A ROADMAP FOR ADDRESSING MARINE DEBRIS IN THE NERRS

SEPTEMBER 2024

About the NERRS

The National Estuarine Research Reserve System (NERRS) is a network of 30 reserves located in 25 states and Puerto Rico. Each site includes programs focused on resource stewardship, research and scientific monitoring, training programs for the public and local officials, and education.

About the NERRS Science Collaborative

The NERRS Science Collaborative is a NOAA-funded program that provides grants and other support for user-driven collaborative research, assessment, and transfer activities that address critical coastal management needs identified by the reserves.

https://nerrssciencecollaborative.org

APPENDIX

Padilla Bay National Estuarine Research Reserve

National Estuarine Research Reserve System Science Collaborative

APPENDIX

A1: REFERENCES FROM EMERGENCE OF END-USER NEEDS

Plastics NERR Cross Sector Sharing Session

Table of survey responses, coded by type of activity. Full responses here: Current Reserve Plastics Efforts (Survey Results)

NERR	Research and Monitoring	Clean-Up and Removal	Education and Outreach, Prevention	Citizen science	Partner-ships and Collabo-ration	Advocacy, Policy, Planning	Micro-plastic	Recycling
ACE Basin			Marine debris education/ stewardship programs for K-12 students					
Apalachicola	Intern research projects on microplastics, could be used for citizen science			Microplastics program, sampled quarterly (sediment and water) microplastics, could be used for citizen science			Microplastics program, sampled quarterly (sediment and water)	
CBNERR-MD				Intern research projects on microplastics, could be used for citizen science			Intern research projects on microplastics, could be used for citizen science	
CBNERR-VA		Clean ups (with K-12 students)	Discovery Labs on plastic open to public; lesson plans, public outreach on marine debris, clean ups (with K-12 students)					
Delaware	Water-based microplastics monitoring from end of 2016-beginning 2020; microplastics measurements in sand and sediment; supported partner work measuring microplastics in nearby tributary and bay	Coastal clean-up along beaches in Kent County DE			RC is the DE representative for the MARCO marine debris regional work group; on a Mid-Atlantic regional grant looking at community-based social marketing to reduce balloon releases		Water-based microplastics monitoring from end of 2016-beginning 2020; microplastics measurements in sand and sediment; supported partner work measuring microplastics in nearby tributary and bay	
Elkhorn Slough			Seasonal theme in Visitor Center, 4th grade lessons on plastic.					

NERR	Research and Monitoring	Clean-Up and Removal	Education and Outreach, Prevention	Citizen science	Partner-ships and Collabo-ration	Advocacy, Policy, Planning	Micro-plastic	Recycling
Great Bay			Conservation Action Education; interpretive exhibits					
GTM		Stewardship sector conducts monthly beach cleanups.	Indoor elementary program scavenger hunts highlight microplastics; Coastal Expeditions elementary program highlights marine debris; other public outreach on microplastics				Indoor elementary program scavenger hunts highlight microplastics; other public outreach on microplastics	
He'eia	Initial conversations with researchers (HPU, UCSD, UW) and NOAA; student projects on plastics in coral reef organisms.				Initial conversations with researchers (HPU, UCSD, UW) and NOAA; student projects on plastics in coral reef organisms.		Student projects on plastics in coral reef organisms.	
Jacques Cousteau		Monofilament collection and recycling program; watershed ambassador does yearly marine debris cleanups within the watershed	Derelict crab pot prevention programs					Monofilament collection and recycling program; watershed ambassador does yearly marine debris cleanups within the watershed
Jobos Bay	Workshops with NGO's and collaborators on micro-plastic monitoring. Research done by a HS student on 2019.				Workshops with NGO's and collaborators on micro-plastic monitoring.		Workshops with NGO's and collaborators on micro-plastic monitoring. Research done by a HS student on 2019.	
Kachemak Bay	Initial conversations							
Lake Superior	Multiple ongoing studies with UW Superior on effect of microplastics in Lake Superior and microplastics as vector for other contaminants.		Marine debris exhibit at interpretive center and mobile exhibit.			Great Lakes Marine Debris Action Plan	Effect of microplastics in Lake Superior and as vector for other contaminants; Marine Debris exhibit on microplastics.	

