Attachment A to Resolution 2022-0012
Amendments to the Water Quality Control Plan for the Santa Ana River Basin to incorporate Total Maximum Daily Loads for Copper (Cu) for Newport Bay, Orange County, California

The following identifies the changes to the Basin Plan as they would appear in the Basin Plan. Attachment B shows these changes in underline/strike-out format.

Add to the Basin Plan
in Chapter 6. Total Maximum Daily Loads (TMDLs),
6.1 Newport Bay Watershed TMDLs

6.1 Copper: Copper (Cu) TMDLs for Newport Bay

The Cu TMDLs for Newport Bay were adopted by the Regional Water Quality Control Board, Santa Ana Region on **December 2, 2022**.

The Cu TMDLs were approved by:

- The State Water Resources Control Board on [insert date here].
- The Office of Administrative Law on [insert date here].
- The U.S. Environmental Protection Agency on [insert date here].

The elements of the Cu TMDLs and the Implementation Tasks and Schedule are presented in Table 6.1 Copper TMDLs-1: Total Maximum Daily Loads (TMDLs) for Copper (Cu) for Upper and Lower Newport Bay. The documentation prepared to support the adoption of these TMDLs, including the Substitute Environmental Document 2022 and the Staff Report 2022 (Appendix A of the SED), are available on the Santa Ana Water Board's FTP site: https://ftp.waterboards.ca.gov/WebInterface/login.html

Metals Impairment Assessments for Newport Bay by Santa Ana Water Board and State Water Board staff

In response to a consent decree, the U.S. Environmental Protection Agency (USEPA) conducted a metals data assessment for Newport Bay, using a weight of evidence approach, and established TMDLs for Cu, lead (Pb), zinc (Zn) and cadmium (Cd) in Upper Newport Bay and San Diego Creek, and TMDLs for Cu, Zn and Pb in the Lower Bay (including the Rhine Channel), in 2002. In addition, USEPA established separate TMDLs for the Rhine Channel for chromium (Cr) and mercury (Hg) since the rest of the Lower Bay was not impaired for Cr and Hg (USEPA 2002, Part H). (USEPA's TMDLs were based on assessment conclusions of clear impairment or potential future impairment.)

In 2006, the State Water Board assessed individual metals in Newport Bay, and listed the Upper and Lower Bay for dissolved Cu on the 303(d) list of Impaired Waters. No other individual metals were listed for Newport Bay based on this State Water Board assessment. This assessment also demonstrated no metals impairment in San Diego Creek. These 2006 findings

with regards to metals impairment in the Bay and San Diego Creek are based on newer metals data than those employed by USEPA and were confirmed in subsequent 303(d) lists of Impaired Waters approved by the State Water Board and USEPA (2010, 2012, 2014-2016). (The 2018 303(d) list, approved by the State Water Board and USEPA, did not include data updates for the Santa Ana Region. The Bay continues to be listed as impaired due to dissolved Cu.)

To consider whether revisions to USEPA's established Metals TMDLs would be appropriate, Santa Ana Water Board staff conducted their own Impairment Assessment for metals in the Bay based on newer data (from 2002-2012) than those used by USEPA, and updated sediment and tissue guidelines (Staff Report 2022). The Impairment Assessment also relied upon a newer interpretation of the listing methodology with respect to sediment specified in the State Board's *Water Quality Control Policy for Developing California's Section 303(d) List (2004, amended 2015) (State Listing Policy (SLP)).*

The results of Santa Ana Water Board staff's Impairment Assessment (2002-2012) are as follows:

1. Upper and Lower Newport Bay

Copper (Cu). Santa Ana Water Board staff found water column impairment for dissolved Cu in both the Upper and Lower Bay based on exceedances of the California Toxics Rule (CTR) saltwater criteria, confirming that Cu TMDLs are still necessary. Sediment Cu exceeded the Effects Range Median (ERM) sediment guidelines with toxicity present in the same areas (but not in paired samples).

Santa Ana Water Board staff found no impairment for Zn, Pb or Cd in the Upper Bay, or Zn and Pb in the Lower Bay; therefore, no TMDLs are required for Pb and Cd in the Upper and Lower Bay, or Zn in the Upper Bay. These findings indicate that USEPA's TMDLs for these pollutant-waterbody combinations are not necessary to achieve or maintain applicable water quality standards.

2. Summary

Santa Ana Water Board staff's Impairment Assessment supersedes USEPA's data assessment that led to the establishment of Metals TMDLs for Newport Bay by USEPA (USEPA 2002), and demonstrates that USEPA's TMDLs for Zn, Pb and Cd are not necessary to achieve/maintain water quality standards. The Cu TMDLs for Upper and Lower Newport Bay, delineated in Table 6.1 Copper TMDLs-1 below, supersede the Cu TMDLs for Upper and Lower Newport Bay established by the USEPA in 2002.

Newer Copper (Cu) Data

State Water Board 303(d) Assessment (2014-2016)
The 2014-2016 303(d) list of impaired waters approved by the State Water Board and USEPA is the most recent and applicable list of those waters. This assessment showed that dissolved Cu continues to exceed the CTR chronic criterion in Upper and Lower Newport Bay; therefore, Cu TMDLs are still required for both the Upper and Lower Bay.

Additional Recent Studies

Other studies also showed that Lower Newport Bay is still impaired for dissolved Cu. These include a monitoring study in August 2019 by the Department of Pesticide Regulation (DPR), Anchor QEA's studies for the City of Newport Beach in June 2015 February 2016, and August 2019. (See Staff Report 2022.)

Table 6.1 Copper TMDLs-1. Total Maximum Daily Loads (TMDLs) for Copper (Cu) for Upper and Lower Newport Bay

Problem Statement for Copper (Cu)
In June 2002, USEPA established TMDLs for Cu, lead (Pb), zinc (Zn), and cadmium (Cd) in the Upper Bay, and Cu, Pb, and Zn in the Lower Bay based on data assessment conducted by USEPA (USEPA, 2002). USEPA found that Cu and Zn exceeded the California Toxics Rule (CTR) saltwater criteria and sediment Cu and Zn exceeded the National Oceanic and Atmospheric Administration's (NOAA's) Effects Range Low (ERL) sediment guidelines (NOAA SQuiRTS 1999, 2008). Sediment toxicity was also found in sediment samples across the Upper and Lower Bay (Bight 1998, 2003). Cu and Zn concentrations were found in mussels in the Lower Bay, but they were not above the Office of Environmental Health Hazard Assessment's (OEHHA) tissue guidelines (1999). Cu, Cd, Pb, and Zn are known to bioaccumulate in benthic organisms, but does not generally bio-magnify up the food chain. The concentrations of heavy metals in aquatic plants in Newport Bay have not been documented, although Allen et al (2008) evaluated metal concentrations in algae. Santa Ana Water Board staff conducted an Impairment Assessment and evaluated more recent data (2002-2012) than the data assessed by USEPA. Santa Ana Water Board's Impairment Assessment showed that Upper and Lower Newport Bay are still impaired for dissolved Cu in water based on exceedances of the CTR chronic criterion (3.1µg/L), and sediment Cu, Zn, and Hg concentrations exceeded the ERM guidelines of 270µg/g, 410µg/g, and 220ng/g, respectively, in the Lower Bay (Staff Report 2022). In addition, sediment toxicity was present in areas where the ERMs were exceeded but sediment chemistry samples were not paired with toxicity samples. Paired chemistry and toxicity data are necessary to assess impairment based on ERM results (State Listing Policy). These Cu TMDLs address dissolved Cu impairment in water and exceedances of the sediment Cu ERM guideline and supersede the Cu TMDLs for Upper and Lower Newport Bay established by USEPA (2002). Continued monitoring and evaluation of Cu are required by these TMDLs. ***Impairment Assessment Results*** *(Staff Report 2022)* ***Water.*** Both Upper and Lower Newport Bay, including marinas, are impaired for Cu based on exceedances of the dissolved Cu saltwater criteria specified in the California Toxics Rule (CTR) (USEPA 2000); therefore, Cu TMDLs continue to be required. ***Sediments.*** Sediment Cu exceeded the Cu ERM sediment guideline in surface sediments in the Lower Bay, particularly in marinas and the Turning Basin/South Lido Channel areas. Sediment toxicity was also found in the Upper and Lower Bay in multiple studies, but toxicity data were not paired with exceedances of the sediment Cu ERM. Further monitoring of sediments is warranted due to exceedances of the sediment Cu ERM and the presence of toxicity in the same areas (Cu-Metals Marina Study, Coastkeeper and Candelaria 2007).

