



Rethinking. Recycling.

November 15, 2016

Antilles Regulatory Section
SAJ-2016-02016 (SP-CGR); Florico 1959
SAJ-2016-02699 (SP-CGR); Florico 1960 N
SAJ-2016-02700 (SP-CGR); Florico 1960 S
SAJ-2016-02701 (SP-CGR); SJ Bay 1888
SAJ-2016-02703 (SP-CGR); SJ Bay 1928

Mr. Sindulfo Castillo
Jacksonville District Corps of Engineers
Antilles Office
Fund. Angel Ramos, Annex Build., Suite 202
383 Franklin Delano Roosevelt Ave.
San Juan, Puerto Rico 00918

Attention: Ms. Carmen G. Román

Dear Mr. Sindulfo Castillo:

Enclosed herewith is the response by Clean Ocean Initiative, Inc. to the Department of the Army (DA) permit application dated October 19, 2016 for retrieval of five submarine decommissioned telecommunication cables from the navigable waters in the U.S. within the Atlantic Ocean, the Mona passage and the Caribbean Sea.

Thank you for your consideration of Clean Ocean's project, and please do not hesitate to contact our offices should you have further questions or concerns.

Sincerely,

David R. Willis

David R. Willis
President

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United States Army Corps of Engineers

SUBMARINE CABLE SURVEY HABITAT and BENTHIC COMMUNITIES

Joshua Morel Matos
Marine Biologist
Clean Ocean Initiative, Inc.

1. Overview

This habitat and benthic communities submarine cable survey is to provide an evaluation of the aquatic organisms and habitats that follow the path of the submarine cables. During this submarine cable survey five cables of the north coast of Puerto Rico are evaluated and analyzed along transects above the cables path. The cables are under permit application SAJ-2016-02016 (SP-CGR) known as Florico 1959, SAJ-2016-02699 (SP-CGR) known as Florico 1960 N, SAJ-2016-02700 (SP-CGR) known as Florico 1960 S, SAJ-2016-02701 (SP-CGR) known as SJ Bay 1888, and SAJ-2016-02703 (SP-CGR) known as SJ Bay 1928. Utilizing video recording taken by our dive team we are able to analyze the ocean floor and gather marine ecological data. Even though many biogeographic settings will be included in this survey, our main goal is to provide biotic components (aquatic organisms and habitats) found along the submarine cable path.

2. Methodology

2.1 Survey & Analysis Design

This report describes the methods used for survey and analysis of the submarine cables, benthic communities and habitats found, and presents the data sets derived from them. The specific objectives of this research were but not limited to:

1. Compare accuracy of Global Marine submarine cable maps and actual location of submarine cables found by Clean Ocean Initiative technicians
2. Obtain visual confirmation (if able) of submarine cables
3. Collect all possible data from surrounding habitats, including ecological settings and components, on the submarine cable path from each site
4. Count and identify to species level (where possible) all fauna and flora observed from a depth of 100' to 250'.
5. Describe any possible areas where cable removal would cause damage to coral reefs, endangered species or any Essential Fish Habitats (EFH)

2.2 Materials

During the process of conducting the submarine cable survey for habitat and benthic communities various tools and instruments were used.

- JW Fishers Pulse 12 - boat towed pulse induction metal detector with a with topside control unit
- JW Fishers DDW-1 Deep Dive Wing - depressor wing designed to tow instruments at deeper depths
- Lowrance HDS-12 Gen3 touchscreen fishfinder / chartplotter
- Garmin GPSmap 541s
- Global Marine submarine cable nautical charts
- Two GoPro Hero4 Silver with deep dive housing
- Intovatec Galaxy Waterproof Video Light
- Insight Genesis Uploading tool

2.3 Methods

Using the most up to date submarine cable nautical charts of the surrounding waters of Puerto Rico, acquired from Global Marine, we were able to choose search points with specific depths to verify the actual location of each individual coax or telegraph cable and observe them visually if able. Global Marine also provided GIS layering through Google Earth, identifying out of service telegraph submarine cables as red and out of service coaxial submarine cables as green. Only the submarine cables that come out San Juan will be evaluated as part of the survey.



Fig. 1 Decommissioned Telecommunication Submarine Cables (telegraph in red and coaxial in green) off the coasts of Puerto Rico.

Our Global Marine submarine cable nautical charts showed the existence of four telegraph and two coaxial submarine cables from the San Juan area. Searching historical archives and maps, we were able to identify three additional submarine cables (2 telegraph 1 coaxial) within the search area between San Juan Bay and Condado. Our dive and research team visited each respective area using a boat towed pulse induction metal detector with a with topside control unit (JW Fisher Pulse 12) to confirm submarine cable locations compared to the charts acquired from Global Marine. We then used linear and zigzag search patterns and grids to chart our own findings in our Lowrance HDS-12 Gen3 touchscreen fishfinder / chartplotter. After we plotted our own chart, we continued using the JW Fisher DDW-1 Deep Dive Wing with custom made fittings to secure two GoPro Hero4 Silver with deep dive housings and a waterproof video light. Along our plotted waypoints from the Lowrance, we then selected a transect starting from a 100' depth that would allow us to continue our plotted waypoints up to 250'. With this method we could save the route taken from the Lowrance

showing longitude, latitude and depth/contour, and follow the submarine cable's path from the surface and allow us to capture video of the habitat, benthic communities and the cable itself (if able) with the Deep Dive Wing. Each cable transect was captured by video a total of three times.

The data collected from the Deep Dive Wing was later transferred to computer for video editing and analysis. The Coastal and Marine Ecological Classification Standard (CMECS) was used for organizing information and classify the environment into biogeographic aquatic settings and reef identification booklets were used for identifying the meiofauna.



Fig.2 Global Marine GIS mapping with possible telegraph submarine cables out of San Juan Bay, Puerto Rico.



Fig.3 Global Marine GIS mapping with possible coaxial submarine cables out of the Condado area in San Juan, Puerto Rico.

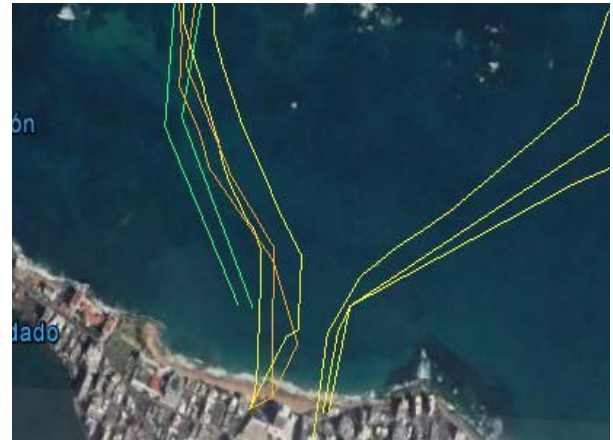


Fig.4 Global Marine GIS mapping with all submarine telecommunication cables out of the Condado area in San Juan, Puerto Rico.

With many submarine telecommunication cables in each respective area the dive team had to inspect each cable and confirm its design. Inspecting the surface of each submarine cable, you can quickly identify the difference between coaxial and fiber-optics. In the Condado area alone there are four additional fiber-optic submarine telecommunication cables (yellow in service, orange out of service) that follow a similar corridor exit of the reef and cross over many times in shallow waters. Once the coaxial submarine cables were confirmed, we continued it's path with the JW Fishers Pulse 12 and JW Fishers DDW-1 Deep Dive Wing respectively.

3. Results and Discussion

3.1 Ecological Structure Settings & Components

Various habitats or ecoregions are defined by climate, geology, and evolutionary history. By knowing the structure setting and components of a habitat, such as structure and characteristics of the water column or geomorphic structural character of the seafloor, one can predetermine various biotic components that may coexist in such habitats. Using the Coastal and Marine Ecological Classification Standard (CMECS) as our structure basis, we can provide a comprehensive framework for organizing information and classify the environment into biogeographic aquatic settings. The following data represents the ecological structure settings and components for the submarine cables.

3.1.1 San Juan Bay - Telegraph cables

Water Column Subcomponents:

Layer

100 - 150'	Marine Offshore Lower Water Column (Marine waters below the pycnocline (or mid-depth), between the 30 meter depth contour and the shelf break.)
151 - 200'	Marine Offshore Lower Water Column (Marine waters below the pycnocline (or mid-depth), between the 30 meter depth contour and the shelf break.)
200 - 250'	Marine Offshore Lower Water Column (Marine waters below the pycnocline (or mid-depth), between the 30 meter depth contour and the shelf break.)

Salinity

Euhaline Water	Average between 35.5-36.4 ppt (parts per thousand) taken from various months (Apr, May, Jun) from the Caribbean Coastal Ocean Observing System (CariCOOS) webpage (www.caricoos.org) which provides animations of AMSEAS model outputs that are specifically tailored for our regional surface waters and updated on a daily basis.
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Temperature

Very Warm Water	The water temperature ranges between 27°C (80°F) to 29°C (84°F) depending on the month of the year and various weather events.
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Hydroform

Hydroform subcomponents were not taken during our benthic survey because we lacked the equipment to measure currents (boundary current, buoyancy flow, deep circulation, mean surface current, etc.), coastal upwelling front, water mass and waves on site, and were not necessary for our survey.

Biochemical Feature

100 - 150'	Euphotic Zone (The zone of the water column that is sufficiently illuminated for photosynthesis to occur)
	Nepheloid Layer (Layer of water that contains a high concentration of silt and sediment—usually at the benthic-water column interface. This layer can be nearly a fluid mud. In the deep oceans, the layer can be hundreds of meters thick; in shallower waters with less fine sediments, it can be much

thinner (only a few centimeters in places) or absent. Thickness is determined by substrate composition and current shear.)

Marine Snow Aggregation (A concentration of organic material in the ocean water column. Composed of a mix of mineral, dead organic materials, and sometimes a rich microbial community. In this feature small particles aggregate through attractive ionic forces and then begin to fall through the water column)

151 - 200' Marine Snow Aggregation (A concentration of organic material in the ocean water column. Composed of a mix of mineral, dead organic materials, and sometimes a rich microbial community. In this feature small particles aggregate through attractive ionic forces and then begin to fall through the water column)

201 - 250' Marine Snow Aggregation (A concentration of organic material in the ocean water column. Composed of a mix of mineral, dead organic materials, and sometimes a rich microbial community. In this feature small particles aggregate through attractive ionic forces and then begin to fall through the water column)

Geoform Subcomponents

Tectonic Setting

Neritic Mesopelagic Continental Shelf - an underwater landmass which extends from a continent, resulting in an area of relatively shallow water above the 1000 m boundary, also known as a shelf sea.

Physiographic Setting

Continental/Island Shelf - that part of the continental margin that is between the shoreline and the continental slope (or a depth of 200 meters when there is no noticeable continental slope); it is characterized by its very gentle slope of 0.1°. Island shelves are analogous to the continental shelves, but surround islands.

Geoform

Anthropogenic Cable (Structures that serve as linear conduits for electricity or as supporting lines for other in-water or above-water infrastructure.)

Biogenic None observed.

Geologic Fluvio-Marine Deposit (Stratified materials (clay, silt, sand, or gravel) formed by both marine and fluvial processes, resulting from non-tidal sea-level fluctuations, subsidence, and/or stream migration (e.g., materials originally deposited in a nearshore environment and subsequently reworked by fluvial processes as the sea level fell))

Sand Plains – sandy flats found in shallow and deep ocean bottoms

Substrate Subcomponents:

Geologic Fine Unconsolidated Mineral Substrate

Medium Sand - Geologic Substrate surface layer contains no trace of Gravel and is composed of > 90% Sand, with a median grain size of 0.25 millimeters to < 0.5 millimeters

Coarse Sand - Geologic Substrate surface layer contains no trace of Gravel and is composed of > 90% Sand, with a median grain size of 0.5

millimeters to < 1 millimeter.

Silty Sand - Geologic Substrate surface layer shows no trace of Gravel and contains 50% to < 90% Sand; the remaining Silt-Clay mix is 67% or more Silt.

3.1.2 Condado, San Juan - Coaxial cables

Water Column Subcomponents:

Layer

- 100 - 150' Marine Offshore Lower Water Column (Marine waters below the pycnocline (or mid-depth), between the 30 meter depth contour and the shelf break.)
- 151 - 200' Marine Offshore Lower Water Column (Marine waters below the pycnocline (or mid-depth), between the 30 meter depth contour and the shelf break.)
- 200 - 250' Marine Offshore Lower Water Column (Marine waters below the pycnocline (or mid-depth), between the 30 meter depth contour and the shelf break.)

