US-Mexico Negotiations on Improved Colorado River Management: An Update (February 19) 2010

2-19-2010

Colorado River Water: Mexico's Perspective on the Ongoing Negotiations

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SEMARNAT

Subdirección General Técnica
Gerencia de Ingeniería y Normas Técnicas

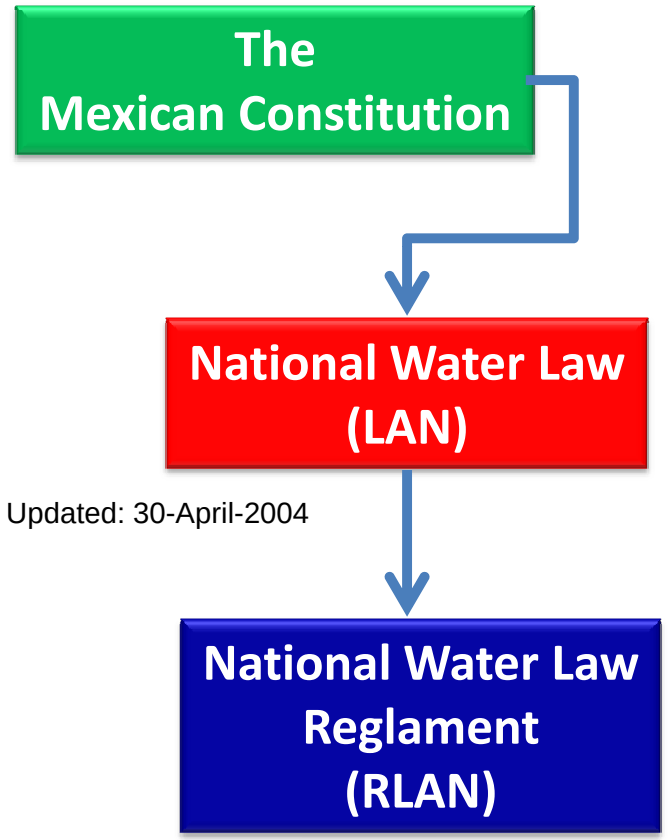
COLORADO RIVER WATER: MEXICO'S PERSPECTIVE ON THE ONGOING NEGOTIATIONS

MSc Mario López Pérez

Boulder Colorado
February, 2010

MEXICAN LEGAL FRAMEWORK

México's Water Legal Framework



Other Legal supports

- Federal Duties Law.
- Environmental Protection Law.
- National Lands and Goods Law.
- Federal Works Improvement Law

Mexican Constitution (article 27 th; fifth parragraph)

- Article 27th establishes that national property are among others, waters of:

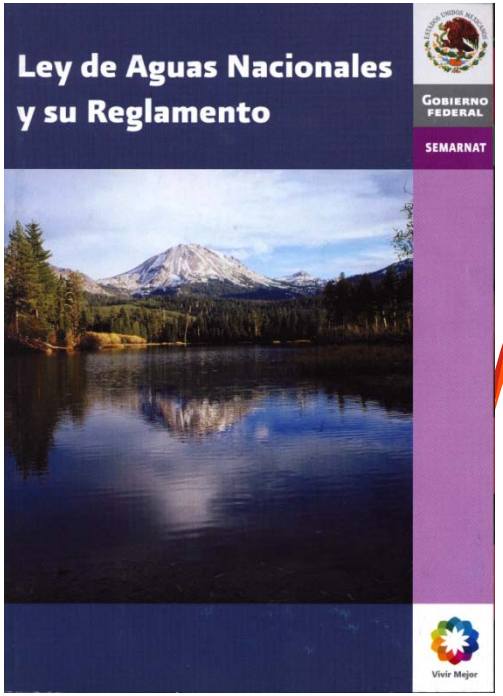
- **Rivers and tributaries, direct or indirect**
- **naturally created Interior lakes**
- **Springs**
- **Groundwater**

- **The domain of the Nation over water is endless and can't pass to others. Only the President can give concessions.**

EVOLUTION OF LEGAL AND INSTITUTIONAL FRAMEWORK IN MÉXICO REGARDING WATER ISSUES

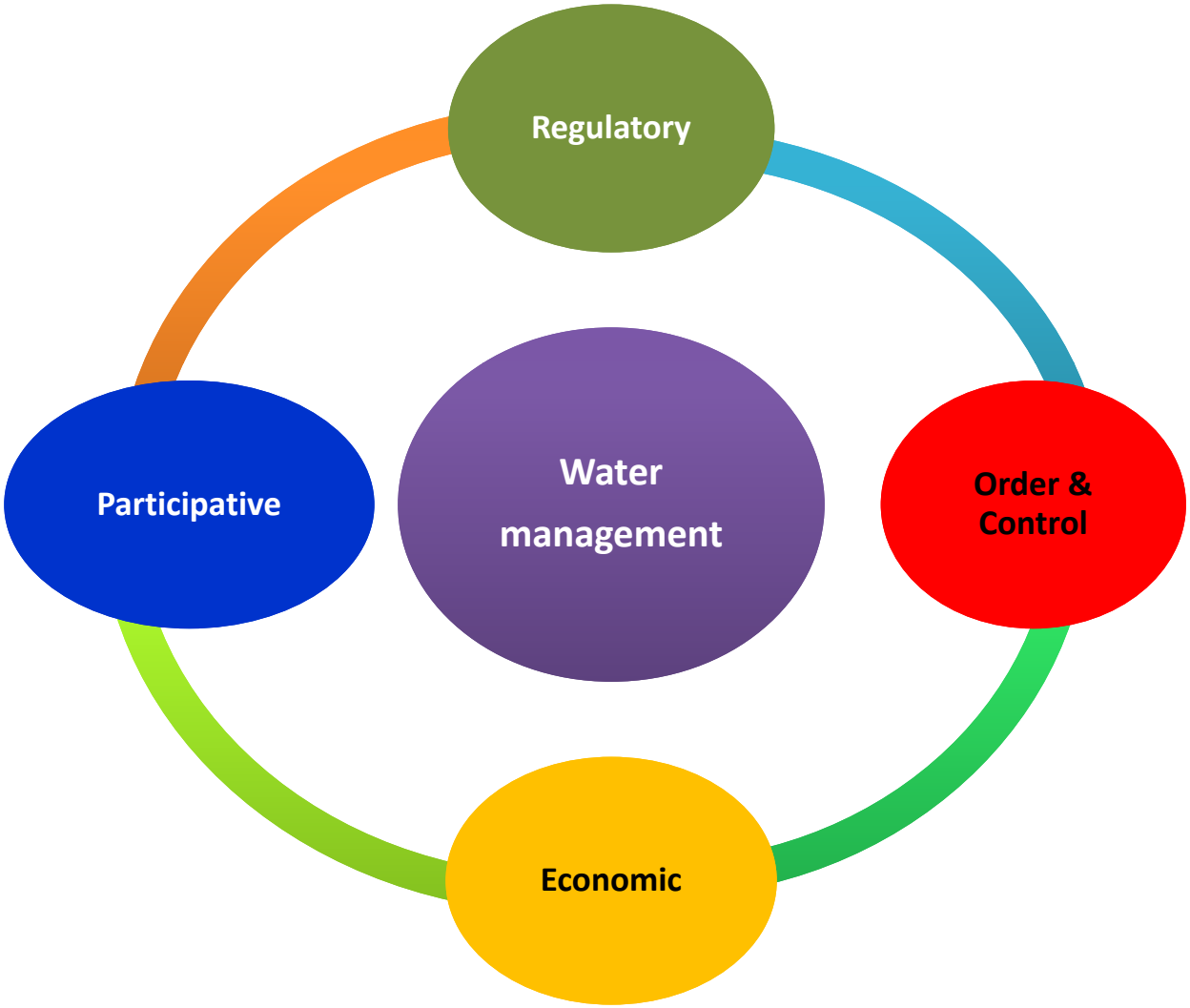
YEAR	LEGAL FRAMEWORK	YEAR	INSTITUTIONAL STRUCTURE
1917	Mexican United States Political Constitution (Art. 27, 5th paragraph)	1917	Secretary of Agriculture and Fostering
1926	Law on Irrigation with Federal Waters (04/01/26)	1926-1946	National Irrigation Commission (28/01/26)
1934	Law on Waters of National Property (31/08/34)		
1946	Law on Irrigation (30/12/46)	1946-1976	Secretary of Hydraulic Resources (31/12/46)
	Presidential Decrees on the Creation and Extinction	1946-1977	
1956	Of the Ruling Law of the Article 27, 5th paragraph of Constitution regarding underground water (29/12/56)		Executive Basin Commissions
1972	Federal Waters Law (11/01/72)	1975-1986	Commission of the National Hydraulic Plan (SRH 1975-76 y SARH 1977-86)
1976	Organic Law of the Federal Public Administration (29/12/76)	1976-1994	Secretary of Agriculture and Hydraulic Resources (29/12/76)
1989	Presidential Decrees on the Creation of CNA (16/01/89)	1989-1994	National Water Commission SARH (16/01/89)
1992	National Waters Law (01/12/92)		
1994	Rules of the NWL (12/01/94)		
1994	Decree that modifies and adds several dispositions of the Federal Public Administration (28/12/94)	1994-2000	SEMARNAP (28/12/94)
		1994-2000	National Water Commission - SEMARNAP
1997	Decree that modifies the Rules of the NWL (10/12/97)		
2000	Decree that modifies and adds several dispositions of the Federal Public Administration(30/11/2000)	2000-	SEMARNAT (31/12/2000)
		2000-	National Water Commission– SEMARNAT
2001	Presidential Decree on the Creation of CONAFOR	2001-	National Forestry Commission(04/04/2001)

Change in the Paradigm



Article 1. This law rules article 27 of the Political Constitution of Mexican United States regarding national waters; and is to be generally observed in all the national territory, its dispositions are of public domain and interest and it has the purpose to regulate the exploitation or use of them, their distribution and control, and the preservation of its quantity and quality as well as, in order to reach an integral sustainable development.

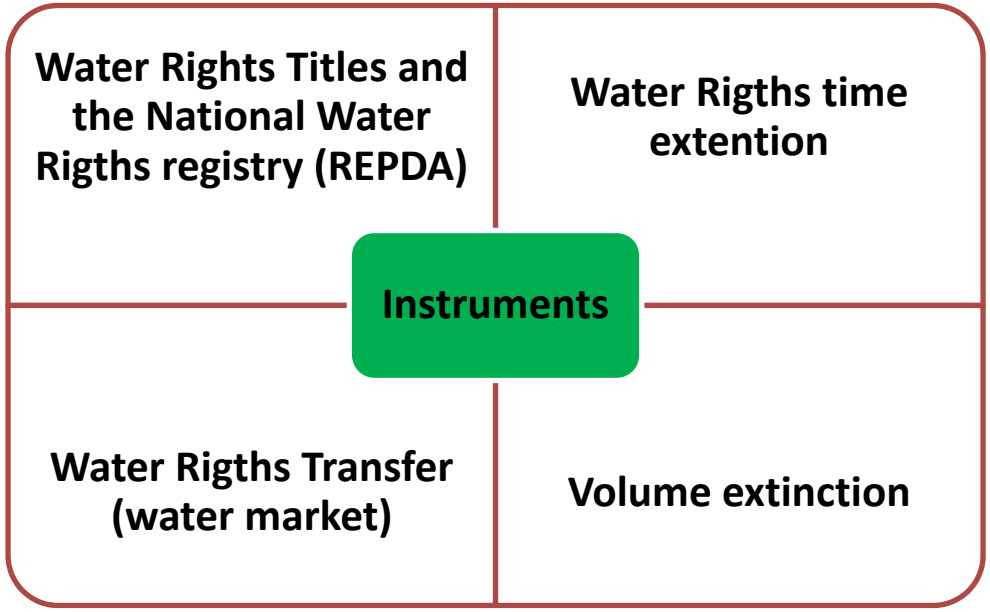
Mexico´s Water Management Instruments



Regulatory Instruments

They are the most important and effective instruments for the water management.

The Water Rights Titles are the basic water allocation instrument and only could be granted when water is available.



