

2024

AMBOS NOGALES GROWING WATER SMART FULL WORKSHOP REPORT



10-11 JUNE 2024
NOGALES, SONORA

ABOUT THE GROWING WATER SMART PROGRAM

Growing Water Smart, a program of the Sonoran Institute and Lincoln Institute of Land Policy's Babbitt Center for Land and Water Policy, introduces communities to a full range of communications, public engagement, planning, and policy implementation tools to realize their watershed health and community resiliency goals. Growing Water Smart workshops empower local government leaders to adopt land use plans and policies that support water resilience. Interested individuals can learn more at www.growingwatersmart.org.



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ABOUT THE BABBITT CENTER FOR LAND AND WATER POLICY

The Babbitt Center for Land and Water Policy, a center of the Lincoln Institute of Land Policy, seeks to advance the integration of land and water management to meet the current and future water needs of Colorado River Basin communities, economies, and the environment. The Babbitt Center develops tools and best practices to guide decisions through research, training, and partnerships for sustainable management of land and water resources in the Basin and beyond.

THANK YOU TO OUR FUNDERS

Our work is made possible by the North American Development Bank and the generous support of partners, sponsors, public institutions, private financiers, and in-kind contributors that envision a more resilient future in communities in the border region between the United States and Mexico.



DISCLAIMER

This report includes information regarding the details of the two-day workshop and the conversations that transpired throughout the event. This document is not a contract or formal agreement of any kind - it does not hold any party responsible for their contributions to discussions or commitments made during the workshop. Instead, this report serves to honor the time and effort committed by participants in this workshop, document and memorialize the progress made, and to further this progress by continuing to support critical discussions about land and water policy integration.

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SUMMARY

This report documents the first Growing Water Smart (GWS) US-Mexico Border workshop, which was held between the cross-border sister-cities of Nogales, Arizona and Nogales, Sonora (referred to as Ambos Nogales – ‘ambos’ meaning ‘both’). The workshop was conducted on June 10th and 11th, 2024, at the Universidad Tecnológica de Nogales in Nogales, Sonora.

It was co-convened by the Sonoran Institute (with support from the Babbitt Center for Land and Water Policy, a center of the Lincoln Institute for Land Policy) and both local Consulates, el Consulado General de México en Nogales, AZ, and US Consulate General in Nogales, SON. The workshop was made possible by the support of the North American Development Bank (NADBank).

The workshop was structured around two major themes that were identified in the Listening Session hosted by Sonoran Institute in Nogales, SON in March 2023:

- Stormwater management to reduce flooding and improve surface water quality, and
- Demand management to preserve regionally shared groundwater and surface water supplies.

The workshop included 37 official participants representing a variety of organizations from across both cities of Nogales, the states of Arizona and Sonora, and the wider US-Mexico border region. The full list of participants and team breakdowns can be found in Appendix A.

The workshop guided participants through the consideration of challenges, opportunities, relevant actors, goals, and strategies for improvement, and culminated in the development of a 12-18-month Action Plan for each of two binational teams focused on the workshop themes of Stormwater and Water Supply/Demand. The full workshop agenda can be seen on the next page.

DAY 1

8:00 – Breakfast

8:30 – Opening remarks

9:15 – Peer-to-peer exchange: Meeting and information sharing

9:45 – Panel discussion: Planning for a Resilient Water Future in a Cross-Border Context

10:45 – Break

11:00 – Team Work Session #1: Current conditions - How water smart are we now?

12:30 – Lunch

1:15 – Presentation: Opportunities to address water in municipal and regional plans and policies

2:45 – Break

3:00 – Team Work Session #2: How can our cities become more water smart?

4:45 – Day 1 Wrap-up

5:00 – End of Day 1

DAY 2

8:00 – Breakfast

8:30 – Opening remarks

8:45 – Team Work Session #3: Identifying Strategies for Becoming More Water Smart

9:45 – Break

10:00 – Team Work Session #4: Aligning Cross-Border Strategies and Projects

11:30 – Break

11:45 – Discussion: Collaboration

12:30 – Lunch

1:15 – Presentation: Resources for Getting to Action

2:15 – Team Work Session #5: Action Planning

4:00 – Break

4:15 – Action Plan Presentations

5:15 – Day 2 Wrap-up and Closing Remarks

5:45 – End of Workshop

6:00 – Dinner

Two major binational opportunities were identified and fleshed out during the workshop. The first included harnessing the existing Binational Technical Group (BTG) organized by the Mexican Consulate General in Nogales, AZ and supported by IBWC/CILA, ADEQ, and several additional organizations. As described in both the Stormwater and Water Supply/Demand teams' binational action plans, leveraging and continuing to support the BTG moving forward will provide a structure and channel for continued binational collaboration related to both themes across the Ambos Nogales region. The primary goals of supporting the BTG will be to further formalize it via development of an official name (such as 'Ambos Nogales 2030/2035'), ensuring that meetings are organized regularly, and opening the group to allow for equitable and comprehensive attendance for all relevant actors.

Further development of the BTG will also include developing sub-committees (or 'technical' committees) to focus on particular initiatives/projects under the umbrella of the BTG.

The second major output of the workshop was the establishment of a goal to develop a binational green infrastructure manual. This document will focus on implementation of green infrastructure across the Ambos Nogales region and include education to support an integrated watershed-wide vision and strategy, leveraging previous work done to identify potential sites. Other workshop outputs included the identification of a range of local actions that could be taken on both sides of the border, which are outlined below.

SONORA

- Revising and updating tariff structures in Nogales, SON, led by OOMAPAS and PDU
- Managing sources for financing sectorization projects, led by OOMAPAS and PDU
- Undertaking a study of existing and new rainwater capture projects to inform the community, led by IMIP and PDU and supported by universities such as Universidad de Sonora, ITSON, UTN, or COLEF
- Developing incentives for implementation of water reuse infrastructure, with OOMAPAS leading implementation of pilot projects
- Implementing pilot projects for alternative water sources, including reuse and rainwater harvesting as demonstrations for the private sector and industry

ARIZONA

- Leveraging code updates to better address stormwater management
- Develop and/or support specific press and information campaigns, for example, with restaurants or other specific stakeholders

- Undertake a broad set of social communication activities, including dissemination of information related to these campaigns on social networks and relevant websites
- Identify existing projects that are successful to use as case studies and examples for further communication, such as the Mariposa border crossing checkpoint

Sonoran Institute remains committed to advancing land use and water sustainability in the Ambos Nogales region and is working to develop a Technical Assistance program to support projects that emerged during the workshop. The next GWS workshop along the US-Mexico border will take place in Mexicali, Baja California in the Fall of 2024, between the sister city communities of Mexicali and Calexico, CA.

AMBOS NOGALES GROWING WATER SMART WORKSHOP

JUNE 2024

This report documents the first Growing Water Smart (GWS) US/MX Border workshop, which was held between the cross-border sister-cities of Nogales, Arizona and Nogales, Sonora (referred to as Ambos Nogales – ‘ambos’ meaning ‘both’). The workshop was conducted on June 10th and 11th, 2024, at the Universidad Tecnológica de Nogales in Nogales, Sonora. It was co-convened by the Sonoran Institute (with support from the Babbitt Center for Land and Water Policy, a center of the Lincoln Institute for Land Policy) and both local Consulates, el Consulado General de México en Nogales, AZ, and US Consulate General in Nogales, SON. The workshop was made possible by the support of the North American Development Bank (NADBank).

The workshop leveraged the groundwork laid by the Sonoran Institute and other partners from previous years, including research and interview stages, and the Ambos Nogales Listening Session conducted in March 2023 (reports from the Listening Session in English and Spanish available [here](#)). Building upon the outcomes of the Listening Session, the Ambos Nogales GWS Workshop created an inclusive space for a bi-national discussion that empowered local and regional stakeholders involved in water and land use management to share their ideas, experience, and perspectives around current and future water-related

opportunities and challenges in the border region. In this way, the workshop was structured around two major themes that were identified in the Listening Session in March 2023:

- Stormwater management to reduce flooding and improve surface water quality, including:
 - ◊ Green infrastructure
 - ◊ Nature-based solutions
 - ◊ Urban runoff
 - ◊ Interaction with sanitation systems
- Demand management to preserve regionally shared groundwater and surface water supplies, including:
 - ◊ Conservation
 - ◊ Reuse
 - ◊ Efficiency of use
 - ◊ Monitoring/measurement
 - ◊ Alternative sources

The workshop included 37 official participants, in addition to the organizing group of facilitators and university staff, as well as other observers. A full list of participant teams including names and positions, in addition to team breakdowns, can be seen in Appendix A. The participants present at the workshop represented the below parties:

- Regional and federal agencies
 - ◊ International Boundary and Water Commission - US Section (IBWC)
 - ◊ Comisión Internacional de Límites y Agua - Sección Mexicana (CILA)
 - ◊ United States Environmental Protection Agency (EPA)
- Academic institutions
 - ◊ Universidad Tecnológica de Nogales (UTN)
 - ◊ El Colegio de la Frontera Norte (COLEF)
 - ◊ El Colegio de Sonora
 - ◊ La Universidad de Sonora
 - ◊ Arizona State University (ASU)
 - ◊ Instituto Tecnológico de Nogales (ITN)
 - ◊ Instituto Tecnológico de Sonora (ITSON)
 - ◊ Instituto Tecnológico de Guaymas (ITG)
- Municipal-level agencies
 - ◊ Secretaría de Planeación de Desarrollo Urbano y Ecología (SDUE) Nogales, SON
 - ◊ Dirección de Planeación del Desarrollo Urbano (PDU) Nogales, SON
 - ◊ El Instituto Municipal de Investigación y Planeación (IMIP) Nogales, SON
 - ◊ Organismo Operador Municipal de Agua Potable, Alcantarillado y Saneamiento (OOMAPAS) Nogales SON (also in representation of the Mayor of the City of Nogales, SON)
 - ◊ City of Nogales, Arizona
- Private sector
 - ◊ Constellation Brands
- State-level agencies from Arizona
 - ◊ Arizona Department of Water Resources (ADWR)
 - ◊ Arizona Department of Environmental Quality (ADEQ)

- Non-governmental/community organizations
 - ◊ Watershed Management Group
 - ◊ Desarrollo y Soluciones Ambientales (SUAMCA)
 - ◊ Friends of the Santa Cruz River
 - ◊ Lincoln Institute of Land Policy (LILP)
- Regional development banks
 - ◊ NADBank

Despite the robust attendance seen at the workshop, an ideal group of participants would have included participation from several additional organizations. Targeted organizations for future engagement, many of whom were invited but unable to attend the workshop, are listed below. These agencies will be considered and invited to future meetings or workshops in the Ambos Nogales region.

- Comisión Nacional del Agua (CONAGUA)
- Comisión Estatal del Agua (CEA) de Sonora
- Comisión de Ecología y Desarrollo Sustentable del Estado de Sonora (CEDES)
- Secretaría de Infraestructura y Desarrollo Urbano (SIDUR) de Sonora
- United States Army Corps of Engineers (USACE)
- United States Geological Survey (USGS)
- Arizona-Mexico Commission
- University of Arizona
- Santa Cruz County (Flood Control District and Floodplain Administration)
- City of Nogales, Arizona (Planning and/or Urban Development Department)
- INDEX Nogales (association of industry/manufacturing organizations and businesses)
- Greater Nogales Santa Cruz County Port Authority
- Fundación del Empresariado Sonorense

- Iniciando Acción para un Mundo Mejor Sonora
- Community Foundation of Southern Arizona
- Permanent Forum of Binational Waters
- Sierra Club (Borderlands Team)

WORKSHOP AGENDA

The workshop followed an adapted version of the traditional Growing Water Smart curriculum, converting the workshop from the traditional

2.5-day agenda into two full working days. The adapted workshop agenda prioritized leading participants from both sides of Ambos Nogales through a series of educational presentations and panels and group work sessions, resulting in the development of a binational 12-18-month Action Plan for each of two groups focused on the principal themes of Stormwater and Water Supply/Demand. The full workshop agenda can be seen on page 2.

