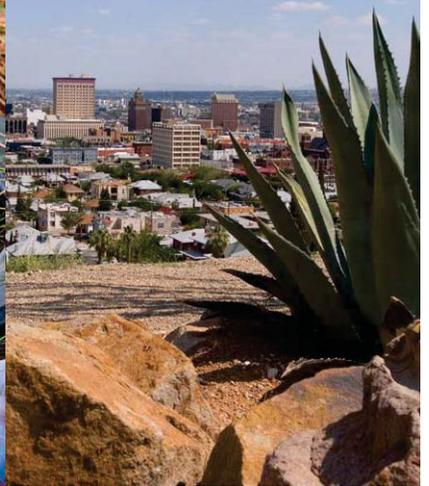


California-Mexico Border Relations Council

Border Region Solid Waste Working Group



Solid Waste &
Waste Tire Strategic Plan



January 2017



The California-Mexico Border Relations Council Border Region Solid Waste Working Group

**Solid Waste & Waste Tire
Strategic Plan
January 2017**

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Executive Summary

The Solid Waste and Waste Tire Strategic Plan (Plan) identifies the objectives of the Border Region Solid Waste Working Group (SWWG) in the development and coordination of solutions to remediate problems associated with waste tires, solid waste, and excessive sediment threatening water quality and public health in the California-Mexico border region.

In 2015, the California State Legislature passed Senate Bill 83 (Committee on Budget and Fiscal Review, Chapter 24, Statutes of 2015), establishing the Border Region SWWG (See Appendix 1) under the California-Mexico Border Relations Council (Council). The legislation directs that the border region activities of the California Department of Resources Recycling and Recovery (CalRecycle) include projects in Mexico that impact the California-Mexico border region, address movement of used tires from California to Mexico, and support cleanup of illegally disposed waste tires and solid waste along the border that could negatively impact California's environment.

SB 83 requires the Council to identify and recommend to the Legislature changes in law necessary to remediate these waste management problems in the border region. The statute also tasks the SWWG with development and coordination of long-term solutions to address and remediate these pollutants that degrade valuable estuarine and riparian habitats, and threaten water quality and public health in California.

In order to advance work in these priority areas, the legislation appropriated \$300,000 from the California Tire Recycling Management Fund (Tire Fund) to the California Environmental Protection Agency (CalEPA). Two projects commissioned by the Council are in progress. Two non-profit organizations—with proven success in environmental work on both sides of the border for demonstration projects—received grants. WILDCOAST received a \$100,000 grant to address waste tire issues along the border in Tijuana. The Sonoran Institute received \$200,000 to research solid waste issues on both sides of the border and to implement small-scale remediation projects that impact the New River.

In addition, CalRecycle contracted with the Institute for Regional Studies of the Californias at San Diego State University (San Diego State) to update the 2009 “The Flow of Used Waste Tires in the California-Mexico Border Region” study (Tire Flow Study) conducted by Dr. Paul Ganster.ⁱ

Conclusions and recommendations from these demonstration projects and the research study shall inform the future work of the SWWG, and the preliminary results and findings have informed the development of this Plan.

To inform further development of the Plan, SWWG members gathered input and provided information in a series of four workshops aimed at sharing information and discussing ideas for addressing waste issues in the border region. The topics covered at the workshops included:

- Fundamental market drivers of waste tires and other solid waste streams at the border.
- Leveraging and enhancing cooperation across borders and levels of government.
- Sustainable funding mechanisms for addressing waste tires and solid waste.
- Sedimentation drivers, their interaction with other waste streams, and possible solutions.

Members of SWWG consulted on content of the Plan throughout its development and held a meeting in December 2016 at CalEPA Headquarters to discuss a final draft and provide in-depth feedback to the writing team. The Plan represents the consensus of the group on the best strategies and options for resolving border pollution issues.

Border Issues



Figure 1 Source: <http://www.deepseanews.com/2010/09/the-invisible-side-plastic-marine-debris/>

Sediments also capture and retain heavy metals in the environment.

Lack of funding complicates remediation of these risks in the border region by inconsistent cross-border collaboration, limited waste management infrastructure in Mexico and limited commodity markets for recyclable materials. The council and SWWG must consider addressing these complications as part of any comprehensive border strategy so that effective and realistic solutions are deployed.



Figure 2 Source: <http://www.becc.org/news/becc-news/cleanup-of-juarez-scrap-tire-collection-center-a-successful-example-of-binational-cooperation#.WHV5QPkrKUK>

sediments.ⁱⁱ The survey methods used in these two studies included visual surface surveys, a waste characterization study, bore drilling and excavating test pits. The 2009 survey revealed extensive amounts of sediment containing an estimated 3,500 tons of

Waste tires, solid waste and sedimentation pose serious environmental and health risks in the border region. Waste tires pose a fire hazard, cause ecological damage to sensitive estuary habitats, and harbor vectors that carry disease. Solid waste chokes waterways, harms wildlife, and carries contaminants that leach into water and are captured and retained in the environment by waste and sediments. Sedimentation chokes waterways, harms natural environments and changes topography to create flood hazards.

The downstream impacts of these waste streams are particularly pronounced within the Tijuana River Estuary and along the New River. Each type of waste presents unique challenges and hazards to the environment and the communities affected. When waste flows across the border into California, it creates a challenge in terms of border relations and interagency, cross-border cooperation.

A 2009 study funded by CalRecycle studied the extent and locations of waste tires, solid waste, and sedimentation.ⁱ A 2014 U.S. EPA study found embedded chemical pollutants in both plastics and

embedded trash including waste tires and beverage containers. The conditions that produced these results have been only fractionally remediated to date due to lack of funding, lack of infrastructure, lack of cross-border collaboration, and other causes discussed later in this Plan. The following map shows the border area.

California-Baja California Border Area

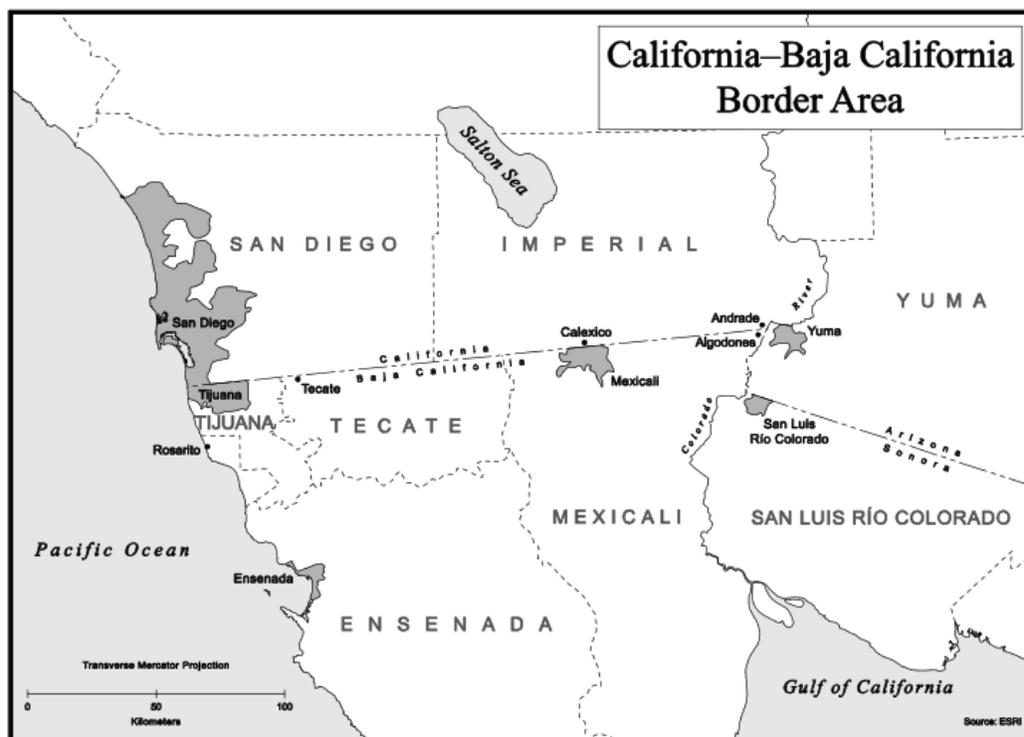


Figure 3 Source: 2009 Tire Flow Study

The 1994 North American Free Trade Agreement (NAFTA) led to a spike in industrial facilities constructed within the free trade zone and a concomitant population boom along the 1,954-mile U.S. border with Mexico. The table below documents the dramatic rise in population along the California-Mexico border region that resulted from the industrial growth in Mexico.

Border Region Population Growth Estimates

Location	1980	1990	2000	2010	2020
CA Border Counties	1,953,956	2,607,319	2,941,502	3,355,351	3,889,001
Baja CA Border Mun.	1,002,459	1,400,873	2,188,899	3,424,592	5,343,687
Total	2,956,415	4,008,192	5,130,401	6,779,943	9,232,688

Source: Border 2020: U.S.-Mexico Environmental Program

A myriad of governmental and nongovernmental organizations (NGO), federal, state, regional and local organizations are committed to resolving cross-border environmental issues. They demonstrate their commitment through participation in one or multiple collaborative groups. The California-Mexico Memorandum of Understanding (MOU) on Climate Change and the Environment has fostered cross-border governmental cooperation. The following table shows the primary collaborative groups, the lead agency, and the goals of the group. The table in Appendix 2 lists the members in each group.

Collaborative Group Goals

Name	Lead Agency	Goals
California-Mexico Border Relations Council	CalEPA	Develop and coordinate long-term solutions to address and remediate problems associated with waste tires, solid waste, and sedimentation along the border that result in degraded valuable estuarine and riparian habitats and threaten water quality and public health in in the California-Mexico border region.
California-Mexico Memorandum of Understanding on Climate Change and the Environment	CalEPA	The California-Mexico MOU on Climate Change and the Environment signed in 2014 is a four-year effort with four priority action areas: climate change, air quality, clean vehicles, and wildfires. In addition to the four priority action areas, there is also interest in California and Mexico to strengthen cooperation on solid waste management. The overall objective of the MOU is to increase the capacity of both governments to cope with the challenges of climate change and to protect and preserve natural resources.
U.S.-Mexico Border 2020 Program	U.S. EPA	Reduce air pollution; improve access to clean and safe water; promote materials management, waste management, and clean sites; enhance joint preparedness for environmental response; enhance compliance assurance and environmental stewardship.
Tijuana River Valley Recovery Team	San Diego Regional Water Quality Control Board	Reduce discharge and cleanup sediment and trash in the Tijuana River.

The International Boundary and Water Commission (IBWC) is an international commission composed of a United States Section and a Mexico Section, each headed by an Engineer Commissioner appointed by his or her respective president. The goal of the IBWC is to provide binational solutions to issues that arise during the application of United States and Mexico treaties regarding boundary demarcation, national ownership of waters, sanitation, water quality, and flood control in the border region.

