

Jessie Eichar



Jody Garnett



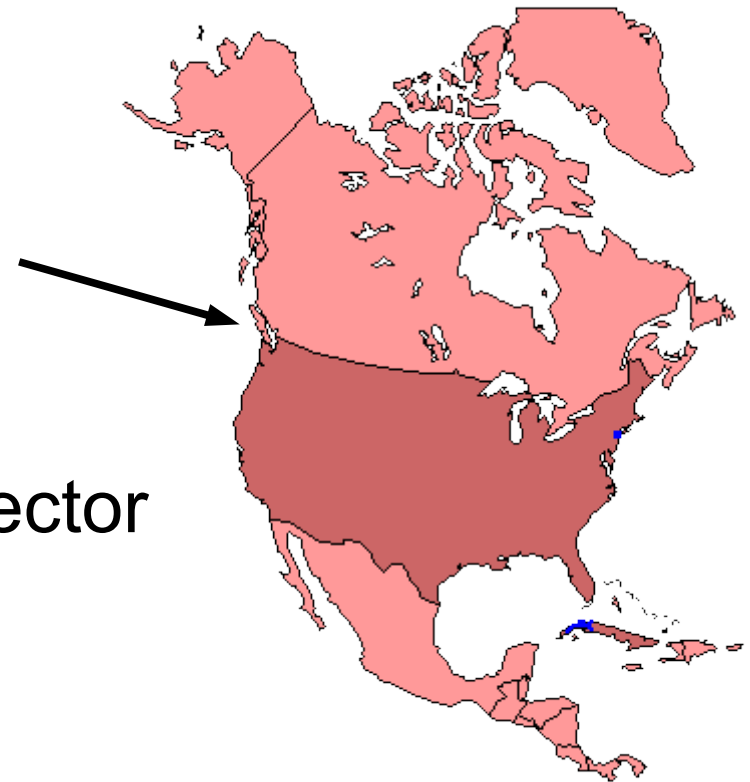
Jeff Lounsbury



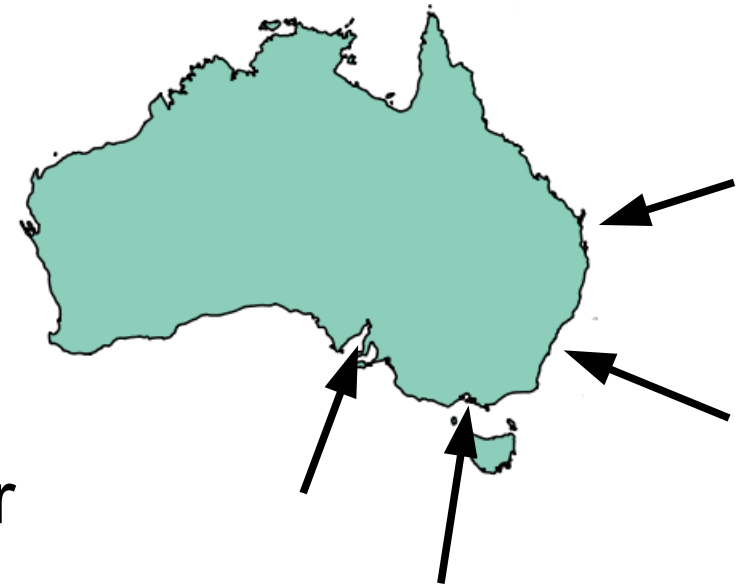
User-friendly Desktop Internet GIS (uDig)

# Refractions Research

- Started uDig in 2004
- Spatial Systems Consulting Company
  - Victoria BC based
  - 25 employees
  - In business for 10 years
- Clients
  - Canada/US/International
  - Federal/Provincial/Private Sector



- Spatial Systems Integration
  - Open Standards
  - Open Source
  - Australia in Sydney, Melbourne, Adelaide ... and Brisbane
- Clients
  - Federal / State / Private Sector
  - OGC



# Other Organizations

- CampToCamp
  - Switzerland and France
- HydroloGIS
  - Based in Italy
  - Hydrology and Geomorphological
- Axios
  - Based in Spain
  - Advanced Edit Tools





# So why open source?

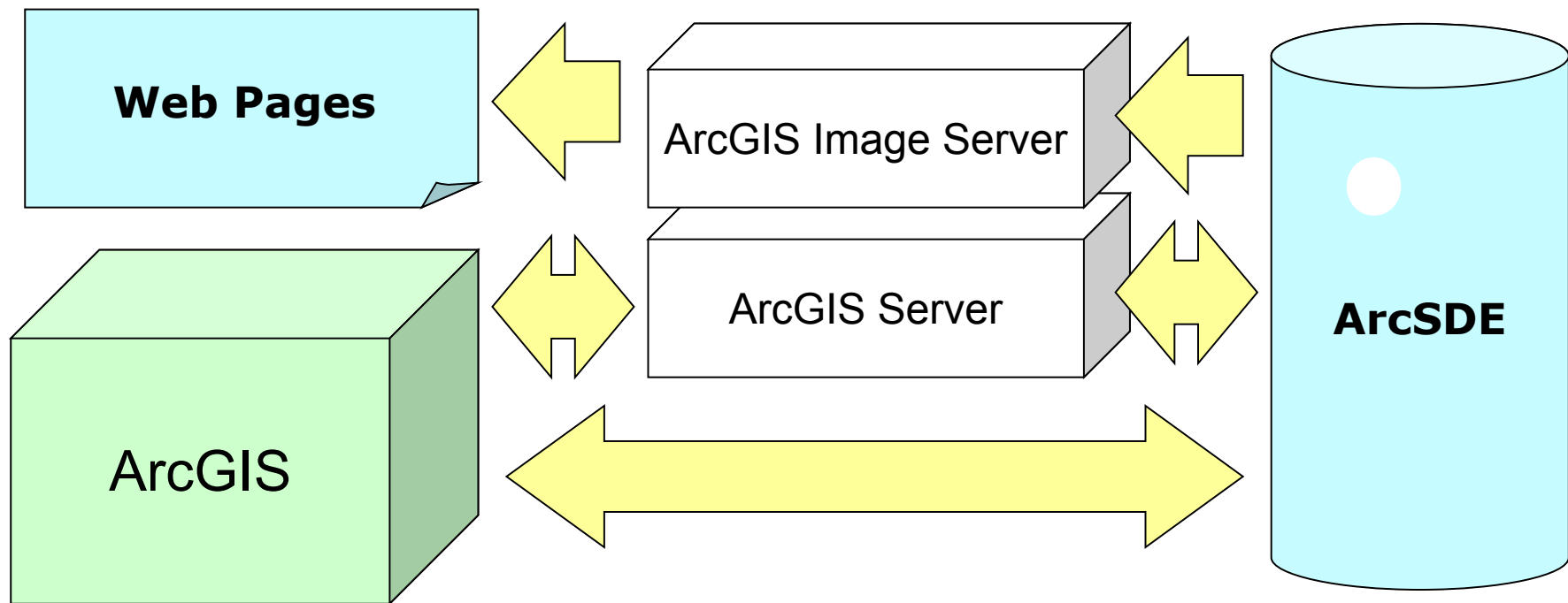
- We need to get the job done
  - We use open source
  - We use proprietary
- Open source our own tools allows us to share maintenance costs
- Being active allowed me to meet you (good advertising)
- Access to experts
- Sharing development risk



