THE MEXICAN ENVIRONMENTAL FLOW STANDARD (SCOPING AND APPLICATIONS)

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OBJECTIVE

The NMX-AA-159-SCFI-2012 Standard establishes the procedure and technical specifications to determine the ecological flow regime in current or national water bodies in river basins.

APPLICATIONS

Applies to all those who conduct studies to request allocations, build infrastructure, make inter-basin transferences, or similar to Environmental Impact Assessment (EIA). As well for all streams or water bodies whose water availability agreements published in the Mexican Official Journal (DOF), do not consider a flow for the conservation of aquatic ecosystems.

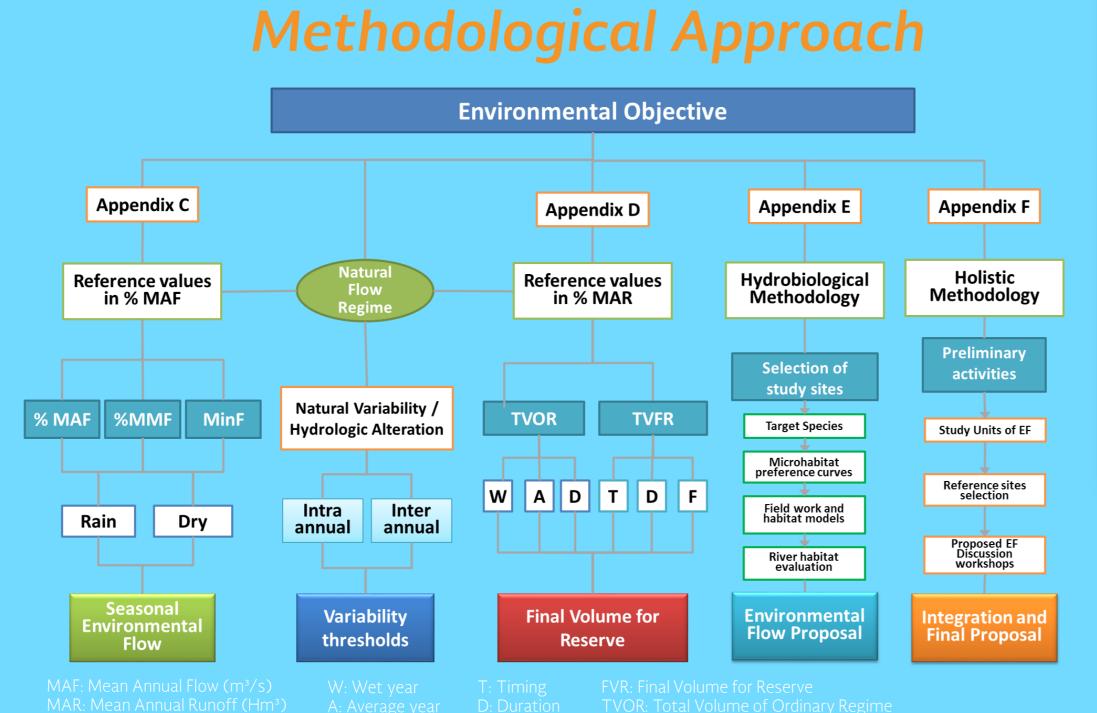
DEVELOPMENT

The first Mexican EF standard draft was issued.

1998

A standard to estimate water availability was issued. EF was considered part of the commited natural discharge downstream (Base flow and EF)

METHODS



In 2007 -2008 hydrological methods modified for tropical rivers were reviewed by a multidisciplinary group from several institutions appointed by CONAGUA and WWF to set the EF Std.

2008

(CONAGUA, WWF – Gonzalo Rio Arronte Foundation, 2012)

