Interactive research in water and mining in Peru, Bolivia and Chile

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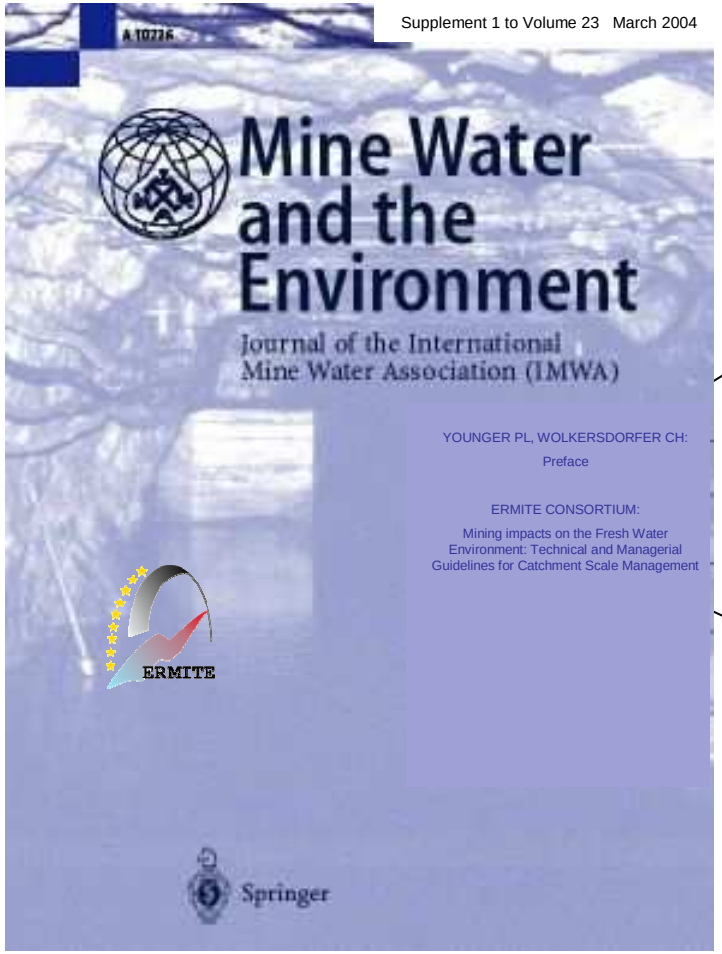
CAMINAR

Overview

- Background
- CAMINAR project
- Peru case study
- Bolivia case study
- Chile case study
- Conclusions

ERMITE: Environmental Regulation of Mine Waters in the European Union

European Commision, 5th Framework Programme, contract EVK1-CT-2000-00078



YOUNGER PL, WOLKERSDORFER CH:

Preface

ERMITE CONSORTIUM:

Mining impacts on the Fresh Water Environment: Technical and Managerial Guidelines for Catchment Scale Management

ERMISA Project (2006)

Objective: "*contribute to the establishment of policies, management systems and technologies aimed at the prevention and remediation of impacts on aquatic ecosystems by mining activities in South America (initial focus on Peru)*"

- Dissemination of results of EU research projects.
- Establishment of a multi-sector forum for dialogue on water, mining and catchments with NGO Labor (*Grupo de Diálogo: Minería y Desarrollo Sostenible*)
- Recommendations to EU

ERMISA

CAMINAR CONSORTIUM

- Newcastle University, Reino Unido (Coordinator)
- Asociación Civil Labor, Lima y Arequipa, **Perú**
- Universidad Nacional de San Agustín de Arequipa, **Perú**
- Universidad Mayor de San Andrés, La Paz, **Bolivia**
- Centro de Estudios Ecológicos y Desarrollo Integral, La Paz, **Bolivia**
- Centro del Agua para Zonas Áridas y Semi-Áridas de América Latina y el Caribe (CAZALAC – UNESCO), La Serena, **Chile**
- Water Management Consultants, Santiago, **Chile**
- Universidad de Oviedo, España
- Instituto Superior Técnico, Lisboa, Portugal

