

**Greater Monterey County Integrated Regional Water Management Program
Regional Water Management Group Meeting**

August 20, 2025

**Location: Monterey Bay National Marine Sanctuary Office, Monterey, CA
and Zoom Conference Call**

RWMG Entity Attendees:

Jenny Balmagia – Central Coast Wetlands Group
Dash Dunkell – Elkhorn Slough Foundation
Beth Febus – Big Sur Land Trust
Piret Harmon – Salinas Valley Basin Groundwater Sustainability Agency
Heidi Niggemeyer – City of Salinas
Erica Parker – Monterey One Water
Paul Robins – Resource Conservation District of Monterey County
Ed Waggoner – City of Soledad
Don Wilcox – City of Soledad
Emily Zefferman – Resource Conservation District of Monterey County

Non-RWMG Attendees:

Alena Anousinh – California Marine Sanctuary Foundation
Anna Campbell – Solarpunk Studio
John Hunt – UC Davis and California Marine Sanctuary Foundation
Sara Hutto – California Marine Sanctuary Foundation
Pam Krone – California Marine Sanctuary Foundation
Jazmine Mejia-Muñoz – California Marine Sanctuary Foundation
Matt Savoca – California Marine Sanctuary Foundation
Katie Siegler – California Marine Sanctuary Foundation
Susan Robinson – Greater Monterey County IRWM Program Coordinator
Taylor van Rossum – California Marine Sanctuary Foundation

Meeting Minutes

1. Brief Introductions

2. Focus on the Monterey Bay Sanctuary's Water Quality Protection Program: The California Marine Sanctuary Foundation (CMSF) partners with the Monterey Bay National Marine Sanctuary (MBNMS) to implement the Sanctuary's Water Quality Protection Program (WQPP). The WQPP was initiated in 1992 through a Memorandum of Agreement, signed by eight federal, state, and local agencies, that recognizes a collaborative approach to protecting and enhancing water quality in the Sanctuary and its watersheds. The Sanctuary receives runoff from 11 major watersheds encompassing approximately 7,000 square miles of land along 276 miles of shoreline. The WQPP partners with local governments, university research scientists, growers, the agricultural industry, non-profit organizations, and other stakeholders throughout these watersheds to monitor pollutants that flow into the Sanctuary, to educate about best management practices, and to study potential solutions to address water quality issues. Today's meeting spotlights the WQPP team's current efforts:

Urban Water Quality Program: Katie Siegler presented an overview of urban water quality programs — including Snapshot Day and First Flush Citizen Monitoring programs.

- Snapshot Day is an annual dry season, volunteer monitoring event that takes place on one day each year across four counties, from San Mateo down to San Luis Obispo. This event has occurred annually since 2000, typically the first weekend in May. Over 4,000 volunteers have participated in Snapshot Day over the years, monitoring typically around 80 sites. Volunteers take field measurements (temperature, pH, etc.) and collect water samples for lab analysis. This year over 100 volunteers participated, visiting 79 sites. Of the 58 sites where samples were collected, 20 sites (35%) are considered Areas of Concern, exceeding threshold values for at least three analytes or field measurements. There was a higher incidence of E. coli exceedances this year than usual (88%), likely due to warm weather in July. The data from Snapshot Day is uploaded to CEDEN, a statewide database. Katie intends to meet with municipalities to follow-up on results. In 2024, a trash pick-up component was added, following up on a recent study that showed 80% of local marine debris derives from rivers flowing into the Sanctuary.
- First Flush is an annual stormwater volunteer monitoring event that takes place just in Monterey County. Citizen monitors collect samples from 14 storm drain outfalls following the first major rain event of the season. First Flush volunteers are a dedicated group of volunteers; they need to mobilize day or night with the first major rain event! Results show significant differences between dry season and first flush sampling: In 2023, results from the “dry run” sampling just prior to the First Flush event showed high nitrate and potassium levels; results from First Flush, on the other hand, showed exceedances for metals, bacteria, surfactants. Data is uploaded to CEDEN. Katie will follow up with stormwater staff at the cities and county to review data and discuss potential management practices to address identified issues.
- Salinas Urban Watch: Sampling for the Salinas Urban Watch program occurs from June to September, with sampling occurring twice/month in the Natividad, Santa Rita, and Gabilan Creeks. The monitoring team assesses whether waterways or outfalls are dry or flowing, and analyze for nutrients and bacteria (will be adding pyrethroids next year). One purpose of this program is to look for illicit discharges. Katie works with the City of Salinas to trace the source of discharges. This year, every waterway showed at least one exceedance for nutrients or bacteria.
- Creek Cleanups in Salinas: CMSF has begun partnering with Downtown Streets Team, a nonprofit that works to support unhoused people, on volunteer trash cleanups. CMSF received a grant from the Community Foundation to conduct six creek clean-ups in Salinas with Downtown Streets Team unhoused volunteers, and one clean-up near the Salinas River State Beach river mouth with Surfrider volunteers. Last year, over 1,800 lbs. of trash was removed in just two hours, 76% of which was plastic.

