

Applicant Organization: City of San Diego supported by the Tijuana River Valley Recovery Team (TRVRT)

Project Title: Recovery Act- Tijuana River Valley Trash Removal and Monitoring Project (TRVTRMP)

Site Location: Tijuana River Valley; Hydrologic Unit Code (HUC): 18070305 (within the United States portion of the watershed).

Land Owner: Combined; City and County of San Diego, State Lands, US Military, Private Contact: City of San Diego, Stormwater Department, David Wells, Grant Administrator, 9370 Chesapeake Drive, San Diego, CA, 92123 (858) 541-4339

On-the-Ground Implementation Start Date: May 1, 2009.

Number and Types of Jobs Created or Maintained and Duration of Each:

NAICS Code	Business Activity	# People Employed by Grant Activities ¹	Grant Funds Allocated to Business Activity
562111	Garbage Pickup	48 FTE for 1 year	\$ 1,448,260
541330	Environmental Consulting Services	5 FTE for 1 year	\$ 575,000
237110	Storm Sewer Construction	30 FTE for 6 months	\$ 5,160,000
562111	Waste Transfer Station, Non Hazardous - Construct - Operations and Maintenance	- 10 FTE for 3 months - 2 FTE annually	\$ 350,000
541711	Biotechnical Research and development services in environmental sciences	3.25 FTE for 24 months	\$ 2,000,000
	Total	79 FTE years	\$ 9,533,260

¹ Estimated Labor (Full Time Equivalents (FTE))

Coastal and Marine Habitats to Benefit from the Project:

The project will improve riparian and estuarine habitat in the Tijuana River Valley by removing current deposits of trash and debris and implementing structural best management practices (BMPs) to prevent future habitat degradation. Trash and debris are physical and chemical threat to flora, fauna and water quality contribute to the growing problem of marine debris.

Project Scope:

The purpose of this project is to remove historic trash and debris accumulation in the Tijuana River Valley and install trash removal best management practices (BMPs) at two locations to collect and remove trash carried in storm water originating in Mexico to prevent future trash and debris deposition. The project proposes a phased implementation approach designed to: 1) restore habitat through direct trash and debris removal, 2) install a network of sensors for monitoring biological and physical features of the river valley, and 3) finalize design and construct trash removal structural best management practice (BMPs) at Smuggler’s Gulch and Goat Canyon. The Tijuana River Valley Trash Removal and Monitoring project is “shovel-ready” and can begin the economic stimulus and habitat restoration activities described above within several weeks of funding award and can also be completed within the funding period of performance.

Project Outputs/Outcomes:

Outputs:

- Immediate removal of up to 100 metric tons of trash and debris accumulated in the Tijuana River and estuarine ecosystem.
- Development and installation of sensors to monitor long-term physical watershed information including land use changes, climate, water quantity and pollution.

- Final design and installation of appropriately sized and effective trash removal BMPs to reduce gross solids in close proximity to the border at two locations in Smugglers Gulch and Goat Canyon.
- Creation or retention of near 75 full time equivalent positions in the San Diego area.

Outcomes:

- Reduced short- and long-term trash loads entering the Tijuana River Valley and ocean receiving waters with an overall reduction in the degradation of the area.
- Improved real time monitoring data to provide information to the TRVRT stakeholders to be used in education, scientific research, decision-making, planning and overall management of restoration and recovery efforts for the sensitive ecosystems of the Tijuana River watershed.
- Economic stimulus of the San Diego economy in the amount of \$9,533,260.

Project Time Line: May 1, 2009 through May 1, 2011.

Project #	Project Name	Task Length (Months)	Due Date ¹
1	Coastal Habitat Restoration(Trash and Debris Removal)	12	August 2009 – August 2010
2	RiverNet: Technology-Based Effectiveness Assessment	24 ²	February 2010
3	Trash Removal BMP and Consolidation Area Design and Construction Design Preparation Construction	12-18 3-6	August 2010 – February 2011 February 2011 – August 2011

¹ Assumes award of funding start data of August 2009.

² Technology-based effectiveness assessment component continues through 2014.

Permits and Approvals: Permitting for Project 1 (manual trash removal) and Project 2 (RiverNet) are not expected to have an adverse impact on endangered species or environmental resources in general, and environmental permitting requirements are expected to be minimal. NEPA and CEQA compliance is likely to be covered by categorical exemption or exclusion. Impacts on endangered species are expected to be avoidable, such that formal Section 7 consultation pursuant to the Federal Endangered Species Act should not be required, and similarly take of listed species pursuant to the California Endangered Species Act should also be avoidable. Projects 3, 4, and 5 (trash removal BMPs and consolidation area) are expected to require NEPA and CEQA documentation, require federal and state endangered species act consultations, require Section 404 permits under the Federal Clean Water Act, Section 1600 permits pursuant to the California Fish and Game Code, Section 401 water quality certification, and compliance with the Porter Cologne Water Quality Act. The City of San Diego will seek environmental permits as part of the planning and design phase of these projects and expects to have all required permits prior to the start of construction.

Federal Funds Requested and Non-Federal Match Anticipated:

The City of San Diego requests \$9,533,260 in federal funds for the implementation of this grant. The TRVRT is in the process of developing a collective agreement to provide match funds totaling \$285,000, comprised of labor match for the grant administration (\$35,000) and operation and maintenance (\$250,000) of the trash removal BMPs after construction.