Salinity

Euhaline Water Average between 35.5-36.4 ppt (parts per thousand) taken from various months (Apr, May, Jun) from the Caribbean Coastal Ocean Observing System (CariCOOS) webpage (www.caricoos.org) which provides animations of AMSEAS model outputs that are specifically tailored for our regional surface waters and updated on a daily basis.

Temperature

Very Warm Water The water temperature ranges between 27°C (80°F) to 29°C (84°F) depending on the month of the year and various weather events.

Hydroform

Hydroform subcomponents were not taken during our benthic survey because we lacked the equipment to measure currents (boundary current, buoyancy flow, deep circulation, mean surface current, etc.), coastal upwelling front, water mass and waves on site and were not necessary for our survey.

Biochemical Feature

- 100 - 150' Euphotic Zone (The zone of the water column that is sufficiently illuminated for photosynthesis to occur)
- Marine Snow Aggregation (A concentration of organic material in the ocean water column. Composed of a mix of mineral, dead organic materials, and sometimes a rich microbial community. In this feature small particles aggregate through attractive ionic forces and then begin to fall through the water column)
- 151 - 200' Euphotic Zone (The zone of the water column that is sufficiently illuminated for photosynthesis to occur)
- Marine Snow Aggregation (A concentration of organic material in the ocean water column. Composed of a mix of mineral, dead organic materials, and sometimes a rich microbial community. In this feature small particles

- aggregate through attractive ionic forces and then begin to fall through the water column)
- 201 - 250' Euphotic Zone (The zone of the water column that is sufficiently illuminated for photosynthesis to occur)
- Marine Snow Aggregation (A concentration of organic material in the ocean water column. Composed of a mix of mineral, dead organic materials, and sometimes a rich microbial community. In this feature small particles aggregate through attractive ionic forces and then begin to fall through the water column)

Geoform Subcomponents

Tectonic Setting

Neritic Epipelagic Continental Shelf - an underwater landmass which extends from a continent, resulting in an area of relatively shallow water above the 200m boundary, also known as a shelf sea.

Physiographic Setting

Continental/Island Shelf - that part of the continental margin that is between the shoreline and the continental slope (or a depth of 200 meters when there is no noticeable continental slope); it is characterized by its very gentle slope of 0.1°. Island shelves are analogous to the continental shelves, but surround islands.

Geoform

Anthropogenic Cable (Structures that serve as linear conduits for electricity or as supporting lines for other in-water or above-water infrastructure.)

Biogenic Shallow/Mesophotic Coral Reef (Composed mostly of aggregate coral reef (Continuous, high-relief coral formation that occurs in various shapes and lacks sand channels. This type includes linear coral formations that are oriented parallel to the shelf edge)

Spur and Groove Coral Reef (Habitat having alternating sand and coral formations that are oriented perpendicular to the shore or bank/shelf escarpment. The coral formations (spurs) of this feature typically have a high vertical relief (compared to pavement with sand channels), and they are separated from each other by 1 - 5 meters of sand or bare hardbottom (grooves)—although the height and width of these elements may vary considerably. This geoform type typically occurs in the fore reef or bank/shelf escarpment zone))

Geologic Sand Plains – sandy flats found in shallow and deep ocean bottoms

Substrate Subcomponents:

Geologic Fine Unconsolidated Mineral Substrate

Coarse Sand - Geologic Substrate surface layer contains no trace of Gravel and is composed of > 90% Sand, with a median grain size of 0.5 millimeters to < 1 millimeter.

Very Coarse Sand - Geologic Substrate surface layer contains no trace of Gravel and is composed of > 90% Sand, with a median grain size of 1 millimeters to < 2 millimeters.

3.2 Benthic Biota

All observed biotic components, with the exception of planktonic biota, were counted and identified to species level (if possible). Through this identification method it is easy to better understand the habitat and if any area could potentially be an Essential Fish Habitat (EFH). In the occurrence where there are vast quantities of the same species the acronym TMTC will be applied meaning Too Many To Count.

3.2.1 San Juan Bay - Telegraph cables

The San Juan Bay telegraph submarine cable corridors are observed and is considered a desolate place. Not much life can be found compared to those who pass by coral reefs or rocky outcrops in the ocean floor. The higher levels of the water column were observed with high concentrations of marine snow and free-floating cnidarians. The benthic substrate consists mainly of silt, making it possible to observe evidence of Gastropod trails and segmented worms around the silty sand flats throughout the surveys. Other invertebrates and vertebrates were observed attached or swimming around debris found in the ocean floor.

Phylum	Common Name	Scientific Name	Found from 100' - 150'	Found from 151' - 200'	Found from 201' - 250'	Total Observed
Annelida	Southern Lugworm	<i>Arenicola cristata</i>	TMTC	TMTC	TMTC	TMTC
Mollusca	Queen Conch	<i>Strombus gigas</i>	1	0	0	1
Mollusca	Milk Conch	<i>Strombus costatus</i>	0	0	17	17
Chordata - Osteichthyes	Cero	<i>Scomberomorus regalis</i>	1	0	0	1
Chordata - Osteichthyes	Coney	<i>Cephalopholis fulvus</i>	3	0	0	3
Chordata - Chondrichthyes	Southern Stingrays	<i>Dasyatis americana</i>	1	0	0	1
Porifera	Scattered Pore Rope Sponge	<i>Aplysina fulva</i>	0	0	TMTC	TMTC
Porifera	Giant Barrel Sponge	<i>Xestospongia muta</i>	1	0	1	2
Porifera	Variable	<i>Aka</i>	1	0	0	1

	Boring Sponge	<i>coralliphaga</i>				
Porifera	Row Pore Rope Sponge	<i>Aplysina cauliformis</i>	1	0	0	1
Porifera	Branching Tube Sponge	<i>Pseudoceratina crassa</i>	1	0	0	1
Cnidaria - Anthozoa	Wide-Mesh Sea Fan	<i>Gorgonia mariae</i>	2	0	0	2
Cnidaria - Hydrozoa	Hydroids	<i>Hydrozoa sp.</i>	TMTC	0	0	TMTC

3.2.2 Condado, San Juan - Coaxial cables

The Condado, San Juan coaxial submarine cable corridors host different types of habitats between the 100 ft and 250 ft range. Spur and groove coral reefs and sand flats are the most basic habitats seen during our surveys. Strong currents keep the water visibility clear from nearby rivers and push all sedimentation further westward towards the San Juan Bay mouth.

Phylum	Common Name	Scientific Name	Found from 100' - 150'	Found from 151' - 200'	Found from 201' - 250'	Total Observed
Annelida	Southern Lugworm	<i>Arenicola cristata</i>	0	TMTC	TMTC	TMTC
Chordata - Osteichthyes	Spotfin Butterflyfish	<i>Chaetodon ocellatus</i>	2	0	0	2
Chordata - Osteichthyes	Rock Beauty	<i>Holocanthus tricolor</i>	1	0	0	1
Chordata - Osteichthyes	French Angelfish	<i>Pomacanthus paru</i>	2	0	0	2
Chordata - Osteichthyes	Spanish Hogfish	<i>Bodianus rufus</i>	3	0	0	3
Chordata - Osteichthyes	Blue Tang	<i>Acanthurus coeruleus</i>	2	0	0	2
Chordata -	Ocean	<i>Acanthurus</i>	3	0	0	3

Osteichthyes	Surgeonfish	<i>bahianus</i>				
Chordata - Osteichthyes	Coney	<i>Cephalopholis fulvus</i>	4	0	0	4
Chordata - Osteichthyes	Slippery Dick	<i>Halichoeres bivittatus</i>	1	0	0	1
Chordata - Osteichthyes	Yellowtail Snapper	<i>Ocyurus chrysurus</i>	1	0	0	1
Chordata - Osteichthyes	Bicolor Damselfish	<i>Stegastes partitus</i>	2	0	0	2
Chordata - Osteichthyes	Yellow Goatfish	<i>Mulloidichthys martinicus</i>	5	0	0	5
Chordata - Osteichthyes	Queen Angelfish	<i>Holocanthus ciliaris</i>	1	0	0	1
Chordata - Osteichthyes	Yellowhead Jawfish	<i>Opistognathus aurifrons</i>	1	0	0	1
Chordata - Osteichthyes	Snapper	<i>Lutjanus sp.</i>	0	1	0	1
Porifera	Dark Volcano Sponge	<i>Svenzea zeai</i>	1	0	0	1
Porifera	Giant Barrel Sponge	<i>Xestospongia muta</i>	17	9	0	26
Porifera	Netted Barrel Sponge	<i>Verongula gigantea</i>	4	0	0	4
Porifera	Branching Vase Sponge	<i>Callyspongia vaginalis</i>	4	0	0	4
Porifera	Convuluted Barrel Sponge	<i>Aplysina lacunosa</i>	6	7	0	13
Porifera	Azure Vase Sponge	<i>Callyspongia plicifera</i>	2	1	0	3
Porifera	Touch-Me-	<i>Neofibularia</i>	1	0	0	1

	Not Sponge	<i>nolitangere</i>				
Porifera	Variable Boring Sponge	<i>Aka coralliphaga</i>	1	0	0	1
Porifera	Brown Tube Sponge	<i>Agelas conifera</i>	3	21	0	24
Cnidaria - Anthozoa	Symmetrical Brain Coral	<i>Diploria strigosa</i>	1	0	0	1
Cnidaria - Anthozoa	Finger Coral	<i>Porites porites</i>	4 Clubtip colonies	0	0	4
Cnidaria - Anthozoa	Corky Sea Finger	<i>Briareum asbestinum</i>	16	0	0	16
Cnidaria - Anthozoa	Elliptical Star Coral	<i>Dichocoenia stokesi</i>	1	0	0	1
Cnidaria - Anthozoa	Star Coral	<i>Orbicella spp.</i>	2	0	0	2
Cnidaria - Anthozoa	Sea Plume	<i>Pseudopterogorgia sp.</i>	0	0	7	7
Cnidaria - Anthozoa	Pinnate Spiny Sea Fan	<i>Muricea pendula</i>	0	0	2	2
Cnidaria - Hydrozoa	Branching Hydroid	<i>Sertularella speciosa</i>	0	0	10	10
Chlorophyta - Green Algae	Stalked Lettuce Leaf Alga	<i>Halimeda tuna</i>	TMTC	0	0	TMTC
Chlorophyta - Green Algae	Three Finger Leaf Alga	<i>Halimeda incrassata</i>	TMTC	0	0	TMTC
Cyanophyta	Fuzz Ball Algae	<i>Symploca sp.</i>	TMTC	0	0	TMTC

3.3 Discussion

The abundance and distribution of species in the Caribbean varies with depth, marine habitat, and other limiting factors. These marine habitats may contain many endangered species and Essential Fish Habitats (EFH) which are important areas to conserve and protect. While conducting the survey we encountered two different marine habitats throughout the course of the submarine cables, which are sand plains and coral reefs.

The two San Juan Bay submarine telecommunication cables commence the 100 ft marker in an area of fluvio-marine deposits. This geologic subcomponent is of both natural (bay and river sedimentation) and human nature (dredging, construction, ship movements, etc) creating a habitat almost completely barren of macrofauna. Trails were often observed over the soft silty sediment belonging to various sized gastropods. Natural debris and man made waste served as anchor to some species of sponges and hydroids who are capable of surviving low light and high sedimentation areas, such as the San Juan Bay mouth.

Removing the submarine telecommunication cables at a 100 foot depth would be considered as no impact to the marine organisms and habitats in the surrounding areas. The submarine cable was observed at the surface of the ocean floor at a depth of 110 ft, but was no longer observed in areas where we had positive confirmation with our JW Fisher Pulse 12 metal detector. Therefore, the submarine telecommunication cables must be covered with sediments.

The three Condado submarine telecommunication cables are located within an area where many other live submarine telecommunication cables crossover and share the shore landing spot.

