CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION (SDRWQCB)

SUPPLEMENTAL ENVIRONMENTAL PROJECT APPLICATION FORM

Project Requested by City of San Diego

Name of Project **Mission Bay Contaminant Dispersion Study**

Date of Request August 9, 2001, revised September 4, 2001

Point of Contact Karen Henry

Phone (619) 525-8647 E-Mail KHenry@sandiego.gov

PROJECT SUMMARY:

Mission Bay can be managed more effectively with a better knowledge of water movement and the associated dispersion of contaminants. Not only can contaminant dispersion models provide the necessary information to reduce the area and total time that beaches are posted, but these investigations can also provide better information to manage health risks to recreational users and increase the credibility of both warnings and statements concerning beach water quality. Without an improved knowledge of water movement, it is not possible to link contamination events to a specific source. For example, bacterial monitoring data frequently shows that beach areas located in the vicinity of the mouth of Rose Creek and the Kendall-Frost wildlife preserve exceed water quality standards for bacteria. Since only single monitoring points are used to determine bacterial contamination, the exact source(s) of the contamination is unknown. This lack of knowledge hampers the design of appropriate and efficient management strategies to cleanup known contaminated beach areas. For example, without a better understanding of dispersion and its effect on the extent and concentration of specific contaminants, it is not clear whether increased circulation in Mission Bay is desirable or not.

The intent of this effort is to identify how contaminants move within the eastern portion of Mission Bay (see attached map). In addition, this proposed project is designed to provide a linkage with the Mission Bay Human Pathogenic Viruses and Epidemiology Combined Study, Mission Bay Source Identification Survey, Mission Bay Dry Weather Bacterial Source Testing Study and the Mission Bay Water Quality Study, an approved Supplemental Environmental Project. Each study will provide data to assess the impacts to Mission Bay's recreational 1 water quality designated beneficial use. Each project/study will provide specific information to assess the multiple bacterial sources that impact Mission Bay's recreational 1 water quality designated beneficial use.

The City of San Diego will closely coordinate with Joan Brackin and other Regional Water Quality Control Board (RWQCB) staff. Monthly meetings will be conducted

between the City of San Diego and the RWQCB to coordinate all aspects of these projects to ensure their data sets will be complimentary.

TOTAL LIFE CYCLE COST FOR THE PROJECT:

Project Overhead/Management	$20,000
Design/Consultation	$20,000
Construction/Implementation	$360,000
Long Term Maintenance/Oversight	$0
Total Project Cost	$400,000

The work will be contracted out. City of San Diego staff will not conduct work as services in kind on this project.

WATERSHED/WATER BODY/LOCATION FOR PROJECT (ATTACH MAPS)

Mission Bay

PROJECT PROPOSED START DATE AND TIME LINE:

City of San Diego will select a consultant from a qualified scientific team/organization to perform the study and submit a written report. Scripps Institution of Oceanography's Center for the Coastal Environment has expressed interest in conducting this study. Other local academic institutions and scientific teams will also be considered.

The preliminary study timeline is as follows:

02-01-02	Program development and coordination.
03-01-02	Prepare work plan. Initial model studies.
06-01-02	Summer season dye, drifter and tidal studies;
09-01-02	Fall season dye, drifter and tidal studies;
01-01-03	Winter season dye, drifter and tidal studies.
03-01-03	Development of contaminant dispersion model.
05-01-03	Data evaluation, report generation and stakeholder meeting.

ORGANIZATION SPONSORING PROJECT (TAX I.D. #):

City of San Diego – I.D. #95-6000776

NAME OF PROJECT MANAGER:
Ruth Kolb, Storm Water Specialist, Storm Water Pollution Prevention Program
Phone: (619) 525-8636

DESIGNATED PROJECT TRUSTEE:
City of San Diego, Ernie Anderson, Director, General Services

DESCRIPTION OF PROJECT TRUSTEE CAPABILITY OR COMMITMENTS TO ENSURE THAT THE PROJECT WILL BE COMPLETE:

General Services is a department within the City of San Diego, a municipal corporation. General Services is responsible for the oversight of the Storm Water Pollution Prevention Program organization and annual operating budget. General Services has the ability and authority to receive revenues and to disburse funds.

City of San Diego will select a consultant from a qualified scientific team/organization to perform the study and submit a written report. Scripps Institution of Oceanography's Center for the Coastal Environment has expressed interest in conducting this study. Other local academic institutions and scientific teams will also be considered.