Note that all sampling sites (except two County monitoring sites) were in marinas and areas of the Lower Bay that were not dredged in 2012. A post-dredge study in the Lower Bay showed that sediment Cu exceeded the ERM guideline in up to 20.5% of the samples and exceeded the ERL guideline at ALL sites and for ALL sampling periods (October, March, August) in both post-dredge sites and marina/Turning Basin sites sampled in this study (Metals Sediment Study in Lower Newport Bay, Coastkeeper and Candelaria 2014). In addition, Cu exceeded the ERM guideline in the marina/Turning Basin sites. Note that only a subset of marinas from the Cu-Metals Marina Study was sampled in this study. A more extensive marina survey is needed to fully assess sediment quality and sediment Cu concentrations in marina and boatyard areas in Newport Bay.

Fish and/or mussel tissue. Cu did not exceed fish or mussel tissue guidelines for either human health or wildlife.

Numeric Targets for Copper (Cu)

These Cu TMDLs include both dissolved Cu targets and sediment Cu numeric and alternative targets, shown in the tables below.

1) The numeric targets for dissolved Cu are the California Toxics Rule (CTR) saltwater criteria for dissolved Cu (chronic 3.1 µg/L and acute 4.8 µg/L) (USEPA 2000). (See Table 1 below.)

2) The targets for sediment Cu are both numeric and alternative targets; the alternative sediment quality objectives (SQOs) target may be achieved as an alternative to the numeric sediment Cu target. (See Table 2 below.)

The sediment Cu targets are as follows:
(2-1) The sediment Cu numeric target is the Effects Range Low (ERL) guideline (34 µg/g) from NOAA SQuiRTS (1999, 2008), and

(2-2) the alternative sediment Cu SQOs target is the sediment quality condition of Unimpacted or Likely Unimpacted, determined by chemistry, toxicity, and benthic analyses per the SQOs methodology specified in the State Water Board's Sediment Quality Provisions (SWRCB 2018). If the condition of Unimpacted or Likely Unimpacted is met, the alternative sediment Cu SQOs target is achieved. If the condition of Unimpacted or Likely Unimpacted is not demonstrated, then stressor identification analyses must be conducted per the SQOs methodology (Sediment Quality Provisions) to determine whether Cu is the cause of the impacted condition. If Cu is not shown to be the cause of the impacted condition, the alternative sediment Cu SQOs target is achieved. (See also Table 9 – Implementation Plan, Tasks 2.0, 2.1.)

Table 1 - Numeric Targets for Dissolved Copper (Cu) in Newport Bay

Dissolved Cu CTR saltwater criteria[1]	
acute	**chronic**
4.8 (µg/L)	3.1 (µg/L)

[1]The numeric targets are the dissolved Cu CTR saltwater criteria.

Compliance with these TMDLs requires that the more restrictive chronic numeric target (3.1 µg/L) is achieved, per State Listing Policy methodology. The CTR saltwater criteria assume a Water Effects Ratio (WER) of 1 (USEPA 2000). (If a different WER is approved for Newport Bay, these criteria and numeric targets for dissolved Cu will change accordingly. The numeric targets will also change accordingly if a dissolved Cu chronic site-specific objective (SSO) is approved.)

Table 2 - Numeric and Alternative Targets for Sediment Copper (Cu) in Newport Bay

Sediment Cu Numeric Target **Effects Range Low (ERL)** [1]	***Alternative Sediment Quality Objectives (SQOs) Target***
34 (µg/g)	Sediment Quality Condition of Unimpacted or Likely Unimpacted[2]

[1]The sediment Cu numeric target is the Effects Range Low (ERL) from NOAA SQuiRTS (1999, 2008).

[2]The alternative sediment Cu SQOs target is the sediment quality condition of Unimpacted or Likely Unimpacted, determined by conducting a sediment assessment using the multiple lines of evidence approach (SQOs methodology) specified in the State Water Board's Sediment Quality Provisions (SWRCB 2018). If the condition of Unimpacted or Likely Unimpacted is not demonstrated, further analyses must be conducted per the SQOs methodology to determine whether Cu is the cause of the impacted condition. If Cu is not shown to be the cause of the impacted condition, the alternative sediment Cu SQOs target is achieved.

Source Analysis for Copper (Cu)

Known sources of Cu include: 1) Cu antifouling paints (AFPs) on boat hulls and runoff from boatyard operations; 2) tributary runoff (i.e., direct discharges of runoff (urban and agricultural) from major tributaries and upstream sub-watersheds into the Bay); and 3) storm drain runoff (i.e., urban runoff from storm drains that empty directly into Newport Bay); and 4) air deposition. Cu AFPs are the largest sources of Cu to the Bay, and Cu discharges from boats are six (6) times higher than the second largest source which is runoff from the major tributaries. Cu loads in storm drain runoff are small compared to the two largest sources but may have localized impacts in areas near storm drains. Bay sediments may also be a source of Cu to Bay waters, although their contribution has not yet been quantified. In addition, algae and other vegetation may contain Cu; however, these sources have not been quantified.

Table 3 - Summary of Copper (Cu) Loads to Newport Bay

	Dissolved Cu (lbs/yr) Cu TMDLs	**Percent (%) of Total^ Cu TMDLs**	**Cu (lbs/yr) (USEPA's Toxics TMDLs*)**
Boats[1]	*18,000[1a]*	81.1	50,114
Tributary runoff [2]	*3005 (548)*	13.5	7020

Storm drain runoff [3]	*303*	1.4	ND
Air deposition[4]	101	0.46	101
Ambient seawater[5]	777	3.5	777
Bay sediments[6]	Unknown	-	Unknown
Total	**22,186**	**100%^**	**58,012[7]**

[*]*Data from USEPA's Toxics TMDLs are included for comparison only. (See Table E-11 -Part E, USEPA's Toxics TMDLs, (USEPA 2002)).
Numbers in italics are different from those estimated by USEPA (Toxics TMDLs, 2002).
ND = no data
^Percentages for separate loads do not total to exactly 100% due to rounding.
[1]Estimates of dissolved Cu load from boats (from passive leaching and hull cleaning) (Staff Report 2022 & USEPA Toxics TMDLs 2002).
[1a]Cu load estimate for boats is based on 5,000 boats/slips, and an average boat size of 40 ft.
[2]Dissolved Cu load in tributary runoff (freshwater) was estimated from total Cu in storm water samples from San Diego Creek and Santa Ana Delhi for 2009-10 and 2010-11 monitoring data (County of Orange). (Dissolved Cu =Total Cu x 0.80). Number in parentheses indicates dissolved Cu load in runoff for the two driest years (2006-07, 2007-08). USEPA's estimate was from County of Orange monitoring data for San Diego Creek and Santa Ana-Delhi (OCPFRD 2000).
[3]Dissolved Cu loads from storm drains (mean of 139lbs (2007), 468lbs (2008) at runoff coefficient of 0.9) were calculated from the Lower Newport Bay Storm drain study data.
[4]Estimate for direct deposition of Cu to surface waters of Newport Bay (USEPA's Toxics TMDLs, Part E, sect. IV 2002).
[5]Estimate of dissolved Cu loads from ocean based on local data (R. Gossett) x approximate ocean volume into Newport Bay (USEPA 2002).
[6]Cu load to waters from bay sediments is unknown at this time, but it is likely lower than contributions from recreational boats and major tributaries.
[7]Cu Total was corrected from Total shown in Table E-11-Part E, USEPA's Toxics TMDLs (USEPA 2002).

