

Data Visualization and Evaluation

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June 2010

Purpose and Objectives

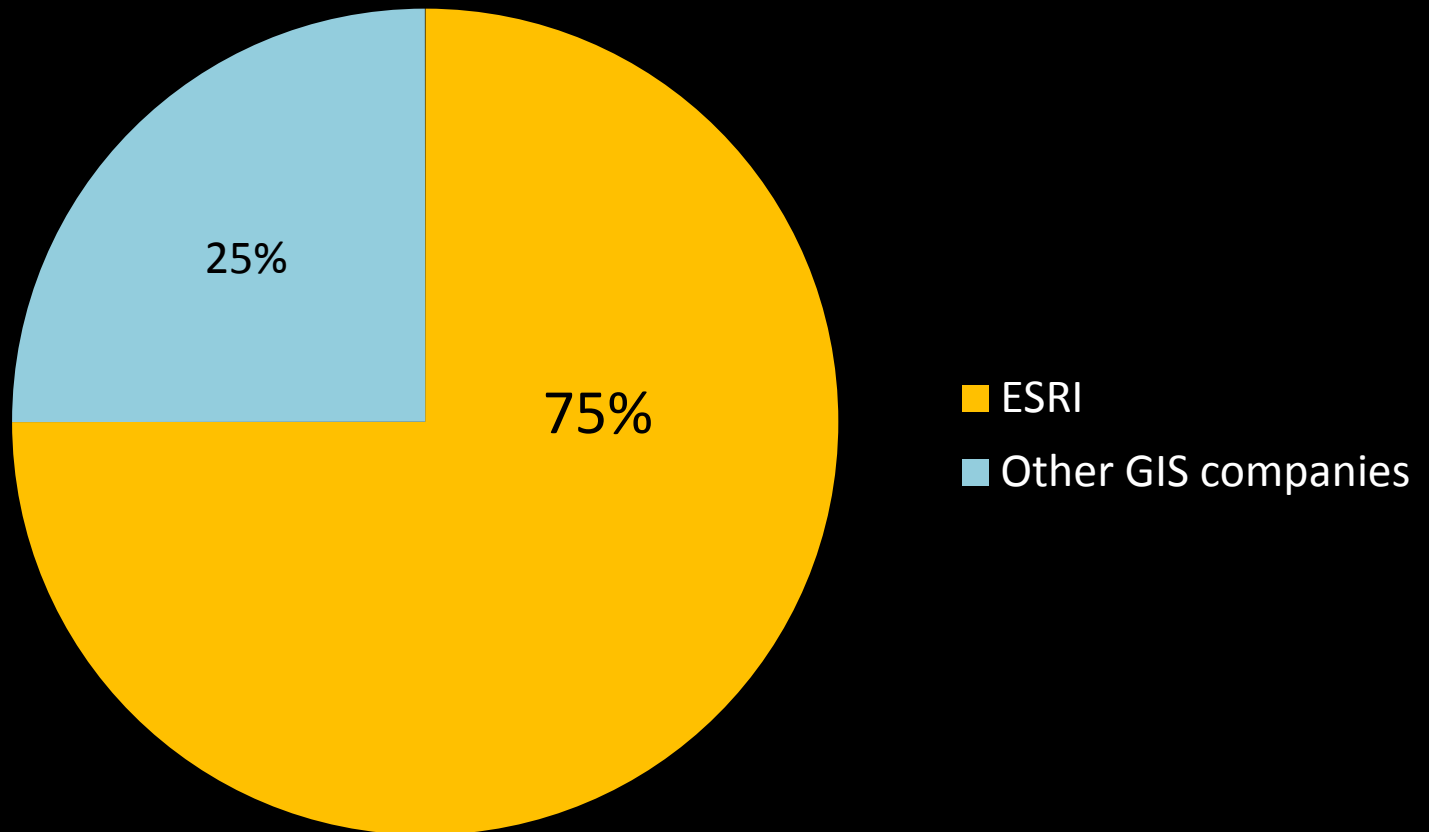
- Purpose

- Introduce to program evaluators the capabilities and general uses of GIS and Remote Sensing in the field of environmental evaluation.

