Chapter 17 -- A RESOURCE LAYER TUTORIAL

The intent of this chapter is to provide a step-by-step, hands-on description of a typical LTPlus resource information layer project. The factor which distinguishes this presentation from that found in *Chapter 18* is that its focus is the digitizing, processing and formatting of thematic map data which has been graphically recorded as layers of points, lines and polygons which describe the location of and/or relationships among natural resource elements. The tutorial in *Chapter 18* specifically details the procedures involved with the digitizing and processing of contour layer data.

SOME GUIDELINES

First, you will be provided with some information about the project--its purpose, physical composition, the current status, and the desired outcome. For this part of the tutorial, you are the pre-GIS project manager, burdened with finding the best way to get the data from manuscript into digital form ready for input to the designated GIS.

For the remainder of this chapter, you will be the LTPlus operator, the only operator assigned to the project, and it is your job to turn the project manager's dreams into reality. Hey...there could be a coffee cup or a key chain at stake here....so pay attention!

All functions and macros will appear in **boldface**

All new or significant terms will appear in *italics*

The command operations will be shown as keyboard, Command Language input; normally, you will probably make mouse or cursor selections from the screen tile or digitizer stickup menu and LTPlus will prompt you to supply the required command parameters and nag you if you enter something incorrectly.

In many instances, there are valid alternatives to the steps shown; don't hesitate to try something different, to experiment with different commands. Your adventures will probably not hurt a thing. Probably. Maybe. Ah. Make a backup of your system before you start this session.

Have fun.

THE PARTICULARS

Project Name: Pooh Bear **Project Area:** 140,000 acres

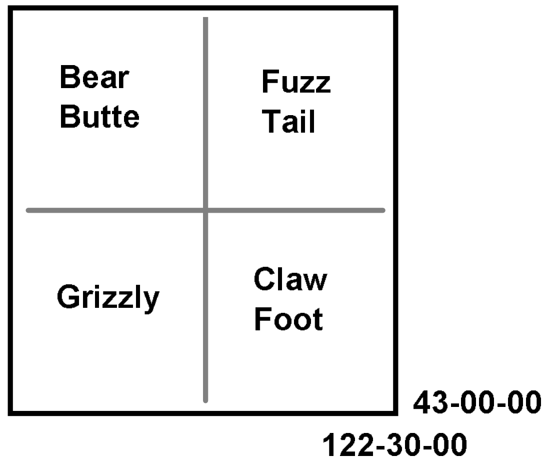
Purpose: To identify non-protected areas currently containing the endangered barrel-chested snipe and to evaluate and identify potential habitats within existing protected areas.

PROJECT SIDEBOARDS

--- Emergency funding has been appropriated for this project.
--- Time is of the essence; 18 large sale areas are in dispute awaiting the outcome of this analysis.
--- MOSS has been installed for the analysis activity.
--- An expert MOSS operator will be provided.
--- There is a contractor all ready to collect the necessary field resource data, awaiting only your instructions about the drafting.
--- LTPlus has been installed on a newly-purchased Compaq 386/33 at your site.
--- You have one, well-trained LTPlus operator.
--- An offsite Houston Instruments ScanCad system has time available for your project.
--- Base layer data is available for purchase.
--- Digital elevation model (DEM) data is available from U.S. Geological Survey at a 7-meter accuracy.

