New Zealand's Critical Underwater Infrastructure

1. This assessment summarises threats to New Zealand's critical underwater infrastructure (CUI) based on global observations and the New Zealand threat environment. It will cover submarine cables providing inter-island, inter-regional and international telecommunications, and the Cook Strait electricity cables.

2. The first section will outline the threats to New Zealand's CUI, while the following sections will briefly explain common causes and motives of damage that relate to the New Zealand context.

3. While oil and gas pipelines make up a part of New Zealand's infrastructure, they are not be included in this assessment due to their limited underwater presence.

4. Cable location and burial data was obtained from a range of sources including public information, cable operators and navigation charts. This was compared against international data on the statistically most common causes of cable damage, to identify vulnerabilities in New Zealand's maritime security area. Current cables are shown in figure 1.

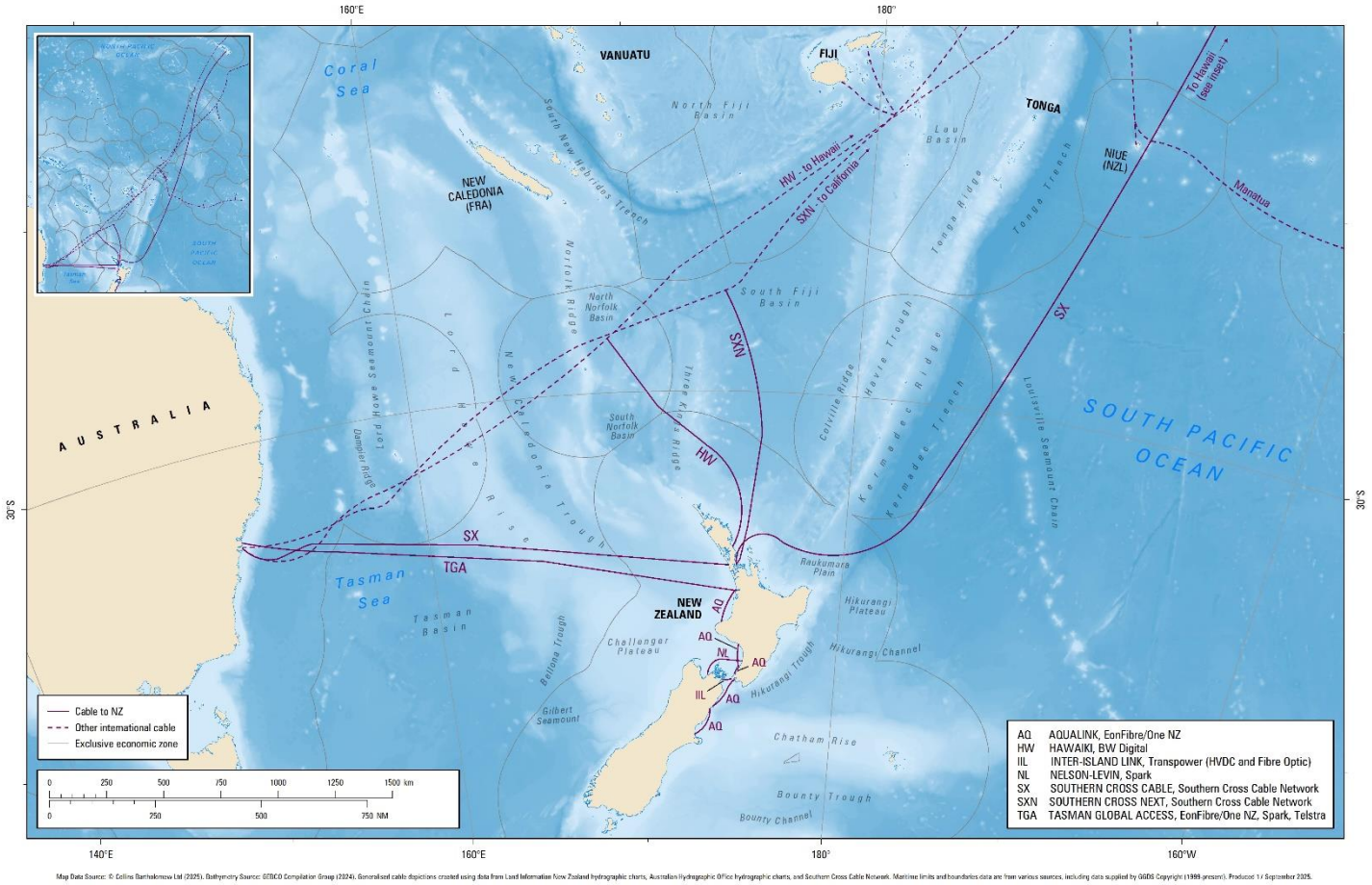

Figure 1: New Zealand's Current Critical Underwater Infrastructure.

