

Problem Solving with Open Source GIS

Web GIS for Decision Support

a personal perspective

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Goals

- Illustrate how Decision Support GIS can benefit from OS Tools
- Overview summary about tools I used in various projects
 - How these tools where used – summary compilation
 - Functionalities used, which technical aspect they covered
 - Examples/case studies
- Personal background / perspective on
 - How I stumbled into OS GIS
 - How to develop technical skills in OS GIS
 - What skills are needed, ongoing education/ training

Background

- How I got into OS GIS
- Running a GIS consulting business since 2007
- Educational background in natural resources:
Physical Geography and Soil Science
- Using Open Source GIS a lot over the last 8 years
- Decision support GIS in
 - Natural resources management & conservation
 - Sustainable development
 - Social and environmental issues

Web GIS Projects

	description	PostGIS	MapServer	OpenLayers	GeoExt	Jquery	Custom PHP	Other
Ekiti State Infrastructure Viewer	Infrastructure Viewer							
Weave - WA Conservation Voters	Member and Voter engagement, mapping of members and active voters							MapScript
Whippet	Weed management prioritization tool							Code Igniter Wkhtmltopdf
US Geocoder	Geocoder (+reverse), Location based information about elected officials and spatial joins							
CALweedmapper	mapping the spread of invasive plants, data collection, database							
Micuenca	Integrated Watershed management projects in Latin America							
VFS Viewer (München Germany)	Large scale forest soil maps, suitability maps by tree species for private forest owners							Wkhtmltopdf
Office of Civil Legal Aid GIS	Mapping Poor people and civil legal aid resources in WA State							MapBender
Obama for America Campaign 2008	Campaign support for organizers in battleground States							
GeoSpatial Partners	Web based image processing. Map creation from sat. imagery via model algorithms, plant vigor etc.							GDAL/OGR Wkhtmltopdf

How Decision Support GIS can benefit from OS Tools

planning of :

- **Inventory & Quantification**

- how many features + where

- **Localization**

- where to allocate resources

- (pro bono lawyers + poor people match)

- **Prioritization**

- allocation of resources

- action

- (weed management , contact voter, ask for support, ...)

Translating planning tasks into functionalities

Summary how I used OpenLayers – Viewer



- **Map Display, „trivial“ Map Viewer tasks , e.g.**
 - attribute ID Tool
 - display and highlight vector data
 - choice of commercial base maps
- **GIS functionalities**
 - reproject features client side
 - create WKT vector features client side
 - use any custom map projection
 - use custom created map tiles (TileCache e.g.)
 - support dynamic layer update client side (*mergeparams*)
- **Integrated with JQuery or GeoExt (Javascript)**
 - tabular data representation and user interface

Translating planning tasks into functionalities

Summary how I used PostGIS - Database



- **Unified data storage and retrieval**
- **GIS functionalities**
 - Find nearest spatial features
 - Nearest road (reverse geocoding)
 - Nearest *conspicif* plant species (Whippet model)
 - Buffer, locate within another feature, and calculate distances (modeling)
 - Model calculations of attributes (leading to prioritization scores)
- **Extension of MapServer capabilities**
 - Data queries for dynamic data display

Translating planning tasks into functionalities

Summary how I used MapServer – Rendering Engine

■ **Map Display and rendering functionalities**



- Cartography, map layer classification etc...

- Dynamic Layer Display

 - replacement variables

 - SLD (read external SLD, output SLD)

- Map Tile Rendering engine

■ **Data publishing**

- WMS

- Dynamic Legend images

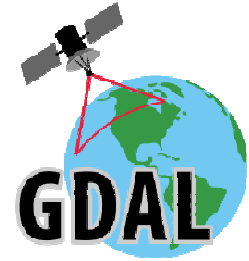
- wide range of input formats

Translating planning tasks into functionalities

Summary how I used GDAL/OGR

■ Raster / Image processing

- run automatically from server side skripts on server bash shell
- image mosaicing, reprojection
- custom scripts to process 3 band tiff images e.g. vegetation vigor classification (Landsat 7+ 8)
- assemble *synthetic* map images , grayscale for background + color classified raster map



Examples/case studies

■ VFS Viewer

An information system for privately owned forest areas in the State of Bavaria, Germany

■ Web Based Image Processing

Commercial system for automatic web based image processing and map delivery

■ Whippet

Weed management & prioritization in California



Kartenanzeige

Kartendaten

- ☒ Flurkartenschnitt 1:5.000
- ☒ Regierungsbezirk
- ☒ Landkreis
- ☒ Gemeinde
- ☒ Kartiergebiete
- Kartiergebietsgrenze
- ☒ Bayern

Schutzgebiete

Datenquellen:

Regierungsbezirke, Landkreise,
Gemeinde, Flurkartenschnitt: LVG
Bayern
Schutzgebiete: LFU Bayern

Impressum:

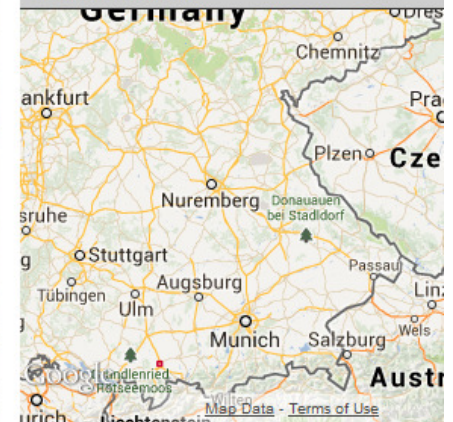
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Übersichtskarte



Wo liegt mein Wald?