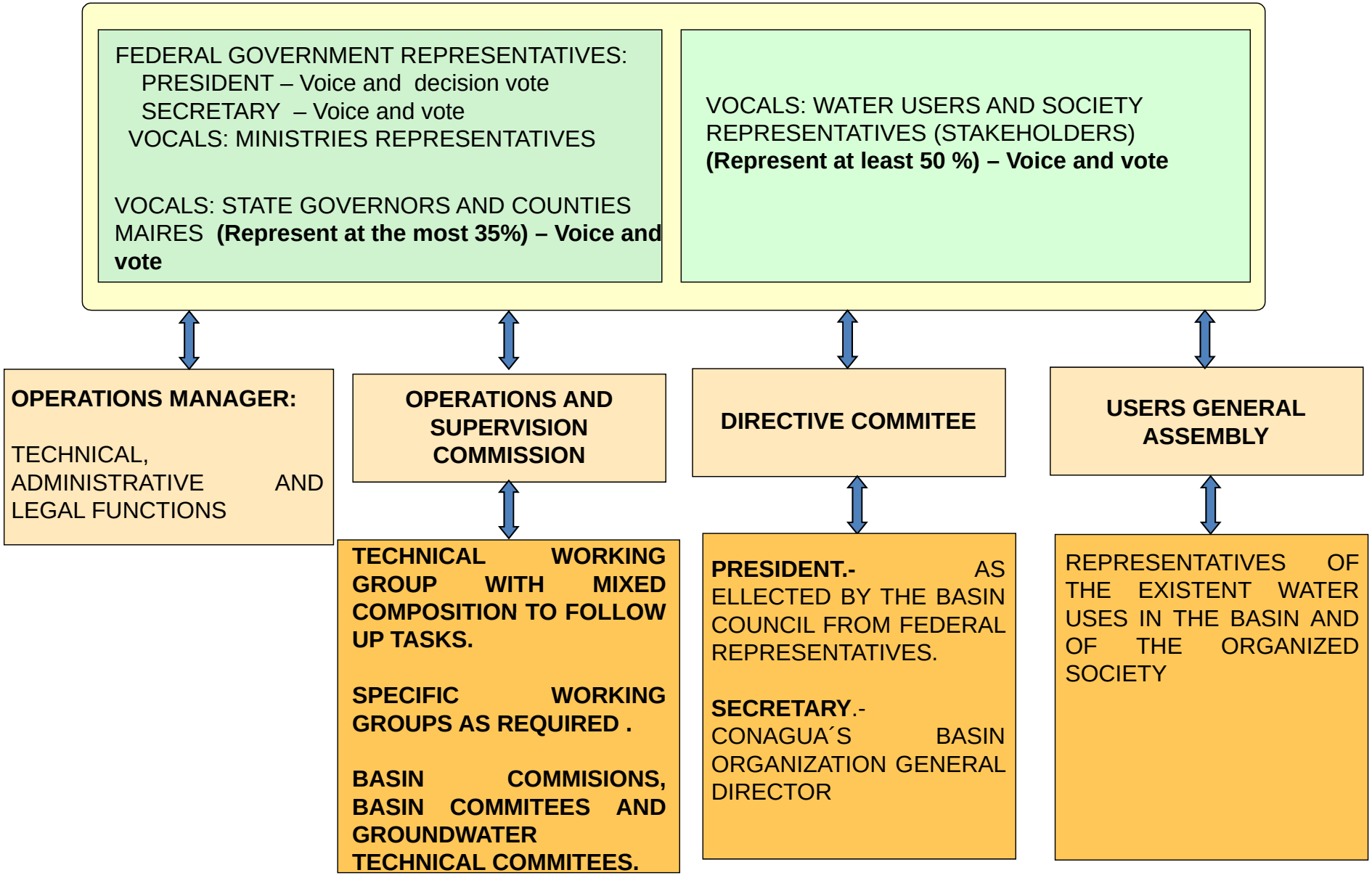
Order and Control Instruments

Inspection and measurement	CONAGUA inspects the water users to verify if they comply with the National Water Law obligations.
Fines	The fines are imposed according to the inspection results (economic or suspending the activity). They are an important instrument to reduce water pollution and to assure water sustainability

Participative Instruments

Basin Councils	They are established with federal, state, county representatives as well as water users and organized interested society. Its goal is to council water interests to improve the water management
Water User Associations	This are mainly in the Irrigation Districts and small irrigated areas.

Basin Councils Organization



Economic Instruments

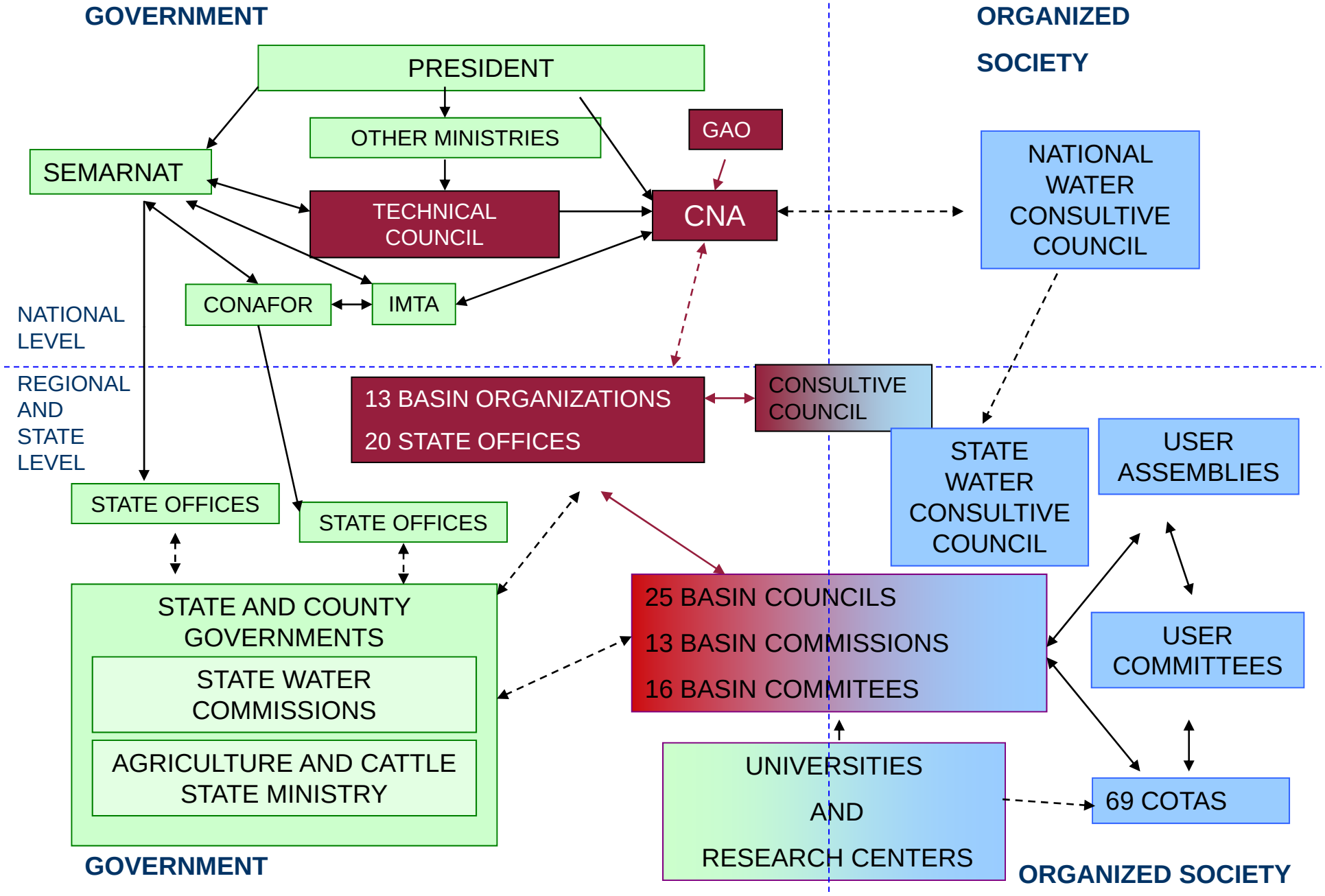
They are established in the Federal Duties Law (**LEY FEDERAL DE DERECHOS**). The users must pay for the water used as well as for using the rivers to receive waste water.

The charge to the users is for the opportunity cost of using the water, promoting the rational use and allowing the institutional programs financed.

The Federal Duties Law:

- Exempts the farmers to pay even that they represent the greatest water consumer.
- Gives the Water Supply entities a preferential fee.
- *The industrial, commercial and service providers users are those who pay more.*

THE MEXICAN GOVERNANCE FOR WATER MANAGEMENT



Legal and policy instruments

Nationals Waters Law and its regulation. CONAGUA

Federal Law on Rights. CONAGUA

State Water Laws. States

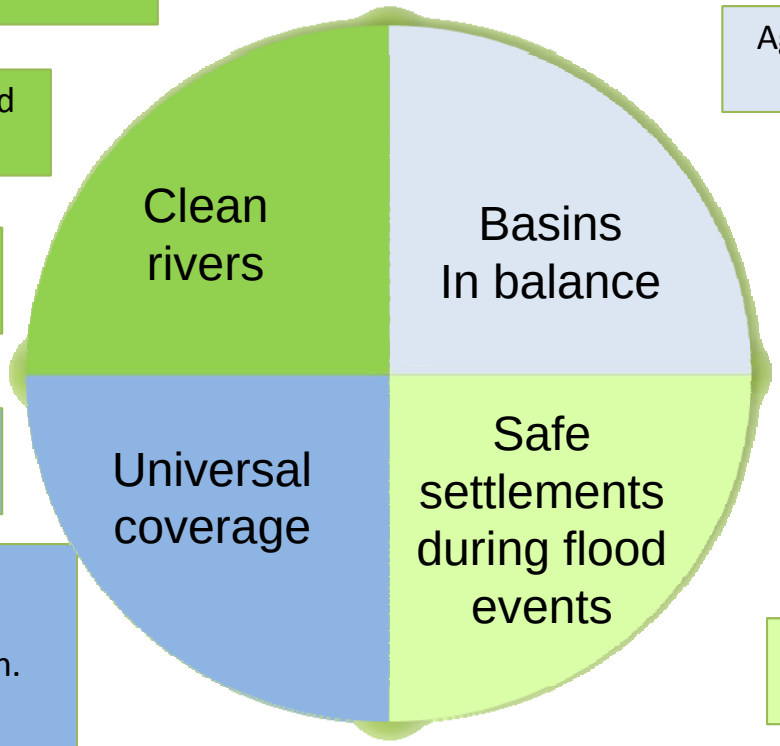
Discharge permits for treated water. CONAGUA

Ecological Mexican Official Standards. SEMARNAT

Mexican Constitution. Art. 115. Municipalities

Federalized programs for incrementing coverages of drinking water and sanitation. CONAGUA, SEDESOL, CDI, CONAVI, States and Municipalities

Mexican Official Standards. Secretary of Health, CONAGUA



Planning Law. PNH. CONAGUA

General Law of Ecological Equilibrium and Environmental Protection. SEMARNAT

Treaty on international water distribution between Mexico and the United States of America. CILA

Agreements on surface water distribution. Basin Councils

Regulations for the use of groundwater. COTAS

Titles grant or allocation of water uses. CONAGUA

General Law on Human Settlements. SEDESOL, States and Municipalities

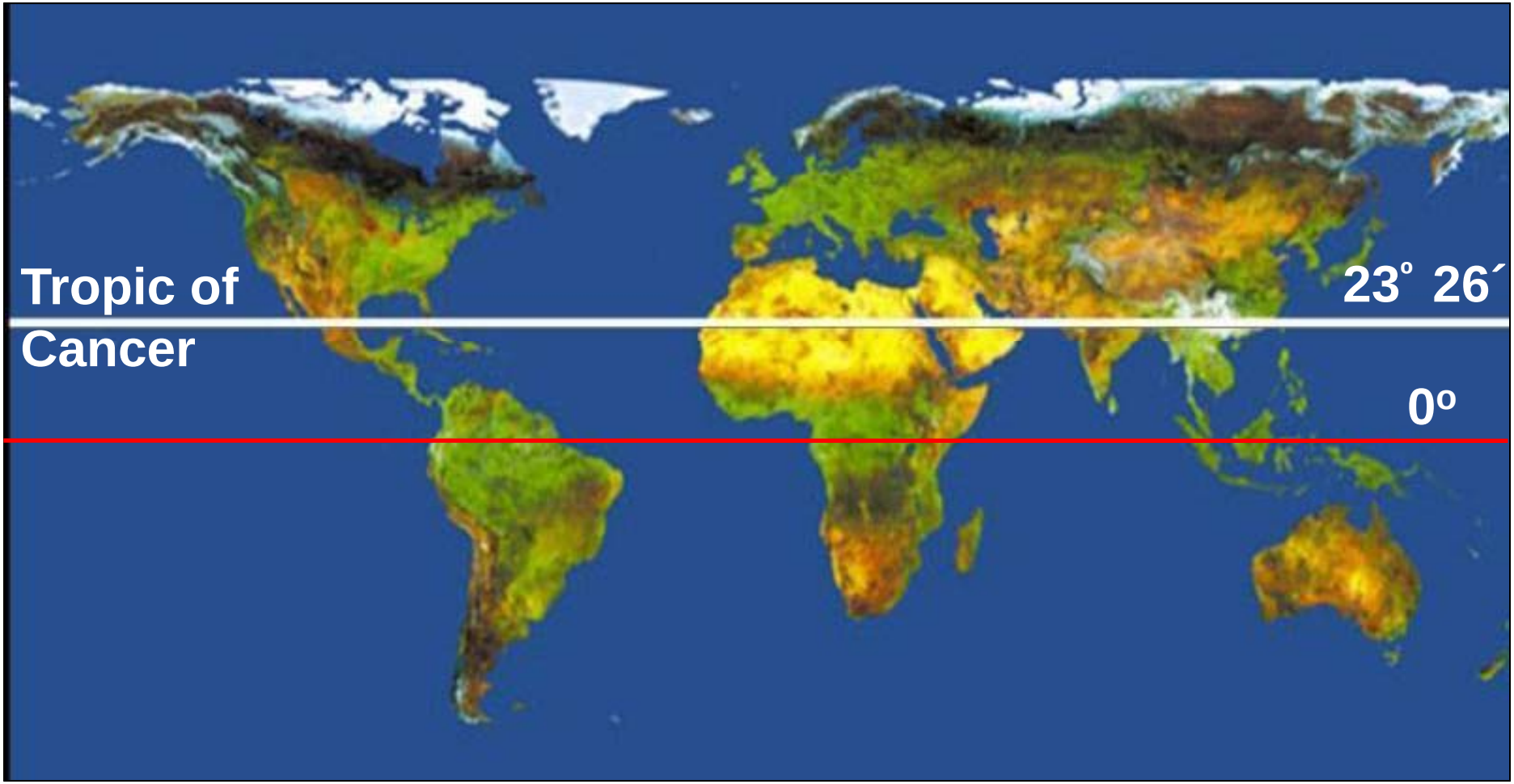
Emergency Plans. CONAGUA, States, Municipalities

