

## LA JOLLA SHORES ASBS PROTECTION IMPLEMENTATION PROGRAM

### Detailed Project Descriptions

#### *Program Development Overview*

**Goal of the Program:** Protect and enhance the Beneficial Uses of the La Jolla State Marine Conservation Area (ASBS No. 29) and the San Diego-Scripps State Marine Conservation Area (ASBS No. 31) through impact reduction, water quality benefits, and habitat enhancement.

There are eight projects in the proposed La Jolla Shores ASBS Protection Implementation Program. The basic characteristics of each are presented in Table 1.

**Table 1: Project Elements and Targeted Contaminant or Issue**

Project Element	Implementation	Assessment	Habitat Improvement	Flow	Sediments	Metals	Bacteria	Pesticides
Project 1: Dry Weather Flow Diversion	✓	✓	-	●	-	●	●	-
Project 2: Source Controls	✓	✓	-	●	●	●	●	●
Project 3: Runoff Reduction	✓	✓	-	●	●	●	●	●
Project 4: LID “Green Lot” Project & Bioretention Project	✓	✓	-	●▲	●▲	●▲	●▲	●▲
Project 5: Street Sweeping	✓	✓	-	-	●	●	●	●
Project 6: Outreach	✓	-	-	●	●	●	●	●
Project 7: Ecosystem Assessment	✓	✓	▲	-	-	-	-	-
Project 8: Information Management	✓	✓	▲	▲	▲	▲	▲	▲

- : Target improvement
- ▲: Increases understanding
- : Not applicable

## ***Impacts to the ASBS***

**Constituents of Concern (COC):** The ASBS support many of the beneficial uses outlined in the Ocean Plan, of which the most relevant relate to recreational uses of the beach and support of the special habitat within the ASBS.

Studies performed for the Final Integrated Coastal Watershed Management Plan (ICWMP) for La Jolla Shores ASBS (Triad Assessment phase) indicated that the priority contaminants of concern include metals, bacterial indicators and turbidity. Lower priority preliminary COC included TCDD (dioxin), PAHs and synthetic pyrethroids (pesticides). These COC are known to impact beneficial uses through beach closures, reduced mussel growth and potential chronic impacts to giant kelp germination and growth. The ASBS drain 1,600 acres of urbanized area. The identified COC sources include: urban runoff, stormwater discharges, aerial deposition, the UCSD/SIO research pier and aquaria seawater discharges from UCSD/SIO.

### **Nuisance Flows:**

Added to the issue of contaminant loads is the **high water usage** for landscaping. Over irrigation on the western campus of UCSD/SIO results in regular urban runoff which picks up pollutants from parking lots and other hardscapes and depositing them directly into the ASBS. These flows carry not only sediment, but also a number of other contaminants, such as nutrients (from irrigation runoff), bacteria (from undetermined sources), and copper and cadmium (from road runoff). Reduced residential and commercial over irrigation will be targeted in the Outreach Project lead by Coastkeeper.

UCSD/SIO was the first ASBS discharger to obtain an exception to the California Ocean Plan's waste discharge prohibition. UCSD/SIO worked collaboratively with the SWRCB and the San Diego RWQCB for over two years to obtain an exception to the Ocean Plan which was granted on July 19, 2004 by the SWRCB. Ocean Plan exception conditions were incorporated into SIO's NPDES permit (No. CA0107239) that was adopted on February 19, 2005. The required monitoring, studies and planning associated with the exception are currently being performed. UCSD and SIO have implemented a Storm Water Management Program to comply with the Phase II MS4 Program.

The City of San Diego is currently working with the SWRCB and San Diego RWQCB to obtain an exception to the waste discharge prohibition for the ASBS. The City submitted its application for an exception in May 2006, and has been actively pursuing activities to characterize and reduce the City's discharges to the ASBS.

## ***Program Benefits***

The projects described below as part of the La Jolla Shores ASBS Protection Implementation Program has multiple benefits and is part of several regional planning initiatives.

In addition, the Program has numerous benefits:

- Addresses a total of 14 high threat discharges in two southern California ASBS (#29 and #31) and focuses on reducing or eliminating the primary source of the threat – urban runoff;

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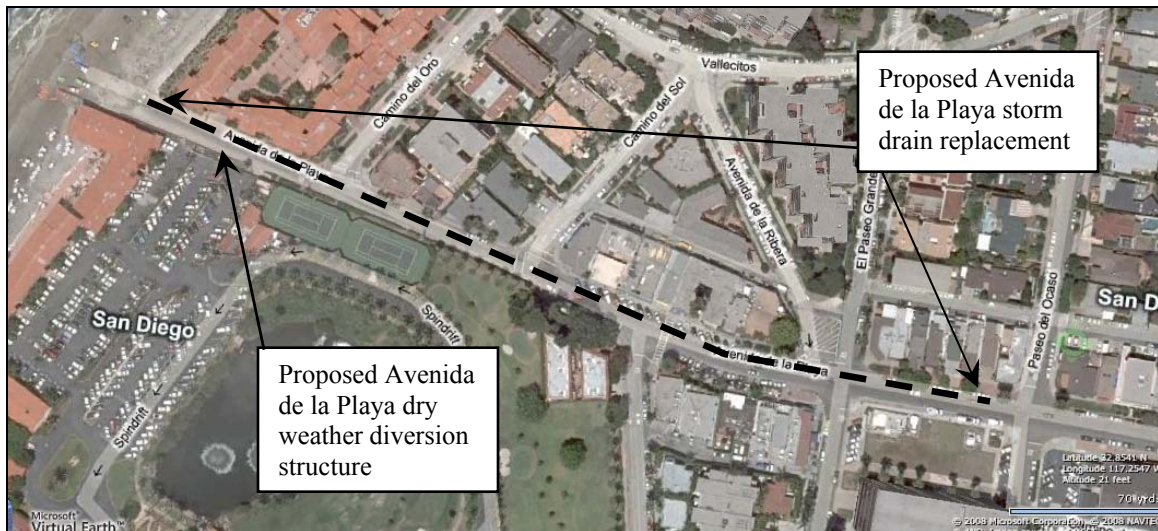
- Addresses the bacteria TMDL listed in *Total Maximum Daily Loads for Indicator Bacteria, Project I - Beaches and Creeks in the San Diego Region*.
- Provides multiple benefits by protecting the ASBS as well as high use public beaches and two Marine Protected Areas;
- Is an essential component of other regional planning efforts (ICWMP, IRWMP, City's 5-Year Strategic Watershed Activity Implementation Plan, Mission Bay & La Jolla Watershed Urban Runoff Management Plan, UCSD/SIO's Stormwater Management Plan);
- Supports LID and water re-use (two Projects in the Program)
- Examines environment variables affecting ASBS and begins integration of selected data sets;
- Supports development web based visualization of near real-time data;
- Tests the ASBS Protection Model and the ASBS Triad Assessment Method which are long-term management tools which could potentially be used across multiple ASBS and multiple regions of California;
- Promotes local and regional information sharing initiatives.

