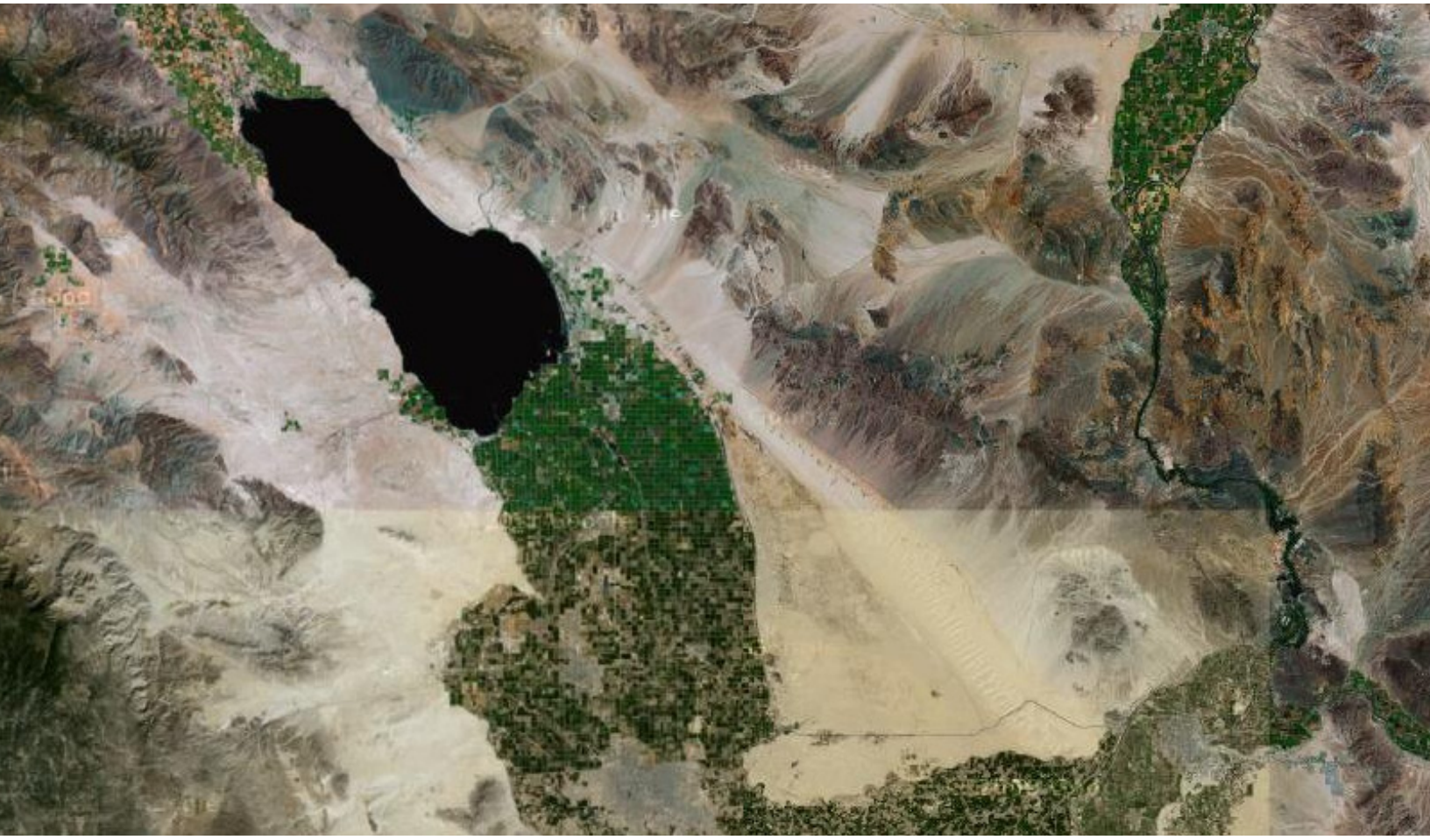
Strategic plan: New River Improvement Project



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New River Improvement Project Technical Advisory Committee

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Prepared for:

California-Mexico Border Relations Council

Prepared by:

New River Improvement Project Technical Advisory Committee (TAC)

Steering Committee:

Deputy Secretary for Border Affairs, California Environmental Protection Agency (Chair) (Designee Daniel Garza)

Jose L. Angel, Assistant Executive Officer, Colorado River Basin Regional Water Quality Control Board

Luis Estrada, Utility Services Director, City of Calexico

Committee Membership:

Ema Rosa Silva, Calexico Community Representative

Miguel Figueroa, Executive Director Calexico New River Committee

Michael Flores, Environmental Scientist, California Department of Fish and Game, Bermuda Dunes Office

Dr. Marilyn Underwood, California Department of Public Health

Frank Gonzalez, P.E., CalTrans, District 6

Leon Lesicka, Executive Director Citizens Congressional Task Force on the New River

Jose Luis Olmedo, Executive Director, Comité Cívico Del Valle

Ralph Cordova Jr., County Executive Officer (designee Andy Horne, Deputy County Executive Officer), County of Imperial

Linsey Dale, Executive Director, Imperial County Farm Bureau

Kevin Kelley, General Manager, Imperial Irrigation District (designee Steve Charlton)

Lisa Santana, U.S. International Boundary and Water Commission, El Paso

Antonio Ortega, Office of Assembly Member V. Manuel Perez

Eduardo Demesa, Chief, Plan Formulation Branch, U.S. Army Corps of Engineers

Jonathan Ballard, Porfolio Manager, U.S. General Services Administration

Trevor Taniguchi, Staff Assistant, California Environmental Protection Agency

Ing. Ignacio Gomez, Secretaria de Infrastructura y Desarrollo Urbano del Estado, Baja California

Consulting and Strategic planning:

Dr. Jeff Loux, Principal Investigator, University of California, Davis Extension

Gene Crumley, Co-Principal Investigator, University of California, Davis Extension

Krista Sloniowski, Strategic planning, Connective Issue and University of California, Davis Extension

Tara Zagofsky, Community Outreach, University of California, Davis Extension

Becky Kelley, Univerisity of California, Davis Extension

John McCaull, Attorney

Dr. Robert Emerick, Stantec, Inc, Wastewater Engineering

RBF Consulting, Maps and Graphics

Celeste Bliven, Document Layout

Shachar Lavi, Document Layout

Document Editing:

Nilan Watmore, Special Assistant, California Environmental Protection Agency

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Executive Summary

North end of future Calexico parkway location.

Introduction

Assembly Bill 1079 (Pub. Resources Code, § 71103.5, added by Stats. 2009, ch. 382, § 1), authored by Assemblyman Victor M. Perez, requires the California-Mexico Border Relations Council Council[1] to create a strategic plan to study, monitor, remediate and enhance the New River's water quality to protect human health and develop a river parkway suitable for public use and enjoyment. Creation of a river parkway in Calexico is also specified in Federal legislation, as part of the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU Public Law 109-59). Specifically, the strategic plan is required to:

- Quantify water quality impairments and their threat to public health.
- Identify and prioritize actions to protect public health, meet water quality objectives and other environmental goals.
- Identify funding sources.
- Identify public agency roles and responsibilities for implementation.

Pursuant to provisions in Assembly Bill 1079, the Chair of the Council appointed the New River Technical Advisory Committee (TAC) to oversee the development of the Plan and ensure community involvement. The TAC began work in the summer of 2010 and continued with multiple internal and stakeholder interactions through fall of 2011. The TAC organized its technical work into four Work Groups:

1. Vision
2. Impairments
3. Remediation
4. Funding and Legal

The New River TAC also solicited advice from consultants, academics and agency experts. The TAC conducted extensive outreach, including presentations to the California Regional Water Quality Control Board (Regional Water Board) for the Colorado River Basin, City of Calexico, City of Brawley executive management, Imperial Valley farming community, U.S. International Boundary Water Commission (U.S. IBWC), Imperial Integrated Regional Water Management Plan Workgroup, North American Development Bank and Border Environment Cooperation Commission. The New River TAC also held community outreach meetings in Brawley, Calexico and El Centro; a series of interviews with community and agency leaders; and held a bi-national, two-day Technical Workshop to critique and enhance the analysis and potential solutions. As a result of the community outreach and expert input, the TAC developed an ambitious vision and goals for the New River, which reflect and address the concerns of the community and are consistent with Assembly Bill 1079. The TAC then developed a comprehensive set of recommended actions to address the New River problems.

The Problem

The New River is severely polluted by discharges of wastes from domestic, agricultural and industrial sources in Mexico and the Imperial Valley. New River pollution threatens public health, prevents supporting healthy ecosystems for wildlife and other biological resources in the New River and contributes to the water quality problems of the Salton Sea. New River pollution also hinders economic development in Imperial County. Based on the most recent available data, the following water quality problems are evident in the New River on the U.S. side of the U.S.-Mexico International Boundary:

- pathogens, low dissolved oxygen (DO), toxicity, trash, selenium, sediment/silt, chlordane, dichlorodiphenyltrichloroethane (DDT), dieldrin, toxaphene, polychlorinated biphenyls (PCBs), hexaclorobenzene (HCB), nutrients and mercury.

Of those, the TAC characterized the impact of each pollutant and determined the most severe contaminants to address are pathogens, low DO, toxicity, trash, selenium and sediment/silt. Pathogen pollution is severest in the New River in Calexico.

In the past two decades, great progress has been made on both sides of the border. In Mexicali and its surroundings, with technical and financial assistance from the U.S., Mexico has built municipal wastewater conveyance, pumping and treatment facilities to serve 97% of that urban area. This has resulted in improved water quality in the New River at the U.S.-Mexico International Boundary. The water quality standards for the New River in California have been established by

Trash accumulating in the International Drain in Mexicali.

Trash screen and pumping station in Mexicali.

Unless otherwise stated, the term "border" refers to the an area extending 60 miles on either side of the International Boundary between the U.S. and Mexico, in the Imperial and Mexicali Valleys

California, pursuant to the Clean Water Act (33 U.SC. §1251 et seq.) and include standards for protection of water contact and non-water contact recreation. However, Mexico's standards for New River water quality are considerably less stringent than the U.S. standards because Mexico classifies the New River as a drain, not a river. Therefore, the pollution levels in the New River at the International Boundary will continue to exceed U.S. standards and beneficial uses will not be protected in spite of existing and planned improvements in Mexico. Calexico is the most directly impacted by this difference in standards because of its location directly downstream from Mexico.

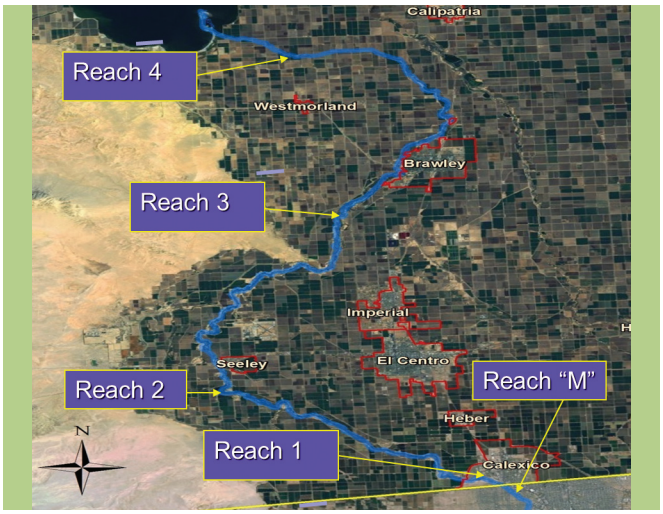
In the Imperial Valley, significant progress has also been made in addressing agricultural and domestic contaminants. Most notably, progress has been made through the State Water Resources Control Board (State Water Board) and the Regional Water Board Nonpoint Source Pollution Control Programs; the Imperial County Farm Bureau's Voluntary Total Maximum Daily Load (TMDL) Compliance Program; the Imperial Irrigation District's Drain Water Improvement Program; the Regional Water Board's silt and pathogen TMDLs; and the State and Regional Water Board's regulatory programs to control discharges of wastes from wastewater treatment plants and urban storm water runoff. Despite the impressive progress, the New River remains impaired under the Clean Water Act for nearly a dozen pollutants, including pathogens. This plan lays out the strategies that have been collaboratively identified to fully address the problems and impairments that remain in the New River.

Planning Approach

The New River's problems are both cumulative and severe. Addressing this situation requires a long-term, multi-faceted effort spanning the entire river corridor, which builds on and learns from existing efforts and involves the collaboration of many agencies and institutions. Specific water quality problems manifest uniquely on specific reaches of the river. Therefore, to identify tailored solutions for specific problems, the TAC divided the river into five reaches:

- **"M"** **Mexicali Reach:** from the Mexicali Valley to the International Boundary
- **1.** **Calexico Reach:** from the International Boundary to Highway 98
- **2.** **Seeley Reach:** from Highway 98 to Evan Hughes Highway at Seeley
- **3.** **Brawley Reach:** from Evan Huges Highway to New River Drop 2 by Brawley
- **4.** **Salton Sea Reach:** from New River Drop 2 to its outlet to the Salton Sea

New River Reaches



This approach also provides for understanding opportunities and constraints for parkway development in the Calexico area and for meaningful water quality remediation for the entire river, as required by AB 1079. The solutions recommended in this plan are based on the following:

1. Continue to clean up the river, building on the regulatory approaches, structural facilities and source control programs that have been working well already.
2. Where existing methods and programs are not suited to specific problems, identify additional program and/or project solutions that most effectively and appropriately address remaining problems.

The recommended solutions in this plan are the actions that had the highest priority among all of the many alternatives considered, based on the opportunities, constraints and goals for the system as a whole.

New River Improvement Project
Strategic Plan

Vision

The New River is a healthy river corridor that serves as an asset to the people, communities, ecosystems and agricultural industry of the Imperial Valley.

Goals

Improve Public Health:
A restored and transformed New River corridor provides a safe, healthy and accessible recreational resource for local communities.

Transform the Ecology:
Improved water quality, habitat and river corridor conditions in the New River support a healthy aquatic and riparian ecosystem and supplies water that contributes to the restoration of the Salton Sea and its delta.

Strengthen the Economy:
The New River is an aesthetic and environmental amenity that enhances community development opportunities and benefits agricultural activities throughout the Imperial Valley.

Figure 1. Strategic plan Recommended Solutions

Recommendation Summary

Mexicali Reach

The federal government should issue a statutory directive to the U.S. Section of the International Boundary and Water Commission and U.S. EPA to:

- Develop a report identifying the steps necessary to ensure compliance with established Treaty Minutes

The U.S. EPA should include the recommendations of this strategic plan in its 2020 update to the Border 2012 program regarding the Mexicali Reach and new infrastructure needed in Calexico.

The U.S. should continue to work with Mexico through the Bi-national Technical Committee for the New River/Mexicali Sanitation Program to:

- Ensure the bi-national sanitation projects in Mexicali are properly operated and maintained and all bypasses of raw sewage and untreated industrial wastes into the New River in Mexicali are eliminated
- Assess the feasibility of conversion of open agricultural drains to regulated drainage ditches
- Cover open urban storm drains
- Provide planning and technical assistance to (a) enhance wastewater operations and maintenance in Mexicali and (b) assist Mexican agencies to develop a watershed management approach encompassing solid waste management, identification of recommended control strategies to deal with point and nonpoint source pollution that continue to impact New River water quality at the International Boundary
- Develop and implement an Integrated Bi-national Monitoring and Reporting Program for the New River that measures cleanup progress in Mexico and tracks emerging threats to the New River at the International Boundary in the U.S.

Further, the Council should work with the State of Baja California under the terms of their 2008 Cooperative Agreement to:

- Establish a comprehensive outreach and education program for both the Mexicali and Imperial Valleys
- Conduct additional training to improve the operations and maintenance of sewage treatment infrastructure and pretreatment controls in both valleys

Calexico Reach

The U.S. Government should:

- Either (a) construct, operate and maintain trash screens for the New River immediately downstream from the International Boundary in the U.S., or (b) assist Mexico so that Mexico constructs, operates and maintains trash screens for the New River immediately upstream from the International Boundary in Mexico; and
- Construct, operate and maintain a conveyance and ozonation disinfection treatment facility near the Calexico Wastewater Treatment Plant to address pathogens and other contaminants.

The U.S. Government and the state should continue to assist the City of Calexico to design and build the Calexico River Parkway to provide recreational, aesthetic and health benefits to the citizens of Calexico.

The State and Regional Water Boards should continue to implement the National Pollution Disharge Elimination System (NPDES) Program for the Calexico Treatment Plant and the NPDES storm water program for the City.

Agricultural Reaches (Highway 98 to the Salton Sea[2])

The U.S. Government should continue to work with local key stakeholders, including Desert Wildlife Unlimited and the Citizens Congressional Task Force on The New River to:

- Construct treatment wetlands in strategic locations along the New River and the tributary agricultural drains (Eleven sites have been identified and analyzed).
- Construct low cost streambed aeration facilities in the New River Channel.

The Regional Water Board should:

- Develop an integrated water quality monitoring and reporting program for the New River that measures cleanup progress and tracks emerging threats for the New River downstream from the Calexico reach;
- Continue to effectively monitor and provide agricultural source control through the Imperial Irrigation District (IID) Drain Water Quality Improvement Program and the Imperial County Farm Bureau Voluntary TMDL Compliance Program for the silt TMDLs;
- Require the farming industry in Imperial Valley to develop and implement management practices to address all other pollutants of concern from the agricultural industry, not just silt; and
- Revise its General NPDES Permit for feedlots to provide containment of and prevent untreated discharges from 100-year storm events.

The state and regional water b oards should continue to implement the NPDES Storm Water Programs for industry, construction activities and small municipalities (a.k.a. “Small MS4s Stormwater NPDES Permit”).

The IID should implement beneficial vegetation management along drain banks to improve water quality and as an erosion prevention/bank stabilization measure.

Legal, Institutional and Funding Recommendations

The City of Calexico, with oversight from the California Department of Transportation (Caltrans), is already taking the lead for the River Parkway in Calexico. However, to implement the watershed-wide solutions summarized in Figure 1 will require unprecedented coordination between agency partners, legal tools and substantial additional funding. These include:

- **The U.S. EPA:** The U.S. EPA should include the appropriate strategic plan recommendations in its 2020 Border Program.
- **Federal Project Definition:** Federal legislation is needed to establish a federal New River Improvement Project definition, authorization and Lead Agency designation for coordination and implementation of federal New River water quality improvement projects, particularly implementation of structural controls for restoration of the New River in Calexico.[3]
- **Federal Legislation:** The regulations that implement the Clean Water Act should allow the permitting and operation of a treatment program in Calexico for the New River. In particular, the U.S. EPA and the State Water Resources Control Board should work together to facilitate implementation of the proposed disinfection facility in Calexico, under existing regulatory tools (e.g., "intake credit system" established under section 122.45(g), 40CFR).
- **State Legislation:** The Porter-Cologne Water Quality Control Act and/or its implementing regulations should allow for the permitting and operation of a water conveyance, disinfection and treatment program in Calexico for the New River. This would likely require the use of "intake credits" or similar administrative tools in the Region's Basin Plan and TMDL program for the New River. The Porter-Cologne Water Quality Control Act and its implementing regulations should be interpreted or amended to promote the expanded construction and management of "treatment wetlands" projects on or near the New River. The state Legislature should direct the state and regional water boards to develop and implement specific reclamation policy that facilitates re-use of New River treated water, provided the water is of sufficient quality for the intended use.
- **Funding Options:** Financial resources have already been committed to the project including $3.2 million for the River Parkway, $800,000 for project planning efforts and $400,000 for strategic planning. Additional funds have been authorized ($20 million), but not appropriated for water quality improvements through the Army Corps 2007 Water Resources Development Act. In addition to pursuing these appropriations, other funding sources could include: Proposition 84 funds for Integrated Regional Water Management programs, the 2012 State Water Bond, Salton Sea funding, California River Parkways, State Water Board Clean Up and Abatement funds, Clean Water Act funds (nonpoint source, wastewater treatment, etc.) and possibly public-private funding from the geo-thermal, small hydro-electric or other renewable energy industry.

1. Introduction

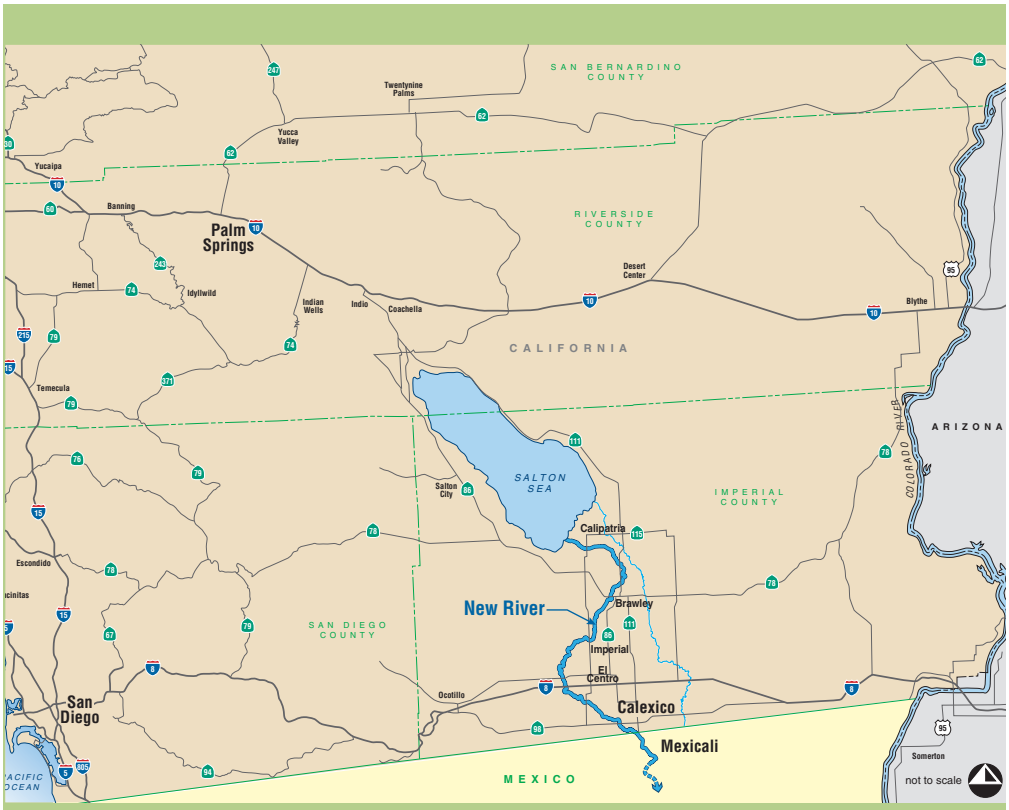


Figure 2. New River Region

Location

The New River is a sub-watershed of the larger Salton Sea Watershed. The New River starts in Mexicali, Mexico, approximately 15 miles south of the International Border and flows north into the U.S. through Calexico, passes through the Imperial Valley and drains into the Salton Sea, some 66 miles north of the International Boundary. The sub-watershed covers approximately 750 square miles, with 63% of that in Mexico and 37% in the U.S. The American communities around the New River are connected by Highways 86 and 111 and include Calexico, El Centro, Seeley, Heber, Westmorland, Imperial and Brawley. The City of Calexico, the unincorporated community of Seeley, the El Centro Navy Air Station and the City of Brawley are the closest to the river (See Figure 2).

Purpose and Scope

This strategic plan provides comprehensive action recommendations to address long-standing and current New River water quality problems. It was developed to fulfill the requirements of California Assembly Bill 1079 (Pub. Resources Code, § 71103.5, added by Stats. 2009, ch. 382, § 1). Assembly Bill 1079 (AB 1079) requires the California-Mexico Border Relations Council (Council) to create a strategic plan for the New River Improvement Project (NRIP). The NRIP is defined as a project to:

> "study, monitor, remediate and enhance New River water quality in the County of Imperial to protect human health and develop a river parkway suitable for public use and enjoyment." (See Appendix 1)

AB 1079 specifically requires the Plan to:

1. Quantify current and projected New River water quality impairments and their threat to public health.
2. Prioritize the actions necessary to protect public health and to meet the New River water quality objectives and other environmental goals, such as improving the quality of water flows into the Salton Sea.
3. Identify potential funds for the implementation of the project and potential lead agencies that would be responsible for environmental review of activities related to the cleanup and restoration of the New River.
4. Identify the appropriate federal, state and local agencies with a role in implementing and achieving the NRIP.

Pursuant to Assembly Bill 1079, the Council appointed a Technical Advisory Committee (TAC) to assist with the development of the Plan. This Plan establishes a vision for the New River and its many and varied stakeholders. The Plan provides recommendations intended to resolve existing New River water quality problems, to improve the overall health of the river and to eventually achieve the established vision. **This is not an engineering study or feasibility level document. It is a conceptual planning document that identifies the components for a comprehensive approach to improve water quality and make environmental enhancements on the New River.** Coming to agreement on both vision and implementation strategies as a group of stakeholders will enable a clear and transparent dialogue and ensure a greater level of support and consensus for the projects that will be implemented.