NERR	Research and Monitoring	Clean-Up and Removal	Education and Outreach, Prevention	Citizen science	Partner-ships and Collabo-ration	Advocacy, Policy, Planning	Micro-plastic	Recycling
Mission-Aransas	Monitoring plastics in plankton samples; collaboration with UTMSI to study chemicals associated with nurdle spills.	Sewardship sector leads clean-ups coordinated with partners.	K-12 and public programs; CTP working with businesses to reduce single-use plastics.	Nurdle Patrol.	UTMSI collaboration to study chemicals associated with nurdle spills; host Microplastic Science Team meeting and Plastic Pollution Symposium (statewide)		Monitoring plastics in plankton samples; host Microplastic Science Team Meeting annually	
North Inlet-Winyah Bay		Clean ups with volunteers			Public programs on microplastics and marine debris topics; education curriculum		Public programs on microplastics and marine debris topics; education curriculum	
Narragansett Bay		Beach cleanups with groups and annual International Coastal Cleanup day		Citizen science with homeschool classes using CleanSwell				
Old Woman Creek		Volunteer beach and estuary clean-ups.	Plastics reduction workshops for local coastal businesses; collaboration with Ohio Sea Grant on marine debris toolkits for environmental educators.	Clean-up volunteers record their findings using the NOAA Marine Debris Tracker app.	NOAA Great Lakes Marine Debris, Ohio Sea Grant	NOAA Great Lakes Marine Debris Action Plan		Coordinating monofilament fishing line recycling
Padilla Bay		Collaboration with local volunteer group in county.	Worked with NOAA's marine debris program to install an exhibit in our interpretive center.		NOAA Marine Debris Program	WA State Marine Debris Action Plan		
Rookery Bay	Monitoring microplastics in estuary.	Grant from NOAA MDP for cleanups.	Grant from NOAA MDP for outreach.	Nurdle Patrol.			Monitoring microplastics in estuary.	
South Slough			Teacher training, field trips to the beach or Washed Ashore with students; partnerships with other education providers like Oregon Sea Grant, NGOs like Surfrider and independent artists		Partnerships with other education providers like Oregon Sea Grant, NGOs like Surfrider and independent artists; partner in the Oregon Marine Debris Action Plan	Oregon Marine Debris Action Plan		

NERR	Research and Monitoring	Clean-Up and Removal	Education and Outreach, Prevention	Citizen science	Partner-ships and Collabo-ration	Advocacy, Policy, Planning	Micro-plastic	Recycling
Tijuana River	Trash characterization, flood risk, ecosystem impacts characterization, flood risk, ecosystem impacts	Source control, clean-up/ removal.	Training and technical assistance (e.g., plastic pollution policy), community education (desembolsate b.c.),		NOAA Marine Debris Program; EPA' Border 2020 program, NGOs, universities	Training and technical assistance (e.g., plastic pollution policy).		Plastic re-use and production
Weeks Bay	Microplastics monitoring by volunteers, nurdle patrol	Coastal Cleanup and other cleanup events; derelict vessel removal and outreach campaign.	Marine debris in K-12, college level, and TOTE programs; reducing waste at workshops, Marine Debris/ Microplastics 101 classes for community members; derelict vessel removal and outreach campaign.	Microplastics monitoring by volunteers, nurdle patrol			Microplastics monitoring by volunteers; Marine Debris/ Microplastics 101 classes for community members	
Wells	Microplastics in larval fish, lobsters.	Annual beach clean-up event.	Annual beach clean-up event; Lunch & Learn presentations.				Microplastics in larval fish, lobsters.	

