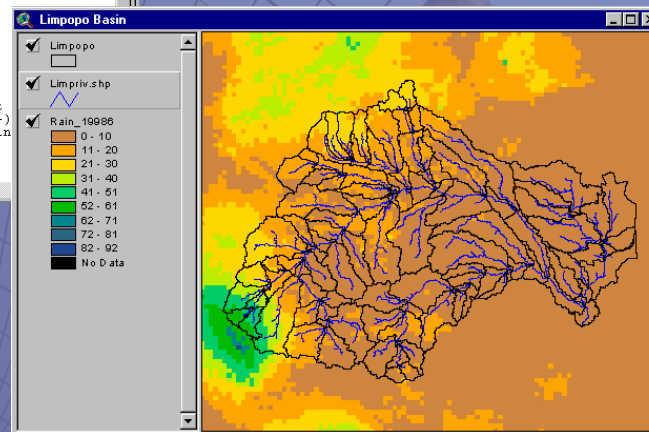


Working with ArcView Data

```
Script1
BinLoc = System.GetEnvVar("AVBIN")
EXEPATH = BinLoc + "\import71.exe"
'DLLPath = BinLoc + "\importdll.dll"
'ImportDLL = DLL.Make(DLLPath.asFileName)
'ImportProc = DLLProc.Make(ImportDLL, "ImportFile", #DLLPROC_TYPE_VOID)
InFileList = FileDialog.ReturnFiles({"*.e00"}, {"Arc/Info Export Files"})
if (InFileList.Count <= 0) then
    return nil
end

InFile = InFileList.Get(0)
InFileBase = InFile.GetFileName
InFileBase = InFileBase.Substitute(".", "e00", "")
InFileBase = InFileBase.Substitute(".", " ", "")
OutCov = FileDialog.Put(InFileBase.asFileName, "", "Output")
This = ImportProc.Call(InFile.asString, OutCov.asString)
System.Execute(EXEPATH ++ InFile.asString ++ OutCov.asString)
```



KNZ_ID	station	LON	LAT	JAN1	JAN2	JAN3
1	KAKAMEGA	34.750	0.283	25.5	17.1	29.5
2	KISII	34.783	-0.683	43.9	17.7	49.8
3	KISUMU	34.583	-0.100	37.7	17.1	31.4
4	LODWAR	35.617	3.117	3.9	0.2	6.2
5	KITALE	35.983	1.000	6.9	1.5	9.6
6	ELDOROT	35.283	0.533	9.3	6.0	1.2
7	NAKURU	36.067	-0.267	6.8	7.3	13.3
8	KERICHO	35.067	-0.067	53.5	26.3	29.6
9	NAROK	35.833	-1.133	44.2	16.5	22.3
10	NYERI	36.967	-0.433	10.4	9.9	14.5
11	THIKA	37.067	-0.983	14.1	8.9	8.1
12	DAGORETI	36.750	-1.300	16.1	11.5	1.9
13	MARSABIT	37.983	2.317	8.7	6.8	4.9
14	MERU	37.650	0.083	16.5	9.5	11.6
15	EMBU	37.450	-0.500	10.0	2.4	2.6
16	KATUMANI	37.233	-1.583	30.1	12.0	6.7
17	MAKINDU	37.833	-2.283	19.0	10.6	5.9
18	MOYALE	39.050	3.533	7.3	2.6	4.3
19	MANDERA	41.867	3.933	0.1	0.0	0.3
20	WAJIR	40.067	1.750	3.0	0.6	0.8

Training Center
U.S. Geological Survey
Center for Earth Resources
Observation and Science (EROS)
Sioux Falls, South Dakota, USA

Getting Data into Arc View



FEWS



ArcView Introduction

Outline:

- Feature Types and Symbology
- Spatial Data Sources
- Creating View / Themes
- Theme Tables
- Saving A Project
- Referencing Views to Real World Coordinates

In Review:

ArcView Projects consist of a series of document windows including views, tables, charts, scripts, and layouts

The view window may contain multiple themes that represent real world objects in the form of points, lines, or polygons.



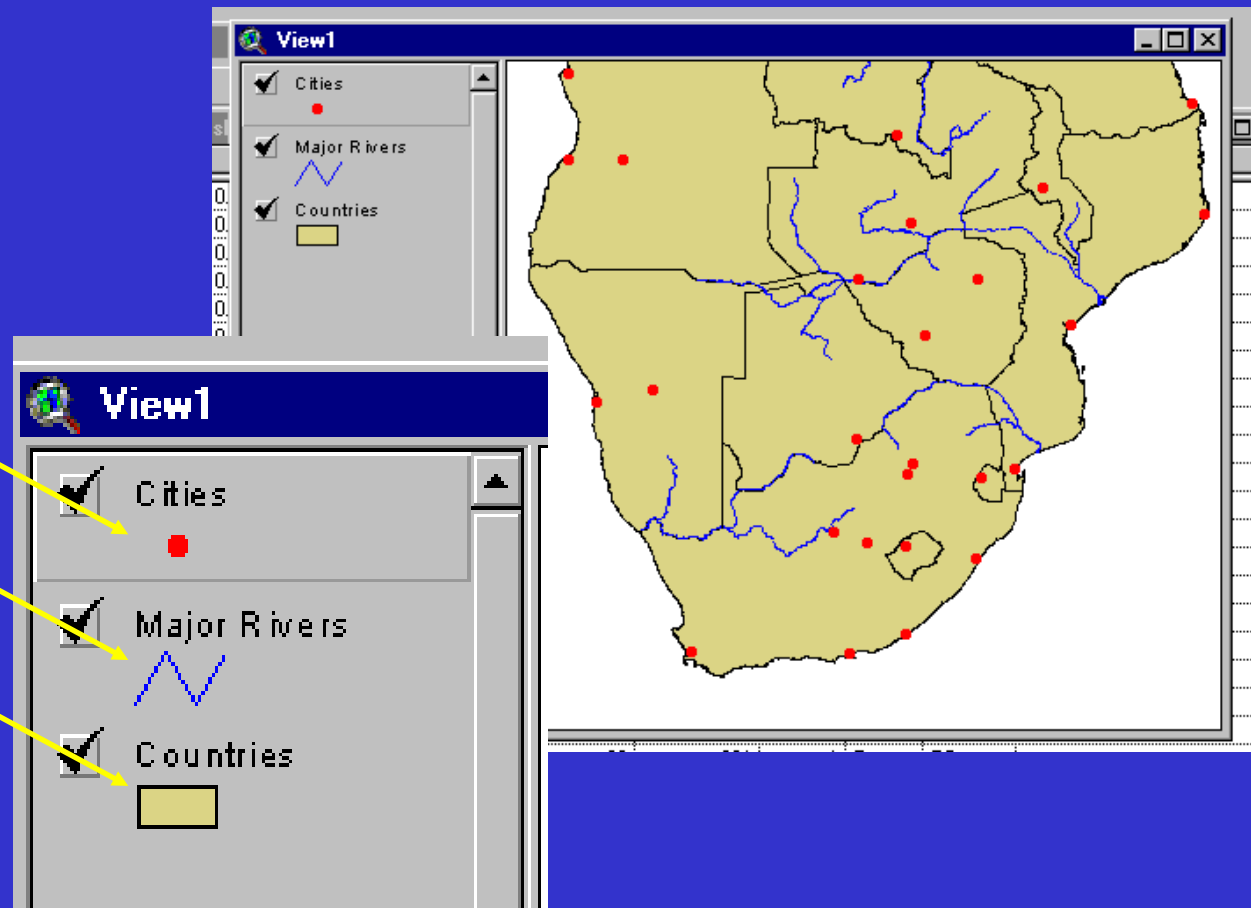
Feature Types and Symbology:

Feature Types

Point Marker

Line Style

Polygon Fill



FEWS



ArcView Introduction

Symbology:

....the way in which feature types are represented on the map is referred to as the theme's symbology

- **Point** Symbols often look like the feature they identify (school=schoolhouse, airport=airplane, water source=well)
- **Line** Symbols can be thick or thin, solid or dashed, and be represented using different colors
- **Polygon** Symbols use a variety of colors and/or patterns to identify the polygon shapes (blue=ocean, green= forest)

The methods for changing symbology are discussed in the section titled “Displaying Themes”

Spatial Data Sources for Vector Themes:

Primary

- ArcView Shapefiles
- Arc/Info Coverages
- BNA's via conversion to Shapefiles

Other

- Data Layers in Arc/Info Librarian or ArcStorm
- Computer Aided Design(CAD) Drawings (extension)
- ESRI's SDE (Spatial Database Engine)

ArcView Shapefiles:

....a shapefile is a simple file format for storing the geometric location and attribute information of geographic features

The file format includes a number of information files which must reside in the same workspace to make the shapefile usable.

.shp - required

.shx - required

.dbf - required

.sbn or .sbx – optional*

.fbn or .fbx – optional*

.ain or .aih – optional*

.prj – optional*

.xml – optional*

.shp – file that stores feature geometry

.shx – stores index of feature geometry

.dbf – dBase file that stores attribute information of features

*View “shapefiles described” under AV Help for more details on optional information files



Shapefile Advantages :

- Shapefile themes draw more quickly
- Shapefile themes can be edited
- Ability to create your own data using the shapefile format
- Other spatial data formats can be converted to shapefiles

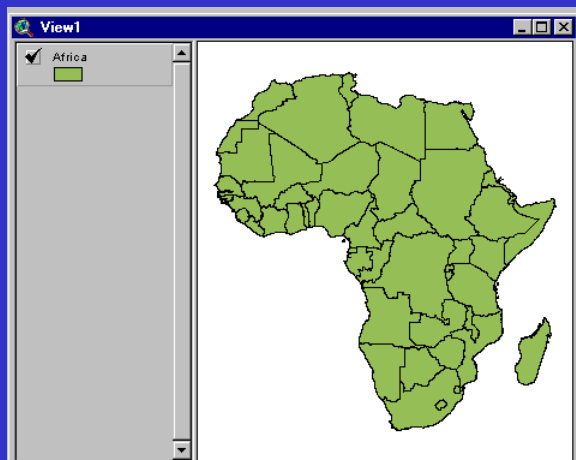
Arc/Info Coverages

Atlas Graphics Files (AGF)

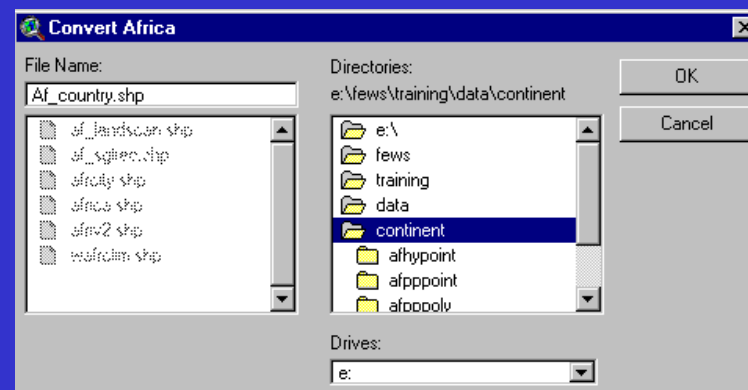
Boundary ASCII Files (BNA)

Converting Themes to Shapefiles :

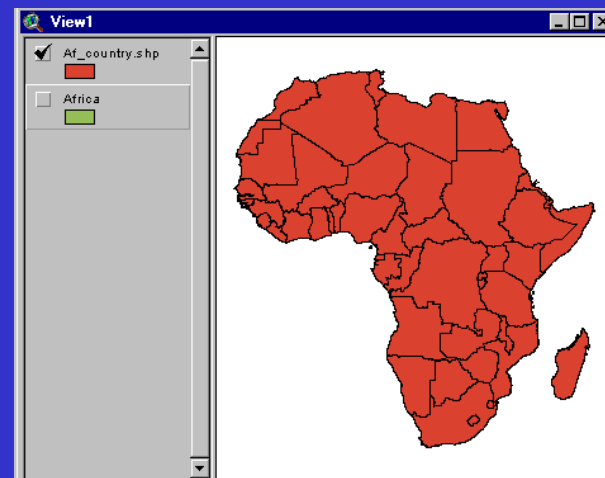
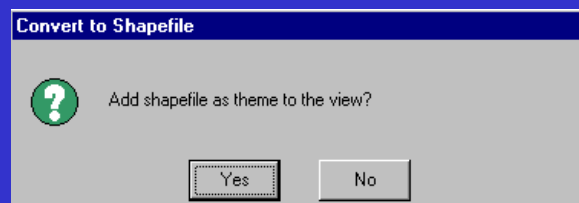
- Convert active theme to shapefile