BASE MAP DESCRIPTION(S)

Map Name	Scale	Description
Bear Butte	1:24,000	7-1/2' USGS 1978
Fuzz Tail	1:24,000	7-1/2' USGS 1978
Claw Foot	1:24,000	7-1/2' USGS 1978
Grizzly	1:24,000	7-1/2' USGS 1978



Layers:

Code	Description	Object Type	Layer Type	Linework Density
OW	Ownership	Polygon	Base	Low
MA	Management Areas	Polygon	Res	Low
TR	Transportation	Line	Base	High
PS	Plant Species	Polygon	Res	High
PA	Plant Association	Polygon	Res	High
HU	Harvest Units	Polygon	Res	High
SH	Snipe Habitat	Point	Res	Low
SC	Soils	Polygon	Res	High
SL	Slope	Polygon	BaseDeriv	Med
AS	Aspect	Polygon	BaseDeriv	Med
HY	Hydrography	Line	Base	Med

PROJECT MANAGEMENT

Some tactical decisions must be made from the project parameter information. Whoever prepared the information above did a good job. It's not only organized, but it contains some data vital to your decision-making process. What decisions do you need to make?

*** How will the data be obtained? Purchased, in an LTPlus compatible format? Digitized manually, using LTPlus? Digitized using another application? Scanned?
*** What instructions do you give the contractor?
*** What guidelines do you give to your LTPlus operator?
*** When can you have all of the data ready to input into the GIS?
*** What will you be able to tell the Management Team about the accuracy and validity of the information after it has been processed through LTPlus?
*** After you've performed this miracle, should you ask for a grade raise?

OBTAINING THE DATA

The factors involved in this determination are:

Time
Cost
Personnel
Data density
Data layer type(s)
Availability of data collection devices

DECISION FACTORS

From the analysis done to date, your decision must be based upon the following thoughts:

Time is limited
Money is no object
You have only one trained LTPlus operator.
You can purchase the 3 base layers.
You can purchase digital elevation model (DEM) data, and slope and aspect can be derived from DEM data in MOSS or GRASS
2/3 of resource layers are high density linework
1/3 of resource layers are low density linework
You can purchase scanning capability

RECOMMENDATIONS

Because you are such a smart and resourceful person, your recommendations probably looks something like this:

Initiate the appropriate paperwork to purchase the Ownership, Hydrography and Transportation base layers immediately. Request that the data be in MOSS Import/Export format and on a medium which is compatible with the MOSS system hardware.

Initiate the appropriate paperwork to purchase the DEM data from USGS. Check with the MOSS manager to insure that the data arrives on a compatible media in a readable format.

Determine the type of coordinates which are to be passed to the MOSS GIS application (UTM, geodetic, State Plane, user-defined?) and advise the LTPlus operator and MOSS manager.

Advise the MOSS manager that both slope and aspect layers will need to be generated from the DEM data.

Contact the unit with the Houston Instruments ScanCad system to request scanning services for 4 layers of 4 maps each, or 16 manuscripts. Clarify that the data should be in .ras format on media compatible with your LTPlus hardware.

Advise your LTPlus operator that 2 layers of 4 maps each will need to be manually digitized. These are low density manuscripts.

Set up a meeting with the contractor to define the drafting requirements. Your LTPlus operator should be in attendance as well. Be prepared to provide any special materials (drafting film, markers, erasers, etc.). Give the contractor several copies of the portion of the User's Guide which describes the manuscript preparation process (*Chapter 2, Manuscript Preparation*).

Supply the contractor with a list of the pre-designated layer names and other pertinent label information. You will also need to provide a set of the 4 quad maps on stable base medium; the contractor will need these for registering the other layers. If time permits, you could go so far as to supply the film bases with the standard slotted punch and provide the treated blank film sheets pre-punched to the same punch registration scheme. Discuss coincident lines with the contractor and the LTPlus operator. Determine ahead of time whether or not there will even be any valid instance of coincidence. A likely and obvious one would be the line which demarcates the project boundary (assuming that it is composed of something other than the map edges). Typically, this line also forms the boundary of polygons on the other resource layers. However, in order for that line to appear as one consistent set of coordinate values in the data exported to MOSS, it should be digitized only once. The edited vector representation can then be reproduced, with the **level_** commands, on every LTPlus map layer for which it is relevant. Develop a standardized procedure for annotating on each of the pertinent layers that the coincident line must be duplicated from another layer prior to the assembly of the layer in LTPlus. Drawing it in a non-scannable color (i.e., yellow for the Houston Instruments ScanCad system) might be one solution. The most important thing is that everyone understand the designated process.

