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# Discharges into state water quality protection areas in southern California

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**ABSTRACT** - Thirty-four areas on the coast of California are classified as State Water Quality Protection Areas (SWQPAs), where discharges of waste are prohibited. Fourteen of these SWQPAs are located in southern California. This study was the first to survey the types and numbers of discharges into each of these areas. Surveys conducted by foot or boat between March 2001 and February 2003 recorded the location, the width of the discharge, and the source of the discharge. Discharges were classified as anthropogenic discharges or outlets (natural gullies, perennial streams, and ephemeral streams). Anthropogenic discharges were classified as: (1) wastewater point sources, (2) municipal/industrial storm water point sources, (3) small storm drain point sources, and (4) nonpoint sources. Almost 1,200 discharges were identified, the majority of them anthropogenic discharges consisting of small storm drains. The source of many of the discharges was not one single large entity or group but developers and local homeowners in highly populated areas, attempting to drain their properties. The findings of this study indicate the need to assess existing monitoring data on water quality and benthic communities to identify and resolve problem discharges.

## INTRODUCTION

In the mid-1970s, 34 areas on the coast of California were designated as areas of special biological significance (ASBS), requiring protection by the State Water Resources Control Board (SWRCB). Fourteen of these ASBS are located in the Southern California Bight. According to the 2001 California Ocean Plan (SWRCB 2001), wastes cannot be discharged into ASBS, and discharges must be located outside the area of influence of ASBS to ensure

maintenance of natural water quality conditions. ASBS have now been classified as SWQPAs in the California Public Resources Code (2001).

Despite the designation of SWOPAs as a protected resource, little is known about the presence and types of discharges that occur in these areas. In southern California, the SWRCB has previously (prior to the completion of this survey) allowed two discharges into these areas under Ocean Plan exceptions: treated wastewater discharges into the San Clemente Island SWQPA, and a desalination brine discharge into the San Nicolas Island SWQPA<sup>2</sup>. However, (prior to this survey) no substantial information existed regarding other point and nonpoint sources that may be found in these areas.

Here, we present a survey that documents the numbers and types of discharges into each of the 14 southern California SWQPAs. This is the first survey of these SWQPAs to identify which sources are potentially contributing inputs into these areas.

## METHODS

The 14 SWQPAs were surveyed by foot or boat between March 2001 and February 2003 (Figure 1). All discharges within approximately 100 m of the high tide line were documented. The position of each discharge was recorded at the downstream end using a Leica® GS50 backpack global positioning system (GPS) or a Magellan® Color Trak handheld GPS. Discharge width was measured, or estimated when direct access was not possible.

An anthropogenic discharge was defined as an anthropogenic source or the location of a discernable volume of water that flows or is released directly into or immediately adjacent to the marine environ-

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<sup>2</sup>Subsequent to this survey the Scripps Institution of Oceanography applied for and received an exception for its discharges from the SWRCB (Resolution 2004-0052, July 2004).

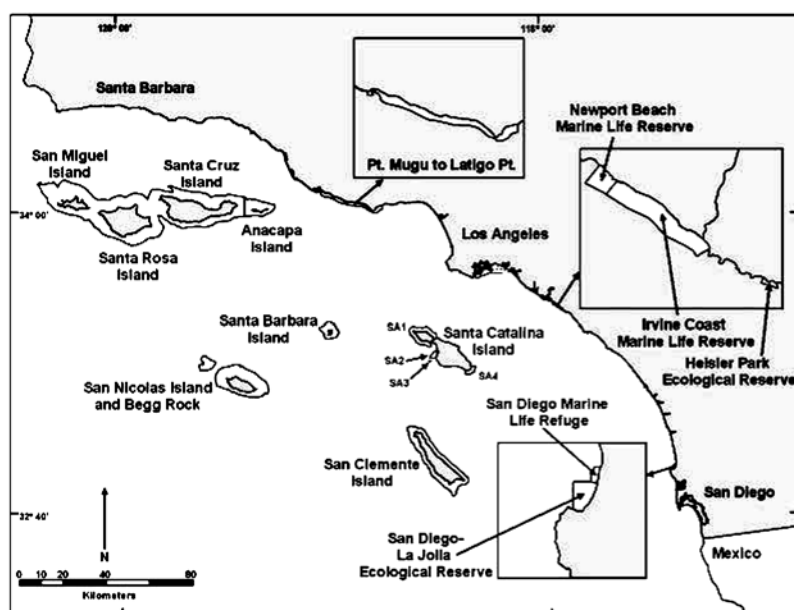


Figure 1. Map of the SWQPAs in southern California (SA = Subarea).

ment of a SWQPA. Anthropogenic discharges were classified into the following categories: (1) wastewater point sources, (2) municipal/industrial storm water point sources (serving multiple properties and likely operated/maintained by a municipality or other government entity), (3) small storm drain point sources (primarily serving individual residential or commercial properties (or small clusters of those properties)), and (4) nonpoint sources (piers; vessel mooring fields; sheet flow from parking lots, roads, stairways, and ramps; wastewater leach fields; anthropogenic erosion/gully formation; military ordnance testing; and rock quarries). An outlet was defined as any naturally occurring water body that drains into or immediately adjacent to a SWQPA and includes perennial streams (or their estuaries), ephemeral streams, and naturally occurring gullies in coastal bluffs and cliffs.

After post-processing and checking the data for quality assurance, the data were mapped in ArcView® 3.2a. The ArcView® output, along with its accompanying documentation, is available from the authors (SCCWRP 2003).

## RESULTS

Of the 1,172 discharges in the southern California SWQPAs, over two-thirds are anthropogenic discharges (Table 1). The largest SWQPA, Mugu Lagoon to Latigo Point (approximately 22.5 miles long), contained the most discharges (441).

