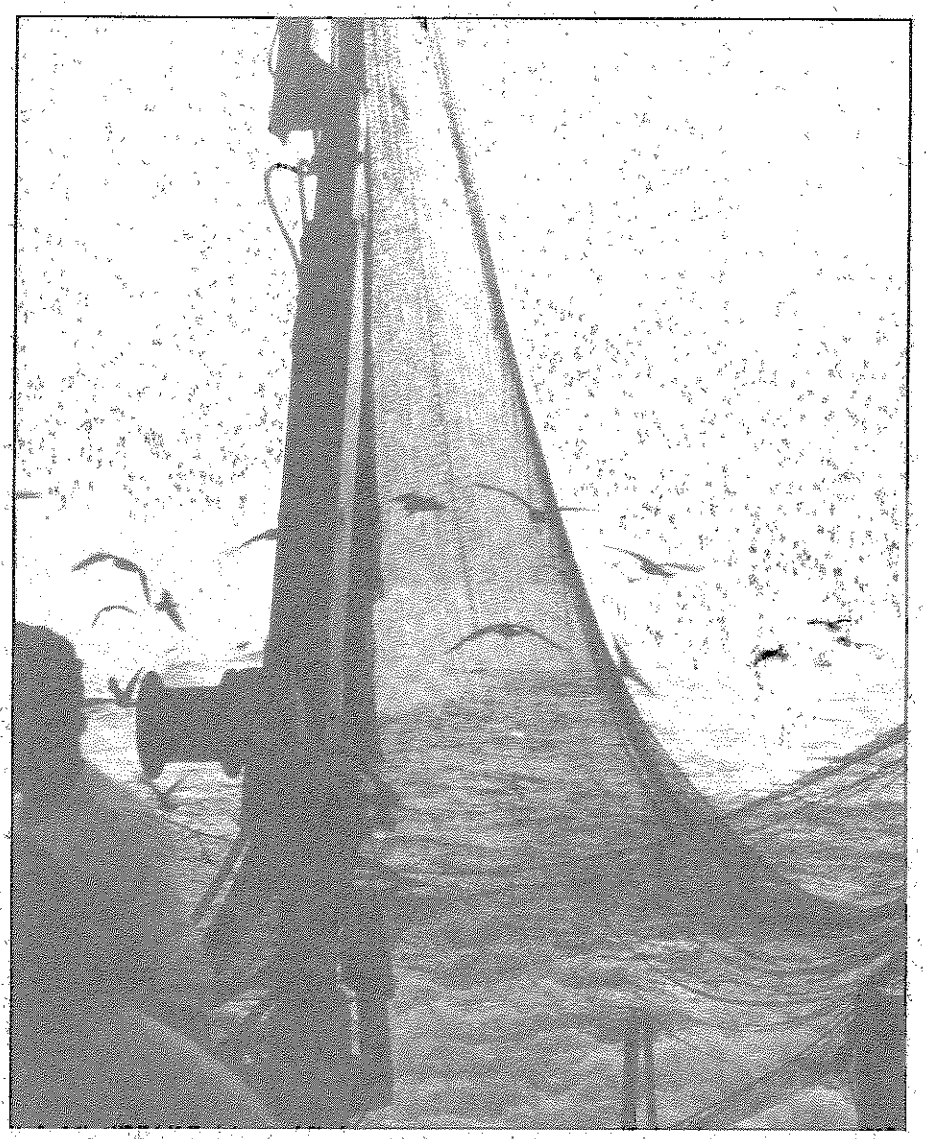
An Assessment of Monitoring in Santa Monica Bay

Santa Monica Bay has been monitored since the early part of this century. Initially, monitoring dealt primarily with fisheries and human bacterial contamination. However, as the population in Los Angeles grew, sewage discharge into the Bay increased and so did the need for better ways to assess the effects.

Historically, discharge monitoring programs have reflected regulatory requirements for compliance. Most existing programs focus on individual permitted discharges or activities. At present, 15 agencies (Table 1) conduct approximately 35 different monitoring programs (Figure 1) at a total annual cost of over $3,000,000.

Some of these programs have provided an enormous amount of information about the effects of point-source discharges. Recently, attention has shifted to a broader view: point source impacts should be assessed in relation to each other and for the region as a whole; non-point sources have become more important. This awareness is due, in large part, to experience gained over the last 20 years, and the recognition that population growth will continue to stress regional resources.



Trawling is conducted to monitor changes in Santa Monica Bay.