- Objectives

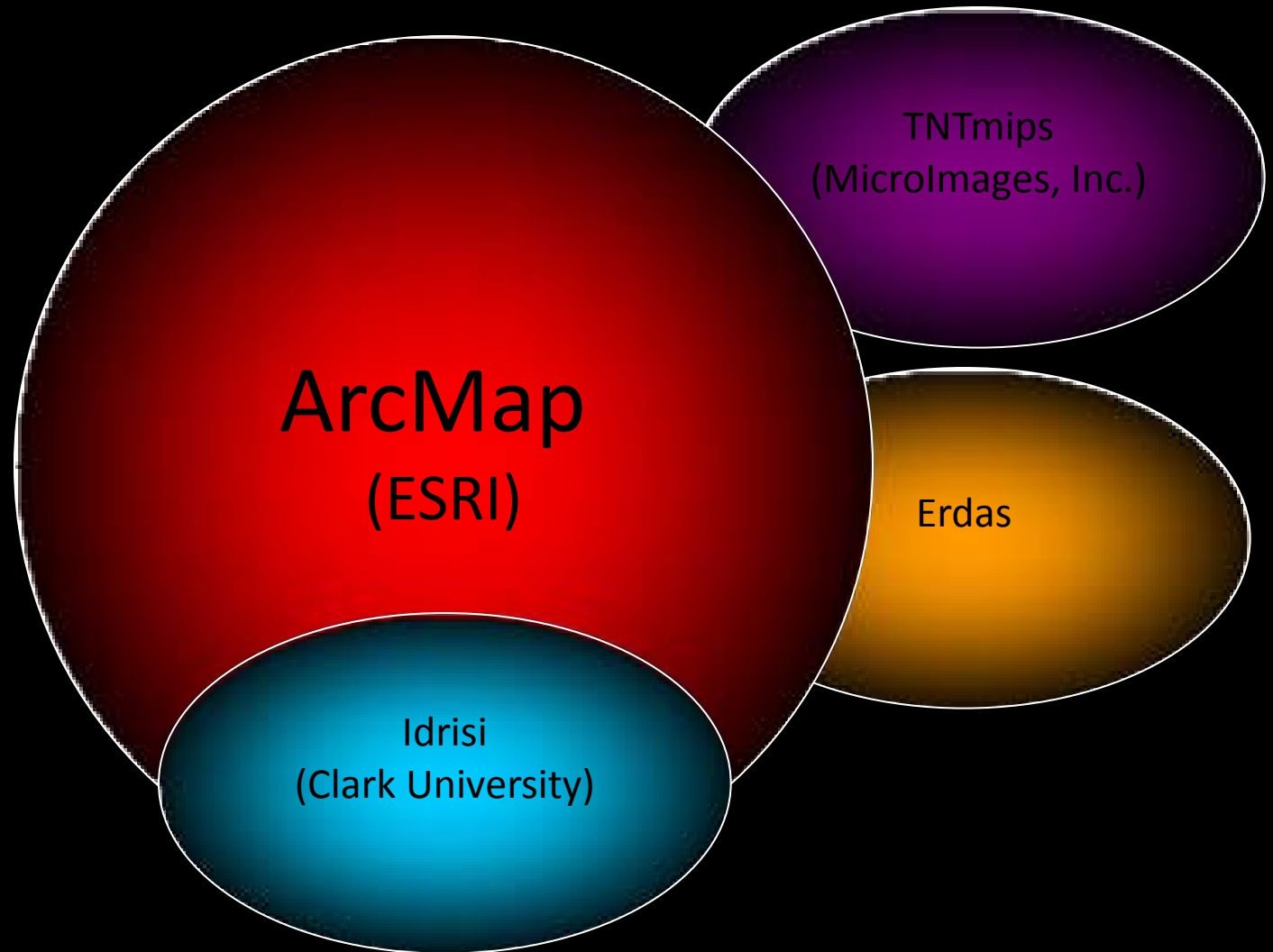
- Show how GIS tools can be used in program evaluation through practical applications.
- Motivate the use of satellite imagery.

Sales of Geoprocessing Software to the U.S. Federal Government

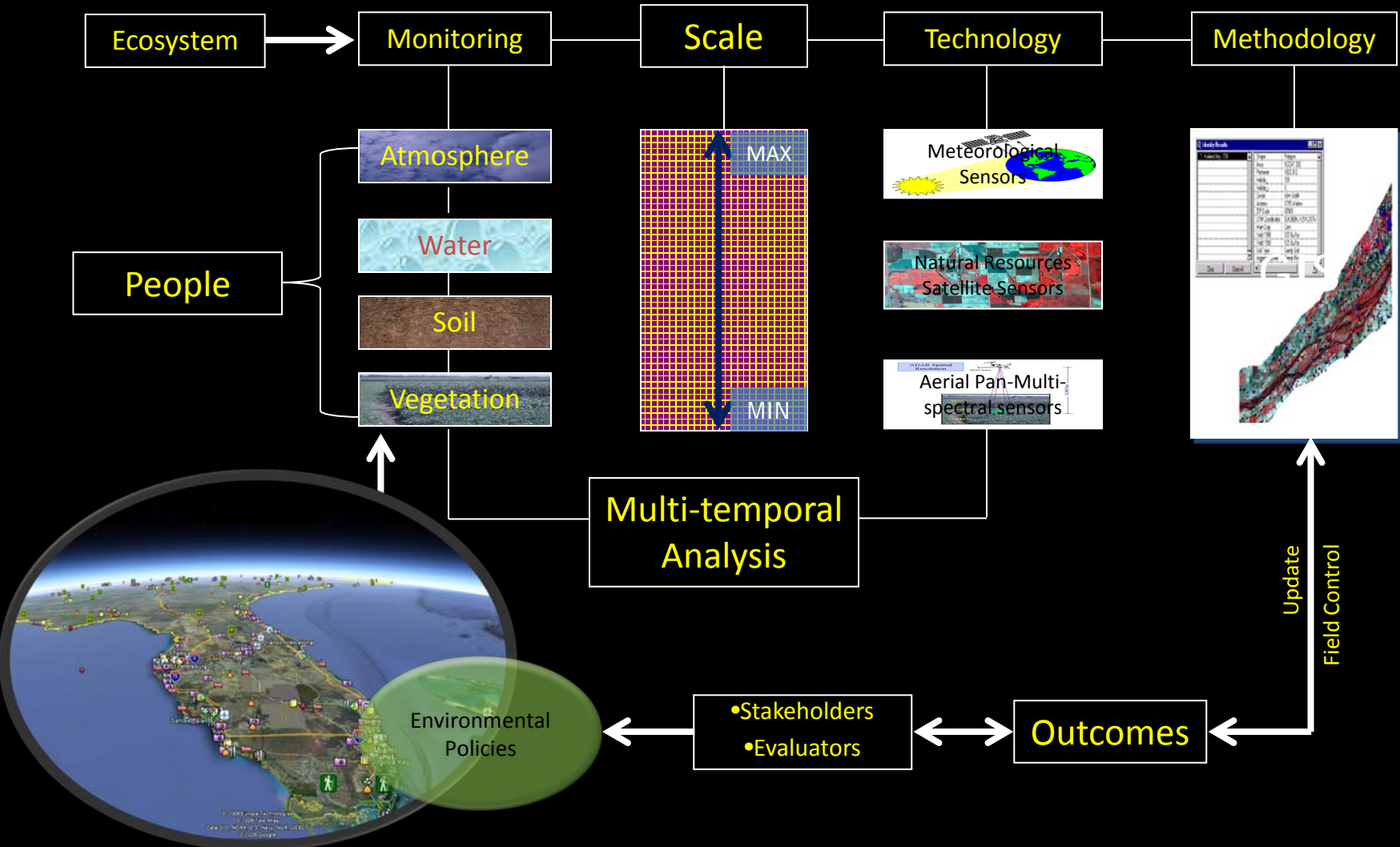


- When the only tool you have is a hammer, you see all your problems as nails.

