Meeting Notes

Marinas Interagency Coordinating Committee (MIACC) & Anti-Fouling Strategies Workgroup (AFSWG) Meeting

Thursday, May 30th, 2019

1:00 PM - 4:30 PM

Hosted by the State Water Resources Control Board, California Coastal Commission, and Santa Cruz Harbor

Santa Cruz Harbor Public Meeting Room
365 A Lake Avenue, Santa Cruz 95062

<table>
<tr><th colspan="2">1. Introductions and Announcements</th><th>1:00 - 1:30 pm (30 mins)</th></tr>
<tr><td>Speaker:</td><td colspan="2">Michael Hanks – Nonpoint Source Program, State Water Resources Control Board (Michael.Hanks@waterboards.ca.gov)</td></tr>
<tr><td>Purpose:</td><td colspan="2">• Participants introduce themselves and their affiliation
• Opportunity for participants to give updates and announcements</td></tr>
<tr><td>Attendance:
(listed in alphabetical order by first name)</td><td>In Person:
• Andrea León – San Francisco Dept. of Public Health
• Darryn Elder-Gotta – San Francisco Dept. of Public Health
• Melissa Salinas – Dept. of Toxic Substances Control (DTSC)
• Michael Hanks – State Water Resources Control Board (SWRCB)
• Michael Sandecki – California Coastal Commission (CCC)
• Suzanne Davis – DTSC
• Vanessa Metz – CCC
• Virginia St. Jean – San Francisco Dept. of Public Health</td><td>On the Phone:
• Aniela Burant – Dept. of Pesticide Regulation (DPR)
• Barry Snyder – Amec Foster Wheeler
• Chris Scianni – State Lands Commission
• Colin Anderson – American Chemet
• Holly Wyer – Ocean Protection Council
• Jeanie Mascia – SWRCB
• Jen Mongolo – L.A. County Beaches & Harbors
• Jim Hayes – Almar Management/Clean Marina Program
• Maral Tashjian – L.A. County Beaches & Harbors
• Michael Tripp – L.A. County Beaches & Harbors
• Michael Quill – L.A. Waterkeeper
• Neal Blossom – American Chemet
• Ray Hiemstra – Orange County Coastkeeper
• Rolf Schottle – Amec Foster Wheeler
• Shana Rapoport – L.A. Regional Water Quality Control Board
• Stephanie Bauer – Port of San Diego
• Sue Keydel – U.S. EPA
• Vicki Gambale – The Bay Foundation</td></tr>
<tr><td>Materials:</td><td colspan="2">• Meeting notes from last MIACC meeting (October 2018)</td></tr>
<tr><td>Participant Updates & Announcements:</td><td colspan="2">• Ocean Plan Triennial Review. (Mike Hanks): The California Ocean Plan's water quality standards are updated every 3 years. The 2019 review's draft update will</td></tr>
</table>

	be released on June 24 for a 45-day public comment period. On July 12 there will be a staff public workshop in Sacramento, and Dec. 3 there will be a Water Board meeting for consideration of adoption of the plan update. • Update to Recreational Boater's Guide to Using Hull Paint in California. *(Stephanie Bauer):* The Port of San Diego worked with staff from DPR, Calif. Division of Boating & Waterways, and L.A. County Beaches & Harbors to update this guide to reflect recent changes to DPR's list of copper hull paints and the allowable copper leach rate. The updated guide will relay this information to boaters, and identify where to get more information. The guide was simplified to educate boaters about what copper hull paints are legally available for sale, and environmentally-sound best practices. Comments on the draft update are due to Stephanie by June 26; the goal is to have the guide printable by August. • Interagency Alternatives Assessment Webinar. *(Mike Hanks & Suzanne Davis):* A webinar from the Netherlands will be June 11, from 8 am to 9 am PST, on safe-by-design innovations focusing on anti-fouling paints and lessons learned. This group includes federal agencies such as OSHA, DOD, U.S. EPA, Consumer Products Safety Commission, also Health Canada and some European agencies. Contact Suzanne (suzanne.davis@dtsc.ca.gov) if you have questions about the webinar. • Updating Checklist for San Francisco Clean & Green Program for Maritime Industries. *(Virginia St. Jean):* San Francisco Dept. of Public Health has a Clean & Green recognition program for maritime industries. Virginia is updating the program's checklist, and would like to see other similar checklists. She is asking for feedback, including information on anti-fouling paints for marinas' structures.
Action Items:	• We'd be happy to broadcast information to the group on any other relevant upcoming events or notices that you send us. • *Vanessa Metz:* Will post final meeting notes, presentations, and materials on the Coastal Commission's webpage for the *Marinas and Recreational Boating Workgroup*, under the heading *Archive of Meeting Notes & Presentations*.

