





# **RASTER DATA**

- Because the raster data model is a regular grid, spatial relationships are implicit
- No need to store spatial location of each cell, just of grid corners/extents & resolution
- Every cell has a value, so size a function of extent and resolution































# ARC HIDES USER FROM THIS UGLINESS

• If you give ArcGIS two overlapping but non-orthogonal rasters, it just lets you do the raster algebra...



- It does this by a combination of using

   Environment settings to select extents
   and a grid resolution; &
  - Resampling to make concurrent grids so raster algebra can be done



 The result is the geoprocessing tool usually works... and the user has no idea what it did behind the scenes



# **RASTERS: SUMMARY**

- Grid provides inherent location information
- Features lose spatial identity as aggregations
- All features treated same way
- Often not very precise, depends on cell size
- Simple computations
- Usually many-to-one cell to attribute table
- · Areas of inadequate info receive NODATA
- Accuracy depends upon representative sampling
- Are overlapping rasters orthogonal or concurrent?







Characteristic	Vector	Raster		
Data Structure	Usually complex	Usually simple		
Storage Requirements	Small for most data sets	Large for most data sets w/o compression		
Coordinate Conversion	Simple	May be slow due to data volumes and requires resampling		
Analysis	Preferred for network analyses, many other spatial operations more complex	Easy for continuous data, simple for many layer combinations		
Positional Precision	Limited only by positional measurements	Floor set by cell size		
Accessibility	Often complex	Easy to modify or program, due to simple data structure		
Display & Output	Map-like, with continuous curves, poor for images	Good for images, but discrete features may show 'stairstep' edges		







COMMON FILE TYPES (Beyond ASCII)						
Type & Source	Extension	Characteristics (R=Raster, V=Vector, A=Attribute, I=image)				
DLG, USGS	*.opt, *.ddf, *.dbf	Digital Line graph Data (V,A)				
DXY, AutoDesk	*.dxf	Drawing exchange file, an ASCII or binary file for exchanging spatial data (V)				
DWG, AutoDesk	*.dwg	Native binary file used by AutoDesk to store drawings in AutoCAD (V)				
Interchange, ESRI	*.e00	ASCII text file for vector and identify attribute data (V)				
Shapefile, ESRI	*.shp, *.shx, *.dbf, *.prj, etc.	Three or more binary files that include the vector coordinate, attribute, and other info $\langle V \rangle$				
VPF, US DoD	various	Vector Products Format, Defense Mapping Agency Distribution Specification				
TIGER, US Census	Tgrxxyyy, stfzz	Set of files by US census areas, xx is a static code, yyy an area code, zz numbers for different file types				
MIF/MID, MapInfo	*.mif, *.mid	Map Interchange File, vector and raster data transport from MapInfo (V,R)				
SDTS, US Gov	none	Spatial Data Transfer Standard, specifies spatial objects, attributes, reference system, data dictionary, and other info $(R, \nu, A)$				
GeoTIFF, Workgroup	*.tif, *.tiff	An extension for geo-referencing Aldus-Adobe public domain TIFF format (R)				
DEM, U.S.G.S.	*.dem	ASCII text format used of distribute elevation data (R)				
Imagine, ERDAS	*.img	Multiband-cpabale image format (R)				





























































### TODAY'S PLAN

- I. Brief Intro Review of Imagery (Rasters)
  - I. Satellite
  - II. Airborne
  - III. Oblique
- II. Data Sources: Capture & Collection

#### FINDING DATA IN THE RIGHT FOMAT

- The single most time consuming part of operating a GIS
  - Approximately 80% of most project resources (time and money) are used for data collection and input





#### **INPUT METHODS:**

- Digitizer
- Two Types: Tablet vs. Digital Scan
- Optical Scanning
- Conversion from digital sources
- Conversion from other analog sources
- Aerial photos / Satellite imagery
- Global Positioning Systems







<b>≥USGS</b>			Contract VI	10-	CARA !!
Geography — The National Map EROS Data Center - PRODUCTS				Site Map Site Search	
Products 🚽 Sc	ience 👻	NASA LP DAAC	Satellite Missions	NSLRSDA	About EROS
Aerial Products	Description				Search/Order
High Resolution Scanned	Digital aerial and USGS archive. Ou	Earth Explorer			
Medium Resolution Digitized	Digital aerial and USGS archive. Ou	Earth Explorer			
National Aerial Photography Program (NAPP)	Recent,high-qual to seven-year cyc	PhotoFinder Earth Explorer			
National High Altitude Photography (NHAP)	High-altitude aerial photos for the conterminous U.S. (1980 - 1989).				Earth Explorer
Survey Photography	Aerial photos from a variety of sources (1939 - present).				Earth Explorer
Index/Mapping Photography	Aerial photos referenced as photo indexes from a variety of sources (1940's - 1980's).				contact us
Digital Orthophoto Quadrangles (DOQs)	Digital images of of the photo with	Earth Explorer			
High Resolution Orthoimagery	Recent (2002-200 meters for the ma States. As more a distribution.	<u>Seamless Data</u> Distribution System (SDDS)			
Space Acquired Photography	Photos taken from the international Space Station (ISS), Shuttle, Skylab, Gemini, and Apollo missions (1965 - present).				Earth Explorer NASA Earth Sciences & Image Analysis (Shuttle and ISS)
Scientific Committee on Antarctic Research (SCAR)	A large collection	Contact SCAR			
Aircraft Scanners	Digital imagery a NASA ER-2, NASA	Earth Explorer (Search Only)			



