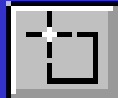
- Name the new shapefile



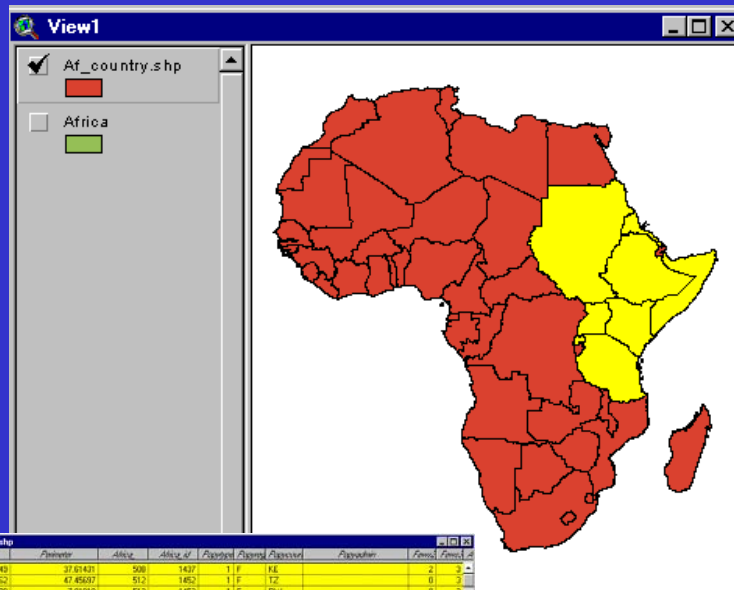
- Add the new shapefile as a theme



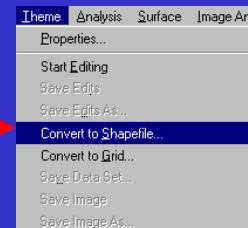
Converting Selected Features to a Shapefile :



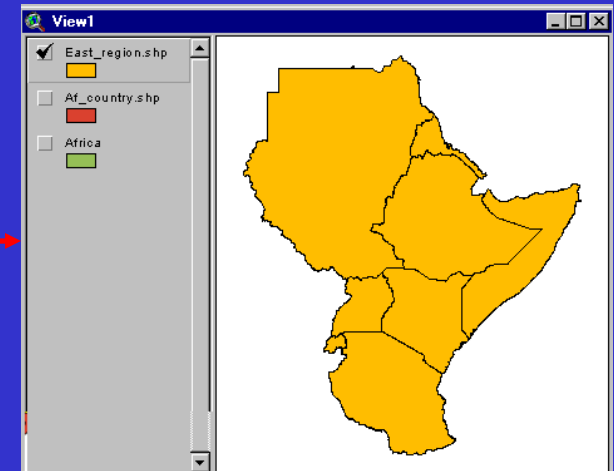
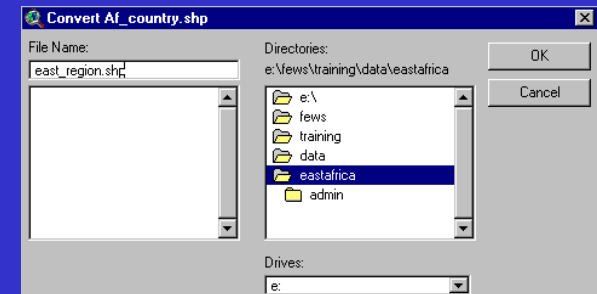
Use the select tool to choose features of an existing theme



d. Attributes of AI_country shape										
Shape	Area	Perimeter	Africa	Africa af	Population	Region	Population	Region	Form	Form
Polygon	47,30843	27,61431	500	1437	11 F	FE	2	2	2	2
Polygon	26,70262	47,45607	512	1452	11 F	TZ	0	0	0	0
Polygon	2,04300	7,81919	513	1453	11 F	RW	0	0	0	0
Polygon	15,61205	22,58022	646	1438	11 F	US	0	0	0	0
Polygon	210,12560	63,21579	651	1385	11 F	SD	7	2	2	2
Polygon	9,94402	26,30040	657	1365	11 F	ER	7	2	2	2
Polygon	62,85685	48,83131	660	1290	11 F	ET	7	2	2	2
Polygon	91,87512	52,12651	662	1403	11 F	SD	0	0	0	0
Polygon	0,00002	0,01540	2	80	11 F	AG	0	4	4	4
Polygon	0,00011	0,04434	3	89	11 F	AG	0	4	4	4
Polygon	0,00005	0,14210	4	104	11 F	TS	0	0	0	0
Polygon	0,00036	0,08117	5	112	11 F	TS	0	0	0	0
Polygon	0,00002	0,01905	6	113	11 F	TS	0	0	0	0
Polygon	0,00026	0,06205	7	119	11 F	TS	0	0	0	0
Polygon	0,00001	0,00001	8	120	11 F	TS	0	0	0	0



Choose convert to shapefile

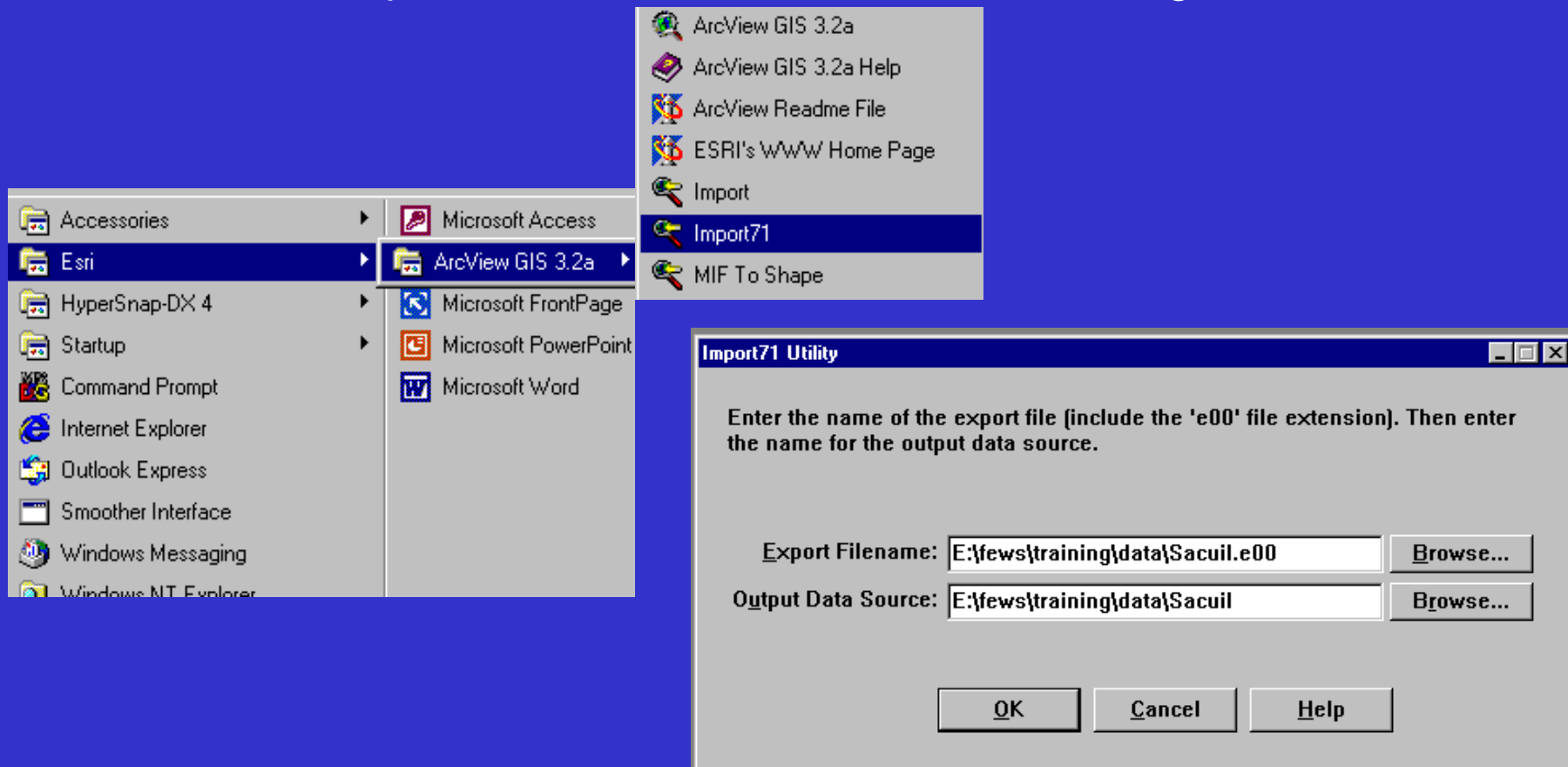


Display new shapefile



Arc Info Export (.e00) Files:

Arc View provides a stand-alone utility called Import71 which can be used to import files in the Arc Info .e00 interchange format.



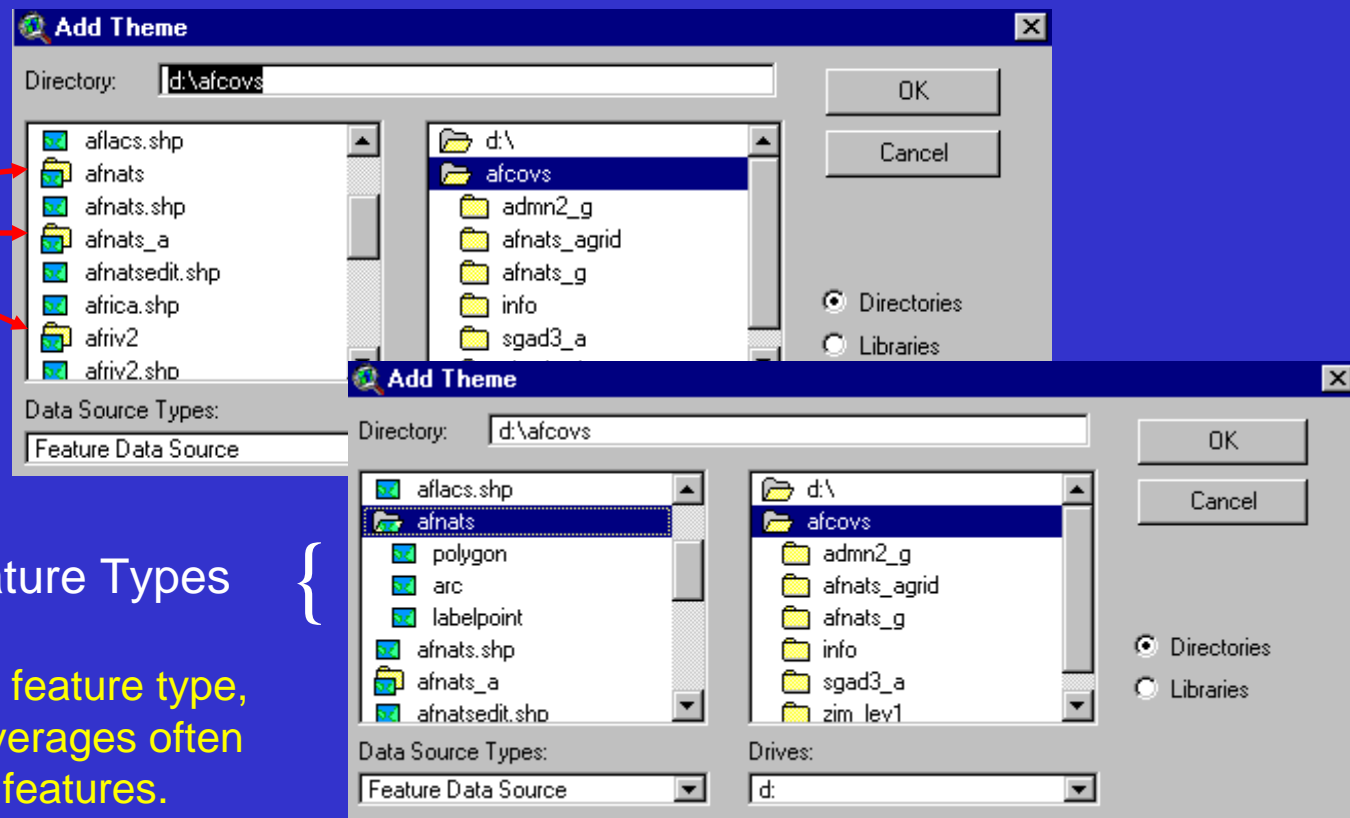
Data Sources with Multiple Feature Types:

- Folders store multiple feature types
- Clicking a folder icon displays all of its feature types

File Folder
icons indicate
more than one
feature type

Feature Types {

Shapefiles contain 1 feature type,
whereas ArcInfo coverages often
contain multiple features.