► Treffer ein-/ausschalten

Adresse

Ortsteil, Gemeinde, Strasse, Postleitzahl:

Q kempten

Die Suche ergab genau einen Treffer

starten





BETA

BETA

Adjust population variables

Step 1 of 5

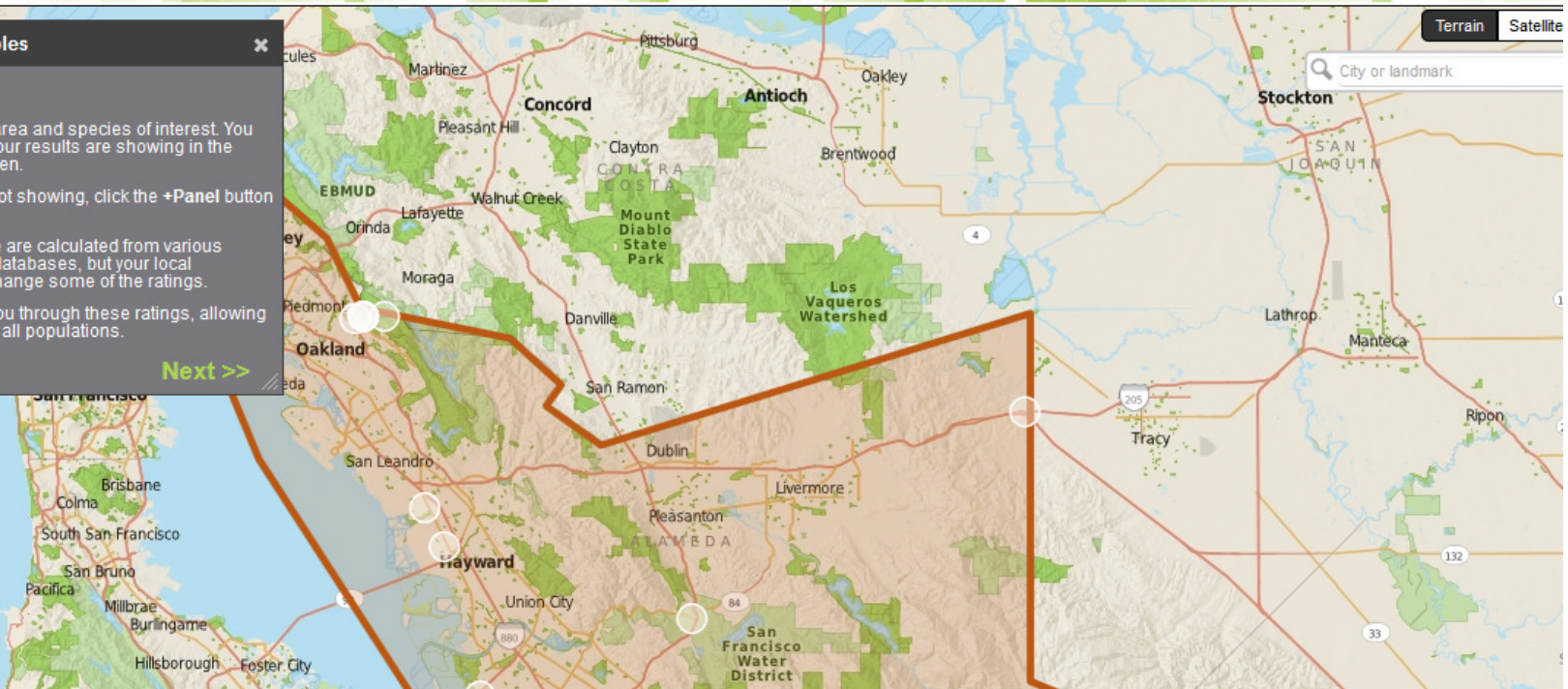
The first step is to select the area and species of interest. You have already done this, and your results are showing in the table at the bottom of the screen.

If the table of populations is not showing, click the **+Panel** button in the lower right corner.

The default values in the table are calculated from various conservation and land cover databases, but your local knowledge may lead you to change some of the ratings.

These next panels will walk you through these ratings, allowing you to change them for any or all populations.

Next >>



Found 15 populations of *Acacia dealbata*, *Acacia melanoxylon*, *Acroptilon repens*, *Aegilops triuncialis*, *Ageratina adenophora*, *Agrostis avenacea*, *Agrostis stolonifera*, *Ailanthus altissima*

Species	Observer & Date	Site Value	Accessibility	Pop'n Size	Herbicide?
 <input checked="" type="checkbox"/> Ageratina adenophora	Daniel Gluesenkamp 2012-03-21	Very High (10) 	Moderate (3) 	> 1-10 ac (3) 	Yes 
 <input checked="" type="checkbox"/> Acroptilon repens	Edmund Duarte 2011-08-08	Moderate (3) 	Moderate (3) 	> 1-10 ac (3) 	Yes 
 <input checked="" type="checkbox"/> Acroptilon repens	Edmund Duarte 2011-07-26	Very High (10) 	Moderate (3) 	> 1-10 ac (3) 	Yes 