FACILITATION TEAM: THE WORKSHOP WAS FACILITATED BY THE FOLLOWING TEAM OF INDIVIDUALS

NAME	POSITION	ORGANIZATION
Noah Kaiser	Facilitator	Sonoran Institute
Francisco Zamora	Master of Ceremonies, Facilitator	Sonoran Institute
Waverly Klaw	Facilitator	Sonoran Institute
Edith Santiago	Facilitator	Sonoran Institute
Claudio Hernández	Facilitator	Sonoran Institute
Eliza Stokes	Facilitator	Sonoran Institute
Kashja Iler	Media Lead	Sonoran Institute
Luke Cole	Facilitator/Participant	Sonoran Institute
Faith Sternlieb	Facilitator	LILP
Vivian Hobbins	Facilitator	ASU
Laura Mullahy	Facilitator/Participant	LILP
Hugo Ángel López Gil Lamadrid	Logistics Support	UTN
Nora López	Logistics Support	UTN

CURRENT CONDITIONS QUESTIONNAIRE

In the weeks leading up to the workshop, a 'Current Conditions Questionnaire' was circulated to all participants in lieu of the traditional GWS Self-assessment Form. This form included a set of 21 questions covering community development, water availability and demand management, stormwater management, and sister city/regional collaboration. The information provided was used to support the productivity and impact of the workshop, as well as to complement and update the results from the Listening Session in March 2023. Participants were asked to respond to all of the questions to the best of their knowledge and responses were compiled and summarized as the basis for Work Sessions 1 and 2 during the workshop.

A total of 12 responses were received, with information focusing more heavily on the Sonora side. A full summary document was prepared and distributed to participants prior to the workshop. Hard copies of the report were available during the workshop sessions for reference. Key insights from the Current Conditions Summary Report are described below.

COMMUNITY DEVELOPMENT

Sonora

- The city of Nogales, Sonora is growing rapidly, especially in the eastern, western and southern areas.
- There are several principal concerns related to the growth in the city, including the following:
 - ◊ Increasing urbanization costs
 - ◊ Decreasing quality of life
 - ◊ A lack of public spaces and green areas
 - ◊ Increasing number of informal settlements

- There are also relevant opportunities to manage the growth in the city, including the following:
 - ◊ Potential to improve urban planning strategy
 - ◊ Potential to centralize developments
 - ◊ Potential to develop additional public spaces and green areas
- The city council (PDU) of Nogales, Sonora, with the input of IMIP, has a [Municipal Development Plan for 2022-2024](#) (part of a Municipal Development Program), aimed at improving urban infrastructure in general, and specifically considering the expansion of the Mariposa checkpoint.

Arizona

- The city of Nogales, Arizona is growing rapidly. However, one of the main problems is the floating/transient population that crosses through the city every day but does not actually live there.
- New developments on the Arizona side include warehouses, gas stations, hotels, and office buildings, a workforce development center, and the South 32 Mine.
- While Santa Cruz County Flood Control Department is responsible for reviewing development applications, there appears to be limited integration between County-level departments and water providers throughout the county.

WATER AVAILABILITY AND DEMAND MANAGEMENT

Sonora

- Water availability and demand management trends in Sonora include:
 - ◊ Exhausted surface water supplies

- ◊ Overexploitation of aquifers
- ◊ Rapid population and urban growth
- ◊ Contamination of water sources by industrial and agricultural activities
- ◊ Climate variability
- ◊ Limited public awareness and education regarding water use and conservation
- Ongoing initiatives or existing plans include:
 - ◊ The BTG Ambos Nogales preparing a portfolio sanitation infrastructure projects
 - ◊ Sonora State Development Plan 2021-2027
 - ◊ Sonora River Basin Water Resources Management Plan
 - ◊ [Sonora Water Plan 2023-2053](#)
- Overall water demand for the municipality of Nogales is not explicitly known.
- Suggested improvements for water availability and demand management in Sonora include:
 - ◊ Increased education for urban populations to encourage and incentivize water conservation
 - ◊ Modernization of infrastructure and smart monitoring
 - ◊ Integration of water resource management
 - ◊ Standardization and regulation of efficient water management practices

Arizona

- The South 32 Mine is a new large water user.
- Total Gallons per Capita per Day for Nogales and Rio Rico combined amounts to approximately 4.6 MGD.
- Ongoing projects include green infrastructure retrofits, water harvesting, watershed improvements, flood control ordinances, and low impact development.

- Suggested improvements for water availability and demand management in Arizona include:
 - ◊ Updated building codes
 - ◊ Green infrastructure retrofitting
 - ◊ Rainwater harvesting
 - ◊ Watershed improvements
 - ◊ Flood control ordinances
 - ◊ Low-impact development
 - ◊ Recognition of the surface/groundwater nexus in regulations

STORMWATER MANAGEMENT

Sonora

- There are multiple challenges related to stormwater management in Nogales, Sonora, including:
 - ◊ Urban waste management
 - ◊ Risk of loss of human life (civil protection)
 - ◊ Inadequate or nonexistent stormwater management infrastructure
 - ◊ Limited planning around new developments
 - ◊ Complex topography
 - ◊ Increasing development and area of impervious surfaces causing runoff that flows toward the US
- IMIP has developed a [Risk Atlas](#) ('Atlas de Riesgos'), supported by NADBank, and is actively working to develop an additional Risk Atlas focused specifically on floods.
- Suggestions to improve stormwater management in Sonora include:
 - ◊ Topographical studies
 - ◊ Improved and regulated tree management
 - ◊ Continued advancement of the Nogales Urban Development Program
 - ◊ Advancing IMIP's Risk Atlas work

- ◇ Implementation of discrete infrastructure projects on particular roadways or areas with high flooding risks
- ◇ Flood warning siren systems

Arizona

- Stormwater-related risks exist more heavily on the Sonoran side, however, increased binational knowledge sharing regarding projects such as IMIP's Risk Atlas is needed to ensure success and long-term sustainability.
- Other Arizona requirements and regulations include:
 - ◇ Municipal Separate Storm Sewer Systems (MS4)
 - ◇ Stormwater Pollution Prevention Plans

Arizona

- Suggested needs from collaborative efforts include:
 - ◇ Investigation of planning and management on the Arizona side for flooding/topography-based issues on the Sonora side
 - ◇ More robust and frequent communication and coordination amongst key actors

SISTER CITY AND REGIONAL COLLABORATION

Sonora

- Suggested needs from collaborative efforts include:
 - ◇ Investigation of infrastructure models intended for water collection in parks, roads, and potentially other spaces
 - ◇ Investigation of the possibility of returning a percentage of the water treated in Nogales, AZ to Nogales, SON
 - ◇ Incentive programs for maquiladoras (large manufacturing plants/factories)
 - ◇ Investigation of retention, detention, or grading ordinances to limit flooding

SESSION SUMMARIES

The following sections describe each of the sessions of the workshop, desired outcomes, major points of discussion, and additional ideas that were raised but not fully discussed due to timing constraints.

PEER-TO-PEER EXCHANGE: MEETING AND INFORMATION SHARING

To introduce participants to one another and open the workshop sessions, participants were instructed to divide organically into groups of 3-4, plus facilitators, to meet one another and share information on their current efforts and initiatives for managing water supply/demand and stormwater. Given the relatively high level of familiarity amongst participants from the Ambos Nogales region, they were encouraged to begin these conversations with people that they did not previously know or have experienced working with. Participants were asked to consider the following questions:

- What is your name, community, agency, position, team, and the length of time your role?
- Why did you agree to participate in the workshop and what do you hope to get out of participating?
- What keeps you up at night with land/water challenges? What gives you hope? What are you doing well that you are proud of?
- What is one thing you would like to ask your peers about managing water and land use policy, methods, or approaches?



Participants sharing early ideas in the Peer-to-Peer Exchange session

PANEL: PLANNING FOR A RESILIENT WATER FUTURE IN A CROSS-BORDER CONTEXT

It is widely understood that the Arizona-Sonora border region is facing significant water resource challenges, but collaborative action at multiple levels is demonstrating a path towards a more sustainable future. This presentation included a panel of experts discussing ongoing collaborative efforts for improving water supply/demand, land use integration, and stormwater management across local, state, regional, and federal levels. Both sides of the border were represented, and cross-border initiatives, such as the BTG in Ambos Nogales led by the Mexican Consulate were discussed. Senior Director of Programs from the

Sonoran Institute, Francisco Zamora, moderated the session, and the panel of expert speakers included:

- Karla Rivera & Marcelo Rodríguez, Asuntos Políticos y Económicos, Consulado General de México en Nogales, AZ
- Ing. Gabriel Bonillas, Director General, OOMAPAS (representing the Mayor of the City of Nogales, SON)
- Ryan Melson, Deputy AMA Director, Arizona Department of Water Resources
- Ing. Jesús Quintanar, Representative of Office, CILA Sección Mexicana



TEAM WORK SESSION 1: CURRENT CONDITIONS - HOW WATER SMART ARE WE NOW?

In this work session, the cross-border topical teams for Stormwater and Water Supply/Demand met to confirm an agreed understanding of current conditions and trends related to their topic, both in their own communities and across the border. The session helped to build consensus around cross-border water goals by reviewing information from the pre-workshop Current Conditions Questionnaire, and included diving back into the following questions:

- What are the plans, regulations, and projects that influence the relationship between water and land use?
- What are your current conditions and projected trends regarding Water Supply/Demand and Stormwater?
- What are your cross-border goals around Water Supply/Demand and Stormwater that you can work to reach together?

The desired outcomes of the session included the following:

- Establishing a base understanding of how water management occurs in each city.
- Confirming and deepening an understanding of current conditions and challenges related to each respective topic (Water Supply/Demand or Stormwater).
- Developing and then ranking cross-border goals around managing Water Supply/Demand and Stormwater.

Stormwater

In Work Session 1, the Stormwater team began by identifying the following actors as relevant players

regarding stormwater management across both sides of the border. First, in Sonora, the relevant actors identified were:

- CILA/IBWC, which works within the entire US-Mexico border region and is engaged in water quality monitoring
- IMIP, which does research and develops flood mapping, including with their [Risk Atlas project](#)
- PDU, which is charged with urban planning in Nogales, SON
- La Universidad de Sonora, a public research university based in Sonora

In Arizona, relevant actors include:

- USGS, which works on flooding early warning systems
- EPA, an independent US government agency that works to protect human health and the environment
- ADWR, which focuses on managing water resources, promoting conservation, and collecting data to protect the state of Arizona's water future
- ADEQ, which focuses on water quality in the state of Arizona
- USACE, which supports ADEQ to regulate drainage
- Santa Cruz County Flood Control District, which focuses on water quantity in Santa Cruz County
- Federal Emergency Management Agency (FEMA), focused on emergency management at a national level
- Secretary of Infrastructure

Regionally, the following initiatives, plans, or strategies were identified:

- **Green Infrastructure for Ambos Nogales: Sustainable Strategies for Stormwater and Combined Sewer Overflows Control in Ambos Nogales (2021)**, developed with support from NADBank, which identified 103 sites for green infrastructure in Ambos Nogales (83 sites in Sonora, 20 in Arizona)
 - ◊ This focused on technical analysis, with decades of information collated, and culminated in conceptual designs (leaving work to be done for specific designs)
 - ◊ This was a collaborative effort between ASU, U of A, USGS, and others
 - ◊ This study was intended to be integrated into urban planning of Nogales, SON but there is currently no regulation or rule that formalizes it
- The EPA Border 2025 Program, which includes or is related to flood analysis/master planning
- The existing BTG organized by the Mexican Consulate General
- Development code updates for the City of Nogales, AZ

Then, water challenges pertaining to the theme of stormwater management were identified, including:

- Flooding danger impacting civilians (civil protection), most prevalent in Sonora.
- Damaged and decaying grey infrastructure

causing leaks and inefficiencies on both sides of the border.

- Lack of green infrastructure in both cities, including for rainwater harvesting.
- Lack of vision in urban planning, including as seen in an increase of impermeable surfaces.
- Stormwater mixing with wastewater causing water quality issues with cross-border impacts.
- Stormwater not being obviously included within the jurisdiction or remit of any governing body, and often being left out.
- Human resources challenges in departments on both sides of the border.
- Enforcement of regulations on both sides of the border and alignment of these regulations as related to cross-border issues.