More detailed information on the eight projects that make up this Program is given below:

## ***Dry Weather Flow Diversion at Avenida de la Playa (Project 1)***

**Problem Statement:** The invert elevation of the existing beach outfall is at the mean sea level and sand regularly blocks all flow, except during the largest winter storms. Dry weather flows collect and stagnate, creating a known source of bacterial discharge to the receiving waters of the La Jolla State Marine Conservation Area (ASBS No. 29).

**The Goal:** Eliminate bacteria and other COC loads to the ASBS by replacing 1,173 linear feet of existing storm drain with a new reinforced concrete box (RCB) culvert and a dry weather diverter located near the outfall.



**Discharge Characteristics:** The Avenida de la Playa Project addresses a high threat bacterial discharge to ASBS No. 29 (SDL062) (see map in Attachment 2).

**Improvements to Water Quality:** The Project will improve water quality in ASBS No. 29 by diverting and therefore eliminating stagnant, bacteria-associated flows.

**Expected Load Reduction:** This Project will reduce dry weather flows by 100%.

**Success of Similar Projects:** The Project elements have all shown to be successful in achieving the goal of reducing flows and loads to the ASBS. The City has installed and is operating many low flow diversions around Mission Bay, and several within the La Jolla Shores area.

**Project Readiness:** This Project was studied by the City as part of the Coastal Low Flow Diversion Program (2005). A mitigated negative declaration was prepared and certified by the City of San Diego for the City's Urban Runoff Management Plans including low flow diversion projects. It is anticipated that this project will be deemed consistent with the mitigated negative

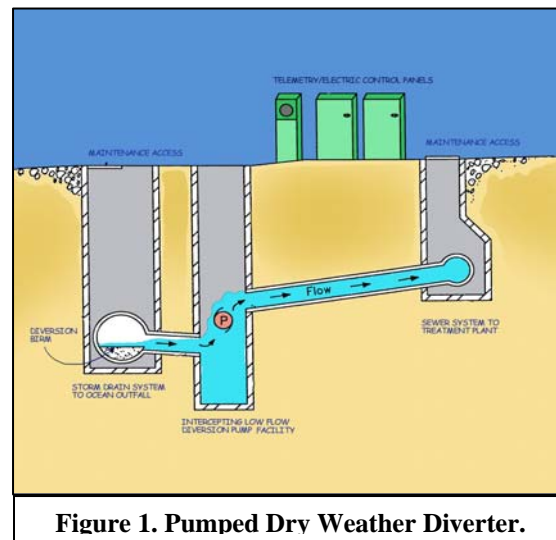
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declaration (MND) and an addendum would be prepared. The City of San Diego has provided a cost match of \$30,000 for planning and engineering design of the Avenida de la Playa diversion. This money has been secured through the City’s Annual Storm Water Department Budget. The City requests that this grant fund the \$950,000 construction cost of the diversion Project.

**Effectiveness Assessment:** The effectiveness of this Project will be assessed by monitoring the average annual flow diverted from the outfall and the load reduction will be quantified with a grab sample from the sump.

**Project Description:** *See Attachment 2 for detailed, technical concept design.* The low flow diversion at Avenida de la Playa is designed to address the problem of water collecting and stagnating in the existing storm drain system. In the existing condition, the downstream end of the system consists of a double 51-inch concrete pipe headwall and attached concrete structure, which is designed to keep beach sand from entering into the system. The invert elevation of the existing storm drain system at this outfall location is approximately equal to the elevation of mean sea level, and thus the outfall is typically blocked by beach sand except when cleared by City crews or by a large storm event. Water in this storm drain system originates from: 1) urban runoff draining from approximately 844 acres of urbanized land, 2) groundwater, and 3) seawater which enters the storm drain through wave action and high tides. Dry weather flows from the much of the upstream watershed are already intercepted by a dry weather diversion structure near the intersection with El Paseo Grande and diverts flows to the sanitary sewer system. Between this existing low flow diversion structure and the beach outfall, water enters the storm drain system, collects, and stagnates. The stagnant water turns black, emits a foul odor and is a known source of bacterial discharge.

To accomplish its goals, this Project will replace approximately 1,173 linear feet of existing storm drain system between the beach outfall and the existing dry weather diverter, with a new reinforced concrete box (RCB) culvert and an additional dry weather diverter located near the outfall (Figure 1). Construction of the RCB culvert, which would have no joints through which groundwater could enter, would eliminate the infiltration of groundwater issue. Construction of a new dry weather diverter would provide that flows seeping in to the downstream end of the system at the outfall could be pumped to the sanitary sewer, thus eliminating prolonged stagnation and subsequent bacterial growth.



**Figure 1. Pumped Dry Weather Diverter.**

### **Project Benefits:**

- Protection and enhancement of water quality and aquatic habitats, particularly those of the La Jolla State Marine Conservation Area (ASBS No. 29);
- Protection of the regional value of coastal waters, including creeks and the ocean;
- Implementation of the City’s strategic and urban runoff management plans; and
- Improve recreational quality of public beaches.

## Source Controls (Project 2)



**Problem Statement:** Urban runoff flows across impervious surfaces, picking up and carrying pollutants on the ground into storm drains which is then discharged directly into the San Diego-Scripps State Marine Conservation Area (ASBS No. 31).

**The Goal:** UCSD/SIO will continue partnering with Urban Corps of San Diego (Urban Corps) to implement BMPs throughout the La Jolla Shores watershed to reduce or eliminate the discharge of pollutants into the ocean including non-storm water discharges.

**Discharge Characteristics:** The Project addresses urban runoff to all storm drains in the watershed discharging to ASBS No. 31. The Project will address nine (9) high threat discharges: SDL064, SDL157, SDM001, SDM006-SDM008, SDM012, SDM017, and SDM049 (see map in Attachment 2).

**Improvements to Water Quality:** The Project will improve water quality in ASBS No. 31 by directly removing or preventing the discharge of trash, sediment and organic material to the storm drain and ASBS.

**Expected Load Reduction:** This Project will result in load reductions for bacteria, sediments and gross pollutants.

**Success of Similar Projects:** The Urban Corps of San Diego was founded in 1989 and began providing job training to 20 youth from disadvantaged inner-city communities. Since then, Urban Corps successfully provided environmental job training and educational opportunities to more than 400 young people each year (<http://www.urbandcorpsd.org/index.html>).



**Project Readiness:** A Categorical Exemption for this project was filed in November 2007. A partnership already exists between UCSD/SIO and Urban Corps, therefore this project is easy to implement as an extension of earlier works. UCSD/SIO will provide a cost match of \$10,000 using allocated budget and staff time. This grant is requested to fund an additional \$50,000 for project implementation.

**Effectiveness Assessment:** The effectiveness of this Project will be assessed by the quantity of sediment, yard waste and trash removed from drainage conveyances, and through visual inspections.