Loading Capacity and Linkage Analysis for Copper (Cu)

In the 2002 Newport Bay Toxics TMDLs, USEPA set both concentration and mass loading approaches to define the metal loading capacity and the TMDLs for Cu. Mass-based load allocations were used to set an upper limit on the mass of metals that are discharged into Newport Bay to prevent an accumulation of metals in the sediment, which may then cause sediment or pore water toxicity. The mass-based allocations will assist in protecting benthic communities. The concentration-based loading capacities are equivalent to the dissolved Cu saltwater acute and chronic targets for dissolved metals (CTR criteria).

The mass and concentration-based loading capacity for these Cu TMDLs are shown in Tables 4 and 5.

These Cu TMDLs use the same methodology as USEPA used in the Toxics TMDLs to calculate loads (USEPA 2002), and the equations used in these TMDLs to calculate the mass-based loading capacity are based on USEPA's bathtub model approach (below). USEPA's model used parameters from RMA's finite element model (RMA 1998).

The total allowable dissolved Cu by mass was calculated by multiplying the numeric target (CTR saltwater chronic criterion) by the volume of water in the Bay. The *mass loading capacity* of dissolved Cu was calculated as the mass of Cu that leaves the Bay minus the mass of Cu remaining in the Bay. The *concentration-based loading capacity* for dissolved Cu is equivalent to the CTR saltwater chronic and acute criteria for dissolved Cu.

*Total Allowable Dissolved Cu by Mass = Bay Volume x Criterion (C_c)
=129,850.09lbs

*Dissolved Cu Mass Loading Capacity $=Mass_{out} - Mass_{in}$
$=(Criteria * Volume_{out}) - Mass_{in}$
$L_f + L_i = C_c * (Q_b + 1.25\ Av_sF_p) - Q_oC_o$
=14,473.056 g/d
=11,646.09 lbs/yr

Where :
L_f =Dissolved Cu in Freshwater Inflow (lbs/yr)
L_i =Dissolved Cu Load from Boats (lbs/yr)
C_c =CTR Saltwater Chronic Criterion for Dissolved Cu
Q_b =Volume Mixed Water Leaving the Bay
A =Newport Bay Surface Area
v_s =Net Settling [as a velocity]
F_p =Particulate Fraction – *Estimated*
Q_o =Volume Ocean Water Entering the Bay
C_o =Dissolved Cu in the Ocean
Values and equations are found in USEPA's Toxics TMDLs – Part E, pp.19-20 (USEPA 2002)

Table 4 - Mass-based Loading Capacity for Dissolved Copper (Cu) in Newport Bay	
Dissolved Cu Loading Capacity (lbs/yr)	11,646

Table 5 - Concentration-based Loading Capacity* for Dissolved Copper (Cu) in Newport Bay		
	Dissolved Cu saltwater acute loading capacity (µg/L)	**Dissolved Cu saltwater chronic loading capacity (µg/L)**
	4.8	3.1

*These concentration-based loading capacity values are equivalent to the CTR saltwater criteria for dissolved Cu and were used as numeric targets in USEPA's Toxics TMDLs (2002). These criteria assume a WER of 1 (USEPA 2000). If a different WER is approved for Newport Bay, the criteria and concentration-based loading capacity values will change accordingly. The loading capacity values will also change accordingly if a dissolved Cu chronic site-specific objective (SSO) is approved.

TMDLs, Wasteload and Load Allocations, and Margin of Safety for Copper (Cu)

In USEPA's Toxics TMDLs, mass-based loads for dissolved metals were based on data prior to 2002. The total loading capacities were calculated using parameters from RMA's finite element model (RMA 1998). A margin of safety (MOS) of 20 percent (%) was subtracted from the total loading capacity and the remaining loading capacity was divided between the wasteload allocations (WLAs) and the load allocations (LAs).

In these Cu TMDLs, Cu load estimates for Newport Bay are based on data obtained since 2002. The total loading capacity for dissolved Cu was calculated by RMA's finite element model as 11,646 pounds per year (lbs/yr), which is the same total loading capacity used by USEPA in the Toxics TMDLs (RMA 1998, USEPA 2002) (see Loading Capacity Section above). The MOS of 10% (revised from USEPA's 20%) was subtracted from the total loading capacity, and the remaining loading capacity was divided between the WLAs and the LAs. If new data were not available for designated sources for WLAs and LAs, the Cu allocations from USEPA's Toxics TMDLs were used (Tables E-10 and E-11, Toxics TMDLs, USEPA 2002). Agricultural runoff and air deposition were calculated as 80% of USEPA's allocations using USEPA's dissolved/total translator of 80% since some of USEPA's allocations were reported as total Cu rather than dissolved Cu concentrations.

For freshwater discharges into the Bay, the mean Cu discharge from both San Diego Creek and Santa Ana Delhi Channel was calculated to be approximately 3005 pounds of dissolved Cu per year for wet years (2009-10, 2010-11 County of Orange monitoring data). (Cu loads from tributaries during wet years were used in these TMDLs to be conservative, as larger loads are discharged in wet years compared to dry years. With respect to Cu discharges from boats, however, it is assumed that discharges from passive leaching plus hull cleaning do not change drastically with wet or dry rainfall years.)

The mean Cu discharge from storm drains was approximately 303 pounds of dissolved Cu per year (mean of 2007, 2008 - Storm Drain Metals Study, Coastkeeper & Candelaria 2010).

The mass-based allocations were divided into WLAs and LAs for tributary and storm drain allocations, WLAs for process water from boatyards (allocation = 0), WLAs for boats, and LAs for air deposition. The allocation for open space is part of the MS4 permit allocation as open space runoff enters the MS4 system and mixes with other runoff; therefore, there are no Cu data specific to open space runoff, and Cu concentrations in open space runoff are likely to be low compared to urban runoff.

The dissolved Cu allocations were calculated as follows:

Dissolved Cu Mass Loading Capacity - MOS =
[Tributary/Storm drain allocations (WLAs+LAs) + (boats/air deposition (WLAs+LAs)](lbs Cu/yr)

11,646 - 1,165 = 3,176 + 7,305 (lbs Cu/year)

The Dissolved Cu Mass Loading Capacity minus the MOS (margin of safety) is equal to the Tributary and Storm drain allocations (WLAs and LAs) plus the WLAs/LAs for boats and air deposition. *Note that the MOS was revised to 10% from 20% in the original BPA.* There is no LA for open space, as in USEPA's allocations, since much of the runoff from open space goes into

San Diego Creek, Santa Ana Delhi, or smaller storm channels and is accounted for in the WLAs for urban runoff.

The mass- and concentration-based allocations specified in the tables below apply to the receiving waters of Newport Bay at all times of the year, regardless of the volume of freshwater flow from all tributaries, including San Diego Creek, Santa Ana Delhi, Costa Mesa Channel, and other tributaries to Newport Bay.

Assumptions and Requirements of Mass-Based Allocations (See Table 6 below)

1. The allocations for MS4 and CalTrans, shown in Table 6 below, apply to tributary/and storm drain inputs to the water column in Upper Newport Bay (defined from San Diego Creek at Jamboree Rd. down to Pacific Coast Highway Bridge), Lower Newport Bay (defined from PCH Bridge to the Newport Jetty) and the Rhine Channel (confined by line drawn from 20th St. across to Lido Beach St. to channel end). These allocations apply to the receiving waters of Newport Bay at all times of the year, regardless of freshwater flow from San Diego Creek, Santa Ana Delhi, Big Canyon Wash, Costa Mesa and Santa Isabel Channels and other tributaries into Newport Bay. Compliance with these allocations is to be assessed in the aggregate at representative sampling points just upstream of major tributary and storm drain discharges into Newport Bay.
2. It is expected that the wasteload allocations for the NPDES Industrial Stormwater General Permit, NPDES Construction Stormwater General Permit, and NPDES Scrap Metal Stormwater General Permit will be implemented through a best management practice based iterative process such as corrective actions or numeric action levels. The limits in the permit shall be written in terms of total Cu, using USEPA's dissolved/total translator of 80% (such that dissolved Cu/total Cu = 0.80, and total Cu = 1.25 x dissolved Cu).
3. The load allocation for air deposition applies to deposition directly to Bay waters.
4. The Cu load from tributary and storm drain runoff is 3176 pounds of dissolved Cu per year is for a wet year. (This load is less in dry years.)
5. The allocation for process water discharges from boatyards is zero. Stormwater discharges from boatyards are regulated under the Industrial General Permit (IGP) for stormwater and are included in the mass-based allocation for "Other NPDES Permittees" (156 lbs/yr).
6. Commercial vessels 79 ft. or greater in length are regulated under the federal Vessel General Permit (VGP) and will be regulated under the Vessel Incidental Discharge Act (VIDA) once it is implemented. The number in this table is an allocation for approximately 15 commercial boats (79 ft. or greater in length), and is based on an average boat size of 100 ft. Cu discharges from those 15 boats are approximately 134 lbs/yr. (The approximate number of commercial boats 79 ft. or greater was obtained from the U.S. Coast Guard (pers. communication USCG, Feb. 2022).
7. The category of Boats includes all recreational boats, and commercial boats < 79 ft. in length.