2. Biofouling Management – Western Regional Panel on Aquatic Nuisance Species	**1:30 – 2:00 pm (30 min.)**
Speaker:	***Chris Scianni –*** *Marine Invasive Species Program, California State Lands Commission* (Chris.Scianni@slc.ca.gov)
Purpose:	Provide an update on the development of biofouling Best Management Practices for recreational boats.
Background:	The Coastal Committee of the Western Regional Panel has identified biofouling associated with recreational boats as a risk for introduction and spread of aquatic nuisance species. The Coastal Committee prepared a Biofouling White Paper, highlighting actions that can be taken to reduce this risk. The committee is also developing Best Management Practices for biofouling management to offer guidance to boat owners.
Materials:	• *Biofouling Management – Assessing Biosecurity Risks and Best Practices* (PPT). Chris Scianni, Marine Invasive Species Program, Calif. State Lands Commission. • *Biofouling in the U.S. Pacific States and British Columbia* (White Paper). (Chris Scianni, Maurya Falkner, and Lisa DeBruyckere, April 2017).
Presentation Notes:	**Summary:** The SLC's Marine Invasive Species Program focuses on biosecurity and invasive species related to commercial shipping, mostly ballast water and biofouling. Chris also chairs the Coastal Committee of the Western Regional Panel on Aquatic Nuisance Species, which is under the umbrella of a federal Aquatic Nuisance Species taskforce. The Committee focuses on coastal marine and estuarine invasive species issues from

	California through Alaska, including British Columbia, and Hawaii. The Committee addresses biofouling risks and management for a variety of vessel types, not just commercial ships, and all sorts of invasive species issues. Vessel biofouling can include barnacles, tubeworms, and bryozoans. If it gets really bad you get three-dimensional structure, with more types of organisms and more mobile organisms, and thus a lot more opportunities for species to jump ship when you pull into a new port or marina. The Committee's focus is not just on vessels, but also different types of mobile marine infrastructure. For example, mobile drilling rigs or construction barges, which sit in one area for a long period and become colonized, and then get moved on to the next job. In 2017, the Committee produced a white paper on biofouling in the Pacific states and British Columbia. Today's presentation will touch on the current science included in that paper, covering risks, management options, and gaps related to four different types of "vessels": 1) commercial merchant and passenger vessels, 2) recreational vessels, 3) commercial fishing vessels, and 4) mobile marine infrastructure. A review from 2015 showed 310 established marine and estuarine non-indigenous species (invertebrates and algae, excluding fish) along the North American West Coast. This is more than the combined total from the East Coast and Gulf Coast. A diagram from another paper in 2011 shows where the non-indigenous species along the west coast reside; most are in California. The black portion of each bar represents the species that were first detected in the region in California, and the white portion shows the species that were first detected in the region outside of California. The authors concluded that California serves as the beach-head for these invasions, as most of the species come into the region through California, and are moved northward through a variety of mechanisms, biofouling one of the main ones. In the white paper, the Committee touched on biofouling moving across ocean basins by commercial ships, and that's a big part of it. But there is movement up and down the coast through a variety of mechanisms. So they shifted their focus to how species are moving not just on the commercial ships, but also on mobile marine infrastructure, recreational boats, and commercial fishing vessels. They reviewed published information on traffic patterns and the number of vessels operating in the states and British Columbia, to see what the risks are for these four classes of vessels. There isn't a lot of information about where and how often recreational vessels move. They had to rely on small snapshot studies from different regions, as there is no central reporting authority. There are seasonal patterns, with most boating activity in the summer and fall. There is strong connectivity between nearby states or provinces, such as San Diego to Long Beach transfers. There are no existing biofouling regulations for the marine environment (they're not advocating for that), and no mechanism to encourage management of biofouling. The key takeaway from the report was this figure showing the spectrum (from none to abundant) of knowledge of vessel population size and activity levels (movements), and also the regulatory authority. For commercial merchant and passenger vessels, they know a lot about how many vessels there are and where they come from. There is also regulatory authority, as they have to report to state and federal agencies. So they have a good idea of the potential risks involved for these vessels. On the other end of the spectrum is mobile marine infrastructure (such as mobile drilling rigs and dredges); they don't know a lot about the population size or how often they are moving, and there really isn't any regulatory authority. And in the middle of the spectrum are recreational vessels and commercial fishing vessels; they have some information from snapshot studies, but there are a lot of unknowns about traffic patterns for these vessel classes. An action item the Committee placed on itself was to develop regionally-consistent best

practices outreach documents on how to manage biofouling for the three vessel classes that aren't commercial merchant and passenger vessels. (These have a lot of information and are regulated, so there aren't gaps as in the other categories). There are lots of best practices documents on how to select anti-fouling coatings, and best practices for in-water cleaning. This guidance is instead about how a boat owner can proactively make decisions to operate their vessel without the risk of spreading species from one region to another. They are still in the process of developing these guidance documents, targeting them to the operational profiles and owners of these vessels. Each document hits four topics: 1) what is biofouling, 2) the vessel types addressed, 3) why is managing biofouling important to the vessel owner, and 4) Best Management Practices, using branding such as "clean before you leave" and "coat your boat."

The Committee is using recommendations from the white paper to draft these best practices documents, then doing a few rounds of internal reviews and revisions. Their goal is to reach out to boat owners to do a practicality review to make sure what they're asking is possible and is useful guidance. At a recent Committee meeting discussing the best practices document for recreational vessels, which is nearly complete, there were questions about whether a tri-fold brochure is the best format for recreational boaters. So they added another component to the review, to figure out the best format for each of the user groups. Chris asked for suggestions on the best way to get information into the hands of boating communities, and whether there are groups that would be willing to help them out with their practicality review in the near future.

The goal of these guidance documents is clear, consistent messaging across jurisdictions on the west coast and Hawaii, and to fill information gaps where regulatory authority is lacking. They're not advocating for any regulatory authority, but want to make sure this guidance information is available and usable for boat owners and mobile marine infrastructure operators to use if they like.

