Draft Compatibility Determination

Title

Right of Way (landing, operating and maintaining the Taiwan-Philippines-USA (TPU) submarine telecommunications cable), Mariana Trench National Wildlife Refuge.

Refuge Use Category

Rights-of-way and Rights to Access

Refuge Use Type(s)

Right of Way (landing, operating and maintaining a submarine telecommunications cable).

Refuge

Mariana Trench National Wildlife Refuge.

Refuge Purpose(s) and Establishing and Acquisition Authority(ies)

Presidential Proclamation 8335 (6 Jan 2009) established the Mariana Trench Marine National Monument in an area of 95,216 sq. miles, under the authority of the Antiquities Act of 1906. The Secretary of the Interior has management responsibility, except that the Secretary of Commerce has primary responsibility for the fishery related activities. Secretary's Order 3284 (16 Jan 2009) directed the Director of the Fish and Wildlife Service to manage the Trench Unit (Mariana Trench NWR) as a unit of the National Wildlife Refuge System. Therefore the following are purposes of the Mariana Trench NWR:

"... for the development, advancement, management, conservation, and protection of fish and wildlife resources ... 16 U.S.C. § 742f(a)(4)

"... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956).

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. § 668dd(a)(2) (National Wildlife Refuge System Administration Act).

"... suitable for— (1) incidental fish and wildlife-oriented recreational development, (2)the protection of natural resources, (3) the conservation of endangered species or threatened species ..." 16 U.S.C. § 460k-1

"... the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ..." 16 U.S.C. § 460k-2 (Refuge Recreation Act (16 U.S.C. § 460k-460k-4), as amended).

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System, otherwise known as Refuge System, is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife,and plant resources and their habitats within the United States for the benefit of present and future generations of Americans (Pub. L. 105-57; 111 Stat. 1252).

Description of Use

Is this an existing use?

Yes. The Service has previously issued four right-of-way permits for submarine telecommunications cables through the Refuge. This Compatibility Determination has been prepared for a new right-of way permit for the Taiwan-Philippines-USA (TPU) telecommunications cable. NEPA compliance for the landing, operation, and maintenance of submarine telecommunications cables within the Mariana Trench NWR is covered under the Final Environmental Assessment for the Programmatic Issuance of Right-of-Way Permits for Telecommunications Cable-Laying Activities within the Mariana Trench National Wildlife Refuge and Mariana Trench Marine National Monument (Programmatic EA; USFWS 2023). The Service has determined that granting a Right-of-Way Permit for the TPU telecommunications cable would have the same impacts as those described in the Programmatic EA, and therefore does not require a new EA.

What is the use?

The use is issuance of a Right-of-Way Permit, defined as the “right to use and possibly alter the landscape through construction, maintenance, and operation of... powerline, telecommunications line ...” on lands under control by the U.S. Fish and Wildlife Service (Service.) The Secretary of the Interior, through his/her authorized representative, the Regional Director, United States Fish and Wildlife Service (Service), in accordance with applicable authorities, and regulations published in 50 CFR 29.21 et. seq., will grant a Right-of- Way Permit to the NEC Corporation, herein referred to as the Permittee. The permit will grant the Permittee the right to use certain submerged lands within the Mariana Trench NWR for up to 25 years solely for the purpose of landing, operating, and maintaining a single submarine fiber optic telecommunications cable. The permit includes those activities required to install and maintain a telecommunications cable on submerged Refuge lands, including, but not limited to, cable installation (laying), pre- and post-lay surveys, cable operations, and

maintenance and repairs.

Is the use a priority public use?

No

Where would the use be conducted?

The TPU Cable System – Guam Landing (Project) is a proposed fiber optic cable segment from the edge of the Guam Economic Exclusion Zone in the east, through the Marianas Trench Marine National Monument, passing between the Islands of Rota and Tinian in the Northern Mariana Islands, and landing in Tanguisson along the western shore of Guam.