8. If compliance with the dissolved Cu CTR chronic criterion of 3.1 µg/L (or compliance with a dissolved Cu CTR chronic criterion adjusted by a WER other than 1, or compliance with an approved dissolved Cu chronic SSO) is achieved in the Bay (i.e. no impairment is demonstrated per the assessment methodology in the State Listing Policy (SLP)), then no further reduction in Cu discharges from boats will be required even if the Cu wasteload allocation for boats is not yet achieved.
9. The margin of safety was reduced from 20 to 10% since conservative assumptions were used throughout the TMDLs (similar to the Marina del Rey Toxics TMDLs approved by the Los Angeles Regional Water Board).

Table 6 - Mass-Based Allocations for Copper (Cu) in Newport Bay

Category	Type	Dissolved Copper (lbs/year)
Tributary and Storm drain WLAs	MS4 permittees[1]	2,501
	CalTrans[1]	348
	Other NPDES Permittees (including the Industrial General Permit (IGP), Construction General Permit (CGP), Scrap Metal General Permit (SMGP)	156[2]
Tributary and Storm drain LAs	Agricultural runoff	171[3]
	Open space runoff	(part of MS4 WLA)
	Sub-total	**3,176[4]**
Boatyards WLAs	Boatyards	0[5]
Boats (WLAs)	Commercial boats (79 ft. or greater)	134[6]
	Boats (all recreational and commercial <79 ft).	7090[7,8]
Air deposition (LA)	Air deposition	81[3]
	Sub-total	**7,305**
Margin of Safety (MOS) 10% [9]		**1,165**
Total TMDL		**11,646**

[1] These allocations apply to tributary and storm drain inputs to the water column in Upper Newport Bay (defined from San Diego Creek at Jamboree Rd. down to Pacific Coast Highway Bridge), Lower Newport Bay (defined from PCH Bridge to the Newport Jetty) and the Rhine Channel (confined by line drawn from 20th St. across to Lido Beach St. to channel end). These allocations apply to the receiving waters of Newport Bay at all times of the year, regardless of freshwater flow from San Diego Creek, Santa Ana Delhi, Big Canyon Wash, Costa Mesa and Santa Isabel Channels, and other tributaries into Newport Bay. Compliance with these allocations is to be assessed in the aggregate at representative sampling points just upstream of major tributary and storm drain discharges into Newport Bay. (See Source Analysis for Cu section (above) for additional description of tributary and storm drain runoff.)

[2] It is expected that the wasteload allocations for the NPDES Industrial Stormwater General Permit, NPDES Construction Stormwater General Permit, and NPDES Scrap Metal Stormwater General Permit will be implemented through a best management practice based iterative process such as corrective actions or numeric action levels. The limits in the permit shall be written in terms of total Cu, using USEPA's dissolved/total translator of 80% (such that dissolved Cu/total Cu = 0.80, and total Cu = 1.25 x dissolved Cu).

[3]LAs for agricultural runoff and air deposition were calculated from total Cu numbers in Table E-10 in the Toxics TMDLs (total Cu x 0.80) (USEPA 2002). The load allocation for air deposition applies to deposition directly to Bay waters.

[4] The Cu load from tributary (3,005 lbs/yr) plus storm drain (171 lbs/yr) runoff is for a wet year. (Tributary load is less in dry years (<1000 lbs/yr))

[5]The allocation for process water discharges from boatyards is zero. Stormwater discharges from boatyards are regulated under the Industrial General Permit (IGP) for stormwater and are included in the mass-based allocation for "Other NPDES Permittees" (156 lbs/yr).

[6] Commercial vessels 79 ft. or greater in length are regulated under the federal Vessel General Permit (VGP) and will be regulated under the Vessel Incidental Discharge Act (VIDA) once it is implemented. The number in this table is an allocation for approximately 15 commercial boats (79 ft. or greater in length), and is based on an average boat length of 100 ft. Cu discharges from those 15 boats are approximately 134 lbs/yr. (The approximate number of commercial boats 79 ft. or greater in length was obtained from the U.S. Coast Guard (pers. communication USCG, Feb. 2022)).

[7]The category of Boats includes all recreational boats, and commercial boats < 79 ft. in length.

[8] If compliance with the dissolved Cu CTR chronic criterion of 3.1 µg/L (or compliance with a dissolved Cu CTR chronic criterion adjusted by a WER other than 1, or compliance with an approved dissolved Cu chronic SSO) is achieved in the Bay (i.e. no impairment is demonstrated per the assessment methodology in the State Listing Policy (SLP)), then no further reduction in Cu discharges from boats will be required even if the Cu wasteload allocations for boats is not yet achieved.

[9]The margin of safety was reduced from 20 to 10% since conservative assumptions were used throughout the TMDLs (similar to the Marina del Rey Toxics TMDLs).

Table 7 - NPDES Permittees and Permit Numbers

Category	Permittees	Name /Permit number[1]
Tributary or Storm drain WLAs	*MS4 permittees*	Waste Discharge Requirements for Areawide Urban Storm Water Runoff for the County of Orange, Orange County Flood Control District and the incorporated cities of Orange County within the Santa Ana Region, NPDES No. CAS 618030, Order R8-2009-0030 as amended by Order R8-2010-0062
	CalTrans	Statewide Storm Water Permit, Waste Discharge Requirements (WDRs) for State of California Department of Transportation, NPDES No. CAS000003, Order 2012-0011-DWQ.
	Other NPDES Permittees Industrial General Permit (IGP)	General Permit for Storm Water Discharges Associated with Industrial Activities, Order 2014-0057-DWQ amended by Order 2015-0122-DWQ and Order 2018-0028-DWQ, NPDES No. CAS000001
	Construction General Permit (CGP)	General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ amended by Order 2010-0014-DWQ and Order 2012-0006-DWQ, NPDES No. CAS000002
	Scrap Metal Permit (SMP)	

		Sector-Specific General Permit for Storm Water Runoff Associated with Industrial Activities from Scrap Metal Recycling Facilities within the Santa Ana Region NPDES Permit No. CAG618001, Order No is R8-2018-0069
Boatyards WLAs	Boatyards	Boatyards are regulated under the Industrial General Permit above.
Boats (WLAs)	Commercial boats (79 ft. or greater)	Vessel General Permit for Discharges Incidental to the Normal Operation of a Vessel (VGP) – Authorization to Discharge Under the National Pollutant Discharge Elimination System

[1]Order numbers will change as permits are updated/renewed

Table 8 - Concentration-Based Allocations for Copper (Cu) in Newport Bay[1]

Dissolved Cu Saltwater Acute TMDL and Allocation (µg/L)	**Dissolved Cu Saltwater Chronic TMDL and Allocation (µg/L)**
4.8	3.1

[1]These concentration-based allocations are equivalent to the CTR saltwater criteria for dissolved Cu, which assume a WER of 1 (USEPA 2000). (If a different WER is approved for Newport Bay, the criteria and the concentration-based allocations will change accordingly. The concentration-based allocations will also change accordingly if a dissolved Cu chronic SSO is approved.) These allocations apply to and are assessed in the receiving waters of Newport Bay where the salinity is equal to or greater than 10 parts per thousand 95% or more of the time. These allocations apply to the receiving waters of Newport Bay at all times of the year, regardless of freshwater flow from San Diego Creek, Santa Ana Delhi, Big Canyon Wash, Costa Mesa and Santa Isabel Channels and other tributaries into Newport Bay. Concentration and flow data for tributary runoff shall be used to determine compliance with the mass-based allocations specified in Table 6 and not as the basis for compliance with the concentration-based allocations specified in Table 8.