Other than the three coaxial cables, we were able to identify four other submarine cables close to the

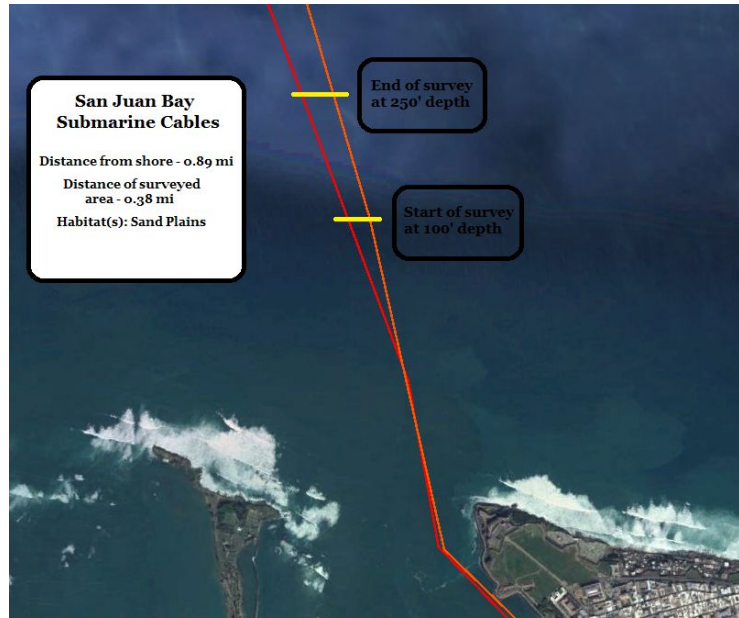


Fig.5 Global Marine GIS mapping with San Juan Bay telegraph submarine cable surveyed area.

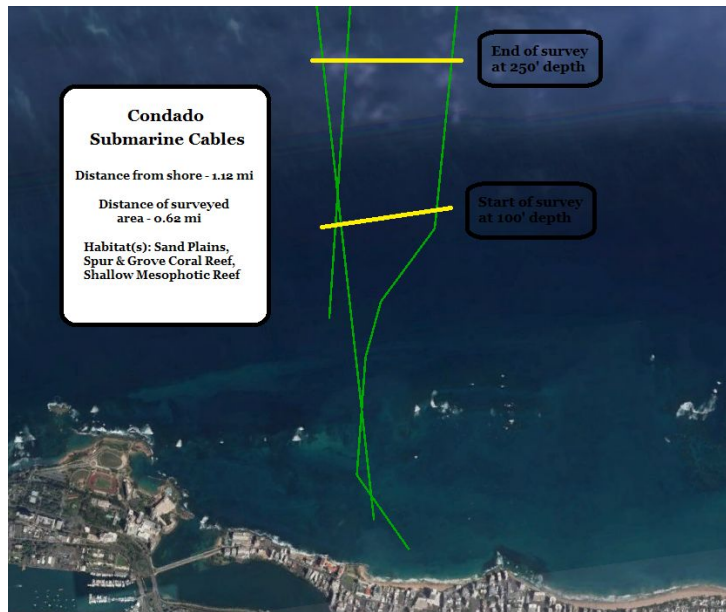


Fig.6 Global Marine GIS mapping with San Juan's Condado coaxial submarine cable surveyed area.

coaxial cable corridors. To make certain we would follow the correct cables during our surveys, Clean Ocean divers inspected the cables and confirmed which cables were coaxial and fiber optics. The first mile of the cable corridors are within a protected shallow water back reef, whereas the cables pass through a groove sand area to deeper waters. Many species of fish, corals and sponges were observed, quickly classifying this as an Essential Fish Habitat with high species biodiversity. Once the submarine cable passes the 160 ft depth marker the coral reef stops and a sand plain can be observed. The submarine cables were observed on video as they pass this transition.

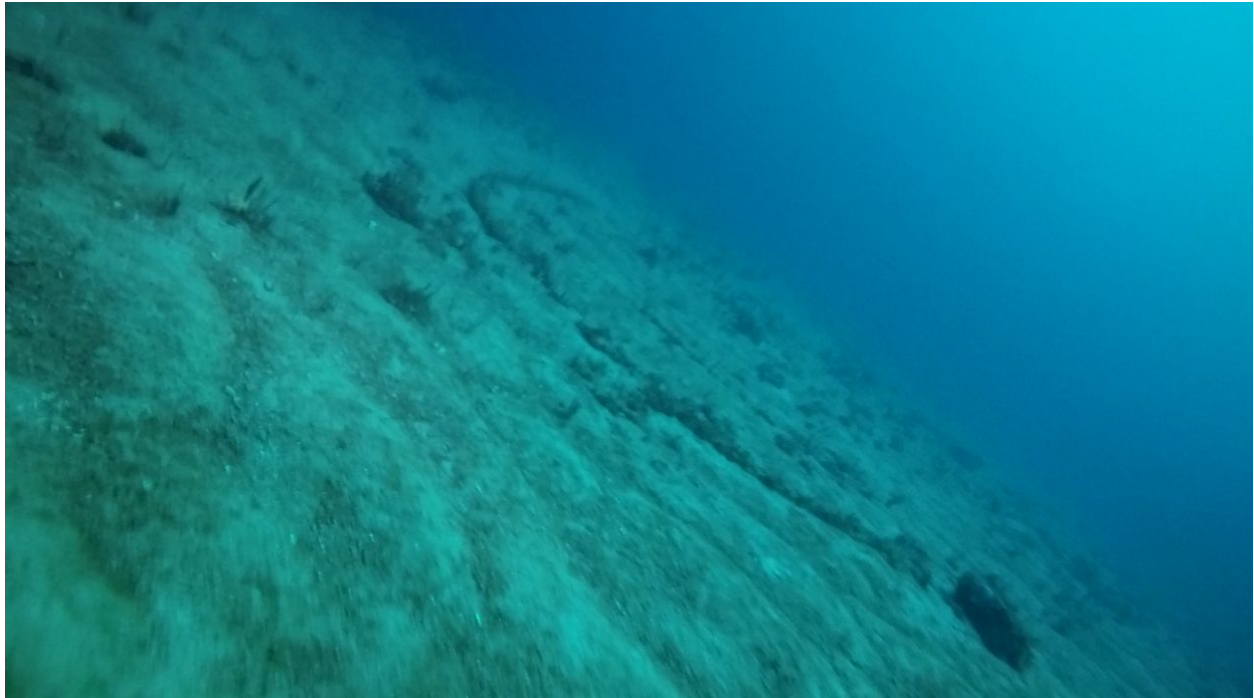


Fig.7 Still-shot of ocean floor contour at 110 ft depth of the San Juan Bay corridor. A submarine telecommunication cable is observed and a quick glance of the benthic habitat

Removing the Condado submarine telecommunication cables at a 100 foot depth would be considered as an impact to the marine organisms and habitats in the surrounding areas. An endangered species of coral (*Orbicella spp.*) was also observed during the first transect section of the submarine marine at a depth of 140 ft. The submarine cable was observed from a depth of 130 ft, and continuously seen up to 180 ft. It could no longer be observed after reaching the sand plains, concluding that it is submerged under the sand. It is recommended that removal of these submarine telecommunication cables commence after the

175 ft depth mark so that no coral reef or endangered species are affected by the cable removal process.

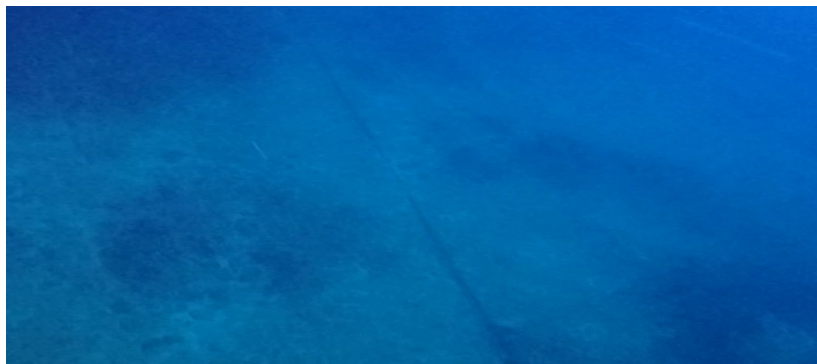


Fig.8 Still-shot of ocean floor contour at 139 ft depth of the Condado cable corridor. The submarine communication cable can be observed throughout the survey up to 180 ft.



Fig.9 Still-shot of ocean floor contour at 100 ft depth of the Condado cable corridor. Clarity in the water column permits algae and coral to grow at such depths, making this area a healthy reef environment.

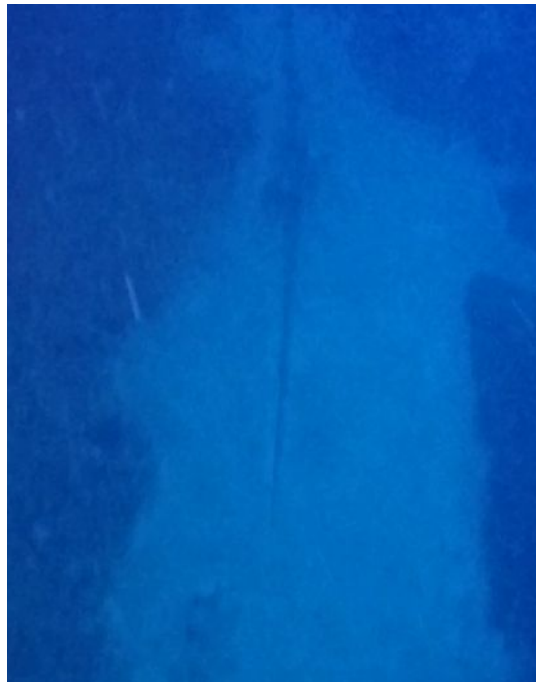
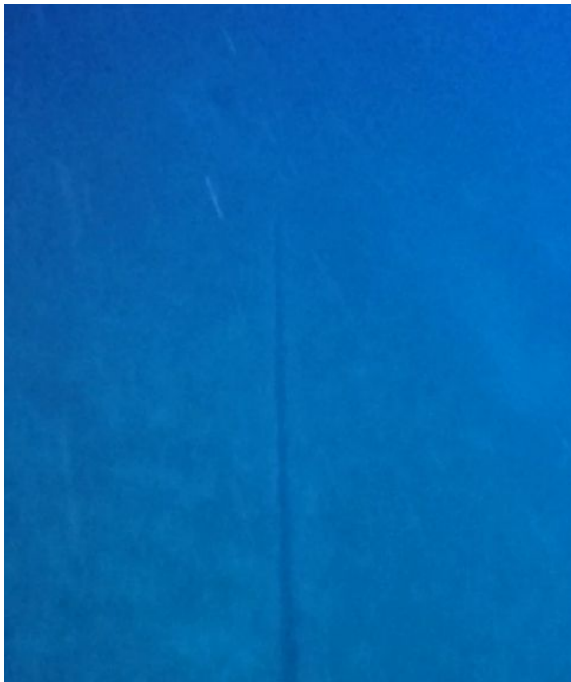


Fig.10-11 Still-shot of ocean floor contour at 153 ft and 158 ft depths of the San Juan Bay corridor. The submarine telecommunication cable submerges within the sand substrate and re-emerges around 20 meters later as it passes through a rocky outcrop.



Fig12 Still-shot of ocean floor contour at 175 ft depth of the Condado corridor. After the 160 ft depth marker the habitat changes from a spur and groove reef to sand plains. The sand plain continues throughout the rest of the survey.

Submarine Cable Removal Methodology

Clean Ocean has commissioned maritime engineering for 2 ROVs designed specifically for Clean Ocean's survey and removal operations. The ROV company commissioned is Submersible Systems, Inc, in Patterson, LA.

The survey and research ROV will be used in shallower waters and its principal purpose is to film corridors, prepare the cable for retrieval, cut the cable in shallow waters up to 3,000', locate cables, study the ocean floor and environment prior to commencing cable retrieval operations. This ROV will be able to cut the cables always at 100' or greater depths. The ROV designed specifically for Clean Ocean's operation will be known as the "Taos". The Taos will expose buried cables pneumatically eliminating the need for water jets and less sediment resuspension. The pneumatic process is much more precise allowing for less if any impact on the ocean floor. The Taos will also be equipped with a manipulator arm with a hydraulic saw attachment to cut the cable without any pull back; therefore, eliminating any potential for damage in the benthic zone and preserving the ocean floor. After the cable is cut at 100' or greater depths,

the Taos will attach a sling with a turnbuckle allowing for the retrieval operation to simply attach and move forward from the prescribed depths with no impact to shallower waters.

