Nurdle Patrol Progress Report Year 2 Quarter 3 (December 1, 2021 – February 28, 2022) PI: Jace Tunnell March 22, 2022

Administration:

Contract Activity

- The Nurdle Patrol Expansion, Education, and Outreach was approved for funding for Year 2 on June 1, 2021.
- 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 two for the amount of \$37,880.00 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.
- Purchase Order issued to Enlighted Images in June 2021 for \$12,000 to produce a four-part video series featuring Diane Wilson.
- Purchase Order issued to Augs Services in July 2021 for \$13,760.00 to create and post two billboards across Texas about Nurdle Patrol from August 2021 to April 2022.

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, and June 1, 2021, for year two.

Host the Texas Plastic Pollution Symposium (TPPS)

The planning committee met on October 22nd and December 1st to discuss the 2022 symposium logistics. It was decided that the 4th annual meeting will be a hybrid event (virtual and in-person) and will take place on Thursday, March 31, 2022, in Port Aransas. The one-day symposium will be held at the Port Aransas Community Theater for oral presentations and the poster session will take place at UTMSI. Student oral presentation and poster awards will be given this year by the Coastal Bend Bays & Estuaries Program. They plan to offer \$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). One hundred thirty-five people have registered as of March 22, 2022, 94 are attending inperson, 12 to be determined and 23 are attending virtually. Thirty people have submitted abstracts and 13 of those are students.

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. Thirteen students are planning to give presentations at this year's symposium in which 8 are presenting posters and 5 are giving oral presentations. Eight students are traveling from out of the Corpus Christi area and will receive the \$500.00 scholarship for travel accommodations etc.

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. As of the end of the third quarter, 154 partners have received the starter kits (Figure 1).



Figure 1. Nurdle Patrol Starter Kit items.

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, information card about how to conduct a nurdle survey, a presentation all about nurdles, and articles describing the problem. 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 will be linked to our webpage very soon. As of the end of the third quarter, 776 teacher kits have been shipped to educators in the USA, Canada, Mexico, Puerto Rico, Costa Rica, Columbia, UK, Spain, Africa, Australia, and Thailand (Figure 2).



Figure 2. Teacher kit items

Plastic Free Life Kit

In January 2021, we initiated the Plastic Free Life Challenge. This friendly competition was designed as an incentive to encourage our partners and individuals to conduct as many

nurdle surveys as possible each month. The group that conducts the most surveys will win a Plastic Free Life starter kit that includes 42 single-use plastic alternatives (Figure 3).



Figure 3. Plastic Free Life Starter Kit items.

Meet with organizations about Nurdle Patrol - Outreach

We acquired 6 new Nurdle Patrol partners and shipped 255 teacher kits this quarter (Figures 4-13; Table 1-2). Virtual and in-person presentations and meetings were given to promote Nurdle Patrol to new organizations, including:

- June 9, 2021 New York students via Zoom.
- July 7, 2021 Teachers on The Estuary (TOTE) Nurdle Patrol presentation in Port Aransas, TX.

