Strategic Environmental Assessment: Needs and Opportunities in Mexico

A view through the Arcediano dam controversy

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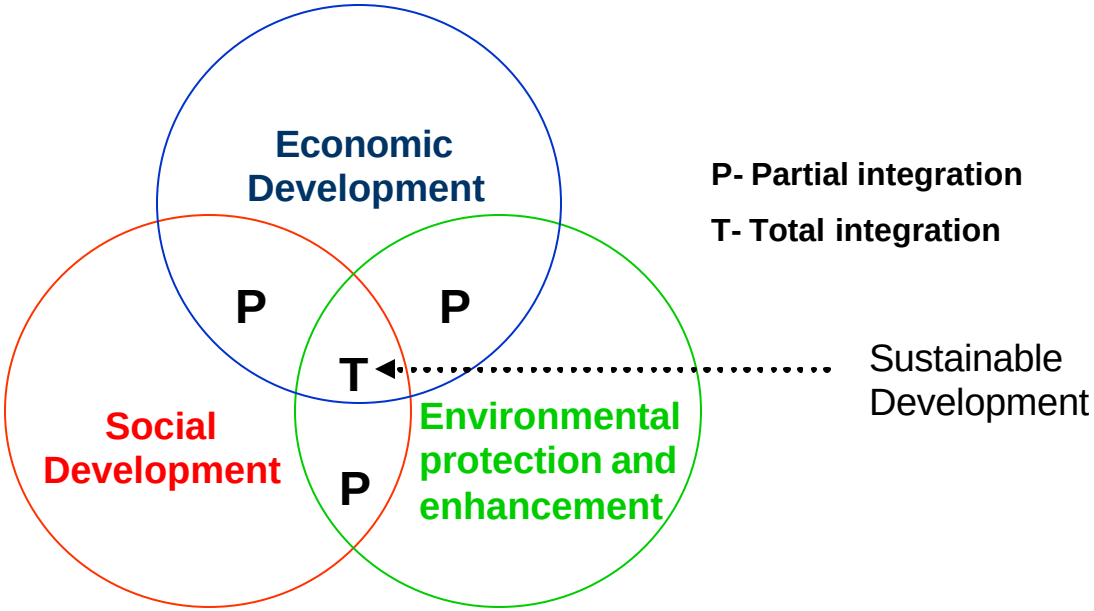
Mexico

Sustainable Development and SEA

- SEA is an important tool to achieve Sustainable Development, by facilitating the integration of the environmental dimension into planning processes



SEA and Sustainable Development

- EIA requirements in place in Mexico since 1988
- No SEA requirements exist in Mexico, nor are they being officially considered
- Exception of planning under the Puebla-Panama Plan

Planning and environmental assessment in Mexico

Mexico is a Federation integrated by 32 States

Planning and environmental assessment in Mexico

- National Planning undertaken under the "National System for Democratic Planning"
  - Considers the involvement of different actors, including different institutions of the federal public administration and State governments, interested social groups, indigenous peoples and communities
  - The planning system is still far from being effectively implemented

Planning and environmental assessment in Mexico

- Article 21 of the Law on Planning states that the National Development Plan must take into account the “environmental variables” related to the economic and social activity
- This is consistent with the definition of Sustainable Development given in the Law on Ecological Balance and Environmental Protection (LGEEPA)

Definition of Sustainable Development in the LGEEPA

- *"…the process that can be evaluated through criteria and indicators of an environmental, economic and social nature that tends to enhance the quality of life and the productivity of people, founded on adequate measures for the preservation of the ecological equilibrium, environmental protection and use of natural resources in such a manner that the needs of future generations are not compromised."*

National Development Plan 2001-2006

- Refers to SD mainly in its environmental dimension
- Makes no reference to assessing the environmental dimension of PPPs

