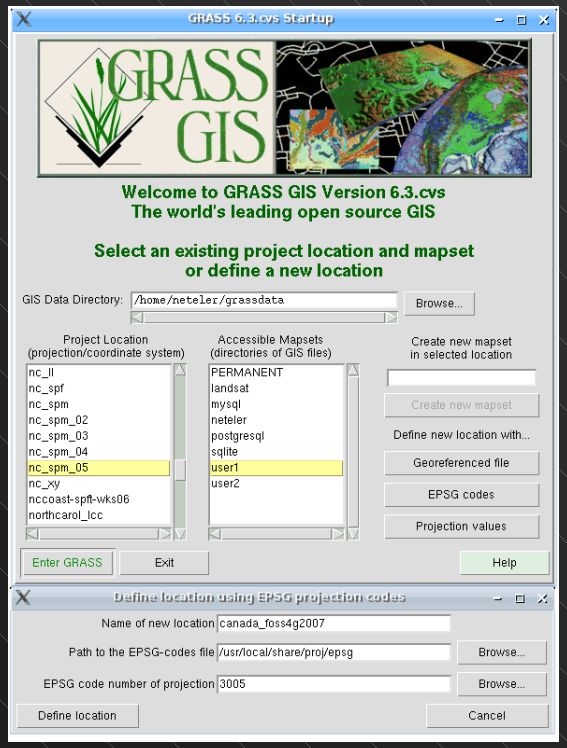
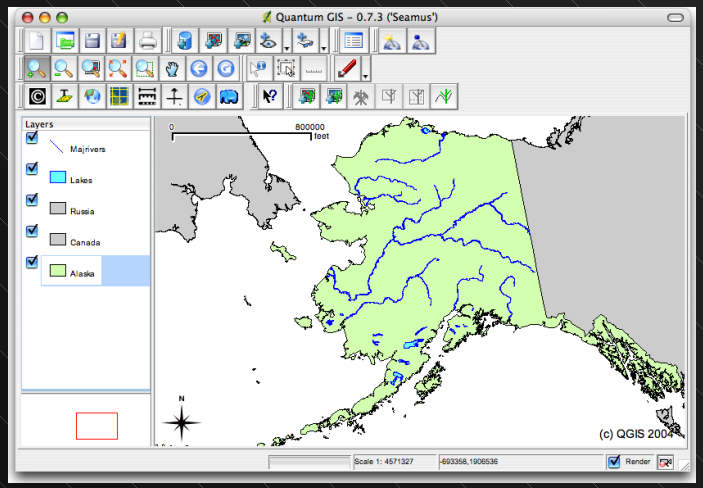
GRASS

- Geographic Resources Analysis Support System
- http://grass.osgeo.org
- Current versions
  - 6.3 “stable” (old)
  - 6.4 “next stable” (new)
  - 7 “development” (future)
- Related software
  - QGIS
  - http://qgis.org