- August 4, 2021 Fidra Nurdle Patrol partnership meeting via Zoom in Scotland.
- August 11, 2021 Texas Parks & Wildlife Depart. Angler Class via Zoom to area chiefs all over Texas.
- September 9, 2021 Virtual presentation to the San Diego Girl Scout Club about nurdles and the new nurdle patch.
- September 10, 2021 Nurdle Patrol presentation to Saint Stanislaus School in Mississippi.
- September 12, 2021 Virtual presentation to the Texas Parks and Wildlife Leadership Angler Class
- September 21, 2021 Illinois River Watch virtual presentation.
- September 22, 2021 Galveston Audubon virtual presentation.
- October 1, 2021 In-person presentation invited speaker at the Valley Environmental Summit in South Padre Island, Texas.
- October 4, 2021 Tracy Weatherall attended the STEAM (Science Technology Engineering Arts Mathematics) night at Kaffie Middle School 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.
- October 10, 2021 Tropical Trail Association virtual presentation.
- October 22, 2021 virtual presentation to Loyola University in New Orleans to a natural science class.
- October 28, 2021 Invited speaker to the General Land Offices' Adopt-a-Beach Workshop in Galveston, Texas.
- November 1, 2021 presented to the Galveston Master Naturalists through a virtual presentation.
- November 10, 2021 Texas A&M University-Kingsville presentation to the SAFER student group.
- January 5, 2022 Mississippi High School via Zoom presentation
- January 26, 2022 Gulf of Mexico Alliance presentation to all 5 Gulf states researching plastics in the environment.
- February 18, 2022 Presentation to multiple universities in Mexico about partnership with Nurdle Patrol.
- January 27, 2022 and February 17, 2022 The education specialists at the Mission-Aransas NERR met with the general public at the Bay Education Center in Rockport, Texas to discuss the negative impacts of nurdles, microplastics and marine debris to the environment, marine life and people.

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 2,736 followers on the closed group Nurdle Patrol Facebook page. Also, the Nurdle Patrol Twitter account (public) was created in August 2020 to educate and inform the general public about plastic pollution and other science related topics. To date there are 331 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 (Figure 4). 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.

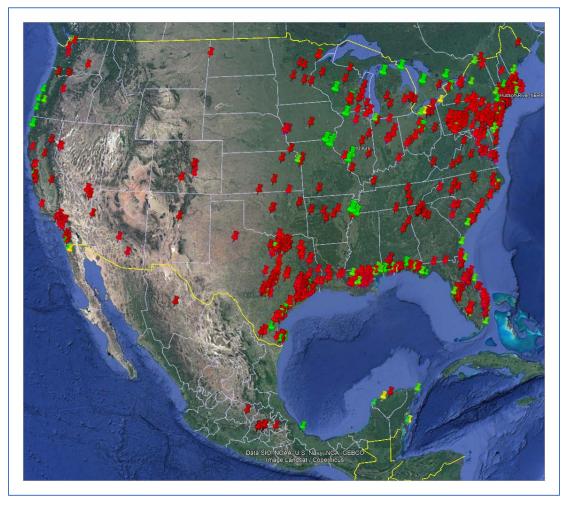


Figure 4. Nurdle Patrol Partners in the continental United States, Canada, and Mexico. Green markers represent partners who joined previously, and yellow markers represent new partners acquired during Y2Q3. Red markers represent Nurdle Patrol Teacher Kits that were sent to educators.



Figure 5. Nurdle Patrol Partners in Alaska.

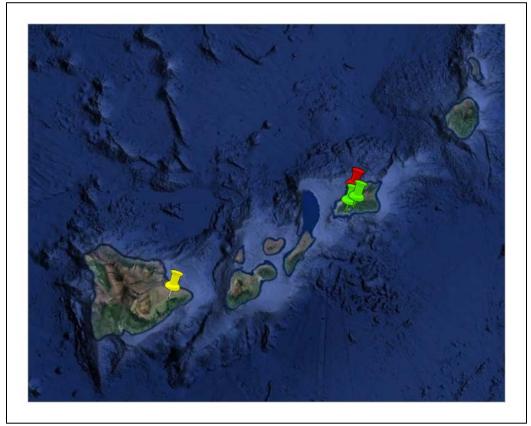


Figure 6. Nurdle Patrol Partners and Teacher Kit in Hawaii.



Figure 7. Teacher Kits in Puerto Rico.



Figure 8. Teacher Kits in Costa Rica and Columbia.



Figure 9. Teacher Kit in Spain.



Figure 10. Teacher kits in the UK.