Our cable retrieval barge “Chickasaw” will be equipped with a second ROV designed specifically for Clean Ocean’s operation. This ROV will be known as the “Wichita”. The Wichita will be working at all times with the cable retrieval operation. The Wichita onboard the Chickasaw will stay directly on the cable path with full video and operational capacities 24 hours per day. The Wichita will see and alert the retrieval operation of any encumbrances in its path. The Wichita will be able to work in depths exceeding 18,000’. The Wichita will be equipped with cutters (from manipulator arm) to cut the cable to avoid any encumbrances including but not limited to reefs, “hot” cables, archeological findings or entanglements. The Wichita after cutting will place a transponder where the cut is made and will be retrieved to the Chickasaws deck for refitting of a vice/clamp and grab the cable past the encumbrance and bring the cable to depths suitable for re-attaching to the Chickasaw for continued retrieval operations. Decompression buoys may be used in certain areas depending on depths and currents to assist in the cable retrieval.

The process described does not require any human diving and will be completed at depths of 100’ or greater for all cables. Clean Ocean will not start operations in any areas with a depth less than 100’.

SUBMARINE CABLE REMOVAL

Clean Ocean will use its ROVs to locate, survey, cut and prepare submarine cables for retrieval from the barge named Chickasaw.

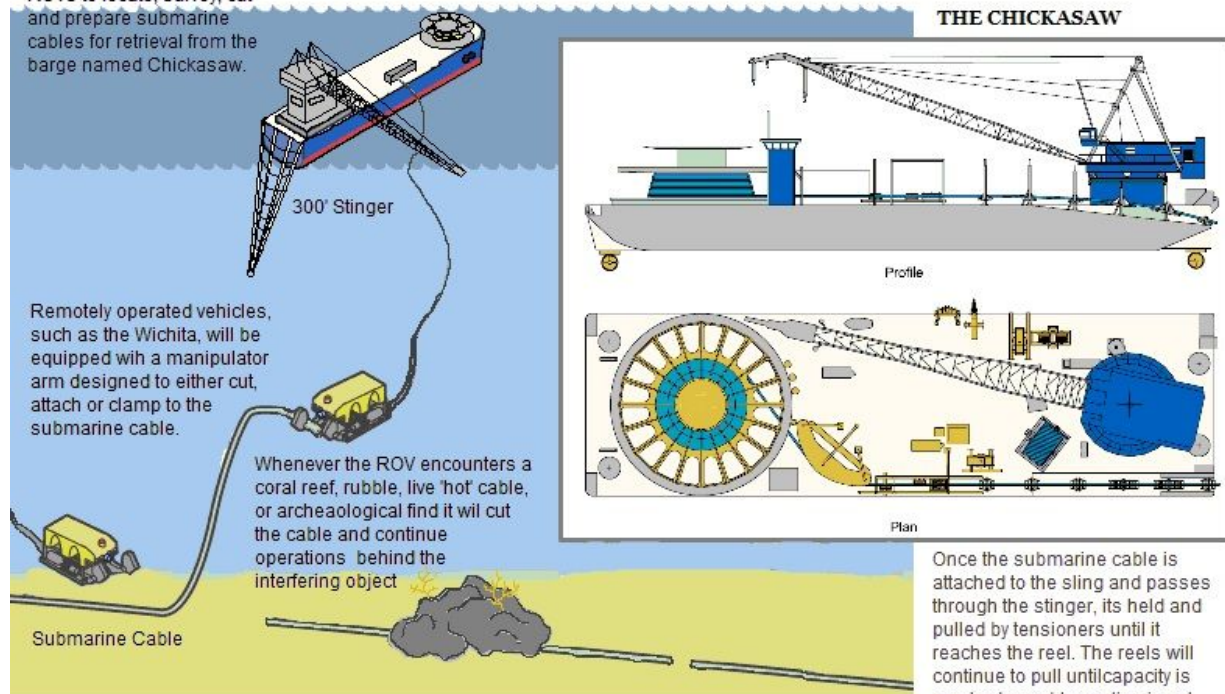


Fig.13 Submarine cable retrieval process diagram.

The cable retrieval operation will be completed by the S/Lay reel method. The operation will be carried out by The Chickasaw (or equal) a S-Lay Dynamically Positioned Lay Barge. The Chickasaw will pull cable onto its reel and onboard spools. The average on board cargo will be 4,500 short tons. For deep operations the Chickasaw is equipped with a 300' stinger, creating less stress to the submarine cables. The Chickasaw dynamic positioning allows for specific location or position of the barge by maintaining the vessels very specialized propulsion and station keeping system by virtue of hull mounted thrusters near the bow, at mid-ship and the stern. When in station keeping mode, these thrusters, which have the capacity to rotate 360o in a horizontal plane, controlled by a vessel board computer system that interfaces with a satellite geographic positioning system. Thus making the Chickasaw a perfect vessel for the the pin point accuracy required for these operations. The dynamic positioning also allows for work in depths of as shallow as 100' feet with no impact to the ocean floor.

Submarine Cable Storage & Transportation

Clean Ocean Initiative, Inc. has employed the pipelay vessel, the Chickasaw (see Appendix A), who was recently reversed engineered to specifically recover submarine telecommunication cables instead of lay pipelines. The Chickasaw has a 80 ft. diameter reel with an average storage capacity of 2,500 short tons. The Chickasaw is capable of an additional 2,000 short tons of storage capacity, for a total storage capacity of 4,500 short tons. The submarine cables are recovered and reeled at a speed of 1.5 knots. Once the submarine cables are reeled and the storage capacity has been reached, the Chickasaw will return to the Mayagüez Bay port at a speed of 4.5 knots, where Clean Ocean's headquarters are located to unload.

At the Clean Ocean facilities a series of tensioners will assist the removal of the submarine cables from the Chickasaw onto transfer reels. These transfer reels can be later moved under roof to different locations within the facility to be cut and separated to each recyclable material. Once separated, the materials are placed in 40 ft. shipping containers until filled or reaches weight limit capacity. The containers are then transported by land to the San Juan terminal or port to be placed on shipping barges where they can be shipped to the companies interested in the recyclable materials.

Possible Impacts: Water Quality & Benthic Habitats

Water Quality

Water quality can be thought of as a measure of the suitability of water for a particular use based on selected physical, chemical, and biological characteristics. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose (defined by the Environmental Protective Agency). Clean Ocean is aware of these measures by consulting and following all protocols established by federal and state agencies to comply with water quality standards.

Increase of sediments or resuspension of sediments affects water quality. The resuspension of sediments is expected while removing submarine cables from the ocean floor. Many of the submarine cables are covered with layers of sediments which allow little to no growth of encrusting organisms to cover the surface of the cables. However, with limited growth on the submarine cables the spatial area of cable to hold any sediment while it's being recovered is very small, reducing the amount of resuspension of these sediments to neighboring areas. The submarine cables in our permit application have a diameter between 1.0” and 3.2” leaving a space of 0.5” and 1.5” respectively where the angle of incline is less than 45°. With the small area of possible accumulation before any sediment fall (resuspension) from the cable as it's being removed, any expected sediment remaining within the surface of the cable will be minimal and will create very little resuspension of sediment during the process of cable removal. The speed of removal also affects resuspension of any sediments from the ocean floor. Our vessel while recovering submarine cables will operate at a continuous speed of 1.5 knots, slowly lifting the submarine cable from the ocean floor creating little current flow to further suspend any sediment.

Sedimentation is known to create adverse effects on coral growth , including coral sperm reproduction availability (Humphrey et al., 2008) and even death (Dodge et al., 1974). This is one of the reasons why Clean Ocean has agreed to do visual surveys of the cable corridors of the entire cable length or up to depths where the remotely operated vehicles (ROV) can reach (18,000 ft.) before cable recovery. By doing so coral reefs, cultural resources or anthropogenic objects, such as live “hot” cables, can be avoided by cutting the submarine cable well before and after the reef system, avoiding little to no resuspension of sediments to reach the reef area when the submarine cables are removed. In areas where the submarine cable is covered with layers of sediments the ROVs will proceed with a pneumatic process of recovery. Once the submarine cable is exposed, the manipulator arm from the ROV will cut the submarine cable and attach a sling with a turnbuckle for later recovery and extraction. By using a pneumatic process instead of water jets the amount of resuspended sediments is reduced greatly.

Benthic Habitats

Approximately 65.5% of the planet is covered by ocean that is greater than 135 m in depth (the approximate depth limit of the continental shelf) and is accessible only by submersibles or remote

sampling gear. Even the remaining shallow areas (approximately 5% of the Earth's surface) present challenges in terms of ship availability and cost, as well as loss of experiments and ship time to weather (Snelgrove, 1999). The coral communities beyond the continental shelf are mostly sessile ahermatypic species that are no longer dependant of sunlight for photosynthesis and are observed at oceanic walls, trenches, or scattered rock formations throughout the ocean floor.

The San Juan submarine cables were laid many decades ago allowing different encrusting or sessile organisms to attach and grow around the cables. In the occasion where the submarine cable has been covered with layers of sediments, little to no growth was observed during our initial surveys. Those cables who have been exposed for years and are still within the continental shelf are expected to have many encrusting organisms attached to the cables. Beyond the continental shelf it is also expected to see organisms attached to the submarine cables but at a much lower species and biodiversity level compared to that in shallower waters. As part of the investigation process before cable removal, Clean Ocean has agreed to do video surveys of the cable corridors of the entire cable length or up to depths where the remotely operated vehicles (ROV) can reach (18,000 ft.). By doing so, we can observe what type of organisms are attached to the submarine cables, surrounding benthic habitats, Essential Fish Habitats (EFH), or possible anthropogenic disturbances (submarine cables, pipelines, shipwrecks, etc.).

Clean Ocean understands the submarine cables to be salvaged will have encrusting and attached organisms. To help most of these organisms Clean Ocean has employed maritime engineers to help develop a "funnel" to remove any attached organism while recovering the submarine cable into the Chickasaw. Below the funnel, collection tubs will be placed with full time marine biologist inspecting the process and releasing most of the organisms back to the ocean. The organisms that are kept by our marine biologists will be placed in specialized holding tanks with the adequate conditioning to survive the trip back to Clean Ocean where we will have Coral Research Facility to study the recovered deep-water organisms attached to the submarine cables. The Coral Research Facility will further help NOAA Deep Sea Coral Research and Technology Program accomplish its objectives for the US Caribbean EEZ region. In addition, several scientists and graduate students are able to study the taxonomy, growth, behaviour and genetics of corals, octocorals, sponges, echinoderms, polychaetes and other invertebrates while in our seawater tanks and aquariums.

A scientific collection permit (see Appendix B) has already been acquired from the Marine Ecology Division at the Department of Natural and Environmental Resources (DRNA in Spanish) for organisms attached to the submarine telecommunication cables within Puerto Rico's territorial waters. A scientific collection permit request was also submitted to the NOAA National Marine Fisheries Services (NMFS) and Sustainable Fisheries Division for federal waters and the EEZ.

Alternative Cable Removal Analysis

Proposed Alternative

As part of Clean Ocean's submarine cable removal plan, the first steps were to acquire maps from Global Marine Systems and verify all possible submarine cables to be recovered. Converting these maps into Geographic Information System (GIS) format and integrating them to Google Earth provided Clean Ocean with quick access and visualization of the telecommunication submarine cable corridors around Puerto Rico and the US Virgin Islands. Therefore, Clean Ocean's research team proceeded to investigate the surrounding areas and corridors of the submarine cables in San Juan, Puerto Rico.

San Juan submarine cables were divided to two categories by Clean Ocean's research team: San Juan Bay cables (SAJ-2016-02701(SP-CGR) - SJ Bay 1888, SAJ-2016-02703(SP-CGR) - SJ Bay 1928) and Condado cables (SAJ-2016-02016(SP-CGR) - Florico 1959, SAJ-2016-02699(SP-CGR) - Florico 1960 N, SAJ-2016-02700(SP-CGR) - Florico 1960 S). Observing the geographical positioning and weather patterns close to the position of the submarine cables, different habitats were expected to be found and different alternatives taken for consideration in the cable removal process. The alternatives set by previous conversations and consultations between Clean Ocean and NOAA set a standard to commence at 100 ft depth, depth beyond any critical habitat, or 250 ft and deeper. To commence in depths shallower to 100 ft. would be nonproductive and would definitely create an impact to the environment. Determining the alternative depths for cable removal requires a benthic survey from 100 - 250 ft depths, in which an emphasis on habitats and coral species can be observed.

