

Supplementary Materials for

Tsunami-Driven **Mega**rafting: Transoceanic Species Dispersal and Implications for Marine Biogeography

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Material and Methods

Sample Acquisition and Processing

Following the arrival in June 2012 of a large fishing dock from Misawa and of several Japanese vessels and buoys along the Oregon and Washington coasts (table S1), we established an extensive contact network of local, state, provincial, and federal officials, private citizens, and environmental (particularly "coastal cleanup") groups, in Alaska, British Columbia, Washington, Oregon, California, and Hawaii. Between 2012 and 2017 this network grew to hundreds of individuals, many with scientific if not specifically biological training. We advised our contacts that we were interested in acquiring samples of organisms (alive or dead) attached to suspected Japanese Tsunami Marine Debris (JTMD), or to obtain the objects themselves (numerous samples and some objects were received that were North American in origin, or that we interpreted as likely discards from ships-at-sea). We provided detailed directions to searchers and collectors relative to sample photography, collection, labeling, preservation, and shipping, including real-time communication while investigators were on site. In addition, a timely alert network permitted some of us (especially JWC and JAM) to respond to reports of objects freshly washed ashore on the Oregon and Washington coasts. Marine biologist colleagues in AK, BC, WA, OR, CA, and HI further responded to our requests to seek out and examine objects to which we had been alerted as newly washed ashore, and to then acquire samples if practical.

Samples from WA and OR were largely assembled at the Miller Laboratory and Chapman Laboratory at Hatfield Marine Sciences Center of Oregon State University and then sent to the Carlton Laboratory at the Williams College-Mystic Seaport Maritime Studies Program in Mystic, Connecticut. Samples from AK, BC, CA, and HI were primarily sent directly to the Carlton Laboratory. Samples initially identified as JTMD (below) were assigned unique numbers (JTMD-

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Biofouling (BF-) based on order of receipt or of information received and thus are not necessarily in chronological order (Table S1).

Selected samples for population biology, growth studies, reproductive analysis, shell chemical composition, and other analyses were retained in Newport. Samples for genetic analyses (barcoding and metagenomics) were sent to the Geller Laboratory at Moss Landing Marine Laboratories, Moss Landing, California. Mussel and other bivalve samples for parasite analysis were sent to the Ruiz Laboratory at the Smithsonian Environmental Research Center in Edgewater, Maryland USA. Initial preservation methods included freezing or preservation in ethyl alcohol or in buffered formaldehyde.

Once samples arrived in the Carlton Laboratory, they were sorted for any invertebrates larger than 1.0 mm in body length, although smaller protists and microinvertebrates, when encountered, were noted and at times archived as practicable. Seventy-nine taxonomists in 13 countries (table S5) were sent specimens for identification or were consulted for their expert advice. Voucher specimens were retained by many of these systematists. JTMD samples, from which specimens were sorted and selected, will be deposited at the Royal British Columbia Museum in Victoria, Canada.

Wood from Japanese trees, milled logs, and other items was presented to the Department of Wood Science and Engineering, College of Forestry, Oregon State University, for thin sectioning and identification to the lowest taxonomic level (family, genus, or species) possible.

JTMD Size Categories

We assigned all objects to one of four size categories: "small" (< 1 m in length); "medium" (1 to 5 m); "large" (5 to 12 m), and "extra large" (13+ m). Size was determined through direct measurements of each object or by estimates based upon photographs. Small items included buoys,

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bottles, styrofoam fragments, and tires; medium items included buoys, pallets, cylinders, post-and-beam wood, vessel fragments, and more; large items included trees, vessels, larger post-and-beams; extra-large items were two docks from the Port of Misawa and one tree. Two of the three extra-large items did not exceed medium or large items in richness; thus pairwise richness comparisons were made (figs. S4 and S5) only between small, medium, and large objects.

Debris Field Sampling

We collected or received (~~Supplementary Materials, Materials and Methods~~) only a fraction of the JTMD field. From discussions with local officials, including county, state, and federal beach authorities and with members of the public and conservation groups, it is clear that a large number of objects discovered by the public during and after 2012 and recognized as probable tsunami-related were not formally reported (including being removed by the public for private acquisition); in turn, many items that were also tsunami-related were not recognized as such. Large sections of the North American and Hawaiian Island coasts are relatively inaccessible, and thus not amenable for searching. Rocky shores, in particular, are visited by the public far less than sandy beaches, and a large fraction of JTMD reaching these shores may be destroyed on impact. Finally, beach debris clean-up campaigns removed and destroyed large amounts of material before scientific examination was possible.

Identification as Japanese Tsunami Marine Debris

We used a broad suite of criteria to determine if an item was directly linked to loss on March 11, 2011, from the Japan coast. To date, all items which could be linked to a specific location in Japan have come from only one of the four prefectures (Aomori, Iwate, Miyagi, and Fukushima) impacted most by the tsunami (3).

Formal identification

Many vessels, buoys, and additional items had registration or other identification numbers, or specific place (including owner) names that could be traced to loss on March 11, 2011, by the Consulate of Japan or through direct communication with owners. Vessels with registration information were identified by prefecture codes, as follows: IT, Iwate; AM, Aomori; MG, Miyagi, and FS, Fukushima.

Known Japanese manufactory

Based upon initial research by S. Holland, District of Ucluelet, British Columbia, post-and-beam (mortise-and-tenon construction) manufactured lumber was identified by means of standard Japanese dimensions (46). This building construction wood appeared suddenly in 2013 on beaches in North America and Hawaii where no such wood had been observed for decades by experienced beachcombers and beach-walkers.

Bioforensics: source region biohomogeneous fingerprint

JTMD-identified items generally supported marine life typical of the colder waters of the Tohoku coast, that is, the northeast coast of Honshu north of the Boso Peninsula. This region supports a biogeographically discrete fauna (47). Thus, arriving biota represented a largely non-random homogeneous "fingerprint" of the portion of the Japanese coast hit hardest by the Great East Japan Earthquake and Tsunami. Some objects from the Tohoku coast arrived in North America and in the Hawaiian Islands with additional species from south of the Boso Peninsula, indicating that these items either drifted south to acquire warmer-water elements, or that southern larvae are entrained in the ocean currents moving north, or both. Non-JTMD objects would be recognized biologically by having communities of species from different regions of the Western Pacific Ocean (Russia to Southeast Asia), but no such objects were found in the study period.

Pulse event window commencing in 2012

No large, steady stream of marine debris from the Tohoku coast has been previously recorded as arriving in North America or in the Hawaiian Archipelago. In contrast, commencing in the spring and summer of 2012, a novel pulse of a wide range of debris items (table S1) began washing ashore from the tsunami source region. As expected from a unique pulse event, this debris field has been diminishing (figure 1S), a phenomenon that would not be expected if debris was arriving in quantity from the Western Pacific (and specifically from Japan) on a continual basis. Indeed, items arrived in a non-random fashion by windage characteristics: items with very high windage (buoys, pallets, some vessels (skiffs), the ship *Ryou-un-Maru*, and the first Misawa dock) arrived in the spring and summer of 2012; many additional small vessels, with lower windage, began to arrive in November 2012, and items driven largely by ocean currents (as opposed to surface winds) then commenced arrival in the winter-spring of 2013, such as post-and-beam building wood, and, shortly thereafter, trees, pilings, and heavier wood beams. Objects in all windage categories, including styrofoam buoys, continue to arrive, as much debris is caught up for years in ocean gyres.

Novel debris pulse arriving with communities of living Japanese species

We have found no published records of any objects landing in North America or Hawaii prior to 2012 with diverse communities of living species from Japan. Observations of marine life in both regions commenced on a regular basis in the 1850s-1860s (48, 49). No JTMD species has been reported in previous scientific, historical, or policy literature as rafted transoceanically from one continental margin and landing on another continental margin. "Japanese glass fishing floats" found washed ashore in Alaska and the Pacific Northwest typically support native oceanic barnacles (*Lepas* spp.) reflective of their loss on the high seas, versus having originated from coastal or port environments. Our extensive searching of beachcomber websites, as well as inquiry among veteran beachcombers on the North American Pacific Coast, yielded one buoy collected in

2004 in Washington with three living species (the barnacle *Megabalanus rosa*, the clam *Hiatella orientalis*, and sponge *Halichondria* sp.). This buoy was an object judged to be sufficiently rare that it was retained as unique by a searcher with more than two decades of beachcombing experience in the Pacific Northwest. We also searched beachcomber websites and popular books (50-53). In contrast, a *sui generis* field of debris, identified to a source area, began to land in North America and Hawaii in 2012 and 2013, with communities of living Japanese species.

JTMD objects with a more thorough sampling history

Based upon detailed knowledge of the specific events around the detection, acquisition, and sampling of a given object, including the knowledge level and experience of the sampling person or team, the amount of time available to sample a given object, the probable diligence of inspection, and other factors, a subset of 110 objects (asterisked in table S1) were identified as having higher resolution assessment for the diversity of macrobiota aboard. These are referenced in this study as Japanese Tsunami Marine Debris - Higher Resolution (JTMD-HR) items.

Biodiversity assessments and biogeographic affiliations

We documented oceanic (neustonic) taxa native to the high seas (table S2B), as well as North East Pacific invertebrates (table S2C) that settled as larvae (and appeared as nepionic recruits typically 1-2 mm in size) or swam onto JTMD as items floated in nearshore waters prior to landing. Additional native Pacific coast and Hawaiian littoral species occasionally moved onto landed debris. None of these pelagic, coastal, or beach acquisitions were included in our calculations.

Temporal and spatial calculations of JTMD biodiversity patterns

Cumulative species richness patterns are based on 279 species of macroinvertebrates, microinvertebrates, protists, and 2 fish species. Finer-grained spatial and temporal diversity patterns are based on 226 living taxa (279 species less 33 microinvertebrates (nematodes,

flatworms, copepods, ostracods, mites) and less than 20 protists, whose diversity over space and time could not be fully assessed throughout the study period). Certain diversity calculations are further based on a subset of 110 objects (including 43 vessels) that were judged to have been most thoroughly sampled. We excluded 39 species (primarily bivalve mollusks and bryozoans) from all analyses that we judged conservatively to be dead upon arrival, although some of these may have died only after shore landing, or may have arrived alive on other undocumented debris. For species occurrences per object, see http://invasions.si.edu/nemesis/jtmd/jtmd_dat.csv.

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Search for evidence of North American Japanese object landings after the 1896 and 1933 Japanese tsunamis

Databases of historical newspapers of Washington and Oregon, and other historical digital archives, were searched for the years 1897 and later (following the June 1896 Meiji-Sanriku Earthquake and Tsunami) and 1934 and later (following the March 1933 Sanriku Earthquake and Tsunami) (54-56). Search terms included tsunami, beach wreckage, beachcomb-, beach drift, Japan-, in various combinations. To date, we have found no records of objects lost from the Tohoku coast in 1896 and 1933 being washed ashore in North America or Hawaii. Beachcombing in the Pacific Northwest was common by the 1870s and 1880s, if not much earlier (57), and searching for Japanese glass floats became a common avocation by the 1920s-1930s (58). There were fewer scientists and lower populations in the Pacific Northwest in the 1890s and 1930s than now, and thus while it would not be surprising if limited records of the landfall of objects from these earlier events were to be discovered, it appears unlikely that a large debris field equivalent to that generated by the 2011 Great East Japan Earthquake and Tsunami came ashore in either location and went unrecorded.

Statistical Analyses

Species accumulation (rarefaction) analyses were made with the `specaccum` function of the R package "Vegan" version 2.4-3 (59). Linear regression and Tukey HSD analyses were accomplished in R as well.

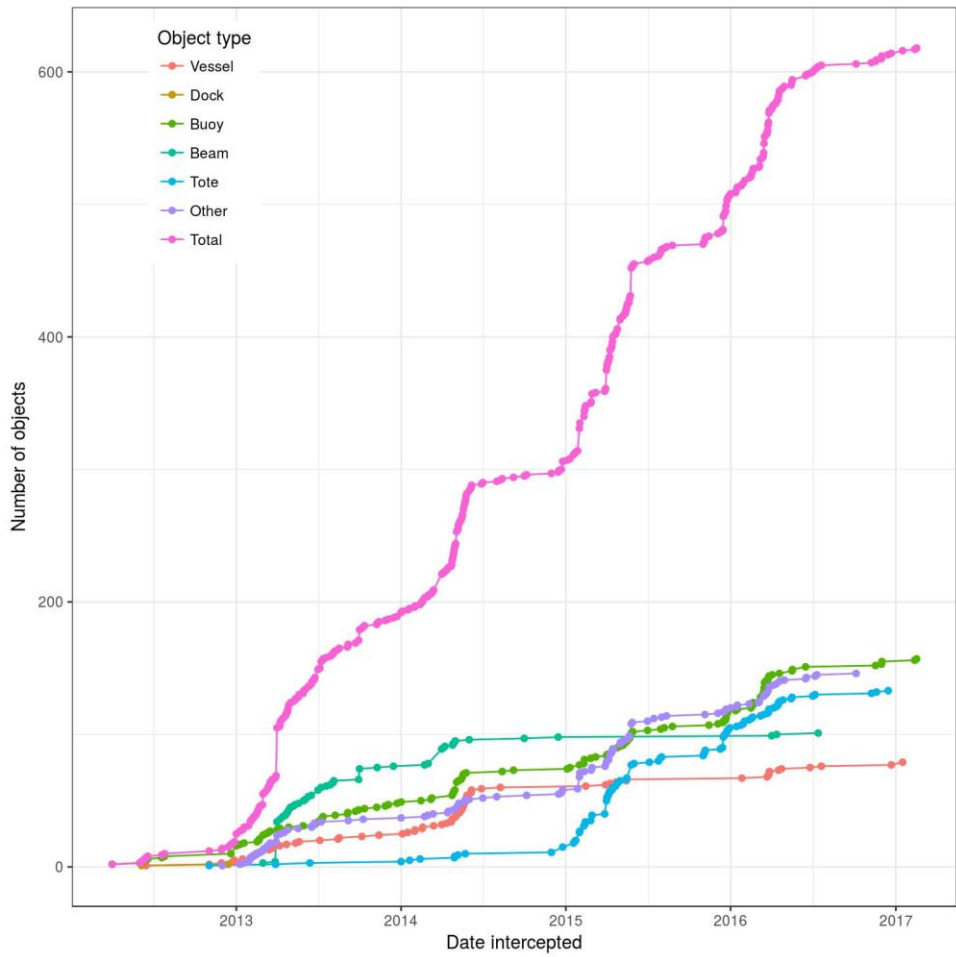


Fig. S1. Cumulative Japanese tsunami marine debris objects by date. Object details as in Fig. 2 caption. Post-and-beam pieces detected in 2016 may represent re-drift (washed back out to sea after earlier landings), rather than being at sea since 2011. JTMD spring landing concentrations are evident in all years.