Another major item to discuss with the contractor and the LTPlus operator is edgematching. It must be done as accurately as possible by the contractor or the LTPlus operator will expend outrageous amounts of time repairing it during the editing process. While there are functions in LTPlus which assist with this activity, there is no magic command which "figures out what connects to what" between adjacent maps. That requires human judgement, presumably from a relatively sane mind! Keep in mind that for quad lines to be dissolved in MOSS, edge nodes must be within 10 feet (ground distance) of the corresponding node on the adjacent map.

Advise the contractor that you must review the first completed manuscript prior to authorizing compilation of the remainder. This is to insure that the work is being accomplished according to the scanning and digitizing requirements.

Prepare a strategy for accurately tracking all incoming and outgoing data, and stick to it!

Advise the LTPlus operator to work with the MOSS manager to insure that the LTPlus data output is compatible with the MOSS hardware/format.

The National Map Accuracy Standard for 7-1/2' quads at 1:24,000 scale allows for a maximum horizontal error of 33 feet. Compare that with the maximum horizontal error specified in the resource data collection contract and record the larger figure as the overall project accuracy descriptor. Advise the Management Team to insure that it is an acceptable amount of variance.

Modify the **config/tolerance** file to match the allowable horizontal error. Advise the LTPlus operator of that value.

The Management Team should, following an Information Needs Assessment (INA) activity, provide a list of attribute designations for each of the layer types. This information comprises what is often called the data dictionary. A copy of the final, approved summary should be given to the LTPlus operator, and several copies provided to the contractor to insure that proper coding of attributes occurs.

Based on the contractor's delivery date, determine a schedule for completing the processing of the data to the point of input to MOSS.

Beat the scheduled target dates and ask for a promotion!

Ready....Set.....GO!

LTPLUS OPERATION MANAGEMENT

Remove the Project Manager's cap and don the LTPlus Operator's, for, as promised, you are now the individual responsible for harnessing and expertly utilizing the full power of LTPlus. Here's what you know:

You will meet with the data collection contractor and be privy to the drafting specifications. Be sure to find out who to talk to if, and when, you have any questions about the layers that you receive for manual digitizing. Talk with the MOSS manager and find out what form the LTPlus output data must be in for the MOSS application and hardware.

The project manager has advised you that all data will be exported to the MOSS GIS in MOSS Import/Export format as UTM eastings and northings (x,y), in ground meters.

Review the project parameters and, in conjunction with the project manager, develop a check list for those maps which you will be processing.

REGISTRATION

Prior to receiving any of the manuscripts for digitizing or scan files for processing, create some registration and header templates for the 4 maps. The *Command Language* steps for accomplishing this activity for all 4 quads is as follows (the quad called FUZZ TAIL has been used in this example):

1. **create fuzz_reg**
   This command creates a new map called fuzz_reg.

2. **header quad_unit=FUZZ TAIL**
   header scale=24000
   header dictionary=pooh_dict
   header map_ht=7.5
   header map_wd=7.5
   (and whatever other parameters are appropriate)

   The header example above specifies that the active map full quad name is FUZZ TAIL, its scale is 1:24,000, it will utilize a data dictionary file called **pooh_dict**, and it is a standard 7.5' series map.

3. **register 1 sw=122.625,43.125**

   The register command records the longitude, latitude coordinates for the SW map base corner, and LTPlus calculates and records the other three.

4. After all of the **(name)_reg** maps have been established online, execute the **edge_maps** command to evaluate and record adjacent map names in the **header** file. This can be done for each of the 4 maps (it works on the current, active map).

   Retain the 4 **(name)_reg** maps online and use the **reg_copy** command to duplicate the geodetic registration for each subsequently processed map.