Overall Project Cost: \$9,818, 260

Project Importance and Applicability

The Tijuana River Watershed is an approximately 1,700 square mile area which straddles the international border between Mexico and the United States (U.S.). Nearly three quarters of the watershed is located in Mexico, but the entire watershed terminates in the U.S., draining into the Pacific Ocean through the Tijuana River National Estuarine Research Reserve (TRNERR). The U.S. section of the watershed is known as the Tijuana River Valley (TJR Valley), including the Tijuana River, its tributaries that enter the TJR Valley through Smuggler's Gulch and Goat Canyon and the Tijuana Estuary (See attached Figure 1). The watershed area includes high-density urban areas on both sides of the border. Rapid population growth in Tijuana, Mexico, southern San Diego and neighboring communities over the past several decades has resulted in significant deterioration of habitat and water quality such that the TJR Valley is one of the most impaired watersheds in the western United States.

There are many environmental impacts to the TJR Valley to be addressed, including significant and persistent flows of trash across the international border into the U.S. (particularly waste tires and plastic), and anthropogenically induced sedimentation resulting from accelerated erosion within the watershed. This results in destruction of the TJR Valley estuary habitat (including valuable salt marsh habitat) and alteration of the natural hydrologic processes in the estuary, pollution from domestic and industrial discharges, and encroachment of exotic, invasive plant species that displace native habitat. Surface water in the Tijuana River and Estuary are listed on the Clean Water Act Section 303(d) list for several pollutants, including eutrophic conditions, indicator bacteria, low dissolved oxygen, pesticides, solids, synthetic organics, trace metals, and trash. The presence of these contaminants also threatens the beneficial uses of the underlying aquifer system. Clearly, the impairment of this watershed poses a monumental management challenge for U.S. and Mexican agencies and stakeholders. These anthropogenic impacts affect the terrestrial, riparian, and marine ecosystems, threatening the continued existence of our most sensitive endemic and endangered species in what is one of the most important estuaries in the United States with respect to biological diversity.

Recent collaboration between local municipalities, non-profit organizations, State and Federal agencies and other interested organizations on both sides of the border has resulted in the formation of the Tijuana River Recovery Team (TRVRT). The TRVRT is a coalition of approximately 30 agencies, sponsored by the San Diego Regional Water Quality Control Board (RWQCB), with a common vision of developing and implementing strategies to coordinate regional efforts to protect and restore the TJR Valley and estuary. The TRVRT mission is to restore the Tijuana River floodplain and estuary to a functional wetland ecosystem through a cooperative effort of governmental administrative, regulatory, and funding agencies with the support and expertise of the scientific and environmental community, and affected stakeholders. This coordinated effort is intended to restore natural habitat in the TJR Valley, reduce the volume and impacts of future accumulations of trash and sediment, and remove existing trash and sediment with the intention to recycle as much of the materials as possible, including the reuse of sand for the replenishment of nearby beaches. The premise of the TRVRT strategy is multifold: to stop trash and sediment from reaching the TJR Valley, to clean up the valley to restore the natural hydrology and values, and to then leverage these activities to address remaining water quality issues.

The activities described under this Recovery Act- Tijuana River Valley Trash Removal and Monitoring Project (TRVTRMP) program represent one of the first coordinated efforts of the TRVRT to combine the collective knowledge, enthusiasm, and resources of the many agencies and groups that are seeking solutions to the myriad of serious environmental issues that plague the TJR Valley. The submission of this proposal under the functional lead of the City of San Diego (City) serves as evidence that the TRVRT members are seriously engaged in attaining the goals defined by their mission. The TRVRT vision will require long-term investment by its members both individually and collectively in order to meet its mission of a fully-restored and naturally-functioning TJR watershed. As such, the TRVRT acknowledges and supports the submission of a separate proposal for an invasive removal project for the TJR Valley under this National Oceanic and Atmospheric Administration (NOAA) funding opportunity by its member organization, Southwest Wetlands Interpretive Association (SWIA).

The TRVTRMP program described in this grant request will protect and restore coastal habitats of the TJR Valley while improving short- and long-term economic conditions of the surrounding region through a multi-faceted strategy of phased project implementation. The TRVTRMP provides a two-phase project plan designed to comprehensively meet the habitat restoration and local economic stimulus goals of the NOAA Coastal and Marine Habitat Restoration Project Grants under the American Recovery and Reinvestment Act (ARRA).

The first phase of the TRVTRMP includes two projects identified below that will provide a unique combination of immediate economic and ecological benefits in the initial phase of the program. These projects will restore habitat in the TJR Valley by physically removing of trash and debris and will install a network of sensors that will be a powerful tool to assist in assessing the effectiveness of future restoration efforts through the implementation of technology-based monitoring throughout the valley on the U.S side of the border. The second phase of the program will install three structural Best Management Practice (BMP) projects that will help control the flow of trash, debris and tires into the TJR Valley through Smugglers Gulch and Goat Canyon. These second-phase projects will begin concurrently with the first phase with an accelerated project planning and design process that will result in sustained economic stimulus as they move to construction and implementation in the latter portion of the grant period.

The first stage of the proposed project is “shovel-ready” at time of award and implementation would begin immediately. As the first phase of cleanup and monitoring commences, the second phase will gather important pollutant loading data and finalize the “detail-ready” design and environmental permitting in preparation for installation of the trash removal BMPs. The TRVTRMP strategy of phased project implementation is designed to provide tangible work-force and habitat restoration benefits through trash and debris removal activities while preparing for continued and long-term economic and ecological benefits. This approach will implement the TRVRT vision as outlined in this project is in accordance with NOAA’s mission of managing coastal resources to meet the nation’s economic, social and environmental needs, as well as two of the overarching goals of the ARRA: preserve and create jobs to promote economic recovery while investing in environmental protection and other infrastructure that provides long-term economic benefits.