The benthic survey for the San Juan submarine cables presented the locations and habitats surrounding the cable corridors. There are no other alternate locations to evaluate because all submarine cable were found and surveyed during this benthic survey.

The San Juan Bay survey revealed large amounts of sediment deposits outside the Bay mouth where the submarine cables are located. At the 100 ft depth no reefs, corals or Essential Fish Habitats (EFH) were observed. Debris found during the surveys had sessile growth such as sponges and hydroids, limited by sunlight able to penetrate suspended sediments in the water column outside San Juan Bay. Completing the survey up to the 250 ft depths revealed no habitats other than sand plains along the submarine cable corridors. Retrieval depth for this cable was set to commence at 100 ft. and will continue at 100 ft. Working at 100 ft depths require less effort and challenges than 250 ft., including the amount submarine cable left in the ocean floor if removal starts at 250 ft. exceeds 4,000 ft and 18,000 pounds of recyclable abandoned materials. No environmental impacts other than small amounts of sediment resuspension along the cable corridors is expected, leaving 100 ft. the most practical and logistical alternative for removal for both San Juan Bay cables.

The Condado survey showed much different results from the San Juan Bay survey. The landing area for these submarine cables enter a protected reef with a back reef, patch reefs and a reef flat. All submarine cables in this area pass along sand grooves within the reef where no major coral formations are found. Clear waters allow many encrusting organisms to attach to the submarine cables even beyond the 100 ft depth. At the 100 ft depth marker a spur and groove coral reef was observed with several reef building coral including an endangered coral species (*Orbicella spp.*). Removal of the submarine cable at 100 ft would be considered non-practical and an impact to the environment. Following the cable corridor, the submarine cables are present over rocky or reef substrates, whereas submerges below the sand substrate whenever a large sand patch is present. This behavior is observed until 160 ft where the reef ends and a sand plain commences, allowing the submarine cable to continue very little before it submerges at 180 ft depth marker and is no longer seen at the surface of the sand substrate. The sand plain continues up to 250 ft where our survey ends. Removal of the submarine cables at a starting depth of 180 ft., where it is considered a depth beyond critical habitats, is the best alternative for these submarine cables because no critical habitat would be affected, no need for pneumatic process to uncover submarine cables is necessary and less recyclable abandoned material left in the ocean floor.

No-action Alternative

The “no-action” alternative is also required for an Environmental Impact Statement (EIS) and the NEPA process. In this case, no-action means the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Minimization Analysis

Every year thousands of feet of submarine telecommunication cables are laid in the oceans around the world. A designed lifespan of 25 years allows telecommunication companies to upgrade to faster and more affordable technologies, not realizing the amount of abandoned cables left in our ocean floor. New fiber optic cables need several decades for its rubber outer sheath to commence eroding and reach its steel armoring. Coaxial telecommunication cables have been decommissioned in our oceans for several decades and telegraph cables for over a century. These anthropogenic objects are slowly corroding and covering our deep oceans, to finally become trash. But one man's trash is another man's treasure.

Clean Ocean’s plan for removal of submarine cables has been previously modified to minimize impacts on coral species and benthic habitats. Various consultations and agreements for the first set of permits with agencies such as NOAA’s National Marine Fisheries Services, Puerto Rico’s Department of Natural Environmental Resources and the US Army Corps of Engineers (USACE) helped Clean Ocean establish “guidelines” to follow for all of the upcoming permit application.

- All submarine telecommunication cables issued for salvaging commence at depths 100 ft. or greater.

- Each submarine cable corridor has to be surveyed for potential impacts on benthic habitats, coral reefs, essential fish habitats, cultural resources, and any other anthropogenic resource.
- Initial depth for submarine cable recovery are re-established after shallow water survey has been conducted and consulted results with National Marine Fisheries Services.
- Complete survey information and videos to be shared with USACE, NOAA and any other lead agency looking for scientific data.

Applying these guidelines helped Clean Ocean minimize the environmental impacts reducing the possible submarine cable segments with high environmental risks.

Another minimization alternative is to commence the removal of submarine telecommunication cables beyond the 9 mile marine territorial line (state) or 12 mile marine territorial line (federal) around Puerto Rico. This method is the least acceptable plan and would not be practicable considering the amount of cable segments left behind exceeds 40 nautical miles (over 243,000 feet of cable) and over a million pounds of recyclable materials. Also, with the technology, studies and logistic of the proposed operation demonstrates little to no impact to the surrounding habitats while recovering the submarine cable. Vital information for the scientific community will also be lost while not surveying the cable corridors in these areas before cable removal.

Coastal Zone Management Certification Status

An application for the Federal Consistency Certificate (CZ-2017-0712-002), Joint Permit Application #1493, commenced with the Puerto Rico Planning Board on July 1st, 2016. An email with the required information needed to complete the certification was received on August 15, 2016 and a letter on September 9, 2016. Clean Ocean Initiative, Inc. is consulting with the Puerto Rico Department of Natural and Environmental Resources (DNER), Puerto Rican Culture Institute (ICP), State Historic Preservation Office (SHPO), and the Puerto Rico Planning Board to fulfill these requirements. An Environmental Recommendation (Recomendacion Ambiental - REA) with permit # 2016-112436-REA-001131 has been submitted to the Office of General Permits (OGPe) for review and further analysis by the DNER to complete the environmental assessment of the project scope within state waters and jurisdictions.

Public & Private Sectors

Benefits and Detrimental Effects

Clean Ocean Initiative, Inc. has placed a complete effort in analyzing the economic and environmental extent of its proposed project; the retrieval of decommissioned telecommunication submarine cables and repurposing of the materials for trading in the global market.

Puerto Rico is in need of innovative business opportunities. Clean Ocean aspires to contribute to the solution by establishing the first submarine cable recycling company in the U.S and Caribbean. This unfolds a variety of possibilities in the local and global markets. Some of the benefits are:

- Enhancements to domestic competitiveness
- Increase sales and profits
- Extend sales potential of existing products
- Maintain cost competitiveness in the domestic market
- Enhance potential for expansion of local businesses
- Gain global market share
- Reduce dependence on existing markets
- Stabilize seasonal market fluctuations

Clean Ocean's operational facility, located at the port of Mayagüez, PR will revive the maritime activity in this area in an effort to cooperate accordingly with the new beginnings of the Port of Mayagüez, Sila M. Calderon. One of the greatest assets Mayaguez possess is its port and there has not been expansive activity in this area for years. Clean Ocean will promote the creation and development of an industry never experienced on this bucolic island.

By initiating a positive economic impact for the city of Mayagüez and Puerto Rico through responsible direct financial contributions and indirect financial contributions in state tax requirements, Clean Ocean is committed to leading the way.

Clean Ocean will continue the rehabilitation of the old Bumble Bee facility for its operations. In addition, it will expand to the adjacent building where the submarine cables will be received and the Deep Water Coral Research Facility will be located. To make this possible, Clean Ocean has already recruited personnel; 8 direct employees and more than 50 indirect workers. Clean Ocean will create job positions for close to approximately 100 professionals with full benefits in the recycling industry, including an integration of marine biologists and engineers collaborating to achieve a modern environmental business through responsible recycling practices while protecting the ocean's ecosystem. The estimated annual salaries and payroll projection is \$2.7M, but not only direct employees will benefit from working for Clean Ocean, the local business economy will be improving as well as we support making use of local services and contractors.

The relative extent of Clean Ocean's proposed project has environmental benefits to both the public and private communities. Over 95% of the world's communication and Internet traffic is carried via submerged submarine fibre-optic cables. By removing outdated and decommissioned submarine telecommunication cables, millions of pounds of recyclable materials are removed from the ocean floor and repurposed for use in commercial and residential markets. In doing so, Clean Ocean is helping the placement and advancement of new technologies, minimize the exploitation of natural resources, reduce the strain on the environment and allow the conservation of more natural habitats.

In the first stage of the project, Clean Ocean will complete a significant part of the methodology of the operation; benthic and archaeological surveys which will provide the advantage of potential discovery of undocumented scientific and cultural resources. In the second stage of the project, Clean Ocean believes the construction of a Deep Water Coral Research Facility will help the scientific community better understand organisms attached to the submarine cable and their surrounding habitats. The attached sessile organisms in the submarine cable will be carefully removed by the ROV controlled by the marine biologists as the cable is salvaged by the Chickasaw (Barge). Some of the removed organisms by the marine biologists will be placed into specialized containers to maintain the organisms alive until returned to Clean Ocean's Deep Water Coral Research Facility where they can be carefully classified and studied. The Deep Water Coral Research Facility will provide:

- Unique opportunity to study deep sea corals, sponges and other invertebrates and vertebrates that have settled on the recovered cable in deep environments
- Study climate (temperature and pH) records stored in deep corals
- Description, taxonomy and genetics of sponges, echinoderms, polychaetes and other invertebrates found within the observed species of corals
- Collaborate with other institutions interested in coral research to effectively design experiments that will benefit scientists investigating deep water corals
- Research factors that affect deep water coral growth in closed systems, including acclimation, lighting, feeding strategies and seawater circulation
- Improve methods of measuring deep water coral growth, including using computerized three-dimensional models to measure coral surface area if applicable
- Disseminate information collected from the project to academics, marine scientists and governmental agencies interested in coral growth or any other research factor, including current and past experiments and results
- Educate the public about the importance of conserving coral reefs. The project will be used as a vehicle to teach coral conservation and science through guided tours and outreach programs
- Prepare and publish scientific papers presenting the project results

Also, while conducting the benthic and archaeological surveys, in-situ gathering of data will include:

- Description of coral and octocorals species and mapping their location
- Generate a catalog of the biodiversity of deep water reef environments
- Study climate induced changes within deep-water environments including dissolved oxygen, pH, temperature, current, salinity, etc.

- Produce HD video quality of the deep coral environments that can be utilized as an educational resource. Making this resource available to scientists and the general public.

Federal Communications Commission

In accordance with the Cable Landing Licensing Act of 1921, only *laying* of submarine cables which are:

- 1.) Owned and operated in the U.S.,
- 2.) Connectivity of submarine cables which connect to Alaska, Hawaii and U.S. Territories,
- 3.) and U.S. submarine cables to foreign countries (with end point in international waters)

would mandate request for permission from Clean Ocean to the Federal Communications Commission (herein, “FCC”). Moreover, once the FCC grants submarine cable landing license for installation and operation of any submarine cable in the United States, U.S. territories or with end point in international waters, the U.S. Army Corps of Engineers (herein “ACOE”) must authorize the installation of any submarine cable in U.S. waters pursuant to the Rivers and Harbor Act of 1899, as well as any submarine cable in a estuary pursuant to the Clean Water Act.

Clean Ocean has communicated with several FCC locations: Licensing Division in Pennsylvania, Media Cable & Licensing in Washington D.C. and San Juan, PR bureaus to inform of operation in removing the decommissioned cables in the Caribbean ocean floors. Additionally, Clean Ocean utilized the FCC’s web-based Cable Operations & Licensing System (COALS) to conduct and corroborate researched data to further determine the identified decommissioned submarine cables laying in the Caribbean ocean floors no longer possess an active license and thus no longer fall under the jurisdiction of the FCC. Furthermore, the design of the submarine cables limits its active lifespan to 20-25 years.

As to protecting the active cables the FCC has authority as it relates to any active licensed submarine cable landing on American shores. The Convention for the Protection of Submarine Cables of 1884 and 1888 respectively, are the governing authority for damage of submarine cables. The 1884/88 convention is the standard used in the U.S. for protection of Submarine cables. The Convention is recognized by the US Federal Agencies; NOAA, FCC and BOMA. The Convention states, “The owner of a cable who, on laying or repairing his own cable, breaks or injures another cable, must bear the cost of repairing the breakage or injury, without prejudice to the application, if need by, of Article II of the present convention.” This convention pertains to Clean Ocean’s operation, if Clean Ocean damages another live cable during its operation Clean Ocean will be responsible for the damage. Clean Ocean will implement and adopt the following procedures to protect the active cables:

- Assign an employee of record to designate cable crossings, maintain records of potential crossings, have on record contact personnel of all active cable owners, quarterly training of all Clean Ocean vessel personnel of procedures in the unlikely event of a live cable damage, follow FCC reporting guidelines of damaged cables including immediate notification to the cable owner and constant compliance with any applicable public or private guidelines as set forth.
- All cable crossings will be identified and recorded by Clean Ocean’s work class ROV prior to any cable retrieval process commencement.