   Invoke the **diary_edit** command for each of the 4 maps and record any relevant comments. This is a valuable tool for tracking problems and/or the history of each manuscript.

   Use the **dict_edit** command to create a data dictionary file which can be used for all of the map layers comprising the project known as Pooh Bear. As you may have noted in the **header** file creation (above), the data dictionary file for this project has been named **pooh_dict**.

   Each line of the text file contains an attribute and its definition. The first 30 characters contain the attribute string (left justified, blank filled on the right). The next 0-100 characters contain a text description for that attribute. Comments may be included in the file by leaving the first 30 columns blank filled. Each map can specify a corresponding data dictionary. This is recorded in the **header** file.

Of course, this procedure can be a friendly experience if you use the mouse to select the desired functions from the screen menus and allow LTPlus to prompt you for the required input.

However you managed to muddle through it all, you are now ready to process the various map layers. There are two primary data entry avenues for this project. While the contractor will be preparing all of the resource layers, only a portion of them will come directly to you for manual digitizing. The remainder will be shipped to another facility for scanning. Once scanned the resulting data files will be returned to you, accompanied by the original manuscripts. With maps and disk media being shipped here and there, it is very important to adhere to the project manager's tracking scheme. What follows is a two-part discussion about data entry.

MANUAL DIGITIZING

Theoretically, only the manuscripts with a relatively low density of linework should be manually digitized. When you receive the first manuscript from the contractor, give it a very thorough evaluation and advise the project manager of any ambiguities or other unacceptable characteristics so that the contractor can correct the drafting process before additional layers are generated. Review *Chapter 2* of this *User's Guide on Manuscript Preparation* and develop a process for your evaluation effort. Conscientiously apply it to every manuscript that you receive. Errors not caught in this pre-processing step will cause major headaches later. Some obvious things to note:

Legibility
Line weight consistency and density labeling both inside and outside of the map border corner ticks punch, or pinbar registration

Edgematching
If the manuscript passes muster, attach it securely to the digitizer tablet (don't use tacks) and prepare for digitizing!

In the following scenario, it is assumed that you have set the cursor and digitizer 1 as the primary graphics input device (GIN). The mouse is the default; you can change that in the **config** file, or, more conveniently, simply execute a command to advise LTPlus of the new GIN status:

ginput dig1 -a
This establishes the cursor/digitizer as the source of screen crosshair movement. The **-a** option advises that the digitizer cursor location will be defined as absolute in nature. This will become apparent after the map has been registered properly, as all movement within the map area will track exactly to the map image on the screen. The alternative (no option) is the relative mode, which simply tracks the left-right-up-down motion of the graphic input device and mirrors the direction, but not the scale, of the movement with the screen crosshair. For now, your primary interest is in using the digitizer cursor to select screen menu commands and also digitize the map corners during the registration process. The steps describing that process will be defined as *Command Language* functions; you will most likely be executing these commands by selecting them from the screen menu and responding to the LTPlus prompts for their required parameters. Also, the Management Area (ma) layer for the FUZZ TAIL quad is used for this example.

1. **create fuzz_ma**

2. **reg_copy fuzz_reg 1 2**

This command copies the geodetic and UTM registration from the files that you created for each map base earlier.

3. **header dictionary=pooh_dict**
   layer_name=Mgmt Area
   quad_unit=FUZZ TAIL
   scale=24000
   search_rad=2
   maptype=polygon

map_ht=7.5
map_wd=7.5

This records the data **dictionary** file name, the layer description, the specific quad name, the layer scale (1:24,000), the desired search radius (2 pixels) for subsequent editing operations, and the map layer type (polygon). Some of this data is utilized for generating any **header** files attached to export files.

4. **Use diary_edit** to annotate the diary file regarding the data entry method to be employed (manually digitized).

5. **edge_maps**

Execute this command to locate and record any adjacent map names in the **fuzz_ma** header file. The adjacent maps must be on the current default data path/address.