The overall ecological benefits of the TRVTRMP focus on control and removal of land-based sources of marine debris, habitat restoration through the removal of trash, debris and tires, and a comprehensive monitoring program that will allow assessment of the effectiveness of the debris removal program and other restoration projects. The amount of trash and debris removed in the initial phase of the TRVTRMP will provide a tangible measure of the success of the project and will also provide valuable information on the sources and pollutant loadings for use in sizing the trash removal BMPs. The technology-based effectiveness assessment monitoring program will allow for sophisticated monitoring of this and other future debris removal and habitat restoration efforts. The secondary phase of the TRVTRMP program will prevent trash and debris from entering the TJR Valley and will allow for the consistent measurement of actual debris tonnage and volume removed by the structural trash removal BMPs at the trash consolidation area. This important information can then be used in future trash source reduction efforts or in designing similar trash capture devices for implementation within the Tijuana River watershed or elsewhere. The following project list summarizes the phased strategy of the TRVTRMP.

PHASE 1

Project 1 – Coastal Habitat Restoration and Debris Removal: The initial phase of the TRVTRMP will seek to remove trash and debris currently present in the TJR Valley coastal habitat that is available for transport and deposition to the marine habitat. The Coastal Habitat Restoration and Debris Removal program will utilize an adaptive management approach to allow for flexibility in the allocation of debris removal effort. The initial phase will focus effort on more easily accessible areas and exploratory effort in less accessible or otherwise limited opportunity areas. The project team will use refine estimates of the magnitude of trash distributed throughout the valley in order to focus future debris removal effort and also characterize and estimate the quantity of nearly buried or trash currently thought to be inaccessible. This project involves the mobilization of labor teams to manually remove surface trash and tires from the TJR Valley, so that the materials can be recycled or appropriately disposed. The character and quantity of these materials will be recorded during removal. Data collected will support the development and implementation of programs and infrastructure to prevent or minimize trash deposition in the TJR Valley and its receiving waters. The adaptive management strategy will allow additional effort and potential removal strategies (such as replacement of debris piles with vegetation such as willow cuttings) and needs (such as utilization of light equipment) to be identified, planned for, and permitted.

This project is “shovel-ready” and will immediately employ participating job corps-type groups, as well as provide detailed data on the tonnage and relative distribution of the types of trash and debris removed. This project will not only provide an instant source of new jobs, it will remove a considerable source of trash and debris prior to its transport to the marine environment (and therefore transformation to marine debris). This habitat restoration project is vitally important because trash is a physical and chemical threat to fauna in coastal and marine environments. A secondary economic benefit is that trash and debris removal will significantly improve the environmental quality of the region’s beaches, which are vital for recreation and tourism.

Project 2 – RiverNet: Technology-based Effectiveness Assessment Monitoring: The initial phase of the TRVTRMP will also include a project to install one of the nation’s largest “wireless

watersheds” to allow a technology-driven baseline environmental monitoring and BMP effectiveness assessment to be performed. The RiverNet project consists of a real-time watershed monitoring network that will provide a platform capable of monitoring and evaluating the diverse factors that influence and threaten the TJR Valley, including land use change, climate, water quantity, and pollution. This effort involves building a network of sensors and digital camera stations dedicated to the real-time monitoring of the environment. The collected information will be integrated into a web-based application, distributing real-time data and storing long-term monitoring information for public and agency access. RiverNet will allow effectiveness assessment monitoring by creating a detailed watershed monitoring network that will inform conservation and management activities and potentially serve as a model for California and elsewhere in the country and other areas of the world that are similarly threatened. The economic benefits of such a system would include reduced watershed and development destruction since the telemetry would allow for near-immediate notification and rapid response of authorities. This would reduce operating costs of local agencies by providing a high-technology notification system. RiverNet would also provide data to help better design future coastal, marine and wetland restoration projects, making the future allocation and use of resources more efficient and cost-effective. This project is “shovel-ready” and will immediately create a measurable amount of professional labor hours to develop and implement the project. Over the course of the project, further job creation would result from technical experts being used to design monitoring sensors, while local field staff will be hired to set up sensors and other monitoring equipment in the TJR Valley and potentially other watersheds. This monitoring network is expected to establish the area as a national wetlands monitoring model, inducing researchers to visit the TJR Valley region, thereby providing additional sources of revenue for local businesses.

PHASE 2

Projects 3, 4 and 5– Trash Removal BMPs and Trash Consolidation Area Design and Construction: Concurrent with the initial phase of activities, the second phase consists of finalizing the design and permitting activities for two mechanical trash interceptors (bar screen) BMPs to be located in two primary tributaries and contributors of trash to the TJR Valley: Smugglers Gulch (Project 3) and Goat Canyon (Project 4) and a trash consolidation area adjacent to the BMPs to allow for the required operation and maintenance activities. The trash consolidation area will also allow for detailed measurements of the amount and type of debris collected. This assessment component of the BMP project will improve the short- and long-term economic condition of the area by maximizing the efficiency of trash removal in the TJR Valley, and by providing economically viable options for recycling, disposal and/or reuse. The project conceptual design and engineering is “detail-ready”, and will employ many engineers, scientists and environmental professionals to develop fast-track final project design, engineering and construction plans. The final planning can begin immediately upon receipt of the NOAA award, generating immediate economic stimulus for design professionals and scientists.

At the completion of the planning and design phase, construction of the trash removal BMPs and trash consolidation areas will begin immediately. The construction phase is anticipated to be approximately 6 months and will include construction of concrete trash capture structures with a trash screen immediately downstream of the Smugglers Gulch and Goat Canyon border fence

crossing locations. The trash consolidation area will be located on City of San Diego property in close proximity to these locations and will consist of a 120 ft by 60 ft bermed concrete pad and ramp, where materials removed from the trash capture devices can be segregated, inventoried and diverted from the waste stream, as appropriate. The trash removal BMPs and trash consolidation areas will result in substantial and quantifiable trash load reductions for the TJR Valley and ultimately the ocean receiving waters, improving habitat and reducing the physical and chemical threats to flora and fauna. The projects will also enhance the short- and long-term economic conditions of the area by improving the surrounding beaches essential for generating revenue resulting from tourism income. The construction and installation of the BMPs will require a measurable amount of labor in the construction sector, as will the short- and long-term maintenance of these devices.