California has willing partners in Mexico, but three-year term limits for some Mexican elected officials can make it difficult to maintain continuity of relationships and carry out the implementation of comprehensive programs, especially when there are so many agencies and groups of agencies working together that sometimes have no coordinated communication.

This Plan addresses all three major waste streams: tires, solid waste and sedimentation. For each waste stream, the Plan includes a description of the context in California, the current situation along the border and a set of prioritized recommendations to remediate the issue. The Plan presents overarching recommendations in the last section that apply to all solid waste types.

Waste Tires and Used Tires

The presence of illegally dumped waste tires in the California-Mexico border region poses serious environmental concerns. Waste tire piles are fire hazards that once ignited can burn for months, cause dangerous air-quality problems, and generate liquid waste that seeps into the soil, ground and surface waters.

Abandoned tires are also prime breeding grounds for mosquitoes (capable of carrying chikungunya, dengue and zika viruses), rodents and other vectors of diseases. Illegal waste tire dump sites are often located close to poor, disadvantaged communities with few resources to combat these problems.

Waste tires also cause damage to estuarine environments. A study of salt water cord grass in North Carolina found that tires inhibited re-growth of cord grass 14 months after the tires were removed.ⁱⁱⁱ Varieties of cord grass are native to California and grow in the Tijuana Estuary.

Addressing these problems requires a collaborative, cross-border effort and the establishment of partnerships between local, state and regional entities that create beneficial and environmentally sound options for use and proper disposal of waste tires.

California Context

The California State Legislature mandates CalRecycle to regulate and manage waste tires within the State of California and to enforce waste tire laws. The Legislature recognized the need for waste tire management and passed Assembly Bill 1843 (Brown, Statutes of 1989, Chapter 974), known as the California Tire Recycling Act (Tire Act).

The Tire Act authorized creation of the Tire Recycling Program and the California Tire Recycling Management Fund (Tire Fund). Pursuant to the Tire Act, a \$1.75 fee per unit is assessed on the sale of all new tires, and \$1.00 of the collected revenue is deposited quarterly into the Tire Fund. The remainder of the fee is appropriated to the California Air Resources Board. CalRecycle allocates the Tire Fund annually based on availability and evolving market opportunities and tire management needs.

To further strengthen waste tire management, the Legislature passed Senate Bill 876 (Escutia, Statutes of 2000, Chapter 838). The comprehensive measure extended and expanded California's waste and used tire regulatory program. A key provision requires CalRecycle to adopt and submit to the Legislature a Five-Year Tire Plan (Five Year Plan) that identifies priorities, performance criteria, and budget allocations. The "Report to the Legislature: Five-Year Plan for the Waste Tire Recycling Management Program (Eighth Edition Covering Fiscal Years 2015/16-2019/20)" was last submitted in 2015. It is updated every two years.^{iv}

CalRecycle expends Tire Fund monies to manage waste and used tires in two functional areas:

1. Permitting and Enforcement

Tire permitting and enforcement activities ensure that reusable and waste tires are stored and transported safely. CalRecycle coordinates with local and regional agencies to mitigate unsafe conditions at abandoned tire pile sites, inspect waste tire generators and haulers, and provide technical and enforcement assistance to jurisdictions and businesses.

- Tire Hauler Program – CalRecycle trains and permits waste tire haulers and works with partner jurisdictions and agencies to inspect and monitor waste tire haulers. Haulers are required to complete manifests that indicate waste tire points of origin and the locations of final disposition. The manifest system enables CalRecycle to track waste tires generated within the state and to determine whether these tires were diverted from landfills for other uses such as tire-derived products, tire-derived fuels, or other commercial purposes. Manifests also reveal how many tires are disposed of in landfills.

- Waste Tire Generators and Businesses – CalRecycle and local jurisdictions inspect waste tire generators to enforce regulations for waste tire storage and hauling. CalRecycle trains all inspectors statewide and monitors inspection activities. CalRecycle funds the Tire Enforcement Agency grant program to empower local jurisdictions to conduct inspections of local waste tire generators and haulers, used tire dealers, and tire-based recycling businesses.
- Waste Tire Cleanup – CalRecycle helps fund cleanup of waste tire piles through grants to local jurisdictions and the local conservation corps. An annual Tire Fund set-aside called The Solid Waste and Tire Cleanup program accomplishes large-scale waste tire cleanups. CalRecycle manages these cleanups by using private contractors. This fund has never been used to remove large waste tire piles in the border region and CalRecycle is not aware of any large tire piles along the U.S. side of the border with Mexico.

2. Tire Recycling and Market Development

California encourages tire recycling and supports tire-derived product markets by offering financial assistance to encourage business and product development and to assist local governments in implementing collection, outreach and public education campaigns. CalRecycle also conducts recycling research, conducts targeted marketing outreach to potential product buyers, and provides technical assistance to stakeholders.

CalRecycle awards grants and loans to businesses and public entities for activities with potential to expand markets for products made in whole or in part from waste tire rubber. The Five Year Plan is in part focused on building a sustainable statewide market infrastructure for tire-derived products such as rubberized asphalt concrete (RAC), tire-derived aggregate (TDA) for civil engineering applications, and rubber mat and cover products.

CalRecycle staff estimates that of the approximately 42 million waste tires generated in 2015, 35.8 million (80.9 percent) were diverted from the landfill through: A) various beneficial uses including reuse and retreading, and B) other uses such as tire-derived products and fuel. A portion of the used tires generated in California each year are of sufficient quality to either be reused within the state or exported abroad, including to Baja California.

The 2009 Tire Flow Studyⁱ and the 2012 report titled “Methodology for the Development of a Model Integrated Waste Tire Management Plan Framework for Baja California”^v provided a set of recommendations and concrete actions CalRecycle and other agencies could pursue to address waste tire issues along the border. Dr. Paul Ganster is under contract with CalRecycle to report on the progress achieved on implementation of the recommendations. A draft report is due to CalRecycle by June 30, 2017, with a final report due by November 1, 2017.

Border Context

According to the 2012 report, “Methodology for the Development of a Model Integrated Waste Tire Management Plan Framework for Baja California” by the Center for Environmental Public Policy at the University of California, Berkeley, significant steps were taken in Mexico to address waste tire disposal, including implementation of a mandatory fee for disposal of waste tires.^{viii} In spite of these efforts, Baja California does not have an adequate budget to address management of waste markets or to invest in infrastructure.

Tire flow across the border creates both economic opportunity and environmental concerns.

The market demand for California’s used tires in Mexico (i.e., imported tires suitable for reuse on passenger or freight vehicles) causes many tires to move into Mexico through legitimate commerce. An informal flow of used tires also exists, however, as a result of individual importation for personal use, scrap vehicles and the illegitimate disposal of waste tires.

It is estimated that Baja California disposes of 1 million to 1.5 million waste tires annually and one third to one half of these tires were imported from the United States. Approximately two thirds of waste tires are landfilled or dumped illegally, while formal management systems capture the remaining one third. A small waste tire disposal fee is charged in Baja California; the cost per tire varies according to tire size. The fee is paid to dispose of waste tires at Baja California state-certified operators, and part of the fee funds two public waste tire disposal facilities, while the rest of the fee remains in the government’s general fund. Baja California does not levy a fee on the sale of tires.

The table below shows data from the 2009 San Diego State Tire Flow Study.^v

Baja California Tire Flow Data

Description	Tires per Year
New tire sales in Baja California	500,000
Estimated formal imports from California	700,000
Formal used/scrap car imports from California	80,000
Estimated informal/untracked imports from California	500,000

Economics Driving the Importation of Used and Waste Tires

A growing number of residents in Mexico’s border cities rely on the automobile for transportation. However, in the face of low per-capita incomes and inadequate credit

availability, vehicle owners depend on access to lower-cost used tires.^v The San Diego State Tire Flow Study identified the disparity in cost between new and used tires in 2009. A Baja California government official provided estimated per unit cost ranges of new and used passenger vehicle tires in Baja California, which vary widely based on tire size. These price ranges are compared in the table below.

Tire Price Ranges

Location	New Tires	Used Tires
Baja California	\$30-80	\$15-50

The used tire trade between California and Baja California is an important economic activity for both states. The used tire industry supports approximately 24,000 Mexican workers employed at as many as 2,015 businesses in Baja California and the adjoining state of Sonora. These jobs pay the US equivalent of \$20 to 26 million in annual wages.

According to the 2009 Tire Flow Study:

- In 2008, California companies generated \$5.8 million in revenue through exportation of 637,500 used tires to Baja California.
- In 2008, used tire imports from California generated \$13 million in revenue for Mexico used-tire businesses.



Figure 4 Spring Valley Weekly Swap Meet is where tires and rims are sold. Source: 2009 Waste Tire Flow Study

CalRecycle's tire hauler registration program, used and waste tire manifest system, and a tire facility inspection program support multiple goals including effective tracking of the movement and disposition of waste tires throughout California and across the border. The system works reasonably well for tracking tires within California. Mexican haulers who collect and haul tires in California must pass the training program to receive a hauler permit to operate in the state. Waste and used tire businesses in Mexico, where imported tires are delivered, are assigned Tire Program Identification Numbers (TPID). The reliability of tracking data for tires imported from California to these businesses is unknown, however, because CalRecycle conducts no cross-border inspections.

Tire Rubber Markets



Figure 5 Typical small used tire shops in Baja California. Source: 2009 Waste Tire Flow Study

A strong waste tire rubber commodity market is a binational concern since the goal is to keep this material out of landfills and the environment. Building a strong commodity market for reuse on both sides of the border can create a demand for waste tires, thereby minimizing illegal dumping and use as tire-derived fuels.

Through the U.S.-Mexico Border 2012 program, the U.S. EPA, in cooperation with Mexico's Secretaria de Medio Ambiente y Recursos Naturales (Secretary of Environment and Natural Resources, SEMARNAT), created the [Scrap Tires Handbook on Recycling Applications and Management for the U.S. and Mexico \(Handbook\)](#). The Handbook is a

resource for developing waste tire rubber markets in the border region between Mexico and the United States. It provides valuable market development information to federal, state, and local governments and to private industry by presenting information and lessons learned from entities that have established and effectively managed waste tire management programs.

In 2013, Michael Blumenthal, vice president of the Rubber Manufacturer's Association in San Antonio, Texas, presented a number of considerations and steps necessary to establishing a market for beneficial use of waste tire rubber in Mexico.^{vi} These included:

- There is a need to develop robust and diversified markets for tire-derived aggregate and tire-derived fuel (a less desirable use).
- Municipalities can become active consumers of tire shred materials for civil engineering applications.
- Mexico needs training in processing technology, civil engineering and business development.
- Mexico needs additional infrastructure, such as a ground rubber manufacturing facility.
- There is potential to create cottage industries to make products from used tires.
- Mexico needs legislation and regulations to control the waste tire infrastructure in order to attract investors who desire some controls over the market.

