1-1989

Data Bits Newsletters, 1989-2006

Long Term Ecological Research Network

01010110
01000011
01010010
00101101

DATABITS

01001100
01010100
01000101
01010010

Data management newsletter of the Virginia Coast Reserve LTER

Volume: 1 Number: 1 January 1989

Dataset Submission

This spring will be an important time for the LTER permanent database. Its time to get the data from last summer consolidated and safely archived before starting new projects and collecting new data.

To submit your data for inclusion into the LTER database, you need to fill out a "Dataset Description" to supplement the information in the "Project Description" you provided earlier and submit a copy of the data themselves on a floppy disk. Pages 1 and 2 of the "Dataset Description" deal with general issues about the data. A separate "Variables" form is filled out for each variable in the data. A "Variable Codes" form is filled out only for variables that take on discrete "coded" values (e.g., 1=male 2=female). The data may be submitted in a variety of forms, in particular LOTUS 1-2-3 spreadsheets, DBASE files and wordprocessor files. Ultimately they will all be converted to standard ASCII text files.

The completed forms and data should be submitted to the data manager. He will perform whatever manipulations are necessary to convert the data to ASCII for archival storage and create a statistical summary of the data for error-checking purposes.

Data Sources

The LTER data management office receives monthly charts of tidal predictions from VIMS. The predictions include times and magnitudes of tidal changes in graphic form. If you need a copy for planning your next trip, contact the data management office. Also on file in the data management office is a paper copy of locations for 100+ tidal benchmarks on the Virginia coast. Included are latitude and longitude, a textual description of the marker and its location and the elevation of the marker relative to mean low water. Announcements of locations are for the period 1951-1976.

Electronic Data Services

The LTER program is now offering a variety of electronic data services including a new electronic bulletin board system (BBS). The bulletin board may be accessed by logging on to one of the department's UNIX computers (these include the SUN and AT&T computers, see Alan Howard if you need to have an account set up) and typing **TELNET GEOCOCCYX.NREL.COLOSTATE.EDU** (or **TELNET 129.82.104.22**). Alternatively, you can use the Tandon computer in the graphics room or the ERDAS computer. Just type the **TELNET** command as on the UNIX computers at the C\> prompt. At the login prompt on the LTER-BBS type: **lter** (lower case only). You will then be asked your name and allowed to set-up a password.

The bulletin board is subdivided into a number of "conferences" (Ecology, Modeling, Data Management, Ecosystems, General) each with several subconferences (NOTICES, MEETINGS etc.). To read messages you select a conference then a subconference. Menus listing the commands are available at any time by typing a ?. To backspace, use Ctrl- Backspace (for some reason, regular backspace does not work properly).

The bulletin board is ideal for posting questions that you not only can't answer, but don't know who to ask. Unlike electronic mail that provides private communication between specific individuals, a bulletin board provides a way to communicate with the community in general. Similarly, it is an excellent way to keep posted on LTER developments that span sites.

By PC bulletin board standards the LTER-BBS is relatively primitive, but it is easy to use and provides an excellent method of getting a feel for the range of LTER activities. The opportunities should increase as usage of the board increases. Currently the board is relatively new and its user base is small, but that should change as more sites gain access to the DOD internet which permits such easy access from UVA without long-distance charges. For further information on BBS operations, contact John Porter, Bill Lauenroth or Lenore Fahrig.

Hubbard Brook Data Now Online

The new Hubbard Brook Bulletin Board provides access to hydrometerological, vegetation, precipitation chemistry and stream chemistry data files and documentation. It can be accessed evenings and nights (4:30 P.M.-9:00 A.M.) on weekdays and 24 hours/day on weekends and holidays. The connection requires a call by your modem to 603-868-1006. Baud rates of 300, 1200 and 2400 are supported. If you need help or access to a modem, contact John Porter.

