Online Presentation
October 27th 2010

INTRO TO GVSIG

A POWERFUL OPEN SOURCE DESKTOP GIS

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Talk Overview

about 5 minutes

Introduction

to Free and Open Source GIS Tools on the Desktop

about 10 minutes

OS Desktop GIS alternatives

gvSIG, UDIG, JGRASS, QGIS, OpenJUMP, GRASS

about 30 minutes

gvSIG Desktop GIS & Sextante extension

for Geoprocessing and Cartography

Part I

Introduction

to Free and Open Source GIS Tools on the Desktop

What is Open Source (GIS)?

Open source means that the source code is available to the general public for use, distribution, and modification from its original design free of charge (among a long list of other requirements)

Open Source ≠ Open Standards

While most open source geospatial software is built on the standards of the Open Geospatial Consortium (OGC) the term "Open Source" it is not synonymous with Open Standards because both proprietary and open source software can be compliant with the OGC Open Standards. http://www.opengeospatial.org

OSGeo is the organization that supports the development of the highest quality open source geospatial software. http://www.osgeo.org

Why use it ? General and incomplete listing

- User is in control
  - Pick you favorite operating system: supports many operating systems: Windows-Linux-Solaris-…
  - No licensing issues (did we install one to many PCs with software XY?)
  - Vendor independency
  - Access to source code: don't like something, need changes to the core system, need extensions – hire somebody to change it right now
- High performance, high quality, high interoperability
  - Distributed programming effort, highly modular…
  - System heterogenity - less prone to hacker attacks and viruses
  - Interoperable – very advanced support of OGC open standards
- Exceptional Support - Commercial and non commercial
  - Mailing lists, user groups, Conferences, IRC channels
  - Fast response times for bug fixes
    typically tracked on the web accessible and open to everybody to report or fix a bug
- It is free

Licenses

Table 1: List of common FOSS software licenses

Name	Style	software
GNU-GPL	strong copyleft license, derived works have to be available under the same copyleft	GRASS, QGIS, gvSIG, Mapbender, PostGIS, GeoServer, AveiN!
LPGL	compromise between copyleft and more permissive licenses, has copy-left restrictions on the program itself, but not on other software linking with the program.	Mapnik, MapGuide
MIT	permissive license, permits reuse within proprietary software (license has to be distributed with that software)	MapServer, GDAL/OGR, Proj4
BSD	permissive license, little restriction, close to the public domain	Ka-Map, FeatureServer, TileCache, OpenLayers
Mozilla (MPL)	hybrid of modified BSD and GPL.	MapWindow, Mozilla Firefox

Overview

- OS Software uses synergies: sharing of libraries
  ►not too much duplication of effort

- Different tribes use different tools:

"Tribe"	Examples
• C/C++ Tribe	Mapserver, GRASS, Mapguide, QGIS PostGIS, OGR/GDAL, PROJ4, GEOS, FDO
• Java Tribe	GeoTools, GeoServer, uDig, DeeGree JUMP, gvSIG, JTS
• Web tribe	MapBender, OpenLayers, Ka-map
• .Net Tribe	SharpMap, WorldWind, MapWindow

Part II

OS Desktop GIS alternatives

gvSIG, UDIG, JGRASS, QGIS, OpenJUMP, GRASS

Desktop Programs


Geographic Resources Analysis Support System (Grass)


User friendly Desktop Internet GIS (Udig)
+ JGrass


Quantum GIS (QGIS)
+ Open Ocean Map


OpenJump

gvSIG

- The Generic Mapping Tools (GMT)
- MapWindow
- SAGA GIS
- ILWIS
- Terra View

Where to obtain the software

- OSGEO 

  - Projects http://www.osgeo.org
  - OSGeo4W http://trac.osgeo.org/osgeo4w
- MapTools http://www.maptools.org
- FreeGIS http://freegis.org/

Geographic Resources Analysis Support System (Grass)

Main supporter “ITC, Trento, Italy”

- Written in C, Unix/Linux based
  in 2008 release of the first windows version!
- Started 1982 by US Army, discontinued 1995
- Revived 1997 by Baylor Univ.
- Since 2001 at ITC

Functionality

- Originally Raster GIS + Remote Sensing
- Now a Comprehensive Desktop GIS
- Image analysis
- As powerful for analysis as Arc/Info !
  (compare Thesis in references)
- Weakness in UI can be mediated using QGIS, JGrass as UI

Quantum GIS (QGIS)

Main supporter Gary Sherman (gsherman@sourceforge.net)

- Written in C++
- Depends on QT widget
- Multi platform

Functionality

- Desktop GIS Viewer
- Can be used as a UI to Grass GIS with the Grass Plug-in
  "a remote control for Grass"
- Python bindings allow for programmatic interaction

QGIS Deployment Example ► Open Ocean Map*

a suite of tools that enable the integrated ecological and socioeconomic assessment of fishery policy and marine conservation, and their effects on coastal communities:

A cross-platform geospatial desktop applications for decision support utilizing

- Python
- QGIS
- QT

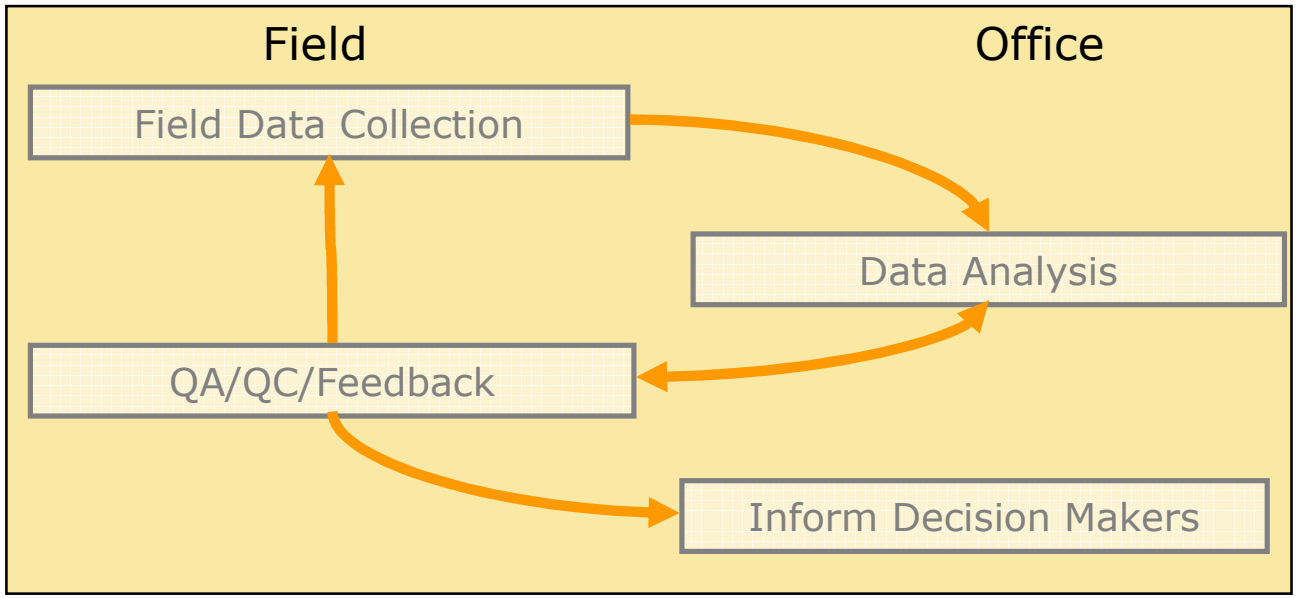
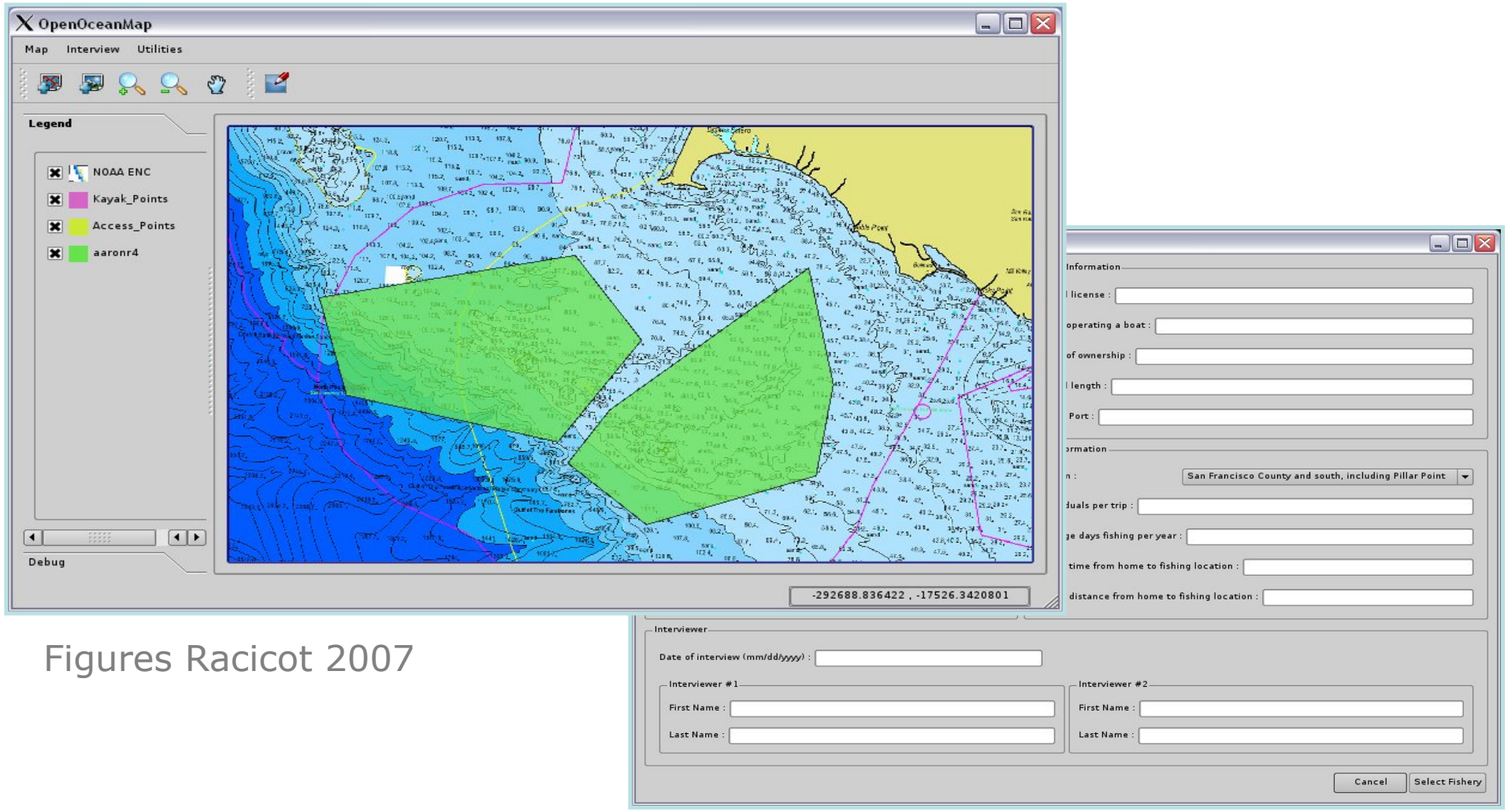


Figure adapted from Racicot 2007

* by Aaron Racicot (formerly at Ecotrust)

QGIS - Open Ocean Map



Figures Racicot 2007

OpenJump - JUMP Unified Mapping Platform

Main supporters “Vivid Solutions” and “Kosmo–SAIG”

- Written in Java
- Variety of “Flavors” (JUMP / OpenJUMP / Kosmo)
- Multi platform

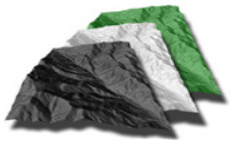
Functionality

- Desktop GIS
- Viewer
- Analysis
- Powerful editing and QA environment
  e.g. shape file problem resolving capabilities

Part III

gvSIG Desktop GIS

and the Sextante extension

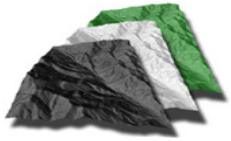


gvSIG – Generalidad Valenciana

Conselleria d'Infraestructures i Transport

- project - Spanish Community of Valencia
- mid range Desktop GIS
- based on open standards
- part of gvPONTIS project

  http://www.gvpontis.gva.es/fileadmin/conselleria/images/Documentacion/memoria/gvpontis_ingles.pdf

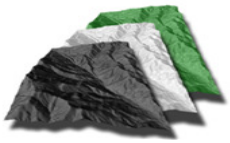


SEXTANTE

- project - Spanish province of Extremadura

  Sistema Extremeno de Analisis Territorial
- java based plug-in for gvSIG
- offers more than 280 spatial functions raster and vector processing

  originally targeted at forestry usage
  initially based on SAGA GIS



SEXTANTE

gvSIG is a project of the Spanish province of Valencia. The goals of the project are to provide an open source GIS that is platform independent and based on open source standards. Basically the capabilities should be comprehensive enough to replace ESRI's ArcView 3 desktop GIS. The user interface and functionalities of gvSIG are similar to ArcView 3, but in addition has capabilities to connect to Internet mapping services.

Another Java based project of the autonomous region of Extremadura called Sextante can be installed as a plug-in and offers more than 270 spatial functions.