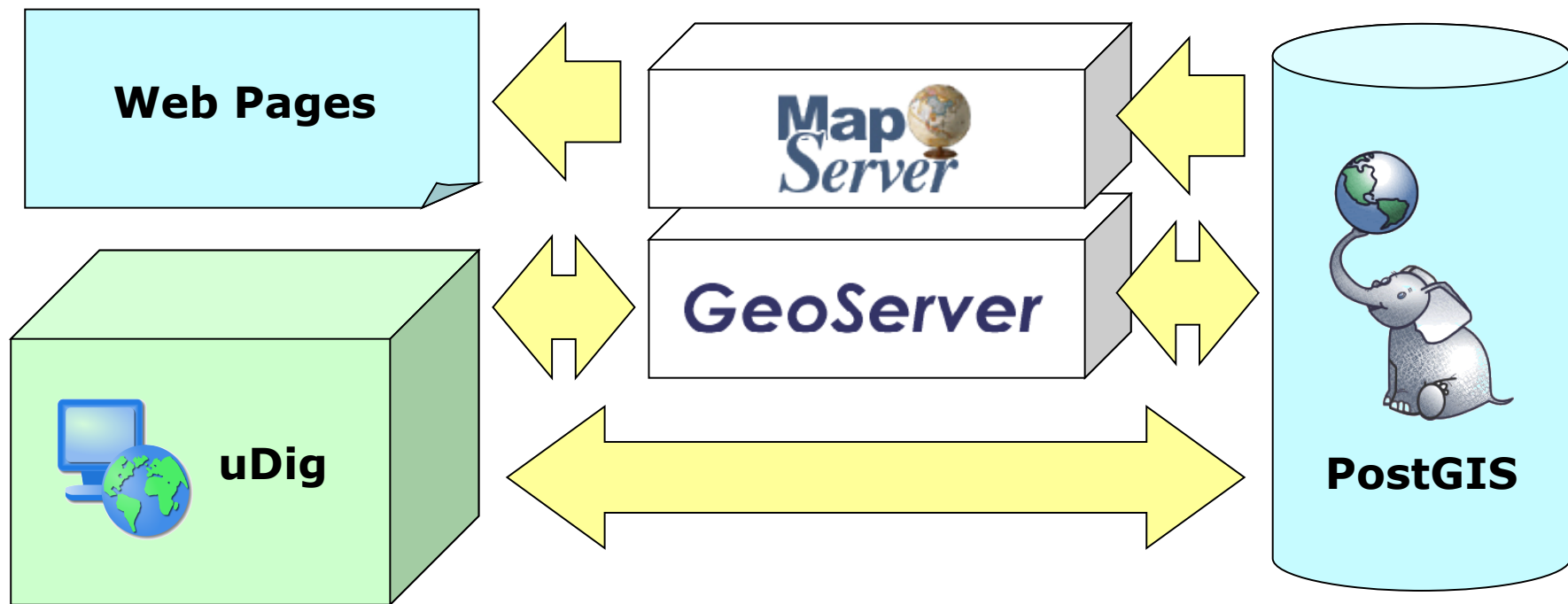
- Spatial Database
  - Concurrency
  - Transactions
  - Seamlessness
- Internet Publishing
  - Feature Access
  - Map Access
- Data Manipulation
  - Direct Access
  - Editing
  - Cartography



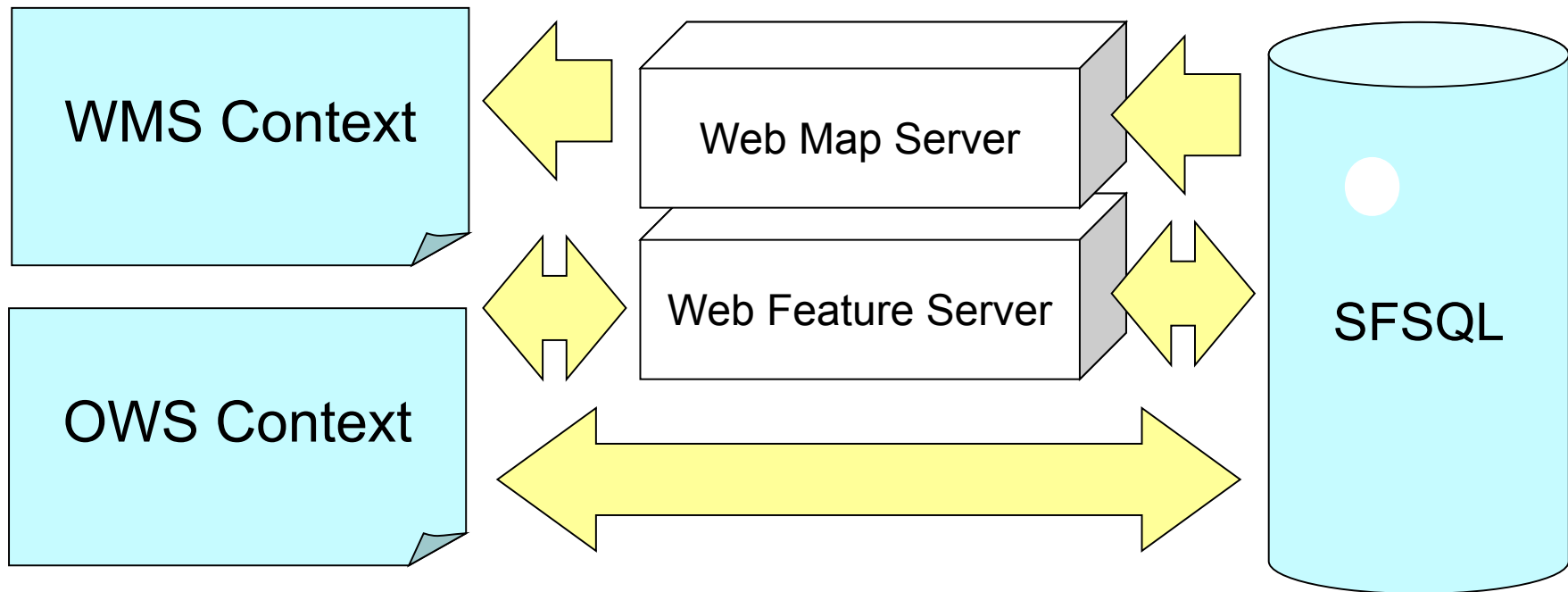
# ESRI Architecture



# Open Source Geospatial Architecture



# Open Standards



# Missing Link for OpenGIS

- Directly view WMS
- Directly edit WFS
- Search Catalogs
- Integrate standard GIS data
- Hide complexity of network access