A2: PROJECT TIMELINE

Project Task/Activity	Associated Output(s)	Year 1 (October 2022 - September 2023)												Year 2 (October 2023 - September 2024)											
			1	1										1	1	1									
		10	1	2	1	2	3	4	5	6	7	8	9	0	1	2	1	2	3	4	5	6	7	8	9
CA Sea Grant Fellow/Host matching process	Fellow placement at Tijuana River NERR																								
Monthly Core Team meetings	Project management; Draft Roadmap incorporating results from Transfer Workshops																								
Project Advisory Committee Meeting #1	NERRS Niche PAC Meeting #1 Agenda NERRS Niche PAC Meeting 1 Intro Slides																								
Knowledge Transfer Workshop #1	Project charter & objectives Process Agenda: NERRS Niche Knowledge Transfer Workshop #1 NERRS Niche Knowledge Transfer Workshop 1 Slides																								
Virtual Writing Retreat	September Core Team Meeting/ Writing Block Agenda																								
Project Advisory Committee Meeting #2	NERRS' Niche PAC Meeting #2 Agenda NERRS' Niche PAC Meeting #2 Slides																								
Knowledge Transfer Workshop #2 (Professional Sharing session at NERRS Annual Meeting)	SWOC Analysis Professional Sharing Session Process Agenda NERRS Niche Professional Sharing session slides																								
In Person Writing Retreat (He'eia NERR)	Roadmap Draft; Y2 Plan January In-person Retreat Itinerary and Process Agenda																								
Project Advisory Committee Meeting #3	NERRS' Niche PAC Meeting #3 Agenda NERRS' Niche PAC Meeting #3 Slides																								
Knowledge Transfer Workshop #3	Communication Strategy Process Agenda: NERRS Niche Knowledge Transfer Workshop #3 Agenda NERRS Niche Knowledge Transfer workshop #3 slides																								
Project Advisory Committee Meeting #4	Process agenda, meeting materials																								
Knowledge Transfer Workshop #4	Final Roadmap																								
Final reporting to NSC	Final grant report to NSC, including lessons learned and next steps																								

A3: COLLABORATIVE PROJECT CHARTER

Core Team

The Core Team comprises the Tijuana River NERR, He'eia NERR, and Padilla Bay NERR. Primary responsibilities include project management, workshop coordination, Roadmap development, and end-user engagement to achieve collaboration goals.

Debris Community of Practice

This project also consists of a Debris Community of Practice (DCoP) that will participate in the transfer knowledge workshops and assist in Roadmap review if desired. The original members of DCoP include the National Oceanic Atmospheric Association (NOAA) Marine Debris Program (MDP), NERR Association (NERRA), California Sea Grant (CASG), and other NERR affiliates through the Plastics Working Group. Here is a breakdown with more specifics on each partnering end-user:

- **NOAA MDP:** NOAA MDP serves as an important DCoP member serve as an important DCoP member through their national efforts to debris monitoring and action plans. These strategies were described in NOAA MDP's 2021-2025 Strategic Plan, which offers many insights and lessons learned as we develop our own strategic plan. These include how to include input from end-users and how different regions can approach aquatic-bound debris mitigation.
- **CASG:** As part of the national Sea Grant system, CASG will play an integral role in supporting me as the CASG fellow during my time at TRNERR. CASG will also share important insights as a DCoP member and share lessons learned from the implementation of their Ocean Litter Strategy developed in collaboration with NOAA MDP and the Ocean Protection Council.
- **NERRA:** As the non-profit arm of the NERR system, NERRA is an important component to the public facing abilities of the NERR System. Further, NERRA has vocalized marine debris to be one of their areas of emphasis in the next couple of years, so it is important to have their partnership within DCoP.
- **NERR Plastics working group:** The NERR Plastics working group is integral to how NERRS niche was established as a project, because it was through the Plastics working group at the 2019 NERRS Annual meeting that NERRS Niche was conceptualized. Through surveying and conservations on aquatic-bound debris, it became apparent that the majority of NERRs are being impacted and mitigating aquatic-bound debris to some capacity. As the project was established, it was clear that capacity was an issue and not all interested NERRs could take on the project within the Core Team. That being said, we wanted to give those NERR representatives an opportunity to advise NERRS niche in a higher capacity than what would be available through the knowledge transfer workshops; hence the formation of PAC. We hope that having regular PAC meetings before each of the transfer knowledge workshops will allow other NERRs to voice their perspectives and give the strategic plan stronger applicability through the NERR system.