DN-III Plan. SEDENA

National Fund on Natural Disasters. SEGOB

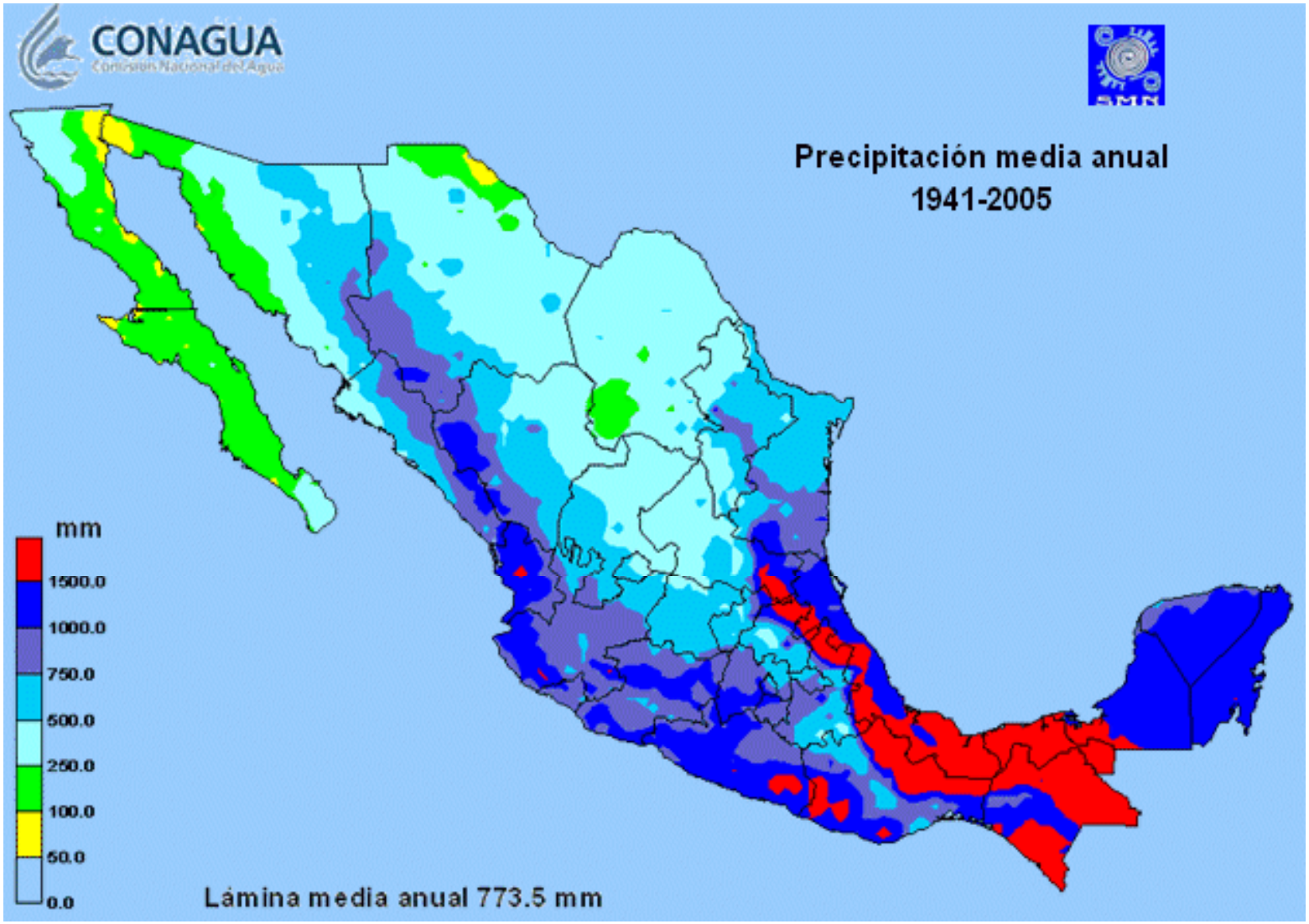
México's geographic location

- Two thirds of México's territory lies on the most arid part of the world (Cancer Tropic). The water availability is a strategic issue



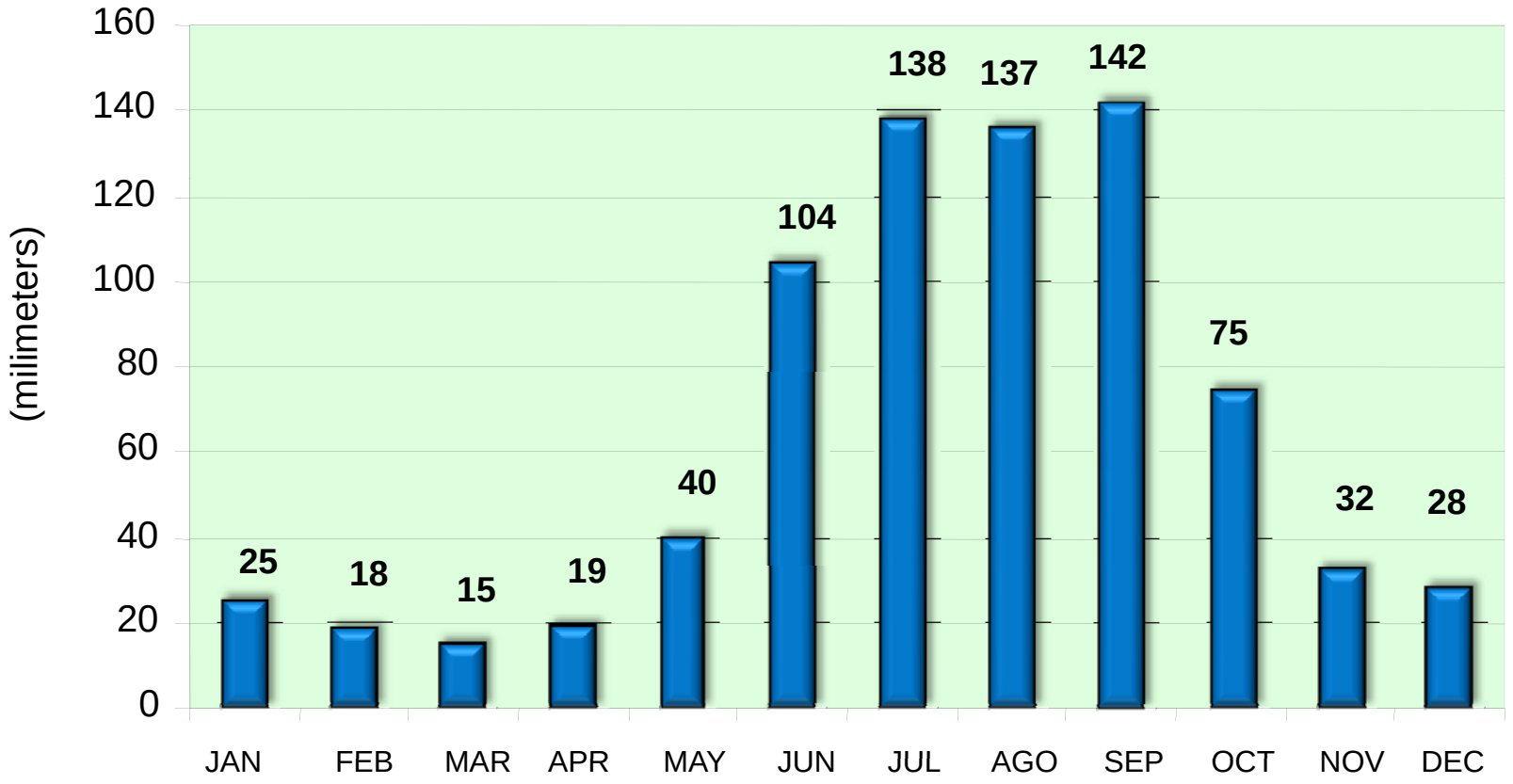
National Rainfall

- The mean annual rainfall is 773.5 mm with high geographic contrasts. The southeast has the highest values and the Northwest the lowest.



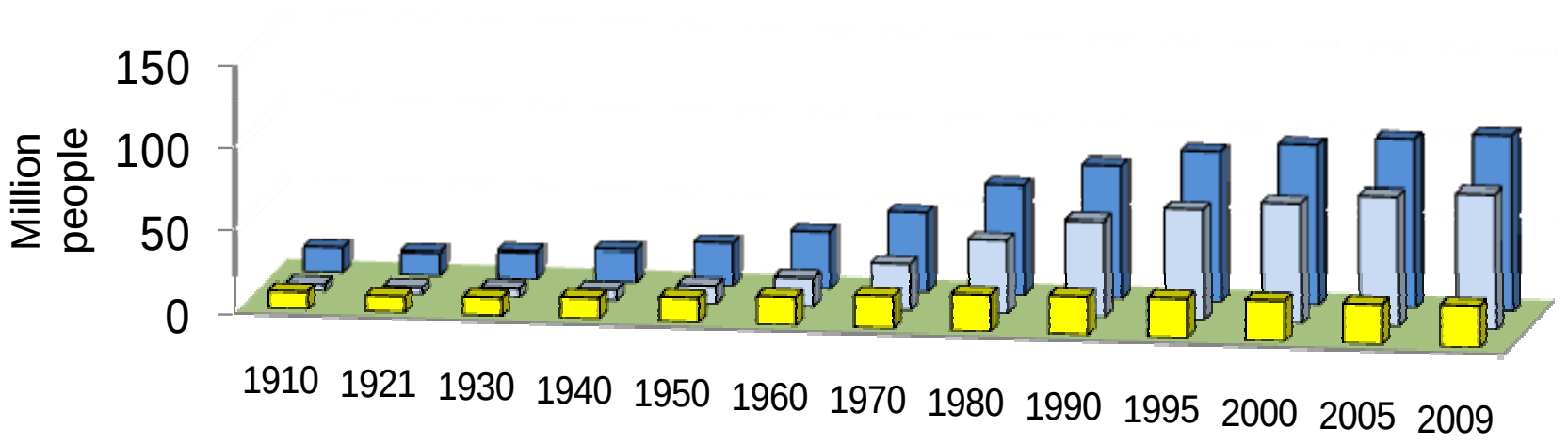
Monthly rainfall variability

- 67% of the annual rain falls in four months



Population growth

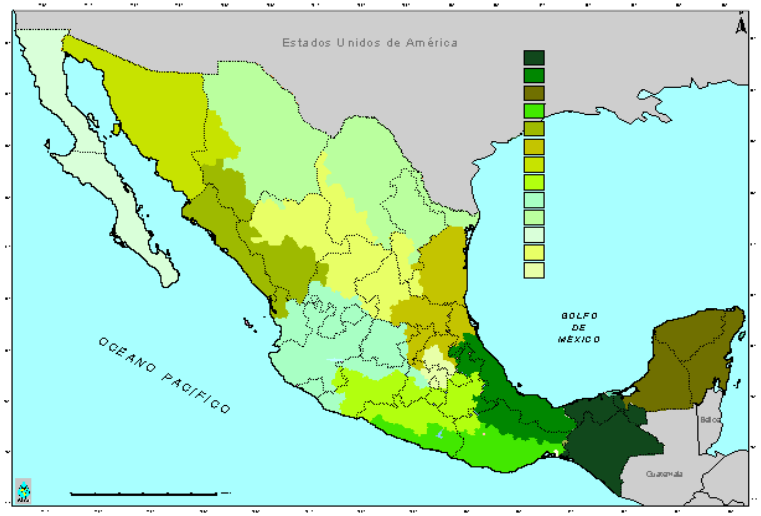
- The population growth has increased in the last 59 years: in the country has been times four and in the cities has been times seven.