SEXTANTE

Main supporter of **gvSIG**	Generalitat Valencia (GVA) - Province of Valencia, Spain
Type	Desktop GIS
Functionality	Multilingual Desktop GIS - Analysis functions can be greatly extended when installing Sextante. Many extensions.
Operating systems	Unix/Linux, Windows
Project started	2003
Implementation	Java
OS libraries	GeoTools and JTS
PostGIS support	Yes
License	GPL

gvSIG association

gvSIG and Sextante facts

Main supporter of **Sextante**	Sextante Team, Victor Olaya, Juan Carlos Giménez
Functionality	Comprehensive set of spatial vector data and image analysis tools
Operating systems	Unix/Linux, Windows
Project started	2004
Implementation	Java
OS libraries	built on top of SAGA GIS functionality
PostGIS support	Yes
License	GPL

gvSIG Distributions

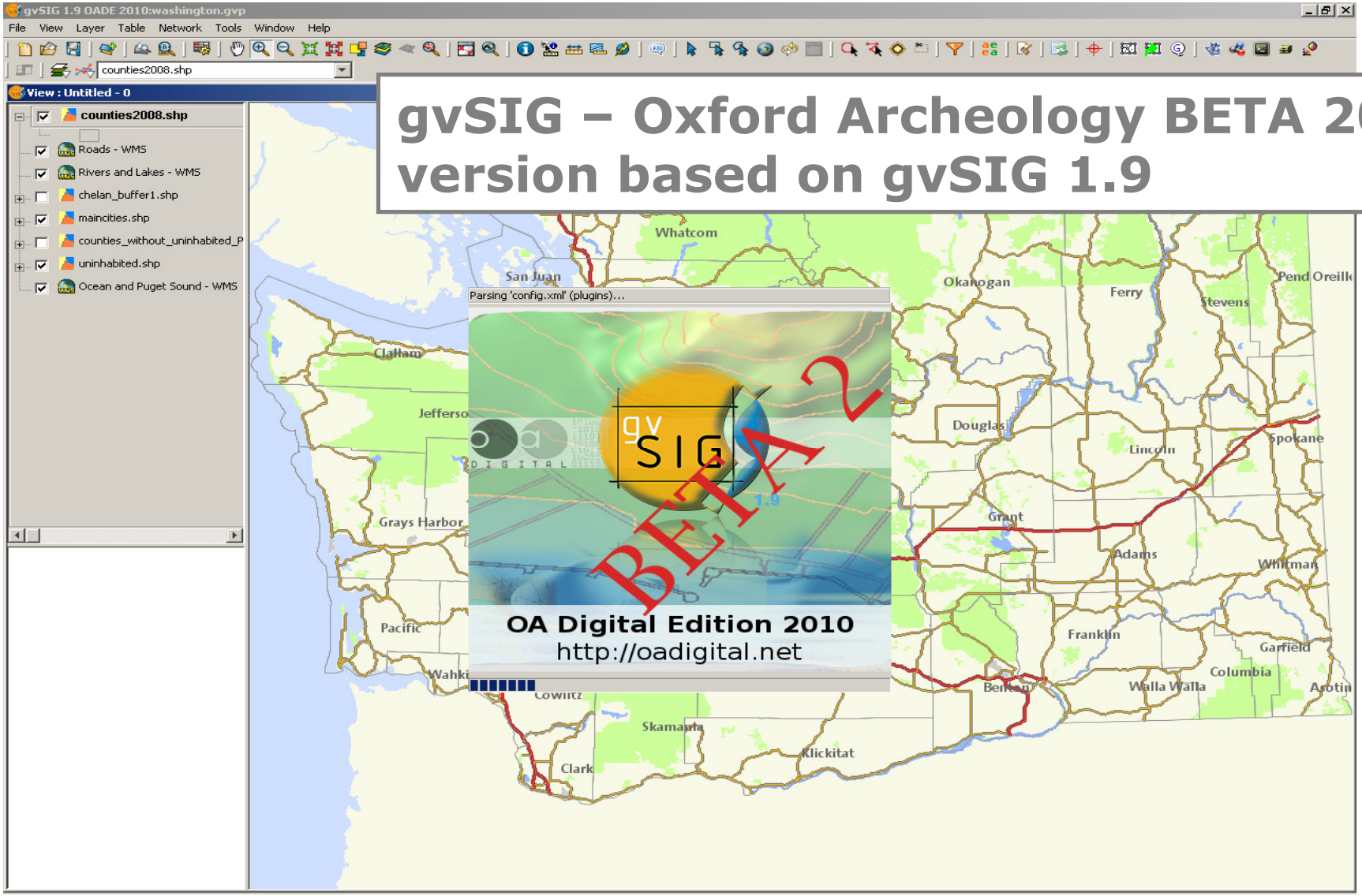
Official

- Desktop version 1.10 RC2
  - Extensions
    - Sextante Analysis
    - 3D visualization
    - Network analysis
- Mobile - *GIS/SDI client on mobile devices.*
- Mini - *map viewer for mobile phones*
  e.g. Yahoo, Google, Bing, OSM tiles

Oxford Archeology

gvSIG 2010 OADE version 1.0.
based on gvSIG 1.10
Win, Unix + Mac OS X !

gvSIG – Oxford Archeology BETA 2010 version based on gvSIG 1.9



Map Projection
the PROJ4 Library - EPSG Definitions

```
# USA Contiguous Albers Equal Area Conic
<102003> +proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=37.5 +lon_0=-96 +x_0=0 +y_0=0 +ellps=GRS80 +datum=NAD83 +uni
# Spherical Mercator
<900913> +proj=merc +a=6378137 +b=6378137 +lat_ts=0.0 +lon_0=0.0 +x_0=0.0 +y_0=0 +k=1.0 +units=m +nadgrids=@nu
# SR-ORG Projection 6627 - Google Mercator - Open Street Map
<6
#
<2
#
<2
#
<2
#
<2
#
<2
#
<2
# St Lucia 1955 / British West Indies Grid
<2006> +proj=tmerc +lat_0=0 +lon_0=-62 +k=0.999500 +x_0=400000 +y_0=0 +ellps=clrk80 +towgs84=-149,128,296,0,0,
# St Vincent 45 / British West Indies Grid
<2007> +proj=tmerc +lat_0=0 +lon_0=-62 +k=0.999500 +x_0=400000 +y_0=0 +ellps=clrk80 +units=m +no_defs  no_defs
# NAD27(CGQ77) / SCoPQ zone 2
<2008> +proj=tmerc +lat_0=0 +lon_0=-55.5 +k=0.999900 +x_0=304800 +y_0=0 +ellps=clrk66 +units=m +no_defs  no_de
# NAD27(CGQ77) / SCoPQ zone 3
<2009> +proj=tmerc +lat_0=0 +lon_0=-58.5 +k=0.999900 +x_0=304800 +y_0=0 +ellps=clrk66 +units=m +no_defs  no_de
# NAD27(CGQ77) / SCoPQ zone 4
<2010> +proj=tmerc +lat_0=0 +lon_0=-61.5 +k=0.999900 +x_0=304800 +y_0=0 +ellps=clrk66 +units=m +no_defs  no_de
```

Projection definition

 # USA Contiguous Albers Equal Area Conic

<102003> +proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=37.5 +lon_0=-96 +x_0=0 +y_0=0 +ellps=GRS80 +datum=NAD83 +units=m no_defs <>

