

Nurdle Patrol Year 3 Final Report (June 1, 2022 – May 31, 2023)

PI: Jace Tunnell

June 13, 2023

Administration:

Contract Activity

- The Nurdle Patrol Expansion, Education, and Outreach was approved for funding for Year 3 on June 1, 2022.
- The Subaward Agreement No. UTA20-000902 between The University of Texas at Austin and Texas A&M University Corpus Christi was fully funded for year three for the amount of \$35,825.00 to further enhance the website for usability and the ongoing maintenance of the phone app to help promote the awareness and education of Nurdle Patrol.

Risks and Impacts: None

Project Tasks:

Hire full-time staff to organize annual meeting, training, travel, manage website and develop promotional materials about Nurdle patrol.

Tracy Weatherall was hired during the first quarter of year one on July 1, 2020, June 1, 2021, for year two, and June 1, 2022, for year three.

Host the Texas Plastic Pollution Symposium (TPPS)

The 5th Annual Texas Plastic Pollution Symposium was a huge success this year! It took place at the University of Houston at Clear Lake on April 4-5, 2023. The planning committee met monthly beginning in June 2022 leading up to the event in April 2023. On Tuesday, April 4th, there was an optional Port of Houston Boat Tour followed by an evening social gathering with heavy hors d'oeuvres at the Kemah Aquarium. On Wednesday, April 5th, check-in began at 8:00AM and the symposium started at 9:00AM. Attendees received a cotton "Swag Bag" filled with a TPPS t-shirt, 18oz glass tumbler with a bamboo lid and additional swag provided by the sponsors. Nurdle Patrol gave each attendee one of our Individual Nurdle Patrol Kits. One hundred eighty people attended in-person and 67 attended virtually. There were 23 oral and 16 poster presentations. A light continental breakfast was provided in the morning, box lunches in the afternoon and brownies and cheesecake were available during the afternoon break.

Student Scholarships

As described in the consent decree, students that attend in person and present their research at the Texas Plastic Pollution Symposium will receive a \$500 stipend to cover costs for travel and expenses. Eleven students submitted abstracts in which 4 were oral presentations and 7 were poster presentations. Student presentation awards were given by the Coastal Bend Bays & Estuaries Program. They gave \$300 for oral presentations

(\$150 1st place, \$100 2nd place, \$50 3rd place) and \$200 for poster presentations (\$100 1st place, \$75 2nd place, \$25 3rd place).

Create Starter and Teacher Kits

The Nurdle Patrol Starter Kit was created during the first year of Nurdle Patrol (2020) for organizations to start-up their own Nurdle Patrol citizen science project or to incorporate nurdle surveys into their existing monitoring program. The kits were designed to supply organizations with resources needed to conduct surveys, talk to their volunteers about nurdles, and provide a foundation for a successful project (Figure 1). As of May 31, 2023, two hundred and eighty-one partners have received the starter kits. Included in this number are 5 kits that were delivered to Cuba in November and 5 more in April by one of our partners (Harte Research Institute) conducting coral reef research. We are excited that we'll get very important nurdle datapoints along the shorelines of Cuba.

The Nurdle Patrol Teacher Kits were also developed during the first year of Nurdle Patrol due to many requests from teachers across the United States that wanted to teach their students about how plastics reach the ocean and what negative impacts plastics have on the environment. These kits include a curriculum about nurdles entering the ocean, what negative impacts there are, and what solutions are out there to prevent nurdles from getting into the waterways. The interactive teacher kits include six jars of nurdles, an information card about how to conduct a nurdle survey, a presentation all about nurdles, and articles describing the problem (Figure 1). An updated version of the teacher kit curriculum was completed during the third quarter which includes an All Level Nurdle Survey, a Nurdle Hurdle Race, K-5 curriculum that includes lesson plans for age specific children in K-1, 2-3, and 4-5, and Middle School and High School Chemistry curriculums. These lesson plans are now linked to our webpage. As of May 31, 2023, 1,778 teacher kits were shipped to educators in the USA, Canada, Mexico, Puerto Rico, Costa Rica, Columbia, Cuba, UK, Spain, Africa, Australia, Turkey, Italy and Thailand. We estimate that each teacher would have 60 students, which means these kits could reach close to 106,680 students, making this an effective tool for educating students about plastics along the Gulf of Mexico and beyond.



Figure 1. Nurdle Patrol Startup Kit (left) and Teacher Nurdle Kit (right)

Meet with organizations about Nurdle Patrol – Outreach

During the 4th quarter, we acquired 28 new Nurdle Patrol partners and shipped 120 teacher kits (Figures 4-5; Table 1-4). Virtual and in-person presentations and meetings were given to promote Nurdle Patrol to new organizations, including the following since June 1, 2022:

- June 6, 2022 & June 20, 2022 – Nurdle presentation for Summer Science at UTMSI.
- June 7, 2022 – Nurdle presentation to the San Antonio River Authority via Zoom.
- June 8, 2022 – Summer Science Program nurdle presentation at UTMSI.
- June 9, 2022 – Nurdle presentation to teachers in central Texas via Zoom.
- July 11, 2022 – Nurdle presentation virtual to a Pennsylvania program called Pesky Plastics with students interested in environmental issues.
- July 13, 2022 – Virtual nurdle presentation to the Houston Canoe Club.
- July 30, 2022 – Invited speaker to the Youth Climate Summit to talk about Nurdle Patrol via Zoom.
- August 13, 2022 – Updated the UT Marine Advisory Council about Nurdle Patrol efforts across Texas.
- August 20, 2022 – Presentation in-person in Port Lavaca at the Calhoun County Environmental Forum.
- September 10, 2022 – Hosted a Nurdle Patrol Film Festival at UTMSI with Diane Wilson as the invited speaker. Showed all 4 videos of Diane Wilson that were produced by Nurdle Patrol. Over 100 attendees.
- September 14, 2022 – 18 Flour Bluff 6th grade students in an Oceans Class met at the beach at Bob Hall Pier to hear about Nurdle Patrol and conduct nurdles surveys.
- September 17, 2022 – Presentation to Adopt a Beach Cleanup volunteers on North Padre Island.
- September 28, 2022 – Presentation in Spanish at the Mexico Plastic Pollution Symposium in Veracruz Mexico.
- October 5, 2022 – Presentation to students at the University of Pittsburg through Zoom.
- October 12, 2022 – Presentation to Gulf Coast Growth Ventures about plastic research at UTMSI.
- November 3, 2022 – Tracy Weatherall attended the STEAM (Science Technology Engineering Arts Mathematics) night at Kolda Elementary in Corpus Christi, Texas to inform students and their families about nurdles and the issues with marine debris and microplastics and their impact on the environment, animals and people.
- December 1, 2022 – Gave a NOAA Webinar Presentation about Nurdle Patrol to 80 NOAA staff.
- December 1, 2022 – Virtual presentation to the Texas Master Naturalists about how to volunteer with Nurdle Patrol.
- December 7, 2022 – In-person presentation at the Restore Americas Estuaries Conference in New Orleans on Nurdle Patrol.
- December 19, 2022 – Federal Government Interagency webinar about nurdles.
- January 10, 2023 – Nurdle presentation to the Gulf of Mexico Alliance virtual conference.

- February 15, 2023 – Nurdle presentation at the Bay Education Center in Rockport, Texas as part of a seminar series.
- March 1, 2023 – Nurdle Patrol presentation in Mexico City to other microplastics institutions working on research in Mexico and the U.S.
- March 16, 2023 – Tracy Weatherall gave a presentation to spring break students about nurdle patrol.
- April 5, 2023 – Nurdle Patrol Mexico presentation at the Texas Plastic Pollution Symposium in Houston, Texas.
- April 17, 2023 – Nurdle Patrol Policy in Texas presentation to University of Texas policy in Texas class through Zoom.
- May 16, 2023 – How to access and use Nurdle Patrol data from the website presentation at Texas A&M University Corpus Christi.
- May 24, 2023 – International webinar with Fidra on a presentation about Nurdle Patrol changing policy in the United States.

The Nurdle Patrol Facebook group is being utilized as a way to communicate with individual citizen scientists as well as new organizations about new efforts related to Nurdle Patrol. News stories, survey results, and other related material are also shared with the more than 2900+ followers on the closed group Nurdle Patrol Facebook page. Also, the Nurdle Patrol Twitter account (public) was created to educate and inform the general public about plastic pollution and other science related topics. To date there are [673 followers](#).

Lisa Scobel, a graduate student studying Environmental Conservation from the University of Wisconsin-Madison, joined the Nurdle Patrol team this summer as an intern and recruited 14 new partners along the Mississippi River's 2,350 mile stretch as well as New York and Canada. In addition, she published 5 Nurdle Patrol related articles that are posted on the nurdlepatrol.org website at <https://nurdlepatrol.org/Forms/News/index.php>. Lisa started a position at the Galveston Bay Foundation in July 2022 as the marine debris coordinator and is helping to spread the word and sample in the Houston/Galveston area about Nurdle Patrol.

