National Digital Forecast Database (NDFD) Tkdegrib and GRIB2 DataDownload and ImgGen Tool Tutorial

Downloading data

After the National Digital Forecast Database Tkdegrib and Grib2 is installed, data will need to be downloaded. This can be done by manually transferring the data to the machine in use.

The Uniform Resource Locators (URLs) for NDFD and the National Digital Guidance Database (NDGD) are located at *www.nws.noaa.gov/mdl/NDFD_GRIB2Decoder/dataloc.php*. The data can be manually downloaded from this site, but the degrib program comes with two ways to automatically access those URLs: from the graphical user interface (GUI) or from the command line.

    1. On the **Download** tab of the GUI program tkdegrib, expand the **ndfd** data set and highlight a sector, or region, in the left column, or expand the sector file by clicking on the plus symbol (+) next to the sector and highlight the specific weather element (Figure 1). To download more than one specific weather element for a sector, hold down the **Control** key on the keyboard and click on the desired weather elements. Then click either the **Download by ftp** or the **Download by http** buttons (either will work) at the bottom of the window. At that point, tkdegrib will contact the Web and store the file in /degrib/data/'dataset'/'sector', where 'dataset' is either NDFD or NDGD, and 'sector' is the abbreviated name of the sector. In the right column, or Message Window, there will be an indication that the tool is trying to locate the data for downloading. The progress bar directly above the two download buttons will reveal how much of the data have been downloaded. When the download is complete the progress bar will say "100 %." However, before the download buttons are clicked, the progress bar will say "100 %"

(even if no data have been downloaded), but then once the buttons are clicked it will start at "0 %" (see Figure 1).

Note: The abbreviations for the individual weather elements are as follows: maxt (maximum temperature), mint (minimum temperature), pop12 (probability of precipitation), qpf (quantitative precipitation forecast), sky (percent of total cloud coverage), snow (total snowfall), td (dew point temperature), waveh (wave height), wdir (wind direction from which it is blowing), wspd (wind speed), and wx (weather string).

2. From a command line or a script (**Note:** in Microsoft Windows, replace /degrib/ with c:\ndfd\degrib16\):

- **/degrib/bin/tcldegrib web.tcl ndfd midatlan,all** should get from the ndfd data set all weather elements found in the midatlan sector.

- **/degrib/bin/tcldegrib web.tcl ndfd conus,maxt,mint** should get from the ndfd data set the maxt and mint weather elements found in the conus sector.

- **/degrib/bin/tcldegrib web.tcl ndgd conus,ozone01** should get from the ndgd data set the ozone01 forecast found in the conus sector.
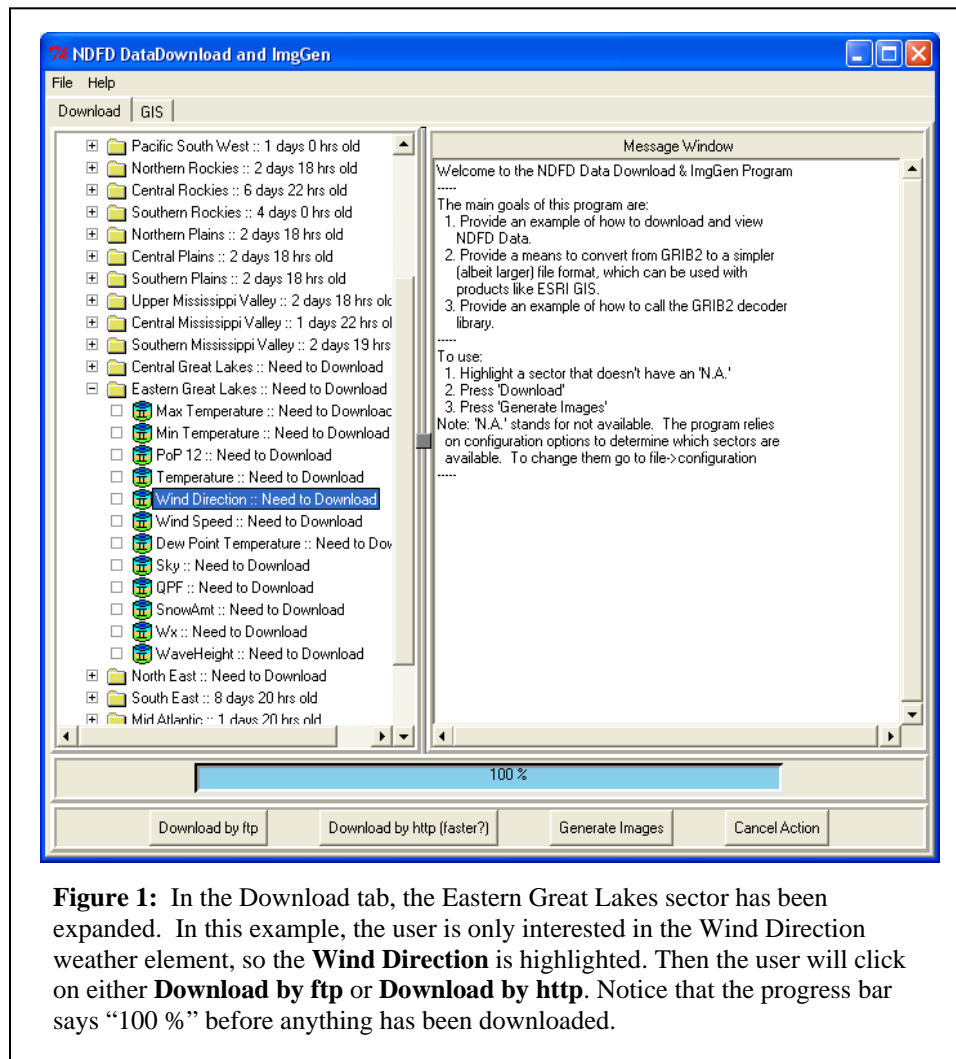
Figure 1: In the Download tab, the Eastern Great Lakes sector has been expanded. In this example, the user is only interested in the Wind Direction weather element, so the **Wind Direction** is highlighted. Then the user will click on either **Download by ftp** or **Download by http**. Notice that the progress bar says "100 %" before anything has been downloaded.

Data Uses

View the data
To get an idea of what the data look like before conversion to other formats (including .shp, .csv, .flt), the user can view the data to see if they are desirable. On **MS-Windows**, use **tkdegrib** with **superImageGen** and **htmlmaker** to create images (.png) and a means of browsing those images with Microsoft (MS) Internet Explorer.

1. In the GUI tkdegrib:
The images can include all the weather elements in a whole sector, or just one or a few selected weather elements within a sector. To view all the weather elements within a sector, click on the **Download** tab, highlight the desired sector in the left column, and click the **Generate Images** button at the bottom of the window. To view specific weather elements, expand the sector of choice in the left column and click on the desired weather element. To choose more than one, hold down the **Control** key on the keyboard and click on more than one weather element. When all desired weather elements are highlighted, click on the **Generate Images** button. That will cause tkdegrib to convert the selected forecasts to mosaic (*.tlf) files. The .tlf file, which is similar to the .flt file, contains the grid in an NxM 4 byte (octet) float file, which starts generating the image in the lower left corner, traverses a row, then starts again on the left. Use .tlf files when using imageGen (otherwise use .flt files). Then tkdegrib calls superImageGen to read the mosaic (*.tlf) files and draw the images. Next htmlmaker is called to create html pages to help view the images, and finally Internet Explorer is called to browse the html.

In the Internet Explorer window there will be a chart on the left with the time period for which the weather is forecasted and columns of each weather element. To the left of the chart there will be a map of the generated sector image. When the cursor is placed on a weather element for a given time period, that weather element will be depicted on the map of the sector (Figure 2).