Next steps for the Urban Water Quality Program: Katie, with help of an intern, will begin analysis of the datasets that have been collected over the years through Snapshot Day and First Flush to understand long-term trends and hotspots.

Ag Water Quality Program: Pam Krone and Taylor van Rossum run the Ag Water Quality program. Taylor explained that the program focuses on four primary concerns: plastics (which can cause marine entanglement and toxicity), pesticides, nutrients (potentially causing HABS, hypoxia, and eutrophication of coastal waters), and greenhouse gases (causing ocean warming and acidification). The Ag Water Quality Program works with partners to share information, educate, and explore solutions that work best for everyone.

- Agriculture Water Quality Alliance (AWQA): The Ag Water Quality Program leads through a collaborative, stakeholder approach. Taylor and Pam facilitate regular meetings of AWQA.

Created in 2000, AWQA is a partnership of agricultural landowners, tech services providers, researchers, farm bureau, and others, spanning 10 watersheds that drain to the Sanctuary.

- Healthy Soils: Pam and Taylor are working on two different Healthy Soils grants, funded by the California Department of Food and Agriculture: 1) a reduced tillage trial/demonstration project with Braga Fresh, and 2) a cover cropping & nutrient management trial/demonstration project with Dole Fresh Vegetables. The projects aim to build soil health, sequester GHG, reduce pesticide/nutrient runoff, and minimize erosion. The reduced till project at Braga Fresh includes three treatment and three control plots, demonstrating effects of 8" tillage depth vs. 36" tillage depth, with an intent to increase carbon storage in soil. The project at Dole includes a 20-acre plot, with two trials and treatments: Cover crop vs. fallow, and nutrient management vs. standard. Results showed yields slightly higher for cover cropped plots, promising! The team samples for biomass (cover crop and cash crops) and conducts soil health testing. Both Dole and Braga track data – yield, emissions data (tractor use), inputs (irrigation, nutrients, pesticides), labor cost – enabling Pam and Taylor to perform cost-benefit analyses. The projects also include outreach events three times/year.
- Food Safety Decision Support Tool: CMSF received a Prop 1 Round 2 IRWM Implementation Grant to develop a food safety decision support tool. Vegetative ditches have been shown to be very effective at reducing polluted runoff. However, many growers are reluctant to install vegetated ditches because they believe vegetative ditches encourage pests, especially rodents, when compared with bare ground ditches. Benefits of vegetated ditches include: removing pesticides and nutrients, reducing bank erosion, increasing infiltration into groundwater basins, increasing biodiversity, potentially improving pollinator habitat, and reducing runoff. CMSF is conducting a study to determine whether vegetated ditches pose an increased food safety risk. Do vegetated ditches attract more rodents? And do they influence rodent movement into fields? The study traps and tracks rodents in vegetated managed ditches, vegetated unmanaged ditches, and bare ground ditches, and tracks the movement of rodents into ag fields. Thus far the study has found similar numbers of rodents in all types of ditches. The study *has* found a difference in species. Generalist species like deer mice are most prevalent in bare ground ditches with house mice following those, both of which have been found to be more likely to carry pathogens. Vegetated ditches tend to have a greater biodiversity and therefore encourage more niche species presence such as California voles and western harvest mice. Deer mice and house mice inhabit these vegetated areas as well; however, in much smaller numbers in those ditches we have looked at thus far.

