S176 Promoting Adaptive Management Based on Participative Monitoring and Knowledge Networks

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Introduction

From ecosystem monitoring in Rio Cuchujaqui watershed, Sonora, México, one set of meteorological, hydrological and functional traits data have been generating for several years, now is necessary collaborative studies and participative workshops in order to integrate not just the studies and analysis from this databases but the active learning and management from local stakeholders. The main goal is facilitate transversal ecosystem learning from formal to tacit local knowledge and vice versa. How to do this is by means of the active involvement of communities living in the watershed on the monitoring and built up of one information repository based in geoweb applications. Then, the three components of adaptive management included in this proposal for a knowledge ecosystem network are: one knowledge repository, a communication component and collaborative projects.

Knowledge ecosystem network

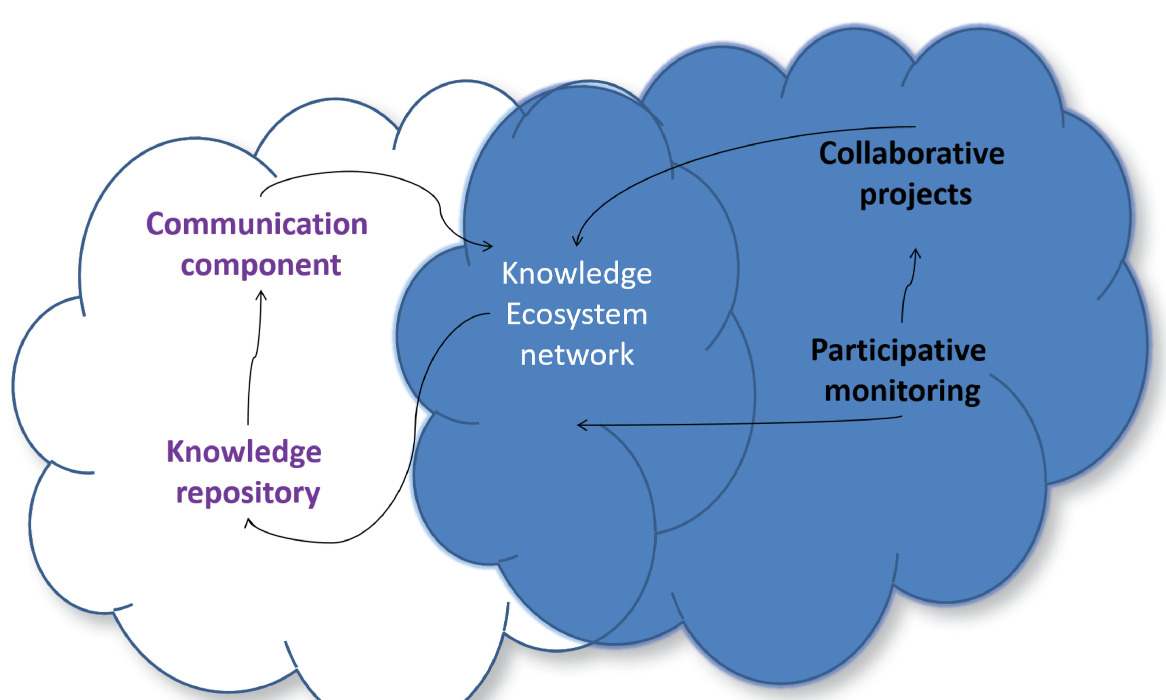


Fig. 1 Adaptive management components.

A knowledge network is composed by people and institutions with management practices embedded on their own aproacches and understanding about ecological systems being modified. The ecosystem knowledge as part of social networks, is a mixture of scientific advances, applied technologies and culturally transmited knowledge, that links ecosystems with management. Adaptive management brings the gap between knowledge networks and ecological systems taken ecosystem resilience into account. Because resilience deals with change, any practice, knowledge or adaptive response learned from experience or observation, build our capacity to disturbances, especially when is placed in context. Then, we use applied technologies, advances in research, collaborative and interdisciplinary workgroups to promote a knowledge ecosystem network for adaptive management on Rio Cuchujaqui watershed.

Geoweb application

Is composed of a repository information called IDEGeo (in reference to spatial database infrastructure SDI) and a communication component. This application with a simple interface, allows create and share geospatial information, documents and multimedia through collaboration between different users that perform different actions within this environment.

Fig. 2 Graphic interface.