Implementation Plan for Copper (Cu)

Compliance with the CTR chronic criterion (numeric target) for dissolved Cu (3.1 µg/L) is the goal of these Cu TMDLs.

The highest priority of these Cu TMDLs is to reduce Cu discharges from Cu AFPs on recreational and commercial boats, since Cu discharges from boats are the largest source of Cu to Newport Bay.
These Cu TMDLs cannot be met unless Cu loading from boats is reduced.

The second priority is to continue to monitor and evaluate sediments in the Lower Bay and lower Upper Bay*, including areas that previously exceeded the sediment Cu ERM guideline and areas with no or limited SQOs or sediment Cu data (in particular, marinas). This evaluation is necessary since sediment Cu exceeded sediment guidelines in Newport Bay studies and there is evidence of sediment toxicity in areas where the sediment guidelines were exceeded. **(the lower Upper Newport Bay is defined as the area from North Star Beach to Pacific Coast Highway along its northwest side and from the Back Bay Science Center south to Pacific Coast Highway along its southeast side and includes the Newport Dunes resort and recreation area. Lower Upper Newport Bay does not extend into the Upper Newport Bay Ecological Reserve.)*

The third priority of this plan is to meet the Cu allocations for tributary and storm drain runoff since tributary runoff is the second largest source of Cu to the Bay. (Cu inputs from storm drains are small compared to boats and tributaries but may be important locally.)

Compliance with the Copper (Cu) TMDLs shall be determined through water and sediment monitoring and evaluation.

1) Reduce Copper (Cu) discharges from Cu antifouling paints (Cu AFPs) on recreational and commercial boats (Task 1, Table 9).

Compliance with the CTR chronic criterion* for dissolved Cu (3.1 µg/L) is the goal of these Cu TMDLs. *(or a dissolved Cu CTR chronic criterion adjusted by a WER other than 1), or an approved dissolved Cu chronic SSO). The compliance schedule is shown in Table 9 and the text below.

The highest priority is to reduce Cu discharges from Cu AFPs on boats since Cu AFPs on boats are the largest source of Cu to Newport Bay. These Cu TMDLs cannot be met unless Cu discharges from boats are reduced.

Compliance Schedule
These Cu TMDLs include a schedule that allows time to implement and adaptively manage the tasks to ensure effectiveness, efficiency, and fairness. *Final compliance with the Cu TMDLs must be achieved as soon as possible but no later than 12 years from the date of approval of the TMDLs by USEPA*. The compliance schedule approach recognizes that dischargers may elect to pursue investigation(s) and adoption of SSOs (or WER adjustments of the CTR criteria) for Cu in Newport Bay that, if approved, would supersede the CTR criteria for

dissolved Cu, and thereby necessitate reconsideration of the dissolved Cu numeric targets identified for these TMDLs.

An implementation schedule with interim compliance milestones and dates has been developed for these Cu TMDLs. In particular, this compliance schedule is applicable to the reduction of Cu discharges from Cu AFPs on boats, and a 60% reduction is required for Cu discharges from boats over 12 years. The tributary and storm-drain mass-based wasteload allocations are currently being achieved (as of the date of the Santa Ana Water Board's adoption of these TMDLs). Final compliance with these TMDLs is to be achieved as soon as possible but no later than 12 years from the date of approval of these TMDLs by USEPA. If Cu discharges from sources other than boats exceed their allocations, a plan would be required to reduce those discharges.

The schedule is shown below and in Table 9.

The interim compliance milestones and dates are as follows:

A minimum 20% reduction of Cu discharges from Cu AFPs shall be achieved no later than (4 years from the date of USEPA approval of the Basin Plan Amendment).

A minimum 40% reduction of Cu discharges from Cu AFPs shall be achieved, no later than (8 years from the date of USEPA approval of the Basin Plan Amendment).

A minimum 60% reduction of Cu discharges from Cu AFPs shall be achieved, no later than (12 years from the date of USEPA approval of the Basin Plan Amendment).

Compliance with the Cu TMDLs will be considered to be achieved if the dissolved Cu CTR criterion of 3.1 µg/L is achieved (i.e., no impairment is demonstrated per the assessment methodology in the State Listing Policy (SLP)), and no further reduction in Cu discharges will be required even if the Cu wasteload allocations for boats are not yet achieved. If, however, the Cu wasteload allocations for boats are achieved, but the CTR criterion* is not achieved, these TMDLs, including the allocations identified for boats and other sources, will be reviewed and revised as needed to ensure CTR compliance, and further reduction in Cu discharges from Cu AFPs, and/or other sources, may be required. *(or a dissolved Cu CTR chronic criterion adjusted by a WER other than 1, or an approved dissolved Cu chronic SSO)*

The percent reductions and schedule for those reductions identified above shall become moot upon the demonstration that compliance with these TMDLs has been achieved.

This approach allows for the implementation of prioritized tasks over time, evaluation of their efficacy, and adaptive management of implementation strategies to ensure that the TMDLs are implemented effectively, efficiently and fairly.

The percent reductions identified in the interim schedule are based on the time expected to be required to implement reasonably foreseeable measures to achieve the reductions. As described in more detail below, these measures include the use of BMPs during hull cleaning, such as the use of soft cloths or a container/filter method of hull cleaning, the development and implementation of diver (underwater hull cleaner) certification/education programs for hull

cleaning, and boat owner/boatyard education programs. Since these measures are already in place in other areas where Cu TMDLs have been adopted due to impairment of the water column by Cu from boats (i.e., Shelter Island Yacht Basin, Marina del Rey), it is expected that comparable programs can be developed and implemented for Newport Bay in approximately 1-2 years, or less. Earley et al.'s study on the life cycle contributions of Cu from vessels demonstrated that an approximate 24% and 32% reduction in Cu discharges from hull cleaning (for epoxy and ablative paints, respectively) can be achieved by using BMPs (soft cloths) compared to non-BMPs (abrasive pads) (Earley et al, 2013, Table 5). In addition, some reduction in Cu discharges is likely to occur as boats are repainted with lower leach rate Cu AFPs (per DPR's maximum Cu leach rate regulation of 9.5 µg/cm^2/d). However, the amount of this reduction depends on the extent of the current use of Cu AFPs with leach rates higher than the maximum allowable leach rate. Nevertheless, the expectation of a minimum 20% reduction as the result of the implementation of BMPs within 4 years after the effective date of the TMDLs is reasonable.

The additional reductions in Cu discharges that would be required pursuant to the interim compliance milestones and dates are similarly expected to be achievable, given the anticipated, continued and potentially enhanced use of BMPs. Dischargers may elect to pursue additional hull cleaning options, such as the use of a container/filter system, and/or dry docking, that could significantly reduce Cu discharges to the Bay from Cu AFPs. Dry docks and a container/filter system for hull cleaning are already available in the Bay, and container/filter system(s) are likely to be improved in the future. The proposed interim schedule for reductions allows ample time for the improvement and use of such systems. Further, Cu discharge reductions are likely to occur as the result of the ongoing use of BMPs, and conversion to lower leach rate Cu AFPs (per DPR's leach rate regulation) or other non-Cu AFPs.