From these challenges, a prioritized list of water resources management goals, to be further developed through the remaining Work Sessions, were distilled:

- Public policy and planning
 - ◊ Creating an institutional framework for green infrastructure implementation in Ambos Nogales
 - ◊ Passing regulations to reduce impacts from new development on the water cycle
 - ◊ Implementing pilot projects for youth and expanding educational training
- Green infrastructure
 - ◊ Implementation of pilot projects, including for rainwater harvesting

- Education
 - ◊ Training and capacity building at multiple levels around how to be water smart (i.e., focusing on water conservation)

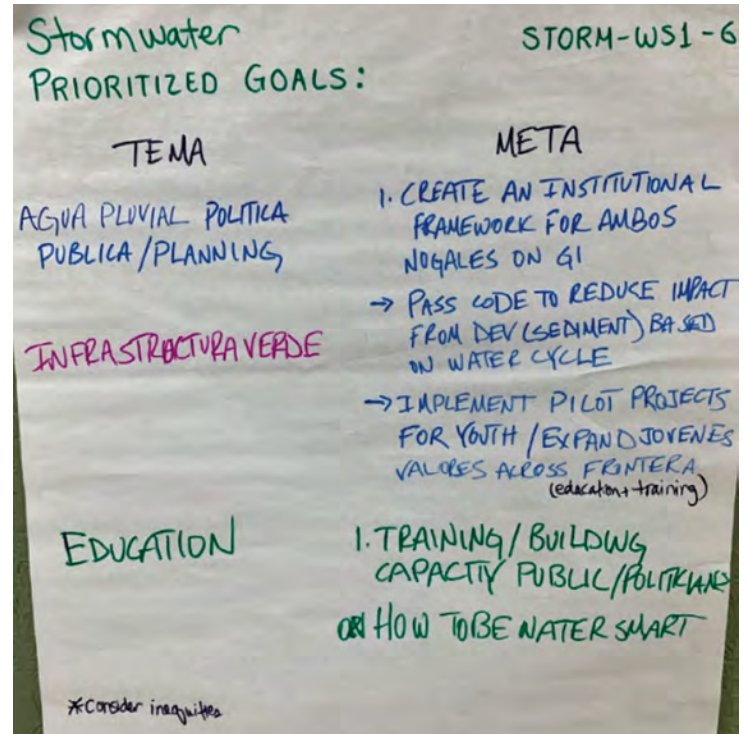
Additional notes from this session also included:

- Establishing a 'culture of water', and similarly, highlighting outdated management techniques that must be revised.
- Involvement of the private sector and industry more broadly could provide financial support and other opportunities.

- CILA has undertaken substantial work with the border liaison mechanism from the Secretary of Foreign Affairs and Secretary of Urban Infrastructure and the portfolio of projects developed there which could be advanced into the implementation phase.



Current conditions and biggest challenges from the Stormwater team in Work Session 1



Prioritized goals for the Stormwater team from Work Session 1

Water Supply/Demand

In Work Session 1, the Water Supply/Demand team began by developing a collective baseline understanding of water management in the Ambos Nogales region. This involved identifying relevant regional and local actors, including the following:

- CONAGUA, which manages water resources at the federal level in Mexico
- CEA, which manages water resources at the state level in Sonora
- OOMAPAS Nogales, which manages water resources at the municipal level in Nogales
- Basin councils and irrigation districts, which manage water at local levels amongst relevant users (agricultural, etc.)
- Santa Cruz Natural Resources Conservation District, which manages water, soil, and air using best management practices in Santa Cruz County
- CILA/IBWC, generally charged with management of transboundary issues and international treaties, and tend to focus on black and gray water
- ADWR, which focuses on managing water resources, promoting conservation, and collecting data to protect the state of Arizona's water future

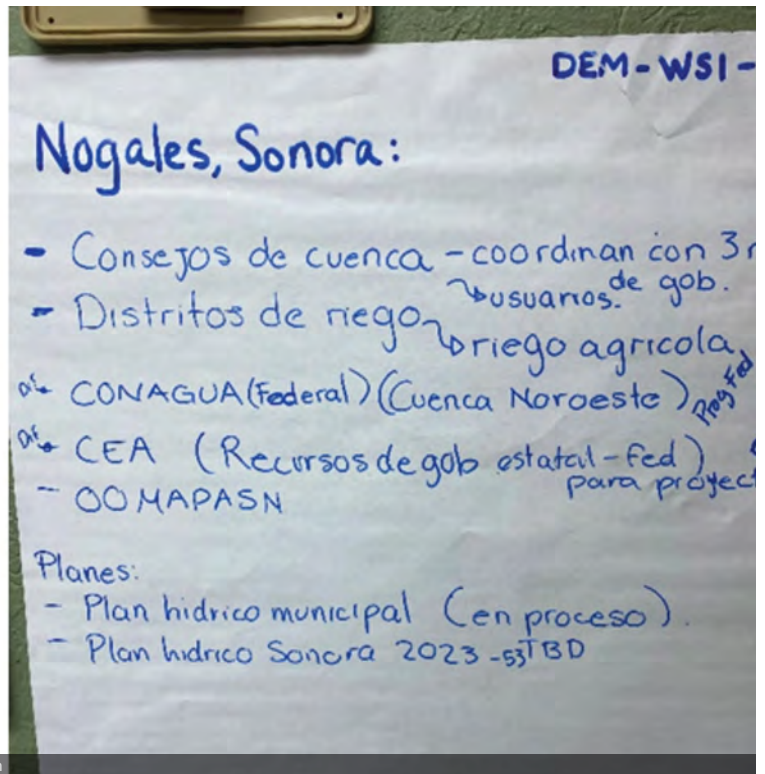
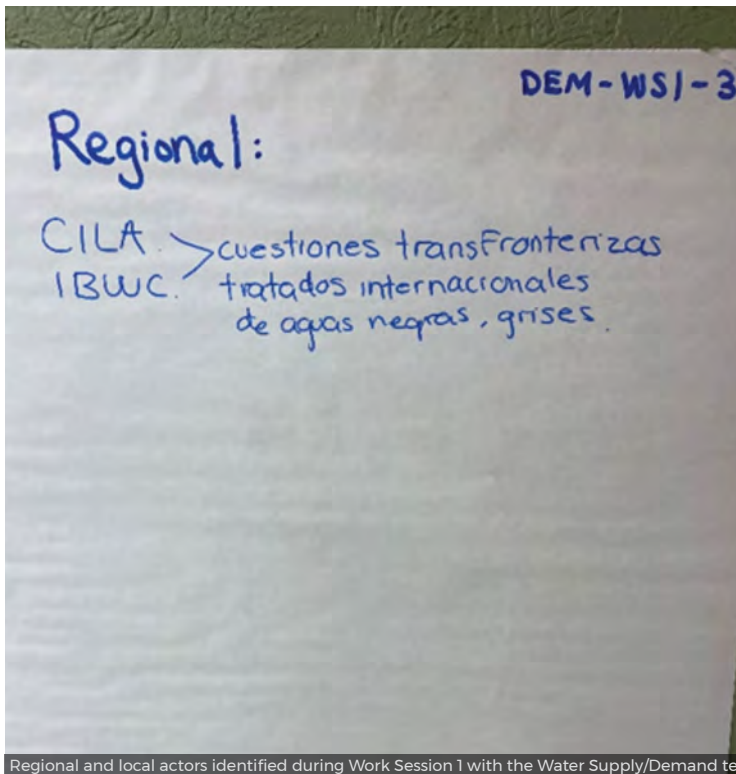
Then, the group turned to considering existing initiatives, plans, or regulations that apply to water management, or may impact agricultural, municipal and industrial water management in Sonora and across the border. The discussion covered the following:

- The [Sonora Water Plan 2023-2053](#), which was identified in the Current Conditions Questionnaire
- Work that is actively being done to develop a water regulation for Nogales, SON in 2024, which is planned to be incorporated into the existing water plan eventually

- Ongoing work by the northwest basin office of CONAGUA
- The relationship between CEA and CONAGUA, which includes resources being based down from the federal and state levels

Next, the group addressed the principal water challenges related to Water Supply/Demand across the Ambos Nogales region. The initial brainstorm included the following challenges:

- Climactic variability causes associated variability in supplies, related to both groundwater and surface water.
- Geological conditions make aquifer recharge challenging.
- Flooding and water supply contamination of water supply due to heavy rains, as there are no separate stormwater and sewer systems in Sonora (i.e., there is no MS4 requirement).
- Old or obsolete infrastructure contributing to loss of water supplies, and limited metering and measurement to track leakages.
 - ◊ According to OOMAPAS, approximately only 19% of water use is measured.
- Inaccurate and outdated water rates/tariff schemes that do not incentivize efficiency and exacerbate inequalities.
- Shared wastewater treatment infrastructure and processes are difficult to manage, including as the Rio Rico plant is receiving more water than its capacity, resulting in challenges related to water ownership and reuse.
 - ◊ Related to this is Minute 276 which governs the quantity of water that Mexico can send to the United States and stipulates that all surpluses must be paid for appropriately.



Regional and local actors identified during Work Session 1 with the Water Supply/Demand team

- Cultural differences and asymmetry in water use, including due to a higher use rate per capita on the Arizona side.
- Asymmetry in regulations across the border cause challenges for management and enforcement.

From these challenges, a more refined list of goals and priorities to be discussed throughout the remainder of the workshop was developed. These goals included:

- Strengthening of education and awareness programs on water use, including:
 - ◊ Evaluating existing education, training, and awareness programs
 - ◊ Developing education, training, and awareness programs for the private sector
- Creating programs for increasing water use efficiency, particularly in distribution systems, and including:
 - ◊ Identifying losses through additional measurement and monitoring

- ◊ Advancing sectorization (i.e., breaking down distribution systems into more manageable 'sectors') programs
- ◊ Searching for funding sources for implementation of new infrastructure and replacement of obsolete infrastructure to reduce water losses

- Creating rainwater capture systems to increase the availability of alternate water supplies
- Developing methods to reuse treated water

Other points of discussion in this session included the following:

- The importance of including the private sector/ industry in conversations about water supply/ demand and conservation, particularly in Nogales, SON
- Integrated storm drains and sewer systems remain a significant challenge on the Sonora side, separate systems could potentially allow for

substantial quantities of stormwater to be reused to augment supplies

- CONAGUA carries out studies every 3 years regarding water availability in aquifers, and uses this information to make decrees/concessions, however extraction from wells is not measured as accurately, but is generally known to be

substantial (and causing overextraction in many places)

- ◊ Studies every 3 years may not be frequent enough to support useful change/progress
- Cultural programs to incentivize and encourage conservation are important

DEM-WS1-4 (1)

Current Conditions/Biggest Challenges: Water supply/demand

- Bajos niveles freaticos.
- Infraestructura antigua
- Variabilidad climatica. (periodos de sequia)
- Contaminacion del suministro de agua debido a lluvias torrenciales. (No hay sistema separado) ^{msst.}
- Buena calidad (Niveles de arsenico altos).
- Cobros, falta de respuesta de usuarios, pago de servicios.
 - Us. viviendas, industria
 - o conexiones ilegales
 - o 60% de recaudación.
 - o esquema tarifario (fijo consumo)
 - Falta de incentivos
 - ↳ industrial
 - ↳ municipal
 - o Medidores (pocos medidores y no hay toma de lectura)
 - ↳ 80 cuota fija
 - ↳ 19% medición
- Rio Santa Cruz, Alamos (modulo 3, cumplimiento MIPA) ^{NEPA}
 - ↳ sobreextraction, mandando al Rio S.C
 - ↳ Transvases de cuenca
 - ↳ Van a la planta Rio Rico
 - ↳ Min 276
 - ↳ 434 lbs - o pago el gobierno
 - ↳ excedentes paga el comapasa

DEM-WS

- Falta de financiamiento para planta de aguas residuales en Nogales SON.
- Rio Rico ^{wastewater} plant. sobre cargada
- No se llego a consenso del valor del agua que se manda a Nog AZ.
- No hay proyectos de reuso de agua tratada.
- AZ
- Mina toma agua del S.C river.
 - ↳ Patagonia City (uso) Red Rocks.
- Diferencias culturales en la demanda de agua. mas consumo en AZ.
- Inequidad (Grupos marginados con bajos suministros)
- Nog AZ. condiciones geologicas no permiten recarga del acuífero. cuencas someras.
- / Diferencias en limites max permisibles de contaminantes entre AZ y SON.

Current conditions and biggest challenges identified by the Water Supply/Demand team in Work Session 1

PRESENTATION: OPPORTUNITIES TO ADDRESS WATER IN MUNICIPAL AND REGIONAL PLANS AND POLICIES

Cities and counties can play a critical role in regional water management by integrating water conservation, efficiency, reuse, and stormwater management into their development plans and policies. In this session, speakers Waverly Klaw (Growing Water Smart Program Director, Sonoran Institute) and Efrain Vizuite (Research Associate, Instituto Tecnológico

de Sonora) provided an overview of the tools and strategies, in both Arizona and Sonora, that can most effectively integrate water and land use planning so that cities can become resilient to water challenges. This presentation followed the five chapters outlined in the [Growing Water Smart Guidebook](#) developed for Mexican communities known as the 'Guia para comunidades mexicanas'. The presentation given by Waverly and Efrain can be accessed [here](#).



TEAM WORK SESSION 2: HOW CAN OUR CITIES BECOME MORE WATER-SMART?

