll Graphs. Do the bars on these two graphs fluctuate oppositely from one another? If they do, it probably means that the algae content in the water is a major influence on your water clarity. If they don't, it indicates that other factors are influencing your water clarity more than algae do. (Remember: A short bar means that the Secchi disk vanished from view only a short distance down in the water.)