Note 1: Unfortunately, superImageGen is an executable that only works on Windows machines.

Note 2: The Image folder on the local drive should be cleared out often if images are generated frequently. Old images are not overridden and will use storage space on the machine.

Note 3: Some versions of Internet Explorer have an active content protector to discourage pop-ups. Disabling this protector will allow the active images to be viewed.

2. From the command line:
Currently there is no way to perform this function from the command line.

NDFD Southern Plains Forecast

Element / Period	Low/ High Temp	Pop12	Temp/ Wind	Dewpoint	Sky
Today	High	PoP12	12Z 15Z 18Z 21Z	12Z 15Z 18Z 21Z	12Z 15Z 18Z 21Z
Tonight	Low	PoP12	00Z 03Z 06Z 09Z	00Z 03Z 06Z 09Z	00Z 03Z 06Z 09Z
Wednesday	High	PoP12	12Z 15Z 18Z 21Z	12Z 15Z 18Z 21Z	12Z 15Z 18Z 21Z
Wednesday Night	Low	PoP12	00Z 03Z 06Z 09Z	00Z 03Z 06Z 09Z	00Z 03Z 06Z 09Z
Thursday	High	PoP12	12Z 15Z 18Z 21Z	12Z 15Z 18Z 21Z	12Z 15Z 18Z 21Z
Thursday Night	Low	PoP12	00Z 06Z	00Z 06Z	00Z 06Z
Friday	High	PoP12	12Z 18Z	12Z 18Z	12Z 18Z
Friday Night	Low	PoP12	00Z 06Z	00Z 06Z	00Z 06Z
Saturday	High	PoP12	12Z 18Z	12Z 18Z	12Z 18Z
Saturday Night	Low	PoP12	00Z 06Z	00Z 06Z	00Z 06Z
Sunday	High	PoP12	12Z 18Z	12Z 18Z	12Z 18Z
Sunday Night	Low	PoP12	00Z 06Z	00Z 06Z	00Z 06Z
Monday	High	PoP12	12Z 18Z	12Z 18Z	12Z 18Z
Monday Night	Low	PoP12	00Z 06Z	00Z 06Z	00Z 06Z
Tuesday	High	PoP12	12Z 18Z	12Z 18Z	12Z 18Z

T and Wind Forecast For Wed May 04 2005 12Z
(Wed May 04 2005 8AM EDT)
National Digital Forecast Database
Experimental graphic created 05/06/2005 10:51AM EDT

Figure 2: The image above shows the weather forecast for the generated weather element for the Southern Plains. The chart on the left reveals the weather forecast for the day the image was generated through the following Tuesday. The columns include maximum and minimum temperature for the day (Low/High Temp), probability of precipitation (pop12), temperature and wind direction (Temp/Wind), dew point temperature (Dewpoint), and percent of total cloud coverage (sky). The cursor is pointed to Wednesday's temperature and wind direction at 12:00 p.m., which is depicted in the image on the right.
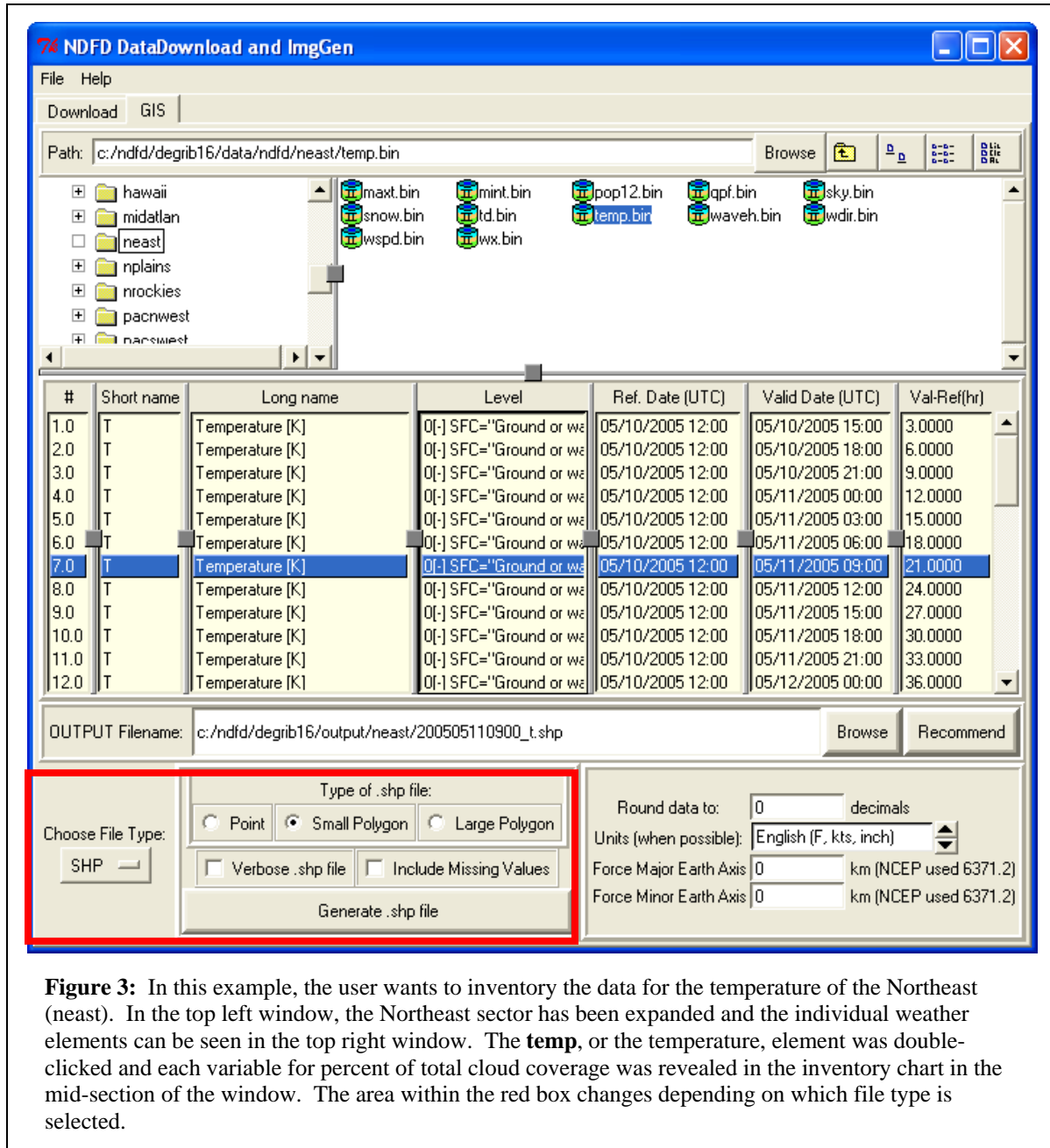
Inventory the data
To see what messages are inside a GRIB file, use degrib to inventory it.

1. In the GUI tkdegrib:
Click on the **GIS** tab, and browse through the files in the upper left corner of the window for the downloaded file of choice. Double-click on a specific weather element in the top right corner, and it should fill out the inventory chart in the bottom half of the window with the following: message number, a short version of the variable name, a long version of the variable name, the level or surface (i.e., the level above the surface of the Earth where the data were forecasted), the reference date (the time at which the forecast was

created), the valid time and date (the time at which the forecast will be true), and the difference between the valid time and the reference time (Figure 3). For example, in Figure 3, the highlighted message number (7.0) is for temperature, or temp. The data were collected at ground level (Level) on May 10, 2005, at 12:00 p.m. (Ref. Date). The time the forecast will be true (Valid date) is at 9:00 a.m. on May 11, 2005, which is 21 hours from the time the forecast was made (Val-Ref).