In this work session, teams met as a city/region (either Nogales, Arizona, or Nogales, Sonora) to recap the goals developed according to each theme in Work Session 1. This served to help identify new strategies to explore to reach these goals and involved review of the pre-workshop Current Conditions Questionnaire. In Work Session 2, teams were asked the following questions:

- What policies and programs do we currently have in our city/region to address our goals in the areas of Water Supply/Demand or Stormwater management? How can our efforts be broadened or enhanced?
- Where are the gaps? What new plans, policies, or programs could address those gaps?

The desired outcomes of the session included the following:

- Developing alignment within the city/region around the goals and direction of each topic.
- Identifying additional feedback or input from other team members.
- Identifying additional resources or subject matter experts who were not present at the workshop to provide information relevant to the following sessions of the workshop.
- Establishing a base understanding of how development management occurs in each city.
- Assessing existing strategies being used to promote Water Supply/Demand management and Stormwater management.

Sonora

The Sonora team began Work Session 2 by revisiting the goals developed in Work Session 1. These summarized goals included:

- Strengthening education programs

- Developing physical efficiency programs related to water
- Creating rainwater capture systems
- Expanding reuse of treated water

The team then briefly addressed additional challenges experienced in Sonora across both topics of Water Supply/Demand management and Stormwater management. These challenges included:

- Declining water levels in tandem with climate variability
- Inequality in water access across the area
- A need to increase the capacity of wastewater treatment plants
- Challenges with water being outside of authorities' (such as CILA) jurisdiction or limits
- Inefficient water infrastructure and collections related to water services

The conversation continued to include the following points related to the team's perceived challenges and associated goals:

- Ownership of basin issues remains a challenge as most basin organizations do not engage with themes regarding water, native species, nor the management of the basin, and it is suggested that they should have a more active role.
- Development-related challenges persist as real estate developers are not adequately considering the runoff and sediment created by developments.
- Educational and outreach initiatives such as Jovenes Valores ('Youth with Value') should be elevated to promote the value of caring for water.
- There is a significant disparity in the demand and use of water between Nogales and Arizona (there is much higher usage in Arizona, measured in GPCD).

- The Los Alisos basin is a critical component of the water (and rainwater) balance in the region, as Nogales, Sonora draws from this basin for their water supply.

Then, the team turned to analyzing current conditions of development and growth, leading to the following points:

- IMIP is preparing to publish an urban development analysis showing that the trend of highest growth and density is occurring in the south and northwest sides of the city.
- Developments in the south of the city are removing a significant amount of biomass (deforestation) and associated benefits are being lost.
- OOMAPAS is the operating organization that is requesting that the treatment plant supply the housing, commercial, and industrial development in Nogales.
- Studies are being carried out on the Santa Cruz River to develop dams and retain water. Sometimes the fact that water is handled by CONAGUA at a federal level creates challenges for municipal-level water managers like OOMAPAS.
- There is significant theft of water services due to growing irregular settlements across Nogales, SON. This should be penalized more substantially, but it would need to be approved in Congress.
- There is a general lack of resources to support greater measurement of water usage and develop more accurate projections related to growth in the city.
- There is no federal funding to support infrastructure networks for water, despite continued paving and road rehabilitation works.

- A water treatment plan should be put into place for the eastern area of the city.

Next, the group examined land use policy opportunities, considering the two themes of Water Supply/Demand and Stormwater individually. The discussion included considering the regulations that impact each of the themes. For Water Supply/Demand, this included:

- The revenue law contains a section for developments that relates to the feasibility of new developments, this considers water rights, and other executive and drainage ordinances.
- The state climate change law in Sonora considers water treatment, rainwater harvesting, and related education. This also relates to the state climate change plan.
- Tree regulations exist at the municipal level in Nogales, SON, which specifically ask establishments to put green infrastructure in parking lots.
- According to the urban development program in Nogales, SON, developers are required to integrate a green infrastructure plan into their developments and there are existing green infrastructure regulations.
- NOM-127 relates to water quality, and all operating organizations must comply with it otherwise they are fined.

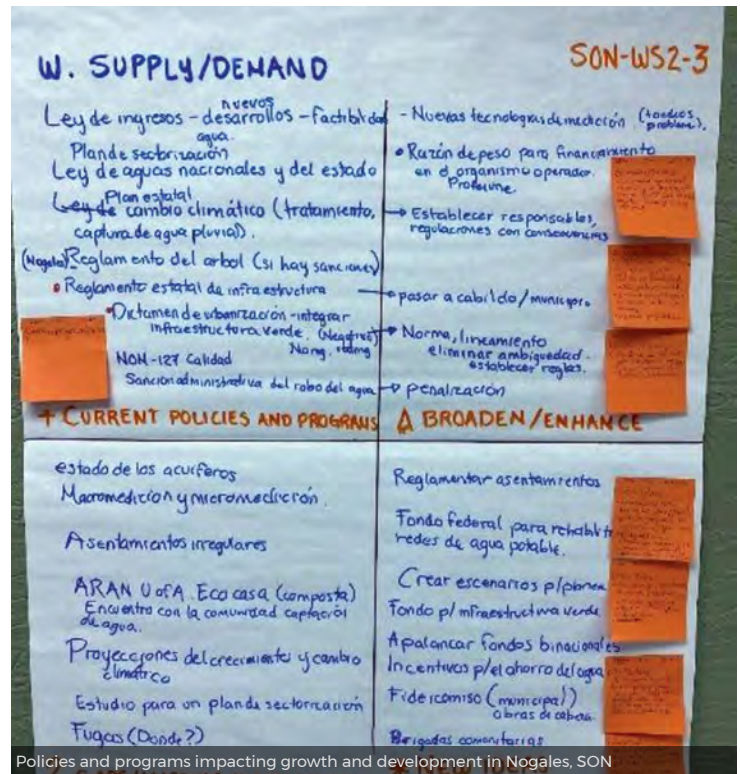
For Stormwater, important regulations and policies to consider included:

- The Atlas of Flood Risks being developed by IMIP, which is scheduled to be released in August 2024. It is expected that this will help to identify irregular settlements and support motivation for funding for flood emergencies at the municipal or business level.

- It was also pointed out that Minute 276 does not apply directly to stormwater.

Next, the group began discussing opportunities and strategies for improvement, which included the ideas listed below. Team members began to leverage existing work by some agencies.

- Expanding upon the existing Green Infrastructure Master Plan for Ambos Nogales.
- Raising binational funds for projects on the Mexican side, which continue to have a big impact on the Arizona side.
- Developing a program to protect civilians by avoiding risks related to rainwater and flooding.
- Creating a fund for the rehabilitation and creation of green infrastructure in Nogales, SON.
- Considering how to access a federal fund to rehabilitate drinking water infrastructure, including distribution networks.
- Creating and applying regulations for irregular settlements.
- Encouraging and incentivizing water conservation, through support of community groups.
- Developing a binational standard for the management of water resources to align management processes.
- Utilizing IMIP's Risk Atlas to complement the Green Infrastructure Master Plan for Ambos Nogales developed by Dr. Lara of ASU to help access funding and support binational groups to develop proposals.
- Bolster the BTG to help promote the development of a legal framework. This would help to generate evidence for the implementation of plans and development of an institutional framework
- IMIP can help to support projects by creating vulnerability maps of flood zones (including information regarding permeable or impermeable areas).



Policies and programs impacting growth and development in Nogales, SON

- OOMAPAS has an active project to create reservoir areas and absorption wells throughout the basin to decrease flood water.
- Existing flood warning systems and sirens could be complemented with other social outreach such as an app.

Other topics of discussion in this session included:

- Inequality persists and vulnerable populations will continue to be left out of flood and emergency warning systems. Related to this, there have been 22 deaths over the last 10 years with 18 large storms producing significant floods.
- Continuing to develop gray infrastructure will not solve the problems at hand due to the high level of urbanization in the city and expansiveness of impermeable surfaces.

Arizona

The Arizona team's focus in Work Session 2 began with zeroing in on development trends and existing land use codes, plans, and programs, that touch

on both Water Supply/Demand and Stormwater. Goals identified in Work Session 1 were revisited and additional detail was added, including:

- Development code updates
 - ◊ Nogales, AZ is in the process of updating its development code. The current code is from 1980, with a new code expected to be completed by mid-2024.
 - ◊ New developments on steep slopes create a lot of problems downstream, this occurs particularly in Nogales, SON but causes Nogales, AZ to receive a lot of trash and erosion. The Engineering Department of the City of Nogales, AZ would like to see shared training and new codes for steep slopes in Ambos Nogales to help prevent these problems.
 - ◊ Code updates could also contribute to more of a structural framework around green infrastructure for stormwater management.
- Education
 - ◊ Jovenes Valores could be leveraged in Arizona
- Improving water conservation and efficiency
 - ◊ Efficiency programs and incentives
 - ◊ Augmentation of supply through rainwater catchment and recycled water
 - ◊ Improved monitoring and measurement of water use

Then, the group focused on reviewing current conditions of development and growth in Nogales, Arizona. It was found that:

- The population of Nogales, AZ is declining, and Rio Rico, AZ is now more populous and continues to grow.

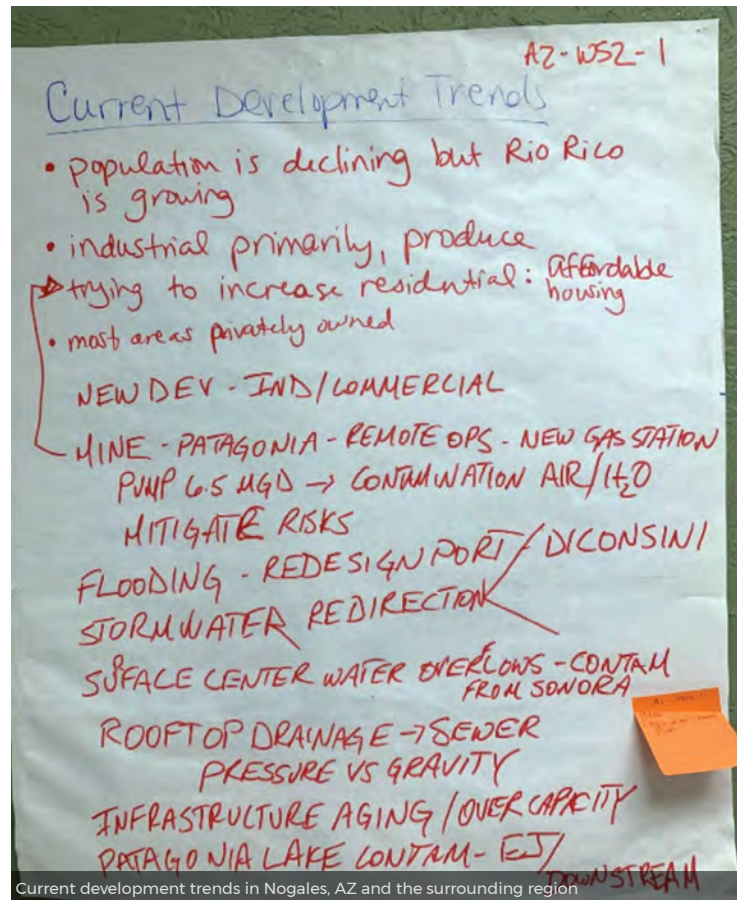
- Nogales, AZ has mostly industrial development currently and is trying to add more residential. A new mine is being developed outside of town, and the jobs it brings are developing a strong need for more affordable housing.
- Most of the ideal locations for affordable housing are privately owned, so the city is trying to make use of the private sector in attaining more affordable housing.
- From the Current Conditions Questionnaire, it was stated that other new developments include warehouses, gas stations, and office buildings (commercial/industrial).
- The water portfolio of Santa Cruz County is currently 99% groundwater and below 1% reclaimed water.

Next, the group examined land use policy opportunities. The major themes uncovered in this conversation included:

- Broadening existing initiatives with the private sector and maquiladoras as big water users who are interested in making an impact but are also often large polluters of heavy metals and other contaminants.
- Infrastructure projects are being discussed to reduce flooding, but funding is needed.
- Newly developed affordable housing could be more water smart.
- Reclaimed water could be used for non-potable uses, although Ambos Nogales has yet to make significant progress on this. Rio Rico may provide an example.
- Santa Cruz County School District is building a curriculum around water conservation that could be leveraged.

Other ideas discussed by the Arizona team in this session included:

- There are diverse communities in Nogales, SON that are chronically underserved.
- There is no joint planning for growth between Ambos Nogales.
- The City of Nogales, AZ is experiencing human resource shortages, presenting challenges related to finding funding, innovations, and staff capacity in general.