If anyone has comments on the draft document for recreational boating (shown in the PPT), or can suggest groups to approach for the practicality review, or has any ideas on the format, please let Chris know over the next week or two. This tri-fold brochure describes what biofouling is; links to the Western Regional Panel's webpage for more information; describes the types of vessels targeted; points out some of the niche areas on recreational boats that are often overlooked and undermanaged (even if the hull is relatively clean, you still might see a lot of organisms in these crevices); and describes why managing biofouling is important to boat owners. The four Best Management Practices listed are: 1) maintain good records to stay on top of things; 2) "coat your boat," paying attention to the operating profile of your vessel and what coatings are legal in your area; 3) "clean before your leave" (a strategy being pushed across the globe for the past 10 years), because if the vessel leaves an area then transporting species becomes an issue; 4) use appropriate cleaning methods, and when you should clean your vessel. This guidance was a group effort, as the Committee has about 45 members (20 are very active); they've also drafted documents for commercial fishing vessels and mobile marine infrastructure, and are doing the practicality review now.

Discussion:

- **Q:** *Mike Hanks:* Why does mobile marine infrastructure have so little information and regulatory authority, is it because it's chartered internationally or is there a lack of laws about their biofouling?
  - *Chris Scianni:* They get used for different projects; a lot of mobile drilling rigs were going into Alaska for exploratory drilling, coming from all over. A company gets a lease for exploratory drilling, but the leasing agency doesn't know where the drilling rig is coming from. There isn't a lot of information about how many rigs are coming in and how often. A lot of times you only hear about the drilling rigs after the fact, when it becomes a big issue in the news. About five years

	ago, there were big mobile drilling rigs in Puget Sound waiting to go to Alaska, and there was a lot of protesting by those who didn't want the drilling to occur. There are a lot of nooks and crannies in these huge drilling rig structures, and they're not necessarily cleaned. The best practices document recommends using local equipment if possible; but if the equipment has to be transported, transport it dry (on a heavy lift vessel) so that the biofouling organisms die during a multi-week transit. It's oftentimes the same thing with dredge vessels and construction barges: a lease goes out for the dredging work, and the company hires their own dredges, but there's no documentation. For example, the Committee worked with the Army Corps of Engineers (ACOE) to try to figure out the population size of dredges in San Francisco Bay during a given year, and it was impossible to get at. ➢ **Q:** *Vanessa Metz:* Are you coordinating with the Dockwalkers Program to get your brochures out to them? o *Chris Scianni:* Not yet, but I did talk to Vivian Matuk about their program. We've been trying to identify different distribution channels, and Dockwalkers would be a good one to consider. o *Virginia St. Jean:* Vivian also has a distribution list, including harbor masters and people with lease agreements who might want to include some of this language. o *Vicki Gambale:* The Bay Foundation is the southern California coordinator for the Dockwalkers Program, and I want to reiterate to coordinate with Vivian, and she will bring us on board as well. We have a lot of contacts with all the harbors and marina managers from Santa Barbara to San Diego. o *Jim Hayes:* On the California Coastal Commission website, under Resources for Marinas and Boating, almost all of the groups listed there can help, including the Clean Marinas Program, and the Clean Boating program; all of these groups have a lot of contacts with the managers.
Action Items:	Over the next week or two, please provide Chris any comments on the draft document for recreational boating, suggestions of groups to approach for the practicality review, and any ideas on the brochure format.

3. Non-Biocide Hull Paint Study and Floating Dry Docking System at Marina Del Rey Harbor	**2:00 – 2:30 pm (30 min.)**
Speakers:	***Maral Tashjian*** *– Planning Specialist; &* ***Jennifer Mongolo*** *– Planner;* *Los Angeles County Department of Beaches and Harbors (LACDBH)* (MTashjian@bh.lacounty.gov)
Purpose:	Discuss the preliminary results of LACDBH's non-biocide hull paint study.
Background:	In March 2019, LACDBH concluded a local study to examine the performance and cost of non-biocide hull paints in the Marina del Rey Harbor. Seventeen County-owned boats were painted with a variety of currently available non-biocide paints and monitored for effectiveness. The study was developed as a precursor for providing recommendations and educational outreach to the local boating community on what non-biocide hull paints could be viable alternatives to copper anti-fouling hull paints.
Materials:	• *Marina del Rey Harbor – Dissolved Copper Reduction Initiatives Update* (PPT). Maral Tashjian & Jennifer Mongolo, L.A. County Dept. of Beaches and Harbors • *FAB Dock In-Water Dry Docking System* (online videos). FAB Dock. • *In-Water Dry Docking Systems* (flyer). L.A. County Dept. of Beaches and Harbors
Presentation Notes:	**Summary:** Marina del Rey Harbor is working on resolving issues in the harbor caused by copper biocide paint from recreational vessels. As part of their effort to reduce dissolved