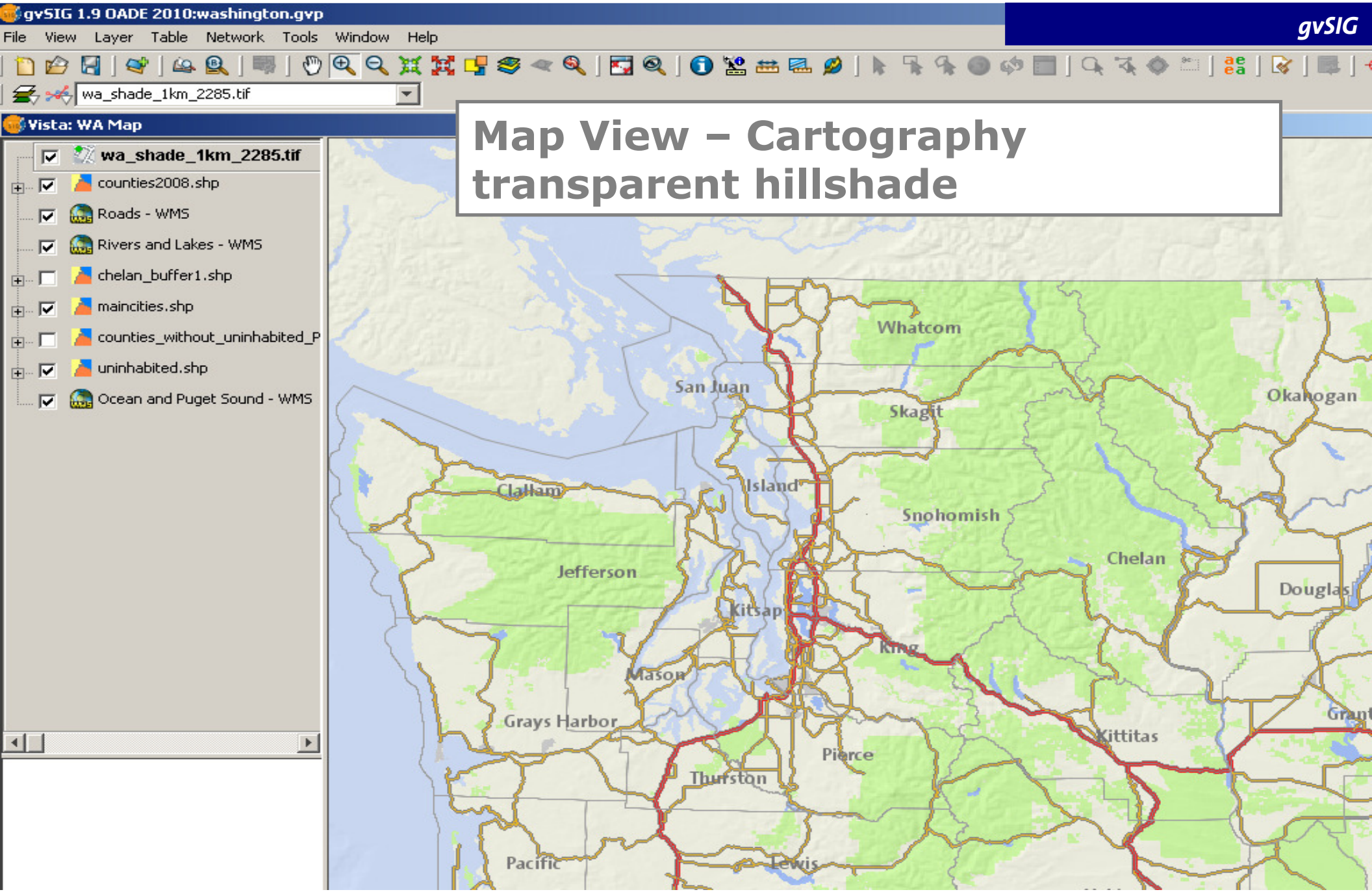
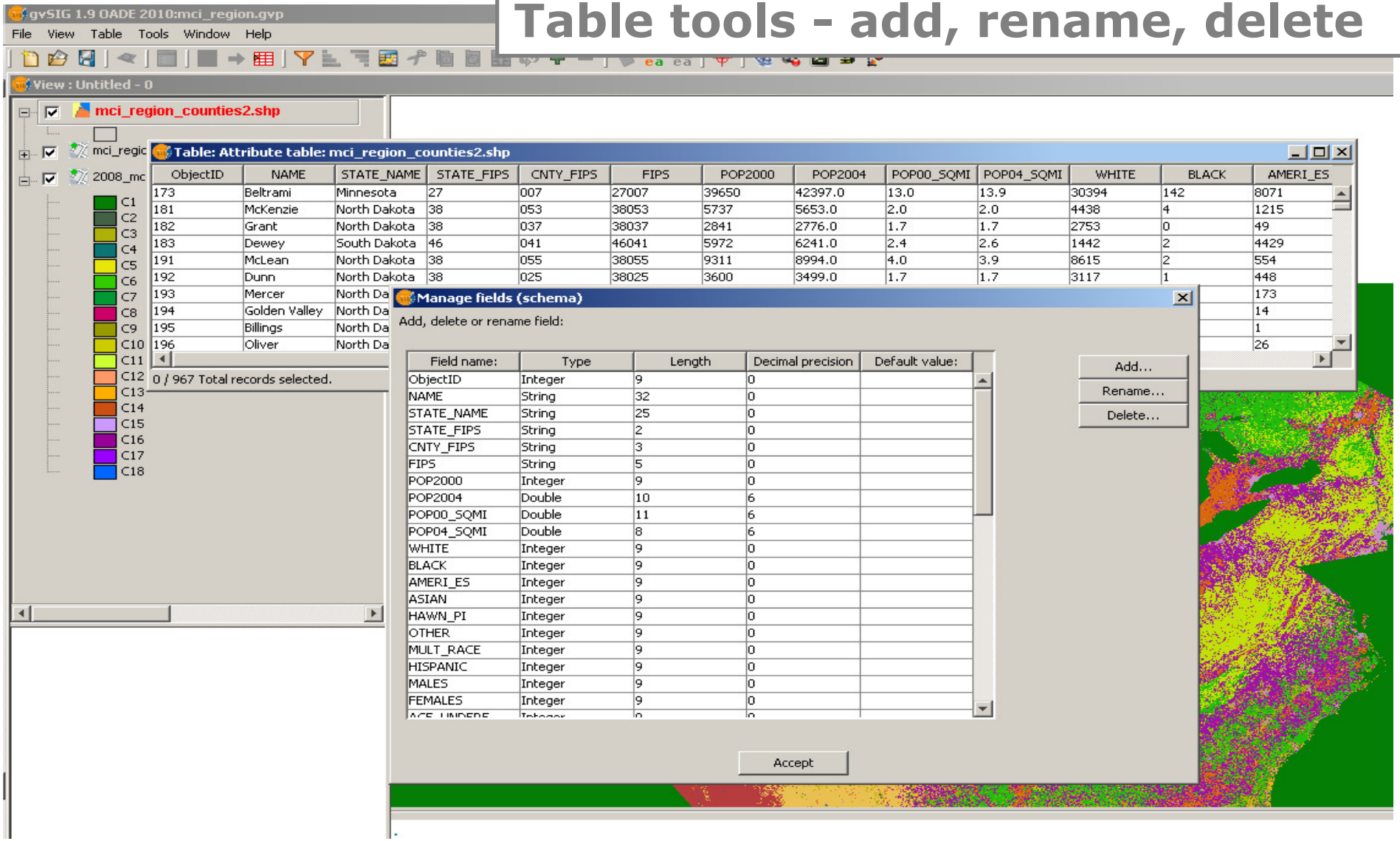

gvSIG 1.9 OADE 2010:washington.gvp
gvSIG
File View Layer Table Network Tools Window Help
wa_shade_1km_2285.tif
Vista: WA Map
wa_shade_1km_2285.tif
counties2008.shp
Roads - WMS
Rivers and Lakes - WMS
chelan_buffer1.shp
maincities.shp
counties_without_uninhabited_P
uninhabited.shp
Ocean and Puget Sound - WMS
Map View – Cartography
transparent hillshade
Whatcom
San Juan
Skagit
Okanogan
Island
Clallam
Snohomish
Chelan
Jefferson
Douglas
Kitsap
King
Mason
Grays Harbor
Kittitas
Pierce
Thurston
Pacific
Lewis