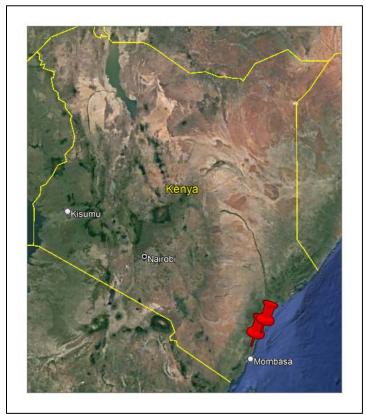


Figure 11. Teacher Kits in Kenya, Africa.

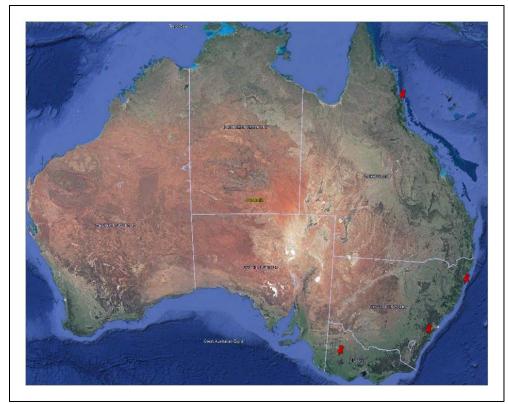


Figure 12. Teacher Kits in Australia.

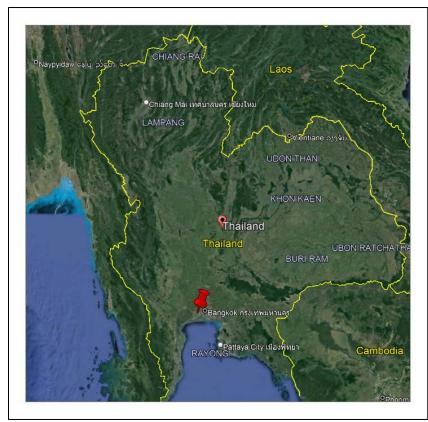


Figure 13. Teacher Kit in Thailand.

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Number	Partner	Group Type	State	N	umber	Partner	Group Type	State
1	Terra Science & Education	School	NY	1	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	Deleware NERR	NERR	DE
4	Coastal Bend Bays & Estuaries Program	NEP	TX		43	ACE Basin NERR	NERR	SC
5	Weeks 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	ТΧ		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	ТΧ		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	ТΧ		58	Mississippi State University Extension	University	MS
20	Parley for the Oceans	Nonprofit	MX		59	Flour Bliff 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	L		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	ТΧ		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'eia 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-Aransas 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 Laudholm	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 February 28, 2022.