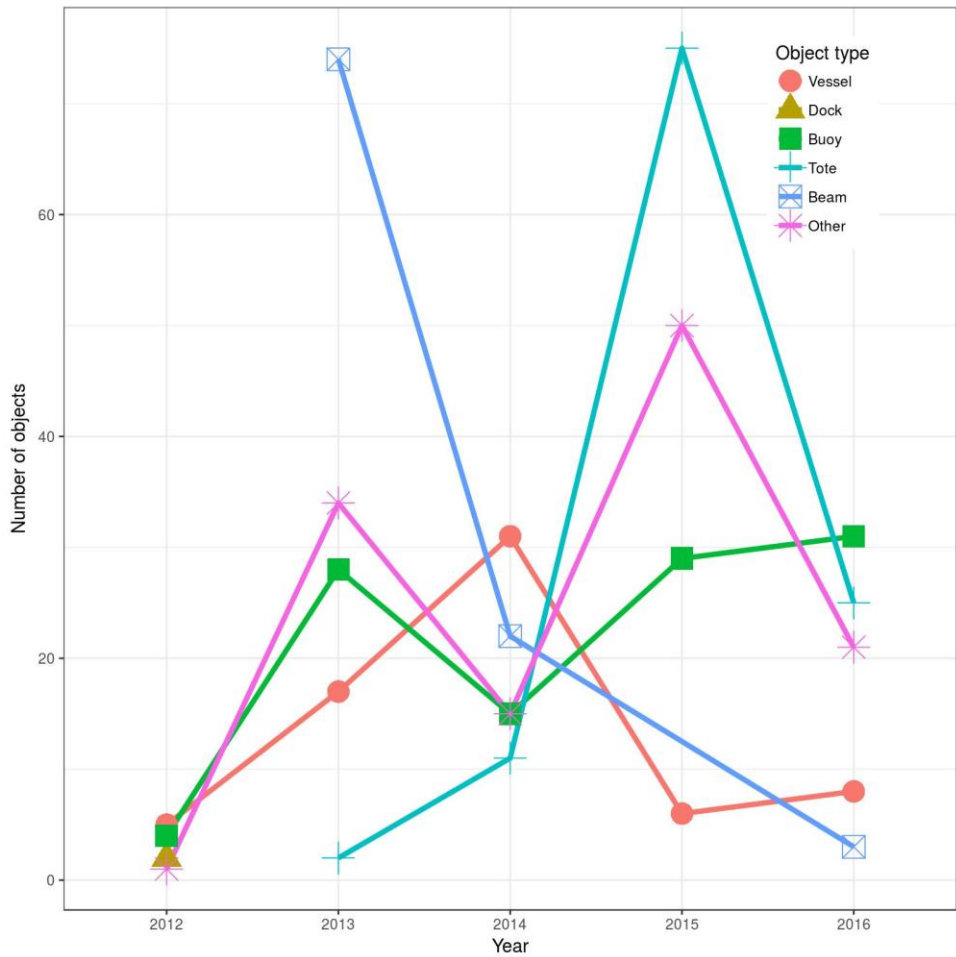


Fig. S2. Frequency of JTMD objects averaged by year, 2012-2016. Data shown as annual summations, and thus 2017 (for which data are available only through February) is not shown. Object details as in Fig. 2 caption. Post-and-beam details as in Fig. 2 and Fig. S1 captions.

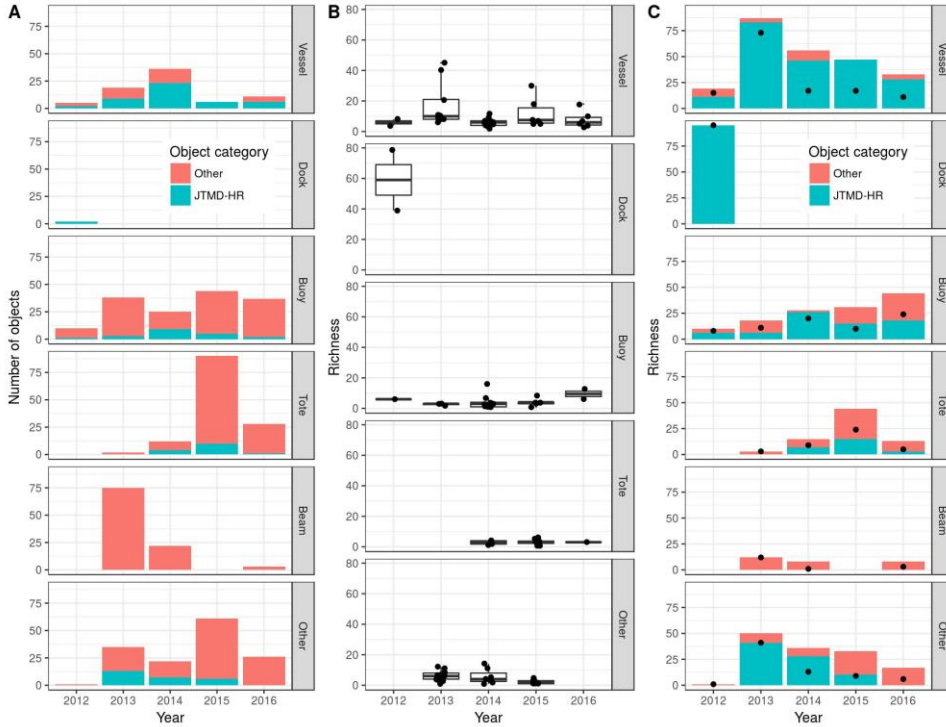


Fig. S3. Detailed summary of temporal distribution of JTMD higher resolution (HR) and all other objects by year, number, and richness. Object explanations as in Fig. 1 caption. (A) Number of objects between 2012 and 2016. Data shown as annual summations, and thus 2017 (for which data are available only through February) is not shown. Higher Resolution objects (see text and note 4) shown in blue. (B) Quartile distribution of species diversity (richness). No post-and-beams were JTMD-HR. (C) Richness by object type. Higher Resolution objects (see text and note 4) shown in blue.

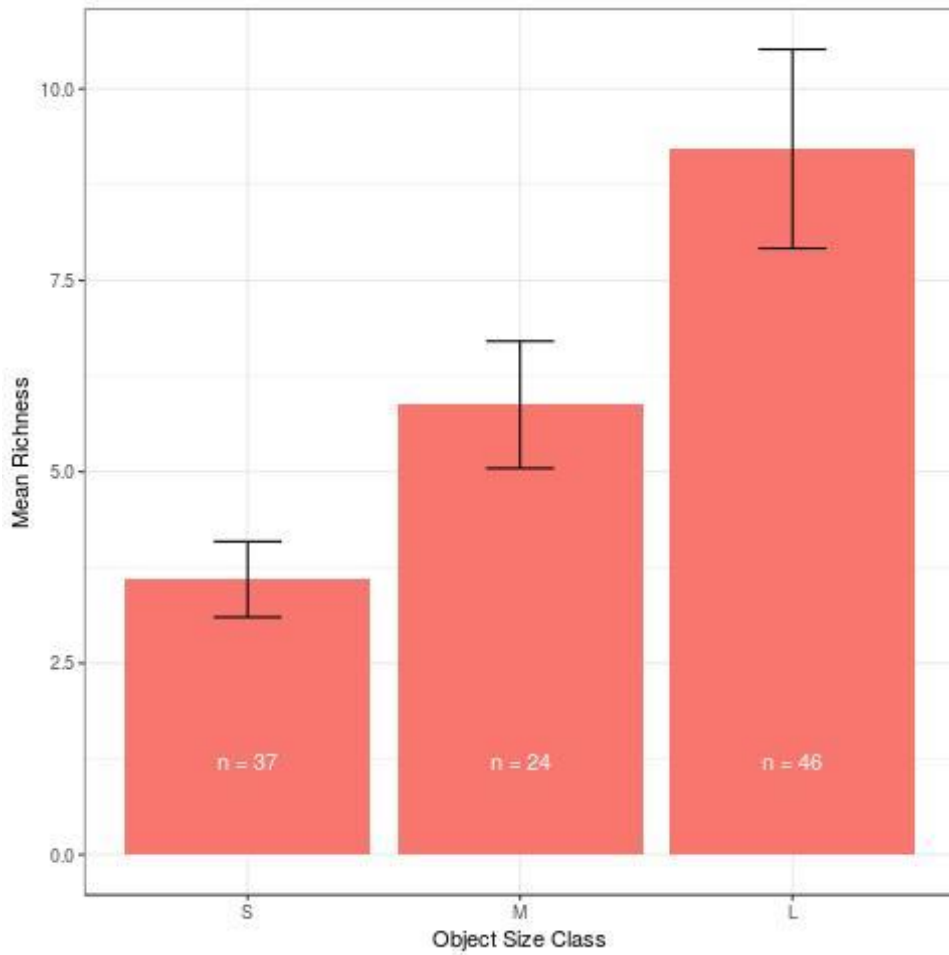


Fig. S4. Mean Japanese macroinvertebrate and fish richness compared to three JTMD object size classes: S, small; M, medium, and L, large. Size class definitions in (4). "n" is number of objects in each size class. See Fig. S5 for significance comparisons.

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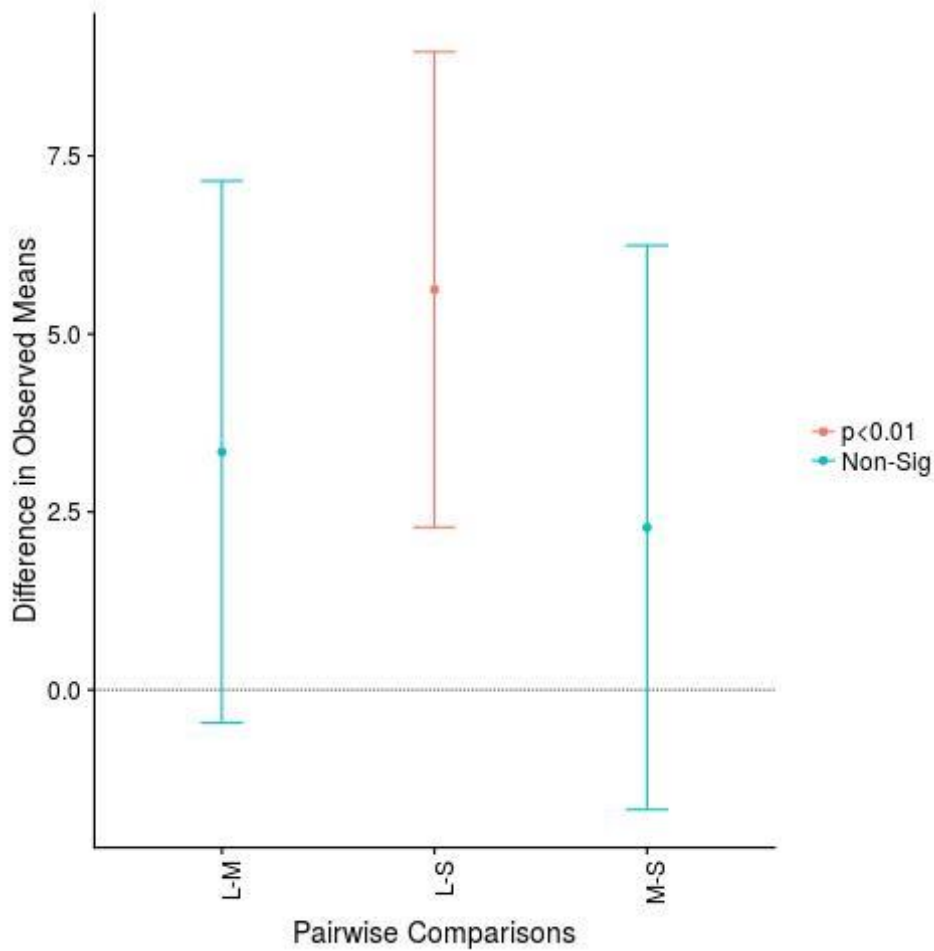


Fig. S5. Differences in observed richness means of Japanese macroinvertebrate and fish richness compared to three JTMD object size classes: S, small; M, medium, and L, large. Size class definitions in (4). Richness of large objects is significantly (p-value 0.01199; Tukey HSD test) different than richness of small objects. Large object richness is not significantly different from medium objects, nor medium from small.

