

LÁCAR LAKE BASIN: IMPROVING LAND USE POLICIES BASED ON AN ECOHYDROLOGICAL APPROACH

SAN MARTÍN DE LOS ANDES - NEUQUÉN (ARGENTINA)

Up-dated in July 2015

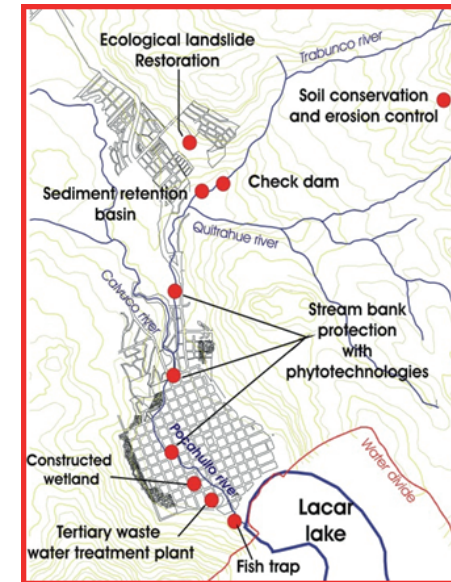
Demosite description

Lithology / Geochemistry

Mesosiliceous tertiary volcanics and metamorphic and plutonic rocks



40°10'S, 71°21'W



Courtesy of M. Gaviño Novillo, 2010

Main description:

- ▶ The demosite belongs to the Lácara Lake and Huahum River Basin (Province of Neuquén).
- ▶ Several streams and rivers drain from headwaters to the Lácara Lake. The outlet is conveyed as runoff by the Huahum/Valdivia River to the Pacific Ocean. The Pocahullo river crosses the City of San Martín de los Andes (26.000 inh) and drains the East part of the basin, equivalent to 20% of whole surface.
- ▶ 700,000 tourists visit National Parks Lanín and Nahuel Huapi. In fact, most of the watershed is under the administration of these two parks.

Conserve Ecohydrological processes in natural ecosystems
✓ YES

Enhance Ecohydrological processes in novel ecosystems
✓ YES

Apply complementary Ecohydrological processes in high impacted systems
✓ YES

Ecohydrology Principles and Solutions

EH IMPLEMENTATION PRINCIPLES

- * Quantification of the hydrological processes at catchment scale and mapping the impacts
- * Distribution of ecosystems and their relevant processes
- * Ecological engineering

EH SOLUTIONS

Biofiltration and sediment trapping using constructed wetlands and vegetation management



Reducing natural and geohydrological risks through control of woody debris, and landslides and margin restoration (fig. 1).

Lifezones

Life Zone
Subtropical Montane
Wet Forest

PPT (mm/yr) 1450
T (°C) 11

PET ratio: 0,45
Elevation: 1425m
Humidity: perhumid



Fig. 1- Riverine restoration (courtesy of M. Gaviño, 2006)

Major Issues

- * Deforestation and soil erosion
- * Water pollution
- * Intensive urban and road development
- * Natural and anthropogenic hazards (landslides, fire, floods (LWD, sediment))
- * Overgrazing causing erosion
- * Eutrophication of the lake due to the increase of nutrients P and N.

Social-Ecohydrological System

Catchment Ecohydrological sub-system

EH Objectives

Water: 4/5
Biodiversity: 4/5
Services: 5/5
Resilience: 5/5

Are inputs to:

EH Methodology

- * Regional evaluation of the present ecohydrological status of the river basin and the Pocahullo river flood valley.
- * Implementation of experimental measures of water management using soft-engineering design and also hard-engineering works inspired in natural processes.
- * Interdisciplinary cooperation.

Set conditions for:

Objectives

- * Evidence based policy formulation
- * Involvement of local authorities/ stakeholders in implementing EH management strategies
- * On-site training for young scientists and decision-makers
- * Dissemination of information on ecohydrological approach for water management

Set conditions for:

Catchment Sociological sub-system

Stakeholders

- * Researchers (University of La Plata, Comahue)
- * Mapuche indigenous population
- * Tourist and ski resort (Chapelco)
- * NC IHP (Argentina)
- * National Water Institute
- * Municipality of San Martín de los Andes

Participate in:

ACTIVITIES

- * Development of a Spatial Decision Support Model for the watershed based on (GIS) (i.e: hydrological features, ecological features, vulnerability maps, land cover classification maps, land use, sediment production, other)
- * Modelling of the basin (fig. 2)
- * Riverine restoration
- * Mitigation of natural hazards
- * Policies EH based
- * Ecohydrology MSc Course (University of La Plata), ERASMUS MUNDUS MSc Course in Ecohydrology

Results

MAIN EXPECTED OUTCOME

Main outcomes achieved: Increase security against natural hazard, enhancing of environmental services, restoration of water quality and biodiversity.

LATEST RESULTS

- ▶ After 22 years, the project has achieved its sustainability and expansion to other areas of the Andean Patagonian Region (Argentina and Chile). Is recognized as a demonstration project of regional scope in the research, design and implementation of innovative measures based on ecohydrology, soft engineering, and participatory approach. More than 10 publications, dissertations and graduation were produced.

[CLICK HERE TO SEE THE REFERENCES](#)

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