National Development Programme 2001-2006

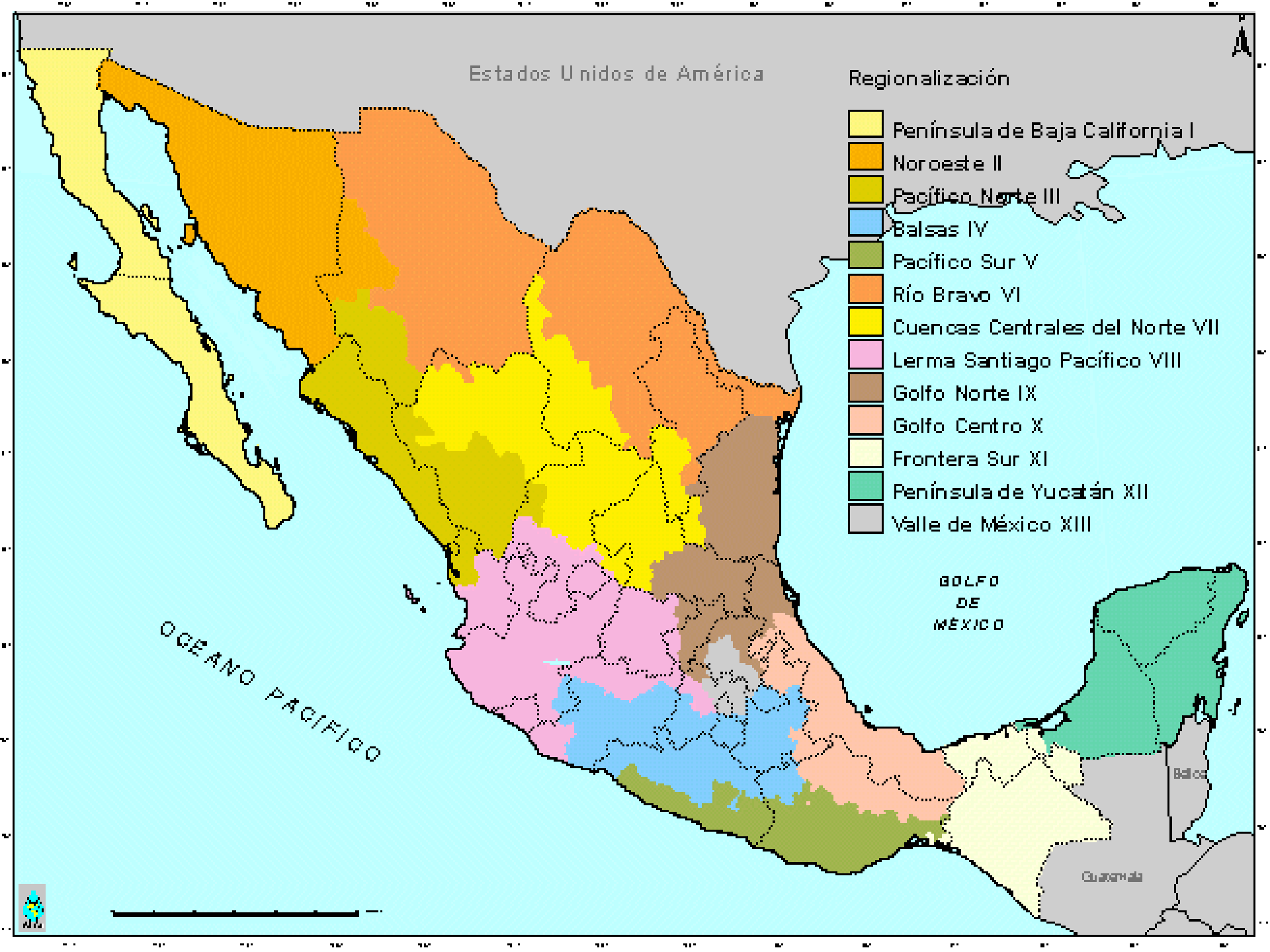
- Some positive initiatives, e.g. the *National Programme for the Environment and Natural Resources 2001-2006* defines as one of the objectives of its 4th Strategic Programme the promotion of SD to *"incorporate the environmental dimension in political, economic and social decision-making in all levels of government, economic sectors and society".*
- Further substantiated through the *Programme to Promote Sustainable Development in the Federal Government*.

Planning and environmental assessment in Mexico

- An adequate framework in line with SD and environmental integration is being created, but still needs to be instrumentalised.
- SEA will be a necessary tool to help achieve an adequate integration of the environment.

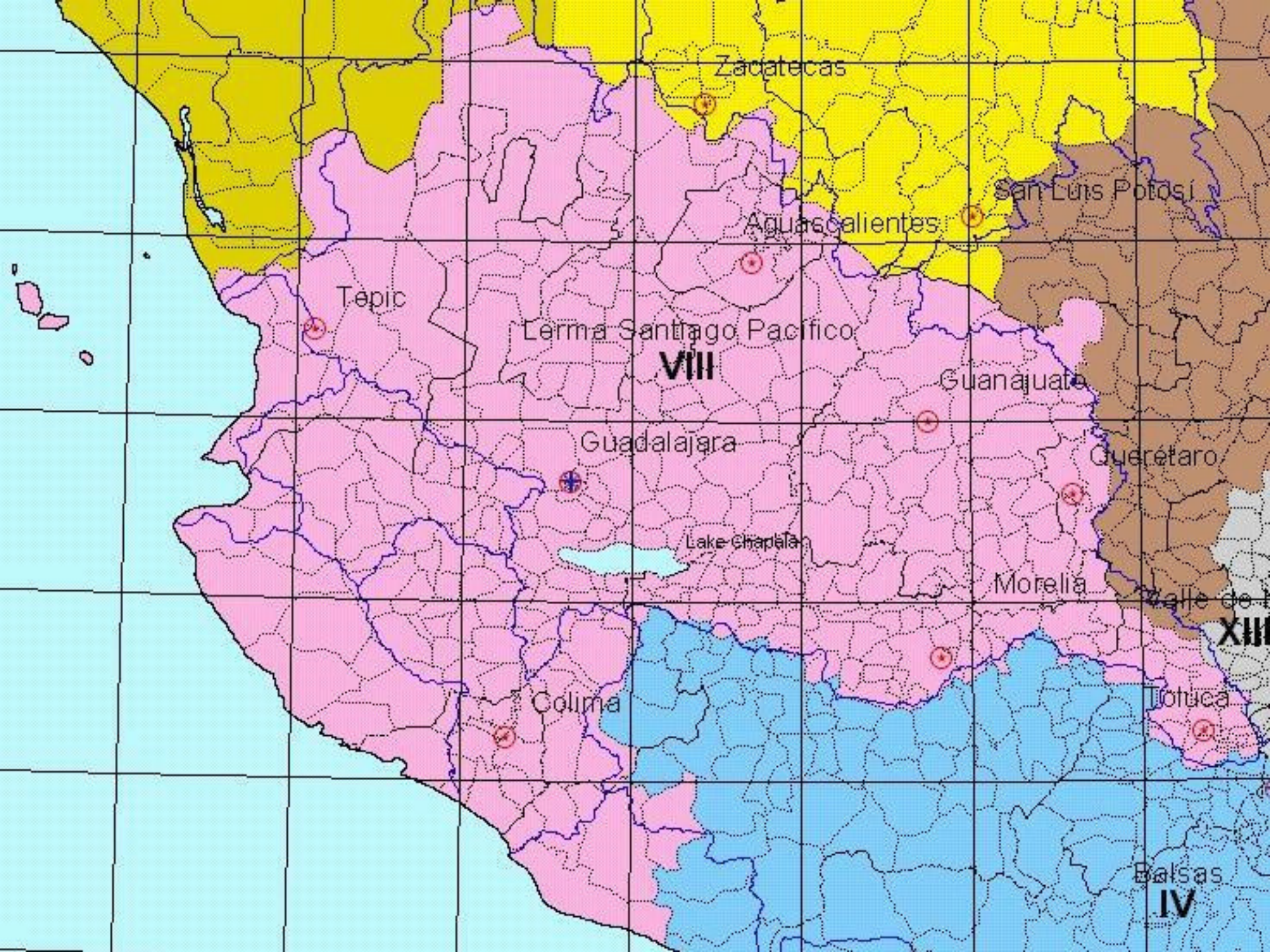
Water Planning in Mexico

- Competent authorities
  - National Water Commission (CNA)
  - State Commissions for Water and Sewerage Treatment (CEAS)
- Basic planning documents
  - National Hydraulic Programme (PHN)
  - Regional Hydraulic Programmes (PHRs)
- Planning boundaries
  - 13 hydrological regions (containing one or more watersheds)
  - 102 sub-regions