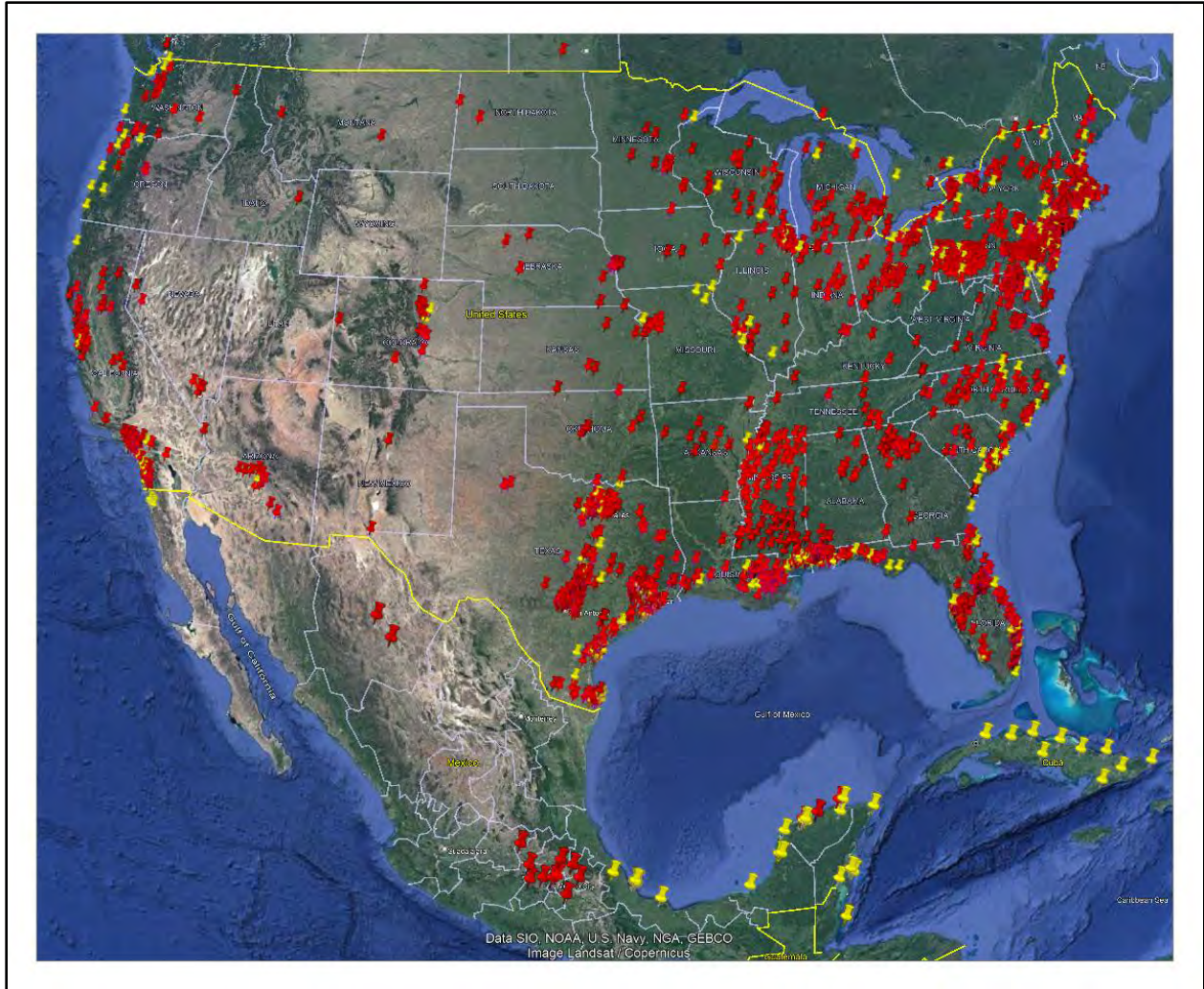


Figure 4. Nurdle Patrol Partners (yellow) and Teacher Kits (red) shipped in the continental United States, Canada, Cuba, Belize and Mexico.