Figure 3: In this example, the user wants to inventory the data for the temperature of the Northeast (neast). In the top left window, the Northeast sector has been expanded and the individual weather elements can be seen in the top right window. The **temp**, or the temperature, element was double-clicked and each variable for percent of total cloud coverage was revealed in the inventory chart in the mid-section of the window. The area within the red box changes depending on which file type is selected.

2. From the command line:
/degrib/bin/degrib "GRIB file" -I
where "GRIB file" is replaced with the name of the downloaded GRIB file.

This should print out the message number, which byte it starts on, the GRIB version, the variable name (both short and long forms of it), the level or surface, the reference time, the valid time, and the forecast projection.

Probe the data

To get a better feel for the data, use degrib to probe the file at a given latitude/longitude point, or a set of points in a point file.

1. In the GUI tkdegrib:
Currently there is no way to perform this function from the GUI.

2. From the command line:
/degrib/bin/degrib "GRIB file" -P -pnt 38,-76
/degrib/bin/degrib "GRIB file" -P -pntFile "foo.txt"
where "GRIB file" is replaced with the name of the downloaded GRIB file, and "foo.txt" is replaced with a file that contains station ID, lat, lon.

This should read the file, and extract each message in the file. Then it will either bilinearly interpolate to the given latitude/longitude point, or find the nearest neighbor, and output that data to stdout. See the "degrib Man Page" (particularly the "PROBE OPTIONS" section) for more details.

Output files

Each time a file is generated there are three options to choose where the generated files are stored: in the OUTPUT Filename box, manually type the desired location of the generated file; browse to a desired file location; or click the Recommend button to have tkdegrib choose one. If tkdegrib chooses the file, it will output the file in the local drive in the ndfd/degrib16/output folder. In the output folder, all the sectors will be listed. The downloaded file will be in the sector corresponding to the downloaded data. Each file generated is named according to the specific weather element and valid date of forecast. For example, in Figure 3 the OUTPUT Filename is c:/ndfd/degrib16/output/neast/200505110900_t.shp, where the forecast is for the temperature (_t) of the North East sector at time 9:00 a.m. (0900) on May 11, 2005 (20050511). The type of file being generated is a shapefile (.shp).

Get metadata about a message

To get "metadata" or information describing a GRIB message, use degrib to create a .txt file. Among the "metadata" will be the maximum value, the minimum value, the number of missing values detected, etc.

1. In the GUI tkdegrib:
Each time a message is converted from a file, the GUI automatically creates a .txt file that contains the metadata. To convert a file, click on the **GIS** tab, and browse for the downloaded file of interest. Double-click the specific weather element in the top right window, and it will fill out the inventory chart in the bottom half of the window. Highlight the message in the inventory chart, and click the **Choose File Type** button at the bottom left of the window. Select a file type from the drop-down menu. Then manually type the name into OUTPUT Filename dialog box or click **Recommend** to have tkdegrib choose one (see "Output files" above). The tool will also generate a text

file that will be in the same location. The default values for the box in the bottom right corner for Round data to and Units (when possible) can be accepted or changed, depending on personal preferences. The values for both Force Major Earth Axis and Force Minor Earth Axis are more advanced options and should be left as 0 for general purposes. Then click the **Generate file** button at the bottom left side of the window.

Note: The "Round data to" value will show its default when the Recommend button is selected. Most the weather elements will default as 0; the exceptions are snow and waveh, which will default as 1, and qpf, which will default as 2.

2. From the command line:
/degrib/bin/degrib "GRIB file" -C -msg 1
/degrib/bin/degrib "GRIB file" -C -msg all
/degrib/bin/degrib "GRIB file" -C -Met -msg 2 -out message2.txt
where "GRIB file" is replaced with the name of the downloaded GRIB file.

This should read the file and extract the requested messages. The -Met option (on by default) tells it to create a .txt file with the metadata. To turn off the meta file option, use -nMet. See the "degrib Man Page" (particularly the "CONVERT OPTIONS" section) for more details.

Get diagnostics about a message
To get some diagnostics about the message before it has been parsed by the code, create an .is0 file. This can be useful for diagnosing packing and unpacking routines, but the WMO GRIB2 Document FM92-X11 GRIB is needed to understand the results.

1. In the GUI tkdegrib:
Currently there is no way to perform this function from the GUI.

2. From the command line:
/degrib/bin/degrib "GRIB file" -C -nMet -IS0 -msg 1
/degrib/bin/degrib "GRIB file" -C -IS0 -msg all
where "GRIB file" is replaced with the name of the downloaded GRIB file.

Convert a message to an ASCII comma-separated file
Use degrib to convert a given message to a .csv file, which is a comma delimited ASCII file that contains x, y, lat, lon, and value line for each cell in the grid. This file can be imported into Excel (limited to the first 65,536 lines), or read by other files to populate an SQL database.

1. In the GUI tkdegrib:
Click on the **GIS** tab, and browse for the downloaded file. Double-click on the specific weather element in the top right corner, and it will fill out the chart in the mid-section of the window. Click on the desired message in the inventory chart. Click the **Choose File Type** button at the bottom left corner of the window and choose **CSV** from the drop-down menu. In Figure 3 the red box in the bottom left corner will no longer have options for types of shapefiles. Instead there will be an option to include missing values in the generated data. This box can be selected if preferred. Manually type the output file name into the OUTPUT Filename dialog box or click **Recommend** to have tkdegrib choose one (see "Output files"). The default values for the box in the bottom right corner for

Round data to and **Units (when possible)** can be accepted or changed, depending on personal preferences (see note under "Get Metadata about a message"). The values for both Force Major Earth Axis and Force Minor Earth Axis are more advanced options and should be left as 0 for general purposes. Then click the **Generate .csv file** button at the bottom of the window. This creates a comma-delimited text file which can be imported into a spreadsheet.

2. From the command line:
/degrib/bin/degrib "GRIB file" -C -msg 1 -Csv
/degrib/bin/degrib "GRIB file" -C -msg all -nMet -Csv
where "GRIB file" is replaced with the name of a downloaded GRIB file.

This should read the file and extract the requested messages. The CSV option tells it to create the .csv file. See the "degrib Man Page" (particularly the "CONVERT OPTIONS" section) for more details.

Convert a message to ESRI shapefile
Use degrib to convert a given message to three different types of ESRI shapefiles: point, small polygon, or large polygon. A point contains the latitude and longitude and is the centroid of each grid cell (Figure 4A). A small polygon is a small five-vertex polygon that represents the value of each grid cell (Figure 4B). A large polygon represents the polygons dissolved by like attributes, so all like values are grouped together into one large polygon (Figure 4C). Polygons give areal coverage. Large polygons are smaller files and they are more manageable than small polygons.

1. In the GUI tkdegrib:
Click on the **GIS** tab and browse for the downloaded file in the top left corner of the window. Double-click on a specific weather element in the top right corner, and it should fill out the inventory chart below. Select the desired message in the inventory chart. Then click on the **Choose File Type** button at the bottom left corner of the window and choose **SHP**. Then manually type the output file name into the OUTPUT Filename dialog box or click the **Recommend** button to have tkdegrib choose one (see "Output files"). Now choose the **Type of .shp file** (point, small polygon, or large polygon). Check the box for **Verbose .shp file** if the values for latitude, longitude, and X and Y are needed (Figure 5A). A non-verbose shapefile will generate point identification and data, but will not generate the latitude, longitude, and X and Y (Figure 5B). The default values for the box in the bottom right corner for Round data to and Units (when possible) can be accepted or changed, depending on personal preferences (see note under "Get Metadata about a message"). The values for both Force Major Earth Axis and Force Minor Earth Axis are more advanced options and should be left as 0 for general purposes. Then click the **Generate .shp file** button at the bottom center of the window.