	1910	1921	1930	1940	1950	1960	1970	1980	1990	1995	2000	2005	2009
Rural	10.8	9.9	11	12.8	14.8	17.2	19.9	22.5	23.3	24.2	24.7	24.3	25.3
Urbana	4.3	4.4	5.6	6.9	11	17.7	28.3	44.3	58	67	72.8	79	82.3
Total	15.1	14.3	16.6	19.7	25.8	34.9	48.2	66.8	81.3	91.2	97.5	103.3	107.6

Water Availability in Mexico

Regions	*(annual m³per person)*
Frontera Sur	24,450
Golfo Centro	10,764
Península de Yucatán	7,750
Pacífico Sur	7,928
Pacífico Norte	6,489
Golfo Norte	5,201
Noroeste	3,116
Balsas	2,029
Lerma - S. - Pacífico	1,663
Río Bravo	1,131
P. de Baja California	1,321
Cuencas Cent. del N.	2,055
Valle de México	144



Availability Criteria

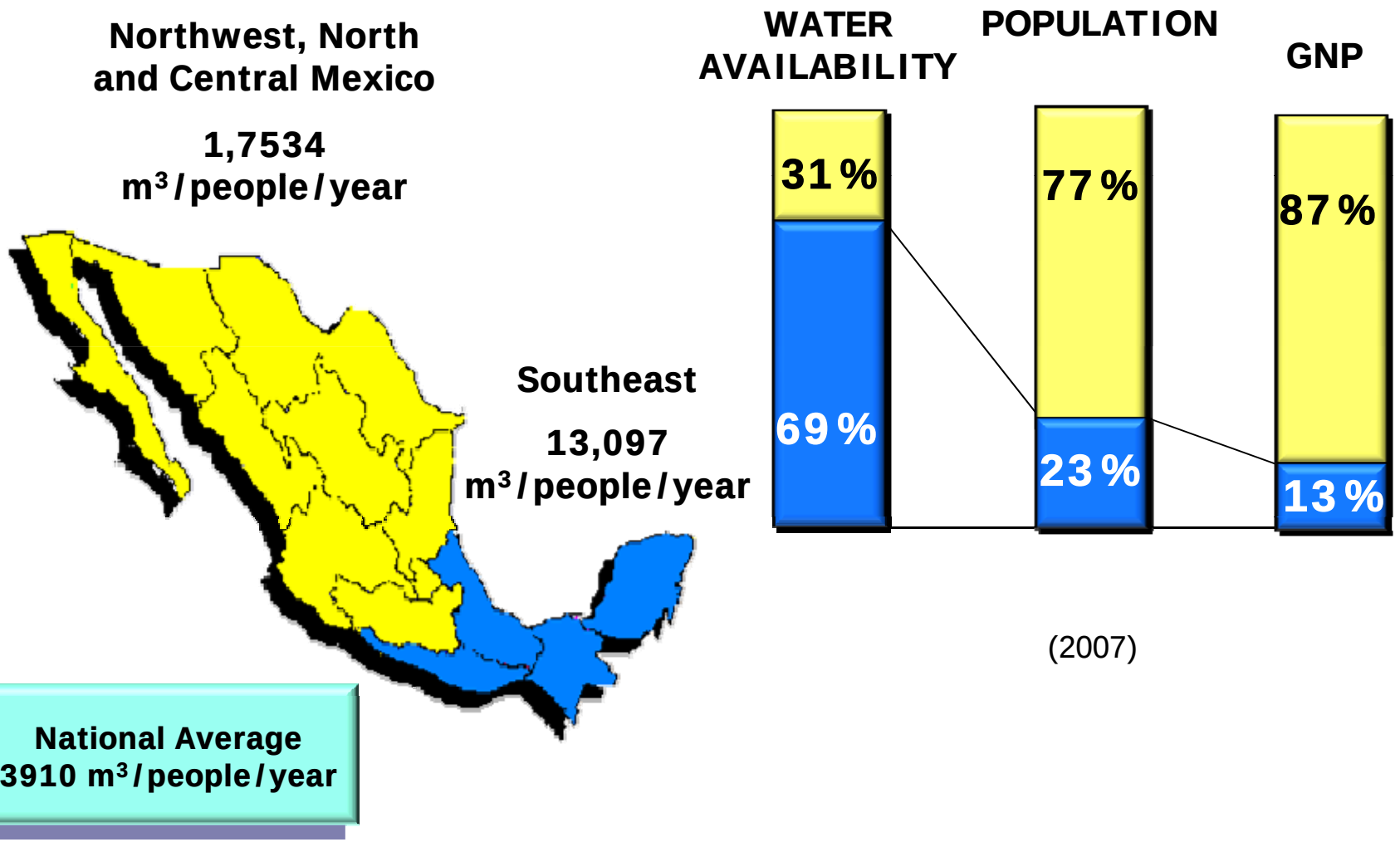
Shortage: **Less than 1,500 m3/hab./year**

Severe Shortage: **Less than 1,000 m3/hab./year**

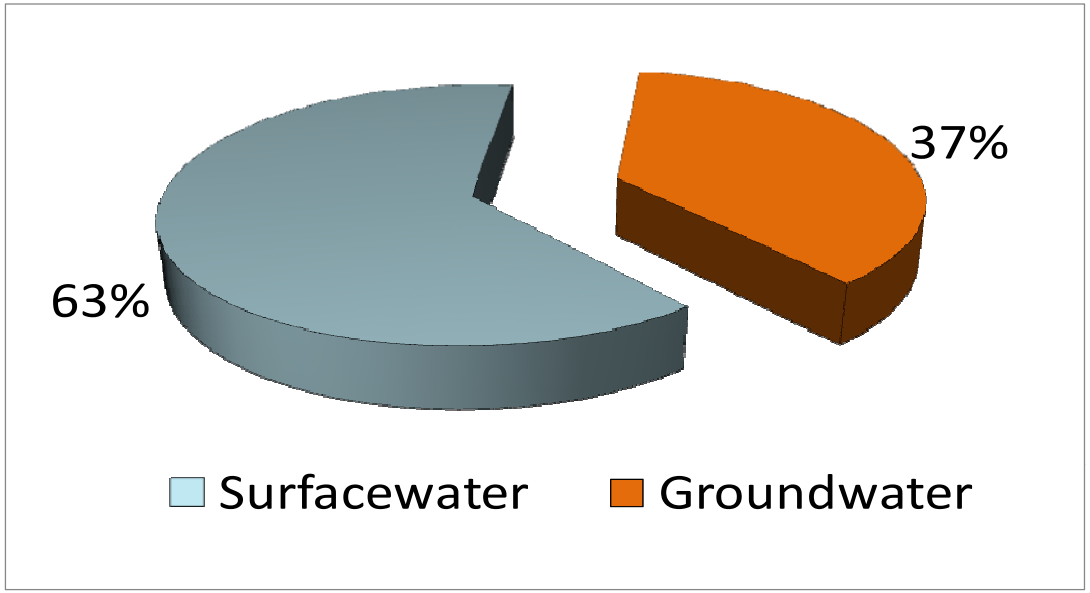
Source: Statistics of Water in Mexico 2007, CONAGUA

Contrast: population water availability and GNP

- Where 31% of the water availability ocurrs 77% of the population lives and produces 87% of the GNP.

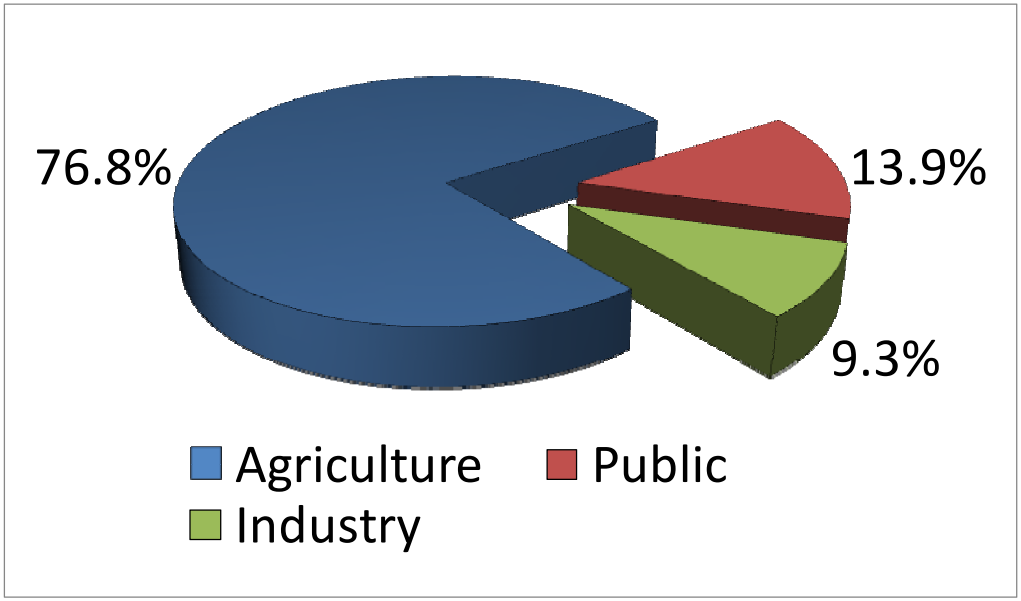


Water Sources and Uses



Sources

Uses



Water Agenda 2030

All urban wastewater with treatment

All rivers and lakes without garbage

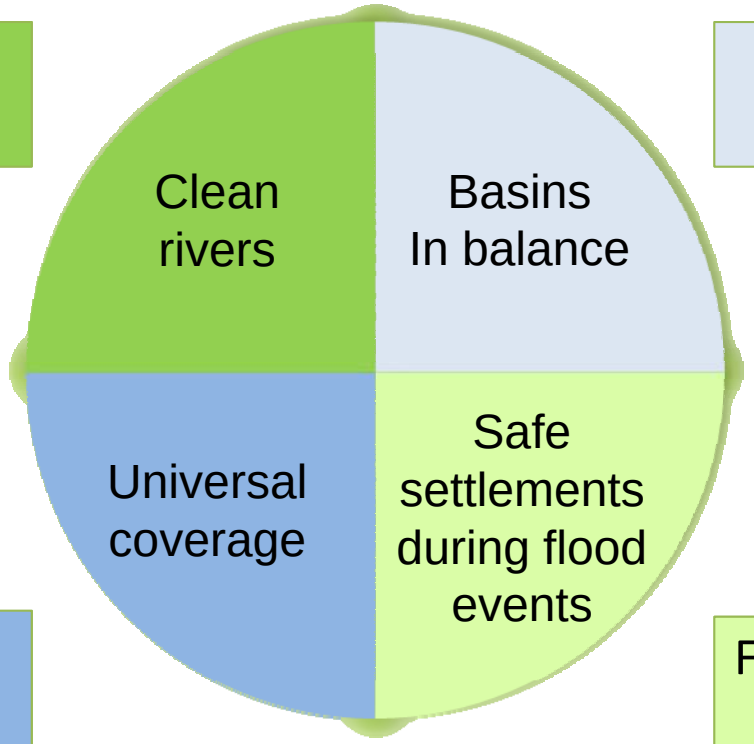
non-point sources of pollution under control

All industrial wastewater with treatment

Suburbs connected to sewage network

Rural communities with drinking water network

Water utilities operating efficiently



All irrigations areas technified

self-managed of Basins

All treated waters reutilized

All aquifers in equilibrium

Effective territorial order

Flood areas free of human settlements

State-of-the-art warning and alert systems

¿How are we going?

- Facing today's challenges, now we are developing major projects, including 15 projects that together represent an investment exceeding US$ 11,800 Million.