GIS Software



Components of an Environmental Program Evaluation Using GIS



The most common and useful source of information for environmental evaluation:

Satellite Images

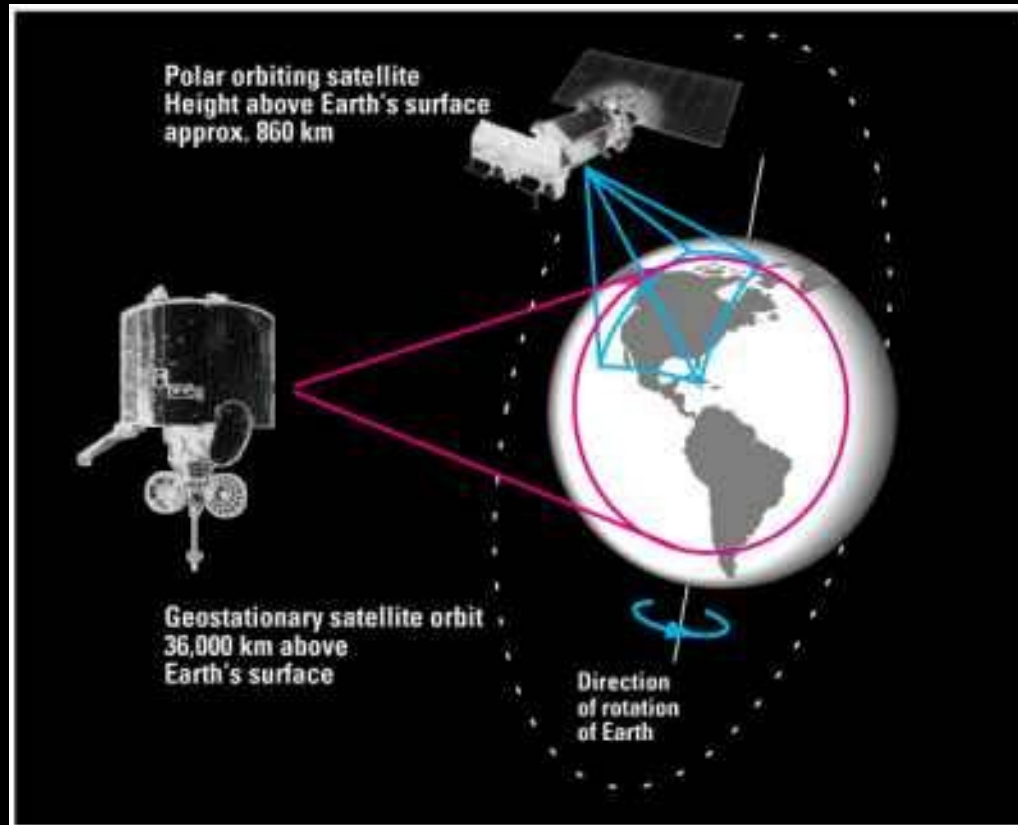
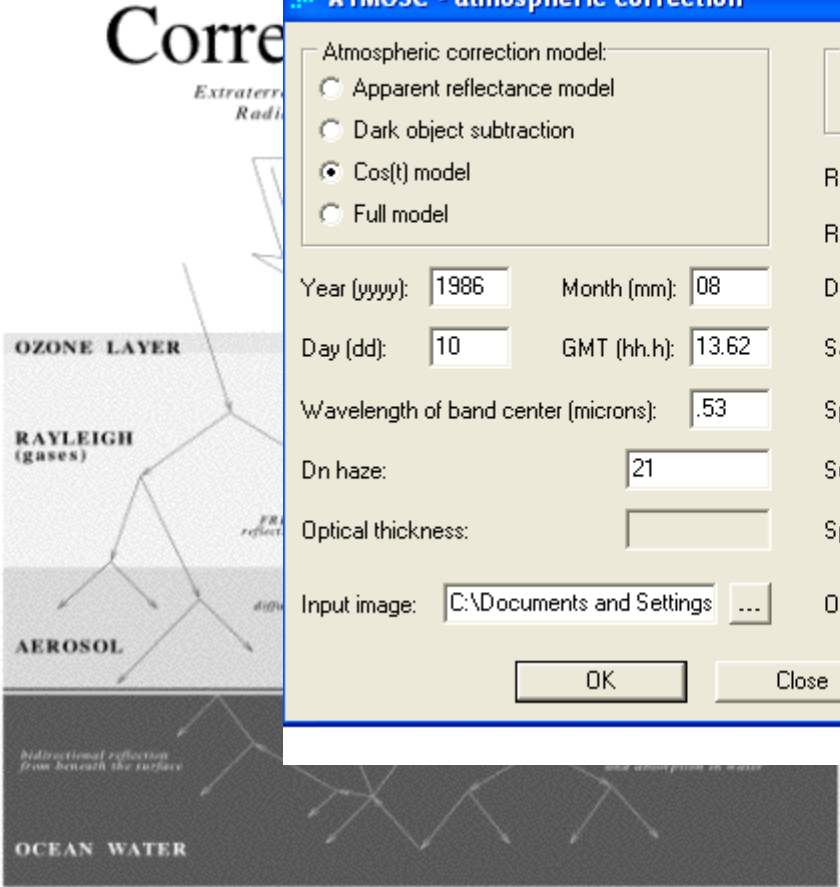


Image Source: Meteorological Service of Canada.