2. From the command line:
/degrib/bin/degrib "GRIB file" -C -msg 1 -Shp -poly 0
/degrib/bin/degrib "GRIB file" -C -msg 1 -Shp -poly 1
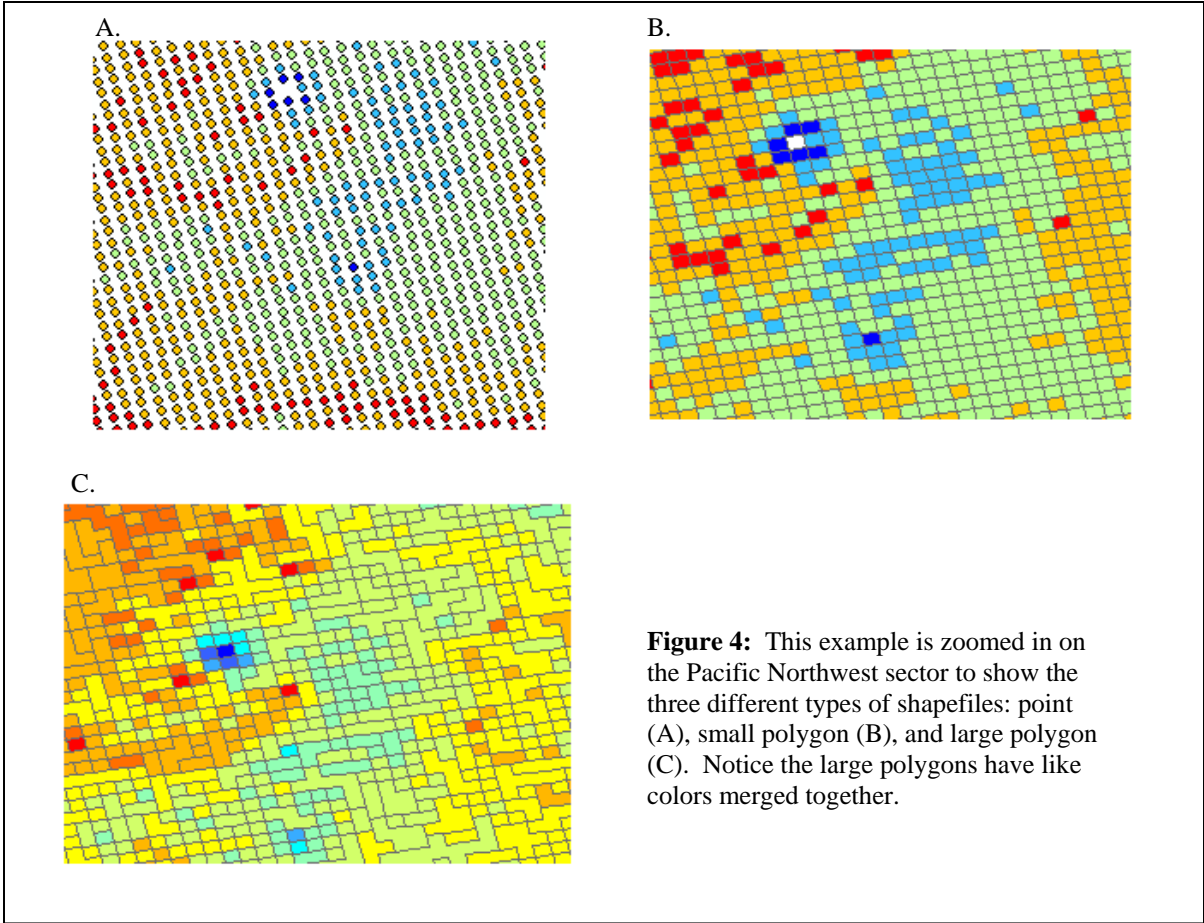/degrib/bin/degrib "GRIB file" -C -msg 1 -Shp -poly small
/degrib/bin/degrib "GRIB file" -C -msg 1 -Shp -poly 2
/degrib/bin/degrib "GRIB file" -C -msg 1 -Shp -poly big
where "GRIB file" is replaced with the name of the downloaded GRIB file.

Figure 4: This example is zoomed in on the Pacific Northwest sector to show the three different types of shapefiles: point (A), small polygon (B), and large polygon (C). Notice the large polygons have like colors merged together.
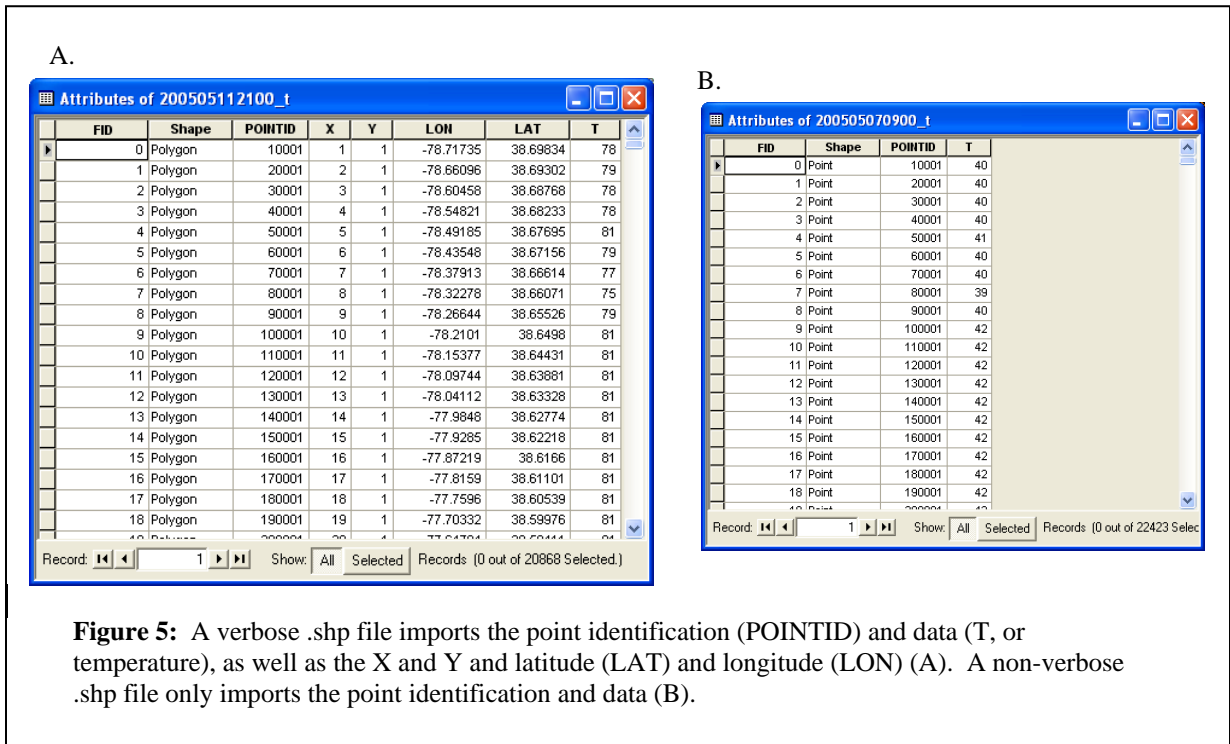

Figure 5: A verbose .shp file imports the point identification (POINTID) and data (T, or temperature), as well as the X and Y and latitude (LAT) and longitude (LON) (A). A non-verbose .shp file only imports the point identification and data (B).