Estados Unidos de América
Regionalización
Península de Baja California I
Noroeste II
Pacífico Norte III
Balsas IV
Pacífico Sur V
Río Bravo VI
Cuencas Centrales del Norte VII
Lerma Santiago Pacífico VIII
Golfo Norte IX
Golfo Centro X
Frontera Sur XI
Península de Yucatán XII
Valle de México XIII
GOLFO DE MÉXICO
OCÉANO PACIFICO
Belice
Guatemala

Water Planning in Region VIII

- The case study focuses on Hydrological Region VIII: the Lerma-Santiago-Pacífico watershed
  - 13% of the country's surface (190 438 km^2)
  - Partly contains 8 States and fully contains 2 States
  - It begins with the birth of the Lerma River in the State of Mexico, running West until its outflow in Lake Chapala, continues with the birth of the Santiago River in Lake Chapala until its outflow into the Pacific Ocean


Zacatecas
San Luis Potosí
Aguascalientes
Tepic
Lerma Santiago Pacifico
VIII
Guanajuato
Guadalajara
Queretaro
Lake Chapala
Morelia
Colima
Toluca
Balsas
IV

Water Planning in Mexico

- Participation of stakeholders takes place through the following consultative bodies:
  - Watershed Councils (*Consejos de Cuenca*)
  - Water Consultative Council *(Consejo Consultivo del Agua)*
  - plus consultation with independent experts and comments provided by the general public

Watershed Councils

- Are formed by the CNA to interact between the CNA, competent authorities and water users in order to formulate and implement programmes and actions
- Their structure hinders them from being effective
  - They are chaired by the CNA
  - Invited experts have voice but no vote
  - “water users” refer only to those with legal titles to withdraw and use water and do not refer to the wider stakeholders
  - Citizens and civil society only participate if invited by the CNA

National Hydraulic Programme (PHN)

- Prepared on the basis of:
  - Regional Hydraulic Diagnoses
  - Regional Strategic Lines for Hydraulic Development
  - Great Vision Regional Hydraulic Programmes 2001-2025
- In practice the PHN is formed on the basis of the different PHRs

Supply of Water to the Metropolitan Area of Guadalajara (MAG)

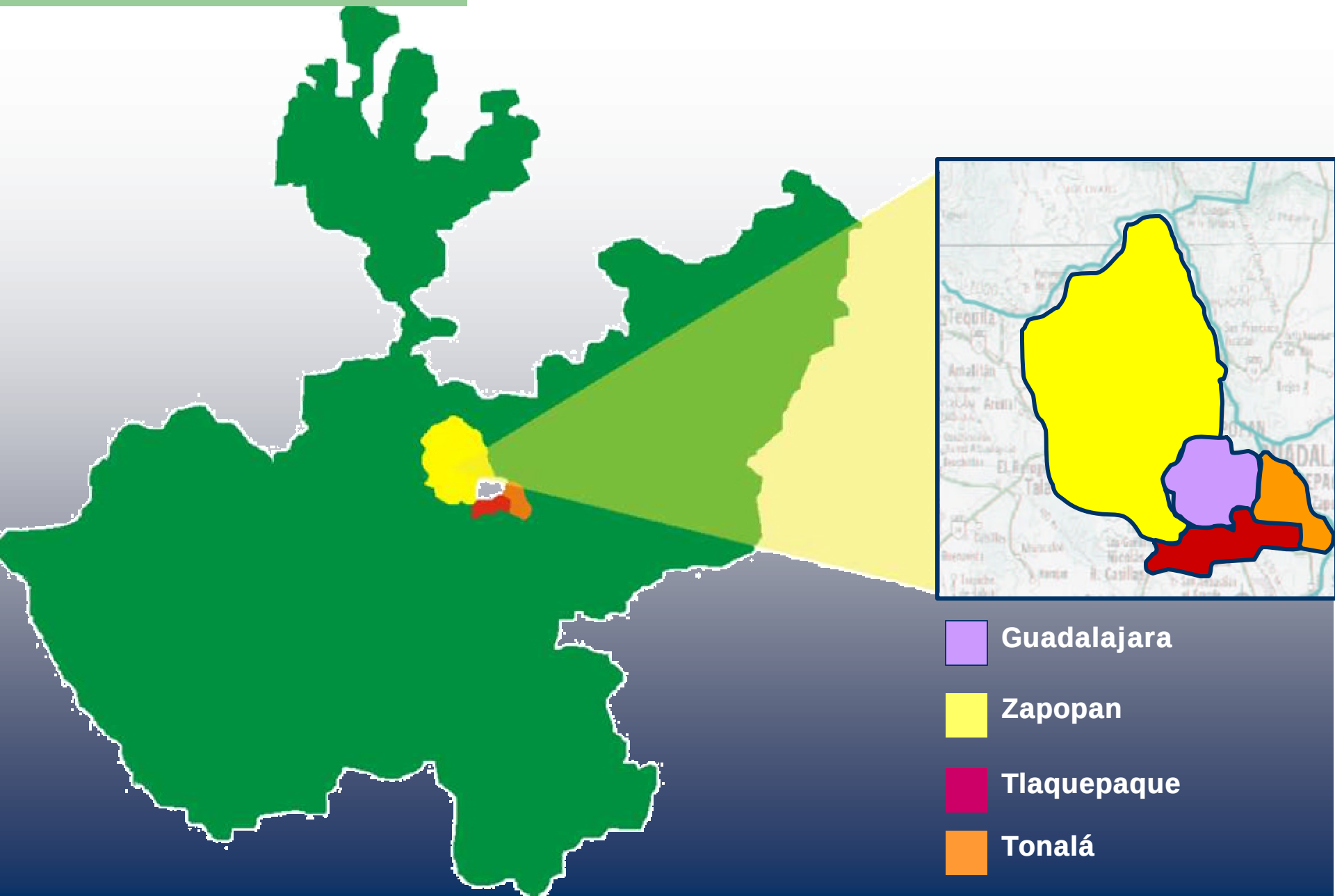
- This case study looks at the planning process for the supply of water to the MAG, which is framed in the PHR for Hydrological Region VIII