Number	Partner	Group Type	State		Number		iroup Type	State
79	Waterkeeper Alliance	Nonprofit	TX	11	117	Castal Brigade N	onprofit	TX
80	Healthy Gulf	Nonprofit	LA		118		onprofit	MS
81	Texas Marine Mammal Stranding Network	Nonprofit	TX	11	119	Lower Mississippi River Foundation N	onprofit	MS
82	Seaside Sustanability	Nonprofit	MA		120	Kipp Delta Public Schools Po	ublic Schools	MS
83	Siera Club, Baton Rouge Group	Nonprofit	LA	11	121	Texas Parks and Wildlife Dept. gd	overnmental	TX
84	The Gale Academy of Environmental Science and Technolgy	School	FL		122	Illinois River Watch Network N	onprofit	L
85	Lake Worth Waterkeepers	Waterkeeper	FL	דר	123	Ohio Sea Grant go	overnmental	OH
86	Columbia Waterkeeper	Waterkeeper	OR	11	124	Harris County Precinct 2 gd	overnmental	TX
87	Cahaba Riverkeeper	Waterkeeper	AL	דר	125	Great Lakes Aquarium Bi	usiness	MN
88	MTHS Eco Club	Nonprofit	WA	11	126	Thunder Bay NMS go	overnmental	MI
89	USM School of Humanities	University	MS	דר	127	Upper Mississippi River NWFR go	overnmental	L
90	TAMUCC Green Team	University	TX	٦Г	128	New York Sea Grant go	overnmental	NY
91	Jean Lafitte National Historical Park ad Barataria Preserve	Nonprofit	LA		129	Great Lakes Environmental Center, Inc. Bi	usiness	MI
92	O'ahu Waterkeeper	Waterkeeper	HI	٦Г	130	Lake Huron Centre for Coastal Conservation N	onprofit	Ontario
93	Plastic Free Grants	Nonprofit	MS	דר	131	Stream Teams United N	onprofit	MO
94	Chesapeake Bay NERR	NERR	VA	11	132	A Rocha USA N	onprofit	WI
95	Friends of Lake Superior Reserve	NERR	WI		133	KEEP PEARLAND BEAUTIFUL N	onprofit	TX
96	University of Michigan	University	MI	٦Г	134	Wisconsin Sea Grant G	lovernmental	WI
97	Save Our Seas Mountain Ocean Project	Nonprofit	TX		135	Sierra Club of Missouri No	onprofit	MO
98	Maryland Coastal Bays Program	Nonprofit	MD	٦Г	136	Environmental Club and Aquatic Science Hi	igh School	TX
99	University of Alaska Fairbanks	University	AK		137	A Greener Future N	onprofit	Ontario
100	University of Oregon's Charleston Marine Life Center	University	OR	זר	138	TPWD gd	overnmental	TX
101	Shoreline Education for Awareness (SEA)	Nonprofit	OR	71	139	University of Houston-Clear Lake	niversity	TX
102	MARYSMA Mar Y Sustentabilidad Para El Medio Ambiente	Eco-Tourism	MX	11	140	Narragansett Bay NERR N	ERR	RI
103	Apalachicola Nat'l Estuarine Research Reserve	NERR	FL	11	141	Barataria-Terrebonne National Estuary Program N	EP	LA
104	FWS Bandon Marsh National Wildlife Refuge	Governmental	OR	11	142	Calhoun County Extension Service G	overnmental	TX
105	Mobile Baykeeper	Nonprofit	AL	11	143	Boyscouts of America Troop 168 Bo	oyscouts	TX
106	Connecticut River Conservancy	Nonprofit	СТ	11	144	Chesapeake Bay Reserve G	overnmental	MD
107	Dimock and Dimock Photography	Business	OR	11	145	Fundación Pedro y Elena Hernández, AC N	onprofit	MX
108	Costa Cleanups	Nonprofit	TX	11	146	Menos Plastico En Mahahual N	onprofit	MX
109	Elizabeth Kratzig	Eco-tourism	FL	11	147	CICESE (Center for Scientific Research and Higher Education)	niversity	MX
110	Elizabeth Kratzig	Travel	FL	11	148	Northern Ohio Surfrider Foundation No	onprofit	OH
111	Rio Grande Chapter of the Texas Master Naturallist	Nonprofit	TX	11	149	Black River Audubon Society No	onprofit	OH
112	Mustang Island State Park	Governmental	TX	11	150	Eastern Shore Fly Fishers N	onprofit	AL
113	Texas Retired Teachers Association	Nonprofit	TX	11	151	Presque Isle State Park gd	overnmental	PA
114	Sea Turtle Inc.	Nonprofit	TX	11	152	Charleston County Public Library Po	ublic Library	SC
115	Choctawhatchee Basin Alliance	Nonprofit	FL	11	153	The Sustainability Institute, Environmental Conservation Corps N	onprofit	SC
116	Turtle Island Restoration Network	Nonprofit	TX	71	154	Hawaii Preparatory Academy Pr	rivate School	HI

Table 2: Nurdle Patrol Partners who have received startup kits as of February 28, 2022 (continued).

