



Fundamentals of PPGIS

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Outline

- Terminology
- Goals
- Pros and cons
- Components of an online PPGIS tool
- Conducting research using PPGIS data
- Advanced topics in PPGIS data analysis

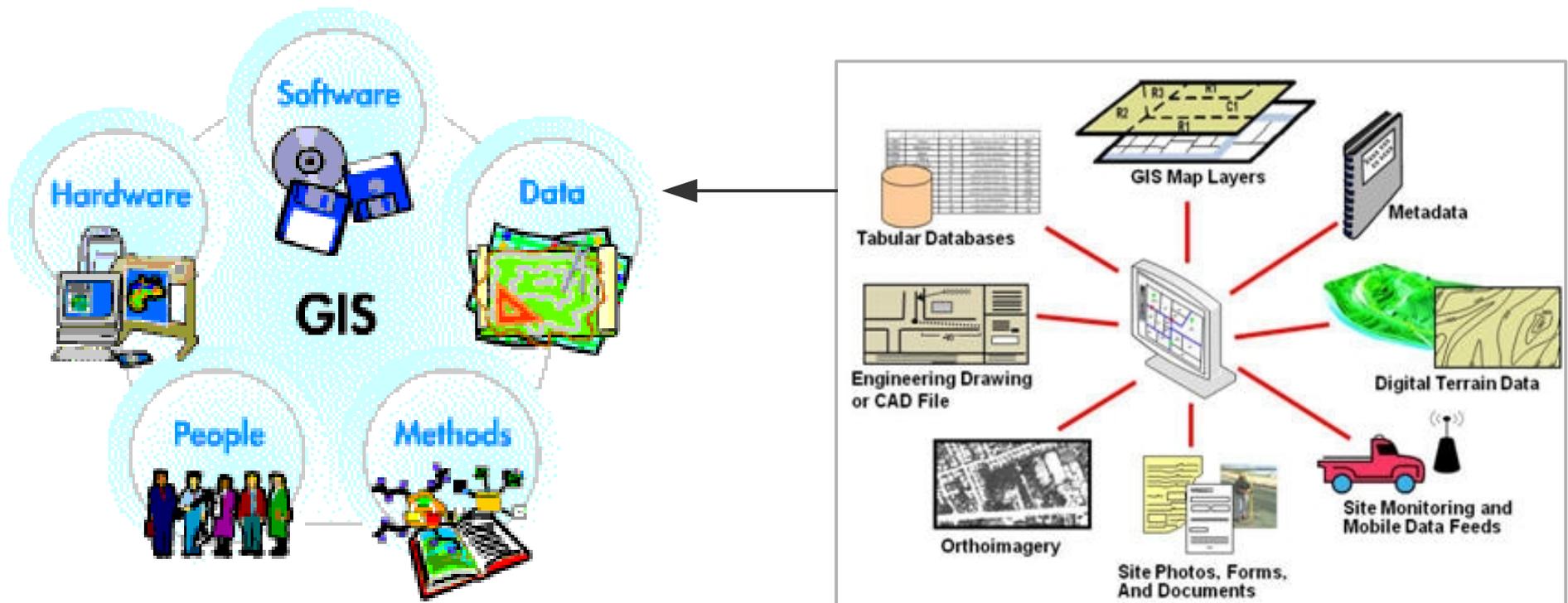


Terminology



Geographic Information Systems and Science

Tools, mindset and epistemology on the collection, abstraction and usage of data with geospatial properties.





Public Participation

Involvement of stakeholders potentially affected by a decision, implying their capacity to influence the final decision. Based on the principle that those affected by a decision should participate in the decision-making process.



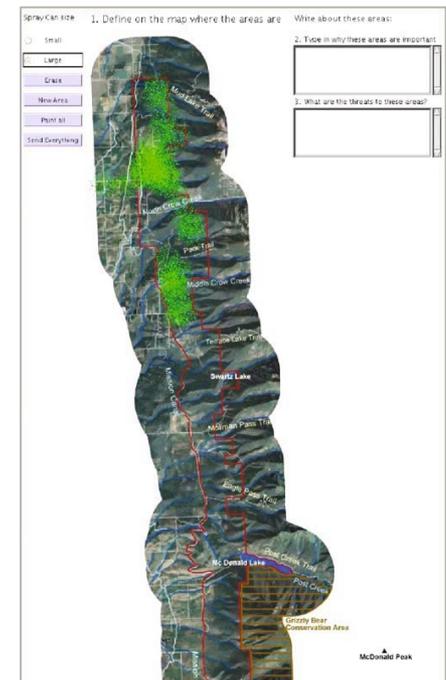
Public Participation

- Design and Implement Public Meetings
- Interview Key Stakeholders
- Engage Community
- Build Trust in the Process
- Create Public Support for the Plan



Participatory GIS / Public Participation GIS

Involvement of local groups in the creation of data to be fed into a GIS and used in spatial decision-making processes that affect them.





Goals



Goals

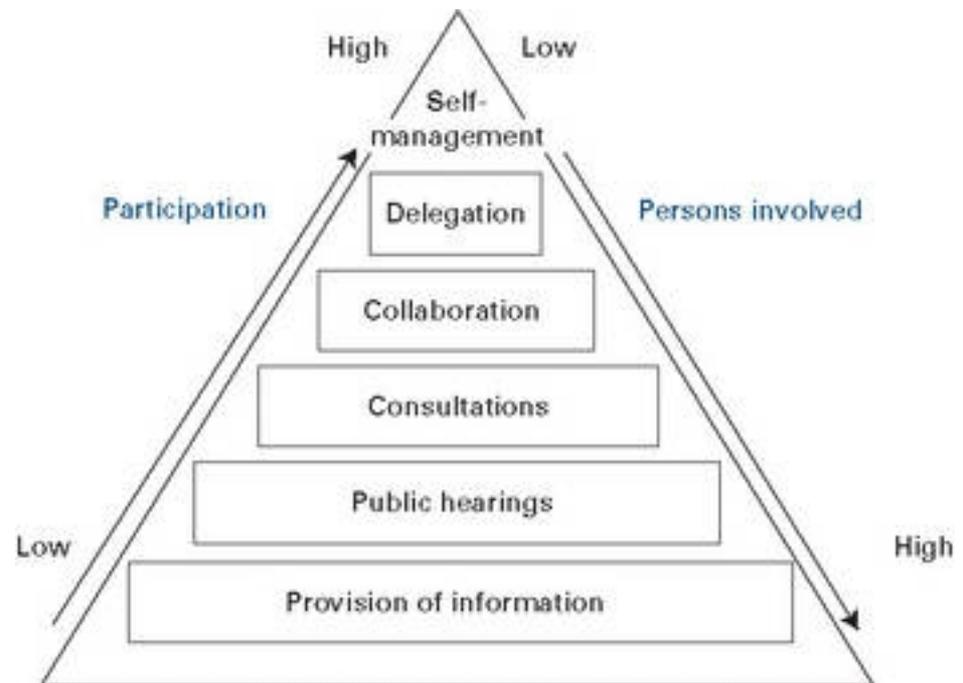
Democratize GIS teaching and usage, so it is accessible to and understood by a widest range of communities and social groups.





Goals

Make citizens participate in spatial planning and policy-making.