This should read the file and extract the requested messages. The -Shp option tells it to create the .shp file. The -poly 0 says to create a point shapefile, the -poly 1 or -poly small says to create the small polygon shapefile, and the -poly 2 or -poly big says to create the "large polygon" shapefile. See the "degrib Man Page" (particularly the "CONVERT OPTIONS" section and the "SHP SPECIFIC OPTIONS") for more details.

Import an ESRI shapefile into ArcGIS
Open a new window in ArcMap. Click on the **Add Data** button and navigate to the previously selected location of generated .shp files (see "Output files"). Highlight the file and click the **Add** button (Figure 6). The shapefile will now appear in the Display view on the left side of the window, and the Map view will appear in the right side of the window (Figure 7). Both the Display tab or Table of Contents and the Map view tab should already be selected.
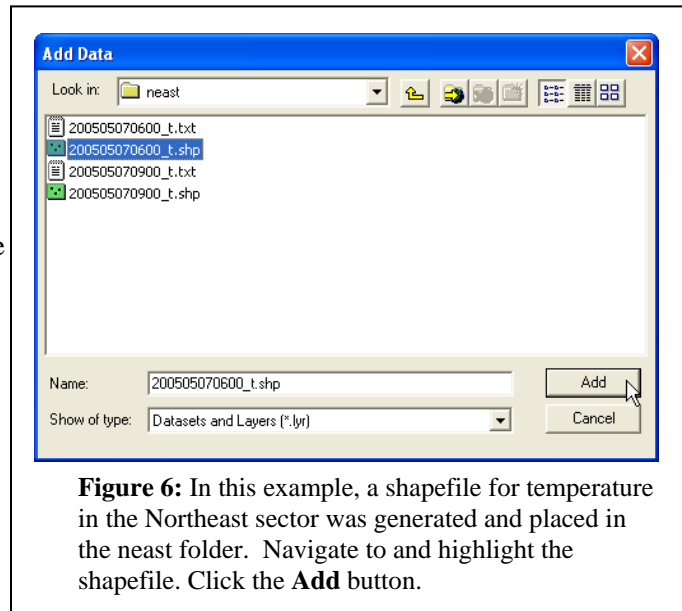

Figure 6: In this example, a shapefile for temperature in the Northeast sector was generated and placed in the neast folder. Navigate to and highlight the shapefile. Click the **Add** button.

Load legends into ArcMap to view GRIB2-derived shapefiles
In the Display view there will be a single symbol with a chosen arbitrary color beneath the shapefile name (Figure 7). This symbology is applied by default. To keep the legend consistent with the legends used on the NDFD Web pages and created in the SuperImageGen tool, a predefined legend needs to be loaded. Predefined legends from ArcView 3 are stored as ArcView Legend Files or AVL files.

Double-click on the shapefile in the Display view (or right-click and scroll down to Properties) of ArcMap. In the Layer Properties dialog, click on the **Symbology** tab (Figure 8A). Then click on the **Import** button in the top left corner. In the Import Symbology dialog box, select **Import symbology definition from an ArcView 3 legend file (*.avl)**.
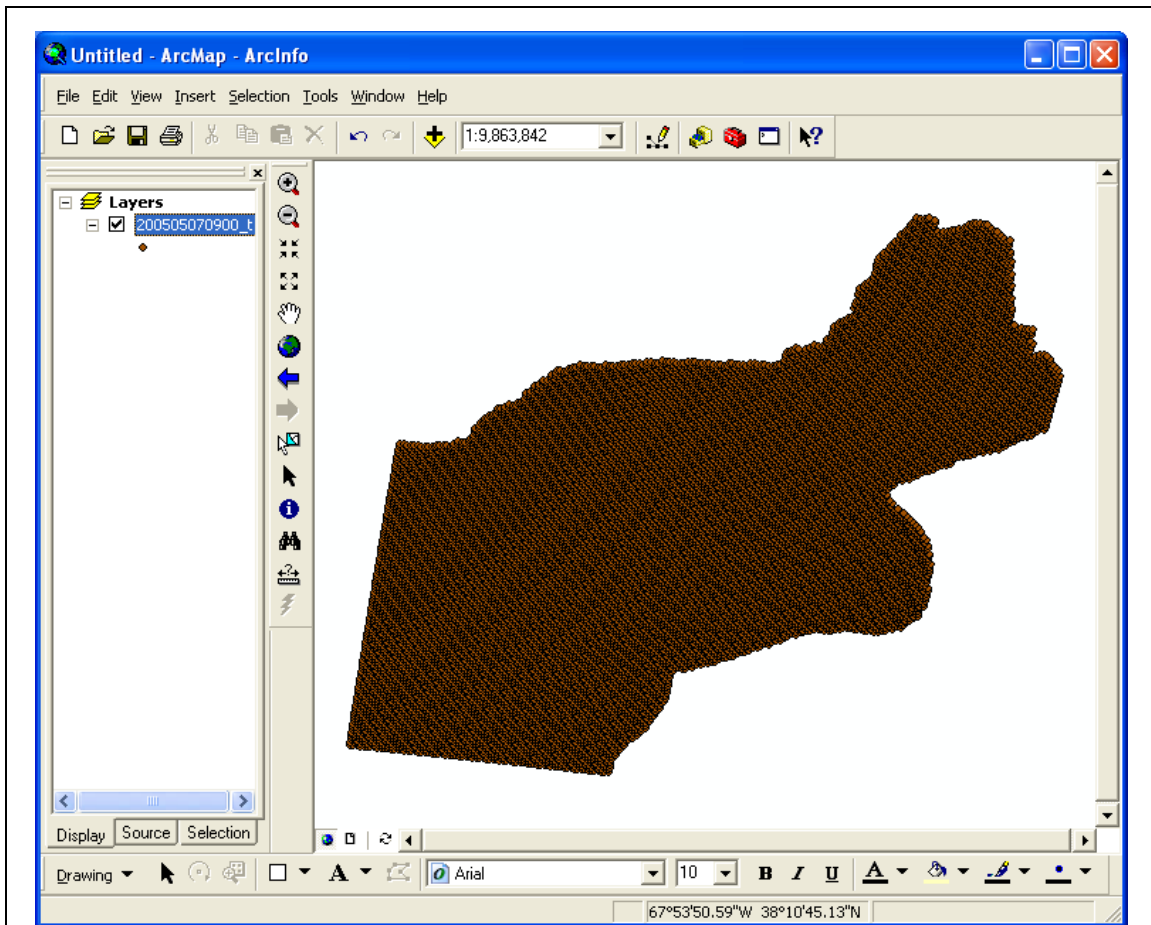
Figure 7: After adding the shapefile into ArcMap, the file (200505070900_t) name is shown in the Display view on the left, and the map is shown in the Map view on the right. The default symbology for ArcMap is one symbol with a single arbitrary color. This example shows the Northeast sector as a point shapefile.

Then click the **Browse** button and navigate to the /ndfd/degrib16/arcview/ folder. Select the /point_legend or /poly_legend, depending on which type of shapefile was generated, highlight the individual weather element that the shapefile addresses, and click the **Open** button (Figure 8B). In the Import Symbology dialog box, under **What do you want to import** select **Complete symbology definition** (Figure 8C). Click **OK**. Accept the **Value Field** default value in the Import Symbology Matching Dialog box and click **OK**. In the Layer Properties dialog there should be different colors for the symbol and different numbers for the value. Click **OK** and notice the symbology now applied to the shapefile in both the Display view and the Map view (Figure 9).