The increasing concern for region-wide effects prompted review of existing monitoring systems and addressed whether they can provide regional information. Studies of the monitoring program in Santa Monica Bay (SCAG 1988) and southern California (NRC 1990a,b) determined that present monitoring systems are not adequate for a region-wide program, but could be adapted to meet those needs.

The Santa Monica Bay Restoration Project (SMBRP) was created in 1989 to develop a conservation and management plan to protect and enhance water quality in Santa Monica Bay. To achieve this goal, the SMBRP set out to design a coordinated marine monitoring program.

Recently, SCCWRP and EcoAnalysis Inc. of Ojai, California, evaluated monitoring programs and data management needs for Santa Monica Bay in a

series of four tasks. Detailed information is contained in the final report to SMBRP (Thompson *et al.* 1991).

Tasks

Task 1: Assess Current Monitoring Programs

Reports by the Southern California Association of Governments (SCAG 1988) and National Research Council (NRC 1990a,b) identified four public and management concerns:

- Is it safe to swim in the ocean?
- Is it safe to eat local seafood?
- Are fisheries and other living resources being adequately protected?
- Is the health of the ecosystem being safeguarded?

These reports emphasize three significant problems that have not been addressed: 1) monitoring programs in the Bay are not coordinated or integrated, 2) monitoring programs do not include all areas of concern, and 3) a coordinated data and information management system does not exist.

Task 2: Develop "Straw Man" Monitoring Objectives

SCCWRP and EcoAnalysis formulated preliminary, or "straw man," objectives for Levels I and II in Task 3. Four levels of monitoring objectives were developed that ranged from broad public concerns to specific scientific and technical issues. Each successive level of detail incorporated the contents of the preceding higher levels (Table 2).

Table 1.
Organizations currently monitoring in Santa Monica Bay and sources of contamination or resources they monitor (SCAG 1988).

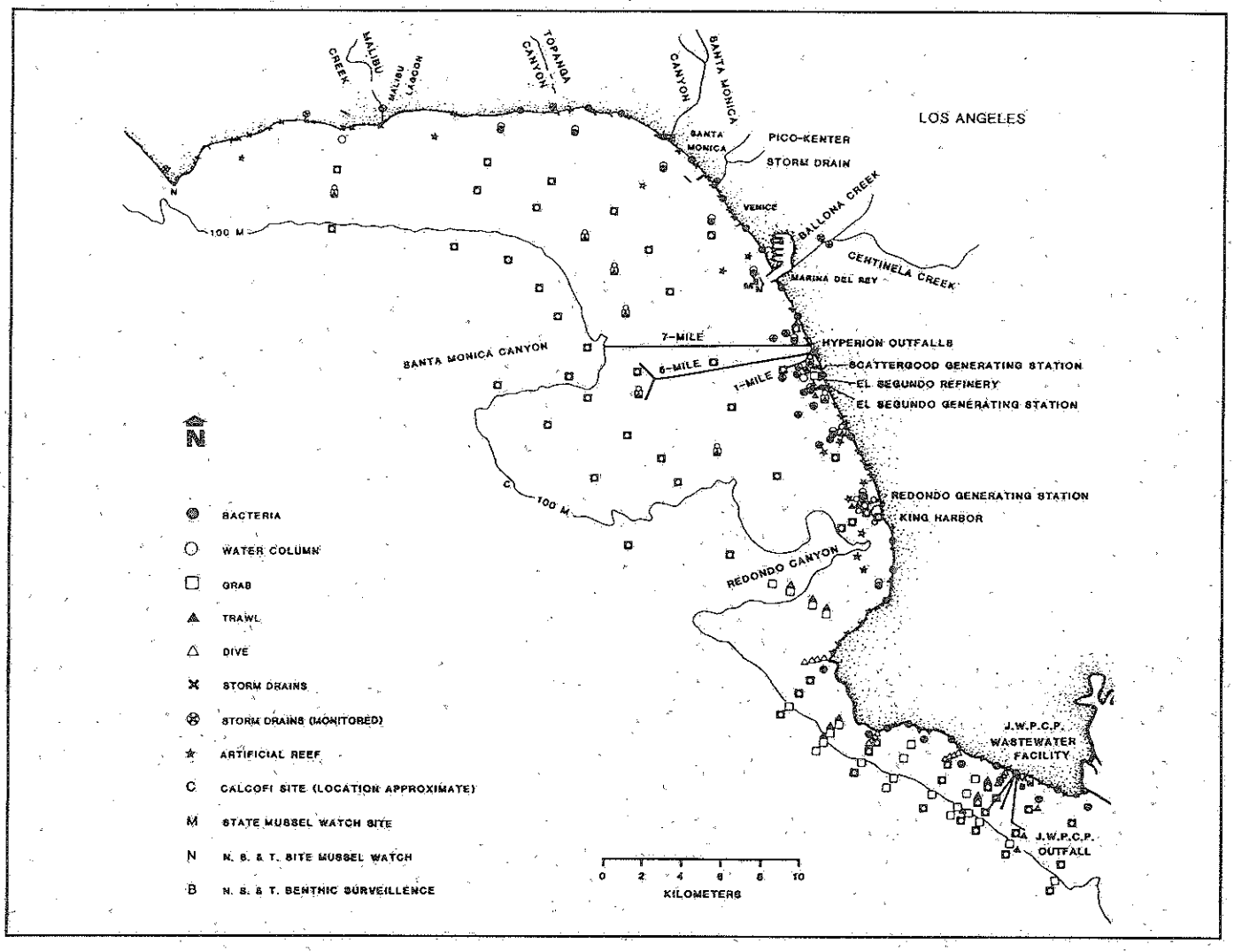
MONITORING ORGANIZATION	SOURCES/RESOURCES MONITORED
National Marine Fisheries Service	Pelagic fish populations and trends
National Oceanographic and Atmospheric Administration	Benthic and shellfish effects regardless of source
U.S. Food and Drug Administration	Seafood contamination, regardless of source
California Department of Fish and Game	Fish populations and trends
County Sanitation Districts of Los Angeles County	Joint Water Pollution Control Plant/municipal wastewater
Los Angeles County Department of Public Works	Runoff in storm drains, rivers, and creeks
Los Angeles County Agricultural Commission	Runoff in storm drains, rivers, and creeks
Los Angeles County Department of Health Services	Pathogens in runoff and sewage
Los Angeles County Department of Beaches and Harbors	Marinas and runoff
Los Angeles County West Mosquito Abatement District	Runoff in storm drains, rivers, and creeks
City of Los Angeles Bureau of Sanitation	Hyperion/municipal wastewater
City of Los Angeles Department of Water and Power	Scattergood Electrical Generating Station
City of Santa Monica	Pico-Kenter storm drain
Southern California Edison	El Segundo, Redondo Electrical Generating Stations
Chevron U.S.A.	Chevron outfall
Sources of contamination that are not monitored	Aerial fallout, advection from other areas, dredge spoils