IDEGEO integrates the basic cartographical information and new information that is generated by researchers. All the information is stored in a spatial database and catalogued according to a basic subset of attributes compatible with the main standards for metadata, like the Federal Geographic Data Committee (FGDC) and Dublin Core. Besides, the information can be downloaded in different formats and consumed through web services following the Open Geospatial Consortium (OGC) standards. In this way, a user can consult and validate the information generated by other members of the network, and at the same time, use it to make analysis and generate new information that can be integrated in the SDI. All this elements, built upon open source software, are complemented with modules in which experts have tools to create web pages and they can integrate several multimedia elements, including visualizations of the spatial data that consume the SDI's web services. All tools facilitate communication through storytelling to the general public.

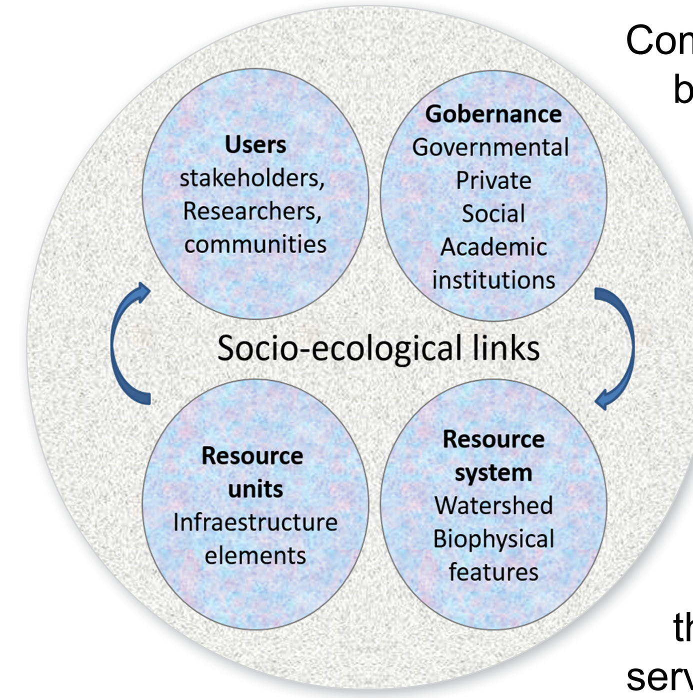


Fig. 3 Framework of managed system.

Fig. 4 Main access to knowledge repository IDEGEO.

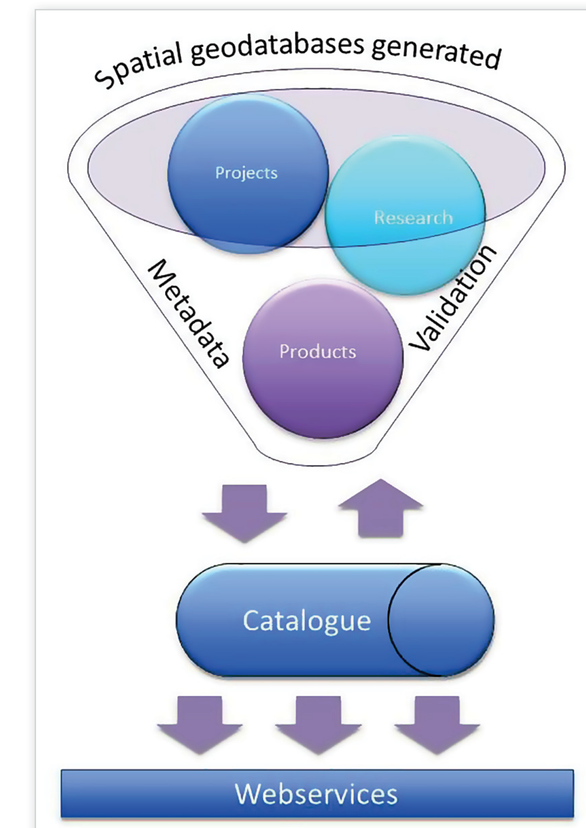


Fig. 5 Data Processing inside IDEGEO.