Newcastle University

25 años Labor Asociación Civil

CEEDI WATER MANAGEMENT CONSULTANTS

CAZALAC Centro del Agua para Zonas Áridas y Semiáridas de América Latina y El Caribe

Universidad de Oviedo

INSTITUTO SUPERIOR TÉCNICO

The CAMINAR project

Catchment Management and Mining Impacts in Arid and Semi-Arid South America

Aims:

- **sustainable management of river-basins** of arid and semi-arid South America subject to impacts from mining
- contribute to the establishment of **policy options**, **management strategies** and **technologies**
- **Peru, Bolivia and Chile** as demonstration countries

Funding: EC FP6 INCO-CT2006-032539

CAMINAR project methodology:

- perform **river-basin case studies**
- establish **forums for dialogue**
- develop **decision support tools**
- develop **river basin management plans**
- develop **guidelines** for integrated water resources and ecosystem management
- inform **policy options**

Study Areas:

Chili River
Arequipa, **Perú**

Poopó Lake
Oruro, **Bolivia**

Elqui River
La Serena, **Chile**

Peru case study:
Location of the Chili River Basin

The Chili River Basin:

A highly regulated catchment

Water management issues (1)

- Only one mayor mine: Cerro Verde SA
  - Up to present exploitation of **Cu-oxides**:
    no water contamination, use 100 L/s
  - Good practice:
    co-funded construction of **Pillones Dam** which provides 3000 L/s
  - Now starting:
    exploitation of **Cu-sulphides**:
    more pollution risks,
    will need 1500 L/s

Presa Pillones

Water management issues (2)

- Other mayor water consumers:
  - Agriculture: currently estimated 11.000 L/s
  - Drinking water: 1500 L/s
  - Industry: 50 L/s
- Currently no mayor water use conflicts
- But estimates for 2010:
  - Mining: 1500 L/s
  - Agriculture: 18.400 L/s
  - Drinking water: 3280 L/s
  - Industry: 450 L/s
  - **Total: 23.630 L/s: will exceed regulated capacity**

Main water-related problem: Untreated sewage from Arequipa city

Sistema Regional de Gestión Ambiental Arequipa
Ordenanza 011-2004-CR/AREQUIPA

Nivel I
APRUEBA

Presidente Regional y Consejo Regional

Nivel II
COORDINAN

Comisión Ambiental Regional Arequipa

Órgano de Línea Ambiental del Gobierno Regional Arequipa
ARMA

Comisión de Ecología, Medio Ambiente y Defensa Civil del Consejo Regional

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Nivel III
PROPONEN

Grupos Técnicos Regionales

Grupo Técnico Agua, Cuenca y Minería en el Sistema Hídrico del Rio Chili

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Nivel IV
EJECUTAN

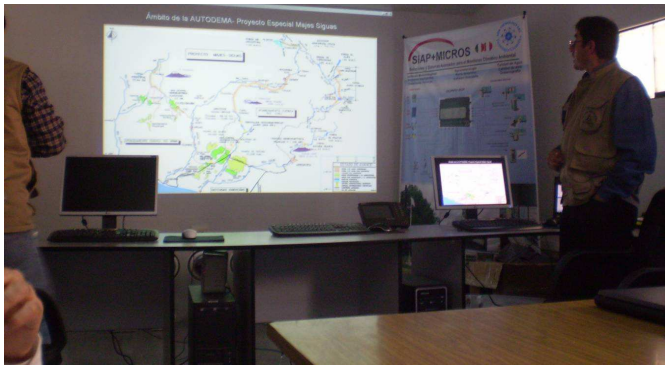
Entidades públicas	Sector privado	Sociedad Civil	Gobiernos Locales	Órganos del GR