# Missing Link for Open Source Spatial

- Standards GIS Functionality
- Directly Edit GIS data
- Connect to PostGIS, MapServer and GeoServer
- Create paper cartography
- Integrate with proprietary infrastructures



# User-friendly

- Direct hands on experience
  - Drag and Drop
  - Responsive user interface
- Sensible defaults
  - optimize for the 90% use case
  - Make use of all the information
- Consistency





# Desktop

- A normal Desktop Application
- Desktop integration; drag and drop
- Native OS widgets



- Web Map Server
- Web Feature Server
- Catalog Service Web
- Open Web Map Context



- Working with local data
- Integrate with existing infrastructure
- Paper Cartography



# uDig Software Developers Kit

- the best of the open source stack
  - Plug-in System – Eclipse RCP
  - Topology – JTS
  - Standards Support – GeoTools
- Not limited to just Java
  - ImageIO-Ext project bridging GDAL to JAI
  - OSSIM integration
- LGPL means no per seat license



# Successful Projects

- DIVA GIS
  - Front end to data-warehouse using R for stats
- JGRASS
  - Hydrology Project now in the help menu
- Axios
  - Advanced Editing Tools
- LISAssoft
  - SLIP Tile Download Plugin
- Refractions
  - Populations at Risk, Line Matcher, etc...



# DIVA GIS

The screenshot displays the DIVA-GIS 6.0 RC5 (Annapurna) software interface. The main window shows a map of a region with a grid overlay, representing a GridBox Analysis. The map is color-coded according to a legend, with colors ranging from red to green. The interface includes a menu bar (File, Edit, Navigation, Layer, Tools, Analysis, Data, Window, Help), a toolbar, and several panels: Projects, Layers, Catalog, Style, and GridBox Analysis.

The **Projects** panel shows a project structure with a folder named "project" containing a sub-folder "Map1" and three layers: "pe\_wildpot", "analysis", and "pe\_department".

The **Layers** panel shows the layers "analysis", "pe\_wildpot", and "pe\_departments" are checked and visible.

The **Catalog** panel shows a table of class labels and their corresponding colors:

ID	Class Label	Top Limit	Class Color
1	Class 1	[ value >= 0.0 ]	#EF0000
2	Class 2	[ value >= 2.0 ]	#FEF500
3	Class 3	[ value >= 6.0 ]	#FEAD00
4	Class 4	[ value >= 10.0 ]	#00FE76
5	Class 5	[ value >= 14.0 ]	#FEB887
6	Class 6	[ value >= 18.0 ]	#FE6969

The **Style** panel shows the following settings:

- Class Attributes:** Color: Choose a Color (Red), Class Label: Class 1, Lower Limit: 0.0, Update SLD File button.
- General Style Settings:** Fill Opacity: 50%, Stroke Color: Red.
- Generate Classes:** Number of Classes: 6, Apply button.
- Classification Schemes:** Equal Interval.

The **GridBox Analysis** panel shows the analysis type and a checkmark indicating it is active.

The status bar at the bottom shows the coordinate system as WGS 84 and the current location as -92.81, -0.27.



# JGrass





JGrass - Java Geographic Resources Analysis Support System

File Edit Navigation Hydrologic Analyses Layer Map Data Window Help

Projects rete\_adige

hydrocare  
 rete\_adige  
 schwachstelle

Layers Bookmarks

JGrass Raster Legend  
 geologia\_prova  
 punti\_monitoraggio\_oracle\_final\_utm\_c  
 bacino\_adige  
 rete\_adige  
 punti\_monitoraggio\_oracle\_meteo

- Depositi detritici, alluvionali e glaciali indistinti.
- Depositi clastici in parte sintettonici.
- Basalti.
- Intervallo clastico e carbonatico incompetente.
- Terza unita' carbonatica stratificata incompetente (in prevalenza carbonatica).
- Terza unita' carbonatica competente. Calcarei Grigi, Calcare del Misone, ecc.
- Successione indistinta calcareo-dolomitica a carattere in prevalenza incompetente.
- Seconda unita' carbonatica incompetente. Calcarei e argilliti stratificati.
- Seconda unita' carbonatica competente. Dolomie in prevalenza massicce. Dolomia Principale.
- Discontinuo intervallo incompetente pelitico-carbonatico evaporitico, spesso policromo ecc.
- Conglomerato della Marmolada.
- Vulcaniti. basalti shoshonitici.
- Effusioni ed intrusioni triassiche indistinte.
- Magmatiti granitiche.
- Magmatiti sienitiche ed alcalisienitiche.
- Magmatiti monzodioritiche e monzogabbriche.
- Prima unita' carbonatica stratificata incompetente. Formazione di La Valle, ecc.
- Prima unita' carbonatica competente. Formazione di Contrin, Dolomia dello Sciliar, ecc.
- Formazione a Bellerophon, Formazione di Werfen, Servino, Carniola.
- Arenarie di Val Gardena e Calcarei a Bellerophon indistinti.
- Molassa post-ercinica. Arenarie di Val Gardena, Verrucano lombardo.
- Vulcaniti riolitiche, riodacitiche e andesitiche indistinte.
- Rioliti.
- Daciti e riodaciti.
- Andesiti.
- Molassa post-ercinica. Conglomerato di Ponte Gardena, Formazione di Collio.
- Granitoidi.
- Micascisti e Filladi
- Paragneiss.
- Porfiroidi.
- Granodiorite del Lago d'Arno e del Lago Boazzo (41 Ma).
- Tonalite del Monte Re di Castello (37 Ma).
- Trondjemite del Corno Alto (34 Ma) e granodiorite di Sostino.
- Tonalite dell'Adamello occidentale (34 Ma).
- Leucotonalite dell'Adamello centrale (33.8 Ma).
- Tonalite della Val d'Avio (34 Ma).
- Tonalite della Val di Genova (32.2 Ma).
- Tonalite della Presanella centrale (31.6 Ma).
- Tonalite della alta Val Nambrone.
- Tonalite della Presanella NE (29.4 Ma).
- Tonalite del Lago della Vacca (40-42 Ma).
- Granodiorite del Bruffione (39.5 Ma).
- Masse gabbriche.
- Micascisti e filladi (Falda dell'Ortles).
- Paragneiss talora migmatitici (Zona Ulten-Tonale).
- Marmi antichi.
- Anfiboliti e peridotiti serpentinite.
- Orthogneiss, da granitoidi prevarisici.
- Laghi e corsi d'acqua.
- Chilacciai.