Task 3: Pulse of the Bay Workshop

The workshop, held in September 1990, was attended by managers from discharge, regulatory, and legislative agencies familiar with the local monitoring programs. The workshop developed monitoring system principles, priorities, and Level I and II management and scientific objectives.

A region-wide monitoring

Figure 1.
Sampling locations and activities of current monitoring programs in Santa Monica Bay.



program could be developed according to the following principles:

- Monitoring should be based on clear management and scientific objectives.
- Monitoring should include evaluation of long-term trends.
- Monitoring should use standard methodology for all programs.

Priorities for marine resource monitoring were wetlands, kelp beds, public health issues, plankton, and benthos (Figure 2).

The management and scientific monitoring objectives devised by workshop participants are proposed as Santa Monica Bay monitoring program objectives. Objectives for swimming, seafood consumption, and living resources were formulated by the workshop participants. Ecosystem monitoring objectives were more difficult to devise due to a lack of technical knowledge about ecosystem structure and function.

Task 4: Evaluate Data Management Systems

Existing data management systems will not meet the needs of coordinated regional monitoring. In order to address Bay-wide issues, existing monitoring programs will need to transfer data among agencies and combine data from various sources. Such an endeavor is possible, but it would be cost-prohibitive.

Three alternatives for a Santa Monica Bay data and information

Table 2.
Framework for development of monitoring guidance. The Pulse of the Bay Workshop focused on Levels I and II. Levels III and IV will be defined during upcoming technical workshops. Level I concerns are drawn from the Southern California Bight study (NRC 1990a) and from the State of the Bay report (SCAG 1988).

1.	2.	3.	4.		
Is it safe to swim in the ocean?	Is it safe to eat the local seafood?	Are fisheries & other living resources adequately protected?	Is health of the ecosystem being safeguarded?	Public/ Management Concerns	LEVEL I
What resources should be protected?				Management/ Scientific Objectives	LEVEL II
What management goals and monitoring strategies should be used?					
What systems/processes should be monitored?					
What kinds and amounts of change should be monitored for?				Measurement Goals	LEVEL III
What parameters should be monitored? How and when should they be monitored?				Technical Plans and Methods	LEVEL IV

management system have been evaluated. The first is a decentralized system that builds on the existing situation by adding a centralized descriptive data index along with common standards for quality control and data transfer. The second is a new, centralized system that contains monitoring data from all Bay programs and is the authoritative data source. The third is the existing Ocean Data Evaluation System (ODES), maintained by the United States Environmental Protection Agency, which presently contains few data from the Bay.