From the landing point in Tanguisson, the cable will extend seaward due west for approximately 3 miles before turning on a north/northwest heading. After approximately 82 miles, the cable will split off in two directions. The segment that will pass through the Refuge will head east and travel between the islands of Rota and Tinian in the Northern Mariana Islands. After approximately 162 miles, the cable will enter the Mariana Trench NWR, where it will continue for another 83.26 miles before exiting the Refuge. The cable will continue outside of US jurisdiction until it reaches the existing cable off-shore of Eureka, California, where it will be spliced.

The cable route will cross over the Mariana Trench and through the MTMNM for a total linear distance of approximately 83.26 miles (134 km or 72.35 nautical miles (NM)). The cable route is the shortest feasible route across the MTMNM. The total cable footprint within the MTMNM is approximately 0.56 acres (24,394 square feet (sq. ft)).

Water depths along the proposed cable route range from 5,100 to 7,500 m, spanning the abyssal (4,000 to 6,000 m) and hadal (6,000 to 11,000 m) zones, based on a non-intrusive bathymetric survey conducted in 2022. The proposed route is relatively flat in the eastern sector, with areas of steep slopes and terrain roughness in the western sector of the route.

When would the use be conducted?

The right-of-way permit would grant the Permittee the right to use certain submerged lands within the Mariana Trench National Wildlife Refuge (Refuge) for up to 25 years solely for the purpose of landing, operating, and maintaining a submarine telecommunications cable. The project would have a life of approximately 25 years. The cable would be decommissioned and left in place once it has reached the end of its lifespan.

How would the use be conducted?

A Right-of-Way Permit would be issued by USFWS to the NEC Corporation to allow

the landing of the TPU fiber-optic communications submarine cable through a portion of the MTMNM.

Subsea Fiber-Optic Cable. Lightweight (LW) cable will be used for the cable segment that passes through the MTMNM. LW cable is 1.7 cm in diameter (0.669 in). The LW cable type has inner steel wires surrounding an insulant of natural polyethylene that is a thinner coating than the LWP cable type (ICPC 2014).

Light pulses can be transmitted only approximately 37 to 50 miles along the cable before they need to be regenerated. This regeneration will be done by regenerator equipment, known as repeaters, attached to the cable at the appropriate intervals. Each repeater will be approximately 11 inches wide by 170 inches long with an approximate footprint of 15 square feet. Repeaters will be connected in line with the cable and lay on the seabed. Repeaters are positioned to avoid conflict with existing cables. Two repeaters would be installed in the cable segment that passes through the MTMNM.

Cable Installation. The fiber-optic cable will be laid directly on the seabed, flush on the seafloor, by a cable-laying ship. The cable laying ship will proceed at approximately 3.7 kilometers per hour (2 knots). Slack will be continuously applied at various rates throughout the installation to allow the cable to conform to the contour of the seabed as much as feasible.

Cable Operations and Maintenance. There is no routine monitoring or maintenance associated with the submerged segments of the cable. However, it is possible that emergency repair activities and associated upgrades could occur. Should the Permittee need to conduct repairs and/or upgrades to the telecommunications cable, these activities would occur within the ROW. The typical triggers for emergency repair are such things as ship anchors being dragged across the cable route during active anchoring, fishing gear entanglement during active fishing (neither of which would be a concern in the MTMNM due to the great depths), and equipment failure. The Right-of-Way permit will include conditions governing the ability to continue to conduct scientific research using ROVs in proximity to the cable. ROVs are generally not permitted to operate near known sea floor cables. However, the Permittee has agreed to conditions in the right-of-way permit that allow the operation of ROVs in proximity of the cable.

Emergency Repair. If the cable needs to be repaired in the MTMNM, it would need to be recovered to the cable ship for repair. Because of the depth of the cable, the operation would take place in several steps. First a flatfish grapnel fitted with a cutting blade would be pulled until it snags and cuts the cable. Then a Gifford grapnel would be used to retrieve one end of the cable to the cable ship. After the cable is recovered, the end would be prepared and the fibers tested using a conventional optical time-domain reflectometer (OTDR). After conducting the necessary tests onboard the cable ship, this end of the cable would be sealed and buoyed off for easy recovery later.