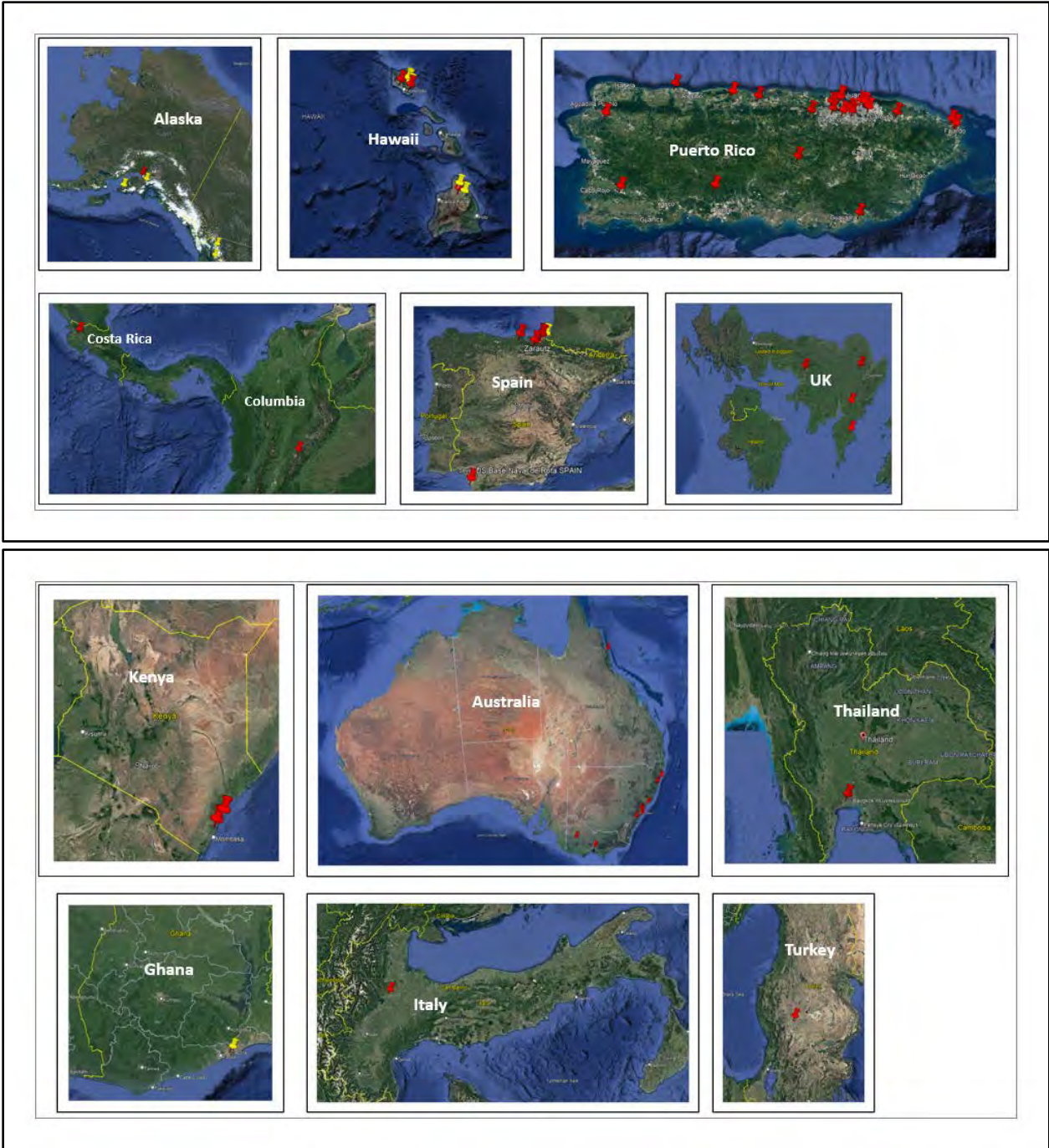


Figure 5. Nurdle Patrol Partners (yellow) and Teacher Kits (red) shipped worldwide.

Number	Partner	Group Type	State	Number	Partner	Group Type	State
1	Terra Science & Education	School	NY	40	Defenders of Wildlife	Nonprofit	NC
2	STEM Engagement	School	NY	41	Old Women Creek NERR	NERR	OH
3	Tampa Bay Estuary Program	NEP	FL	42	Delaware NERR	NERR	DE
4	Coastal Bend Bays & Estuaries Program	NEP	TX	43	ACE Basin NERR	NERR	SC
5	Week's Bay NERR	NERR	AL	44	Angler Action Foundation	Nonprofit	FL
6	Rockport Fulton Middle school Ecology/Environmental Club	School	TX	45	Hudson River NERR	NERR	NY
7	Island R/V Resort	Business	TX	46	Friends of the Kaw	Nonprofit	KS
8	Southernmost Homeschoolers	Homeschool	FL	47	Buffalo Niagara Waterkeeper	Waterkeeper	NY
9	Inland Ocean Coalition North Texas Chapter	Nonprofit	TX	48	Crystal Coast Waterkeeper	Waterkeeper	NC
10	Choctawhatchee Basin Alliance	Waterkeeper	FL	49	White Oak New Riverkeeper Alliance	Waterkeeper	NC
11	National Park Service - Padre Island National Seashore	Federal	TX	50	Sapelo Island NERR	NERR	GA
12	Friends of Padre	Nonprofit	TX	51	NY-NJ Baykeeper	Waterkeeper	NY
13	Universidad de Veracruzana - Sea & Reef Program	University	MX	52	South Slough NERR	NERR	OR
14	Rookery Bay NERR	NERR	FL	53	A Rocha USA	Business	FL
15	Surfrider Foundation - Texas Coastal Bend Chapter	Nonprofit	TX	54	Sustain 2 Remain	Nonprofit	TX
16	Galveston Bay Foundation	Nonprofit	TX	55	Missouri Confluence Waterkeeper	Waterkeeper	MO
17	Texas A&M University - Corpus Christi, Conrad Blucher Instit.	University	TX	56	Great Bay NERR	NERR	NH
18	Texas Master Naturalist	Nonprofit	TX	57	Sea Grant - Mississippi-Alabama	Sea Grant	MS
19	The University of Texas, Rio Grande Valley	University	TX	58	Mississippi State University Extension	University	MS
20	Parley for the Oceans	Nonprofit	MX	59	Flour Bluff ISD	School	TX
21	11th Hour Racing	Nonprofit	TX	60	Corpus Christi Hooks	Business	TX
22	Monsignor McClancy Memorial HS	School	NY	61	Padilla Bay NERR	NERR	WA
23	Nicholls State University	University	LA	62	Kachemak Bay NERR	NERR	AK
24	Texans For Clean Water	Nonprofit	TX	63	Bayou City Waterkeeper	Waterkeeper	TX
25	Flyaway Paper Straws	Business	FL	64	Save Our Shores	Nonprofit	CA
26	Our Lady Academy	School	MS	65	Delaware Sea Grant	Sea Grant	DE
27	Saint Stanislaus	School	MS	66	Louisiana State University	University	LA
28	Shedd Aquarium	Aquarium	IL	67	Mountain Watershed Association - Youghiogheny Riverkeeper	Nonprofit	PA
29	Charleston Waterkeeper	Waterkeeper	SC	68	Florida Sea Grant - UF/IFAS Extension Pinellas County	Sea Grant	FL
30	South Padre Island Sessions	Business	TX	69	Narragansett Bay NERR	NERR	RI
31	Gulf Guardians	Nonprofit	TX	70	Barataria-Terrebonne National Estuary Program	NEP	LA
32	Sun of a Beach Cleanup	Nonprofit	FL	71	Sarasota Bay Estuary Program	Nonprofit	FL
33	Keep Bolivar Beautiful	Nonprofit	TX	72	He'ia National Estuarine Research Reserve	NERR	HI
34	University of Texas Marine Science Institute	University	TX	73	North Carolina Coastal Reserve and NERR	NERR	NC
35	Mission-Aranas NERR	Governmental	TX	74	North Inlet-Winyah Bay NERR	NERR	SC
36	Jacques Cousteau NERR	NERR	NJ	75	Wildlife Club	Nonprofit	FL
37	Wells Reserve at Loudholm	NERR	ME	76	Tillamook Estuaries Partnership	NEP	OR
38	Tijuana River NERR	NERR	CA	77	Chesapeake & Coastal Service, CBNERR	NERR	MD
39	Guana Tolomato Matanzas NERR	NERR	FL	78	Morro Bay National Estuary Program	NEP	CA