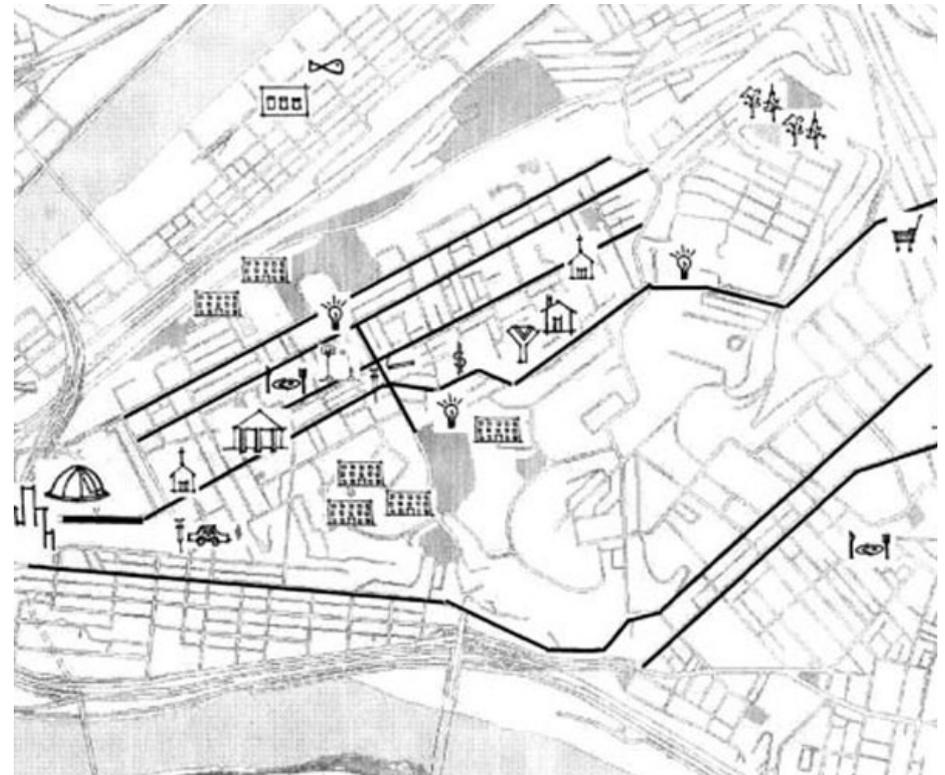


Levels of participation



Goals

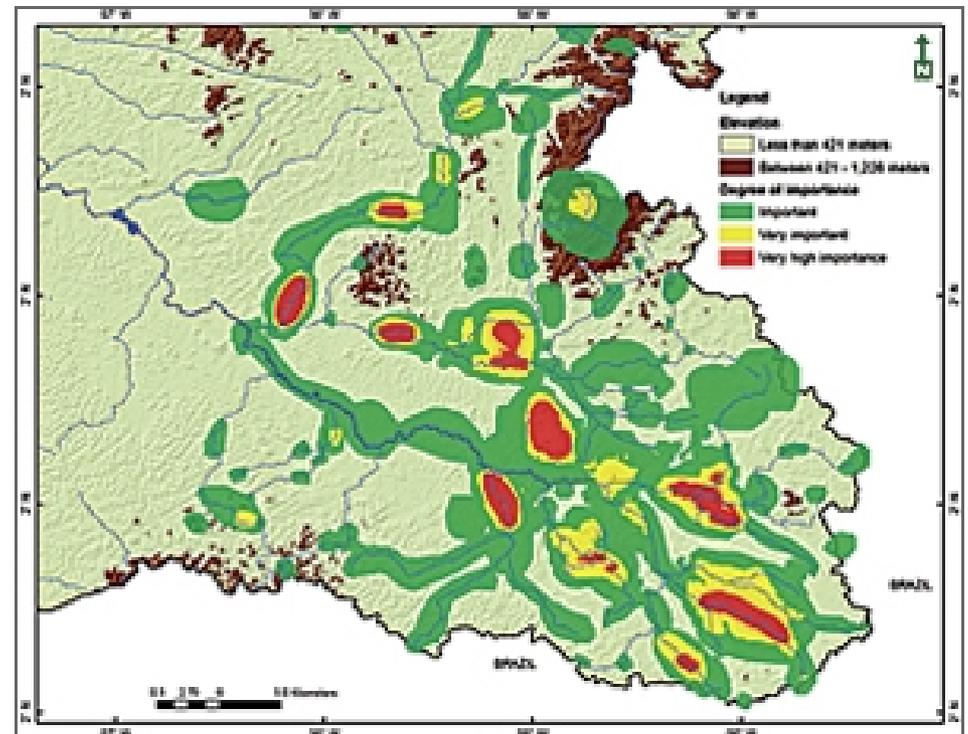
Capture local knowledge and vernacular geographies.





Goals

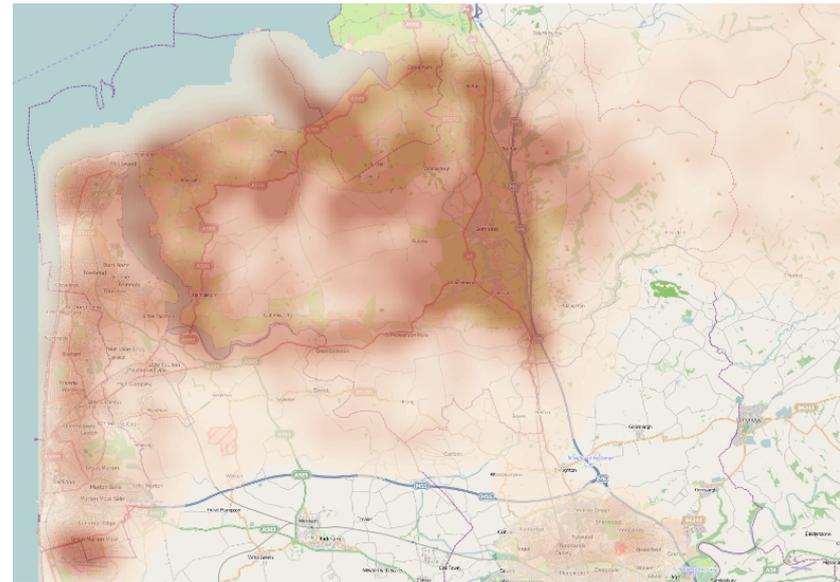
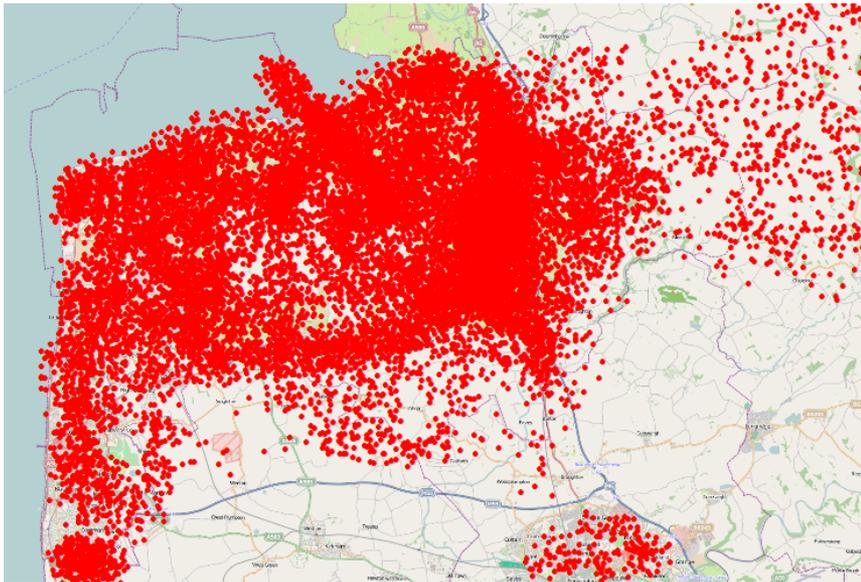
Include public values in Decision Support Systems.





Goals

Map spatial perceptions of the public, and the meanings they attach to these locations.





Pros and cons



Disadvantages of PPGIS

- Access to PPGIS technology by the public may be limited.
- Depends on the geographical and computer literacy of participants.
- Data quality limitations deriving from the survey (involvement of respondents, sample representativity).
- Distrust between the survey client and author, and potential participants.



Advantages of PPGIS

- Stimulates the use of GIS technologies as well as geographical thinking by the public.
- Data inaccuracies tend to be low-weighted with increasing the numbers of participants.
- Includes opinions and the involvement of a wide range of stakeholders in the planning process.
- Helps improve mutual understanding and trust between all parties in the project.
- Places a large portion of labor on the public end, with a minimal cost.
- United we stand!