Collaborative projects

A workgroup from ITSON launched a multi-scale Carbon and water monitoring program at the Sierra de Alamos-Rio Cuchujaqui natural reserve in Sonora to assess the effects of climate, weather and land use variability in the functional dynamics of this ecosystem. We have instrumented at Mature Tropical dry forest (TDF) site for eddy covariance measurements of NEE and ET and laid out a 1 km by 1 km grid to sample carbon pools (soil, roots, organic layers, litter fall) and vegetation biomass in 20 national inventory-like conglomerates. Along this effort, during 2015, we added two eddy covariance towers; one at an adjacent recently abandoned (<6 years) agricultural site and one at a secondary forest with ~30 years of abandonment, this last tower within an interinstitutional project. Combining information of stand flux and soil carbon pools across different successional stages we can produce information for process model parametrization of the dry end of the TDF. The ultimate goal of this program is to stablish a long-term ecohydrological observatory were interdisciplinary, collaborative and multiscalar work in biogeosciences can be implement to understand this ecosystem within the Anthropocene.

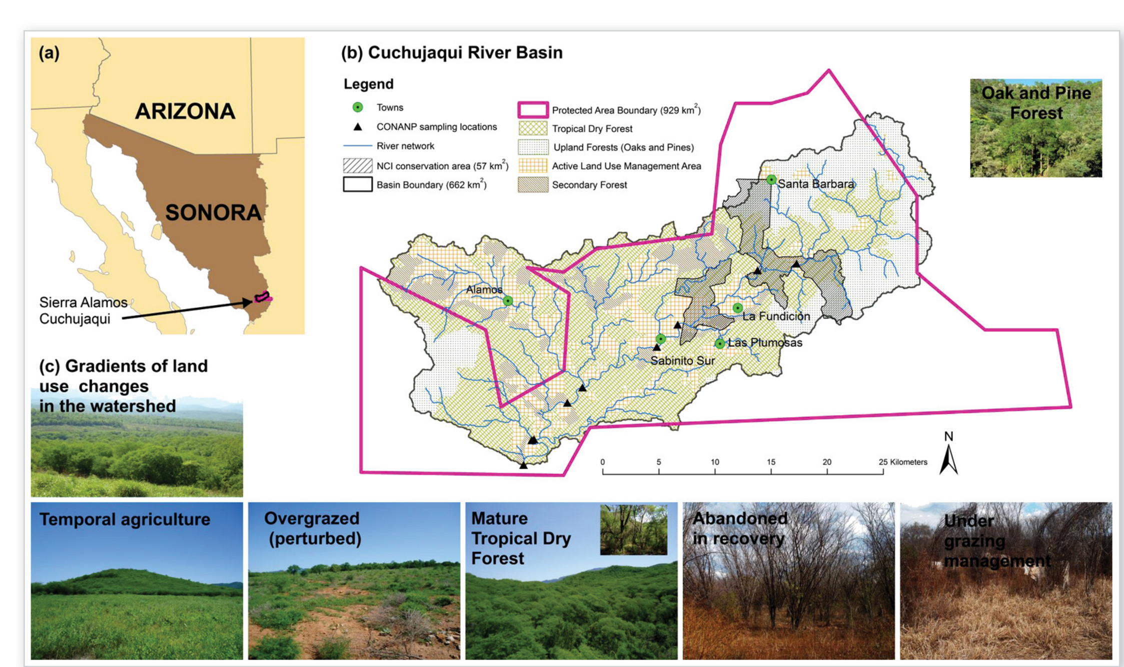
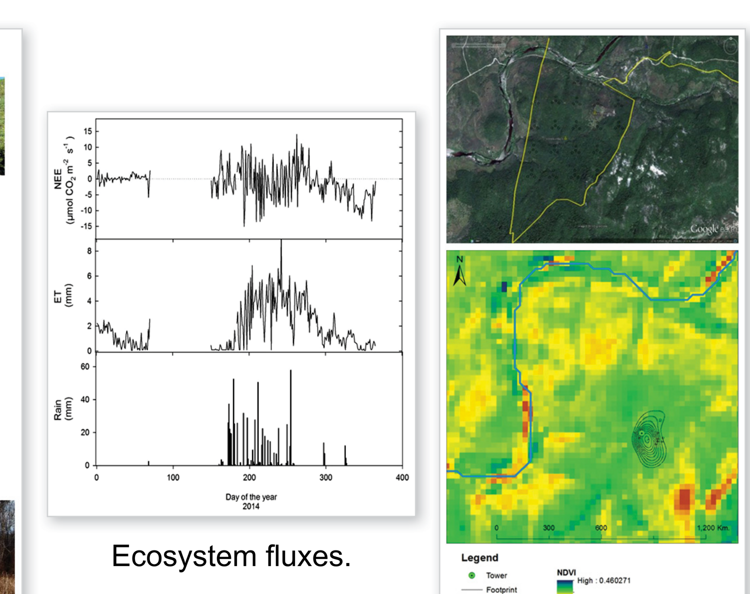


Fig. 6 Rio Cuchujaqui watershed in context.