Potential Water Reserves

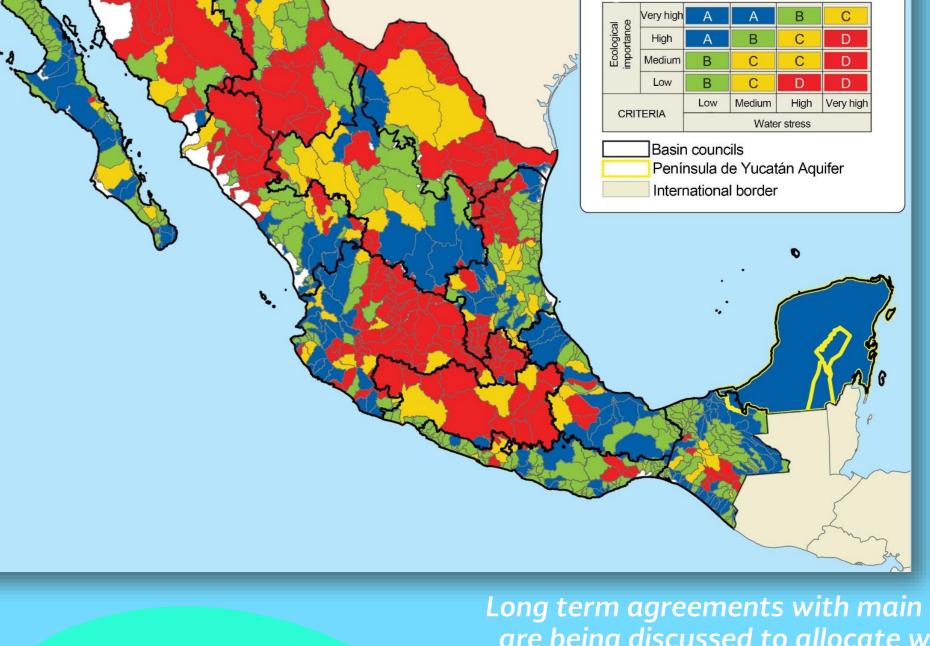
This program will constitute an early adaptation measure focusing on saving water for the environment and future generations, and coincides with the urgent need for society to preserve its natural heritage and promote water management focused on saving and securing the watershed balance – which form the strategic objective of the Federal Government's 'Water Agenda 2030'.

(CONAGUA, WWF – Gonzalo Rio Arronte Foundation, 2012)

Basins Environmental Objective

The EF standard recognizes a flow regime instead a minimum flow, and applied to every new hydraulic infrastructure project or water allocation. The standard includes hydrological methods, as the base for analysis, to set seasonal and monthly flows as well to reserve annual volumes for the environment. Include hydro-biological and holistic approach

2012



Long term agreements with main users are being discussed to allocate water for environment and public service. Studies for hydropower plants are being carried out to include daily alterations and potential impacts.

2015

A National Environmental

Reserves Program is in place for well-preserved basins. Sites of reference with applications of hydrological, hydraulics and hydrobiological methods.

Ecological responses are being incorporated, and some provisions to deal with flow recovery in exhausted or polluted rivers. WQ and social issues.

2002

2010

In doing so international experiences were considered and inputs needed to apply the standard stated, such as water availability decreed for each basin.

RESULTS

Basin Water Availability

Official Mexican Standard

"Conservation of water resources - it establishes the specifications and the method to determine mean annual availability of national waters."

> Annual Mean Surface Water Availability in a Watershed.

It is determined into the mainstream at the

Annual Average Surface Water in the Basin

AVERAGE ANNUAL Drainage Basin TO DOWNSTREAM COMMITTED

CURRENT ANNUAL Downstream

Annual average availability of GROUNDWATER IN AN AQUIFER.

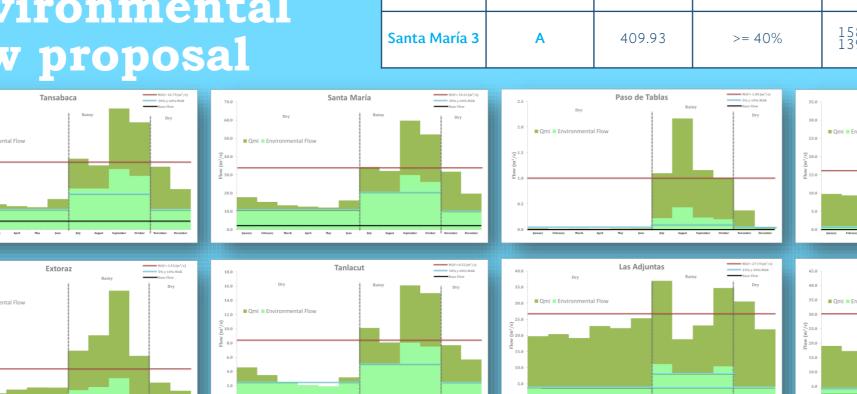
Annual AVERAGE AVAILABILITY OF Underground WATER IN AN AQUIFER