Atmospheric Corrections



ATMOSC - atmospheric correction

Atmospheric correction model:

- ☐ Apparent reflectance model
- ☐ Dark object subtraction
- ☒ Cos(t) model
- ☐ Full model

Radiance calibration option:

- ☒ Lmin/Lmax
- ☐ Offset/Gain

Year (yyyy): 1986 Month (mm): 08

Day (dd): 10 GMT (hh.h): 13.62

Wavelength of band center (microns): .53

Dn haze: 21

Optical thickness:

Input image: C:\Documents and Settings ...

Radiance at Dn 0 (Lmin): -.284

Radiance at Dn max (Lmax): 33.3

Dn max: 187

Satellite viewing angle (0 = vertical): 0.0

Spectral solar irradiance (E₀): 179.26

Sun elevation (0 = at horizon): 42.42766

Spectral diffuse sky irradiance: 0.0

Output image: ...

OK Close Help

$$\rho_t(\lambda) = \rho_r(\lambda) + \rho_a(\lambda) + \rho_{ra}(\lambda) + t(\lambda)\rho_{wc}(\lambda) + t(\lambda)\rho_w(\lambda) + t(\lambda)\rho_g$$

GIS: a silent revolution

1970's – early 1990's

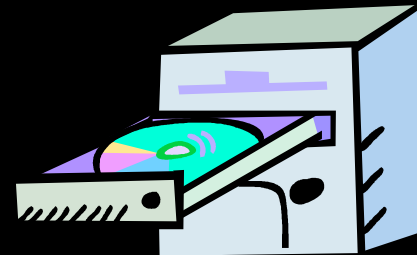


\$5,000 – 6,000

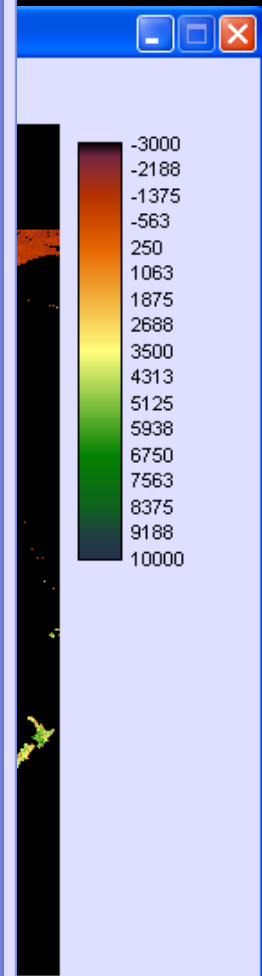
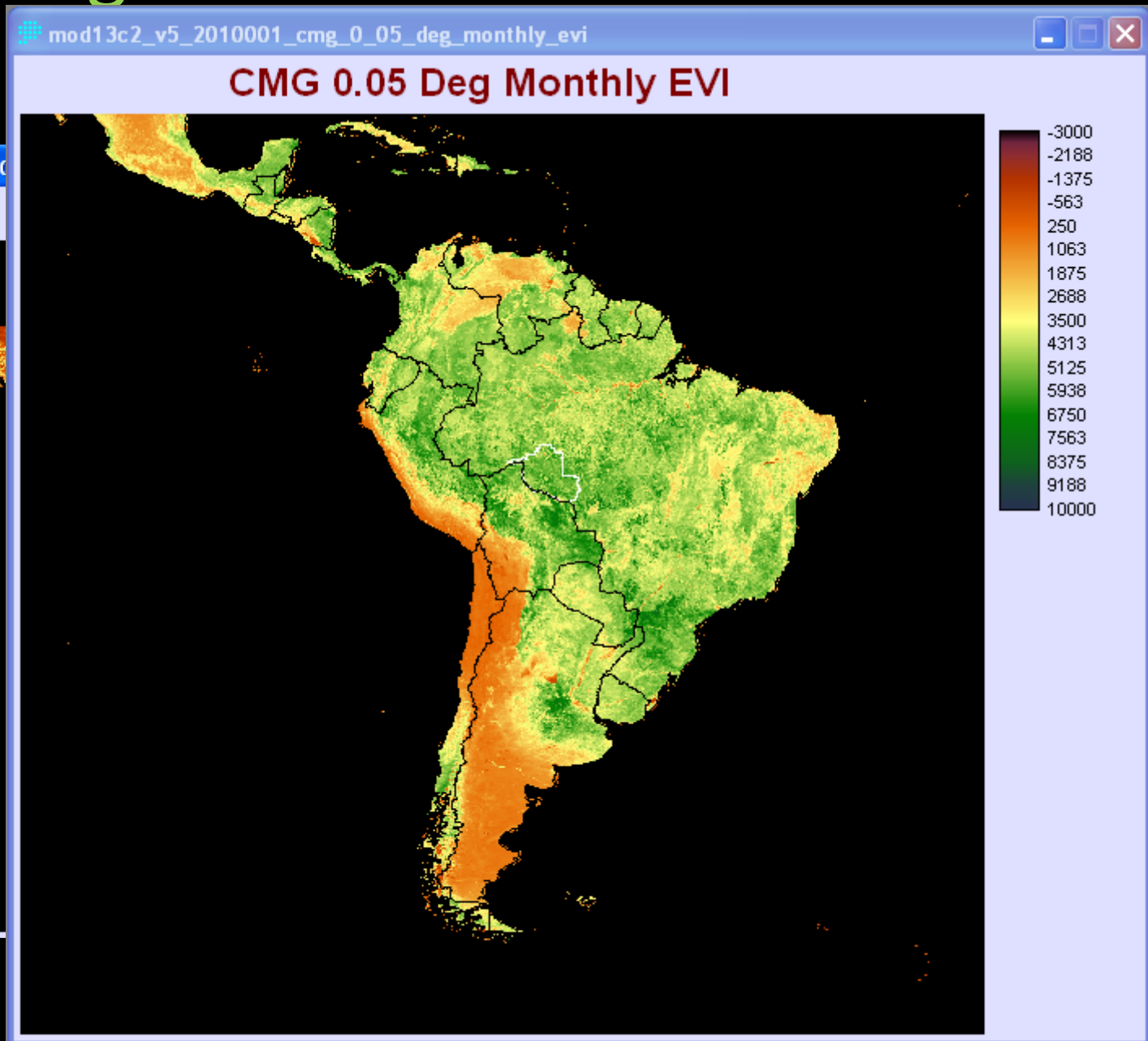
Current