Project Advisory Committee

The Project Advisory Committee (PAC) is a subset of the DCoP, and has the primary responsibility of advising the Core Team throughout the development of both the transfer knowledge workshops and the Roadmap.

Operations

Fig 1. Comparative Roles Chart

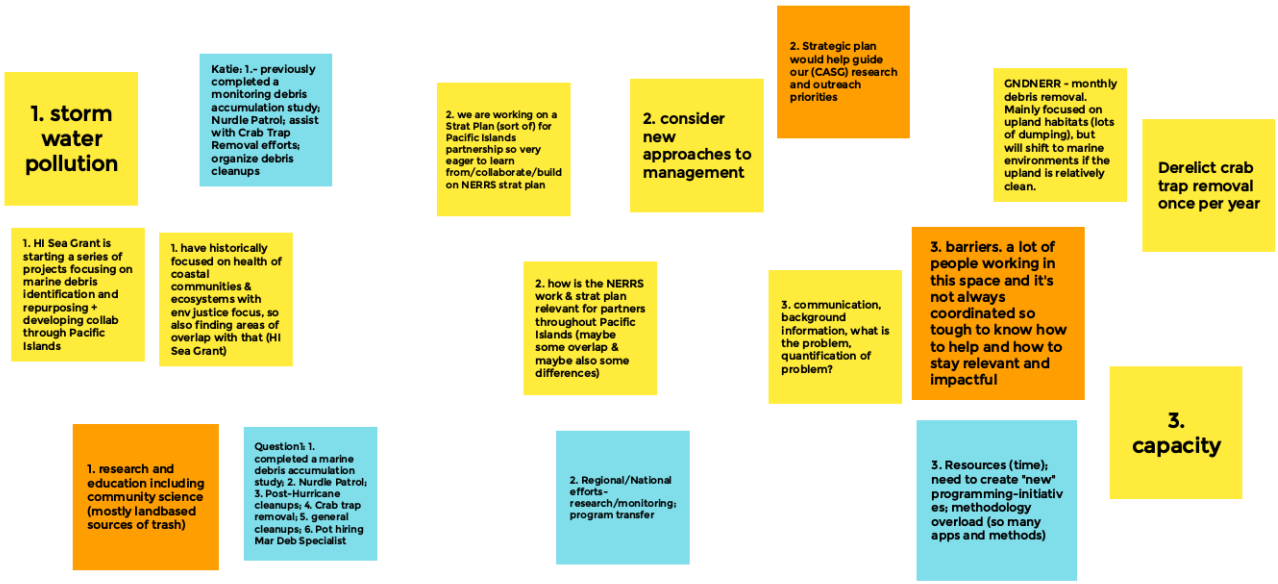
	Monthly Meetings	Workshop planning meetings (4 total)	Workshops (4 total)	Roadmap reviewing (when needed)
Core Team	X	X	X	X
PAC		X	X	X
DCoP			X	If desired

As seen in Figure 1 above, the main operational components of the project are monthly Core Team meetings, workshop planning meetings, and the transfer knowledge workshops. While the DCoP are only asked to attend the 4 total workshops, they are also invited to support review of the Roadmap. PAC members are asked to attend the 4 planning meetings in addition to the workshops (8 total meetings), as well as assist more closely in Roadmap review. The Core Team is then expected to attend all workshops, planning meetings, monthly meetings, as well as a virtual writing retreat in fall 2023 as well as an in person writing retreat in winter 2024. The project is a 24 cycle beginning in September 2022 with an expected final delivery in September 2024.