Te Kāwanatanga o Aotearoa
New Zealand Government

Threats to New Zealand's CUI

5. Seismic activity, fishing and anchoring present the highest risk to New Zealand's CUI. Other potential causes of damage to cables include dredging, abrasion and theft; however, these are less applicable to New Zealand's cables which are mostly located in deep water, or have mitigations in place.

6. While cables located in high activity areas (such as the Hauraki Gulf and Cook Strait) are buried, patrolled or located in protection zones, these cables remain at risk of damage from anchoring or fisheries activities. Mitigations reduce, but do not eliminate all threats of damage.

7. Non-nefarious threats (such as seismic activity, fishing and anchoring) present far greater threats to New Zealand's CUI than that posed by deliberate damage.

    a. Non-nefarious causes make up the majority of damage to cables, based on international data.

    b. New Zealand's cables do not traverse contested waters and are not located near current conflict zones.

    c. New Zealand's international cables are mostly located in deep water and are difficult to access.

8. While non-nefarious causes make up the majority of damage to submarine cables, the potential for threat actors to deliberately damage cables have been highlighted by the European Union, NATO, and Australia. They highlight that deliberate damage may be a grey zone tactic and instances occur against a backdrop of strategic competition, tension or conflict.

Global Causes of CUI Damage

9. Data from the International Cable Protection Committee (ICPC) indicates that over 70% of cable damage each year is linked to everyday marine activity. Since 2015, the ICPC has recorded a yearly average of 150-200 cable damage incidents.

10. There are likely to be unreported faults due to the lack of international reporting requirement, difficulties proving the cause and intent of damage, and not disclosing damage for security reasons.

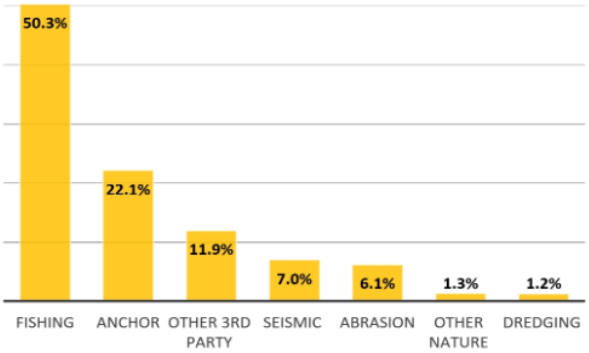

Figure 2: Causes of cable faults, 1986-2025

11. Figure 1 shows CUI damage causes:

    a. Fishing: 50% of damage to CUI is linked to fishing, including trawling which usually occurs in depths up to 1600m. Additionally, Fish Aggregating Devices (FADs) used attract fish and use weights that can damage cables in depths up to 4000m. These devices are not currently used in the New Zealand exclusive economic zone.

    b. 22% of cable damage is linked to anchor dragging due to poor seamanship, weather or maritime emergencies. The majority of these incidents occur in water depths less than 200m. Anchor penetration into

the seabed is usually less than 1m, but can be up to 3m in some areas.

c. Other third-party damage results from dumping, construction, offshore energy and mining operations.

d. Seismic activity such as earthquakes or volcanic eruptions accounts for 7% of damage to CUI.

e. Abrasion occurring from cable movement on the seafloor, or regular contact from fishing equipment, which causes progressive damage and eventual cable failure.

f. Other natural causes refer to fish or shark bites, accounting for 1% submarine cable damage. There have been no instances of shark or fish bites causing damage since 2006.

g. Dredging accounts for a small portion of cable damage. This will possibly increase as climate change and increasingly severe weather increases the frequency of gravel or sand replenishment, or resilience construction near submarine cables.