Integrantes del GT

1. Gobierno Regional de Arequipa - ARMA
2. Asociación Civil LABOR
3. Universidad Nacional San Agustín - IRECA
4. Gerencia Regional de Energía y Minas
5. Gerencia Regional de Salud
6. Gerencia Regional de Agricultura.
7. AUTODEMA
8. Municipalidad Provincial de Arequipa
9. Municipalidad Distrital de Uchumayo
10. INRENA
11. Ministerio del Ambiente -CONAM
12. Sociedad Minera Cerro Verde
13. EGASA- Generadora de Energía
14. SEDAPAR – Agua potable
15. Pueblo Joven de Cerro Verde
16. Junta de Usuarios de Riego Regulado
17. Junta de Usuarios de Riego No Regulado
18. Junta de Usuarios de Riego La Joya
19. INGEMMET
20. Administración Técnica del Distrito de Riego
21. Consejo Regional del Gobierno Regional Arequipa
22. Colegio de Ingenieros del Perú – Arequipa
23. Comunidad campesina de Cuenca Alta
24. Reserva Nacional de Salinas y Aguada Blanca
25. Sociedad Agrícola de Arequipa
26. DESCO
27. COPASA
28. SENAMHI
29. PRONAMACHS

Themes for Catchment Policies

1. Institutions
2. Water Culture
3. Water decontamination
4. Efficient water management
5. Recovery of traditional technologies of water use and conservation.
6. Positive relation between mining and water