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**Project Description:** The Project is designed to address the urban runoff problems identified by assessing and implementing targeted BMPs in the western portion of the UCSD/SIO campus. Activities and BMPs conducted through the UCSD/SIO and Urban Corps partnership will include: waste collection/removal, and full recovery pressure washing.

**Project Benefits:**

- Protection and enhancement of water quality and aquatic habitats, particularly those of the San Diego-Scripps State Marine Conservation Area (ASBS No. 31);
- Protection of the regional value of coastal waters;
- Implementation of the UCSD/SIO's Stormwater Management Plan;
- Provides educational and information sharing opportunities to disadvantaged youth (members of the Urban Corps program);
- Improves local information sharing initiatives between the City and the UCSD/SIO; and
- Improve recreational quality of public beaches.

### ***Runoff Reduction (Project 3)***

**Problem Statement:** Over-irrigation of landscaping adjacent to roads, parking lots, and other impervious surfaces on UCSD/SIO campus delivers excessive flows and associated contaminants to the San Diego-Scripps State Marine Conservation Area (ASBS No. 31).



**The Goal:** Increase the distribution uniformity (DU) of irrigation (resulting in water conservation/optimization), reduce runoff from UCSD/SIO landscaping, and reduce and associated contaminants from entering the receiving waters of the ASBS.

**Discharge Characteristics:** Dry weather flows have been analyzed at UCSD/SIO and have been found to contain pollutants such as copper and bacteria. Both of these are contaminants of concern for ASBS No. 31. This Project addresses urban runoff to all storm drains in the watershed discharging to ASBS No. 31. The Project will address nine (9) high threat discharges: SDL064, SDL157, SDM001, SDM006-SDM008, SDM012, SDM017, and SDM049 (see map in Attachment 2).

**Improvements to Water Quality:** This Project will make irrigation more efficient and consistent, therefore improving water quality by reducing or eliminating pollutant carrying flows.

**Expected Load Reduction:** This Project will reduce dry weather flows and associated COC-loads to the ASBS (especially bacteria and metals). Irrigation improvements will be implemented across more than 150,000 square feet of SIO campus landscaping.

**Success of Similar Projects:** Adaptive irrigation controllers have been shown to reduce residential flow by 49% (IRWD, (2008) and Diamond et. al, (2003)). *See technical reports in Attachment 8.*

**Project Readiness:** A Categorical Exemption for this project was filed in November 2007. The project requires \$80,000 worth of funding by the grant for Maxicom timers and project implementation.

**Effectiveness Assessment:** The effectiveness of this Project will be assessed through monitoring of flow (pre- and post-implementation) and photo documentation.

**Project Description:** The Project is designed to address the problem of irrigation run-off flowing across roads, parking lots, and other impervious surfaces picking up pollutants on the ground and carrying them into storm drains then directly to the ocean without any treatment. UCSD/SIO is committed to controlling non-storm water discharges to the ASBS and has identified three high priority areas in the western portion of the UCSD/SIO campus that have persistent irrigation run-off. To accomplish its goal, selected irrigation systems in these areas will



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be replaced with Maxicom (Rainbird) irrigation controllers to reduce the discharge of irrigation runoff and associated copper and bacteria to the public beach and ASBS.

The irrigation system improvements will:

- Automatically adjust watering to weather/soil conditions. This will eliminate irrigation overflows by not irrigating saturated soils.
- Automatically turn off flow in the system if a line break or an increase in expected programmed amount of water is detected. This will eliminate flows created by leaking sprinklers, valves, or line breaks.
- Provide actual water consumption data. This will allow the users to more accurately calculate water demands/soil moisture requirements.
- Improve water distribution uniformity (DU) throughout the project area. An uneven distribution of water by existing sprinkler systems produces irrigation overflow and poor turf quality. The Maxicom will improve the DU, thus, preventing over watering to compensate for dry areas and controlling runoff.



### **Project Benefits:**

- Protection and enhancement of water quality and aquatic habitats, in both ASBS 29 and 31);
- Protection of the regional value of coastal waters in La Jolla and Newport through information sharing program;
- Water use reduction and water supply reliability improvement in an area that relies on imported water for domestic supply (Ahwahnee Principles for Resource Efficient Land Use #4);
- Implementation of the UCSD/SIO's Storm Water management Plan and the City's Strategic and Urban Runoff Management Plans;
- Improve recreational quality of public beaches.

## **LID “GreenLot” at Kellogg Park (Project 4)**

### **Problem Statement:**

Urban runoff and storm flows wash high priority contaminants of concern directly onto the beach and into ASBS No. 29 through two beach outlets on the western edge of the Kellogg Park beach parking lot.



**The Goal:** Reduce or eliminate dry and wet weather flows to the public beach and ASBS.

**Discharge Characteristics:** The Projects address COC-loads (dry and wet weather discharges) to ASBS No. 29. The Projects will address one (1) high threat discharge (SDL063) which was identified by the State Water Resources Control Board. The Projects will also address discharge at the northern end of Kellogg Park parking lot. This beach outlet only discharges during wet weather storm events. The beach outlet is regularly covered with sand and the parking lot routinely floods during storms. A water quality baseline for this “unknown” outlet was collected by the City during the 2007/2008 wet season (see map in Attachment 2).

**Improvements to Water Quality:** The Project will improve water quality in ASBS No. 29 by directly reducing flows and discharges to the ASBS.

**Expected Load Reduction:** Load reductions of all COC will be achieved through the LID infiltration project and flow retention projects at Kellogg Park. An effectiveness assessment has been implemented and will provide valuable load reduction data for California infiltration LIDs. The average percent removal efficiency for infiltration LIDs based on contaminant of concern is (based on research by Dr. Brian Dempsey, U. of Pennsylvania, cited in Adams, (2003):

- Total Suspended Solids - 91%
- Total Phosphorus - 66%
- Total Nitrogen - 72%
- Biological Oxygen Demand – 75%
- Total Metals – 90%
- Lead – 74%
- Zinc – 81%
- Copper – 42%
- Total Kjeldahl Nitrogen – 53%

*Find technical report at (<http://www.stormh2o.com/may-june-2003/pavement-porous-bmps.aspx>)*

**Success of Similar Projects:** According to research by Dr. Brian Dempsey, porous pavement result in very high removal rate for total suspended solids, metals, and oil and grease (Adams, Michele (2003), Porous Asphalt Pavement With Recharge Beds 20 Years and Still Working). The

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porous pavement LID project has been designed in accordance with the Caltrans construction specifications.

**Project Readiness:** The concept designs for the LID pervious pavement “greenlot,” bioretention area and rain barrel system have been completed. CEQA and other permitting for the LID Project has not yet been initiated. Construction of the LID Project is projected to cost \$740,000, which has been request to be funded by this grant.

**Effectiveness Assessment:** The City has already conducted a baseline water quality assessment for wet weather flows from Kellogg Park. The LID projects will be assessed by comparing these baseline studies with post-construction water quality and flow monitoring. Post-construction pollutograph monitoring shall be conducted for two storm events with a minimum forecast of 0.2-inches of rain.