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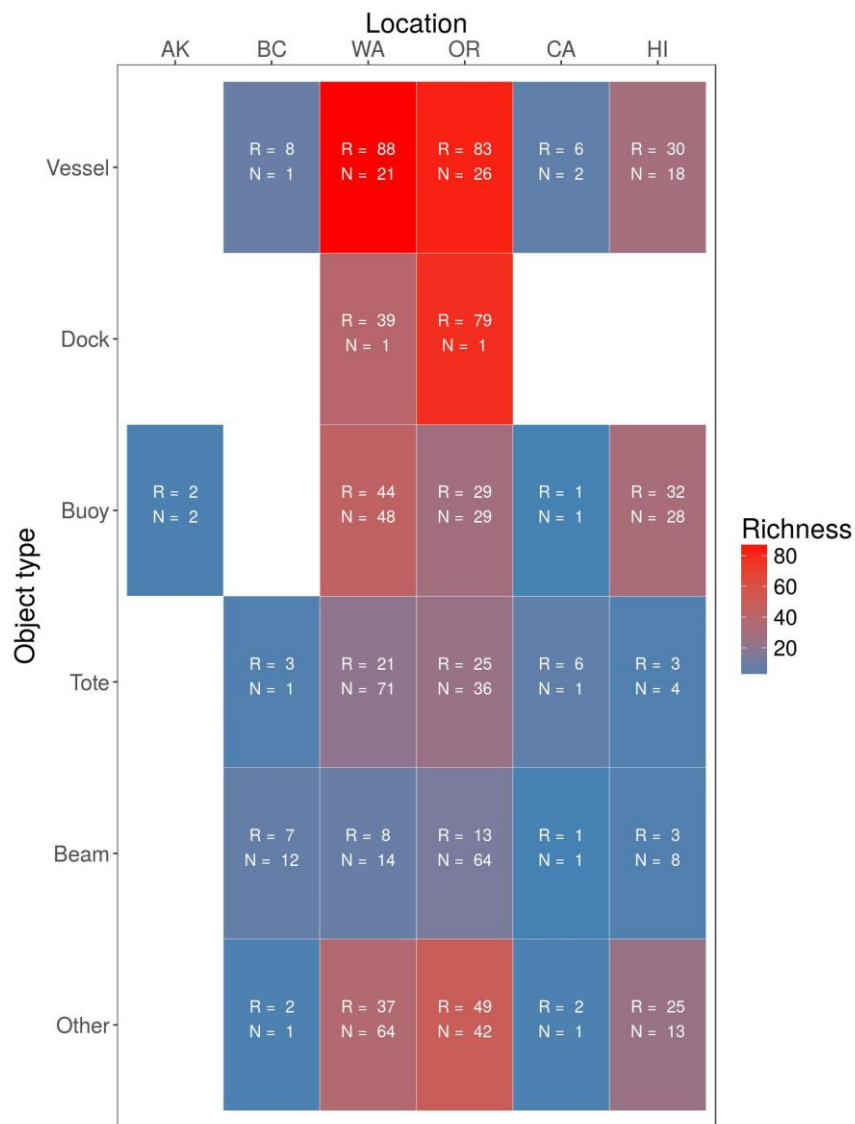


Fig. S6. Details of richness and number of objects by location (states and province). R is total summed species richness and N is total object number, for each object type by location. For

example, there was one dock landing in Oregon (JTMD-BF-1) with 79 macroinvertebrate species, and one dock landing in Washington (JTMD-BF-8) with 39 macroinvertebrate species.

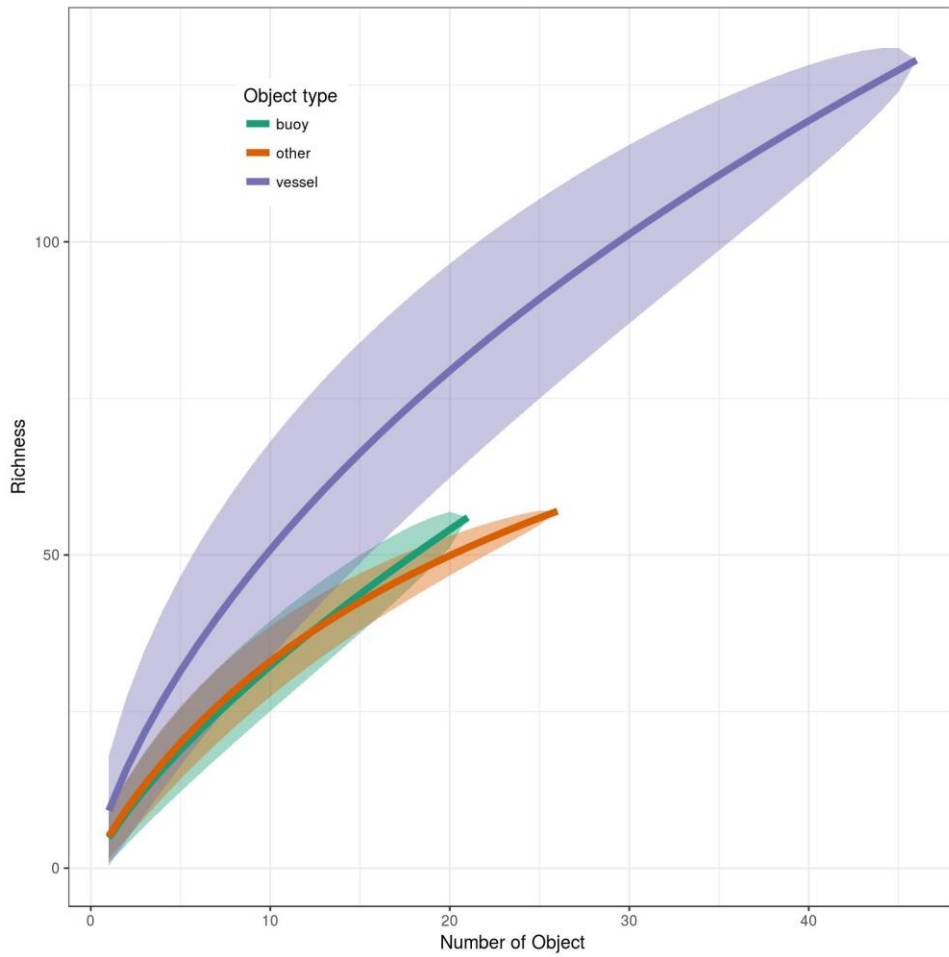


Fig. S7. Rarefaction estimate of total potential JTMD richness. Chao 1 estimators based upon JTMD-HR buoys, vessels, and other objects (as detailed in Fig. 2 caption). Estimators shown in table S4.

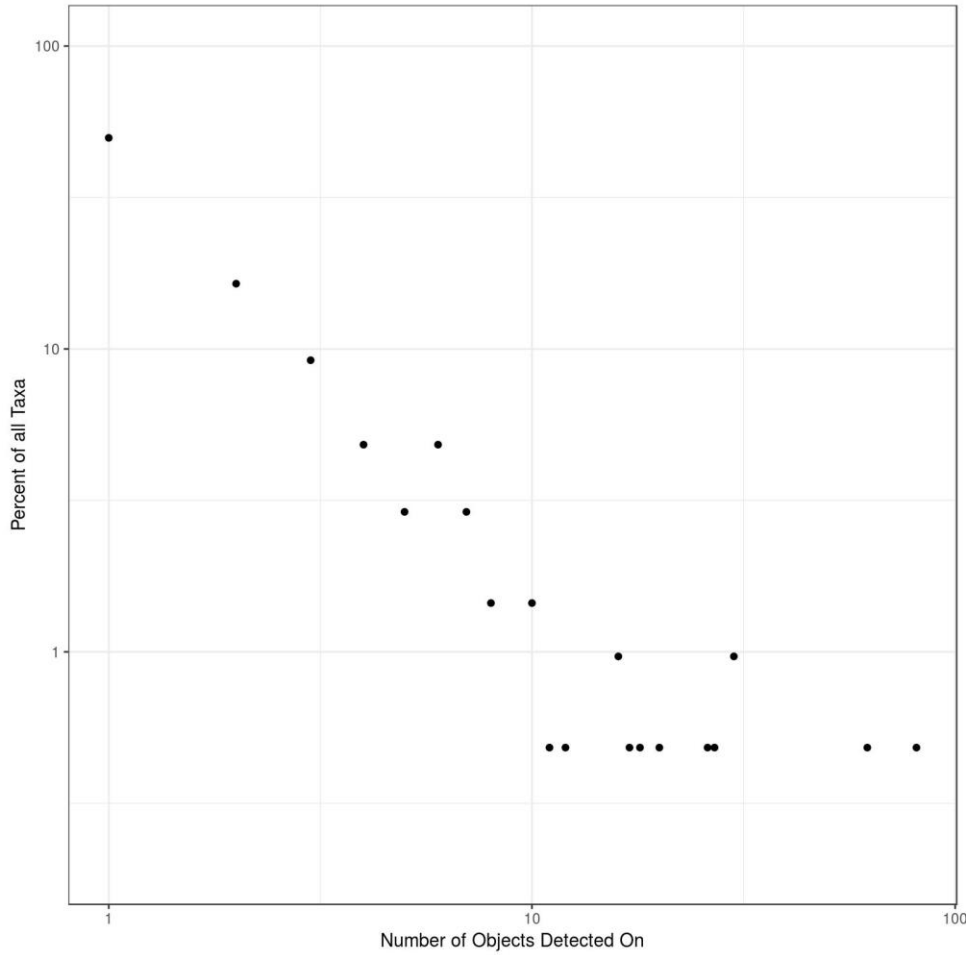


Fig. S8. Percentage of all macroinvertebrate and fish taxa as a function of the number of objects on which they were present. Log scale plot of JTMD-HR objects (n= 110).

Table S1. Register of all sampled Japanese Tsunami Marine Debris (JTMD) objects: BF (Biofouling) numbers, landing site locations, latitude x longitude in decimal degrees, date, and object type; prefecture and city of origin if known

Some earlier numbered items (not shown) were later removed from the database as not meeting JTMD-BF-criteria (note 4). Some sites (such as the Long Beach Peninsula WA, Ocean Shores Peninsula WA and the Cape Blanco OR region) are several kilometers in length, and thus a site with the same name may have slightly different coordinates. Post-and-beam wood dates are actual or best estimated landing dates (occasionally set as a standard date based upon forensic evidence and site familiarity). Object metadata are at http://invasions.si.edu/nemesis/jtmd/jtmd_dat.cvs.

* = JTMD-HR: JTMD objects most thoroughly sampled (Higher Resolution) for macrobiota diversity.

JTMD-BF-	State or Province	Location	Latitude	Longitude	Date	Object	Prefecture (and city) origin in Japan
*1	OR	Newport: Agate Beach	44.66455	-124.061158	5 June 2012	dock	Aomori: Misawa
*2	WA	Ilwaco	46.302406	-124.037256	15 June 2012	vessel	Miyagi
3*	OR	in ocean off Lincoln City	44.92825 (estimate)	-124.045969 (estimate)	9 June 2012	buoy	
4	OR	in ocean 85 km off Alsea Bay	44.418397	-124.922792	June 2012	buoy	

5	CA	Bodega Bay: Salmon Creek Beach	38.204659	-123.041335	19 June 2012	float	
*6	HI	Oahu: Kahana Bay	21.556689	-157.874972	29 November 2012	vessel	Iwate: Ofunato
7	OR	in ocean off Newport	44.614878 (estimate)	-124.195000 (estimate)	12 June 2012	float	
*8	WA	Olympic National Park: near Mosquito Creek	47.798108	-124.482242	18 December 2012	dock	Aomori: Misawa
9	WA	Olympic National Park: near Mosquito Creek	47.798108	-124.482242	20 December 2012	float	
10	WA	Olympic National Park: near Mosquito Creek	47.798108	-124.482242	20 December 2012	float	
11	HI	Oahu: Punaluu	21.591161	-157.890456	24 December 2014	vessel	Miyagi

12	WA	Grays Harbor: Damon Point	46.931561	-124.100528	28 December 2012	vessel	
13	WA	Olympic National Park: near Mosquito Creek	47.800236	-124.483256	20 July 2012	buoy	
14	CA	16km north of Fort Ross	38.596853	-123.350833	1 April 2012	float	
15	CA	in ocean off Ft. Ross	38.460178 (estimate)	-123.355556 (estimate)	26 July 2012	buoy	
16	Midway	Eastern Island	28.205808	-177.336394	2 November 2012	tote	
*17	HI	Oahu: Hanauma Bay	21.271094	-157.696808	9 January 2013	buoy	
*18	OR	Clatsop Beach	46.188033	-123.989461	9 January 2013	dock fender	
19	HI	Hawaii: Honokohau	19.676731	-156.026666	9 January 2013	float	
*20	HI	Oahu: Mokuleia	21.582003	-158.206703	17 January 2013	metal cylinder	
21	HI	Kauai: in ocean off Nohili Point	22.064383 (estimate)	-159.783819 (estimate)	18 January 2013	navigation buoy	Fukushima: Onahama

22	WA	Ocean City State Park	46.983494	-124.174953	2 February 2013	refrigerator	
*23	OR	Gleneden Beach	44.889214	-124.035278	5 February 2013	vessel	
*24	OR	Newport: South Beach	44.607683	-124.0687	8 February 2013	pallet	
25	HI	Oahu: Kahuku	21.683367	-157.944247	13 February 2013	vessel	Miyagi
*27	HI	Oahu: Makapuu Beach	21.311108	-157.66005	14 February 2013	pontoon section	
*28	OR	Horsfall Beach	43.454106	-124.277689	20 February 2013	vessel	Miyagi
29	OR	Clatsop Beach	46.188033	-123.989461	27 February 2013	vessel	Iwate
30	OR	Lincoln City: Road's End	45.008075	-124.009661	28 February 2013	vessel	
31	HI	Oahu: Laie	21.648639	-157.922369	4 March 2013	rope	
*32	HI	Maui: Ahihi Kinau	20.600631	-156.437	11 March 2013	pontoon section	

33	HI	Oahu: Kaha'u	21.457827	157.830000	7 March 2013	buoy	
34	HI	Kauai: Lepeuli Beach	22.207492	-159.338625	20 February 2013	ropes/ buoys	
35	HI	Oahu: Kahuku	21.683367	-157.944247	21 February 2013	buoy	
36	OR	Florence: Muriel Ponsler Wayside	44.169722	-124.117383	14 March 2013	vessel	
*37	WA	Olympic National Park	47.798108	-124.482242	17 March 2013	box	
38	OR	Cape Arago: Lighthouse Beach	43.338936	-124.372622	17 March 2013	buoy	
*39	OR	Cannon Beach	45.892186	-123.964725	21 March 2013	vessel	Fukushima
*40	WA	Long Beach Peninsula	46.475511	-124.071969	22 March 2013	vessel	Iwate: Rikuzentakata
41	HI	Maui: Kahoolawe: Kanapou	20.546353	-156.553056	13 March 2013	buoy	
*42	OR	Lincoln City: Salishan	44.889214	-124.035278	9 April 2013	log	

*43	OR	Lincoln City: Camp Westwind	45.038608	-124.006022	7 April 2013	vessel	
44	BC	Ucluelet	48.9367	-125.552303	28 March 2013	post-and- beam wood	
45	BC	Ucluelet	48.9367	-125.552303	8 April 2013	post-and- beam wood	
46	BC	Ucluelet	48.9367	-125.552303	8 April 2013	post-and- beam wood	
47	OR	Nye Beach	44.642333	-124.063011	14 April 2013	post-and- beam wood	
48	OR	Nye Beach	44.642333	-124.063011	14 April 2013	post-and- beam wood	
49	HI	Oahu: Lanikai Beach	21.393008	-157.715328	29 March 2013	container	
*50	OR	Coos Bay: north spit	43.411944	-124.300539	22 April 2013	vessel	
51	OR	Coos Bay: north spit	43.411944	-124.300539	25 April 2013	pallet	
52	OR	Coos Bay: north spit	43.411944	-124.300539	25 April 2013	pallet	
53	BC	Ucluelet	48.9367	-125.552303	April 2013	post-and- beam wood	
54	HI	Hawaii: Kamilo Point Beach	18.974297	-155.597222	8 April 2013	Float	