Next, the other cable end would be recovered and similarly tested to locate the fault more precisely. The cable ship would retrieve this end of cable until the fault is aboard. After the fault site (either a cable or repeater section) is removed from the system, the repaired cable would be joined to the fault-free cable end and paid out as the vessel returns to the buoyed end. When the buoy is recovered aboard the ship, the two cable ends would be joined. After final testing, the cable would then be paid out through the stern of the ship to settle on the ocean floor.

Retirement, Abandonment, or Removal of the Cable Systems. The project would have a life of approximately 25 years. After a cable is decommissioned, it is typically abandoned in place. Abandonment in place would cause fewer environmental impacts than recovering the cable from the seafloor.

Why is this use being proposed or reevaluated?

The freedom to lay undersea cables has long been recognized as a lawful use of the sea. The United States recognizes this right under the Convention on the High Seas (1958), Article 2: the Convention on the Continental Shelf (1958), Article 4; and the United Nations Convention on the Law of the Sea (UNCLOS) which provides that within the Exclusive Economic Zone (EEZ) (200 nautical miles (NM)), all states enjoy the "freedoms referred to in Article 87 of navigation and overflight and of the laying of submarine cables and pipelines." (Article 58). The TPU cable system will connect Taiwan to the mainland United States (Eureka, California) with branches to the Philippines and Guam, increasing internet bandwidth and connectivity for the region.

Availability of Resources

In general, the Refuge will incur no expense except administrative costs for review of the application, issuance of a ROW Permit, and staff time to conduct a supplemental environmental analysis and complete a finding of appropriateness (FOA) and compatibility determination (CD). The Permittee will oversee the landing of the submarine cable and will be responsible for maintenance of the cable.

Administrative Costs:
Review request, coordination, and process ROW Permit: 4 staff: 58 hours: $2,250.00
Review environmental analysis, prepare FOA and CD: 1 staff: 60 hours: $3.450.00
Total $5,700.00.

Anticipated Impacts of the Use

The effects and impacts of the proposed use to refuge resources, whether adverse or beneficial, are those that are reasonably foreseeable and have a reasonably close causal relationship to the proposed use. This CD includes the written analyses of the environmental consequences on a resource only when the impacts on that resource could be more than negligible and therefore considered an "affected resource." Water and air quality, geology and soils, floodplains, wilderness, environmental justice, and

climate change will not be more than negligibly impacted by the action and have been dismissed from further analyses.

Potential impacts of a proposed use on the refuge's purpose(s) and the Refuge System mission

Most of the possible impacts recognized are over or within the water column, and therefore outside the boundary of the Refuge (The Mariana Trench NWR includes only submerged lands within the Mariana Trench Marine National Monument).

Possible impacts to the bottom community of Mariana Trench NWR, including disturbance to benthic marine organisms, are described in Short-term and Long-term Impacts, below. However, these impacts are likely to be minor to negligible, and would not materially interfere with or detract from the Refuge's ability to meet its purposes, or the Refuge System mission.

Short-term impacts

Impacts of laying and maintaining submarine telecommunications cable were analyzed in the Programmatic EA (USFWS 2023). The impacts of installing, operating, and repairing the TPU cable would be consistent with the impacts described in the Programmatic EA. Impacts to habitat and wildlife caused by the Permittee's use of the ROW are expected to be short term and minor, as described below.

Cables in deep water environments are generally laid on the surface of the ocean floor, as is being proposed for the TPU Cable. Environmental impacts associated with submarine cables can generally be attributed to either installation, maintenance and repair work, and removal; or the operational phase.