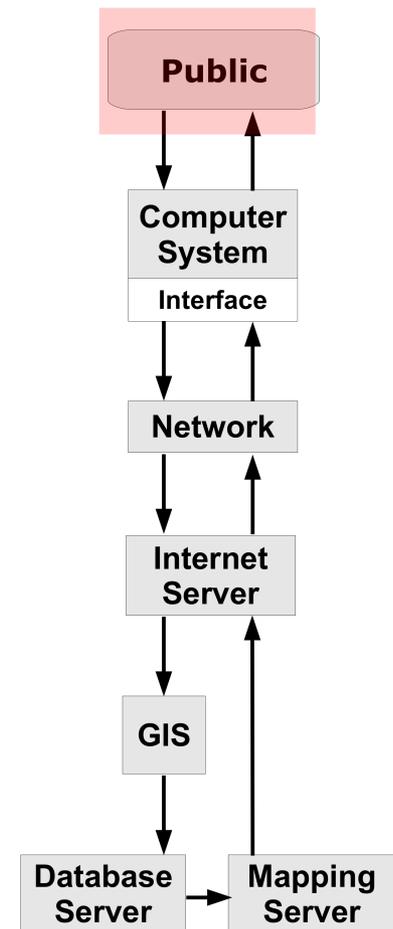


Components of an online PPGIS tool



Components of an on-line PPGIS: the public

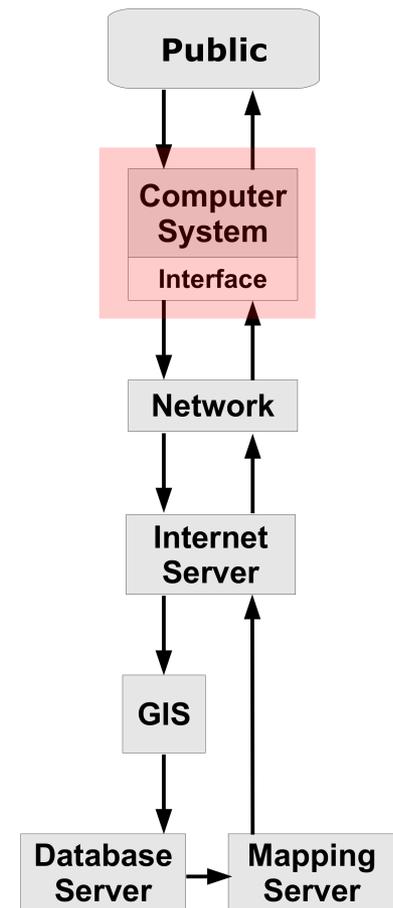
- It is the source of information of PPGIS data.
- As in any survey procedure, it is the respondents who ultimately determine the information quality of the collected data.





Components of an on-line PPGIS: computer

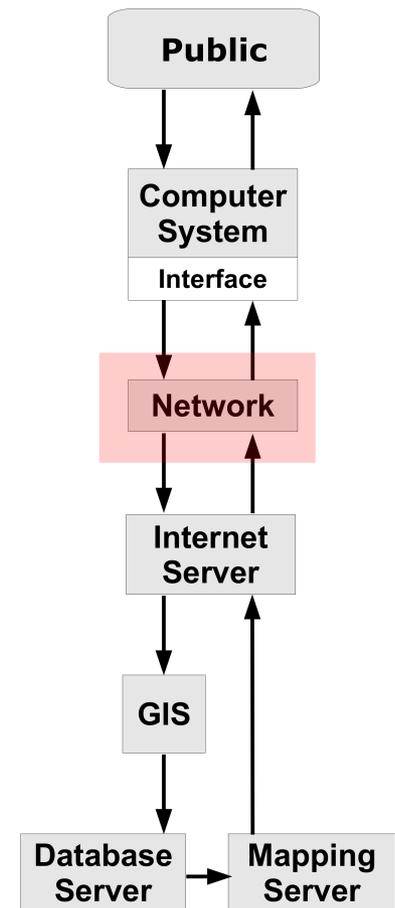
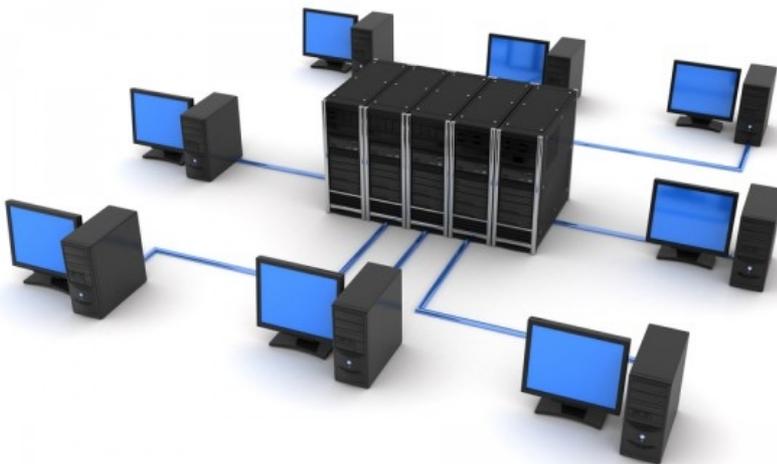
- Consists of a *client* (terminal where data is introduced into the system) and a number of interfaces used for human-machine communication (screen, mouse, keyboard).





Components of an on-line PPGIS: network

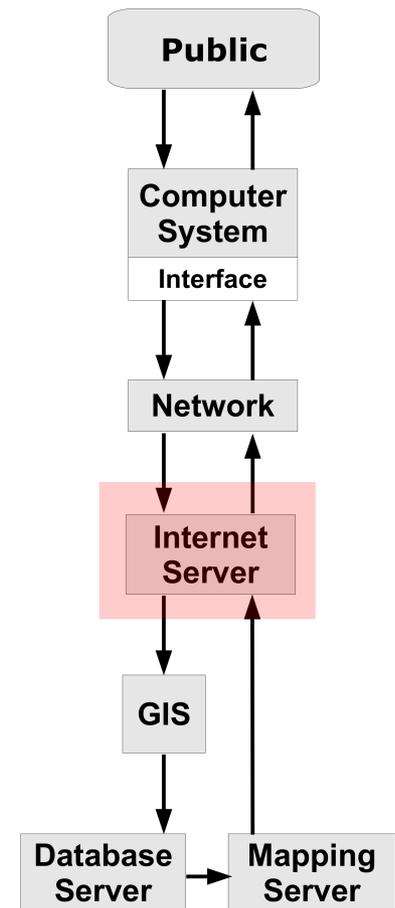
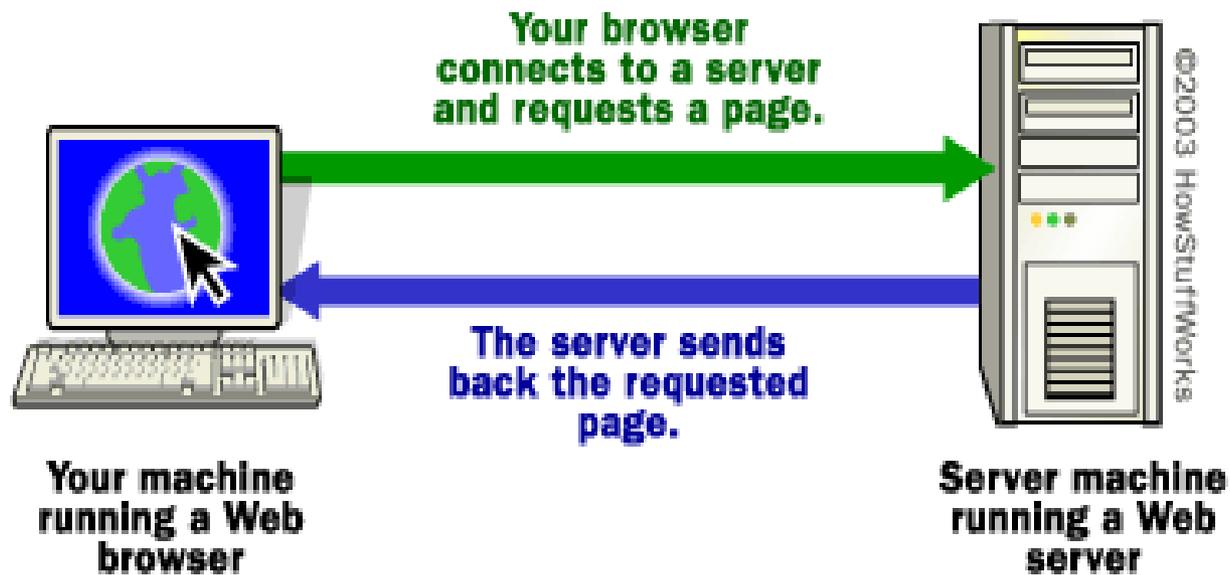
- Transmits data through a structure of interconnected computers.
- Not necessarily the Internet (could be a local network).