Non-Nefarious Causes of Damage

12. Accidents: poor weather or vessel breakdowns may require emergency anchor deployment in the interest of vessel safety, resulting in anchors being dropped or dragged over CUI.

13. Negligence: ICPC data indicates negligence is a factor in 60% of cable faults and occurs through fishing or anchoring with little regard for submarine cables present in the area.

Deliberate Damage to CUI

14. Globally, confirmed deliberate damage to CUI accounts for less than 1% of all cable damage. Potential methods include:

    a. Civilian research, fishing or recreational vessels equipped with cutting devices or dragging anchors. These are simple to acquire and implement, do not require underwater expertise and are easy to conceal in regular maritime traffic.

    b. Undersea explosives or remotely triggered mines. CUI is vulnerable to even small amounts of explosives, though handling and placing these devices requires care, skill and undersea warfare capabilities.

    c. Crewed or uncrewed submersible vessels which are increasingly used in maritime scientific research. Such vessels can be deployed from shore or larger support ships.

15. Vessels involved in deceptive shipping practices[1] are often associated with poor maintenance and seamanship, which will possibly be used as pretext for cable damage. The use of deceptive shipping practices is increasing, particularly in Europe and Asia, in response to increasing sanctions.

Threat Actor Motives to Target CUI

16. Global maritime infrastructure, including submarine cables, continues to be a plausible target during escalating conflict or tensions, according to the European Commission. Potential motives include:

[11] Deceptive shipping practices are activities used to evade detection, sanctions and regulations while engaging in illegal operations. Practices include fraudulent use of shipping registries, manipulating Automatic Identification System data to display incorrect location information, falsifying documents, ship-to-ship transfers, altering vessel names and false flags.

a. State sponsored threats: during conflict or tensions, state actors seeking military, political or economic advantage will possibly target submarine cables.

b. Grey zone tactics:[2] the maritime domain has increasingly seen grey zone tactics employed. Due to the complexity and extended physical location of cables ranging from littoral waters to the high seas, submarine cables will possibly be targeted by grey zone activities.

c. Theft: CUI components will possibly be stolen, particularly older copper cables.

Vulnerability Factors

17. High traffic areas: submarine cables located in or close to areas of high fishing and shipping activity, particularly in shallower water of less than 200m.

18. Geology: New Zealand's submarine cables are vulnerable to seismic and volcanic events in addition to ocean currents driven by extreme weather. Seismic events have previously damaged New Zealand's domestic CUI, most recently during the 2016 Kaikoura Earthquake; while land-based this is a reminder of New Zealand's vulnerability.

19. Areas of competing claims: overlapping or competing maritime boundary claims have resulted in delays to maintenance and repair of cables, as well as the laying of new cables. These delays will possibly increase faults as cables are kept in service longer than designed or are forced to be rerouted to a higher threat location. Such faults are common in Asia and almost certainly will not threaten New Zealand's CUI.

20. Depth: In shallower waters less than 200 metres, 65-75% of damage to submarine cables is related to human activity such as fishing or shipping. In deeper waters, natural hazards such as earthquakes become the primary cause of damage to submarine cables.

21. Burial: unburied cables are at higher risk of damage from fishing and anchoring. Undersea currents and seabed makeup can see previously buried cables uncovered. Cables are usually buried between 0.5-1.5m deep, but can be up to 3m deep. In waters deeper than 1500m, submarine cables are typically not buried as they are less at risk of anchor and fishing related damage, and the technical complexity of burying cables in deeper waters. Submarine cable burial reduces - but does not eliminate- the threat of external damage to submarine cables.

22. Unarmoured cables: which are common in waters deeper than 2000m with less threat of external damage.

23. Cable Landing Stations are vulnerable to damage as they are more accessible than submarine cables located offshore. Physical security measures including surveillance and access control mitigate the potential for international damage.

[2] These are tactics which occur between peace (or cooperation) and war or armed conflict. They aim to destabilize, weaken or test responses to growing power projection, but fall below the threshold of armed conflict. Grey zone tactics are difficult to attribute and can be challenging to enforce in international regulatory structures. Some examples include sabotage, cyber operations, espionage or incursions involving civilian law enforcement vessels.