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Source Identification of Multinational Abandoned, Lost, or Discarded Fishing Gear from the Eel and Hagfish Trap Fisheries throughout the North Pacific Ocean

Carl J Berg[1]*, Ning Yen[2], Eo Jin Son[3], Haodong Xu[4], Megan Lamson[5], Cheryl King[6], Scott McCubbins[1,5], Barbara Wiedner[1,5], Cynthia Welti[1,5], Ai Iwamoto[7], Lauren Blickley[8], Hanna Lilley[8], Paige White[9], Yoojin Lee[10], Megan McCuller[11], Aria Lupo[12], Thea Johanos[13], Sarah-Jeanne Royer[14], Jennifer Lynch[9], Satoquo Seino[15], James Carlton[12] and Nikolai Maximenko[16]

[1]*Surfrider Foundation, Kaua'i Chapter, Kaua'i, Hawai'i, USA*
[2]*IndigoWaters Institute, Kaohsiung City, Taiwan*
[3]*Graduate School of Environmental Studies, Seoul National University, Seoul, Republic of Korea*
[4]*University of Tokyo, Tokyo, Japan*
[5]*Hawai'i Wildlife Fund, Hawai'i, Hawai'i, USA*
[6]*Sharkastics, Maui, Hawai'i, USA*
[7]*Surfrider Foundation Japan, Fujisawa City, Japan and UMITO Partners Inc, Tokyo, Japan*
[8]*Surfrider Foundation, San Clemente, California, USA*
[9]*Hawai'i Pacific University, Center for Marine Debris Research, O'ahu, Hawai'i, USA*
[10]*Department of Chemical and Biomolecular Engineering, Yonsei University, Seoul, South Korea*
[11]*North Carolina Museum Natural Resources Research Lab, Raleigh, North Carolina, USA*
[12]*Williams College-Mystic Seaport, Mystic, Connecticut, USA*
[13]*National Marine Fisheries Service, Pacific Islands Fisheries Science Center, O'ahu, Hawai'i, USA*
[14]*The Ocean Cleanup, Rotterdam, The Netherlands*
[15]*Kyushu University, Fukuoka, Japan*
[16]*International Pacific Research Center, SOEST, University of Hawai'i at Mānoa, O'ahu, Hawai'i, USA*

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***Corresponding author:** Carl J Berg, Surfrider Foundation, Kaua'i Chapter, Kaua'i, Hawai'i, USA

Supplemental material 3. Biofouling Analyses of ETE by Dr. James Carlton, Megan McCuller and Aria Lupo.

Figure 1: *Mytilus coruscus.* Collection sample number 2 on right. Left photo from: Qian, Jin, Fujing Deng, Sandra E. Shumway, Menghong Hu, Youji Wang, 2024.The thick-shell mussel *Mytilus coruscus*: Ecology, physiology,, and aquaculture, Aquaculture, 580, Part 2, 740350, https://doi.org/10.1016/j.aquaculture.2023.740350.

Figure 2: *Dendostrea folium*. Collection sample numbers 108, 109, 110.

R rare	<10 colonies or individuals
C common	10 -100
A abundant	100+ (too numerous to count)
X	present
*	Sample saved

Note: Samples were analyzed from December 2021 to May 2022 with most done from December 28, 2021 to January 12, 2022. Three additional samples received February 2025, entered February 2026:

Process Number	Jellyella	Lepas < 5 mm shell length unless noted Sm smooth Sp spiny	Hydroid stolon / stalks	White crusts foraminifera colonies and bleached coralline algal crust, sometimes nodulose	Foraminifera other than Homotrema dendritic (branching) colonies	Balanoid barnacles	Bivalves	Worm tubes Sp Spirorbid, Ser Serpulid, Sab Sabellariid All: tubes only, no bodies	Other Bryozoa / Sponges / Other Species / Comments on taxa to left
1	A	R		X	X				*1 snail from beach? 1mm *1 unknown object 1mm;
2			A			*C *Chthamalus proteus* variable morphology live, 3-7 mm	*R (2, *Mytilus*)		12 mm; 17 mm; no internal crenulations on shell: *Mytilus coruscus*
3	A	C			R				
4	A	C (Sp)		C					