A4: RESULTS FROM KNOWLEDGE TRANSFER WORKSHOP #1: FINDING COMMON GROUND

Breakout Room #1

1. How do you currently interact with aquatic-bound debris in your work?
2. How do you imagine the Strategic Plan can help you do your work differently? ex. Think about sectors creating programs, more public visibility, communicate what you're already doing...
3. What are the barriers to implementing this work currently?

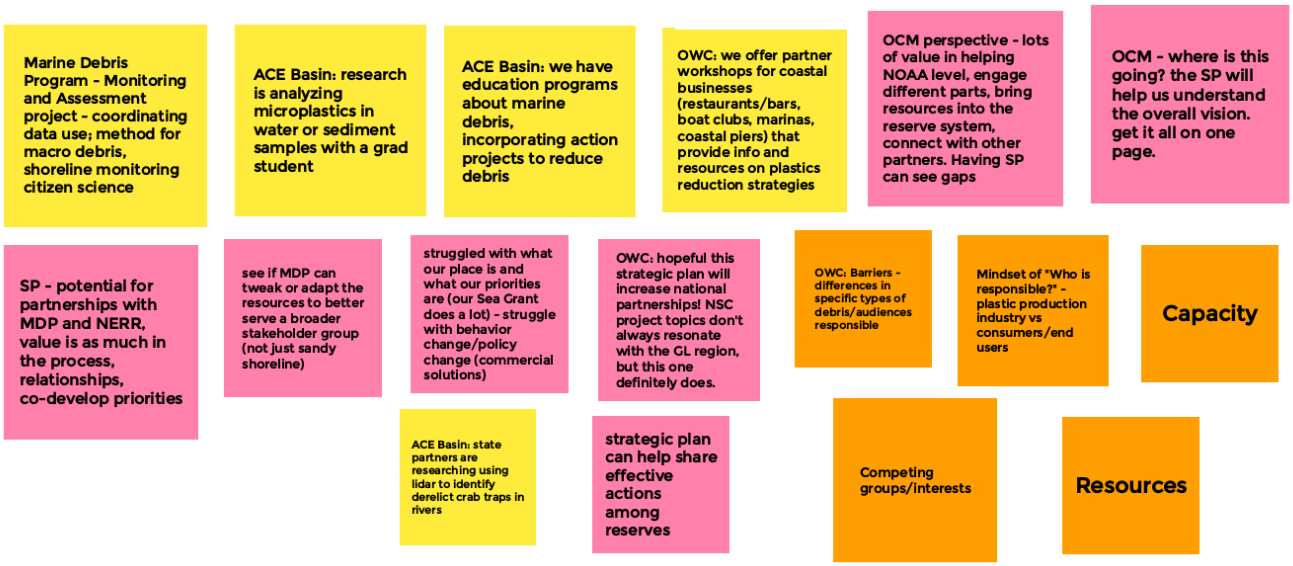


Breakout Room #2 - Kristen

1. How do you currently interact with aquatic-bound debris in your work?
2. How do you imagine the Strategic Plan can help you do your work differently? ex. Think about sectors creating programs, more public visibility, communicate what you're already doing...
3. What are the barriers to implementing this work currently?

Breakout Room #3 - Shimi

1. How do you currently interact with aquatic-bound debris in your work?
2. How do you imagine the Strategic Plan can help you do your work differently? ex. Think about sectors creating programs, more public visibility, communicate what you're already doing...
3. What are the barriers to implementing this work currently?