The rain barrel system will be assessed for structural integrity during field operations and maintenance inspections. Load reductions will be determined by extrapolating water quality data collected under the City of San Diego’s Rain Barrel/Downspout Disconnect program.

**Project Description:** The Kellogg Park Projects are designed to address the problems of urban runoff and pollutant discharges to the ASBS. To accomplished the Project goals, Kellogg Park parking lot will be retrofitted with pervious concrete as follows: the existing asphalt concrete paving, concrete ribbon gutters, and any impermeable pavement base materials will be removed; existing curbs will be protected in place; new pervious concrete paving and base will be installed in place of the old asphalt paving while maintaining existing lines and finished surface elevations; the existing parking striping will be replicated on the new pervious concrete pavement. All concrete between the existing palm trees within the curbed planter areas will be removed and replaced with mulch or drought tolerant vegetation (Figure 2).

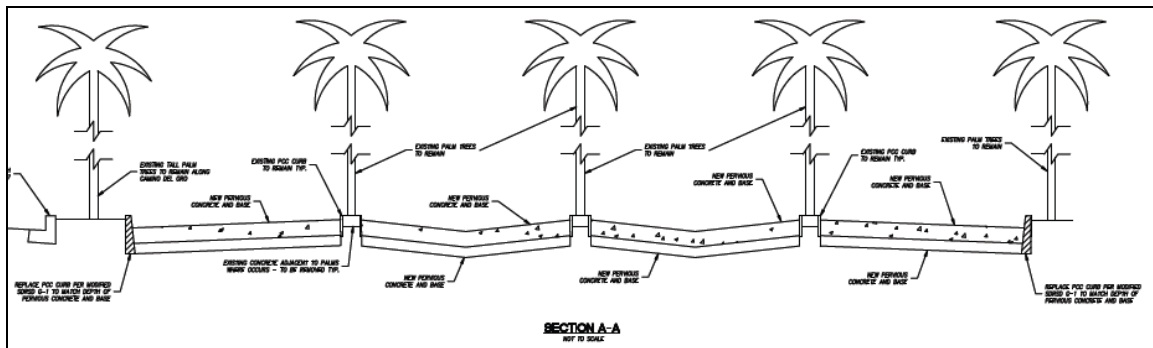
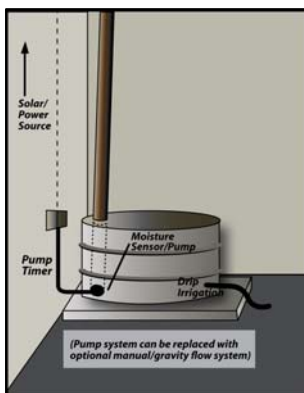
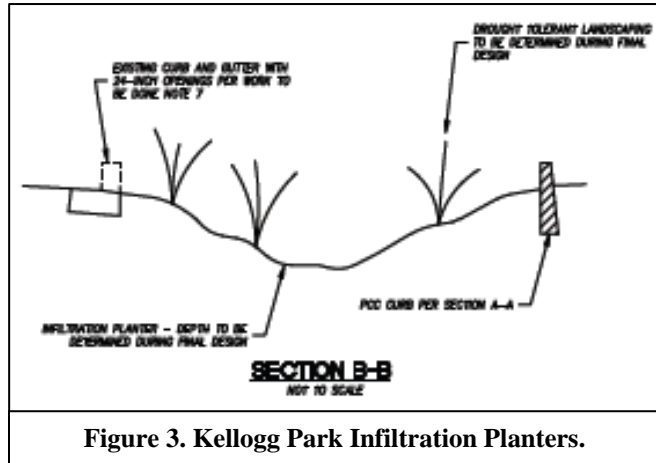


Figure 2. Kellogg Park Porous Pavement LID Cross-Sectional Design.

See Attachment 2 for detailed, technical concept design.

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Along Camino del Oro, the existing landscaped area between the parking lot and street will be retrofitted to include infiltration planters which will accept and infiltrate street surface runoff (Figure 3).



A rain barrel system will be installed at the comfort station on the north side of Kellogg Park. This 75-gallon rain barrel will capture runoff from the roof of the building, reducing the volume of first flush runoff to the ASBS. The captured water will be used to irrigate the adjacent landscaping. This project will reduce water use in San Diego, a region which depends on imported water for domestic supply.

### Project Benefits:

- Protection and enhancement of water quality and aquatic habitats, particularly those of the La Jolla State Marine Conservation Area (ASBS No. 29);
- Protection of the regional value of coastal waters;
- Water use reduction and water supply reliability improvement in an area that relies on imported water for domestic supply (Ahwahnee Principles for Resource Efficient Land Use #4);
- Implementation of Ahwahnee Principles for Resource Efficient Land Use #5;
- Implementation of the City's strategic and urban runoff management plans; and
- Improve recreational quality of public beaches.

## **Aggressive Street Sweeping (Project 5)**

**Problem Statement:** Storm water and non-storm water (e.g., wash water, irrigation overflow, etc) runoff from urban areas flows across roads, parking lots, and other impervious surfaces and can carry pollutants on the ground into storm drains and then directly to the ASBS without any treatment.

**The Goal:** Reduce bacteria, metals, pesticides, and sediment pollutant loads to the ASBS by removing them from impervious surfaces.



**Discharge Characteristics:** The Project addresses oils/grease, trash, bacteria, sediment, metals and gross pollutants (trash) in both ASBS No. 29 and No. 31. By sweeping and removing these pollutants, the UCSD/SIO Aggressive Street Sweeping Project will address nine (9) high threat discharges in ASBS No. 31: SDL064, SDL157, SDM001, SDM006-SDM008, SDM012, SDM017, and SDM049. By sweeping and removing these pollutants, two of the City's Aggressive Street Sweeping pilot study areas will address five (5) high threat discharges in ASBS No. 29: SDL189, SDL196, SDL199, SDL062, and SDL063 (see map in Attachment 2).

**Improvements to Water Quality:** The Aggressive Street Sweeping Project will reduce sediment, heavy metals, and bacteria loads discharging to the two ASBS.



**Expected Load Reduction:** The Aggressive Street Sweeping Project is projected to remove 9,720 cubic feet of debris, containing litter, sediment, and heavy metals, each year. The estimated percent load reduction based on contaminant of concern is (based on NVPDC (1992), as cited in Young et. al, (1996)):

- Total Solids - 55%
- Total Phosphorus - 40%
- Total Nitrogen - 42%
- Chemical Oxygen Demand – 31%
- Biological Oxygen Demand – 43%
- Lead – 35%
- Zinc – 47%

The estimated annual load reduction of the Aggressive Street Sweeping Program is:

- Total Solids - 4.9 lbs
- Lead - 0.3 lbs
- Zinc – 6.4 lbs

*See technical report in Attachment 8.*

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**Success of Similar Projects:** The Project elements have all shown to be successful in achieving the goal of reducing flows and loads to the ASBS (Sutherland, (1997)). The anticipated load reductions are based on the NVPDC (1992) study cited in Young et. al, (1996). *See technical reports in Attachment 8.*

**Project Readiness:** This project does not require CEQA documentation or permits. The budget for this project is \$355,000. It is requested that \$150,000 of this budget be supplied by the grant. The City has provided a cost match for the Project in the form of payment for street sweeping equipment (\$165,000). The purchase was initiated in September 2007. UCSD/SIO will provide supplemental funding using allocated budget and staff time (\$40,000 allocated).