August 2011 Technical Advisory Committee Meeting

Strategic plan Collaboration and Participation

The TAC was appointed by the Secretary of the California Environmental Protection Agency (Cal/EPA) in the summer of 2010. There are hundreds of important stakeholders involved with the New River because of the water quality issues, planning or restoration efforts. Appendix 4 lists many of the stakeholders that have been consulted and involved in this planning process. Coordination and collaboration with all stakeholders is key to making the plan a long-term success. In recognition of this, the TAC is comprised of representatives of affected cities and counties; relevant local, regional and state agencies; non-governmental organizations, residents and other stakeholders dedicated to achieving the goals of AB 1079. Appendix 2 provides background information on the TAC's structure and mission, objectives and TAC Team Charter. Appendices 3 to 6 provide information about communication with stakeholder groups that have been consulted and involved in this planning process.

The TAC began work in July 2010 and has met over 20 times to conduct technical analysis, review work performed by specific work groups or consultants, establish goals and objectives and move towards the development of a strategic plan. To facilitate the plan's development, the TAC created the following four work groups made up of participating members:

1. Strategic Vision
2. Water Quality Impairments
3. Remediation Options
4. Funding, Financing and Governance/Management

These work groups met from the summer of 2010 through the fall of 2011 as needed to develop the reports and analyses required by AB 1079, which were the basis for this plan. Further, the TAC held a Technical Review Workshop on September 13 and 14, 2011. The purpose of the workshop was to vet each of the potential solutions being considered including new structural facilities, programmatic improvements, regulatory and enforcement opportunities and funding, financing and governance needed to implement these changes. This workshop provided objective "third party" review of possible solutions and expanded the expertise and reach of the TAC and its consultants to the academic, consulting, governmental and NGO sectors in the U.S. and Mexico. Input from the Technical Review Workshop is included throughout this plan (see Appendix 5).

All of this input, along with hundreds of hours of TAC member involvement and previously developed technical and policy information, has been synthesized into the TAC's final recommendations submitted in the form of this strategic plan to the California-Mexico Border Relations Council.

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2. Background & Context

Figure 3. Watershed Boundaries

Hydrogeological Setting

Salton Sea Watershed

The Salton Sea Watershed drains the Coachella Valley, Imperial Valley and a portion of the Mexicali Valley in Mexico. The Salton Sea is about 35 miles long and 9 to 15 miles wide with approximately 380 square miles of water surface and 105 miles of shoreline. The surface of the Sea lies approximately 227 feet below Mean Sea Level (MSL). Its two main tributaries are the Alamo and New Rivers. The watershed was created by the Colorado River. Thousands of years ago, the area that is now the Salton Sea was a part of the Gulf of California, which stretched all the way to the Santa Rosa Mountains and Chocolate Mountains that now surround it on the east and west. The Colorado River drained into the ocean at that point near the southern end of the Chocolate Mountains (see Figure 3).

Rivers naturally deposit sediment over time, causing the elevation underneath them to rise. As the Colorado River deposited sediment it filled its delta and created dry land, moving the delta and coast further and further south. This formed an inland basin that was cut off from the Colorado River at what is now the southeastern border of the basin. An inland watershed with no outlet is known as an endorheic (terminal) basin. The elevation of the watershed divide created by the sediment

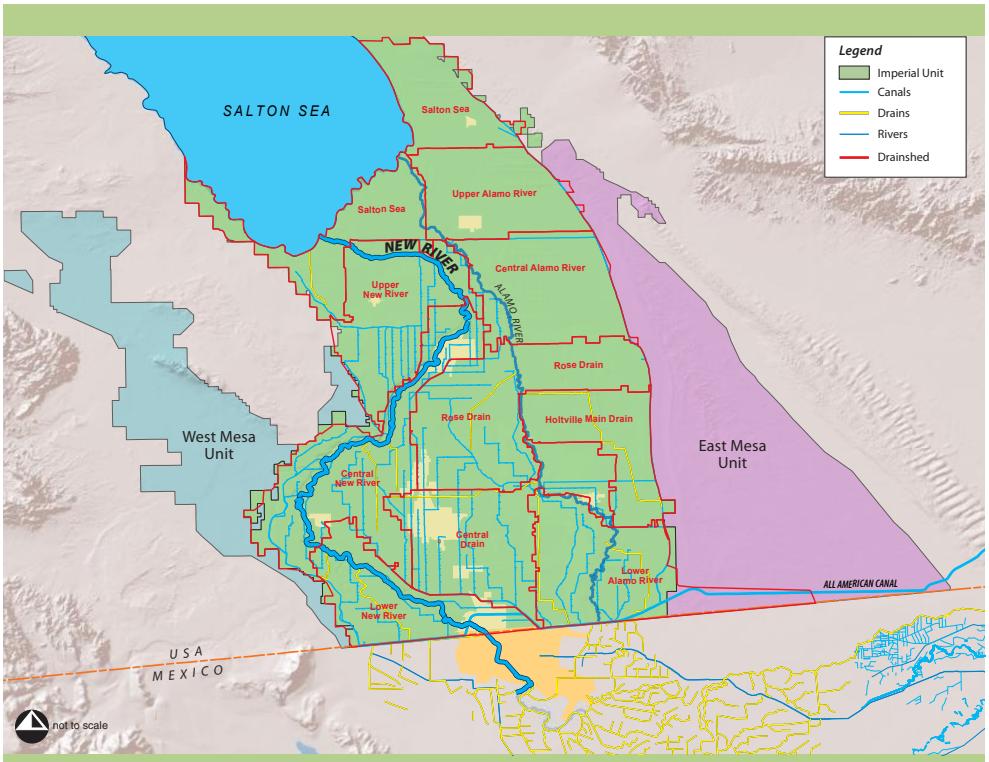
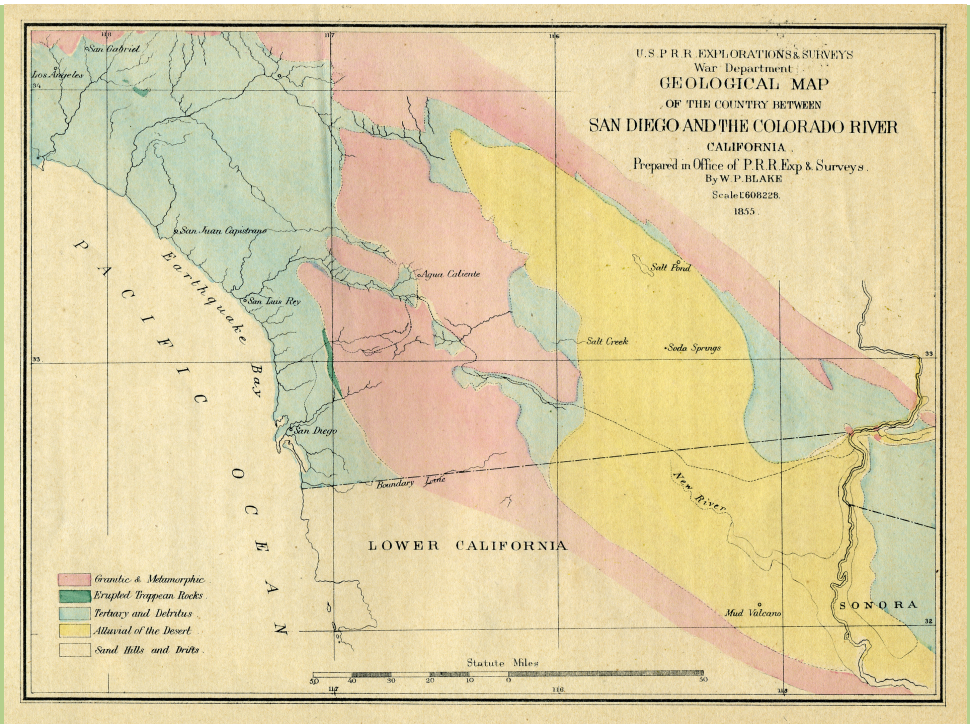


Figure 4. Constructed Hydrology of the Imperial Valley

deposits is not high, so when there was a large enough flood in the Colorado River, flow would spill over the divide and fill in the lowest elevations of the Salton Basin, known as the Salton Sink or Trough. Depending on the volume of this flow, the Sink would (on occasion) be filled with water for months, years or decades at a time until the water infiltrated or evaporated. When the lake had water, this terminal lake was known by Native Americans as "Lake Cauhilla." Over time this area, which started out as part of the Colorado River Watershed, became the Salton Sink Basin and is now known as the Salton Sea Watershed.

The most recent formation of the Salton Sea occurred from 1905 to 1907. In 1901[4], the California Development Company created the Alamo Canal[5] to take water from the Colorado River near Yuma, Arizona and bring it to the Imperial Valley for irrigation purposes. Part of the Alamo Canal ran through Mexico, along the International Border. By the end of 1904, the Alamo Canal had silted up. To keep the water flowing to the Imperial Valley and de-silt the Alamo Canal, three temporary diversion canals were built. However, they were built without head gates to control water intake and in 1905 the Colorado River flow overwhelmed the temporary system. Consequently, the entire flow of the Colorado emptied into the Salton Sea Watershed via the Alamo River and New River. This continued until the Alamo Canal was repaired in 1907. By that time, Colorado River water filled the Salton Sink with so much water that it created what is now referred to as the Salton Sea. After the canal failure, the Imperial Irrigation District was formed to build a new canal to bring water from the Colorado River to the Imperial Valley. It was called the All American Canal and was completed in 1940. The older Alamo Canal was shut down shortly afterwards. Figure 4 illustrates the present-day irrigation infrastructure system that has been developed and supports the extensive agricultural industry in the Imperial Valley today.

1855 Map of New River Region



The New River Sub-watershed

The "New" River was formed by occasional flows from the Colorado River flowing into the Salton Sink. These flows created a basic shallow desert wash that would have been typical of other desert washes in the region. When the entire flow of the Colorado River went into the Salton Sea (1905-1907), its water poured into the Sea with such force that it eroded the New River channel to form the deep river canyon that it is today. Runoff from all of the washes in the Basin drained to the Salton Sink, pooled there and infiltrated into the ground or evaporated over time. The New River would have reverted to being a dry desert wash too, but agriculture in the Imperial and Mexicali Valleys continued and expanded after the flood and agricultural runoff became the river's main source of "water." The New River channel that was created is approximately 60 miles in length and up to two-thirds of a mile in width within the United States. Within Mexico this natural channelway is discernible for about 13 miles. The New River sub-watershed drains approximately 175,000 acre-feet from Imperial Valley and 300,000 acre-feet from the Mexicali Valley, Mexico, which includes the metropolitan area of the City of Mexicali.

The New River in Mexicali at the International Boundary and confluence of the International Drain

Environment

Historical Water Quality Conditions

In the 1940s, the New River was widely recognized for its significant water pollution problems, primarily because of the odor of raw sewage. Since then, continuing growth of urban areas, industry and agriculture on both sides of the border, have further degraded the quality of water in the river. Pollution sources have included untreated municipal sewage, primarily from Mexicali, trash, treated and untreated industrial discharges, treated effluent from municipal wastewater treatment plants, urban storm drainage and a variety of agricultural irrigation runoff on both sides of the border. By the 1970s and 1980s, the New River had already acquired the dubious reputation of being one of the most polluted in the U.S., with many of the pollutants posing serious human health hazards to local populations, particularly those in Calexico and Mexicali.

Since the 1990s, significant efforts have been made on both sides of the border to improve water quality conditions in the New River and its watershed. These improvements are detailed in the next chapter of this Plan and have included, among other improvements:[6]

- Non-structural and structural controls to upgrade wastewater treatment in Mexicali; and improvements to wastewater treatment facilities in the U.S.
- Regulatory and voluntary pollution control and source reduction programs, especially in the Imperial Valley farming sector
- Structural projects within the Imperial Irrigation District
- Wetlands demonstration projects along the New River (and neighboring Alamo River)

Despite these extensive efforts in the U.S. and Mexico, water quality in the New River remains out of compliance with many U.S. water quality standards. Water pollution levels pose health and quality of life concerns in Calexico and the Imperial Valley, as well as being sources of pollution to the Salton Sea. Based on the most recent data available, the water quality impairments of the New River in the U.S. include: low dissolved oxygen, toxicity, pathogens, trash, selenium, sediment/silt, chlordane, DDT, dieldrin, toxaphene, PCBs, HCB, nutrients, mercury, chlorpyrifos, diazinon, copper and zinc[7] (see detailed discussion in Chapter 3 and Appendix 7).

The Sonoran Desert Landscape around The Salton Sea

Overview of the Ecology and Hydrology of the New River

The New River is a part of the Colorado Desert, which is itself a subset of the larger Sonoran Desert ecosystem. The area typically has two short rainy seasons a year, which are influenced by Gulf of California weather patterns coming up from the Colorado River delta. Storm flows in the New River are important in relationship to flooding characteristics and to the total volume of water that reaches the Salton Sea every year. However, ecological conditions in the New River itself are mostly determined by dry weather "effluent dominated" flows.

Without water inputs from human sources, the New River would only have water flowing in it during an occasional major storm event. However, discharges from irrigation and industrial and municipal water use has resulted in year round flows in the river. During dry weather (e.g. nearly all of the time) the water in the river consists of only these anthropogenic discharge flows. Therefore, fresh water does not dilute pollutants in the discharge from these year-round sources during most of the year.

Dry weather flow at the International Boundary is currently around 120 – 200 cubic feet per second (cfs). Dry weather flow is expected to decline somewhat as Mexico finds various ways to reuse New River water. However, the TAC's analysis suggests that dry weather flows will continue around 60-100 cfs for the foreseeable future (see Impairments Technical memo, p. 7 et seq.).

Wet weather flow varies widely. The Federal Emergency Management Agency (FEMA) estimates flows of 1,600 cfs for a 100-year storm event at the International Boundary; Mexico projects 3,382 cfs for the same storm event. The New River sub-watershed is approximately 750 square miles with an annual average rainfall of 2.5 inches per year. Rainfall contributes about 3% of the total inflow into the Salton Sea.

In terms of human sources, the greatest flow contributor is agricultural runoff. As Table 1 shows, agricultural runoff from land in the Imperial Valley accounts for more than two-thirds of the river's total flow of 396,840 acre-feet per year. Urban and industrial flows have more concentrated pollution, but do not contribute as much water in terms of volume.

Table 1. New River Flow Sources

Source	Flow Contribution (as % of total Flow at the Outlet)	Flow (AFY)
Mexicali Sources		
Zaragoza WWTP(1)	3.5%	13,970
Industrial Wastewater(2)	1.7%	6,570
Urban Storm water(2)	0.7%	2,630
Agricultural runoff	16.2%	64,450
Total Flow at International Boundary(3)	**22.1%**	**87,620**
US Sources		
Municipal/Domestic WWTPs(4)	2.4%	9,500
Urban, storm water(5)	0.8%	3,100
Agricultural runoff	74.7%	296,616
Total Flow at Salton Sea Outlet(3)		**396,840**

(1) Based on data reported by Comision Estatal De Servicios Publicos de Mexicali.

(2) Based on data from Binational Technical Committee for New River/Mexicali Sanitation Project.

(3) Based on data from USGS gauging stations (International Border, Westmorland) for New River.

(4) Based on RWQCB NPDES Program data from nine municipal WWTP including Calexico, Brawley, Seeley, Heber, Date Gardens, McCabe Union School District, Westmorland, US Naval Facility in El Centro and Centinela Prison.

Maintaining flow volumes in the river is important to the Salton Sea downstream. The Salton Sea is shrinking because of the loss of some return flows and this in turn is degrading the habitat value and creating dry “playas” of exposed Sea floor that can cause air pollution problems when the sediments becomes airborne. Plans to restore and maintain the Salton Sea require that both the water quality of inflows improve and that the volume of flow into the Salton Sea remains as large as possible.

Community

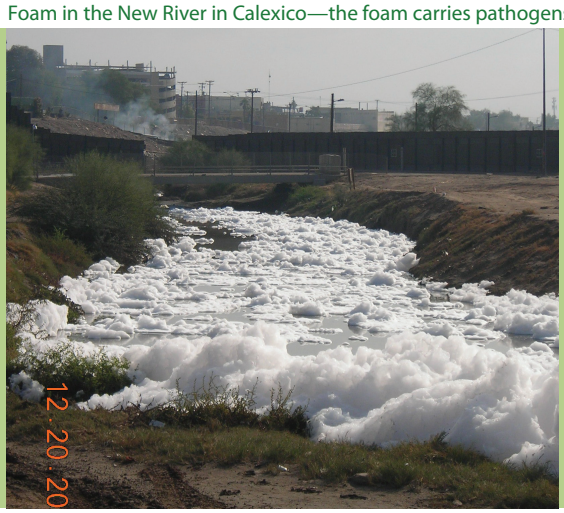
The ecological problems that have existed in the New River over time affect the people who live around it. For decades there have been efforts to improve the river. However, despite impressive efforts on both sides of the border, a comprehensive solution has not yet been formulated. Agencies in Mexico, as well as the U.S. EPA and IBWC bear primary responsibility for New River pollution from Mexico. In spite of over $100 million dollars of sewage infrastructure improvements in Mexicali (with over $50 million dollars from the U.S.) and with technical assistance, the river remains severely polluted as it flows north into California. Imperial Valley communities need a comprehensive and timely solution to the river's contamination. Previous solutions which were promised but did not materialize, have left many residents with a feeling of skepticism and the impression that a polluted New River is a permanent part of their lives. The Westside residents of Calexico and Department of Homeland Security personnel are arguably those most impacted/threatened by the New River because they are the closest to it.

Demographics

The Imperial Valley is a predominantly rural and relatively low income Latino region in Southern California. The U.S. Census Bureau 2010 data show that the population in Imperial County is 174,528, of which 80% are of Hispanic or Latino origin, 70.8% speak a language other than English at home, 29.3% are under the age of 18 years old, 31.5% are foreign born, over 19% do not have health insurance.[8] The data also show that the household per capita income for 2009 was $16,017. More than 22% of the population have incomes that fall below the federal poverty level. Imperial County has one of the highest unemployment rates in the state. For August 2011, the unemployment rate was measured by the U.S. Census Bureau at 32%. Data from the state Employment Development Department show that the 2010 annual average unemployment rate for Imperial County was well above California's annual average.

Luis Olmedo with Comite Civico del Valle at the International Boundary during a storm event.

Foam in the New River in Calexico—the foam carries pathogens



History of Health Exposure

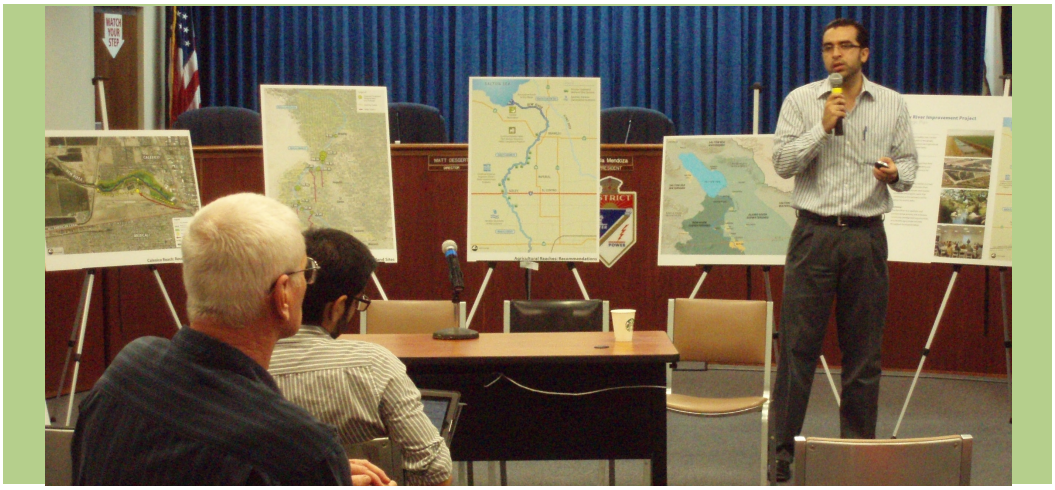
Poor water quality conditions in the New River affect the resident population of Calexico (population 37,552) and Department of Homeland Security and U.S. Customs personnel most directly. Calexico is where pollution levels are the most concentrated and where the river is in closest proximity to an urban area, running adjacent to the Calexico West Port of Entry. Immigration Customs and Enforcement agents (e.g., the Border Patrol) also work along the entire stretch of the New River in the Imperial Valley. Exposure risks are difficult to track and monitor because health impacts are often cumulative over long periods of exposure. Health risks can be especially problematic for sensitive populations such as children, the elderly or those with existing conditions such as respiratory problems. There have been "health consultations" but there have not been any comprehensive studies directly documenting health effects from the New River.

In 1995, Imperial County petitioned the U.S. Department of Health and Human Services to evaluate the public health impacts caused by the New River. In response to the petition, the Agency for Toxic Substances and Disease Registry (ATSDR) evaluated existing environmental data for the New River and conducted a "Health Consultation." ATSDR concluded, in relevant part, that the New River poses a potential public health hazard because area residents could be exposed to fecal streptococci and other pathogens through contact with contaminated surface water and foam; and the maximum levels of several pesticides and PCBs detected in the New River exceeded comparison values for both cancer and non-cancer effects. A copy of ATSDR's health consultation report can be found at:

http://www.sci.sdsu.edu/salton/NewRiverPPHCons.html

Besides the consultations, there is also considerable anecdotal evidence that pollution in the New River has resulted in serious health effects for residents in the Imperial Valley (particularly in Calexico) and Mexicali over the last several decades. The odor of the New River in Calexico can be physically overpowering, particularly at night and during the summer.[9] The River is aesthetically displeasing with turbid color, trash and other visual reminders of poor water quality. Foam sometimes forms on the surface and blows into public business and residential areas. The foam carries pathogens from the water. Residents have long described skin conditions, respiratory issues and related health effects, attributing these problems to the river.

Miguel Figueroa from the Calixico New River Committee at the November 2011 strategic plan public workshop.



Every year undocumented immigrants use the river to enter the U.S. to evade Border Patrol agents, who cannot safely enter the water to detain them. Consistent with the ATSDR's finding, it stands to reason that anyone that comes in contact with the river endangers his/her health because levels for many New River contaminants are in violation of U.S. standards (see Chapter 3: Water Quality Impairments). In the U.S., water quality standards have been established based on scientific studies to protect public health. The New River does not meet water quality standards for water contact and non-contact recreation; and the known densities of pathogen-indicator organisms in the river are well above levels considered to be safe for human health by the California Department of Public Health and U.S. EPA. Furthermore, the New River does not meet other standards established for the protection of wildlife.

Community Involvement and Collaboration

In recent years, community involvement efforts by the city of Calexico, Imperial County, U.S. Customs and Border Protection, Imperial Valley College, San Diego State University in the Imperial Valley, the Comite Civico del Valle (CCV), Vecinos De Calexico, Citizens Congressional Task Force on the New River (CCTFNR), Desert Wildlife Unlimited (DWU), Calexico New River Committee (CNRC) and others have made some progress in bringing the community together on various outreach efforts. The CNRC, CCV and CCTFNR have been particularly successful in drawing attention to the problems of the river.

The primary objectives of these local and regional collaborations have been cleaning up the New River and its floodplain and developing a community-based approach for eliminating the negative influences that the river has on residents, businesses, quality of life and economic development. The CNRC has focused its efforts on development of a River Parkway in the Calexico area to provide recreational, aesthetic and habitat benefits to the community. In addition, the CCV has focused on raising environmental awareness and promoting outreach and education while and the CCTFNR and DWU have focused on implementation of wetlands and aeration structures to remedy the pollution.

Strip mall at Grant and Cezar Chavez in Calexico.

Economy

The New River has had a chronic negative economic impact, particularly on the west side of Calexico. The river contributes to urban blight and disinvestment in the area because of its odors, contamination and reputation around the region. It has exacerbated the loss of businesses, declining real estate prices and the halt of otherwise viable residential or commercial development. Land along the U.S.-Mexico International Boundary in Calexico sits undeveloped or underdeveloped in part because of the perceived and actual problems associated with the New River. The underutilization of this land in turn prevents employment opportunities that would otherwise help alleviate Imperial County's high unemployment rate. People from Mexicali and Calexico come to downtown Calexico to shop. Remediating the river conditions in Calexico would reinvigorate the local economy by allowing development of the idled land and providing shoppers a healthier environmental and business setting.

In the agricultural areas of the Imperial Valley, the river serves an important economic purpose. It provides a way to drain runoff from farms. Although environmental laws restrict the quality of the water that drains into the New River, they do not restrict the quantity of water. In fact, ecosystem management efforts at the Salton Sea need these flow volumes to continue. The Imperial Valley's agricultural industry makes the County the tenth largest agricultural county in the State of California in terms of economic output. In 2010, it produced over $1.5 billion dollars in revenue. One in every three jobs in the Valley is related to agriculture. For every $1,000 of total gross value produced in the agriculture sector, $345 of personal income is generated from agriculturally related jobs.[10]

While the region is dominated economically by the farming industry, the County is developing a "green energy" sector as well. Both solar power and geothermal power projects are being built, which will help create jobs for residents. Water is particularly important to geothermal projects, which need water for cooling the power generating equipment. The idea of reusing river water to grow algae is also being considered. The algae will reduce contaminants in the water and can then be converted into bio-fuel.