	copper they started a multi-phase pilot study to look at available non-biocide paints. This presentation will go over the Pilot Paint Study, the results of Phase I, next steps, and other copper reduction initiatives (including floating dry docks). The overall goal of the study is to convert 100 boats in the harbor from copper to non-biocide paints, to evaluate the effectiveness of the non-biocide paints. Phase I of the Pilot Study converted 17 county-owned boats to non-biocide paints, starting in Fall 2017; the report was posted this month. Phase I provides educational outreach and recommendations to the boating community, to get private boat owners to convert their boats to non-biocide paints. The task timeline started with data collection and contracting, then paint conversion, followed by tracking, and a summary report. They did an inventory of available non-biocide paint, looking at prior paint studies, online searches, and recommendations from boating stakeholders. They gave each paint company a questionnaire about their paint (such as VOCs emitted, application method, and recommended cleaning schedules). They sent that information to local boatyards to see if they have any experience with these paints. They learned that one of the paints has a VOC level that exceeds what's permitted in the county, so they weren't able to use it. They also sent a questionnaire to local hull cleaners about their experience with these non-biocide paints. And finally, they did a boater's survey to see what paint they have on their boats, frequency of cleaning, etc. The survey showed 46% of boaters have copper-based paint, and 35% didn't know what kind of paint (which implies it is copper), so most boats are painted with copper. They settled on four paints from three companies. The 17 county vessels were stripped and repainted with non-biocide hull paints, which took four months using two boat yards. They selected boats of a similar type and usage to paint with different paints, so they could easily compare monitoring results. There was a 3-month performance monitoring period to assess fouling level and hull paint condition (using a U.S. EPA and Port of San Diego rating system). The Harbor had a contract with a hull cleaning company to clean their boats every two weeks, without the flexibility to schedule more frequent cleanings, which was a challenge. The Harbor added weekly diver inspections, and also interviewed boat operators on their boat's performance. The results showed variable performance for fouling and paint condition for all three of the paints that are hard non-biocide paints (ceramic or epoxy-based). These paints consistently had quite a bit of fouling and were difficult to clean. The other paint (Intersleek) is a soft non-biocide paint, and was consistently rated as mainly light fouling with excellent paint condition. The hard non-biocide paints required frequent aggressive cleaning at 2-week intervals, and still had normal to excessive fouling. They might have benefitted from weekly cleaning or a different cleaning method (such as power rotary brushes). The soft non-biocide paint (Intersleek) was easy to clean and had light to normal fouling; this paint has foul-release properties and is designed to not be cleaned. However, the soft non-biocide paint has high up-front costs and is easily damaged; it works well on frequently used boats. **Note:** The recording of the meeting stopped at this point, so please see the PowerPoint for information on the remainder of the presentation.
Action Items:	None

4. Motor Vehicle Brake Friction Materials Law (California Brake Pad Law)	**2:40 – 2:55 pm (15 min.)**
Speakers:	***Melissa Salinas & Suzanne Davis –*** *Safer Products and Workplaces Program, Department of Toxic Substances Control* (*Melissa.Salinas@dtsc.ca.gov & Suzanne.Davis@dtsc.ca.gov)*
Purpose:	Provide awareness of the California Brake Pad Law.
Background:	The California Brake Pad Law banned brake pads containing more than trace amounts of heavy metals and asbestos in 2014 and then also bans brake pads containing more than 5 percent copper in 2021. By 2025, the law reduces the amount of copper allowed to almost zero. The law requires manufacturers comply with laboratory testing and certify, with a mark, their products comply with the restrictions set for brake pads. DTSC is required to track the copper in brake pads reduction efforts and the progress of these efforts toward meeting the copper total maximum daily load allocations in California.
Materials:	*California Brake Pad Law* (PPT). Melissa Salinas, Dept. of Toxic Substances Control.
Presentation Notes:	**Note:** The recording of the meeting was re-started partway through this presentation, so please see the PowerPoint for information on the presentation prior to this point. **Summary:** The DTSC is collaborating with the SWRCB on a Legislative Report due to the Governor and Legislature on Jan. 1, 2023, on copper in brake pads reduction efforts, progress in meeting copper TMDLs in California, and recommended actions to meet copper TMDLs. They're starting to research how to find data or whether they need to develop data. As the MIACC is focused on water quality issues regarding copper, this is a great opportunity to share a brief introduction to the Brake Pad Law and ask for the group's thoughts on available data, and thoughts on appropriate contacts. The questions shown on data recommendations are to start a conversation, and they're open to a conversation with anyone who is interested. The Brake Pad Project Team members are shown in this graphic; they're looking for contacts in the Water Resources Control Board, and potentially in the Air Resources Board. They are also creating a Brake Pad Work Group to help them get through the process of collecting and analyzing data, and developing the legislative report. Today they're reaching out to this group to help them identify these contacts, interested agencies and stakeholders. The goals of the Work Group are to identify data and methodologies that are currently available, and to identify data gaps and other potential actions to reduce copper TMDLs. The tentative schedule for the Work Group includes a first meeting in June 2019 to determine frequency of meetings, identify topics, and fine-tune the goals. **Discussion:** ➢ **Q:** *Vanessa Metz:* Real roughly, how much of a contribution does brake pad copper make to a copper-impaired waterbody? Is it a big proportion of the copper impairment, or are other sources typically more important? o *Suzanne Davis:* Presently, we're not sure. The Sustainable Partnership back in 2009 tried to do an estimate for Bay Area watersheds, and identified it as one of the major non-point sources of copper to those watersheds. I'm not sure if it's the same thing for other waterbodies. The idea of this law was that waterbodies near highways would get a lot of deposition from copper emissions from brake dust. But we're hoping this Work Group will help us figure out how to make that determination. I've been working with the Air Board; they have brake emission factors we can use to estimate the amount of brake dust that is emitted, and based on the copper content we can determine from the current formulations, we can then come up with an estimate.