Import71 Scripts:

We have provided two scripts that automate the Import71 process. They allow the user to import either a single Arc Info Interchange (.e00) file or do batch importing of numerous .e00 files.

Scripts

Import71.ave - imports a single .e00 file

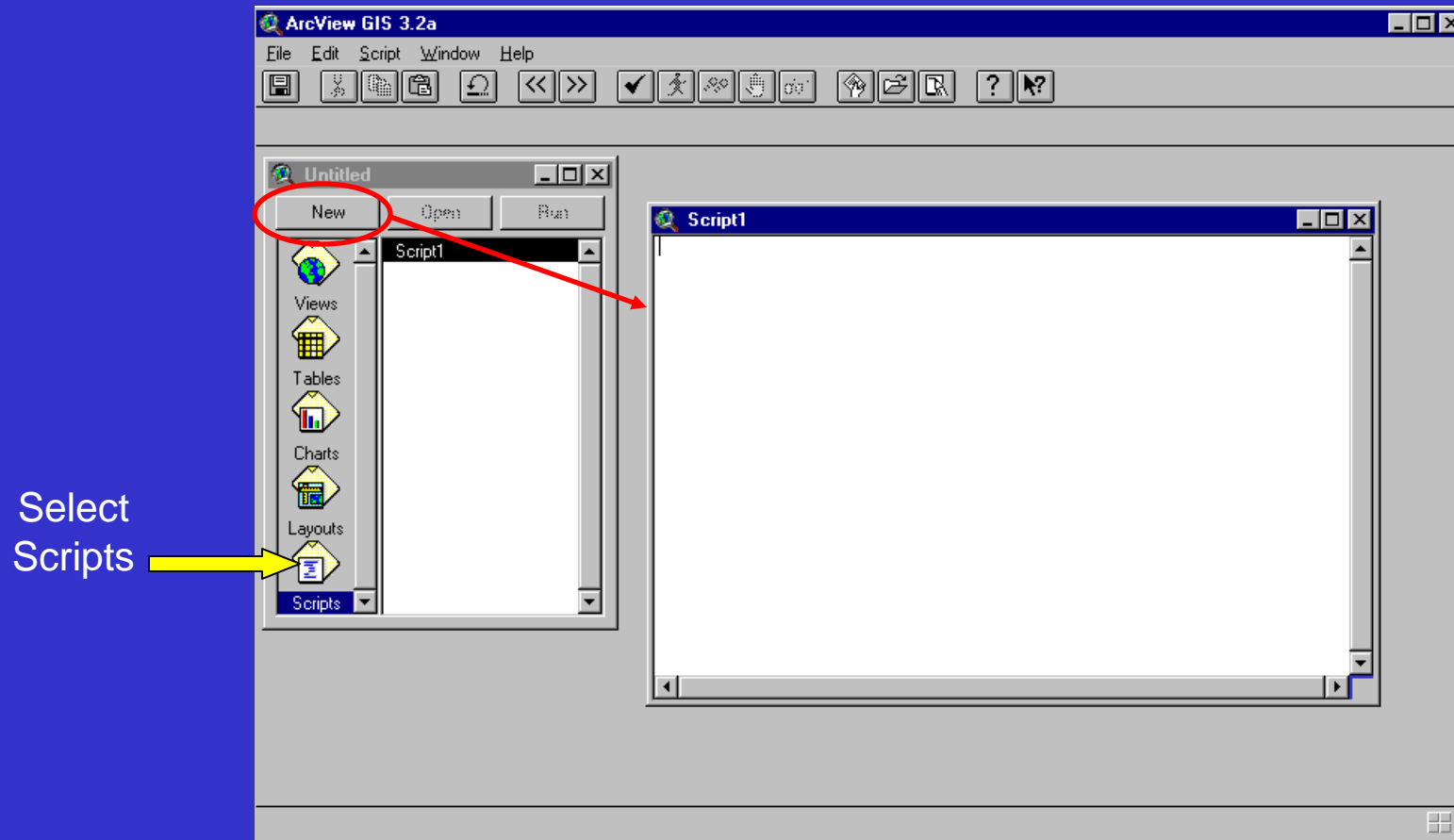
Import711.ave - allows batch conversion of .e00 files

Both scripts require that the Import71 utility exists in the
\\..\\arcview\\bin32 directory

System Requirement : Windows 95,98, or NT only

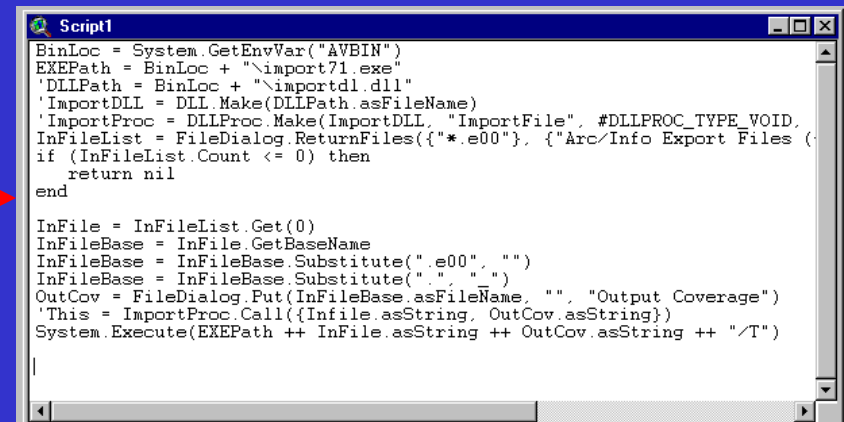
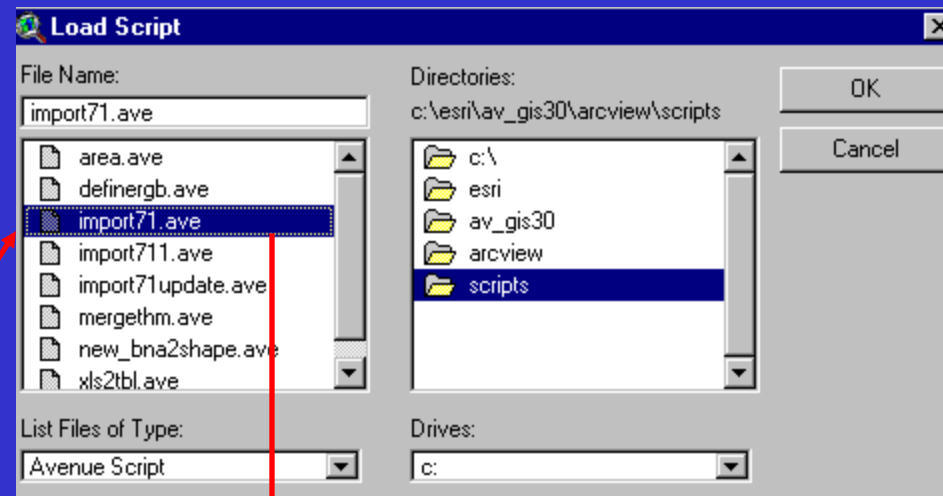
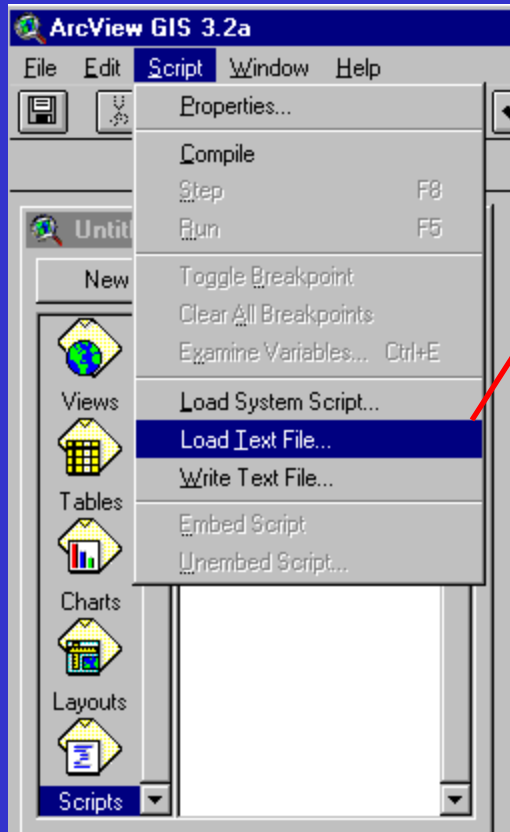
Using ArcView Scripts:

Step 1: Open a Script Window



Using ArcView Scripts:

Step 2: Load Script from Text File



Using ArcView Scripts:

Step 3: Compile and Run Script



Compiles Script

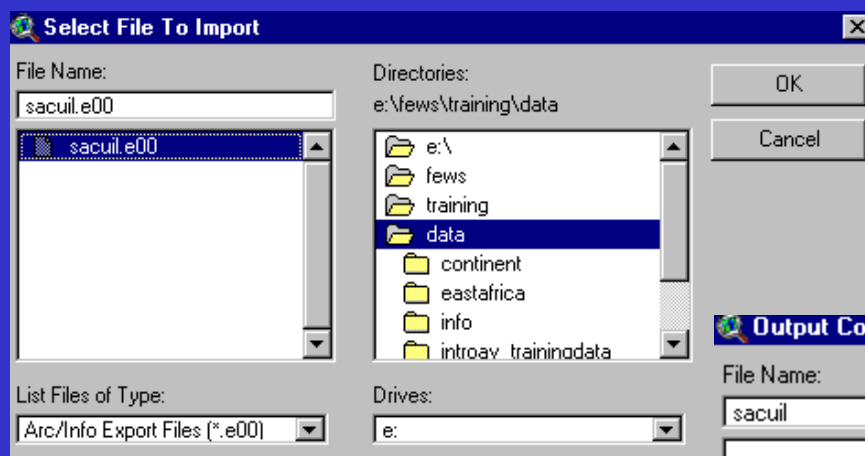


Runs Script

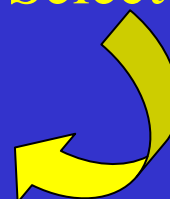
Using ArcView Scripts:

Step 4: Follow Script Prompts

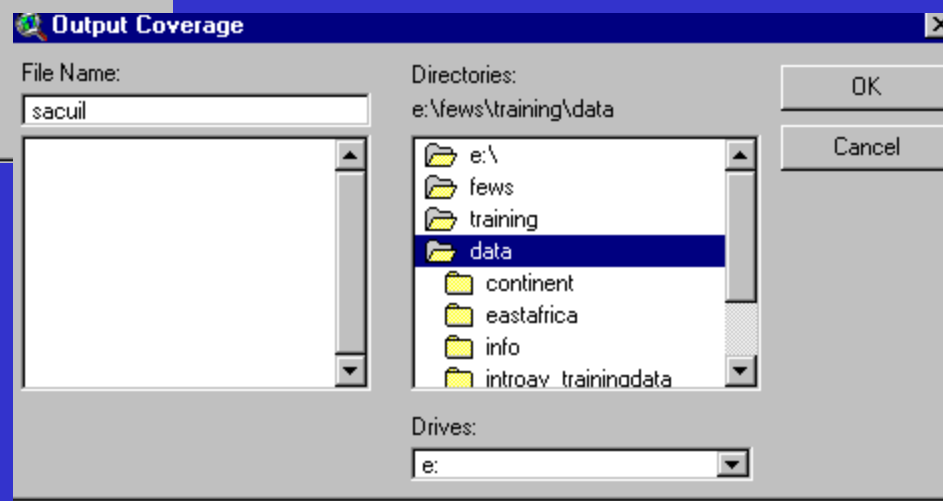
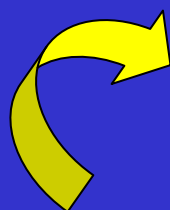
...in the case of Import71.ave