Legal and Institutional

The Clean Water Act (33 U.S.C. §1251 et seq.) regulates water quality in all waters of the nation (e.g., rivers). The U.S. EPA has delegated some of its authority to implement key provisions of the Clean Water Act to the State of California, including responsibility for promulgating and enforcing water quality standards and controlling sources of pollution. The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) is the state's law governing water quality control in California.

The state established water quality standards for the New River in accordance with the Porter-Cologne Water Quality Control Act and the Clean Water Act. The U.S. EPA approved the state standards and, therefore, considers them as U.S. standards. These standards are found in the Water Quality Control Plan for the Colorado River Basin Region (a.k.a. Basin Plan). Meeting these standards is the primary driving force behind AB 1079 and this strategic plan.

Attaining water quality standards in the New River is complicated and compromised by the fact that the U.S. does not have jurisdiction over waste discharges coming from Mexico and flowing across the International Boundary. Mexico regulates the New River as a drain, which means less stringent water quality standards than if it were classified as a river, as it is in the U.S. Even if Mexico were to classify the New River as a river instead of as a drain, Mexico's water quality standards for rivers are less stringent than U.S. water quality standards for rivers. Therefore, because of significant legal and regulatory differences, even if water flowing into the U.S. from Mexico may improve based on bi-national efforts, it will never meet U.S. and California water quality standards.

Currently, the water in the New River in Mexico is not even in compliance with applicable Mexican standards for drains, or with the provisions in Treaty Minute 264. The U.S. and Mexico are cooperatively working to address New River pollution from Mexico. This collaborative relationship has resulted in water quality improvements and will continue to do so as the partnership works to achieve full compliance. This issue is discussed in further detail in the remediation work group and the legal and funding work group technical memos (see Appendices 8 and 10, respectively).

An overview of the various laws and institutions involved with water quality related governance of the New River are outlined below.

In Mexico

- Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT) translates to the Ministry of Environment and Natural Resources. It is the federal agency that establishes water quality standards for waters in the country including drains and rivers.
- The Procuraduría Federal de Protección al Ambiente (PROFEPA) translates to The Federal Attorney for Environmental Protection. It was created in 1992 as a division of the SEMARNAT. This agency has technical and operational autonomy. Its mission is to monitor and verify compliance with regulations and provide remedies and penalties for breaches of legislation.
- Comision Nacional Del Agua (CONAGUA) is responsible for implementing SEMARNAT's standards in Mexico, regulating both the receiving waters and the entities discharging wastes into the waters. CONAGUA has been instrumental in the significant improvements that have been made in Mexicali in terms of both structural facilities (such as wastewater treatment lagoons) and regulatory compliance programs.
- Comision Estatal de Servicios Publicos de Mexicali (CESPM) is a state agency for the State of Baja California that owns and operate the municipal wastewater treatment systems in Mexicali and is responsible for complying with CONAGUA regulations.
- Baja California's Ecologia is an agency of the State of Baja California responsible for protecting the environment. It is also responsible for ensuring that industrial dischargers comply with CONAGUA regulations pertaining to industrial waste streams. Its mission is to apply specific strategies for the conservation of the ecosystems of Baja California.
- Secretaría de Infrastructura y Desarrollo Urbano (SIDUE) translates to the Ministry of Infrastructure and Urban Development. This is a state agency for the State of Baja California that is responsible for development of urban infrastructure for Baja California. It is in charge of Mexico's expansion of the port of entry project, including encasing the river in Mexicali.
- Baja California's Comision Estatal del Agua (CEA) develops and coordinates Baja's water supply system; and it also plans for the collection, treatment and reuse of wastewater.

Bi-National

The U.S. and Mexican governments have a long history of working together on water and other environmentally-related matters that influence both sides of the border. Agreements that are reached between them are codified by international treaties.

The "Utilization Of Waters Of The Colorado And Tijuana Rivers And Of The Rio Grande" treaty (known as the Treaty of 1944) established rights to the water in the Colorado River Watershed between Mexico and the U.S. It was amended by a series of 'treaty minutes' to codify agreements about water quality in the New River, including Treaty Minutes 264 (1980), 274 (1987), 288 (1992) and 289 (1992). Additional information about the two key treaties that effect the New River (Treaty Minute 264 and 288) is described in the next section under Existing Plans and Programs in Mexico.

- International Boundary and Water Commission (IBWC) and Comisión Internacional de Limities y Agua (CILA): The International Boundary Commission is a bi-national federal agency that originally dealt with resolving Boundary issues along the U.S.-Mexico International Boundary. The Treaty of 1944 included the oversight of water rights into the organization's mission and renamed it to the IBWC. The IBWC has a section in the U.S. federal government and a section in the Mexican federal governments, known there as the Commission International de Limites de Aguas, (CILA). The U.S. Section of IBWC has been authorized to own and operate several international wastewater treatment plants in the U.S., which treat wastewater from Mexico, including the South Bay International Wastewater Treatment Plant in San Ysidro California.

In 1983, the Presidents of the U.S. and Mexico signed the "Agreement Between The United States Of America and The United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area" (known as the La Paz Agreement). This is a pact to protect, conserve and improve the environment of the border region of both countries. The La Paz Agreement identifies organizations in both countries responsible for coordination of this effort.

- U.S. EPA & Secretaria de Desarrollo Urbano y Ecologia: For the U.S., the U.S. EPA was designated as the coordinating organization. In Mexico, the Mexican Secretaria de Desarrollo Urbano y Ecologia (SEDUE) was designated as the coordinating agency at the time, although this role is now being served by SEMARNAT and CONAGUA jointly. The Border 2012 program has been developed to coordinate the implementation of this treaty on both sides of the border. It is coordinated on the U.S. side by the EPA. It takes a bottom-up, regional approach, which relies heavily on local input, decision-making, priority-setting and project implementation to best address environmental issues in the U.S.-Mexico border region. It brings together a wide variety of stakeholders to prioritize sustainable actions that consider the environmental needs of the different border communities.

In 1994 the Presidents of the U.S. and Mexico signed the North American Free Trade Agreement (NAFTA), which established the Border Environment Cooperation Commission (BECC), North American Development Bank (NADB) and the Commission for Environmental Cooperation (CEC).

- BECC and NADB: The BECC supports the sustainable development of the border areas through the planning, design and regulatory compliance of environmental infrastructure, such as wastewater treatment facilities, drains and pumping facilities. The NADB facilitates the financing and construction of these projects.
- CEC: It facilitates collaboration and public participation to foster conservation, protection and enhancement of the environment for the benefit of present and future generations, in the context of increasing economic, trade and social links among Canada, Mexico and the U.S.

Although there is considerable overlap, in the U.S. it is generally the IBWC's role to oversee cross-border issues relating to water supply (flow volume and rights); the U.S. EPA's role to resolve cross-border issues relating to water quality; and the BECC and NADB's role to resolve cross-border issues requiring infrastructure project implementation and funding.

In the United States

- The Clean Water Act (CWA) regulates waters of the United States, including the water quality attributes of those waters. The U.S. Environmental Protection Agency (EPA) is tasked with implementing this law and does so through a variety of regulatory programs.

In California

- The Porter-Cologne Water Quality Control Act (Porter-Cologne) is a state law that regulates the waters of California, which is complimentary and works with the requirements established by the CWA.
- The U.S. EPA has granted the State of California the responsibility of implementing the Clean Water Act on its behalf, but under its supervision. Cal/EPA is the state agency that oversees all state boards, departments and offices (BDOs) charged by state law to protect the environment.
- Within Cal/EPA, the State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) are charged with protection of water quality in California by Porter-Cologne.
- The State Water Board oversees nine Regional Water Boards who carry out water quality control programs regionally. The New River is under the jurisdiction of the Colorado River Basin Regional Water Board. The Regional Board is responsible for implementing a variety of programs to protect water quality. These programs establish the framework for the New River strategic plan:
    - A Basic Plan for each region establishing water quality standards, beneficial uses and appropriate programs for the entire region
    - National Pollution Discharge Elimination System (NPDES) permits under the Clean Water Act for all point sources of pollutants
    - Storm water permits for municipalities and major construction, industrial, mining and other activities that generate runoff pollutants
    - TMDLs for all water bodies determined to be impaired for particular pollutants
- Various other permit types including Waste Discharge Requirements (WDRs), Anti-Degradation Policy, Nonpoint Source Enforcement Policy, Toxics Standards for Inland Surface Waters (SIP), various waivers and others.
- California Mexico Border Relations Council: The council was created by AB 3021 (Núñez, 2006) to provide an annual update on California–Mexico activities and programs to the Legislature and oversee and collaborate on California-Mexico border issues. The council has the potential to identify new border priorities and fundable projects in the areas of infrastructure, trade, environment, health and security while supporting current and ongoing activities such as the Border Governors Conference, trade missions, border workgroups and coordinating specific future projects with Mexico.

Historical and Current Funding

Water Quality Monitoring

The Regional Water Board is actively involved in the cleanup of the New River and has been a significant force in developing strategies to address cross-border water pollution. The Regional Water Board has monitored the water quality of the New River since 1975 to track pollution and clean up progress. In 1995, U.S. EPA provided funds to the Regional Water Board to monitor and document the water quality at the International Boundary on a monthly basis, but it discontinued the funding in early 2000 despite California's position that New River pollution from Mexico is a federal responsibility. Since then, the state has been using state resources to continue to track and document the pollution and ensure the federal government meets its responsibilities.

Mexicali Wastewater Treatment

In 1992, Treaty Minute No. 288 established a long-term sanitation strategy for the New River water quality problems at the International Boundary and divided the sanitation projects into Immediate Repairs (a.k.a. "quick fixes"); the Mexicali I; and the Mexicali II projects.

Immediate Repairs Project: This project addressed critical deficiencies in existing facilities including rehabilitating and replacing lift and pump stations, relining and replacing collection lines and dredging wastewater treatment plant lagoons. The U.S. EPA's Border Environmental Infrastructure Fund (BEIF) contributed $4.2 million to the Immediate Repairs project, costing over $7.6 million. The Mexican match provided $3.4 million. Additionally, the U.S. EPA contributed about $6 million to planning activities leading to the Immediate Repairs project, Mexicali I and Mexicali II projects.

Mexicali I Project: The subsequent Mexicali I Project, certified in 1998, consisted of 19 components to improve the collection and treatment of wastewater in the fully developed Mexicali I area. U.S. EPA BEIF contributed $20.6 million to the total project cost of $55 million.

Mexicali II Project: The "Las Arenitas" wastewater treatment plant is sited in an uninhabited area 16 miles (26 kilometers (km)) south of Mexicali. The Mexicali II project was certified in September 2003 with a total project cost of $30 million. In 2007, the Las Arenitas plant construction was completed.

Overall, U.S. EPA has contributed nearly half the $98.6 million cost of the Mexicali wastewater projects, with the Mexican government contributing the remainder of the funds. Already, these projects are serving an estimated 635,000 people in Mexicali and have resulted in the treatment of approximately 40 million gallons per day of sewage.

Also, the IBWC established a Binational Technical Advisory Committee (a.k.a. the BTC) under provisions of IBWC Treaty Minute 299 to oversee implementation and development of the projects. The BTC has led to improved communication and strong collaborative working relationships between the two countries. The U.S. BTC members are representatives of the Imperial irrigation District (IID), Imperial County, Regional Water Board (R7), State Water Board, U.S. EPA and U.S. IBWC. The BTC has provided oversight for implementation of the projects and water quality sampling in Mexicali to determine the overall performance of the projects. It also conducts monthly observation tours of the New River in Mexicali to ensure the projects remain operational, while identifying existing and new problems (e.g., emerging threats) and recommending solutions to the problems. The BTC meets periodically, usually in the CILA Mexicali office, to discuss these issues.

Calexico River Parkway Funding

Several years ago, $3.2 million was awarded to the City of Calexico through the Federal 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, Public Law 109-59, 119 Stat. 1144). These funds were designated for a "High Priority Project" (HPP), specifically to "develop bicycle paths and public park space adjacent to the New River, Calexico." The appropriation stayed in bureaucratic limbo until 2009 because of an inability to secure the required 20% match of non-federal funds.

In 2009, a suitable California non-General Fund match – river parkways funding – was identified for the federal $3.2 million. The State Budget Conference Committee agreed to an $800,000 appropriation from the California River Parkways Program administered by the California Natural Resources Agency to be used as matching funds. The budget language stated the funds were to be used "for various planning needs necessary to develop a river parkway plan and river improvement project for the New River." The expenditure is guided by the Agency's Proposition 84 Program Guidelines.

Supplemental Environmental Projects (SEPs)

During the last five years, the Regional Water Board has approved funding of close to $400,000 of Supplemental Environmental Projects (SEPs) as part of settlements of fines issued against dischargers in the Imperial Valley for violation of their NPDES Permits. The SEPs have provided funds to operate and maintain the Brawley and Imperial pilot study wetlands, funds for the Calexico New River Committee for its outreach and education programs and funds for the City of Calexico to address New River pollution.

Cal/EPA Environmental Justice Grant for CNRC

In 2005, the State Water Board awarded the Calexico New River Committee a $20,000 grant to conduct an Environmental Justice pilot project to address New River pollution. The State Water Board was State Lead for the project.

Funding for NRIP strategic plan

In April 2010, the State Water Resources Control Board awarded $400,000 to the City of Calexico from the Cleanup and Abatement Account (CAA) for the development of the NRIP strategic plan. The funding also provides for data gap water quality monitoring and testing.

New River Treatment Wetlands Pilot Project Funding

The Citizens Congressional Task Force on the New River analyzed and recommended the development of four pilot treatment wetlands; two along the Alamo River and two along the New River. The Bureau of Reclamation and Imperial Irrigation District constructed the wetlands relying on a U.S. Congressional appropriation. The wetlands cost about $8 million each to get operational. This funded things such as pre-testing, environmental compliance work, construction and planting. This cost did not include the cost of land acquisition because the land was provided by the IID.

Private Sector Funding

To date, no private funding has been used for New River restoration. However, opportunities for funding for the New River could come from private sector sources interested in water reuse and reclamation. The most likely user of reclaimed/recycled water in Imperial County is the burgeoning renewable energy sector. Imperial County has made a significant commitment to developing its considerable renewable energy resources. These include biomass, geothermal, solar and wind technologies. The technology with the greatest potential – and the greatest need for water for its cooling process – is geothermal energy. Small hydro-electric generator may also provide an opportunity.

Related Plans and Proposals

A number of important watershed related plans and projects have been proposed and are in varying stages of analysis, approval or implementation.

Salton Sea Ecosystem Restoration Program, Species Conservation Habitat Project:
To address the myriad of Salton Sea environmental problems, the California Legislature passed a series of bills in 2003 and 2004 (SB 277, SB 317, SB 654 and SB 1214) that requires the California Natural Resources Agency to perform a restoration study determining a preferred alternative for the restoration of the Salton Sea ecosystem and providing protection of the wildlife dependent on that system. This study is to be done through the Natural Resource Agency's Department of Water Resources (DWR) and the Department of Fish and Game (DFG). The main policy objectives are:

1. **Habitat:** Restore long-term stable aquatic and shoreline habitat for the historic levels and diversity of fish and wildlife that depend on the Salton Sea.
2. **Air Quality:** Eliminate air quality impacts from restoration projects and from the receding waters of the Sea resulting in airborne contaminants.
3. **Water Quality:** Protect water quality in the Salton Sea (which will be greatly assisted by addressing New River water quality).

To accomplish these objectives, the Salton Sea Ecosystem Restoration Program was established within DWR to ensure coordination of efforts between the Legislature, various federal, state and local agencies, stakeholders and the general public, in order to achieve the policy objectives listed above. The first major project within this program is the Species Conservation Habitat Project. The Draft EIS/EIR for this Project was released in August of 2011 and can be found at:

http://www.water.ca.gov/saltonsea/habitat/eir2011.cfm

In a separate, earlier effort, there were a number of broad planning and restoration concepts identified by the Salton Sea Authority to address issues over the long term including:

- In-Sea Barrier & Circulation Channels (to separate the current sea into two separate bodies)
- Water Treatment Facilities
- Habitat Enhancement Features
- Colorado River Water Storage Reservoir
- Park, Open Space and Wildlife Areas
- Master Plan for Communities around the Sea

Similarly, the U.S. Department of Interior's Bureau of Reclamation (Reclamation) is the federal lead agency for Salton Sea restoration efforts, pursuant to the Salton Sea Reclamation Act of 1998. The Act directed the Secretary of the Interior, through Reclamation, to study options for managing the salinity and elevation of the sea to preserve fish and wildlife health and to enhance opportunities for recreation use and economic development while continuing the sea's use as a reservoir for irrigation drainage.

Reporting requirements of the Act were met in January 2000, when the Department forwarded a draft EIS/EIR and several other reports to Congress. Since then, analyses have continued on options presented in those reports and new options. More information about Reclamation's restoration efforts can be found at:

http://www.usbr.gov/lc/region/programs/saltonsea.html

Imperial Integrated Regional Water Management Plan

The region is also developing an Integrated Regional Water Management Plan (IRWMP), as required for water resource related state funding. An IRWMP is a regional, multi-stakeholder plan designed to look at all aspects of the watershed and address water resources issues on a comprehensive, regional and stakeholder-driven basis. Projects that will be included in this plan are being identified now and may include projects from this NRIP strategic plan. The Imperial Irrigation District is coordinating this effort. A full description of the Imperial IRWMP can be found at:

http://imperialirwmp.org/Imperial_Charter%2021oct2010_WF_rev.pdf

New River Improvement Project: Calexico New River Parkway

In 2004 the City of Calexico and the Calexico New River Committee proposed a set of coordinated improvements for the New River. As stated in the Project description "the... proposed improvements are intended to transform the New River as it flows through Calexico and continues north through Imperial County from its current condition to an attractive community asset that will protect public health while fostering local economic development." This is where a River Parkway project was first identified for the river in Calexico, which AB 1079 then specifically mandated as a critical improvement for the New River ecosystem.

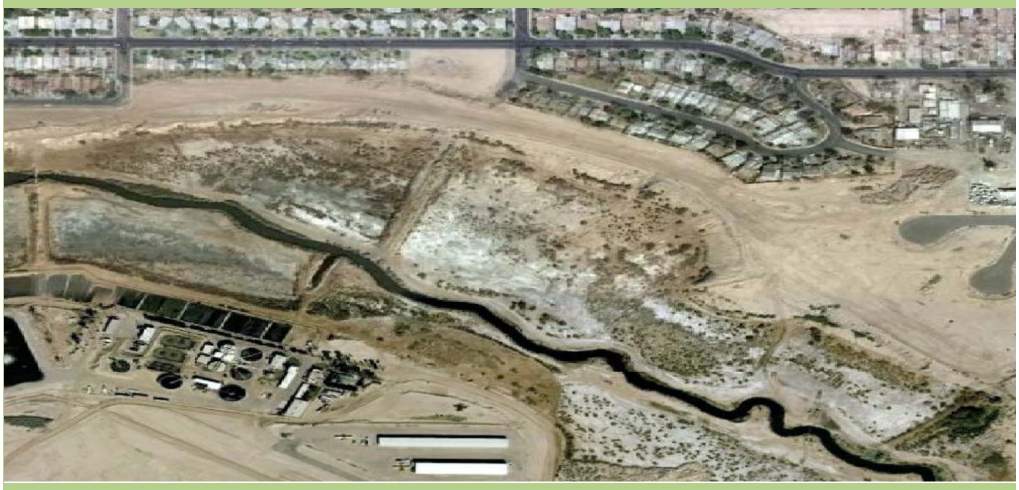
The specific feature was identified and designed to meet the following:

- Provide immediate public health and environmental improvements in a manner that is compatible with longer-term pollution control and environmental improvements for the New River and Salton Sea.
- Provide an enhanced environment for community/economic development.
- Phase project development so that those features that can be quickly permitted move ahead independently of those features that require a lengthy review process.
- Identify project features that can be developed locally, without the need for international negotiations.

Several of the components of this project are directly related to water quality remediation, which is addressed in the next chapter of this plan (see Figure 5):

- Isolate river flows to allow for water quality remediation. This creates an environment suitable for public access to the floodplain in Calexico.
- Create open space on the north side of the river. This area will be graded and hydro-seeded. Bike and pedestrian paths will be constructed. Soccer fields and baseball fields would be constructed. Public restrooms will also be provided.

Without Parkway



With Parkway

Figure 5. Computer Enhanced Aerial View With and Without the Proposed River Parkway in Calexico

- Create another open space on the south side of the river. This area will be graded and hydro-seeded. Native (drought tolerant) trees will be planted along the bicycle trail.
- Remove non-native species to the west of the All American Canal siphon and replanting the area up from the riverbank with drought tolerant native species.
- Stabilize the river channel as appropriate and provide sufficient clean up to the river bottom and any contaminated soils.
- Improve New River habitat efforts, such as native vegetation and restored or artificial wetlands, developed in cooperation with fish and wildlife agencies, to mitigate adverse impacts of constructing the improvements.

3. Analysis of Water Quality & Remediation Options

Current Water Quality Impairments

As noted in the previous chapter, a legacy of urban, agricultural and industrial pollutants have created a set of complex and challenging water quality problems throughout the length of the New River. To address these issues requires a multi-faceted approach involving collaboration of many agencies and institutions. It also involves a close examination of specific pollutant constituents in each reach of the river and an understanding of the capacity for meaningful water quality remediation.

The Impairments Work Group Technical Memo and its various attachments (see Appendix 7) characterize New River pollution on both sides of the border in detail. Based on the most recent data available, the following impairments are evident on the U.S. side of the border: low dissolved oxygen, toxicity, pathogens, trash, selenium, sediment/silt, chlordane, DDT, dieldrin, toxaphene, PCBs, hexachlorobenze (HCB), nutrients and mercury. Each of the reaches of the New River has different levels of these pollutants, based on varying inputs such as agricultural run-off and urban treated wastewater. These impairments have been classified into four categories based on the severity of their impact:

Pollutants to Be Watched: Emerging pollutants that require more sampling or more scientific studies to fully determine the extent to which they are causing impairment.

Non-Impact Pollutants: Pollutants with delisting recommendations (i.e., pollutants that were at one time but are no longer causing impairment).

Moderate-Impact Pollutants: Pollutants for which current data show improved water quality and require that ongoing cleanup efforts continue.

Severe-Impact Pollutants: Pollutants that either (a) severely impair water quality; and/or (b) pose a significant threat to public health.

Each category requires a different management response. The first three are likely to focus on monitoring programs, policy changes or continuation of existing regulatory and compliance programs. However, the severe-impact pollutants have been identified as the most critical and are referred to as "Constituents of Concern" by the Regional Water Board. They are the most critical because existing solutions are not sufficient for remediation. They require additional structural and non-structural solutions for remediation and thus are the priority of this strategic plan and the focus of its recommended solutions.

Constituents of Concern (Severe Impact Pollutants)

The "Constituents of Concern" currently having a severe impact on the New River are pathogens, low dissolved oxygen, trash, toxicity, selenium and silt.

Low Dissolved Oxygen

Pollution in a river is a food source for algae, vegetation and bacteria. In order to metabolize this food, these organisms also need to 'breathe' oxygen. When there are large amounts of wastes in the water, food consumption will increase and so will the uptake of oxygen. In water systems with low dissolved oxygen, the amount of nutrients (or waste) entering the system is greater than the oxygen needed to consume it. Low dissolved oxygen levels are a problem because they inhibit the ability of the water system to process the remaining nutrients or wastes, which leads to the die off of the organisms that require oxygen to survive. Increasing the levels of dissolved oxygen requires either reducing the amount of nutrients in the system or artificially mixing oxygen into the system to support the larger amount of waste/food consumption.

Pathogens

Discharge from feed lots, slaughterhouses, treated and untreated sewage and contaminated runoff carry pathogens. Pathogens include viruses, bacteria or fungi that can cause serious diseases in humans. Pathogens are most commonly measured by looking at E. coli, enterococci and fecal coliform bacteria levels. The main source of pathogens in the New River is discharges of wastes from Mexico.

Toxics and Toxicity (e.g. Pesticides)

A 'toxic' is a known pollutant and 'toxicity' is the degree to which a pollutant (or a combination of pollutants) is harming surrounding biological resources in a specific location, as measured by a detrimental physiological impact on any flora or fauna. The toxicity in the New River is primarily caused by pyrethroids, a type of pesticide. The sources of this contaminant are diffuse and likely include urban and agricultural areas on both sides of the border. In urban areas, pesticides applied indoors and in yards find their way into both storm water runoff and the municipal sewage system.

Selenium

Selenium is a Constituent of Concern because it exceeds regulatory limits. The various programs in place today for the Colorado River upstream of California are not likely to reduce concentrations substantially. However, selenium may not be as high of a priority as the other Constituents of Concern for this strategic plan for several reasons:

1. The scientific and regulatory communities have not come to consensus on how best to deal with selenium contamination. This makes selenium a less actionable problem than the other constituents, since definitive guidance for selenium is not yet available.

2. The source of selenium is not the New River itself or the surrounding sub-watershed, so it is difficult to address from a source control perspective. Selenium in the New River originates in Colorado River water that is used for irrigation. While there are ongoing efforts (e.g., selenium TMDL's) in New Mexico and Colorado to reduce selenium in the Colorado River before it reaches California, the projected concentration of selenium in the water column will still be of concern even if those efforts are successful.