- Clean Ocean will follow the guidelines set forth by The International Submarine Cable Protection Organization to protect the active cables during the retrieval process.
- Clean Ocean will carry an insurance policy naming the cable owner's and other necessary agencies additionally insured.

Endangered Species Act

Avoidance & Minimization

Avoidance and minimization measures presents the federally listed species protected under the Endangered Species Act (ESA) that are known to be found or are likely to be found within the project and/or analysis area. Current T.E.P. lists obtained from the USFWS IPaC (USFWS 2014b) and NOAA's NMFS are utilised for this analysis. The following discussions are focused on T.E.P. species known to occur in the project area, specifically those which have a high likelihood of occurrence based on proximity to the project area, or those that have suitable habitat present in or adjacent to the project area.

Other federally listed wildlife species which are known to occur in the analysis area are Elkhorn Coral (*Acropora palmata*) and Staghorn Coral (*Acropora cervicornis*). Designated critical habitats for these species have been established (See appendix C) and no critical habitat areas will be affected during the proposed operations. Another listed coral species present during our surveys is *Orbicella spp.*, where proper procedures are in place to avoid damaging or affecting this species during the proposed operations.

Cetaceans

Humpback Whales (*Megaptera novaeangliae*), Sei Whales (*Balaenoptera borealis*) and Sperm Whales (*Physeter macrocephalus*) are the only federally listed cetaceans known to occur in the project or analysis areas. Sei whales are rarely seen of the coasts of Puerto Rico and the Virgin Islands, while sperm whales are usually seen south of Puerto Rico. Humpback whales are migratory species which are more commonly seen between the months of January and April all around the island.

To help protect large whales and/or dolphins, our vessel (the Chickasaw) will always operate at slower speeds (5 knots or less) which will significantly reduce the risk of mortally wounding a whale if it is struck, whereas container ships can travel 12 knots or more. At these slow speeds it also provides the animal with an increased reaction time to move away from the vessel. NOAA's National Marine Fisheries Service coordinates a program aimed to reduce collisions with critically endangered whales, mostly Right Whales, in North America's eastern seaboard using mandatory ship reporting systems, yet none exists in the Caribbean Sea. If any Areas To Be Avoided (ATBAs) have been established by the International Maritime Organization (IMO), we will make proper procedures to avoid this area and return when the season has ended to avoid migrating whale populations.

Sea Turtles

All sea turtles found in the Caribbean are federally listed as either endangered or threatened. There are four species typically found in the U.S. water of Puerto Rico and the Virgin Islands: hawksbill sea turtle (*Eretmochelys imbricata*), green sea turtle (*Chelonia mydas*), leatherback (*Dermochelys coriacea*) and loggerhead sea turtle (*Caretta caretta*). There are final critical nesting habitats designations along the coasts of Puerto Rico for two sea turtle species: hawksbill and green sea turtle. The proposed submarine cable removal operations will not affect any of these designated nesting habitats (See appendix D).

To help protect sea turtle species our vessel, the Chickasaw, will always operate at slower speeds (5 knots or less) which will significantly reduce the risk of wounding any sea turtle species. At these speeds it also provides the animal with an increased reaction time to move away from the vessel. If at any time Areas To Be Avoided (ATBAs) are established, we will make proper procedures to avoid this area and return when the season has ended to avoid sea turtle populations.

Manatees

The West Indian Manatee (*Trichechus manatus*) is one of the federally listed mammals known to be found in the project or analysis areas. Manatees are rarely found in open ocean and are more typically found along shallow water seagrass beds or river mouths. There is a final critical habitat designated for the West Indian Manatee but proposed operations will not affect the designated critical habitat or the manatee itself due to the proposed area of operations. The Chickasaw will always operate at slower speeds (5 knots or less) which will significantly reduce the risk of mortally wounding a marine organism if it is struck. If at any time Areas To Be Avoided (ATBAs) are established, we will make proper procedures to avoid this area completely. Also required manatee protection and conservation guides, and bilingual signs will be placed and/or installed near work boat operators and all personnel associated with the project to avoid collisions with manatees (See appendix E).

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Appendix

Appendix A *The Chickasaw*

Our Fleet

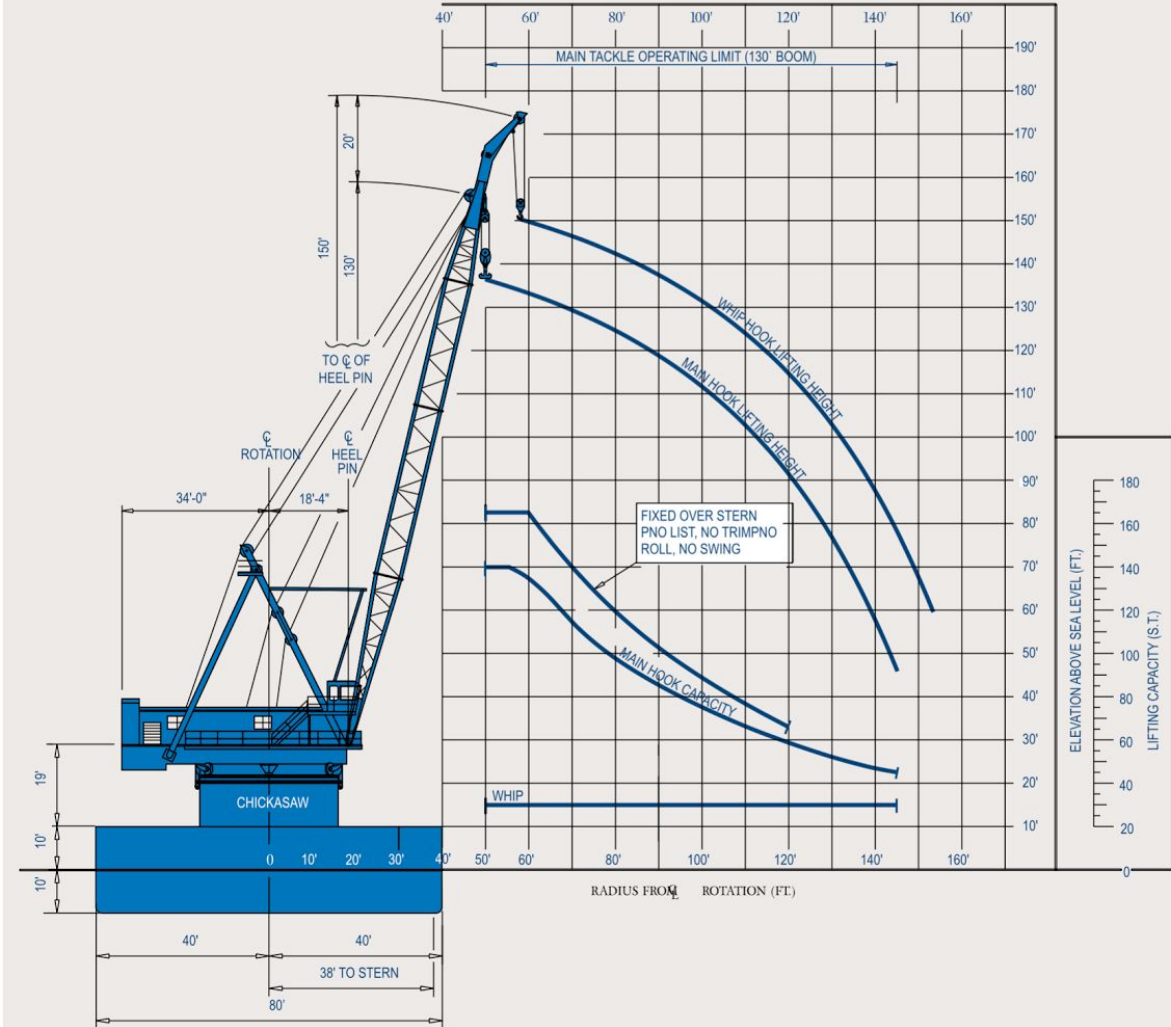
Chickasaw

[DP Derrick / pipelay vessel



Technip
take it further.

Chickasaw



Hook radius vs. lifting capacity & hook height

Specifications

Length (overall).....	275 ft (83.82 m)
Width.....	80 ft (24.38 m)
Depth.....	20 ft (6.10 m)
Classification.....	All Oceans, ABS A-1
Year Built.....	1970
Registry (Flag).....	USA
Operating Draft (min/max).....	9 ft (2.74m)/14 ft (4.27 m)
Tonnage (gross/net).....	4722/1415
Max Deck Load.....	Project Specific
Free Deck Area (length x width).....	73.5 ft (22.4 m) x 49 ft (14.94 m)
Moon Pool (yes/no).....	no
Accommodations.....	73 people
Hospital Beds.....	6
Transit Speed (econ/max).....	Towed
Helicopter Max rating.....	6,200 lbs (2,812.32 kg)
Helicopter Refueling Capacity.....	N/A
Helideck Dimensions.....	40 ft (12.19 m)

Machinery

- Main Engines..... N/A
- No. of Generators..... 4
 - Main Power..... (2) 650 kW AC; (2) 645 kW DC
 - Auxiliary Power..... N/A
- No. of Compressors..... (1) 125 psi
 - Total Output..... 750 cfm (1,274.25 m³/h)
- Water Makers..... N/A
 - Total Capacity..... N/A

Bunker capacity

- Fuel..... 60,000 USG (227,100 L)
- Fresh Water..... N/A
- Potable Water..... 100,000 USG (378,500 L)

Dynamic positioning

- DP Class..... N/A
- DP System...Nautronix ASK4002 w/dual redundant controls
- Thrusters (2) Bow (2) Stern

Type	Th500 Retractable	HRP 600L Retractable
Power	550 hp ea	750 hp ea.
- Total DP Power.....2,600 hp

Communication systems

- Telephone, VHF Radios, Satellite Phone, E-mail & Fax, Client Internet

Navigation

- Radar-Furuno Navnet 1943 C/NT, AIS-GPS; AIS Satellite Compass

Mooring equipment

- No. of Anchors; Wt..... (3); 20,000 lb (9,072 kg)..... (1) 10,000 lb (4,536 kg)
 - Make/Type..... Delta Flipper.....Delta Flipper
- No. of Winches.....2
 - Make/Type.....American 480 B
 - Wire (length/diameter).....2,500 ft (762 m)/1.5 in

Main crane

- Derrick
- Make/Model.....Clyde 32
 - Type.....Revolving
 - Boom Length
 - Main.....130 ft (39.62 m)
 - Auxiliary.....N/A
 - Whip.....150 ft (45.72 m)
 - Capacity
 - Main Revolving.....127 s. tons @ 50 ft (115 MT @ 15.24 m)
 - Main Fixed.....165 s. tons @ 50 ft (149.7 MT @ 15.24 m)
 - Auxiliary.....N/A
 - Whip.....30 s. tons @ 45 ft (27.2 MT @ 13.72 m)

Auxiliary crane(s)

- Make/Model/Type.....N/A

Mission equipment

- Pipelay Method(s).....Reel S-Lay
- No. of Work Stations (@ 40 ft).....3
- Pipe Diameter (min/max).....4 in/12 in
- Tensioners (make/type).....N/A
 - Total Capacity (each/total).....N/A
- Reel Capacity (tonnage).....2,500 s. Tons (2,267 MT)

Diameter	Capacity (mi)	Capacity (km)
4	45.27	72.8847
6	19.13	30.7993
8	11.55	18.5955
10	5.68	9.1448
12	3.79	6.1019

- Abandon/Rec. Winch
 - Type (make/model).....Smatco
 - AR Wire (length/diameter).....7,000 ft (2,133.6 m)/2 in
- Capacity.....200,000 lb (90,720 kg)
- Davits.....N/A

Stinger

- Type.....Fixed and Articulate
- Length (min/max).....40 ft (12.192 m) & 100 ft (30.48 m) Articulate; 100 ft (30.48 m) Fixed