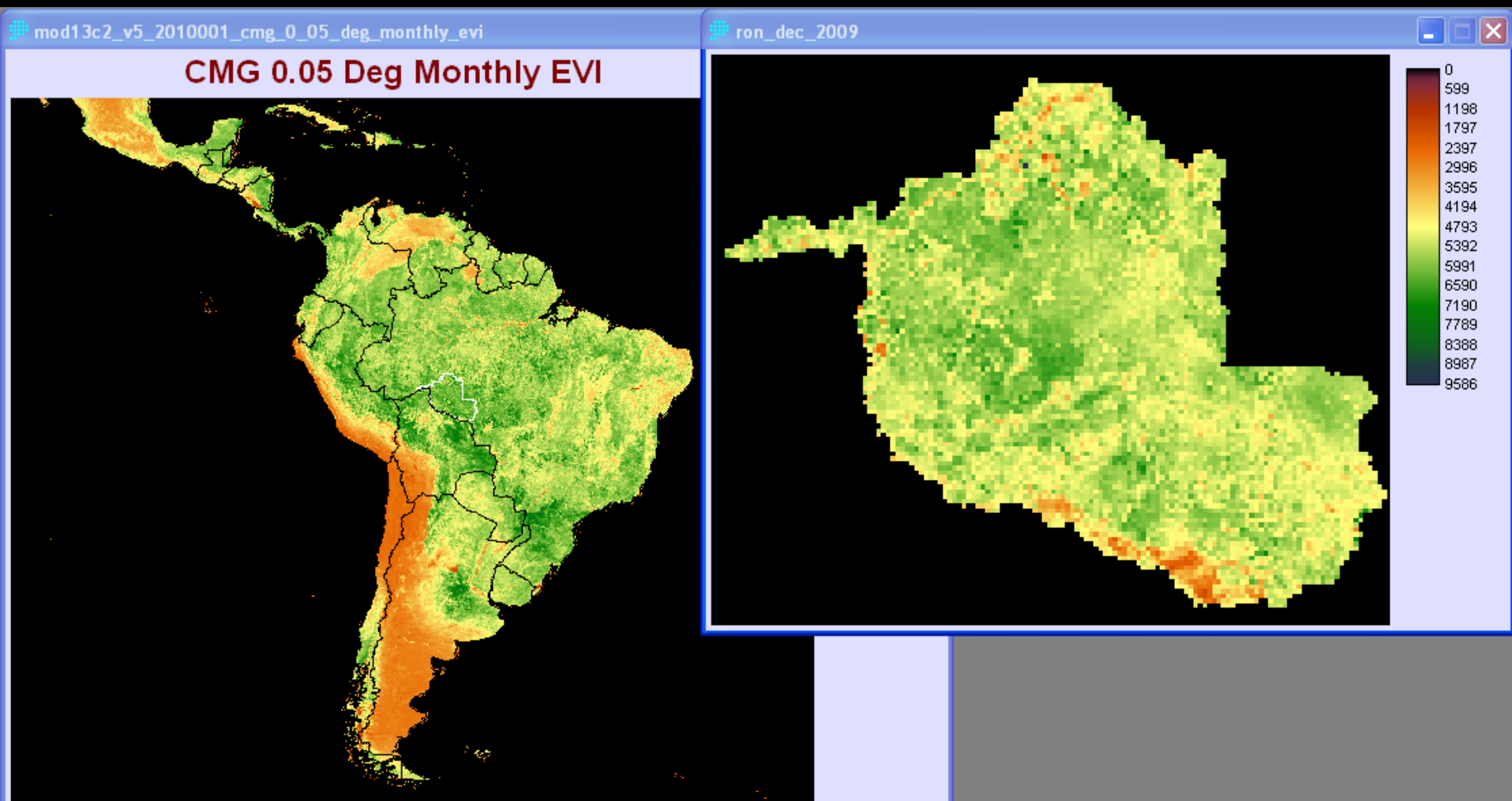
FREE



Vegetation Status of the World in



Rondônia, Brazil



Forest Cover in Brazil and the U.S. (Gapminder)

[Dynamic chart](#)

Download Country Level Data for Any Country in the World:

administrative boundaries, roads, railroads, altitude, land cover, population density:

[DIVA-GIS \(website\)](http://www.diva-gis.org/gdata)

Download data by country | DIVA-GIS - Mozilla Firefox

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http://www.diva-gis.org/gdata

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Brazil

Subject
Administrative areas
Administrative areas
Inland water
Roads
Railroads
Elevation
Elevation (country mask)
Land cover
Land cover (country mask)
Population
Population (country mask)
Gazetteer

| Theme | Description | Source | Format | Resolution |
|-----------------------------------|---|----------------------------|---------------|------------|
| Administrative areas (boundaries) | Country outlines and administrative subdivisions for all countries. The level of subdivision varies between countries | GADM, version 1.0 | Vector (area) | - |
| Inland water | Rivers, canals, and lakes. Separate files for line and area features | Digital Chart of the World | Vector (line) | - |

Done

Google Custom Search Search

Search the web
DIVA-GIS

Ads by Google

GIST Master's Program
Earn a MS in GIST Online at the University of Southern California.
GIS.USC.Edu