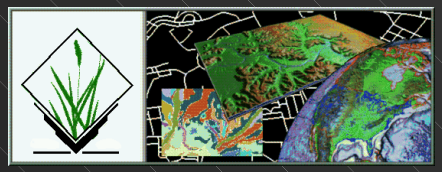


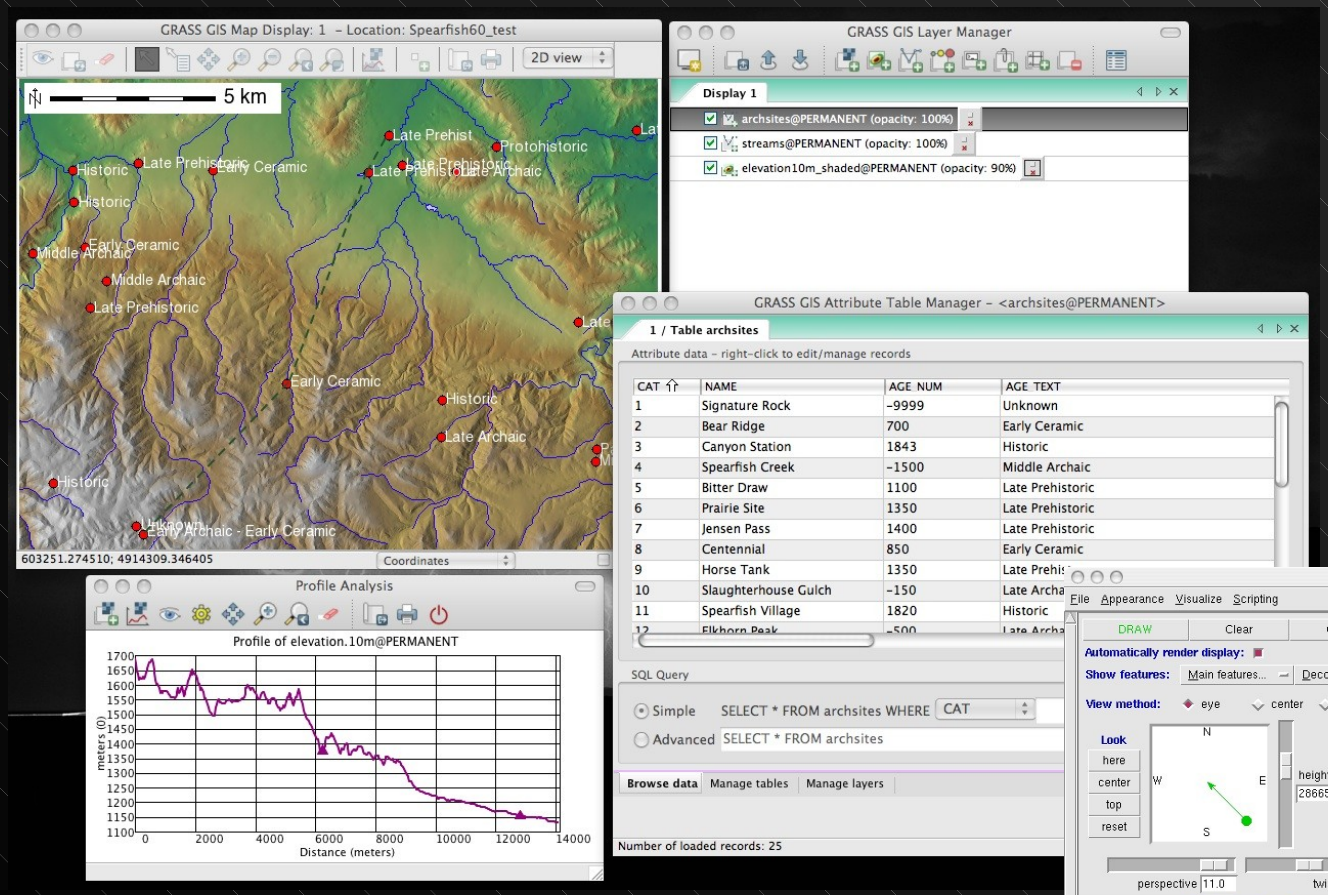


GRASS Capabilities

- Spatial data display and management as raster, vector, and volumes
- Data import in multiple formats, reprojection, digitizing
- Attribute data management
- Links to external DBMS (e.g., SQLite, MySQL, PostgreSQL, and ODBC)
- Spatial analysis and geostatistics
- Interpolation and modeling
- Multispectral image display and analysis
- N-dimensional visualization

GRASS




GRASS GIS Map Display: 1 - Location: Spearfish60_test
2D view
5 km
Late Prehist
Protohistoric
Historic
Late Prehistoric
Early Ceramic
Late Prehistoric
Late Archaic
Historic
Early Ceramic
Middle Archaic
Middle Archaic
Late Prehistoric
Early Ceramic
Historic
Late Archaic
Historic
Unknown
Early Archaic - Early Ceramic
603251.274510; 4914309.346405
Coordinates
GRASS GIS Layer Manager
Display 1
archsites@PERMANENT (opacity: 100%)
streams@PERMANENT (opacity: 100%)
elevation10m_shaded@PERMANENT (opacity: 90%)
GRASS GIS Attribute Table Manager - <archsites@PERMANENT>
1 / Table archsites
Attribute data - right-click to edit/manage records
CAT NAME AGE_NUM AGE_TEXT
1 Signature Rock -9999 Unknown
2 Bear Ridge 700 Early Ceramic
3 Canyon Station 1843 Historic
4 Spearfish Creek -1500 Middle Archaic
5 Bitter Draw 1100 Late Prehistoric
6 Prairie Site 1350 Late Prehistoric
7 Jensen Pass 1400 Late Prehistoric
8 Centennial 850 Early Ceramic
9 Horse Tank 1350
10 Slaughterhouse Gulch -150
11 Spearfish Village 1820 Historic
SQL Query
Simple SELECT * FROM archsites WHERE CAT
Advanced SELECT * FROM archsites
Browse data Manage tables Manage layers
Number of loaded records: 25
Profile Analysis
Profile of elevation.10m@PERMANENT
meters (0)
Distance (meters)
NVIZ
File Appearance Visualize Scripting Help
DRAW Clear Cancel
Automatically render display:
Show features: Main features... Decorations...
View method: eye center fly none
Look
here
center
top
reset
N
W
E
S
height 28665
z-exag 1.000
perspective 11.0
twist 0.0
Vector Lines Panel
Current: streams
New Delete
line width 2
display flat
display on surface(s): elevation_dem@PERMANENT
vector height above surface 1.1
DRAW CURRENT
Close
New center of view has been set

Installation: Windows

- Only version 6.4 available
- Download windows installer from grass.osgeo.org/download/index.php
- Install WinGRASS by double clicking and following the dialog.
- Opt to download both the Spearfish and North Carolina datasets

Installation: Mac

- Install “frameworks”
  - = utilities/dependencies
  - individually or as complete package (dmg)
- Install GRASS (recommend 6.4)
  - note differences for OS X 10.4 (“Tiger”) and 10.5 (“Leopard”) versions
  - drag and drop in applications or in folder
- Create folder for GRASS data files
  - Download demo datasets from grass.osgeo.org/download/data.php
  - drag and drop demo data into folder

Installation: Linux

- Use package installer
  - Make sure that dependencies are installed
- Create directory for GRASS data files
  - Download demo datasets from grass.osgeo.org/download/data.php
  - drag and drop demo data into data directory

GRASS Data

- GRASS has it's own way of storing raster and vector information
- These are not (yet) "drag and drop" style files, so you have to manage files with the GRASS menu options
- You can import from and export to ANY standard GIS formats