Select Input .e00 File

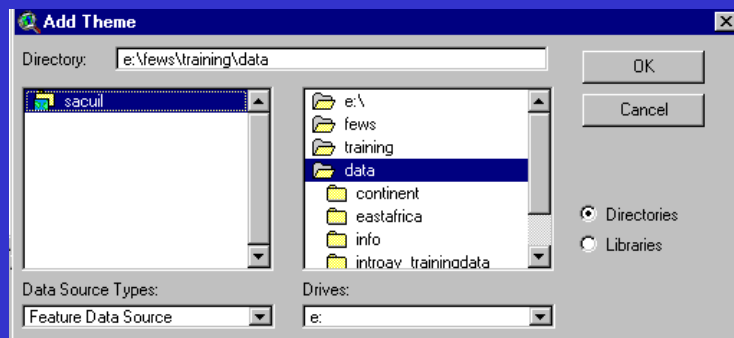


Select Output Coverage



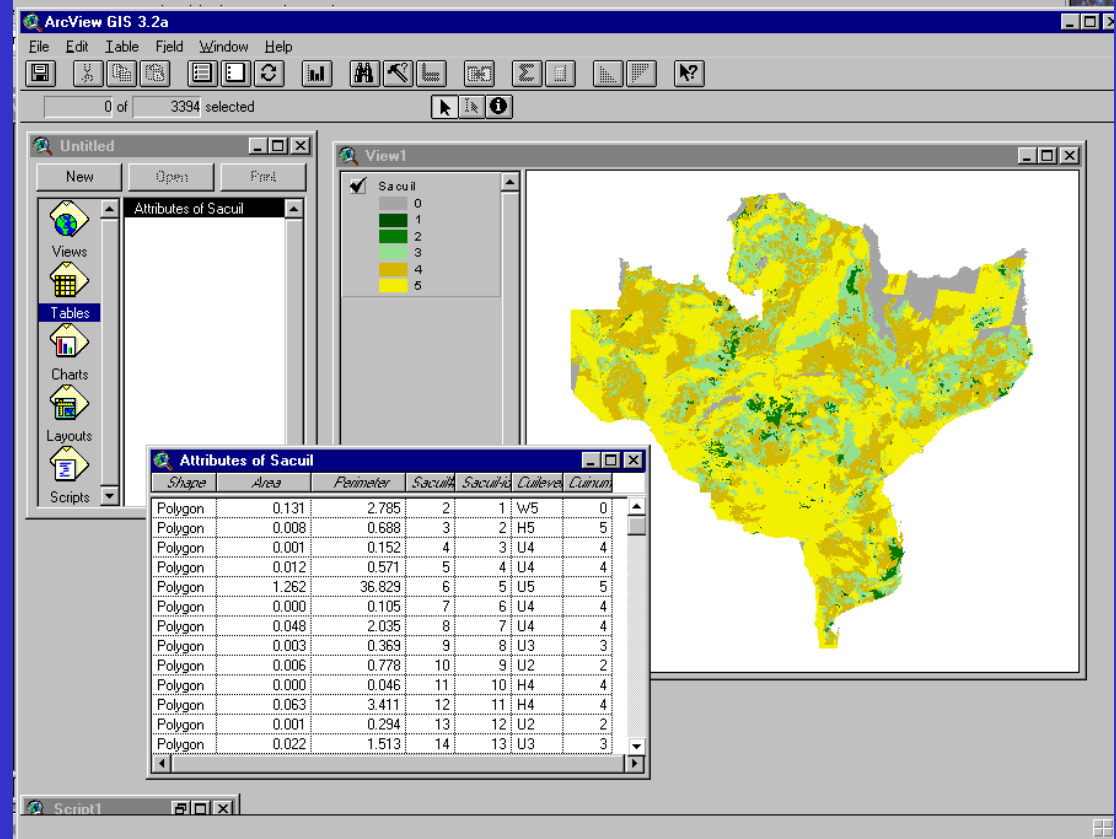
Using ArcView Scripts:

Step 5: View Results



Southern Africa

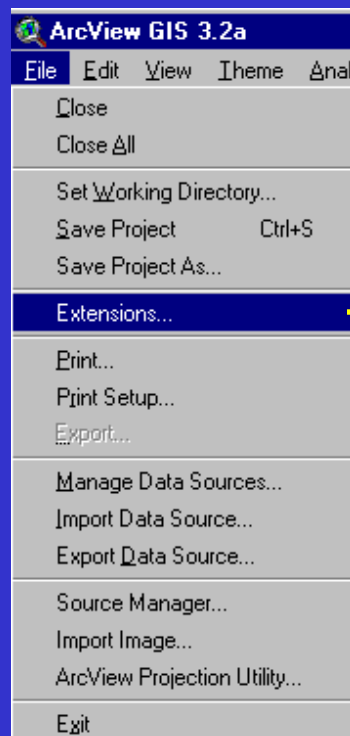
Crop Use Intensity Coverage



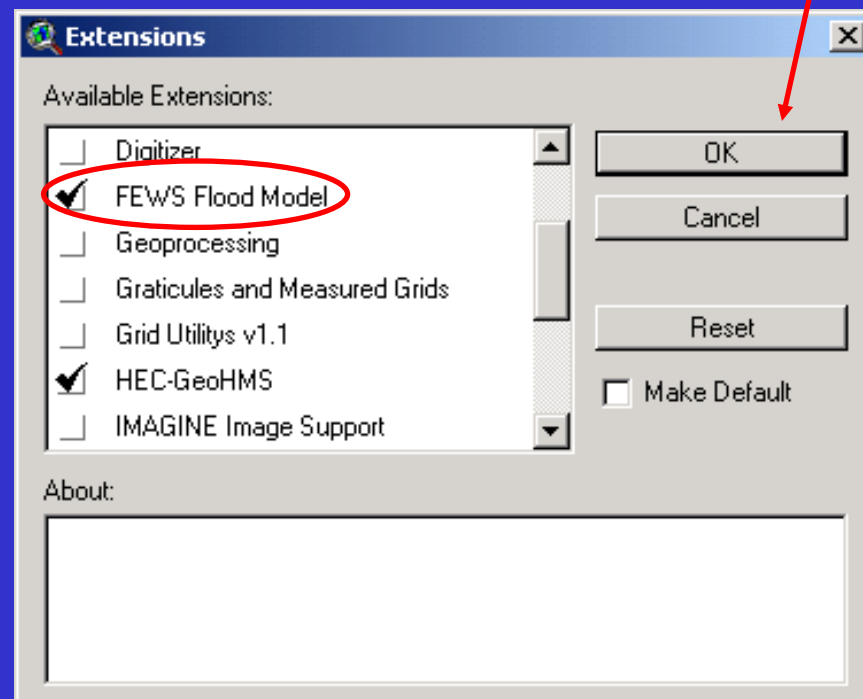
Using ArcView Extensions:

...extensions allow users to extend their ArcView environment by enabling sharing of customizations, documents, or other objects in a project independent manner.

1) Open the Extensions Dialog Box

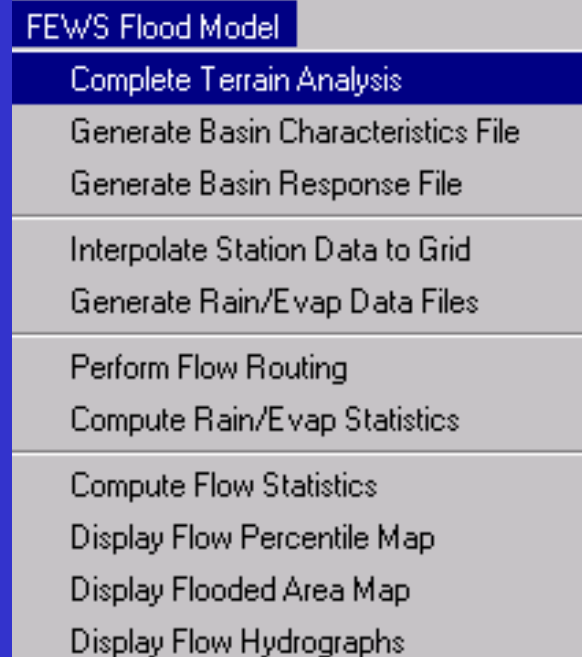
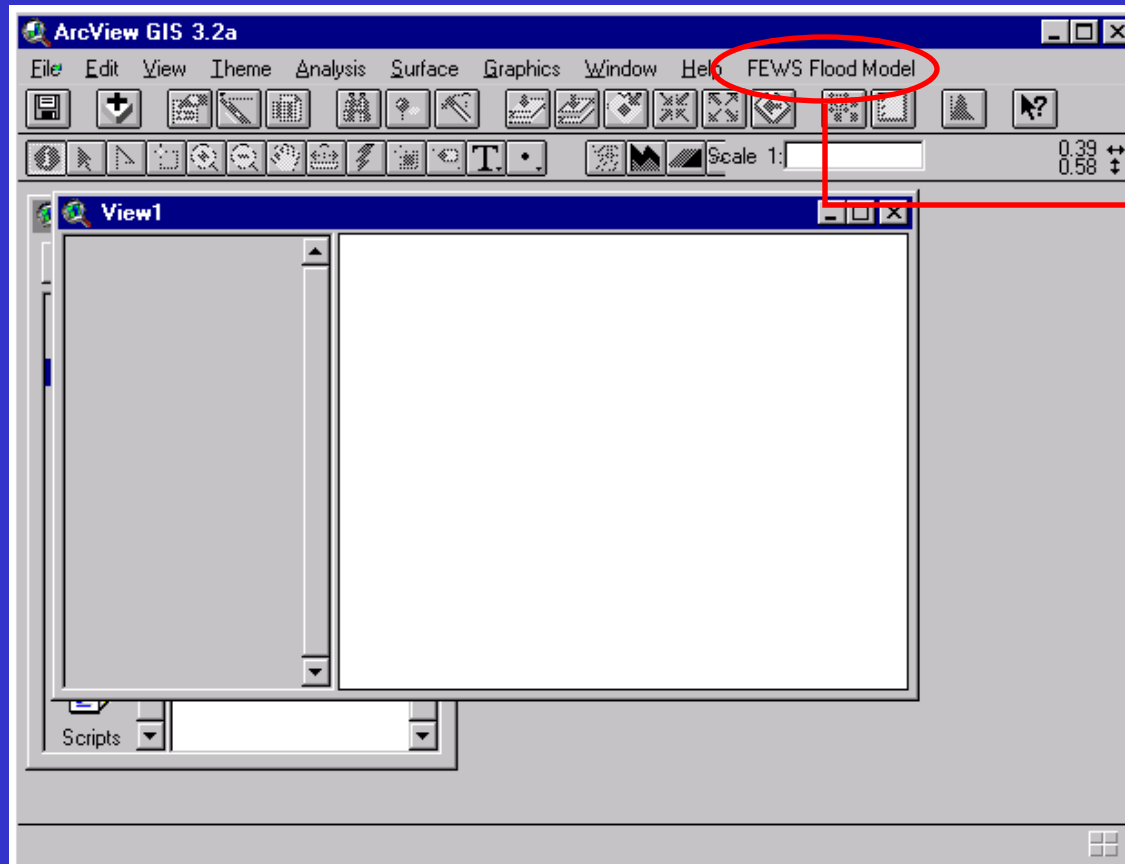


2) Select Extension



3) Click OK

When the extension loads, it adds new functionality to your current ArcView session.