PHR Hydrological Region VIII

- Objective 1: Achieve sustainable water management
  - Strategy 1: Identify alternative sources that would substitute Lake Chapala as a drinking water source for the MAG
    - Priority Programmes and Actions: …cancel the water concession from Lake Chapala to the MAG…
- Objective 4: Promote expansion of the coverage and quality of drinking water, sewerage and waste water treatment services
  - Strategy 3: Address the shortcomings in the supply of drinking water for the cities of Guadalajara, León and Querétaro
    - Priority Programmes and Actions: …development of alternatives sources for the supply of the MAG and construction of waste water treatment plants for the MAG

Water supply for the MAG: evolution of a crisis

- The MAG is the 2nd urban centre in Mexico, with a population nearing 4 million
- Until the 1950s the primary source of drinking water was the extraction from aquifers and deep wells.
- In 1953 the Covenant of the Santiago River allowed Guadalajara to take water from this river which, by 1957, became the main source of water.
  - The Santiago River is an outlet from Lake Chapala, so the lake was considered to be the source of water


Guadalajara
Zapopan
Tlaquepaque
Tonalá

Water supply for the MAG: evolution of a crisis

- In the 1970s the Atequiza channel was built, taking water from the Santiago River immediately after Lake Chapala, allowing an additional supply of 4 m^3/s
- In the 1980s the Chapala-Guadalajara aqueduct was built, taking water directly from the lake