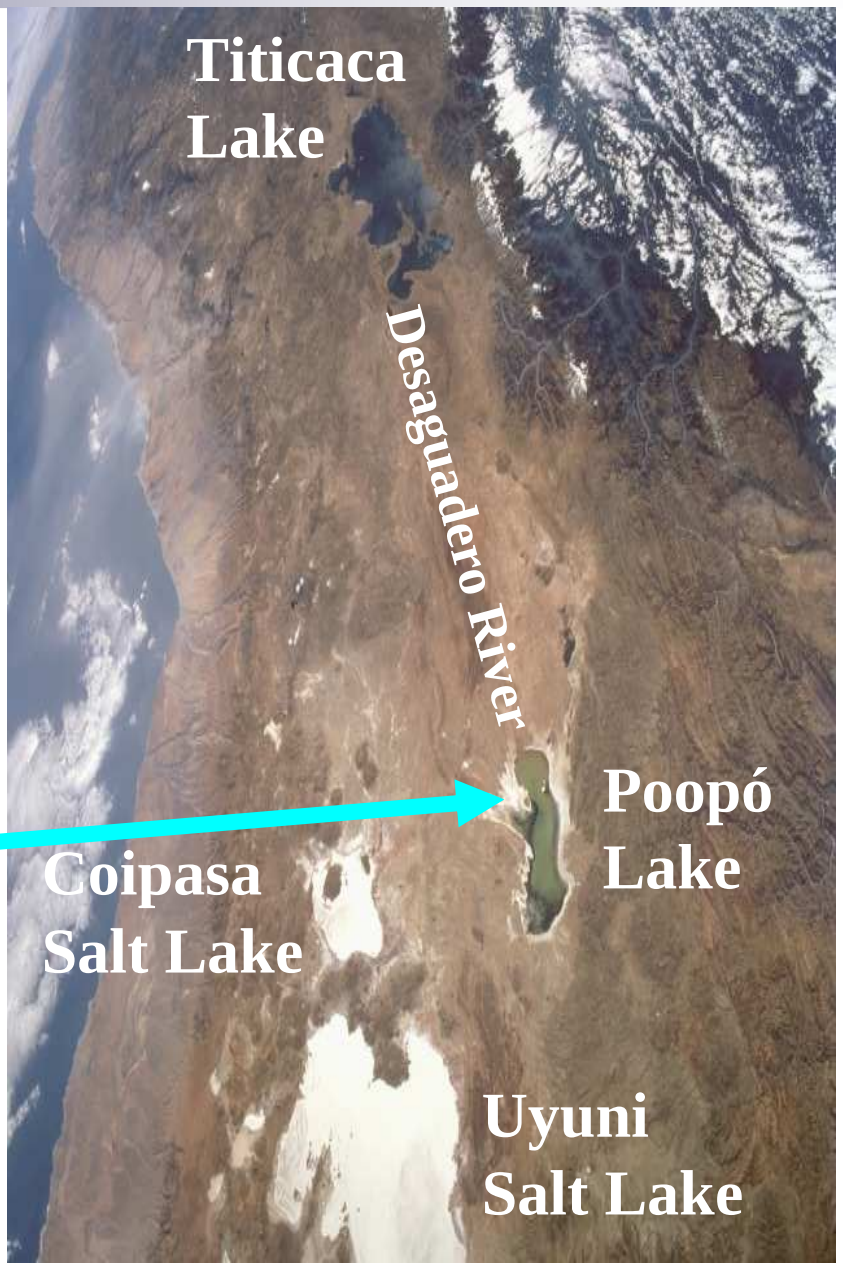


National Forum Peru

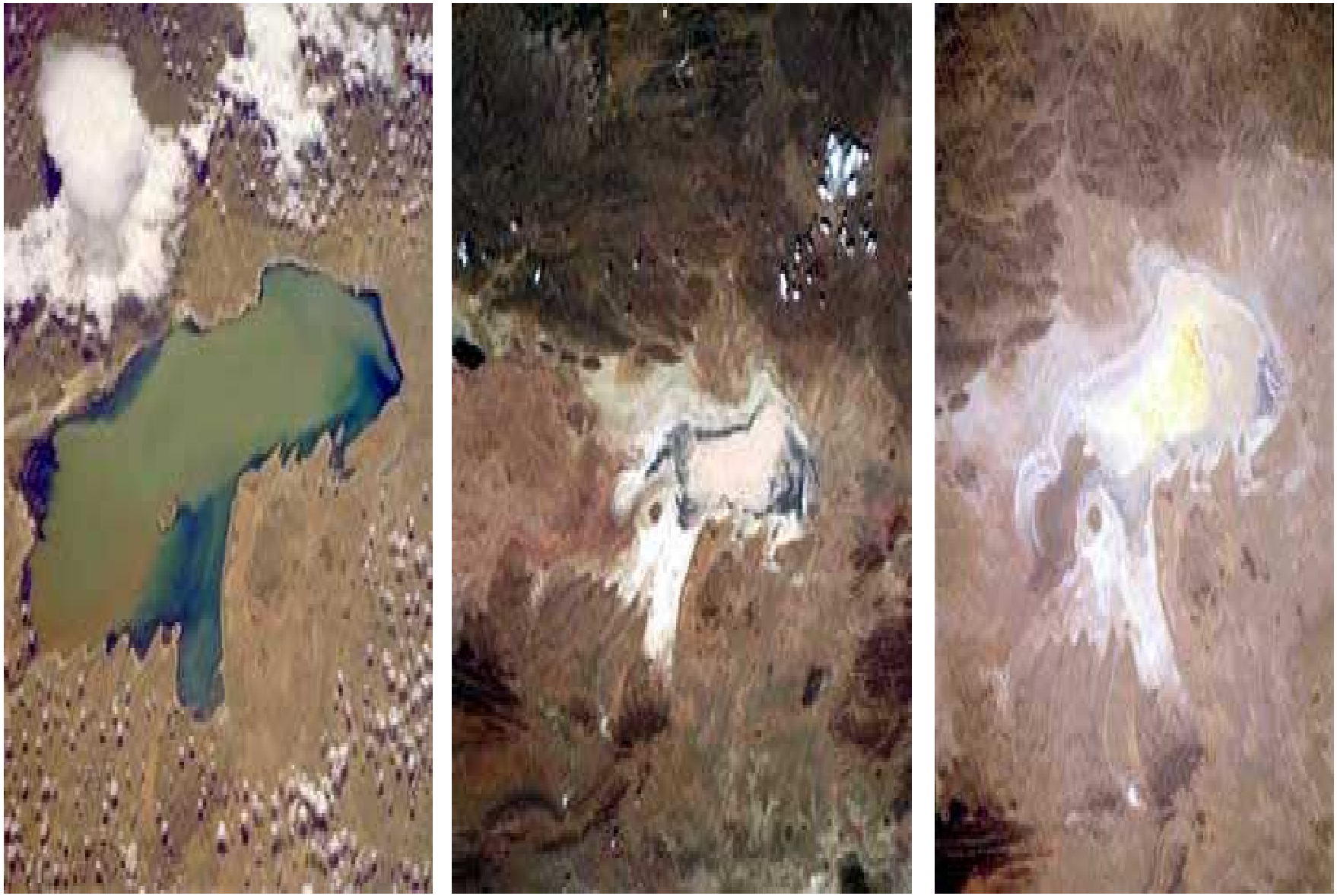
- Grupo de Dialogo Minero
- Working group on Agenda del Agua
  - Ministry of Energy and Mines
  - Ministry of Environment
  - Ministry of Agriculture