Phone App Maintenance and update website

A contract was signed with Texas A&M University-Corpus Christi Conrad Blucher Institute (CBI) in August 2021. 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 (<u>www.NurdlePatrol.org</u>). Both versions of the phone app, Android, and iOS, were released in May 2021. The app is being downloaded and utilized by citizen scientists. The development team have been working on the following administrative tasks during the third quarter of year two:

- Manage Logo
- Manage Reports
- Manage News
- Manage Patrol Photos
- Manage Partner Logos
- Manage Users (Figure 14)



Figure 14. Menu showing admin tools in development environment (Preview)

Most of the administrative features have been implemented as of March 16, 2022 and will be released and available on nurdlepatrol.org by the end of March 2022. Once they are available, the old Nurdle website will be taken down and no longer accessible on the Internet. In addition, the development team received more than a hundred partner logos and made them available on the Partners page on NurdlePatrol.org. The new Resource page is expected to be available by the first week of April.

Beginning the first week of April, the development team will switch focus to the mobile application bug fixing and development. The list of tasks includes fixing the location issue when the user is on the Data Entry page (Figure 15), adding historical nurdle report on the map, and adding the solution page.

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Figure 15. New Manage Patrol Data Entry page in development environment.

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 adding to the NurdlePatrol.org website. For year 2 (2021) funding, a four-part video series featuring Diane Wilson is being produced. The first video was filmed on July 21, 2021 and is complete. The second video was filmed on September 27, 2021 and is complete. The third and fourth videos have been shot and are being edited for completion. Once all four videos are complete, a strategic release will be announced.

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. End this video with the beginning efforts of knowing that Formosa is discharging plastic pellets into the waterways where Diane has raised her kids and fished for a living, and that she knew 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. End video with Diane talking about the key pieces of evidence that brought down Formosa, including utilizing Nurdle Patrol data as part of that effort. Jace could come in at the end and talk with Diane about the big picture of Formosa's nurdle concentrations vs other parts of the Gulf that were being collected to show the impact of how many pellets Diane was collected compared to other areas.

3. Working with Nurdle Patrol: Diane and Jace talk about collecting nurdles at Formosa, at other plastic manufacturing sites, sending in TCEQ complaints across the state to put nurdle releases from 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. End with talking about "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. Have this impactful about the future, with plastic policy changes that have occurred in Texas and other states, federal efforts going on, and end the video as if there is another series waiting to come out about the good things happening.

Public Awareness

In year 1 (2020) we created a Nurdle Patrol rack card that 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 (Figure 16). We created this card in English and Spanish (Figure 17).



Figure 16. Nurdle Patrol outreach flyer front and back.



Figure 17. 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 for the second year. One billboard was installed in August 2021 in Portland, Texas near the Gulf Coast Growth Ventures plastics plant that is being constructed, and the second billboard was installed in Point Comfort (site 355751) in February 2022 (Figure 18).



Figure 18. Nurdle Patrol billboard campaign.

Nurdle Patrol is proud to have an outreach installation at the Texas State Aquarium (Figure 19). 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.

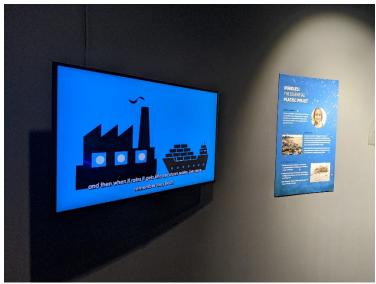


Figure 19. Nurdle Patrol outreach installation at the Texas State Aquarium.

Summary

A total of 623 surveys were conducted during Year 2, Quarter 3 (Y2Q3) and 19,235 nurdles were removed from the beaches, riverbanks, and lake shorelines of the United States and Mexico. Nurdlepatrol.org acquired 6 new partners and shipped 271 teacher kits to educators in the USA, Canada, Mexico, Puerto Rico, Costa Rica, Columbia, UK, Spain, Africa, Australia, and Thailand (Table 3).

Y2Q3	Number of Surveys	Nurdles Removed	New Partners	Teacher Kits
December	187	6,541	2	48
January	132	4,681	2	193
February	304	8,013	2	30
Total	623	19,235	6	271

Table 3: Y2Q3 Progress Report Summary

Obstacles

Currently there are no obstacles to report.