GIS Developments

Progress is proceeding on many fronts, including submission of a supplemental proposal to NSF to upgrade Geographical Information System (GIS) facilities, digitizing of vegetation maps and development of new data-layers for Hog Island.

Assembled by Dr. Shugart, the NSF Supplement proposes to add ARC/INFO software and additional ERDAS workstations to the existing ERDAS GIS. Hardware would include SUN workstations and a high capacity (892 MB) file server along with assorted plotters and digitizers.

New data layers include semi-rectified versions of the 1974 vegetation maps compiled by Cheryl McCaffrey for Hog, Rogue, Wreck, Cobb, Little Cobb and Cedar islands. The GIS images have a resolution of 2x2 m and final

rectification to the UTM coordinate system is expected when copies of the original aerial photographs are received sometime in January.

A geomorphological data layer for Hog island has been produced by Scott Harris, Vaughn Mears and Susan Trossbach. The data-layer was produced from 1985 Army Corp of Engineers aerial photographs (1:12,000 scale) projected onto a base map, classified based on visible geomorphological and vegetative features and digitized using ERDAS to a 10 m resolution. The resulting GIS image has 20 classes ranging from active beach to marsh. A similar data layer is being developed for Cedar island by Susan Trossbach.

Vegetation Dataset Nears Completion

A dataset using information compiled by Cheryl McCaffrey is undergoing final preparations for entry into the VCR-LTER database. The dataset consists of two data files. The first provides a listing of which species are known to be present on any of the Virginia barrier islands, along with common names, origin (introduced, native) and growth form (shrub, tree, herb). The second file contains a listing of each island a species occurred on, what vegetation types it occurred in and its relative abundance (1=rare, 5=abundant) in those vegetation types.

The data files are related using a six letter species code consisting of the first three consonants of the genus and species. Use of these standard codes in future datasets will permit rapid access to the full range of information for a species and is encouraged for all LTER researchers. Copies of the list of species and their codes are available from John Porter.

From the LTER BBS

This message was downloaded from the LTER-BBS and is an example of the types of questions that can be posed to the larger LTER community:

Message 8 of conferences/modeling/notices:

The following is a description of a model analysis problem I have encountered. I would be interested in hearing ideas anyone has on this. Before describing the problem I need to explain the general purpose of the modelling. General qualitative hypotheses in ecology have come mainly from simple, analytically tractable models. However, these models are often recognised as being unrealistic and oversimplified. This has lead to use of more complex simulation models. However, simulation models are usually developed with a particular system in mind and the main question regarding parameters is how to get an accurate estimate. I am interested rather in using simulation models for the same purpose that analytical models are normally used - i.e., to develop general qualitative hypotheses/theories. The general question is: If a model is analytically intractable how does one use it to come up with general hypotheses? Analysis of analytical models usually produces solutions that are smooth, continuous and valid for known ranges of parameters. In simulations one deals with individual values of parameters. To uncover the shapes of the curves many simulations using different values of the parameter(s) are required. If a large number of well-spaced values is used, the relationship may be fairly well described. However, unlike in analytical solutions, the true nature of the curves is never really known because it is not possible to conduct simulations for every possible value of the parameters. Also, there are usually several parameters and the effect of one value of one parameter on the model outcome may depend on the level of other parameter(s). Finally, the parameters may affect the outcome of the model in some nonlinear or non-smooth way. The problem is therefore (i) how do you set up a simulation experiment with the purpose of developing general qualitative hypotheses? and (ii) how do you analyse the results? I will use as an example a simulation experiment I conducted (Theor. Popul. Biol. 34: 194-213 (1988)) using a spatially explicit model of population dynamics. The model has 6 parameters - intrinsic growth rate, carrying capacities, dispersal rate, dispersal distance, dispersal directionality, external immigration rate. The simulation outcome had two measures: population size and spatial variability. The model is general in that it is not of a particular species. I was interested in developing qualitative hypotheses concerning (i) the relative importance of the 6 parameters on the model outcomes and (ii) the qualitative relationships between the most important parameters and the model outcomes (i.e., the shapes of the curves). This is not the same thing as a sensitivity analysis. The question in a sensitivity analysis is how sensitive is the model outcome to changes (usually small changes) in the estimated value of a parameter? The question here is rather, what is the qualitative relationship between the model outcome and the parameters over all or most of the possible parameter space? An obvious approach is to do a factorial simulation experiment, in the simplest case with two values, low and high for each parameter. This would be alright for a first cut if we knew that the relationships between the parameters and the outcome were all straight lines or at least monotonic. This would require a relatively small number of simulations and a simple analysis of variance of the outcome. However, we do not know whether this assumption is valid. If low levels of the parameter may result in high outcome, intermediate levels in low outcome, and high levels in high outcome, a factorial with at least 3 levels for each parameter is required. Since we do not know the shapes of the relationships it is not possible to determine how many levels are required. If we choose some number that seems large enough to reveal the shapes of the curves, say 10 levels per parameter, the number of simulations becomes impractical (1 million in the above case of 6 parameters; the model takes 5 min. per run because it is spatially explicit so this simulation would take over 9 yrs.). Even if enough simulations could be conducted, there is always the possibility that something important happens between two adjacent chosen values for a parameter. An alternative approach is to use a latin hypercube design which is what I did in this study. I conducted 2000 simulations. In each simulation I chose a random value for each of the 6 parameters. The values were chosen from a uniform probability distribution over the range of possible values for each parameter. However, it turned out that analysing the results was not straightforward.