Table tools - add, rename, delete



gvSIG Geoprocessing Tools

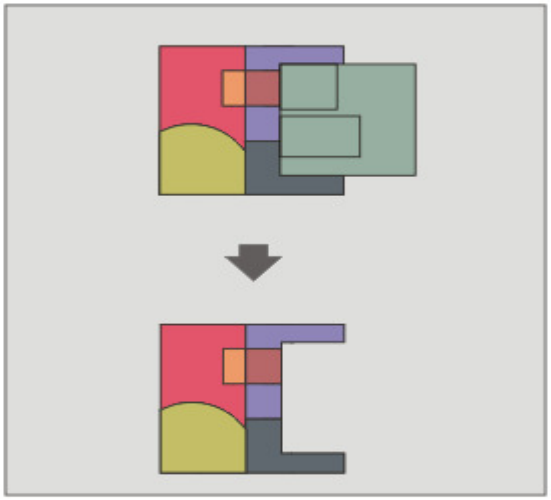
Geoprocessing tools...

- Geoprocessing tools
  - Analysis
    - Proximity
      - Buffer zones
      - Spatial join
    - Overlay
      - Clip
      - Difference
      - Intersection
      - Union
    - Computational geometry
      - Convex hull
      - Voronoi/Delaunay
    - Aggregation
      - Dissolve
  - Data conversion
    - Merge
    - XY shift (2D)
    - Reproject
    - Generalize
    - Smooth
    - Transform
  - Topology
    - Flip lines
    - Reduce to lines
    - Reduce to points
    - Clean
    - Build polygons

Difference

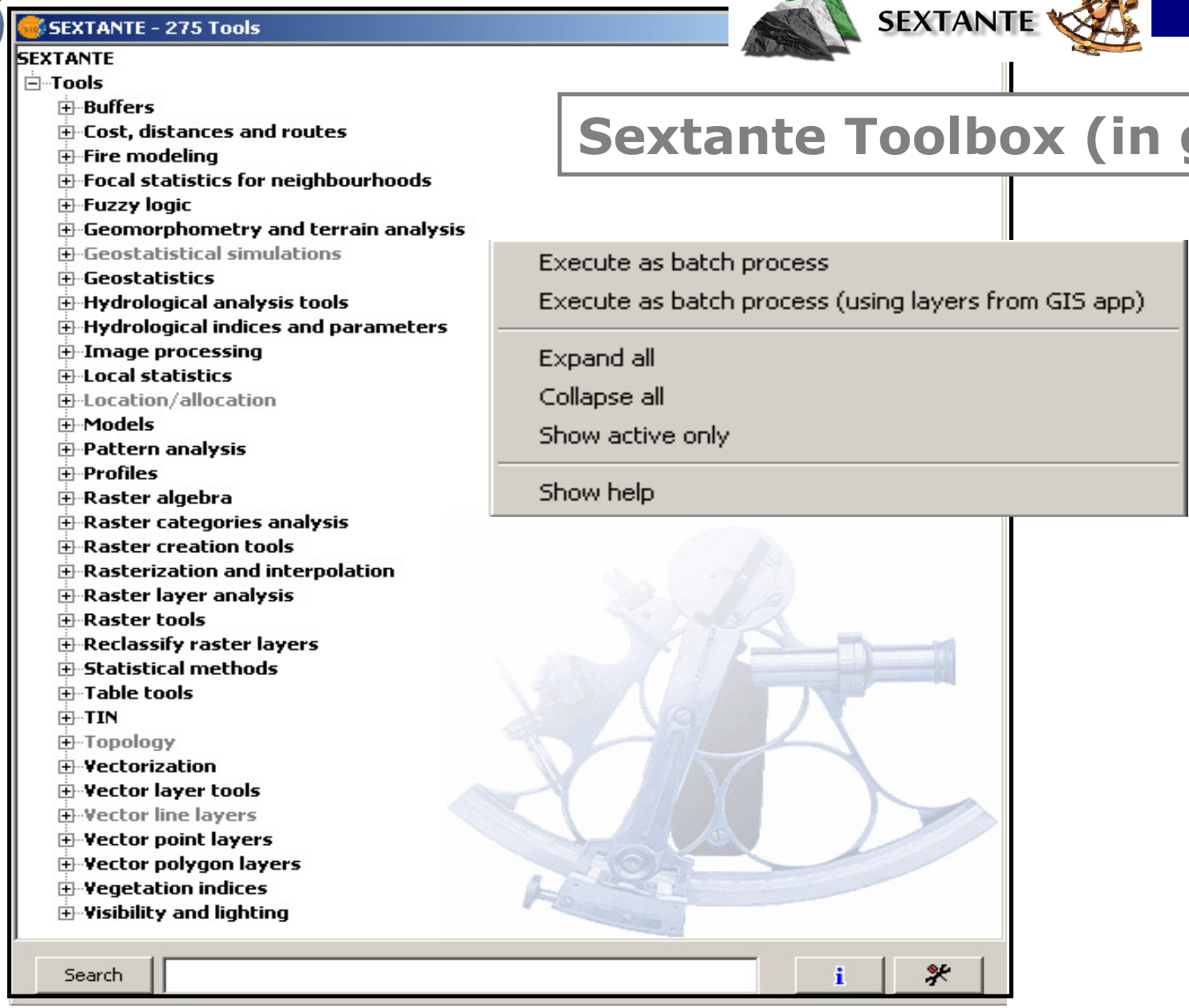
This tool performs a geometric *overlay* operation. It works on two layers, an input layer **A** and an overlay layer **B**. The procedure is also called a "spatial NOT" operation, because it includes all geometries of **A** that are *not* present in **B**.

Owing to its geometric nature, this operation only works for *polygon* type layers. The result layer will have a copy of the attribute table of the input layer.