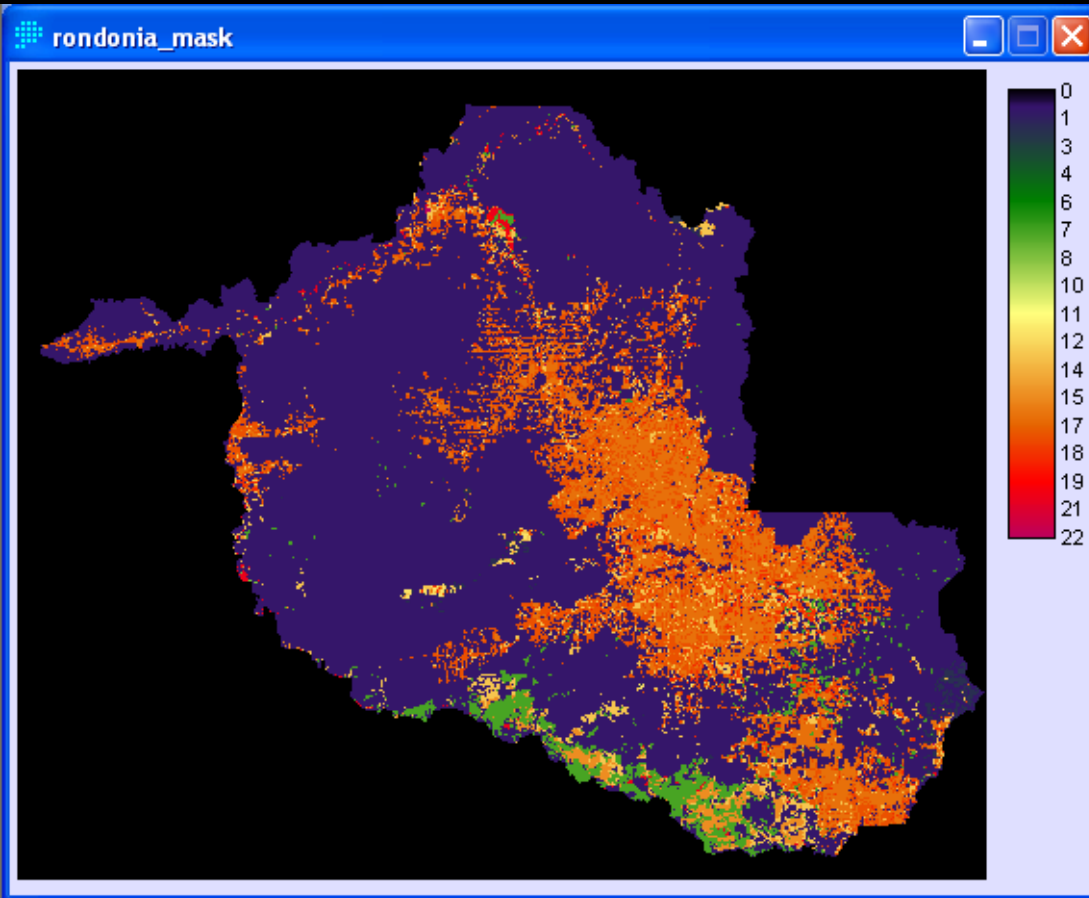
Supercharge your GIS Data
Enhance your map data with Akamai Solutions from DLT.
www.dlt.com/akamai

Your GIS Data Source
Get an online quote today Get the data

The screenshot displays the DIVA-GIS 7.1.6 software interface. The main window shows a map of Brazil with a land cover overlay. The legend on the left lists various land cover categories, including 'Tree Cover, broadleaved, evergreen', 'Shrub Cover, closed-open, evergreen', 'Herbaceous Cover, closed-open', 'Cultivated and managed areas', 'Mosaic: Cropland / Tree Cover / Other natural vegetation', 'Bare Areas', 'Water Bodies', 'Snow and ice', 'Artificial surfaces and associated areas', and 'No Data'. An 'Identify' window is open, showing the coordinates of a selected point (X: -61.95281, Y: -11.38314) and the corresponding land cover value (17). The status bar at the bottom indicates the current coordinates (x: -75.5704, y: -12.3985) and scale (Scale 1 :24732634).