Components of an on-line PPGIS: web server

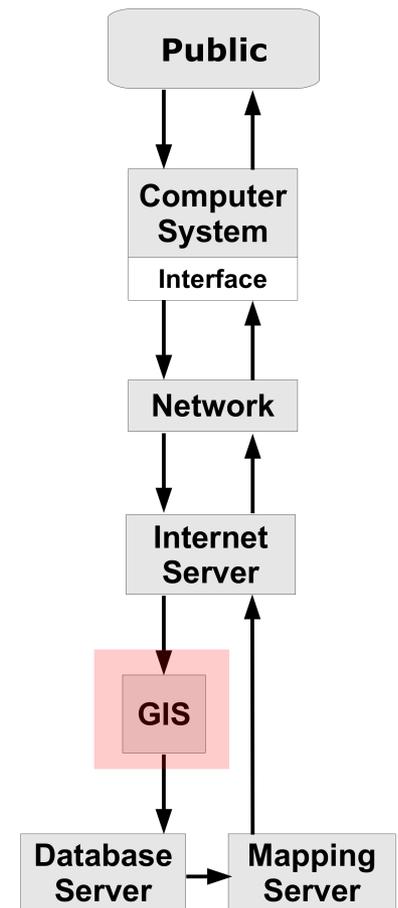
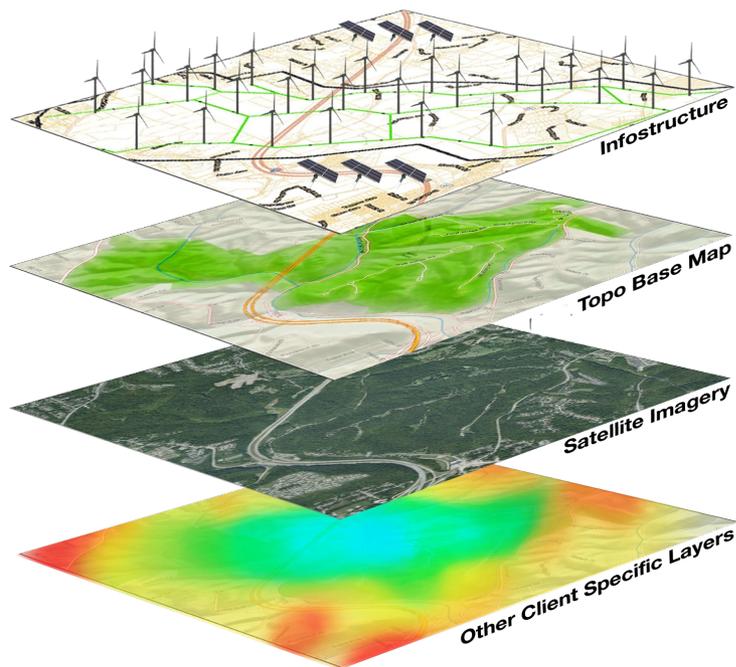
- Receives and delivers web content that circulates through the network.





Components of an on-line PPGIS: GIS

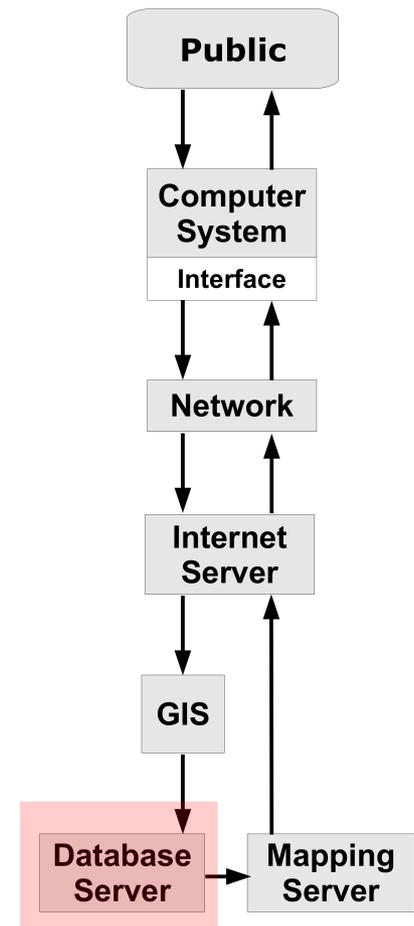
- Processes both geospatial and non-spatial data to be stored in the database.





Components of an on-line PPGIS: database

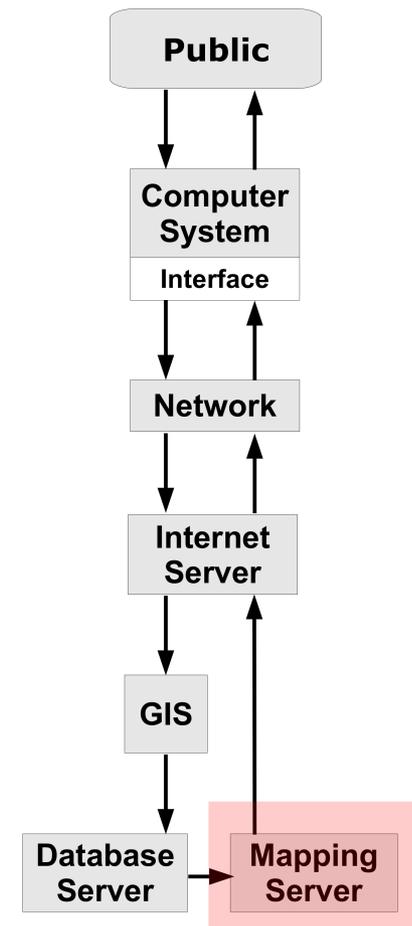
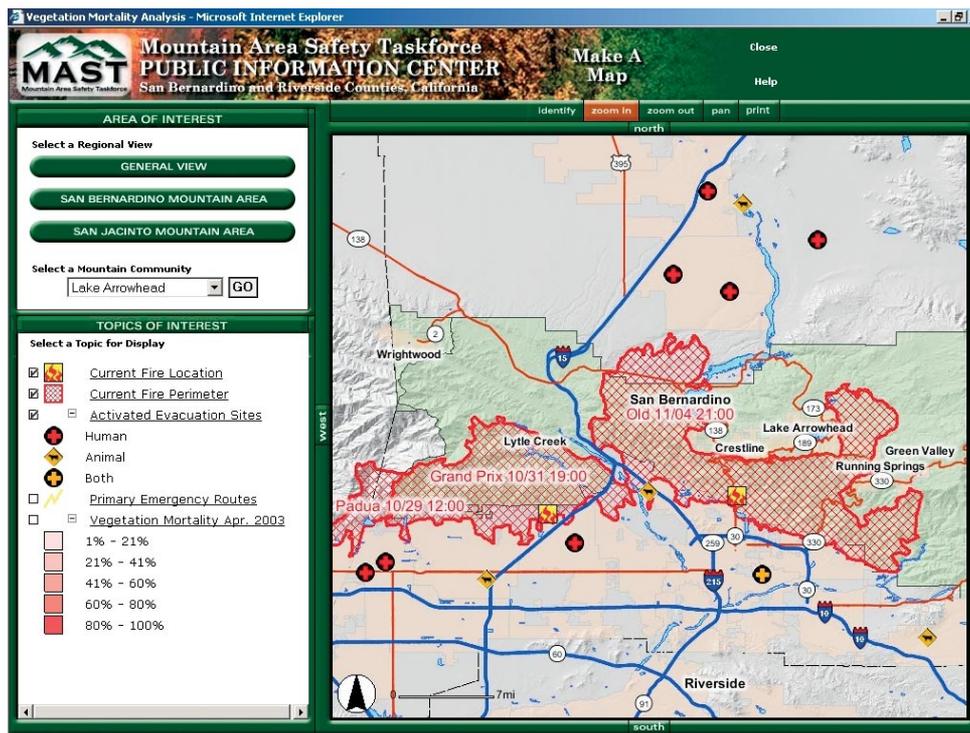
- Controls storage, management and retrieval of PPGIS data.