3. There are differences between the selenium concentrations being detected by The Regional Water Board's Surface Water Ambient Monitoring Program (SWAMP) and the selenium concentrations being detected by U.S. Bureau of Reclamation (USBR) in the New River. The Regional Water Board monitoring data show levels well above the selenium water quality objective (5 parts per billion), while the bureau's monitoring data show concentrations only marginally and occasionally higher than allowable limits. The Regional Water Board, DFG and USBR are working together to determine why these discrepancies are showing up in the data.

Silt/Sediment

Silt is also a Constituent of Concern in the river because toxics (e.g., insoluble pesticides like DDT) bond to the surface of soil through a process called adsorption. As soil is kicked up into the water column by high flows, it carries the bonded toxics downstream. High levels of silt in runoff from the farmland also make the water column cloudy, thus increasing turbidity, which is detrimental to the aquatic ecology of the river.

For purposes of analysis and planning, the New River was divided into five primary reaches, a reach in Mexico and the remaining four in the United States. Each reach is differentiated by its own unique context, problems and opportunities. The table on the next page lists the specific Constituents of Concern by reach that are having a severe impact on the New River in the United States. The table also lists Beneficial Uses for the New River as defined by the Regional Water Board Basin Plan that are impaired as a result of the severe pollution. This table does not include an assessment of the impairments in Mexico because it is based on California water quality regulatory standards and monitoring.

Table 2. Severe Impairments by Reach in the U.S.

New River Reach	COCs	Primary Source(s)	Impaired Beneficial Uses(s)
Reach 1 Calexico Reach International Boundary to Highway 98	Pathogens	Wastes from Mexico	REC-I, REC-II
	Low Dissolved Oxygen	Wastes from Mexico	REC-I, REC-II, WARM
	Trash	Wastes from Mexico	REC-I, REC-II, WARM, WILD
	Toxicity	Wastes from Mexico	WARM, WILD, RARE
	Selenium	Wastes from Mexico	WARM, WILD, RARE
Reach 2 Seeley Reach Highway 98 to Evan Hewes Highway	Pathogens	Wastes from Mexico	REC1, REC2
	Low Dissolved Oxygen	Wastes from Mexico	REC-I, REC-II, WARM
	Toxicity	Wastes from Mexico and irrigated return flows from Imperial Valley	WARM, WILD, RARE
	Selenium	Wastes from Mexico and irrigated return flows from Imperial Valley	WARM, WILD, RARE
Reach 3 Brawley Reach Evan Hewes Highway to New River Drop 2	Pathogens	Wastes from Mexico, Seeley WWTP, Brawley WWTP	REC-I, REC-II
	Toxicity	Wastes from Mexico and USA	WARM, WILD, RARE
	Selenium	Wastes from Mexico and irrigated return flows from Imperial Valley	WARM, WILD, RARE
	Sediment/Silt	Irrigated return flows from Imperial Valley, IID O&M activities	REC-I, REC-II, WARM, WILD, RARE
Reach 4 Salton Sea Reach New River Drop 2 to its outlet to Salton Sea	Pathogens	Waste from Mexico; Brawley, Seeley and Westmorland WWTPs	REC-I, REC-II
	Toxicity	Wastes from Mexico and USA	WARM, WILD, RARE
	Selenium	Wastes from Mexico and irrigated return flows from Imperial Valley	WARM, WILD, RARE
	Sediment/Silt	Irrigated return flows from Imperial Valley, IID O&M activities	REC-I, REC-II, WARM, WILD, RARE

Key to Beneficial Uses:
REC–I means recreational use of the water (river) involving body contact - e.g.: swimming.
REC–II means recreational use of water (river) not involving body contact.
WARM means supporting warm water ecosystems.
WILD and RARE means preservation of rare and endangered species.

Moderate Impact Pollutants

The Impairments Work Group categorized a series of moderate impact pollutants that are known to occur in the New River. These constituents are pollutants for which current data show improved water quality and have on-going clean-up programs (largely in the U.S.) that appear to be working and need to be continued. While these programs are critical, they are not the focus of this strategic plan other than to recognize the importance of maintaining the on-going efforts and continuing progress.

Hexachlorobenzene (HCB) and Mercury: The New River is listed on the 2008 303(d) list of waters not meeting water quality standards for hexachlorobenzene (HCB) and mercury, among others. Readily available data show that HCB and mercury exceeded water quality criteria last in 1994. Data collected between 1994 and 2004 show that HCB and mercury are meeting New River water quality standards, but cannot be removed from the 303(d) list during the next listing cycle as required by California 303(d) listing policy due to lack of an adequate number of observations. Because the listing of these constituents was based on fish tissue data, an ongoing region-wide fish tissue water quality monitoring program will continue to provide Regional Water Board staff with data and information to track the water quality trend for these constituents and to likely recommend delisting if appropriate.

PCBs: PCBs are legacy industrial chemicals whose uses in the U.S. were banned in the late 1970s. Available data show that the concentration of PCBs in fish tissue samples, which was the basis for the 303(d) listing, has been reduced significantly, but still exceeds the water quality criteria. However, most of the available data are more than 12 years old. The Regional Water Board reports that it will be collecting more data to either support Total Maximum Daily Load (TMDL) development or delisting.

Sediment and Soil Sampling and Analysis: The Department of Toxic Substances Control (DTSC) and the Regional Water Board developed and implemented a focused field sampling plan to collect sediment and/or soil samples from the river bottom and flood plain of the New River in the City of Calexico. The purpose was to collect data to determine whether a California or federal hazardous waste existed in the sediments and soils along the New River from the International Boundary to the All American Canal.

On April 13 and 14, 2011, DTSC staff collected 35 soil samples from the New River bottom and on portions of the floodplain. The findings for the 35 samples exhibited no California or federally-regulated hazardous waste characteristics/concentrations.[11] The analyses examined heavy metals in the sediments, volatile organics, organo-chlorine pesticides (DDT and its derivatives), chlorinated herbicides, PCBs (polychlorinated biphenyls), acidity and flammable characteristics. The Fish Bioassay analysis was negative for all 17 samples analyzed for the California-regulated toxicity criteria.

Existing and Established Remediation Plans, Projects and Programs

This section describes existing and established projects and programs in Mexico and the United States and encompasses many varied agencies, funders and management entities. The foundation of this strategic plan is built on continuing the successful efforts of these organizations over the last two decades. In recent years, considerable progress has been made and the ambient water quality conditions in the New River reflect that improvement. However, the river's water quality continues to stay well below U.S. and California standards for critical pollutants as discussed earlier. Recognizing that Mexico's water quality standards are less stringent than those of the U.S., it is clear that additional facilities, regulatory programs, voluntary collaborative programs and related clean-up efforts are needed.

Existing Remediation Efforts in Mexico

Non-structural Controls

In 1980, the IBWC established Treaty Minute 264 titled "Recommendations for Solution to the New River Border Sanitation Problem at Calexico, California-Mexicali, Baja California." This was a major accomplishment for the IBWC because it memorialized a long-standing problem and gave hope to residents on both sides of the border that finally there would be a timely solution to serious sanitation and water quality problems. Among other things, Treaty Minute 264 established that the long-term solution to the New River at the International Boundary would be the elimination of all domestic and industrial wastewaters in the river by construction of pumping and pipeline projects to convey these wastes southwestward from Mexicali. While much has been accomplished, 30 years later, full compliance with the Treaty Minute standards has not been attained.

In the late-1980s, there was a fundamental shift in Mexican policy to deal with New River pollution in Mexicali. In 1987, Mexico started to accept assistance to deal with its sewage infrastructure. The U.S. IBWC and Mexican CILA sections completed a joint project totaling close to $1.2M to retrofit sewage pumping plants in Mexicali. Even though this project did not substantially mitigate New River pollution, the Regional Water Board viewed this as a major breakthrough because it paved the way for future bi-national projects and cooperation to reduce New River pollution in Mexicali.

In 1992, the IBWCs signed Treaty Minute 288, which called for a number of specific actions and projects to address New River water quality including:

- Rehabilitation of major sewage collectors
- Acquisition of cleaning equipment for the sewage collectors (e.g., vacuum trucks)
- Acquisition of standby power generators for the main pumping plants
- Construction of a new wastewater treatment plant and sewage collectors
- Installation of gravity collectors to replace open air agricultural drains
- Implementation of an industrial pretreatment program
- Elimination of clandestine dumping of solid wastes into surface waters
- Elimination of untreated discharges

- Improvements to the operation and maintenance of sewage infrastructure
- Utilization to the maximum extent possible of treated effluent southwest of Mexicali for irrigation and disposal of unused effluent some distance from the International Boundary

The bi-national committee set up to develop and manage the Mexicali sanitation projects can continue to serve as a pivotal institution and venue for wastewater treatment improvements in Mexico.

During the last two decades, Mexico has also taken substantial steps in promulgating new environmental laws to restructure and empower its federal agencies with responsibility for environmental protection. However, California's regulatory experience indicates that it takes many years to implement sound environmental regulatory programs. In spite of CONAGUA's best regulatory efforts, untreated and partially treated discharges of wastes from industry (e.g., slaughterhouses) and the municipality continue in violation of standards.

Again, it is important to recognize that Mexican water quality standards for the New River and its tributaries in Mexico are significantly different than California's water quality standards because Mexico classifies the New River as a drain rather than a river. For example, the Mexican bacteria standard is 1000 MPN/100 ml fecal coliforms, while the U.S. standard is of 200 MPN/100 ml fecal coliforms.

California-Baja California Cooperation Agreement

In October 2009, the State of California and Baja California signed a collaboration agreement to foster a favorable relationship of partnership and cooperation for the benefit of the citizens of both states. The agreement addresses cooperation in the following areas:

- Economic development
- Environmental protection
- Border crossings
- Public security and civil protection
- Health
- Renewable energy
- Development of agribusiness

The California-Mexico Border Relations Council is the California lead for implementation of the agreement. The agreement expires in October 2013. Under the agreement, the states have conducted various technical workshops, including a joint training workshop in March 2010 on Wastewater Treatment Plant Operations and Maintenance for Mexican personnel dealing with wastewater (e.g., wastewater treatment plant operators). The State and Regional Water Board and CONAGUA were leads for the training. The agreement provides for continued technical cooperation at the state-to-state level. It is a logical vehicle to establish a comprehensive outreach and education program for both the Mexicali and Imperial Valleys and additional training opportunities to improve the operations and maintenance of sewage infrastructure and pretreatment controls in both valleys.

Pump Station in Mexicali

Structural Controls

NAFTA provides for financing opportunities to develop and implement structural controls to address New River pollution in Mexico. The State of California and the State of Baja California actively participated in the BECC certification program to develop and implement sanitation projects for the Mexicali I and Mexicali II service areas and, by extension, address New River pollution from Mexico. In 1997, the BECC certified the Mexicali I and II sanitation projects.[12] The U.S. EPA was essential in securing funding not just for these two projects, but also for "emergency sewage projects" in Mexicali—the so called "Quick Fixes" projects.

The main objective of these projects was to eliminate municipal raw sewage in the New River and provide sewage services to the City of Mexicali (see Remediation Work Group Technical Memo, Appendix 8). The projects totaled close to $98 million dollars, funded roughly by 45% from Mexico and 55% from the U.S. The "Quick Fixes," the Mexicali I and Mexicali II projects, were completed in 1999, 2005 and 2007, respectively. The projects eliminated 10 to 20 million gallons of raw sewage that Mexicali was routinely discharging into the New River. They also resulted in significant reductions in phosphate at the International Boundary and ultimately into the Salton Sea.

In spite of this progress, the New River at the International Boundary remains polluted due to the remaining discharges of wastes from point and nonpoint sources in Mexico (e.g., untreated and improperly treated industrial discharges of wastes, urban and storm water runoff, agricultural runoff and trash). The bi-national projects were designed to provide adequate sewage services to the City of Mexicali, which they have done. However, they were not designed to address the additional pollution caused by the sources listed previously which continue to keep the water quality out of compliance with treaty agreements.

Existing Remediation Efforts in the U.S.

Point and nonpoint sources of pollution from the Imperial Valley also contribute to the water quality problems in the U.S. portion of the New River. Pollution control for the New River in the U.S. has been largely driven by non-structural legal and regulatory solutions (i.e., regulation/policy), which in turn have triggered implementation of structural controls (e.g., WWTP upgrades) and management practices by responsible parties who are subject to these regulations.

Non-structural Controls for Point Sources of Pollution

The Regional Water Board is implementing a full regulatory scheme to deal with and control the water quality impacts caused by wastewater treatment plants, feedlots and storm water runoff from the municipalities and the County. The Regional Water Board has also adopted Pathogen and Dissolved Oxygen TMDLs to further address the New River impairments potentially caused by the point sources in the U.S. (e.g., WWTPs and feedlots) and for pollution at the International Boundary. The Regional Water Board also adopted a New River Trash TMDL[13] to address the trash problem at the International Boundary. TMDL's are watershed-wide regulatory programs that bring together multiple stakeholders to resolve pollutant-specific problems affecting a water body. A description of regulatory controls for the point sources follows.

Municipal Wastewater Treatment Plants: There are nine domestic/municipal wastewater treatment plants (WWTPs) discharging treated wastewater into the New River or its tributaries. Each of the WWTPs is regulated through the NPDES Program (see Appendix 7, Impairments Work Group Technical Memo). The plants in Calexico and Brawley discharge the majority of treated effluent into the New River.

Up until 1998, all of the domestic/municipal WWTPs in the New River watershed were discharging secondarily treated, but undisinfected, wastewater into the New River. In 1998, the Regional Water Board issued revised NPDES permits with disinfection requirements for the WWTPs. Currently, all of the WWTPs discharging into the New River in Imperial County have NPDES permits that include disinfection requirements. Several of the WWTPs are having problems complying with metal standards and other effluent limitations and therefore, are under Cease and Desist Orders from the Regional Water Board to bring their discharges into full compliance with their permits (i.e. Brawley WWTP, McCabe School District WWTP, Seeley WWTP).

Feed-Lots: There are eight Confined Animal Feeding Operations (CAFOs) in the New River watershed in Imperial County, regulated under a General NPDES Permit adopted by the Regional Water Board. Although the intent of the permit is to prohibit discharges of wastes from the CAFOs into New River, the permit actually provides for the CAFOs to discharge their wastes untreated when there are storm events that have a greater than 25-year return frequency. During these storm events, discharges of wastes from the CAFOs would adversely and severely impact the New River.

Tula Drain in Mexicali, Mexico

Storm Water: The cities of Brawley, Imperial, El Centro, Calexico and the County of Imperial are individually enrolled under the Water Board's municipal storm water management permit (known as the Small Phase II MS4 General NPDES Permit). This general permit is being renewed and has recently added the cities of Calipatria and Holtville. In Imperial County, there are approximately 50 industrial activity facilities that are enrolled in the Industrial Storm Water Permit which regulates discharges associated with 10 broad categories of industrial activities.

New River Pathogen TMDL: This TMDL was adopted in 2002 and is primarily enforced by the Regional Water Board. The TMDL evaluates the bacterial contribution from point and nonpoint sources of pollution and establishes density-based standards for point sources and nonpoint sources expressed in terms of three indicator bacteria. The major sources of pathogen in the New River are from point and nonpoint sources in the Mexicali Valley, primarily from slaughterhouses, feedlots, untreated and partially treated sewage and trash. In the U.S., point sources of bacteria include the nine WWTPs, potentially CAFOs along the New River and urban storm water runoff.

All of the NPDES Permits for the WWTPs have bacteria effluent limitations that are consistent with and implement the Pathogen TMDL. The Regional Water Board has issued formal enforcement (e.g., fines and cease and desist orders) to all of the WWTPs that fail to comply with their permits. These regulatory controls and enforcement actions are working to control the pathogen contributions from WWTPs in the U.S.

Because the Regional Water Board does not have authority to require Mexico or the U.S. government to reduce waste at the International Boundary, the Regional Water Board can only request cooperation from Mexico and the U.S. government to take actions to ensure discharges of wastes from Mexico do not violate this TMDL. Consequently, the TMDL requested the U.S. Section of the IBWC and U.S. EPA to provide a technical report to the Regional Board with proposed measures (e.g., plans and specifications for disinfection facilities) and a time schedule for implementation to ensure that waste discharges from Mexico do not violate standards. Neither the U.S. IBWC nor the U.S. EPA has provided the requested information to ensure compliance with the Clean Water Act. Moreover, the Regional Water Board indicates that the measures undertaken by the U.S. IBWC and U.S. EPA have not fully dealt with the discharges of wastes from Mexico. This is a primary reason that the New River has not achieved compliance with the TMDL and beneficial uses of the river are severely impaired in the Calexico and Seeley reaches. Pathogens are a critical concern for the strategic plan.

New River Trash TMDL: This TMDL was adopted in 2007. It addresses New River impairment caused by trash. The primary cause of the impairment is illegal dumping and littering of trash into the New River and its tributary drains in Mexicali. The exact amount of trash is unknown, but is estimated to be 120 tons/year (Imperial County Sanitation Department 2003). This equals 240,000 pounds/year, or 658 pounds/day. Most of this trash is collected and removed from the river when it intersects the Imperial County Calexico Landfill, which is located about four miles downstream of the International Boundary. Trash that enters the U.S. or remains within Mexico dissolves and leaches dangerous impairment-causing constituents (e.g., pathogens, organic matter, metals and VOCs) into the New River threatening public health and aquatic and wildlife communities. Thus, eliminating discharges of trash into the New River and its tributaries also helps to address pathogens and other pollutants. The TMDL numeric target is zero.

The TMDL requests the U.S. Section of the IBWC and U.S. EPA to provide a technical report to the Regional Board with proposed measures (e.g., plans and specifications for disinfection facilities) and a time schedule for implementation to ensure that waste discharges from Mexico do not violate U.S. water quality standards for the New River downstream from the International Boundary. The U.S. IBWC and U.S. EPA have not complied with that request and discharges of trash from Mexico continue to violate the TMDL and impair the beneficial uses of the New River. Addressing trash at the International Boundary is a critical concern of this strategic plan.

New River Dissolved Oxygen TMDL: This TMDL was adopted by the Regional Water Board in 2011 and is pending OAL and U.S. EPA approval. The TMDL addresses the low Dissolved Oxygen (DO) impairment of the New River in the first 12 mile (19.3 km) reach downstream of the International Boundary. The primary sources of pollutants that cause this impairment are untreated or partially treated urban and industrial wastewater discharged to the New River and its tributaries in Mexicali. These untreated wastes contain high amounts of organic matter that exert a Biological Oxygen Demand (BOD) and ammonia, which are consuming in-stream DO. Low DO levels threaten fish and wildlife communities and prevent the establishment of a healthy ecosystem. Most fish species in warm water streams require a minimum of 5.0 milligrams per liter of DO for optimum health (which is the proposed TMDL numeric target). This standard is applicable throughout the year for the entire stretch of the New River. Achieving this numeric target will protect the New River's beneficial uses. The numeric target takes into account that the New River is a warm water system and protects the most sensitive organisms, particularly during their vulnerable early life stages.

The annual average DO levels were extremely low when measured between 1997 and 2002 (1.13 mg/L to 2.8 mg/L). These low DO levels were primarily caused by raw sewage formerly discharged into the New River in Mexicali. With the completion of Las Arenitas WWTP in Mexicali in 2007, New River DO conditions have improved at the International Boundary, but other untreated and partially treated discharges (e.g., industrial discharges) from Mexico continue to cause violation of the TMDL.

The TMDL has a compliance deadline of 2017. Like other programs that deal with pollution flowing into the U.S. from Mexico, this TMDL requests the U.S. IBWC and U.S. EPA to provide a technical report to the Regional Board with proposed measures and a time schedule for implementation. Whether this will be effective is not yet clear. Thus far, non-structural tools have not proven successful at affecting change in Mexico, while structural solutions have been. Addressing low DO is of critical concern for this strategic plan.

Non-structural Controls for Nonpoint Sources of Pollution (Agricultural Activities)

Historically, discharges of wastes from agricultural practices had been unregulated in California, even though pollutants from agricultural practices are responsible for much of the impaired surface waters in the state. In the mid-1990s, pollution from agricultural practices came under the regulatory "microscope" with the development and implementation of TMDLs to address the impairments as required by the Clean Water Act (section 303(d)). The Regional Water Board is currently implementing the following regulatory measures as the most sensible adaptive management strategies to deal with the potential and actual water quality impacts associated with irrigated agriculture in the Imperial Valley:

- Priority silt TMDLs
- Policy for the Implementation and Enforcement of the [state] Nonpoint Source Pollution Control Program
- Cooperative agreements with the farming community of Imperial Valley
- Basin Plan Conditional Prohibitions of Discharge

Also, the State Water Board has ordered the Imperial Irrigation District (IID) to address/investigate selenium impacts. A description of the silt TMDL, the State Water Board directive and the cooperative farm and drainage programs follows.

New River Sedimentation/Siltation TMDL: This TMDL was adopted in March 2003. This is a priority for the Regional Water Board because it not only addresses New River impairment caused by silt from irrigated agriculture and from IID's drainage activities, but also because it indirectly addresses insoluble legacy pesticides (e.g., DDT and Toxaphene) and phosphate attached to silt. About two-thirds of the New River's total flow comes from agricultural discharges from agricultural drains and most of the remaining one-third comes across the International Boundary from Mexico. The Boundary flow contribution has a substantially lower suspended sediment concentration.

The target established in this TMDL is an annual average in-stream total suspended solids (TSS) concentration of 200 milligrams per Liter (mg/L) and applies throughout the entire U.S. length of the New River from the International Boundary to the Salton Sea. This target is a 17% reduction of annual mean, as measured from 1996 to 1998 at the outlet to the Salton Sea, where the TSS concentrations are highest. This reduction is to be accomplished in four phases, over a 12-year implementation schedule. The total sediment load to the New River corresponding to the numeric target is approximately 128,000 tons per year.[14]

The TMDL identifies a variety of farming management practices (MPs) and establishes requirements for the IID and individual farmers. The TMDL requires farmers to submit a sediment control plan to the Regional Water Board and implement the MP's proposed. Sediment control programs may be submitted by an individual farm landowner, renter/lessee and/or operator/grower (Individual Program), or by a group of farm landowners, renters/lessees and/or operators/growers (Group Program). In all cases, the sediment control program must assess specific site problems and conditions,

develop alternative sediment management practices and monitor the results. As the Remediation Work Group Technical Memo details, most agricultural operations are in compliance with this TMDL.

The TMDL also establishes a cooperative agreement with the Imperial County Farm Bureau (ICFB), which has developed a voluntary program to assist farmers in complying (see "Imperial County Farm Bureau Voluntary TMDL Program" section of this report). Farmers participating in and in good standing with, the ICFB program are in compliance with their TMDL requirements. Over 98% of the farmers discharging irrigation return flows in the Imperial Valley are enrolled in the ICFB's Program. To date, this TMDL is responsible for a 30% load reduction of silt into the New River. The program has won state and federal environmental awards. This program and the other two silt TMDLs for the Imperial Valley have also reduced the amount of phosphate going into the Salton Sea. This regulatory control is working beyond expectations.

State Water Board Water Rights Order No. 2002-0013 [Revised]: The State Water Board issued Water Right Order No. 2002-0013 (Revised) to provide for the transfer of up to 300,000 acre feet per year of water from the IID to the San Diego County Water Authority as part of a water supply project for San Diego. A copy of the State Water Board order can be downloaded from:

http://waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2002/wro2002-13revised.pdf

In recognition of the environmental impacts that the transfer could have in the Salton Sea Watershed, the State Water Board Order requires that the IID mitigate dust emissions from Salton Sea exposed beaches; mitigate habitat impacts on the Salton Sea, New River, Alamo River and Imperial Valley Drains; and design and implement a study to identify practices that affect selenium concentrations in agricultural drains within the southern portion of the Salton Sea watershed.

The Order, required approximately 350 acres of aquatic habitat to be created as a replacement for aquatic habitat in agricultural drains in the valley. This has been legally accomplished. Two additional phases of aquatic habitat are planned in 2014 and 2019. The IID is also evaluating the efficacy of various dust emission control practices for use on exposed Salton Sea beach and on applicable fallowed agricultural fields.

The IID also continues with the implementation of conditions and mitigation measures that are more directly applicable to water quality within the watershed and, more specifically in the New River. IID developed a draft study plan to address selenium. The plan proposed using data compiled from an ongoing four year study of selenium concentrations in various agricultural drains and evaluating land practices/cropping patterns within the identified drain-sheds. The State Water Board approved the study plan for the selenium Fate and Transport Study in 2008 and IID began implementation in 2009. IID also continues to evaluate various operation and maintenance practices and identify best management practices that might be useful in mitigating various potential water quality and wildlife habitat impacts.

Agricultural water quality management using planted wheat strips.