1:457,312 UTM Zo...sphere 644574, 5154080

Catalog Web Catalog Search Table





JGrass - Java Geographic Resources Analysis Support System

File Edit Navigation Hydrologic Analyses Layer Map Data Window Help

Projects: rete\_adige

hydrocare

- rete\_adige
- schwachstelle

Layers: JGrass Raster Legend

- geologia\_prova
- punti\_monitoraggio\_oracle\_final\_utm\_c
- bacino\_adige
- rete\_adige
- punti\_monitoraggio\_oracle\_meteo

Legend:

- Depositi detritici, alluvionali e glaciali indistinti.
- Depositi clastici in parte sintettonici.
- Basalti.
- Intervallo clastico e carbonatico incompetente.
- Terza unita' carbonatica stratificata incompetente (in prevalenza carbonatica).
- Terza unita' carbonatica competente. Calcarei Grigi, Calcare del Misone, ecc.
- Successione indistinta calcareo-dolomitica a carattere in prevalenza incompetente.
- Seconda unita' carbonatica incompetente. Calcarei e argilliti stratificati.
- Seconda unita' carbonatica competente. Dolomie in prevalenza massicce. Dolomia Principale.
- Discontinuo intervallo incompetente pelitico-carbonatico evaporitico, spesso policromo ecc.
- Conglomerato della Marmolada.
- Vulcaniti. basalti sishonitici.
- Effusioni ed intrusioni triassiche indistinte.
- Magmatiti granitiche.
- Magmatiti sienitiche ed alcalisienitiche.
- Magmatiti monzodioritiche e monzogabbriche.
- Prima unita' carbonatica stratificata incompetente. Formazione di La Valle, ecc.
- Prima unita' carbonatica competente. Formazione di Contrin, Dolomia dello Sciliar, ecc.
- Formazione a Bellerophon, Formazione di Werfen, Servino, Carniola.
- Arenarie di Val Gardena e Calcarei a Bellerophon indistinti.
- Molassa post-ercinica. Arenarie di Val Gardena, Verrucano lombardo.
- Vulcaniti riolitiche, riodacitiche e andesitiche indistinte.
- Rioliti.
- Daciti e riodaciti.
- Andesiti.
- Molassa post-ercinica. Conglomerato di Ponte Gardena, Formazione di Collio.
- Granitoidi.
- Micascisti e Filladi
- Paragneiss.
- Porfiroidi.
- Granodiorite del Lago d'Arno e del Lago Boazzo (41 Ma).
- Tonalite del Monte Re di Castello (37 Ma).
- Trondhjemite del Corno Alto (34 Ma) e granodiorite di Sostino.
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- Masse gabbriche.
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- Paragneiss talora migmatitici (Zona Ulten-Tonale).
- Marmi antichi.
- Anfiboliti e peridotiti serpentinite.
- Ortogneiss, da granitoidi prevarisici.
- Laghi e corsi d'acqua.
- Ghiacciai.

1:457,312 UTM Zo...sphere 644574, 5154080

Catalog Web Catalog Search Table



# JGrass Hydrology

The screenshot displays the JGrass software interface. The title bar reads "JGrass". The menu bar includes "Tools", "Horton Machine", "Window", and "Help". The "Horton Machine" menu is open, showing a list of hydrological tools:


- DEM manipulation
- Geomorphology
- Network related measures
  - h.extractnetwork
  - h.D2O
  - h.D2O3D
  - h.DD
  - h.hacklength
  - h.hacklengths3D
  - h.hackstream
  - h.magnitudo
  - h.seol
  - h.strahler
  - h.netnumbering
  - h.netdif
- Hillslope analyses
- Basin attributes
- Statistics
- Hydro-geomorphology

The main window shows a map of a watershed with a color-coded elevation gradient (green and blue) and a red stream network. The status bar at the bottom displays the coordinates "1:39,058", "Monte ... zone 1", and "1637684, 5114440". The bottom-left corner has buttons for "Catalog", "Active Region", and "Table View".



# Axios Spatial Operations

Catalog Web Catalog Search Default Feature Editor Table View **Spatial Operations** Issues

Operation **Buffer**  Perform


**Buffer**  
Clip  
Intersect

**Source**  
Layer

**Result**  
Layer

**Options**  
Width

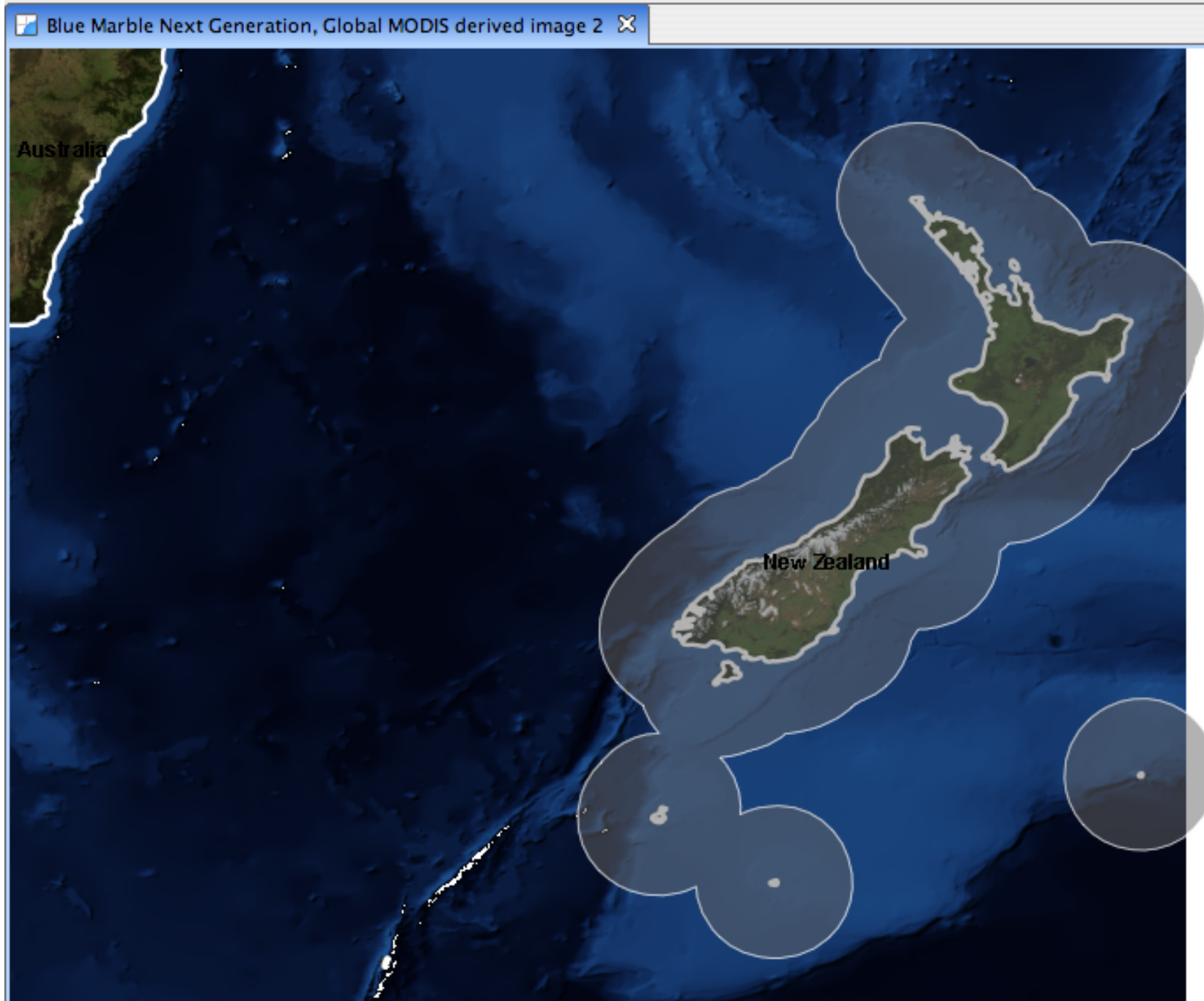
Map's units  Layer's units  Units Selection