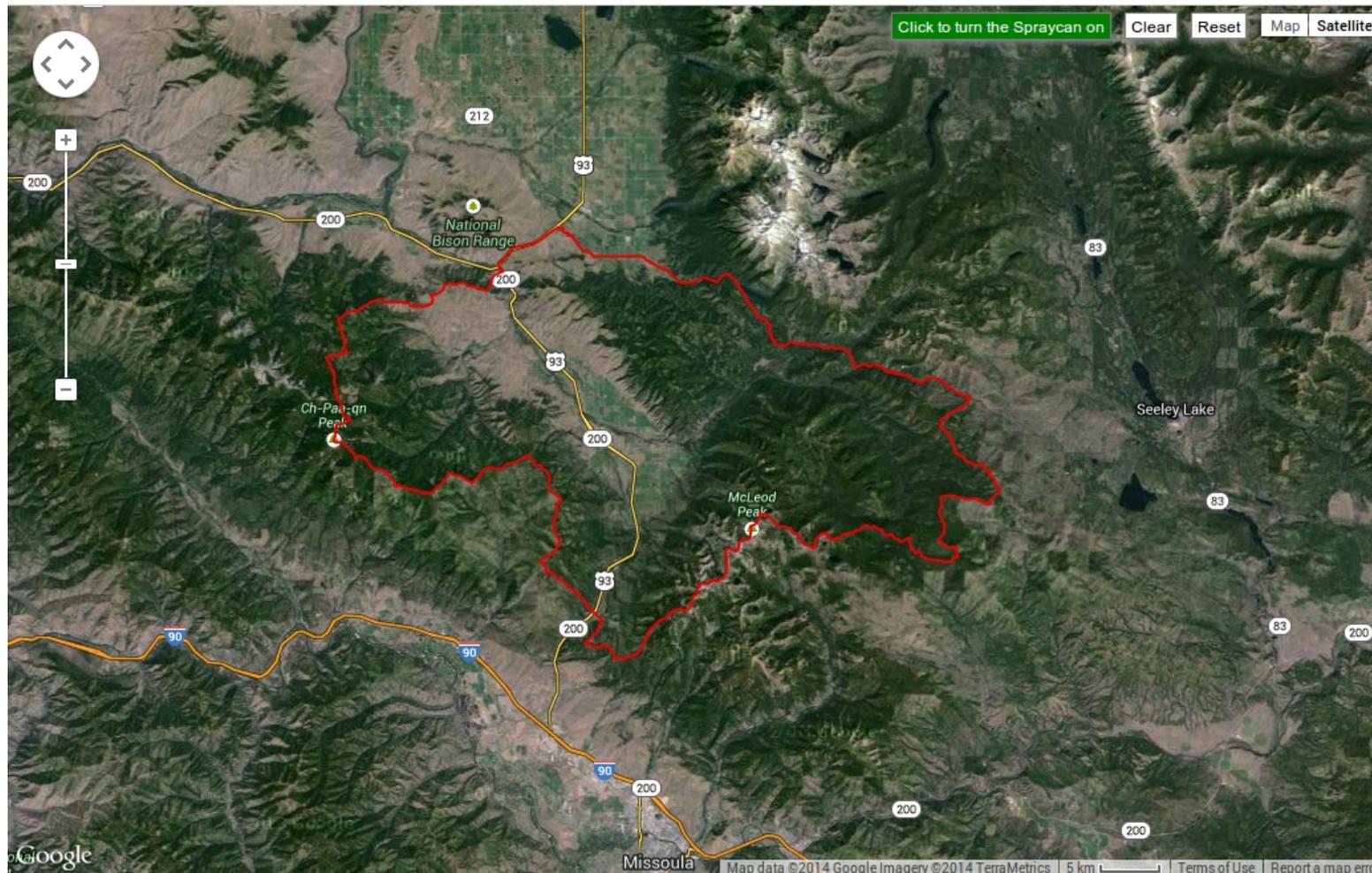
Components of an on-line PPGIS: map server

- Controls the display of geospatial data through the network.





Example: Map-Me PPGIS



The area outlined in red is the Jocko Landscape. Please indicate an area that you believe has changed over the years.

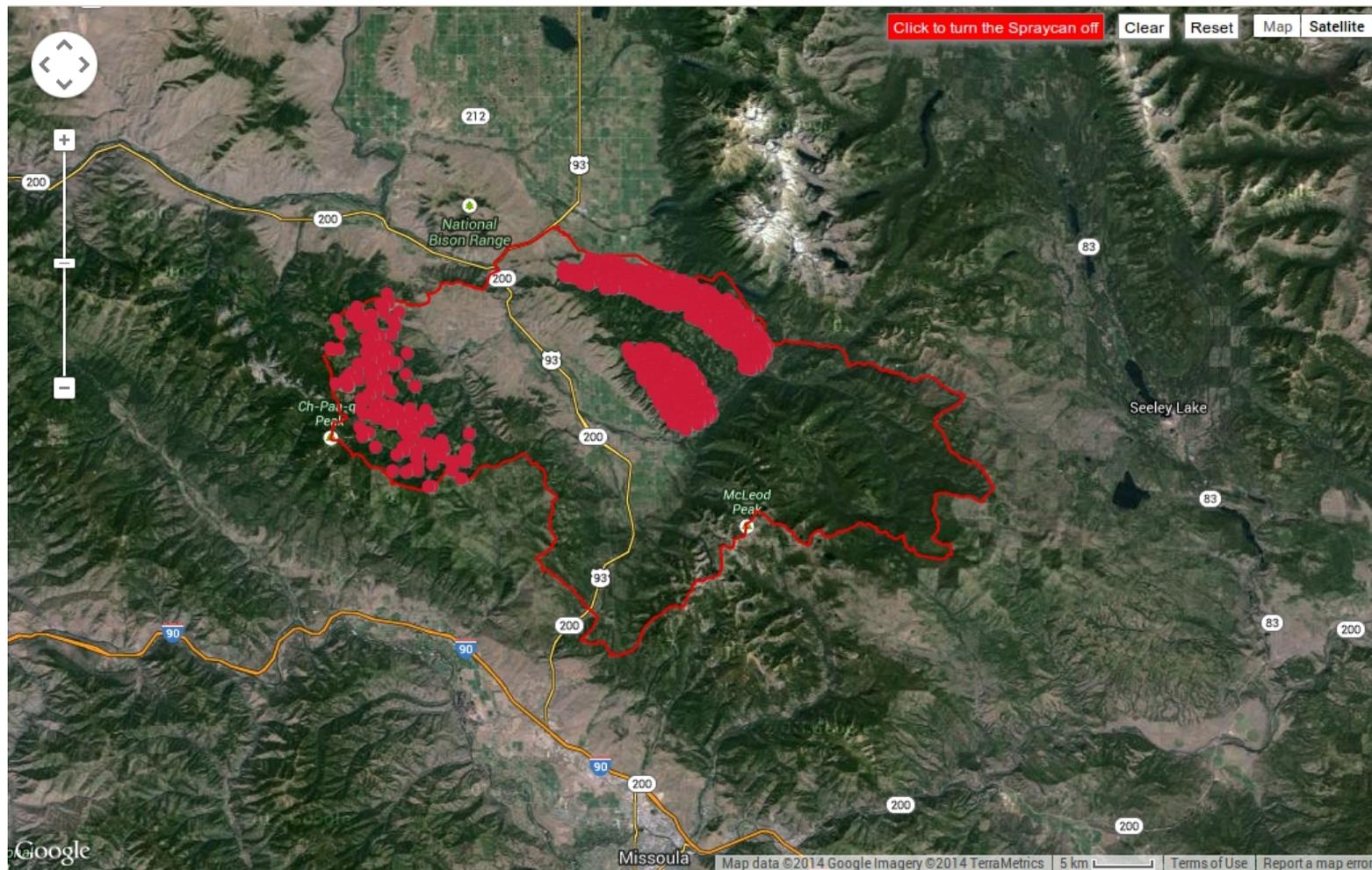
What did this area used to be like and what is the source of your knowledge?