6. **register 4 sw=(x),(y) nw=(x),(y) ne=(x),(y) se=(x),(y)**

This operation is efficiently accomplished by selecting the **register** function from the screen menu, entering the coordinate system code (**4 = digitizer 1**, absolute x,y coordinates) and then, prompted again by LTPlus, digitizing the four base corners on the **fuzz_ma** manuscript, in the requested sequence (clockwise from the sw corner). The coordinat system codes are listed with the **coord_type** command in *Chapter 8* of the *User's Guide* as well as in *Appendix B*. The affect of this action is to record, for the duration of the current, active map session, the digitizer coordinate values for the four map corners.

7. **coord_type 2**

The purpose of this command is to establish which units of measurement of cursor movement on the map will be displayed. This is purely informational although subsequent commands requiring distance or coordinate user input will assume that the entered values are in these units. This command can be activated at any time and any number of times. In the example above, the coordinate units displayed will be UTM meters.

8. Digitizing.....a complex sport...

To digitize the map, you will select various drawing modes, described in *Input Mode, Chapter 9*, to trace the linework on the manuscript attached to the digitizer tablet with the digitizer cursor.

Typically, the needed functions are either selected from the screen menu or activated by pressing the numbered digitizer cursor keys, which were previously mapped to specific input mode functions. Generally speaking, a set of cursor key functions can be developed using the **ckeys_** functions and stored as a file which is then recorded in the **config** file. LTPlus will load the cursor key definition file and it will remain active until an exit from LTPlus or until a new file is loaded with **ckeys_get**.

An alternate method would be to develop a digitizer stickup menu containing LTPlus functions using the **digmenu_** commands, store that menu file and then execute the **digmenu_get** command to load the desired stickup menu set prior to starting the digitizing activity.

In this example, it is assumed that you are using the slightly less efficient approach of selecting screen menu functions with the current **GIN**, the digitizer cursor, and then using that same input device to supply the linework coordinate values by tracing all line segments. Note that any given line segment on the layer need only be traced once, and the line segments may be digitized in any sequence and do not need to start and end on a node (intersection of 2 or more line segments). Your responsibility is to behave like a brilliant, albeit somewhat erratic, human scanner. Your mission, should you choose to accept it (and what is the alternative, Mr. Science?), is to turn on screen pixels to match the ink lines on the manuscript. **DO NOT** (because you will be very sorry if you do) trace all the way around each and every polygon on the map. Not being perfect, you will be unable to trace a line shared by two polygons in exactly the same location each time and the result will be a sliver polygonal area on the screen (and in the raster data file) which is not real. So, be a good little scanner and trace those lines just once. You may want to mark each line as it is digitized to help prevent this. And don't forget about any of the guidelines established regarding true coincident lines.

Review all of the commands in *Chapter 9* to determine how to best accomplish the digitizing activity. Keep in mind that most of those commands are merely condition-setting modes. This means that, once executed, that mode stays active until a new mode is activated or **clear_mode** is executed. These mode conditions do nothing as far as retrieving and storing x,y coordinates. Those operations occur when either of the condition- implementing modes (**start** and **continue**) is implemented. These act under whatever conditions are set by the current input mode.

An example:

> To trace a wiggly (curved vs straight) line on the **fuzz_ma** manuscript, you would select the **draw** command from the screen menu, followed by the **start** command, from the screen menu or by a pre-programmed cursor key press. That function requires an x,y coordinate position for the beginning point on the line which you provide by placing the digitizer cursor crosshair over the point on the manuscript and pressing any numbered button (again, assuming that none of the cursor keys have been mapped to LTPlus functions).
>
> To continue an uninterrupted trace of the line, you would next select the **continue** function from the screen menu and then begin tracing the line, depressing any numbered cursor button at any significant angle point (**vertex**) along the line. That line is assumed to end when the **start** function is activated for a new line, or the **clear_mode** or any non-input mode function is executed.
>
> Each of the input mode functions behaves differently and the best way to learn how to use those commands is to simply try them. All of your efforts are being stored in random access memory (RAM) only, and will remain their in that limbo state until you either activate a **raster_save** command or select a non-input mode function (in which case, LTPlus will ask you to confirm a **raster_save** action).