TEAM WORK SESSION 3: IDENTIFYING STRATEGIES FOR BECOMING MORE WATER-SMART

In this work session, participants again worked in their city/region teams to develop and refine a list of strategies (plans, policies, programs, or projects) to address their Water Supply/Demand and Stormwater management goals. They also identified which strategies would require or benefit from a cross-border approach. The following questions were asked during Work Session 3:

- What strategies will help you meet your Water Supply/Demand and Stormwater goals?
- What strategies may require cross-border approaches or support?

Desired outcomes for this session included:

- Identifying strategies for achieving water goals.
- Highlighting areas where cross-border support is needed.

Sonora

In Work Session 3, the Sonora team returned to the goals developed in Work Sessions 1 and 2 and began analyzing strategies that could be employed to meet these goals (focusing on both themes of Water Supply/Demand and Stormwater).

The first goal that the team considered in this session was to strengthen education and awareness programs related to water use. Strategies to meet this goal included the following ideas:

- Developing or supporting an interdisciplinary, interinstitutional, and binational group to support educational programs. Existing groups were mentioned, including:
 - ◊ The rainwater harvesting group organized by COLEF, known as the 'Rain Gardens Group'
 - ◊ The BTG led by the Mexican Consulate General

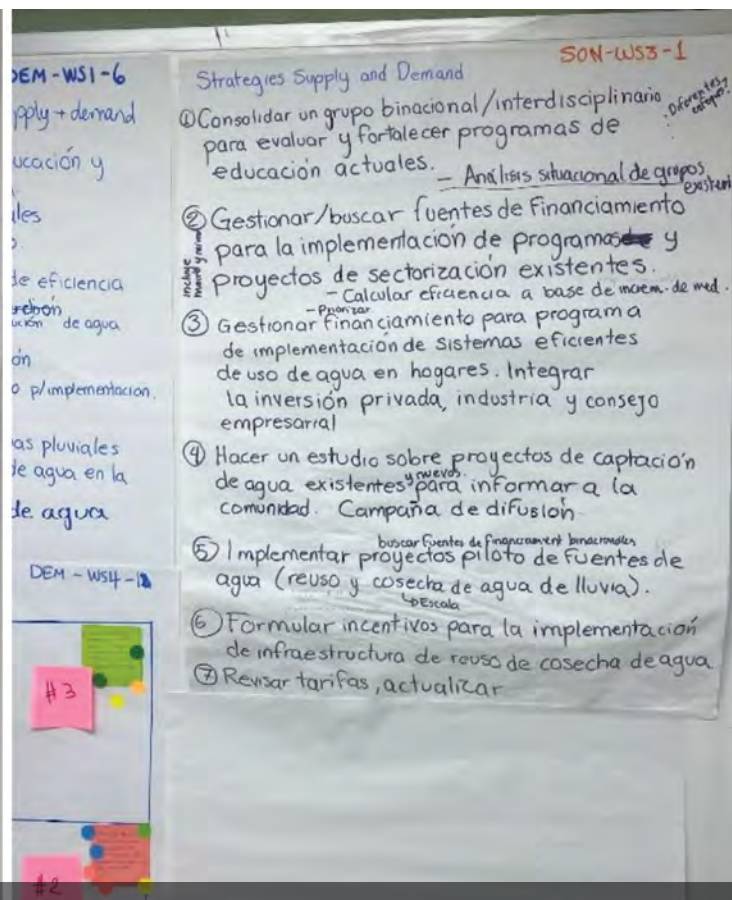
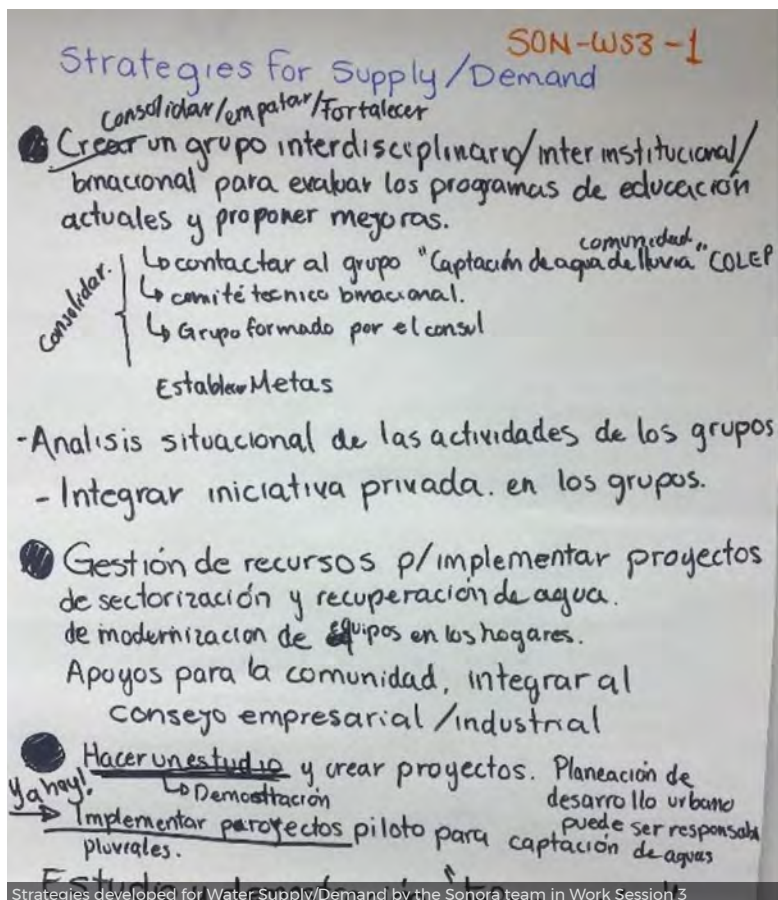
- Developing a matrix or a situational analysis to identify and consolidate the ongoing collaborative efforts (such as the groups named above), and make sure the groups are accessible to the appropriate and necessary actors
- Including the private sector in these discussions, including manufacturing, farmers, agriculture, and other businesses.
- Developing example projects, laboratories, observatories, or water libraries (potentially including video or social media content) to demonstrate to the communities that collaboration is happening, and that progress is being made.

The next goal that the Sonora team focused on was creating programs to increase the physical efficiency of the water distribution system. Strategies and ideas to support the achievement of this goal included the following:

- Developing a means to more comprehensively manage financial and human resources to implement projects across agencies.
- Implementing water and energy efficiency projects in homes.

Then, the Sonora team focused on the goal to create stormwater capture systems. This goal was analyzed through several sub-components, including:

- Rainwater harvesting for alternative supply
 - ◊ Identifying and studying examples of houses that have adapted rain and greywater collection systems that are functional.
 - ◊ Developing a technical group to provide guidance on the design of these systems, including colleges of engineers and architects.



Strategies developed for Water Supply/Demand by the Sonora team in Work Session 3

- ◊ Investigate regulation and incentivization of rainwater capture and harvesting at the household level.
- Sediment
 - ◊ Investigating grading and slope modification to reduce issues caused by non-regulated slopes and development.
 - ◊ Supporting paving of roads to help decrease sediment issues and erosion.
 - ◊ Supporting modification and increased enforcement of construction regulations and codes that are intended to prevent excess sediment flows.
 - ◊ Increasing conservation areas and other areas that support the absorption and infiltration of rainwater.
- Green infrastructure
 - ◊ Seeking funds to support existing projects and considering better management of these resources.
 - ◊ Leveraging existing projects that identify where green infrastructure could be implemented.
 - ◊ Undertaking a water balance at the basin level to identify and align with basin-level objectives.
- Creating an institutional framework for green infrastructure in Ambos Nogales
 - ◊ Investigating and supporting better regulation of state law and supporting articles.

- ◇ Leveraging the existence of binational acts to give municipalities additional power to advance this work.

Arizona

Work Session 3 began by recapping the goals developed on Day 1, which included:

- Creating an institutional framework for green infrastructure in Ambos Nogales
- Passing development code updates to reduce impacts from development on the water cycle
- Implementing pilot projects to educate the youth, including expanding initiatives such as Jovenes Valores from Nogales, SON to also cover Nogales, AZ

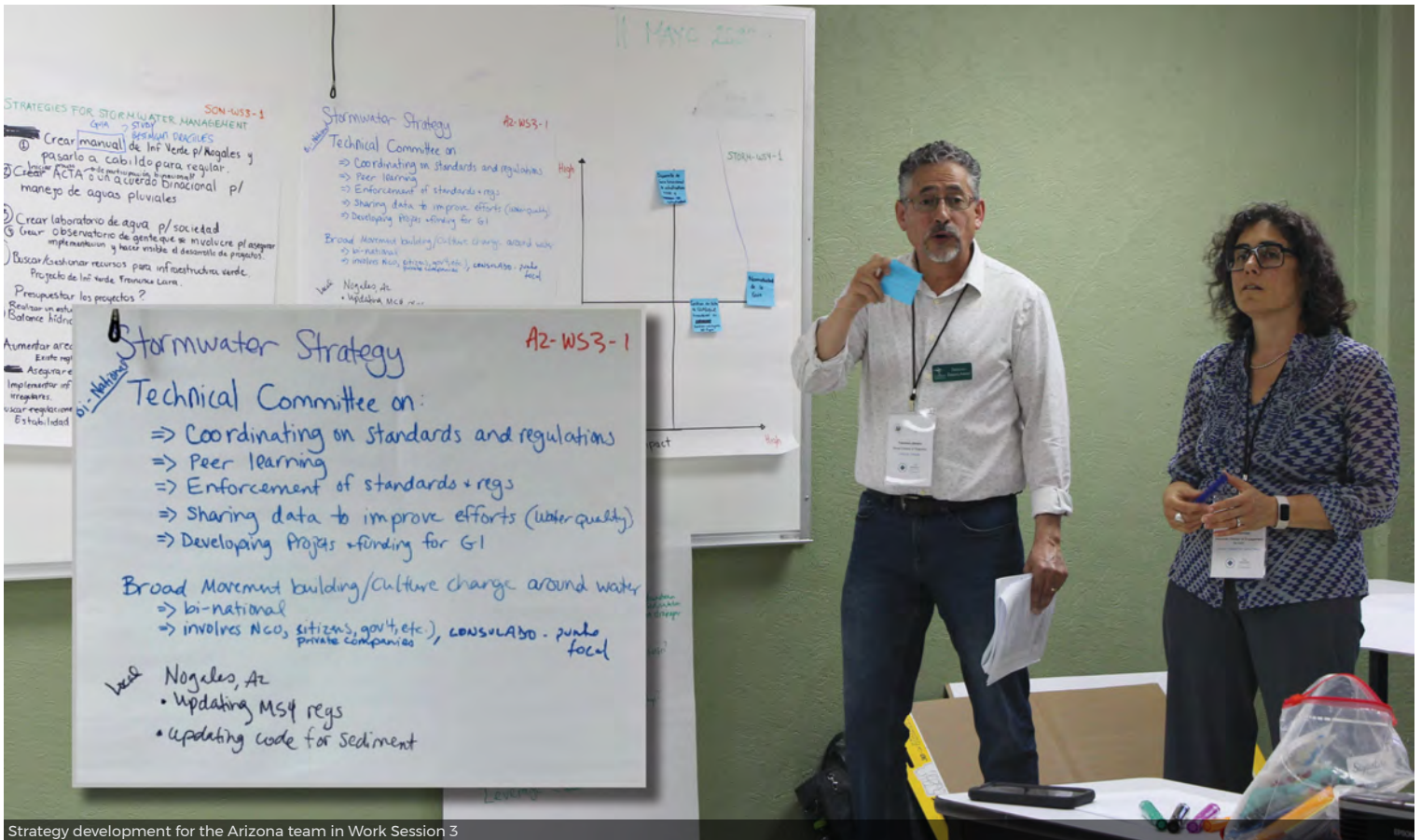
The Arizona team then discussed strategies that could be used for achieving these goals and integrating water and land use. These included:

- Considering resources and funding for green infrastructure strategy and projects, which can often be a big lift and prevent projects from reaching the stage of 'shovel-ready'
 - ◇ Funding sources were discussed including Local First Arizona, and the Water Infrastructure Financing Authority (WIFA) of Arizona
 - ◇ WIFA may be perceived as a more challenging opportunity, as the requirement for matching funding is a barrier
- Developing or improving upon an existing binational agreement/committee, with an equal number of representatives from both sides of the border
 - ◇ This type of mechanism, for which templates exist, could set the agenda for water management in the region – it could be a solid outcome of the workshop providing structure to continue these conversations