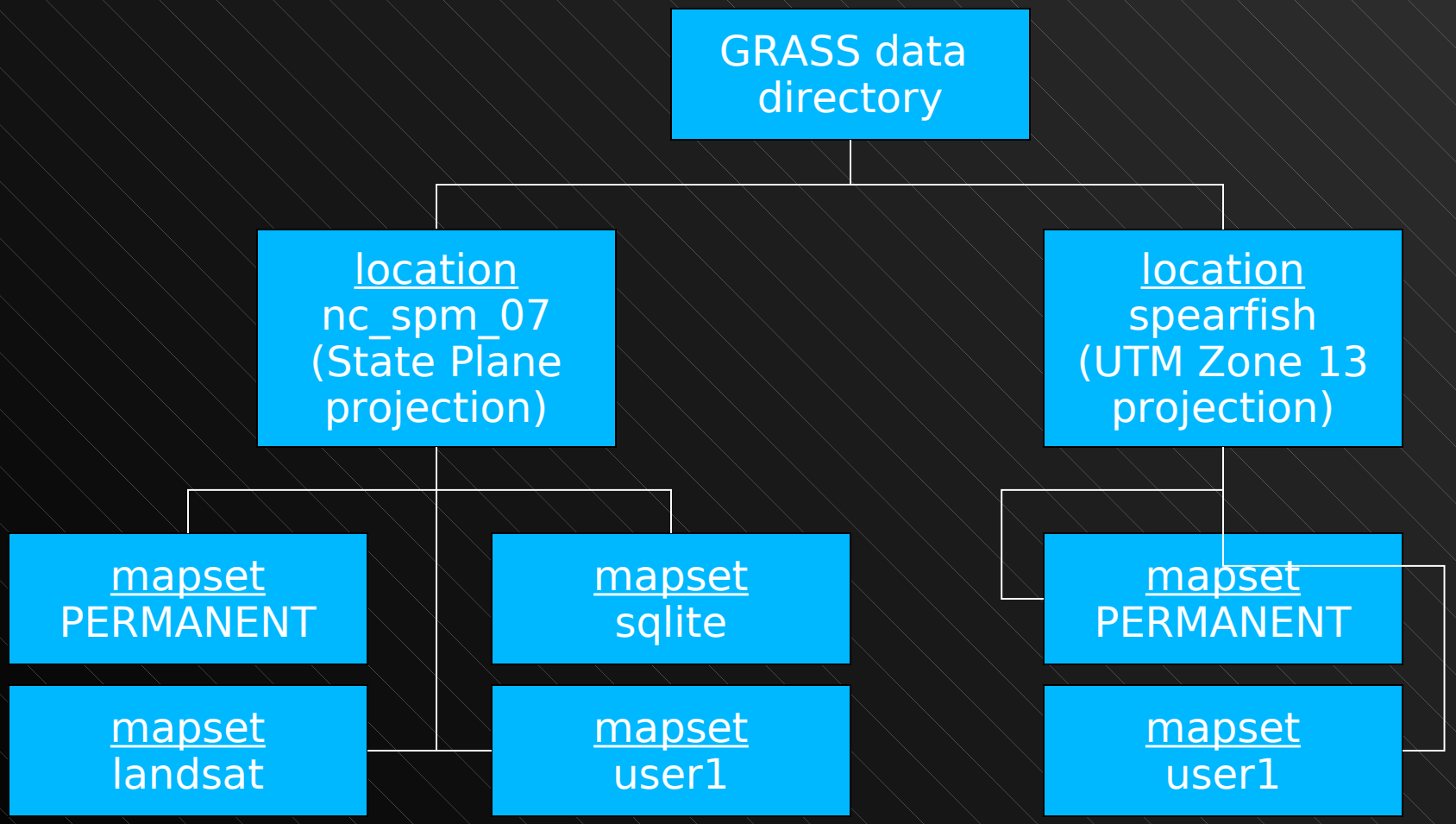
GRASS Data Structure

- GRASS GIS database = data directory
  - Place where you keep your GIS data
  - Can be any folder/directory
  - Just have to tell GRASS what it is
- GRASS project location
  - Special folder/directory
  - Created by GRASS
  - All geospatial inside a location have the same geographic projection
  - All work in a GRASS session takes place within a single location

GRASS Data Structure

- GRASS mapset
  - Special folder/directory that holds geospatial data files
  - Created by GRASS
  - Every location always has at least 1 location = PERMANENT
  - Can make other mapsets to organize your data
  - Can change data in current working mapset
  - Can read data in all mapsets in the current working location
  - Cannot access data in mapsets in a different location (with some exceptions)