Ecosystem fluxes.

Flux footprint.

Fig. 7 Contemporary flux measurements at TDF.

Advancing participative ecohydrological monitoring

Besides the ecohydrological monitoring we have made advances on one participative project, based in local capacities and requirements related with hydrological ecosystems services, identifiying monitoring priorities like quantity, quality and management of water for several uses; better functional state of watershed is encouraged, favouring recharge and slow runoff, then sites to build terraces were proposed. These proposals were made with the concept of resilience as management metaphora or goal for Rio Cuchujaqui watershed. This effort was made by means one participative worshop, were private and public stakeholders, as researchers and students dicussed about data and information requirements to compliment the ecohydrological monitoring. The geographical model is the watershed, but the observations must be done at local sites along the river from water management perspective and area distributed variables are needed to charactherize ecosystem support process linked with hydrological services, like land cover, plant functional traits and terrain landforms.

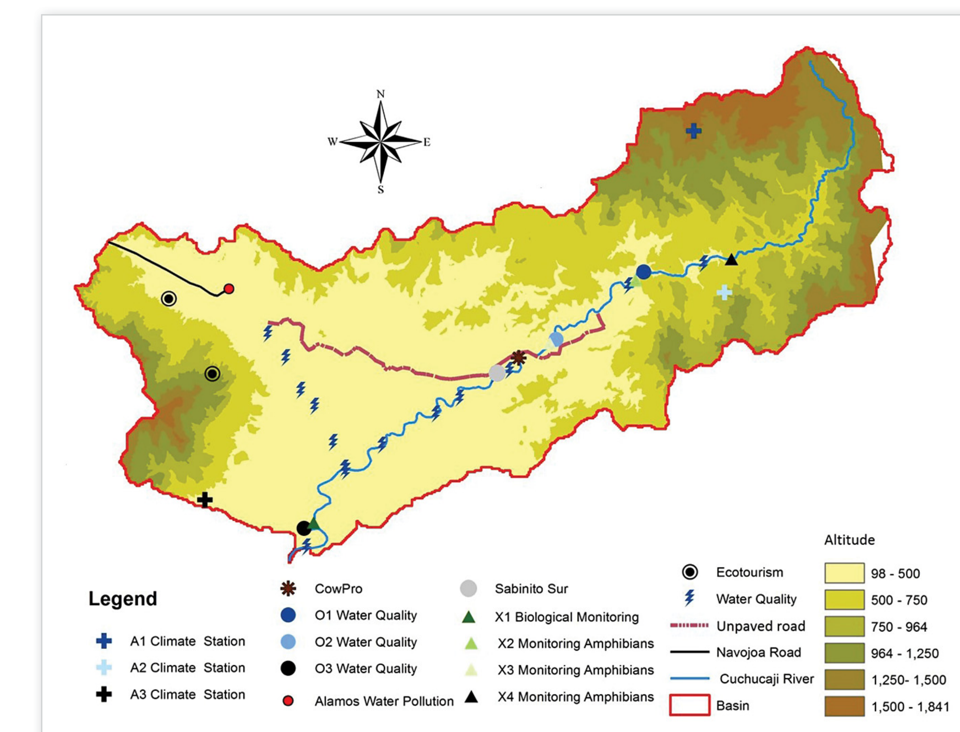


Fig. 8 Sites proposed from partipative workshop.

Fig. 9 Showing collaborative efforts.

Conclusions

This innitiative to consolidate an ecosystem knowledge network is at its beginnings but is clear that some elements are keys to promote collaborative and interdisciplinary projects: a common conceptual and applied framework, consensed research objectives and one commitment to acomplish a simple set of shared management goals.

The use of the Geoweb application improve and organize internal processes from institutions comprising knowledge networks, help on identification of complimentary skills and data requirements, a common spatial model increased the chance to develope interdisciplinary models and concepts and facilitate discussion.

It consists on an opportunity to advance into the hydrometeorological science application to promote a sustainable management.

References

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