4. Motor Vehicle Brake Friction Materials Law (California Brake Pad Law)	2:40 – 2:55 pm (15 min.)
	But how to take that estimate and correlate it with TMDLs, that's the part we really need help on. We're looking to the water board for some methodologies or tools that have been developed that might help us adapt that. We're also reaching out to find other organizations that might help us with that question. o *Aniela Burant:* DPR has a new copper regulation designed to reduce copper concentrations in California marinas. We're starting a marina monitoring study this summer, looking at the contribution from anti-fouling paint; we hope to discuss this at a future MIACC meeting. So there might be a way we can work together, and have a conversation about how we're trying to assess copper concentrations. We're doing a lot of dry season sampling, so perhaps you can do wet-season sampling. o *Holly Wyer:* Have you had an opportunity to reach out to the San Francisco Estuary Institute or the Southern California Coastal Water Research Project? These organizations have regional monitoring programs, and may have some copper data in stormwater and for other sites that are close to roads. o *Vanessa Metz:* Didn't BASMAA (Bay Area Storm Water Management Agencies Association) do a brake pad study a number of years ago? o *Virginia St. Jean:* Kelly Moran was one of the researches on that o *Melissa Salinas:* Kelly Moran was one of the key individuals in crafting the Brake Pad Law. That work she did was later incorporated into the Sustainable Partnership Project, and so we're looking at that data along with what's been done by Washington State. o *Virginia St. Jean:* Copper is a big architectural feature (such as copper gutters), and that's going to be a little tougher to find out about. Access to waterways might be a determining factor, but copper does get into storm drains. o *Mike Hanks:* Why are motorcycles excluded from the Brake Pad Law? o *Melissa Salinas:* Brake pads are a lot smaller on motorcycles, so my speculation is if they try to take the copper out of the brake pads, the pads would be a lot larger, and that might cause a major redesign of the braking system on motorcycles, and possibly affect safety. The Brake Pad Law affects any vehicle on California Highways, which includes trailers. CHP, the fire department, buses, and garbage trucks. However, large equipment vehicles such as construction vehicles may be exempt if they can't drive on the freeway itself (such as a Caterpillar tractor).
Action Items:	Contact the speakers with suggestions on available data and appropriate contacts.

5. Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures	2:55 – 3:25 pm (30 min.)
Speaker:	***Vanessa Metz –*** *Coastal Water Quality Program, California Coastal Commission (Vanessa.Metz@coastal.ca.gov)*
Purpose:	Provide recommendations for materials and Best Management Practices to minimize the water quality impacts of building overwater structures (e.g., piers, wharves, docks, boat ramps, and bridges) and waterfront structures (e.g., bulkheads and esplanades).
Background:	Materials used to build overwater and waterfront structures have the potential to degrade water quality. Treated wood is of particular concern in aquatic environments because the pesticides in wood preservatives – commonly copper – can adversely impact aquatic organisms, especially fish and invertebrates, and may accumulate in the underlying sediment. A variety of materials are available as alternatives to treated wood for building overwater and waterfront structures; inert coatings or wrappings may also

5. Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures	2:55 – 3:25 pm (30 min.)
	reduce the leaching of preservatives from treated wood. Best Management Practices, both during construction and long-term, must also be carefully considered to protect coastal water quality.
Materials:	• *Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures* (PPT). Vanessa Metz, California Coastal Commission. • *Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures* (Factsheet). Vanessa Metz, California Coastal Commission.
Presentation Notes:	**Summary:** For today's presentation, I'll start with protection of overwater & waterfront structures using treated wood and alternative materials, and also coatings and wrappings. Then I'll focus on the use of treated wood, including types of preservatives for various components of the structure, the preservative retention level (how much preservative is in the wood after treatment), and design features to minimize abrasion. I'll then discuss where to avoid treated wood, and how to do a preservative risk assessment. I'll conclude with a reminder to use Best Management Practices (construction-phase and post-construction) to prevent pollution of waterways with the chemicals in treated wood. Overwater structures include a range of structures, including piers, wharfs, docks, boat ramps, and bridges, which typically have both in-water components (such as piles or sheet-piles) and oftentimes above-water components (such as structural framework and decking). We're also talking about waterfront structures (such as bulkheads, esplanades, and boardwalks). Threats to building materials in the aquatic environment include insect damage (such as termites), fungal decay, impacts and stress (such as from boat damage), and in marine waters, also potential impacts from marine boring organisms and corrosive saltwater. A variety of techniques are used to protect these building materials. For at least a century, creosote was commonly used to protect wood against damage, including from marine borers and saltwater. A variety of other types of wood treatment preservatives have been approved as pesticides by the U.S. EPA, many of them copper-based. Alternative materials are available for both dock decking and piles (and other in-water structures). Coatings and wrappings, and design features (such as bumpers) can also help protect the wood or other building materials. The problem with treated wood in aquatic environments is that it leaches pollutants. Creosote was used for many decades to treat piles, and in the Santa Cruz Harbor they still have quite a few creosote-treated piles. Creosote leaches polycyclic aromatic hydrocarbons (PAHs), which accumulate in sediment and are toxic, and keep leaching for many years. The Coastal Commission hasn't approved the use of creosote-treated piles for new structures for many years. Most of the other commonly used preservatives are copper-based, and this group is familiar with the aquatic toxicity impacts of copper. Other toxins in wood preservatives approved for aquatic uses include dioxins, which are contaminants in pentachlorophenol ("penta"). Dioxins are highly toxic and bioaccumulate in marine life, so the Coastal Commission hasn't approved the use of penta-treated wood in aquatic environments for many years. The copper-based wood preservatives are what are commonly used now. Impacts of these pollutants are both in the water column and in the sediment (impacting benthic organisms), and some chemicals bioaccumulate in aquatic organisms. Very low concentrations of some of these pollutants, particularly copper, can affect fish and invertebrates adversely, even from short periods of exposure (5 or 10 minutes). Low levels of copper can affect juvenile fish olfaction, impacting their ability to both find prey

5. Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures	2:55 – 3:25 pm (30 min.)
	and escape predators, and the effects of short exposures can be long-lasting. Some alternatives to treated wood piles (and other in-water components) include reinforced concrete, steel, fiber-reinforced polymer composites, and a variety of combinations of these materials (such as steel-encased concrete). The Harbor here has examples of many of these materials (including spun-concrete, pre-cast concrete, polymer, and steel piles). CCC Water Quality staff recommends that piles be constructed of alternative materials instead of treated wood, unless there is a valid engineering reason for using treated wood (such as replacing a few wood piles in an existing structure, where alternative materials may cause undue stresses). For the decking, there are a variety of alternative materials than can be used instead of treated wood, including concrete, fiberglass, metal grating, plastic, wood-plastic composites (such as Trex), or naturally-decay-resistant wood (such as redwood, etc.). In the Santa Cruz Harbor, untreated Douglas fir decking has been in use for a decade without a problem. CCC Water Quality staff recommends prioritizing the use of alternative materials instead of treated wood for decking material, wherever feasible. Santa Cruz Harbor has examples of many of these materials, including metal grating, composites, and plastic decking. To further protect piles (made of wood or other materials such as concrete or steel), a variety of wrappings can be applied (including industrial-strength plastic wrapping and fiberglass jackets) or coatings (such as polyurea or epoxy). Wrappings and coatings can protect piles from impact, corrosive saltwater, and marine borers. To minimize leaching of preservatives, wrappings on treated wood piles need to extend from below the mudline to above the high-water line. Wrappings can also be used to repair a treated wood pile, such as installing a fiberglass jacket filled with epoxy around the pile. CCC Water Quality staff recommends that if a treated wood pile is used (with a valid engineering reason), the pile should be sealed completely with an inert coating or wrapping; inert means the coating or wrapping doesn't itself leach toxic chemicals into the water. We also recommend that coatings or wrappings on concrete or steel piles must be of an inert material. We've seen proposals for use of a coal-tar coating that leaches hydrocarbons into the water, so we want to avoid that. For decking, a variety of penetrating sealers (such as semi-transparent stains) or durable epoxy coatings can be used to reduce leaching of preservatives from treated wood decking. Studies have shown that just one treatment with a penetrating sealer on treated wood decking after construction reduces leaching of copper and other chemicals by 60% for at least 3 years. So sealers are effective, but my concern is that when maintaining or re-sealing the decking, you need to avoid sanding, scraping, and pressure-washing, because that releases treated wood particles into the water. That's of concern because due to their high surface area, treated wood particles leach a lot more copper into the water than does a larger chunk of wood. CCC Water Quality staff recommends considering applying a penetrating sealer to treated wood decking; the sealer should be toxic-free and preferably water-based. Also, we recommend taking care during maintenance to minimize the release of treated wood particles to the water. The next question is which preservative is best? The EPA has approved 9 treated wood preservatives for use in aquatic environments. Only three preservatives are approved for saltwater or brackish water immersion, where the wood needs protection from marine borers. Additional preservatives are also approved for freshwater use, or for saltwater/brackish water splash zones. Different components of the structure (such as decking vs. the support structure) have different requirements for both the preservative type and the strength of the preservative ("preservative retention level"). Of the three preservatives approved for saltwater or brackish water immersion (such as for piles and

5. Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures	2:55 – 3:25 pm (30 min.)

sheet-piles), two are copper-based, and the third is creosote. CCC Water Quality staff recommends avoiding creosote because of aquatic toxicity, unless there is a valid reason to use it (such as replacing a few wood piles in a copper-impaired waterbody).

That leaves two copper-based preservatives approved for saltwater immersion, Ammoniacal Copper Zinc Arsenate (ACZA) and Chromated Copper Arsenate (CCA). Both are metal-arsenate preservatives, meaning they contain arsenic, which has high toxicity to mammals and is a potential human carcinogen. So ACZA and CCA are not recommended for use where there is frequent human contact. However, the good thing about these metal-arsenate preservatives is they leach a lot less copper than most of the other copper-based preservatives. ACZA is the one mostly used on the west coast, because it effectively treats coast Douglas fir, a local wood commonly used for building materials. The other preservative, CCA, cannot treat Douglas fir, and is restricted to certain commercial and industrial uses. For 30 years, CCA was the treated wood you usually bought at a lumber yard, but it was phased out for residential use in 2004 due to human health concerns about its arsenic content. So we recommend using ACZA if you're using treated-wood marine piles.

For uses in or above freshwater, or in the splash zone above saltwater or brackish waters, there are several other approved preservatives. If the wood is not in human contact we recommend the metal-arsenate preservatives (such as ACZA), because they leach much less copper than most of the alternatives. But plan ahead, because ACZA-treated lumber may need to be special-ordered in some areas (as the lumber has to be shipped to a treatment facility). Instead of ACZA, people tend to use one of three arsenic-free preservatives approved for these uses, which are safer if there is human contact. One is Alkaline Copper Quaternary (ACQ), which is the treated wood you typically see at a lumber store now. The second is Copper Azole (CA), which is not approved for freshwater piles. And the third is oil-based Copper Naphthenate (CuN), which is not as commonly used, as people don't like the odor of the oil. However, the arsenic-free preservative ACQ leaches roughly twice as much copper than the metal-arsenate preservative ACZA. So if the component is not in human contact, we recommend using ACZA instead, if it's available.