What is the area like now and what do you believe has caused the change from what it used to be like?

What would you like this area to be like in the future and why?



Example: Map-Me PPGIS



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Example: Map-Me PPGIS

The area outlined in red is the Jocko Landscape. Please indicate an area that you believe has changed over the years.

What did this area used to be like and what is the source of your knowledge?

Woodlands used to be much more open. I've been gone to this place since the 1960's. Also from Elders

What is the area like now and what do you believe has caused the change from what it used to be like?

Oversized forest. Closed canopy. Unhealthy. They have to thin.

What would you like this area to be like in the future and why?

Thinned forest, for fauna and flora to be in equilibrium. That's how it used to be.



Conducting research using PPGIS data



Stages on conducting PPGIS-based research

1. Literature review and familiarity with the case study
2. Survey design
3. Data collection
4. Data analysis and results
5. Report of results



1. Literature review and familiarity with the case study

- 1.1. Review the history, theory, methods and applications of the PPGIS approach.
- 1.2. Review case studies similar to yours, paying special attention to their goals, objectives, research process and results.
- 1.3. Meet with stakeholders and discuss their views on the problem and on the application of the PPGIS approach.
- 1.4. Produce a synthesis of the review.



2. Survey design

- Sampling should preferably be random but stratified:
 - This gets around biased samples at the stratum level (i.e. all strata are represented). Examples of strata are youngsters/elders, managers/non-managers.
 - Randomness is preserved, though, on sampling each stratum.
- Questionnaires should avoid involved questions and secure concise responses keeping to the point.
- If possible, a pilot survey would first be carried out, out of which feedback can be obtained to design the final version of the survey protocol.



3. Data collection

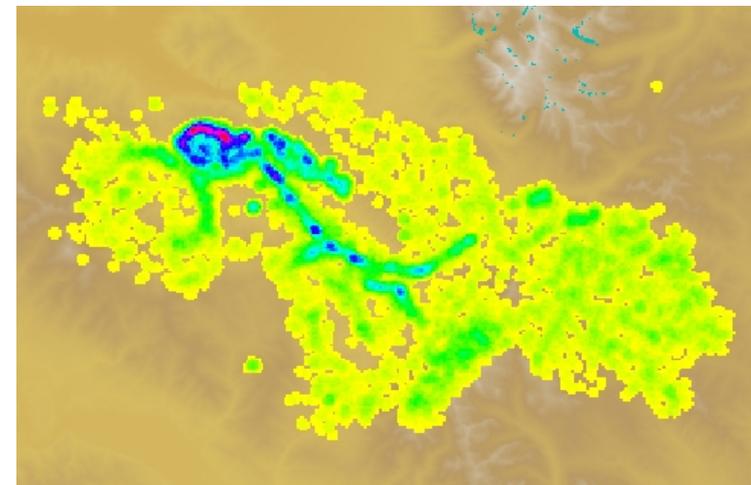
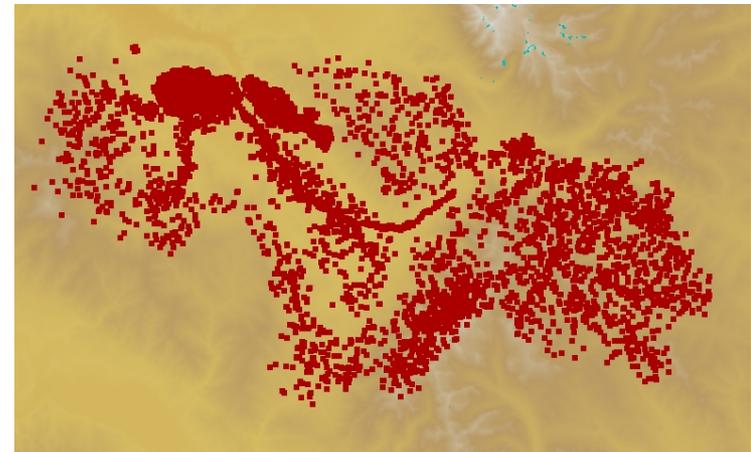
- a) Off-line without digital support: data collection by analogical means and subsequent digitization by a specialist.
- b) Off-line with digital support: data collection by a disconnected terminal.
- c) On-line PPGIS: remote introduction of data and storage in a centralized database.





4. Data analysis and results

- Mapping of answers.
- Application of spatial statistics: could answer locations depend on landscape properties? (e.g. land use, land rights, taboo areas).
- **Tip:** implication of stakeholder representatives in the analysis process and a joint discussion of results is desirable, as it helps to get clues on interpreting results and to re-formulate hypotheses.





5. Report of results

- Stakeholders' viewpoints of the results should be included if possible, whether by referring to these or communicated by co-authoring representatives, as stakeholders comprise the data source of the survey and in order to involve them throughout the whole research process.
- Should include an outline of the whole research process, including survey design, characteristics of the sample and the equipment used over the process
- Adhere to mapping standards! Use legend, scale, titles, metadata details...

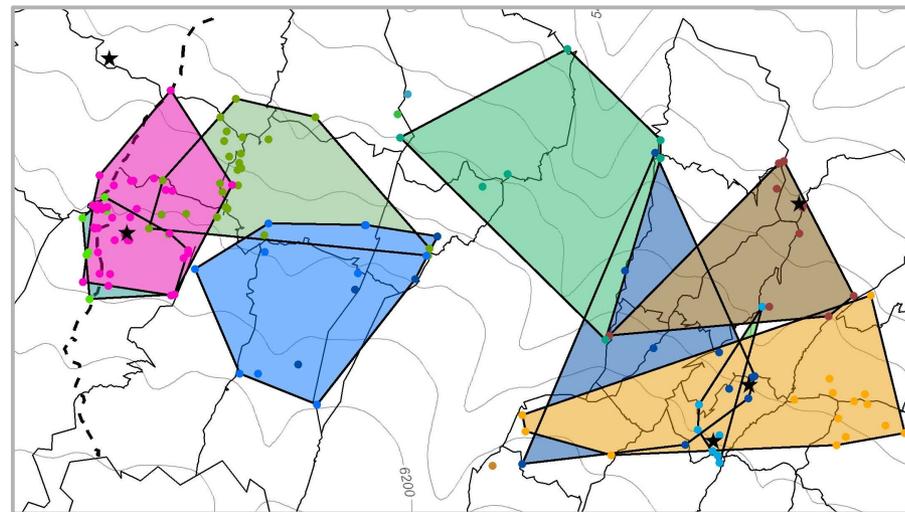
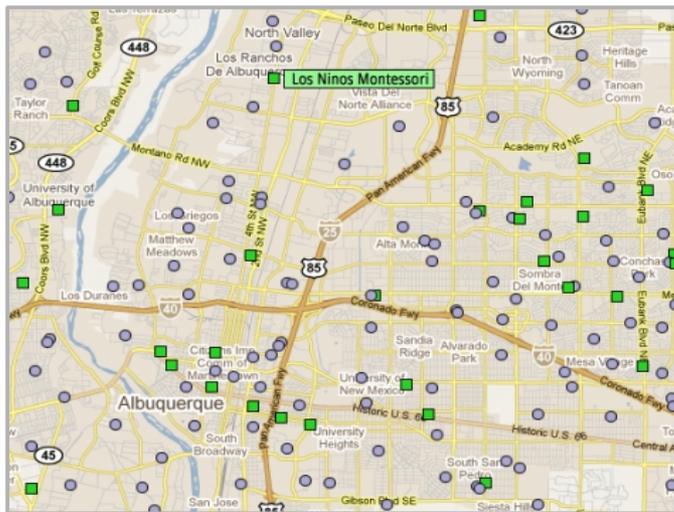