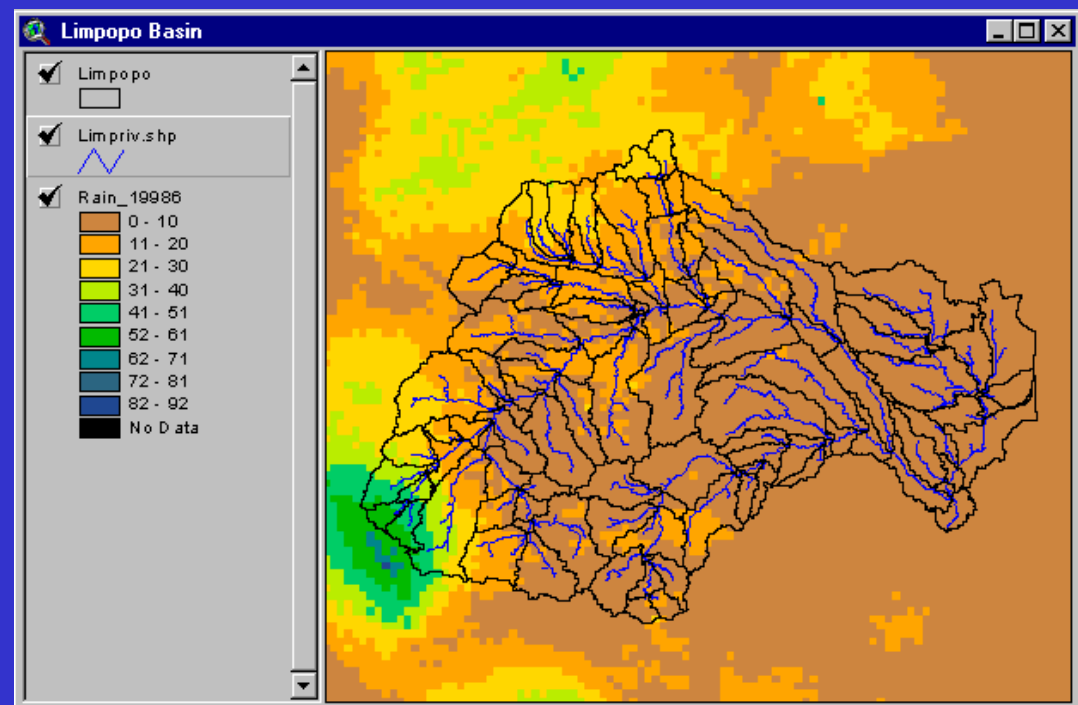


Spatial Analyst Extension:

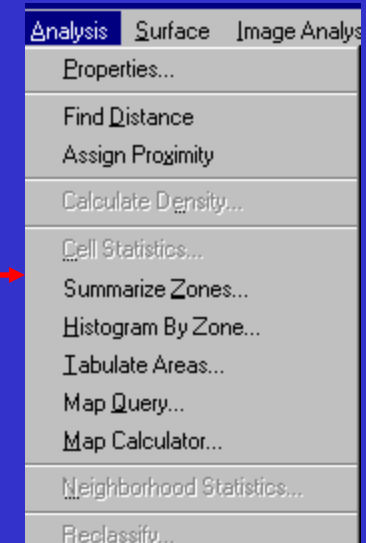
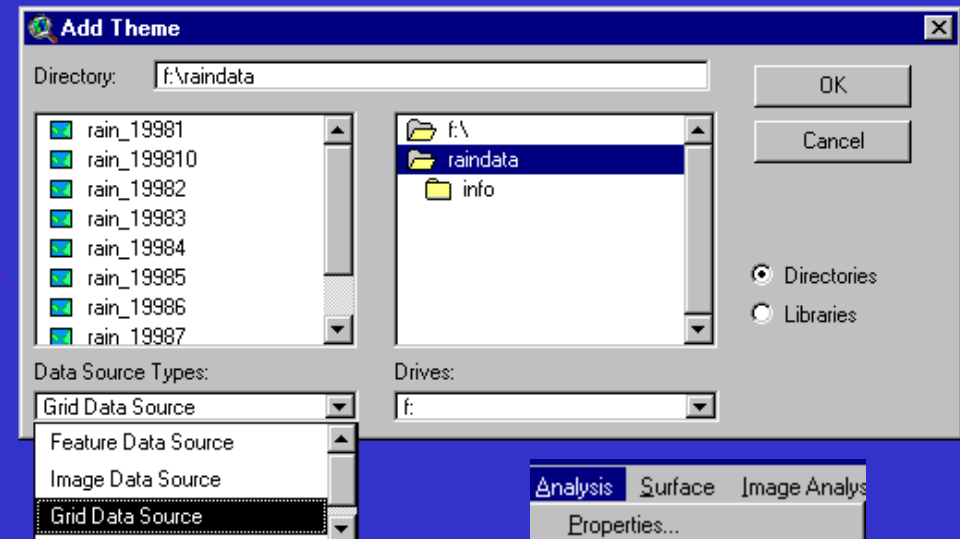
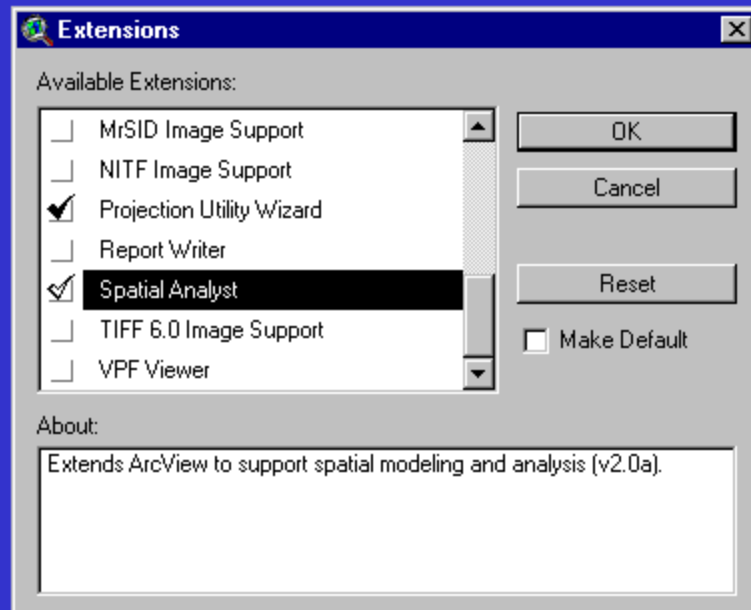
- Uses feature themes and grid themes for analysis
- Represents geographic phenomena with cell-based themes
- Creates, displays, queries, and analyzes cell-based data

Feature Themes {

Grid Theme {



Spatial Analyst Extension:



Loading the spatial analyst extension results in the addition of grid data sources in the add theme dialog box and enables a number of analysis tools.

More on ArcView Extensions:

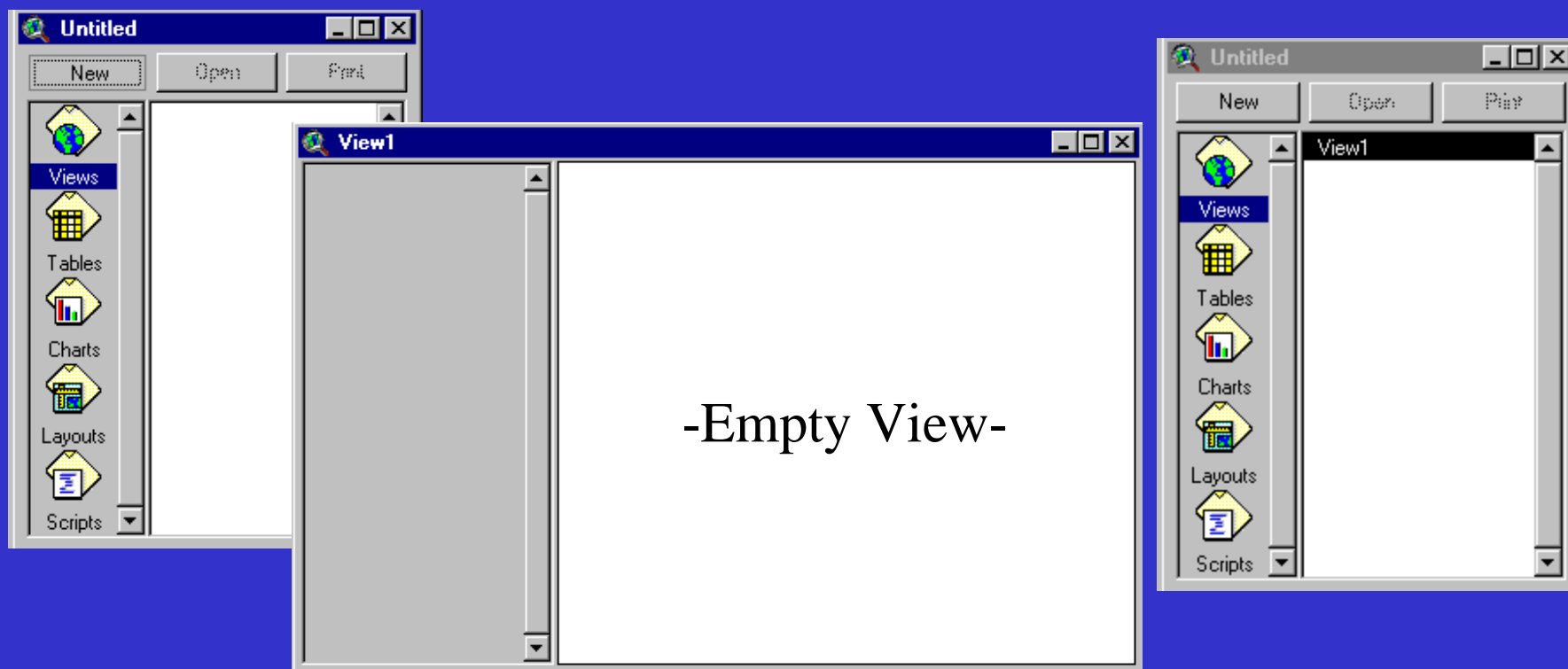
- ❑ A project can be made dependent upon extensions so that each time you load that project, ArcView first loads the associated extensions.
- ❑ You can define a default extension environment (with Make Default in the extensions dialog) so that ArcView loads the specified extensions automatically each time you start up the software.
- ❑ ESRI delivers many of its new products in extensions, but extensions can be created by anyone with knowledge of the Avenue programming language and are a great way for you to share your work with others.

Section 2a Procedures

- Examine Point, Line, & Polygon Features
- Use the Import71 Utility for Arc Info .e00 Files
- Examine Multiple Feature Types
- Open a Script Window
- Load, Compile, and Run an Import Script
- Add the Imported file to a View and Display
- Examine ArcView Extensions
- Load the FEWS Flood Extension
- Load Spatial Analyst Extension

Creating Views / Themes:

- Open a new or existing project
- Create a new view document
- The new view is listed in the project window



Adding Themes from XY Coordinates:

...dekadal rainfall totals for point locations in Kenya

1) Data as a text file including xy coordinates (event table)

kenya_dekainfall.txt - Notepad

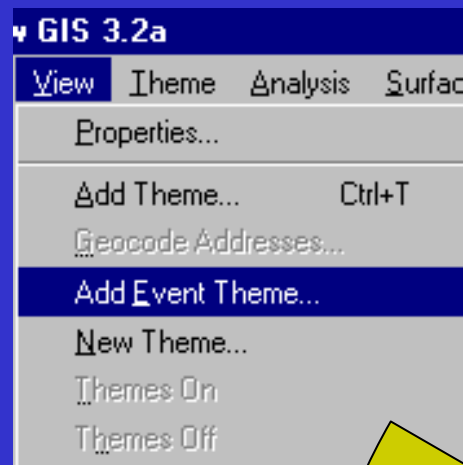
FEWS_ID	KMD_ID	station	LON	LAT	JAN1	JAN2	JAN3	FEB1	FEB2	FEB3	MAR1	M
7	1	KAKAMEGA	34.750	0.283	25.5	17.1	29.5	31.6	34.7	23.6	33	5
10	2	KISII	34.783	-0.683	43.9	17.7	49.8	42.6	45.9	25	41.4	6
11	3	KISUMU	34.583	-0.100	37.7	17.1	31.4	39.7	19.7	21.5	32.2	4
14	4	LODWAR	35.617	3.117	3.9	0.2	6.2	1.9	4.3	2.5	4.3	1
12	5	KITALE	35.983	1.000	6.9	1.5	9.6	8.4	24.5	17.4	13	2
2	6	ELDORET	35.283	0.533	9.3	6	1.2	9.7	16.9	14.6	10.2	2
25	7	NAKURU	36.067	-0.267	6.8	7.3	13.3	10.3	6.5	12.5	9.3	1
9	8	KERICHO	35.067	-0.067	53.5	26.3	29.6	36.8	41.4	34.5	53.1	6
26	9	NAROK	35.833	-1.133	44.2	16.5	22.3	24	21.6	18.3	24.9	2
29	10	NYERI	36.967	-0.433	10.4	9.9	14.5	14.7	13.9	7.3	20.2	1
30	11	THIKA	37.067	-0.983	14.1	8.9	8.1	11.4	17.9	5.9	22.3	3
1	12	DAGORETI	36.750	-1.300	16.1	11.5	1.9	19.2	21.5	3	14.9	3
18	13	MARSABIT	37.983	2.317	8.7	6.8	4.9	14.2	4.4	13.3	11.1	9
19	14	MERU	37.650	0.083	16.5	9.5	11.6	11.1	13.1	13.9	4.3	2
3	15	EMBU	37.450	-0.500	10	2.4	2.6	6.9	3	0.8	9.3	3
8	16	KATUMANI	37.233	-1.583	30.1	12	6.7					
15	17	MAKINDU	37.833	-2.283	19	10.6	5.9					
21	18	MOYALE	39.050	3.533	7.3	2.6	4.3					