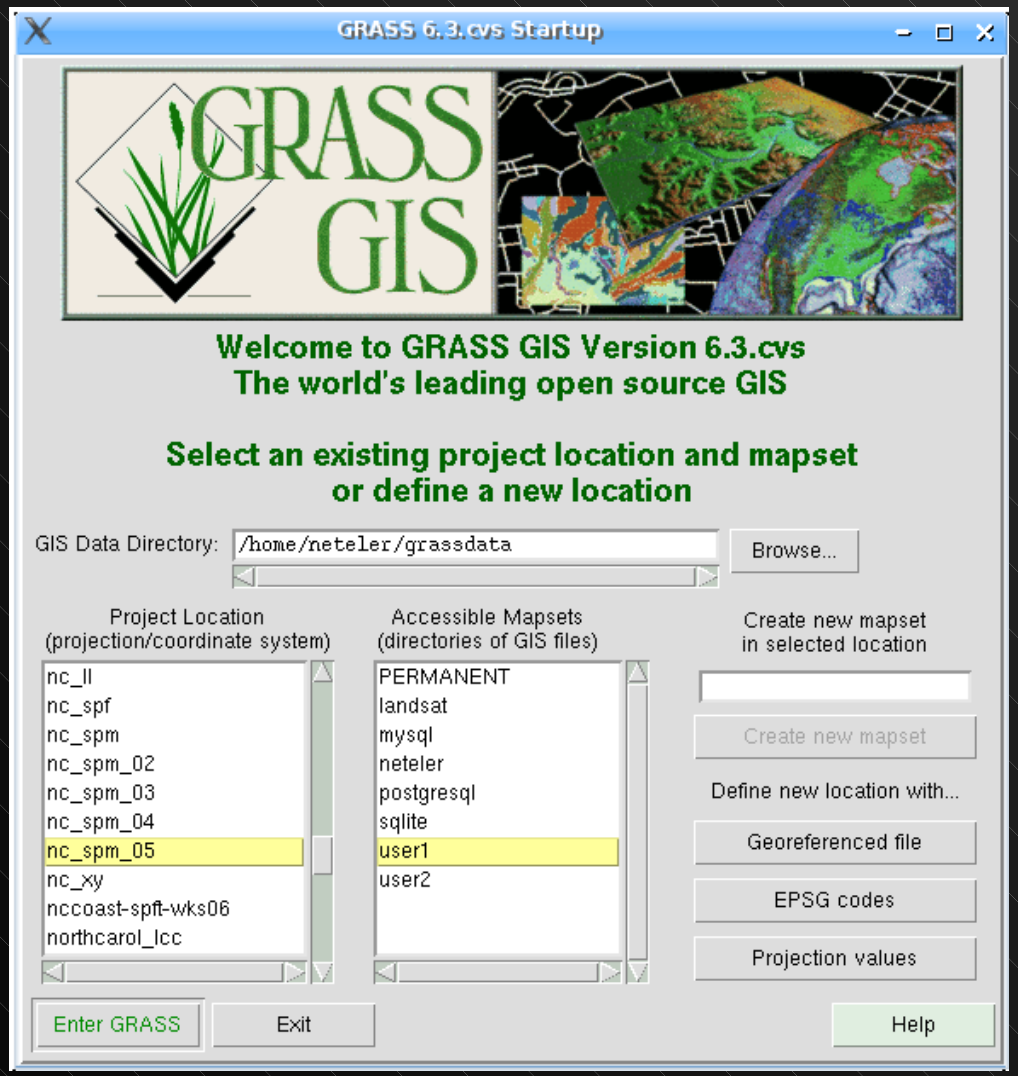
GRASS Data Structrure



Starting GRASS

- You must select the location and mapset where you want to work before you can enter GRASS.
- Helps to make sure that all your data are georeferenced in the same way. Critical for combining multiple data layers accurately in a GIS.
- Can only create a new location or a mapset when you start GRASS, or when importing external GIS data.