Do vegetated ditches affect movement of rodents into the field? This study is ongoing. The team is working at 12 ditch sites, four of each type of ditch, trapping 10 rodents at each, then implementing telemetry grids in the field. Grids include 25 telemetry poles, which track where the rodents are in the field. The study will then implement fencing as a management practice to determine how effective fencing is in minimizing access into fields. Results of the project will help develop a decision support tool to guide growers in deciding which ditch type is best for them, and what type of vegetation would be best for them. The team is hoping to influence the whole value chain – growers, buyers, food safety personnel, etc. Finally, they will estimate potential benefits of vegetated ditches by mapping ditch locations throughout the Salinas Valley, estimating potential reduction in pollutants on a regional scale.

Ag Plastics: Jazmine Mejia-Muñoz and Alena Anousinh provided an overview of the team's work with growers and manufacturers to reduce the escape of ag plastics into surface waters and the Monterey Bay National Marine Sanctuary (NMS). Jazmine began by noting how the invention of polyethylene and

its subsequent application to agriculture revolutionized the ag industry. Plastic is used as mulch (the thin plastic that covers crop beds), driplines, greenhouses, fencing, and in many other uses. Plastic mulch reduces weeds, which reduces the need for both chemicals and labor. The use of fumigation tarps is actually *required* by Monterey County for strawberry systems when applying fumigants to reduce impacts to air quality. But plastic that escapes from the field poses a risk to Sanctuary resources as marine debris, additionally carrying toxins associated with agricultural production to the marine environment. Plastic mulch can easily tear and escape through wind or runoff. More and more restrictions are being placed on the disposal of plastic mulch in landfills, and it is becoming more and more expensive (now \$112/ton in Monterey County). Some landfills in Santa Cruz don't even allow plastic mulch! There is great interest in identifying/creating alternative end-of-life uses for plastic mulch.

The WQPP Ag Plastics team began by assessing plasticulture use. By weight, 12 million lbs/year of drip tape are being used in Monterey County. They found that 10% of plastic is being left behind in the fields even under best management practices. A separate study found that 80% of plastic in waterways was traced back to 1) mulch, and 2) drip tape, since it was the highest plastic used in weight. What were growers doing with this plastic? Most were landfilling. Some were sending it to recycling. Some were leaving plastic on site in legacy piles. In Florida they can burn it! In Baja, they don't have landfills, so that's a major challenge.

The team began looking at possible alternatives: Can we just not use plastic? Some possibilities are: hydromulches, straw mulches, paper-based mulches, wool in cover crops, agri-textiles (they're plastic but can be reused for up to 10 years). None of these would work for the type of commercial agriculture in the Salinas and Pajaro Valleys. Maybe in the future, but it's simply not a possibility now.

The WQPP Ag Plastic team is participating with partners in an \$8M USDA grant-funded biodegradable mulch (BDM) study across the US. BDM is designed to be tilled into the soil. It has a carbon backbone that allows for microorganisms to attack this weak link and allow it to degrade. Was found to achieve 90% biodegradation in a lab-based test. The team and partners have started doing trials in Washington, Nebraska, Florida, and California. How fast does it degrade? Ideally the plastic needs to maintain its integrity until tilled into the soil, at which point it should degrade quickly enough so as not to build up over multiple crop rotations. Currently there is a 14% biodegrade rate, which growers are happy with. The study has also found that this plastic does not perform significantly differently from non-BDM in terms of crop yield. There are some limitations, however: It is not approved for organic use. It should take no more than two years to biodegrade but the team is finding it takes up to six years to biodegrade (and ideally it would be closer to 6 months, with crop rotations). The team is starting to see increasing interest from manufacturers and grower-shippers.

How can we maximize *removal* of plastic from the fields, so that it does not escape to ocean waters? To ease the burden of collection, the WQPP team explored mechanical options (vs. hand labor) using a "megabinder" to collect the plastic from the field. The megabinder collects then densifies the thin sheets into tightly rolled bales. These bales are then taken to a "dry-wash" line to reduce contamination (removing sediment) so that the plastic can be recycled. The team found no significant difference between hand collection and mechanical collection in terms of the amount of plastic collected (which is good), but the megabinder still left some plastic behind. So the team is now working to create a "lifter" to allow plastic to be lifted whole, leaving fewer pieces behind. They're also working with manufacturers to strengthen the sides of the plastic so it does not tear as easily. They will be starting those trials in September.