There are several preservatives approved by EPA for aquatic uses that CCC Water Quality staff recommends avoiding, if feasible, due to aquatic toxicity concerns. I already mentioned creosote and pentachlorophenol. Two others to avoid are micronized formulas (using copper nanoparticles) of the arsenic-free preservatives, which were introduced a few years back. They are Micronized ACQ (MCQ) and Micronized CA (MCA). They leach a lot less copper than the non-micronized versions, which is good. However, studies have shown that micronized copper nanoparticles are highly toxic, up to 65 times the aquatic toxicity of non-micronized copper. So there are serious human health and aquatic toxicity concerns with these two micronized preservatives. Until more studies have been done, CCC Water Quality staff does not recommend the use of micronized preservatives in overwater structures.

Instead, we recommend using alternatives to treated wood for decking, where feasible. However, for the structural framework underneath dock decking, some of the alternative decking materials (such as composites) don't have the strength needed for the framework. So even when alternative materials are used for the decking, you often have treated wood used for the structural framework underneath.

It's really important to select the right preservative retention level. Treated wood is available in a variety of Use Categories (such as "ground contact") which have different preservative retention levels. Many people think that if they get treated wood with the most preservative in it, it will be protected for longer. But it just leaches more copper, so

5. Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures	2:55 – 3:25 pm (30 min.)

you need to get the minimum retention level appropriate for the intended use of the component. For example the retention level of ACZA preservative in a wood pile for marine immersion is much greater (in order to protect against marine borers) than is needed for wood decking that is not immersed in saltwater.

There is also a program to certify that treated wood has been produced for aquatic use; we recommend using this "BMP-certified" treated wood, where available. There are also a variety of design features to minimize abrasion of treated wood (such as bumpers or a protective wear surface), which we recommend using where feasible.

Situations where the use of treated wood should be avoided include where there is a low water circulation or flow rate (typically 0.3 ft./sec or less); harbors, marinas, and wetlands are some potential examples. Pollutants may concentrate there instead of being flushed away. Also, treated wood should be avoided in areas that have especially copper-sensitive aquatic life (such as salmon, herring, crabs, and mussels). Also, in areas where the waterway is already impaired by the preservative chemical (such as copper), you need to avoid the use of treated wood containing that chemical.

If you're considering using treated wood for a project, and want to know whether it's going to be a problem for aquatic toxicity, there are some Screening Assessment tables that the Western Wood Preservers Institute (WWPI) developed with NOAA; see my factsheet for links to these tables. For the various preservatives, these tables show the amount of treated wood (both piles and decking) that is predicted to not exceed EPA's aquatic water quality criteria for copper (and other chemicals) at a particular water flow rate. There are different tables for saltwater vs. freshwater, because the impact of copper on aquatic life is more pronounced in freshwater. These tables are a good first step in assessing whether you might have a problem with a project, with some caveats.

If the screening shows there might be a concern, or the project exceeds 30 piles and/or 3,000 ft^2 of above-water treated wood, a site-specific Intermediate Risk Assessment is required. This can be done with an online monitoring took from Oregon State University, and requires gathering information on additional environmental parameters.

For any overwater structure, it's important to follow construction-phase Best Management Practices (BMPs) to keep pollutants, chemicals, sediment, and construction waste out of the water. If you're using treated wood, it's also important that you use BMPs specific to the use of treated wood. For example, keeping sawdust and wood fragments out of the water. Also, when using field-applied topical preservatives (water-based copper naphthenate) to cut ends and drilled holes in treated wood, apply the preservative sparingly and be careful not to drip it into the water.

It's also important to follow post-construction BMPs for long-term use of the structure, repair, monitoring, and maintenance. Again, if using treated wood, include BMPs specific to the use of treated wood, such as avoiding sanding, scraping, and pressure-washing treated wood during maintenance. Also, avoiding the use of deck cleaners and brighteners that increase leaching of copper from treated wood. Any wrappings or coatings should also be monitored and replaced if they become damaged, so they remain functional and don't contribute to marine debris.

See the factsheet I wrote for this presentation for additional information and links.

Discussion:

Q: *Virginia St. Jean:* Is anybody researching alternatives to copper, arsenic, chromium, the persistent metals; is there any movement on that at the EPA, or is that going to have to happen at the state level?

5. Use of Treated Wood and Alternative Materials for Building Overwater and Waterfront Structures	2:55 – 3:25 pm (30 min.)
	o *Vanessa Metz:* That's a question for you guys; I don't know what EPA is doing. **Q:** *Jen Mongolo:* You talked about arsenates not being appropriate where there is human contact; what about for marine mammals, are there any concerns for impacts? o *Vanessa Metz:* I would think there would be, as there are several places where sea lions haul out on boat docks, for example. I would think you wouldn't want to use preservatives containing arsenic in these structures.
Action Items:	None.