Environmental Concerns



Figure 6 Source: <http://superfund.sdsc.edu/>

Environmental concerns include importation of used tires that are illegally dumped, use of tires as fuel in cement kilns, and unplanned construction using waste tires.

Importation of used tires increases the number of waste tires in Mexico because used tires become waste tires more quickly than new tires. Suboptimal driving conditions in Baja California, such as unpaved streets and roads, deteriorated surfaces, and other road hazards, result in an average three-month life span for used tires.

Importation of waste tires from Mexico is impractical due to distance, transportation costs, and customs restrictions and regulations. Market forces within California also affect the impracticality of importation, including shrinking demand for crumb rubber for specific uses such as play fields and

variances in export demands that create a surplus of in-state waste tire stocks. Therefore, the importation of tires from Mexico is, according to an industry expert consulted in the preparation of this report, economically undesirable at this time.

Illegal Dumping

Illegal dumping of waste tires is another key environmental concern. Factors that fuel illegal dumping, including inadequate disposal infrastructure, have historically resulted in the accumulation of large tire piles along the U.S.-Mexico border.

U.S. and Mexico federal, state, and local environmental authorities addressed the accumulation of waste tire piles under the aegis of Border 2012, the U.S.-Mexico border environmental program based on the 1983 La Paz Agreement. Authorities identified forty-two tire stockpiles along the U.S.-Mexico border, totaling an estimated 400,000 tires in Baja California.^{vii}

An informal field investigation in 2012 by the Baja California Secretariat of Environmental Protection (BCSPA) and SEMARNAT reported smaller tire piles and

illegal dumpsites dispersed throughout border cities.^{viii} The report indicated that at that time there were no longer any large, informal tire piles in Baja California; however, a preliminary status update (see p. 20) provided by WILD Coast on the outcomes of their demonstration project shows illegal waste tire disposal is an ongoing issue. No current and comprehensive assessment is available on waste tire pile accumulations. Waste tire pile site inventories are fluid because tires are continually added and removed. Furthermore, the conditions that created the tire piles remain intact and are a challenge for California, the United States, and Mexican border states.

The cost of tire cleanup efforts is also an ongoing issue. The cleanup of legacy piles in Baja California between 2004 and 2006 cost about \$666,000 and removed 1.4 million tires. Ongoing cleanup of small tire piles has a higher per tire cost and the expense is considerably higher when tires are carried by storm water across the border into California and are mixed with other solid wastes and sediments.^v

Tire-Derived Fuel

The Tire Study reported in 2009 that about 40 percent of the used tires exported to Mexico were captured by formal reporting systems. The vast majority of these tires were used for tire-derived fuel in cement kilns. Tires are used as fuel for cement kilns because they have a higher Btu (British thermal unit) content than coal. Tires also burn cleaner than coal, but toxic emissions are still a concern. A 2010 U.S. EPA report identified 30 cement kiln plants in 18 Mexican States that utilized tire-derived fuel, as shown in the following map.

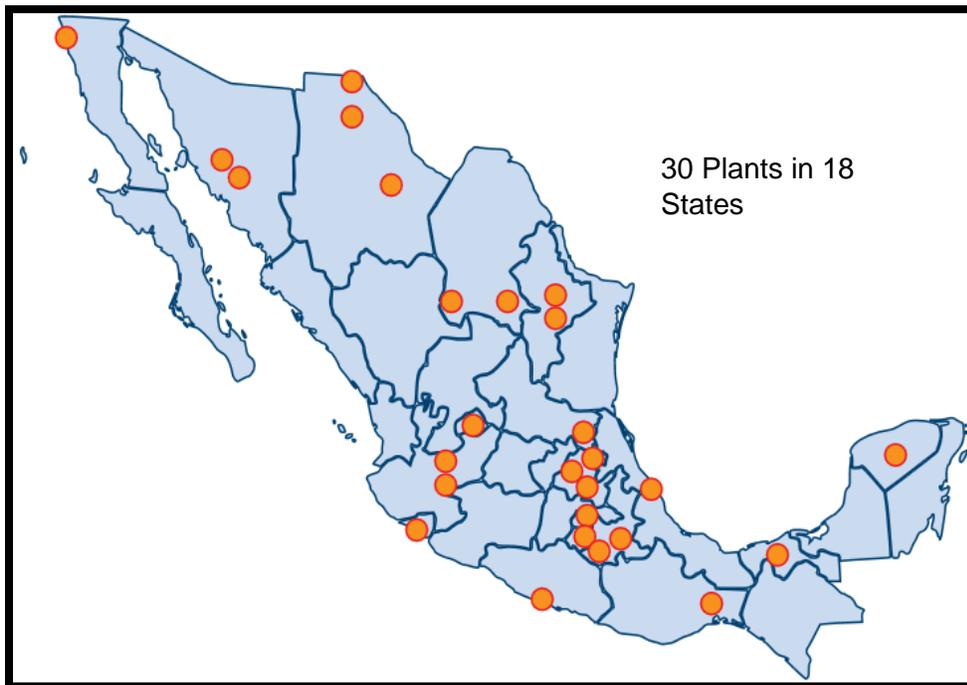


Figure 7 Source: EPA Scrap Tire Handbook

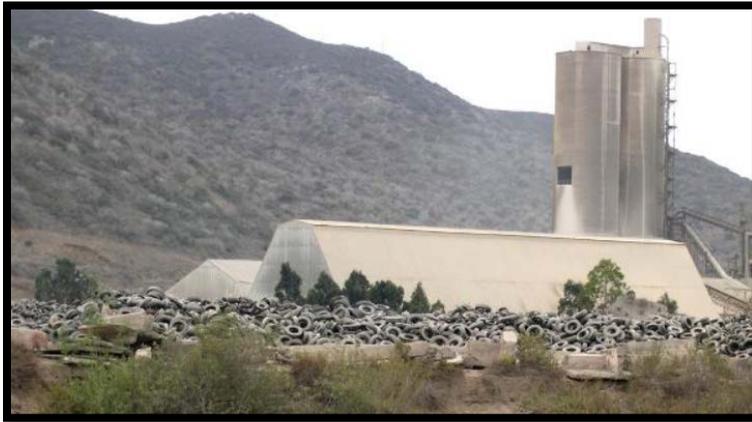


Figure 8 CEMEX (Cementos de México) cement plant in Ensenada burns shredded tires as tire-derived fuel. Depending on demand for cement, it can burn approximately 500,000 tires per year. The plant stores roughly one year's supply of tires on site. Source: 2009 Tire Flow Study

Only one cement kiln is located in Baja California, in the city of Ensenada. It can burn up to 500,000 tires per year.^{ix} The next closest cement kiln that uses waste tires is located in Hermosillo, Sonora, more than 400 miles from Mexicali. The cement companies in northern Mexico have cooperated with Mexican officials to decrease waste tire stockpiles along the border, but at times the costs of alternative fuels can make long hauling of waste tires from the border economically untenable.

Waste Tires Used in Construction

Waste tires are often used in under-engineered construction projects that are vulnerable to erosion. The Tijuana River carries both illegally discarded tires and tires washed downstream from eroded construction projects back into the United States during the rainy season, thereby polluting federally protected areas including the Border Field State Park and the Tijuana River Estuary.

Researchers estimate about 30 percent of Baja California waste tires are used for civil engineering projects such as self-built housing that is common in Tijuana, Tecate and other Baja California urban areas. Waste tires are also used in many civil engineering projects linking homes to roads, as erosion prevention measures, and as retaining walls to stabilize slopes. During rainy winters, it is common for these tire-based structures to collapse, sending tires, sediment, and other debris into the canyon beds, rivers, and downstream into the estuaries along the border.

Mexico does not currently have engineering standards or building codes for using tires as a construction material. A non-profit organization called Alter Terra (www.alterterra.org) is making an effort to design and disseminate sound engineering practices and to work with the Mexican government to write and implement building codes and regulations.

Alter Terra has completed demonstration [projects](#) in Tijuana that feature retaining wall structures to support existing housing and other construction on the hillsides. According to Alter Terra Executive Director Oscar Romo, Alter Terra pioneered this technique and

Guatemala has used, approved and adopted it in their country. With publication assistance through a grant from the California Department of Water Resources, Alter Terra is writing a manual on how to use waste tires safely for construction projects. Publication is expected in February 2017.



Figure 9 Failed retaining wall, which threatens the integrity of the upper road and the lower road. Tires often end up in the canyon bottom and are transported downstream into the United States. Source: 2009 Waste Tire Study



Figure 10 Recent self-constructed housing in newly developed areas in the upper Los Laureles watershed. Note the use of scrap tires for foundations, retaining walls, and stairways. Source: 2009 Waste Tire Study

WILDCOAST Demonstration Project

WILDCOAST is a 501(c)(3) non-profit corporation with offices in both Imperial Beach, California and Ensenada, Mexico. WILDCOAST was established in 2000 to protect coastal areas in the Californias and Latin America. Today, the WILDCOAST mission addresses establishing public and private protected areas, implementing stewardship and management activities, building community conservation capacity, developing and advocating conservation policy, and carrying out communications campaigns.

The Border Relations Council granted \$100,000 from the SB 83 appropriation to WILDCOAST to conduct a one-year demonstration project in Tijuana that:

- Removes up to 100,000 waste tires from four locations.
- Identifies potential markets for tire-derived products (e.g., asphalt, light bricks, and energy).
- Evaluates the effectiveness of cross-border multilateral and sector partnerships with respect to waste tires.

More than halfway through the project, WILDCOAST reported progress in meeting the project goals.

Progress to Date

- 15,000 tires have been removed
- A successful two-month lobbying effort convinced a waste tire collector to pursue remanufacturing companies rather than use tires for fuel.
- WILDCOAST has identified eager clients who need shredded waste tires to manufacture new products like asphalt, turf, shoes and other items.
- WILDCOAST, government agencies from Mexico and California, and the private sector are continuing to collaborate successfully to accomplish project goals.
- News of the project's success is traveling throughout the region and Mexicali officials have expressed interest in the progress of this Tijuana-based pilot project.

Lessons Learned to Date

- Permitting challenges are delaying cleanup within the Tijuana River Channel.
 - Tire remanufacturers require multiple sizes of tire shred feedstock. This region needs a private facility to purchase a new shredder to produce a specific, in-demand shred size, so remanufacturers will purchase the material.
 - Separate permits are required for installation of new tire shredding equipment for private facilities.
 - Private tire shredding companies are unfamiliar with the permitting process and unable to provide the resources to apply for new permits for new shredding machines.
- Rain and resulting mud make it difficult for workers to remove waste tires safely from cleanup sites, which limits the project to fair weather months.

WILDCOAST's final report is due in May 2017. It will include specific data about tire shredding and recycling in Mexico, as well as the effectiveness of cross-border partnerships in achieving the goals of the project.