Project Scientific Merit and Technical Approach

The overall approach to recovery of the Tijuana River Valley ecosystem involves a multi-faceted set of projects that seek to reverse the degradation of the river valley from years of abuse and neglect. This trash removal and monitoring project seeks to remove the trash and debris deposited in the TJR Valley, install trash removal BMPs to collect trash and prevent future deposition in two major tributaries, and assess and monitor the effectiveness of the recovery efforts.

Coastal Habitat Restoration: In partnership with the County of San Diego Parks and Recreation Department, the California Conservation Corps (CCC) and San Diego Urban Corps (Urban Corps) will be utilized to physically remove surface trash and debris within the TJR Valley. During the dry weather periods (potentially beginning within 30 days of the project award), CCC and Urban Corps crews will undertake the cleanup of up to approximately 2619 acres of the TJR Valley (see attached figure 1) and remove accumulated trash, waste tires and anthropogenic debris from the coastal estuary habitat of the TJR Valley. The CCC will provide a portion of the labor, the hand tools, dumpsters, skidsteers, truck transport and all other non-mechanical materials necessary to complete the task of the removal of trash. Surface and partially exposed trash will be collected, quantified, and either recycled or properly disposed. Typical items expected to be picked up include: liquid containers, bags, tires, appliances, furniture, and children's toys.

The County and the CCC will divide the project area into sections for the project implementation and the completion of each section will be signed off by the two parties as completed. Each section will be divided per the County's designated inspector. The work effort will be staged such that areas where debris removal activities near the riverbed or potentially flooded and inaccessible areas will be performed during the dry season between May and September when flow is anticipated to be minimal. Care will be taken to avoid disturbance of sensitive flora, fauna and cultural items. The overall goal of the trash removal and habitat restoration effort is to prevent the significant amount of accumulated trash and debris present in the TJR Valley from entering the marine environment during wet weather flows and contributing to the growing problem of marine debris which threatens both flora and fauna in the estuary and coastal habitat as well as marine species as it is transported downstream to the ocean.

The effort will include three 16-man crews using truck transport and hand-powered equipment working 8 hour days for up to 12 months total (this includes up to 66,560 labor hours). A County biologist will provide awareness training to the CCC and San Diego Urban Corps crews to ensure they efforts minimize disruption to the habitat, endangered species populations, and cultural items. In areas where sensitive habitat is known to be located and there is potential for sensitive species disturbance, a biologist will accompany the work crews to make sure disturbance does not occur.

RiverNet- Technology-based Effectiveness Assessment Monitoring: San Diego State University (SDSU) and Scripps Institution of Oceanography (SIO) have partnered to develop and deploy a real-time environmental sensor network throughout the Tijuana River watershed, called RiverNet, to provide vital information and analysis for policy makers, stakeholders, and the research community. This project is designed to establish the TJR Valley as one of the Nation's largest "wireless watersheds" And serve as a model for other effectiveness assessment monitoring efforts. Under this grant, the project team will design and implement a platform that is capable of monitoring and evaluating the diverse factors that influence and threaten the watershed, including land use change, climate, water quantity, and pollution. The value of collecting real-time data cannot be overstated. The proposed program will create a real-time watershed monitoring network that will support existing efforts, inform conservation and management activities, and alert agencies to hazardous events (such as floods or water/sewer line breaks) allowing for near-immediate notification and a rapid response.

The RiverNet project proposes to build a network of sensors, dedicated to the real-time monitoring of the environment, targeting water quality (conductivity, turbidity, pH, temperature, dissolved oxygen, and water depth/pressure), weather (air temperature, relative humidity, wind speed/direction, precipitation), and digital camera stations. All information will be integrated into a web-based application, distributing real-time data and storing long-term monitoring information for public and agency access. The location of these sensors will be determined through discussions with local stakeholders, project partners, and agencies but will generally be driven by a science-based decision process. The project team will use a strict, science-based approach to site prioritization and selection that integrates information on key landscape features, such as stream confluences, geomorphology, critical pollution zones, beneficial uses, and sensitive habitats/species.

High-tech environmental sensor networks are comprised of various types of sensors, "middleware" (software that collects the data from them), and a data repository and web portal where the data are stored and viewed. High-tech environmental sensor networks provide several distinct advantages to conventional methods of monitoring the environment. They provide real-time information, making possible early detections of critical events, such as environmental contaminations or floods. Having continuous and immediate access to sensors also enables more effective maintenance of equipment. The use of automated sensors may improve personnel safety by minimizing the need for staff to enter remote areas during fires, floods, and contamination events.

The long-term data collected as part of RiverNet will also serve as a source of "context" for other periodic data collection efforts (e.g. nutrients, metals, bacteria, etc). Changes in constituents of

concern can be better understood if placed in a broader spatial and temporal context of the watershed. For example, information gained from grab samples (collected periodically throughout the years) can be better understood if the manager understands why changes in the pollutants occurred (e.g. extended drought, increasing agricultural runoff, increases in impervious surfaces, etc).

A preliminary list of the potential applications for the RiverNet system is provided below. However, an ongoing process will closely match the needs of stakeholders with the scientific capabilities of this project as it moves forward. Throughout the project, the research team will carry out a series of meetings with TJR Valley and watershed stakeholders and the TRVRT partners. The purpose of these workshops will be to educate potential users about the data gathering and analysis system being installed. These meetings will facilitate a needs assessment that will point to information that policy makers, watershed managers and stakeholders need to make informed decisions. The project activities will enable the project team to implement a sensor array and real-time network that produces data, knowledge, and information that is relevant to community members and local and regional organizations.