Table 1: Nurdle Patrol Partners who have received startup kits as of May 31, 2023.

Number	Partner	Group Type	State	Number	Partner	Group Type	State
79	Waterkeeper Alliance	Nonprofit	TX	117	Castal Brigade	Nonprofit	TX
80	Healthy Gulf	Nonprofit	LA	118	Northcoast Environmental Center	Nonprofit	CA
81	Texas Marine Mammal Stranding Network	Nonprofit	TX	119	Pascagoula River Audubon Center	Nonprofit	MS
82	Seaside Sustainability	Nonprofit	MA	120	Lower Mississippi River Foundation	Nonprofit	MS
83	Siera Club, Baton Rouge Group	Nonprofit	LA	121	Kipp Delta Public Schools	Public Schools	MS
84	The Gale Academy of Environmental Science and Technology	School	FL	122	Texas Parks and Wildlife Dept.	governmental	TX
85	Lake Worth Waterkeepers	Waterkeeper	FL	123	Illinois River Watch Network	Nonprofit	IL
86	Columbia Waterkeeper	Waterkeeper	OR	124	Ohio Sea Grant	governmental	OH
87	Canaba Riverkeeper	Waterkeeper	AL	125	Harris County Precinct 2	governmental	TX
88	MTHS Eco Club	Nonprofit	WA	126	Great Lakes Aquarium	Business	MN
89	USM School of Humanities	University	MS	127	Thunder Bay NMS	governmental	MI
90	TAMUCC Green Team	University	TX	128	Upper Mississippi River NWFR	governmental	IL
91	Jean Lafitte National Historical Park ad Barataria Preserve	Nonprofit	LA	129	New York Sea Grant	Governmental	NY
92	O'ahu Waterkeeper	Waterkeeper	HI	130	Great Lakes Environmental Center, inc.	Business	MI
93	Plastic Free Grants	Nonprofit	MS	131	Lake Huron Centre for Coastal Conservation	Nonprofit	Ontario
94	Chesapeake Bay NERR	NERR	VA	132	Stream Teams United	Nonprofit	MO
95	Friends of Lake Superior Reserve	NERR	WI	133	A Rocha USA	Nonprofit	WI
96	University of Michigan	University	MI	134	KEEP PEARLAND BEAUTIFUL	Nonprofit	TX
97	Save Our Seas Mountain Ocean Project	Nonprofit	TX	135	Wisconsin Sea Grant	Governmental	WI
98	Maryland Coastal Bays Program	Nonprofit	MD	136	Sierra Club of Missouri	Nonprofit	MO
99	University of Alaska Fairbanks	University	AK	137	Environmental Club and Aquatic Science	School Club	TX
100	University of Oregon's Charleston Marine Life Center	University	OR	138	A Greener Future	Nonprofit	Ontario
101	Shoreline Education for Awareness (SEA)	Nonprofit	OR	139	TPWD	Governmental	TX
102	MARYSMA Mar Y Sustentabilidad Para El Medio Ambiente	Eco-Tourism	MX	140	University of Houston-Clear Lake	University	TX
103	Apalachicola Nat'l Estuarine Research Reserve	NERR	FL	141	Calhoun County Extension Service	Governmental	TX
104	FWS Bandon Marsh National Wildlife Refuge	Governmental	OR	142	Boyscouts of America Troop 168	Boyscouts	TX
105	Mobile Baykeeper	Nonprofit	AL	143	Chesapeake Bay Reserve	Governmental	MD
106	Connecticut River Conservancy	Nonprofit	CT	144	Northern Ohio Surfrider Foundation	Nonprofit	OH
107	Dimock and Dimock Photography	Business	OR	145	Black River Audubon Society	Nonprofit	OH
108	Costa Cleanups	Nonprofit	TX	146	Eastern Shore Fly Fishers	Nonprofit	AL
109	Elizabeth Kratzig	Eco-tourism	FL	147	Presque Isle State Park	Governmental	PA
110	Elizabeth Kratzig	Travel	FL	148	Charleston County Public Library	Governmental	SC
111	Rio Grande Chapter of the Texas Master Naturalist	Nonprofit	TX	149	The Sustainability Institute, Environmental Conservation Corps	Nonprofit	SC
112	Mustang Island State Park	Governmental	TX	150	Hawaii Preparatory Academy	Private School	HI
113	Texas Retired Teachers Association	Nonprofit	TX	151	Marine Science Graduate Student Organization	University	TX
114	Sea Turtle Inc.	Nonprofit	TX	152	Riverside-Corona Resource Conservation District	Nonprofit	CA
115	Choctawhatchee Basin Alliance	Nonprofit	FL	153	The Community Environmental Health Lab at MDI Biological Laboratory	Laboratory	ME
116	Turtle Island Restoration Network	Nonprofit	TX	154	Washington State Community College	College	OH