Figure 8: In the Symbology tab, click on **Import** (A). The legend to import is the one for which the weather element was downloaded and added into ArcMap. The downloaded file is a point shapefile, and in this example is temperature-specific. Hence, the highlighted .avl file below is for a temperature-specific point legend (B). When the legend file appears in the Legend File window, be sure **Complete symbology definition** is selected and click **OK** (C).

A.

B.

C.
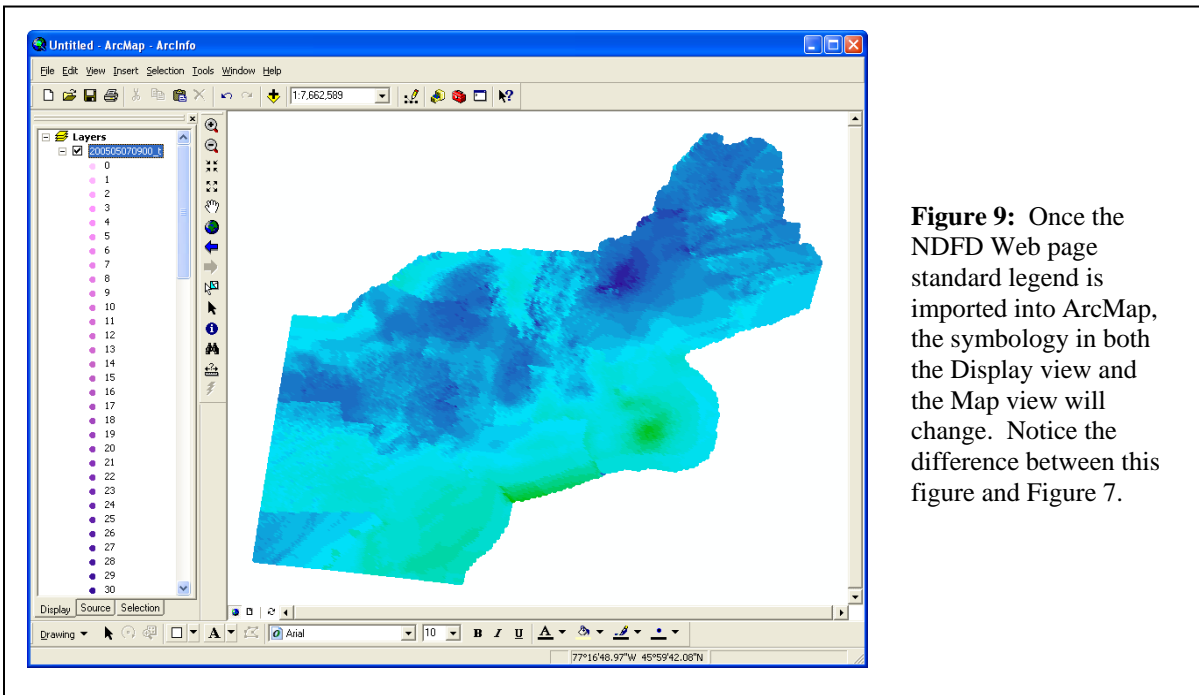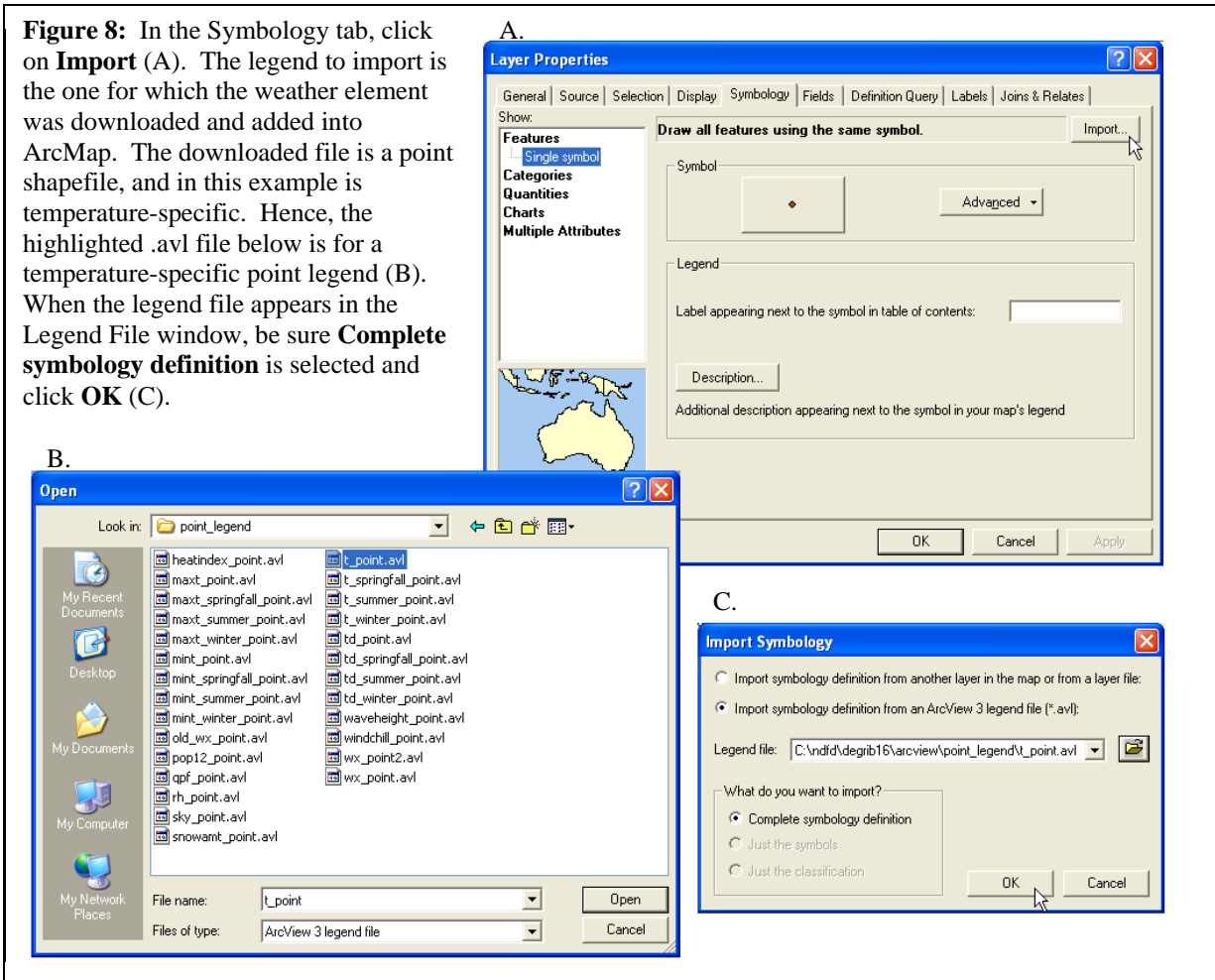
Figure 9: Once the NDFD Web page standard legend is imported into ArcMap, the symbology in both the Display view and the Map view will change. Notice the difference between this figure and Figure 7.

Convert a message to ESRI Spatial Analyst or GrADS file format
Use degrib to convert a given message to a .flt file. The .flt file consists of N x M floats where N and M are the dimensions of the grid. ESRI Spatial Analyst requires the .flt file along with an .hrd file. GrADS used the same format except that, in addition to the .flt file, it required a control file (.ctl).