- Implementing real-time environmental sensor networks to measure weather conditions, water flow and quality parameters, including sediment and debris discharge. Sensor data will be collected in real-time, and made available to policy makers, watershed managers, researchers and educators over the Internet. The data will enable managers to instantly identify or predict changes in water quality and identify pollution areas; enable researchers to investigate the relationship between weather events, pollution, tidal hydrology in the estuary and currents and eddies offshore; and enable educators to engage students to learn about the complexity of the ecosystem and the connections across national boundaries.
- Modeling of the effects of the regional Tijuana sewage treatment plants can help track the impacts of processed effluent that will ultimately be discharged into stream courses within the TJR watershed.
- Data gathering and modeling to predict impacts of land use change on prescribed Total Maximum Daily Loads (TMDLs).
- Environmental monitoring to track the results of restoration in the watershed, informing adaptive management.

In order to gain this broader understanding, a network of sensors can be established strategically throughout the watershed. Unlike traditional water quality monitoring programs, the sensor network can collect continuous hourly data. This vast increase in sample size allows a genuine tracking and understanding of the watershed at a scale well beyond traditional monitoring efforts. As part of the sensor network, basic water chemistry data includes the following parameters: water temperature, pH, stream flow, dissolved oxygen (DO), turbidity, and conductivity. Co-located meteorological stations also inform us of the abiotic conditions influencing the river (precipitation, ambient temperature, relative humidity, photosynthetic active radiation, etc).

All the information collected by RiverNet will be available via an online database service and georeferenced using a Geographic Information System (GIS). The information will be readily

available to the TRVRT partners, TJR Valley stakeholders, and general public members within the region and can be used to track changes within the watershed, monitor the success or failure of management or restoration programs, and inform future management and conservation within the watershed. RiverNet is being designed in such a way that as technology advances and new sensors are made available in the future, they can be readily introduced into the “watershed laboratory” at a minimal cost. It should be noted that the timeline below includes tasks and goals that may be concurrently. It is anticipated that the timeline will allow the RiverNet project to be completed within the 24 month NOAA grant performance period. The following list details the goals of the RiverNet project and a bulleted list of objectives associated with each goal.

Goal 1. Involve watershed stakeholders in the development of RiverNet (6 months)

- Identify data needs, gaps, existing efforts, and potential users within the watershed.
- Link data collection to regional water conservation needs, management concerns, water quality/quantity monitoring programs, and large-scale research programs.
- Link data collection with existing and future hydrological assessments.
- Develop maintenance and funding plan for the sensor network, including agreements for long-term management and maintenance.
- Develop a strategy for distributing information to provide early warning and detection for hazardous events such as floods, water or sewer line breaks, landslides, etc.

Goal 2. Develop site selection and prioritization matrix for sites within the watershed (6 months)

- Develop a conceptual model for the development of the “wireless watershed” that addresses data needs, statistical rigor, and temporal/spatial variability.
- With involvement from the stakeholder group, develop a science-based approach to site prioritization and selection that integrates information on key landscape features, such as stream confluences, geomorphology, critical pollution zones, beneficial uses, information needs, and sensitive habitats/species.
- Work with existing TRVRT and other partners to link monitoring locations with existing data collection and priority sites
- Establish a framework for data collection, storage, analysis, and dissemination.

Goal 3. Establish fifteen wireless sensors in the watershed (18 months)

- Work with the stakeholders and partners to select and approve the locations for wireless monitoring stations.
- Integrate water quality sensors, meteorological sensors, and camera stations into the final design.
- Use sensor data to inform restoration, management, and conservation practices, linked directly with the health and sustainability of our water resources and natural ecosystems/processes.
- Track changes to the watershed in response to invasive species, restoration programs, or other alterations to the landscape.

- Establish a framework for dissemination of information to inform adaptive management programs in the watershed.

Goal 4. Make the RiverNet program visible and accessible (12 months)

- Increase public awareness by providing this tool as a web-based application for project partners and stakeholders to use as part of their outreach and education efforts.
- Work with local partners to help them develop information kiosks for public education and outreach in the watershed at the visitor center.
- Work with local schools, and Universities to integrate the data into classroom curricula and field trips to the Estuary.

The evaluation of the project will be performed in collaboration with the partners and the stakeholders within the watershed, and will involve input from agencies as well as the general public. Ultimately, the hope is this RiverNet project will serve as a model for California: creating awareness, informing management, and ensuring a sustainable future for the nation's precious natural resources.

Trash Removal BMP and Trash Consolidation Area Design and Construction: The Trash Removal BMP and Trash Consolidation Area Design and Construction project will provide multiple beneficial outcomes of economic stimulus and prevention of trash and debris accumulation in the Tijuana River Valley through a phased implementation approach. The first phase of the project will complete the final design and permitting that will allow the construction of mechanical trash interceptors (bar screen) BMPs in Smugglers Gulch and Goat Canyon, two primary tributaries and contributors of trash to the Tijuana River Valley.

Estimating annual litter loads and litter loads per storm for the Smugglers Gulch and Goat Canyon tributaries is a key component to the development of BMP conceptual and final designs. Although there is a paucity of research data available for litter loading rates and the nature of litter as a pollutant is heterogeneous, a review of available literature and data was conducted for trash collection BMP devices in order to determine the conceptual size requirements for the project area. Trash loading rates are often estimated through land use analysis and measures of litter comprehensively and partially collected in drainage channels and storm drain outfalls. The literature sources suggest there is considerable variability in volume and mass of litter generated in areas with similar land uses and also considerable storm to storm variability. However, general litter loading characteristics from the studies mentioned above and others conducted as part of trash TMDL development in the Los Angeles basin and best professional judgment were used to determine the preliminary sizing and design of the Smugglers Gulch and Goat Canyon trash removal BMPs. It is recognized that the described methods are a simplified approach to addressing litter loads and do not account for factors such as antecedent build-up of litter. Based on preliminary approximations, it is estimated that the trash removal BMPs may remove up to 500 metric tons of trash and debris from the watershed annually.