Rondônia Land Cover

From DIVA-GIS data source

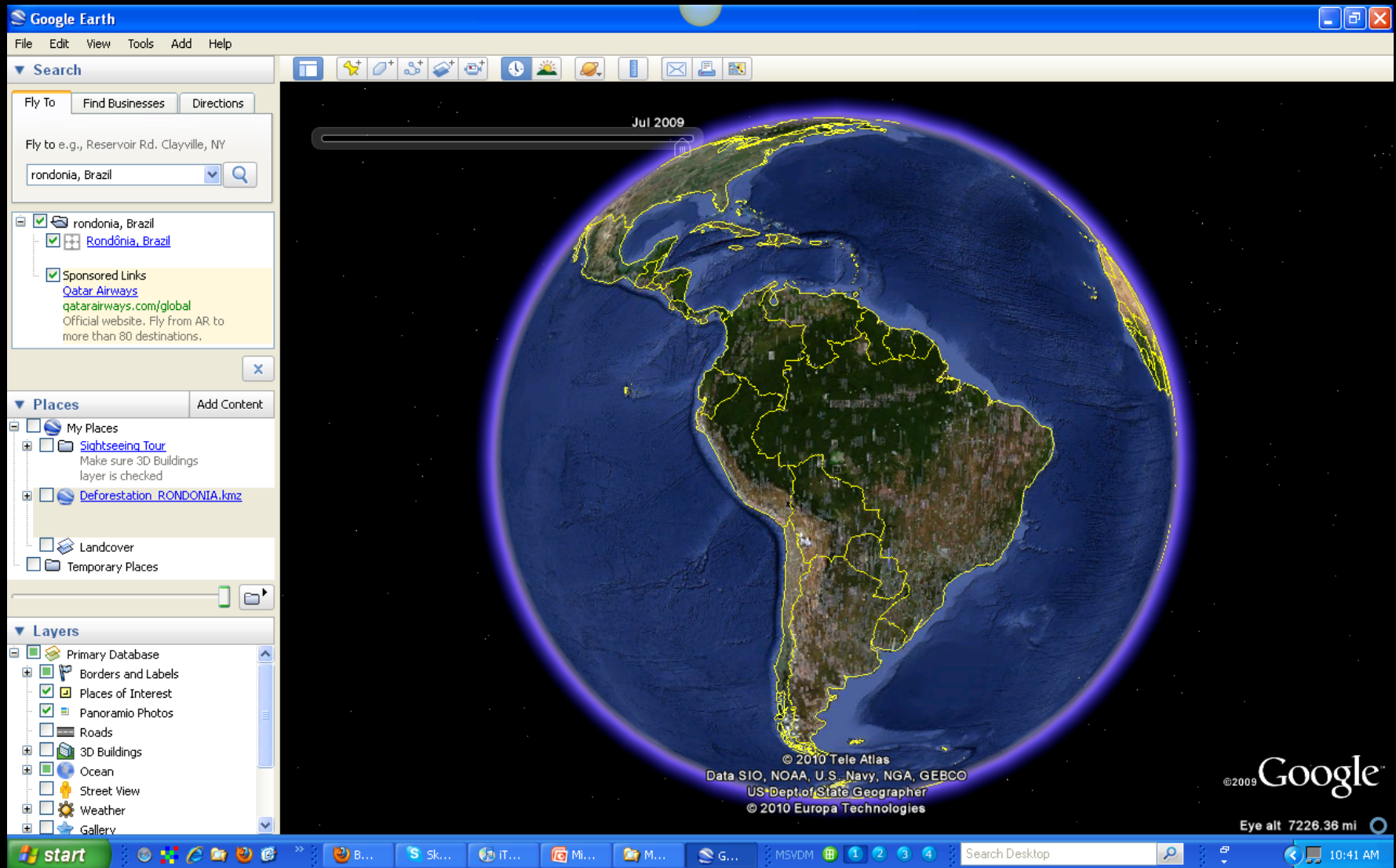


| Category | Square Miles | Land Cover |
|----------|--------------|--|
| 0 | 112552.1 | Background |
| 1 | 64195.9 | Tree Cover, broadleaved, evergreen |
| 2 | 539.2 | Tree Cover, broadleaved, deciduous, closed |
| 7 | 2676.1 | Tree Cover, regularly flooded, fresh water |
| 8 | 3.2 | Tree Cover, regularly flooded, saline water |
| 12 | 174.2 | Shrub Cover, closed-open, deciduous |
| 13 | 3231.9 | Herbaceous Cover, closed-open |
| 14 | 51.3 | Sparse herbaceous or sparse shrub cover |
| 15 | 1101.1 | Regularly flooded shrub and/or herbaceous cover |
| 16 | 9046.8 | Cultivated and managed areas |
| 17 | 8579.5 | Mosaic: Cropland / Tree Cover / Other natural vegetation |
| 18 | 1404.6 | Mosaic: Cropland / Shrub and/or grass cover |
| 19 | 31.1 | Bare Areas |
| 20 | 263.3 | Water Bodies |
| 22 | 11.1 | Artificial surfaces and associated areas |
| Total | 91,309.5(*) | * Excluded background |

Geovisualization for Everyone

- But how can I share this information with other evaluators or stakeholders who do not have GIS software in their desktops?
- How can I get GIS software? Where can I get training?
- How can I display GIS data on my desktop computer without getting bankrupt?