A standard statistical approach to problems in which relationships between several independent variables and one dependent variables are sought, is to build the best polynomial model relating the independent variables (the parameters) to the dependent variable (the output). This produced a descriptive model of the relationships between the parameters and the model outcome. However, it did not result in anything that could be phrased in terms of general hypotheses because the parameter combinations that turned out to be most important were quite complicated. I don't have the exact relationship anymore, but if the 6 parameters are called a-f and the outcome is y, the result looked something like y = c3a + bd - f2a2b + d - be2 + (etc. for about 20 terms, each significant but having only a small contribution to the overall R2). Even if I constrained the analysis to start with the simplest terms, the resulting equation consisted of a large number of terms, each having a small but significant contribution to the R2. Also, this analysis did not give an estimate of the relative importance of each parameter in explaining variation in the model outcome. The approach I ended up using was as follows. First, polynomial regression equations were calculated for each of the two output variables on each of the input parameters. This resulted in estimates of the forms of the underlying relationships. To determine the relative importance of the parameters, the polynomial regression equations were then used as polynomial variables in stepwise regressions of the output variables. This method seemed to work alright except for one disturbing problem: the total amount of variation explained by the regression using the polynomial variables was 78% for population size and 23% for spatial variability. If this were field data this might not be too bad, but since the parameters are the only thing that could affect the model outcome (apart from a small stochastic effect), one would expect that analyses of the model output using these parameters would result in most of the variance being explained. Since some of the relationships in the model are nonlinear, I wonder whether some portion of the parameter space placed the model in a chaotic regime; these simulations could then contribute to model outcome that is not explainable by the parameter values. I would be interested to hear any ideas that anyone might have on any of this. - Lenore Fahrig

01010110 01000011 01010010 00101101

DATABITS

01001100 01010100 01000101 01010010

Data management newsletter of the Virginia Coast Reserve LTER

Volume: 1 Number: 2 March 1989

Weather Station Data

One doesn't need a weather station to tell that the weather on the shore has been windy and cold lately. However, the LTER Level-2 weather stations, currently undergoing the final stages of installation, can give you the weather picture in much more detail. Instruments are monitored and data recorded on an hourly basis, with daily and monthly averages computed when the data is processed. Parameters measured are:

1. Temperature (hourly average, maximum, minimum)
2. Vapor pressure
3. Precipitation
4. Wind speed
5. Wind direction (measured as an hourly wind vector)
6. Solar and photosynthetically active radiation

Although data are being recorded on an hourly basis, the hardware and software are capable of much higher rates of acquisition. If you have a project that needs specialized meteorological data, Bill Nuttle can make additions to the existing programs to support it. Similarly, the data recorders are capable of servicing more instruments than are currently in place, so limited additions of specialized equipment can also be supported

Weather stations will be deployed on the mainland (on Nature Conservancy's Brownsville property) and on Hog Island. The Brownsville station is in place and undergoing final calibration checks. The Hog Island station should be deployed over spring break (weather on Hog Island Bay permitting).

Obtaining UTM Coordinates for Study Sites

One of the problems with working in an unspoiled wilderness is the lack of good, stable, landmarks. To help in accurately locating specific sites, a number of options are available. The first of these is standard USGS topo. maps. Using the ERDAS MSTEST command (or latest version of the EZDIGIT digitizing program) and a digitizing tablet makes getting UTM coordinates off of maps easy. If it is difficult to locate your sites based on what is on the topo. map, rectified (geometrically corrected) aerial photographs of Hog Island are available on the ERDAS system. Coordinates may be read out directly using the CURSES command.

If using a map or photograph is still no help, the portable LORAN unit (available at the VCR-LTER lab in Oyster) can be used to get a direct read-out of the latitude and longitude of your study site. The data management office has a program for converting Lat.-Lon. directly to UTM coordinates. For a copy of the program, contact John Porter.

VIMS Chesapeake Bay Bibliography

The Virginia Institute of Marine Science Library has compiled an annotated bibliography of over 8,000 citations about the Chesapeake Bay. They have also compiled a thesaurus of keywords to aid researchers in searching the bibliography. In the thesaurus, primary terms are followed by related terms in order of generality. Scientific and common names of species are also compiled. Even if you don't need a search of the Chesapeake Bay Bibliography (CBB) specifically, the thesaurus is invaluable for selecting keywords for searches of other databases. A copy of the CBB Thesaurus and forms for requesting searches of the CBB by the VIMS library is available from the VCR-LTER data management office.

LTER BBS Instructions Available

A recent message from Tom Kirchner of the CPER-LTER details use of the new LTER electronic bulletin board using both modems and the internet connection. If you would like a copy of the message, contact John Porter.

GIS Developments

New Proposals

February was a busy month for writing proposals to upgrade existing remote-sensing and geographical information system (GIS) capabilities. A proposal was submitted to NSF to fulfill "minimum standard installation" (MSI) requirements. Included in that proposal was a GIS system using ARC/INFO software run on a SUN workstation.

An additional proposal was submitted to the Academic Computing Support Program (ACSP) within UVA. That proposal included two remote-sensing/GIS workstations running ERDAS software. Although the focus of the proposal was on workstations for instructional purposes, there is little doubt that they would help to take some of the load off the existing PC-based ERDAS system.

New Images

The long-awaited copies of the aerial photography (1974) used by Cheryl McCaffrey in her 1975 mapping of the vegetation of the Virginia barrier islands have arrived. Four frames making up Hog Island have been scanned into the ERDAS system and are in the process of being geometrically corrected (rectified). Additional acquisitions of historical photography are:

NASA infrared photographs from 1986 at 1:68,000 for Cobb Island to Assawoman Island,

NASA infrared photographs from 1976 at 1:130,000 for the entire VBI complex,

Army Corp. of Engineers photographs (various media) from 1985, 1979, 1977 at 1:12,000,

NHAP81 infrared photographs from 1981 at 1:58,000 for Hog Island, Paramore Island, Brownsville and Upshure neck.

Contact Susan Trossbach for details on specific coverages.