The Refuge consists only of submerged lands. The National Marine Fisheries Service oversees activities that have the potential to affect fish and marine mammals living in the waters above the refuge. Therefore, only effects to the benthic environment are analyzed here. Effects to fish (other than benthic species) and marine mammals from multibeam sonar used during cable route surveys, noise associated with the vessel and any laying machinery, visual disturbance from the vessel, and potential collisions between the vessel and marine mammals, are not analyzed.

Candidate actions potentially responsible for interactions with the benthic environment include laying down the cable on the seafloor, short and long-term interactions of the cable and its environment, and cable retrieval in the event of a fault or at the end of the cable's lifespan.

When placed in waters more than 2,000 meters in depth, cables are generally not buried. They are simply laid across the ocean floor. This is because, at such depths, cables are significantly less susceptible to potentially harmful interactions with living marine resources. The degree of benthic disturbance caused by laying submarine cables depends on the habitat and its associated ecosystem. The underlying geology

of the proposed cable route has not been extensively studied or surveyed. Hadal zone researchers Heather Stewart and Alan Jamieson studied areas in the hadal and adjacent abyssal slope zones of the southern MTMNM (Stewart and Jamieson 2018). They classified the basic geologic structure by depth zones. Substrate types were categorized through the analysis of photographic data. Within the water depth range of 4,506 m to 5,641 m, the dominant seabed sediment observed comprised muddy gravel, with one observation each of bedrock, bedrock and fine-grained sediment, and gravelly fine-grained sediment across all fifteen sampling stations (Stewart and Jamieson 2018). Within the water depth range of 6,008 to 7,941 m, gravelly fine-grained sediment was the dominating sediment type; fine-grained sediment, bedrock, slightly gravelly fine-grained sediment, and muddy gravel were also observed within this depth range (Stewart and Jamieson 2018). A nonintrusive bathymetric survey of the proposed TPU cable route in 2022 found predominantly rock outcrop along the western half of the route, and predominantly fine sediment on the eastern half of the route.

Deep sea coral and sponge communities occur in areas of clear water, such as on ridges, seamounts, canyon walls and shelf-edge breaks, where there is hard substratum, sufficient food, and moderate to strong currents (Hourigan et al. 2017). These communities are richest in areas of high slope and terrain roughness (rugosity). The bathymetry of the proposed cable corridor indicates there are areas of higher slope and terrain roughness in the western portion of the cable route. Although there are no known deep-sea coral and sponge communities along the cable route, there is an inferred higher probability for the presence of deep-sea corals and sponges at these locations. However, ridge dives conducted at depths below 3,000 m have not yet observed high-density deep-sea coral and sponge communities. The deepest 2016 Mariana Islands expedition ROV dives were below a depth of 5,000 m: Petite-spot volcano (1605L3-18), Hadal Ridge (1605L3-04), Hadal Wall (1605L3-21) and Subducting Guyot 1 (1605L3-16). A low-density community of 20 counts per km was observed at Petite-spot volcano, while deep-sea corals and sponges were scarce at the other three deepest dives (Kelley et al. 2019 in USFWS 2023, Appendix A). Therefore, at the depths at which the cable would be laid (5,100 to 7,500 m) it is unlikely that high-densities of deep-sea corals or sponges would be encountered.

Laying submarine cable, though a relatively short-lived activity, can be disruptive to the area and ecosystem in which it is carried out. There is a low potential for adverse impacts on biological resources within the cable's relatively narrow footprint. Potential impacts from the cable-laying process include laying the cable directly on, damaging, or abrading sessile or slow-moving organisms, although given the 1.7 cm (0.669 in) diameter of the cable, the likelihood of direct adverse impacts is low. Organisms, including deep-sea coral and sponge communities in the vicinity of the cable route, could also be adversely affected by the temporary disturbance of surface sediments and the associated increase in turbidity. Increases in turbidity and suspended sediments would be localized and temporary, and eventually dispersed by benthic currents.