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5			A (heavy fuzz)	X? extensive white nodulose patches	X	*X *Tetra clitella* dead and alive; largest live 6mm; a mis-shapen barnacle	1 dead, 2 mm juvenile *Isognomon*?	Sp R	*Vermetidae: *Dendropoma*, dead, transverse ridges, growing on barnacle
6							R (3, *Isognomon* sp.)		*16 mm *Isognomon* removed; 2 others left (2, 3.5 mm); 4 Hawaiian species – is it possible that the larger one is Asian and the smaller ones Hawaiian?
7	C	A		C					*Strange small windy tubes / worms? Unknown
8	R			A	R	R *Tetra-clitella* 1 dead, 10 mm; 2 live, 8 mm and *N. intertextus 3 live, largest 5 mm)		Sp A	
9				A	C	C *Tetra-clitella* largest 10 mm		Sp A	
10		C (Sm)		C	A		*Hipponicids – 4 mm *Antisabia foliacea* serpulids have settled on top	Sp C Ser A with distinct keel on tube	*Homotrema* R Pink; Flatworm egg case? 1 mm; Bryozoa, multiple coastal species; *"*Proboscina*" (in bag); Sponge one 1 mm piece
11	R	R (Sp)	C	C	C				agglutinating foram? * C; smallest plastic piece by possible Bryozoan B
12			C			C *Tetra-clitella* smallest 1 mm, largest live 7mm			
13						*Tetra-clitella* smallest live 3 mm; largest live 9 mm; dead and alive; and N. intertextus (1,4mm)		Sp R	*Tetraclitella* valves in vial

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14	A	R (Sp)		A	C	C *Tetra-clitella* smallest 1 mm		Sp A	
15									Coral colony (15 x 20 mm) dead *Pocillopora*?
16	A	A (Sm)			X				Covered with dried Hawaiian beach sand (in small bag)
17		R (Sm)		C	C	*Verruca cookei* Very fine sculpture C 1.5 - 3 mm	* Small bivalves: 1 dead, unidenti-fied, 6 mm; 4 newly settled, 1-2 mm each, of which 3 were alive and newly settled – Anomii-dae?	Ser C	Bryozoan sp. C Fine brown scuzz A Snail from beach
18	C	R	C		A			Sp C	
19			A						Heavily coated with dried brown filamentous algae?
20	A		R	A	C		*1 un-identified bivalve no internal tooth 3 mm		Bleached *Homotrema* C *unknown brown algal film? R filamentous algae C
21	C	1 (10mm) (Sm) R			A				Bleached *Homotrema* R, unidentified forams C
22					C			*Sp C	*Homotrema* patch R Sponge, 5 colonies, one 5 cm
23			?						Dense fibrous brown mats A– hydroids?
24				A	A	*Tetra-clitella* C		Sp C	*Homotrema* R Sponge C
25									Coral colony 15 x 15 mm
26									*Homotrema* R
27	R			A					*Homotrema* A
28	R			R					Some fibrous material
29	C			C					*Homotrema* C
30				R					*Homotrema* R
31	R				A				*Homotrema* R Brown fibrous material inner flange
32				R					*Homotrema* R

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33	R				R				*Homotrema* R
34	C	R (Sm)			R	R*; 6 newly settled 1.2 mm *Amphibi-ans retic-ulatus*			*Homotrema* C
35	A	R (Sp)	Abrown dense stolons	X				Ser	Newly settled Ser - very small
36	A	C (a few cyprids)		X	A				
37	A	R (sm)							*Homotrema* C, white fibrous material A
38									Small patch of white fibrous material R
39	C				A			Ser A	
40	A				A				
41	A								Brown film crust
42	R	A 1 (10 mm)	A						Pennate diatoms A; "mi-crodot" swirly forams R
43	A			X					White plastic fibers, small patch
44	A								Tiny bit of cyclostome* from Hawaiian beach sand
45	A	C (Sm)	A		A				Micro swirly foram, A
46	A	A (Sp)							
47	A		X						
48	A	A (+ cyprid)			A				See pictures for den-drites
49	C				R				
50	A	None!			A (fused)				Pennate diatoms A
51	A	R			C				
52	A	R (Sp)	C		C				Agglutinating forams? *