55	OR	Moolack Beach	44.699717	-124.0636	11 May 2013	post-and- beam wood	
56	OR	Newport: South Beach	44.607683	-124.0687	17 April 2013	tree	
57	OR	Newport: South Beach	44.607683	-124.0687	8 May 2013	post-and- beam wood	
*58	OR	Clatsop Beach	46.188033	-123.989461	30 May 2013	vessel fragment	
59	OR	Nye Beach	44.642333	-124.063011	30 May 2013	post-and- beam wood	
60	OR	Tillamook Bay: Ocean Beach	45.561572	-123.952322	19 May 2013	post-and- beam wood	
61	OR	Nye Beach	44.642333	-124.063011	30 May 2013	post-and- beam wood	
63	WA	Grayland Beach North	46.805672	-124.105000	21 April 2013	post-and- beam wood	
64	OR	Yaquina Head	44.675583	-124.077778	3 June 2013	post-and- beam wood	
65	OR	between Lost Creek and Thiel Creek	44.552100	-124.075556	9 June 2013	post-and- beam wood	
66	OR	between Lost Creek and Thiel Creek	44.552100	-124.075556	9 June 2013	post-and- beam wood	

*67	OR	Cape Arago: North Cove	43.307539	-124.399283	18 June 2013	pallet	
68	HI	Hawaii: Kamilo Point	18.974297	-155.597222	February 2013	refrigerator	
69	HI	Hawaii: Kamilo Point	18.974297	-155.597222	16 March 2013	refrigerator	
70	HI	Hawaii: Kamilo Point	18.974297	-155.597222	23 June 2013	TV set	
*71	WA	Olympic National Park	47.800236	-124.483256	23 June 2013	pallet	
72	HI	Oahu: Punaluu	21.591161	-157.890456	17 June 2013	I-beam	
73	OR	Coos County: Whiskey Run Beach	43.2163167	-124.396944	8 July 2013	piling	
74	OR	Coos County: Whiskey Run Beach	43.2163167	-124.396944	8 July 2013	post-and- beam wood	
75	HI	Oahu: Laie: Malaekahana Beach	21.668564	-157.936668	5 July 2013	vessel	Iwate
76	AK	Kenai Fjords National Park	59.846864	-149.595081	24 June 2013	buoy	
77	BC	Vancouver Is: between	48.627503	-124.771111	13 June 2013	box	

		Bamfield and Port Renfrew					
78	WA	Makah Reservation	48.329967	-124.664167	12 May 2013	vessel	Aomori
79	OR	Bandon region	43.115111	-124.436436	winter- summer 2013	buoy	
80	OR	Bandon	43.115111	-124.436436	winter- summer 2013	buoy	
81	OR	Bandon	43.115111	-124.436436	winter- summer 2013	pallet	
*82	OR	Coos Bay region	43.216942	-124.396583	30 March 2013	board	
83	BC	Vancouver Is.: Turret Is.	48.895589	-125.338889	18 May2013	plastic bottle	
84	HI	Oahu: James Campbell NWR	21.697456	-157.955556	week of July 8 2013	buoy	
85	HI	Oahu: James Campbell NWR	21.697456	-157.955556	week of July 8 2013	buoy with rope	

86	OR	North of Cape Sebastian: Kissing Rock	42.386447	-124.424722	4 August 2013	post-and- beam wood	
87	HI	Oahu: Kawela	21.700403	-158.006547	14 August 2013	vessel	Miyagi
88	HI	Oahu: Turtle Bay Resort	21.705314	-157.997778	17 August 2013	vessel	
89	OR	Tillamook Co.: Bay Ocean Peninsula	45.561572	-123.952322	28 July 2013	post-and- beam wood	
*90	HI	Hawaii: in ocean off Keauhou	19.575356 (estimate)	-155.991675 (estimate)	4 September 2013	buoy	
91	HI	in ocean 1.6 km off Kona coast	19.341684	-155.585672	5 September 2013	buoy	
92	HI	Hawaii: Kamilo	19.951283	-155.855347	12 July 2013	buoy	
93	AK	Sitka area: SSSC/ Cherokee, Yamani area	56.669294	-135.197222	8 August 2013	buoy	
94	BC	Ucluelet	48.9367	-125.552303	winter- spring 2013	vessel	

95	BC	Ucluelet area	48.9367	-125.552303	winter- spring 2013	vessel fragment	
96	HI	Maui: Au'au channel	20.780583	-156.73545	22 September 2013	buoy	
97	WA	Long Beach Peninsula	46.475511	-124.071969	20 April 2013	post-and- beam wood	
103	OR	Bandon region	43.115111	-124.436436	late 2012 to early 2013	buoy	
104	OR	Bandon region	43.115111	-124.436436	late 2012 to early 2013	buoy	
105	OR	Bandon	43.115111	-124.436436	1 January 2013	buoy	
106	OR	Cape Blanco	42.838236	-124.561644	11 July 2013	buoy	
107	OR	Whiskey Run Beach	43.2163167	-124.396944	8 July 2013	post-and- beam wood	
108	OR	Cape Arago: Lighthouse Beach	43.338936	-124.372622	11 July 2013	post-and- beam wood	

109	OR	Cape Arago: Lighthouse Beach	43.338936	-124.372622	13 July 2013	post-and- beam wood	
110	BC	Ucluelet	48.9367	-125.552303	spring 2013	post-and- beam wood	
111	BC	Ucluelet	48.9367	-125.552303	spring 2013	post-and- beam wood	
114	OR	Rocky Point, south of Port Orford	42.719197	-124.467778	19 July 2013	post-and- beam wood	
116	OR	Crook Point, south of Gold Beach	42.25125	-124.412772	1 July 2013	post-and- beam wood	
117	OR	Brookings: Lone Ranch State Park	42.0982194	-124.343056	5 August 2013	post-and- beam wood	
118	OR	Cape Arago: South Cove	43.303531	-124.396389	August 2013	post-and- beam wood	
119	OR	Pistol River, south of Gold Beach	42.277378	-124.408819	1 April 2013	post-and- beam wood	
120	OR	North Cove, Cape Arago	43.307539	-124.399283	1 April 2013	post-and- beam wood	
121	OR	Cape Arago: North Cove	43.307539	-124.399283	1 April 2013	post-and- beam wood	

123	OR	Cape Arago: North Cove	43.307539	-124.399283	1 April 2013	post-and- beam wood	
124	OR	Crook Point, south of Gold Beach	42.25125	-124.412772	1 July 2013	post-and- beam wood	
125	OR	Lost Creek, south of Newport	44.551983	-124.073486	1 October 2013	post-and- beam wood	
126	OR	Newport: Agate Beach	44.66455	-124.061158	1 July 2013	post-and- beam wood	
127	OR	Crook Point, south of Gold Beach	42.25125	-124.412772	1 July 2013	post-and- beam wood	
128	OR	Bandon	43.115111	-124.436436	2 March 2014	post-and- beam wood	
*129	BC	Long Beach Peninsula	49.067658	-125.753644	6 October 2013	vessel	
*130	OR	Clatsop Beach	46.188033	-123.989461	9 October 2013	pontoon section	
*131	WA	Between Grayland Beach State Park and Tokeland	46.750892	-124.096014	13 November 2013	vessel	

132	HI	Maui: Au'au channel between Maui and Lana'i	20.851781	-156.744167	27 November 2013	buoy	
133	HI	Maui: Au'au channel between Maui and Lana'i	20.851781	-156.744167	4 December 2013	buoy	
*134	WA	Westport: Twin Harbors State Park	48.857367	-124.108597	16 January 2014	vessel	Miyagi
*135	OR	Yachats	44.335344	-124.099811	17 February 2014	vessel	
136	OR	Newport: South Beach	44.607683	-124.0687	22 February 2014	lid	
137	OR	Newport: South Beach	44.607683	-124.0687	22 February 2014	post-and- beam wood	
138	HI	Kamilo Beach	18.974297	-155.597222	late January 2014	post-and- beam wood	

*139	HI	Pearl Harbor: Hickam Field	21.317361	-157.960361	18 February 2014	vessel	Miyagi
140	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	December 2012	cooler	
141	WA	Long Beach Peninsula	46.475511	-124.071969	March 2013	lid	
142	HI	Oahu: Hanauma Bay	21.271094	-157.696808	29 May 2013	buoy	
143	HI	Oahu: Kailua Beach	21.405117	-157.738383	6 September 2013	pallet	
144	HI	Kauai: Waipake Lepeuli	22.207492	-159.338625	29 September 2013	buoy	
145	HI	Oahu: Maunaloa Bay	21.258203	-157.744394	12 October 2013	buoy	
147	HI	Kauai: Hanamaulu Beach Park	21.993161	-159.340833	8 November 2013	lighted marine buoy	
148	HI	Maui: Kalepa Gulch:	20.935936	-156.506111	February 2014	vessel	

		Waihee					
149	HI	Kauai: Waipake Beach	22.207492	-159.338625	27 April 2013	buoy	
150	OR	Cape Arago: North Cove	43.307539	-124.399283	1 October 2013	post-and-beam wood	
152	Midway	Eastern Island	28.205808	-177.336394	2 November 2012	vessel	Miyagi
153	Midway	Eastern Island	28.205808	-177.336394	16 February 2013	buoy	
*154	Midway		28.205808	-177.336394	2012-2013	buoy	
155	Midway	Eastern Island	28.205808	-177.336394	14 February 2014	buoy	
156	Midway		28.205808	-177.336394	2012-2013	buoy	
157	OR	Newport: South Beach	44.607683	-124.0687	1 October 2013	post-and-beam wood	
158	HI	Oahu: Malaekahana Beach Park	21.668564	-157.936668	12 February 2014	box	
159	OR	Cape Arago: South Cove	43.303531	-124.396389	16 June 2013	post-and-beam wood	
*160	OR	Cape Meares:	45.524289	-123.955261	26 April 2014	tree	

		Tillamook Bay spit					
161	OR	Newport: North Jetty	44.615053	-124.073889	1 October 2013	post-and-beam wood	
163	OR	Otter Rock	44.746533	-124.062978	1 October 2013	post-and-beam wood	
164	OR	Otter Rock	44.746533	-124.062978	5 April 2014	post-and-beam wood	
165	OR	Ophir: Woodruff Creek	42.588292	-124.396944	May 2013	post-and-beam wood	
167	OR	Crook Point, south side	42.25125	-124.412772	1 April 2013	post-and-beam wood	
*168	WA	Long Beach Peninsula	46.475511	-124.071969	10 March 2014	buoy	
*170	WA	Long Beach Peninsula	46.475511	-124.071969	23 April 2014	vessel	
171	OR	Tillamook	45.561572	-123.952322	25 April 2014	post-and-beam wood	
*172	OR	Newport: South Beach	44.607683	-124.0687	27 April 2014	buoy	
*173	OR	Newport: South Beach	44.607683	-124.0687	27 April 2014	buoy	
174	OR	Yaquina Bay, beach at Hatfield Station	44.623867	-124.045278	26 April 2014	post-and-beam wood	

176	OR	Newport: South Beach	44.607683	-124.0687	29 April 2014	post-and-beam wood	
*177	WA	Ocean City State Park: Ocean Shores	46.983494	-124.174953	28 April 2014	vessel	
179	BC	Ucluelet area: Salmon and Beach	48.9367	-125.552303	9/10 March 2014	post-and-beam wood	
180	BC	Ucluelet area: Broken Group Islands	48.873264	-125.369445	8 April 2014	post-and-beam wood	
181	WA	Long Beach Peninsula	46.475511	-124.071969	March 2013	buoy	
182	WA	Long Beach Peninsula	46.475511	-124.071969	March 2013	post-and-beam wood	
183	WA	Long Beach Peninsula	46.475511	-124.071969	24 April 2014	buoy	
184	WA	Long Beach Peninsula	46.475511	-124.071969	24 April 2014	buoy	
186	OR	Lost Creek, South Beach, 118 th Street	44.551983	-124.073486	30 April 2014	tote	
187	AK	Catherine Island, Chatham Strait	57.3224556	-134.812778	30 April 2014	buoy	

*188	OR	Cape Lookout	45.356672	-123.973058	2 May 2014	vessel	
189	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	buoy	
190	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	propane tank	
191	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	plastic fragment	
192	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	buoy	
193	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	buoy	
*196	OR	Waldport	44.439411	-124.084272	11 May 2014	vessel	
*197	OR	Quinalt	47.400867	-124.330544	9 May 2014	pontoon section	
*198	OR	Sand Lake: Tierra del Mar	45.253539	-123.969358	12 May 2014	vessel	
*199	OR	north of Umpqua River	43.783216	-124.174530	15 May 2014	vessel	
200	OR	Rockaway: Manzanita State Park	45.720494	-123.945572	April 2012	buoy	
*201	OR	Brian Booth State Park	44.528783	-124.076225	16 May 2014	vessel	

*202	OR	Surfland	44.580408	-124.069608	16 May 2014	vessel	
203	WA	Long Beach Peninsula	46.475511	-124.071969	April 2013	buoy	
*205	HI	Kauai: Larsen's / Lepeuli Beach	22.206567	-159.338425	12 April 2014	vessel	Miyagi
206	HI	Oahu: Waimanalo	21.328933	-157.689167	16 April 2014	propane tank	
*207	OR	Coos Bay: Charleston	43.345911	-124.321667	17 May 2014	buoy	
*208	OR	Cape Arago: North Cove	43.307539	-124.399283	19 May 2014	vessel	
*209	HI	Oahu: Haleiwa, in ocean	21.810331 (estimate)	-158.317636 (estimate)	19 May 2014	vessel	
*210	OR	Carter Lake	43.854247	-124.160867	21 May 2014	vessel	
211	OR	Tahkenitch Lake region	43.805472	-123.169442	21 May 2014	vessel	
*212	OR	Siuslaw River south jetty	44.015347	-124.139364	21 May 2014	pontoon section	
214	OR	Cape Blanco	42.838236	-124.561644	1 October 2013	post-and- beam wood	
*215	OR	South of Dunes City	43.803047	-124.170392	19 May 2014	buoy	