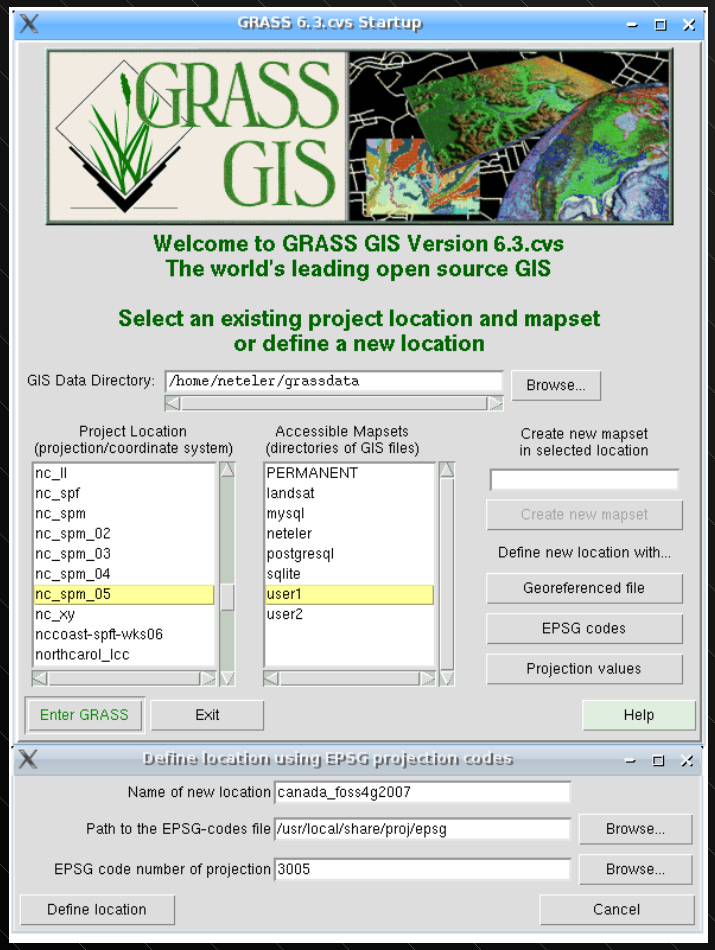
Starting GRASS



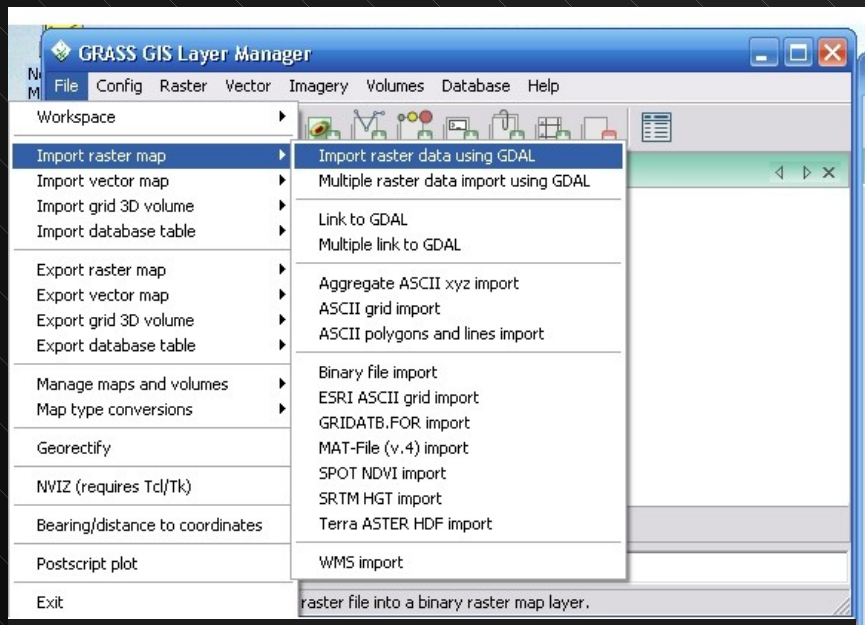
Creating Locations & Mapsets

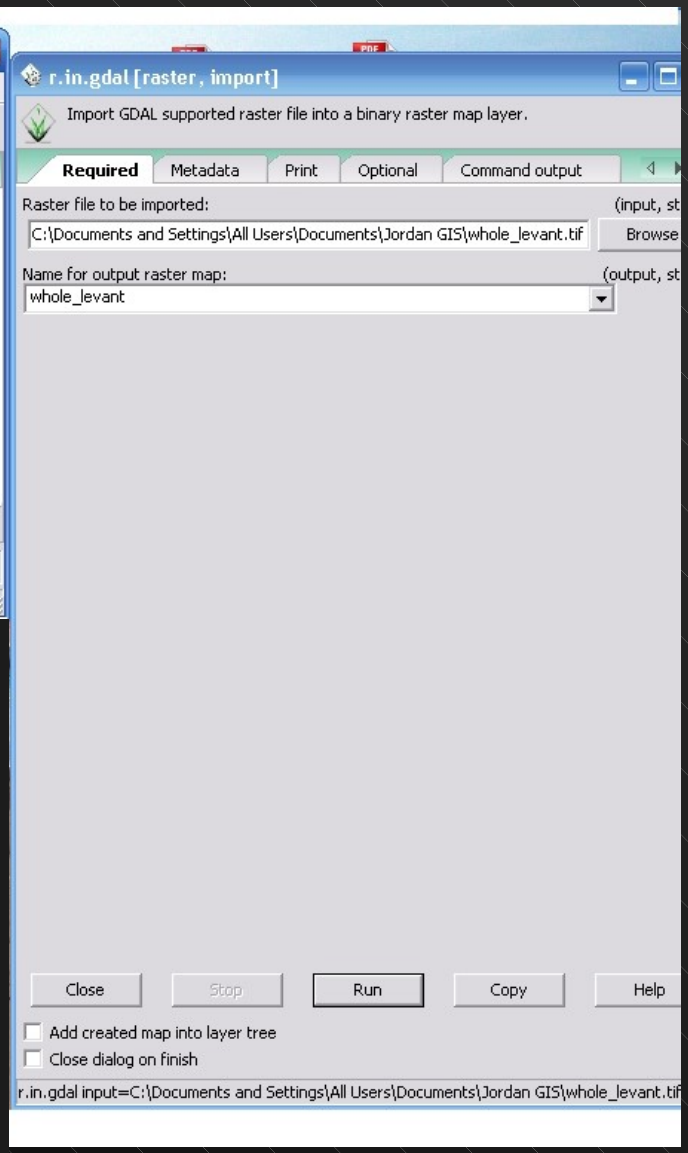
- Create location
  - Match georeferenced file
  - Pick EPSG code
  - Specify georeferencing parameters and (optionally) resolution and extents
- Create mapset
  - Enter new name
  - Press “Create new mapset” button