**Effectiveness Assessment:** The effectiveness of this Project will be assessed by determining the volume of debris removed (through visual observations) and calculating the load reduction by extrapolating water quality data collected under the City's current Aggressive Street Sweeping pilot study in the watershed. Debris data will be used for two of the City's Aggressive Street Sweeping pilot study areas: the commercial/residential route #408 in La Jolla Shores, and two coastal residential routes #504 and #512.

**Project Description:** Aggressive Street Sweeping has high potential for reducing pollutants in urban runoff. The Project achieves its goals by removing polluted material from impervious surfaces before it is entrained and diluted in urban runoff. Sweeping significantly reduces trash and sediment from urban runoff and can also reduce soluble pollutants such as metals and nutrients, which are difficult and costly to remove by structural BMPs once dissolved.

As the coastal UCSD/SIO campus roads are uneven and are often littered with large debris from branches and leaves from numerous trees, UCSD proposes to purchase a mechanical street sweeper, which employs a rotating gutter broom to remove particles from the street gutter area and a water spray to control dust. Sweeping will occur daily during the work week, averaging 30-35 miles per day, with the entire campus being covered on a weekly basis.

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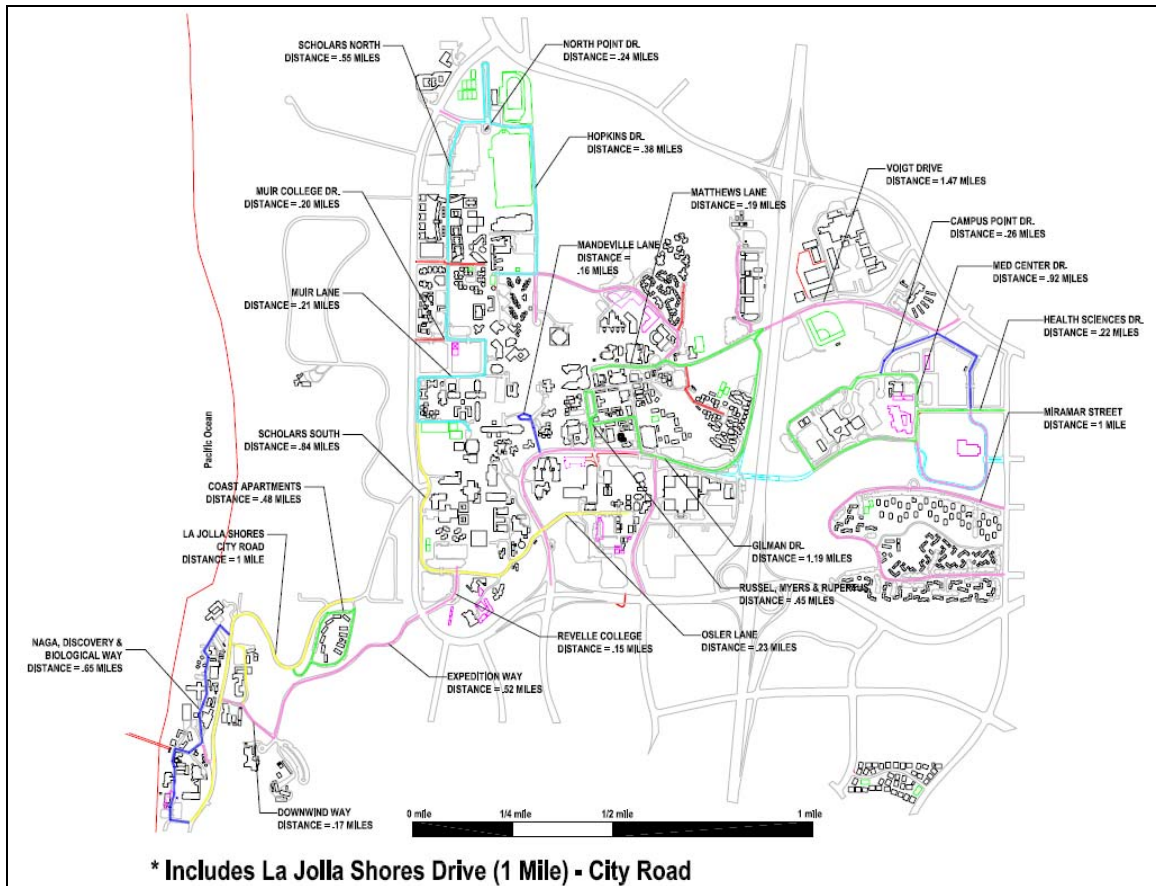


Figure 4. Map of UCSD/SIO Campus to be Swept with New Machine.

### Project Benefits:

- Protection and enhancement of water quality and aquatic habitats, particularly those of the La Jolla State Marine Conservation Area (ASBS No. 29) and the San Diego-Scrapps State Marine Conservation Area (ASBS No. 31);
- Protection of the regional value of coastal waters;
- Implementation of UCSD/SIO's Stormwater Management Plan and the City's Strategic and Urban Runoff Management Plans;
- Improves local information sharing initiatives between the City and UCSD/SIO; and
- Improve recreational quality of public beaches.

## ***Outreach (Project 6)***

**Problem Statement:** Urban runoff (e.g., wash water, irrigation overflow, etc) flows across roads, parking lots, and other impervious surfaces and can carry pollutants that are on the ground into the City’s storm drains. The pollutants flow down the pipe, directly to the ASBS without any treatment.



**The Goal:** Distribute storm water educational information to increase knowledge and awareness of the ASBS and methods to protect them. Mobilize beach-cleanups, and educate underprivileged children about the ASBS. Conduct educational studies to determine which outreach methods encourage citizens to adapt non-polluting behaviors.

**Discharge Characteristics:** The Project addresses urban runoff to all storm drains in the watershed discharging to ASBS No. 29 and No. 31. This Outreach Project will address the nine (9) high threat discharges in ASBS No. 31: SDL064, SDL157, SDM001, SDM006-SDM008, SDM012, SDM017, and SDM049. The outreach Project will address the five (5) high threat discharges in ASBS No. 29: SDL189, SDL196, SDL199, SDL062, and SDL063.