These Cu TMDLs recognize that compliance with the CTR chronic criterion (3.1 µg/L) may be achieved in Newport Bay before the 60% reduction of Cu discharges from boats is achieved. If such compliance is achieved, no further reductions in Cu discharges will be required. The maximum 12-year time frame is considered to be sufficient to allow the development and implementation of BMPs for hull cleaning, and for boats to be repainted with lower leach rate Cu AFPs or non-biocide AFPs/coatings as part of the routine maintenance of boats. This compliance schedule also allows for the consideration of Newport Bay site specific Cu objectives or WER adjustments to the CTR criteria, or the Saltwater Cu Biotic Ligand Model (if this model is approved by USEPA for such use) if the dischargers choose to pursue this option. If such Newport Bay-specific adjustments or objectives are approved, then reconsideration of the need for and nature of these TMDLs will be appropriate.

2) Monitor and evaluate Cu in sediments with the sediment quality objectives (SQOs) methodology for compliance with the sediment Cu numeric target (ERL) or the alternative SQOs target and evaluate the sediment Cu SQOs data using the ERM guideline plus toxicity analyses for trend analyses (Task 2, Table 9)

The second priority of these Cu TMDLs is to monitor and evaluate Cu in sediment using the sediment quality objectives (SQOs) methodology (including chemistry, toxicity, benthic community analyses) required by the Sediment Quality Provisions (SWRCB 2018), to determine the sediment condition and compliance with the sediment Cu numeric (ERL) or alternative SQOs target; and evaluate the sediment Cu SQOs data using the ERM guideline (270 µg/g) and toxicity analyses in paired samples to determine sediment Cu and toxicity trends. Sampling should be conducted in the Lower Bay and lower Upper Bay, including marinas and the Turning Basin/South Lido Channel areas

that previously exceeded the sediment Cu ERM guideline and areas with no or limited SQOs or sediment Cu data (in particular, marinas).

Compliance with the sediment Cu target may be achieved by 1) meeting the ERL sediment Cu target; or 2) meeting the SQOs target which is the sediment quality condition of Unimpacted or Likely Unimpacted per the SQOs methodology (interpretation and integration of multiple lines of evidence as defined in the Sediment Quality Provisions).
If the sediment quality condition of Unimpacted or Likely Unimpacted is not demonstrated, conduct stressor identification studies using the SQOs methodology~~,~~ to determine whether Cu is the cause of the impacted condition. If Cu is not shown to be the cause of the impacted condition, the alternative sediment Cu SQOs target is achieved. (See Table 5-1b Numeric and Alternative Targets for Sediment Copper (Cu) in Newport Bay.)

3) Meet Copper (Cu) mass-based allocations for tributary and storm drain runoff - continue to monitor and evaluate Cu concentrations and flow in runoff (Task 3, Table 9)

The second highest source of Cu to Newport Bay is tributary runoff. Cu loading from storm drains is small compared to boats and tributaries but may be important locally.

The third priority is to meet the Cu allocations for tributary and storm drain runoff. This task includes the continued monitoring and evaluation of Cu (and other metals) in tributary and storm drain runoff.

4) Evaluate local impacts of Copper (Cu) discharges from larger storm drains (Task 4, Table 9)

The fourth priority is to evaluate the local impacts of storm drain runoff from larger storm drains. This task includes the monitoring and evaluation of Cu in larger storm drain discharges, and in-Bay receiving waters and sediments below storm drain outlets for compliance with the numeric targets for dissolved Cu (CTR chronic and acute criteria) and the sediment Cu numeric or alternative SQOs target~~s~~.

Monitoring and evaluation of sediments shall be conducted with the SQOs methodology and shall include chemistry, toxicity, and benthic community analyses. SQOs data shall be used to determine the sediment condition and compliance with the sediment Cu numeric or SQOs target. The data shall also be evaluated using the sediment Cu ERM and toxicity analyses in paired samples.

Summary
These Cu TMDLs include compliance schedules that allow time to implement and adaptively manage the tasks to ensure effectiveness, efficiency, and fairness.

Final compliance with the Cu TMDLs must be achieved as soon as possible but no later than 12 years from the date of approval of the TMDLs by USEPA.
The compliance schedule approach also recognizes that dischargers may elect to pursue investigation(s) and adoption of site-specific objectives for Cu in Newport Bay that may supersede the CTR criteria for dissolved Cu, and thereby necessitate reconsideration of the water column numeric targets identified for these TMDLs.

Implementation tasks and schedules are summarized in Table 9 below, along with the parties responsible for implementation of these TMDLs in Newport Bay (listed by task).

The Santa Ana Water Board will implement these requirements through appropriate orders issued to the dischargers, e.g., waste discharge requirements, conditional waiver(s) of waste discharge requirements, Water Code section 13267 investigative orders, and, where necessary, cleanup and abatement or other enforcement orders. The dischargers are encouraged to coordinate their efforts to implement these TMDLs to optimize efficacy and the use of resources.

Table 9 - Implementation Plan and Schedule for Copper (Cu) TMDLs

Implementation Task	***Schedule and Dischargers***
1) Reduce Copper (Cu) discharges from Cu antifouling paints (Cu AFPs) on recreational and commercial boats	*As soon as possible but no later than (12 years from date of USEPA approval of the Basin Plan amendment), with the following interim schedule:* *No later than (4 years from the date of USEPA approval of the Basin Plan amendment): A minimum 20% reduction of Cu discharges from AFPs shall be achieved.* *No later than (8 years from the date of USEPA approval of the Basin Plan amendment): A minimum 40% reduction of Cu discharges from AFPs shall be achieved.* *No later than (12 years from the date of USEPA approval of the Basin Plan amendment): A minimum 60% reduction of Cu discharges from AFPs shall be achieved.* *Compliance with the Cu TMDLs will be considered to be achieved if the dissolved Cu CTR chronic criterion of 3.1 µg/L* is achieved, (i.e. no impairment is demonstrated per the assessment methodology in the State Listing Policy (SLP)), and no further reduction in Cu discharges will be required even if the Cu wasteload allocation for boats is not yet achieved. If, however, the Cu wasteload allocation for boats is achieved, but the CTR chronic criterion* is not achieved, these TMDLs, including the allocations identified for boats and other sources, will*

	be reviewed and revised as needed to ensure compliance with the dissolved Cu CTR criteria and further reduction in Cu discharges from Cu AFPs and/or other sources may be required. **(or a chronic CTR criterion adjusted by a WER other than 1, or an approved dissolved Cu chronic SSO)* *The percent reductions and schedule for those reductions identified above shall become moot upon the demonstration that compliance has been achieved.*
1.1 Implementation Plan and Schedule from dischargers to reduce Cu discharges from Cu AFPs on boats *1.1.1 The dischargers shall submit their own proposed implementation plan(s) and schedule(s) to achieve reductions of Cu discharges from Cu AFPs in accordance with the requirements identified in Task 1 above.* *The proposed implementation plan(s) and schedule(s) shall include monitoring and evaluation of Cu in marinas, channels, and open water sites in the Bay; identify actions to be taken to reduce Cu from boats; and determine the Cu load reduction from boats.* *The proposed plan(s) shall include tasks to monitor and evaluate dissolved and total Cu in water to determine compliance with the dissolved Cu CTR chronic criterion, and water quality parameters (DOC, pH, salinity, temperature, TSS).* *1.1.2 The dischargers shall implement their plan(s) and schedule(s), and submit an annual report that includes all monitoring data and assessment of that data including a determination of compliance with the dissolved Cu CTR chronic criterion.* *Dissolved Cu data - determine compliance with the dissolved Cu CTR chronic criterion.* *Total Cu data and water quality parameters to evaluate trends over time.*	*<u>Dischargers</u>* *City of Newport Beach (City)* *County of Orange (County)* *Marina owners/operators* *Individual boat owners* *Underwater hull cleaners* *Boatyard owners/operators* *1.1.1 As soon as possible but no later than (3 months from date of USEPA approval of the Basin Plan amendment*) *1.1.2 Upon Santa Ana Water Board approval of the dischargers' implementation plan(s) and schedule(s) or upon Executive Officer approval.* *The report shall be submitted one year from the date of Santa Ana Water Board or Executive Officer approval of the implementation plan, and annually thereafter. The Executive Officer is authorized to adjust the annual report submittal schedules based on justification of the adjustments.*