DETAILED PROJECT INFORMATION

1. PROPOSAL DESCRIPTION

This study will develop a field-based decision support matrix that can be used to reduce the overall number of beach postings and closings, and reduce the human health risk due to contact with contaminated water. This will be achieved through the use of field data and predictive transport models that address the dispersion pathways for bacteria and other contaminants. Thus this project will effectively determine the sources of bacteria entering Mission Bay and the extent and duration of contamination under a variety of conditions. The project would entail the following steps:

1. Provide decision support data to more effectively warn recreational users of contamination (reduced beach closures; increased protection).
2. Provide improved knowledge of contaminant dispersion (transport & mixing) as a basis for evaluating appropriate remediation options (e.g., dredging or gates).
3. Determine contaminant transport routes to identify sources of contamination from a known area of impact, and to determine zones of impact from a known source of contamination (e.g., wet weather flows out of Tecolote Creek).
4. Predict impacts on water quality due to changes in climate and/or local human activity, e.g., changes in hydrology of Rose and Tecolote Creeks.

5. Provide improved expertise to effectively plan for water-borne interactions between the multiple uses of Mission Bay – recreational, economic and ecological.
6. Develop a field-based contamination dispersion model that can be effectively used as a decision-support tool for Mission Bay.
7. Integrate field studies and model results with the Mission Bay Human Pathogenic Viruses and Epidemiology Combined Study, Mission Bay Source Identification Survey, the Mission Bay Dry Weather Bacterial Source Testing Study, and the Mission Bay Water Quality Study.

The proposed project does not require discretionary permits and environmental review under the California Environmental Quality Act from the City of San Diego. Notification of dye testing will be given to RWQCB, County of San Diego Department of Environmental Health, California Department of Fish & Game, San Diego Harbor Patrol and other necessary agencies in the event of public or media inquiries.

It may be necessary to modify the scope of work and schedule for the contaminant dispersion study dependent on preliminary study results. Changes in the project design and schedule are subject to the approval of the Executive Officer of the SDRWQCB. Under no circumstances shall changes in the project design decrease the approved total project cost.

2. PROBLEM STATEMENT

In May 1999, Mission Bay was listed as a 303(d) impaired water body under the Clean Water Act for high coliform counts. A few months later in July 1999, Assembly Bill (AB) 411 monitoring of California beaches began. The AB 411Monitoring Program increased sampling frequency and expanded the constituents to include a third bacteriological indictor organism, Enterococcus. These new monitoring parameters have led to the identification of local beach and bay water contact recreational areas as chronic "hot spots" causing frequent closures in Mission Bay and along the coastline. The length of the beach posted and the time period that the beach is posted can be variable and is a "best guess" by regulators. At times it is expected that longer-than-necessary beach lengths are posted for longer-than-necessary time periods because there is no reliable description of contamination dispersion under varying tidal, wind and runoff conditions. Conversely, contamination may spread further than the posted area and allow for recreational users to be exposed to contaminated water, with a subsequent risk of illness.

3. HOW WILL THE PROJECT BENEFIT WATER QUALITY AND BENEFICIAL USES?

Mission Bay can be managed more effectively with a better knowledge of water movement and the associated dispersion of contaminants. Not only can contaminant

dispersion models provide the necessary information to reduce the area and total time that beaches are posted, but these investigations can also provide better information to manage health risks to recreational users and increase the credibility of both warnings and statements concerning beach water quality.

4. HOW WILL THE SUCCESS OF THIS PROJECT BE MEASURED?

Project success will be measured in the reduction of beach closures/postings in the areas adjacent to the comfort stations and parking lots, moored boats and the existing storm drains. This project is a top priority on the City's work plan that was developed to support the Mayor's goal of 50% reduction of beach posting and closure days by 2004.

5. DETAILED WORK PLAN

Please include a detailed supplemental report of the proposal/project that includes the following:

It may be necessary to modify the scope of work and schedule for the contaminant dispersion study dependent based upon preliminary study results. Changes in the project design and schedule are subject to the approval of the Executive Officer of the SDRWQCB. Under no circumstances shall changes in the project design decrease the approved total project cost.

a. Scope of Work (work to be performed)

The following is an outline of tasks that are anticipated to be performed:

Work Plan
Consultant will prepare a work plan identifying protocols, procedures, tasks, time schedule and job titles for each task of the study.

Computer modeling.
A model of water circulation will be constructed. The high resolution of time and space in this model will allow for superior replication of the small-scale mixing processes that are not effectively modeled in scale physical models. It is expected the TRIM2D model will be utilized. This is a depth-averaged tidal model that has already been successfully applied to San Diego Bay. This model can then be used as the basis for a mass balance model of bacteria or virus concentrations in the bay. Further, the model can be used to backtrack contamination data from shoreline monitoring to identify the location/source where the contamination entered the bay.

Bathymetric survey.

The exact depths of channels and intertidal areas will be surveyed as needed. A successful implementation of the model depends on accurate bathymetry data.