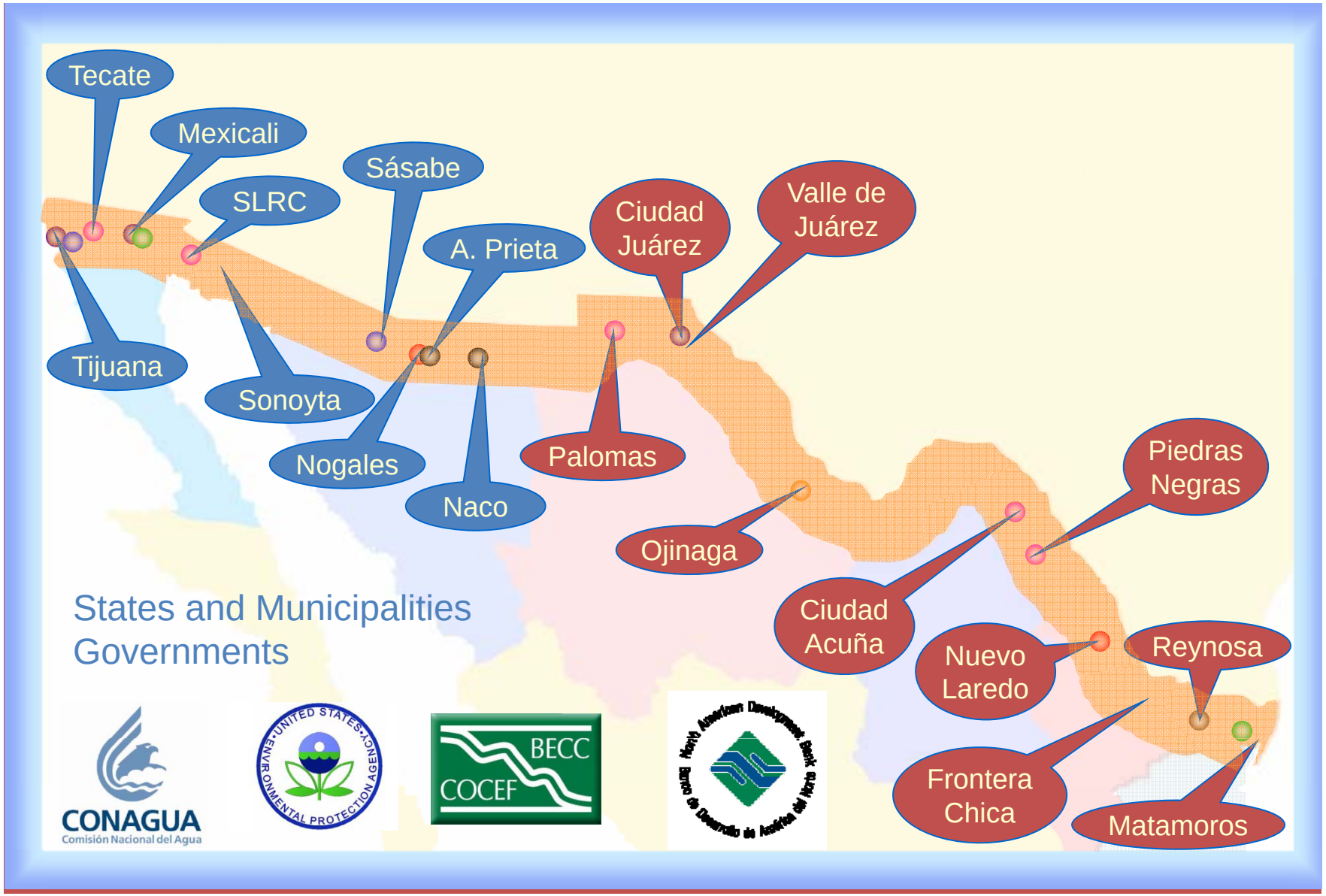
Drinking water and Sanitation	Hydroagrulture Infrastructure and flooding protection
1. East Tunnel Outfall	9. Ecological Park Lake Texcoco
2. Sanitation for the Valley of México. WWTP Atotonilco	10. Integral Hydric Plan of Tabasco
3. Sustainability Cutzamala System	11. Picachos Dam (1st stage of the Baluarte- Presidio project)
4. Sanitation for the city of Guadalajara	12. Santa María Dam (2nd stage of the Baluarte-Presidio projects)
5. Aqueduct II	13. Río Bravo (Grande) Basin
6. El Realito	14. Pánuco and Tamesí rivers
7. Zapotillo	15. Lerma-Chapala Basin
8. El Purgatorio (formerly Arcediano)	

MAIN BINATIONAL INSTITUTIONAL ACTORS

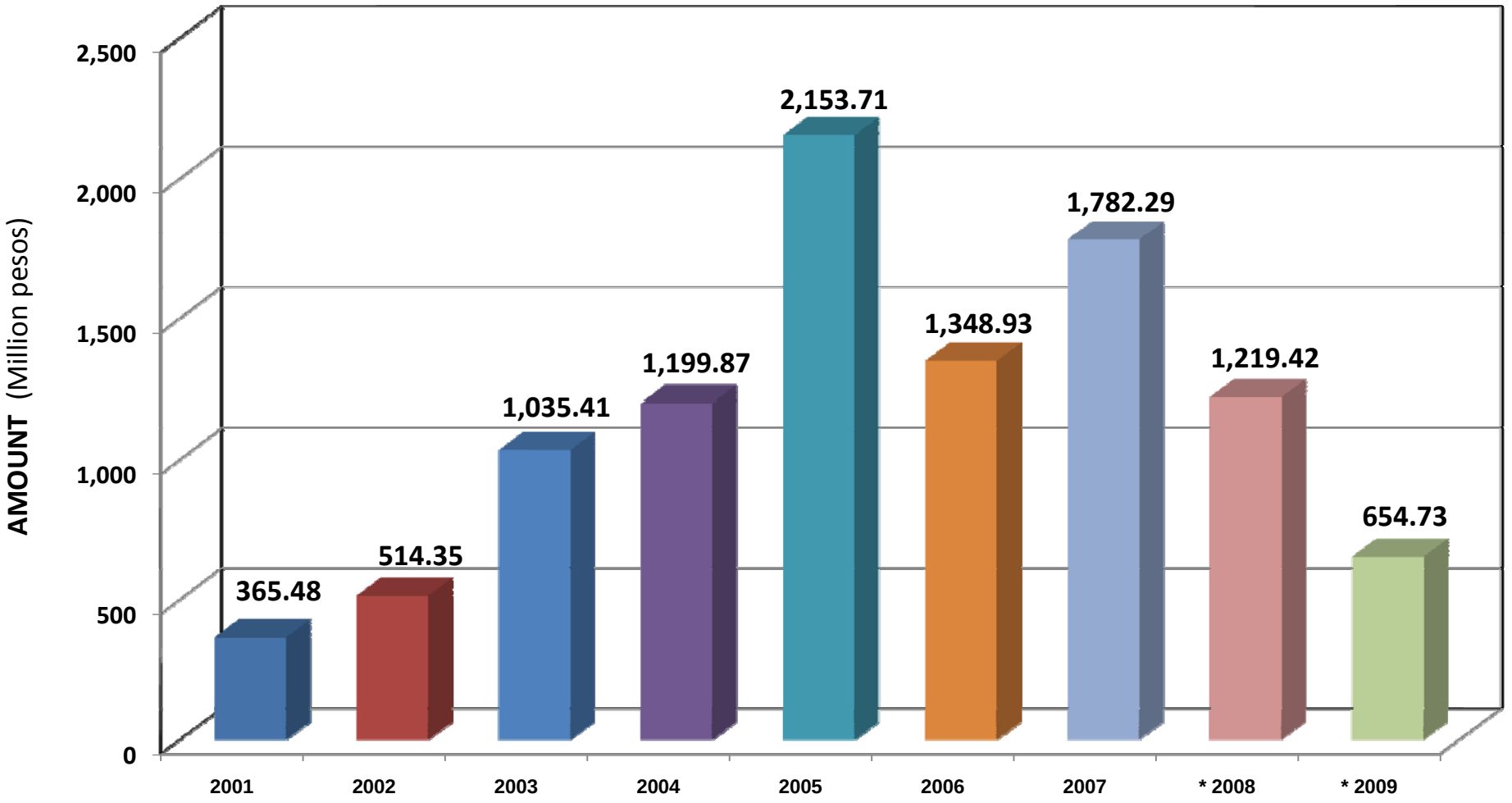
INTERINSTITUTIONAL COORDINATION

- IBWC
- EPA – CNA Joint Program
- CNA - COCEF – BDAN – CILA coordination
- Border Program 2012
- Binational City Committees for Colorado and Bravo River Basins
- Mexican Basin Councils