**Advanced options** 

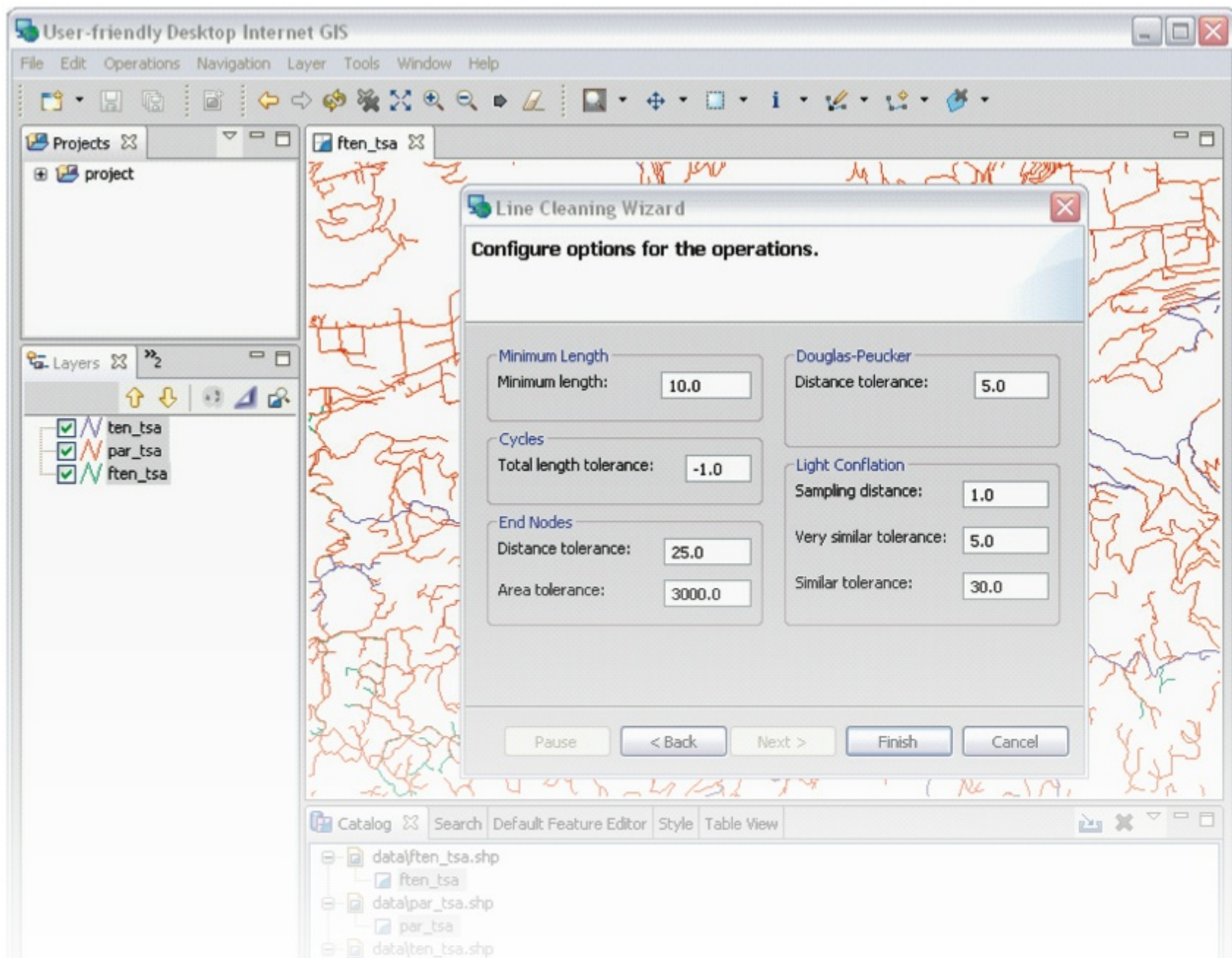




# Axios Spatial Operations - Buffer

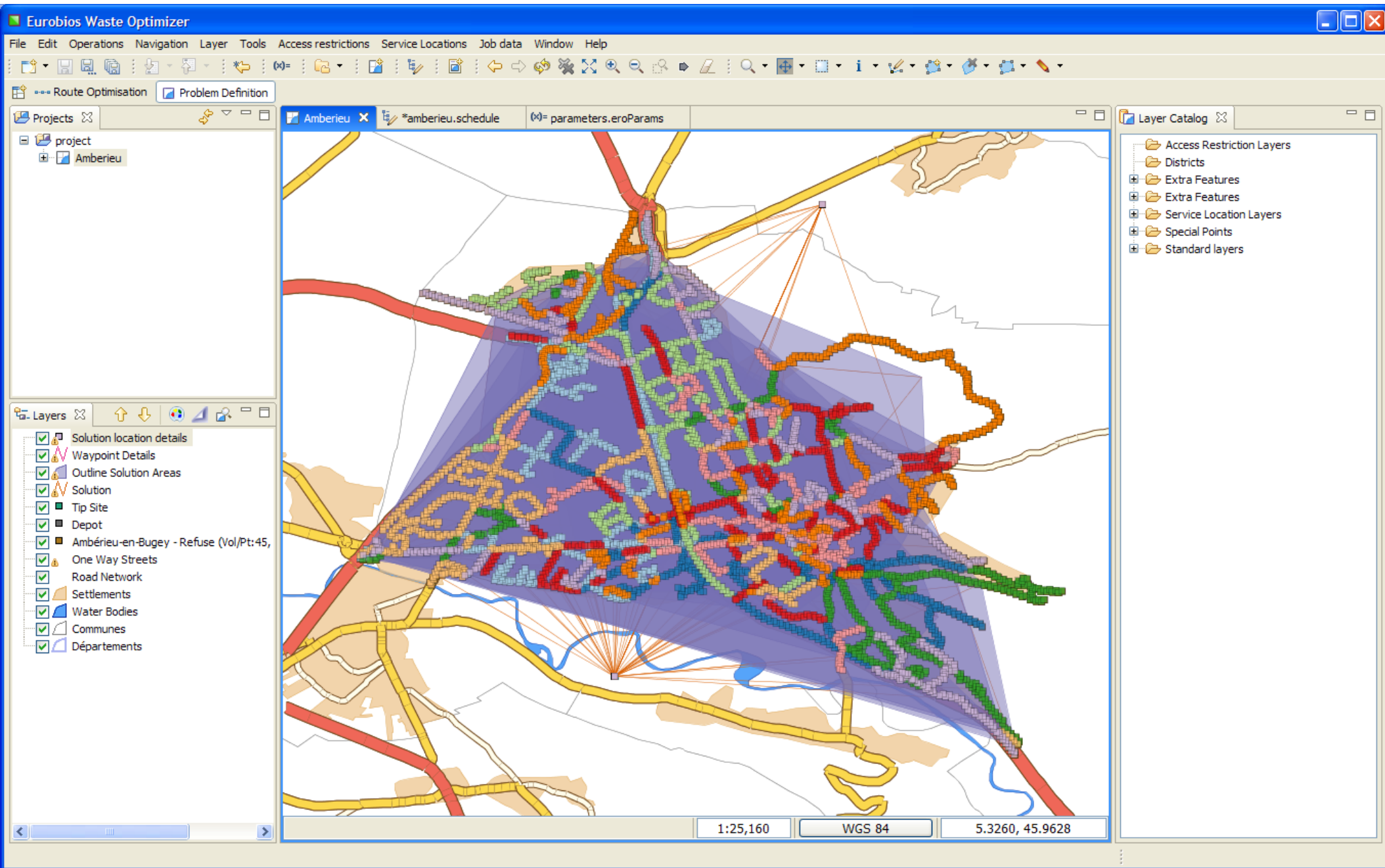


# Line Cleaner





# Eurobios Route Optimization Engine





- From the city of Münster Germany
- OGC Web Processing Client
- Chaining of data services within the process request
- Manage multiple WPS instances
- Log interaction with Ganymede plugin





# 52° North

User-friendly Desktop Internet GIS

File Edit Operations Navigation Layer Tools Window Help


Projects

- project
  - Map

Map

Layers

- smooth geometries
- Buffered Polygon
- landcover
- province
- ras2006\_Type
- spanish roads



1:203,879 WGS 84 -8.223, 42.557

Catalog Web Catalog Search Default Feature Editor Table View Ganymede Log(s) View

Quick Filter: No Filter

Date	Message
2007-05-0...	Fetching Response From Cache for Request: <Execute xmlns="http://www.opengespatial.net/vps" xmlns:ows="http://www.opengespatial.n...
2007-05-0...	Fetching Response From Cache for Request: <Execute xmlns="http://www.opengespatial.net/vps" xmlns:ows="http://www.opengespatial.n...
2007-05-0...	Fetching Response From Cache for Request: <Execute xmlns="http://www.opengespatial.net/vps" xmlns:ows="http://www.opengespatial.n...