Imperial County Farm Bureau Voluntary TMDL Program: As noted in the Sediment TMDL section, the Imperial County Farm Bureau (ICFB) developed its Voluntary TMDL Compliance Program in 2001. The Program's main objective is to assist the farming community in the Imperial Valley to comply with the adopted Sedimentation/Siltation TMDLs for the New River, Alamo River and Imperial Valley Drains. These waters are within the Salton Sea Watershed. The Program is based on a watershed wide approach that divides the Imperial Valley into ten sub-watersheds (a.k.a. drain-sheds): five of the drain-sheds for the Alamo River, four drain-sheds for the New River and one drain-shed containing all of the drains that discharge directly into the Salton Sea. The TMDLs have a numeric target goal of 200 milligrams per liter of total suspended solids (TSS), to be done in four phases, over a 12-year schedule. The Program contributes to attainment of Water Quality Standards by:

1. Establishing membership requirements for farmers to participate in the program and tracking participation
2. Identifying, recommending and providing technical assistance, outreach and education for implementation of management practices (MPs) to comply with TMDL requirements and address site-specific conditions
3. Requiring farmers to file annual water quality improvement plans that identify problems in their fields that could contribute to water quality degradation and listing the MPs to be implemented to address the problems and comply with requirements

4. Coordinating key project actions with the Imperial Irrigation District (IID), who also has responsibility for compliance with TMDL requirements because it is responsible for operation and maintenance (O&M) of the Imperial Valley drains
5. Holding periodic meetings to discuss overall progress, generic problems and areas that need further efforts
6. Tracking all farmland in the Program and the types and number of MPs that are on each parcel under cultivation; and classifying MPs on a drain-shed basis and linking them with the flow and water quality monitoring data for the drain-shed to determine MP effectiveness and contribution to load reductions
7. Assessing overall progress and compliance with the TMDL load reductions by evaluating flow and water quality data for the rivers; and reporting on a quarterly and annual basis

The program has achieved unprecedented success. To date, the level of participation of farmers responsible for compliance with the TMDLs is 96-98%. The program was featured in a U.S. EPA brochure entitled 'TMDLs and Agriculture in the West' and received a California Governor's Environmental and Economic Leadership Award in 2004 and the U.S. EPA's Environmental Leadership Award in 2006. From a water quality perspective, as Phase 2 came to a close in 2009, the most recent water quality monitoring data show that the TSS levels in the Rivers are well below the interim numeric targets set by the TMDLs. Phase 3 of the TMDLs calls for additional load reductions in the amounts of 10, 4 and 20 percent for the Alamo River, New River and Imperial Valley Drains, respectively. Farmers implement an average of five MPs per field, resulting in an estimated 25,000 MPs being implemented valley-wide in any given year. For detailed descriptions of the program and its administration, see the Remediation Work Group Technical Memo (Appendix 8). Implementation of the ICFB's Program costs approximately $250,000/year. The cost to implement MPs is $6 to $40 per acre, with the most of the implemented MPs are less than $13 per acre.[15]

Pilot treatment wetland project near Imperial by the Citizen's Congressional Task Force on The New River.

Structural Controls

IID Drain Water Quality Improvement Program (DWQIP): The IID DWQIP is an example of a structural control program triggered by regulation. The Siltation/Sedimentation TMDLs for the Imperial Valley required the IID to prepare, submit for approval and implement the DWQIP to address the impacts that the O&M activities on the drains have on surface waters. The DWQIP deserves special attention because it also incorporates other measures and programs to address overall improvement of O&M activities, which should also result in overall improved conditions of the drains and rivers.

The IID developed its program in September 2003 to address water quality impairment within the New River, Alamo River and 1,406 miles of Imperial Valley drains. The program includes the implementation of extensive water quality monitoring and reporting, as well as several management practices which serve to reduce water quality impairments within the IID drainage system. These include a Tail Water Education Program, drain cleaning checklists, use of "rakes" for large vegetation removal (salt cedar), use of excavator-mounted GPS units during drain cleaning operations, a drain improvement program to make capital improvements within drains that exhibit abnormally-high water quality impairment, support of the Farm Bureau's Voluntary TMDL Compliance Program and most recently, a vegetation management plan.

The specific purpose of the vegetation management plan is to enhance coordination of mechanical, chemical and biological drain maintenance practices that serve to improve drain water quality and reduce sediment loads. Proper maintenance of earthen side-slopes, including the use of beneficial plants and coordinated herbicide application, will assist with erosion control and subsequent sedimentation. Plants identified as beneficial may be preserved and/or propagated to maintain the integrity of side-slopes on earthen channels.

In 2008, IID was awarded a $900,000 grant from the California State Proposition 50/84 Agricultural Water Quality Grant Program to implement actions that support drain water quality improvement. This grant-funded project, entitled Precision Drain Cleaning BMP Plan, is composed of four specific programs. For specific details of the drain improvement program and vegetation management program, see the Remediation Work Group Technical Memo (Appendix 8). The IID is spending approximately $5,000,000 per year to implement the program.

Pilot treatment wetland project near Brawley by the Citizen's Congressional Task Force on The New River.

New River Citizen's Congressional Task Force Demonstration Wetland Projects: In 1997, U.S. Representative Duncan Hunter asked the non-profit organization, Desert Wildlife Unlimited, to head the Citizen's Congressional Task Force (Task Force) to improve water quality in both the New and Alamo Rivers to reduce degradation of the Salton Sea. In 2000, the Task Force developed and implemented two pilot wetland projects to test the effectiveness of constructed wetlands in lowering nonpoint source pollutants: one of the wetlands is near the City of Imperial (a.k.a. the Imperial Wetlands) and the other wetland is adjacent to the New River in the City of Brawley (a.k.a. the Brawley Wetlands). Additional information on the pilot wetlands can be found at the following web site:

http://www.newriverwetlands.com/frameset1.html

Each of the wetlands has a comprehensive water quality monitoring program. In 2006, Tetra Tech, Inc., under a contract with IID and with funding from the Bureau of Reclamation, prepared a report evaluating the performance of the wetlands. A copy of Tetra Tech's report can be found at the following web site:

http://www.newriverwetlands.com/images/pilotfinalreport.pdf.

Monitoring data for both sites indicate the wetlands are effective in dealing with total suspended solids, nutrients and fecal coliform. The data also indicate that certain constituents, especially selenium, which is present at elevated concentrations in the drains and rivers, may be bio-accumulating in invertebrates and fish at high levels. Also, selenium concentrations in the eggs of wetland-dwelling birds were tested and found to be at the high end of background concentrations. These results indicate the need for further study to understand the extent of risk to the ecosystem posed by the concentration of toxics in the wetlands (Tetra Tech, 2006).[6].

Potential Additional Remediation Plans, Projects and Programs

The extensive efforts described in the previous section, both structural and non-structural, on both sides of the border have attempted to address many of the water quality related problems that have historically existed in the New River. However, they have not resolved the remaining pollution that is still having a severe impact on the river and the beneficial uses it must support, particularly in the Calexico area.

This section reviews a variety of solutions that have been considered by the TAC for implementation to meet regulatory requirements and achieve the vision established for the New River.

Constraints and Opportunities in Mexico

If beneficial uses of the New River and a river parkway are to be realized in the Calexico area, either:

1. Mexico needs to implement measures to reuse and recycle all New River flow at the International Boundary so no polluted water flows into the U.S.; or
2. Additional controls need to be developed and implemented in the U.S. to address the trash, pathogen and low dissolved oxygen impairments at the International Boundary.

In terms of water quality, it is likely that the U.S. EPA will continue to work with Mexico over time to achieve Mexico's national water quality standards for drains. In terms of flow volume, it is also likely that dry weather flow will be somewhat reduced over time. The treaties with Mexico address water quality, but they do not address the quantity of flow at the International Boundary and Mexico's water needs are increasing. The U.S. IBWC reports that Mexico has conducted preliminary feasibility studies to recycle and reuse additional New River flows. However, the alternatives Mexico is considering do not deal with projected storm water flows and focus on reclaiming only the "cleaner" dry weather flows for reuse. If that is the case, projects are likely to reduce current New River flows at the International Boundary by only about 30%.[17] Beyond that, it may be technically impossible and/or economically infeasible for Mexico to reduce their remaining dry or wet weather New River flows. In summary, it is highly unlikely that Mexico will be able or interested in reclaiming and reusing all New River water; therefore, polluted water will continue to enter the U.S. at Calexico into the foreseeable future.

The pathogen, trash and low dissolved oxygen problems originating in Mexico cannot be resolved by implementing additional non-structural (i.e. regulatory) controls in the U.S. or by achieving CONAGUA water quality standards in Mexico for currently untreated industrial discharges. There would still be a severe pathogen problem at the International Boundary because Mexico's standards for bacteria are significantly less stringent than in the U.S.

The illegal dumping of trash[18] into the New River and its tributaries in Mexico is also a daunting problem. The encasement of some lateral drains and a substantial portion of the New River in Mexicali have reduced the problem by removing people's access to the river. However, there are still too many open drains and insufficient resources to patrol the drains to prevent illegal dumping of trash, to complete encasement of drains, or to provide for an adequate solid waste infrastructure to mitigate the illegal dumping of trash and other wastes.[19]

The Remediation Work Group concluded:

1. There are opportunities for water quality improvement in Mexico, however it is not certain how or when those improvements will be made.
2. There will continue to be a significant flow in the New River at the International Boundary and, even if water quality standards in Mexico are reached, the water will not meet U.S. standards once it flows across the International Boundary.
3. Solutions in the U.S. to address the trash, pathogen and DO problems originating in Mexico must focus on structural controls, since non-structural regulatory solutions only work if the source is within U.S. jurisdiction.

Constraints and Opportunities in the United States

Regarding New River pollution from U.S. sources, in spite of the success of the Imperial County Farm Bureau's Voluntary Compliance Program, the significant improvements being implemented by the IID and the State and Regional Water Boards' regulatory efforts, there is still work to be done.

It is the TAC's interpretation that Congress recognized this relationship between the New River and the Salton Sea in the Salton Sea Reclamation Act of 1998, which explicitly provides for implementation of constructed wetlands to improve New River water quality. Implementation of specific structural controls, like wetlands, would result in improved water quality and also provide for new wildlife habitat and additional recreational opportunities. This would benefit the New River watershed, as well as the Salton Sea.

Structural Alternatives to Address Trash, Pathogens and Low Dissolved Oxygen

The most commonly accepted technologies to deal with trash (once it is in wastewater) and pathogen problems are screening and disinfection, both of which are part of the treatment functions of a Waste Water Treatment Plant (WWTP). Additional mechanical aeration or injection of oxygen would increase the dissolved oxygen in New River water and would help remedy the problem of low dissolved oxygen. The following is a discussion of these remediation project alternatives.

Full Wastewater Treatment Plant (WWTP)

Typically, municipal wastewater is treated at a centralized WWTP. A conventional WWTP includes physical, chemical and biological processes to remove contaminants. There are generally three stages of treatment in a conventional WWTP:

Pretreatment - Removes large materials (e.g., trash and rags) and grit (e.g., sand) that can damage pumping equipment and/or interfere with other stages of treatment.

Primary Treatment - Removes settle-able or floating contaminants.

Secondary Treatment - Removes dissolved and suspended biological matter, typically using aerobic processes.

When a fourth stage is added to remove particular pollutants (e.g., disinfection for pathogen control or anaerobic processes for further chemical conversion), the WWTP would provide advanced treatment, also known as Tertiary Treatment.

In 1987, a report entitled "New River Pollution Abatement Report Recommended Projects"[20] (known as the Montgomery Report) was prepared for the Regional Water Board to recommend projects for the abatement of pollution in the New River. One of the five options the Montgomery Report evaluated was an advanced WWTP to treat the entire river near the International Boundary (physical/chemical treatment plus disinfection). The projected costs for an advanced WWTP to treat 475 cubic feet per second (the average flow of the river back then) would be nearly $750,000,000 in today's dollars. The O&M costs for such treatment system would likely exceed $50,000,000 per year.

When the Regional Water Board commissioned the Montgomery Report, the New River was undoubtedly the most polluted river in California. It carried significantly more flow and untreated industrial and municipal wastes than it does now, including more than 20 million grams per day of raw sewage from Mexicali. At that time, consideration of a large advanced WWTP near the International Boundary made sense—technical sense at least. From a cost perspective, however, the project was considered too costly then and it is surely too costly today. What is worth noting about the Montgomery report is that it found "in-stream disinfection and aeration" of the river at the International Boundary as the superior alternative to deal with New River pollution from Mexico. In other words, even in 1987, it made economic and technical sense to design a focused treatment system to deal exclusively with the pathogens, low dissolved oxygen and trash problems. Targeted structural controls make sense.

Trash Screens at the International Boundary

The preferred method to address trash is source control. However, once trash is in a river, screening facilities are necessary to provide pretreatment and remove trash and solids from the New River. A trash screening facility could be installed for the New River on either side of the International Border. Two general categories of devices used to separate coarse solids from water are screens and bar racks. Screens use either plates, milled slots, or various meshes, while bar racks consist of a series of parallel bars, normally 1/4 to 1/2 inch wide, running vertically through a channel with open space between the bars of a width that is appropriate for the purpose of the required trash removal.

The 1987 Montgomery Report evaluated various screening methods and found the "climber screen" as the best suited for both trash and coarse solids removal. The "climber screen" consists of a bar rack, an automated mechanical (hydraulic) rake and a trash conveyor system. The bar rack, which would extend across the entire width of the river, from near the bottom of the channel to several feet above the water level, serves to detain the flow of trash from continuing downstream in the river. A belt or chain–driven automated rake, roughly three feet wide, travels along a suspended rail mounted above the bar rack, lifts up the trash that has collected in front of the rack and dumps it onto a conveyor belt located immediately behind and parallel to the rack. The rake systematically moves in one direction approximately the width of the rake mechanism, repeating the process of lowering and pulling trash up to the top of the rack and onto the conveyor belt, beginning on one end of the rack and continuing until it reaches the other end of the rack. For the duration of the rack cleaning process, the conveyor belt transports the trash into a trash receptacle located at the end of the conveyor, which is routinely emptied at an appropriate disposal facility.

A screening facility could be built on either side of the International Boundary. Several members of the TAC held discussions with Baja California officials (SIDUE) in charge of the proposed expansion of the Mexicali West Port of Entry. SIDUE prepared a conceptual design and cost estimates for a trash screen on their side of the International Boundary (estimated at $2.6M). Building a similar trash screen on the U.S. side of the International Boundary would cost significantly more (in the range of $4M) because of higher materials and labor costs and additional permitting requirements. As part of the Border expansion project, SIDUE has indicated that they would consider incorporating a trash screen for the New River at the International Boundary in Mexico and would operate and maintain it, provided the U.S. pays for its construction. Therefore, the TAC unanimously recommended that the offer from Mexico should be considered seriously, not just because of the cost, but also because the U.S. would not have to address O&M costs for the screen and the costs associated with disposing of the screened trash and solids.

Disinfection Facility at the International Boundary

Regarding pathogens, about 50% of the pathogens entering the U.S. come from the New River main-stem channel and the other 50% comes from the International Drain, which joins the New River main-stem in Mexico just feet before the International Boundary. There was significant discussion at the TAC meetings of whether to: (a) isolate and disinfect the International Drain flow in either Mexico or the USA in a to-be-determined location that would be away from urban populations, or (b) disinfect the whole river in Calexico after it enters the U.S. There was also significant discussion regarding what flow volume the conveyance and disinfection facilities should be designed for at the concept level. Dry weather, wet weather, something in between and whose estimates for the expected volumes should be used.

As indicated in the Hydrology Section of the Impairments Work Group Technical Memo (see Appendix 7), there is significant technical disagreement over projected storm water flows at the International Boundary. What is not in dispute is the cost associated with conveying various flows. A conveyance facility for a projected flow of 11,600 cfs (i.e. the 100 year return flow as calculated by GSA in 2008) would cost approximately $63,000,000. To put this in perspective, the average flow of the Colorado River at the International Boundary with Mexico is 2,500,000 cfs; and the highest recorded flow for the New River in Calexico during the last 30 years is 833 cfs.

In addition, the New River flows at the International Boundary have decreased during the last 10 years and are expected to decrease by an additional 30% in the future. In light of this, it was the TAC's opinion that building the conveyance and disinfection facilities to treat even Federal Emergency Management Agency's (FEMA) projected 100-year flow could easily cost $500 million. This is a cost that is difficult to justify because of the marginal environmental gains. Therefore, the TAC recommended that: (a) the existing New River channel should continue to be used to handle storm events; and (b) the current dry weather flows of the River should be diverted for disinfection.

The Remediation Work Group considered that disinfection facilities could be built on either side of the International Boundary, just like a trash screening facility. Building this type of wastewater treatment plant in Mexico would require first and foremost consent from Mexico. Mexico would also have to agree to operate and maintain the facility. Under such a scenario, the U.S. would be likely responsible for all the costs associated with the construction and O&M of the facility, mainly because the pathogen-indicator standards in Mexico are permissive. Perhaps more importantly, this would require that a new treaty be negotiated with Mexico, one that makes provisions for construction and O&M of the disinfection facility, specifies effluent standards to meet the pathogen TMDL load allocation at the Border and ensures water TMDL allocation for the New River in the U.S. immediately downstream from the International Boundary and ensures water for the United States.[21] The TAC felt it would be highly improbable that the U.S. could negotiate such a treaty. Therefore, the Remediation Work Group concluded that building the facility in Mexico should not be given additional consideration without explicit support for this from the appropriate federal and bi-national agencies.

Various feasible alternatives have been advanced for where the outflow of a disinfection facility could be located:

Back to the International Boundary: The water would be directed back into the New River channel some where between the International Boundary and the future River Parkway so that water would flow through the Parkway year round.

Adjacent to Treatment Plant: An outflow pipe could be connected to the New River channel directly adjacent to the disinfection facility. This alternative represents the shortest distance for the conveyance of water and hence a cost savings.

Downstream of the Parkway: The water could be returned to the New River channel downstream of the River Parkway to avoid the urban part of Calexico.

Treatment Wetlands: The water could be directed into a system of constructed treatment wetlands that would provide tertiary treatment.

The issue of where to discharge the outflow requires additional study depending on other decisions, such as the River Parkway design and the design issues, cost implications and location of the disinfection facility. This is beyond the scope of this Plan to determine and would require a project design level assessment.

In May 2011, the TAC commissioned Stantec Consulting Services, Inc., to prepare a preliminary assessment of the technical feasibility and costs associated with disinfecting the New River in Calexico. The design looked at treating an average flow of 140 cfs and with a peak hydraulic capacity of 200 cfs. Stantec evaluated the most commonly used approaches to bacterial disinfection: chloramination, exposure to Ultra Violet (UV) light, chlorination and ozonation. No matter what the treatment method, the Stantec report indicates the New River would likely require a 3-log reduction in bacteria densities to meet water quality standards.

Chloramination and UV light are not recommended as viable options for disinfecting the New River. Chloramination is much more effective at inactivating bacteria than inactivating virus or protozoan cysts. Therefore, achieving a bacteria based regulatory objective via chloramination does not provide the same level of overall pathogen protection as chlorination. Also, chloramination for disinfection requires the addition of ammonia into the river flow. This adds to the cost with no obvious benefit.

UV light is relatively ineffective at disinfecting water with low UV transmittance because the UV light cannot effectively reach the entire water column. UV light is also not very effective when disinfecting water containing a high concentration of particles because light cannot penetrate the particle, regardless of the dose applied. Considering the range of suspended solids and turbidity measured in the New River, UV disinfection is not suited as a disinfectant remediation option for this project. Based on this analysis, Stantec recommends either chlorination or ozonation as possible disinfection methods for the New River.

Stantec developed a conceptual chlorination design to further evaluate its feasibility. This concept calls for a diversion structure, screening facility, pump station, grit removal facility, chlorination contact/mixing facilities, effluent return conveyance and chemical storage facilities. Construction costs are estimated to be approximately $71.6 million for 3-log reduction. Annual operation and maintenance costs are estimated to be approximately $3.0 to $3.5 million for either 2-log or 3-log reduction.

A conceptual ozonation design was also evaluated and would include a diversion structure, screening facility, pump station, grit removal facility, ozonation system (feed gas storage and preparation; ozone generation; ozone injection and mixing; ozone contact; off-gas destruction) and effluent return conveyance. Construction costs for ozonation disinfection are estimated to be approximately $86.4 million for 3-log reduction. Annual operation and maintenance costs are estimated to be approximately $4.5 for 2-log reduction and $7.4 million for 3-log reduction.

Chlorination seems to be the most promising alternative when considering only economic factors. However, ozonation is a superior technical choice for three major reasons:

1. Ozone is a more potent disinfectant than chlorine.
2. Ozone oxidizes far more refractory organics than chlorine, which helps protect New River aquatic life and addresses the greater water quality concerns.
3. Ozonation residual is dissolved oxygen, which is beneficial to aquatic habitat. It also does not increase salt concentrations and does not pose the inherent risk of chlorine residual toxicity to aquatic life as compared to chlorination.

Identifying and evaluating the conveyance infrastructure needed to capture the New River flow at the International Boundary and route it to the disinfection facility was beyond the scope of Stantec's work. The actual specifications of the conveyance structure would depend on the design flow and location of the disinfection facility, design of the Border crossing project, design of the River Parkway and various environmental and engineering factors.

Ideally, the disinfection facility should be built in an area close to the International Boundary, close to the New River channel and in an area zoned and used for such facilities to minimize costs of the conveyance infrastructure and limit environmental and community impacts. The area adjacent to the City of Calexico WWTP meets these criteria. A conveyance structure to handle up to 200 cfs could cost up to $17 million.[22]

To implement this project, a number of significant issues will still need to be resolved, including:

Funding: Determining which agency or agencies can fund construction of the facility and for O&M.

Legal: Governance for the facility (e.g., who owns and operates the facility and its infrastructure).

Regulatory: Permits for the facility (e.g., waste discharge permits, permit for air emissions, compliance with CEQA, NEPA and the Clean Water Act).

Technical Design: Refining the design criteria, including influent water quality to determine potential interference with ozonation and whether additional infrastructure is needed (e.g., sludge handling facilities); and conducting pilot tests to ensure feasibility.

Aeration Devices

Dissolved oxygen (DO) is required for aerobic bacteria to break down excess nutrients, as well as to sustain aquatic life. Low dissolved oxygen levels impair the New River. Aeration is an inexpensive and potentially important remediation option. Any procedure by which oxygen is added to the water can be considered a type of water aeration. Aeration devices can be inexpensive, such as the placement of media (e.g. boulders, rip-rap, etc.), in the river channel to encourage agitation of the water surface, which adds oxygen to the water. Other, more complex and costly methods of aeration include drop structures within the river channel, cascading aeration structures, mechanical surface aerators, bubble aerators and circulators.

There are likely many locations where sufficient head and velocity is available to incorporate aeration structures as a New River remediation option. Therefore, aeration devices are considered to be a viable remediation option, ideally, located as close to the International Boundary as possible where dissolved oxygen levels are the lowest.

Constructed Wetlands

Constructed wetlands, where the primary goal is water quality improvement, have been used throughout North America for several decades to treat polluted waters. Wetlands can be thought of as natural biological reactors providing tertiary level treatment. When pollutants enter a wetland, they may be removed by retention in the sediments, algae, or plants; by microbially-mediated reactions that may transform contaminants into volatile or bio-available forms; or by infiltration into the soil underlying the wetlands.

Using wetlands to treat New River flows would generally consist of a diversion structure to direct flow into the wetland, a settling basin to promote sediment removal, planted wetland cells and an outlet structure to return flows back into the river. Compared with other treatment options, wetlands are relatively simple and cost effective to operate and maintain. Constructed wetlands raise one issue of concern, however. They can allow selenium to enter the food chain where it bio-accumulates in aquatic and other wildlife resources. The Remediation Work Group determined that wetlands are a viable option for aiding in the treatment of several severely impacting water quality problems including pathogens, sediment/ silt, nutrients, low dissolved oxygen and some metals. Further, they would also provide for new wildlife habitat and additional recreational opportunities.

A wetland site reconnaissance study (Nolte, 2002)[23] was performed in 2002 which identified 79 potential sites for constructed wetlands and sedimentation basins adjacent to the New River (40 sites) and Alamo River (39 sites). The sites were evaluated using ten weighted criteria, which culminated in the development of a list of the top 35 sites with the greatest feasibility for construction. In 2006, an investigative study (Davey-Cairo Engineering, Inc., 2006)[24] including analytical transect surveys and topographic surveys, was performed on 42 potential sites (22 New River, 20 Alamo River), including the top 35 sites from the previous wetland study. Based upon this in-depth survey work, there are 11 New River sites that have been classified as recommended for construction, totaling 1,523 acres. Although prior investigation by the Citizen's Congressional Task Force on the New River indicates wetlands are most feasible within New River reaches 3 and 4 (gravity flow from the New River was considered a primary factor), they may be constructed within any of the reaches, particularly, if the disinfection facility remediation option is to be implemented in reach 1 or 2.

As noted earlier, a concern with these types of constructed wetlands is bio-accumulation of selenium. Review of the available data for the pilot wetland projects in Brawley and Imperial indicate that the wetlands are removing a small portion of selenium from the influent, but "removed" selenium has the potential for bio-accumulating in biological resources and specifically in the eggs of nesting birds. So far this has not been observed, but it is critical that any future wetland project include a comprehensive monitoring program to track the threat and actual impacts that selenium may have on biological resources.