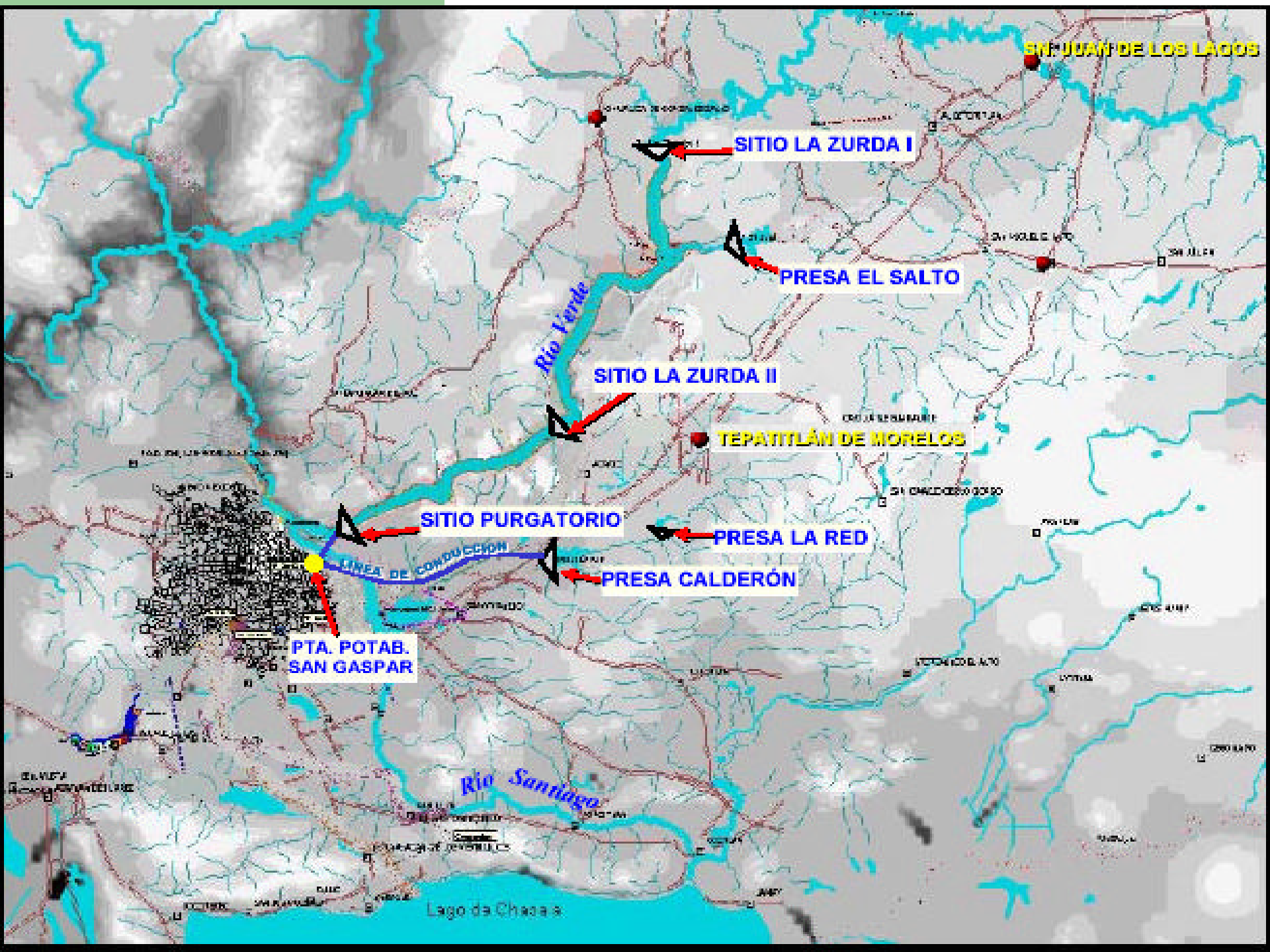

P.P.3
PRESA CALDERON
ZAPOTLANEJO
AUTOPISTA A MEXICO
GUADALAJARA
SISTEMA AGUA AZUL
P.P.1
P.P.2
SITIO DE ENTREGA CERRO DEL CUATRO
PRESA LAS PINTAS
PUENTE GRANDE
CANAL LAS PINTAS
PLANTA DE BOMBEO No. 2
EL SALTO
JUANACATLAN
AEROPUERTO
PRESA EL AHOGADO
PLANTA DE BOMBEO No. 1
PLANTA DE BOMBEO SANTIAGUITO
PRESA LA CALERA
RIO SANTIAGO
PRESA PONCITLAN
CANAL EL GUAYABO
STA. ROSA
PRESA DE RIVADORA CORONA
OCOTLAN
CAJITLAN
CANAL ATEQUIZA
PONCITLAN
PLANTA DE BOMBEO DE OCOTLAN
LAGUNA CAJITLAN
JAMAY
ACUEDUCTO CHAPALA GUADALAJARA
IXTLAHUCAN
LAGO DE CHAPALA
AJIJIC
CHAPALA
PRESA DERIVADORA MALTARANA
MALTARANA
RIO LERMA

Water supply for the MAG: evolution of a crisis

- By the late 1980s the levels of Lake Chapala started to decrease
- In 1990 an authorisation was given to use the water from the Verde River
- The *Sistema La Zurda-Calderón* was devised in 1982 in order to supply the MAG with water from the Verde River

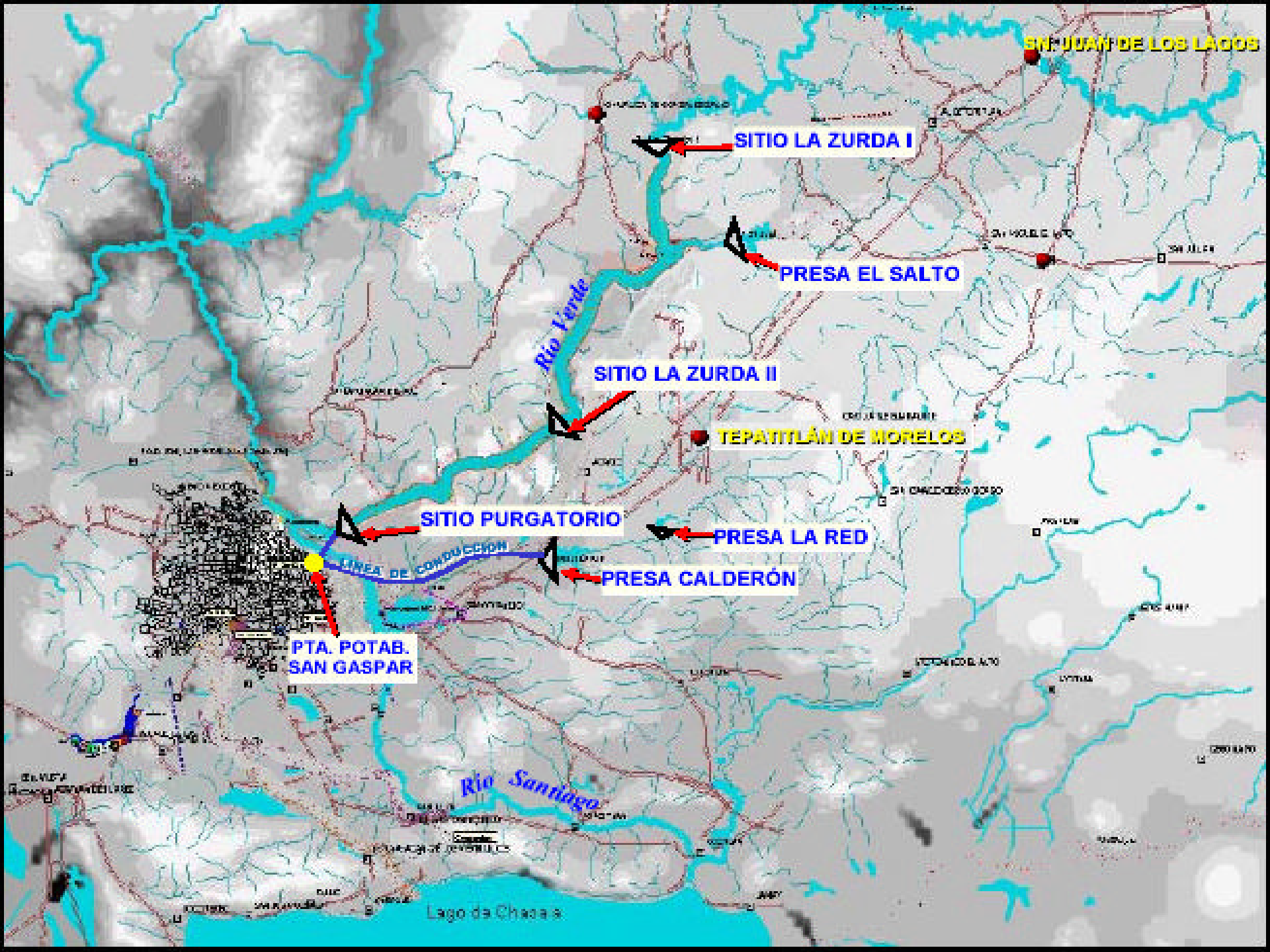
The *La Zurda-Calderón* System

- Phase 1
  - Building of the Calderón dam (66 Mm^3)
  - Building of the Calderón-Guadalajara aqueduct (31 km)
  - Building of the first part of the San Gaspar water purification plant (3 m^3/s)
  - This phase was completed in June 1991