1. In the GUI tkdegrib:
Click on the **GIS** tab and browse for the downloaded file in the upper left corner of the window. Double-click on a specific weather element in the top right corner of the window, and it should fill out the inventory chart in the mid-section of the window. Click the desired message in the inventory chart. Then click the **Choose File Type** button and choose **FLT** from the drop-down menu. The options in the red box in Figure 3 will change when FLT is selected. In the **Grid** drop-down menu, choose one of the three options: Projected: Original GRIB (which is original map projection); Coverage: Nearest Point (which fills out a flat latitude/longitude grid by finding the nearest points to the original grid); or Coverage: Bi-Linear (which fills out a flat latitude/longitude grid by finding the four surrounding points on the original grid and does a bi-linear interpolation). To create the GrADS .ctl file, click on **Create GrADS .ctl file**. The other three options (Start at Upper Left, use NDFD Weather code, and M.S.B. First) are more advanced options and do not need to be selected for general purposes. In the OUTPUT Filename dialog box, type the output file name or click **Recommend** to have tkdegrib choose one (see "Output files"). The default values for the box in the bottom right corner for Round data to and Units (when possible) can be accepted or changed, depending on personal preferences (see note under "Get Metadata about a message"). The values for both Force Major Earth Axis and Force Minor Earth Axis are more advanced options and should be left as 0 for general purposes. Then click the **Generate .flt file** button at the bottom of the window.

Note 1: In the **Grid** drop-down menu, Coverage: Bi-Linear should be used with continuous data (e.g., temperature), while Coverage: Nearest Point should be used with noncontinuous data (e.g., weather type). Nearest point can be used with continuous data, but bi-linear cannot be used with noncontinuous data.

Note 2: When working from a PC, the Grid selection, Projected: Original GRIB, tends to take longer.

2. From the command line:
/degrib/bin/degrib "GRIB file" -C -msg 1 -Flt
/degrib/bin/degrib "GRIB file" -C -msg 1 -Flt -Interp –GrADS
/degrib/bin/degrib "GRIB file" -C -msg 1 -Flt -GrADS
where "GRIB file" is replaced with the name of the downloaded GRIB file.

This should read the file and extract the requested messages. The FLT option tells the program to create the .flt file. The -GrADS option says to create the .ctl file. The -Interp allows GrADS to work better, since it tells degrib to interpolate the grid to a latitude/longitude coverage grid, which saves GrADS from having to do so. See the "degrib Man Page" (particularly the "CONVERT OPTIONS" section and the "FLT SPECIFIC OPTIONS") for more details.

For more information on degrib and GrADS go to
www.nws.noaa.gov/mdl/NDFD_GRIB2Decoder/grads.php.

For information on FORTRAN or C access to .flt files go to
www.nws.noaa.gov/mdl/NDFD_GRIB2Decoder/flt.php.

Open an FLT file in ArcGIS
To open an FLT file in ArcMap, ArcToolbox is needed. Open ArcMap and click on the
ArcToolbox icon. This will open the ArcToolbox window. Expand the **Conversions Tools**
option in the Favorites window. Next, expand the **To Raster** option. Then double-click on the
Float to Raster selection (Figure 10A). This will open the Float to Raster window (Figure 10B).
In the **Input floating point raster file** box, find the .flt file that was generated from the NDFD
DataDownload tool and open it. The program should create an Output Raster location. Then click
OK. This will bring the float file into ArcMap (Figure 11).

A.   B.
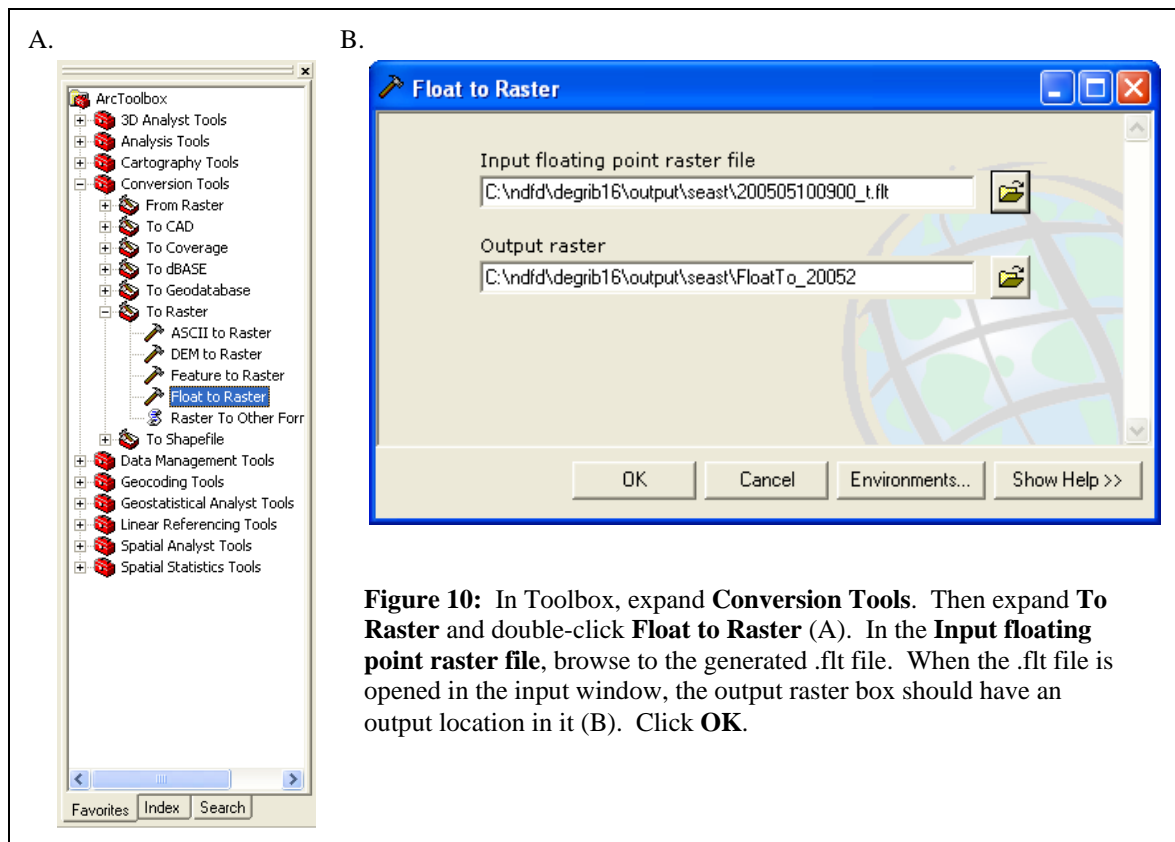
Figure 10: In Toolbox, expand **Conversion Tools**. Then expand **To
Raster** and double-click **Float to Raster** (A). In the **Input floating
point raster file**, browse to the generated .flt file. When the .flt file is
opened in the input window, the output raster box should have an
output location in it (B). Click **OK**.

Convert a message to NetCDF
Use degrib to convert a given message to a network Common Data Form (NetCDF) file (.nc). For
more information about the NetCDF format, visit
http://my.unidata.ucar.edu/content/software/netcdf/index.html.