Creating Locations & Mapsets



Import Data

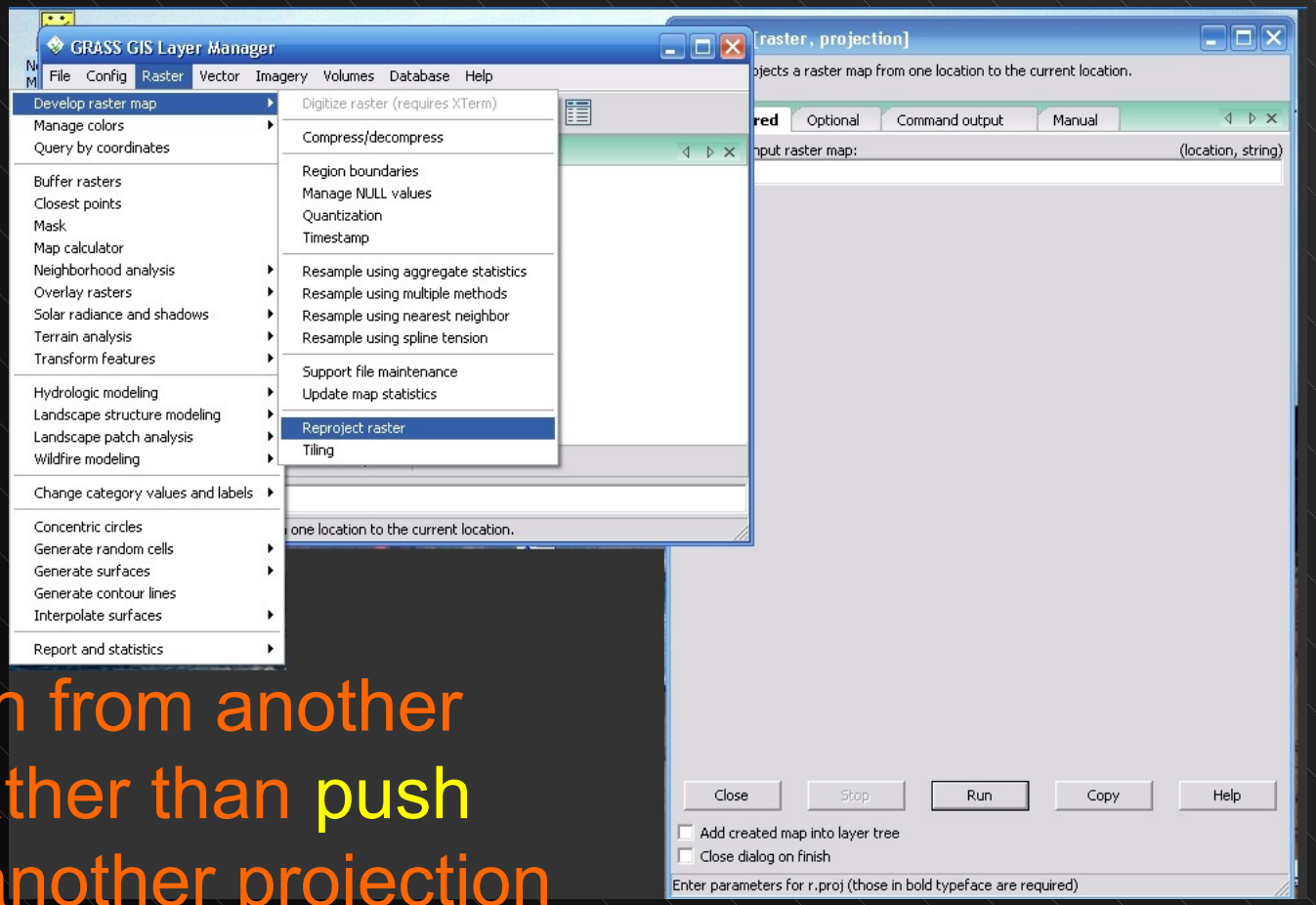




- Import/export rasters using GDAL
- Import/export vectors using OGR

Reprojection

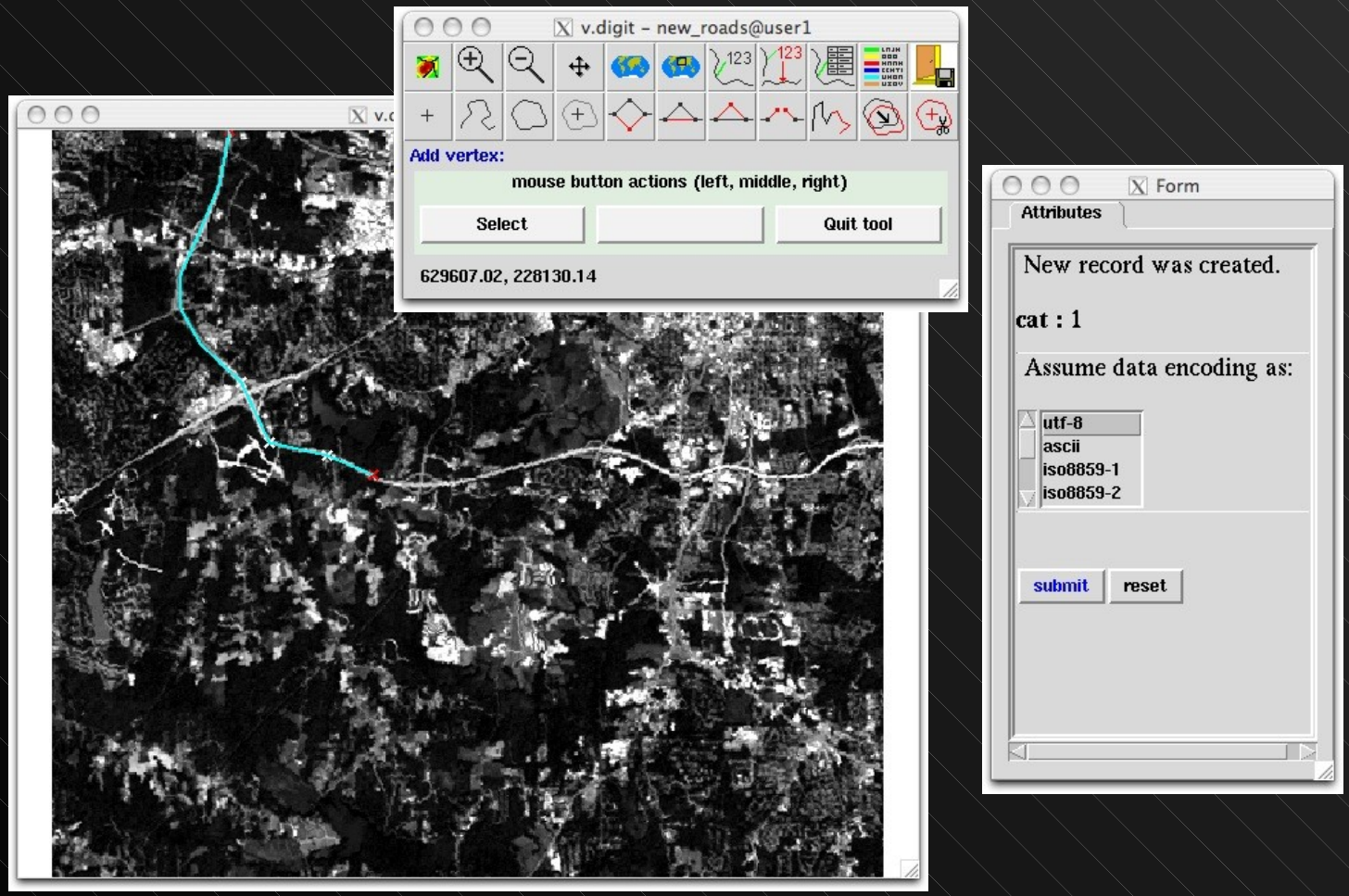