Based on the actual costs of the Imperial and Brawley pilot wetland sites, the estimated construction and O&M costs for wetlands are approximately $50,000 per acre and $20,000 per year to $60,000 per year per site (depending on acreage), respectively. This cost does not include the cost for purchasing the land. At least four acres of land are needed to treat a flow of one cfs. This means that to treat five cfs (about 3.2 mgd) of New River water, the construction and O&M costs would be approximately $1,000,000 construction costs and $40,000 in O&M costs.

Non-Structural Alternatives — Selenium and Toxicity

Selenium is common throughout the western United States in marine sedimentary rocks. An important source of selenium to the New River watershed is the upper Colorado River. Drainage from irrigated agriculture in the Grand and Uncompahgre Valleys of the Colorado Plateau in western Colorado may account for as much as 75 percent of the selenium load in the Colorado River near the Colorado-Utah state line. This water is then diverted to the New River watershed for municipal, industrial and agricultural use. The states of Colorado, Nevada and New Mexico have adopted TMDLs that address selenium impairments. The total selenium loading of the Colorado River as it enters California and Arizona is expected to be reduced as a result of those TMDL efforts. Nevertheless, even if those efforts are successful and the selenium concentration in the Colorado River were to be cut down in half (reduced to 0.5 ppb), it is projected that discharges of wastes from Mexico and agricultural runoff in the Imperial Valley would still cause selenium in the New River to exceed the State of California standard.

Selenium from Imperial Valley Sources

In addition to Mexico's contribution at the International Boundary, both point and nonpoint sources of pollution in Imperial County contribute to the New River selenium problems. The Regional Water Board has a number of options to address the selenium problems including:

- Develop and implement a selenium TMDL[25] that would establish a load allocation for New River downstream from the Border, load allocations for agricultural runoff and waste load allocations for the WWTPs. The allocations for the WWTPs would be incorporated into the WWTPs' NPDES permits
- Establish a conditional prohibition for selenium (similar to the one that is used for sediment in the Imperial Valley)
- Establish a conditional prohibition that addresses not just selenium, but also all other pollutants from irrigated agriculture that have, or could have an adverse impact on water quality
- WDRs for irrigated agriculture that address not just selenium, but also all the constituents from irrigated agriculture that have, or could have an adverse impact on water quality
- Waiver of WDRs for irrigated agriculture that addresses not just selenium, but also all pollutants from irrigated agriculture that have, or could have an adverse impact on water quality

The State Water Board regulatory conditions on the IID constitute a significant step towards addressing the selenium contribution from nonpoint sources in Imperial Valley. The order requires the IID to identify: (a) farming practices in the Imperial Valley that result in the concentration of selenium discharged to the Salton Sea and its tributaries; and (b) ways (e.g., Management Practices) to reduce selenium discharges to levels that meet water quality objectives. The results of the IID study could be used to develop and implement any of the above-mentioned regulatory controls for nonpoint sources.

Developing a TMDL that explicitly addresses selenium in the Imperial Valley would be costly and complex, potentially exceeding $1.5 million. There are over 1600 miles of drains in the Imperial Valley. If a TMDL is approved for the New River, not only would it require the IID and farmers to implement management practices to address their selenium contribution, but it would also require the WWTPs to upgrade their level of treatment to address their selenium contributions.

All of the regulatory options available share two common traits: (1) they would have to rely on the Imperial Valley farming community implementing MPs to address their selenium-laden discharges; and (2) they would have to require the WWTPs upgrade their level of treatment to control selenium. There are technologies available to remove selenium from water. However, it is questionable whether they are sufficient number of cost-effective MPs for the agricultural industry. Removal of selenium at the WWTPs would also be an expensive proposition (e.g., greater than $10 million in construction costs and greater than $1 million in annual O&M for treating 1 mgd of wastewater using reverse osmosis). Further, regardless of the regulatory option implemented by the Regional Water Board, the effort would not be successful unless the contributions from Mexico are also addressed.

While selenium remains a constituent of concern, the data uncertainties and the relatively modest impact in the region discussed in Chapter 2 suggest it may not warrant as much priority attention as the other severe impact pollutants such as pathogens.

The Regional Water Board believes that further reductions in concentrations can be achieved through changes in irrigation practices by local farmers, relying on established regulatory programs and the cooperative compliance programs that have been successfully run by the Imperial Irrigation District and the Imperial County Farm Bureau. In addition, the treatment wetlands recommended to address other constituents of concern will also create a reduction in selenium.

The Regional Water Board staff reports that compliance with the State Water Board order directives on selenium should take place before additional regulatory measures are considered for development and implementation in the Imperial Valley. In the interim, the Regional Water Board should continue to work with DFG and the USBR to reach consensus on monitoring procedures and findings, the reductions that are achieved and whether any problems of bioaccumulation manifest. Similarly, the USEPA and IBWC should take steps to work with Mexico to ensure the selenium contribution from Mexico does not adversely impact the beneficial uses of the New River in the U.S.

Toxicity from Imperial Valley Sources

According to a Toxicity Identification Evaluation performed through the State's Surface Water Ambient Monitoring Program, pyrethroid pesticides are causing toxicity in the New River. These are pesticides associated with domestic and agricultural uses. The State Water Resources Control Board is presently adopting the "Policy for Toxicity Assessment and Control," which includes new numeric objectives for chronic and acute toxicity requirements for wastewater, storm water and some nonpoint sources discharges. This policy will provide statewide regulatory consistency, a basis for equitable enforcement and is designed to protect aquatic life beneficial uses. This policy will inform the Regional Water Board on how to address the problem from sources in the U.S., including a sound methodology for source identification/quantification and control. In addition, the state's Department of Pesticide Regulation is currently adopting new regulations to address pesticide related water quality impacts. Both agricultural and urban sources will be included in the regulations. In Mexico, source identification and control would need to be facilitated with regulatory agencies there through the U.S. EPA. The Regional Water Board staff reports that it will be: (a) recommending issuance of a comprehensive Monitoring and Reporting Program (MRP) for the Imperial Valley to better ascertain the source(s) of toxicity, including the contribution from urban runoff, effluent from the WWTPs and agricultural runoff; and (b) based on the results of the MRP take additional steps to control the sources as provided by the Policy adopted by the State Water Board. The U.S. EPA and U.S. IBWC would also need to take steps to address New River toxicity from Mexico.

Non-Structural Alternatives — Moderate Impact Pollutants

Nutrients (Nitrogen and Phosphorous)

Excess nutrients contribute to blooms of algae and create eutrophic conditions in a water body.[26] Although the New River does not seem to exhibit nutrient impacts, they are evident in the Salton Sea. Since the New River flows directly into the Salton Sea, which is currently listed as an impaired water body due to nutrients, the Regional Water Board must ensure that the downstream uses are protected. Water Board staff began development of this TMDL in 2005.[27] Since then, data indicate a significant reduction in nutrients from Mexico, following completion of Mexicali II WWTP. Also, the silt TMDLs for the Imperial Valley have also contributed to a reduction of phosphorus—the limiting constituent—in the Salton Sea. The Regional Water Board data show that the nutrient loading into the Salton Sea has been reduced by 20%. Unless a Salton Sea restoration project is implemented, a TMDL may only result in marginal water quality improvement in the Salton Sea. Therefore, development of this TMDL is on hold, pending selection of a Salton Sea restoration project.

Organochlorine Pesticides

The organochlorine pesticides chlordane, DDT, dieldrin and toxaphene are man-made chemicals. They are often referred to as "legacy pesticides" (LPs) because, while their use has been banned, they persist in the environment and have residual effects. The agricultural industry was the dominant user of these pesticides. The Regional Water Board is required by CWA Section 303(d) to address the impairment through the TMDL process. However, besides TMDLs, the Regional Water Board has other options to address impairments LPs as discussed below.

Developing a TMDL that explicitly addresses these legacy pollutants will be contentious, complex and costly. Considering that LPs are no longer in use in the U.S., it would be difficult to assign waste load allocations to sources that are no longer actively applying these chemicals. It would also be difficult to assign waste load allocations to meet numeric targets in fish tissue samples. If the cost to develop existing TMDLs is any indication as to what it would cost to develop other TMDLs, the cost could easily exceed $750,000. Also, the TMDL would not be viewed as successful unless the contributions from Mexico are also addressed. The silt TMDLs indirectly address LPs. Further, the listing for these LPs was based on exceedances of water quality standards (WQSs) in fish tissue and water samples according to State of California listing policy guidelines. Readily available data show that the concentration of LPs in water and sediment samples has been reduced to below detection limits and fish tissue data also shows that the concentration of LPs in fish tissue samples, which was the basis for the 303(d) listings, has been reduced significantly. The Regional Board has other regulatory options such as incorporating approved MPs into existing regulation (e.g., the Implementation Plan of the New River Silt TMDL, or the Conditional Prohibition), or some other enforceable regulatory instrument. This approach would save state resources, would be less contentious than a TMDL while accomplishing the same thing and can be implemented right away in the U.S.

Summary

There are many worthy efforts in place or in process to assist in addressing New River pollution involving structural controls, non-structural programs, regulation and voluntary compliance. The strategic plan is based on the idea that these efforts will continue and their benefits will continue to be realized: wastewater treatment and enforcement in Mexico; agricultural source controls and TMDL compliance in the Imperial Valley; Imperial Irrigation District's drain improvements; wetland demonstration projects; and various regulatory and voluntary programs. However, with certain pollution levels still far out of compliance, additional remediation efforts are imperative to realize the directives of state and federal legislation.

4. Vision, Goals & Recommended Solutions

This chapter presents the formal Problem Statement developed by the TAC, as well as their long-term Vision and Goals for the New River as a whole. It also identifies the prioritized plans, programs, facilities and projects in each reach of the New River to form a complimentary suite of solutions that strategically target specific water quality problems and work together to fully and efficiently implement this plan's vision for a sustainable New River. In some cases, there are alternative methods for resolving a problem, in other cases one solution has emerged as the clear choice. To the extent that the programs and facilities that will provide the most benefit are already in place or underway, the strategic plan highlights the additional actions that must be taken to ensure full water quality remediation benefit.

The TAC recognizes that solutions will not be implemented all at once because of funding limitations, legal issues, or engineering constraints. The TAC also realizes that some projects or programs may be higher priorities for one interest group versus another. However, comprehensively solving the water quality problems of the New River and realizing the goals set forth in AB 1079, will require action, collaboration and cooperation from all stakeholders, agencies and organizations in the U.S. and Mexico.

Landscape of the Salton Sea Region

New River Vision and Goals

Without a common understanding for what the future New River could be, it is difficult to achieve coordination and collaboration at the project level. Therefore, the TAC conducted one on one interviews with a cross section of stakeholder interests to ask about their concerns related to the river, what they thought the river was supposed to ultimately be, what kinds of projects would be appropriate and so forth. The feedback from these interviews is summarized in Appendix 4: Stakeholder Interview Summary Memo. In addition, the TAC conducted outreach meetings in three Imperial Valley communities to understand residents concerns and aspirations for the river corridor. The TAC held a Technical Review Symposium in which academics, agency representatives, non-profit organizations leaders and community leaders were asked to comment and strengthen the recommended solutions. This input was instrumental in developing a vision, long-term goals and strategies for the New River. Together, they articulated an identity for the river that would allow it to serve a broad range of human and ecosystem purposes. The TAC expects that the vision and goals can be fully realized within 10 to 20 years.

Vision:

The New River is a healthy river corridor that serves as an asset to the people, communities, ecosystems and agricultural industry of the Imperial Valley.

Goals:

1. Improve Public Health
A restored and transformed New River corridor provides a safe, healthy and accessible recreational resource for local communities.

2. Transform the Ecology
Improved water quality, habitat and river corridor conditions in the New River support a healthy aquatic and riparian ecosystem and provide water that contributes to the restoration of the Salton Sea and its delta.

3. Strengthen the Economy
The New River is an aesthetic and environmental amenity that enhances community development opportunities and benefits agricultural activities throughout the Imperial Valley.

Abandoned recreation facilities at Salton Sea Beach.

The New River Issues in a "Nutshell"

Severely degraded water quality is undermining both the New River and Salton Sea ecosystems, which in turn hinders economic development in the region and undermines opportunities for community quality of life and recreational amenities.

The Impairments and Remediation Work Groups Technical memos (see Appendices 7 and 8) identify degraded water quality as the primary environmental problem in the New River ecosystem. There are many contaminants creating the problem and the sources of pollution come from both the Mexican and U.S. sides of the border. The impact of pollution is magnified by the fact that there are only natural flows in the river during short and infrequent rainstorm seasons. The economic, social and ecological impacts of the impaired river are magnified as the river runs directly through Calexico and other Imperial Valley communities.

The ecological impacts create a variety of direct and indirect costs for the region. Direct costs include the cost of treatment and modified practices and potential fees required by regulation. Indirect costs include the economic liability to the surrounding communities where the condition of the river contributes to blight and long-term economic disinvestments, particularly in the Calexico area. Another indirect cost is how pollution renders a natural resource unusable for any other productive community, economic, recreational or aesthetic purpose. To the extent that the river pollution impacts human health, there are a variety of personal costs for those impacted in terms of the loss of ability to earn income and increased health risks.

Design Principles

A sustainable ecological system is a balanced closed-loop system where elements and energy cycle freely and completely through the system on a long term basis without impact to any part of the system.

One of the concepts of sustainable design borrows the idea of nutrient cycling from ecology. It asserts that a sustainable approach to designing places means rethinking and redistributing outputs and inputs so that every input is also an output into some other part of the system to reestablish balance and integration.

The pollutants in the New River are outputs from local agriculture, industry and communities that are overwhelming the existing system's ability to absorb them and then convert them into a usable form to sustain the ecosystem. Solving this problem means reducing the pollutants entering the system and increasing the system's capacity to absorb or release them. Both structural and non-structural mechanisms can be employed to do this.

Water Quality Solutions for the New River

Chapter 3 identifies water quality impairments and potential remediation actions to address each constituent (see Appendices 7 and 8 for more detail). The potential solutions fashioned by the TAC are a direct response to specific pollutants and the particular conditions of each New River reach. Appropriate solutions were identified reach by reach because the problems, opportunities and constraints in each reach vary. In addition, the "Constituent of Concern" cannot be addressed in only one reach. The scale of the problem is too significant and must be handled by a variety of solutions in each reach where the opportunities exist so that they cumulatively achieve the goals of this plan.

The TAC took account of many variables in determining which solution or option might be preferable including: specific pollutant problems; institutional capacity (e.g. regulatory capacity, organizational capacity); surrounding uses (farming vs. urban vs. industrial); presence of opportunities (like an existing wastewater treatment plant) or constraints (such as conveyance distance), as well as practical considerations like costs, technical certainty and total amount of water flow. The TAC also considered variables such as political implications and stakeholder acceptance. These were distilled into a series of guiding principles that helped in the TAC's deliberations. The general principles are listed in Table 3.

Table 3. Guiding Principles for Evaluating Alternative Solutions for the New River

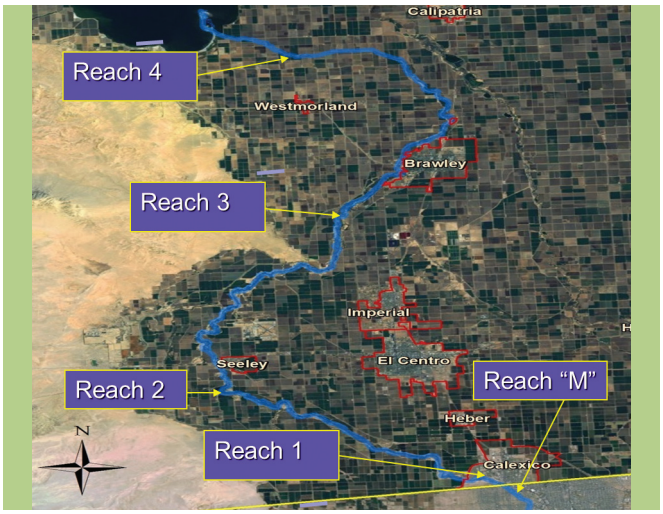


Figure 6. New River Reaches

Effectiveness in Addressing Water Quality: Public Health
Pathogens and Related Pollutants
Effectiveness in Addressing Water Quality: Ecological Health
Trash
Dissolved Oxygen
Toxicity
Selenium
Silt/Sediment
Effectiveness in Restoring Beneficial Uses
Appropriateness for Addressing the Differences Between Mexico and U.S. Water Quality Standards
Proven Success in Previous Efforts
Additional Ecological Benefits
Habitat Restoration or Protection
Wetlands Expansion
Salton Sea Restoration
Economic Development and Community Benefits
Removal of Odor
Improvement of Aesthetics/Economic Development Potential
Open Space and Recreational Opportunities
Project or Program Feasibility
Technical/Engineering Feasibility
Adjacent Land Use and Locational Compatibility
Permitting and Regulatory Feasibility
Cost (Capital and Operations and Maintenance)
Fundability (Fit with Known Funding Programs)
Political Viability
Feasibility for Management/Maintenance and Governance
Community/Stakeholder Acceptability

Open drainage ditch in Mexicali.

Objectives and Solutions in the Border Reaches

The river reaches of Mexicali and Calexico are closely related in terms of their problems and required solutions. While the Mexicali reach is not the focus of AB 1079 or this strategic plan, it is clear that the most severe water quality problems in Calexico, particularly those that relate to human health such as pathogens, primarily originate in Mexicali. They must be cooperatively addressed in both countries.

Reach M: Mexicali

A centralized sewage collection system and two wastewater treatment plants serve 97% of the Mexicali metropolitan area. Mexico is also planning the Mexicali IV wastewater treatment project and applying for Border Environment Cooperation Commission certification for this project. The proposed project would essentially double the existing treatment capacity of its Las Arenitas wastewater treatment plant.

The sources of pollution that remain are runoff from the agricultural land around Mexicali, a mix of partially treated and untreated discharge from industries (e.g., slaughterhouses, glass factories, etc.), urban runoff and some untreated or partially treated wastewater, as well as infrequent events like spills, illegal discharges and times when the treatment facilities are not fully operational. Large amounts of trash are also regularly dumped into open channels throughout the urban areas.

Reach Specific Objectives

- Reduce pollution originating in Mexico affecting the constituents of concern in Calexico and the Imperial Valley: pathogens, low dissolved oxygen, trash, toxicity and selenium.
- Bring all dischargers and water resources in the Mexicali Valley into compliance with their national standards and with key provisions of Treaty Minutes 264 and 288.
- Maintain the highest levels of collaboration and cooperation with the responsible agencies in the U.S. and Mexico to continue to seek structural and non-structural solutions.

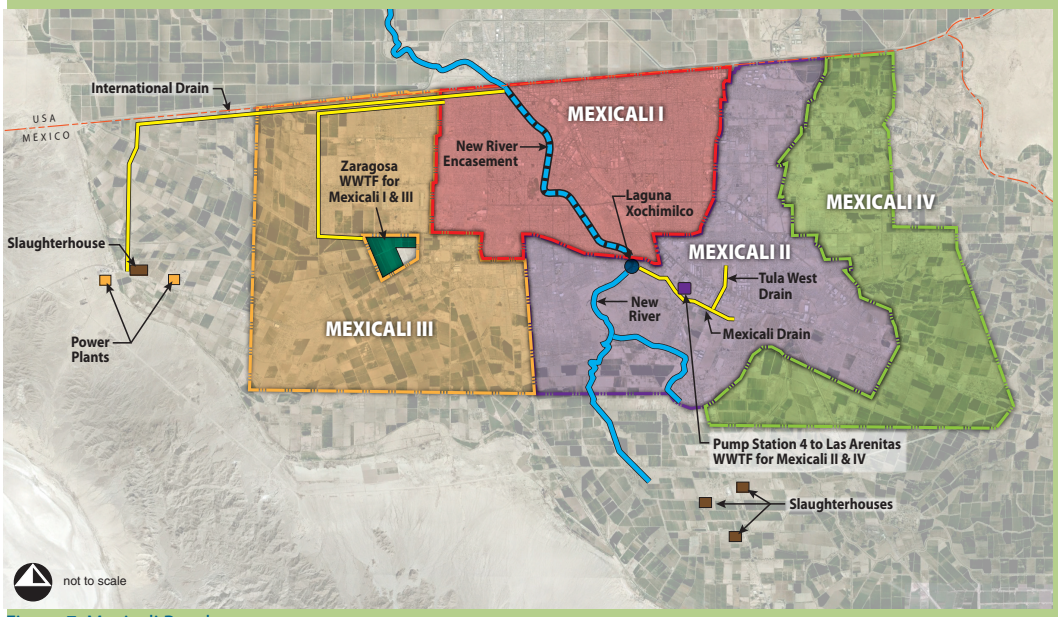


Figure 7. Mexicali Reach

Analysis

The U.S. does not have any legal jurisdiction over the New River in Mexico and cannot require that regulatory or other measures be taken to reduce pollution. While much has been achieved, as long as Mexico classifies the New River as a drain rather than a river, maintains less stringent water quality standards than the U.S. and continues to have facilities and enforcement issues, water quality in the New River at the International Boundary will fall well below U.S. standards and beneficial uses will not be protected.

What has worked very well in the past 15 years is a long term, close and collaborative relationship between Mexico and the U.S. with funding and technical support between the two countries to implement structural solutions such as wastewater collection, pumping and treatment. The BTC has been fundamental in developing and establishing this collaborative relationship. It also has a well-established implementation record to address New River pollution from Mexico. These collaborative projects need to continue, particularly as Mexicali expands. However, they do not avoid the need for additional remediation in the U.S., especially in the Calexico area. In addition, the U.S. and Mexico need to build on these successes and focus on watershed-based source control programs including options such as recycling and trash reduction, encasing urban drains, monitoring and enforcement of key pollutant sources like slaughterhouses, agricultural runoff and related sources. Another strategic direction should be to work collaboratively to find viable uses for reclaimed and recycled New River water in Mexicali. Each of these efforts could be coordinated through the Border 2020 program of the U.S. EPA.

Recommended Solutions

Structural

Solution M 1: Continue to Enhance Wastewater Treatment Infrastructure

The U.S. Section of the BTC for the New River/Mexicali Sanitation Projects should continue to work closely with its Mexican counterparts (e.g. CESPM, CONAGUA, CILA and Ecologia) to improve, develop and enhance wastewater collection and treatment facilities in Mexicali and the surrounding region. This could entail technical assistance, funding, joint projects and other methods whose ultimate goals also include protection of the beneficial uses of the New River in the U.S.

Solution M.2: Assess the Feasibility of Conversion of Open Agricultural Drains To Bio-swales

The U.S. Section of the BTC should provide technical assistance to evaluate the feasibility of converting open agricultural drains to bio-swales in areas where it is appropriate. Vegetating open channels with proper design, soil preparation and plant selection can offer water quality treatment for pathogens, dissolved oxygen, toxicity, selenium, silt and other constituents. Bio-swales require considerable management and maintenance and are difficult to assess in terms of the levels of pollution reduction benefit, but they can substantially reduce the downstream pollutant problem. Bio-swales also can provide aesthetic and habitat benefits. However, vegetation in the channels can reduce the storage volume in the drains for handling storm events and requires substantial initial investment. Relying on the well-established U.S./Mexico collaborative working relationship, a pilot design and implementation project might be the appropriate starting point.

Solution M.3: Cover Open Urban Storm Drains

The U.S. Section of the BTC should evaluate the feasibility of covering up currently exposed urban storm drains in key areas in Mexicali where trash dumping and illegal discharges are prevalent. A GIS analysis of open drains and "trouble spots" might be a valuable first step.

Non-Structural

Solution M.4: Watershed Management Approach

Working in collaboration with U.S. EPA and Mexican agency counterparts, as well as the local municipality and regional government, develop a long term watershed management approach to addressing nonpoint source and selected point source pollutant problems. This could entail technical assistance, policy assistance, source identification and GIS mapping, monitoring, educational programs, enforcement and dispersed physical or structural improvements. The BTC could be a logical coordinator of this effort. Specific programs that might become a part of this effort might be:

- **Solid Waste Technical Assistance:** Provide technical assistance to the municipality of Mexicali to develop and implement a solid waste management program that reduces trash dumping and improves trash collection, recycling and disposal in areas with known trash dumping problems
- **Point Source Control:** Provide regulatory technical assistance to SEMARNAT, CONAGUA and other appropriate agencies in Mexicali to fully implement its national standards for industrial point sources, including slaughterhouses
- **Nonpoint Source Control:** Provide technical assistance to the City of Mexicali and its appropriate regulatory agencies to develop and implement a nonpoint source control and public outreach program
- **Infrastructure O&M:** Work with partner agencies in Mexicali to find an alternative to the practice of dumping raw municipal wastewater into the river when sewage conveyance or treatment infrastructure fails and improve the operations and maintenance of this infrastructure
- **Monitoring Programs:** Provide technical assistance to the appropriate agencies in Mexicali to develop and implement a comprehensive monitoring program to identify "hot spots" of contamination to guide the implementation of additional source control. The Regional Water Board estimates that implementation of a comprehensive water quality monitoring program for the New River in Mexicali and the International Boundary would cost approximately $300,000/yr

Reach 1: Calexico

The next reach of the New River starts at the U.S./Mexico International Boundary, passes by the west side of Calexico and ends where the river crosses Highway 98, a total of nearly four miles. Many residents have formed an idea for what they want to see in Calexico based on development in Mexicali, where the New River has been buried underground through the center of the city. Mexicali has begun to develop an urban civic corridor with a wide boulevard through the middle of the river's floodplain. This has not improved the ecological health of the river, but it has provided an urban amenity and economic development for the local community that has catalyzed revitalization in the areas surrounding that corridor.