		Tehakenitch campground beach					
*216	OR	South of Dunes City Tehakenitch campground beach	43.803047	-124.170392	19 May 2014	buoy	
217	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	buoy	
218	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	buoy	
219	OR	Cape Lookout Beach	45.356672	-123.973058	4 May 2014	buoy	
221	OR	Cape Lookout Beach	45.356672	-123.973058	25 May 2014	vessel	
*222	WA	Ocean Park	46.475511	-124.071969	23 May 2014	vessel	Iwate
*223	WA	Long Beach Peninsula	46.475511	-124.071969	24 May 2014	vessel	Miyagi
*224	WA	Long Beach Peninsula	46.475511	-124.071969	24 May 2014	vessel	
225	OR	Strawberry Hill	44.254792	-124.112822	27 May 2014	vessel	Iwate

*226	WA	Ocean City	46.983494	-124.174953	25 May 2014	vessel	Miyagi
*227	WA	Long Beach Peninsula	46.475511	-124.071969	5 June 2014	vessel	
228	WA	Long Beach Peninsula	46.475511	-124.071969	5 June 2014	vessel	
*229	WA	Quinault	47.400867	-124.330544	6 June 2014	vessel	Miyagi
230	WA	Long Beach Peninsula	46.475511	-124.071969	6 June 2014	vessel	Miyagi
231	OR	South of Pistol River State Park	42.259853	-124.409167	1 October 2013	post-and- beam wood	
*232	OR	Port Orford: Humbug Mountain State Park	42.687594	-124.448233	17 May 2014	buoy	
233	OR	Netarts Bay	45.429753	-123.946803	28 June 2014	vessel	
234	OR	Newport: South Beach	44.607683	-124.0687	9 February 2013	propane tank	
235	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	1 March 2013	tire	

236	AK	Sitka	57.063358	-135.359564	25 May 2014	buoy	
*237	AK	Sitka	57.063358	-135.359564	24 May 2014	buoy	
239	AK	Sitka	57.063358	-135.359564	2013	buoy	
*240	CA	Daly City: Mussel Rock Beach	37.668644	-122.496175	9 August 2014	vessel	
*241	OR	Cape Meares	45.524289	-123.955261	19 August 2014	helmet	
242	HI	Maui: Au'au channel	20.851781	-156.744167	7 September 2014	buoy	
244	BC	Ucluelet	48.9367	-125.552303	1 April 2013	post-and- beam wood	
245	BC	Ucluelet	48.9367	-125.552303	1 October 2013	post-and- beam wood	
246	BC	Ucluelet	48.9367	-125.552303	1 June 2014	post-and- beam wood	
247	OR	Cape Arago: North Cove	43.307539	-124.399283	15 December 2014	post-and- beam wood	
249	CA	Mendocino Co.: MacKerricher State Park	39.516656	-123.781389	13 August 2014	buoy	

250	CA	Dry Lagoon	41.225081	-124.108608	6 June 2014	vessel	Miyagi
251	BC	Ucluelet	48.9367	-125.552303	28 April 2014	buoy	
252	OR	Cape Blanco north	42.838236	-124.561644	23 May 2014	basket	
253	HI	Oahu: Kahana Bay	21.556536	-157.874844	22 April 2014	vessel	Iwate
254	OR	Lost Creek	44.551983	-124.073486	29 April 2014	tote	
*255	WA	Ocean Shores	46.972447	-124.176611	7 May 2014	tote	
257	HI	Oahu: between Sandy Beach and Erma's	21.289992	-157.665069	6 October 2014	pontoon section	
*258	OR	Seal Rock: Quail Street	44.414208	-124.083808	23 February 2013	container box doors	
259	OR	Bay Ocean	45.520389	-123.95667	February 2013	carboy	
260	OR	Retz Creek, south of Port Orford	42.712125	-124.461944	11 March 2013	wooden dock frame	
261	OR	Gold Beach: Kissing Rock	42.386447	-124.424722	1 April 2013	Post & Beam wood	

262	OR	Bandon	43.115111	-124.436436	1 April 2013	post-and- beam wood	
263	OR	Crooked Creek, Bandon (Devil's Kitchen State Park)	43.0818833	-124.437222	1 April 2013	milled log	
*264	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	22 December 2014	tree	
265	OR	Newport: Moolack Beach	44.699717	-124.0636	1 April 2014	post-and- beam wood	
266	OR	Newport: Moolack Beach	44.699717	-124.0636	1 April 2013	post-and- beam wood	
267	OR	Newport: Moolack Beach	44.699717	-124.0636	1 April 2013	post-and- beam wood	
269	OR	Newport: Moolack Beach	44.699717	-124.0636	1 April 2014	post-and- beam wood	
271	OR	Newport: Moolack Beach	44.699717	-124.0636	1 April 2014	post-and- beam wood	
272	OR	Newport: Moolack Beach	44.699717	-124.0636	1 April 2014	post-and- beam wood	
274	OR	Newport: South Beach	44.607683	-124.0687	1 April 2013	post-and- beam wood	

*277	OR	Seal Rock	44.414208	-124.083808	30 November 2014	tote	
280	OR	Lincoln City: Road's End	45.008075	-124.009661	1 April 2014	post-and- beam wood	
281	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	8 May 2014	carboy	
*282	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	8 May 2014	milled wood	
*283	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	8 May 2014	buoy	
284	WA	Long Beach Peninsula	46.475511	-124.071969	23 December 2014	buoy	
285	WA	Long Beach Peninsula	46.475511	-124.071969	4 January 2015	vessel	
286	WA	Long Beach Peninsula	46.475511	-124.071969	January 2015	fillet board	
287	WA	Long Beach Peninsula	46.475511	-124.071969	January 2015	tote	
*288	OR	Beverly Beach	44.7199	-124.059308	20 January 2015	pallet	

289	OR	Tillamook South Jetty Beach (north of the Cape)	45.561572	-123.952322	18 January 2015	tote	
290	OR	Tillamook	45.561572	-123.952322	18 January 2015	tote	
291	OR	Tillamook South Jetty Beach (north of the Cape)	45.561572	-123.952322	18 January 2015	tote	
292	WA	Tokeland	46.704481	-123.974444	20 January 2015	tote	
*293	WA	Long Beach Peninsula	46.475511	-124.071969	28 January 2013	pipe	
295	WA	Long Beach Peninsula	46.475511	-124.071969	27 January 2015	sieve lid	
296	OR	Bandon: Bullard Beach	43.152231	-124.415278	1 April 2013	post-and- beam wood	
297	OR	Bandon: Bullard Beach	43.152231	-124.415278	1 April 2013	post-and- beam wood	
298	OR	Bandon: Bullard Beach	43.152231	-124.415278	1 April 2014	post-and- beam wood	
299	WA	Long Beach Peninsula	46.475511	-124.071969	11 February 2015	tote	

300	WA	La Push: Toleak Point	47.833653	-124.539722	10 February 2015	buoy	
301	WA	La Push: Strawberry Point	47.845478	-124.550000	11 February 2015	buoy	
302	WA	La Push: Strawberry Point	47.845478	-124.550000	11 February 2015	buoy	
303	WA	La Push: Strawberry Point	47.845478	-124.550000	11 February 2015	buoy	
*304	OR	in ocean off Newport	44.634933 (estimate)	-124.211486 (estimate)	12 February 2015	basket	
*305	OR	Lincoln City: Westwind Camp	45.038608	-124.006022	13 February 2015	crate	
*306	OR	Brookings	42.043511	-124.268592	10 February 2015	tote	
309	OR	Cape Arago: South Cove	43.303531	-124.396389	1 April 2013	post-and- beam wood	

311	HI	Oahu: Waimanalo Beach	21.328933	-157.689167	1 April 2013	post-and- beam wood	
312	HI	Oahu: Waimanalo Beach	21.328933	-157.689167	1 April 2013	post-and- beam wood	
313	HI	Kauai: Donkey Beach	22.115622	-159.296389	1 April 2014	post-and- beam wood	
315	HI	Kauai: Hanamaulu Beach	21.993161	-159.340833	9 November 2013	post-and- beam wood	
316	WA	Moclips	47.229131	-124.216706	1 April 2013	post-and- beam wood	
317	WA	Moclips	47.229131	-124.216706	1 April 2013	post-and- beam wood	
318	WA	Moclips	47.229131	-124.216706	2013-2014	post-and- beam wood	
321	WA	Grayland	46.805672	-124.105000	spring 2014	post-and- beam wood	
322	WA	Queets	47.540406	124.3568	October 2014	post-and- beam wood	
323	WA	Ocean Shores	46.972447	-124.176611	spring 2014	post-and- beam wood	

327	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	spring 2013	milled log	
*328	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tray	
*329	HI	Hawaii: Kohanaiki	19.694592	-156.044561	14 February 2015	vessel	Miyagi
*330	WA	Strawberry Point	47.845822	-124.550458	25 February 2015	buoy	
331	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	14 March 2014	vessel	
332	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	lid	
333	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	pot	
334	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	urchin tray	
335	WA	Long Beach Peninsula	46.475511	-124.071969	March- April 2015	sieve	
336	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	buoy	

337	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	pipe	
*338	WA	Olympic National Park	47.798108	-124.482242	22 May 2015	pallet	
*339	WA	Olympic National Park	47.798108	-124.482242	16 May 2015	vessel	
340	BC	Wouwer Island Beach	48.898867	-125.33145	29 March 2015	pallet	
*341	WA	Olympic National Park	47.798108	-124.482242	22 May 2015	buoy	
342	WA	Olympic National Park	47.798108	-124.482242	22 May 2015	buoy	
343	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tote	
344	OR	Cape Perpetua	44.290814	-124.112208	7 April 2015	tote	
345	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014	frame	
346	WA [not HI]	Waikiki Beach	46.278106	-124.07865	1 April 2015	tote	
*347	OR	Seal Rock	44.414208	-124.083808	14 April 2015	buoy	
348	OR	Seal Rock	44.414208	-124.083808	14 April 2015	buoy	

*349	WA	Copalis Beach	47.116217	-124.184644	14 April 2015	tank	
350	WA	Moclips	47.229131	-124.216706	14 April 2015	sieve	
*352	WA	Long Beach Peninsula	46.475511	-124.071969	30 March 2015	vessel	
353	WA	Moclips	47.229131	-124.216706	5 April 2015	tote	
354	WA	Long Beach Peninsula	46.475511	-124.071969	3 April 2015	tote	
355	WA	Roosevelt Beach, Moclips	47.1722	-124.19536	6 April 2015	tote	
*356	OR	in ocean off Seal Rock	44.517033 (estimate)	-124.1203 (estimate)	9 April 2015	vessel	Iwate
357	WA	Ocean Shores	47.53138	-124.353	2012 to pre-April 2015	buoy	
*358	WA	Olympic National Park: Queets	47.540406	124.3568	9 April 2015	tray	
359	WA	Long Beach Peninsula	46.475511	-124.071969	13 April 2015	tote	

360	WA	Long Beach Peninsula	46.475511	-124.071969	25 April 2015	tote	
361	WA	Long Beach Peninsula	46.475511	-124.071969	25 April 2015	tote	
362	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	29 July 2015	tote	
*363	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	26 February 2015	bowl	
364	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	8 May 2015	carboy	
365	WA	Ocean Shores	46.972447	-124.176611	5 July 2015	tote	
366	WA	Kayostia Beach	48.037831	-124.68265	15 July 2015	boom	
*367	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	29 July 2015	tote	
368	WA	Long Beach Peninsula	46.475511	-124.071969	18 May 2015	lid	
*369	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	

370	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	rebar cap	
371	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	eel trap	
372	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
373	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
374	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
375	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	top	
376	WA	Long Beach Peninsula: Seaview	46.475511	-124.071969	25 May 2015	tote	
377	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	pan	
378	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
379	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
380	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
*382	CA	San Francisco: Ocean Beach	37.759711	-122.511564	26 May 2015	tote	

383	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tote	
384	WA	Long Beach Peninsula	46.475511	-124.071969	25 December 2014	tote	
*386	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	buoy	
*387	WA	Long Beach Peninsula	46.475511	-124.071969	25 December 2014	frame	
*388	WA	Long Beach Peninsula	46.475511	-124.071969	25 December 2014	tote	
389	WA	Long Beach Peninsula	46.475511	-124.071969	25 December 2014	tote	
390	WA	Long Beach Peninsula	46.475511	-124.071969	January-March 2015	propeller	
391	WA	Long Beach Peninsula	46.475511	-124.071969	January-March 2015	cylinder	
392	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	cutting board	

393	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tub	
395	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	crate	
396	WA	Moclips	47.229131	-124.216706	14 April 2014	pallet	
397	WA	Long Beach Peninsula	46.475511	-124.071969	1 May 2015	pontoon section	
398	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	octopus trap	
400	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	mirror cover	
401	WA	Kalaloch Beach	47.605564	-124.378775	7 August 2015	buoy	
*402	WA	Seaview	46.475511	-124.071969	10 May 2015	vessel	
403	WA	Kalaloch	47.605564	-124.378775	25 April 2015	buoy	
404	OR	Kissing Rock Beach	42.386447	-124.424722	25 August 2015	buoy	
*405	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tote	
*406	WA [not HI]	Waikiki Beach	46.278106	-124.07865	March-April 2015	tote	

407	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	bucket	
408	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tote	
409	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tote	
*410	OR	open ocean off Newport	44.576869	-124.695656	10 February 2015	tote	
411	OR	open ocean off Newport	44.576869	-124.695656	10 February 2015	tote	
412	WA	Long Beach Peninsula	46.475511	-124.071969	March-April 2015	tote	
413	WA	Long Beach Peninsula	46.475511	-124.071969	January-March 2015	tote	
*414	WA	Long Beach Peninsula	46.475511	-124.071969	14 December 2014	tote	
415	WA	Long Beach Peninsula	46.475511	-124.071969	January-February 2015	plastic fragment	
416	OR	Newport: South Beach	44.607683	-124.0687	spring 2013	milled log	

417	OR	open ocean off Newport	44.576869	-124.695656	25 February 2015	tote	
418	WA	Long Beach Peninsula	46.475511	-124.071969	26 May 2015	tote	
420	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	26 May 2015	vessel panel	
421	HI	Kauai: Kealia Point	22.090506	-159.304722	1 April 2014	post-and- beam wood	
422	OR	Bandon	43.115111	-124.436436	15 December 2013	post-and- beam wood	
423	OR	Gold Beach: Barley Beach	42.456883	-124.423803	14 May 2015	pallet	
424	OR	Crook Point, south of Gold Beach	42.25125	-124.412772	28 March 2015	tote	
425	OR	Crook Point	42.25125	-124.412772	17 April 2015	golf caddy leg	
426	WA	Queets	47.540406	-124.3568	9 April 2015	tray	
427	OR	Cape Arago	43.307539	-124.399283	28 May 2015	plastic bar	