SN. JUAN DE LOS LAGOS
SITIO LA ZURDA I
PRESA EL SALTO
Río Verde
SITIO LA ZURDA II
TEPATITLÁN DE MORELOS
SITIO PURGATORIO
PRESA LA RED
LÍNEA DE CONDUCCIÓN
PRESA CALDERÓN
PTA. POTAB.
SAN GASPAR
Río Santiago
Lago de Chapala

The *La Zurda-Calderón* System

- Phase 2
  - Building of the El Salto dam (80 Mm^3)
  - Building of Purgatorio pumping system
  - Completion of 2nd part of the San Gaspar purification plant (5 m^3/s)
  - Only the El Salto dam was built
- Phase 3
  - Building of the Zurda I and Zurda II dams and completion of the Purgatorio pumping system

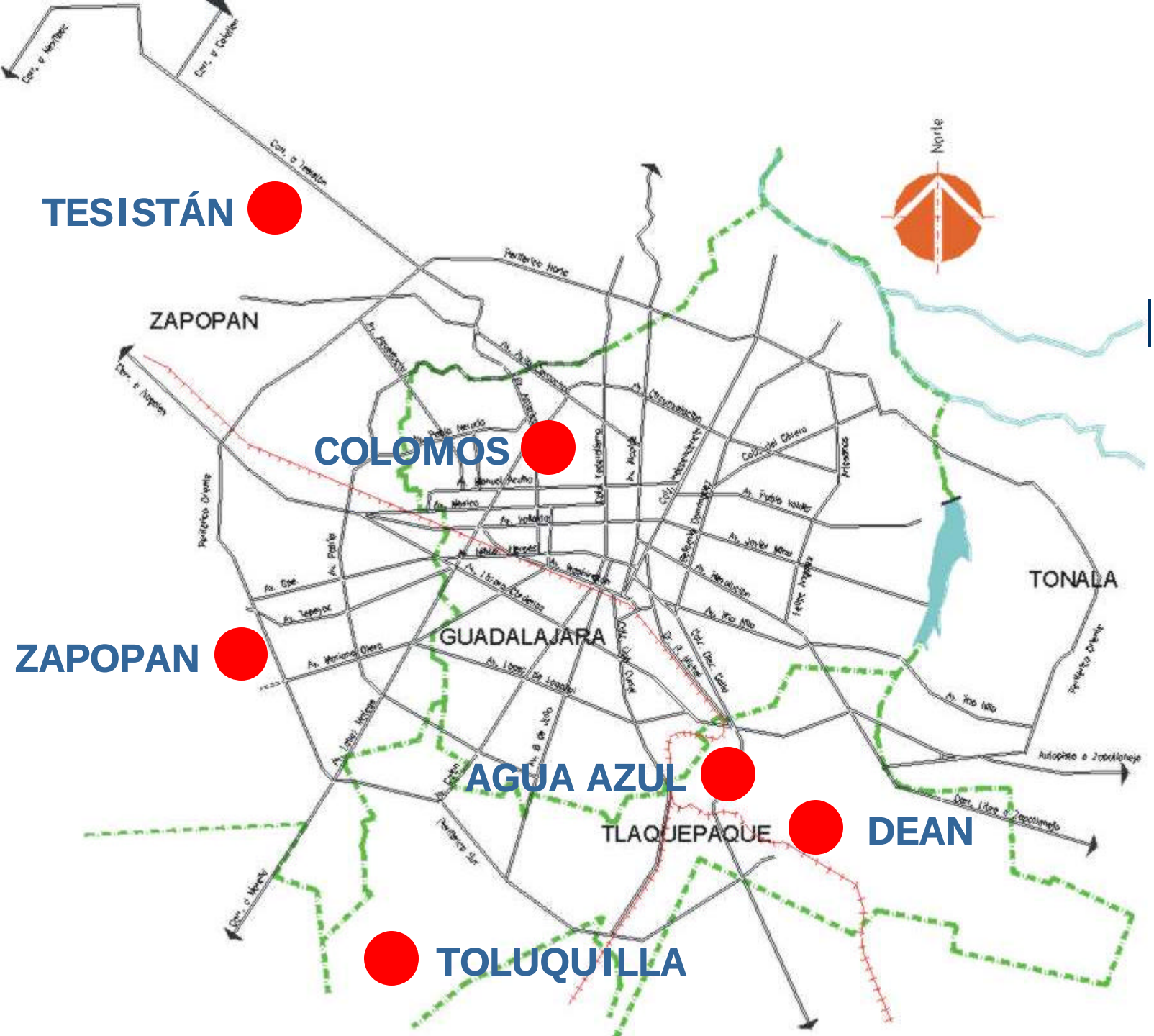

SAN JUAN DE LOS LAGOS
SITIO LA ZURDA I
PRESA EL SALTO
Río Verde
SITIO LA ZURDA II
TEPATITLÁN DE MORELOS
SITIO PURGATORIO
PRESA LA RED
LÍNEA DE CONDUCCIÓN
PRESA CALDERÓN
PTA. POTAB.
SAN GASPAR
Río Santiago
Lago de Chapala

The *La Zurda-Calderón* System

- The scheme was abandoned for reasons which are not clear, including:
  - Pressure from the civil society
  - High costs of pumping (600 m)

Supply of water to the MAG, the current situation

- The MAG currently receives 9 m^3/s
  - 4,5 m^3/s from Lake Chapala
  - 3,0 m^3/s from groundwater
  - 1,5 m^3/s from the Calderón dam
- 43% of the supply from aquifers is lost due to deteriorated infrastructure
- Since the 1990s the water level of Lake Chapala started to decrease dramatically, due in a large part to the extraction of water from the Lerma River upstream. In an attempt to protect Lake Chapala finding alternative sources of drinking water for the MAG was defined as a priority.