Table 2: Nurdle Patrol Partners who have received startup kits as of May 31, 2023 (continued).

Number	Partner	Group Type	State	Number	Partner	Group Type	State
155	Centro de Investigación y de Estudios Avanzados del IP.N. Mérida	University	MX	195	Urban Rivers	Nonprofit	IL
156	Sea Hero	Nonprofit	NJ	196	Girl Scout Troop 809	Nonprofit	FL
157	American Association of University Women	Nonprofit	IL	197	North Carolina Coastal Federation	Nonprofit	NC
158	Cazteel High School	High School	AZ	198	North Carolina Coastal Federation	Nonprofit	NC
159	NASA TX Space Grant Consortium UT Austin Center for Space Research	Governmental	TX	199	Kairo Musto	School	Spain
160	Lower Brazos Riverwatch	Nonprofit	TX	200	Unity College Department of Animal Behavior	University	PA
161	Gulf of Mexico Youth Climate Summit	Nonprofit	TX	201	National Park Service	Governmental	WA
162	City by the Sea Museum	Nonprofit	TX	202	Colegio Congregacion Mita	University	PR
163	City by the Sea Museum	Nonprofit	TX	203	Crew 454	Scouts	TX
164	Northampton Oceanography	University	PA	204	Girl Scout Troop 28173	Girl Scouts	TX
165	Loggerhead Marinellie Center	Nonprofit	FL	205	The Modern Mortician	Business	WA
166	Lehigh Elementary Science club	School Club	PA	206	Sustainability is Sexy	Business	CA
167	NAHS Oceanography Club	High School	PA	207	Lucy Beckham High School	High School	SC
168	Bois d' Aro Chapter of Texas Master Naturalist	Governmental	TX	208	Squirrel Friends	Business	LA
169	River Arts Community Arts Center	Nonprofit	VT	209	Jerseghoredetecting	Business	NJ
170	Ocean Knoll Elementary School	School Club	CA	210	Galveston Nurdle hunters	Nonprofit	TX
171	Center for Reservoir and Aquatic Systems Research, Baylor University	University	TX	211	Seaview learning	Elementary	MA
172	Fundación Pedro y Elena Hernández, AC	Nonprofit	MX	212	KIND (Kids In Nature Discovering)	Nonprofit	TX
173	Menos Plastico En Mahahual	Nonprofit	MX	213	Intermission - NAFI	Nonprofit	ME
174	CICESE (Center for Scientific Research and Higher Education)	University	MX	214	Vance Charter School Environmental Club	High School	NC
175	El Colegio de la Frontera Sur	College	MX	215	Marine beach cleanup	Nonprofit	RI
176	Instituto EPQOMEX	University	MX	216	SCCPSS	School District	GA
177	Campamento Tortugero Santander	Nonprofit	MX	217	Cascadia Daily News	Business	WA
178	Pensacola & Perdido Bays Estuary Program	Governmental	AL	218	Price Cathedral AME Zion Youth Group	Youth Group	NC
179	Three Rivers Waterkeeper	Nonprofit	PA	219	Katie Kate's Clean up	Business	FL
180	Moderna Pharmaceutical	Pharmaceutical	MA	220	The Bubbly Moon	Business	PA
181	Adventure Aquarium	Business	NJ	221	North Carolina Wesleyan University	University	NC
182	Prince William Sound Stewardship Foundation	Nonprofit	AK	222	Coastal Carolina University	University	SC
183	Scott Township Conservancy	Nonprofit	PA	223	Gamma Zeta Chapter of Industry Pharmacists Organization (IPIO)	Business	FL
184	Big Sewickley Creek Watershed Association	Nonprofit	PA	224	Pagan Academy	Private School	MS
185	NC State University- Environmental First Year Program	University	NC	225	JACKSON COUNTY SOIL & WATER CONSERVATION DISTRICT	Governmental	CA
186	North American Marine Environment Protection Association	Nonprofit	CT	226	Helix Charter High School	High School	MD
187	Manitowoc Public Library	Library	WI	227	SMCM Marine Science Program	High School	FL
188	HAR	Real Estate	PA	228	Riviera Revived	Business	MX
189	Hawaii Pacific University, Center for Marine Debris Research	University	HI	1	Universidad Nacional Autónoma de México	University	MX
190	Audubon Texas Bird City Texas	Nonprofit	TX	230	Fundacion Rescate Rapaz	Nonprofit	MX
191	toeswater	Nonprofit	IL	3 (Me	Eco.oaland Tizimin	Nonprofit	MX
192	Coast Episcopal School	Private School	MS	232-236	Cuba	Nonprofit	Cuba
193	Cimarron Middle School	Middle School	CO	237	NOAA-Disaster Response Center	Governmental	AL
194	ClimbPDX	Nonprofit	OR	238	Texas Master Naturalist Galveston Bay Chapter	Governmental	TX