Waste Tire Recommendations

Consistent with the findings and recommendations of the 2012 Development of a Model Waste Tire Management Framework for Baja California, the SWWG recognizes that strategies and effective regulatory programs for sustainable waste tire management at the California-Mexico border must address the fundamental drivers of the waste tire issues. Solutions should include a consideration of alternative and economically viable uses of waste tires and any regulatory construct should consider how best to address the essential source problems of unmanaged waste tires. Cleanup efforts alone, or solutions implemented only on the California side of the border, deliver only temporary

solutions. It is prudent and efficient to build sustainable programs and programmatic infrastructure to manage the causes of these environmental issues.

1. Eliminate Gaps in California's Waste Tire Tracking System

The SWWG would like to see the California tire tracking system strengthened to more accurately quantify used tires flowing from and through California into Baja California.

In California:

- Convert the paper manifest system to an electronic manifest system.
- Assign each border crossing (Mexico and neighboring states) a Tire Program Identification Number (TPID) so tires leaving the state would be reported, rather than the current system of assigning TPIDs to end destinations, such as a tire shop in Mexico. This change would also improve the capacity of CalRecycle to share export data with Mexico.
- Pay tipping fees to haulers only when they deliver them to a TPID, rather than the current system in which tipping fees are paid when tires are picked up.
- Upgrade the hauler program to improve the quality of haulers. This could include raising the amount of the bond required and increasing the difficulty of the exam that haulers must pass to obtain a permit. The bond is currently \$10,000.
- Past Recommendations from the 2009 Tire Flow Study included the following:
 - Identify ways to strengthen the California tire tracking system to better quantify the flow of used tires.
 - Take steps to increase cooperation with neighboring border states, U.S. Customs and Border Protection, and the California Highway Patrol in order to improve tire flow data.

In Mexico:

- Revisit import rules and other barriers.
- Share import and export data regionally and binationally.
- Re-examine the existing regulatory structure. Where a regulatory structure needs to be established, set oversight and enforcement responsibilities.

The recommendations listed below were made in the 2009 Tire Flow Study. Dr. Paul Ganster will give an update on the progress on these recommendations in the updated study that CalRecycle commissioned.

- Update information on import permit quotas, actual imports, permit enforcement and accounting improvements.
- Assess the size of tire piles, identify how they accumulate, and propose potential solutions to remedy the problem.

- Collect data on the number of tires recycled into tire-derived products, used in brick or cement kilns, or used in unauthorized construction in border areas.
- Research and describe local collection systems, including financing and operational capacity.
- Create and implement methods for CalRecycle and Baja California environmental protection staff to assist each other.
- Update information on existing institutional infrastructure.

2. Provide Technical Assistance to Increase Waste Tire Processing Infrastructure and Market Development in Baja California—Institutional Capacity

California's experience in effective waste tire stewardship and market development can provide models and sources of technical support for effective cross-border collaboration. Long-term and sustainable programmatic infrastructure requires four key components including financing, collection systems, processing facilities, and market demand. Financing involves a stable and adaptable funding stream ensuring consistent financing in support of reasonable regulatory oversight and incentives that encourage market and infrastructure development. Instruments to consider include fees, grants and loans. Collection Systems are a means or program by which materials are consistently collected and introduced into a management system. Processing Facilities refer to operators and companies who receive the material and convert it into a new product or feedstock for another intended purpose. Market Demand refers to a network of end users and customers who can use the processed materials.

In California:

- Identify opportunities for California government and industry experts to attend meetings or other forums on expansion of the waste tire and tire rubber industry in Mexico.
- Encourage market infrastructure investments on the border.
- Enable California waste tire businesses to import waste tires from Mexico when markets allow; importation laws and regulations are prohibitive at this time. While industry experts indicate that there is currently equilibrium between supply and demand in California, understanding the existing obstacles to importation may yield future benefits should demand increase.

In Mexico:

- Explore fee structures that could fund investments in a waste tire industry and product manufacturing sector in Mexico.
- Work with existing industry to expand markets for tire-derived products.
- Disseminate information about best practices and existing models such as the BECC Scrap Tire Management Strategic Model, which was successfully implemented in Ojinaga, Chihuahua, to create a self-sustaining tire policy.

The BECC's Strategic Model provides a methodology that involves local stakeholders in identification of local solutions. The Strategic Model includes general strategies such as collection, tire use, storage, and final disposal, as well as cross-sectional strategies like legal and regulatory action, measuring and evaluation, education, and outreach at the federal, state, and local levels. The BECC's Strategic Model is a useful tool because scrap tire programs in different places require different structures. A strong structure for local government involvement in the development of waste tire policy is crucial particularly because there is often less continuity of leadership at local level.

3. Increase Tire Amnesty Events Along the Border

CalRecycle provides grants to jurisdictions and local conservation corps to collect waste tires from their communities through amnesty events and waste tire pile cleanups.

At an amnesty event, the public is invited to dispose of waste tires at no charge. These events are a successful strategy to prevent illegal dumping and are easily replicable. Amnesty events are marketed within communities in advance through radio ads, community notices, and online using email blasts and listservs. A drop-off pattern is established at the site on the day of the event. Community members drop off waste tires that volunteers stack within containers or on trucks, and the waste tires are then hauled away for recycling or disposal to a predetermined location.

In California:

- Encourage border jurisdictions to apply for Waste Tire Amnesty Grants through CalRecycle and to include the local conservation corps in their applications.
- Invite Mexican officials to attend amnesty events to observe how they work and to offer technical assistance.

In Mexico:

- Set up regular amnesty events at the two public waste tire storage facilities funded by the waste tire disposal fee to encourage legal disposal of waste tires.
- Set up waste tire collection routes that result in disposal at the public waste tire facilities.

4. Support Development of Standards for use of Waste Tires in Civil Engineering Projects

Through financial assistance, research and development, and an education and outreach effort, California has proven the value of tire-derived products in road maintenance, drainage projects, light rail sound damping and many other applications. California, as well as U.S. EPA, have identified a broad range of civil engineering

projects effectively using tire-derived aggregate (TDA). These projects can include drainage applications for highways, local roads, and small-scale engineering projects like backfill around foundation walls. Guidance exists detailing the appropriate standards by which TDA can be utilized.^{ix}

In California:

- Provide online access to technical materials, best practices, and research reports on the use of crumb rubber in engineering applications.
- Connect technical experts with Mexican engineers to support use of tire rubber in projects in Mexico.
- Continue to conduct or support research and development on new ways to utilize tire rubber for marketable products.

In Mexico:

- Adopt codes and regulations that implement sound engineering standards for use of tires and tire derived products in a variety of civil engineering applications.
- Support market development for tire derived products and infrastructure necessary to manufacture these products.

5. Encourage Establishment of a Mexican Tire Management Program

Mexico may overcome a lack of funding to promote safe waste tire disposal and tire rubber markets by establishing a tire management program. Mexico could choose from a range of tire management models that have been implemented globally.

One effective model is California's waste tire fee charged on new tire sales. Possible structures for tire fees in Mexico could include:

- Imposing a set fee on new and used tires based on tire size in a tiered format.
- Imposing a fixed tire fee on all vehicle registrations. Vehicle owners would be given certification of the fee payment, which would provide a discount on future tire purchase.
- Imposing a fee structure that is tiered based on annual income to moderate the impact on low-income drivers.

Three other tire management models are common in Europe as cited in the Product Stewardship Institute's Tire Stewardship Briefing Document.^x

Free Market System

The distributors deal directly with the recycler of their choice on a free-market basis. This system requires the last holder of a tire to have responsibility for handling it. Free

market systems are active in Austria, Germany, Ireland, Switzerland, and United Kingdom.

Government Responsibility Financed through a Tax System

Under this system, producers pay a tax, and the state is responsible for administering tax collection and makes payments to recyclers. A tax system is active in Croatia, Denmark, and the Slovak Republic.

Producer Responsibility System

End of life (ELT) tire regulations mandate producer responsibility generally through a collective system; although self-compliance is also a possibility in ELT regulation, it is relatively uncommon in Europe. The law provides the legal framework and assigns responsibility to tire manufacturers and importers (producers) to organize the management of scrap tires. Producers generally contribute to a collective fund that finances collection, transportation, education and communication, recycling, and recovery. These systems are in place in Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Greece, Hungary, Italy, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden and Turkey.

Other Solid Waste

The SWWG recognizes that there is also a need to address the diverse content of the waste streams polluting the border region and to understand their volume and pathways. In addition, base prioritization of waste stream remediation is needed not only on volume but also on the relative risks to public health and potential environmental damage.

California Context

California has passed ambitious legislation for solid waste reduction. In 2012, AB 341 (Chapter 476) established a goal for California to source reduce, recycle, or compost 75 percent of its waste by 2020. Subsequently, in 2015, SB 1383 (Chapter 395) moved California closer to that goal by requiring mandatory recycling of reusable materials as well as organic waste for most California commercial businesses and multi-family residential buildings.

CalRecycle is mandated to administer and provide oversight for all of California's state-managed waste handling and recycling programs. The Department is mostly known for overseeing used tire, beverage container and electronic waste recycling; however, CalRecycle is also responsible for organics management, used motor oil, carpet, paint, mattresses, rigid plastic containers, plastic film wrap, newsprint, construction and demolition debris, and household hazardous waste.

CalRecycle has an annual budget of approximately \$1.4 billion, including \$1.1 billion in the Beverage Container Recycling Fund; other funding is generated from recycling fees on new electronics, tires and used oil, and disposal fees charged by landfills. Much of these monies are reinvested into the economy through payments and grants to the industry and local jurisdictions to support waste reduction, recycling, and safe disposal efforts. The remainder covers CalRecycle's annual operating budget. CalRecycle receives no money from the state's tax dollar supported General Fund.

The AB 341 Report to the Legislature put forth five strategies and three additional focus areas that CalRecycle, the Administration or Legislature can pursue to reach the 75 percent recycling goal.^{xi} These strategies are not intended as an implementation plan, but rather a catalog of options for moving forward. The strategies are:

- Moving organics out of the landfill
- Expanding the recycling and manufacturing infrastructure: permitting and compliance assistance and financing
- Exploring new models for state and local funding of materials management programs

- Promoting state procurement of postconsumer recycled content products
- Promoting extended producer responsibility

Conceptual proposals are also included for three additional focus areas:

- Source reduction
- Commercial recycling
- Other Products (packaging, waste tires, e-waste and used oil)

Border Context

While waste tires are a highly visible environmental problem in the border region, there are other solid waste streams to address. As outlined in “Recovery Strategy: Living with the Water,” water and wind easily transport floatable trash like Styrofoam and plastics, enabling these wastes to move across the border when collection and proper disposal is not accomplished. Mexico lacks the comprehensive infrastructure to collect and manage these waste types.^{xii}

Exponential population growth in the border region since the ratification of NAFTA has exacerbated waste dumping including electronic waste, household appliances, green waste, construction and demolition waste and more. Limited waste management services and infrastructure do exist, but municipal governments do not have sufficient funds to keep up with the growing demand. This results in illegal dumping into canyons, drains, and riverbeds.