On the U.S. side of the International Boundary, the City of Calexico desires improved civic and urban amenities as well. Fundamental improvements to the quality of the New River can convert a liability into an asset to provide recreational space and attract investment in order to improve the quality of life in Calexico.

Reach Specific Objectives

- Urban revitalization in Calexico and increased public recreational and habitat amenities
- Removal of potential or perceived health hazards as a result of exposure to polluted New River water
- Remediation of pathogens, low dissolved oxygen, trash, toxicity and selenium
- Creation of the New River Parkway as an attractive amenity and recreational and open space resource for Calexico.

Analysis

The strategic plan's vision calls for a healthy river corridor that is an asset to people and communities. Calexico is the most populated stretch of the river on the American side of the International Boundary. The community wants to access the floodplain as a recreational amenity that also supports economic development and community improvement opportunities for the area. This is articulated by this plan's goal for public health and for the economy. The creation of a River Parkway in the floodplain here implements the vision and goals of this plan. However, there are many design challenges because pollution coming from Mexicali is the most concentrated in Calexico (including high levels of pathogens that affect REC I and II water quality requirements for recreation) and because of the close proximity of the urban area and lack of space that creates for remediation projects.

It would be both difficult and undesirable to enclose or bury the New River through Calexico, as Mexicali has done, because of a variety of regulatory, environmental and water quality constraints. Such a project would not resolve water quality impairment concerns in the river or the Salton Sea, which is also a goal of this plan. In addition, funding programs strongly favor comprehensive environmental restoration of rivers over underground channelization. For these reasons, the TAC unanimously rejected the idea of simply piping the river from the International Boundary to Highway 98, as originally envisioned by many Calexico and Imperial Valley residents. Instead, the TAC favored a comprehensive, approach that identifies a series of solutions that respond to specific opportunities and constraints throughout this reach and the river corridor as a whole.

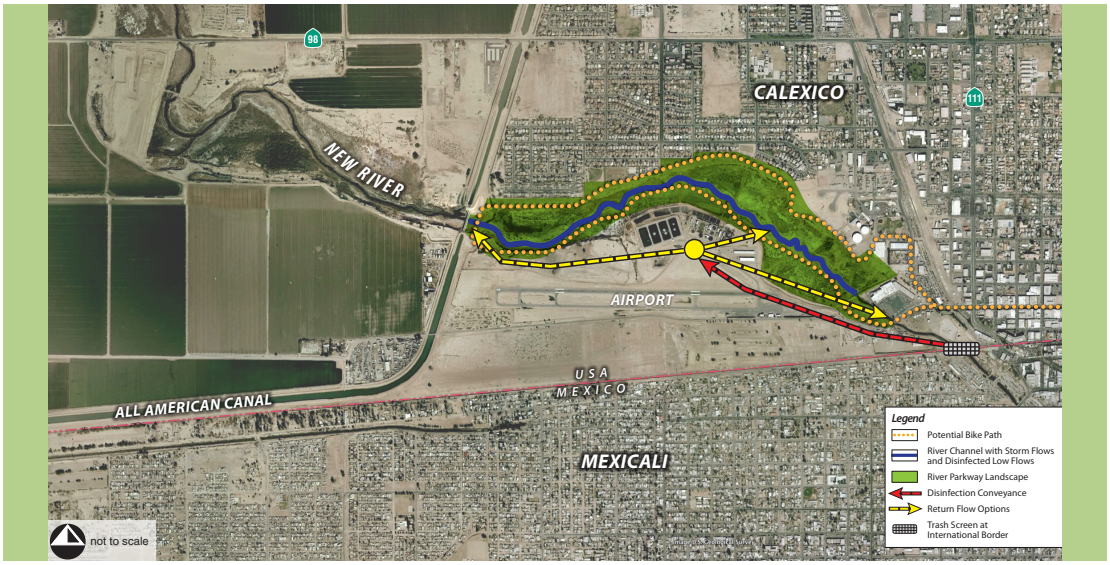


Figure 8. Calexico Reach

In the Calexico reach, water quality improvements must focus on supporting the implementation of a river parkway to leverage the social and economic opportunities in this area. Integrating these functions in this strategic plan results in multiple benefits such as recreation, economic development, transportation, goods movement, urban design, national security and historic preservation. This kind of interrelated project design and integration makes these projects more competitive for funding because it makes a larger range of funding sources available and demonstrates a greater degree of cost sharing among the combined efforts. Funders often favor projects that can leverage their investments and achieve additional overall benefit.

The other related community development efforts in Calexico near the International Boundary area include:

- **Border Crossing:** The General Services Administration and the Mexican federal government are implementing new border crossing projects called 'Mexicali West Port of Entry' on both sides of the International Boundary. On the Mexicali side, the underground culvert that carries New River flow will be extended approximately 800 feet to the International Boundary. On the U.S. side, the plan is to continue the culvert approximately 20 feet further to address a bank erosion concern.
- **Gran Plaza Outlet Mall:** The City of Calexico has envisioned a mixed use/retail center located directly to the south of the River Parkway and just west of the Border Crossing complex, in order to capitalize on shoppers who cross the border for goods and services.
- **Downtown Calexico:** There is interest in revitalizing The City of Calexico's Old Town area at some point in the future. Various options have been considered, such as turning 1st Street into a pedestrian only street.

Recommended Solutions

The following recommendations are likely to be implemented by various agencies in partnerships. For example, the structural solutions such as trash screens or a disinfection facility might involve the Army Corps of Engineers and General Services designing and constructing facilities in consultation with the Regional Water Board and U.S. EPA. The facilities might be managed by a joint powers authority, one or several agencies (like the IBWC), or a new regional agency with broader New River responsibility. It is also important to point out that the numbering of these recommendations does not imply any sort of priority or preference. It is simply used for listing purposes.

Structural

Solution C.1: Trash Screen at the International Border in Mexico

Design and implement "Climber Screens" on the Mexicali side of the International Boundary. This project is designed to pre-treat the entire river for trash and coarse solids and would include a bar rack, an automated mechanical rake, trash conveyor and disposal system. Mexican officials have indicated a preliminary willingness to include this feature provided it is funded by U.S. sources.

Estimated Cost: $2.6 million

Solution C.1a: Trash Screens at the International Boundary in the U.S.

This is the same alterative as above, but if constructed in the U.S. it will be more costly to construct and maintain.

Estimated Cost: $4.2 million

Solution C.2: Conveyance and Disinfection Treatment Facility

A pump station and conveyance system would send flows to a disinfection facility. This facility would provide in-stream disinfection for normal flows of up to 140 cfs through the use of Ozonation. Although other locations are possible, co-location of this facility with the Calexico wastewater treatment plant seems to be the most logical site. Flows above 140 cfs would remain in the river channel passing through Calexico via an overflow spillway near the International Boundary.

Estimated Cost: $71-86 million
Estimated Cost of Conveyance: $17 million

Solution C.3: Disinfection Treatment Plant Return Flows

This would allow the treated water to return to the river channel to provide potential benefit to the future parkway, in-stream beneficial environmental uses and compliment restoration efforts in the downstream reaches and Salton Sea. There are a variety of approaches to return the treated water back to the river channel. Additional analysis is needed to evaluate the best option.

Back to the International Boundary: Treated water would be piped back to the New River channel near the International Boundary to create running water through the entire Calexico River Parkway.

Adjacent To The Treatment Plant: Water could be discharged back to the New River at a point closest to the treatment facility, thereby reducing conveyance costs. This would provide water for part of the Calexico River Parkway.

After The Parkway: The return flow pipe could connect with the New River north of the Calexico Parkway to by-pass Calexico altogether.

Diversion To Industrial Or Agricultural Use: The return flow could be diverted for an economically viable use such as cooling or use in a geothermal energy facility. This could result in private investment in the project. The project design and cost would depend on the proposed use.

Solution C.4: Aeration

Aeration would help remediate the problem of low dissolved oxygen and is relatively easy to implement. The various aeration methods include low cost solutions like boulders or rip rap, or higher cost features like drop structures, cascading aeration structures, mechanical surface aerators and circulators. These can be located anywhere where head and water velocity is sufficient, so long as it does not cause water to back up into drainage channels.

Estimated Cost: Varies widely depending on the design, quantity and placement.

Solution C.5: Calexico River Parkway

As specified by AB 1079 and federal transportation funding legislation, an open space and recreational parkway has been proposed and initial funding has been provided by Caltrans and a match from California Proposition 84. This project would provide great benefit to the community of Calexico and surrounding communities in terms of economic development, aesthetics, recreation and public health and safety. It is key to leveraging environmental improvements to realize the social and economic goals for the region articulated in this plan.

While the detailed design parameters of the parkway are just now being developed, it is certain that water quality clean-up, soil and river bed analysis and clean-up need to be pursued simultaneously with parkway planning. It is likely that the City of Calexico will continue to take the lead on planning and design of the parkway in partnership with Caltrans and close coordination with the State and Regional Water Boards, Resources Agency and other agencies who might be involved in water quality projects like the U.S. Army Corps of Engineers.

Estimated Cost: To be determined based on the final configuration of the parkway, clean-up issues, decisions on what land uses are to be in the parkway and similar issues.

Non-Structural

Solution C.6: Monitoring and Reporting Program

Currently, there is not a comprehensive monitoring and reporting program set up along the New River, but there are many individual monitoring and reporting activities as a result of TMDLs, the Farm Bureau program, IID's program and others. Integrating the various efforts together could reduce costs and improve information for adaptive management purposes in the future. The Regional Water Board would be an appropriate agency to coordinate and implement this program.

Estimated Cost: $1.5 million/year

Solution C.7: NPDES Programs, TMDLs

The Regional Water Board should continue to implement and enforce its NPDES Program to control the effluent discharged from the City of Calexico WWTP into the New River in this reach. It should also continue to implement the General NPDES Permit for Small MS4s to manage urban storm water runoff from Calexico. It should also continue to enforce its pathogen, DO and trash TMDLs.

Estimated Cost: Variable

Objectives and Solutions in Agricultural Reaches

After the river passes Calexico it enters the predominantly agricultural areas of the Imperial Valley (although there are also urban sources of pollutants from treatment plants and storm drainage). There are over 1,600 miles of agricultural drains in the Imperial Valley, which cumulatively contribute 75% of the nearly 300,000 AFY total volume in the New River. The Regional Water Board has pursued a multi-faceted approach to achieving source control requirements with the farming industry that includes the four TMDLs listed in chapter 3, IID's Drain Water Quality Improvement Program, the Imperial Valley Farm Bureau's Voluntary TMDL Compliance Program and various Water Board permits and orders. This has proven to be very effective and the farming community prefers it because it has allowed them to find the methods of compliance that work best for them. Therefore, unlike the structural solutions that are the focus in the Mexicali reach and reach 1, the remediation of constituents of concern in agricultural reaches 2, 3 and 4 emphasize non-structural solutions.

Reaches 2, 3 and 4 Combined

Objectives

- Reduce contamination of various constituents coming from agricultural operations
- Address urban storm water runoff from cities and continue to upgrade urban wastewater effluent
- Address pathogens, low dissolved oxygen, toxicity, selenium and additional moderate impact pollutants

Analysis

Structural projects, particularly water treatment wetlands, can aid in the overall efforts at watershed-wide compliance. The objective of treatment wetlands is to decrease loads of constituents including suspended sediment, phosphorus, nitrogen, selenium, pathogens and other trace metals. When pollutants enter a wetland, they can be removed by retention in the sediments, volatilization into the atmosphere, or infiltration into the soil underlying the wetlands.

The wetlands could be located near the end of tributary agricultural drains to capture and remediate contaminants before they reach the New River, or along the channel and floodplain of the New River itself. The pilot projects developed as part of the New River Citizen's Congressional Task Force along the New and Alamo Rivers have demonstrated substantial water quality clean-up benefits. The New River Pilot Wetland Final Study (Tetra Tech, 2007) evaluated the performance of four pilot sites and show promise for remediating a variety of contaminants. The challenge of wetlands is providing sufficient acreage to intercept a substantial volume of river flow. In addition, selenium may bio-accumulate in organisms as a result of using treatment wetlands.

A series of site studies have already been conducted that investigate appropriate locations for treatment wetlands around the New River. Of the original 79 sites that were evaluated in the Imperial Valley, 11 were identified as very well suited for treatment wetlands on the New River (see Figure 10). These 11 sites add up to a total of 1,523 acres. As a reference, approximately four acres of wetlands are needed to treat a flow of one cubic foot per second. This means that if all 11 identified wetland sites were converted to wetlands, it could treat flows of approximately 380 cubic feet per second, which is between average flows at the International Boundary in 2010 (121 cfs) and at the Salton Sea (548 cfs) in 2010.

Wetlands can be implemented in combination with other source control measures and serve a targeted purpose in the appropriate locations. Wetlands offer many added benefits including aquatic and terrestrial habitat, recreational space and aesthetic improvements. Sites in the New River channel offer the advantage of available, inexpensive land; while sites in side drainages offer the advantage of not allowing pollutants to enter the river at all, targeting specific pollutants and ensures that we are not "treating water twice" as the river goes through a series of wetlands.

Recommended Solutions

Non-Structural

Solution A.1: Monitoring and Reporting Program

Currently there is not a comprehensive monitoring and reporting program set up along the New River, but there are many individual monitoring and reporting activities as a result of TMDLs, the Farm Bureau program and others. Integrating the various efforts together could reduce costs and improve information for adaptive management purposes in the future and a more targeted approach to source control. This program should address point and nonpoint sources of pollution. The Regional Water Board would be an appropriate agency to implement this program.

Solution A.2: Agricultural Runoff Source Control

Each of the water quality objectives for this reach can be addressed through source control based on full implementation of the established or emerging TMDLs and the IID, Farm Bureau and related programs administered by the Regional Water Board.

- Continue the IID Drain Water Quality Improvement Program
- Continue the Imperial Valley Farm Bureau Voluntary TMDL Compliance Program
- Continue to pursue compliance with silt TMDLs
- Enhance Regional Water Board Conditional Prohibition: The Regional Water Board should require responsible parties to develop and submit for implementation proposed management practices to address all constituents of concern from irrigated agriculture, including management practices for all current use pesticides and for selenium

Figure 9. Recommended Solutions for Agricultural Reaches 2, 3 and 4

If additional agriculturally-related regulatory programs are deemed viable or necessary, the Regional Water Board could pursue other measures as provided by the Porter-Cologne Water Quality Control Act (e.g., waste discharge requirements).

Solution A.3: Urban Storm Water Management

Imperial County and each of the major cities in the county are subject to urban storm water permits issued by the State Water Board. As these permits are renewed or developed, source controls and monitoring programs should focus on the severely impacting pollutants for the New River.

- Focus on severe impact pollutants in the Regional Board's NPDES General Storm Water Permit for Small MS4s in the Imperial Valley
- Focus on severe impact pollutants in the State Board NPDES General Phase II Storm Water Permit for Small MS4s in the Imperial Valley
- The Regional Water Board should issue a comprehensive monitoring and reporting program to track the contributions of pollutants affecting water quality, focusing on the most severe pollutants

Solution A.4: Feed Lot Permits

The Regional Water Board should enhance the Concentrated Animal Feeding Operations General NPDES Order to directly reduce pathogens and provide additional protection against wastewater overflows resulting from a 24-hour storm with a 100-year return frequency.

Solution A.5: NPDES Programs and TMDLs

The Regional Water Board should continue to implement and enforce its NPDES Program to control the effluent discharged from WWTPs into the New River in these reaches. It should also continue to implement the General NPDES Permit for Small MS4s to manage urban storm water runoff from the county and Brawley. It should also continue to enforce its pathogen and DO TMDLs.

Structural

Solution A.6: Construct Treatment Wetlands

Where source controls prove ineffective for particular constituents, or where additional treatment is desired, wetlands should be designed, developed and operated to address contaminants. There are 11 priority sites noted as having the highest level of feasibility along the New River, in reaches 2 and 3 (see Figure 10). Two categories of wetlands opportunities are described: Category 1 (or preferred) sites that can be used for wetlands or sediment basins and carry flow from the drains or river by gravity, thus lowering construction and O&M costs; and Category 2 sites, also suitable for wetlands or sediment basins, but requiring structural improvements to facilitate gravity flow, and thus increased costs.

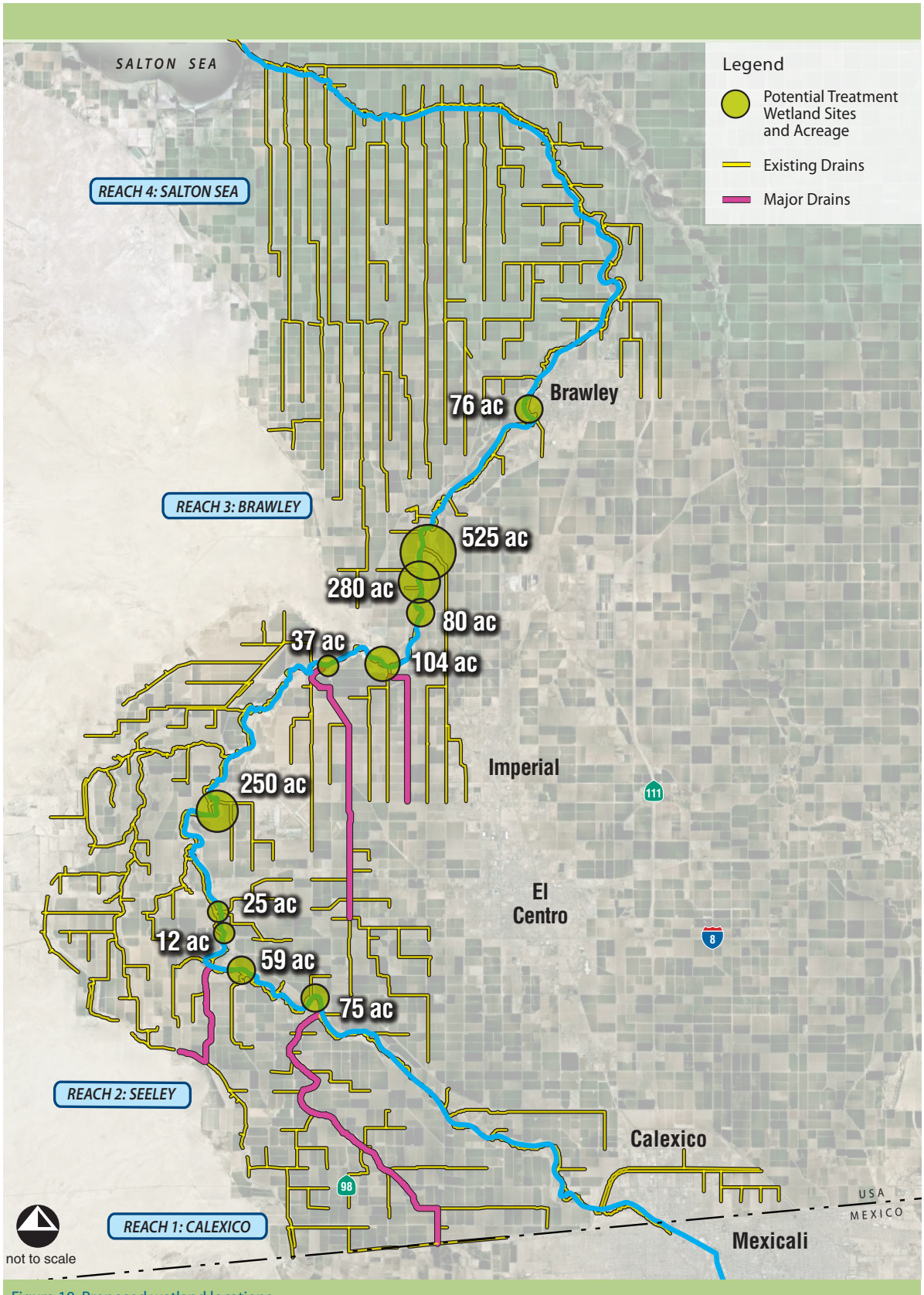


Figure 10. Proposed wetland locations

Design, development and operations of the wetlands could be accomplished using various institutional models including a joint powers agency, an existing agency (like IID), a nonprofit or trust set up to create and manage wetlands or other entity with appropriate expertise and capabilities. The pilot wetlands are currently maintained by IID and Desert Wildlife Unlimited. The Bureau of Reclamation would be an appropriate agency for construction of the projects.

Estimated Cost: Varies depending on the site; typical costs based on the pilot studies are approximately $50,000 per acre for construction and $20,000-$60,000 per site for O&M costs.

Specific Wetlands Sites in Reach 2: Seeley

The Seeley Reach starts at Highway 98 and extends to the Even Hewes Highway in Seeley. This is a transitional reach between the urban pollution issues up stream and agriculturally-dominated water that continues downstream toward the Salton Sea. As the solutions discussed previously for Mexicali and Calexico are implemented, the water flowing into this stretch of the river should be closer to being in compliance with regulatory requirements. However, it is also where contaminants from agricultural runoff increases.

Four preferred treatment wetland sites were identified in the Seeley Reach (see Figure 10).

- 65-acres, located off Drew Road, where Sunbeam Drain discharges into the New River, is wide enough for wetland construction. IID owns almost all the land contained within this site. The potential water sources for wetlands include the New River and Sunbeam Drain.
- 50-acres, located where the New River is intersected by Highway 8, encompass prime agricultural land and some businesses. The potential water source for wetlands is the Fig Drain and/or incorporation with the Fig Lagoon.
- 59-acres, located at the Drew Road River crossing, has heavy reeds alongside this section of the river, with overbanks 2 to 3 feet above the river. An agricultural field is located within 60 feet of the left bank. Wetland construction will require purchasing property from the local owner. The potential water sources for wetlands are Wormwood Drain and the New River.
- 93-acres, located off McCabe Road, 200 feet upstream of Elder Lateral 5, has sufficient room for wetlands construction on the left bank. The right overbank is very narrow with cliffs running close to the river. IID is the land owner of this area. The potential water sources for wetlands include the New River and Greeson Drain.

Specific Wetlands Sites in Reach 3: Brawley

The Brawley Reach starts at Even Hewes Highway in Seeley and ends at Drop 2 in Brawley. The problems in this reach are primarily agriculturally related. Unlike the reaches before it, there is not a problem with low dissolved oxygen. However, this is where silt in the water column becomes a major problem.

The water quality problems in this reach are dominated by agricultural flows. The various TMDLs and the successful implementation of the IID program and the Farm Bureau program have paved the way for the use of cooperative source control strategies as the primary means of water quality improvement. In addition, this area includes most of the treatment wetland opportunity sites.

Seven preferred treatment wetland sites were identified in the Brawley Reach (see Figure 10).

- 76-acres, located west of Brawley and north of Highway 78, has land 3-6 feet above the river on the left bank. The potential water sources for wetlands are the New River and Gardner Drain.
- 585-acres, extends from the Brawley Cattle Call grounds southwest 3.8 miles. The existing riparian zone for this site could be used for wetlands. IID owns most of this area, but there are some private parcels interspersed. The potential water source for wetlands are several drains, as well as the New River itself.
- 320-acres, located near the Keystone Road Bridge, runs parallel to the New River approximately one-half mile to the east at its nearest point. Some sections of this site may require grading to make gravity flow work. The potential water sources for wetlands include the New River, Sumac Drain, North Central Drain and Sumac Lateral 1 Spill.
- 122-acres, located west of the North Central Drain and the Eucalyptus Canal, includes land on the left bank (opposite the farm fields). The potential water source for wetlands is the New River.
- 104-acres, located where Forrester Road crosses the river, includes land on the south side of the river and 45 acres on the north side. The existing Imperial Wetlands are immediately upstream of this site. While the riparian zone in this area is fairly wide, facilitating the construction of wetlands, the overbanks are 10 feet above the river. The potential water source for wetlands is Rice 3 Drain, as well as the New River.
- 85-acres, are located upstream from the Existing Imperial Wetlands, near Thompson Road. The right downstream bank cannot be used for wetland construction due to 15-foot high banks. However, the left downstream and right upstream overbanks could work. There is heavy vegetation on all four banks in this area. IID owns most of the land with a portion of the right side owned privately. The potential water sources for wetlands are the New River and Fillerie Spill.
- 391-acres, parallels the New River for approximately 7 miles near Worthington, Mealey and Aten roads. Many of this area's properties are suitable for the construction of wetlands.

Solution A.7: Vegetated Drainage Ditches

Bio-swales can help remediate pollutants, particularly within an urban setting, including locations within Mexico as discussed previously in this Plan. Similar in principle to bio-swales, vegetated drainage ditches can help remediate pollutants in an agricultural environment. If both source control and treatment wetlands are not sufficient for water entering the New River to meet regulatory standards, vegetated drainage ditches could be implemented in multiple locations to achieve additional improvement. A vegetated drainage ditch would simply utilize beneficial vegetation along drain banks as an erosion prevention/bank stabilization measure and would likely be suitable for implementation in most drains. The IID is currently attempting to quantify the benefits of this practice in a grant-funded study, which will be completed by December of 2012.