1. In the GUI tkdegrib:
   Click on the **GIS** tab and browse for the downloaded file in the upper left corner of the
   window. Double-click on a specific weather element in the top right corner of the
   window, and it should fill out the inventory chart in the mid-section of the window.
   Select the desired message in the inventory chart. Next click the **Choose File Type**
   button in the bottom left corner of the window. In the file type drop-down menu choose

NetCDF. Then manually type the output file name into the OUTPUT Filename dialog box or click the **Recommend** button to have tkdegrib choose a name (see "Output files"). In the red box (refer to Figure 3), accept the default values under **This creates a NetCDF file using the 'CF Metadata Convention Ver. 1.0, 28 Oct 2003'**." The default values for the box in the bottom right corner for Round data to and Units (when possible) can be accepted or changed, depending on personal preferences (see note under "Get Metadata about a message"). The values for both Force Major Earth Axis and Force Minor Earth Axis are more advanced options and should be left as 0 for general purposes. Then click the **Generate NetCDF.nc** file button at the bottom of the window.
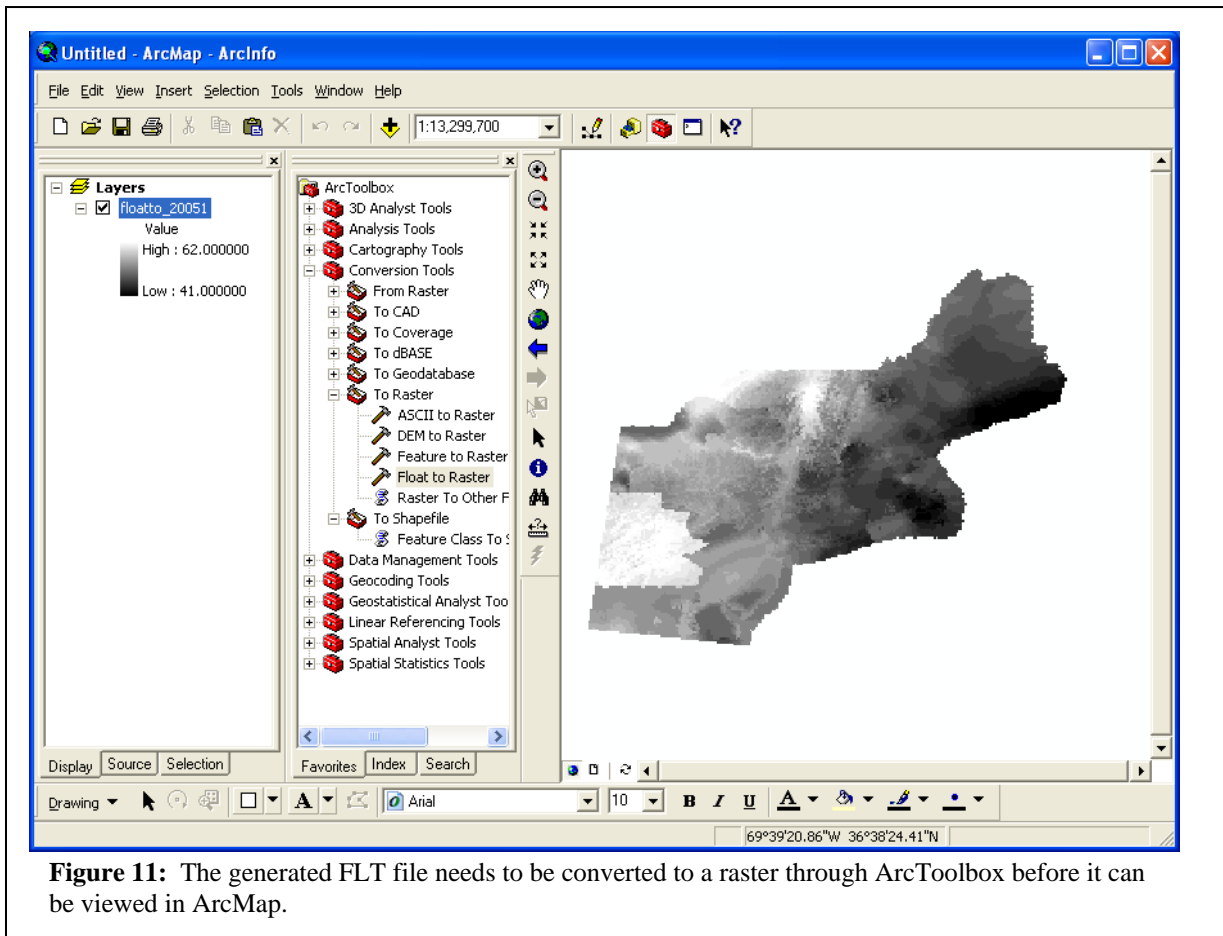
Figure 11: The generated FLT file needs to be converted to a raster through ArcToolbox before it can be viewed in ArcMap.

2. From the command line:
/degrib/bin/degrib "GRIB file" -C -msg 1 -NetCDF 1
where "GRIB file" is replaced with the name of the downloaded GRIB file.

This should read the file, and extract the requested messages. The -NetCDF 1 option tells the program to create a NetCDF file using degrib's conventions version 1. This attempts to use the CF (climate and forcast) convention. See the "degrib Man Page" (particularly the "CONVERT OPTIONS" section) for more details.

Convert a sub grid of certain types of GRIB2 files to GRIB2
Use degrib to get a sub grid of certain types of GRIB2 files. It only works for GRIB2 files that were packed using simple pack, complex pack, or complex pack with second order differencing (which NDFD uses, but NCEP does not), since those are the only forms that it knows how to pack. This cannot be used to convert a message from GRIB1 to GRIB2, because degrib currently does not have a mapping of the GRIB1 metadata to GRIB2 metadata.

    1. In the GUI tkdegrib:
Currently there is no way to perform this function from the GUI.

    2. From the command line:
/degrib/bin/degrib "GRIB file" -C -msg 1 -Grib2 -lwlf 30,-105 -uprt 40,-85
where "GRIB file" is replaced with the name of your GRIB file.

This should read the file and extract the requested messages. The -Grib2 option tells it to create a GRIB2 message. The -lwlf 30,-105 tells it to use a subgrid with the lower left corner at lon=-105E, lat=30N. The -uprt 40,-85 tells it to use a subgrid with the upper right corner at lon=-85E, lat=40N. See the "degrib Man Page" (particularly the "CONVERT OPTIONS" section) for more details.

Create a flat file database
Use degrib to create a flat file database that is made up of either many .flt files and an index file (.ind), or a single cube file (.dat) and an index file (.ind). This is useful for Common Gateway Interface (CGI) access to the NDFD, since probing the uncompressed form of the data is faster than probing the GRIB2 files.

    1. In the GUI tkdegrib:
Currently there is no way to perform this function from the GUI.

    2. From the command line:
/degrib/bin/degrib "GRIB file" -Data -Index simple.ind
/degrib/bin/degrib "GRIB file" -Data -Index simple.ind -out simple.dat
where "GRIB file" is replaced with the name of your GRIB file.

This should read the file, create a new file simple.dat, append each converted grid to simple.dat, and create an index file simple.ind. The -Data option tells it to create the database, and the -Index simple.ind tells it what to name the index file. The -out simple.dat tells it what to name the .dat file. By default it uses the index filename replacing the extension with .dat. See the "degrib Man Page" (particularly the "DATABASE CREATE OPTIONS" section) for more details.

Probe a flat file database
Degrib can be used to probe a flat file database that is made up of either many .flt files and an index file (.ind), or a single cube file (.dat) and an index file (.ind). This is useful for CGI access to the NDFD, since probing the uncompressed form of the data is faster than probing the GRIB2 files.

    1. In the GUI tkdegrib:
Currently there is no way to perform this function from the GUI.

2. From the command line:
/degrib/bin/degrib "index file" -DP -pnt 35,-76
where "index file" is replaced with the name of the index file (.ind) that was created when using the -Data command.

This should read the index file, figure out where 35,-76 is, open the (.dat) file or the set of (.flt) files, jump to and read that cell, and return the results on the command line. See the "degrib Man Page" (particularly the "DATABASE PROBE OPTIONS" section) for more details.