**Improvements to Water Quality:** The Project will improve water quality in the two ASBS by raising awareness, increasing knowledge and encouraging behavior changes intended on reducing or eliminating COC and COC-associated flows

**Expected Load Reduction:** Beach-cleanups will remove gross pollutants from beaches and the storm drain conveyance system. Education efforts are anticipated to raise awareness, increase knowledge and subsequently modify behavior, resulting in load reductions for COC in urban runoff, including bacteria, metals and pesticides.

**Success of Similar Projects:** The City of San Diego’s pollution prevention education program, Think Blue, and San Diego Coastkeeper have been working collaboratively on ASBS education and outreach with great success since 2006. Previous ASBS outreach has included brochure distribution, community meetings, speaker’s bureaus and beach clean-ups.

San Diego Coastkeeper was launched in 1995 (as San Diego Baykeeper) in order to combat chronic pollution of San Diego Bay that transformed a once-thriving ecosystem into a highly toxic waterbody. In 2005, San Diego Baykeeper became San Diego Coastkeeper to reflect the organization’s expanded mission which now encompasses protecting all of San Diego County’s bays, beaches, watersheds and ocean.

Successful community outreach, education and advocacy efforts have reached thousands of San Diegans who are now empowered to be stewards of clean water and a healthy coastal ecosystem. Due in part to increased awareness and collaboration with the City, area sewage spills have decreased by 70% and beach closures by almost 60% in the City of San Diego. San Diego’s regulations for storm water and industrial discharge standards are now considered best practices for California and the nation.



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Other successful projects include beach cleanups, which have drawn nearly 20,000 San Diegans who have removed over 140,000 pounds of debris from beaches as part of monthly cleanups and Coastal Cleanup Day. In 2007, 283 volunteers collected 189 pounds of trash at La Jolla Shores. So far in 2008, 244 volunteers have collected 380 pounds of trash, and there are several more cleanups scheduled in La Jolla Shores in 2008. In addition, more than 3,000 volunteers have helped

gather critical data on the health of local waters and kelp beds. To reach school-aged children each year, the City of San Diego and Coastkeeper sponsor a hands-on education program (Project SWELL) in the local school district which educates nearly 40,000 students about water quality and pollution prevention issues.

**Project Readiness:** Both the City of San Diego and San Diego Coastkeeper have resources and experience with educational and outreach programs to implement these ASBS outreach projects. Coastkeeper will obtain a Notice of Exemption for the public outreach Project. The outreach efforts lead by Coastkeeper has a budget of \$175,000; the grant is requested to fund \$100,000 and the City will match \$75,000 from the City's annual storm water budget to subsidize a Community-Based Social Marketing project. The collaborative outreach with UCSD/SIO (Birch Aquarium) has a budget of \$60,000. The grant is requested to fund \$20,000 and UCSD/SIO will match \$40,000 using allocated budget and staff time.

**Effectiveness Assessment:** The effectiveness of this Project will be assessed by several methods. Traditional outreach will be assessed by tracking attendance at stakeholder meetings, the number of brochures distributed, and the volume/weight of trash collected at organized beach-clean ups. The CBSM study will use surveys and direct observation to evaluate the community's understanding of the significance and value of the ASBS as well as any observable behavior changes.

**Project Description:** This outreach Project is designed to effectively implement the La Jolla Shores Coastal Watershed Management Plan by expanding public outreach and promoting ocean stewardship. In order to achieve the Project goals, the City of San Diego and Coastkeeper will implement outreach efforts which complement the City's CBSM program. The Project elements include conducting speakers bureaus and public workshops in the La Jolla Community, traditional outreach to community members at local events and functions. Coastkeeper will include ASBS and project update information in their membership email alerts, the Coastkeeper Watermarks newsletter, and on their website. They will also organize beach cleanup events at La Jolla Shores, host guided tours of the ASBS, and collaborate with Birch Aquarium. Through this collaboration, an educational watershed program including a transportable informational display will be developed.

The City of San Diego and Coastkeeper recognize that protected ocean areas like ASBS benefit both the people and coastal environment of San Diego by providing healthy, biologically diverse ocean ecosystems for future generations to enjoy. Benefits include the conservation and recovery of endangered and threatened marine species, such as the green abalone and rockfish found in the overlapping marine conservation areas. If left relatively undisturbed, these local areas create environments for fish and other species to reproduce and flourish, which in turn helps to maintain

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healthy fisheries. Over time, these areas become places where scientists can study undisturbed ecosystem functions and apply this knowledge to other impacted areas.

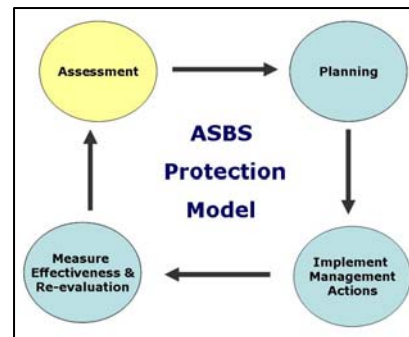
### **Project Benefits:**

- Protection and enhancement of water quality and aquatic habitats, particularly those of the La Jolla State Marine Conservation Area (ASBS No. 29) and the San Diego-Scripps State Marine Conservation Area (ASBS No. 31);
- Protection of the regional value of coastal waters;
- Implementation of the UCSD's Stormwater Management Plan and the City's strategic and urban runoff management plans;
- Promotion environmental stewardship through cleanups, educational programs and signage;
- Provides educational and information sharing opportunities to disadvantaged youth;
- Improves local information sharing initiatives between the City and the San Diego Coastkeeper; and
- Improve recreational quality of public beaches.

## ***Ecosystem Assessment (Project 7)***

**Problem Statement:** Constituents of concern (COC) which have been identified in urban runoff in the watershed that discharges to the two ASBS are known to reduce mussel growth and induce potential chronic impacts to giant kelp germination and growth.

**The Goal:** To determine the effect and effectiveness of the proposed Program of Projects on the ASBS marine community using the ASBS Triad Assessment Approach (ICWMP).



**Discharge Characteristics:** The priority COC found in urban runoff which discharges to the ASBS include: metals (copper, chromium, nickel and arsenic), bacterial indicators and turbidity. Lower priority preliminary COC included TCDD (dioxin), PAHs and synthetic pyrethroids (pesticides). These COC are known to impact beneficial uses through beach closures, reduced mussel growth and potential chronic impacts to giant kelp germination and growth. The Project addresses urban runoff to all storm drains in the watershed discharging to ASBS No. 29 and No. 31.

**Improvements to Water Quality:** The Assessment process will improve long term water quality by identifying effective and efficient Projects which improve water quality in the two ASBS by reducing or eliminating COC-associated flows. These Projects can then be refined using the ASBS Triad Assessment Approach to optimize the ASBS management plan.