Advanced topics in PPGIS data analysis



Data models for the location of events

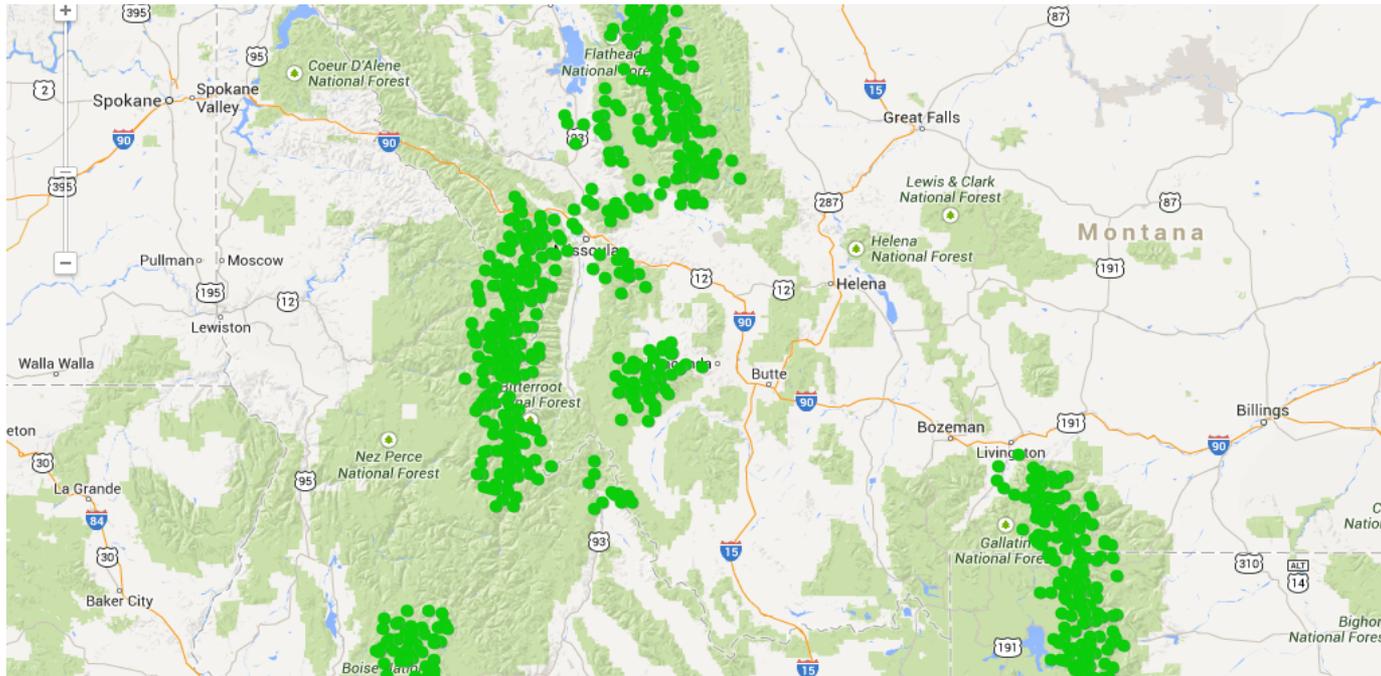
Exact models: assume that locations of tagged phenomena are known with certainty.





Data models for the location of events

Fuzzy models: take account on the fact that locations of phenomena may be vaguely and/or imperfectly known by respondents, and so the tagging.





Issues in the analysis of PPGIS data

Text tends to produce much larger volumes of data than measures, but their information is unevenly distributed among text units and could even be superfluous.

What are the benefits of these areas?

I really do not know. I guess they preserve some biodiversity that otherwise would disappear, specially endemic species and the like

What are the benefits of these areas?

.....|

Spray on the map those places you think are wilderness areas

What makes them a wilderness?

What are the threats facing them?

What are the benefits of these areas?

Back

Spray Again

Next

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Issues in the analysis of PPGIS data

Linguistic registers and patterns may not be uniform among participants (dialectal modes, specialist vocabulary, jargon, misspellings, typos, Internet typing slang) so semantic standards less efficiency the richer the text data set.

What are the benefits of these areas?

You can do a bunch of pretty cool stuff up there, like hiking or canoeing

What are the benefits of these areas?

They offer a range of leisure services whose availability depends, nevertheless, on the protection of local habitats

Spray on the map those places you think are wilderness areas

What makes them a wilderness?

What are the threats facing them?

What are the benefits of these areas?

Back Spray Again Next

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Issues in the analysis of PPGIS data

Verbalized definitions may be semantically fuzzy, e.g. include polysemy, alternative textual entailments, conceptual generalizations (abstraction) or references to a whole by one or several of its parts.

What are the threats facing them?

Logging and the effects of diseases on the tree health

What are the threats facing them?

The proliferation of pathogens on the tree bark and branches, along with industrial activity of the timber sector

Spray on the map those places you think are wilderness areas

What makes them a wilderness?

What are the threats facing them?

What are the benefits of these areas?

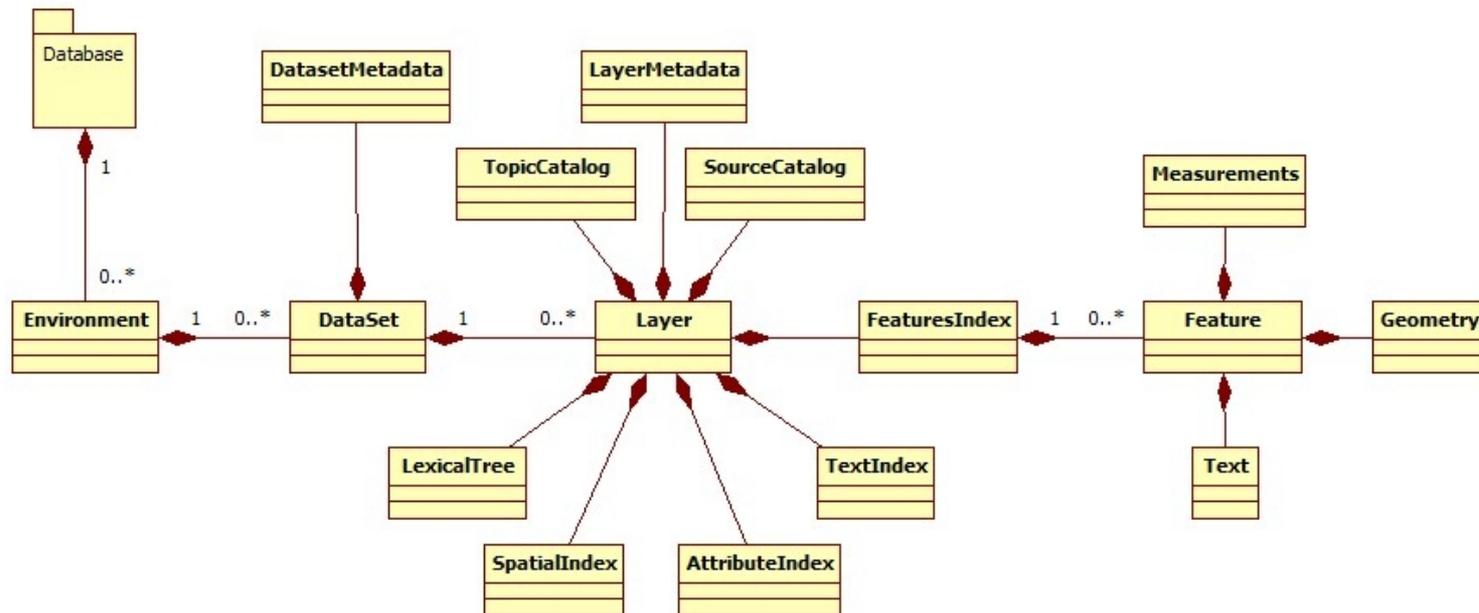
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Data organization: the composite database model