- Events
  - “I Encuentro de Comités de Monitoreo y Vigilancia Ambiental Participativa” 94 organisations from 14 regions

Bolivia case study:
Poopó Lake



Fluctuating water levels in Poopó Lake



Mining at many scales:
National and international companies

Cooperative miners

extracting minerals from old tailings

Avicaya
mineral
processing
plant

discharging tailings
directly to the river

Informal miners

reprocessing tailings directly in the river

Pollution caused by mining

Regional Forum Oruro

- Alliance with Prefectura Departamental de Oruro
  - Technical Workshops
  - Informal meetings

- Stakeholder involvement in Municipalities
  - PAZÑA and POOPO

Results of Poopo Stakeholder Participation and Case Study to date

- Severe contamination of the area by metals and acidic waters
- Conflicts between population and mining operations
- However, many residents are “agro-mineros”
- Some of the contamination (e.g. As) is also due to local geology
- CAMINAR monitoring extended to identify sources of contamination and pathways
- CAMINAR will elaborate Environmental Action Plans for the municipalities to help them negotiate with the miners

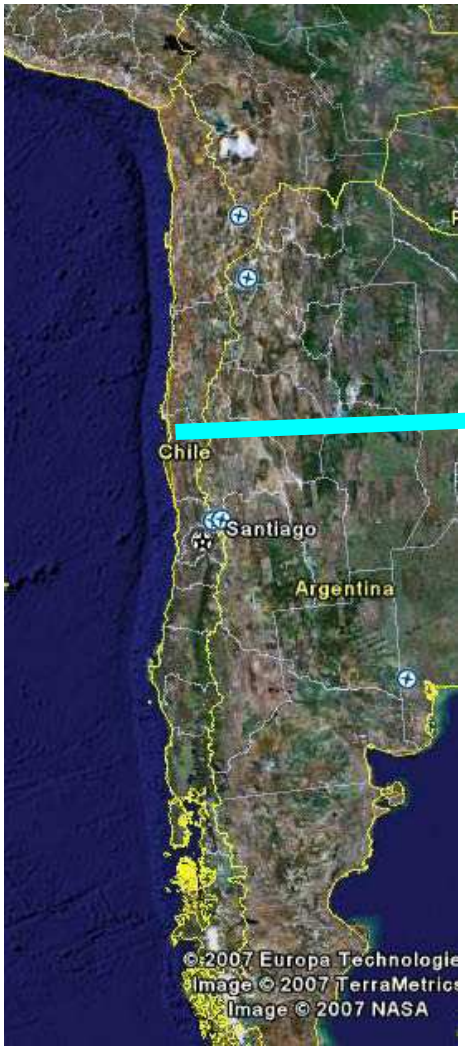
National Forum Bolivia

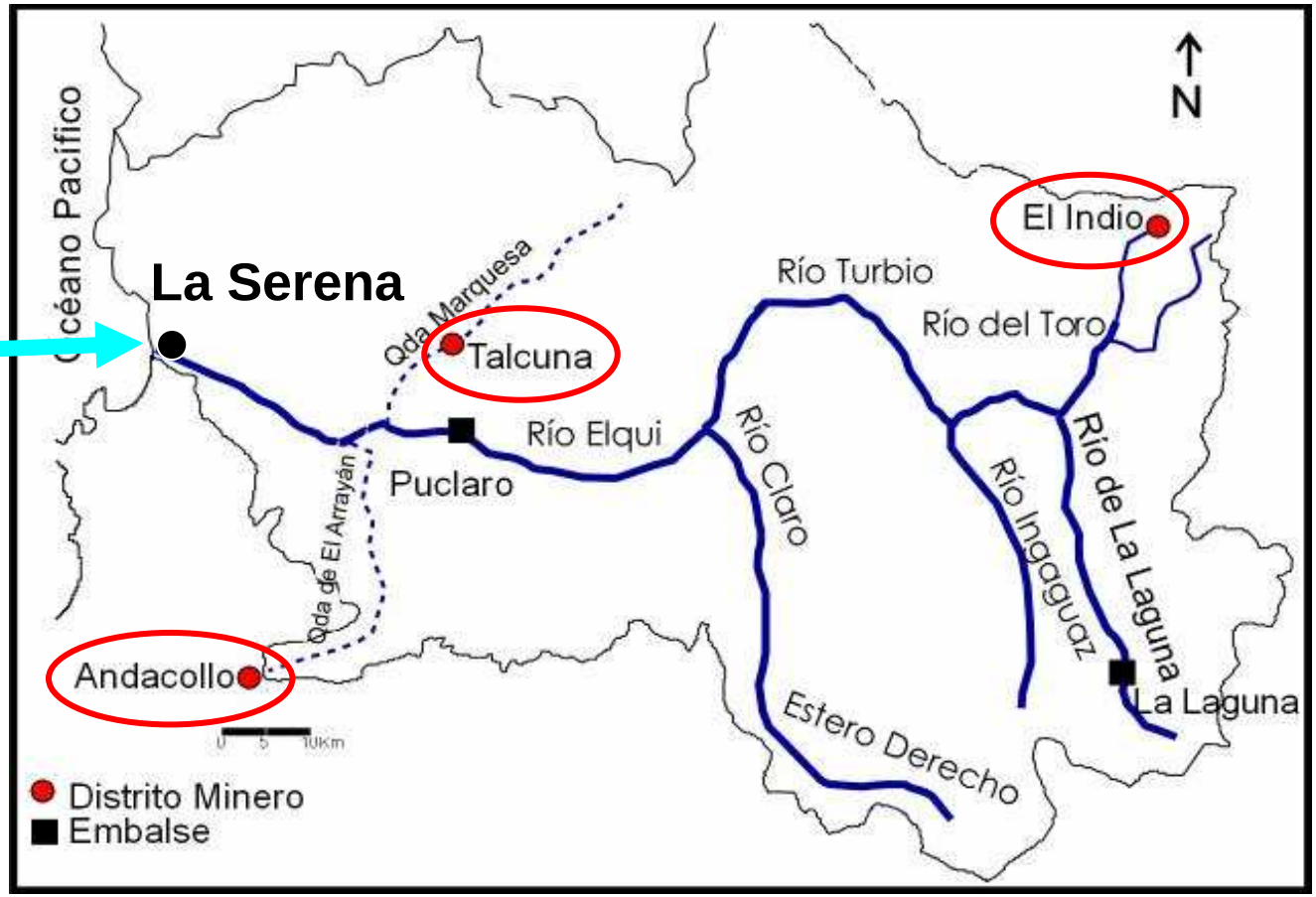
- National Commission on Mining and Environment of the Liga de Defensa del Medio Ambiente (LIDEMA)
- National Working Group
  - Viceministro de Ciencia y Tecnología
  - Viceministro de Minería
  - Rep. Del Viceministerio de Recursos Naturales y Medio Ambiente
  - Rep. Del Viceministerio del Agua,
  - Ministry of Agriculture