WATER SUPPLY AND SANITATION PROJECTS ALONG THE US MEXICO BORDER

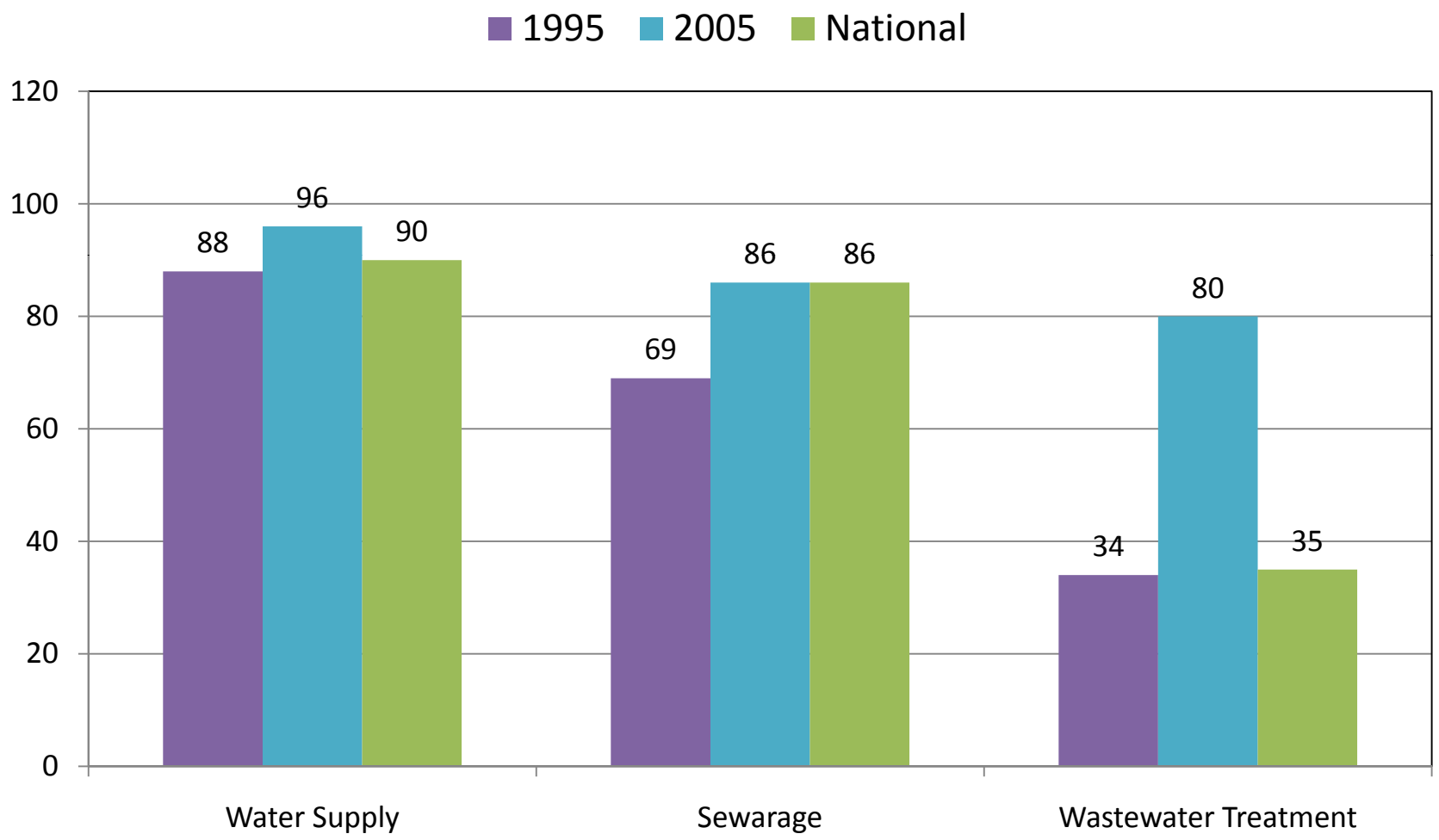


US/MEXICO BORDER JOINT INVESTMENTS

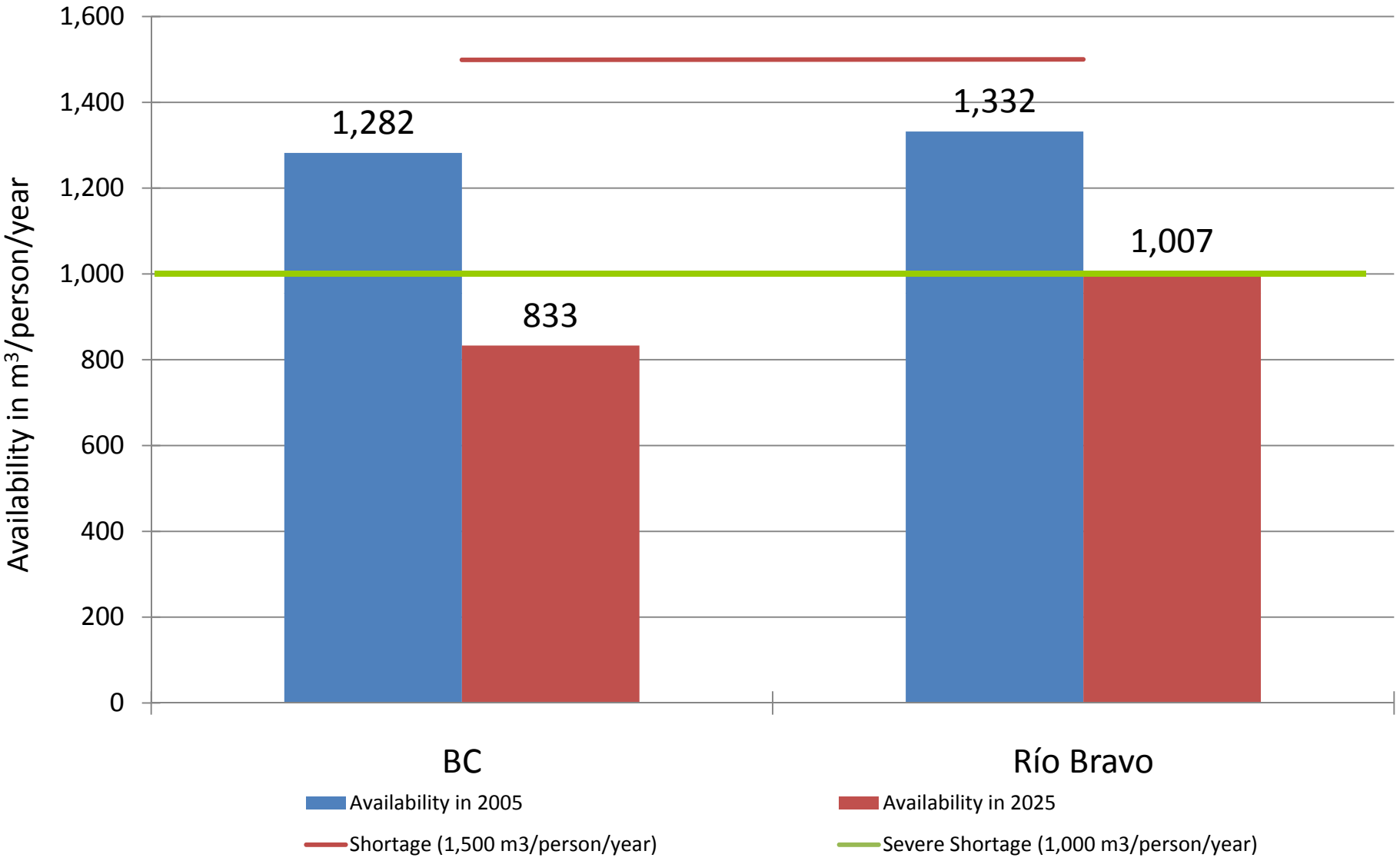


***** Preliminary amounts **(October 2009)**

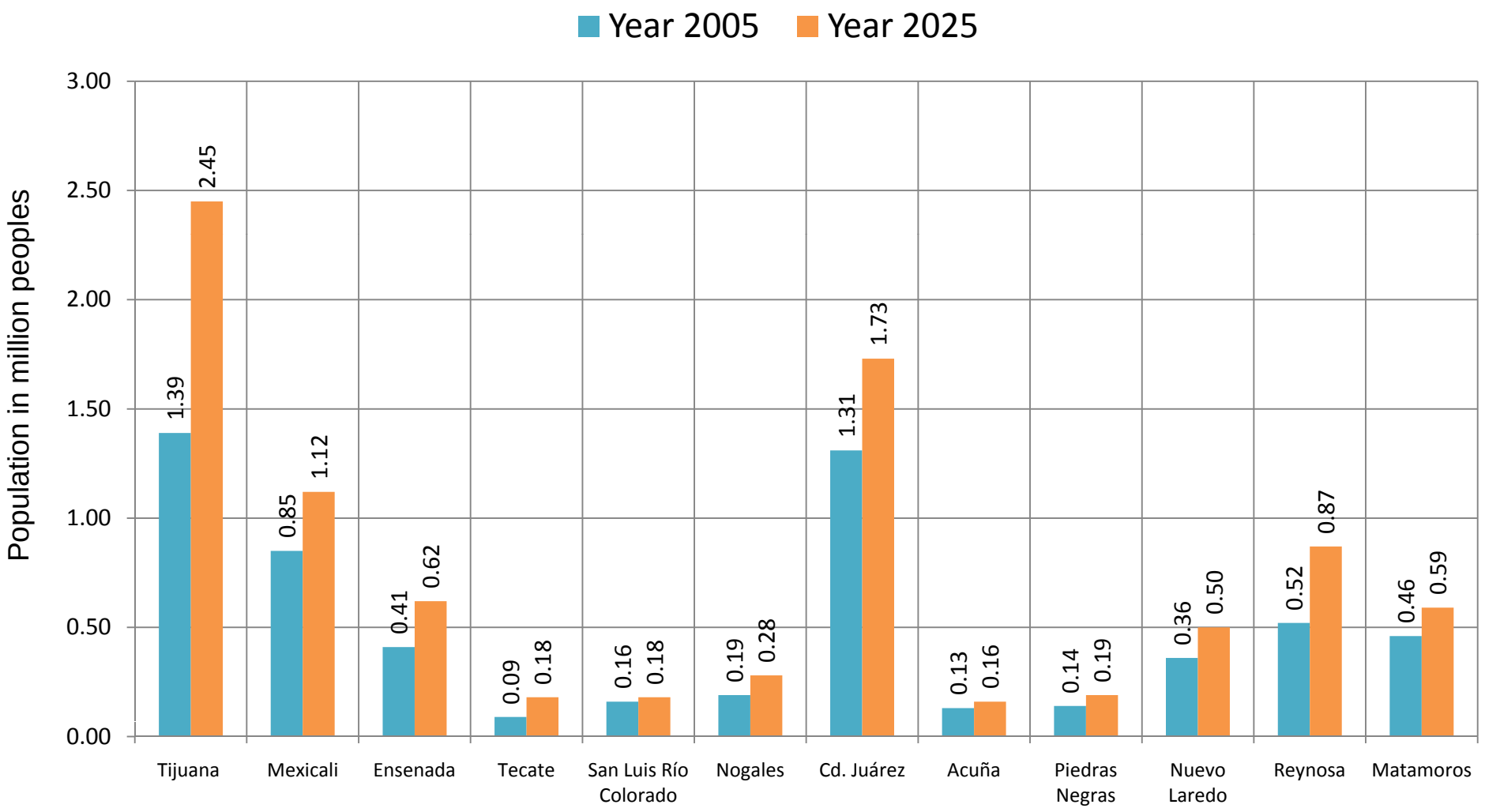
WATER SUPPLY, SEWERAGE AND WASTEWATER TREATMENT COVERAGE EVOLUTION IN THE MEXICAN BORDER



WATER AVAILABILITY ALONG THE US/MEXICO BORDER



MAIN CITIES POPULATION ALONG THE US/MEXICO BORDER



Source: CONAPO

COLORADO RIVER

COLORADO RIVER REGION

- Colorado River has a length of 2,300 km.
- Ten dams control the flow regime and none lies in Mexico. Only one is international.
- 1.5 million hectares are irrigated in EEUU and 170,000 hectares in México.
- After irrigation, evaporation is the second largest water consumer.
- 30 million people receive water supply from the Colorado river.

COLORADO RIVER REGION WATER DISTRIBUTION

Water Allocation:

Upper Basin: 9,251 hm^3

Lower Basin: 9,251 hm^3

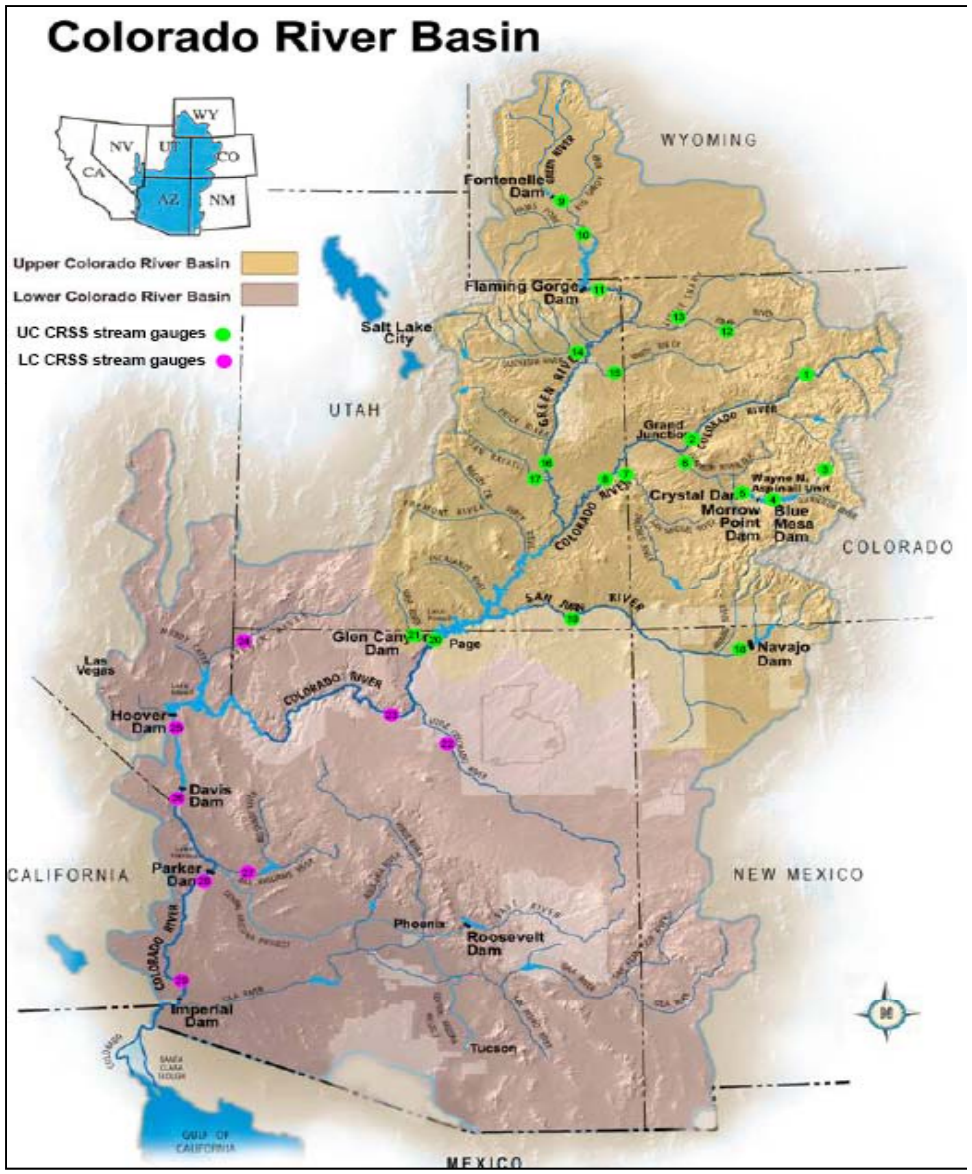
Mexico: 1,850 hm^3

TOTAL 20,352 hm^3

Water Availability:

☹ 18,500 hm^3

The water is over allocated



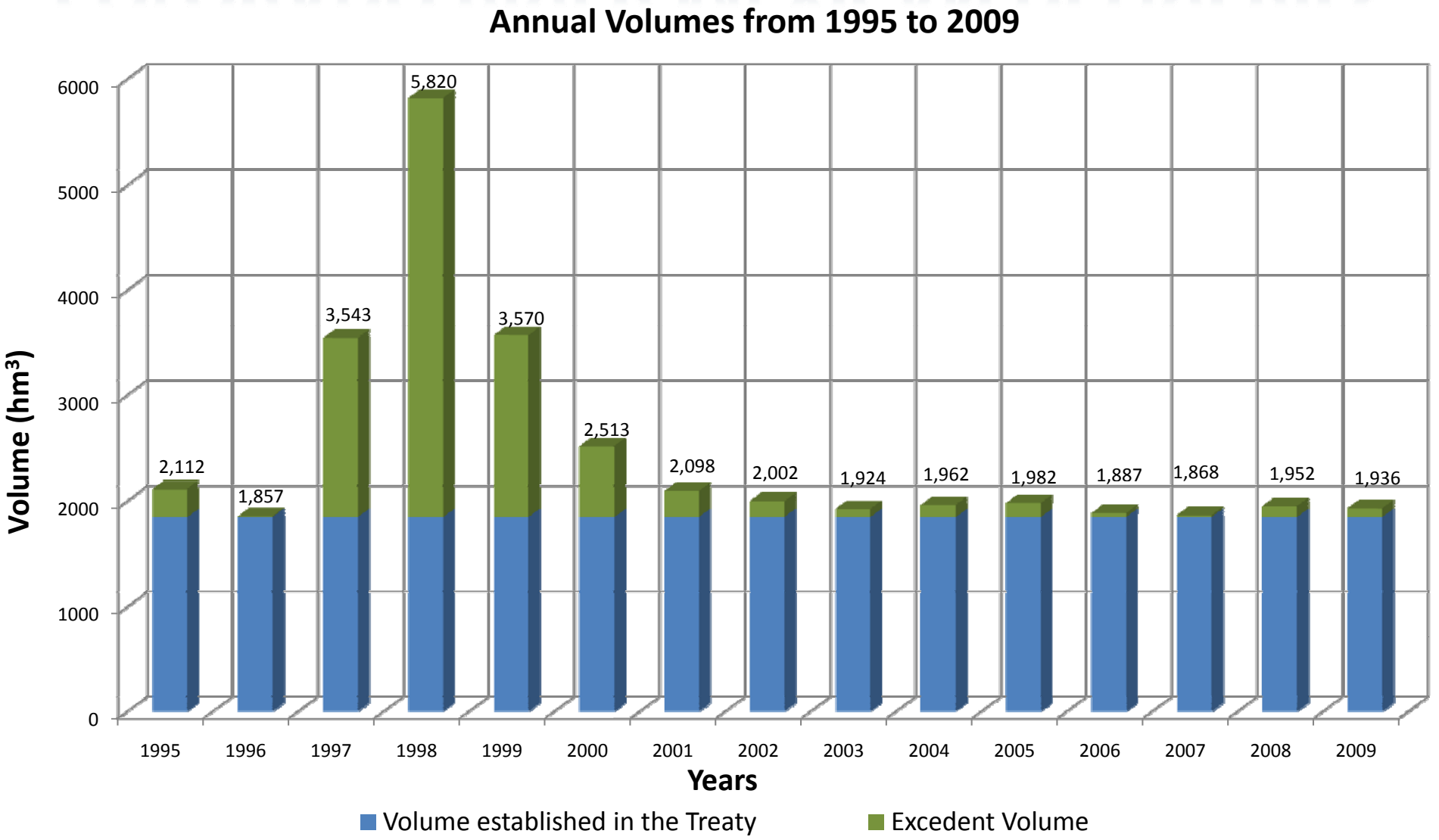
International Treaty of 1944: Delivers to Mexico