A collaborative study conducted by the Monterey Bay Aquarium Research Institute (MBARI) and the National Oceanic and Atmospheric Administration division of Oceanographic and Atmospheric Research (NOAA-OAR) investigated the potential interactive effects between a fiber-optic submarine cable and its environment (Kogan et al. 2006). Results from this study indicated that the cable had few detectable effects on marine life. Although this was generally the case, in areas with soft sediments, the cable provided an artificial solid substrate that a number of different species sought out. This is known as the 'reef-effect' and results in species inhabiting an area that they typically would not (OSPAR 2009). The 'reef-effect' has been studied extensively and has been found in many cases to lead to the introduction of non-local biota and the alteration of the natural benthic community. The introduction on non-local biota is highly unlikely given the depth of the cable. Localized changes in the benthic community are possible, but would likely be temporary as the cable becomes buried in the sediments over time (Kerchhof et al. 2007, Tyrell and Byers 2007, OSPAR 2009).

Fiber-optic cables primarily transmit light; however, they also use a small amount of electricity to power the repeaters and boost the telecommunications signal, and therefore transmit small amounts of electromagnetic radiation and heat to the surrounding environment. During normal operation, the cable is powered by direct current (DC). DC currents produce the same type of magnetic field as the earth. The magnetic field generated by the cable is hundreds of times smaller than the Earth's magnetic field and thus would not be detectible or distinguishable against the Earth's field. A small amount of electromagnetic radiation may be produced by submarine fiber-optic cables during the rare events when the cable suffers an outage and AC electroding is used to find faulted cables. These would be exceedingly rare, short-term events and would generate very low levels of radiation comparable to background levels naturally produced by the earth. Therefore, it is expected that the weak magnetic fields produced by the TPU cable would have a negligible potential effect on marine organisms.

The submarine cable system is designed and manufactured to be electrically isolated from the environment and in the event of an incident resulting in an insulation cable fault, the cable will be automatically grounded to zero as it comes into contact with water. Consequently, there will likely be negligible effects resulting from electricity associated with the cable.

Long-term impacts

Once in place—if correctly laid—submarine cables have thus far not been shown to have a significant adverse effect on the surrounding marine environment since they are generally immobile once placed and coated with a layer of polyethylene, which is inert in seawater. Leaching from cables and their repeaters is believed to pose very little risk to the surrounding environment –especially in extremely deep environments (Collins 2007; Andrady 2000). Chemical breakdown processes, such as

oxidation, hydrolysis, and mineralization, are extremely slow – largely as a result of low UV penetration at those depths. In a study conducted by Andrady (2000), it was predicted that total conversion of cable-grade polyethylene to carbon dioxide and water would take centuries.

Impacts to the Public: The existing regulated uses within the Mariana Trench NWR would continue after the laying of the cable. These include research and exploration of the Mariana Trench with the proper federal permits, and commercial fishing in compliance with federal regulations.

In summary, the issuance of the ROW Permit to install, operate and maintain the telecommunications cable would result in minor, short term negative impacts to the benthic habitat and marine life; negligible long-term impacts to the benthic habitat and marine life; and no negative impacts to the public. There would be long-term positive impacts to the public since the TPU cable system will connect Taiwan to the mainland United States with branches to the Philippines and Guam, increasing internet bandwidth and connectivity for the region. This access to the Internet would positively affect economies by facilitating faster and wider access to information, promoting competition in the markets, enhancing communication in terms of lower cost and higher speed.

Public Review and Comment

This compatibility determination has been prepared concurrently with a Supplemental Analysis, which tiers from the Programmatic Environmental Assessment (USFWS 2023) that addresses environmental effects associated with the proposed ROW for the subject submarine telecommunications cable. The public will be notified of the opportunity to review and comment on the Draft CD through posting of the CD on the Refuge's webpage. Concerns by the public will be addressed in the final CD.

Determination

Is the use compatible?