2) Add file to the project as a table

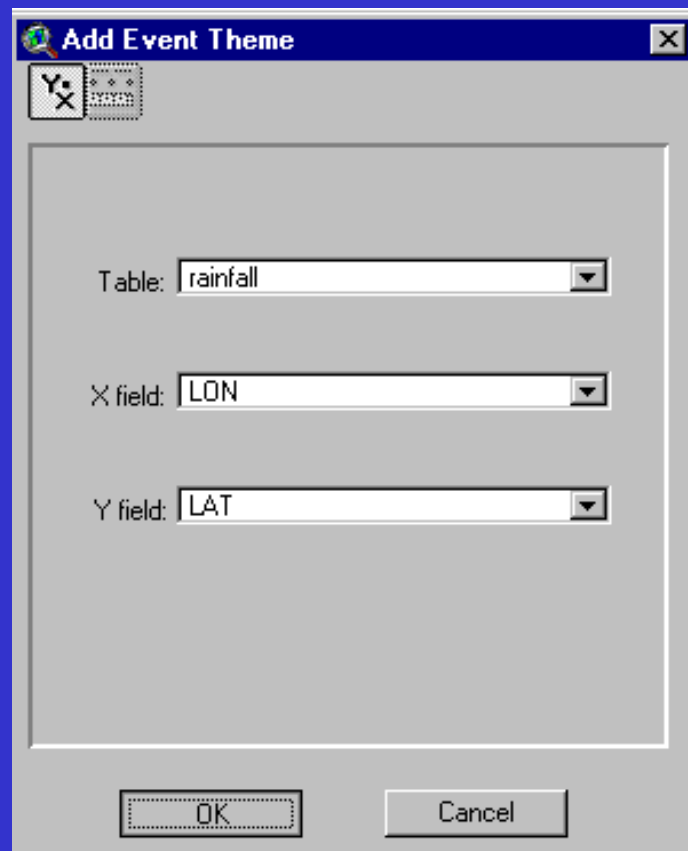
rainfall

FEWS_ID	KMD_ID	station	LON	LAT	JAN1	JAN2	JAN3	FEB1	FEB2	FEB3	MAR1	M
7	1	KAKAMEGA	34.750	0.283	25.5	17.1	29.5	31.6	34.7	23.6	33	5
10	2	KISII	34.783	-0.683	43.9	17.7	49.8	42.6	45.9	25	41.4	6
11	3	KISUMU	34.583	-0.100	37.7	17.1	31.4	39.7	19.7	21.5	32.2	4
14	4	LODWAR	35.617	3.117	3.9	0.2	6.2	1.9	4.3	2.5	4.3	1
12	5	KITALE	35.983	1.000	6.9	1.5	9.6	8.4	24.5	17.4	13	2
2	6	ELDORET	35.283	0.533	9.3	6	1.2	9.7	16.9	14.6	10.2	2
25	7	NAKURU	36.067	-0.267	6.8	7.3	13.3	10.3	6.5	12.5	9.3	1
9	8	KERICHO	35.067	-0.067	53.5	26.3	29.6	36.8	41.4	34.5	53.1	6
26	9	NAROK	35.833	-1.133	44.2	16.5	22.3	24	21.6	18.3	24.9	2
29	10	NYERI	36.967	-0.433	10.4	9.9	14.5	14.7	13.9	7.3	20.2	1
30	11	THIKA	37.067	-0.983	14.1	8.9	8.1	11.4	17.9	5.9	22.3	3
1	12	DAGORETI	36.750	-1.300	16.1	11.5	1.9	19.2	21.5	3	14.9	3
18	13	MARSABIT	37.983	2.317	8.7	6.8	4.9	14.2	4.4	13.3	11.1	9
19	14	MERU	37.650	0.083	16.5	9.5	11.6	11.1	13.1	13.9	4.3	2
3	15	EMBU	37.450	-0.500	10	2.4	2.6	6.9	3	0.8	9.3	3
8	16	KATUMANI	37.233	-1.583	30.1	12	6.7					
15	17	MAKINDU	37.833	-2.283	19	10.6	5.9					
21	18	MOYALE	39.050	3.533	7.3	2.6	4.3					

3) Select Add Event Theme from the View Menu



4) Create a point theme from the rainfall table using the longitude and latitude as the x and y fields respectively.

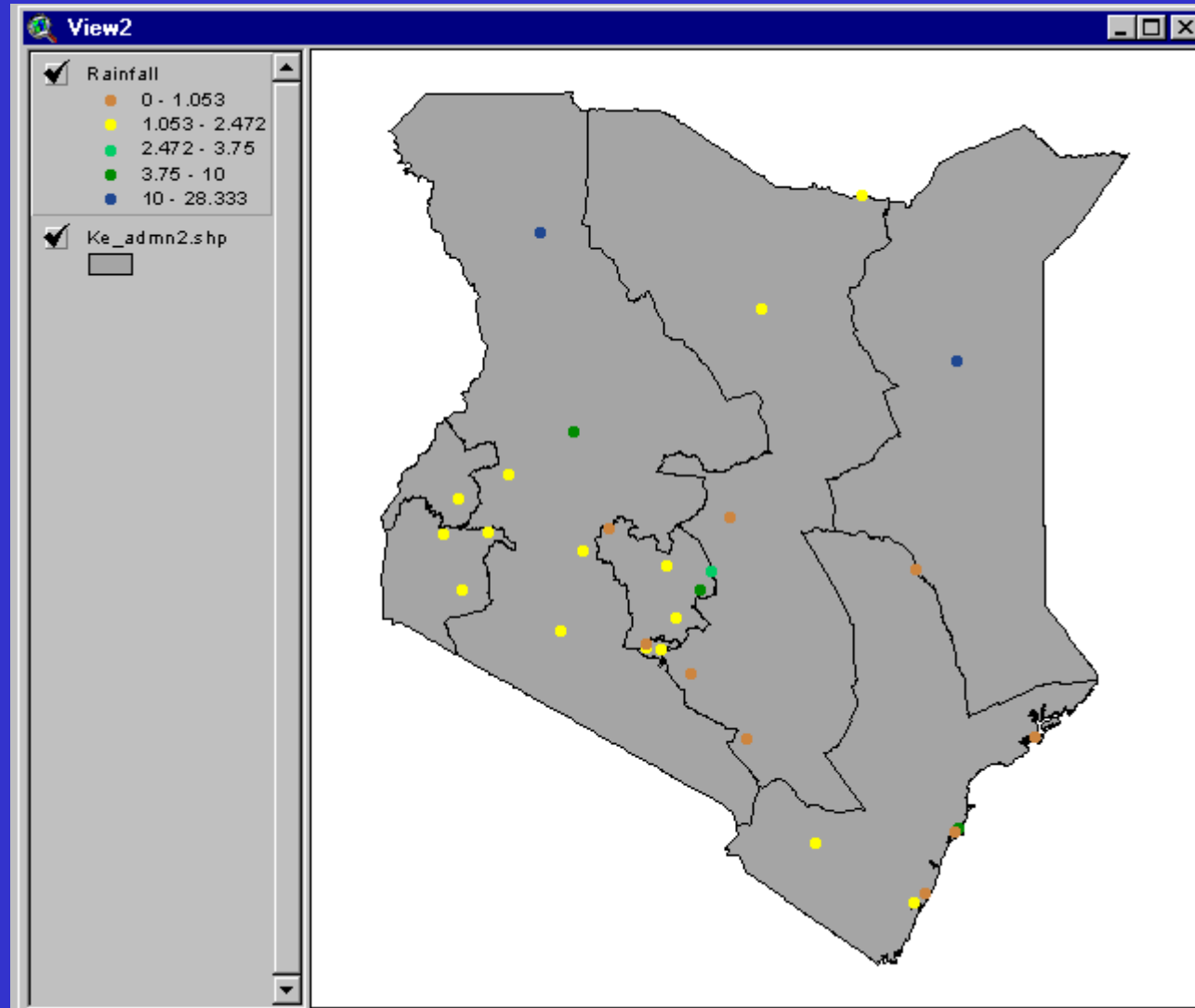


Adds the
rainfall point
theme to the
view.

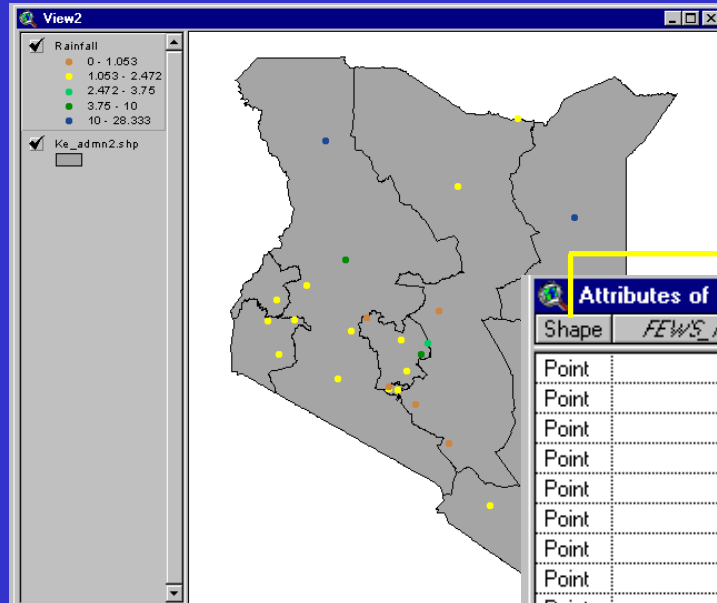
Turn the theme
on to view
points.

Add country
theme to view
point locations.

Use graduated
colors to
distinguish
rainfall
amounts.



View Event Theme Table:



The attribute table for the rainfall theme contains the original data as well as a new field called "shape".

Shape	FEWS_ID	KMD_ID	station	LONG	LAT	JAN1	JAN2	JAN3
Point	7	1	KAKAMEGA	34.750	0.283	25.5	17.1	29.5
Point	10	2	KISII	34.783	-0.683	43.9	17.7	49.8
Point	11	3	KISUMU	34.583	-0.100	37.7	17.1	31.4
Point	14	4	LODWAR	35.617	3.117	3.9	0.2	6.2
Point	12	5	KITALE	35.983	1.000	6.9	1.5	9.6
Point	2	6	ELDORET	35.283	0.533	9.3	6.0	1.2
Point	25	7	NAKURU	36.067	-0.267	6.8	7.3	13.3
Point	9	8	KERICHO	35.067	-0.067	53.5	26.3	29.6
Point	26	9	NAROK	35.833	-1.133	44.2	16.5	22.3
Point	29	10	NYERI	36.967	-0.433	10.4	9.9	14.5
Point	30	11	THIKA	37.067	-0.983	14.1	8.9	8.1
Point	1	12	DAGORETI	36.750	-1.300	16.1	11.5	1.9
Point	18	13	MARSABIT	37.983	2.317	8.7	6.8	4.9
Point	19	14	MERU	37.650	0.083	16.5	9.5	11.6
Point	3	15	EMBU	37.450	-0.500	10.0	2.4	2.6
Point	8	16	KATUMANI	37.233	-1.583	30.1	12.0	6.7
Point	15	17	MAKINDU	37.833	-2.283	19.0	10.6	5.9
Point	21	18	MOYALE	39.050	3.533	7.3	2.6	4.3
Point	17	19	MANDERA	41.867	3.933	0.1	0.0	0.3
Point	32	20	WAJIR	40.067	1.750	3.0	0.6	0.8

Theme Table Structure:

...Include descriptive information about theme features

- **Shape Field** – describes the feature type (point,line,poly) of the theme
- **Geometry Field** – contained in themes created from ArcInfo coverages
- **Identification Field** – coverage_# and coverage_id, also contained in themes created from ArcInfo coverages

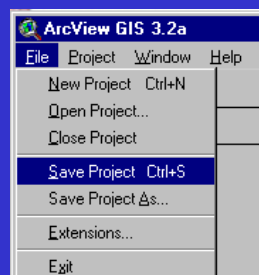
Shape Field	Geometry Fields	Identification Fields	Other Data Fields
----------------	--------------------	--------------------------	-------------------

Attributes of Afrcity.shp							
Shape	Area	Perimeter	Cities_#	Cities_id	Name	Country	Population
Point	0.000	0.000	137	181	Tunis	Tunisia	12250
Point	0.000	0.000	162	210	Fes	Morocco	5350
Point	0.000	0.000	181	241	Cairo	Egypt	93000
Point	0.000	0.000	220	296	Bur Sudan	Sudan	2067
Point	0.000	0.000	234	322	Niamey	Niger	3982
Point	0.000	0.000	237	326	Bamako	Mali	6461

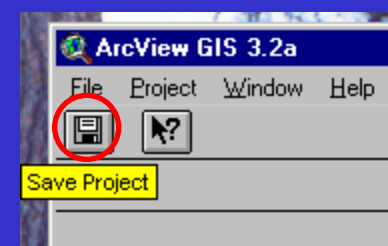
Saving A Project:

- Saves work you've done on any aspect of the project
- All documents (views, tables, charts, etc.) are saved
- Updates are made to the project (.apr) file

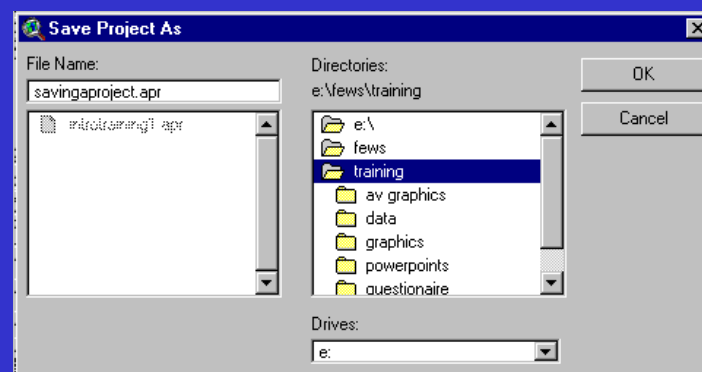
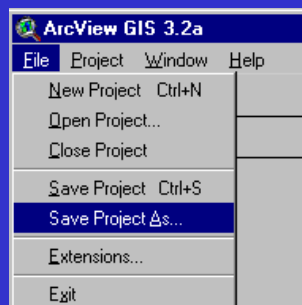
If project exists and you've made changes....



or



If saving a new project or saving an existing project with a different name....