Establishes that:

- **"Of the Colorado River waters, whatever their source, there are assigned to Mexico a guaranteed volume of 1850.2 Mm^3 per year".**
- **In cases of extraordinary drought or serious accident to the irrigation systems in the USA, this volume is reduced in the same proportion of reductions in the U.S.**

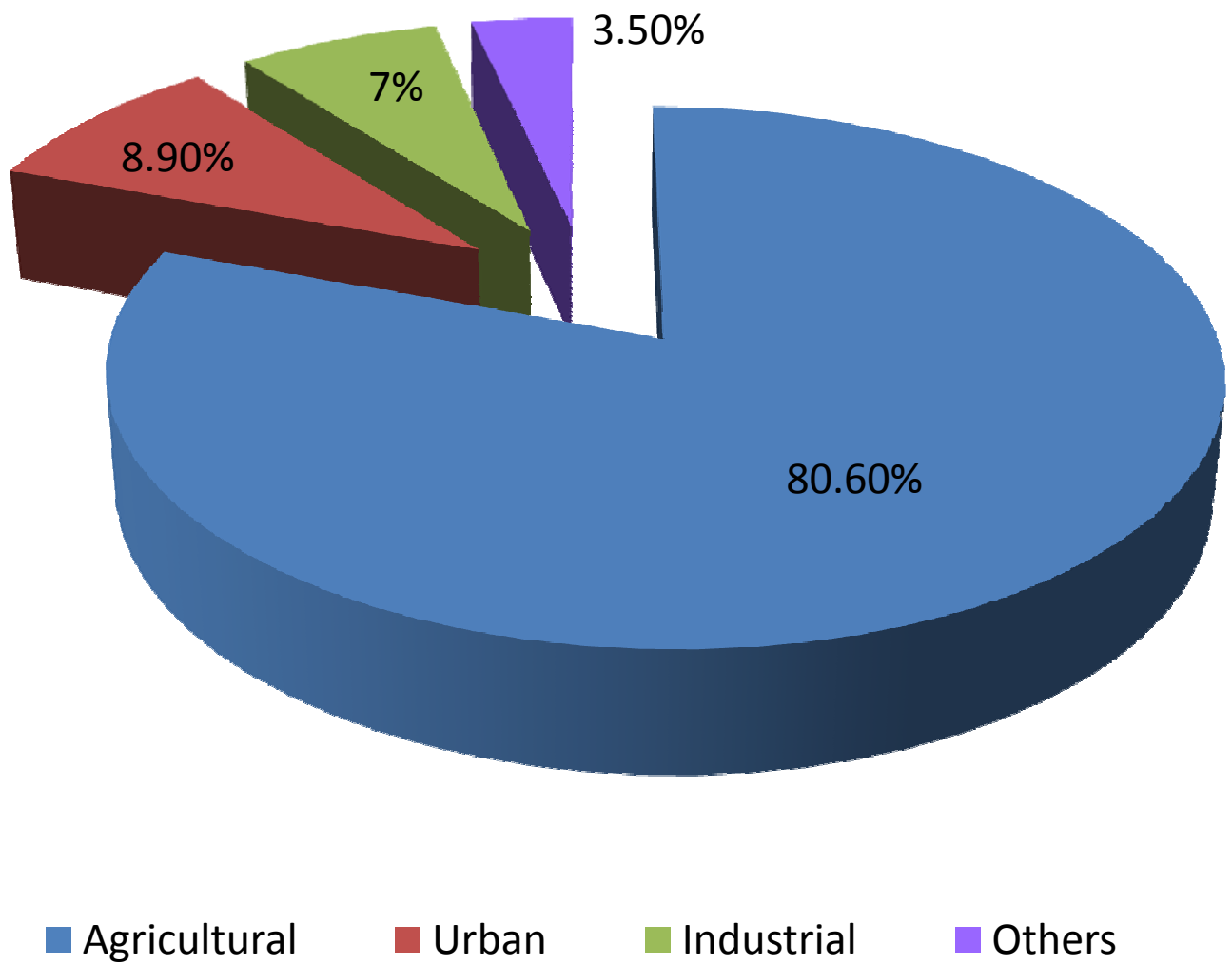
- **When the water in the Colorado River is in excess of the needs of supply / consumption in the U.S., they are obligated to deliver to Mexico additional volumes of water from the Colorado River System for up to a total volume not exceeding 2096.9 Mm^3.**

COLORADO RIVER MEXICAN DELIVERIES



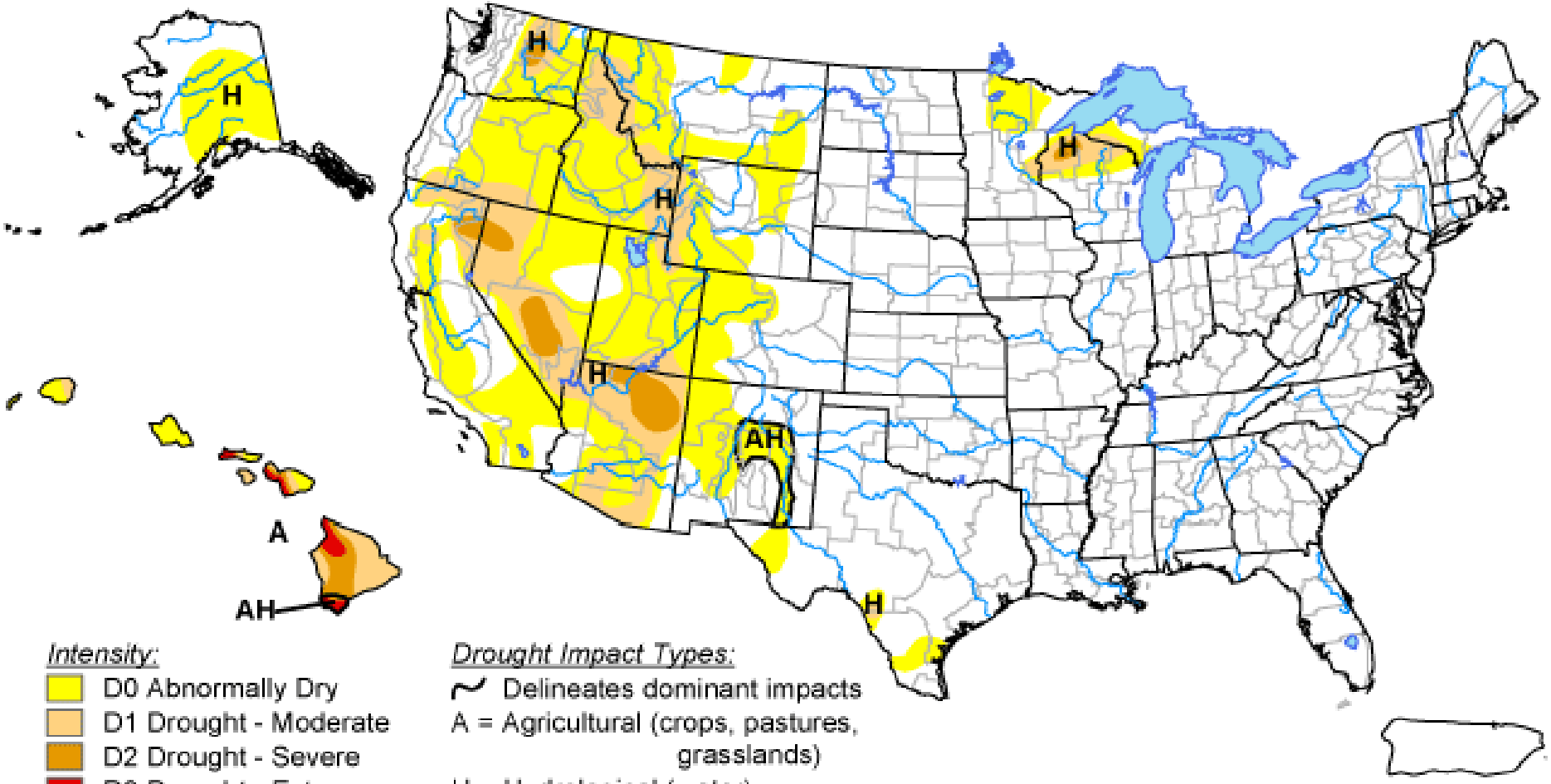
The historical deliveries from the United States in 1995-2009 period show that every year these had been above the established volume and in six of them even over the maximum volume.

Main Water Uses in Baja California



U.S. Drought Monitor

February 9, 2010
Valid 7 a.m. EST



Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/dm

Released Thursday, February 11, 2010

Author: Brian Fuchs, National Drought Mitigation Center

Water problems in the Baja California Border

- Overexploitation of aquifers leading to a marked decrease in the amount of water available.
- Contamination of groundwater discharges mainly urban, industrial and agricultural.
- Urban and industrial growth and change of use of land for agriculture, livestock, which change the environment.
- Of the total groundwater available in the Region, 60% are located in the Mexicali Valley and the "Mesa Arenosa", the first one for agricultural use and the second one to supply for the border cities of San Luis Rio Colorado to Tijuana.
- Low efficiency in irrigation, water wastage due to rudimentary irrigation practices, poor maintenance of water infrastructure, leveling problems.
- In the agricultural plot the efficiency level is 71%, resulting in a total efficiency of 56% in the gravity driven systems.

Source: Programa Hídrico Visión 2030 del Organismo de Cuenca Península de Baja California

DROUGHT AND CLIMATE CHANGE IN COLORADO RIVER BASIN

The Colorado River meets much of the water needs of seven states in the USA, two from Mexico and thirty-four American tribes. This represents a population of 30 million people, projected to reach 38 million by 2020. In the past 100 years, the total percentage of area affected by extreme droughts, in the U.S. has ranged from 14% a year on average, with a maximum of 65% in 1934.

It is well documented that the allocation of Colorado River water to the basin States took place during the wettest period (between 1905 and 1925), in a period of 400 years.

Recently, the western U.S. has suffered a sustained drought, 30-40% of the region is subjected to a severe drought since 1999, and the Colorado River has had, between 2000 and 2004, the five-year low flow rate ever recorded. In addition, States of the southwestern U.S. are experiencing one of the fastest rates in the country and generate a social demand, economic and environmental resources, with the resulting legal disputes.

Source: El cambio climático y el agua. Documento Técnico VI del Grupo Intergubernamental de Expertos sobre Cambio Climático

DROUGHT AND CLIMATE CHANGE...

A small portion of the Colorado River basin (15%) provides most of its volume (85%). Estimates show that with global warming and increased evaporation, runoff reduction reached 30% during the twenty-first century.

Under these conditions, and taking into account the planned withdrawals, it could only meet the needs specified in the Colorado River Compact for 60-75% of the time between now and 2025.

Some studies estimate that by 2050, average moisture conditions in the southwestern U.S. could match those seen in the 50s, such changes would be due to rising temperatures.

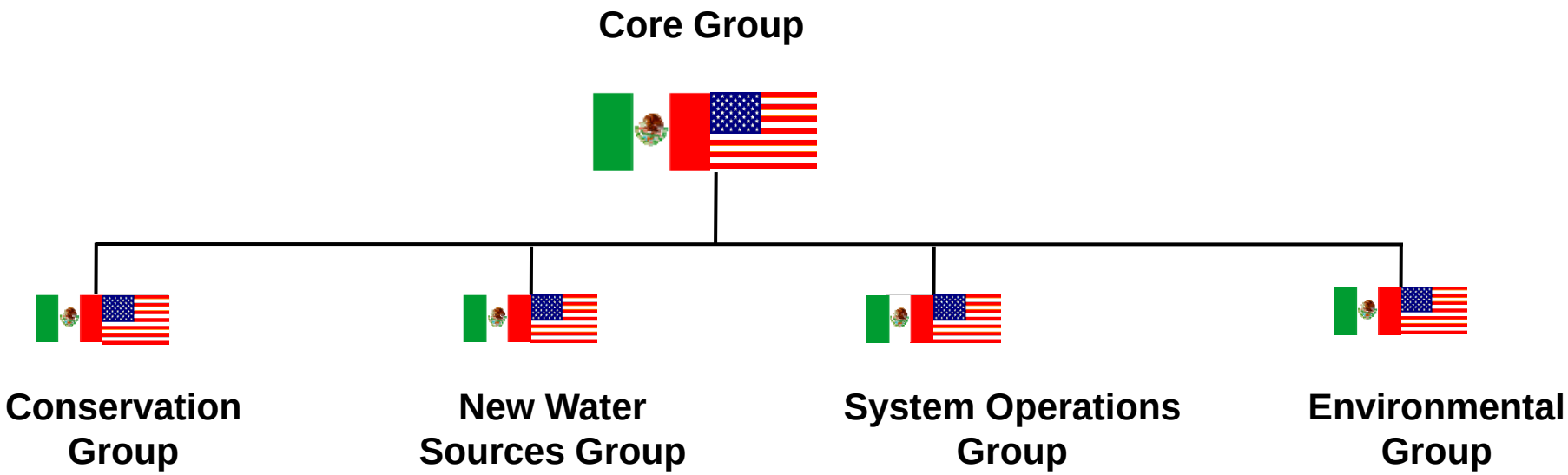
Most scenarios of Colorado River flow at Lees Ferry indicate that, in 20 years, the runoff could be insufficient to meet current demand for water resources.