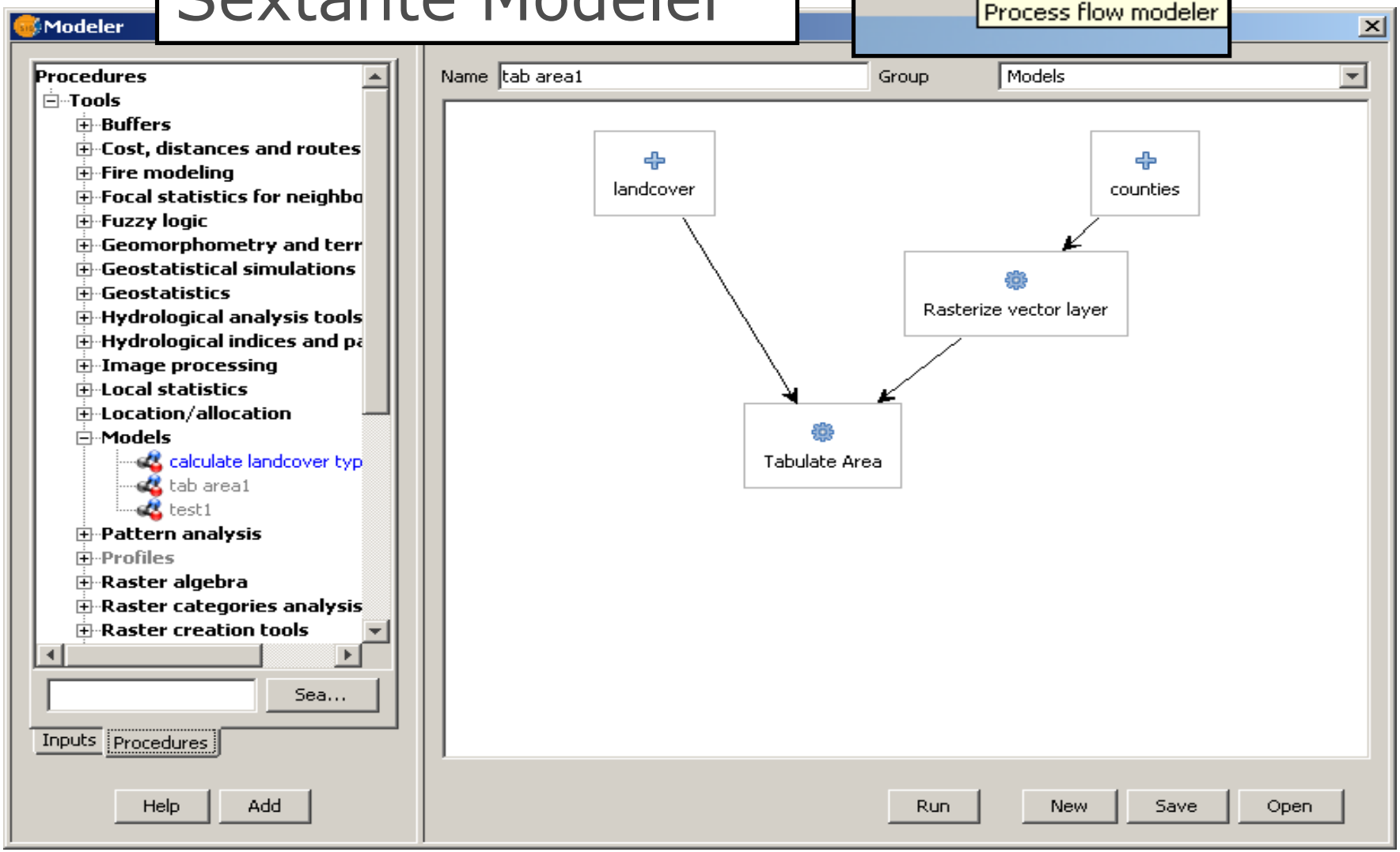


Open tool... Close

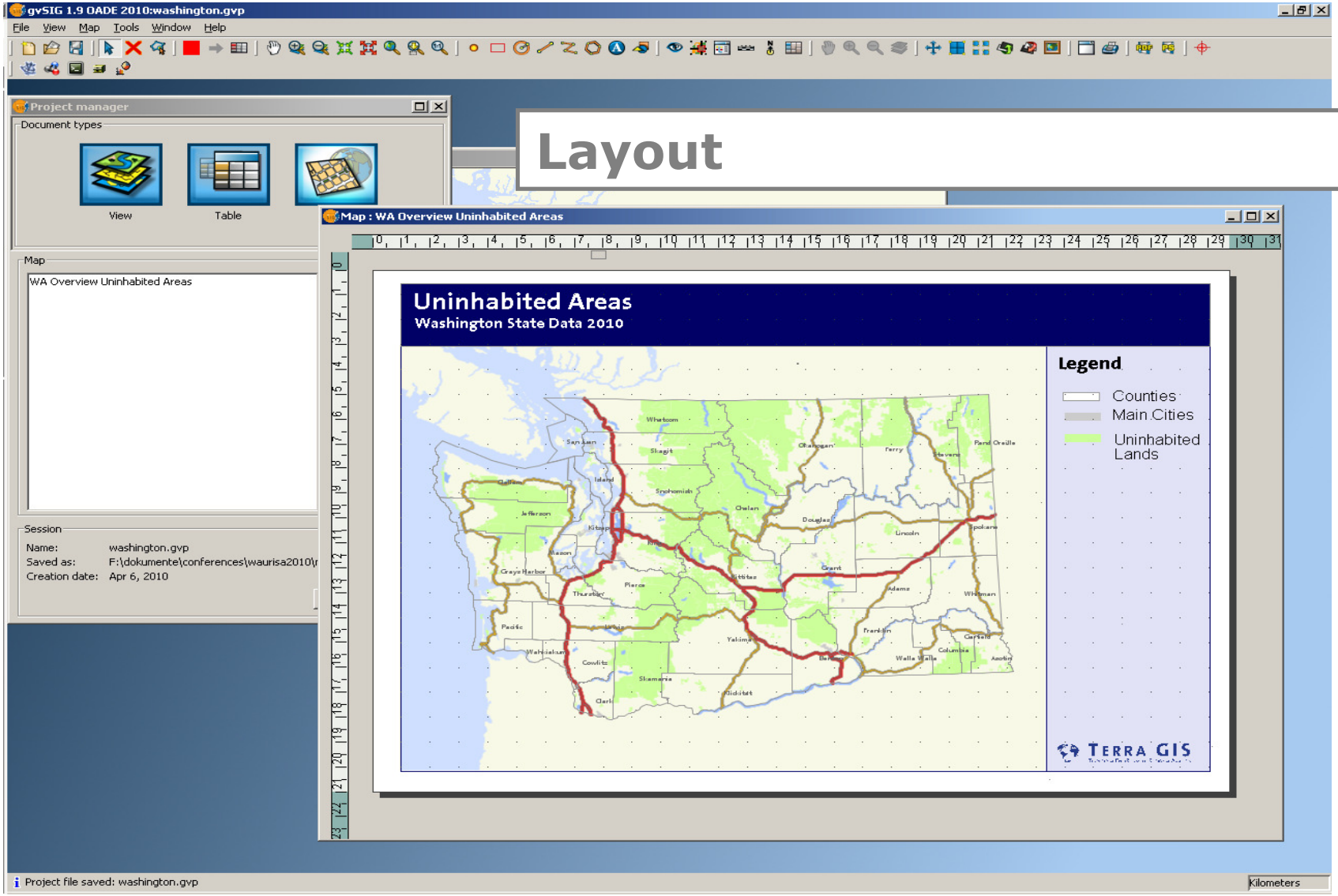
Sextante Toolbox (in gvSIG)