428	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	11 April 2015	buoy	
429	WA	Queets	47.540406	-124.3568	9 April 2015	tray	
430	WA	Ocean Shores	47.53138	-124.353	2014	tray	
433	OR	Kissing Rock Beach, south of Gold Beach	42.386447	-124.424722	16 December 2014	bucket	
434	CA	Bodega Bay: Doran Spit	38.311311	-123.047500	1 April 2013	post-and- beam wood	
435	WA	Long Beach Peninsula (Surfside and north)	46.475511	-124.071969	4 November 2015	bin	
436	WA	Long Beach Peninsula: north of Oysterville Approach	46.551036	-124.061892	5 November 2015	tray	
437	WA	Long Beach Peninsula: Oysterville	46.551036	-124.061892	5 November 2015	tote	

438	WA	Long Beach Peninsula	46.475511	-124.071969	8 May 2015	buoy	
439	WA	Long Beach Peninsula	46.475511	-124.071969	29 May 2015	buoy	
440	OR	Beverly Beach	44.7199	-124.059308	16 December 2015	buoy	
441	OR	Bandon: 3.2 km south of Coquille Point	43.108092	-124.436389	week of 2 November 2015	tote	
442	WA	Long Beach Peninsula	46.475511	-124.071969	14 November 2015	buoy	
443	WA	Long Beach Peninsula	46.475511	-124.071969	9 December 2015	tote	
444	WA	Long Beach Peninsula	46.475511	-124.071969	2015	tote	
445	WA	Long Beach Peninsula	46.475511	-124.071969	15 December 2015	buoy	
446	WA	Long Beach Peninsula	46.475511	-124.071969	17 December 2015	tote	

447	WA	Long Beach Peninsula	46.475511	-124.071969	22 December 2015	tote	
448	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	22 December 2015	rope/tote	
*449	WA	Moclips	47.229131	-124.216706	29 May 2014	vessel	
451	OR	Nye Beach	44.642333	-124.063011	26 December 2015	buoy	
452	WA	Long Beach Peninsula	46.475511	-124.071969	24 December 2015	buoy	
453	HI	Oahu: Waimanalo	21.328933	-157.689167	1 April 2014	post-and-beam wood	
454	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	styrofoam-wood panel	
*455	WA	Copalis Beach	47.116217	-124.184644	3 April 2015	buoy	
456	OR	Bandon	43.115111	-124.436436	20 December 2015	tote	

457	OR	Manzanita	45.720494	-123.945572	28 February 2015	tote	
*458	WA	Long Beach Peninsula	46.475511	-124.071969	15 April 2015	fish box	
459	WA	Ocean Shores	46.972447	-124.176611	4 December 2015	buoy	
460	WA	Ocean Shores	46.972447	-124.176611	4 December 2015	plastic fragment	
461	OR	Manzanita	45.720494	-123.945572	28 February 2015	tote	
462	WA	Long Beach Peninsula	46.475511	-124.071969	4 January 2015	buoy	
463	WA	Queets	47.540406	-124.3568	9 April 2015	tray	
464	WA	Queets	47.540406	-124.3568	16 December 2015	tote	
465	WA	Queets	47.540406	-124.3568	16 December 2015	tote	

466	OR	Queets	47.540406	-124.3568	23 January 2015	tote	
467	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	tote	
468	WA	Long Beach Peninsula: 4.8 km north of Oysterville	46.551036	-124.061892	13 March 2014	pallet	
469	WA	Queets	47.540406	-124.3568	16 December 2015	tote	
470	WA	Queets	47.540406	-124.3568	16 December 2015	tote	
471	WA	Queets	47.540406	-124.3568	16 December 2015	line	
472	WA	Queets	47.540406	-124.3568	16 December 2015	tote	
473	WA	Queets	47.540406	-124.3568	16 December 2015	tote	

474	WA	Queets	47.540406	-124.3568	16 December 2015	tote	
475	WA	Queets	47.540406	-124.3568	16 December 2015	tote	
476	WA	Long Beach Peninsula: near Leadbetter Point	46.475511	-124.071969	25 December 2015	tote	
477	WA	La Push to Kalaloch	47.605564	-124.378775	10 May 2015	buoy	
478	WA	La Push to Kalaloch	47.605564	-124.378775	24 May 2015	buoy	
479	WA	La Push to Kalaloch	47.605564	-124.378775	24 May 2015	buoy	
480	WA	La Push to Kalaloch	47.605564	-124.378775	July 2015	buoy	
481	WA	Long Beach Peninsula	46.475511	-124.071969	23 December 2015	buoy	
482	WA	Roosevelt Beach Moclips	47.229131	-124.216706	2015	rope	
483	OR	Cape Lookout	45.36350	-123.97057	1 April 2014	post-and- beam	

485	WA	Long Beach Peninsula: Oysterville	46.63135	-124.07090	1 April 2013	post-and- beam	
486	WA	Long Beach Peninsula: Oysterville	46.63135	-124.07090	1 April 2013	post-and- beam	
487	WA	Long Beach Peninsula: Oysterville	46.63135	-124.07090	1 April 2013	post-and- beam	
488	WA	Long Beach Peninsula: Oysterville	46.63135	-124.07090	1 April 2013	post-and- beam	
489	WA	Long Beach Peninsula: Oysterville	46.63135	-124.07090	1 April 2013	post-and- beam	
493	WA	Long Beach Peninsula: Oysterville	46.63135	-124.07090	1 April 2014	vessel panel	
494	OR	Gold Beach: Pistol River	42.277378	-124.408819	1 April 2013	post-and- beam	
495	OR	Bandon	43.115111	-124.436436	22 May 2014	wood-metal fragment	
496	WA	Long Beach Peninsula	46.475511	-124.071969	29 January 2016	tote	

*497	HI	Oahu: Laie	21.648594	-157.921944	25 January 2016	vessel	Aomori
498	WA	Long Beach Peninsula	46.475511	-124.071969	11 February 2016	tote	
499	WA	Long Beach Peninsula	46.475511	-124.071969	15 February 2016	buoy	
500	WA	Long Beach Peninsula	46.475511	-124.071969	16 February 2016	tote	
501	WA	Long Beach Peninsula	46.475511	-124.071969	18 February 2016	tree	
502	WA	Long Beach Peninsula	46.475511	-124.071969	20 February 2016	buoy	
503	WA	Long Beach Peninsula	46.475511	-124.071969	20 February 2016	buoy	
504	CA	Bodega Bay: Salmon Creek Beach	38.324833	-123.0728	5 March 2016	plastic cap	
505	WA	Long Beach Peninsula	46.475511	-124.071969	7 March 2016	buoy	

506	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	7 March 2016	buoy	
507	OR	Tillamook Bay: Bay Ocean Peninsula	45.561572	-123.952322	7 March 2016	buoy	
508	OR	Arch Cape	45.816578	-123.964722	19 February 2016	tote	
509	WA	Long Beach Peninsula	46.475511	-124.071969	7 March 2016	buoy	
510	WA	Ocean Shores	47.53138	-124.353	2012-2015	buoy	
511	WA	Ocean Shores	47.53138	-124.353	2012-2015	buoy	
512	WA	Ocean Shores	46.972447	-124.176611	between 2012 and 2015	buoy	
513	OR	Gold Beach: Kissing Rock	42.362	-124.42448	21 December 2015	buoy	
514	OR	Tillamook	45.561572	-123.952322	16 January 2016	buoy	
515	OR	Bandon	43.115111	-124.436436	22 December 2015	buoy	

516	OR	Tillamook: Sout Jetty	45.561572	-123.952322	16 January 2016	plastic bar	
517	OR	Cape Blanco, south near Eel River	42.82883	-124.5506	28 December 2015	tote	
518	WA	Long Beach Peninsula	46.475511	-124.071969	14 March 2016	buoy	
519	WA	Long Beach Peninsula	46.475511	-124.071969	7 March 2016	container	
520	OR	Tillamook Bay: Bay Ocean Peninsula	45.561572	-123.952322	14 March 2016	buoy	
*521	OR	Nye Beach	44.642333	-124.063011	14 March 2016	tote	
522	OR	Newport: South Beach	44.607683	-124.0687	16 March 2016	buoy	
523	OR	Gold Beach: Pistol River	42.277378	-124.408819	21 March 2016	shoe	
524	OR	Gold Beach: Myers Creek Beach	42.311950	-124.416389	3 March 2016	broom handle	
525	OR	Yachats	44.335344	-124.099811	16 March 2016	dust pan	
*526	OR	Horsfall Beach	43.454106	-124.277689	22 March 2016	vessel	

527	OR	Hubbard creek	42.735542	-124.478703	24 March 2016	pot	
528	OR	Hubbard creek	42.735542	-124.478703	24 March 2016	tray	
529	OR	Hubbard creek	42.735542	-124.478703	24 March 2016	buoy	
530	OR	Hubbard creek	42.735542	-124.478703	24 March 2016	vessel	
*531	OR	Seal Rock: Quai Street	44.483056	-124.084503	25 March 2016	buoy	
*532	WA	Kalaloch	47.6019	-124.375589	26 March 2016	vessel	Iwate
*533	OR	Lincoln City: Road's End	45.008075	-124.009661	27 March 2016	vessel	
534	OR	Long Beach Peninsula: 3.2km south of Leadbetter Point	46.475511	-124.071969	25 March 2016	tote	
535	WA	Long Beach Peninsula	46.475511	-124.071969	3 April 2016	rope	
536	WA	Long Beach Peninsula	46.475511	-124.071969	5 April 2016	tote	
537	OR	South of Winchester Bay	43.646717	-124.213056	15 April 2016	tote	

*538	OR	Sixes River	42.855417	-124.543953	16 April 2016	vessel	
539	HI	Kauai: Kealia Beach	22.090506	-159.304722	1 April 2013	milled log	
540	HI	Kauai: Kealia Beach	22.090506	-159.304722	1 April 2013	milled log	
541	WA	Long Beach Peninsula	46.475511	-124.084503	15-17 April 2016	tote	
542	WA	Long Beach Peninsula	46.475511	-124.084503	12 April 2016 [re-drift]	post-and- beam wood	
543	OR	Seal Rock: Quail Street	44.483056	-124.084503	18 April 2016	buoy	
544	OR	Seal Rock Quail Street beach	44.483056	-124.084503	18 April 2016	dish rack	
545	OR	mouth of the Umpqua River	43.667692	-124.214722	26 March 2016	vessel	
546	OR	Moolack Beach Bridge	44.699717	-124.0636	29 April 2016	barrel fragment	
547	WA	Long Beach Peninsula	46.475511	-124.071969	14 May 2016	tote	
548	WA	Long Beach Peninsula	46.475511	-124.071969	16/17 May 2016	buoy	

549	WA	Long Beach Peninsula	46.475511	-124.071969	16 May 2016	tote	
550	WA	Long Beach Peninsula	46.475511	-124.071969	16 May 2016	buoy	
551	WA	Long Beach Peninsula	46.475511	-124.071969	September-December 2015	tote	
553	WA	Long Beach Peninsula	46.475511	-124.071969	31 December 2015	pot	
554	WA	Pacific Beach	47.208714	-124.210833	12 April 2015	plastic object	
*555	HI	Oahu: Alan Dav Beach	21.297578	-157.654742	22 April 2015	vessel	Miyagi
556	OR	Bandon: Mars Street	43.087114	-124.436469	14 January 2016	bucket lid	
557	OR	Gold Beach: Crook Point	42.25125	-124.412772	26 March 2016	tote	
558	OR	Gold Beach: Crook Point	42.25125	-124.412772	26 March 2016	tote	
559	OR	Gold Beach: Crook Point	42.25125	-124.412772	26 March 2016	buoy	
560	OR	Gold Beach: Crook Point	42.25125	-124.412772	26 March 2016	black bar	

561	OR	Bandon	43.115111	-124.436436	6 November 2015	tote	
562	OR	Gold Beach: Pistol River	42.277378	-124.408819	18 March 2016	buoy/rope	
563	WA	Long Beach Peninsula	46.475511	-124.071969	2 April 2015	tote	
564	WA	Long Beach Peninsula	46.475511	-124.071969	2 April 2015	lid	
565	WA	Long Beach Peninsula	46.475511	-124.071969	2 April 2015	tote	
566	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	lid	
567	WA	Long Beach Peninsula	46.475511	-124.071969	25 February 2015	buoy	
569	OR	Manzanita	45.720494	-123.945572	28 February 2015	bowl	
570	OR	Manzanita	45.720494	-123.945572	28 February 2015	tote	

571	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	tote	
572	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	bumper	
573	OR	in ocean off Heceta Head	44.1355 (estimate)	-124.220289 (estimate)	December 2014- March 2015	tote	
574	OR	in ocean off Heceta Head	44.1355 (estimate)	-124.220289 (estimate)	10 February 2015	tote	
575	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	tote	
576	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	jug	
577	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014-	tote	

					March 2015		
578	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	tote	
579	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	float	
580	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	tote	
581	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	bowl	
582	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	lid	
583	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014-	plastic fragment	

					March 2015		
585	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	cylinder	
586	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	shelving	
587	WA	Long Beach Peninsula	46.475511	-124.071969	December 2014- March 2015	tote	
588	WA	Long Beach Peninsula	46.475511	-124.071969	25 February 2015	lid	
589	OR	Moolack / Beverly Beach	44.715225	-124.060472	15 June 2016	buoy	
590	OR	Crook Point	42.25125	-124.412772	16 March 2016	buoy	
591	WA	Olympic National Park: Mosquito Creek	47.798108	-124.482242	21 April 2015	tote	

592	OR	Bandon: Mars Street	43.087114	-124.436469	14 January 2016	tote	
593	WA	Long Beach Peninsula	46.475511	-124.071969	16 April 2016	tote	
594	WA	Long Beach Peninsula: Leadbetter	46.475511	-124.071969	1 February 2016	tote	
595	WA	Long Beach Peninsula: Leadbetter	46.475511	-124.071969	1 February 2016	tote	
596	OR	Lane County: Bob Creek Wayside	44.262031	-124.110000	19 April 2015	tote	
597	WA	North Ocean Par	46.475511	-124.071969	24 January 2016	tote	
598	WA	Long Beach Peninsula	46.475511	-124.071969	16 February 2016	buoy	
599	WA	Long Beach Peninsula	46.475511	-124.071969	26 April 2015	tote	
600	OR	Crook Point South	42.25125	-124.412772	15 June 2016	bottle cap	
601	OR	Crook Point South	42.25125	-124.412772	15 June 2016	buoy	