The first option is recommended for two reasons. Startup and maintenance costs are significantly lower than for the remaining options. Control of the data would remain with local users who access it most often and know the most about it. Implementing this option would involve gathering information about the content and location of relevant data and preparation of thorough documentation. Specific quality control standards and exchange formats would be developed to facilitate data transfer and use.

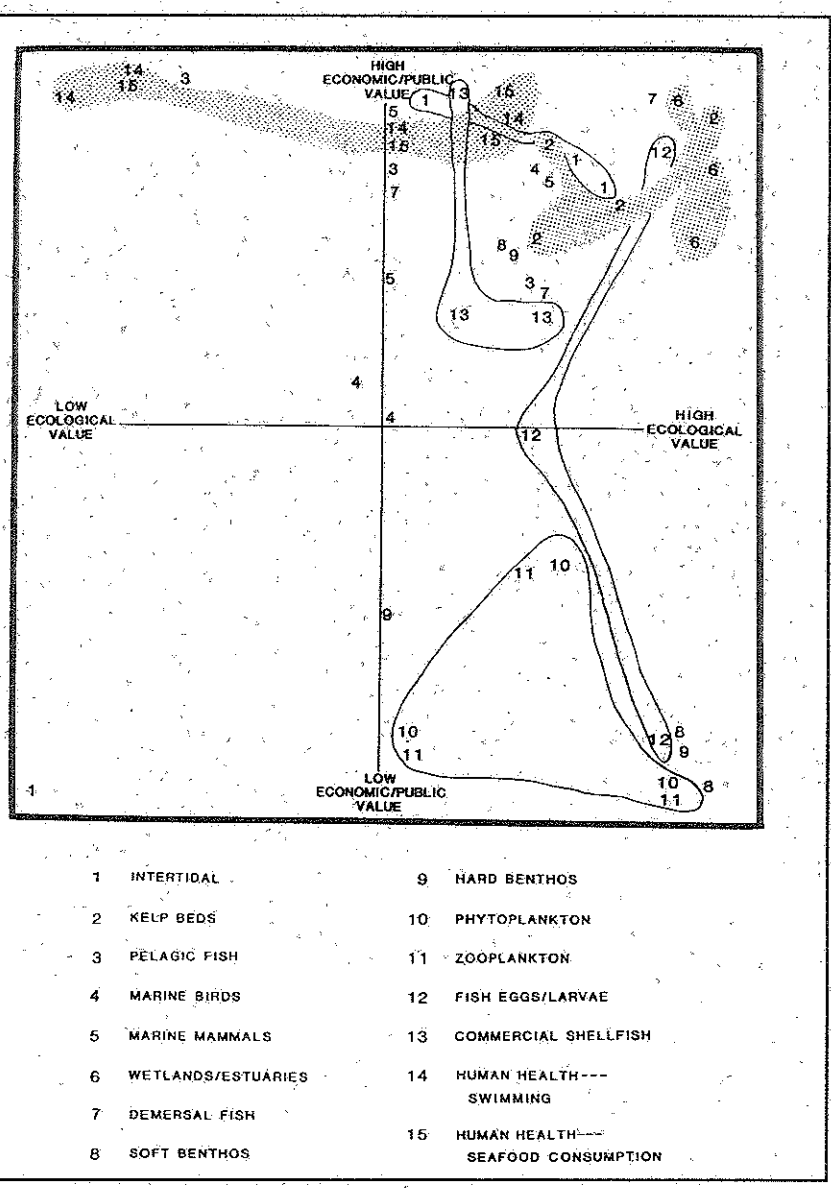
Conclusions

The determination of monitoring objectives, principles, and priorities, and the options for a data management information system, represent a step forward in monitoring program design. Creation of a coordinated, Bay-wide monitoring program can

proceed based on the results of the Pulse of the Bay Workshop. However, an improved monitoring program will need to address the compliance mandates of existing programs.

The next step will be to develop Level III and IV monitoring objectives (Table 2). Once these objectives are approved, local, state, and federal agencies can determine how to implement the program. Through the cooperation of the SMBRP and the various agencies involved in Bay monitoring programs, it should be possible to develop a demonstration monitoring program that is more comprehensive, coordinated, and efficient than present monitoring programs. ■

Figure 2.
Prioritization of living resources and ecosystem components for monitoring. Workshop groups ranked each component by placing it within the space. Positions of similar numbers are shaded or outlined for some of the most important components.



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