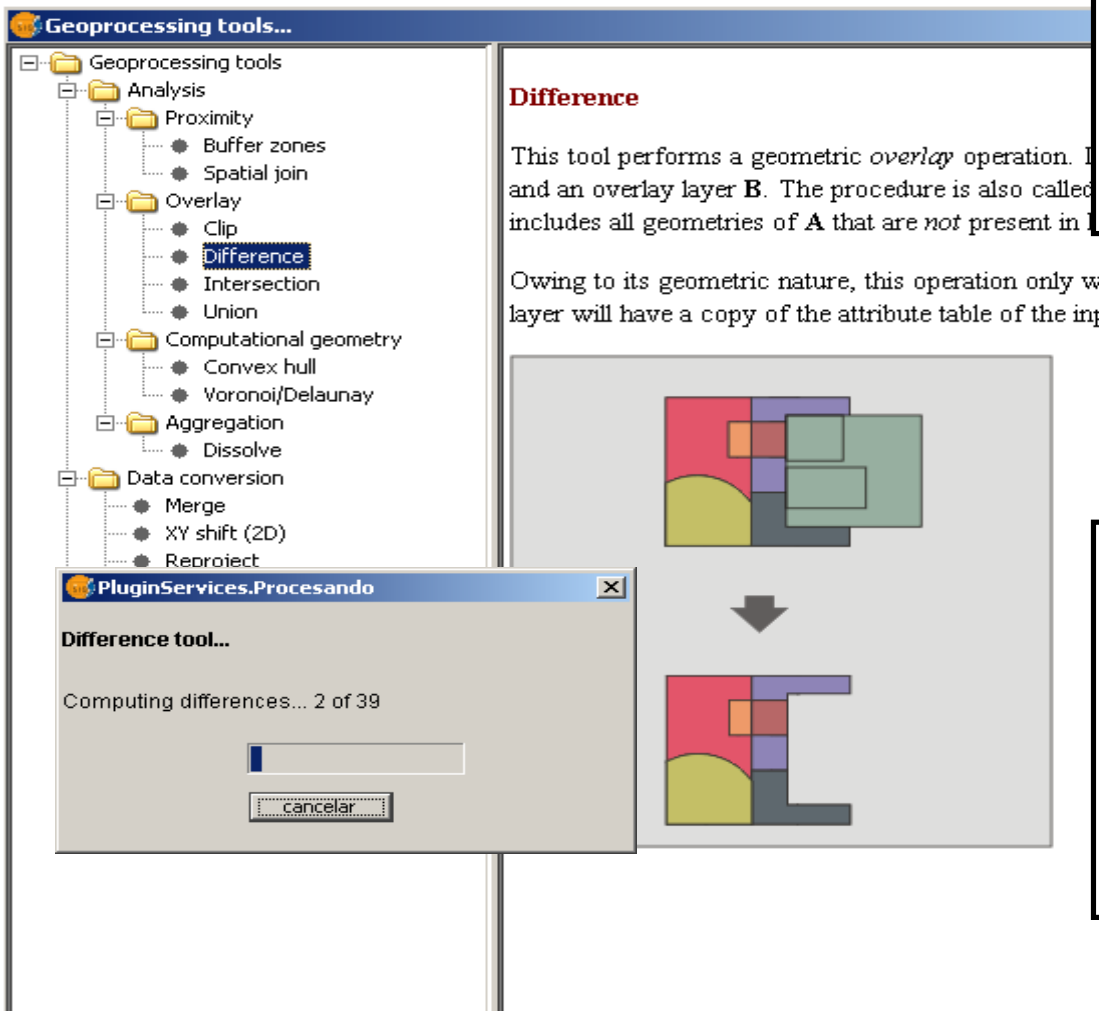
Sextante Modeler

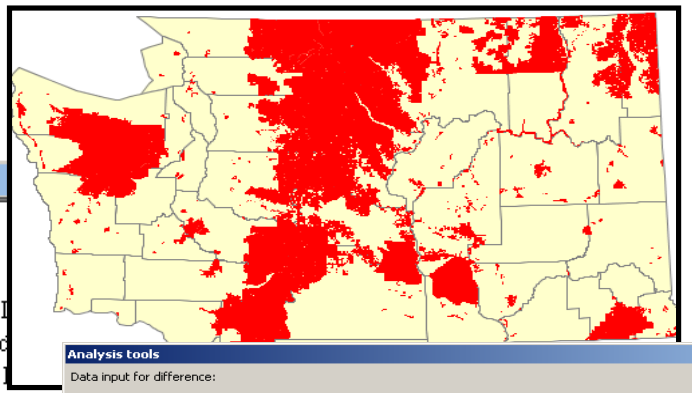


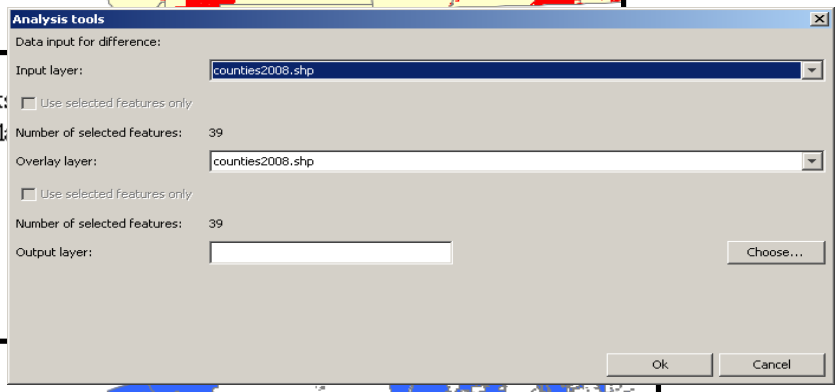
Layout

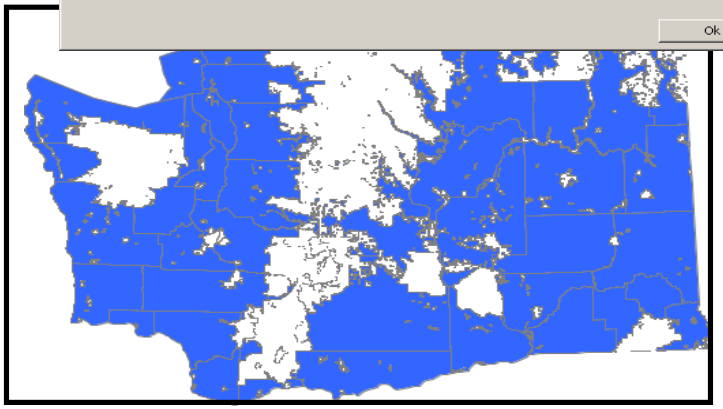

gvSIG 1.9 OADE 2010:washington.gvp
File View Map Tools Window Help
Project manager
Document types
View
Table
Map
WA Overview Uninhabited Areas
Session
Name: washington.gvp
Saved as: F:\dokumente\conferences\waurisa2010\
Creation date: Apr 6, 2010
Map : WA Overview Uninhabited Areas
Uninhabited Areas
Washington State Data 2010
Legend
Counties
Main Cities
Uninhabited Lands
TERRA GIS
Project file saved: washington.gvp
Kilometers

Overlay - Difference









- functionality examples
  - reprojection
  - batch processing
  - dissolve
  - format conversion
  - editing