602	OR	Crook Point South	42.25125	-124.412772	17 June 2016	tire	
603	WA	Beard's Hollow, south of Long Beach	46.305194	-124.075278	16 May 2015	tote	
604	WA	Long Beach Peninsula	46.475511	-124.071969	2016 May	tote	
605	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	2015	buoy	
606	WA	Long Beach Peninsula	46.475511	-124.071969	8 March 2015	buoy	
607	WA	Surfside	46.475511	-124.071969	17 May 2015	buoy	
608	WA	Long Beach Peninsula: near Ocean Park	46.475511	-124.071969	15 April 2015	tote	
609	WA	Long Beach Peninsula	46.475511	-124.071969	15 March 2016	buoy	
610	WA	Long Beach Peninsula: Leadbetter	46.475511	-124.071969	14 May 2015	tote	
611	WA	3 miles north of Long Beach	46.475511	-124.071969	13 May 2015	buoy	

612	WA	Long Beach Peninsula: Leadbetter	46.475511	-124.071969	16 March 2016	buoy	
613	WA	Long Beach Peninsula: Leadbetter	46.475511	-124.071969	19 February 2016	buoy	
614	OR	Lincoln Co.: Moolack Beach	44.699717	-124.0636	11 April 2016	tote	
615	WA	Long Beach Peninsula: 4.8km south of Leadbetter Point	46.475511	-124.071969	26 May 2015	buoy	
616	WA	Long Beach Peninsula	46.475511	-124.071969	May- September 2015	can	
617	WA	Quinalt Indian Reservation: South Queets	47.400867	-124.330544	21 May 2015	fiberglass foam piece	
618	WA	Long Beach Peninsula	46.475511	-124.071969	12 January 2016	buoy	

619	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	24 December 2015	buoy	
621	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	22 December 2015	buoy/rope	
622	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	25 December 2015	tote	
623	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	24 December 2015	tote	
624	OR	0.5 miles north of Yaquina Head light, Newport	44.679414	-124.070833	20 December 2015	tote	
625	WA	Long Beach Peninsula	46.475511	-124.071969	2 June 2015	pallet	
626	HI	Kauai: Kapa'a	22.081806	-159.312128	25 June 2016	vessel	Miyagi

627	HI	Kauai: Kapa'a Beach	22.081806	-159.312128	1 April 2016 [re-drift]	post-and- beam wood	
628	OR	Newport: South Beach	44.607683	-124.0687	24 April 2013	post-and- beam wood	
629	OR	Newport: South Beach	44.607683	-124.0687	27 April 2013	post-and- beam wood	
630	OR	Newport: South Beach	44.607683	-124.0687	27 April 2013	post-and- beam wood	
631	WA	Grays Harbor County: Roosevelt Beach	47.175278	-124.199167	12 August 2015	pallet	
632	OR	Seal Rock: Quail Street	44.483056	-124.083808	14 April 2015	tote	
633	HI	Kauai: Waipake Beach	22.207492	-159.338625	29 September 2013	post-and- beam wood	
634	OR	Newport: South Beach	44.607683	-124.0687	16 March 2016	buoy	
635	OR	Moolack Beach	44.699717	-124.0636	17 May 2016	buoy	
636	OR	Manzanita	45.720494	-123.945572	28 February 2015	tote	

637	OR	Moolack Beach	44.699717	-124.0636	8 April 2015	tote	
638	OR	Sacchi Beach	43.264578	-124.38645	23 April 2016	vessel	Miyagi
639	WA	Long Beach Peninsula	46.475511	-124.071969	February- May	buoy	
640	OR	Newport: Agate Beach	44.66455	-124.061158	23 March 2016	tote	
641	WA	Long Beach Peninsula	46.475511	-124.071969	5 July 2016	pallet	
642	WA	Long Beach Peninsula	46.475511	-124.071969	6 July 2016	tote	
643	WA	Long Beach Peninsula	46.475511	-124.071969	15 March 2016	buoy	
645	WA	Long Beach Peninsula	46.475511	-124.071969	January- May 2016	buoy	
646	OR	Manzanita	45.720494	-123.945572	28 February 2015	bucket	
647	WA	Long Beach Peninsula: Leadbetter Point	46.475511	-124.071969	15 March 2016	buoy	
648	OR	Crook Point South	42.25125	-124.412772	26 March 2016	lid	

649	OR	Moolack / Beverly Beach	44.715225	-124.060472	10 April 2016	jug	
650	WA	Long Beach Peninsula	46.475511	-124.071969	10 July 2016	table	
651	OR	Nye Beach	44.642333	-124.063011	13 July 2016	tree	
*652	OR	Falcon Cove	45.781247	-123.969906	20 July 2016	vessel	
653	HI	Oahu: Kahuku	21.683367	-157.944247	13 March 2016	buoy	
654	HI	Oahu: Kailua	21.405117	-157.738383	11 March 2016	buoy	
655	HI	Papahānaumoku uāke Marine National Monument, in ocean	25.752922 (estimate)	-170.458333 (estimate)	1 June 2015	fish bin	
656	OR	Otter Crest	44.756714	-124.064444	26 March 2016	jug	
657	WA	Long Beach Peninsula	46.475511	-124.071969	April-May 2015	buoy	
658	OR	Newport: South Beach	44.607683	-124.0687	5 October 2016	pallet	
659	WA	Long Beach Peninsula	46.475511	-124.071969	May 2015	tote	

660	WA	Long Beach Peninsula	46.475511	-124.071969	2014	tire	
661	HI	Hawaii: south of Honokohau Harbor, Kona	19.664656	-156.030736	17 November 2016	buoy	
662	HI	Hawaii: Kamilo Point	18.974297	-155.597222	19 November 2016	tote	
663	WA	Long Beach Peninsula	46.475511	-124.071969	8 November 2016	tote	
664	WA	Long Beach Peninsula	46.475511	-124.071969	30 November 2016	buoy	
665	WA	Long Beach Peninsula	46.475511	-124.071969	1 December 2016	buoy	
666	CA	Daly City: Mussel Rock Beach	37.672642	-122.495833	25 July 2015	tote	
*667	HI	Kauai: Kapa'a	22.081806	-159.312128	7 December 2016	rope/buoys	

668	OR	Bandon	43.088001	-124.435364	15 March 2016	tube	
669	OR	Bandon	43.088001	-124.435364	15 March 2016	sieve	
670	OR	Bandon	43.088001	-124.435364	15 March 2016	pot	
671	OR	Bandon	43.088001	-124.435364	15 March 2016	tubing	
672	OR	Bandon	43.088001	-124.435364	18 April 2016	lid	
673	WA	Long Beach Peninsula	46.475511	-124.071969	27 May-15 September 2015	tote	
674	WA	Long Beach Peninsula	46.475511	-124.071969	27 May-15 September 2015	plastic piece	
675	HI	Oahu: Waimanalo	21.328933	-157.689167	22 December 2016	vessel	Miyagi
676	OR	Bandon	43.088001	-124.435364	15 December 2016	tote	
677	HI	Hawaii: southeast coast	18.911128	-155.678056	16 January 2017	vessel	

		on DHHL lands					
678	WA	Long Beach Peninsula	46.475511	-124.071969	12 February 2017	buoy	
*679	WA	Long Beach Peninsula	46.475511	-124.071969	16 February 2017	buoy	

Table S2. List of species recorded on Japanese Tsunami Marine Debris.

A. Japanese species

* Asterisked species were reproductive upon arrival (with gametes, gametic tissue, or brooded young) or were present in 2 or more age classes (generations).

CHROMISTA

Rhizaria

Foraminifera

Cibicides lobatulus

Elphidium crispum

Bolivina cf. *B. seminuda*

Acervulina inhaerens

**Cornuspira involvens*

Dyocibicides perforata

**Miliolinella subrotunda*

Nonionella stella

Planogypsina squamiformis

Planorbulina mediterraneensis

**Rosalina globularis*

Trochammina sp.

Cercozoa

Gromia "oviformis"

Ciliophora

Suctoria

Species A (yellow)

Species B (white)

Folliculinidae

Unidentified sp.

Vorticellidae

Vorticella sp.

Zoothamniidae

Zoothamnium sp.

PORIFERA

**Callyspongia murex*

Chalinidae, unidentified sp.

**Clathrina coriacea*

Cliona sp.

**Halichondria panicea*

**Halichondria* cf. *H. sitiens*

**Hymenciadon sinapium*

**Leucandra* sp.

**Leucosolenia eleanor*

**Mycale macginitei*

**Sycon raphanus*

**Ute* sp.

CNIDARIA

Hydrozoa

Thecata

Abietinaria inconstans

Aglaophenia aff. *A. pluma*

**Amphisbetia furcata*

Antenella sp.

**Campanularia volubilis*

**Clytia hemisphaerica*

Clytia linearis

Clytia cf. *C. universitatis*

Eutima japonica

Halecium tenellum

Halecium delicatulum

**Halopteris* aff. *campanula*

Hydrodendron gracile

Hydrodendron mirabile

**Laomedea flexuosa*

**Obelia longissima*

Obelia dichotoma

**Obelia geniculata*

Orthopyxis caliculata

Orthopyxis platycarpa

Phialella quadrata

**Plumalecium plumularioides*

**Plumularia setacea*

Plumularia caliculata

Sertularella sp. A

Sertularella mutsuensis

Symplectoscyphus tricuspidatus

Athecata

Stylacteria sp.

Bougainvillia muscus?

Unidentified anthoathecate A

Anthozoa

Actinaria

Metridium dianthus

**Anthopleura* sp.

**Diadumene lineata*

Diadumene cf. *D. franciscana*

?*Urticina* sp.

Actinaria sp. A

Actinaria sp. B

Actinaria sp. C

Actinaria sp. D

Actinaria sp. E

Scleractinia

Pocillopora damicornis

NEMATODA

Unidentified spp. (3+)

NEMERTEA

Lineidae, unidentified sp.

Quasitetrastemma nigrifrons

Oerstedtia dorsalis

Unidentified sp.

PLATYHELMINTHES

Rhabditophora

Tricladida

Uteriporidae?

Unidentified spp. (2+)

Monogenea

Benedenia seriolae?

Heteraxine heterocerca?

SIPUNCULA

Phascolosoma scolops

ANNELIDA

Oligochaeta

Unidentified spp. (2+)

Polychaeta

Capitellidae

Unidentified sp.

Nereididae

Nereis pelagica

Perinereis nigropunctata

Phyllodocid

Eulalia quadrioculata

Eulalia viridis-complex

Eteone sp.

Nereiphylla cf. *N. castanea*

Polynoidae

Halosydna brevisetosa-complex

Harmothoe imbricata

Lepidonotus sp.

Syllidae

Syllis elongata-complex

Syllis hyalina-complex

Syllis cf. *S. ehlersoides*

Syllis cf. *S. farallonensis*

Syllis cf. *S. pulchra*

Syllis gracilis-complex

Syllinae spp. 1-6

Sphaerosyllis sp.

Trypanosyllis zebra?

Amblosyllis speciosa-complex

Terebellidae

Amphitrite sp.

Terebella sp.

Oeonidae

Arabella semimaculata-group)

Onuphidae

Unidentified sp.

Spionidae

Polydora sp.

Pygospio californica

Orbiniidae

Naineris sp.

Chrysopetalidae

Unidentified sp.

Paleanotus sp.

Acrocirridae

Acrocirrus sp.

Fabriciidae

Unidentified sp.

Sabellariidae?

Unidentified sp.

Sabellidae

Amphiglena sp.

Serpulidae

Hydroides ezoensis

Spirobranchus cf. *S. minutus*

Spirobranchus polytrema

Salmacina sp.?

Spirorbidae

Unidentified spp.

MOLLUSCA

Gastropoda

Lottiidae

Lottia dorsuosa

Lottia versicolor

Lottia tenuisculpta

Lottia kogamogai

Lottia sp.

Lottia sp. N-D Eernisse

Lottia sp. O

Lottia sp. BF3

Nipponacmea habeii

Nacellidae

Cellana grata

Calyptraeidae

Crepidula onyx

Vermetidae

Serpulorbis sp.

Columbellidae

Mitrella moleculina

Mitrella sp. A

Muricidae

Reishia bronni

Pulmonata

Siphonariidae

Siphonaria sirius

Siphonaria sp.

Nudibranchia

Dolabella auricularia

Hermisenda crassicornis

Dendronotus frondosus

Eubranchus sp.

Dorididae, unidentified sp.

Unidentified sp.

Bivalvia

Mytilidae

**Mytilus galloprovincialis*

Mytilus coruscus

Mytilus trossulus

Modiolus kurilensis

Modiolus nipponicus

Modiolarca cuprea

Trichomusculus semigranatus

Mytilisepta virgata

Septifer bilocularis

Lithophaga curta

Anomiidae

Monia umbonata

Monia macrochisma

Gryphaeidae

Hytissa numisma

Hytissa chemnitzii

Ostreidae

Crassostrea gigas

Dendostrea folium

Saccostrea sp.

Spondylidae

Spondylus cruentus

Arcidae

Arca boucardi

Hawaiiarca uwaensis

Barbatia lima

Barbatia virescens

Pectinidae

Scaechlamys squamata
Laevichlamys irregularis
Paschinnites coruscans
Mizuhopecten yessoensis
Pectinidae sp. C
Pectinidae sp. A
Limidae
Limaria hakodatensis
Pteriidae
Pteria sp.
Pinctada imbricata
Pinctada margaritifera
Pinctada chemnitzii
Isognomon legumen
Malleidae
Malleus irregularis
Chamidae
Chama sp. A
Chama sp. B
Myidae
Sphenia coreanica
Hiatellidae
Hiatella orientalis
Teredinidae
**Psiloteredo* sp.
**Teredothyra smithi*

Bankia carinata

Bankia bipennata

Lyrodus takanoshimensis

Teredo navalis

Polyplacophora

Mopalia seta

Acanthochitona achates

Acanthochitona sp. A

Acanthochitona rubrolineata

Placiphorella stimpsoni

ARTHROPODA: Crustacea

Copepoda

Harpacticus sp.- *flexus* group

**Harpacticus compsonyx*

**Harpacticus septentrionalis*

**Harpacticus nicaceensis*

**Harpacticus* sp.

**Parastenhelia spinosa*

**Tisbe* spp.

**Paralaophonte congenera*

**Sarsamphiascus minutus*

**Sarsamphiascus varians* group

**Heterolaophonte discophora*

Heterolaophonte sp.

