Executive Summary from

FINAL
2015 SHELTER ISLAND YACHT BASIN
DISSOLVED COPPER TOTAL MAXIMUM DAILY LOAD
MONITORING AND PROGRESS REPORT

Submitted to:
California Regional Water Quality Control Board
San Diego Region

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.
9210 Sky Park Court, Suite 200
San Diego, California 92123

Prepared for:

Port of San Diego

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Amec Foster Wheeler Project No. 1415100618

EXECUTIVE SUMMARY

This report is the annual Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) Monitoring and Progress Report for 2015, which has been prepared in compliance with Investigative Order No. R9-2011-0036 (Investigative Order), issued by the San Diego Regional Water Quality Control Board (Regional Board) to the San Diego Unified Port District (Port) on March 11, 2011. The Investigative Order states that TMDL implementation progress is to be determined by (1) tracking data on the number of vessel hulls with paint converted from copper-based antifoulant paints (AFPs) to alternative AFPs, and (2) monitoring dissolved copper concentrations and toxicity in the water column. Passive leaching of copper from vessel hull paints has been identified as the major source of dissolved copper in SIYB; it composes 93 percent of the total load, according to the TMDL that the Regional Board incorporated into the *Water Quality Control Plan for the San Diego Basin—Region 9* (Basin Plan) in 2005 under Resolution Number R9-2005-0019. The dissolved copper load attributed to in-water hull cleaning was identified as second highest source in SIYB (5 percent).

In 2012, the first TMDL interim compliance target, a 10 percent load reduction was achieved. The 2015 monitoring period marks the third year in the second TMDL interim compliance period, requiring a 40 percent load reduction by the end of 2017. There is no new compliance target for 2015 if the 10 percent load reduction is met and progress continues toward the next interim target. Per the requirements of the Investigative Order, the *SIYB TMDL Monitoring Plan* (Amec Foster Wheeler, 2016a) describes the monitoring program that is used to track the progress of implementing the SIYB Dissolved Copper TMDL and achieving the required dissolved copper load reductions.

This 2015 Monitoring and Progress Report follows the approach detailed in the most recent Monitoring Plan and reports on best management practice (BMP) implementation in SIYB and San Diego Bay, vessel conversions, and water quality monitoring, as required by the Investigative Order.

Best Management Practice Implementation

The Port and the Shelter Island Master Leaseholders TMDL Group have been implementing a variety of BMPs to reduce dissolved copper loading and improve water quality in SIYB. During 2015, several BMP activities were implemented. Many of the 2015 initiatives focused on continuing efforts to encourage use of low leach copper paints and non-copper alternatives. Highlights include the following:

- The Port undertook several actions that support AB 425[1], including co-signing, with the Regional Board, a letter to the Department of Pesticide Regulation (DPR) requesting the department expedite paint reformulation efforts and provide to the public a list of paints that meet the low leach category (i.e., DPR Category I) conditions. The Port also developed a SIYB Hull Paint Guidance List to better align vessel tracking with DPR leach rate categories and created a brochure, *Boater's Guide to Using Hull Paint in California*, which highlighted the DPR's leach rate categories and identified environmentally friendly hull paint alternatives.

[1] Assembly Bill (AB) 425 (Atkins). Pesticides: copper-based antifouling paint: leach rate determination: mitigation measure recommendations. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB425

- The Port achieved a major milestone by completing the SIYB Hull Paint Conversion Project. This five-year project, funded by the State Water Resources Control Board (SWRCB) Clean Water Act Section 319(h) Non-Point Source Program, developed several successful outreach tools and converted 41 boats to non-copper paints, resulting in a 38.51-kilogram per year (kg/yr) dissolved copper load reduction.
- The Port communicated regularly with state and federal agencies, policy makers, and legislators to promote consistency in requirements being developed across the state. Partaking in the Inter-Agency Coordinating Committee and hosting a TMDL Roundtable meeting of State of California and Regional Board staff provided valuable opportunities for networking to discuss strategies for implementation of activities and lessons learned and to build upon successful activity models. Participating in workshops and conferences provided an opportunity to talk to other municipalities and State and Regional Board staff about ongoing copper reduction efforts.
- The Port continued to implement in-water hull-cleaning regulations, including requiring permits for all hull-cleaning businesses, requiring marinas to check divers as they enter facilities, and conducting inspections for cleaning-related activities.
- The Port and Shelter Island Master Leaseholders continued joint collaboration with the regulators in the conduct of the monitoring program as well as preparation of this Monitoring and Progress Report.
- The Shelter Island Master Leaseholders continued efforts to reduce copper loading by giving wait-list priority for slips at marinas and yacht clubs for vessels with hulls that have non-copper paint, providing areas for dry storage of sail boats and using high capacity hoists to transfer vessels onto land, and encouraging the use of slip liners and in-water lift systems.
- The Shelter Island Master Leaseholders also encouraged the use of non-copper and lower copper alternatives by holding regular meetings and providing outreach to boaters to help facilitate hull paint transitions to non-copper, DPR Category I (low leach), and low-copper products.

Vessel Conversions and Reduction of Dissolved Copper

A significant event in 2015 was the DPR's release of a memorandum that identified copper hull paints by leach rate category. This memorandum was an essential first step in identifying the types of lower leach paints (i.e., DPR Category I) that will play a vital role in continued dissolved copper load reductions in SIYB and corresponding water quality improvements.