Table 3: Nurdle Patrol Partners who have received startup kits as of May 31, 2023 (continued).

Number	Partner	Group Type	State	Number	Partner	Group Type	State
239	LL Corral	Business	FL	257	Abeona Academy	Private School	ME
240	StopUsingPlasticBags	Non Profit	FL	258	Vassar Club of Texas	Non Profit	TX
241	Wright Charter	Private School	CA	259	Charleston Charter School for Math and Science	Charter School	SC
242	The University of Oregon	University	Or	260	Argosy Adventures	Influencer	TX
243	Douglas County Conservation District	Governmental	CO	261	Southold Jr/Sr High School Environmental Club	Public School	NY
244	AmeriCorps	Governmental	NJ	262	Coalition of Community Organizations	Non Profit	TX
245	Houston Zoo	Non Profit	TX	263	Port of Houston Partners in Maritime Education	Business	TX
246	PCHS Green Environmental Club	High School	MS	264	4-H Natural Resources	Non Profit	TX
247	Elk River Yacht Club	Business	MD	265	Antoniano Ikastetxea	Non Profit	Spain
248	Friendswood Junior High School National Junior Honors Society	Junior High	TX	266	Playa Platino Rio Lagartos	Non Profit	MX
249	Sea Camp - TAMUG	Non Profit	TX	267	Moalou	Non Profit	MX
250	Tobacco Cays Marine Station Concordia University Nebraska	Non Profit	Belzce	268	Coloradas flora y fauna	Non Profit	MX
251	Galli and Gannon ocean protection group	Non Profit	CA	269	Elk County Catholic High School Pennsylvania Envirothon Teams	High School	PA
252	Saluki Reefers- SIU Marine Bio Club	University	IL	270	Plastic Punch	Non Profit	Ghana
253	Trash4Tokens	Non Profit	CA	271	Universidad Autónoma de México, Instituto de Ciencias del Mar y Limn	University	MX
254	Instituto de Ciencias Marinas y Pesquerías	University	MX	272-276	Cuba	Non Profit	Cuba
255	Instituto de Ciencias Marinas y Pesquerías	University	MX	277-281	Instituto de Ciencias Marinas y Pesquerías	University	MX
256	Girl Scouts	Non Profit	TX				

Table 4: Nurdle Patrol Partners who have received startup kits as of May 31, 2023 (continued).

Phone App Maintenance and update website

A contract was signed with Texas A&M University-Corpus Christi Conrad Blucher Institute (CBI) in July 2022. The work by CBI includes improvement to the phone app for Nurdle Patrol by adding all data onto a map, as well as updates to the Nurdle Patrol website

(www.NurdlePatrol.org). Both versions of the phone app, Android, and iOS, were released in May 2021.

The Nurdle Patrol project made significant progress throughout the third year, with key developments and enhancements implemented during each quarter. Here is a summary of the project's quarterly achievements:

Quarter 1

During the first quarter the development team focused on two main features. They conducted research and implemented a geospatial query tool for the map page, allowing users to draw shapes on the map to query the Patrol for specific areas. Additionally, they worked on the Monthly Report feature for Admin users, providing an interface to retrieve reports from the Admin Portal, replacing the previous manual process of sending CSV files via email.

Quarter 2

In the second quarter, the team continued to improve the website's functionality. They added support for URLs in article links, enabling users to be redirected to selected URLs from mouse clicks. They also incorporated a "Share on Facebook" button below the article's title, facilitating content sharing on Facebook. Additionally, the team focused on creating the admin banner announcement feature, comprising a table view of active announcements and an Edit Announcement popup.

Quarter 3

During the third quarter, the team released the public-facing feature for the announcement banner, following adjustments based on feedback received from Mr. Tunnell. Admin users gained the ability to create new announcements, set expiration dates, and prioritize banners. The bug affecting the Display Reports toggle on the iOS and Android mobile applications was also fixed. Furthermore, plans were made to update server-side third-party libraries to enhance infrastructure security.