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53	A	R							Megan McCuller notes: some cyclostomes (*Proboscina*?) overgrowing *Jellyella*, and some *Jellyella* overgrowing cyclostomes; lovely growing colonies of *Proboscina*? seem too extensive to be Hawaiian
54	A	Cyprids			R				*Homotrema* R
55	A								*Homotrema* R
56	C	A (sm, sp)	A		R		R* 1 mm *Pteria*?		Pennate diatoms A
57	A	C (sp)							*Homotrema* R
58	A	R			C				In this case the *Jellyella* are *eburnea**
59	C	R							
60	A								
61	A	R	C		C				
62	A	R (Sp)			x				
63	A		X dense fibrous mats	(Foram) C					
64	C	C	A		R			Ser R	*Homotrema* C
65	A		X dense fibrous mat	X	x				
66	A	R							
67	A		R		R				*Homotrema* C
68	R	R (Sp)	A	C	C	3 specimens small, smooth white < 1 mm			Barnacles: did not attempt to remove valves
69	A	C (Sp)							
70	A		A Fuzz						Foraminifera from beach
71	A	R			C				Brown chambered foraminifera about .5 mm C, "*Ammonia*-like"; from beach
72	A	R			C				
73	A				C				

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74	A very de-cayed	A (Sp) tiny -5 mm a few cyprids	R						
75	C	C	C	C	C		Uniden-tified juvenile bivalve	Sp (smooth, no keel) C	Bivalve may be beach acquisition
76									White microfibers A, trapping sand debris
77	A				C				*Homotrema* R; picture taken of hexagonal *Jellyella*
78	A						1, 1 mm nepionic attached		Lots of fine brown fibrous material
79	C		C						Encrusted with sand! Dried slime?
80								Sp C	White fibrous material C
81	R			R	R				½ bivalve cemented to inner flange; a 1mm zooid colony; *Homotrema* A
82	A	C			*Planorbulina acervalis*? growing on trap 2mm				
83	C								Light brown fuzz
84	R			X degraded					Dried beach debris? -brown mats – no structure
85	C		R		R				
86	R								*Padina*? – and crustose coralline
87	R								Dried clumps of calcar-eous stuff covered in fibrous mats, possibly degraded *Jellyella* C
88	A	R			One cluster of about a dozen *Planorbulina* C				Lots of brown film
89	C			R	C covering de-graded *Jellyella*				*Homotrema* C
90	A	R (Sp)		X					

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91	R				C				
92	C			C	A				
93	A							Sp A	
94	A								*Homotrema* C, white microdots C
95							R (5)		Unknown tiny white objects maybe egg cases (see #96)
96				A	C		R about 9	Sp C	Unknown small objects – egg cases? like #95 same crystalline-type structure. But yellow, with center hole and slightly larger 1 mm,
97				C	C	*Tetraclitella* 5 mm R, *Nesochthamalus* 4mm R			
98			A	R	A	*Verruca* R	R 2 dead 12 mm and 8 mm, *Crassostrea*?	Ser R; Sp C	*Homotrema* C; pennate diatoms C; degraded sponge R; cyclostomes? C; with erect tubes; coral, tiny R; smooth brown vermetid tube, dead, R
99						*Nesochthamalus*, live: 5 specimens, largest 9 mm		Sp R	
100						*Tetraclitella* C			Vermetid snail R with ridges (Dendropoma)
101						*Tetraclitella* R 6mm largest; *Verruca* R 3 mm		Sp A; Ser A	*Homotrema* R
102				A	C	*Tetraclitella* C + 4 tiny barnacles about 1 mm, live and dead			
103				R		*Verruca* R (3 mm); *Tetraclitella*, largest 10 mm C		Sp A; Ser A; 2 Sabellariidae	Sponge A large yellow colony C; Sponge B paler dendritic C; cyclostome bryozoan R; tiny sponge piece
104	C		A	R		*Chthamalus* C	Old oyster valve fragments; 1 *Isognomon*, 12 mm, no tissue but whole, paired		"Sponge B" (see 103) R See photos of *Isognomon*; probably *I. californicus* from Hawaii despite name. has similarities to *I. acutirostris* from Japan

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105	C	A Sp	A		C				
106						*Chthamalus proteus*, 5 mm; live	*Isognomon californicum*, 10 mm (Hawaiian); *Isognomon* sp., 5 and 8 mm		microporous crust, unknown
107							*Isognomon californicum*, 10 mm (Hawaiian)		
108	C						*Dendostrea folium*, 86x59 and 84x59, lower valves only; Pectinidae (18 mm, paired valves)		*Lichenopora* sp. 3 mm; dried gammarid amphipod; dried asellote isopod
109	C					1 empty barnacle	*Dendostrea folium*, 30x19, lower valve		
110	C	Sm	stolons/ stalks	white crusts			*Dendostrea folium*, 76x84; 44.6x18.2		*Scruparia ambigua*

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