A5: RESULTS FROM KNOWLEDGE TRANSFER WORKSHOP #2: LEVERAGING STRENGTHS & IDENTIFYING OPPORTUNITIES

Frame 1: National Narrative

Strengths

- Can generate research questions
- Education programs
- Can support grant applications
- Tagging local work in social media ex #marinedebris
- Will bring fund partners

Weaknesses

- Not clearly defined

Opportunities

- No one is doing estuaries
- Should be both qualitative and quantitative
- Place-based foundation to develop national narrative
- Data translated to policy
- Need swag
- Need to know gaps in NOAA MDP
- Gap analysis
- Look to other NERR initiatives
- Need name- catchy
- Great potential for environmentalaction-type programming.
- Environmental action programs are optional for ECs to participate in and report
- Characterize debris issues NERRS-wide. Does this align with what we are seeing coastwide, nationally? Can NERRS serve as a proxy for characterizing the larger problem?
- Develop NERR-wide marine debris tag that every Reserve uses on all marine debris posts to weave site-based issues, successes into a national narrative ex. #NERRSmarinedebris

Challenges

- Data management & access across reserves
- Diverse issues
- Overlap with NOAA MDP & EPA
- Trash Free Waters, Estuary Program
- Public perception on ocean or beach, not estuary
- Funding for national/cross reserve projects

Frame 2: Partnerships & Relationship Building

Strengths

- Aligning with NOAA's goals of prevention, removal, research
- Resources through the local department of environmental services
- Success and impact story sharing
- Social media posts for alternatives to plastics (e.g., non-balloons)
- More volunteers (e.g. adopt-a-highway before reaching estuary)
- Local citizen advocacy groups

Weaknesses

- None identified during the workshop
- Methods/standardization for estuary plastic sampling

Opportunities

- Use photos as evidence to lead to more policy making
- Baseline research/monitoring, and Coastal Training Program (CTP) communication
- Clean-up campaign through social media/national estuaries week
- NOAA Regional MDAP tie into what we are doing? In every region?
- Surfrider, Clean Ocean Action, other local orgs
- Coastal sweeps (national)
- Source-point identification and prevention
- Schools (NERRA offering i.e. activities)
- Environmental Action workgroup (through ECs)

Challenges

- Methods/standardization for estuary plastic sampling
- How to integrate NERR tie-ins with NOAA plan
- Seek patterns in types of debris found where, social economic factors (metrics?)
- Getting different groups out, consolidating data
- Many avenues of attack

Frame 3: Shared Resources & Database

Strengths

- Learning from other reserves knowledge exchange
- Easy engagement/access for all ages & stakeholders
- Easy positive impact & measurable outcomes
- We have reserves with experience in M.D.

Weaknesses

- Lack of regulation/policy
- Need resources to address M.D. removal
- Lack of clear definitions, need strong answer to what M.D. is

Opportunities

- NOAA MD tracker easy to use
- Collecting data trends in other places
- Benthic habitat mapping to help with inaccessible M.D.
- System wide cleanup event
- Pull together/synthesize existing data
- Outreach campaign & storytelling

Challenges

- How do you measure
- Reporting
- How do we remove it?
- Lack of capacity for MAR projects
- Organizing all the different M.D. recovery
- Most plastics difficult to detect & hard to determine what we can do about them

A6: RESULTS FROM KNOWLEDGE TRANSFER WORKSHOP #3:COMMUNICATING MARINE DEBRIS

Breakout Room 2: Communication Discussion

Instruction: Take a few moments to read the following questions and place sticky notes with your thoughts. The facilitator will then lead a group discussion. You will have 10 minutes before you will have return to the main room.

Discussion Questions: What are the messages we want to communicate about marine debris in estuaries and what the NERRs are doing about it? How do we utilize what we just learned about communication to hone these messages for maximum impact?

A7: PADLET & OTHER MENTIONED RESOURCES

Think Global, Act Local Padle

Knowledge Transfer Workshop #2 at Jaqcues Cousteau NERR.
Photo courtesy of MeganSpitzer, TRNERR California Sea Grant Fellow