Google Earth

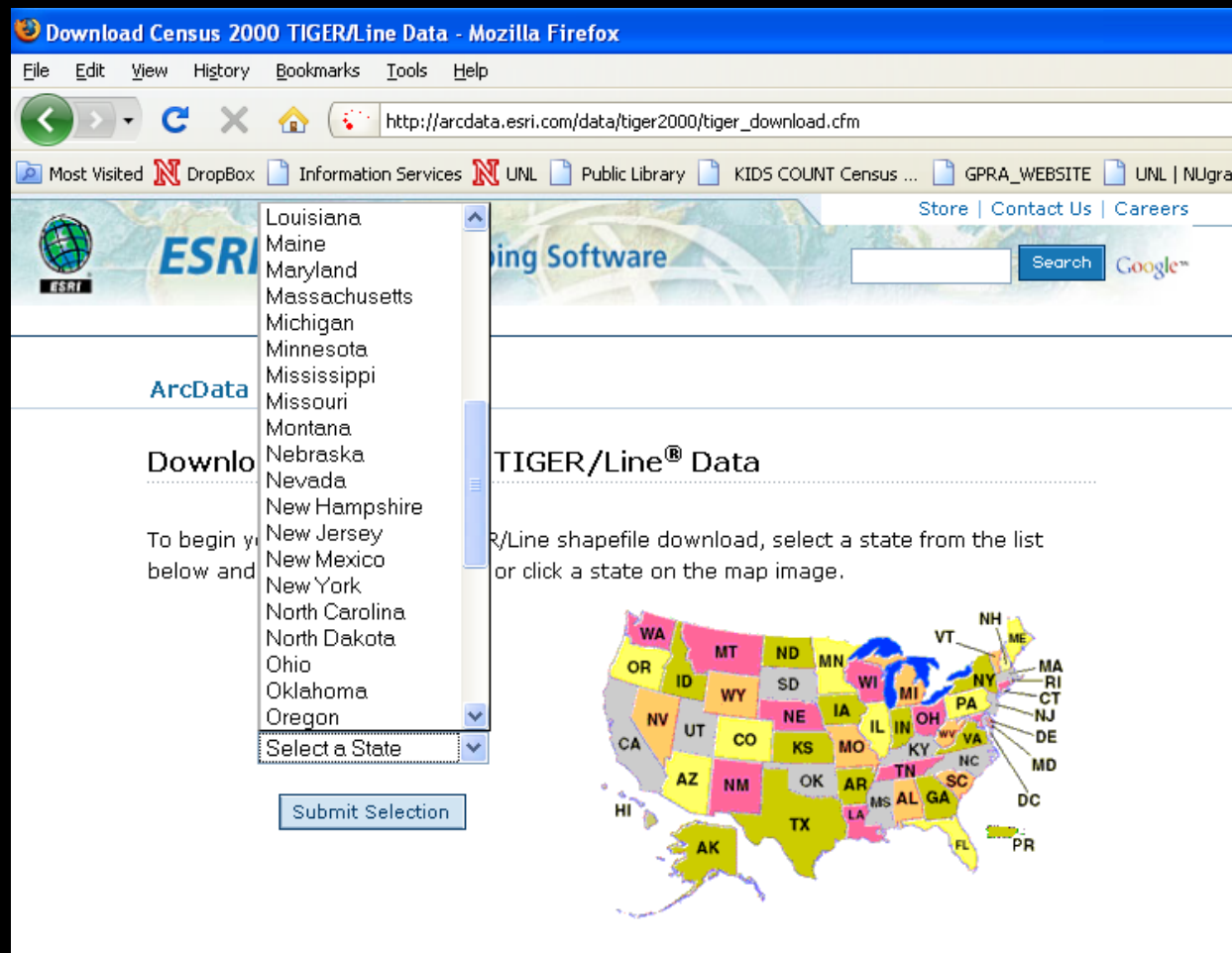


Deforestation – Rondônia, Brazil

[Amazon Deforestation 1975-2008](#)

Useful Resources

- http://arcdata.esri.com/data/tiger2000/tiger_download.cfm



GLOVIS

USGS Global Visualization Viewer

USGS
science for a changing world

Earth Resources Observation and Science Center (EROS)

USGS Global Visualization Viewer
Select a collection, then click on the Global Locator Map to view satellite browse images in that area.

Select Collection

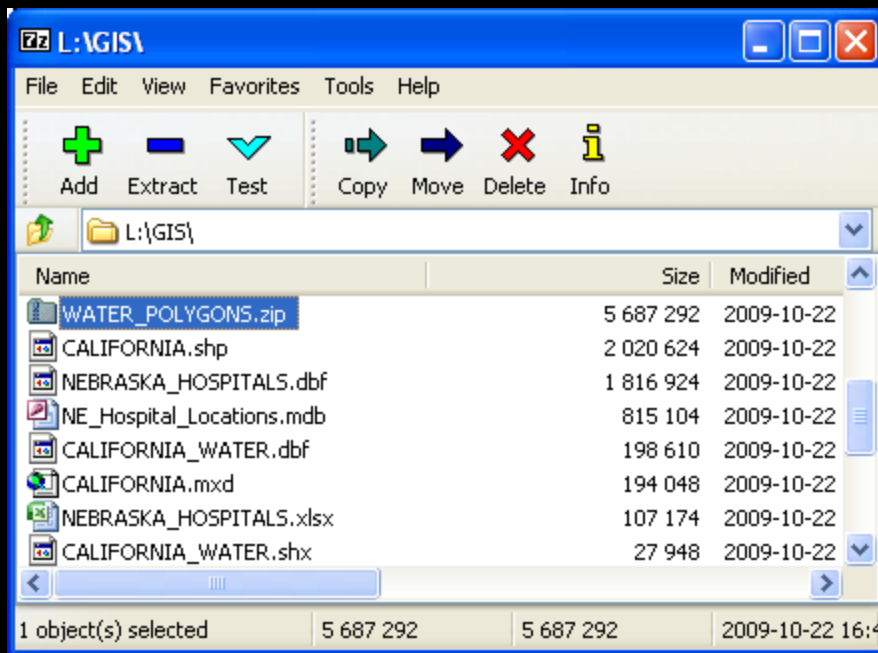
Latitude Longitude



Done

Additional Useful Tools to Efficiently Manage your Data

- Uncompress data: 7-Zip File Manager



We like “GIS-free” stuff

| Data | | | |
|--|---|---------------------------------------|----------------------|
| What do you need? | You can get it here: | Format | Geographic Extension |
| Census data at the county level | ArcData: http://arcdata.esri.com/data/tiger/2000/tiger_download.cfm | Shapefiles | State |
| Geographic Features (parks, hospitals, schools, airport) | GNIS: http://geonames.usgs.gov/ | CSV files (geographic coordinates) | State |
| Worldwide data (administrative areas, inland water, roads, railroadas, elevation , land cover, population, gazetteer) | http://www.diva-gis.org/gdata | Vector and grid files | Worldwide |

We like “GIS-free” stuff

| Data | |
|---------------------------------|---|
| What do you need? | You can get it here: |
| GIS Training | ESRI TV: http://www.youtube.com/results?search_query=esri+tv&aq=f |
| Tips and tricks in Google Earth | http://www.youtube.com/watch?v=GSuJq4UzkIA |
| | |

GIS & Remote Sensing Software

| Software (http://) | Cost (US\$) | Platform | Level of difficulty |
|--|---|--------------------|---------------------|
| Geographic Information System (GIS) | | | |
| ArcView http://www.esri.com/ | 1,500 | Windows | ★ ★ |
| Idrisi http://www.clarklabs.org/ | \$650 \$250 (student version) | Windows | ★ ★ ★ |
| TNTmips http://www.microimages.com/downloads/index.htm | \$100 to \$6,000 (pro) FREE (limited size files) | Windows, Mac, Unix | ★ ★ ★ ★ ★ |
| DIVA-GIS http://www.diva-gis.org/download | FREE | Windows, Mac | ★ |
| Quantum GIS http://www.qgis.org/ | FREE | Windows | n.a. |
| Remote Sensing | | | |
| Erdas Imagine http://gi.leica-geosystems.com/LGISub1x33x0.aspx | 7,500 | Windows | ★ ★ ★ ★ |

GIS Training and Tips/Tricks in YouTube

YouTube - ArcGIS Desktop 9.3: New KML Export Support - Mozilla Firefox

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http://www.youtube.com/watch?v=iuuoCpTCx48&feature=related

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esri tv July 26, 2008 (more info)

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Convert features directly to the KML format and export them to other clients that support KML.

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