Stakeholder participation at national level

- Collaboration with Viceministry of Water to develop:
  - the **Bolivian National River Basin Plan**
  - the **Program of Prevention and Mitigation of Water Contamination**
- Collaboration with Viceministry of Mining to draft a new **Mining Law**

Chile Case Study: Elqui River Basin



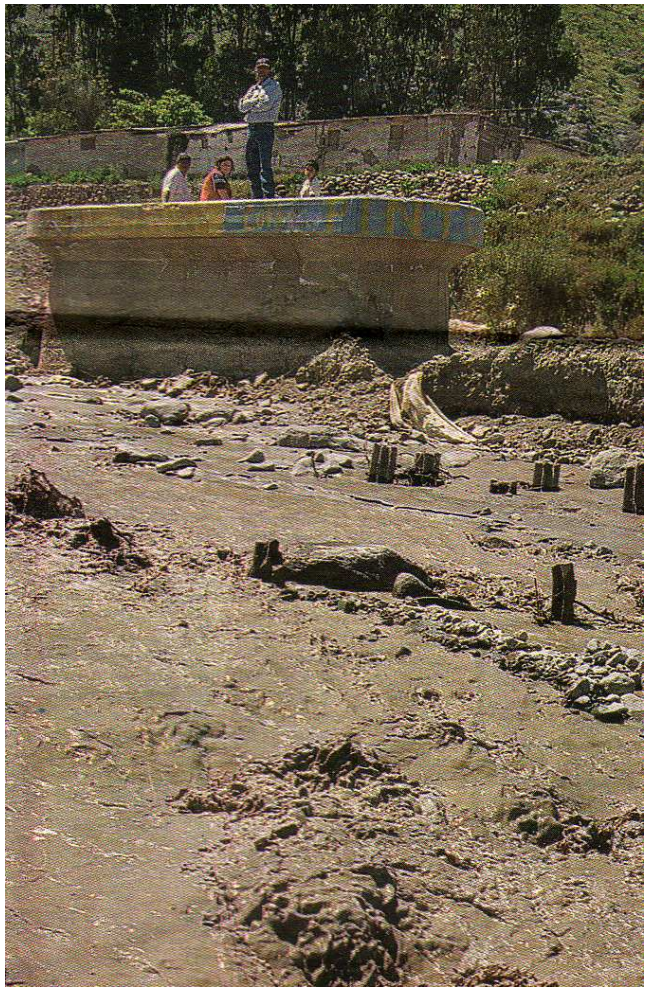


Competing water uses:
Mining, agriculture, tourism

Mining issues

Operating mines are well controlled, but abandoned mines cause contamination:

Flash floods erode tailings



Dialogue Groups Chile

National Group

- Very rigid institutional set up
- Mining companies have very safe conditions and have a very reduced appetite for engaging in dialogues

Catchment Group

- Hard beginning, difficult to attract actors
- At the end of 2008 the Dirección General de Aguas established the Mesa de Agua de la Región de Coquimbo
- CAZALAC coordinates and most of catchment actors involved
- More interest to take part in an institutionalised setting.

Conclusions

- Water contamination issues are very diverse in the three case studies.
  - Peru: Mining impact relates mainly to water quantities, while quality is impacted mostly by urban sewage.
  - Bolivia: Severe water contamination, remediation at large scale extremely difficult.
  - Chile: Active mines impact mainly on water quantities, while abandoned mines pose a contamination threat.

Conclusions

- In all three case study countries, water management at basin scale is hindered:
  - no single competent state organism
  - IWRM at basin scale not legally implemented
  - lack of resources to enforce the law
- Environmental Laws only give general provisions, lack of explicit norms and consistent policies.


Thank you