Reproject from one projection system to another with g.proj



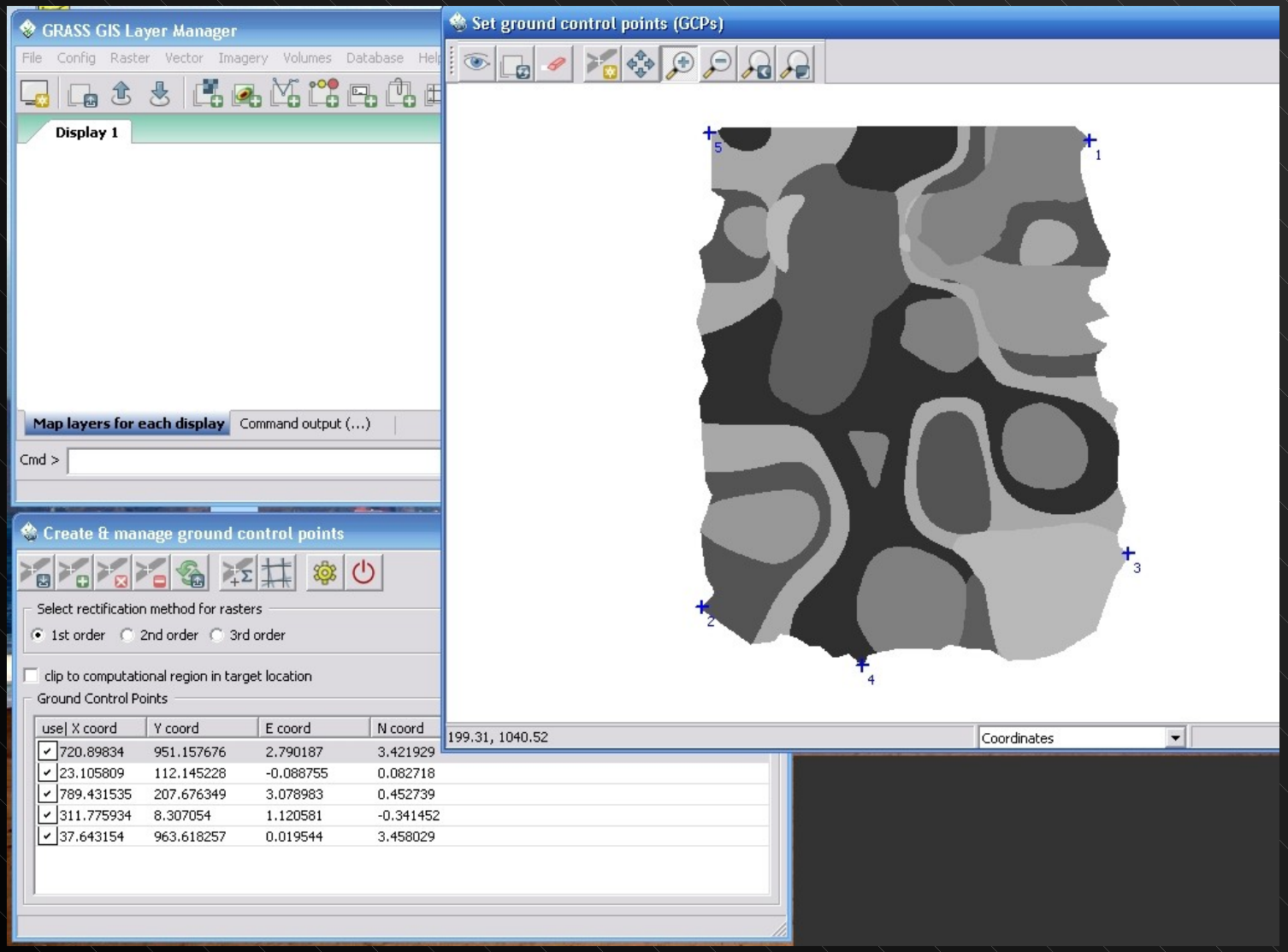
Pull data in from another location rather than push data into another projection