Pipe bury equipment.....N/A

Diving system.....N/A

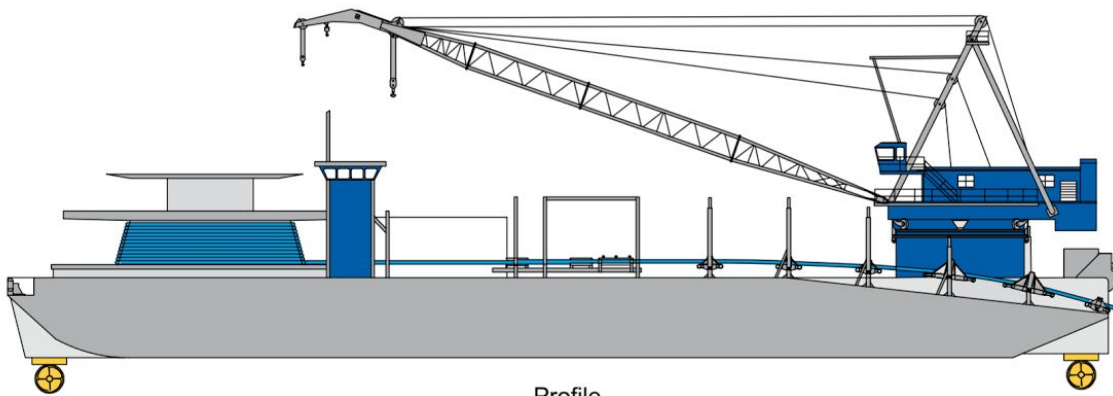




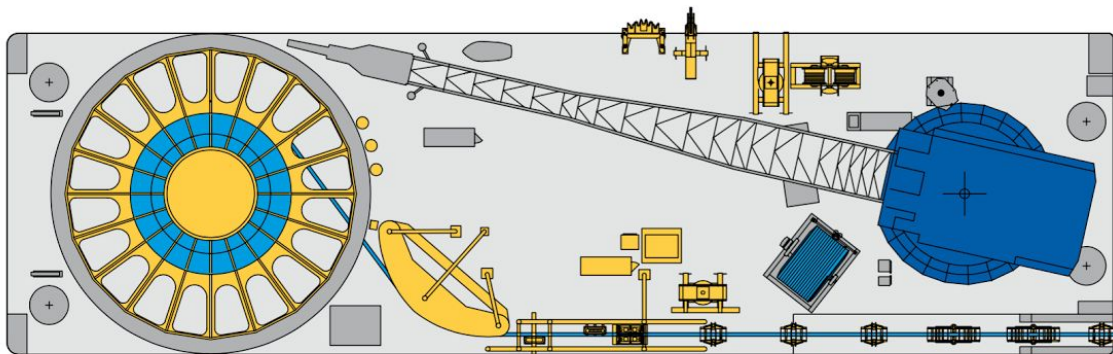
HEADQUARTERS
Technip
 89 avenue de la Grande Armée
 75773 Paris Cedex 16
 France
 Phone: +33 (0) 1 47 78 24 00

Technip USA, Inc.
 11700 Katy Freeway - Suite 150
 Houston, Texas 77079 - USA
 Phone: 281-870-1111

www.technip.com



Profile



Plan

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Appendix B Department of Natural & Environmental Resources Scientific Collection Permit



ESTADO LIBRE ASOCIADO DE
PUERTO RICO
Departamento de Recursos Naturales
y Ambientales

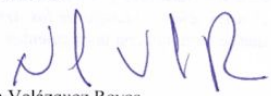
PERMISO PARA PROPÓSITOS CIENTÍFICOS

<p>Autorizado: Joshua Morel Matos José A. Rivera Clean Ocean Initiative, Inc. Carretera 64 # 3075 Bo. Maní Mayagüez, PR 00682 Tel. (787) 717-0887</p>	<p>Número DRNA: 2016-IC-114 (O-VS-PVS15-SJ-00853-01072016) Expira: 31 de agosto de 2017 Lugar donde se autoriza a llevar a cabo la actividad objeto de este Permiso: Alrededor de áreas costeras de Puerto Rico, incluyendo el Canal de la Mona</p>
<p>La Parte Peticionaria de epígrafe, solicita al Departamento de Recursos Naturales y Ambientales (DRNA) un Permiso para Propósitos Científicos.</p> <p>Evaluada la Solicitud presentada, al amparo de la Ley Núm. 23 de 20 de junio de 1972, según enmendada, mejor conocida como <i>Ley Orgánica del Departamento de Recursos Naturales y Ambientales</i>, y la Ley Núm. 147 de 15 de julio de 1999, <i>Ley para la Protección, Conservación y Manejo de los Arrecifes de Coral en Puerto Rico</i>, se emite el presente Permiso, sujeto a que se cumplan con las siguientes:</p> <p>1. Condiciones y autorización:</p> <ol style="list-style-type: none"> 1.1. La validez de este Permiso depende de que las actividades aquí autorizadas se lleven a cabo de acuerdo a las leyes y reglamentos estatales y federales aplicables y de que se cumpla con las condiciones aquí estipuladas. 1.2. Este Permiso es intransferible y sujeto a revisión o cancelación si las circunstancias, a juicio del DRNA, así lo ameritan. 1.3. Este Permiso no será válido sin los permisos federales y locales correspondientes de éstos ser requeridos. 1.4. Este Permiso deberá ser portado por su tenedor en todo momento durante su uso. 1.5. Se autoriza al Sr. Joshua Morel Campos, Biólogo de "Clean Ocean Initiative, Inc." en Mayagüez y colaboradores, a remover cables submarinos y al manejo de los organismos que se puedan encontrar adheridos a dichos cables. El propósito es reciclar los materiales del cable marino y coleccionar algunos organismos de profundidad para establecer un centro de investigación. 1.6. Este Permiso se concede sujeto a las siguientes condiciones: <ol style="list-style-type: none"> 1.6.1 Los organismos coleccionados serán colocados en una instalación de investigación en Mayagüez. 1.6.2 Tan pronto se comience con la remoción y se recopile información sobre la cantidad de los organismos impactados, especialmente corales blandos y pétreos, deberá rendir UN INFORME a la División de Ecología Marina a los seis meses de haber comenzado las actividades para evaluar el impacto que se está obteniendo sobre las comunidades bénticas. El mismo deberá ser enviado a: njimenez@drna.gobierno.pr 1.6.3 Toda información (video o fotos) coleccionada sobre la actividad de remoción, la documentación del cable marino y el tipo de fondo impactado deberá formar parte del informe entregado a la División de Ecología Marina. 1.6.4 De tener alguna dificultad con el mantenimiento de los organismos coleccionados y preservados, deberán informar a la División de Ecología Marina para hacer los arreglos con otros museos en Puerto Rico que podrían recibir dicha colección. 	

17 AUG 2016

P.O. Box 366147 San Juan Puerto Rico 00936
Tel: 787.999.2200 Fax: 787.999.2303
www.drna.gobierno.pr




1.6.5	Deberá tomar las medidas necesarias para evitar causar daño a corales y otros organismos marinos durante la actividad.
1.6.6	Las embarcaciones utilizadas no deben anclar sobre corales ni hierbas marinas durante el transcurso de las actividades.
1.6.7	De hacer alguna publicación sobre este estudio, la misma deberá indicar el número del permiso bajo el cual se llevó a cabo la colección de las muestras.
1.6.8	Deberá solicitar la renovación al menos noventa (90) días laborables, previo a la fecha de expiración del Permiso.
2. Requisitos de Informe: Deberá rendir UN INFORME detallado de las actividades realizadas al amparo de este Permiso, treinta (30) días antes de la fecha de expiración, disponiéndose que transcurrido el término sin haber presentado el informe, el DRNA podrá incautar y disponer de cualquier especie autorizada en el Permiso, no renovar el Permiso o tomar acciones legales y administrativas que en derecho procedan.	
Expedido por:  Nelson Velázquez Reyes Subsecretario	Fecha de efectividad: 17- agosto-16



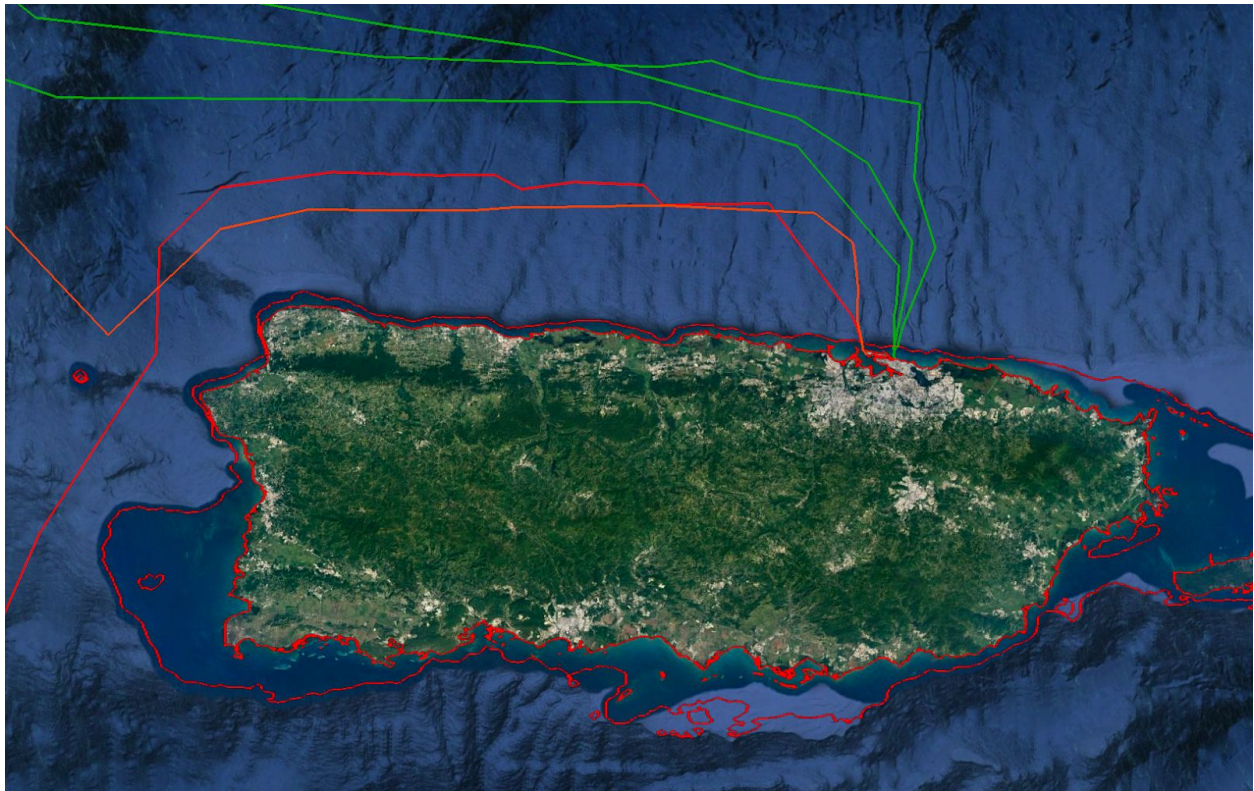
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Departamento de Recursos Naturales
y Ambientales