Mexico treats solid waste differently than California primarily due to lack of funding. The state of Baja California does not have a budget for waste management, so there is limited collection infrastructure. For example, the nearest landfill to Mexicali is twenty miles from the city. This makes disposal of solid waste economically unfeasible for the average person who must focus on their basic needs. There are also no solid waste collection vehicles to remove solid waste from the community to the landfill.

Jurisdictional issues exist as well. Residents often dump trash into the drains in Mexicali, which are federal property. Local government has no right or authority to remove the trash.

Solid waste has a significant impact on the Tijuana River. In 2014, the U.S. EPA conducted a Tijuana Valley sediment retention basin characterization study at the request of California’s Borderfield State Park and the Tijuana River National Estuarine Reserve to assess chemical concentrations, physical properties, and plastic content of the sediment in the basins and on two background areas. The study found significant levels of Organochlorine Pesticides (OCPs), Polychlorinated Biphenyls (PCBs), and Polybrominated Diphenyl Ethers (PBDEs) in colocated sample pairs of sediment and

plastic. Contaminants in plastics samples were higher than sediments “suggesting that plastic particles may accumulate these compounds by absorption and adsorption.”ⁱⁱ

Solid waste also greatly affects the New River. The New River was primarily a storm wash before wastewater began flowing into the channel. Discharges from agricultural, industrial and municipal water use now cause the river to flow year round. As mentioned earlier, residents commonly use the upstream drains in Mexicali as dumps for solid waste. This trash collects in the drains and washes downstream, especially in storm events. The Sonoran Institute Demonstration Project addresses solid waste issues in the Mexicali drains and mid-project outcomes are discussed later in this report.



Figure 11 New River. Source: <http://compasscultura.com/life-death-on-the-salton-sea/>

Plastic, Foam and Other Waste Streams

There is no formal measurement of the amount of plastic, foam and other debris that litters the border area; however, various cleanup events throughout the Tijuana River Valley help quantify the problem. Each year, the Tijuana River Action Network (TRAN), a grassroots partnership comprised of thirteen partner organizations and thirty-one supporting organizations, organizes a large volunteer cleanup effort throughout the Tijuana River watershed. The group removes a large number of waste tires, but the vast majority of trash consists of other materials.

Year	Acres Cleared	Tires Removed	Other Trash Removed (tons)
2015	19.2	284	42.8
2014	8.3	106	38.0
2013	11.0	185	51.0



Figure 12 TRAN cleanup site. Source: Tijuana River Action Network Blog

Volunteer cleanup events are beneficial but limited because they are staffed by volunteers and lack sustained funding. They are also hampered by permit restrictions related to threatened and endangered species and access constraints during the rainy season.

The San Diego Regional Water Quality

Control Board organized the Tijuana River Valley Recovery Team (TRVRT) in 2009. The TRVRT is a collaborative organization consisting of more than 30 federal, state and local agencies focused on addressing sediment, trash and environmental issues on both sides of the U.S.-Mexico border. In 2015, the TRVRT published its [5-year Action Plan](#),^{xii} which outlines cost-effective solutions to manage trash and sediment pollutants. Some of these strategies for solid waste include:

- Floatable trash capture devices
- Storm drain capture devices
- Trash removal programs in Mexico and California
- Trash source control that includes both collection and recycling

The Sonoran Institute Demonstration Project

The Sonoran Institute is a 501(c)(3) corporation founded in 1990 and headquartered in Tucson, Arizona. The organization works throughout Western North America to protect natural resources and to assure clean water, air and energy.

The Sonoran Institute received \$200,000 from the SB 83 appropriation to conduct a one-year demonstration project to reduce illegal disposal of solid waste in drains that contribute to the pollution of the New River. The purposes of the project are to:

- Prepare a Needs Assessment and Action Plan that compiles information on solid waste issues and potential El Niño impacts
- Perform cleanup activities that address drain sanitation
- Deliver environmental education to selected schools in the Mexicali region

- Disseminate project information and objectives to regional communities



Figure 13 New River. Source: <http://alliancehealthcarefoundation.org/calexico-new-river-committee/calexico/>

More than halfway through the project, the Sonoran Institute reported on their progress.

Progress to Date

- 3,800 cubic meters of solid waste was removed from three drains: Tula, Mexicali and the Colector del Norte. The organization is on track to meet the target of 6,000 cubic meters removed.
- The Sonoran Institute seeks to rehabilitate these drains into green corridors. The International Drain site in Mexicali was successful and the Institute is considering a similar model. After implementation, the Mexicali area has eliminated illegal dumping and the project has proven to be an asset to the community.
- The project is benefiting from collaboration among many government agencies and groups including CalEPA, CalRecycle, Imperial County Health Department, Calexico Public Works, Comité Civico del Valle, Calexico New River Committee, the International Boundary and Water Commission, City of Calexico, Colorado River Regional Water Quality Control Board.
- Approximately 1,500 students and adults received instruction through the education component, which includes participation in environmental education conferences. The social media component of the outreach campaign is set to debut in 2017.

Lessons Learned to Date

- The project has yielded a deeper understanding of jurisdictional obstacles. The city of Calexico, for example, removes trash alongside the New River bank once or twice

a year, depending on funding, but no entity removes trash from within the New River.

- Border patrol gates designed to keep people from illegally entering the United States via the New River observe and collect significant amounts of trash. The Border Patrol opens the gates twice a day to search for people hidden in the trash and foam. There is no standardized trash collection program in place, and waste continues to flow down the New River toward the Salton Sea.
- The Sonoran Institute discovered illegal dump sites along the U.S. side of the border at Calexico, California that contribute to New River contamination.
 - Waste material consists mostly of construction and demolition waste and organic waste from landscaping businesses
 - Costs associated with legal disposal make illegal dumping attractive. The Institute discovered an illegal dumpsite less than one mile from the Calexico landfill

Solid Waste Recommendations

Multiple sources were considered in creating the following recommendations. See the end notes for additional information.

1. Increase Trash and Sediment Capture Devices and Provide for Maintenance and Operations

Trash and sediment collection must continue until other practical measures, such as drain cleaning and conservation easements, are developed. Maintaining existing capture devices and adding them where needed, such as in Goat Canyon, will require increased budget commitments by local, regional, state, federal and binational stakeholders.

Infrastructure is needed to capture trash and reduce downstream trash and sediment deposits in the main channel called Stewart's Drain (Puerta Blanca), in Smugglers Gulch cross-border canyon (El Matadero), and in Los Laureles. Annual volumes in the main channel are about 30,000 cubic yards of sediment, 1,000 tons of trash, and 400 tires, which cost approximately \$1.9 million to clean up. The annual solid waste volume in Smugglers Gulch and its downstream pilot channel is up to 30,000 cubic yards of combined sediment, trash, and tires, which cost \$2 million to clean up. The annual average total for Goat Canyon is 60,000 cubic yards of combined sediment trash and tires, which cost \$1.8 million to clean up.

Trash interception devices could include booms similar to those installed in Goat Canyon. Sediment retention basins or weirs could be installed to capture sediment and non-floatable trash. This construction could be initiated through short-term pilot scale

projects or, preferably, through long-term projects that incorporate ongoing operation and maintenance.

The expected outcomes from trash interception projects are:

- Concentration of solid waste and sediments in predetermined areas, making removal and material separation more efficient
- Less solid waste, sediment and tires flowing downstream that would otherwise spread out into vast areas of sensitive riparian, estuarine and ocean habitats
- Cost savings to agencies that coordinate trash removal and flood control activities in the valley
- Reduced flooding danger and lower public health risks

2. Increase Capacity for Drain Cleaning

The Sonoran Institute demonstration project highlights the potentially transformational effect of clearing drains of garbage and debris. As government agencies and community members see progress, the Sonoran Institute reports growing momentum and in-kind donations for additional drain cleaning activities. The Sonoran Institute hopes to expand its Mexicali drain cleaning effort and to transform illegal dumpsites into green corridors.

In addition to supporting programs modeled after the Sonoran Institute drain-cleaning project and the New River improvement project, California can help ensure local officials have adequate equipment necessary to continue these efforts including dump trucks, skip loaders and back hoes. An effort should be made to identify funding sources, to establish public-private partnerships based on successful demonstration projects, and to explore the feasibility of obtaining donated or surplus equipment.

3. Formalize cooperative solid waste management framework between California and Mexico



Figure 14 Tula West Drain, New River, Mexicali.
Source: http://www.waterboards.ca.gov/coloradoriver/water_issues

Management of solid waste streams was not included in the Joint Action Plan for the MOU. An option could be to invite states and Baja California to add an addendum to the 2014 California and Mexico “Memorandum of Understanding (MOU) to Enhance Cooperation on Climate Change and the Environment” to work on solid waste as a priority action area. Adding solid waste as a priority policy area provides the mechanism needed to track the multiagency efforts related to waste, tires, solid waste, and

sedimentation in the border region. Identifying current and proposed regional efforts can ensure that objectives are complementary and efficient.

California is prepared to provide technical assistance and consultation relative to solid waste (including e-waste and scrap tires) and waste recycling management strategies and programs through the Border 2020 project. California can offer consultative assistance in the following areas:

- Share program information regarding the State's e-waste program, including overviews of both CalRecycle's and the Department of Toxic Substances Control's respective and cooperative roles, the program's history, and regulations.
- History and information on financing and fee mechanisms to support materials management programs, including extended producer responsibility programs.
- Consultation and information sharing on market development strategies. California could provide successful examples such as loan, grant, and incentive payment programs for various waste materials and recycling commodities.
- Consultation and guidance on effective local government collaboration and support, including the interaction between the state and local enforcement agencies.

While Mexico, and the State of Baja California in particular, have expressed interest in this assistance, technical dialogue has yet to occur. California remains committed to this consultative assistance, and the SWWG notes that solid waste recycling and management programs should have clear jurisdictional authorities and roles. Articulation of these roles requires an understanding of the region's governance and, in particular, the commitment and involvement of local government. Many federal, binational, state, regional, local, and nongovernmental agencies and organizations are working within the border region, which increases the risks of duplicative or incompatible efforts.

Electronic Waste

California Context

California enacted the Electronic Waste Recycling Act in 2003 to address environmental and health concerns related to proper disposition of electronic waste (e-waste) in California. The California Department of Toxic Substances Control (DTSC) regulates and enforces storage, collection and recycling of e-waste under the Act, and CalRecycle manages the payment system for collectors and recyclers funded by an electronic waste recycling fee authorized in the Act that is further described below. The intent of the Act is to:

- Provide financial relief to responsible parties for managing covered electronic waste
- Foster cost-free recycling opportunities for consumers throughout the state
- Reduce illegal dumping and increase compliant management and disposition
- Eliminate the stockpile of waste computer monitors and televisions
- Decrease the amount of hazardous materials in covered products

The Act established a fee that consumers pay at the time of purchase on covered devices to offset handling when these devices are disposed. The California Board of Equalization collects the fee and CalRecycle administers it. The fund fosters a collection and processing infrastructure. CalRecycle approves participation in the program for collectors and recyclers while DTSC enforces participant's adherence to regulations.