In addition to sizing criteria, the conceptual design team has investigated an optimal placement strategy for the trash interceptor BMPs. Based on the preliminary placement strategy, the project design aims to integrate the construction of the trash removal BMPs immediately down stream of the constructed box culverts and energy dissipation structures constructed as part of the U.S

Department of Homeland Security's Border Fence Project west of the San Ysidro International Border Crossing at Smuggler's Gulch and Goat Canyon. The trash removal BMPs will be constructed near the culvert spillway and energy dissipation structures to allow for the capture of the trash and debris as close to the border fence as possible, before it enters the river ecosystem. This also allows for the BMPs to be sited on or adjacent to the Border Fence project area. The secondary benefits of this placement and design strategy is that it has a smaller impact on sensitive ecosystems and environmental permitting may not be required for the installation of the BMPs. Additionally, the trash capture devices will serve as additional energy dissipation, reducing erosion of the river bed and banks down stream.

This project will design, permit and construct a trash screen BMP system with dimensions of approximately 50 ft x 340 ft, adjacent to the energy dissipation structures down gradient of the Smugglers Gulch spillway. The Goat Canyon structure will be slightly smaller at 45 ft by 285 ft. The BMPs will be located within the project area of the border fence culvert spillways and energy dissipation devices at each location. The trash screen portion of the BMPs will be sized to pass the 100 year storm and capture the trash loading of the 2 year design storm within the BMP structure. Trash and debris from storms larger than the 2 year storm will accumulate on the spillway.

It is anticipated that final design and permitting will be completed 15 months after receipt of grant funding and construction is estimated to take approximately 6 months.

The economic benefit of the trash removal BMPs will include intensive project work for design and environmental permitting specialists in the initial phase. The design, engineering and permitting process will employ many technical professionals in various engineering and design fields and can begin immediately upon funding award. The project will require up to 15,000 ft² of steel screening plates in the manufacturing of the trash racks. The design team is committed to ensuring that all iron, steel and manufactured goods are produced in the U.S. The construction and installation of the BMPs will create more than 50 jobs in the concrete and construction industries, which are sectors of the economy that have been hit hard by the economic downturn in California. Operation and maintenance of these devices will require additional employment of at least 4 City maintenance workers or will result in the contracting of debris removal and recycling services. The trash removal BMPs will result in a substantial and quantifiable trash load reductions for the valley and ultimately the ocean receiving waters. The trash removal BMPs will also improve the short- and long-term economic condition of the area by removing a significant source of marine debris that significantly compromises the environmental quality of the surrounding beaches and ocean waters and are vital for recreation and tourism.

In addition to the trash removal BMPs, the project will complete the design and permitting of a trash consolidation area on City-owned land in close proximity to the Smugglers Gulch and Goat Canyon trash removal BMPs. The trash consolidation area will be a 120 ft x 60 ft bermed concrete pad for use during the wet season for the collection, segregation, inventorying and transfer of debris removed from the trash racks between storm events.

The construction of the trash consolidation area will result in the employment of a five man construction crew for approximately two months. As mentioned above, the on-going operation

and maintenance of the trash capture devices will result in additional employment of 4 city maintenance workers and may require the City to purchase of additional equipment and vehicles to perform the operation and maintenance procedures. It is estimated that up to 15% of the trash and debris captured by the trash removal devices is recyclable material that will benefit the local scrap metal and recycling industries.

Overall Qualifications of the Applicants

The TRVTRMP team consists of City and County of San Diego staff, other TRVRT member organizations, the CCC, SDSU, SIO, URS Corporation America dba URS Corporation (URS). The TRVRT member organization and SDSU and SIO have worked for many years with stakeholders from both sides of the border in the TJR Valley and the related offshore environment including beach zones. The table below presents the key technical personnel and their associated organization affiliations that will be engaged in the project. An annotated resume for the City Project Coordinator David Wells is included in the Supplemental Information section of the application package. Additional project lead and other resumes are available upon request. Additional staff not listed will also support the project as-needed.

It should be noted that the grantee has determined that the total amount of federal funding under the Trash Removal BMPs and Trash Consolidation Area Design and Construction tasks will be expended through the contract and employment of a qualified environmental consultant. The consultant shall perform the activities identified under the grant scope of work for the specific tasks. The need to seek contractor support for this work is due to a lack of in-house expertise and staff at the City Stormwater Department to complete the project work. The contractor supporting the City in this effort, URS, has broad experience in the areas of environmental and engineering design and the technical capability to provide support to the City. URS was selected by the City to perform as-need stormwater engineering and consulting services under a competitive procurement standard process. The City's Nominating and Selection Process is based on the policies, procedures and guidelines contained in City Council Policy 300-7, dated August 10, 2004, Consultant Services Selection, and the City's Administrative Regulation 25.60, dated June 1, 2004, Selection of Consultants for Work Requiring Licensed Architect and Engineering Skills and Other Related Professional Services.

In addition to the City and TRVRT partners' commitment to the use of iron, steel and manufactured goods from U.S. sources, the project team is also committed to complying with the wage rate requirements of ARRA Section 1606.