ENMIENDA AL PERMISO PARA PROPÓSITOS CIENTÍFICOS

<p>Autorizado: Joshua Morel Matos José A. Rivera Clean Ocean Initiative, Inc. Carretera 64 # 3075 Bo. Mani Mayagüez, PR 00682 Tel. (787) 717-0887</p>	<p>Número DRNA: 2016-IC-114 (E) (O-VS-PVS15-SJ-00853-01072016) Expira: 31 de agosto de 2017 Lugar donde se autoriza a llevar a cabo la actividad objeto de este Permiso: Alrededor de áreas costeras de Puerto Rico, incluyendo el Canal de la Mona</p>
<p>La Parte Peticionaria de epígrafe, solicita al Departamento de Recursos Naturales y Ambientales (DRNA) una Enmienda al Permiso para Propósitos Científicos.</p> <p>Evaluada la Solicitud presentada, al amparo de la Ley Núm. 23 de 20 de junio de 1972, según enmendada, mejor conocida como <i>Ley Orgánica del Departamento de Recursos Naturales y Ambientales</i>, y la Ley Núm. 147 de 15 de julio de 1999, <i>Ley para la Protección, Conservación y Manejo de los Arrecifes de Coral en Puerto Rico</i>, se emite la presente Enmienda, sujeto a que se cumplan con las siguientes:</p> <p>1. Condiciones y autorización:</p> <ol style="list-style-type: none"> 1.1. La validez de este Permiso depende de que las actividades aquí autorizadas se lleven a cabo de acuerdo a las leyes y reglamentos estatales y federales aplicables y de que se cumpla con las condiciones aquí estipuladas. 1.2. Este Permiso es intransferible y sujeto a revisión o cancelación si las circunstancias, a juicio del DRNA, así lo ameritan. 1.3. Este Permiso no será válido sin los permisos federales y locales correspondientes de éstos ser requeridos. 1.4. Este Permiso deberá ser portado por su tenedor en todo momento durante su uso. <p style="text-align: center;">ENMIENDA AL PERMISO NÚMERO: 2016-IC-114</p> <p style="text-align: center;">Esta Enmienda se concede para cambiar la condición 1.5 del permiso en cuestión.</p> <ol style="list-style-type: none"> 1.5. Se autoriza al Sr. Joshua Morel Matos, Biólogo de "Clean Ocean Initiative, Inc." en Mayagüez y colaboradores, a coleccionar organismos acuáticos de profundidad con el propósito de establecer un centro de investigación en Mayagüez. 1.6. Las demás cláusulas del Permiso otorgado, prevalecen tal y cual fueron aprobadas. <p>2. Requisitos de Informe: Deberá rendir UN INFORME detallado de las actividades realizadas al amparo de este Permiso, treinta (30) días antes de la fecha de expiración, disponiéndose que transcurrido el término sin haber presentado el informe, el DRNA podrá incautar y disponer de cualquier especie autorizada en el Permiso, no renovar el Permiso o tomar acciones legales y administrativas que en derecho procedan.</p>	
<p>Expedido por:  Nelson Velázquez Reyes Subsecretario</p>	<p>Fecha de efectividad: 8 septiembre - 16</p>

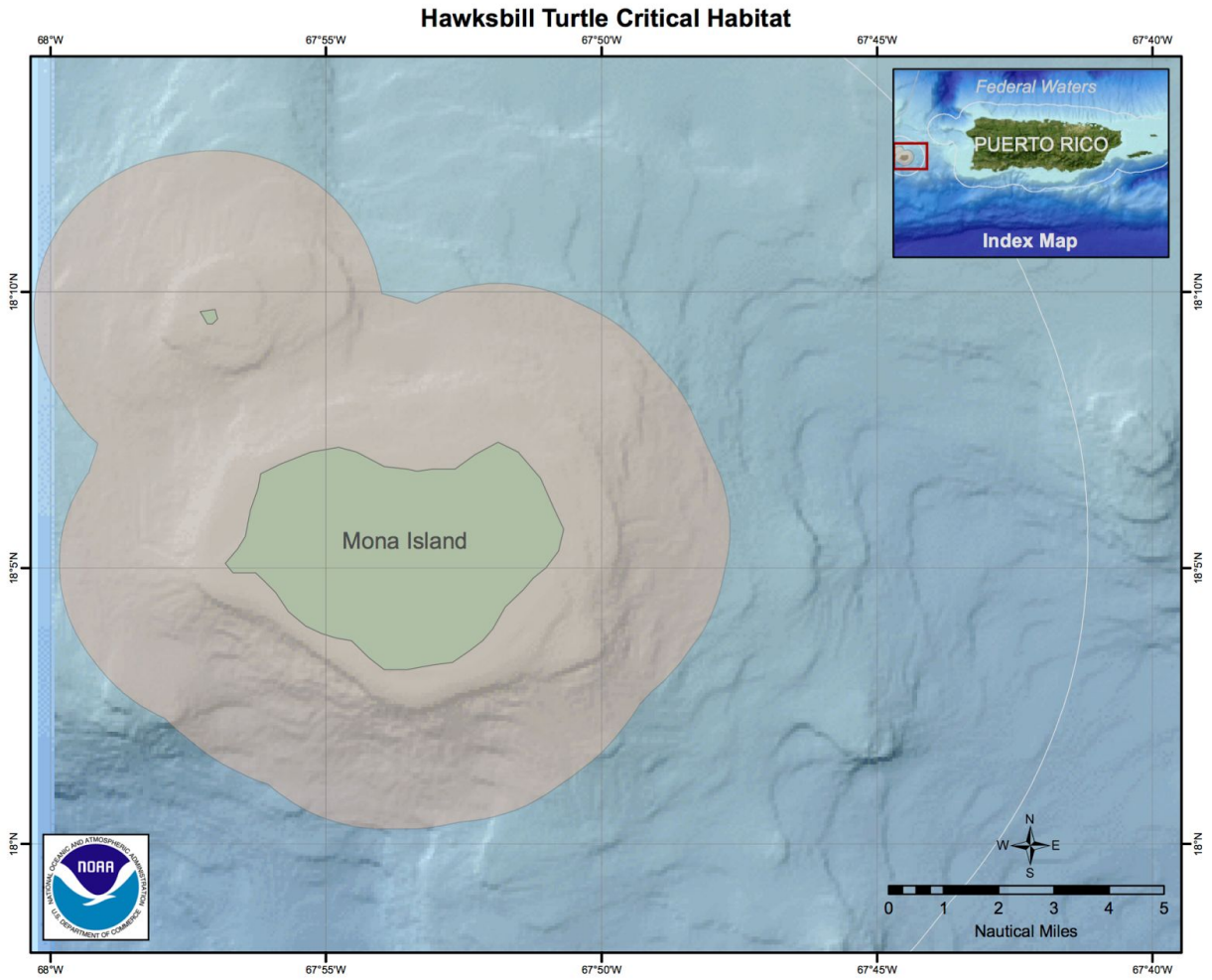


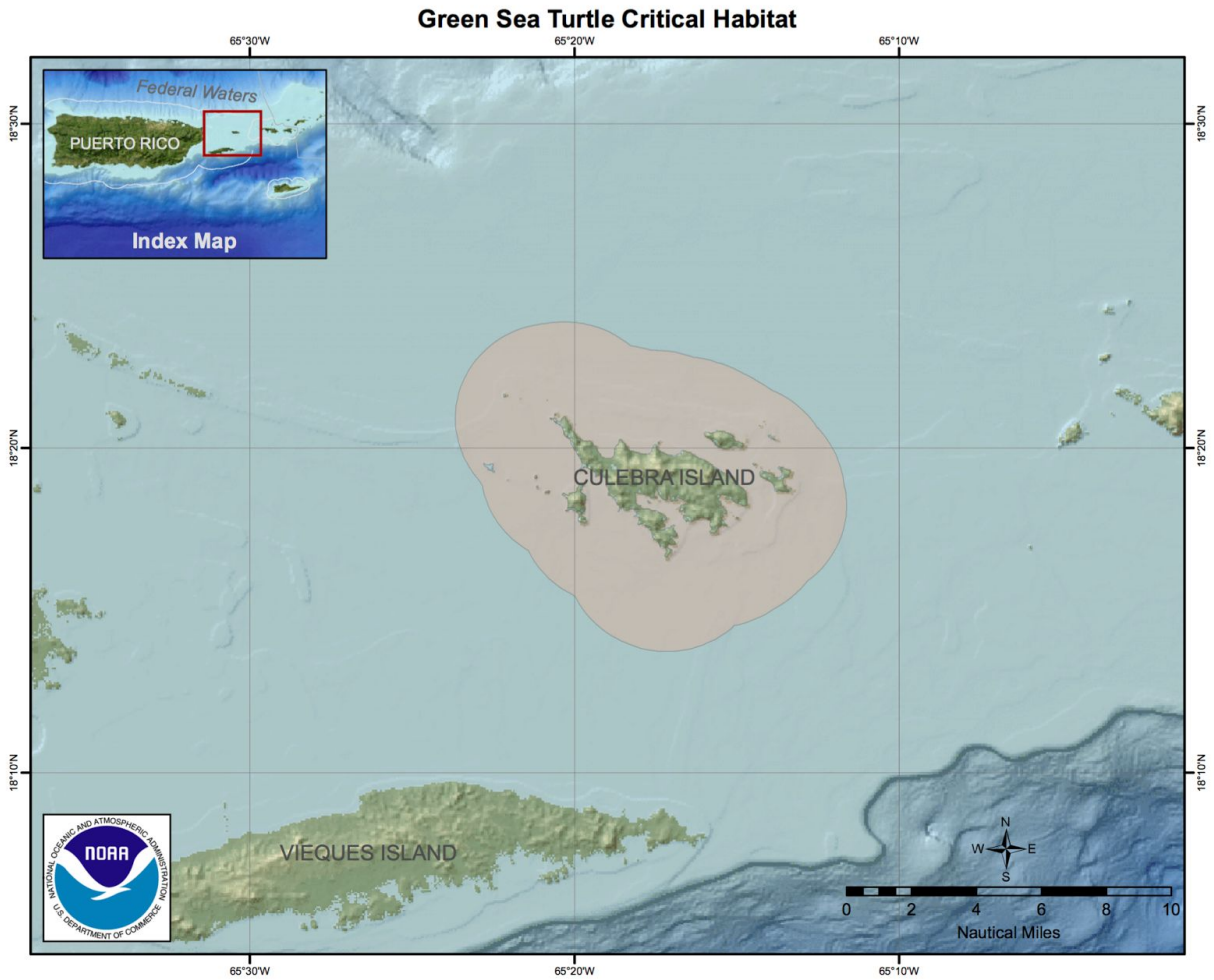
Appendix C *Staghorn and Elkhorn Coral designated critical habitats*



San Juan submarine cables and Designated Coral Critical Habitats

Appendix D *Critical Nesting Habitats for Hawksbill and Green Sea Turtles*





PRECAUCIÓN: HÁBITAT DE MANATÍ
CAUTION: MANATEE HABITAT

Toda embarcación
VELOCIDAD MÁXIMA 5MPH
All project vessels **IDLE SPEED/NO WAKE**

Si observa un manatí a 50 pies o menos del área de trabajo,
toda actividad en el agua debe

DETENERSE

When a manatee is within 50 feet of work all in-water activities must **SHUT DOWN**

Informe cualquier accidente con un manatí.
Report any collision with or injury to a manatee.

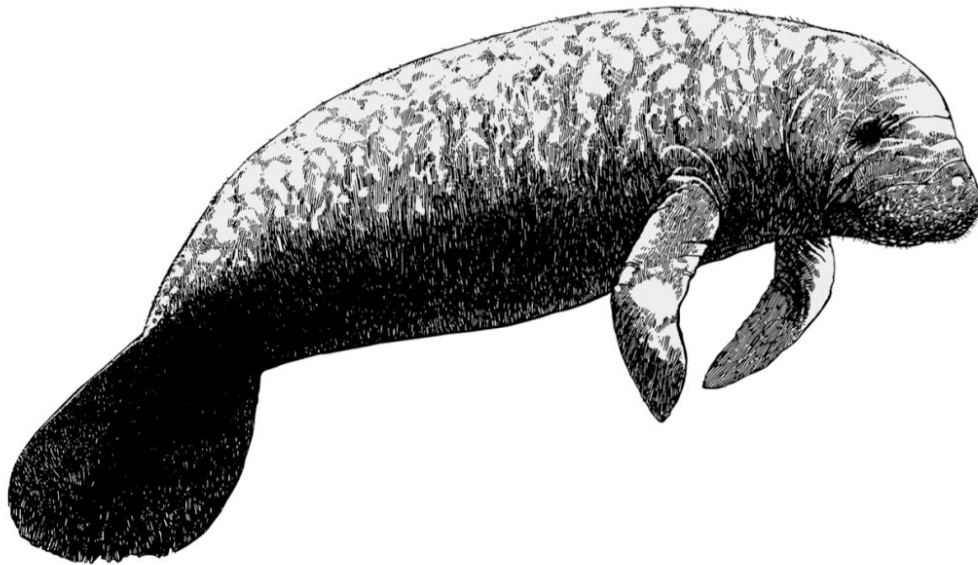


Vigilantes DRNA
(787)724-5700

PRECAUCIÓN

Manatíes en el Área

Caution: Watch for Manatees



VELOCIDAD MÁXIMA 5MPH
IDLE SPEED/NO WAKE

Informe cualquier accidente con un manatí.

Vigilantes DRNA
(787) 724-5700

Report collisions, sick, dead or injured manatees.