Estimated Cost: Believed to be minimal. Current IID grant-funded study will attempt to quantify costs.

Solution A.8: Streambed Aeration in the New River Channel

Because low dissolved oxygen is a severe impact pollutant in this reach, aeration projects in the river channel itself would help with this condition. The various aeration methods include boulders, rip rap, drop structures, cascading aeration structures, mechanical surface aerators and circulators. These can be located anywhere where head and water velocity is sufficient, so long as it does not cause water to back up into drainage channels.

Estimated Cost: Varies widely depending on the design, quantity and placement.

Reach 4: Salton Sea

This reach starts at Drop 2 in Brawley and goes to the outflow of the river into the Salton Sea. This area is entirely agricultural in terms of the water sources draining into the river. However, it also plays a special role in terms of habitat because it is the interface between the New River and the Salton Sea's habitat resources. Because the Salton Sea plays such an important ecological role in the region and internationally as part of the Pacific Flyway supporting migratory birds, the River's ability to provide a healthy aquatic habitat in this area is particularly important.

In stream water quality conditions need to be at their highest quality in this part of the New River to support the habitat resources of the Salton Sea. The area has the advantages of high river flow and the vast majority of that is agricultural return flows. Source controls, along with the treatment wetland opportunities in the tributaries of this reach and the previous one can ensure that new contaminants do not enter the river in these lower reaches. This will also give any pollution from up-stream time to cycle through and be diluted by the time it gets to the Salton Sea.

New River Delta at the Salton Sea.

The Salton Sea is receding over time due to evaporation and water supply reductions, which is posing a number of problems. As the sea shrinks, the river's confluence with the sea moves further away making the river longer, the surrounding lake bed becomes exposed and the water in the sea becomes saltier. The soils that are exposed are very fine; and when the wind picks up these fine particles, they become airborne. This allows particulate matter (which is also potentially contaminated) to contribute to air pollution and potentially exacerbate respiratory problems. As the Salton Sea becomes more saline, fewer fish are able to survive. This is a problem for the migratory birds that stop here for refuge on their long journey across the Pacific Flyway.

In addition to the continuation of non-structural solutions (like the IID Drain Program and Farm Bureau Voluntary Compliance Program) and the structural solutions noted earlier for the agricultural reaches (treatment wetlands, aeration, bio-swales), the following options are worth considering to address the unique issues of the Salton Sea.

Solution A.9: Riparian and Habitat Wetlands

This reach would be a good location for the creation of riparian habitat wetlands throughout the floodplain itself. This will compliment and support the habitat resources at the delta estuary with the Salton Sea. The California Natural Resources Agency and the U.S. Army Corps of Engineers are in the process of studying the feasibility of various habitat wetland project opportunities in the delta area to help ensure that as the sea recedes, the soils underneath remain covered and the habitat function of the area is preserved.

Solution A.10: Aquaculture Ponds On Exposed Lake Bed

The California Department of Fish and Game is currently working on a pilot project constructing aquaculture ponds on the exposed sea bed in order to cover some of this area with water and to provide an additional source of food for the birds.

Legal, Institutional and Funding Recommendations

Implementation of the structural and non-structural solutions for each reach will entail working within the context of state, federal and international law and institutions. In some cases, existing policy, or the lack of policy, will make implementation of the recommendations problematic. This section discusses the legal and policy constraints that currently exist at the different levels of government and a set of recommended solutions to address them, as well as potential funding options for implementation. This information is presented in greater detail in Appendix 10.

International

The primary challenge with international policy identified by the TAC is that Treaty Minute commitments have not been fully met in Mexico. This would require action and enforcement by the appropriate bi-national agencies in the U.S. and Mexico. The policy solutions the TAC recommends to address this are as follows:

- Federal Directive or Legislation: Issue a statutory directive to the U.S. Section of the International Boundary and Water Commission (IBWC) and U.S. EPA to:
    - Develop a report identifying the steps necessary to ensure compliance with the Treaty Minutes and outlining collaborative actions to improve the reliability of the bi-nationally funded wastewater/sanitation projects.
    - Update the bi-national water quality monitoring program to track data in Mexico related to all U.S. water quality standards and to track the impact of discharges in Mexico on resources in the U.S.
    - Provide U.S. support to infrastructure projects in Mexicali that fully and timely implement SEMARNAT's National Standards and protect the beneficial uses of the New River in the U.S.
- U.S. EPA: Include in the Border 2020 update to the Border 2012 Program the recommendations of this strategic plan regarding the Mexico reach of the New River and the infrastructure needed in Calexico to address pathogens and trash.

Federal

Two primary policy issues have been identified at the Federal level. The first is the lack of a clear project description for the New River Improvement Project in the U.S. Code. Secondly, under the Clean Water Act[28] and its implementing regulations, a treatment facility in Calexico would likely have a difficult time meeting traditional NPDES point source discharge standards. The policy solutions the TAC recommends to resolve these two issues are as follows:

- Federal Project Definition: Establish a federal project definition and authorization for the New River Improvement Project. Identify a lead agency that can coordinate the activities of all participating agencies. This should be consistent with the project language in California's AB 1079.
- Federal Clean Water Act Compliance: The regulations that implement the Clean Water Act should allow the permitting and operation of a treatment program in Calexico for the New River. In particular, the U.S. EPA and the State Water Resources Control Board should work together to determine if existing tools such as the NPDES intake credit system (40 CFR section 122.45(g)) would allow operation of the proposed Calexico facilities.

State

The policy concerns identified at the Federal level for structural treatment solutions (including treatment plants and wetlands) also apply to the Porter-Cologne Water Quality Control Act at the state level. Legal clarity on this issue would facilitate implementation of a project that could produce water of sufficient quality, particularly in the Calexico area, that could provide for public-private partnerships for sharing the costs of producing reclaimable water. The policy solutions the TAC recommends for state government are as follows:

- The Porter-Cologne Water Quality Control Act and/or its implementing regulations[29] should allow for the permitting and operation of a water conveyance, disinfection and treatment program in Calexico for the New River. This would likely require the use of "intake credits" or similar administrative tools in the Region's Basin Plan and TMDL program for the New River.
- The Porter-Cologne Water Quality Control Act and its implementing regulations should be interpreted to promote the expanded construction and management of "treatment wetlands" projects on or near the New River.
- The state Legislature should direct the State and Regional Water Boards to develop and implement specific reclamation policy language that facilitates re-use of New River treated water provided the water is of sufficient quality for the intended use.

State law SB 387 authored by state Sen. Denise Ducheny, was passed in 2005. It reclassifies the river as an "urban creek" at the state level. This should be used to facilitate the permitting process among state regulations for the diversion of the design flow for the disinfection facility to begin at the American side of the International Boundary and connecting directly to the river channelization that Mexico will construct up to their side of the Boundary. It could also facilitate a possible project to continue the channelization of the River into the United States by 20 or 30 feet to allow for a Border Patrol road to be constructed between the inbound and outbound lanes of traffic on the American side of the International Boundary. In which case, the design flows could be diverted at the end of that facility. In either case, SB 387 enables projects that will protect the downtown Calexico area from exposure to contaminated water flowing in from Mexico before it can be treated.

Institutional Recommendations

There are a variety of institutional arrangements that could be used or created to plan, design, permit, build and operate the solutions recommended in this strategic plan. Some programs have an obvious implementing agency (e.g. Regional Water Board to continue to administer the regulatory programs for WWTPs and agricultural source control in the U.S.). Some facility projects also have a logical implementing agency (e.g. U.S. Army Corps of Engineers to construct conveyance and disinfection facility in Calexico; and the U.S. Bureau of Reclamation to construct treatment wetlands). The IBWC may be an appropriate agency to manage new treatment facilities as they have done in the past. However, there are many different partnerships and institutional structures that might be feasible. A Joint Powers Agency might be useful in developing and operating treatment projects. A community benefits district might be a useful tool in organizing regional and local interests for project development or O&M; or to fund on-going costs. These institutional options will require additional study as projects and programs are better defined.

Future Funding Recommendations

To the extent that stakeholders pursue outside state and federal funding for efforts in Agricultural Reaches 2, 3 and 4, the TAC agreed that funds should be directed first to the IID and Farm Bureau programs identified in the recommendations of this strategic plan. This is because of the success that has already been demonstrated by these programs and because the structural solutions for this area are the only pollution issues that will remain after the various programs are implemented.

International/Treaty Implementation: To date, bi-national funding for New River projects has focused on the Mexicali wastewater system improvements discussed earlier. Funding needs for the additional programs and projects recommended in this strategic plan will require additional sources. If the feasibility level project design and environmental review conducted (possibly by the Corps of Engineers) then the NAD Bank can fund construction of projects in Calexico and the IBWC can operate and maintain them.

Federal Funding: Over the past several years, Congressman Filner and Senators Feinstein and Boxer have submitted annual appropriations requests as part of the federal budget process. These requests have not yet resulted in funds being appropriated for the New River. However, with the finalization of the strategic plan, this may increase the interest on the part of federal agencies such as the U.S. Army Corps of Engineers to continue to pursue specific appropriations for the projects in Calexico. In addition the Bureau of Reclamation has funded two pilot treatment wetlands on the New River and could appropriate a funding channel for the additional 11 wetlands. The FY 2011 Interior, Environment and Related Agencies Appropriations Requests included:

- $600,000 under the Environmental Protection Agency (EPA) State and Tribal Assistance Grants (STAG) program for the New River Project Box Culvert (Filner, Boxer)
- $100,000 for the New River Restoration project under the U.S. Army Corps of Engineers Section 219 account. Funding would be used to complete the feasibility study for clean-up of the New River (Filner)

Table 4. Summary of Funding Opportunities for Recommended Solutions

Recommended Solutions		Funding Options													
		Federal			**State**								**Local & Private**		
						Prop 84			SWRCB						
		International Treaty	Congressional Appropriation Request	2007 Water Resources Development Act	2012 Water Bond	IRWMP Funding	Salton Sea Funding	CA River Parkway Program	SWRCB Cleanup & Abatement Account	State Revolving Fund	CWA NonPoint Source Program	Water Recycling Funding Program	IID	Geothermal / Other Energy Company	Local Revenue (Tax)
Mexico	M1: Wastewater Treatment in Mexico	X													
	M2: Vegetate Ag. Drainage Ditches	X													
	M3: Cover Urban Storm Drains	X													
	M4: Watershed Management Programs	X													
Calexico	C1: Trash Screen in Mexico	X													
	C1a: Trash Screen in US		X	X	X	X			X	X	X	X		X	
	C2: Conveyance & Disinfection Facility		X	X	X	X			X	X		X		X	X
	C3: Disinfection Facility Return Flow		X	X	X	X			X	X		X		X	X
	C4: Aeration		X	X	X	X			X	X					
	C5: Calexico River Parkway		X	X	X	X		X		X	X				
	C6: Monitoring & Reporting Program		X	X	X	X				X	X				
	C7: NPDES & TMDL Programs		X	X	X	X				X	X				
Agricultural Imperial Valley	A1: Monitoring & Reporting Program				X	X							X		
	A2: Ag. Runoff Source Control				X	X				X			X		
	A3: Urban Stormwater Management				X	X				X	X				
	A4: Feedlot Permits				X	X							X		
	A5: NPDES & TMDL Programs				X	X				X	X		X		
	A6: Constructed Treatment Wetlands		X		X	X				X		X	X		
	A7: Vegetated Ag Drainage Ditches				X	X				X			X		
	A8: Aeration				X	X				X			X		
	A9: Riparian & Habitat Wetlands		X		X	X	X						X		
	A10: Aquaculture Ponds		X		X	X	X						X		

In 2007, Congress passed the Water Resources Development Act (WRDA). The Act contained the following funding authorizations. To date, Congress has not appropriated these funds.

- IMPERIAL COUNTY, CALIFORNIA: $10 million for wastewater infrastructure, including a wastewater disinfection facility and polishing system, to improve water quality in the vicinity of Calexico, California, on the southern New River, Imperial County, California.
- NEW RIVER, CALIFORNIA: $10 million for wastewater infrastructure to improve water quality in the New River, California.

State of California Funding: *2012 Water Bond Funding for New River*

An $11.1 billion general obligation bond measure is currently on the November 6, 2012 ballot in California as a legislatively-referred state statute. The measure is known as the Safe, Clean and Reliable Drinking Water Supply Act of 2012. If voters approve the measure, it will allow the state government to borrow $11.1 billion to overhaul the state's water system. As part of Chapter 5 of that document (Drought Relief), the following authorization is included:

> The sum of twenty million dollars ($20 million) shall be available for water quality and public health projects on the New River.

Integrated Regional Water Management Program for Imperial Valley

A $5.4 billion general obligation bond measure for natural resource protection was passed by the voters in November 2006 (Proposition 84). The Colorado River Basin Region received an allocation of $36 million as part of a $1 billion authorization for the Integrated Regional Water Management Program (IRWMP) administered by the California Department of Water Resources. The Imperial IRWM Plan is being developed by the Imperial Irrigation District "to increase its water supply, reduce water demand, improve water quality, enhance its environmental resources and manage flood and storm water" in the Imperial Region. The Imperial Plan is currently soliciting project ideas. To be eligible, projects must be designed and have permits; environmental clearance, financing and partnering agreements. Competitive projects will also have to meet the state's preferences and priorities for use of the grant monies.

Salton Sea Funding

Proposition 84 also contains $47 million for the Salton Sea Restoration Fund. Given the significant costs and demand for funds for restoration projects at the Sea, it is unlikely that these funds would be available for New River projects. However, the establishment of The Salton Sea Restoration Council created in 2010 by SB 51 (Ducheny) promises a new governance structure to guide future Salton Sea restoration efforts. The November 2012 Water Bond contains $100 million for Salton Sea restoration projects.

California River Parkways Program

Proposition 84 allocated $72 million to the California Natural Resources Agency for the California River Parkways Program. This Program is governed by the California River Parkways Act of 2004. The Program has funded the existing $800,000 grant to the City of Calexico. The Agency has a history of awarding additional grants for regions or projects that have already received funding. The Agency is currently accepting applications for the remaining $30 million in Proposition 84 funding. The November 2012 Water Bond contains an additional $50 million for the River Parkways Program.

SWRCB Cleanup and Abatement Account

The Cleanup and Abatement Account (CAA) was created to provide public agencies with grants for the cleanup or abatement of a condition of pollution when there are no viable responsible parties available to undertake the work. Only public agencies with authority to cleanup or abate waste are eligible to receive funding. In 2010, the SWRCB approved 15 projects totaling $9.3 million in funding, including the $400,000 grant to the city of Calexico for developing the NRIP strategic plan. In 2009, the CAA funded 24 projects for approximately $12.4 million.

State Revolving Fund

One potential opportunity is the Clean Water State Revolving Fund (CWSRF) program established in 1987 under The Clean Water Act. The CWSRF program offers low interest financing agreements for water quality projects. Annually, the program disburses between $200 and $300 million to eligible projects. Applications are accepted on a continual basis. It is not certain which agency or partnership should take the lead or be the primary officiant. This needs to be addressed at a more detailed level of the project.

Eligible projects include, but are not limited to:

- Construction of publicly-owned facilities
- Wastewater treatment
- Local sewers
- Sewer interceptors
- Water reclamation facilities
- Stormwater treatment
- Implementation of nonpoint source (NPS) projects or programs
- Development and implementation of estuary comprehensive conservation and management plan.

Clean Water Act (CWA) §319(h) Nonpoint Source (NPS) Program

Annually, the California NPS Program allocates approximately $4.5 million of Clean Water Act Section 319 (h) funding from the U.S. EPA to support implementation and planning projects that address water quality problems in surface and ground water resulting from NPS pollution.The goal of these projects is to ultimately lead to restoring the impacted beneficial uses in these water bodies. Projects are required to be located in a watershed that has an adopted/nearly adopted Total Maximum Daily Load (TMDL) for the constituent of concern.

Water Recycling Funding Program (WRFP)

Since the mid-1970s, California has made an effort to promote water use efficiency through the Clean Water Act and passage of several bond measures. The Water Recycling Funding Program (WRFP) provides funding for construction loans and grants, planning grants and research for water recycling projects. The 2012 Water Bond has $1 billion for various water recycling programs and projects.

Local Funding

For one or several of the Calexico projects, such as New River disinfection or the New River Parkway, a local revenue generation mechanism might be considered. For example, a Calexico sales tax or possibly some form of benefit-assessment district might defray capital or O & M costs. This would of course, be subject to appropriate decision-maker and voter approvals.

Private Sector Financing Options

Public-private funding options could be a substantial part of the analysis and discussion of any future New River remediation project. As noted in the Background Section of this Plan, the burgeoning renewable energy industries of Imperial County will require considerable amounts of water in the future. This could provide an opportunity to off-set some of the capital, or O&M costs of New River remediation projects. Geo-thermal energy producers seems to be the most likely partnering opportunity at this time. In addition, there is sufficient flow for small or micro hydro electricity generation projects. The IID is a possible lead agency.

Geothermal power plants are normally air-cooled or water-cooled. Colorado River water is currently purchased for the evaporative cooling process through industrial use water contracts with the IID. The County's Interim Water Resource Plan allocates up to 25,000 acre-feet of industrial use water for the geothermal industry. As industrial water costs increase, geothermal developers are looking at other options for supply. For instance, Ormat Technologies Inc. has contracted with the city of Brawley to finance the construction and maintenance of a tertiary treatment system for the City of Brawley's Wastewater Treatment Plant in exchange for 100 percent of the city's daily effluent outflow for the life of their East Brawley power plant. This 50 MW power plant needs approximately 6,800 acre-feet of water per year for cooling purposes.

As part of their environmental review process, Ormat has also looked at the upgrade costs and water volume available from other wastewater treatment plants in Imperial County that discharge into the New and Alamo Rivers. The desalted or recycled water would either be used directly (for example, a geothermal power plant), or would be delivered to a current use that would then forego the use of the Colorado River. It is likely that a potential reclaimed water user like Ormat would need to have cooling water available at a price of $400-$500 per acre-foot for this to be a viable funding option.

Another industry with significant water needs and the potential for using degraded or reclaimed water is the algae bio-fuels market. Algae can be grown on degraded water sources such as agricultural drainage, saline aquifer water and/or reclaimed municipal wastewater. This creates flexibility for policy decisions for water allocation for Salton Sea restoration, urban uses and agricultural uses. As the New River Improvement Project moves forward, it would be advantageous to discuss financial partnerships with institutions such as the San Diego Center for Algae Biotechnology and the Imperial Valley College in order to assess water needs, costs and feasibility for using New River water for this promising technology.

Lead Agencies, Environmental Review and Permitting Requirements

The recommended new projects and programs described in this strategic plan will each require additional feasibility analysis, design and construction level engineering (e.g. for structural projects) and environmental review and permitting. The level and scope of environmental review and permitting will depend on the project type (disinfection facility in Calexico vs. treatment wetlands, for example) and its scale, as well as which agency is the designated lead (federal vs. state vs. local/regional) and how the project or program is funded.

In all cases, the projects will require basic CEQA and/or NEPA review. If the lead agency is a federal agency (e.g. U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, or General Services), or if there are federal funds involved, then a NEPA review will be required. For all projects, CEQA review will also be required. It is likely that a combined CEQA/NEPA document will be the correct vehicle for overall environmental review in many cases.

For the border projects in and around Calexico, including the trash screens, conveyance and disinfection facilities, potential lead agencies could be the IBWC, or Army Corps of Engineers, possibly in partnership or collaboration with General Services or a local/regional consortium like a Joint Powers Authority. In addition to NEPA and CEQA review, these projects would likely need additional permits such as: an NPDES discharge permit for returning the effluent to the New River; an Army Corps 404 permit for dredging and filling waters of the U.S.; a 401 certification from the Water Board; and, Fish and Game Streambed Alteration permits (so called 1600 permits). Special permitting requirements might also be required for diverting river water into the conveyance facility. Other permits are likely because of border issues.

The Calexico Parkway will require CEQA and/or NEPA clearance and likely other permits such as a Dredge and Fill (404) permit from the Corps, Fish and Game streambed alteration permits and floodplain clearance. Local permits for water and sewer connections will also be needed. The lead agency for this project might be Caltrans, but might also be the city of Calexico or a Joint Powers Authority made up of various local and regional partners.

The treatment of wetlands in reaches 2 and 3 would likely follow a similar pattern to the pilot wetlands already in operation. The U.S. Bureau of Reclamation took the lead in construction, with assistance from IID and Desert Wildlife Unlimited. If Reclamation took the lead again or there were federal funds, NEPA review would be required (as well as CEQA). In addition, a discharge permit, 404 permit, streambed alteration permit, floodplain encroachment permit and possible access agreements off of public roads or highways may be needed.

The many regulatory and programmatic recommendations in this strategic plan could be handled without additional permitting or environmental review based on the lead agencies and partners already established. However, if these programs were significantly changed or expanded, additional permitting may be needed.

Specific project or program permitting will require additional analysis in subsequent phases of the New River Improvement Project.

Endnotes

1 The Council is comprised of the California Environmental Protection Agency (Cal/EPA), California Natural Resources Agency, California Health and Human Resources Agency, California Business Transportation and Housing Agency, California Department of Food and Agriculture and California Emergency Management Agency. The Council is chaired by Cal/EPA.

2 The Natural Resources Agency continues to plan for restoration of riparian and habitat wetlands at the Salton Sea and development of aquaculture ponds on exposed lake bed areas at the Salton Sea.

3 Federal Legislation is already in place for U.S. Department of Interior to be Lead for construction of wetlands in the Imperial Valley to address New River pollution. Also, Congress has already authorized the U.S. Army Corps of Engineers to address New River pollution.

4 Floods have also been documented for 1884, 1891, 1892 and 1895.

5 This canal was also referred to as the "Imperial Canal."

6 These programs and projects are described in the following chapter, Water Quality Impairments and Remediation Options and are detailed in the Remediation Work Group Technical Memo (see Appendix 8).

7 The Regional Water Quality Control Board will begin the process of de-listing several constituents of concern for the New River based on the recent data including: chlorpyrifos, diazinon, copper and zinc.

8 U.S. Census Bureau: http://quickfacts.census.gov/qfd/states/06/06025.html.

9 A study conducted by California Department of Public Health Services in 2010 regarding the odors (e.g., hydrogen sulfide odors) for the Calexico area found that there are multiple sources for the odors, including sources in Mexicali and Calexico. A copy of the study's findings can be found at: http://www.atsdr.cdc.gov/HAC/pha/NewRiverEnglish/NewRiverHC12032010.pdf.

10 Imperial County Agricultural Commissioner 2010.

11 Resource limitations precluded Toxicity Characteristic Leaching Procedure (TCLP) analysis.

12 The Mexicali I and Mexicali II projects included most, but not all of the key projects contemplated under Treaty Minute 288.

13 Copies of the Regional Water Board TMDLs can be downloaded from: http://www.waterboards.ca.gov/coloradoriver/water_issues/programs/tmdl/tmdl_projects.shtml

14 The numeric target was based on The National Academy of Sciences (NAS) and the European Inland Fisheries Advisory Council (EIFAC) recommendations that suggest general levels of suspended solids that would be protective of aquatic ecosystems.

15 Sedimentation/Siltation TMDL for the Alamo River. California Regional Water Quality Control Board, Colorado River Basin, 2002.

16 Tetra Tech, Inc., 2006. Performance Evaluation of the New River Demonstration Wetlands.

17 This projected reduction in flows is more conservative than the State Resources Agency's projected reduction in flows. According to the Resources Agency's draft EIR for the Salton Sea Ecosystem Restoration Program, flows at the International Boundary are projected to be about 98,000 acre-feet/yr by 2075.

18 Once trash is discharged into a surface water, it can cause an immediate adverse water quality impact. Even if the trash is removed, it already caused an impact.

19 Besides household trash, the Regional Water Board and IBWC have also observed dead animals (dogs, cats, etc.), cars and domestic appliances also in the drains tributary to the New River.

20 James M. Montgomery, Consulting Engineers, Inc., 1987. New River Pollution Abatement Report Recommended Projects.

21 Under current USA laws and regulations, it is the Regional Water Board's position that effluent from the disinfection facility would also have to meet all applicable standards to the New River in the USA.

22 See Remediation Technical memo.

23 Nolte Associates, Inc., 2002. Reconnaissance Inventory of Wetland and Sedimentation Basin Sites, New and Alamo Rivers.

24 Davey-Cairo Engineering, Inc., 2006. The Citizen's Congressional Task Force on the New River – Survey of Potential Wetland Sites.

25 The USEPA could also adopt a Selenium TMDL not just for the New River, but also for the entire Lower Colorado River.

26 Ammonia can also contribute to low dissolved oxygen in surface waters. Even though the ammonia concentrations in the New River at the International Boundary are relatively very low, ammonia may have to be addressed down the road, on both sides of the Border (see New River Dissolved Oxygen TMDL). The problem is mainly caused by untreated discharges

27 Development of this TMDL would likely result in establishments of nutrient SSOs for the Salton Sea and its tributaries.

28 33 U.S.C. §1251 et seq. (1972.)

29 Title 23, California Code of Regulations.