**Paramphiascella fulvofasciata*

Ambunguipes aff. *rufocincta*

**Dactylopodamphiascopsis latifolius*

Ostracoda

Sclerochilus verecundus

Sclerochilus sp. 1

Sclerochilus sp. 2

**Xestoleberis setouchiensis*

Obesotoma cf. *O. setosum*

Obesotoma sp.

Paradoxostomatidae

Cirripedia

Megabalanus rosa

Megabalanus zebra

Megabalanus sp.

**Semibalanus cariosus*

Balanus crenatus

Balanus glandula

Balanus trigonus

Chthamalus challengerii

Pseudoctomeris sulcata

Tetraclita japonica

Amphipoda

Ischyroceridae

**Jassa marmorata-complex*

Ampithoidae

Ampithoe valida

Ampithoe lacertosa

Ampithoe koreana

Stenothoidae

Stenothoe crenulata-complex

Photidae

Gammaropsis japonica

Dogielinotidae

Allorchestes sp.

Pleustidae

Trachypleustes sp.

Caprellidae

**Caprella mutica*

**Caprella cristibrachium*

Caprella penantis

Caprella equilibra

Caprella drepanochir

Tanaidacea

**Zeuxo normani*

Isopoda

**Ianiropsis serricaudis*

Ianiropsis derjugini

Munna japonica

Dynoides spinipodus

Decapoda

Hemigrapsus sanguineus

Oedignathus inermis

Sphaerozius nitidus

PYCNOGONIDA

Endeis nodosa

INSECTA

Diptera

**Telmatogeton japonicus*

ACARINA

Halacaridae

Halacarellus schefferi

BRYOZOA

Cheilostomata

Aetea anguina

Callaetea sp.

Biflustra grandicella

Biflustra irregulata

Biflustra cf. *B. arborescens*

Arbocuspis

**Bugula* sp.

Bugulina stolonifera

Callopora craticula

Catenicella sp.

Cauloramphus spinifer

Cauloramphus sp. A

Celleporaria brunnea

**Celleporella hyalina*

Celleporina porosissima

Celleporina cf. *C. globosa*

Celleporina sp. A

Conopeum nakanosum

Cribrilina mutabilis

Cryptosula pallasiana

Drepanophora cf. *D. gutta*

**Escharella hozawai*

**Exochella tricuspis*

**Fenestrulina* cf. *F. orientalis*

Membranipora villosa

**Metroperiella* cf. *M. biformis*

Microporella borealis

Microporella luellae

Microporella neocriboides

Rhynchozoon sp.

Schizoporella japonica

**Scruparia ambigua*

Smittoidea spinigera

**Tricellaria inopinata*

Watersipora mawatarii

Watersipora typica

Cyclostomata

**Crisia* sp. A

Crisia cf. *C. serrulata*

Crisidia sp.

Disporella cf. *D. novaehollandiae*

?Entalophora sp.

Filicrisia cf. *F. franciscana*

Proboscina sp.

Stomatopora sp.

Tubulipora misakiensis

Tubulipora pulchra

Ctenostomata

Alcyonidium sp.

Walkeria prorepens

KAMPTOZOA

Barentsia sp.

ECHINODERMATA

Asteroidea

Asterias amurensis

Aphelasterias japonica

Patiria pectinifera

Echinoidea

Temnotrema sculptum

Holothuroidea

Havelockia versicolor

Ophiuroidea

Unidentified sp.

CHORDATA

Asciacea

Didemnum vexillum

Diplosoma sp.

Herdmania cf. *H. pallida*

Unidentified sp. A

Unidentified sp. B

PISCES

Oplegnathus fasciatus

Seriola aureovittata

B. Oceanic Pelagic (Neustonic) Species

CNIDARIA

Hydrozoa

Obelia griffini

ANNELIDA

Polychaeta

Amphinome rostrata

ARTHROPODA: Crustacea

Amphipoda

Caprella andreae

Cirripedia

Lepas spp.

Conchoderma auritum

Decapoda

Planes major

Plagusia immaculata

Plagusia squamosa

MOLLUSCA

Gastropoda

Fiona pinnata

Bivalvia

Teredora princesae

Uperotus clava

BRYOZOA

Cheilostomata

Jellyella tuberculata

Jellyella eburnea

Arbopercula angulata

C. North East Pacific Nearshore Species Acquisitions

ANNELIDA

Polychaeta

Polynoidae

ARTHROPODA: Crustacea

Cirripedia

Balanus glandula

Balanus crenatus

Pollicipes polymerus

Isopoda

Gnorimosphaeroma sp.

Idotea wosnesenskii

Idotea resecata

Amphipoda

Prilohyale littoralis

Parhyale sp.

MOLLUSCA

Bivalvia

Mytilus spp.

Crassadoma gigantea

Hiatella arctica

BRYOZOA

Cheilostomata

Pomocellaria californica

CHORDATA

Asciacea

Styela gibbsii

Pyura haustor

Table S3. Frequency of Occurrence of Eight Most Common Living JTMD Species

Phylum	Class / Order	Species	Number of JTMD-BF items on which species was found alive (of 511 items with living biota)	Frequency of living individuals on JTMD-BF items
Mollusca	Bivalvia	<i>Mytilus galloprovincialis</i>	261	51.1%
Bryozoa	Cheilostomata	<i>Scruparia ambigua</i>	203	39.7%
Bryozoa	Cheilostomata	<i>Aeteidae (Aetea anguina, Callaetea sp.)</i>	69	13.5%
Arthropoda	Amphipoda	<i>Jassa marmorata</i>	45	8.8%
Arthropoda	Isopoda	<i>Ianiropsis serricaudis</i>	39	7.6%
Bryozoa	Cheilostomata	<i>Bugula sp.</i>	35	6.8%
Arthropoda	Cirripedia	<i>Megabalanus rosa</i>	35	6.8%

Table S4. Rarefaction Richness Estimators

Total Species Pool Estimates (Fig. 6)

Species	Chao	Chao.se	jack1	jack1.se	jack2	boot	boot.se	n	Object Type
207	357.179	40.8711	309.063	33.9045	376.142	250.491	20.1210	11	all
	4	6	6	4	5	4	8	0	

Vessels Only Species Pool Estimates (Fig. S7)

Species	Chao	Chao.se	jack1	jack1.se	jack2	boot	boot.se	n	Object Type
120	262.455	45.3905	199.434	25.6860	250.534	158.318	14.0468	4	vessel
	4	8	8	5	3	7	5	6	s

Buoys Only Species Pool Estimates (Fig. S7)

Species	Chao	Chao.se	jack1	jack1.se	jack2	boot	boot.se	n	Object Type
56	170.353	57.0810	95.0476	15.3389	126.126	71.6865	7.28566	2	buoy
	7	7	2	5	2	6	1	1	

Other Objects Species Pool Estimates (Fig. S7)

Species	Chao	Chao.se	jack1	jack1.se	jack2	boot	boot.se	n	Object Type
57	85.99408	14.62032	83.92308	7.778365	98.24923	69.0067	4.468681	26	other

Table S5. Systematic zoologists and other scientists contributing to the identification of marine invertebrates and protists on Japanese Tsunami Marine Debris

Scientist	Affiliation	Taxon
Bjørn Altermark	Arctic University of Norway, Tromsø, Norway	Teredinidae
Claudia Arango	Queensland Museum, Australia	Pycnogonida
David Bilderback	Bandon, Oregon, USA	Bryozoa
Philip E. Bock	Mount Waverley, Victoria, Australia	Bryozoa
Luisa M. S. Borges	Helmholtz-Zentrum Geesthacht, Germany	Teredinidae
Ralph Breitenstein	Oregon State University, Hatfield Marine Science Center, USA	General invertebrates
Stephen Cairns	Smithsonian Institution, National Museum of Natural History, USA	Scleractinia
Dale Calder	Royal Ontario Museum, Canada	Hydrozoa
James T. Carlton	Williams College, Massachusetts USA and Williams-Mystic Maritime Studies Program, Connecticut, USA	General invertebrates; Mollusca; Cirripedia
Benny Chan	Academia Sinica, Taiwan, China	Cirripedia
John W. Chapman	Oregon State University, Hatfield Marine Science Center, USA	Amphipoda, Isopoda, Tanaidacea, Decapoda; general invertebrates
Henry Choong	Royal Ontario Museum, Canada; Fairbanks Museum, St. Johnsbury, Vermont USA; Royal British Columbia Museum, Canada	Hydrozoa
Eugene V. Coan	Santa Barbara Museum of Natural History, California, USA	Bivalvia

Jeffery R. Cordell	University of Washington, USA	Copepoda
Matthew T. Craig	NOAA, National Marine Fisheries Service, La Jolla, California, USA	Pisces
Natalia Demchenko	Zhirmunsky Institute, Vladivostok, Russia	Amphipoda
Matthew Dick	Hokkaido University, Japan	Bryozoa
Anthony Draeger	Kensington, California, USA	Polyplacophora
Douglas J. Eernisse	California State University, Fullerton, USA	Gastropoda; Polyplacophora
David Elvin	Oregon Marine Porifera Project, Shelburne, Vermont, USA	Porifera
Neal Evenhuis	B. P. Bishop Museum, Hawaii, USA	Chironomidae
Daphne Fautin	University of Kansas, USA	Anthozoa
Karin H. Fehlaue-Ale	Universidade Federal do Paraná, Brazil	Bryozoa
Kenneth Finger	University of California, Berkeley, USA	Foraminifera
Megan Flenniken	Stony Brook University, New York, USA	Anthozoa
Toshio Furota	Toho University, Japan	General invertebrates
Aaron Gann	Oregon State University, USA	Pisces
Jonathan Geller	Moss Landing Marine Laboratories, USA	General invertebrates
Scott Godwin	NOAA Honolulu, USA	General invertebrates
Dennis P. Gordon	National Institute of Water & Atmospheric Research, Wellington, New Zealand	Bryozoa
Terry Gosliner	California Academy of Sciences, San Francisco, USA	Opisthobranchia

Takuma Haga	National Museum of Nature and Science, Tokyo, Japan	Bivalvia
Niels-Viggo Hobbs	University of Rhode Island, USA	Isopoda
Leslie Harris	Los Angeles County Museum of Natural History, USA	Polychaeta
John Holleman	Merritt College, Oakland, California, USA	Platyhelminthes
Gyo Itani	Kochi University, Japan	Decapoda
Colin Johnson	Harvard University, USA	Bryozoa
Hiroshi Kajihara	Hokkaido University, Japan	Nemertea
Gerald Krantz	Oregon State University, USA	Halacaridae
Elena Kupriyanova	Australian Museum, Australia	Serpulidae
Gretchen Lambert	University of Washington, USA	Ascidacea
Robert N. Lea	California Academy of Sciences, San Francisco, California, USA (formerly California Department of Fish and Wildlife)	Pisces
Katrina Lohan	Smithsonian Environmental Research Center, Edgewater, Maryland, USA	Haplosporida
Konstantin Lutaenko	Zhirmunsky Institute, Vladivostok, Russia	Mytilidae
Joshua Mackie	California State University, San Jose, USA	Bryozoa
Christopher Mah	Smithsonian Institution, National Museum of Natural History, USA	Asteroidea
Svetlana Maslakova	University of Oregon Institute of Marine Biology, USA	Nemertea
Linda McCann	Smithsonian Environmental Research Center, Edgewater, Maryland, USA	Bryozoa

Mary McGann	U.S. Geological Survey, Menlo Park, California, USA	Foraminifera
Gary McDonald	University of California, Santa Cruz, USA	Opisthobranchia
James H. McLean	Los Angeles County Museum of Natural History, USA	Gastropoda
Megan I. McCuller	Williams College, Massachusetts USA and Williams-Mystic Maritime Studies Program, Connecticut, USA	Bryozoa
Richard Mooi	California Academy of Sciences, San Francisco, California, USA	Echinoidea
Bruce Mundy	National Marine Fisheries Service, Hawaii, USA	Pisces
Katherine Newcomer	Smithsonian Environmental Research Center, Edgewater, Maryland, USA	Anthozoa
Eijiroh Nishi	Yokohama National University, Japan	Annelida
Teruaki Nishikawa	Nagoya University, Japan	Sipuncula
Atsushi Nishimoto	National Research Institute of Fisheries Sciences, Japan	Teredinidae
Jerrold G. Norton	Pacific Grove, California, USA (formerly National Marine Fisheries Service)	Pisces
Ronald Noseworthy	Jeju National University, South Korea	Polyplacophora
Peter Ng	National University of Singapore, Singapore	Decapoda
Michio Otani	Osaka Museum of Natural History, Japan	Cirripedia; General Invertebrates

David Pawson	Smithsonian Institution, National Museum of Natural History, USA	Holothuroidea
Erik Pilgrim	National Exposure Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, USA	Gastropoda, Polyplacophora
Michael J. Raupach	Carl von Ossietzky University, Oldenburg, Germany	Teredinidae
Gregory Ruiz	Smithsonian Environmental Research Center, Edgewater, Maryland, USA	Haplosporida, Hydrozoa
Hiroshi Saito	National Museum of Nature and Science, Japan	Polyplacophora
Eric Sanford	University of California, Davis, Bodega Marine Laboratory, California USA	Anthozoa
J. Reuben Shipway	Northeastern University, Nahant, Massachusetts USA	Teredinidae
Ashleigh Smythe	Virginia Military Institute, USA	Nematoda
Jackie Sones	University of California, Davis, Bodega Marine Laboratory, California USA	Anthozoa
Ichiro Takeuchi	Ehime University, Japan	Amphipoda
Hayato Tanaka	Hiroshima University, USA	Ostracoda
Paul D. Taylor	Natural History Museum, London, England	Bryozoa
Nancy Treneman	University of Oregon Institute of Marine Biology, USA	Teredinidae
Paul Valentich-Scott	Santa Barbara Museum of Natural History, California, USA	Bivalvia
Leandro Vieira	Universidade Federal de Pernambuco, Brazil	Bryozoa

Judith Winston	Smithsonian Marine Station, Fort Pierce, Florida, USA	Bryozoa
Moriaki Yasuhara	University of Hong Kong, China	Ostracoda