Considerations when saving projects:

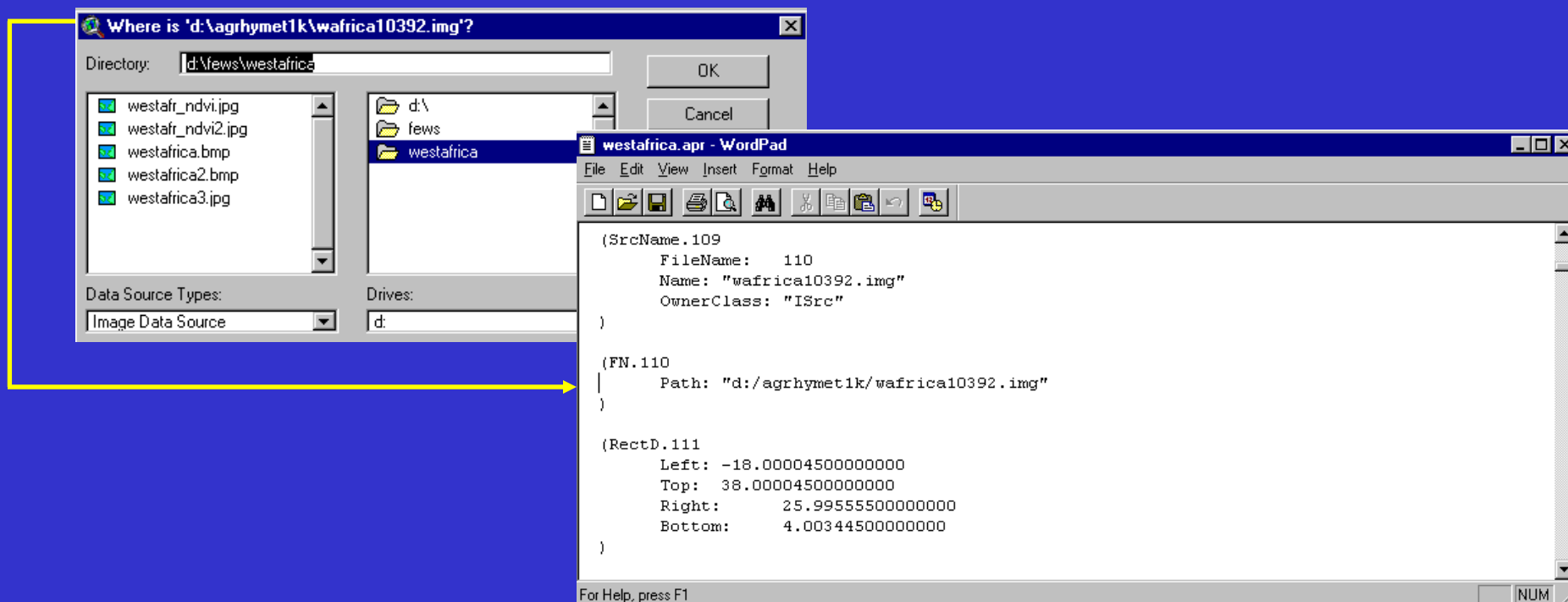
It is important to understand what information the .apr file saves.

*“The .apr file is a special text file called an Object Database (ODB) file. ODB files do not store data for your themes and views, but rather store the definition of these objects. In other words, these files contain information about what windows are open in the project, where they are located, and the **paths** to the data being used.”*

Data paths become very important when considering how to manage and share projects with others.

Project Repair:

- Data is moved or deleted
- On opening a project, ArcView asks for data location
- Inconvenient and time consuming



Creating an Indestructable Project:

Two Methods

- Edit .apr File
- Use Relative Paths



Editing the .apr File:

- Use any text editor
- Update pathnames
- Save as text file (no formatting)
- **DO NOT** edit other object definitions

Replace

Path: "c:/projects/moz/rivers.shp"

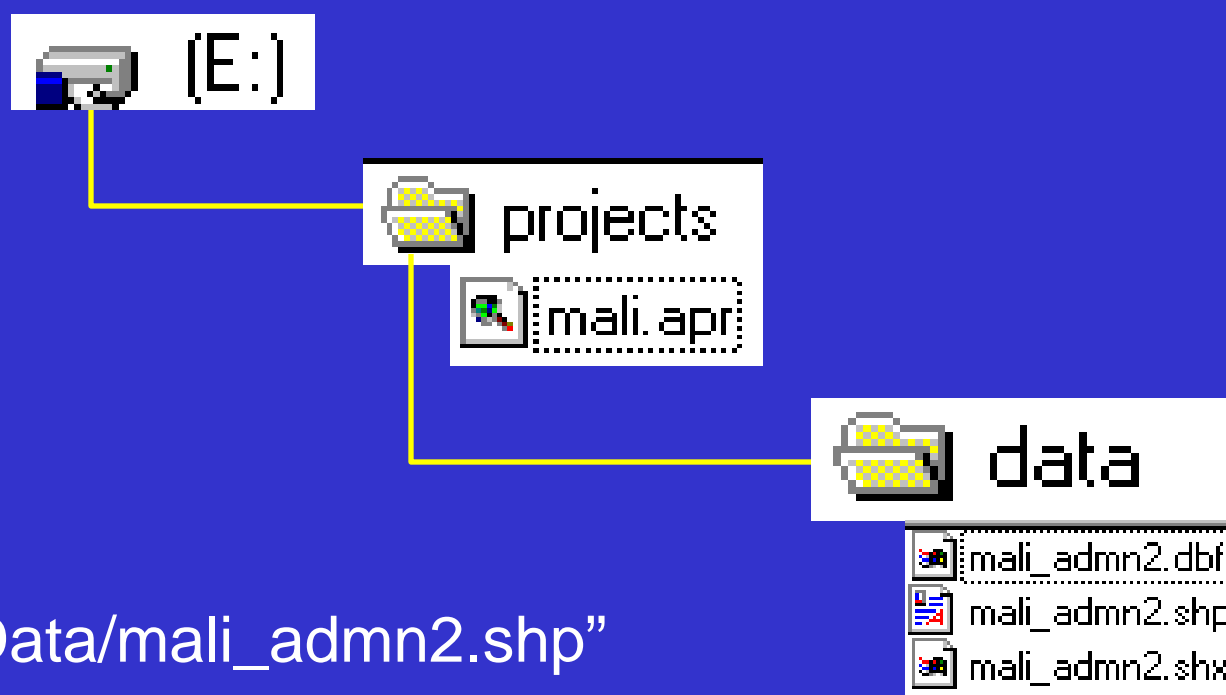
With

Path: "d:/mozambique/rivers.shp"

Using Relative Pathnames:

...Relative pathnames show where the data is in relation to the project (.apr) file

The simplest way to use relative pathnames is to put the data for themes and tables in a directory below the directory containing the project file



Path: "Data/mali_admn2.shp"

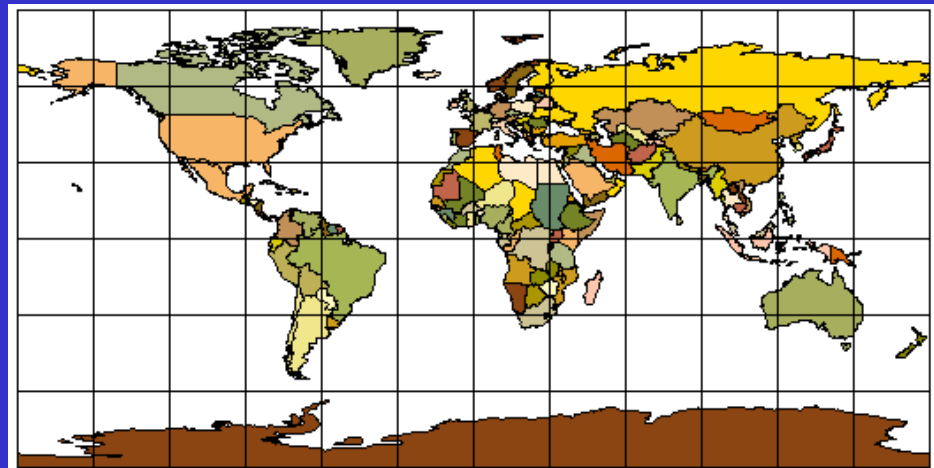
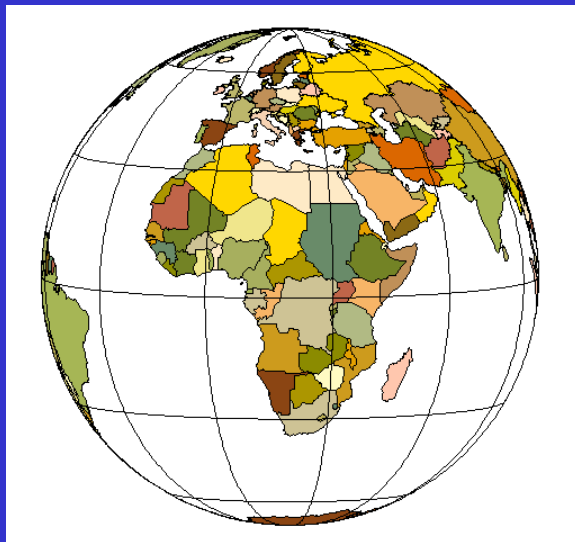
Using Relative Pathnames cont'd:

- ❑ Now your project is portable. When you move the project to another directory or computer, it will still open because the location of the project file does not matter.
- ❑ All that is necessary is to keep the directory structure consistent (i.e., the data directory in the same location relative to the project file).
- ❑ Another way to make projects portable is to put project files in the same directory as the data files. Then, the path to the dataset would be just the name of the shapefile, grid, image, or table.