This ag plastics project started in 2023 with 200 acres, and expanded to 1,953 acres in 2024. This year the team is expecting 10,000 – 20,000 acres of mechanically collected plastic. This practice is being

commercially adopted now across the region. The team has also partnered to have drip tape and hoophouse plastic collected and baled and sent out for recycling. They are currently partnering to expand that program in the Salinas Valley.

Even with these improvements in practices there will still be plastic left behind in the field. So the team is paying attention to the role that vegetated ditches can play in acting as a buffer, capturing plastic where it can be collected and removed. They are working to encourage grasses at the end of beds, cover crops, and vegetated ditches.

Microplastics: Matt Savoca's presentation, titled, "Tracking the source and transport of microplastics in the greater Monterey Bay region to inform risk assessments," described his research in collaboration with CMSF, MBNMS, and the Moore Institute for Plastic Pollution Research in Long Beach. Origin: The 2022 MBNMS 5-year Management Plan includes a Marine Debris Action Plan, with a goal to assess and reduce the amount of marine debris in or entering the Monterey Bay NMS, and activities to conduct monitoring of microplastics to understand the extent and threat to the Sanctuary. This led in 2023 to an Ocean Protection Council and Sea Grant 2-year grant. Main objectives: 1) quantify the flux of microplastics between rivers, oceans, wildlife (land-sea interface); 2) understand the sources; 3) involve citizen scientists; 4) understand what/if risk this poses to the Sanctuary.

Collection of field samples: seawater, biota, river, beach sampling (about 100 volunteers have contributed!). Lab work: took samples, filtered and separated into two different size classes: large (5000 – 500 micrometers) and small (500 – 50 micrometers), characterizing morphology and type of polymers. Large particles were counted by color: white, blue, black, etc. White were mostly Styrofoam bits. Films and fibers are smaller. Most of the microplastics they found in the environment were smaller. Most plastics per unit volume were found in beach samples – not in ocean samples; in fact, the amount of microplastics per unit volume was found to be 20-fold higher in beach samples than in ocean water samples! Beach sand seems to be a sink for a lot of this debris! And possibly a source (from the people who visit the beaches).

In the small size class, the researchers identified over two dozen types of polymers but nearly all were from five different types of plastic. Food dilution is a concern (filter feeding animals). Toxicity thresholds have been proposed by Southern California Coastal Water Research Project (SCCWRP): At what level should we be concerned? If particles are concentrated enough, what level can they translocate to other parts of the body? The smaller particles you look for, the more you find.... In that smaller size, we should be monitoring for these particles regularly! In beach sand, concentrations are much, much higher than in the water column...

Toward understanding a microplastic mass balance for Monterey Bay: From deep sea to rivers to wildlife. Biota: samples in krill etc. take a longer time to process. But they're coming up with a full picture of the ecosystem. They don't know how much is being deposited from the air. In the future it would be good to look into more detailed sourcing, and have more dedicated studies to assess risk to indicator or sensitive organisms. Also - assessment of effectiveness of interventions.

Key takeaways to date:

- Strong relationship between microplastic size and abundance. Small microplastics are 100x more numerous than large microplastics.
- Understanding flux: Beaches are an end point for plastics (and possibly a source): 20x higher on beaches than water particularly in Santa Cruz area.
- Main contributor: Styrofoam-type particles. Really common on beaches. Haven't seen it anywhere else but the beaches.

- Sites in northern Monterey Bay – San Lorenzo River and Pajaro – are more impacted than Salinas and Carmel River areas.
- Crossing the lower level of risk thresholds: Microplastic levels in rivers, seawater, and beaches at levels above established risk thresholds for food dilution.
- Identified 26 different types of polymers, but almost all are within five types of plastics (polypropylene, polyethylene, polystyrene, polyester, polyacrylamide).
- The public loves this topic – are very engaged and concerned!

3. Other News/Updates (None)

The next Regional Water Management Group meeting is scheduled for October 15, 2025, at the Big Sur Land Trust office in Monterey.