Recent experience suggests that conditions are now 'critical' in that basin. The variability and climate change, coupled with increasing pressure because of the effect of development, will cause unprecedented scale droughts unknown for the institutions of the region and exacerbate conflicts among water users.

Mexico – US Cooperation in Colorado River Basin

Mexico fully shares the vision to manage the basin with a comprehensive approach and supports what IBWC in 2008 formalized: a core group and four working groups.

The federal, state and NGO's representatives from Mexico which form part of the groups have a full decision making profile



US-Mexico Cooperation Actions

With the vision of managing the watershed integrally, within the IBWC it was formed in 2008 a core group and four working groups with representatives of federal, state and NGOs in Mexico and the US.

Main Objectives of Mexico

- **Meet water needs, present and future for urban uses, agriculture and environment in the US-Mexico border**
- **Assess current weather conditions, and future condition of scarcity.**
- **Developing new sources and increase storage capacity.**
- **Binational investment programs for water conservation and environmental improvement.**

Main Objectives of the US

- **Addressing needs of water quantity and quality of current and future urban use, agriculture and environment of US and Mexico**
- **Implement procedures to better manage water scarcity.**
- **Evaluate potential water exchange US-Mexico of new sources produced by the development of infrastructure, improvements or other projects.**
- **Assess potential impact of climate change on Colorado River.**

Projects on the agenda for the Working Groups

- Modernization of 014 Irrigation District.
- Improvement of the agricultural drainage system.
- Base flow downstream of Morelos Dam.
- Project of boundary stretch.
- Projects on environmental restoration.
- México´s water conduction on the CTA.
- México´s construction of storage structures.
- Desalinization projects.
- Other projects.

IDENTIFIED PROJECTS IN THE WORKING GROUPS

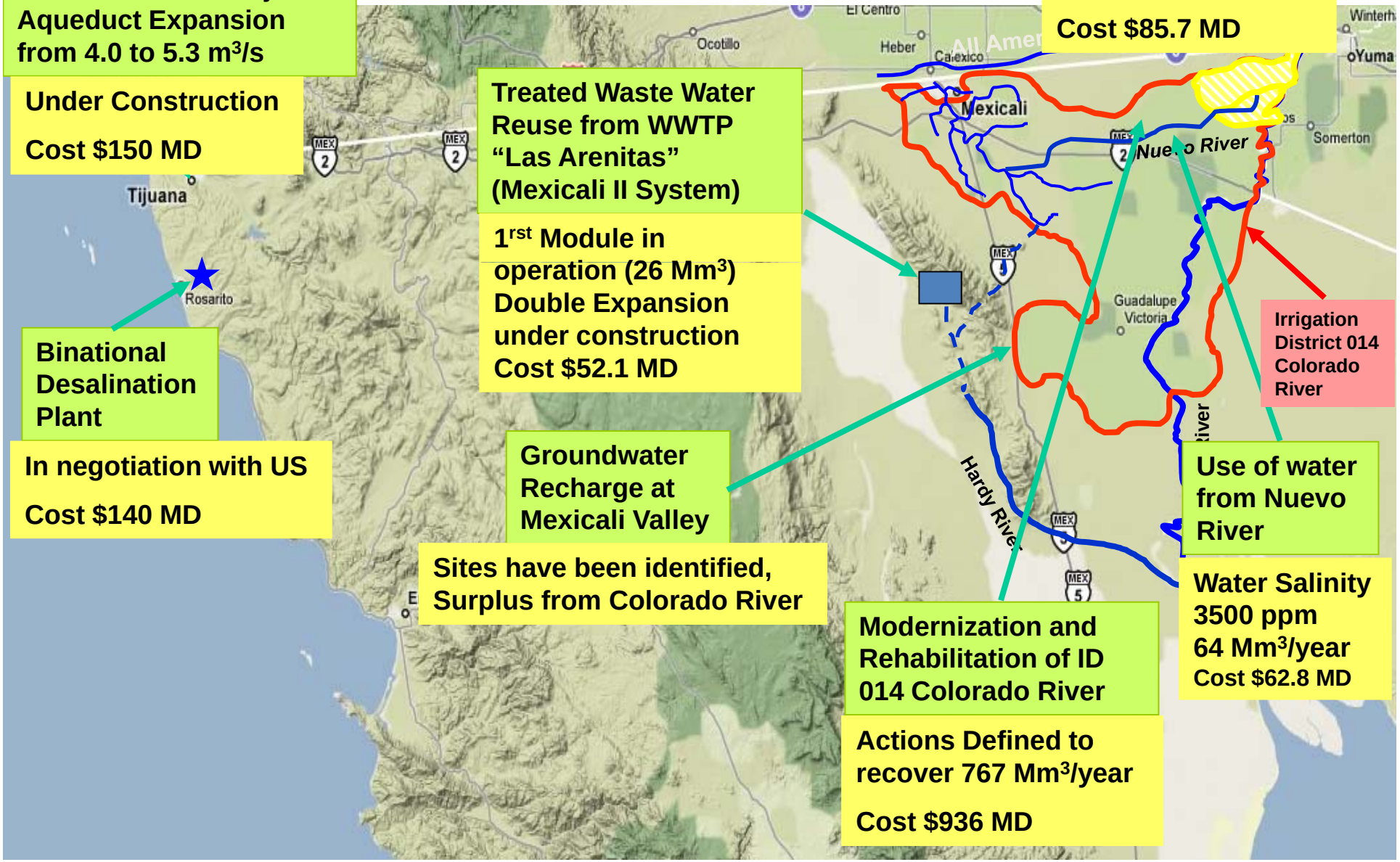
- Conservation Group: Lining 75 Km of the main network of ID 014, with an approximate cost of 680 MDP, with this project about 46 hm^3/year will be recovered. This volume is not compromised.

- New Water Sources Group: Identification of sites to build desalinations plants at Rosarito, Puerto Peñasco and Ensenada.

- Environmental Group: Establishment of five priority areas of conservation and map of water needs for the environment, considering the boundary sector, riparian and Colorado River Delta.

- System Operations Groups: Conduction of Mexico's water by AAC, aquifer monitoring, shortage and drought plans, annual and multiannual storage in Mexico and US, modeling the whole Colorado River System, operational storage, deliveries of water (surplus) by Gila River and Nuevo River.

Projects to Address the Water decrease Problem in the Region



Modernization and Tecnification Modules 4 and 5, ID014

Actions Defined to recover 89 Mm^3/year

Cost $85.7 MD

Colorado River – Tijuana Aqueduct Expansion from 4.0 to 5.3 m^3/s

Under Construction

Cost $150 MD

Treated Waste Water Reuse from WWTP "Las Arenitas" (Mexicali II System)

1rst Module in operation (26 Mm^3)
Double Expansion under construction
Cost $52.1 MD

Irrigation District 014 Colorado River

Binational Desalination Plant

In negotiation with US

Cost $140 MD

Groundwater Recharge at Mexicali Valley

Sites have been identified, Surplus from Colorado River

Use of water from Nuevo River

Water Salinity 3500 ppm
64 Mm^3/year
Cost $62.8 MD

Modernization and Rehabilitation of ID 014 Colorado River

Actions Defined to recover 767 Mm^3/year

Cost $936 MD

WHY WATER DESALINATION IS NECESSARY IN MEXICO?

- According with statistics, our country has low availability of fresh water (between 1,000 and 5,000 liters annuals per person, approximately 3 to 15 liters daily), for that reason, knowledge and implementation of sea water desalination techniques are very important

- In some zones of the country, in short term, the only available supplies of water to population centers, industries and hotels will be sea and brackish water, which makes impossible to use them in its natural conditions, that's why is necessary to process them to take them out the excess of salts and to supply drinking water, as well as to prevent reject water discharges pollution.

DESALINATION PLANTS IN MEXICO

- In 2002 there were 171 desalination plants
  - Installed capacity 781 l/s
- In 2006 there are 435 registered desalination plants
  - Installed capacity 3,600 l/s
  - This represents 5 times more.

– The State with more desalination plants is Quintana Roo with 79 plants, followed by Baja California Sur with 71.

– Although in Quintana Roo there are several reverse osmosis plants like Xcalak, near Chetumal, Contoy Island and Cozumel are un disuse

DESALINATION PLANTS IN PROJECT, NORTH BORDER

In Ensenada, B.C.

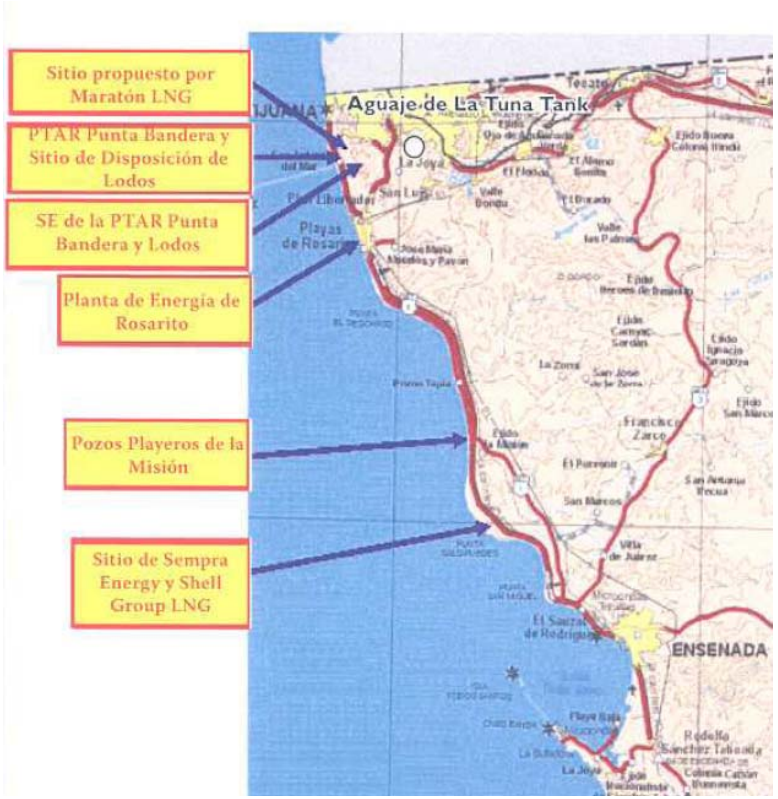
- Capacity 250 l/s, it's bided, it's expected to begin the construction in a short time. The cost will be 372 MP.

In Rosarito, B.C.

- Capacity 2,190 l/s, the expected investment is 1,300 MDP, USA would participate in its construction

In Puerto Peñasco, Son.

- Capacity 4,700 l/s in a 1st phase. Is an initiative from Arizona State, the water will be used to municipality and agricultural.



Binational Desalination Plant in Rosarito, B.C.

It is under analysis to build a Binational Desalination Plant in Playas de Rosarito, BC, with a capacity of 1,095 l/s at an initial stage to 2.190 l/s as final capacity.

The volume of desalinated water would be shared between Mexico and the United States.

Currently, San Diego County Water Authority is financing the Feasibility Study and the Preliminary Design of the Plant .

The activities in which we work are:

- Data collection
- Field visits to possible sites for the plant
- Tour through various routes for water delivery
- Energy requirements
- Water demand projections for Mexico and the US
- Requirements and Environmental Permitting

CHALLENGES

The future scenario is characterized by:

- High rates of population and economic growth in border region.
- Increasing competition for water.
- Unfavorable scenario of climate variability.
- Overexploitation and degradation of sources
- Environment degradation

How to confront it

- Continue to identify opportunities for cooperation that benefit both countries.
- Being able to use the U.S. system to store water in Mexico, in order to relax the operation and adjust in conditions of scarcity.
- Generating new sources of water leading to increased water supply and reduce pressure on the hydrological system.
- Explore U.S. investment schemes in exchange for water infrastructure for a fixed period that result on the interest and benefit for both countries.
- Allocate part of the volumes that are retained or generated on environmental improvement.
- Jointly tackle the impacts they generate.
- Address the technical, legal, economic, environmental, social, political, aspects involved in each project.
- Do not affect the 1944 Water Treaty.
- Review and approve jointly the cooperation projects under international coordination in the framework of the IBWC.
- Involve all those affected or involved (Federation, states, users, members of Congress from both countries).
- Adequate public management.

Final Message

The Governments of Mexico and the US have been characterized by:

- ✓ The great capacity of jointly provide efforts to strengthen policies to protect the environment and natural resources sustainably;
- ✓ The willingness to cooperate in the search for joint actions to improve environmental quality and optimize the quality of life of people in the border region shared by both countries.
- ✓ Opportunities for collaboration and the importance of strengthening cooperation through initiatives on priority issues of common interest.
- ✓ The willingness to promote new mechanisms for dialogue and agreements leading to the strengthening their relations of friendship and mutual productive action;

The desire of the National Water Commission is that the binational collaborative effort, is considered as an international example in terms of integrated water management by basin.

¡¡THANKS!!