The Act covers specific types of e-waste, but in California all electronic waste is presumed to be hazardous because improper disposal can pose serious human and environmental risks. DTSC adopted and enforces regulations that require management of all electronic waste as a universal waste because "...they pose lower immediate risk to people and the environment when properly managed..."^{xiii} This management includes the proper handling and recycling of e-waste.

E-waste management presents a particular challenge because product development is rapid and ongoing, which creates new challenges for the recycling industry and they must constantly adjust to a changing waste stream. The Act also established certain manufacturer responsibilities including consumer information, brand labeling, annual reporting, product design for recycling, and reduction of hazardous materials.

Border Context

According to Mexico's National Institute of Ecology and Climate Change (INECC), the country generated roughly 358,000 tons of electronic waste in 2014: an estimated 10 percent of that material was recycled, 40 percent was stored in homes and 50 percent was landfilled. The amount of electronic waste is expected to increase significantly, since Mexico switched from an analog signal to a digital television signal in 2015; this change drives the disposal of tens of millions of analog, cathode ray tube (CRT) televisions. CRT and other electronic devices that contain dangerous and toxic materials such as lead, mercury and brominated flame-retardants makes proper disposal imperative.



Figure 15 Source: https://wn.com/mexico_waste

Similar to the market forces that drive demand for used tires in Mexico, there is also demand for lower-cost, repaired or reusable electronics in Baja California. According to the U.S. International Trade Commission, Mexico was the number one importer of used U.S. electronics in 2013, taking in almost 129,000 tons. The devices with shortened life spans are eventually disposed of in Mexico and some are recycled in an unsafe manner, presenting significant health risks to humans. Some of these materials end up in waterways

and cause harm to water quality and environments of downstream communities.

As outlined in an article in Bloomberg's Businessweek,^{xiv} "The lack of a formal, regulated recycling industry is one of many reasons Mexico has become a magnet for spent electronics." Low or non-existent disposal costs make the developing country a dumping ground for these hazardous materials. Current laws in Mexico require large corporate consumers of electronics to file electronic waste management plans. However, with limited oversight of the electronic waste recycling industry, there is high potential for unsafe handling and disposal of electronic waste.

The U.S. EPA devised an e-waste management system for implementation in Mexicali to reduce health threats to the public and operators, strengthen small e-waste enterprises, and increase the collection and proper disposal of e-waste. With current funding, the management system aims to train and certify e-waste collectors and processors and provide proper safety equipment. The U.S. EPA selected ten of the estimated 80 small recycling facilities currently operating in the City to participate. Participants will be assessed regularly to ensure compliance with program requirements. The system includes a training component to establish best practices for future training, and certification of operators. The Agency is also working to secure funding to create a centralized e-waste recycling facility.

E-waste Recommendations

1. Support Electronic Waste Management Infrastructure Development

Through the Border 2020 Program, the U.S. EPA is taking bold steps to support the creation of an effective program for the long-term management of the electronic waste discards in northern Mexico. The U.S. EPA will disseminate the results and best practices that emerge from implementation of the BECC Mexicali project^{xv} to help expand successful program elements to other border cities.

An increased commitment to cross-border collaboration may also help municipalities in Mexico organize e-waste collection and disposition infrastructure. CalRecycle can offer technical assistance related to its Covered Electronic Waste Program, established under the Electronic Waste Recycling Act of 2003, as a potential model for funding the collection and safe disposition of electronic waste in Mexico. CalRecycle maintains significant information on the quantity, flow, and disposition of residual materials, such as CRTs and CRT glass that may have been shipped to processors in Mexicali (like Termoeléctrica de Mexicali or TDM) as the result of the covered electronic waste (CEW) program. CalRecycle does not track the flow of general electronics that do not enter the CEW program, as that hazardous material falls under the regulatory authority of DTSC, whose authority includes the receipt of export notification and annual shipment reporting.

Sedimentation

The Tijuana River Watershed (TRW) drains 1,750 square miles across the U.S.-Mexico border and only 27 percent of the TRW lies in California. The watershed flows into the Tijuana River and then discharges into the Tijuana Estuary and Pacific Ocean on the U.S. side of the border. Sedimentation due to erosion, trash and waste tires are the primary causes of environmental degradation and health concerns for proximate communities. Pollutants flowing into the TRW also include heavy metals, chemicals, fertilizers, and sewage.^{xvi}

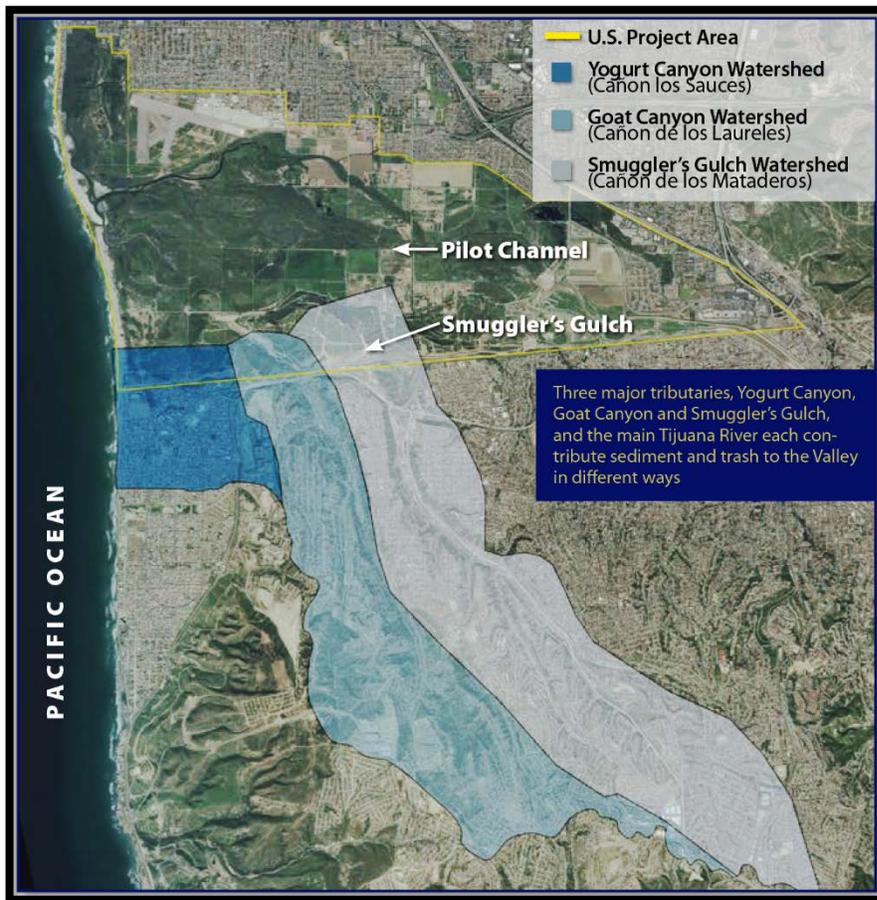


Figure 16 Tijuana River Watershed

California Context

Sedimentation is primarily a concern for water quality and is therefore administered and regulated by the State Water Resources Control Board and California State Parks.

Sedimentation's affect on water quality is described in a 2011 report entitled, "Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality for the Protection of Fish and Wildlife,"^{xvii} by the State Water Resources Control Board, Division of Water Quality.

In California, proposed watershed developments that could impact the quality and quantity of bay and estuary sedimentation are to be reviewed according to these factors:

- Past, present, and probable future beneficial uses of water
- Environmental characteristics of the hydrographic unit under consideration
- Water quality conditions that could reasonably be achieved through control of factors affecting water quality
- Economic considerations
- The need to develop housing within the region
- The need to develop and use recycled water

The California Natural Resources Agency's member departments, agencies and commissions, the U.S. Army Corps of Engineers (USACE), and the Coastal Sediment Management Workgroup's (CSMW) collaborated on a Sediment Master Plan (SMP) for the State. The SMP identifies and prioritizes regional sediment management needs and opportunities along the California coast and provides this information to resource managers and the general public in order to streamline sediment management activities. Issues may include coastal erosion, recreational opportunities, environmental impacts, dredging and sediment flow through coastal watersheds.

The SMP is implemented through a series of region-specific Coastal Regional Sediment Management Plans (RSM) prepared by appropriate regional entities with oversight and assistance from CSMW.

Among the advisory agencies contributing to the CSMW is the Tijuana River National Estuarine Research Reserve (TRNERR). Sediment is a primary management consideration for TRNERR, as high levels of sedimentation have resulted from the intensely altered urbanized setting along the U.S.-Mexico border. TRNERR collaborates with various governmental agencies and academic institutions to conduct research and restoration in sediment-impacted wetlands.

Border Context

The Tijuana Estuary is part of the Southern California Coastal Wetlands Complex and is identified as one of 2,200 International Ramsar Convention Treaty wetlands of international importance. The Tijuana Estuary is one of thirty-eight wetlands of international importance that have been identified within the United States.



Figure 17 Source: <http://www.calrecycle.ca.gov/archive/IWMBPR/2009/09Sept/34.htm>

Sedimentation in the Tijuana Valley has negatively impacted the estuarine environment and changed the topography. Sediments and trash are washed downstream from degraded upstream environments, which is primarily due to rapid population growth and inadequate solid waste services in Tijuana. The loss of upstream riparian habitat contributes to the high sedimentation of waters flowing from the three primary watersheds that feed the Tijuana

River. These habitats, primarily coastal sage and scrub, are destroyed due to the construction of homes, dirt roads, and retaining walls made of waste tires without proper engineering or planning for runoff.

The build-up of sediments affects the ecology of the valley, as sediments and trash collect downstream and traps solid waste. The build-up of material also increases flood risks to infrastructure in the valley.

The deleterious effect of the loss of riparian habitat is well documented. In 2013, Courtenay White at Royal Roads University wrote about the impact of homeless encampments on natural riparian habitats. She concluded that, “Healthy riparian stream corridors are integral to the biological diversity and water-quality of the local ecosystem, and their degradation can cause social and economic problems at local and regional levels....”^{xviii}

A report on a tidal salt marsh sediment study^{xix} in Chromosphere detailed how increases in sedimentation combined with solid waste flowing into an estuary poses potential long-term health risks for wildlife and humans. The study found that sediments absorb metals in the water column and settle to the bottom. “Consequently, sediments are recognized as the final repository for a substantial fraction of the metal load in many watersheds and can therefore provide a long-term integrated source of information regarding environmental quality.”^{xix} The report also supports similar findings of the 2014 EPA Sediment Characterization Study^{xv} that found contaminants in plastic and sediment samples from the Goat Canyon retention basins.