TESISTÁN
ZAPOPAN
COLOMOS
ZAPOPAN
GUADALAJARA
TONALA
AGUA AZUL
TLAQUEPAQUE
DEAN
TOLUQUILLA
Norte

Looking alternative sources of water for the MAG

- The so-called Citizen's Council, with a base in the Chamber of the Construction Industry opened up a forum to select the best alternative
  - A call for submission of alternatives was open for almost a year
  - 53 "alternatives" were proposed, ranging from mere ideas to more detailed projects
- A Technical Working group was established to review the alternatives
- The only conditions were: to provide a flow of 10,4 m^3/s for the MAG during a period of 30 years

Looking alternative sources of water for the MAG

- By this time the CEAS for the State of Jalisco had been created (May 2001), and they formally adopted the 53 alternatives
- All alternatives were presented in a series of public meetings (between March and May, 2001)
- A consulting company was hired to undertake the analysis of alternatives

The analysis of the 53 alternatives

- Proposals were classified under three categories:
  - Projects selected for a more detailed analysis
  - Support projects and proposals
  - Regional development projects and proposals

The analysis of the 53 alternatives

- On a first screening 14 alternatives were selected
  - This first screening took into account: ”geological, geotechnical, water quality,environmental, social, etc.” factors
  - This diversity of criteria was not reflected in the report
  - E.g. the comparative analysis of the final 6 alternatives is reported in terms of technical feasibility and cost mainly (with no reference to potential environmental impacts)

The analysis of the 53 alternatives

- A second screening reduced the number of alternatives to 9, out of which 3 were excluded
  - 2 for not being able to supply the required flow of water
  - 1 because it “presents a different multisectorial integration of projects” (not specified what this means)

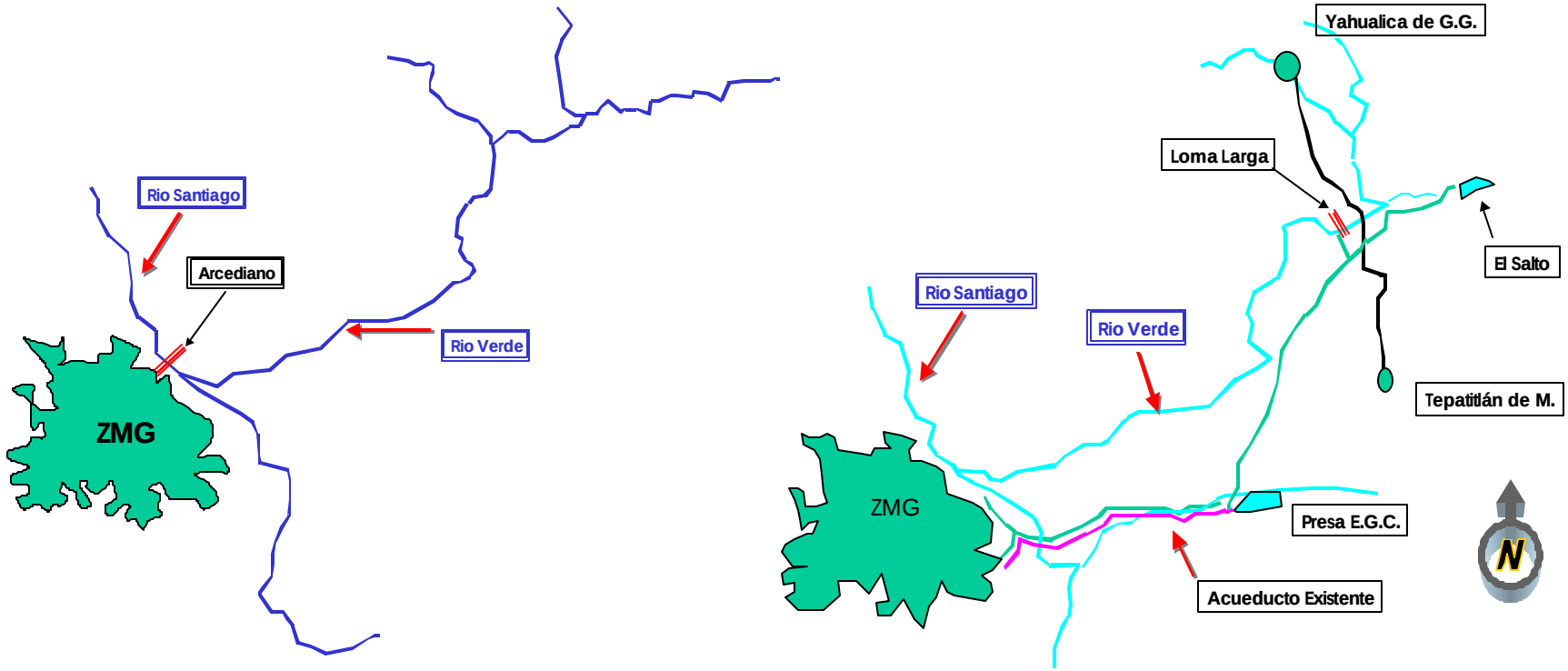
The analysis of the 53 alternatives

- Out of the remaining 6 projects, 5 consisted of dams on the Verde River and one of a system of deep wells in the San Isidro aquifer
- These alternatives received a more detailed analysis in terms of costs (investment and operation) and volume of water supplied