Project Coordinator	Trash Removal BMP and Trash Consolidation Area Design and Construction
David Wells- <i>City of San Diego</i>	Ed Othmer, PE, CPSEC, CPSWQ- <i>URS</i>
Coastal Habitat Restoration and Debris Removal	Matt Moore, PE, CPESC- <i>URS</i>
Larry Duke- <i>County of San Diego</i>	Leo Handfelt, PE, GE- <i>URS</i>
RiverNet: Technology-based Effectiveness Assessment Monitoring	Robert Scott, PG, CHg- <i>URS</i>
Mathew Rahn- <i>SDSU Foundation</i>	Hasan Nouri, PE- <i>URS</i>

The following sections identify the specific applicant qualifications of the project team lead organization for the TRVTRMP projects.

Coastal Habitat Restoration and Debris Removal: The County of San Diego Department of Parks and Recreation has successfully administered a similar trash and debris collection program under a grant from the California Integrated Waste Management Board (CIWMB) (grant number TCU13-04-1). Under the similar program, the County removed approximately 4,500 tires from the TJR Valley. In addition, as part of normal operations County staff performs focused debris removal efforts in various locations throughout the TJR Valley within their jurisdiction.

RiverNet: Technology-based Effectiveness Assessment Monitoring: SDSU has an auxiliary field research station in the Tijuana Estuary and SDSU and SIO jointly have significant experience in developing and deploying sensor networks for monitoring of biological and physical features of coastal watersheds of Southern California. SIO has a long history of near shore water quality and current tracking research and application development. Together, the two institutions have pioneered the integration of heterogeneous data sets (e.g. meteorology, water chemistry, imagery, seismology, and fire hazard) in the Santa Margarita Reserve.

Trash Removal BMP and Trash Consolidation Area Design and Construction: URS consists of recognized experts and experienced San Diego-based licensed professionals in engineering, storm water, sediment control, GIS, geotechnical, and other scientific fields. URS has completed all aspects of BMP development in Southern California; from conceptual design through environmental assessment and permitting to final construction and implementation. Recently, the Team has performed storm water program support, hydrology and hydraulic analysis, BMP and Low Impact Development (LID) design, asset management, geotechnical, environmental permitting and storm water permit compliance monitoring and technical support for the City. In addition, URS is performing a surface survey of trash and waste tires in the TJR Valley that is supported by a grant provided to the City and County by the California Integrated Waste Management Board (CIWMB). The results of the survey will provide a feasibility study level estimate of the location, characteristics and volume of the debris present in the valley.

The following table illustrates the depth and breadth of the Team’s experience with similar projects and disciplines involved with various components of the TJR Trash Removal and Monitoring project.

Project Type	Affiliation	Year	Project Description
Stormwater Design	City of San Diego	2002 - 2008	Prop 13 – Chollas Creek Water Quality Protection & Habitat Enhancement Project (CA State Agreement No. 04-015-559) (San Diego) Client: City of San Diego Project Value: \$2.24 million Involve community residents and stakeholders to remove invasive vegetation and concrete channel, widen and stabilize creek cross sections, create a park-like setting according to the City's Chollas Creek Enhancement Program, and improve water quality. Restored 1.85 acres of riparian and native habitat and walking trail along the Encanto Tributary of Chollas Creek.
Habitat Restoration and Debris Removal	County of San Diego	2003-2004	County of San Diego- Department of Parks and Recreation- DPR successfully administered the CIWMB grant number TCU13-04-1 in collaboration with the City of San Diego Solid Waste Local Enforcement Agency. Approximately 4,500 tires were removed from the Tijuana River Valley located within the Tijuana River Valley Regional Park in the southwest portion of San Diego County.
Environmental Monitoring	SDSU	Ongoing	SDSU Field Stations Program (FSP)- supports research and education at its four field stations in Southern California. Santa Margarita Ecological Reserve (SMER), a 4500-acre reserve at the boundary of San Diego and Riverside Counties, is one of the most densely instrumented and monitored reserves in the nation. The reserve is monitored by nearly 250 environmental sensors located across 66 automated observatories, with connectivity provided by UCSD's High Performance Wireless Research and Education Network (HPWREN) are available to researchers, educators, and public agencies at real-time.
Environmental Monitoring	SDSU	Ongoing	Department of Geography Watershed and Border Groups SDSU's Department of Geography is at the center of significant teaching (undergraduate and graduate degrees with emphasis on watershed science) and research on watersheds in the Baja California border region and in Southern California through the Center for Earth Systems Analysis Research (CESAR). It maintains websites with geospatial data and other information on the Tijuana River Watershed (trw.sdsu.edu), the watersheds of the San Diego Bay, the Newport Watershed in Orange County, among others.
Environmental Monitoring	SIO	Ongoing	University of California, San Diego/Scripps Institution of Oceanography (SIO) ROADNet The NSF-funded ROADNet project has developed the concept of a Virtual Object Ring Buffer (VORB) to ease the access and use of heterogeneous, multi-sensor data. Currently the ROADnet system is operational with more than 4,000 data streams from multiple-disciplines including environmental sensors at SDSU's Santa Margarita Ecological Reserve, and SDSU's Sky Oaks Reserve, image streams (on ships, from ecological reserves, etc), seismic sensors (over 1,000 locations from all seven continents and most islands), oceanographic data, ocean wave monitoring using HFCR, etc. These data streams are accessed from >100 ORBs servers running on more than 70 distributed hosts.
Design, Hydrology & Hydraulics Construction	URS	2003	Caltrans Statewide Storm Water Services (State of California) Client: Caltrans-Statewide Project Value: \$95 million Design standard development; storm water research study design and implementation; storm water treatment system evaluation; storm water BMP PSE&S; program development. SR-73 Treatment Technology Pilot BMPs -Provide programmatic and design services oversight for all treatment technology BMP pilot sites. Assessed hydrologic and hydraulic characteristics of sites; prep basis of design reports and developed designs for BMP pilot sites.
Hydrology & Hydraulics	URS	Ongoing	Coyote Creek Watershed Management Study - Hydrology Report (Orange and Los Angeles Counties, CA) Client: U.S. Army Corps of Engineers Project Value: \$67,000 Prepared a draft Hydrology Report for 165 square mile urbanized Coyote Creek Watershed. Compiled and reviewed, and existing data; analyzed existing stream gage data (flood-frequency analysis), conducted low flow analysis; modeled and calibrated 5-, 10-, 25-, 50-, and 100-year flows using HEC-HMS.
Design / Hydrology & Hydraulics	URS	2007	SR-76 Widening and Realignment - Design (San Diego County, CA) Client: Granite Construction Project Value: ~\$100,000 (H&H Work) Prepared final engineering construction drawings for 2.3 km widening and realignment and bridge widening of existing rural state route along San Luis Rey River. Prepared hydrology and hydraulic analyses, reports, and storm drain design for final engineering construction drawings including: Rational Method and Unit Hydrograph Method hydrology calculations; hydraulic floodplain calculations and mapping using HEC-RAS; bridge scour analysis using HEC-18; sediment transport and scour protection design along San Luis Rey River using HEC-6 and HEC-23, and FEMA CLOMR and Caltrans plan/report preparation and processing.