The report should also identify tasks implemented and the effectiveness of those actions; and evaluate progress towards meeting the dissolved Cu CTR chronic criterion, the TMDL allocations for Cu discharges from boats and the percent reduction requirements identified in 1) above.	
1.2 Reduce Cu Discharges from Cu AFPs on Recreational and Commercial Boats (Recommended Implementation Tasks) *The implementation plan(s) and schedule(s) (not to exceed 12 years) proposed by the dischargers shall consider the recommended tasks listed below and provide justification for tasks that are not included in their plan. If the implementation plan(s) include tasks that are not among the recommended tasks, the discharger(s) must provide justification and documentation to demonstrate that selected tasks are expected to achieve the TMDLs.* ***1.2.1 Require underwater hull cleaners to use BMPs and develop and implement a diver certification program that includes education; clean boats according to the manufacturer's label instructions and consider a reduced cleaning frequency schedule if feasible.*** *The implementation plan(s) shall consider strategies to:* *1) Require underwater hull cleaners to use BMPs, such as soft cloth and/or container/filter methods;* *2) Develop and implement a diver certification, permit or licensing program, including education, training, and enforcement;* *3) Use additional BMPs developed by dischargers to reduce hull cleaning discharges, including use of a container/filter method during cleaning, and dry dock cleaning and storage; and* *4) Clean boats according to the manufacturer's label instructions and consider a reduced cleaning frequency, if feasible.*	

1.2.2 Develop/Continue Education Program(s) for Boaters, and Boatyards and Marina Owner/Operators *The implementation plan(s) shall consider strategies to develop and/or continue education programs for boaters, and boatyard and marina owner/operators, that include the following:* *1) Cu water quality issues, Cu impairment, and Cu TMDL requirements;* *2) BMP requirements for all underwater hull cleaners, including the use of soft cloths or container/filter methods, and BMP requirements for boatyards;* *3) Conversion from current Cu AFPs to lower leach rate Cu AFPs or non-biocide AFPs including costs (application, maintenance, and hull cleaning costs), availability, and maintenance requirements, including BMPs for hull cleaning (label use recommendations should be followed for these paints);* *4) The use of non-Cu AFPs containing other biocides is not recommended; however, if non-Cu biocide AFPs are used, then recommended BMPs for hull cleaning and label use recommendations should be followed for these paints;* *5) Department of Pesticide Regulation (DPR) recommendations for reduced hull cleaning frequency;* *6) Alternative boat storage options, such as dry dock storage and/or slip liners (see Task 1.2.1 above); and* *7) Conditions and requirements instituted by the City of Newport Beach and Orange County to reduce Cu AFP discharges to achieve TMDL requirements by dischargers (such as hull cleaning certification, permits or licenses for divers that include BMP requirements, or new conditions in City and County's (or other agency's) marina lease agreements and marina slip agreements with boaters).* ***1.2.3 Convert boats from current Cu AFPs to lower leach rate Cu AFPs or non-biocide AFPs.*** *(Lower leach rates Cu AFPs include those at or below DPR's maximum allowable leach rate of 9.5 µg/cm^2/d). (The conversion of Cu AFPs to non-Cu biocide AFPs is not recommended.)*	

The implementation plan(s) shall consider strategies to: *1) Convert boats from current Cu AFPs to lower leach rate Cu AFPs or non-biocide AFPs/coatings on recreational and commercial boats moored in the Bay permanently or intermittently for more than 30 consecutive days. The order of use preference for alternative AFPs/coatings is:* *1.1) Cu AFPs with leach rates at or below 9.5 µg/cm^2/d (DPR's leach rate regulation),* *1.2) non-biocide AFPs/coatings,* *1.3) non-Cu biocide AFPs (The conversion of Cu AFPs to non-Cu biocide AFPs is not recommended.)* *Recommended BMPs for hull cleaning, and label use recommendations should be followed for these paints (see 1.2.1 above);* *2) Require new boats to use lower leach rate Cu AFPs (leach rates at or below 9.5 µg/cm^2/d per DPR's regulation) or non-biocide AFPs/coatings.* *Recommended BMPs for hull cleaning and label use recommendations should be followed for these paints (see 1.2.1 above).* *(The use of non-Cu biocide AFPs is not recommended);* *3) Determine the Cu AFPs currently in use and Cu discharges to the Bay from those Cu AFPs, especially for commercial vessels.* *4) Provide incentives for marina owner/operators, and individual boat owners in marina leases, permits, or other mechanisms, such as the required use of BMPs and/or the use of incentives to boaters who convert to lower leach rate Cu AFPs or non-biocide AFPs.*	
2) Monitor and evaluate Cu in sediments using the sediment quality objectives (SQOs) methodology (including chemistry, toxicity, benthic community analyses) (required by the Sediment Quality Provisions), to determine the sediment condition and compliance with the sediment Cu numeric target (ERL) or the alternative SQOs target; and evaluate sediment Cu SQOs data using the ERM guideline (270 µg/g) and toxicity analyses in paired	

samples to determine sediment Cu and toxicity trends. *Sampling should be conducted in the Lower Bay and lower Upper Bay, including areas that previously exceeded the sediment Cu ERM guideline and areas with no or limited SQO or sediment Cu data (in particular, marinas).* ***Compliance with the sediment Cu target may be achieved by 1) meeting the ERL sediment Cu target; or 2) meeting the SQOs target which is the sediment quality condition of Unimpacted or Likely Unimpacted per the SQOs methodology (interpretation and integration of multiple lines of evidence as defined in the Sediment Quality Provisions).*** *If the sediment quality condition of Unimpacted or Likely Unimpacted is not demonstrated, conduct stressor identification studies using the SQOs methodology~~,~~ to determine whether Cu is the cause of the impacted condition. If Cu is not shown to be the cause of the impacted condition, the alternative sediment Cu SQOs target is achieved. (See Table 5-1b Numeric and Alternative Targets for Sediment Copper (Cu) in Newport Bay.)*	
2.1 Implementation Plan and Schedule from dischargers *Monitor and evaluate sediments with the SQOs methodology (including chemistry, toxicity, and benthic community analyses) to determine the sediment condition and compliance with the sediment Cu numeric target or the alternative SQOs target; evaluate sediment Cu SQOs data using the ERM guideline (270 µg/g) and toxicity analyses in paired samples to determine sediment Cu and toxicity trends. Sampling should be conducted in the Lower Bay and lower Upper Bay, including areas that previously exceeded the sediment Cu ERM guideline and areas with no or limited SQOs or sediment Cu data (in particular, marinas).* *If using the alternative SQOs target for compliance, conduct stressor identification studies if the sediment condition is not Unimpacted or Likely Unimpacted to determine*	*<u>Dischargers</u>* *City of Newport Beach (City)* *County of Orange (County)* *Marina owners/operators* *Individual boat owners* *Underwater hull cleaners* *Boatyard owners/operators* *2.1.1 As soon as possible but no later than (3 months from date of USEPA approval of the Basin Plan amendment)* *2.1.2 Upon Santa Ana Water Board approval of the dischargers' implementation plan or upon Executive Officer approval.* *The report shall be submitted one year from date of Santa Ana Water Board or Executive Officer approval of the implementation plan(s) and schedule(s), and annually thereafter. The Executive*

whether Cu is the cause of the impacted condition. *2.1.1 The dischargers shall submit proposed implementation plan(s) and schedule(s) to monitor and evaluate sediments with the SQOs methodology (chemistry, toxicity, and benthic community analyses) to determine the sediment condition and compliance with the sediment Cu numeric target (ERL) or the alternative SQOs target; evaluate sediment Cu SQOs data using the ERM guideline (270 µg/g) and toxicity analyses in paired samples to determine sediment Cu and toxicity trends. Sampling should be conducted in the Lower Bay and lower Upper Bay, including areas that previously exceeded the sediment Cu ERM guideline and areas with no or limited SQOs or sediment Cu data (in particular, marinas).* *If using the alternative SQOs target for compliance, conduct stressor identification studies if the sediment condition is not Unimpacted or Likely Unimpacted to determine whether Cu is the cause of the impacted condition.* *2.1.2 The dischargers shall implement their plan(s) and schedule(s), and submit an annual report that includes the data and assessment of that data with SQOs methodology to determine the sediment condition and compliance with the sediment Cu numeric target (ERL) or the alternative SQOs target; evaluate the sediment Cu SQOs data using the ERM guideline (270 µg/g) and toxicity analyses in paired samples to determine sediment Cu/toxicity trends. If using the alternative SQOs target for compliance, conduct stressor identification studies if the sediment condition is not Unimpacted or Likely Unimpacted to determine whether Cu is the cause of the impacted condition.* *This annual report may be combined with the report required in 1.1.2. above.*	*Officer is authorized to adjust annual report submittal schedules based on the demonstration that such adjustment is justified.*
3) Meet Copper (Cu) mass-based allocations for tributary and storm drain runoff - continue to monitor and evaluate Cu concentrations and flow in runoff	