9. **frame_map d g**

This command will **draw** (**d**) a frame connecting the four corners. Their exact geodetic positions will be used. This may or may not be necessary. However, if the map border (also sometimes called the *neatline*) serves as a part of any of the map's polygons, then the line must exist and should be placed with the **frame_map** command. Do not digitize a corner-to-corner sequence. It is not only inefficient, but not particularly accurate either.

Ooops! One more assumption for the sake of a great example....FUZZ TAIL is the second Management Area polygon manuscript that you have digitized to date. Yesterday, you completed digitizing of the CLAW FOOT layer entitled **claw_ma**. When you executed the **edge_maps** command earlier in this session, that name was recorded in the **fuzz_ma** header file.

10. **import claw_ma 35**

    graphics +h35

These commands will display vectors from the adjacent **claw_ma** map in level 35 of the current map. The **graphics** command will display the **claw_ma** vectors in a highlighted color. The purpose of this function is to allow you to *edgematch* the linework between adjacent map layers. Keep in mind, however, that only the raster data for the current, active map may be modified to match the adjacent map vectors. Any changes to the data in the *margin* area is not applied to the associated map raster file.

Oh..and one more thing . . . the vector viewing plane may not be activated. To activate that plane while retaining the capacity to also view the raster plane, use this command:

11. **graphics +n0**

This will turn on both graphics planes.

In this example, vectors (line segments) from **claw_ma**, located south of **fuzz_ma** will be highlighted. Connect the **fuzz_ma** segments to the **claw_ma** lines using the input mode commands. When you are done, remove the **claw_ma** data with the following command:

12. **level_clear 35**

In the better-safe-than-sorry department:

13. **raster_save**

Which, as previously mentioned, saves the raster to the current, active map file. It is wise to do this on a regular basis, particularly if there are raging electrical storms in the area!

In our relatively simplistic scenario, you have just completed digitizing all of the linework for the **fuzz_ma** map. In addition, you performed the edgematching with the layer to the south. To record that fact, execute this command:

14. **header edgematch = s**

Now for the fun stuff! At this point in time, **fuzz_ma** is nothing more than a raster file in need of editing. However, it probably needs much less editing than a scanned raster file because manually digitized lines (which are received as vectors) are converted to unit- width lines of pixels. The following commands are often stored as a *macro* and applied to a list of maps.

15. **frame_map d g**

(just in case the frame was broken during previous editing)

16. **del_spurs 2**

This will delete all *spurs* which are <= 2 pixels in length. A spur is a segment of which at least one end is not connected to any other segment.

17. **fill_holes**

This will fill any single-pixel holes which may have been inadvertently created by the previous **del_spurs** command.

18. **thin_lines**

With no other parameters, this command will thin all raster lines by removing one pixel row from each side of each line until unit width is attained. A manuscript which has been manually digitized will not be much impacted by this function. By the same token, it won't hurt either.

19. **del_spurs 2**

20. **grow_spurs 2**

21. **del_spurs 2**

22. **log spur**

This series of commands works to clean up the raster. The **log** command checks for any unwanted spurs and records their locations in the log file. Use the following command to cycle through the logfile:

23. **step log +**

Each execution of this commands causes the area containing the next logfile error to be displayed. You may use the **input** mode function to correct the errors.

Once all spurs have been corrected, execute the following command:

24. **del_spurs 99999**

This will delete any remaining spurs up to 99999 pixels in length.

25. **save**

This command insures that the current raster has been saved to the offline data path/address as defined by the **data_path** variable in the **config** file.