- ◇ Pursuing binational/joint development of regulations
- ◇ Binational data sharing
- ◇ Develop sub-committees related to specific topics – such as stormwater management
- ◇ Consider challenges of enforcing binational regulations
- Community education and training
 - ◇ Focusing on the community-scale and then scaling up
 - ◇ Developing a video resource highlighting the shared nature of the watershed
 - ◇ Pursuing binational education and training, particularly related to operations and management
 - ◇ Utilizing existing resources – from sources such as the State of Arizona or ASU
- Updating or improving development codes and regulations
 - ◇ Land use code updates for sediment control
 - ◇ There will be a General Plan update in 2030 in Nogales, AZ – both cities have General Plans, but they do not readily consider one another
 - ◇ Standardizing construction details for public works
- Other ideas discussed during this session included:
 - ◇ Expanding upon Minute 276 could include creating a minimum for conveyance, treatment, and disposal of sewage from Ambos Nogales at the International Sewage Treatment Plant, as currently there is only a maximum
 - ◇ The idea of Mexico 'selling' the water it sends to the treatment plant in the US to raise funds to pay off its related debts was discussed briefly

- ◊ A fee could be collected to support green infrastructure for stormwater
- ◊ There is a desire for MS4-style permits across Ambos Nogales

- ◊ Demonstrate large-scale stormwater capture on the Arizona side, such as Ephraim Canyon



Strategy development for the Arizona team in Work Session 3

TEAM WORK SESSION 4: ALIGNING CROSS-BORDER STRATEGIES AND PROJECTS

In this work session, the topical cross-border topical teams, incorporating members from both sides of the border to return their focus to the themes of Water Supply/Demand and Stormwater, convened to discuss the tools and strategies that were identified in each community team during Work Session 3. Cross-border projects were identified and discussed, and projects were prioritized based on factors such as feasibility and impact. The following questions were asked of teams in Work Session 4:

- What strategies did each city brainstorm to address Water Supply/Demand or Stormwater management goals?
- What strategies should be prioritized?
- Is there agreement around the strategies that require cross-border collaboration?
- What are the objectives we intend to achieve through our Action Plans?

The desired outcomes for this session included:

- Establishing agreement on the main strategies and projects that can be pursued cross-border and regionally.
- Prioritizing regional projects based on impact and feasibility.
- Establishing a framework for the action plan that local teams then work to align projects with and deepen in their next work session.

Stormwater

The Stormwater team began Work Session 4 by examining the strategies developed in Work Session 3 and voting on their expected level of impact and relative feasibility. Strategies from both the Arizona and Sonora groups were examined, including the following:

- Sonora:
 - ◊ Creating an institutional framework for green infrastructure in Ambos Nogales.
 - ◊ Passing a code to reduce impact from development on the water cycle.
 - ◊ Implementing pilot projects with youth educational programs such as Jovenes Valores across both sides of the border.
 - ◊ Beginning the process of developing a new binational act (or minute) for stormwater management.
 - ◊ Creating a social water laboratory/observatory for the general public to observe and understand green infrastructure projects.
 - ◊ Finding additional resources for green infrastructure.
- Arizona:
 - ◊ Improving and updating regulations.
 - ◊ Increasing community participation.
 - ◊ Expanding binational data and information sharing.
 - ◊ Augmenting the existing BTG with community participation.

Then, these strategies were reduced into a refined list of cross-border strategies and projects within the theme of Stormwater management, with the groups' focus landing on the third strategy.

- Creating a binational manual for green infrastructure specifically for Ambos Nogales and having it approved by the respective local councils, including:
 - ◊ Finding and managing resources for green infrastructure
 - ◊ Conducting a water balance study to examine watershed levels

- Giving visibility to the progress and implementation being undertaken in Ambos Nogales
 - ◊ This could be supported by a laboratory or observatory open to the public to demonstrate green infrastructure projects
- Expanding upon the existing BTG, to develop Technical Sub-committees that would focus on:
 - ◊ Coordinating and enforcing standards and regulations on both sides of the border
 - ◊ Peer learning and data and information sharing to improve efforts
 - ◊ Developing and managing project funding for green infrastructure
 - ◊ The committee would be made up of universities, community groups, elected officials, etc., and could build into a governing structure for the watershed

- ◊ It would be intended to meet frequently to maintain momentum
- ◊ This committee could be charged with developing, or initiating, an additional act/minute, but would need to be fully established first
- ◊ The committee would need an official name, such as Ambos Nogales 2030/35
- Other topics discussed during this session included:
 - ◊ Adapting existing green infrastructure tools from the region, including green infrastructure manual from Hermosillo, Sonora and a green pallet from Santa Cruz County.



in-network Stormwater K1
Binational Committee
 Technical Committee on Development Standards and Regulations
 • No binational element in general plans of either city
 Technical Committee on:
 => Regulations coordination + ~~training~~ peer learning + enforcement
 => Sharing data
 => Projects / Funding for GI
Local
 updating MS4
 updating code for sediment
 * movement building around water that is broad (ngos, government, citizens)

The Stormwater team's strategies and further detail developed in Work Session 4

- ◇ Developing a water balance as a base or platform for other projects that would stimulate continuity amongst a wide variety of initiatives.

Water Supply/Demand

The Water Supply/Demand team began Work Session 4 by examining the strategies developed in Work Session 3 and voting on their expected level of impact and relative feasibility. Strategies from both the Arizona and Sonora groups were examined, including the following:

- Formation of a binational interdisciplinary group
 - ◇ Leveraging the existing BTG in Ambos Nogales that is led by the Mexican Consulate which is developing a list of projects and solutions including educational initiatives. This could be supported by a situational analysis of existing groups to clarify members, roles, and responsibilities.
- Manage financing sources for sectorization/distribution projects
 - ◇ Increasing metering and water measurement, particularly on the Nogales, SON side, as only 19% of the population has a meter and is subject to a fixed rate. This information would be important to understand efficiency and share this data across agencies.
 - ◇ Employing both macro and micro metering/measurement, with macro-measuring supporting sectorization, followed in the future by micro-metering (on a household scale) which is much more expensive (on the order of MXN \$1,000)
 - ◇ Smart or remote metering that closes supplies when bills are not paid could be implemented, there are examples in other places

- Revise the tariff/billing scheme in Nogales, SON
 - ◇ There are fixed fees for citizens using up to 25 m³ and rate changes (including a 30% increase in rates, have not previously been approved)
 - ◇ Supposedly, the Sonoran state water law contains a formula for increasing rates on a 5-year basis, however, it is now understood to be outdated
 - ◇ Household-level metering is a key step that will encourage people to pay for what they are actually using, increase better care and stewardship of water, this has been seen in Hermosillo
 - ◇ Municipal-level administration will need to be improved for delivery of household meters to become a reality – the process is moving too slowly and without organization at the moment
 - ◇ There is a breadth of existing satellite meter technology which could be used to support metering, although the technology is expensive and may be met with topographical challenges in the Ambos Nogales region

Next, the team focused on prioritizing the strategies that had been developed and fleshed out through Work Session 3. In this process, the group landed on the following prioritized strategies, beginning to outline the details of the Action Plan within the first two strategies before time ran out:

- Reviewing and updating water rates in Nogales, SON, including through financing, usage/conservation incentives, and related programs
 - ◇ Reviewing social information to include in the initiative (0-3 months)

- ◇ Starting a conversation as soon as possible with local authorities, including introducing the strategy to city council, so that rate changes can be approved (1-3 months)
 - ◇ This process includes several steps:
 - 1) advisory council, 2) governing board, 3) council commissions, 4) submission to the council, 5) submission to congress, and 6) approval and integration into water law
 - ◇ A 'social rate' and inflation must both be considered to ensure rate changes are useful and equitable
- ◇ Including a social communication/ information strategy
- ◇ Seeking a general subsidy from the federal or state government (or apply an existing one) to cover the cost of marginalized communities (4-6 months)
- Managing financing sources for the implementation of sectorization projects
 - ◇ Generating budgets for priority projects and then search for funding opportunities and reviewing requirements with NADBank (0-6 months)
 - ◇ Seeking financing that is not subject to the 50%/50% condition (in federal programs, 50% of the cost of the project is needed for to be accepted)
 - ◇ The city council could also potentially provide resources
- Conducting a study on existing water harvesting projects to inform the community and developing and associated dissemination campaign



Strategy: gestionar fuentes de financiamiento para proyectos de sectorización.

- Presupuestos de proyectos prioritarios
- Buscar oportunidades con el NADBank, y revisar requisitos, información. Buscar financiamiento que no este sujeto 50-50. 0-6 meses
- Gobierno municipal (contactar) con un plan de acción (1 año)
- Argumentos de como impacta a la ciudad veñno 0-3 meses
- hablar con NADBank and y con ASUT para abrir oportunidades

1 Goal: Strategy: Revisar y actualizar las tarifas de agua. Outcome: agua.

Corto plazo:

- 1: Introducir al cabildo en 1-3 meses empezar la conversación con autoridades.
- 2: Consejo consultivo UMAS.
- 3: Junta de gobierno.
- 4: comisiones de cabildo. - Considerar un cobro adicional

Enfocarse en aplicar la ley. Aprovechar empuje político.

Crear sistema?

- Hacer revisión de las acciones e información social a incluir en la microtrea. Aceptación Social → Organizar Municipal + Bancaria + Comarcas → 0-3 meses
- Subsidio, buscar en el gob federal. 4-6 meses aplicar en sistema

Strategy prioritization and preparation for action planning from the Water Supply/Demand team in Work Session 4

DISCUSSION: COLLABORATION

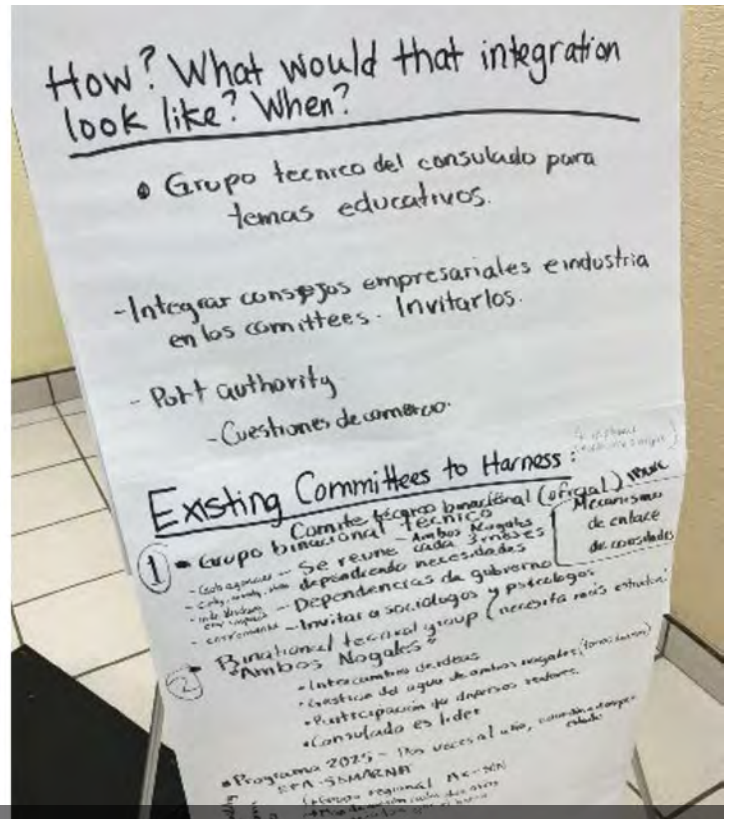
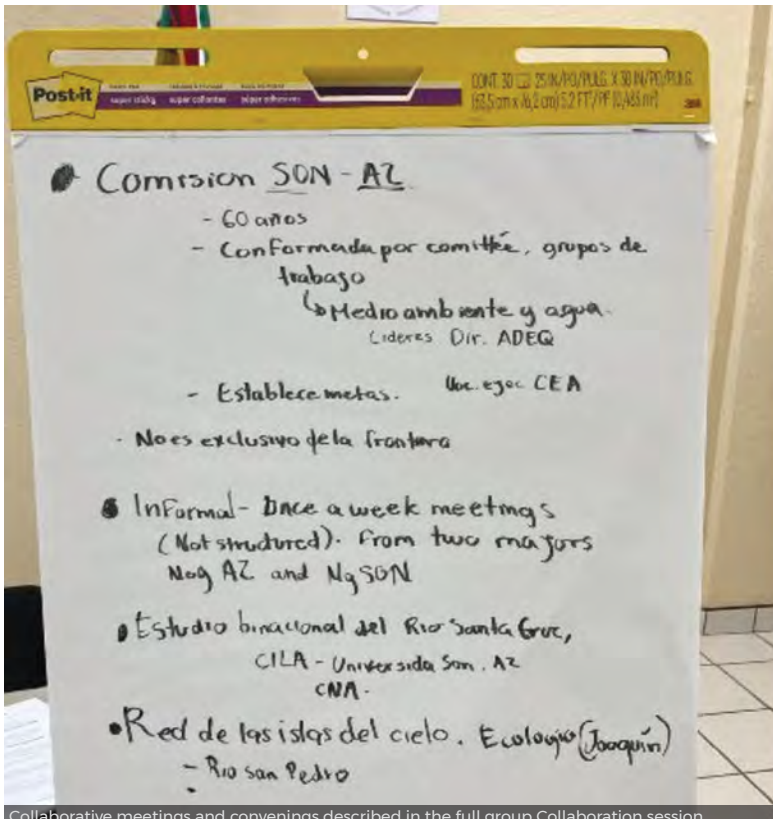
This full group discussion focused on identifying existing collaboration mechanisms that could be used to maintain momentum and progress in a cross-border fashion after the workshop. It also involved opening space for new collaborative approaches that may need to be established to carry out long-term collaborative engagement and project implementation into the future. The session was moderated by Francisco Zamora, Senior Director of Programs, Sonoran Institute and Vivian Hobbins, Project Manager Research, Arizona State University. The following questions were asked openly to the entire group of participants:

- What existing meetings, conferences, events, or studies are planned in the next 12 months regarding water supply/demand or stormwater management?
- Can any existing processes be harnessed to make progress on shared goals and project

implementation? What would that integration look like (integrating topics into the program/ agenda, holding a side-meeting, broadening the invitation list, etc.)?