For Example - Path: "mali_admn2.shp"

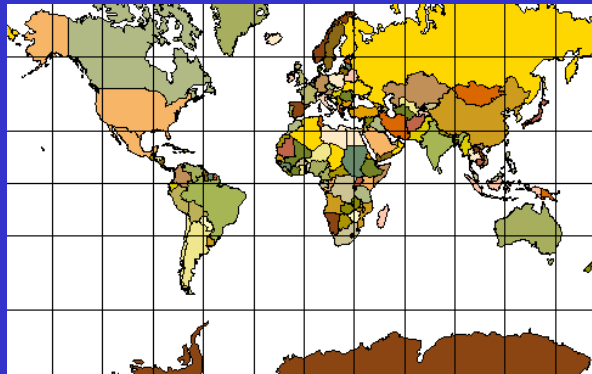
Referencing Views to Real World Coordinates:

- Locations on the globe are measured in degrees of latitude and longitude
- Locations on a map are measured using x and y coordinates
- A map projection converts locations from spherical to planar coordinates

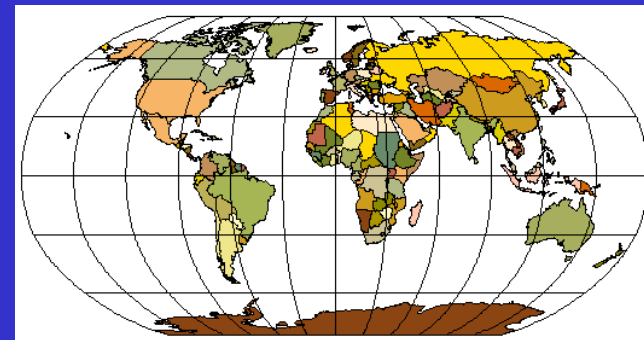


Understanding Distortion:

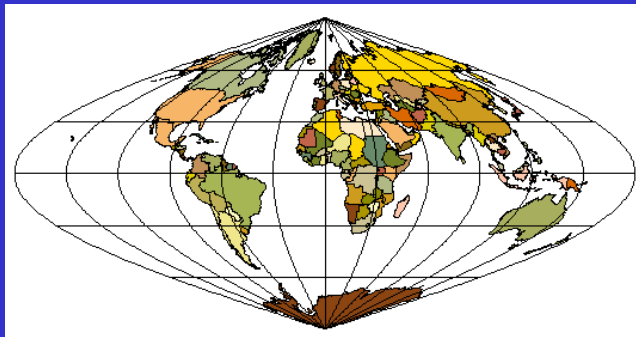
- Map Projections produce distortion in one or more spatial properties (shape, area, distance and direction)
- Specific projections eliminate or minimize distortion of certain properties



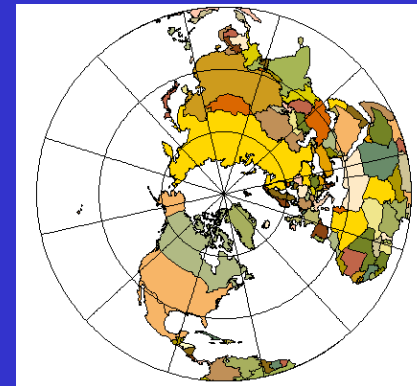
Mercator



Robinson



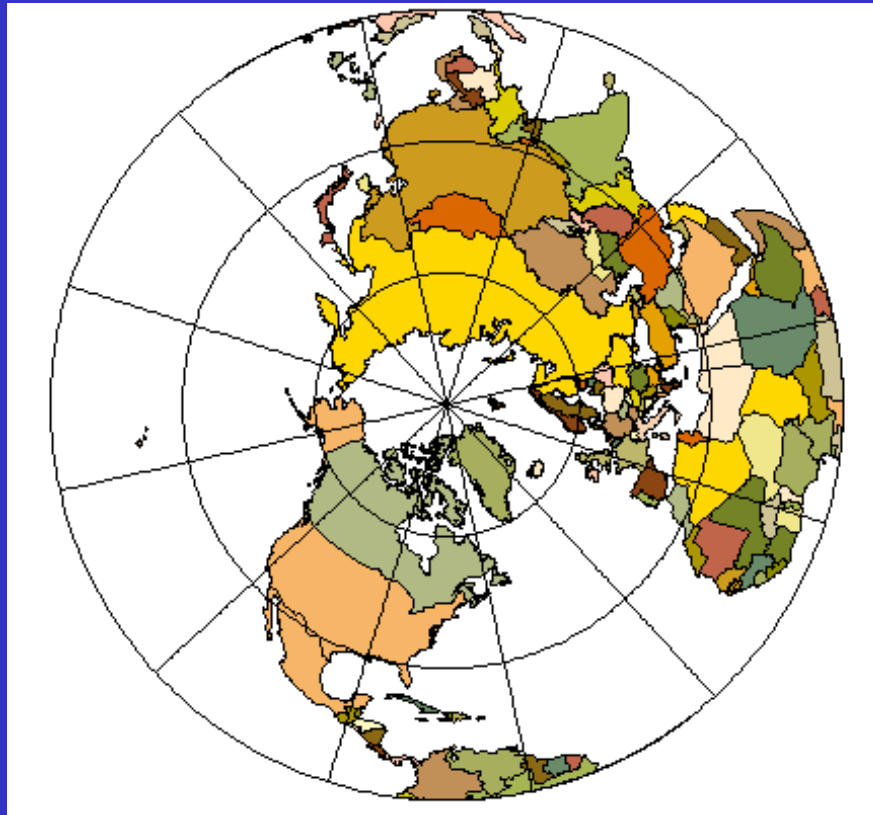
Sinusoidal



Azimuthal

FEWS Flood Model uses the Azimuthal Projection:

Azimuthal is an equidistant projection that preserves the property of distance. Here, you see a polar aspect centered on the North Pole.

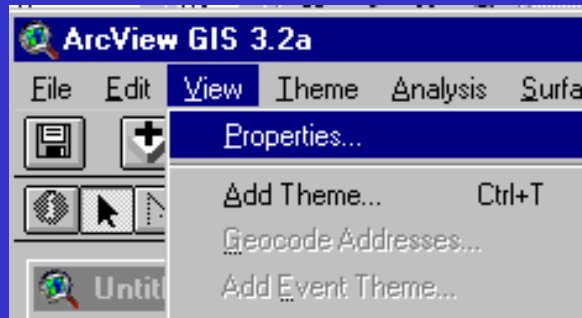


Setting the properties of the View:

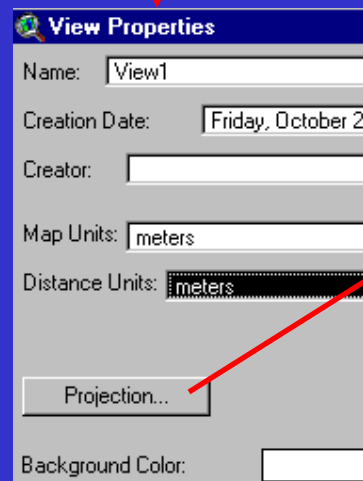
- Un-projected Data
 - Map units are automatically set to decimal degrees
 - or
 - Choose any supported map projection
 - Set distance units
- Projected Data
 - Set map units to data source units (e.g., meters, feet)
 - Cannot change map projection
 - Set distance units

Setting the map projection of the View:

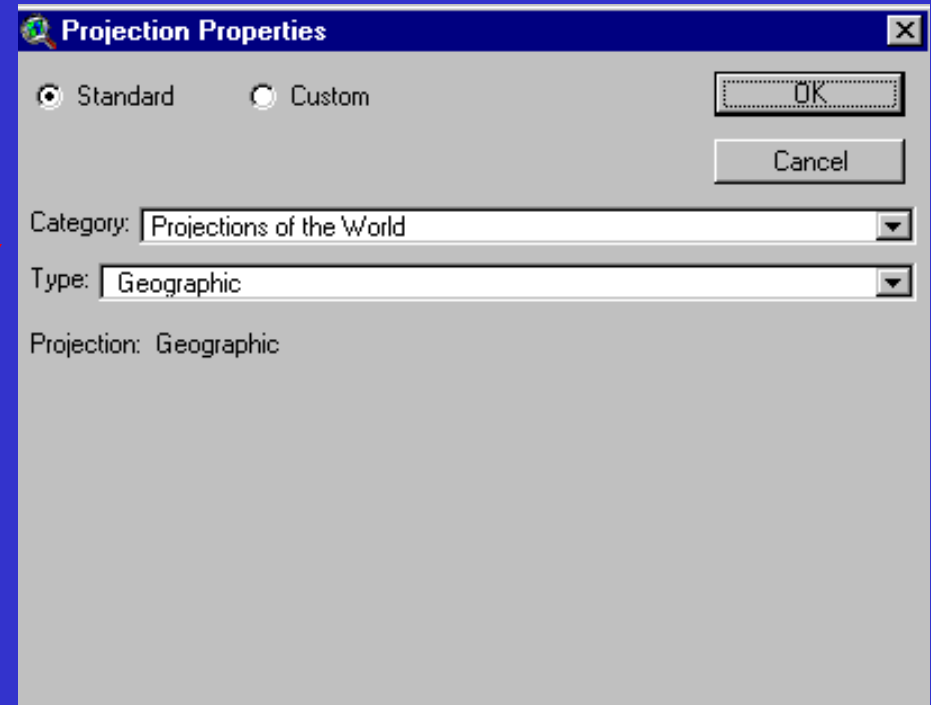
Select
properties
in the
view
menu



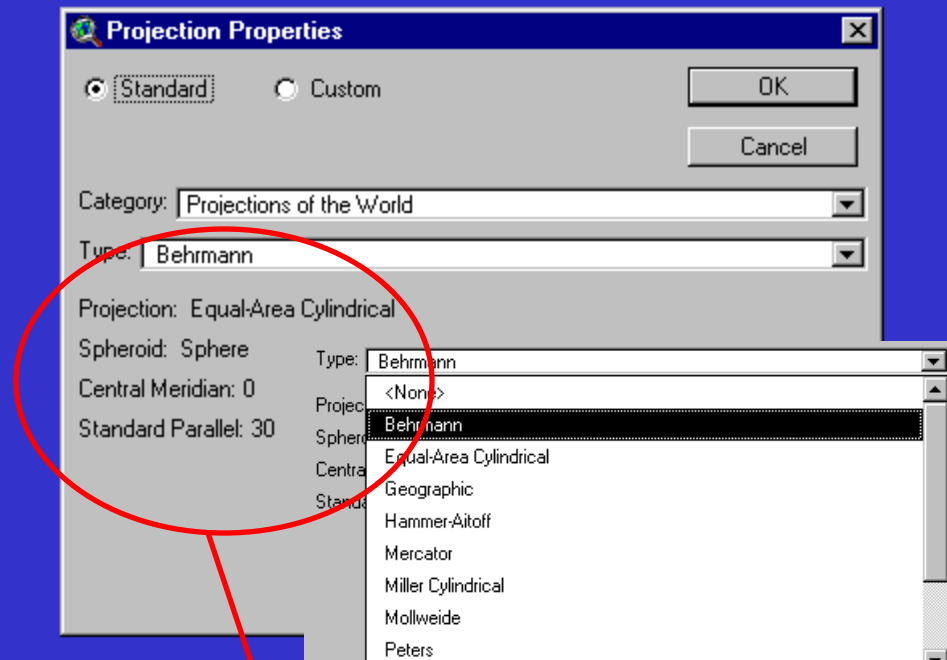
Select the
projection
button in
the view
properties
dialog



Select standard or custom projection

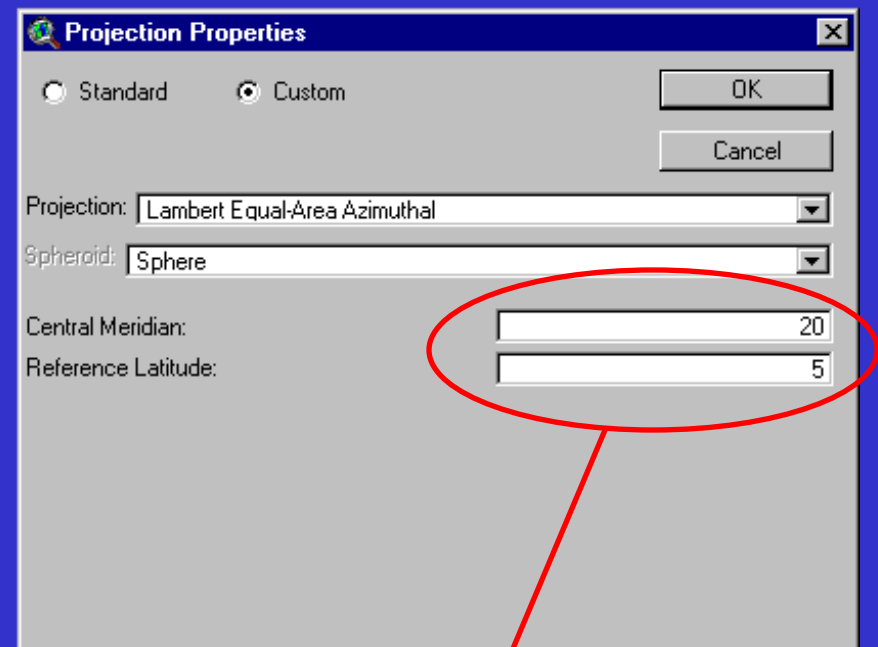


Standard Projections



Standard projections have fixed projection parameters

Custom Projections



Custom projections allow the user to enter their own projection parameters.

Note: When you apply a projection, only the view of the data is projected; the source data coordinates are not changed.

Section 2b Procedures

- Add a Text File Including XY Coordinates to a Project
- Add an Event Theme Using an XY Coordinate File
- Add the New Point Theme to a View
- Examine the Point Theme Attribute Table
- Examine Attribute Table Structure
- Review Considerations for Saving a Project
- Examine a Project File (.apr)
- Set the Map Projection for a view Using a Custom Projection