Digital Image Storage

Although the tape drive for reading and storage still has not arrived, it is possible to put images from computer tapes onto the ERDAS system and to save copies of images and GIS files to magnetic tape by using a mainframe computer. Currently, files are uploaded to the University's IBM 3090 computer (named WATSON) using FTP (File Transfer Protocol) across the ethernet link. Typically a file will take about 1-2 minutes per megabyte to transfer. Once on WATSON it is written to a magnetic tape with a capacity of approximately 200 MB. If you have images that you would like stored on a temporary basis, contact John Porter. A more formal system for storing images is still under development.

Software Upgrades

Software available on the PC at the eastern shore laboratory is in the process of being upgraded. New versions of DBASE, TURBO PASCAL, QUICK BASIC and WATFOR FORTRAN are in the process of being installed and should be ready for the new field season.

DBASE IV- features a built-in compiler for faster operation, improved interfaces with other programs (notably, LOTUS 1-2-3) menus and edit screens. Also included is an SQL interface that lets you run SQL (the IBM mainframe's relational database program) on a microcomputer (or so the claim is made).

TURBO PASCAL version 5 features a new debugger that answers your programming dreams and lots of new functions for interfacing with DOS.

QUICK BASIC version 4.50 includes a major upgrade of the documentation (no printed manuals! All the help is in pop-up screens), improved debugging and better support of paths.

WATFOR FORTRAN is actually a switch back to a previous version, because of bugs in the latest version. However, the expiration date has been reset to eliminate "this version has expired messages."

Consultant's motto:

Nothing is Impossible

for the man who doesn't have to do it himself.

– Weilers Law

Dept. of Environmental Sciences, Clark Hall, University of Virginia, Charlottesville, VA 22903. J. Porter, editor

Databits
Virginia Coast Reserve LTER
Department of Environmental Sciences
Clark Hall
University of Virginia
Charlottesville, VA 22903

01010110
01000011
01010010
00101101

DATABITS

01001100
01010100
01000101
01010010

Data management newsletter of the Virginia Coast Reserve LTER

Volume: 1 Number: 3 May 1989

Storm of '89

The N'oreaster of March 1989 has more than its share of colorful tales. Here is a condensed version of a report from Bruce Hayden on how that storm compared to other recent storms.

The storm of March, 1989 was hindcast using the method developed by C.L. Bretschneider and used by by Bosserman and Dolan (1968) in order to compare it with an established historical record. The maximum significant wave height (deep water) during the storm period was 16.5 feet. A storm of this magnitude has a return frequency of about 4 years.

The storm of March 1989 had deep water wave heights in excess of 5 feet for 115 hours; this makes the storm "exceptional." During the period 1942-1984 more than 1200 winter storms off the U.S. Atlantic Coast were of sufficient magnitude to produce waves in excess of 5 feet along the mid-Atlantic coast. Two storms during this period had longer storm durations (waves of at least 5 feet) than the storm of March 1989. The coastal storm of March 1951 had a duration of 150 hours and a storm in February 1969 had a duration of 170 hours. The Bosserman storm record reveals that twenty nine storms had maximum deep water significant wave heights of 16 feet of more during the 1942-1984 period. The average duration of these 29 storms was 54 hours. Thus the storm of 1989 had more than twice the average duration of storms of similar magnitude. The observation recordof Bosserman indicates that the durations of this length occurred only twice in more than 1200 storms.

Herbarium collection

The herbarium collection of pressed specimens compiled by Cheryl McCaffery during her 1974 vegetation survey of the VCR is now available at the LTER lab in Oyster. A complete list of species and their specimen numbers is available from John Porter.

Programmer's observation:

The toughest part of debugging is getting past the belief that nothing is really wrong

Networking Conference

John Porter attended an LTER Wide Area Networking Conference at the National Center for Supercomputing Applications in late April. He returned with lots of information on network services, mailing lists, and public-domain software. If you are interested in seeing or copying the materials provided, contact John Porter.