3.1 The Santa Ana Water Board will revise existing WDRs and NPDES permits *Existing permits, including the MS4 storm water permit and State Water Board general permits, will be revised as necessary to implement the Cu TMDLs' requirements.* *New permits will implement applicable Cu TMDLs requirements.*	*Existing permits: Upon permit renewal (or earlier, if dictated by circumstances that require revisions to an existing permit) after (date of USEPA approval of the Basin Plan amendment), recommend changes to permits issued by the State Water Board, (i.e., Industrial General Permit, Construction General Permit, Scrap Metals General Permit).* *New permits: as new permits are established.*
3.2 Monitoring and evaluation by dischargers *3.2.1 The dischargers shall submit**,** individually or collectively**,** proposed implementation plan(s) and schedule(s) to monitor flow and Cu concentrations and determine the Cu loads from tributary and storm drain runoff to demonstrate compliance with the Cu mass-based wasteload and load allocations (WLAs, LAs)**.*** *The proposed plan(s) shall include monitoring and evaluation of dissolved Cu and total Cu in water, and water quality parameters (DOC, pH, salinity, temperature, and TSS). These plan(s) shall also include the determination of the Cu loads in tributary and storm drain runoff. (Existing monitoring for MS4 systems may be utilized for this task.)* *3.2.2 The dischargers shall implement their plan(s) and schedule(s), and submit an annual report that includes the data and an assessment of that data, with respect to achieving the TMDLs mass-based allocations. (Existing monitoring and reporting for MS4 systems may be utilized for this task.)* *3.2.3 If the Cu loads exceed the TMDLs' allocations for urban and/or agricultural runoff, the dischargers shall develop and submit proposed plan(s) and schedule(s) to achieve the TMDLs allocations for Cu discharges from tributary and storm drain runoff. The proposed plan(s) and schedule(s) shall include a reporting program.*	*Dischargers* *County of Orange (County)* *City of Newport Beach (City)* *Other MS4 permittees* *CalTrans* *Agricultural dischargers* *Other NPDES permittees* *3.2.1 As soon as possible but no later than (3 months from date of USEPA approval of the Basin Plan amendment)* *3.2.2 Upon Santa Ana Water Board approval of the dischargers' implementation plan(s) and schedule(s) or upon Executive Officer approval. The report shall be submitted one year from the date of Santa Ana Water Board or Executive Officer approval of the implementation plan, and annually thereafter. The Executive Officer may adjust annual report submittal schedules upon determining that such adjustment is justified.* *3.2.3 As soon as possible but no later than 3 months from the finding that the that WLAs or LAs have not been achieved, as determined by the Executive Officer.* *3.2.4 Upon Executive Officer approval of the remediation plan.*

3.2.4 The dischargers shall implement their plan(s) and schedule(s), and submit a report that identifies the actions taken and the effectiveness of those actions, and evaluate progress towards meeting the TMDLs mass-based allocations for Cu discharges from tributary and storm drain runoff.	
4) Evaluate local impacts of Copper (Cu) discharges from larger storm drains	
While Cu discharges from larger storm drains discharging directly to the Bay (i.e., El Paseo, Carnation, Polaris, PCH West, Arches West and Arches East) are low compared to discharges from Cu AFPs and tributary runoff, Cu loads from larger storm drains may have localized impacts in receiving waters near these storm drain outlets. *4.1 The dischargers shall submit proposed implementation plan(s) and schedule(s) to evaluate the local impacts of Cu discharges from the larger storm drains (48 to 78 inches in diameter) in the Upper and Lower Bay. (The six larger storm drains in the Bay include El Paseo, Carnation, Polaris, PCH West, Arches West, and Arches East.)* *The proposed plan(s) shall include monitoring and evaluation of dissolved and total Cu in larger storm drain discharges (Task 3), and in-Bay receiving waters near storm drains, and include water quality parameters (DOC, pH, salinity, temperature, TSS).* *The proposed plan shall include monitoring and evaluation of in-Bay sediments near storm drain outlets using the SQOs methodology (chemistry, toxicity, and benthic community analyses) (per the Sediment Quality Provisions) to determine the sediment condition and compliance with the sediment Cu numeric (ERL) or alternative SQOs target and evaluate sediment Cu SQOs data using the ERM guideline (270 µg/g) and toxicity analyses in paired samples for trend analyses. Sampling should be conducted in the Lower Bay and lower Upper Bay, including areas that previously exceeded the sediment Cu ERM*	*<u>Dischargers</u>* *County of Orange (County)* *City of Newport Beach (City)* *Other MS4 permittees* *CalTrans* *Agricultural dischargers* *Other NPDES permittees (including IGP, Construction)* *4.1 As soon as possible but no later than (3 months from date of USEPA approval of the Basin Plan amendment).* *4.2 Upon Santa Ana Water Board approval of the dischargers' implementation plan(s) and schedule(s) or upon Executive Officer approval.* *4.3 As soon as possible but no later than 3 months from the finding of impairment in the water column, or the finding that sediments are impacted, as determined by the Executive Officer* *4.4 Upon Executive Officer approval of the plan(s) and schedule(s)*

guideline and areas with no or limited SQOs or sediment Cu data (in particular, marinas). *If using the alternative SQOs target for compliance, conduct stressor identification studies if the sediment condition is not Unimpacted or Likely Unimpacted to determine whether Cu is the cause of the impacted condition.* *The plan shall include a recommended reporting program/schedule.* *4.2 The dischargers shall implement their plan(s) and schedule(s) to determine the significance of localized Cu discharges from larger storm drain discharges and submit a report that includes the data and an evaluation of the data.* *4.3 If impairment for Cu is found in the water column (based on exceedances of the CTR criteria consistent with the assessment methodology in the SLP), the dischargers shall develop and submit a plan(s) and schedule(s) to reduce Cu discharges from storm drains to impacted areas, and correct the impairment. The proposed plan(s) and schedule(s) shall include a recommended reporting program.* *4.4 The dischargers shall implement their plan(s) and schedule(s) to correct impairment in the water column, resulting from Cu discharges from storm drains in the Upper and Lower Bay. The reports submitted shall identify actions taken and the effectiveness of those actions and evaluate progress towards meeting the Cu CTR criterion and the concentration-based TMDL allocation for Cu discharges from storm drain runoff and numeric target for sediments.*	
5) The Santa Ana Water Board will issue new orders and revise existing orders to implement the Cu TMDLs	*As soon as possible after (the date of USEPA approval of the Basin Plan amendment)*
6) Submit Updated Cu TMDLs Report, and Reevaluate and Revise the TMDL	*Within six months of the completion of implementation Tasks 1 through 5, an updated TMDL report shall be submitted*

	by the dischargers. This report shall evaluate the efficacy of the implemented Cu reduction strategies and provide recommendations for revisions to those strategies and these Cu TMDLs. *Subject to staffing and resource availability, the Santa Ana Water Board will reevaluate these TMDLs in (five years after the approval of the Basin Plan amendment by USEPA) or earlier if warranted by new data, the adoption of site-specific Cu objectives or the Updated TMDLs report.*

References for Copper (Cu) TMDLs

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