The Chromosphere report further concluded that these metals pose long-term risk to humans as, “... metals are not biologically or chemically degraded so sediment bound metals are likely to persist much longer in the environment. Thus, metals can affect the health of wildlife and humans long after their major sources have been removed.”^{xix}

The brief descriptions below summarize the issues and remediation efforts at each of the watershed areas.

Goat Canyon

Sediment discharged from the Goat Canyon watershed is degrading salt marsh habitats in the valley. California State Parks constructed two sediment retention basins downstream of the international border to capture sediments. These two basins capture up to 60,000 cubic yards of material that must be excavated each year. The basins intercept most of the sediment during the wet season but major storm events can overwhelm them.

Smuggler's Gulch

Sediments from the Smuggler's Gulch watershed contribute to flooding dangers. The City of San Diego and San Diego County provide resources to clear sediments when feasible to reduce the potential for flooding. The City also constructed a Pilot Channel to divert water during larger storm flows from the north part of the watershed directly to the ocean. The Pilot Channel also requires regular sediment removal to prevent flooding.

Los Laureles Canyon

The Los Laureles Canyon watershed feeds directly into the Tijuana Estuary Reserve. The erosion and sediment build-up harms growth of native species and contributes to the loss of soil. Sedimentation endangers native plants such as the Salt Marsh Bird's Beak, which is a hemiparasite that uses Shoregrass and Salt Grass as a host plant.^{xxi}

Sediment Remediation

Removal of the sediment, separation of embedded trash and tires, and disposal of all materials are the primary strategies on the U.S. side of the border. Sediment management is costly. Since 2009, California alone expended nearly \$3 million for sediment and trash clean-ups within Goat Canyon. Ongoing remediation would require additional funding.

A 2009 waste tire and sedimentation study^{xxi} commissioned by the IBWC found that as much as 12 feet of sediment had accumulated in the Pilot Channel and five feet in other areas of the Tijuana River Valley. Much of the material tested was sand and clay with little evidence of chemical pollutants or trash. It was determined that these materials could be removed and re-used.

Erosion prevention is the primary method to reduce sedimentation. Erosion prevention strategies planned for this watershed include re-vegetation of upstream habitats and installation of pervious pavers to distribute rainwater evenly on soil and to channel runoff into storm drains to prevent erosion.

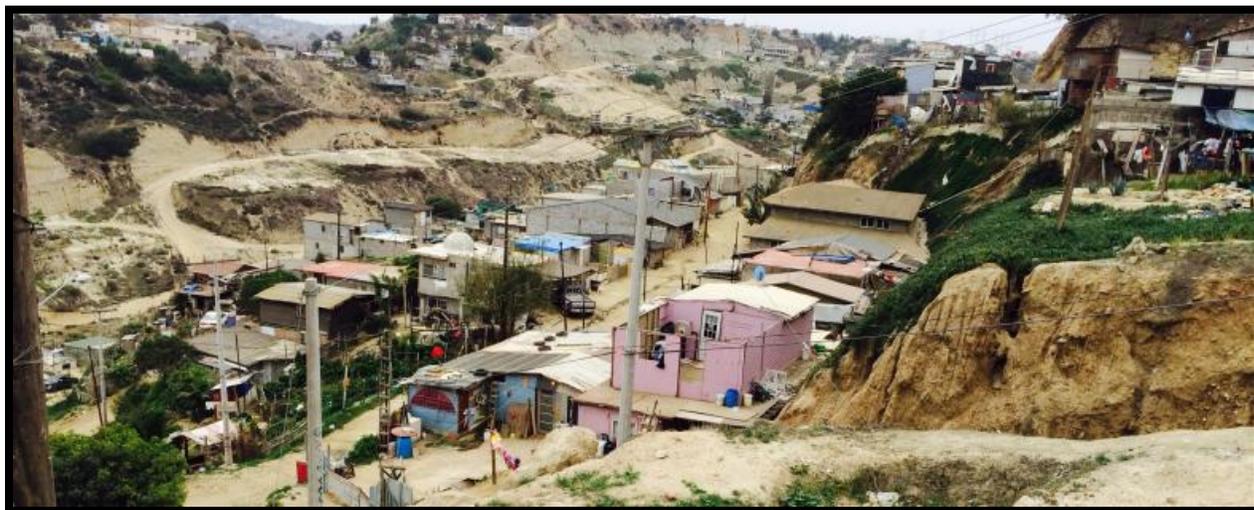


Figure 18 Los Laureles Canyon. Source: <http://superfund.sdsc.edu/>

Providing assistance and technical support to the appropriate government agencies in Mexico can lead to upstream erosion prevention measures that over time will lower the need for and the cost of remediation efforts in the U.S.

Sedimentation and Water Quality Recommendations

The recommendations below are derived from information gathered at the SWWG workshop series, the TRVRT 5-Year Action Plan, and additional cited source documents.

1. Implement Water Quality Measures to Reduce Runoff and Erosion

Increase Number of Bio Filtration Basins

- Until upstream erosion control measures can be implemented to reduce the flow of sediments downstream, regional landowning agencies on both sides of the border need to install and maintain sediment retention basins to minimize sediment flow into protected areas. Efforts should focus on Smuggler's Gulch, Yogurt Canyon, and other locations in the City of Tijuana. These basins will capture sediment loads flowing from the canyons of Tijuana. Regional agencies will need to manage effectively sediment capture, removal, and identification of locations where sediment can be deposited or reused. The obstacle to this program is a shortage of funding for both capital costs and operations and maintenance. Lack of agency coordination and planning are institutional barriers.

Storm water control measures

- Encourage road paving and green infrastructure improvements throughout the City of Tijuana, with emphasis on irregularly developed canyon communities. Recent studies supported by the U.S. EPA indicate that paving the dirt roads in Los Laureles Canyon would reduce sediment loads into Goat Canyon by as much as 40 percent. It is anticipated that significant sediment reduction would also be realized through similar road improvements in other areas of Tijuana, such as Matadero Canyon.

Road paving Should Be Appropriately Paired with Green Infrastructure Techniques Focused on Storm Water Control and Infiltration

- Vegetated infiltration basins, biofilters, pervious paving, rainwater capture, and other techniques would reduce sedimentation and control storm water runoff. Conservation programs could restore the vegetation of hillsides in the watershed canyons.

Secure Conservation Easements in Urban Canyons in Mexico

- To prevent invasive species and damaging pollutants from coming into the reserve, natural areas and their corresponding ecosystem services should be protected and restored at key locations. Conservation areas would serve as vegetative buffers to filter storm water and sediment. Opportunities exist to encourage the establishment of conservation areas throughout the City of Tijuana, and especially in the open spaces of Los Sauces, Los Laureles, and Matadero Canyons.

Maintenance of Goat Canyon Sediment Basins

- The sediment basins generate up to 60,000 cubic yards per year and require continuous maintenance. Securing ongoing funds for maintenance of the Goat Canyon sediment retention basins would allow for continued removal of sediment and trash from the basins, transport and disposal of trash, and transport and landfill disposal or reuse of sediment.

2. Construct and Maintain Green Infrastructure to Improve Water Quality through Restoration of Hydrologic Function of the Environment

Reclamation of Nelson Sloan Quarry

- The County of San Diego acquired the Nelson Sloan quarry with funding from the California Coastal Conservancy for reclamation and restoration of native upland habitat. Planning, construction of infrastructure, and operation of the former Nelson Sloan quarry, consistent with the 2016 Nelson Sloan Management and Operations Plan and Cost Analysis,^{xxii} would allow for a complete reclamation of the quarry and

restoration to valuable native upland habitat. This would be accomplished using sediment in the valley from routine excavations from cross-border flows. Additionally, the reclamation will facilitate projects such as the proposed Brown Property restoration and proposed salt marsh restoration. It would also lower implementation costs of Sedimentation Recommendation One.

- **Cost Estimate:** Several fill alternatives have been evaluated for the Nelson Sloan Quarry Project, differing in volume of sediment received at the site. Cost for a 1,000,000 cubic yard fill project are estimated at \$17,558,685. Cost for a 2,300,000 cubic yard fill project are estimated at \$33,548,784. The priority is to maximize fill at this location. Both projects anticipate roughly a 20-year horizon.

Restoration of the Brown Property

- Restoration of this property will improve habitat, recreational uses, and hydrologic function. The Brown Property on the U.S. side was the site of unauthorized fill activities in the past. Analyzed by CalRecycle, the fill was determined to be inert, nonhazardous waste. Removal of this fill and restoration of the site to riparian forest floodplain would yield multiple benefits:
 - Substantially improve the hydrology of the Tijuana River Valley
 - Benefit habitat and recreational uses
 - Improve flood control at neighboring farms and military operations at the U.S. Navy Outlying Field

Sediment removal would be more economical if the Nelson Sloan Quarry were available to receive the fill

- **Cost Estimate:** Restoration of the Brown Property to improve habitat, recreational uses, and hydrologic function.
 - \$1,000,000 for planning
 - \$1,000,000 for construction

3. Support Wetland Restoration Projects in the Tijuana River Valley

The Tijuana Estuary Tidal Restoration Program is an example of a comprehensive restoration planning process that seeks to increase the Tijuana Estuary's ability to sustain healthy ecosystem functions over time. Restoration of the estuary, including increased tidal prism, and other estuarine functions, will improve the estuary's ability to naturally flush sediments from the system and sustainably accommodate relatively higher levels of pollution. Additionally, healthy riparian habitats upstream can filter and buffer the estuary and ocean environments.

Overarching Recommendations

The recommendations in this section address overarching needs for organizing, planning, building relationships, and leadership. While these recommendations identify communications and reliable funding strategies, they should be considered in the broader context of the plan's other recommendations, in particular those addressing regulatory solutions.

There is an existing body of research and recommendations that considers how best responsible and impacted entities could design, implement, and oversee regulatory programs such as managing waste flows, diversion, and recycling, and effective environmental stewardship. The following regulatory construct best practices inform this plan:

- Clearly identified and prioritized policy outcomes
- Clear and achievable regulations ensuring incentives
- Defined and realistic enforcement mechanisms
- Reliable and consistent performance and compliance monitoring
- Defined responsibilities and stewardship roles
- Sustainable funding mechanisms
- Viable and productive uses for end products and their market development

Ongoing efforts vis-à-vis regulatory program solutions should consider this construct and ensure it is part of the communications and reliable funding strategies recommended here.

1. Designate lead entity to coordinate efforts and facilitate communication

A lead entity should be designated to serve as the key point of facilitation and communication. That entity should work to build partnerships and relationships that offer diversity of perspective, help monitor changing waste streams, and maintain focus to sustain efforts.

A lead entity would serve as a central point of contact among groups working on border region environmental issues by helping prioritize needs and minimizing duplication of efforts by raising awareness of work currently taking place. The lead could also serve to formalize shared leadership between various agencies that may want to lead these efforts. Additionally, the entity could serve as a repository for information about previous and ongoing efforts to remediate solid waste along the border. A Joint Powers Authority (JPA) could also serve to formalize shared leadership between various agencies that may want to lead these efforts.