26. **assemble**

Assembly is the unmitigated act of forming the meaningless raw raster representation of your map into meaningful object-oriented data (points, lines, polygons). This must be done prior to attempting to plot the information.

27. **plot 1 24000 0**

This command will generate a single-pen plot of the linework on the default primary plotter1 at a scale of 1:24,000. This plot can then be overlaid onto the original manuscript and the two sheets viewed over a light to determine if any linework is missing or mis-located.

28. Edit the map, if necessary.

Again, use the **input** mode commands to effect any necessary modifications to the linework.

29. **save**

Save the raster if any changes were made.

30. **assemble**

Re-assemble the map if any changes were made in the previous step.

31. **plot 1 24000 1 250**

This command will produce a new plot at a scale of 1:24,000 on the primary default plotter1. The record numbers will appear as labels and will be drawn at a character height of 250 mils (or 1/4-inch). This map should be visually compared with the original manuscript and steps 27-29 repeated as necessary.

32. **atrbt_dig 2 3 (attribute string)**

In reality, you will select the **atrbt_dig** command from a screen menu and LTPlus will place you in the attribute digitizing mode where you will stay until you execute another function or the **clear_mode** command. You will be prompted for the required function arguments as necessary. In the function statement above, the first value (**2**) represents the object type to which the attribute will be assigned (polygon), the second parameter is the action type code (**3**=new attribute) and the final argument is the attribute string itself.

Once the function arguments have been established with the mode implementation, you will initiate attachment of the designated attribute to an object by selecting the **continue** command and depressing a cursor button while the cursor crosshair is targeted on or, in this case, inside of, the appropriate object. The logical way to accomplish this is to have the **continue** function mapped to a single cursor button, and depress that specific button while on or inside of the object on the manuscript which is taped to the digitizer tablet (see the **ckeys_** commands in *Chapter 6*).

To remain in the **atrbt_dig** mode and change the attribute string, simply re-invoke the **atrbt_dig** mode with a new string. An efficient way to handle this entire operation is to map that particular mode-selection function to a cursor button as well.

If you tire of turning around to the keyboard to enter each new attribute string, it might be wise to review the **digmenu_** commands (in *Chapter 6*) and develop a *stickup menu* containing alphanumeric characters and enter the string by sequentially pressing buttons over the appropriate menu boxes.

Continue this activity until all attributes have been attached.

33. **plot 1 24000 3 200**

This command will generate a plot at a scale of 1:24,000 on the default primary plotter. Each object (in this case, polygon) will be labeled with its assigned attribute string. Only the first attribute string assigned will be shown.

To see all attribute strings assigned to each object (assuming there were multiple assignments), you will need to modify the command thusly:

34. **plot 1 24000 4 200**

If a visual evaluation of the attribute assignments is too complex, you may wish to use some of the **atrbt_** functions described in *Chapter 12* along with the **set_** operations described in *Chapter 13*. Then utilize the report function (*Chapter 14*).

35. **export moss claw_maas 1 2 2 0**

This is the command which will generate an ascii output file in a format compatible with the MOSS GIS. The first parameter is the export format type which, in this particular example, is **moss**. The second argument is the *ascii* file name into which the formatted data is to be stored. The third parameter is the attribute code, where **1** advises that both object coordinates and attributes will be output. The fourth parameter is the coordinate type code (see **coord_type**) which, in this case, is UTM meters. The fifth argument for this function is the object type code (see **crit_type**), where represents polygons only. The last argument is the *set number* which contains the objects to be included in the export file. A valid set number is in the range **1- 24**, or a **0** which means that all objects shall be included.

36. **backup fuzz_ma**

This command will copy all of the data files associated with the map called **fuzz_ma** to the same name and directory structure at the path and address defined by **bkup_path** in the **config** file.

37. **exit 0**

This initiates a graceful exit from this LTPlus session without saving the current map (which is unnecessary, since you invoked **save** commands earlier).