Digitizing vectors in GRASS

- Old v.digit module, only for windows users

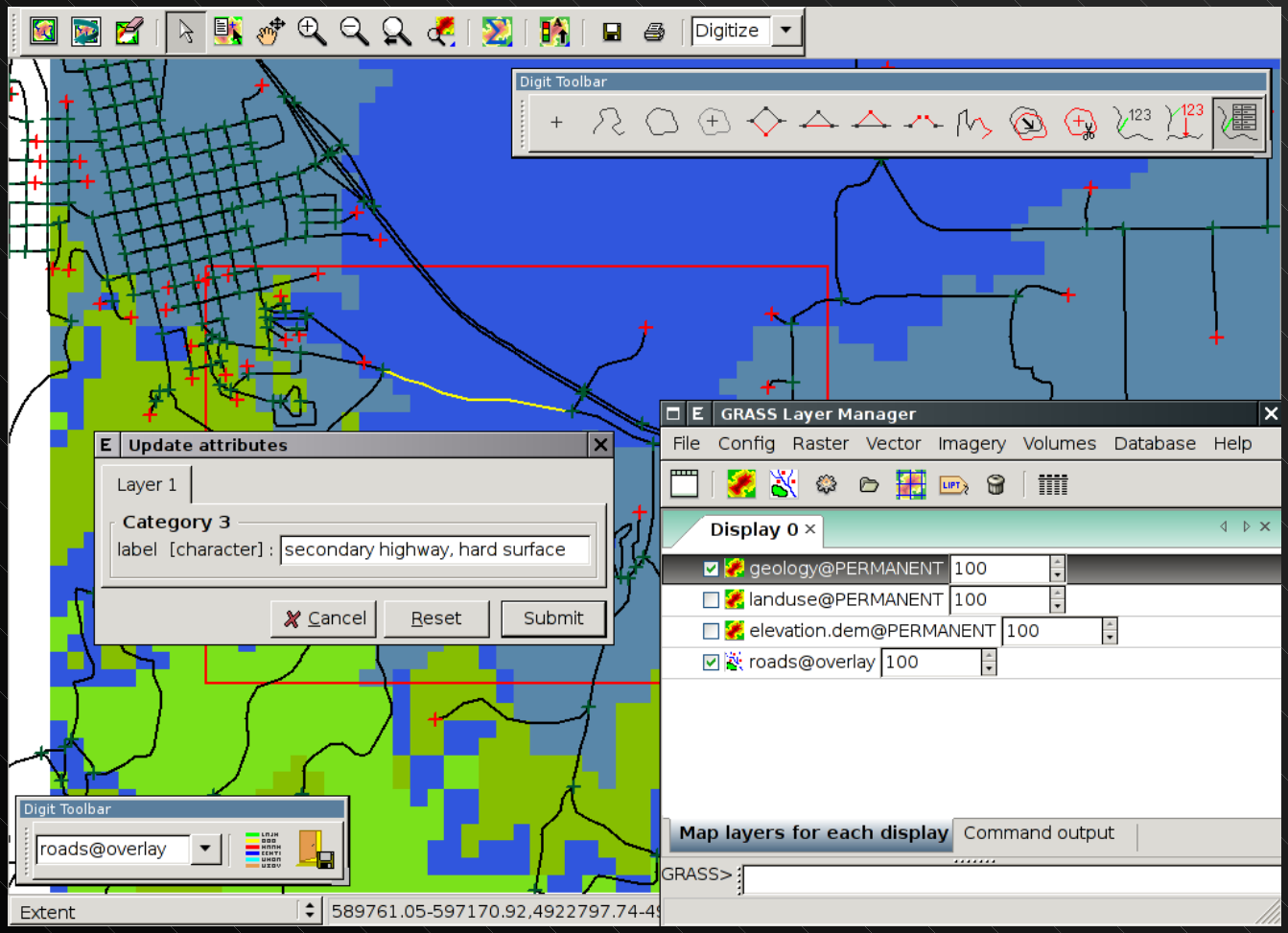


Georectification



Digitizing vectors in GRASS

- wxPython GUI, Mac, Linux



Digitizing vectors in GRASS

- QGIS with GRASS plug-in, all platforms