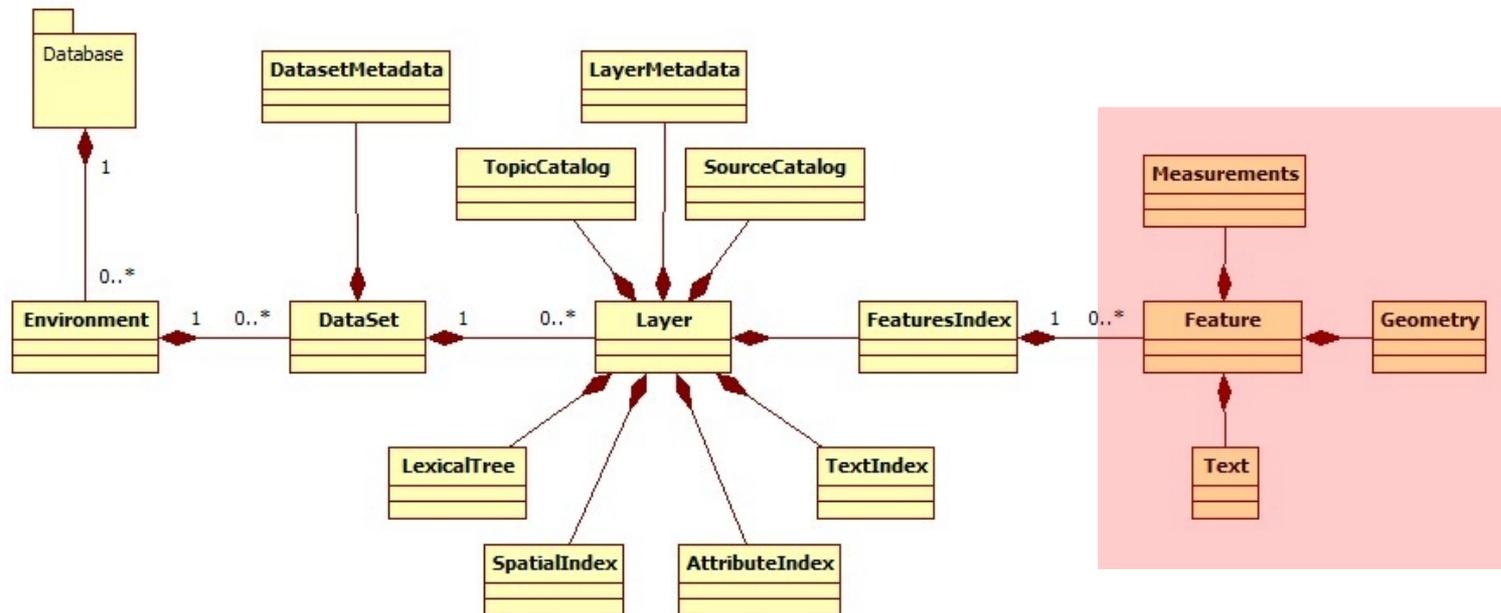
An Object-Oriented database is suitable for dealing with the complexity and heterogeneity of PPGIS features.





Data organization: the composite database model

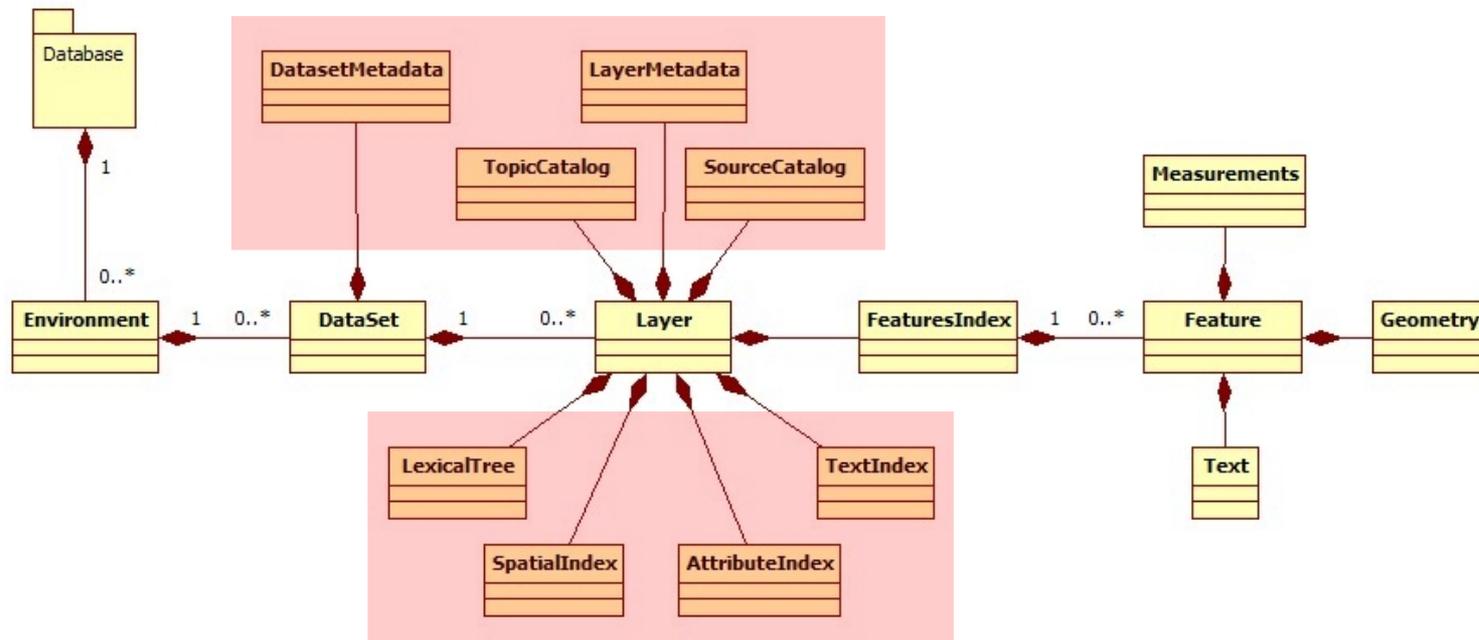
PPGIS features may comprise composite data vectors with spatial, temporal, measure and text components.





Data organization: the composite database model

Additional modules take on functionality for the improvement of queries of the composite database and the archiving of ancillary information about features.





Information retrieval: a naturalized query language

Natural Language Programming (programming with natural language expressions, e.g. standard English) provides theoretical principles for the synthesis, retrieval, mapping and management of composite data vectors, also facilitating query formulation.

```
select features from layer 2013 in dataset tpk where text  
has noun pine or a synonym,
```

```
then map them as overlays with these parameters: xres as 100  
and yres as 100
```



Information retrieval: a naturalized query language

Natural Language Processing turns out suitable for the interpretation and patterning of human language text data by means of fully- or partially automated mechanisms.

```
select features from layer 2013 in dataset tpk where text  
implies that use of fire has good effects on forests
```



Thank you