Outreach and Education

The Tijuana River Valley Recovery Team partners firmly believe that public participation is the key to habitat restoration, improved wetland habitats and cleaner ocean waters. The TRVRT is committed to incorporating public outreach as an essential portion of the proposed TRVTRMP program. The ultimate success of this project depends on the acceptance, support and integration of this effort into local and regional policy development, environmental management and long-term planning decisions so the TJR Valley and adjacent coastal areas are protected over the long-term.

Another method that the TRVTRMP project will seek to distribute information to the public will be education in the form of job corps-type group participation during the initial coastal habitat restoration and debris removal as well as project awareness networking through the TRVRT. Given the wide variety of active TRVRT member organizations, the combined public outreach component will allow the environmental benefits of trash removal to be broadcast to a number of individuals. It is anticipated that a strong message concerning the scope and severity of the trash issue in the TJR Valley will be passed through the active project participants to other interested and general public members on both sides of the international border. Because much of the trash in the TJR Valley originates in Mexico, performing public outreach on the Mexican side of the border is essential to the lasting success of this project. Accordingly, one of the partner organizations of the TRVRT is actively working with project partners in Mexico, and is working to establish education activities for Mexican citizens to increase their awareness of the resulting effects of trash pollution and what measures may be taken to prevent pollutants from entering waterways.

The TRVRT, with the City as the lead partner, is the umbrella organization for the preparation of a grant proposal under this NOAA funding opportunity. There are a multitude of potential outreach and education opportunities and potential benefits that each of the TRVRT partners will be able to utilize to generate support from local public and surrounding communities as the TRVTRMP project moves forward. The commitment to operate and maintain the trash removal BMPs will allow the TRVRT partners acute awareness of the types and amount of trash and debris collected in the TJR Valley. The TRVRT partners may then use this information to augment current education and outreach programs, develop site- or project-specific outreach opportunities or to create educational experiences for members of the general public that make contact with the TJR Valley, the TRVRT partners, or the other associated programs. Similar to other portions of the TRVTRMP program, it is hoped that the collective approach of the TRVRT will allow a synergistic outreach effort to ultimately restore habitat and reduce the contribution of trash and debris from the TJR to the growing problem of marine debris.

Finally, the TRVRT will seek to work with local partners to help develop sections of the TJR Valley into a recreational area for local residents and tourists alike. The use of the watershed area for recreation, especially around the Tijuana River National Estuarine Research Reserve, will be a vital tool in bringing information about the watershed and TRVTRMP to the public while showcasing the benefits of maintaining a clean and functioning wetland area. Information kiosks for public education and outreach will be created to teach visitors of the issues affecting the TJR Valley and the steps being taken to clean and maintain it. Transforming parts of the

watershed into a desirable destination for outdoor activities will also have the benefit of potential exposure to philanthropic funding from parties interested in aiding the TRVRT initiative.

Project Summary

The TRVTRMP is a combination of projects designed to generate employment and economic benefits to a wide-variety of business and research sectors through a comprehensive habitat restoration and effectiveness assessment monitoring program. The proposed phased implementation approach highlights the sustained economic stimulus effort by the City and TRVRT partners to develop integrated programs with lasting benefits to the sensitive habitat of the TJR Valley. The TRVTRMP is “shovel-ready” and can begin the economic stimulus and habitat restoration activities described above within several weeks of funding award and also be completed within the funding period of performance. In addition, the proposed monitoring program, the technology-based effectiveness assessment RiverNet system, provide cost-effective monitoring of the TRVTRMP program and will also benefit future habitat restoration and recovery efforts in the TJR Valley and serve as a model real-time data collection system for other impacted habitats.

The City and the TRVRT partners understand that the recovery and restoration of the TJR Valley is a long-term goal that will require: significant cooperation between the TRVRT agencies and organizations, general public, and international partners; collaboration between watershed managers, scientists, engineers and regulators; judicious allocation of limited resources to cost-effectively remove existing pollutants and control sources of habitat degradation; and prolonged investment of TRVRT partner and other resources to guide the ecological recovery of one of California’s largest and most sensitive coastal wetland habitats. Letters of support from the TRVRT partners are included in the supplemental information of this submission. The TRVTRMP program seeks to support immediate economic recovery of the U.S. economy through an integrated habitat restoration and debris removal program. The City and TRVRT partners are proud to submit this NOAA funding application for the TRVTRMP program as a first collective step towards the long-term recovery vision for the TJR Valley.