The final 2 alternatives

- Arcediano dam
  - 404 Mm^3 dam in the junction of the Santiago and Verde Rivers (i.e. the canyons of Huentitán and Oblatos), with a 803 ha surface
- Loma Larga dam
  - 450 Mm^3 dam on the Verde River with a 1359 ha surface

The Arcediano and Loma Larga dams



Comparative analysis of the final 2 alternatives

- A comparative technical and economic feasibility study was carried out
  - The investment and operation costs were the primary analytical criteria
- A comparative socioeconomic analysis for the two sites was undertaken, based on a cost-benefit analysis which took into account:
  - Water demand, opportunity cost, investment costs, costs of complementary infrastructure works, and operational and maintenance costs
- Both studies concluded that Arcediano is the best alterantive

The Arcediano dam controversy

- Technical and economic points of controversy
  - Water will need to be pumped up 560 m, resulting in an expensive operational cost
    - This is considered especially risky as the cost of electricity has increased 210% since 1998 and is not related to inflation
  - The project requires an initial investment of 670 million dollars, being the largest investment project in Jalisco in the last years
  - Clean waters from the Verde River will be mixed with polluted waters from the Santiago river, reducing the efficiency of the water treatment systems
    - The project considers building a series of WWTPs along the Santiago River
      - This is an obligation of Municipalities and must not be associated as a positive impact of the Arcediano project
      - Doubts about the efficiency of the WWTPs

The Arcediano dam controversy

- Environmental points of concern
  - The canyon of Huentitán is a protected area at Municipal level
    - However, the decree was never formally published and eventually withdrawn after the Arcediano project was proposed
    - Little sensitivity for the lifestyle of the affected community of Arcediano
    - It is suspected that the nearby landfill of Matatlán filters leachates to the area that will be flooded
    - It is suspected that the sediments of the Santiago River are polluted and may release pollutants to the dam

The Arcediano dam controversy

- Although Federal environmental policy establishes the need to undertake Integrated Watershed Management, this wider perspective has not been taken into account
  - The solution must be linked to demand management, to eliminating obsolete irrigation systems, to minimising losses in the water distribution system, and through effectively controlling water discharges along the Lerma River

The Arcediano dam controversy

- Some claim that alternatives exist, including the long abandoned La Zurda-Calderón system, or enhancing the infrastructure of the Calderón dam in order to be able to deliver up to an additional 1,3 m^3/s
- The decision-making process has been non-transparent and participatory initiatives been a sham
  - The analyses of the 53 alternatives were not made publicly available, nor results and reasons notified to proponents
- Some claim strong economic interests of people in power behind the government's 'stubbornness' to defend Arcediano

The EIA

- Once the project had been selected, an EIA was prepared
  - Very poor quality of the EIS
  - The logic being it is the justification that any potential negative impact will be offset by the benefits of eliminating the extraction of water from Lake Chapala
- The EIS was submitted on June 2003
- The EIA resolution was made on 27 October 2003, establishing a series of conditions to the project
  - It is important to notice that the resolution is dated 27 October, whilst the PHR, dated June 2003, already states that Arcediano is the selected project to supply water to the MAG

The planning process in a framework of Sustainable Development

- The three dimensions to SD were not considered on the same level
  - The Economic and technical dimensions were the only criteria used to assess the 53 alternatives
  - Only after the final project was selected (Arcediano), the environmental dimension came into play, through the preparation of the EIA
    - Even in this case the formal decision over the project was taken before the EIA resolution was issued
- The Government's objectives of achieving SD will never be met if planning processes are allowed to be dominated by economic objectives exclusively

The planning process in a framework of Sustainable Development

- Integrated Watershed Management is currently non existent in Mexico
  - Watershed Councils are not sufficient to guarantee the representation of stakeholders, nor have cross-sectoral cooperation mechanisms been put in place
- The formal water planning process is not reproduced in practice
  - The PHN and the PHRs seem to be compilations of decisions already taken and that do not respond to the wider watershed dimension

The planning process in a framework of Sustainable Development

- The PHN clearly and correctly points out tat solutions must give priority to demand management and making existing supply more efficient, over the construction of large infrastructure projects.
  - This policy guideline was completely ignored in the planning process concerning Arcediano

The planning process in a framework of Sustainable Development

- Public participation, transparency and accountability were seriously absent in the planning process
  - After the call to present proposals, the whole planning process was closed to public scrutiny

The potential role for SEA

- SEA has the potential to effectively integrate the environmental dimension in the planning process as an aid to help achieve planning in a framework of SD
- SEA would allow the identification of potential environmental impacts of alternative PPPs to achieve stated objectives
- Transparency and accountability can help dissipate doubts about the honesty of politicians or point them out in order to trigger the judicial system at the early stages

The role for SEA

- Mexico is in the right track in promoting legislation and policy guidelines that recognise SD and promote the integration of the environment and public participation in planning processes
  - But these provisions are not efficiently put into practice and SD remains a void concept
- SEA is a potentially useful tool to bring the environmental dimension to the forefront of the planning process
  - SEA must be understood as an integral element of the planning process, and not be merely applied to already decided plans and programmes

Other planning processes: the Puebla-Panama Plan

- The PPP has an a general objective the integration and economic and social development of the Mesoamerican area, initiated on June 2001
- In 2003 the Mesoamerican Initiative for Sustainable Development (MISD) was agreed in order to *"ensure that all projects, programmes and initiatives of the PPP incorporate adequate environmental management practices and promote the conservation and sustainable management of natural resources"*
- The MISD considers SEA as a tool to *"assess the synergetic and regional effects of the different plans, programmes and projects of the different initiatives of the PPP in order to identify and propose the environmental and sustainability considerations as well as for the reduction of risks that must be incorporated transversally"*

The Puebla-Panama plan

- To date no SEAs have been carried out, and the terms under which they are to be prepared are unclear, as no transparent SEA procedures and requirements have been defined
- It is important that Mexico and Central America make best use of the experiences in SEA under the PPP in order to develop national SEA systems