Annual dissolved copper loading reduction was assessed by tracking conversions of hull paints from copper to non-copper, DPR Category I (low leach paints), or low-copper (i.e., less than 40 percent copper) products, and aging of copper paints on vessels moored in SIYB. The Monitoring Plan was updated in 2015 to include DPR Category I paints as a new category of paints in the annual vessel tracking survey.

Based on the vessel tracking assumptions discussed in Section 2.3.4 of this report, the transition of a vessel to non-copper hull paint was assumed to reduce annual loading by 0.9 kg/yr, and the transition to DPR Category I or low-copper hull paints was assumed to reduce loading by 50 percent (i.e., 0.45 kg/yr). Vessel tracking indicates that there has been a reduction

of over 40.4 percent (approximately 849 kg/yr) in annual dissolved copper loading to SIYB from vessels when compared with the SIYB TMDL-assumed baseline loading of 2,100 kg/yr[2].

The 40.4 percent dissolved copper load reduction calculated for the 2015 monitoring period is a result of (1) continued improvements in the vessel tracking and reporting process, and (2) continued transition of vessels to non-copper, DPR Category I (low leach), and low-copper hull paints. Based on the 2015 load reduction result (40.4 percent), the SIYB TMDL program is on target to achieve the second interim load target by the end of the second compliance period (the end of 2017).

Water Quality Monitoring

Monitoring of water column dissolved copper and toxicity is required to determine whether and when water quality objectives have been attained, and beneficial uses have been restored. In September 2015, water quality was sampled at six stations in SIYB and at one reference station (adjacent to SIYB near the main San Diego Bay navigation channel) to determine dissolved copper concentrations in the basin, test for acute and chronic toxicity, and assess water quality trends.

Results from the September 2015 monitoring event showed that the basin-wide average dissolved copper level was 6.9 microgram(s) per liter (µg/L), which was approximately 17 percent lower than the 2005–2008 baseline average (8.3 µg/L) and similar to the 2014 basin-wide average (7.0 µg/L). Consistent with previous years, dissolved copper results at five of the six SIYB sampling stations exceeded the California Toxics Rule (CTR) criterion continuous concentrations (CCC) water quality objective (WQO) of 3.1 µg/L. The 2015 monitoring event also showed that dissolved copper concentrations at four of the six stations had exceeded the CTR acute criterion maximum concentration (CMC) WQO (4.8 µg/L). This result is an improvement over that of 2014, when dissolved copper levels in five of the six SIYB stations exceeded the CMC WQO.

The 2015 monitoring program found that two stations (SIYB-1, the station farthest inside the basin; and SIYB-2, the station closest to vessels) had statistically significant effects on developing mussel larvae. No toxicity was observed in the fish larvae survival tests.

Conceptual Model Update

The 2011 SIYB TMDL Conceptual Model was updated with two new pieces of information.

1. The uncertainties and data gaps identified in the 2011 Conceptual Model report were reevaluated based upon new information. Some of the data gaps identified in the 2011 report have been addressed (e.g., developing and implementing a vessel tracking database), while others (e.g., quantifying the load of dissolved copper potentially released from sediments to overlying waters) have not yet been addressed.
2. A study was conducted using the Marine Antifoulant Model to Predict Environmental Concentrations (MAMPEC) model to evaluate the predicted environmental concentrations of dissolved copper in SIYB waters using multiple leach rate scenarios

[2] The total dissolved copper load per the SIYB TMDL equals 2,100 kg/yr from vessel paints (the total includes contributions from passive leaching and in-water hull cleaning). The estimated load contributions from background sources, urban runoff, and atmospheric deposition are not included in this total.

and realistic SIYB-specific input parameters. The model results indicated that transitioning to DPR Category I (low leach) paints would result in reduced water column levels of dissolved copper in SIYB. However, the study results also indicated that a significant reduction in leach rates (compared with current levels) would be required to achieve the CTR CCC dissolved copper WQO of 3.1 µg/L.

Recommendations

Based upon the findings of the 2015 SIYB TMDL monitoring program, four recommendations are being proposed with regard to future monitoring activities. The recommendations include repositioning a sampling station, conducting an enhanced water column testing special study in SIYB to assist with dissolved copper leach rate modeling, tracking DPR Category I (low leach) paints as a separate category, and presenting separate dissolved copper load allocations from passive leaching and hull cleaning in future reports.

Summary

The SIYB TMDL monitoring program results indicate that the next interim target, a 40 percent load reduction, was achieved during 2015. As such, the program, with continued implementation, appears on track to maintain this load reduction through the 2017 target year. Progress is being made in (1) vessel conversions to alternative DPR Category I (low leach), lower copper and non-copper hull paints, (2) increased boater education and outreach, (3) more accurate information on paint leach rates, (4) better accounting practices and survey methods for determining hull paint types, and (5) continued implementation of hull-cleaning BMPs. A reevaluation of the uncertainties and data gaps from the 2011 Conceptual Model indicated that some of the data gaps have been filled. Finally, a modelling study showed that the predicted environmental concentrations of dissolved copper in SIYB would decrease as DPR Category I (low leach) paints become more widely used. A continuous, collaborative, and proactive approach will be necessary on the part of all stakeholders to continue reducing the copper loading and to meet future compliance goals for Shelter Island Yacht Basin.