The Binational Technical Committee (Border Environment Cooperation Commission [BECC], IBWC, U.S. EPA) is a good example of a means to exchange information among members. However, it is important that all stakeholders, in particular NGOs who perform work in the region (e.g. MexiCali), are included in the development of solutions to waste issues.

2. Secure steady and flexible funding sources for ongoing border needs

California cannot independently resolve all solid waste issues on the border. Both federal governments, Mexican state governments, and local jurisdictional stakeholders must all contribute to planning and funding solutions to the environmental issues the Plan addresses. One-time and short-term funding (i.e., financial support for physical infrastructure projects such as ecosystem restoration), as well as sustainable funding (e.g., fee-supported materials management programs) are critical elements to achievement of these recommendations.

Funding opportunities for border region projects include:

- The California Tire Recycling Management Fund (Tire Fund). As previously noted, the Tire Fund currently supports two demonstration projects in Tijuana and Mexicali via a one-time \$300,000 appropriation. However, the Tire Fund can only support those projects that address risks of waste tires returning to California. Therefore, it is not a sustainable or broadly applicable means of supporting other projects and materials management problems within the region.
- AB 1071 (Chapter 585, Statutes of 2015) Supplemental Environmental Projects. Pursuant to AB 1071, boards, departments, and offices within CalEPA have developed Supplemental Environmental Project (SEP) catalogs.
- An SEP is an environmentally beneficial project that a person subject to an enforcement action voluntarily agrees to undertake in settlement of the action and to offset a portion of the civil penalty. To the extent that enforcement actions respond to border region issues, an SEP could be relevant. However, enforcement actions are unpredictable and should not be viewed as a substitute for sustainable funding.
- Assembly Bill 965 (Chapter 668, Statutes of 2015) authorized the California Department of Fish and Wildlife to consult with the Border Relations Council to establish criteria to fund projects for cross-border urban creeks and watersheds.

Specifically, the projects will address the ecological, flood control, water quality, and hydrological conditions associated with these creeks and watersheds. Given the persistent harm resulting from solid waste and sedimentation upon watersheds and waterways within the region, recommended projects presented in this Plan should be among those pursued for Proposition 1 grants.

Meetings to establish funding criteria are planned for early 2017. Once this is accomplished, project proponents can apply for funding.

A key consideration in planning for investments in solid waste issues along the border is that the problems flow with the water so the best solutions are those that remediate the issues upstream at the source. Since 73 percent of the Tijuana watershed lies in Mexico, and since much of the solid waste in the New River comes from the Mexicali drain system, the best solutions to many issues are those that act to limit the quantity of waste tires, solid waste and sediments that enter waterways and are washed across the border.

Financial constraints in Baja California and local municipalities limit funding for integrated waste tire management programs and present complexities relative to managing other waste streams. Limited federal level support compound these financial limitations. Legal restrictions on the expenditure of many fees collected in California make it difficult to secure financial support for cross-border collaboration on projects or activities outside California. However, financial investment and support in Mexico, such as through demonstration and pilot projects, not only yields critical performance data and analysis, it demonstrates California's clear commitment to supporting the border region and solving or ameliorating persistent environmental problems.

Therefore, the long-term success of border cleanup and waste management programs depends on securing budget commitments from sustainable funding sources on both sides of the border.

Appendix 1 - SWWG Membership and Background



California Environmental Protection Agency (CalEPA)

In 1991, California's environmental authority was unified in a single, cabinet level agency called CalEPA. The mission of CalEPA is to restore, protect and enhance the environment and to ensure public health, environmental quality, and economic vitality. The agency fulfills its mission by developing, implementing and enforcing environmental laws that regulate air, water and soil quality, pesticide use, and waste recycling and reduction.

The Secretary of CalEPA chairs the Border Relations Council, reflecting the cross-border impacts of environmental problems and the ongoing necessity to facilitate coordinated solutions to waste issues that affect the health of the environment of border communities.

California Department of Resources Recycling and Recovery (CalRecycle)

CalRecycle is one of three departments under CalEPA. CalRecycle facilitates the SWWG as the primary California agency that oversees the state's solid waste management and waste recycling programs through regulatory oversight, financing, and policy development. In addition to the department's solid waste, organics infrastructure, beverage container recycling, and e-waste recovery programs, CalRecycle is tasked with administering regulations related to storage, transportation, recycling and disposal of approximately 42 million used and waste tires in California annually.

State law requires CalRecycle to engage in California-Mexico border region waste tire activity, such as training for haulers, environmental education, abatement planning, tracking waste tire flow, and uniform application of waste tire environmental and flow control requirements. These projects address California-to-Mexico movement of used tires, education, infrastructure, mitigation, cleanup, prevention, reuse and recycling.

California Department of Parks and Recreation (Region 9)

The mission of California State Parks is to provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.

California State Parks manages the Tijuana Estuary and the Border Field State Park, which are both heavily affected by all solid waste issues addressed by the Plan.

The San Diego Regional Water Quality Control Board (San Diego Water Board)

San Diego Water Board is a key regional stakeholder in resolving solid waste and sedimentation issues that impact water quality. The southernmost portion of the San Diego Water Board's jurisdiction is the Tijuana River watershed, approximately 73 percent of which is located in Mexico.

Colorado River Regional Water Quality Control Board (Region 7)

The mission of Region 7 is to preserve, enhance, and restore the quality of California's water resources and ensure proper allocation and efficient use for the benefit of present and future generations.

Region 7 has primary responsibility for addressing the New River's water quality problems. The staff has been instrumental in achieving cooperative, binational implementation of projects in Mexicali to restore the city's sewage collection and treatment systems to satisfactory operating standards, which directly impact the quality of the water in the New River that flows through Calexico.

SWWG Guiding Principles

In January 2016, SWWG members adopted six guiding principles central to implementation of successful solutions to the border issues addressed in the Plan. The Working Group advises that these principles should be central to implementing the recommendations presented in this Plan.

Guiding Principles

- 1) Cross-border benefits to facilitate cross-border collaboration.
- 2) The inclusion of local and regional governments in California and Mexico, ensuring they have a role in the implementation of the Plan's goals.
- 3) Environmental justice and a recognition of socio-economic conditions vis-à-vis the Plan's goals and recommendations.
- 4) A consideration of natural ecosystems restoration.
- 5) An awareness of market conditions that drive solid waste and waste tire issues at the border.
- 6) Recommended goals and objectives will, to the extent it is possible, reflect long-term, sustainable, and scalable solutions.

Appendix 2 – Table of Cooperative Groups and Members

AGENCY	BORDER RELATIONS COUNCIL MEMBERS	CALIFORNIA – MEXICO MEMORANDUM OF UNDERSTANDING ON CLIMATE CHANGE AND THE ENVIRONMENT MEMBERS	U.S.– MEXICO BORDER 2020 PROGRAM	TIJUANA RIVER VALLEY RECOVERY TEAM
Arizona Dept. of Environmental Quality				
Audubon Society				X
Banco para el Desarrollo de América del Norte			X	
California Air Resources Board		X		
California Business, Consumer Services, and Housing Agency	X			
California Coastal Commission				X
California Coastal Conservancy				X
California Department of Conservation, Office of Mining and Reclamation				X
California Department of Fish and Wildlife				X
California Department of Food and Agriculture	X			
California Department of Resources Recycling and Recovery (CalRecycle)				X
California Environmental Protection Agency	Chair	X	X	X
California Governor’s Office of Emergency Services	X	X		
California Health and Human Services Agency	X		X	
California Natural Resources Agency	X			
California Office of Binational Border Health			X	
California State Parks				X

SOLID WASTE & WASTE TIRE STRATEGIC PLAN

AGENCY	BORDER RELATIONS COUNCIL MEMBERS	CALIFORNIA – MEXICO MEMORANDUM OF UNDERSTANDING ON CLIMATE CHANGE AND THE ENVIRONMENT MEMBERS	U.S.– MEXICO BORDER 2020 PROGRAM	TIJUANA RIVER VALLEY RECOVERY TEAM
California State Water Resources Control Board				X
California Transportation Agency	X			
City of Imperial Beach				X
City of San Diego				X
Comisión de Cooperación Ecológica Fronteriza			X	
Comisión Internacional de Límites y Aguas			X	
Comisión para la Cooperación Ambiental de América del Norte			X	
CONAFOR		X		
CONAGUA – Comisión Nacional del Agua			X	
Consejo Consultivo para Desarrollo Sustentable (Mexico's Consulting Council for Sustainable Development)			X	
County of San Diego				X
Good Neighbor Environmental Board			X	
International Boundary and Water Commission			X	X
National Marine Fisheries Service				X
National Oceanic and Atmospheric Administration				X
Native American Environmental Protection Coalition			X	
North American Commission for Environmental Cooperation			X	

SOLID WASTE & WASTE TIRE STRATEGIC PLAN

AGENCY	BORDER RELATIONS COUNCIL MEMBERS	CALIFORNIA – MEXICO MEMORANDUM OF UNDERSTANDING ON CLIMATE CHANGE AND THE ENVIRONMENT MEMBERS	U.S.– MEXICO BORDER 2020 PROGRAM	TIJUANA RIVER VALLEY RECOVERY TEAM
North American Development Bank			x	
OpenOceans Global				x
Procuraduría Federal de Protección al Ambiente (Mexico’s Federal Attorney General for Environmental Protection)			x	
San Diego Coastkeeper				x
San Diego County Water Authority				x
San Diego Regional Water Quality Control Board				Lead
Scripps Institution of Oceanography				x
Secretaría de Salud (Mexico’s Secretariat of Health)			x	
Secretaria de Medio Ambiente y Recursos Naturales		x	x	
Southern California Coastal Water Research Project				x
Southwest Center for Environmental Research and Policy			x	
Southwest Wetlands Interpretive Association				x
State Coastal Conservancy				x
Surfrider Tijuana River National Estuarine Research Reserve				x
Tijuana River Valley Equestrian Association				x
U.S. Army Corps of Engineers				x
U.S. Bureau of Reclamation				x

SOLID WASTE & WASTE TIRE STRATEGIC PLAN

AGENCY	BORDER RELATIONS COUNCIL MEMBERS	CALIFORNIA – MEXICO MEMORANDUM OF UNDERSTANDING ON CLIMATE CHANGE AND THE ENVIRONMENT MEMBERS	U.S.– MEXICO BORDER 2020 PROGRAM	TIJUANA RIVER VALLEY RECOVERY TEAM
U.S. Customs and Border Patrol				x
U.S. Department of Agriculture				x
U.S. Department of Health and Human Services			x	
U.S. Environmental Protection Agency	x		Lead	x
U.S. Fish and Wildlife Service				x
U.S. Navy				x
U.S.-Mexico Border Health Commission			x	
University of California at San Diego				x
WILDCOAST/COSTASALVAJE				x

End Notes

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