2007-05-0...	Factory already initialized
2007-05-0...	Fetching Response From Cache for Request: <Execute xmlns="http://www.opengespatial.net/vps" xmlns:ows="http://www.opengespatial.n...
2007-05-0...	Factory already initialized
2007-05-0...	<ows:ExecuteResponse xmlns:vps="http://www.opengespatial.net/vps">□□ <ows:Identifier xmlns:ows="http://www.opengespatial.net/...
2007-05-0...	<ows:ExecuteResponse xmlns:vps="http://www.opengespatial.net/vps">□□ <ows:Identifier xmlns:ows="http://www.opengespatial.net/ows">org...
2007-05-0...	Fetching Response From Cache for Request: <Execute xmlns="http://www.opengespatial.net/vps" xmlns:ows="http://www.opengespatial.n...
2007-05-0...	<ows:ExecuteResponse xmlns:vps="http://www.opengespatial.net/vps">□□ <ows:Identifier xmlns:ows="http://www.opengespatial.net/...
2007-05-0...	<ows:ExecuteResponse xmlns:vps="http://www.opengespatial.net/vps">□□ <ows:Identifier xmlns:ows="http://www.opengespatial.net/ows">org...
2007-05-0...	CONNECT

Rendering Map: Map

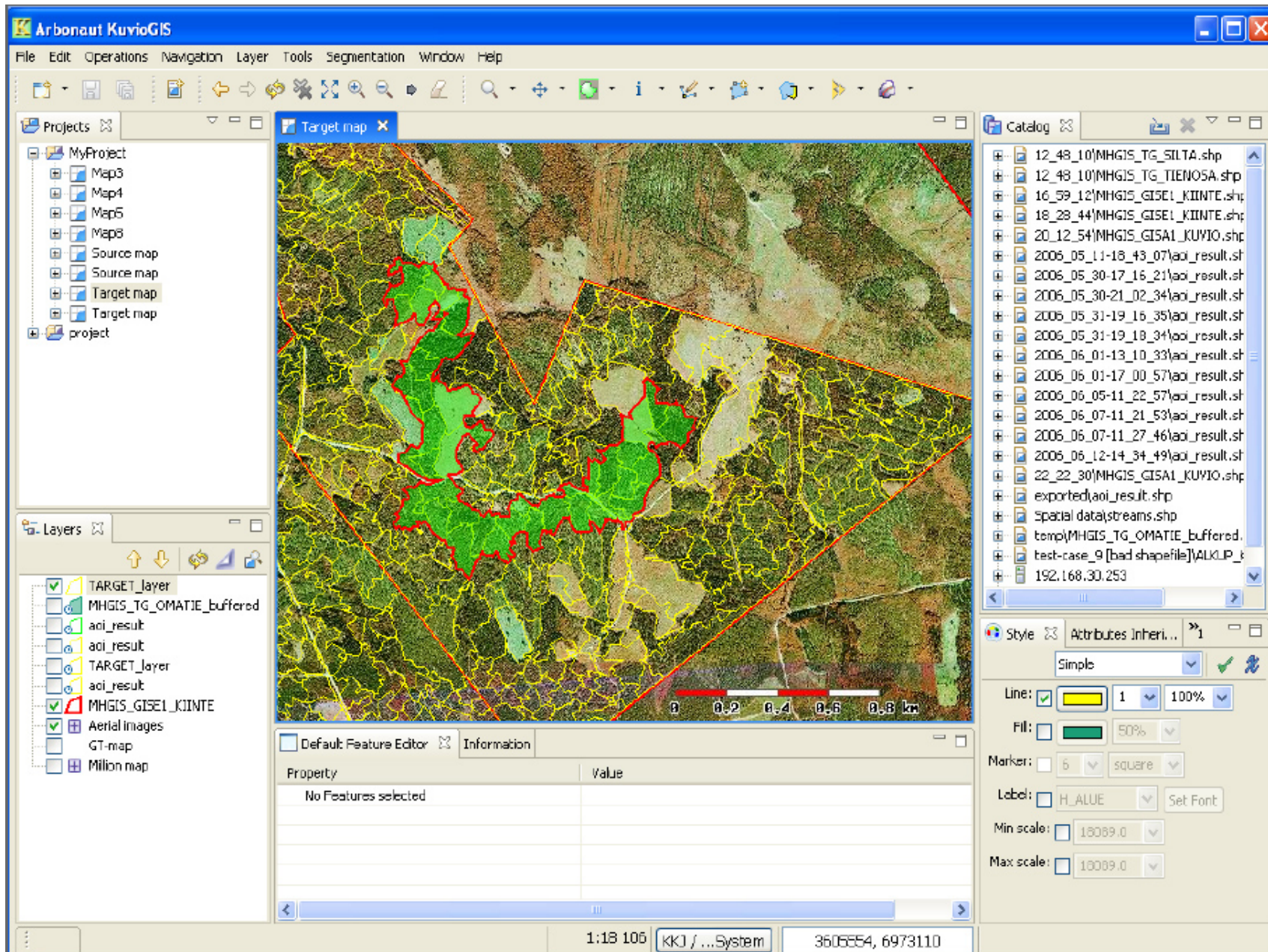


- Arbonaut – private company out of Helsinki,
- ArboGIS - automation for forest inventory update
  - Extract forest stand information from aerial maps
  - Attach information from old inventory to new stands
- TAAKA