Quarter 4

In the final quarter of the year, efforts were primarily directed towards resolving impediments and delivering enhancements for the website and mobile applications. The team attended the 2023 Texas Plastic Pollution Symposium in April, where they showcased the Nurdle website and mobile application, gathering valuable feedback and ideas for improving Nurdle Patrol. Additionally, they worked on strengthening security for the infrastructure by updating server-side third-party libraries.

Develop Educational and promotional videos

Videos produced from year 1 funding (2020) have been placed on the YouTube Channel that the Mission-Aransas Reserve maintains, as well as posting to various social media platforms, and added to the NurdlePatrol.org website. For year 2 (2021) funding, a four-part video series featuring Diane Wilson was produced and completed. The videos were shown at the Nurdle Patrol Film Festival on September 10, 2022. For year 3 (2022) a

documentary of Nurdle Patrol's work in Mexico was produced and completed in April 2023.

Below is a list of the films shown at the Nurdle Patrol Film Festival on September 10, 2022.

1. Diane Bio: Diane's life growing up as a multigenerational shrimper, raising kids, living and working on the bay in Texas, and her passion with ensuring that environmental justice was being served. Towards the end of the video, Diane talks about the early days of knowing that Formosa was discharging plastic pellets into the waterways where she had raised her kids and fished for a living and knew that something had to be done.

2. Formosa Lawsuit: Diane describes the long battle with Formosa, taking samples daily for three years straight, making allies with whistle blowers that worked for Formosa, the dangers of working against Formosa in the community, and the lawsuit's ultimate decision. Diane discusses the key pieces of evidence that brought down Formosa, including utilizing Nurdle Patrol data as part of that effort.

3. Working with Nurdle Patrol: Diane and Jace talk about collecting nurdles at Formosa and at other plastic manufacturing sites, sending TCEQ complaints across the state to put nurdle releases from the many plastic manufacturing sites on the official record of the state, using the Formosa lawsuit funding to expand Nurdle Patrol efforts across the U.S., and the continued fight with Formosa. At the end they discuss "where do we go from here?".

4. Future: Where do we go from here? Diane and Jace talk about the Matagorda Bay Mitigation Trust, the \$50M in funding that was set up from the Formosa lawsuit consent decree that Diane established, what projects are being funded, where Nurdle Patrol is going in the future, and what Diane's future plans are. At the end of this video they discuss the future with plastic policy changes that have occurred in Texas and other states, federal efforts going on, and if there is going to be another series about the good things happening.

Public Awareness

The Nurdle Patrol rack card continues to be printed and describes how to conduct a Nurdle Survey on the front side and on the back side it has more detailed information including where to look for nurdles, what nurdles are, and a QR Code link to NurdlePatrol.org where a training video can be found. We created this card in English and Spanish (Figures 6 & 7).



Figure 6. Nurdle Patrol outreach flyer front and back.



Figure 7. Spanish version of the Nurdle Patrol outreach flyer front and back.

The billboard campaign was created during the first year (2020) of Nurdle Patrol and was a huge success and has been extended into the third year with one near the Formosa Point Comfort (site 355751) in February 2022 and will remain at this site until February 2024 (Figure 8).



Figure 8. Nurdle Patrol billboard campaign.

Nurdle Patrol is proud to have an outreach installation at the Texas State Aquarium (Figure 9). The Texas State Aquarium reached out to us in the summer of 2021 to request video footage, images of nurdles, and text on the impact of plastics in the environment. From the information we sent, the aquarium was able to create an exhibit with a video that plays continuously, and a poster display educating folks on what nurdles are, how they get into the environment, and solutions for reducing plastics getting into the ocean.



Figure 9. Nurdle Patrol outreach installation at the Texas State Aquarium.

Summary

A total of 1,388 surveys were conducted during the fourth quarter of Year 3 and 25,719 nurdles were removed from the beaches, riverbanks, and lake shorelines across the United States, Mexico and additional countries worldwide. Nurdlepatrol.org acquired 28 new partners and shipped 120 teacher kits to educators in the USA, Canada, Mexico, Puerto Rico, Costa Rica, Columbia, UK, Spain, Africa, Australia, Turkey, Italy and Thailand (Table 5). A total of 3,979 surveys were conducted and 118,588 nurdles were removed from the environment during Year 3. Nurdle Patrol gained a total of 105 new partners, 723 teacher kits were shipped and 485 Individual Kits were handed out during the third year of nurdle patrol (Table 6).

Y3Q4	Number of Surveys	Nurdles Removed	New Partners	Teacher Kits	Individual Kits
March	426	7,846	7	22	75
April	587	8,272	10	24	198
May	375	9,601	11	74	0
Total	1,388	25,719	28	120	273

Table 5: Y3Q4 Progress Report Summary.

Y3	Number of Surveys	Nurdles Removed	New Partners	Teacher Kits	Individual Kits
Q1	823	19,631	21	299	41
Q2	1,077	59,726	37	255	171
Q3	691	13,512	19	49	0
Q4	1,388	25,719	28	120	273
Total	3,979	118,588	105	723	485

Table 6: Y3 Progress Report Summary.

Obstacles

Currently there are no obstacles to report.