Model validation/calibration.
High-resolution and seasonal field data on currents, water level, water temperature and salinity will be used to validate the computer model, ensuring that the model is effectively and accurately representing the circulation and mixing processes as presently active in the bay. Acoustic Doppler current profilers, pressure gages, and conductivity-temperature recorders will be moored at critical locations in Mission Bay.

Field observations of dispersion.
Under a variety of conditions (tide, weather, season, river flow, ocean conditions) dye will be released from know sources of contaminated runoff to Mission Bay, e.g., Tecolote Creek. The dispersion of dye will be monitored with fluorometers thus allowing a detailed description of dispersion under those conditions. Repeat studies will be aggregated into an empirical and statistical characterization of dispersion patterns from major contamination sources. Dye dispersion will be further quantified through simultaneous deployment of GPS-tracked drogues. The computer model will be considered successful only once it can reasonably replicate these field observations.

Distribution patterns.
Baywide patterns of temperature and salinity distribution will be mapped out under a variety of conditions. These patterns provide integrated representations of bay-wide dispersion and bay-ocean exchange.

Scenario sketching – zones of impact.
Field observations (e.g., dye dispersion studies) and model output will be used to explore specific scenarios and to determine statistically significant zones of impact – the spatial extent and temporal duration of contamination under specific conditions. These zones of impact can then be used to guide beach closure/posting decisions, planning decisions, source abatement actions, and spill response.

Data and model visualization.
State-of-the-art visualization capabilities will allow for effective display of both quantitative and qualitative data via web protocols. Effective visualization provides invaluable assistance in making qualitative judgments underlying management decisions for the bay. The dispersion of high-concentration plumes will be well represented in model output, as is shown in examples on the San Diego Bay web-site.

Interactive database.
A data server will provide a repository for raw data as well as graphic output and copies of publications relating to Mission Bay dispersion. These data will be available to project staff, the City, and the public at large.

Report
Consultant will submit a written report to the City of San Diego.

Workshops.
Inclusive science workshops will be held at the beginning and end of this project – in the beginning to review Mission Bay data and existing research activities, and at the end to link project results to management strategies for cleanup and abatement of bacterial contamination.

b. Budget

Project Overhead/Management	$15,000
Design/Consultation	$20,000
Construction/Implementation	$365,000
Long Term Maintenance/Oversight	$0
Total Project Cost	$400,000

The work will be contracted out. City of San Diego staff will not conduct work as services in kind on this project.

c. Task descriptions

Design/Consultation: The Consultant will prepare the work plan identifying the study's protocols, procedures, tasks and time schedule.

Construction/Implementation: This study will require seasonal measurement of water movements and dye dispersion in the eastern portion of Mission Bay to determine contaminant dispersion flow patterns. The dye testing will occur during the summer of 2002, fall 2002 and the winter of 2002/2003.

d. Methods and materials
- Computer modeling
- Bathymetric survey (as needed)
- Model validation/calibration
- Seasonally dye testing of the eastern portion of Mission Bay
- Current, water level, water temperature and salinity measurements
- Zones of impact for various scenarios
- Data and model visualization

e. Resource needs
- Flourometers
- GPS-tracked drogues
- Dye
- Boat
- Buoys

- Acoustic Doppler current profilers
- Pressure gages
- Conductivity temperature recorders
- Supercomputer to run modeling program
- Website data server

f. Regulatory needs

This project does not require discretionary permits and environmental review under the California Environmental Quality Act from the City of San Diego. There will be coordination with other agencies regarding the seasonal dye testing of Mission Bay.

g. Schedule

02-01-02	Program development and coordination.
03-01-02	Prepare work plan. Initial model studies.
06-01-02	Summer season dye, drifter and tidal studies;
09-01-02	Fall season dye, drifter and tidal studies;
01-01-03	Winter season dye, drifter and tidal studies.
03-01-03	Development of contaminant dispersion model.
05-01-03	Contaminant Dispersion Study presented at a public meeting Submission of a written report

h. Work products and documents to be retained for records

As part of the project, the work plan for the Contaminant Dispersion Study will be prepared to guide the dye testing protocols and procedures. All documentation and computations will be maintained by the City of San Diego.

i. Other information about the proposed project that may be of interest to the SDRWQCB

Mission Bay is the receiving water for all Tecolote Creek discharges. Effluent from the creek during the February spill was released into Mission Bay and caused the beaches near the mouth of Tecolote Creek to be posted.

I certify that the information provided in this application is an accurate and complete report of the costs, scope of work and expectations of this proposed project I am submitting to the SDRWQCB.

K L Henry
SIGNATURE

9/4/01
Date

Mission Bay Contaminant Dispersion Study Area

Study Area

S:\Correspondence\Ruth\SEP maps\MB Study Area