Yes

Stipulations Necessary to Ensure Compatibility

To ensure compatibility with the National Wildlife Refuge System and the refuge goals and objectives, installation and maintenance of the aforementioned submarine fiber optic cable can only occur under the following conditions:

1. The Service reserves the right to authorize other activities, including research involving remote operated vehicles (ROVs), in the vicinity of the cable. Before permitting activities within 500 meters of the final as-built location of the cable, the Service will consult with the Permittee to establish protocols for

communications and operations to minimize the potential for impacts to the cable. The Permittee will ensure that the final coordinates identifying the location of the cable are fully communicated and has agreed to conditions in the right-of-way permit that allow the operation of ROVs in proximity of the cable.

2. The Permittee will produce and share the "as built" legal description describing the accurate location of the cable to the Service, within 180 days after it has been laid on the seafloor.
3. To minimize the risk of introducing contaminants into the marine environment, all instruments and equipment (including small boats) should be checked prior to deployment to ensure that there are no contaminant leaks (oil, fuel, hydraulic fluid, etc.) which could affect marine resources in the project area.
4. If any instruments or equipment is found to not be in good working order, it should be removed from service until all necessary repairs have been made which would prevent a release of contaminants.
5. The crew of the vessel used to lay the cable should try to minimize the amount of detergents and other noxious substances that might be washed overboard as part of an effort to clean instruments or equipment used during the cruise or in day-to-day operation of the vessel.
6. To prevent the spread of disease or invasive species, all equipment used in the cable laying operation should be rinsed with fresh water when practical.
7. A robust biosecurity plan must be submitted for review prior to cable laying operations to ensure that invasive species will not be inadvertently introduced into the Monument/Refuge.
8. Birds at sea have the potential to be attracted to or confused by lights on the vessel. At night the ship shall use the minimum amount of light necessary for legal and safe transit when underway. Through coordination with the USFWS, the cable ship operators will be briefed on the potential for bird encounters and will follow these protocols:
    A. After putting on gloves, the operators will pick up any downed birds and place them in a clean box to prevent soiling of their feathers.
    B. The birds will be kept in a cool, safe place until daylight.
    C. The birds will then be placed in an open area near the stern of the cable ship where they can take off when ready.
    D. Photographs of any downed birds will be taken to document distribution of species at sea and the USFWS will be notified and provided with these photographs.
9. The Permittee shall notify the Refuge Manager or his/her designee a minimum

of 2 weeks prior to commencing with installation of the submarine cable to avoid conflicts with Refuge programs.

10. Any operations to conduct emergency repairs or maintenance of the cable must be coordinated with the Refuge Manager prior to scheduling said repair or maintenance.
11. The Permittee shall notify the Refuge Manager 30 days prior to the cable decommission date.
12. Consistent with regulations at 50 CFR 25.21(h), the Service reserves the right to modify terms and conditions of the ROW permit in the future, as necessary to ensure continued compatibility with the use and occupancy of the land.

Justification

It is anticipated that wildlife populations will find sufficient food resources and resting places such that their abundance and use of the Refuge will not be measurably lessened during the submarine cable installation, operation and maintenance activities facilitated by the proposed use. The relatively limited number of wildlife individuals expected to be adversely affected during the operation and maintenance of the submarine cable will not cause wildlife populations to materially decline, the physiological condition and production of wildlife species present will not be impaired, alterations to the behavior and normal activity patterns will be minor or nonexistent, and their overall welfare will not be negatively impacted.

The right of way as described is determined to be compatible because potential impacts from the permittee's use of this right of way on wildlife that use this Refuge unit would be minimal and not materially interfere with or detract from achievement of the NWRS mission or from the Service's ability to achieve Refuge wildlife, habitat, or other public-use-related purposes and goals.

Signature of Determination

Superintendent, Mariana Trench Marine National Monument

Signature of Concurrence

Assistant Regional Director Signature and Date

Mandatory Reevaluation Date

Delete this text and insert year for reevaluation

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