Password protection

Traditionally, password protection at UVA has been largely a formality. Computer money is easy to obtain for any valid purpose and the incentive to break into someones account is therefore diminished. However, UVA is no longer an isolated institution. It is now connected to the Internet, a collection of networks providing access to UVA computers from all over the country. While the benefits of an Internet connection are manifest, a cost is that your computer account can be accessed by a very large group of people that are anonymous and outside UVA's community of trust. An example of the vulnerability of systems on the Internet was the publicized "virus" attack of several months ago. One of the methods used by the virus to get access systems was a list of the 800 most popular passwords. It included common names, common words and computer terms.

Fortunately, you can virtually eliminate the chance of anyone breaking in to your account by using a good password. A good password should have the following characteristics:

1)it should be at least 6 characters long,
2)it should not be a name or word found in the dictionary, and
3)it should include one or more numbers (but not your phone number or address — these are part of the public record).

Despite these restrictions it is still possible to come up with a password that is easily remembered. Just take the same approach as you would to selecting a personalized car licence plate. Passwords such as IThink2, Im2Hot, Pass4me all meet the criteria above, but are easy to remember.

From the LTER-BBS

Message 15 of conferences/general/notices:
Date: Monday, May 8, 1989 - 7:47 AM
From: JOHN DOWD.
Subject: Termites
Coweeta has a termite outbreak! (drought???). Anybody interested in intersite comparisons call DAC Crossley at (404) 542-7832. Bitnet address: DACCROS@USCN.

Message 16 of conferences/general/notices:
Date: Tuesday, May 9, 1989 - 8:44 AM
From: D ACKERLY.
To: ALL
Subject: Sampling regimes for micrometeorology
At Harvard Forest, we are getting ready to set up a micrometeorology sampling system for above ground parameters relevant to plant growth and for soil temperature. We would be interested in finding out what sort of sampling regimes are being used at other LTER sites. I.e. for long-term sampling what is the temporal resolution of the measurements? What variables are measured? How many stations are used and how are they distributed in space? What are the research questions underlying the sampling? Any information would be greatly appreciated so that we can make the data sets more useful in the long-run by using similar sampling methods.
David Ackerly
Harvard

9-track tape drive available

The ERDAS GIS system is now equiipped with a 6250 b.p.i. 9-track magnetic tape drive. The drive accepts standard tapes (available at the computer center Computer Store at $12.50 for a 2400 foot tape) and is auto-loading and extremely easy to use. With a 2400-foot tape, it has a capacity of approximately 200 MB. The software provided with the drive makes it very easy to backup files and restore them. The TBACKUP command operates just like the MSDOS BACKUP command with a few additions. The TDIR command lets you get a listing of the files on a tape created with the TBACKUP command, and the TRESTORE command (again, similar to the MSDOS RESTORE command) allows easy retrieval of one or more files from a tape. To make things even easier, the TMENU command will construct tape commands for you using a menu approach.

If you are creating a tape for transfer directly to a mainframe computer and wish to avoid the special tape formats used by TBACKUP and TRESTORE, there are standard commands for positioning the tape, writing markers and writing to the tape in a desired format. ASCII to EBCEDIC translation is also supported.

Electronic mail

Email to the shore

Remember, electronic mail to the VCRLTER lab in Oyster can simply be addressed to:
VCRLTER@VIRGINIA..BITNET
Mail is checked at least daily on the shore.

New personnel

New addresses for VCR-LTER personnel are:
LML7O@VIRGINIA (note: letter-O, not zero) for Luis Lagera the new project coordinator and
CRC7M@VIRGINIA for Randy Carlson the new site manager.

Dept. of Environmental Sciences, Clark Hall, University of Virginia, Charlottesville, VA 22903. J. Porter, editor

Databits
Virginia Coast Reserve LTER
Department of Environmental Sciences
Clark Hall
University of Virginia
Charlottesville, VA 22903