# Arbonaut - ArboGIS





# Arbonaut - ArboGIS

The screenshot displays the Arbonaut KuvioGIS software interface. The main window is titled "Arbonaut KuvioGIS" and features a menu bar (File, Edit, Operations, Navigation, Layer, Tools, Segmentation, Window, Help) and a toolbar with various GIS tools. The interface is divided into several panels:

- Projects:** A tree view showing a project named "MyProject" containing several maps (Map3, Map4, Map5, Map8) and source maps.
- Layers:** A list of layers including "TARGET\_layer", "MHGIS\_TG\_OMATJE\_buffered", "aci\_result", and "MHGIS\_GISEI\_KIINTE".
- Target map:** A map view showing a red boundary and a green area on a satellite image.
- Source map:** A map view showing a yellow boundary and a green area on a satellite image.
- Style Catalog:** A panel for styling, showing a "Simple" style with options for Line (width 1, color green), Fill (color green, 50% opacity), Marker (size 5, shape square), Label (text "H\_ALUE", font "Set Font"), and scale settings (Min scale: 18093.0, Max scale: 18093.0).
- Attributes Inheri...:** A panel for attribute inheritance, currently showing "1".
- Information:** A table with columns "Property" and "value", currently displaying "No Features selected".

At the bottom of the interface, there is a status bar showing the scale "1:18 093", the system path "KKJ / ... System", and the coordinates "3600565, 6972452".





# Arbonaut - TAAKA

The screenshot displays the TAAKA software interface, which is used for land use planning and mapping. The main window shows a map titled "Miljoonakartta" with various layers and features overlaid on a satellite-style background. The interface includes several panels:

- Layers:** A list of layers on the left side, including "työkohteen\_metsätalouskuviot\_119073", "SELEKEYTYKSEN\_VALUMA\_ALUE", "RUMMUT", "PINTAVALUTUSKENTTA", "PIENNARTASANNE", "PEHMEIKKO", "MAAJOHTO", "LASKEUTUSALLAS", "KAIVUKATKO", "ILMAJOHTO", "HAARUKKAOJA", "AJOLUISKA", "OJANOSA", "KUNNOSTUSOJITUKSEN\_TYOKOHDE", "Peruskartta", "Ilmakuvat", "GT-kartta", and "Miljoonakartta".
- Style:** A panel at the bottom left for styling the map. It includes options for "Line" (color, width, and opacity), "Fill" (color and opacity), "Marker" (shape and size), "Label" (font and position), and "Min scale" and "Max scale" settings.
- Catalog:** A panel at the bottom right showing a hierarchical list of layers and features, including "Ilmakuvat", "Miljoonakartta", "Peruskartta", "Vektorit", "AE\_ALUEET", "AE\_PISTEET", "GISA1\_KUVIO", "KIINTEISTORAJAT", "PAAMAANKAYTTO", "SIVUMAANKAYTTO", "Kohdetasot", "Kohdetasot", "AJOLUISKA", "AJOURA", "HAARUKKAOJA", "ILMAJOHTO", "KAIVUKATKO", and "KUNNOSTUSOJITUKSEN\_TYOKOHDE".
- Map:** The central map area shows a detailed view of a site with various features labeled, such as "Selk. valuma-alue 2", "Ilmajohdot", "Maajohto", "Kaiivukatko", "Laskeutusallas", "Pintavalutuskenttä", "Piennartasanne", "Ajoluiska", "Ojanosa", "Rumpu", and "Terästä". Dimensions and coordinates are also displayed on the map.
- Scale and Coordinates:** A scale bar at the bottom indicates a scale of 1:29,706. The map shows coordinates in the KKKJ system, with values 3353917, 7012430.





# Arbonaut - TAAKA

The screenshot displays the TAAKA software interface. The main window shows a map with several annotations and project details. The project information includes:

- Suunnittelun yksikkö:** 123 Karstula
- Suunnittelun piiri:** 2
- Työkohde:** 74 Kalkki
- Scale:** 1:20000
- Copyright:** © Metsähallitus 25.9.2007 20:36, © Maanmittauslaitos 1/MYY/06

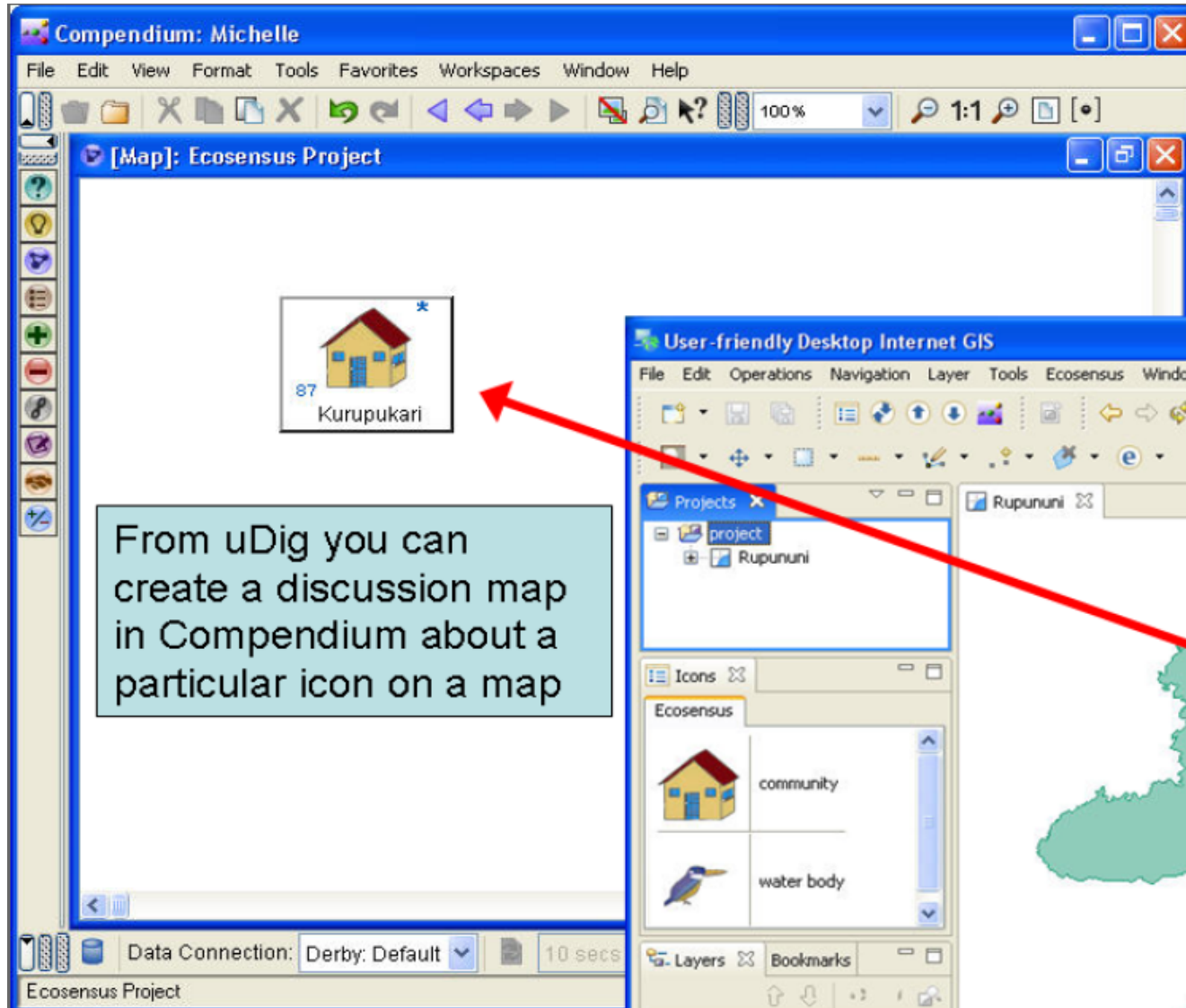
The map features a red dotted boundary and a purple line. Key annotations include:

- Selkäväläma-alue 2** (highlighted in yellow)
- dv 196m**, **dy 273m**, **dy 342m**, **dy 111m**, **dy 242m**, **y 421m**, **h 244m**, **g 337m**, **b 647m**, **lp 282m**, **ko 73m**, **lj 78m**, **lm 328m**, **lat 188m**, **JKm 234m**, **JKI 233m**, **kk 228m**

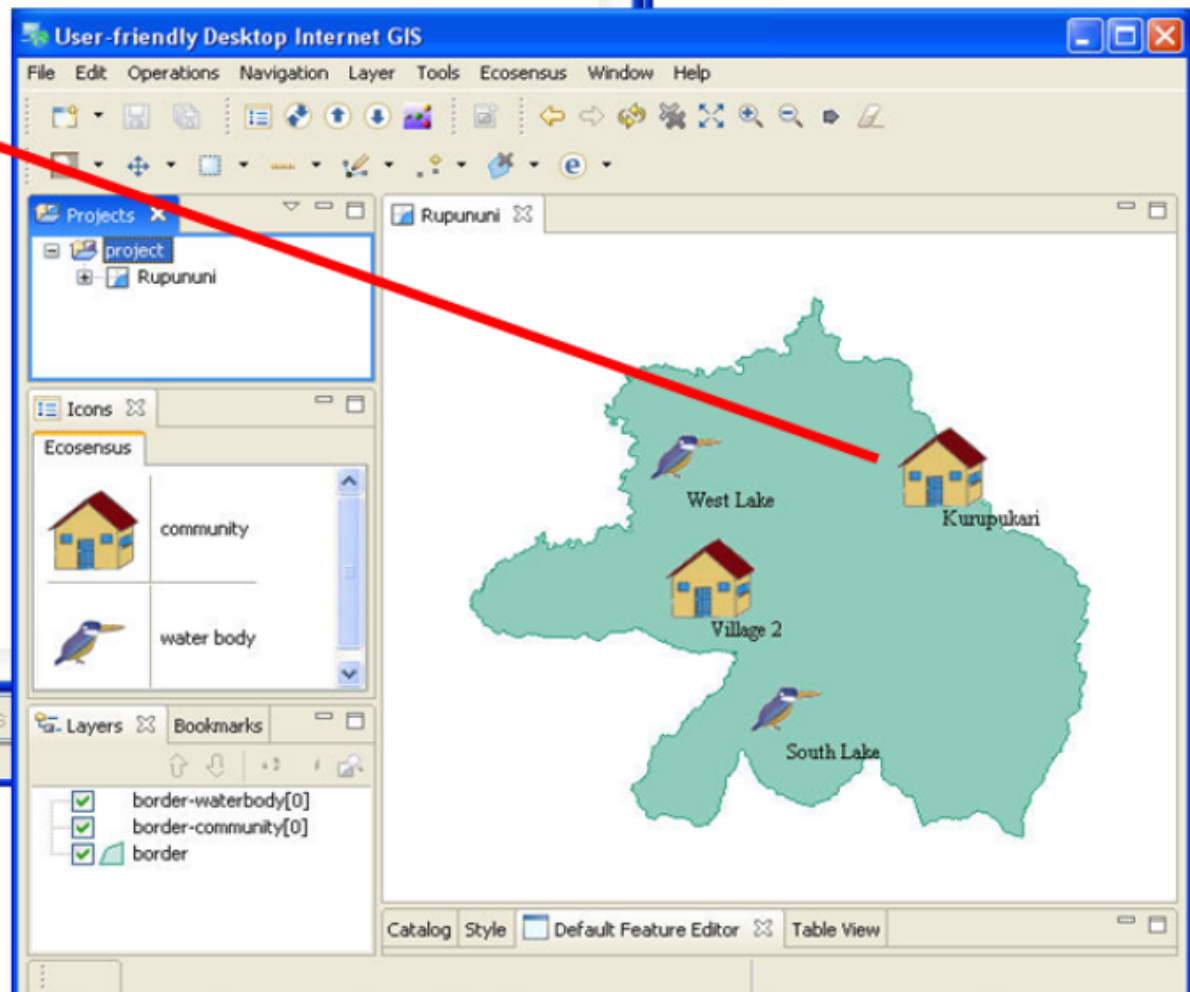
The interface also includes a Layers panel on the left with various map layers, a Style panel at the bottom left, and a Catalog panel at the bottom right. The status bar at the bottom indicates the current scale (1:23,095) and coordinates (KKJ / ...System, 3353586, 7009914).



# Open University of the UK – EcoSensus



**uDig and  
Compendium  
integration**





User-friendly Desktop Internet GIS

File Edit Operations Navigation Layer Tools Window Help

Projects project

Layers

- bj\_locations
- bj\_routes
- bj\_water
- bj\_parks

Catalog Search Default Feature Editor Style Table View Information

Line: 1 100% Fill: 50% Marker: 6 square

Label: name Set Font Min scale: 54147.0 Max scale: 54147.0





# So Many Projects

- Eurobios Routing
- Line Cleaner
- KuvioGIS
- TAAKA
- DivaGIS
- Populations @ Risk
- EU GeoVista
- Souwhat.com
- Jgrass
- 52° North
- Axios's Spatial Ops
- SOC Transformations
- All the ones I was not allowed to talk about...



# Walkthrough 1

- Grab a friend  
(or make a new one)
- Grab a workbook
- It's time to meet uDig

