

**REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

**EXECUTIVE OFFICER SUMMARY REPORT
JUNE 20, 2018**

ITEM 7

SUBJECT

Informational Item - Have Robot, Will Travel: Applications for Next Generation Monitoring and Remediation. (*Sarah Mearon*)

STAFF RECOMMENDATION

This is an informational item only. The Board will not take an action.

KEY ISSUES

1. Next generation technologies enhance our ability to efficiently identify, prevent, reduce, treat, and avoid pollution. These technologies enhance the San Diego Water Board's overall mission of restoring and protecting water quality and beneficial uses within the San Diego Region.
2. Remotely operated technologies such as robots can be used to monitor compliance, collect water quality and other environmental data, perform enforcement inspections, and remediate water pollution such as ocean trash.

PRACTICAL VISION

This item is consistent with the mission of the Monitoring and Assessment chapter of the Practical Vision, which calls for accurate and efficient monitoring and assessment programs that assess the status and trends of conditions in San Diego Region waters and identify sources of impairment.

DISCUSSION

Ocean Plastics Pollution Remediation

Plastic pollution is a scourge on the environment that threatens the health of water bodies, ecosystems, fish and wildlife, and humans. Most of the trash found in marine environments originates on land, and the majority of pollution found in watersheds is composed of plastic materials. Within the San Diego region, a recently completed trash study¹ found that plastic debris is present in 88 percent of intertidal zones around San Diego Bay, with most of the plastic debris deposited in mudflats and salt marsh habitats. Further offshore, the Great Pacific Garbage Patch is estimated to span over 600,000 square miles, which is over three times the size of California.

Clear Blue Sea, a local startup, is looking to address the massive issue of ocean plastics pollution using next generation technology. With FRED (Floating Robot for Eliminating Debris), its prototype floating robot powered by renewable energy, Clear Blue Sea has designed unmanned catamaran-based vessels that can be deployed on the open sea to collect plastic debris by the ton. FRED uses a conveyor belt collection system to retrieve debris of different sizes, which is then transported to freighters for delivery to ports for sustainable disposition. The company is also developing technology capable of collecting microplastics down to 10 millimeters in size. As was shown in the San Diego Bay trash study, the impacts of microplastics on nearshore areas are also becoming a major challenge.

¹ San Diego Bay Debris Study: Special Study – Plastic Debris Monitoring Report. Available at https://www.waterboards.ca.gov/sandiego/water_issues/programs/swamp/docs/Final_SD_Bay_Debris_Study_Oct2016.pdf

Ocean Outfall Plume Mapping

Ocean outfall plume mapping is commonly required of operators of Publicly Operated Treatment Works (POTWs) as part of their discharge monitoring to assess environmental impacts from discharges and compliance with regulatory standards. Accurately mapping ocean outfall plumes is a challenge because of highly variable ocean conditions. Traditional tracking methods typically use tracers deployed from boats, which are then monitored by collecting water samples at a limited number of stations. This method often results in patchy, incomplete data regarding the plume location.

Emergent technology in the field of oceanographic instrumentation is enhancing survey methods for detecting and mapping ocean outfall plumes. Scripps Institution of Oceanography has recently conducted monitoring missions to map and characterize the Point Loma Ocean Outfall wastewater plume using an Autonomous Underwater Vehicle (AUV). Use of the highly mobile AUV, outfitted with various sensors, was shown to be more effective for mapping ocean outfall plumes due to increased spatial resolution, adaptive sampling options, reduced signal interference effects, and low operational costs. This has made the AUV an appealing alternative when compared to traditional outfall plume monitoring techniques.

SIGNIFICANT CHANGES

Not applicable.

COMPLIANCE RECORD

Not applicable.

PUBLIC NOTICE

An announcement for the item was posted on the San Diego Water Board's website and sent to subscribers to the email list for Board meetings on May 29, 2018. The agenda notice for today's meeting was posted on the San Diego Water Board's website and sent to subscribers to the email list for Board meetings.

SUPPORTING DOCUMENTS

None.