AVERAGE ANNUAL TOTAL RECHARGE

COMMITTED NATURAL DISCHARGE

GROUNDWATER EXTRACTION

Environmental flow proposal



Public use

Stream Classification

Hidrometric Gauges

Principal Rivers

Environmental Objective

Env. Obj. State Stream Rio San Juan Querétaro Rio Tula Hidalgo Rio Moctezuma Las Adjuntas Querétaro Mazacintla Rio Moctezuma Querétaro San Luis Potosí **Tanlacut** Rio Verde Rio Tampaón San Luis Potosí **Tansabaca** Santa María Río Santa María San Luis Potosí Extóraz Río Extóraz Querétaro

Water allocation for public use

	Extoraz	D	98.94	5-14%	79 (80%) Qro. 15.18 (14%) Gto.	2060	
	Santa María 3	Α	409.93	>= 40%	158 (38%) Oro. 139 (32%) Gto.	2080	
Waría Rai	MAN - 3-123 (m²/s)	2.5 Dry 2.0 Qmi II Environmenta (1.5) Do (2.1.5) Do (3.1.5) Do (4.1.5) Do (5.1.5) Do (6.5) Do (6.5) Do (7.1.5) Do (8.5) Do (9.1.5	Paso de Tablas Rai	NAJ" 1.00 (m"/s) Sty Time Hate There There I Dry 1 Dry 25.0 25.0 25.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	Ixmiquilpal Dry Gmi II Environmental Flow	Ratey	PMAN-16.1 (m²/s) 25 ty 10% MAR Eller Per Dry Dry
cut	MAT= 0.52 (m ² /s) 30% y 60% MAR Rese Place	40.0 Dec	Las Adjuntas	MAS = 27.59 (m²/s) = 15% 3.00 Past 45.0	Mazacintla	·	MAF= 30.27(m ³ /s) 15% y 30% MAR

Water reserves

Mexican "DECREE whereby the agreements listed are abrogated and is established the water reserves for watersheds appointed."

9th Article

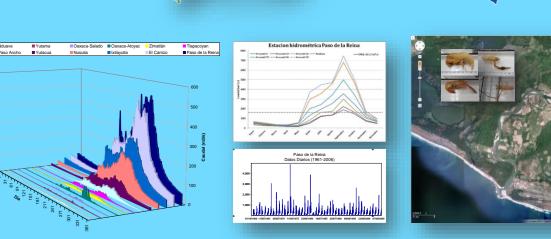


"The bases and provisions to be taken by the National Water Commission for granting concessions national reserve of surface water for environmental use or ecological conservation are:"

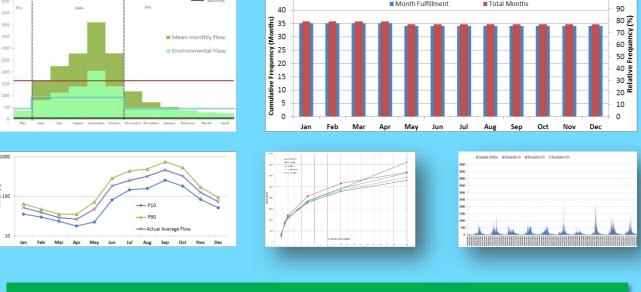
San Pedro Mezquital River: 354.74 Hm³ San Pedro Desembocadura: 2,296.66 Hm³

Hydraulic Projects

Appendix A & B

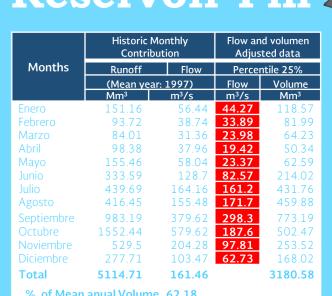


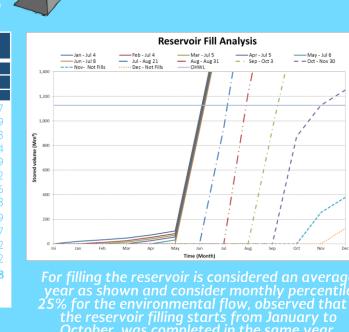
Appendix C & D



FVR = TVOR + TVFR $FVR = 3,320 + 198 = 3,518 \text{ Hm}^3/\text{year}$ FVR = 3,518 Hm³/year = 64% of the MAR (5,430 Hm³/year)







1. Importance of counting with a reference standard with a definition of flow regime instead minimal flow.

2. Advances on environmental reserves decreed at country level.

- 3. Increasing case studies with different methodologies.
- 4. Moving towards multidisciplinary approach for ecosystem responses.
- 5. Advances on monitoring and follow up protocols.
- 6. Participation at Latin American level through IHP-UNESCO Ecohidrology (March 2015 last meeting in

CONCLUSIONS

Panama).