**Expected Load Reduction:** *Not applicable.*

**Success of Similar Projects:** *Not applicable.*

**Project Readiness:** The ASBS Triad Assessment Approach was used while developing the IWCMP and this Program of Projects. A baseline water quality assessment has been implemented at Kellogg Park. UCSD/SIO will obtain a notice of exemption for the non-harmful ecosystem assessment studies planned for this Project. The Project has a budget of \$345,000. The City is contributing a cost match of \$45,000 (for BMP Monitoring) which was secured in the City's Annual Stormwater Budget. UCSD/SIO is contributing \$50,000 using allocated budget and staff time. The grant is requested to fund the remaining \$250,000 for Project implementation and monitoring.

**Effectiveness Assessment:** The practical implementation of the ASBS Triad Assessment Approach will be tested during implementation of this Program of Projects. Lessons learned will be reported and used to adjust the Approach and ASBS Protection Model.

**Project Description:** The ASBS Triad Assessment Approach was utilized to identify the priority contaminants of concern and develop this Program of Projects which were specially designed to address the observed water quality problems. This Assessment Project is the first step of the ASBS Protection Model which is used to evaluate the current Program in order to efficiently and effectively modify the long term management strategy in the ASBS.

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The Triad Assessment Approach consists of adaptive monitoring and identifying ecosystem linkages by determining contaminant fate/physical conditions and the biological uptake and impacts. The Program impact on the ASBS will be determined, along with a new set of highest priority pollutants, pollutant sources, potential degree of impact on the ecosystem, and data gaps. A tiered management approach can then be employed to address the contaminants deemed to have the highest degree of impact. A secondary benefit of assigning a scale to impact effects is that the effectiveness of management measures that address impacts can be assessed using biologically relevant criteria.

During this Assessment Project, UCSD/SIO will perform ecosystem assessments to evaluate the effectiveness of the proposed projects on the ASBS marine community. Higher-level ecosystem endpoints (population and community effects) will be linked to local forcing. Assessments will include additional bioaccumulation studies using mussel plantings to verify previous results and a benthic study of the sandy inter-tidal areas.



Benthic studies will be coordinated with sediment sampling and regional biological surveys to further develop long term ecosystem assessment using biomarkers and indicator species. All assessments will be complimentary to the Bight08 regional ASBS studies. Other programs such as CalCOFI (California Cooperative Ocean Fisheries Investigations), SCCOOS (Southern California Coastal Ocean Observing System), CDIP (Coastal Data Information Program, wave measurements and forecasting), and the California State Mussel Watch program will provide necessary data outside the ASBS on a larger scale and will be incorporated into analyses of ASBS data where applicable.

BMP monitoring will be used to augment Ecosystem Assessment efforts. Flows and loads for pre- and post- project implementation will be sampled and compared. Wet weather monitoring will be conducted during two storm events which have a 72 hour antecedent dry period, and a minimum forecast of 0.2 inches of rain. Five discrete samples will be collected at Kellogg Park to construct a pollutagraph of the monitored storm. Samples will be collected at the diversion site in Avenida de la Playa and composited to obtain a flow-weighted sample. Dry weather data will be collected under the City of San Diego Coastal Program. All samples will be analyzed for bacteria, metals, nutrients, PAHs, PCBs, and pesticides. The program began in 09/2007 and will through project completion in 2013. Additional monitoring and performance metrics are discussed in the Scope of Work.

### **Project Benefits:**

- Protection and enhancement of water quality and aquatic habitats, particularly those of the La Jolla State Marine Conservation Area (ASBS No. 29) and the San Diego-Scripps State Marine Conservation Area (ASBS No. 31), through improved information and project management;
- Protection of the regional value of coastal waters;
- Implementation of the City's strategic and urban runoff management plans;
- Assessment of the innovative Triad Assessment Approach, a potential regional and state-wide tool for ASBS program management; and

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- Improved regional information sharing initiatives between the City of San Diego, UCSD/SIO, and the City of Newport Beach.

### ***Information Management (Project 8)***

**Problem Statement:** Integrated information management systems are a critical tool to efficiently assess and manage regulatory programs. Information management systems are needed for integration and public data dissemination so that interrelated biological-physical-chemical processes present in the watershed and marine environment can be assessed and available to a wide range of users. These data requirements span both regulatory and non-regulatory based data collection efforts.

**The Goal:** Continue development of an ASBS information management system at UCSD/SIO to establish the infrastructure needs and generate a conceptual design required for long term assessment of ASBS performance and related management decisions. To develop a usable information system used by a range of users.

**Discharge Characteristics:** *Not applicable.*

**Improvements to Water Quality:** *Not directly applicable.*

**Expected Load Reduction:** *Not applicable.*

**Success of Similar Projects:** *Supporting Technical Reports not applicable.*

**Project Readiness:** The project does not require CEQA documentation or permits. UCSD/SIO is contributing a \$20,000 cost match using allocated budget and staff time. The grant is requested to fund the remaining \$120,000 required to implement the project.

**Effectiveness Assessment:** The Project will be assessed using the output and outcome indicators defined below.

Output Indicators:

- Expansion of SWAMP compatible information management system to include water quality, physical condition, and ecosystem assessment data from both ASBS.
- Web-based visualization tool with near real-time data.
- Information management tool functions off RAID system and has offsite backup system.

Outcome Indicators:

- Creation of a user-driven data management system that serves data providers, analysts, partner agencies and the community. System users will determine if the data management system developed is usable.
- Information system that integrates water quality data and ocean ecosystem assessment data.
- Information which resides within the system will be available for a broad range of users including the ASBS permittees, the SWRCB and RWCRB, the IRWM partners, and general public.