The Santa Barbara and Anacapa Islands SWQPA had only four discharges and Farnsworth Bank had none, since it was completely submerged with no coastline.

Anthropogenic discharges consisted of small storm drains, which drain individual or small clusters of residential or commercial properties; municipal/industrial storm drains; non-point sources, which were primarily sheet flow runoff (e.g., down stairs, ramps, piers, etc.), and point sources. Anthropogenic discharges were more common on the mainland in highly populated areas. These discharges ranged in size from 0.03 m to 30.00 m, with a mean size of two-thirds of a meter.

Outlets were less numerous and consisted of gullies and streams. The majority of outlets were located in the eight island SWQPAs. Outlets varied greatly in size from 0.3 m to 100.0 m, with a mean of 4.3 m.

## DISCUSSION

This first study of SWQPAs in southern California identified a large number of discharge structures in areas that were supposed to have none. However, this large number could be an overestimate, and may well reflect the problem of defining what constituted a discharge. Identifying obvious discharges, such as pipes and cement culverts, was straightforward; but identifying other conveyances that typically do not have flows associated with them, such as stairs and pathways, was more problematic. Some of these discharge sources only enhance runoff a little but are not large collection devices. Since the goal of this study was to determine the types and numbers of discharges into these areas, all conveyances that would lead to discharges into these areas were included.

While our inclusion of all structures that discharge into SWQPAs may lead to an overestimate of discharges, other study design elements may lead to an underestimate of discharges into these areas. First, most surveying was completed during periods of little or no rain. Some discharges are covered with sand or vegetation and are not visible unless they are flowing. Few drainages were flowing at the time the

**Table 1. Summary of source categories for each SWQPA.**

SWQPA Name	Source Types						Total
	Anthropogenic Discharges				Outlets		
	Small Storm Drain Point Sources	*Mun./Ind. Storm Water Point Sources	Nonpoint Sources	Wastewater Point Sources	Natural Gullies	Perennial/Ephemeral Streams	
1. San Miguel, Santa Rosa, and Santa Cruz Islands	-	-	-	-	135	-	135
2. Santa Barbara Island, Santa Barbara County and Anacapa Island	-	-	4	-	-	-	4
3. Mugu Lagoon to Latigo Point	283	106	21	-	13	18	441
4. San Nicolas and Begg Rock	-	10	1	1	31	4	47
5. Santa Catalina Island - Subarea One: Isthmus Cove to Catalina Head	18	-	20	1	17	-	56
6. Santa Catalina Island - Subarea Two: North End of Little Harbor to Ben Weston Point	-	-	3	-	5	-	8
7. Santa Catalina Island - Subarea Three: Farsworth Bank Ecological Reserve	-	-	-	-	-	-	0
8. Santa Catalina Island - Subarea Four: Binnacle Rock to Jewfish Point	-	1	1	-	3	-	5
9. Newport Beach Marine Life Reserve	7	3	8	-	1	2	21
10. Irvine Coast Marine Life Reserve	-	9	7	-	13	3	32
11. Heisler Park Ecological Reserve	5	5	4	-	1	-	15
12. San Clemente Island	-	16	5	2	97	3	123
13. San Diego Marine Life Refuge	70	15	2	5	-	-	92
14. San Diego-La Jolla Ecological Reserve	175	5	4	-	9	-	193
Total:	558	170	80	9	325	30	1,172

\*Mun. = Municipal/Ind. = Industrial

survey was conducted and most of these were streams or pipes draining residential areas. Second, we were only surveying discharges within 100 m upstream of the high tide line, which excludes other discharges that may be contributing from further inland. Finally, many private homes were located within the survey area, which required us to survey from distance to avoid trespassing.

The largest number of discharge conveyances were small storm drains. A single large entity was not identified as being directly responsible for these discharges. Instead, these small storm drains were installed mostly by developers or homeowners to drain individual properties. These smaller drains are primarily located in mainland SWQPAs, where population size has grown in the surrounding areas since the inception of these ASBS/SWQPAs.

Although waste discharges via the identified conveyances are illegal, the large numbers of discharge structures identified may present a regulatory problem because it may be unrealistic to demand complete removal of paved pathways or flood con-

trol structures from heavily developed areas. Further study of existing conditions is recommended. According to the Ocean Plan, SWQPA are a beneficial use that, along with other related beneficial uses (e.g., rare and endangered species, marine habitat, fish migration and spawning, etc.), must be protected. Natural water quality in the SWQPA must be maintained in order to protect these beneficial uses. While identifying actual and potential sources of waste discharge, this study does not answer the questions: (1) Is natural water quality being maintained? and (2) Are beneficial uses being protected? Therefore, we recommend a study to determine whether discharges impacting water quality and beneficial uses in the SWQPAs, and if they are, the extent of the impact as well. An assessment of existing monitoring data on water quality and benthic communities would be valuable in determining the general status of water quality in SWQPAs and in identifying any specific problem discharges that need to be addressed promptly.

## **LITERATURE CITED**

California Public Resources Code (Section 36600 et seq.), as amended by the Marine Managed Areas Improvement Act of 2000, effective January 1, 2001.

SCCWRP (Southern California Coastal Water Research Project). 2003. Final Report: Discharges into State Water Quality Protection Areas. Prepared for State Water Resources Control Board. Sacramento, CA. Contract 01-187-250. Southern California Coastal Water Research Project. Westminster, CA.

SWQRCB (State Water Resources Control Board). 2001. California Ocean Plan. State Water Resources Control Board, Sacramento, CA.

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