Importing data into PostGIS

shp2pgsql + pgsql2shp

shp2pgsql -I -s 2285 counties2008.shp counties_pg > counties.sql

psql -U postgres -d weave –f counties.sql

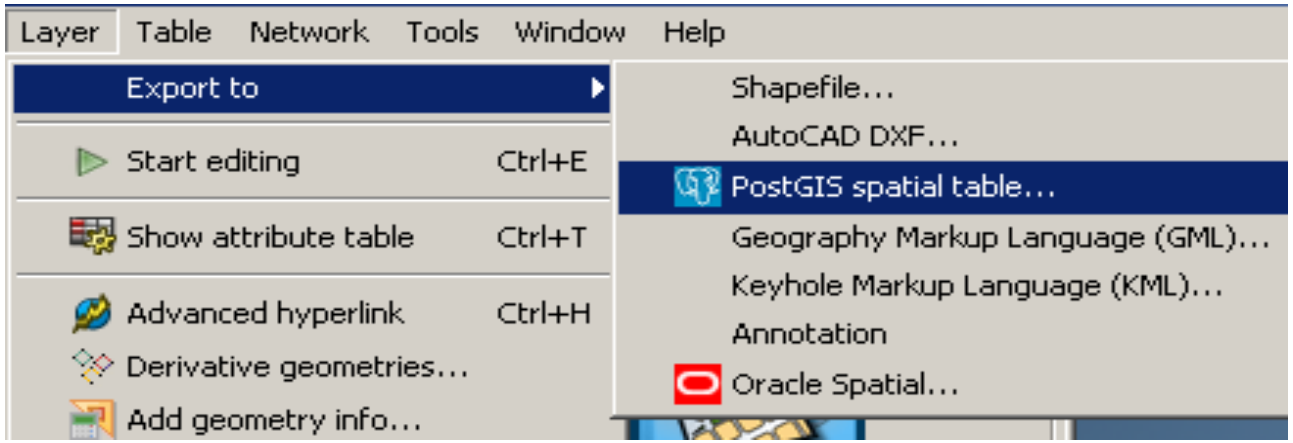
Can combine both with "|"

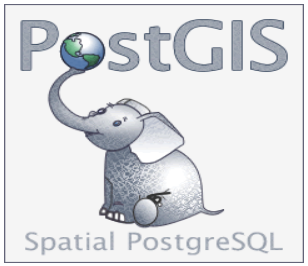
ogr2ogr

ogr2ogr -f "PostgreSQL" PG:"host=localhost user=postgres port=5432 dbname=workshop password=postgres" streamnet_fishdist.mdb -lco GEOMETRY_NAME=the_geom -t_srs "EPSG:2285" -nln "Fish_AllSpeciesCombined" fishspecies

user interfaces

gvSIG etc.





PostGIS – Spatial Database

- PostGIS is an extension for PostgreSQL
- adds support for geographic objects to PostgreSQL
- enables PostgreSQL server to be used as a backend spatial database for GIS
- Spatial operations and analysis simply mean running a (spatial) SQL query in the database
- Similar functions as SDE and much more ….

PostGIS facts

Main supporter of **PostGIS**	Refractions Research, Victoria, Canada
Type	Spatial database. PostGIS is an extension for PostgreSQL
Functionality	Storage and retrieval of spatial data (geometries such as point, line, polygon, multipoint, multiline, multipolygon, geometry collection). Spatial indexing. GIS functions via spatially enabled SQL. E.g. intersections, distance calculations, reprojection
Operating systems	Linux, Windows, Mac
Project started	2001
Implementation	C
OS libraries	GEOS, Proj4
License	GPL

Conferences

Year	Location	Dates	URL
2010	Barcelona, Spain	September 6-9 ,2010	http://2010.foss4g.org
2009	Sydney, Australia	October 20-23,2009	http://2009.foss4g.org
2008	Cape Town, South Africa	Sep/Oct 2008	www.foss4g2008.org
2007	Victoria, Canada	September 2007	http://www.foss4g2007.org
2006	Lausanne, Switzerland	September 2006	http://www.foss4g2006.org

User Groups

CUGOS	Cascadia Users of Geospatial Open Source	Seattle	http://cugos.org
PDX OSGIS	Portland Area	Portland	http://groups.google.com/group/pdx-osgis
BAUGOS	Bay Area Users of Geospatial Open Source	San Francisco	http://groups.google.com/group/baugos
FRUGOS	Front Range Users of Geospatial Open Source	Colorado	http://groups.google.com/group/frugos

Links

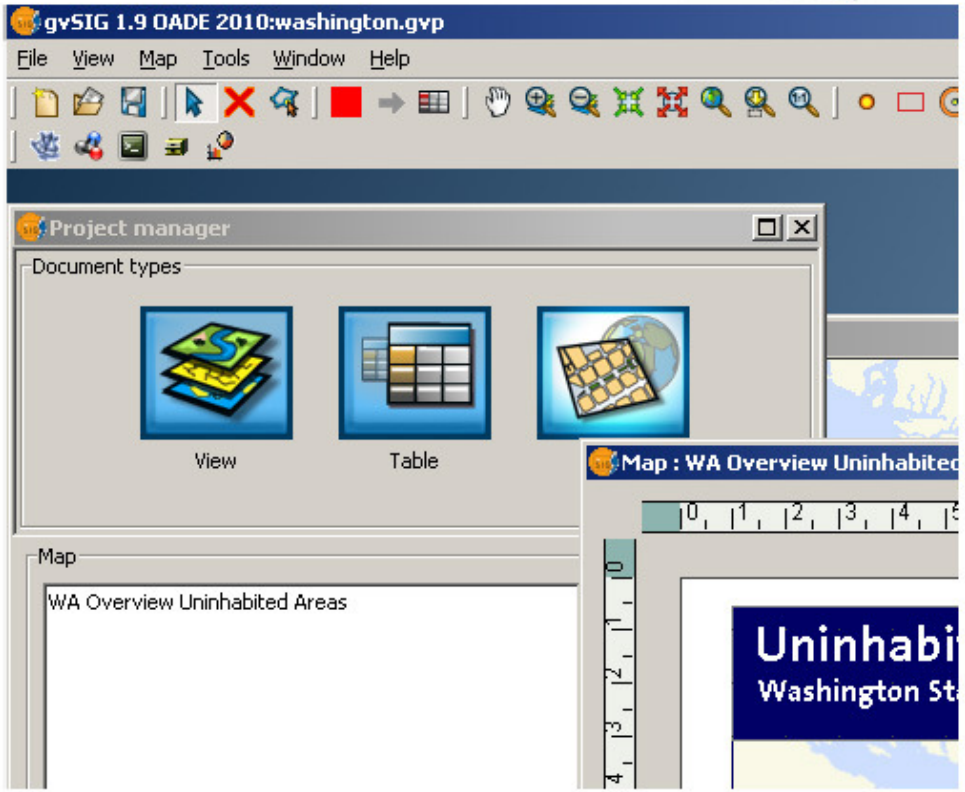
- gvSIG
- gvSIG Association
- gvSIG at OSGEO
- gvSIG project information
- gvSIG OA Digital Edition 2010, 1.0.
- blog post about gvSIG GIS by Karsten
- gvSIG overview - CSGIS website
- gvSIG Case Studies

gvSIG
Introductory class

November
16th +17th, 2010

Seattle
KC GIS Center

Introduction to gvSIG
a powerful Open Source
Desktop GIS



CONTACT ME WITH QUESTIONS

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TERRA GIS
TERRESTRIAL ENVIRONMENT REGIONAL ANALYSIS

TERRA GIS LTD OFFERS GIS CONSULTING AND TRAINING