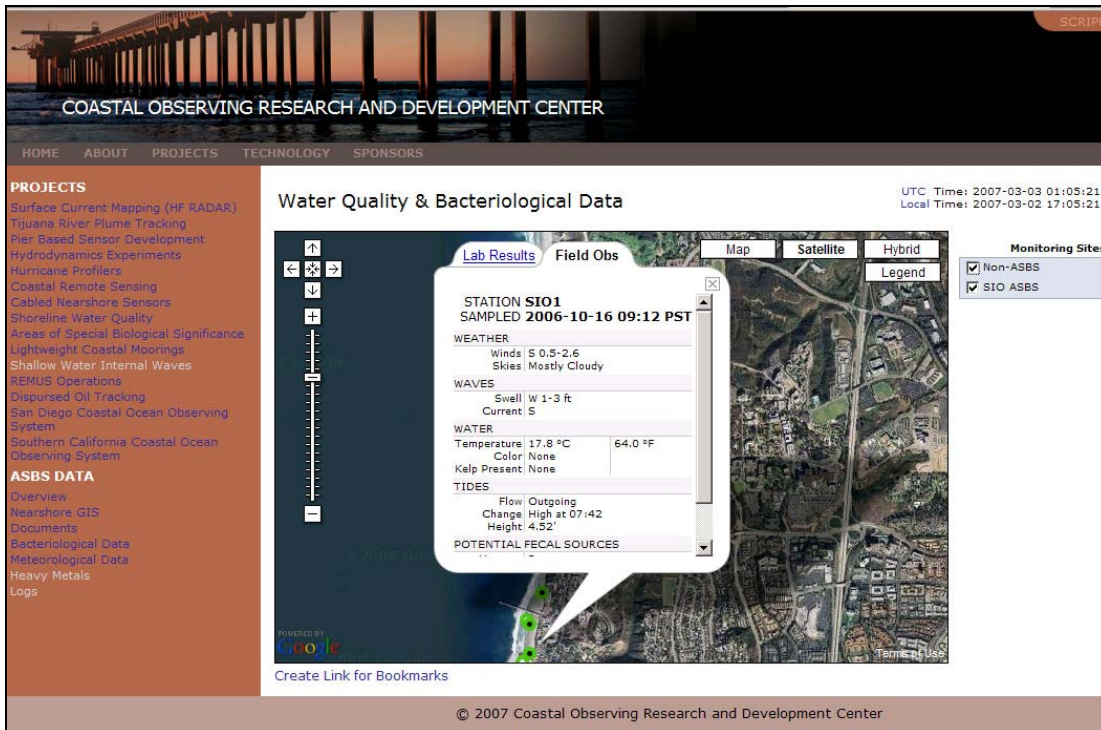


Figure 5. Information Management Tool Output Showing Google Map Display of Field Observations

**Project Description:** This Project is designed to establish the infrastructure needs and generate a concept design for an information management tool required for long term assessment of ASBS performance and related management decisions. The current information management framework developed by UCSD/SIO for the La Jolla Shores ICWMP. It was created using the SWAMP model and includes: automated data transfer and ingestion, data archiving and backup, historical data download, and public display of data (<http://cordc.ucsd.edu/projects/asbs>).

This Project will continue to expand upon the SWAMP system. The system will support the data streams that exist within Southern California Coastal Ocean Observing System (SCCOOS), include new regulatory data, and extend ingestion beyond UCSD/SIO (City of San Diego data). It will also be transported to a system with a redundant array of independent disks (RAID) and undergo an offsite backup utility.

In recent months, the SWAMP format has undergone changes. In order to maintain a seamless flow of data, programmers must adapt and respond to the changing requirements and data formats. Reasonable outputs and a user-friendly access and public display are essential system components which will be developed in this Project. The proposed system will extend beyond water quality data to include ASBS ecosystem assessment data and begin to integrate environmental data based on location (latitude, longitude), time, and elevation. The information management system will display near real-time data in an organized and digestible format easily accessible to scientists, decision makers, and the general public. Visualization methods will be leveraged from the information management system for dissemination and display used by the SCCOOS. The variables to be assessed in this Project include:

- Ocean stratification measurements (temperature and salinity);
- Ocean surface current maps both internal and external to the ASBS boundary;
- Ocean current profiles (observations at depth);
- Ocean salinity;

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- Wave height and direction, modeled surf zone currents;
- Bathymetry maps (repeated observation to document changes);
- Bottom type, grain size and substrate;
- Local meteorology to describe local precipitation and upwelling favorable winds;
- Flow rates for local estuaries and freshwater discharges (natural or otherwise) nearby the ASBS; and
- Time records of nutrients (nitrates, phosphates, silicates) within the ASBS.

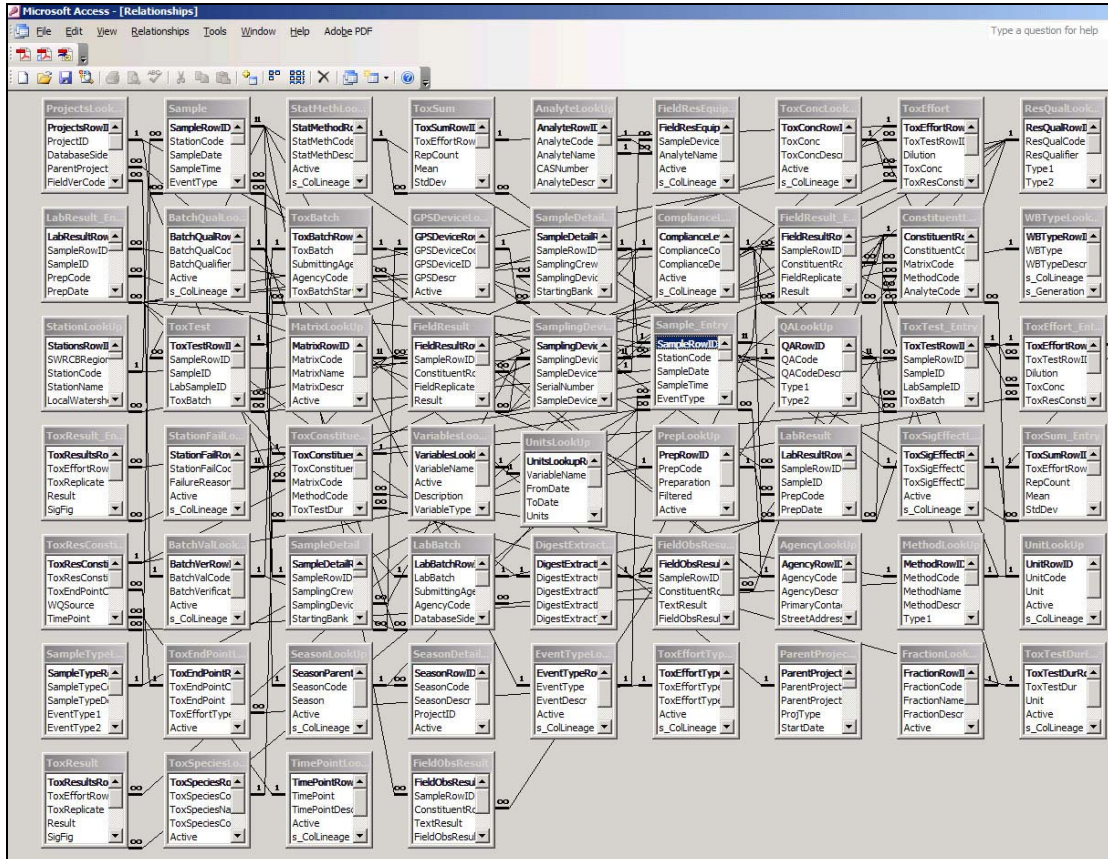


Figure 6. Complexities of the Information Management Tool Using a Microsoft Access View of the SWAMP System Relational Database.

### Project Benefits:

- Protection and enhancement of water quality and aquatic habitats, particularly those of the La Jolla State Marine Conservation Area (ASBS No. 29) and the San Diego-Scripps State Marine Conservation Area (ASBS No. 31), through improved information and project management;
- Implementation of the City’s strategic and urban runoff management plans;
- Maintain and Upgrade current SWAMP system;
- Expansion of SWAMP system to include water quality, physical condition, and ecosystem assessment data from both ASBS;
- Support web based visualization of near real-time data; and
- Improved local and regional information sharing initiatives between the City of San Diego, UCSD/SIO, and the City of Newport Beach.