6. Meeting Wrap-Up	3:25 – 3:40 pm (15 min.)
Speakers:	***Mike Hanks –*** *Nonpoint Source Program, State Water Resources Control Board (Michael.Hanks@waterboards.ca.gov), &* ***Vanessa Metz –*** *Coastal Water Quality Program, California Coastal Commission (Vanessa.Metz@coastal.ca.gov)*
Purpose:	Review follow-up actions from this meeting, and solicit ideas for future meeting topics and meeting locations for the Fall 2019 meeting.
Action Items:	• *Mike Hanks*: Will send emails to the MIACC with links to: o The draft update to the Recreational Boater's Guide to Hull Paint in Calif., with Stephanie Bauer's email address, for more information. o Registration information for the Interagency Alternatives Assessment Webinar. o Video for in-water dry docking. • All the meeting presentations and materials will be posted on the MIACC webpage. • Please provide suggestions for topics & speakers for the Fall 2019 MIACC meeting.

7. Santa Cruz Harbor Field Tour	3:40 – 4:30 pm (50 min.)
Speaker:	***Michael Sandecki –*** *Coastal Water Quality Program, California Coastal Commission (Michael.Sandecki@coastal.ca.gov)*
Purpose:	View examples of preservative-treated wood and alternative materials used in building overwater and waterfront structures at Santa Cruz Harbor.
Background:	See "background" for topic #5.
Materials:	*Photos from the Santa Cruz Harbor Field Tour: Treated Wood and Alternative Materials Used in Overwater and Waterfront Structures.* Photos by Michael Sandecki, Calif. Coastal Commission & Michael Hanks, State Water Resources Control Board.
Presentation Notes:	The Santa Cruz Harbor is constructed within the footprint of a bar-built coastal lagoon located at the interface of Arana Gulch and the ocean. The harbor was constructed in two stages. The lower harbor was constructed by Granite Construction under the supervision of the Army Corps of Engineers in 1963, and the upper harbor was built by the City in 1973. Some 375,000 cubic yards of sediment were dredged to create the lower harbor, deepening the middle portion of the freshwater lagoon to create 360 small craft slips. The dredged sediment was used to fill in the sides of the lagoon, creating upland areas suitable for parking and other harbor-related activities. East Cliff Drive and Atlantic Street, which crossed the sand spit at the lower end of the lagoon, was truncated to open the harbor mouth to the ocean, and the East Cliff Drive lagoon crossing was replaced with the Murry Street bridge farther up in the lagoon, parallel to the existing railroad bridge. The City expanded the harbor in 1973, building the upper or north harbor which provided an additional 455 boat slips, more parking, and areas that are used for boat

7. Santa Cruz Harbor Field Tour	3:40 – 4:30 pm (50 min.)
	parking and for maintenance facilities. The original railroad trestle bridge was replaced when the harbor was expanded, so that boats could pass under the bridge and into the upper harbor. Altogether, about 900 parking stalls are present at the harbor. Having been built before today's water quality regulations came into effect, runoff from the parking lots flows untreated to the harbor. Pollutants typically present in parking lot runoff include sediment, metals, nutrients, organic compounds, and bacteria. The harbor's docks and boat slips were originally constructed using creosote-treated Douglas fir piles, and structural timbers of preservative-treated wood, including the use of copper naphthenate preservative in the lower harbor. Originally, wooden decking was used for the floating docks in the lower harbor, and concrete decking was used in the upper harbor. However, in the past, the issue of wood preservatives did not rise to the same importance as it does today, and any information found on which wood preservatives were used in the harbor decades ago is generally anecdotal. The site is underlain with a deep layer of mud and fine sediment over Purisima bedrock. The sediment is deeper in the upper harbor, which means that the piles for the upper harbor are required to be up to 75 feet long in order to make contact with the underlying bedrock. In contrast, the piles in the lower harbor range from 35 feet to 55 feet in length. Over the years, many of the piles and original overwater structures have been replaced. Besides routine maintenance and replacement required due to deterioration and aging, much damage occurred during the Loma Prieta earthquake in 1989 and the tsunami in 2011. Within the harbor, it is apparent that a number of different types of piles have been used over time, as well as a variety of decking materials. There are also repairs-in-place that have been required where pile foundations support buildings. These repairs involve installing a fiberglass jacket over the damaged length of the pile, and backfilling the void between the pile and the jacket with cementitious grout. The types of piles used in the harbor have changed over time, from creosote-treated wood piles (1960s to late 1980s) to steel piles, sometimes wrapped with (an unknown) polymer (late 1980s to early 1990s). After that, 205 spun concrete piles were installed following the 2011 tsunami, and most recently, 65 solid precast concrete piles were installed in 2016. In 2019, 80 steel piles with high-density polyethylene (HDPE) sleeves are expected to replace most of the remaining wood piles. Even though concrete decking is expected to far outlast wood (even wood treated with copper-based preservatives), many of the original concrete decks in the upper harbor shattered during the Loma Prieta earthquake. Over time, most of the harbor's wood and concrete floating dock decking has been replaced with composite decking. Composite decking uses a blend of sawdust and recycled plastics to create deck boards. Composite deck materials were introduced in the 1990s, but have been significantly improved over time to address rot and UV deterioration. Decking in most other areas of the harbor (e.g., Citizen's Dock, adjacent to the boat repair facility, and the dining deck at Aldo's restaurant) is comprised of Douglas fir, generally preserved with ACQ, or more recently, using non-treated Douglas fir.
Action Items:	None.

Meeting notes by Vanessa Metz, California Coastal Commission.

Funding for this project has been provided in part by the U.S. Environmental Protection Agency (U.S. EPA) pursuant to Assistance Agreement Nos. C9-79757514; C9-79757515; C9-79757517, and any amendments thereto which have been awarded to the Water Board for the implementation of California's NPS Program. The content of this document does not necessarily reflect the views and policies of the U.S. EPA or the Water Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.