This conversation yielded the following information. Firstly, the following meetings and convenings were described:

- The EPA Border 2025 Program Meeting (which was planned to be conducted on June 12th and 13th, 2024) with support from ADEQ, CEA, and CEDES in Nogales, SON
- An IBWC/CILA meeting, which was planned to be conducted on June 13th and 14th, in Nogales, SON
- The BTG in Ambos Nogales
- The Arizona/Mexico Commission (also known as the Sonora/US Commission on the Mexican side)
- Municipal meetings between Ambos Nogales, which occur semi-regularly and are not formally structure



Collaborative meetings and convenings described in the full group Collaboration session

PRESENTATION: RESOURCES FOR GETTING TO ACTION

It is well known that project implementation cannot happen without human and fiscal resources. To help teams prepare for Work Session 5: Action Planning, this presentation included three relevant speakers who shared available opportunities for financial resources and technical support. Speakers for this session are listed below, with links to their presentations.

- **Jorge Hernandez, Project Manager, North American Development Bank**
 - ◊ NADBank offers both funding and technical assistance programs, primarily through its Community Assistance Program (CAP) and Border Administration Program
- **Mari Gonzalez, Environmental Protection Specialist, United States Environmental Protection Agency**
 - ◊ There are several EPA funding and support opportunities available, include the Border Water Infrastructure Program, Border 2025, WaterTA (which focuses on technical assistance), and the Community Change Grants
- **Waverly Klaw, Growing Water Smart Program Director, Sonoran Institute**
 - ◊ Sonoran Institute is working to develop a Technical Assistance program with up to USD \$20,000 available for projects coming out of the GWS workshop



Jorge Hernandez of NADBank delivers a presentation regarding opportunities for funding

TEAM WORK SESSION 5: ACTION PLANNING

In this final team work session, topical teams reconvened to focus on developing details, including necessary funding resources, of binational 12-18-month Action Plans. Teams prepared to present their completed Action Plans to the entire group in the following presentation session. Teams were posed the following questions as they worked to develop their Action Plans:

- How will we carry out our priority strategies and projects?
- What resources will we need, and how will we procure them?
- Where are the opportunities to celebrate wins?
- How will we measure success?

The desired outcome of Work Session 5 included:

- Cross-border, collaborative projects and goals are developed through the final Action Plan

Stormwater

The stormwater group began Work Session 5 by revisiting the major strategy from Work Session 4 related to strengthening the BTG. This included outlining that the members of this group must include, at minimum, the following parties:

- Universities
- Operating organizations
- State governments
- Municipal governments
- County-level governments
- Non-governmental organizations
- Business groups and the private sector
- Federal agencies such as the USGS

To initiate development of the Action Plan and with the understanding that the BTG would continue to strengthen itself, the team focused on another one of its developed goals from previous working sessions, related to the development of a **binational green infrastructure manual**. The discussion involved outlining the following attributes of this manual, including:

- Being a bilingual document that provides a cross-border perspective different to other 'best practice' documentation.
- Focusing on implementation and education to support an integrated watershed-wide vision and strategy.
- Combining strengths from other existing, similar guides, including the green palettes from both Nogales, AZ and Nogales, SON as well as the Hermosillo green infrastructure manual to identify joint, shared goals.

- Documenting pilot projects and case study examples from the list of 103 projects developed by Dr. Lara and to demonstrate how code modifications could work in practice.

Leading parties for this goal were identified as follows:

- Watershed Management Group, charged with applying for Technical Assistance grant funding from the Sonoran Institute to support the development of the manual.
- CILA, charged with organizing coordination meetings and raising the topic of the manual to the BTG.
- The City of Nogales, AZ Planning and Zoning Department, charged with reviewing existing manuals and related documentation to accumulate information in support of the development of the manual.

The steps to identified to develop the manual include the following:

- A Sub-committee within the BTG is formed to develop the guide, by August 2024
- A consultant is hired to undertake the development of the guide
- The sub-committee reviews the guide, expected to take 4 weeks
- Additional information and data are collected, expected to take 4 weeks
- The committee integrates a proposal for the guide, by December 2024
- The guide is introduced the BTG
- The guide is reviewed and approved by the BTG
- The guide is published and distributed publicly

Next, the team focused on the second major goal for their Action Plan, related to **Ambos Nogales' positioning on the agenda of major regional agencies**

and funders. This goal is motivated by the relative imbalance within distribution of resources within the US-Mexico border region to more prominent cities like Tijuana and San Diego and seeks to drive Ambos Nogales' positioning upward on this agenda. Actions related to this goal were loosely defined, and include the following ideas:

- Developing and/or supporting specific press and information campaigns.
- Undertaking a broad set of social communication activities, including dissemination of information related to these campaigns on social networks and relevant websites
- Identifying existing projects that are successful to use as case studies and examples for further communication, such as the Mariposa checkpoint.
- Supporting/engaging with school visits to wetlands to promote education among youth.
- Supporting both cities to have sections on their websites regarding activities that are underway in each city
- Lobbying with legislators and council members.

Water Supply/Demand

In Work Session 5, the cross-border team focused on Water Supply/Demand identified several goals for continued collaborative work. These include:

- Revising and updating tariff structures in Nogales, SON
- Managing sources for financing sectorization projects
- Undertaking a study of existing and new rainwater capture projects to inform the community
- Developing incentives for implementation of water reuse infrastructure
- Implementing pilot projects for alternative water sources, including reuse and rainwater harvesting
- Supporting the BTC

Within each of these goals, a set of action steps and associated responsibilities and timelines were developed. These are further elaborated below:

- Revising and updating tariff structures in Nogales, SON
 - ◇ OOMAPAS and the municipality of Nogales, SON will review the actions and social information needed to include the initiative by September 2024
 - ◇ This may require binational communication amongst authorities
 - ◇ OOMAPAS will initiate conversations with authorities and introduce the proposal to the city council by October 2024
 - ◇ This includes the process of working with the 1) advisory council, 2) government board, 3) council commissions, 4) council, and 5) congress
 - ◇ This should also consider an additional charge to fund other projects (such as green infrastructure), focus on applying and enforcing the law, and taking advantage of political momentum
 - ◇ Work will be undertaken to identify existing government subsidies to support the changes in the tariff scheme by December 2024
- Managing sources for financing sectorization projects
 - ◇ Prioritizing and validating projects by September 2024
 - ◇ Applying for project funding via NADBank's CAP
 - ◇ This program is highly competitive as it considers the themes of water, air, and solid waste management across California, Arizona, Baja California, and Sonora
 - ◇ CAP includes a total of USD \$750,000

- ◇ Projects must be ready to begin implementation and verified and granted permission by other governing bodies such as ADEQ or CONAGUA
 - ◇ A proposal for USD \$20,000 in Technical Assistance grant funding from Sonoran Institute will be developed to fund a consultant to support OOMAPAS' grant writing department which is short-staffed
 - ◇ Other funding sources will be researched, particularly those that do not require funding matches
- Undertaking a study of existing and new rainwater capture projects to inform the community
 - ◇ PDU and IMIP to collaborate on compiling information from hydrological studies and growth and development in the city
 - ◇ Including IMIP's Risk Atlas which is a completed document, a flood-specific document is expected to be released in August 2024
 - ◇ Ing. Felizardo Grajeda of IMIP to prepare a proposal to undertake Master Plan for Water Capture Projects and dissemination program, and submit to Sonoran Institute to initiate the project
 - ◇ Identify and apply for other funding sources, including from EPA, SIDUR, and CONAGUA to further the project
 - ◇ This may also include the climate change fund available in Nogales/ Sonora
 - ◇ Universities such as Universidad de Sonora, ITSON, UTN, or COLEF could lead the undertaking the research, in partnership with PDU/IMIP who collect data and submit the proposal
- ◇ This study should support and tie into the work done by Dr. Lara at ASU identifying 103 sites for green infrastructure implementation in Ambos Nogales
- Developing incentives for implementation of water reuse infrastructure
 - ◇ Investigate opportunities for funding incentive programs
 - ◇ Existing programs that may be leveraged exist within ADWR (Santa Cruz Active Management Area) or through the Arizona-Mexico Commission
 - ◇ An analysis will be undertaken (potentially by IMIP or PDU) to understand how reduced surplus flows due to increased efficiency in Sonora would impact Arizona - this research may need to be supported by academia
 - ◇ Incentive programs should begin with accessories that are proven to increase efficiency
 - ◇ OOMAPAS to lead implementation of pilot projects to be analyzed
 - ◇ Hugo Lopez of UTN to provide information related to the Mexican standard for runoff in homes applicable in Nogales, Sonora and the case study example of Human Scale, a factory which develops furniture for offices and captures and uses only rainwater in their operations
 - ◇ A further advancement on this case study may involve sharing information with INDEX Nogales to influence maquiladoras

- Implementing pilot projects for alternative water sources, including reuse and rainwater harvesting as demonstrations for the private sector and industry
 - ◊ OOMAPAS to consider creating institutional incentive programs
 - ◊ Review regulations that may provide tax breaks or other incentives to the private sector for decreased water footprints
 - ◊ The business council and INDEX will need to be contacted
 - ◊ Document the Human Scale case study for water reuse feasibility
 - ◊ Leverage PDU's upcoming revision of the ordinance for urban planning related to the industrial sector, this is soon to be approved and released

- Supporting the BTG
 - ◊ COLEF to lead a sub-committee that undertakes a situational analysis of ongoing water conservation initiatives in Ambos Nogales, including development of a table or network of relevant actors and their connections
 - ◊ Additional sub-committees should be created related to conservation and education, with the intent of evaluating educational programs that already exist
 - ◊ This could rely on the sub-committee lead by COLEF
 - ◊ This could leverage ongoing programs from ASU, COLEF, and the City of Nogales Social Wellbeing Department
 - ◊ Consider the EPA Border 2025 program as a financing opportunity

ACTION PLAN PRESENTATIONS

In this final full group session, the two topical teams addressing Water Supply/Demand and Stormwater respectively, presented their binational 12-18-month Action Plans to the entire group. These presentations allowed participants to understand the goals, timeframes, and responsibilities developed by both teams. Results and outcomes from the teams' work together across all work sessions are described in the next section.



Efrain Vizquete presents the Water Supply/Demand team's Action Plan

OUTCOMES AND NEXT STEPS

This section documents the major outcomes of the workshop, including the most promising initiatives and projects that were discussed over the two days, and presents next steps for maintaining this momentum moving forward.

BINATIONAL OPPORTUNITIES

Two major binational opportunities were discussed during the workshop. The first includes harnessing the existing BTG organized by the Mexican Consulate Generals in Nogales, AZ and supported by IBWC/CILA. As described in both teams' binational action plans, leveraging and continuing to support this group moving forward will provide a structure and channel for continued binational collaboration related to both themes across the Ambos Nogales region. The primary goal of supporting the BTG will be to further formalize it, including via development of an official name, such as 'Ambos Nogales 2030/2035', and ensuring that at least the following types of organizations/agencies are represented in the group:

- Universities
- Operating organizations
- State governments
- Municipal governments
- County-level governments
- Non-governmental organizations

- Business groups and the private sector
- Federal agencies such as the USGS

Next, further development of the BTG will include developing Sub-committees (or 'Technical' Committees) to focus on particular initiatives/projects under the umbrella of the BTG. These will include:

- Developing a binational green infrastructure manual, led by Watershed Management group and supported by Dr. Lara of ASU
- Initiating development of, an additional binational act/minute, supported by IBWC/CILA
- Undertaking a situational analysis of ongoing water conservation initiatives in Ambos Nogales, including development of a table or network of relevant actors and their connections, led by Dr. Hilda Garcia of COLEF
- Developing and managing project funding for green infrastructure
- Coordinating and enforcing standards and regulations on both sides of the border

- Peer learning and data and information sharing to improve efforts

Sonoran Institute is committed to meeting with CILA and the Mexican Consulate to continue to support and collaborate with the BTG, including via arranging additional (and more frequent) meetings and expanding the meeting invitation list.

The second major output of the workshop was the establishment of a goal to develop a binational green infrastructure manual. This document will focus on implementation of green infrastructure across the Ambos Nogales region and include education to support an integrated watershed-wide vision and strategy. It will leverage and expand upon the work by Dr. Lara of ASU which identified 103 sites for green infrastructure project implementation across the region. This initiative will be led by Watershed Management Group and involve inputs from Dr. Lara of ASU and support from CILA and the City of Nogales, AZ Planning and Zoning Department. As described above, the specific roles of these agencies are:

- Watershed Management Group will apply for grant funding from the Sonoran Institute to support the development of the manual
- CILA will organize coordination meetings and raise the topic of the manual to the BTG
- The City of Nogales, AZ Planning and Zoning Department will review existing manuals and related documentation to accumulate information in support of the development of the manual

LOCAL OPPORTUNITIES

In addition to the major binational opportunities that arose during the workshop, local opportunities on each side of the border were also discussed.

Sonora

In Sonora, the following local opportunities were discussed as key improvements to support water demand sustainability locally:

- Revising and updating tariff structures in Nogales, SON, led by OOMAPAS and PDU
- Managing sources for financing sectorization projects, led by OOMAPAS and PDU
- Undertaking a study of existing and new rainwater capture projects to inform the community, led by IMIP and PDU and supported by universities such as Universidad de Sonora, ITSON, UTN, or COLEF
- Developing incentives for implementation of water reuse infrastructure, with OOMAPAS leading implementation of pilot projects
- Implementing pilot projects for alternative water sources, including reuse and rainwater harvesting as demonstrations for the private sector and industry

Arizona

In Arizona, the following local opportunities were identified:

- Leveraging code updates to better address stormwater management
- Develop and/or support specific press and information campaigns, for example, with restaurants or other specific stakeholders
- Undertake a broad set of social communication activities, including dissemination of information related to these campaigns on social networks and relevant websites

- Identify existing projects that are successful to use as case studies and examples for further communication, such as the Mariposa checkpoint

Sonoran Institute remains committed to advancing land use and water sustainability in the Ambos Nogales region and is working to develop a Technical Assistance program to support projects that emerged during the workshop. Sonoran Institute is also working

through mid- and late-2024 to continue conversations with participants and support their efforts on the back of the June 2024 workshop.

The next GWS workshop along the US-Mexico border will take place in Mexicali, Baja California in the Fall of 2024, between the sister city communities of Mexicali and Calexico, CA.



APPENDICES

APPENDIX A – WORKSHOP PARTICIPANTS AND TEAMS

Participant Teams

Participants were structured into four teams, corresponding to the two major themes and the two

sides of the border. Team breakdowns can be seen in the tables below.

ARIZONA STORMWATER		
NAME	POSITION	ORGANIZATION
Joaquin Marruffo	Border Programs Manager	ADEQ
Ben Lomeli	Board President	Friends of the Santa Cruz River
Juan Guerra	City Engineer	City of Nogales, Arizona
Terecita Camou	Senior Engineer Technician	City of Nogales, Arizona
Luis Salgado	Green Infrastructure Project Manager	Watershed Management Group
Joaquin Murrieta	Cultural Ecologist Director	Watershed Management Group
Francisco Lara-Valencia	Professor	ASU
Luke Cole	Director, Santa Cruz River Program	Sonoran Institute
Albert Flores	Plant Manager	IBWC-US
Eduardo Loyola	Public Affairs Manager	Constellation Brands

SONORA STORMWATER

NAME	POSITION	ORGANIZATION
Jaime Parra	Director	IMIP Nogales
Mariana Salazar Ruiz	Geóloga/Analista de Sistemas de Información Geográfica	IMIP Nogales
Adriana Guerrero	Ecology Coordinator	SDUE Nogales
Javier Villanueva	Director of Urban Design Planning	PDU Nogales
Luis Alan Navarro Navarro	Research Professor	El Colegio de Sonora
Antonio Cáñez-Cota	Research Professor	El Colegio de Sonora
Ing. Jesús Quintanar	Office Representative	CILA-MX
Jorge Hernandez	Project Manager	NADBank
Ing. Miguel Roberto Castro Silvain	Profesor de Asignatura	UTN
Ing. Samuel Andrés Acosta Loaiza	Profesor de Asignatura	UTN
Claudio Alonso Murrieta Ortiz	Link	SUAMCA

ARIZONA WATER SUPPLY/DEMAND

NAME	POSITION	ORGANIZATION
Claudia Gil Anaya	Border Liaison	ADEQ
Jorge Maldonado	Mayor	City of Nogales, Arizona
Alejandro Barcenas	Public Works Director	City of Nogales, Arizona
Ruben Artana	Public Works	City of Nogales, Arizona
Elia Tapia	Professor	La Universidad de Sonora
Gerardo Calza	Project Manager	NADBank
Ryan Melson	Deputy AMA Director	ADWR
Laura Mullahy	Special Projects Manager	Lincoln Institute for Land Policy
Wayne Belzer	Environmental Engineer	IBWC-US

SONORA WATER SUPPLY/DEMAND

NAME	POSITION	ORGANIZATION
Ing. Francisco Luján	Head of Sanitation and Special Projects	CILA-MX
Ing. Gabriel Bonillas	Director General	OOMAPAS Nogales
Hilda García-Pérez	Director of Nogales Unit	El Colegio de La Frontera
Lucia Villegas Bojorquez	Urban Design Coordinator	IMIP Nogales
Efrain Vizquete Jaramillo	Research Associate	ITSON
Hugo Ángel López Gil Lamadrid	Professor	UTN
M. C. Mario Balvanedo Rodríguez Arenas	Profesor de Tiempo Completo	UTN
Pedro Garcia	Academic Director	ITG
David Ernesto Baltazar	Head of Land Science Department	ITN

APPENDIX B - WORKSHOP EVALUATION

After completion of the workshop, participants were invited to provide feedback in the format of an evaluation form in alignment with typical GWS workshops. A total of 12 evaluation responses were recorded for the workshop, with 1 participant providing a valuable testimonial statement. Results from the evaluations are included below.

Firstly, participants were asked to rank each of the workshop sessions for their usefulness on a scale of 0 or 1-5, with options corresponding to the following breakdown:

- Did not attend (0)
- Not at all useful (1)
- Slightly useful (2)

- Somewhat useful (3)
- Very useful (4)
- Extremely useful (5)

Results from this section of the evaluation are shown in Figure 1.

Next, participants were asked to answer a set of questions related to a general evaluation of the workshop. Questions sought to identify the most valuable, least valuable, and any missing parts of the workshop from the participants' perspectives. This section also offered an opportunity for participants to comment on the overall length of the workshop and the venue, food, lodging, and general reception. Participants' responses regarding the most valuable part of the workshop are summarized below:

- Developing a deeper understanding of the transboundary problems and the ecosystem of actors and initiatives
- Aligning cross-border strategies and projects
- Sharing visions, ideas, and projects and networking with key actors in transboundary water management

Participants' responses regarding the least valuable part of the workshop are summarized below:

- Further consideration should be made to ongoing work within and by the community, so that initiatives are not building from scratch
- The Peer-to-Peer Exchange session
- The Resources for Getting to Action session

Similarly, participants were asked to provide input on any topics or concepts that were missing from the workshop or should be removed in future sessions. Responses about additional concepts to include in the future are summarized below:

- Degrowth of urban areas, as a measure of having better water quality and conservation
- Ongoing and existing work in Ambos Nogales by the local community
- Institutional weakness for enforcement of regulations and accountability
- The perspective and influence of industry and the private sector

There were no responses related to topics that did not need to be included in the workshop, however, the point was repeated that greater local representation would be important to include in future workshops.

Most participants responded that the workshop was about just right in terms of length, with some suggesting the workshop was too short. All participants had positive comments about the venue, food, lodging, and reception.

Next, participants were asked to rank, also on a scale of 1-5, the value of knowledge shared at the workshop corresponding to several topics. These topics are listed below:

- Awareness of the need for US-MX border communities to manage water supply and demand for sustainable growth.
- Awareness of policy recommendations for guiding community growth and development.
- Awareness of Arizona/Sonora (or other) rules and regulations empowering local community action on water efficiency and conservation.
- Awareness of concepts and benefits of community resiliency.
- Awareness of the function of water supply-demand balance equations.
- Understanding steps in a water planning framework to guide strategic planning for water resources.
- Knowledge of methods and practices for how to integrate water efficiency and conservation into land use plans and policy.
- Understanding of own community's level of readiness and methods for building community support for action.
- Understanding of best practices for collaboration across departments and jurisdictions.

Participants' options for ranking these topics included the following:

- Did not learn any new information (1)
- Reinforced previous knowledge (2)
- Learned some new information (3)
- Learned a great deal of new information (4)
- Learned new information beyond expectations (5)

Results from this section of the evaluation are shown in Figure 2.

Next, participants were asked to provide input on the quantity of different types of sessions. For each type of session, participants had the option to vote for more (3), the same amount (2), or less (1) of that type of session. Results are included below:

- Exchanges with peers from other workshop teams (average response 2.6, indicating participants would like more of these sessions)
- Full group Q&A or discussion opportunities (average response 2.5, indicating participants would like more of these sessions)
- Team work sessions (average response 2.4, indicating participants would like more of these sessions)
- Full group presentations (average response 1.8, indicating participants would like less of these sessions)

Additional comments received in this section included the following:

- Sessions should integrate local knowledge
- More time should be given to small groups, and less time should be spent in presentations

Finally, participants were encouraged to provide any additional comments regarding ways to improve the workshop as a whole moving forward. These ideas are summarized below:

- Provide time for all participants to meet one another, not just in the small working groups
- Provide an opportunity to repeat the experience
- Provide an orientation or conversation before the workshop to reduce the feeling of 'building from scratch' during the workshop sessions
- Understand and involve the ongoing work and initiatives in the community
- Include participants from industry, private sector, and the educational sector in future iterations

One participant left a testimonial describing their positive experience at the workshop. This is included below (*translated from Spanish*).

"These workshops reinforce cross-border human and social capital (networks) to overcome the challenges of comprehensive management of sister cross-border basins such as Ambos Nogales - allowing important social actors to be identified and made visible."

– Dr. Luis Alan Navarro Navarro
Profesor Investigador, El Colegio de Sonora
(Hermosillo, Sonora)

Figure 1. Usefulness of Sessions (average response 1-5)



- Panel Discussion: Planning for a Resilient Water Future in a Cross-Border Context
- Team Work Session #5: Action Planning
- Discussion: Collaboration
- Presentation: Opportunities to Address Water in Municipal and Regional Plans and Policies
- Team Work Session #3: Identifying Strategies for Becoming More Water Smart
- Team Work Session #4: Aligning Cross-Border Strategies and Projects
- Presentation: Resources for Getting to Action
- Action Plan Presentations
- Peer-to-Peer Exchange: Meeting and Information Sharing
- Team Work Session #1: Current Conditions – How Water Smart Are We Now?
- Team Work Session #2: How Can Our Cities Become More Water Smart?

Figure 2. Knowledge Analysis (average response 1-5)



- Awareness of the function of water supply-demand balance equations.
- Awareness of the need for US-MX border communities to manage water supply and demand for sustainable growth.
- Awareness of Arizona/Sonora (or other) rules and regulations empowering local community action on water efficiency and conservation.
- Understanding of best practices for collaboration across departments and jurisdictions
- Awareness of concepts and benefits of community resiliency.
- Understanding steps in a water planning framework to guide strategic planning for water resources.
- Understanding of own community's level of readiness and methods for building community support for action.
- Awareness of policy recommendations for guiding community growth and development.
- Knowledge of methods and practices for how to integrate water efficiency and conservation into land use plans and policy.



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