The Northern Australia Quarantine Strategy and Torres Strait

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The Torres Strait is the body of water separating mainland Australia from Papua New Guinea (PNG). Only 151 kilometres wide at its narrowest, the strait is dotted with a chain of 133 islands. In the north of the strait, only 3.6 kilometres separate PNG from Saibai Island; and Indonesia (Papua province) is only about 150 kilometres from Boigu Island. The Torres Strait region is part of the state of Queensland, Australia, and is administered by the Torres Strait Regional Authority (TSRA), a Commonwealth body.

Quarantine and biosecurity have been a part of life in the Torres Strait region for over 200 years. From the late 1800s, Thursday Island served as a point of entry for tall ships, with a quarantine station on nearby Gialug Island used to house the sick. Culturally, Torres Strait Islanders are a distinct group of Indigenous Australians and have cultural and kinship links with both PNG and the Cape York Peninsula, Queensland. The Torres Strait Treaty — which was signed in 1978 and entered into force in February 1985 — provides a framework for managing the common border area between Australia and PNG. This treaty defines the boundaries between the two countries and facilitates the free movement (without passports or visas) of traditional inhabitants from both countries across this border, to protect their traditional way of life. More specifically, free movements for traditional activities are allowed between Torres Strait Islanders who live in the Torres Strait Protected Zone (TSPZ) and PNG citizens from 13 designated Treaty Villages on the adjacent southern PNG coast.

Under provisions of the *Biosecurity Act 2015* (Cwlth), the Torres Strait is divided into two biosecurity zones: the TSPZ in the north and the Torres Strait Permanent Biosecurity Monitoring Zone (TSPBMZ) in the south (Figure 1). International arrivals occur in both zones — under the provisions of the Torres Strait Treaty in the TSPZ; and via Horn Island Airport and Thursday Island, which serve as designated first points of entry for aircraft[1] and vessels[2] respectively, in the TSPBMZ.

Due to the proximity to neighbouring countries with a different pest and disease status from Australia, the close cultural ties Torres Strait Islanders have with these countries, and other international arrivals, the region is recognised as a potential pathway for biosecurity risks to enter Australia. Besides human-assisted movements, Torres Strait is also a pathway for the natural spread of biosecurity risks into Australia, such as by windborne spread of insects that are pests or vectors for disease, and movements of migratory species such as birds and bats that can act as reservoirs for disease.

The Northern Australia Quarantine Strategy (NAQS) is a biosecurity program of the Australian Department of Agriculture, Water and the Environment with surveillance and regulatory functions. NAQS employs almost 30 staff across most inhabited islands in the Torres Strait, as well as the Northern Peninsula Area (NPA) on the mainland, adjacent to the Torres Strait, to help manage the biosecurity risks throughout this region. NAQS also employs approximately 30 staff to fulfil the scientific surveillance functions of the program, with these staff operating across all of northern Australia, including Torres Strait.

Torres Strait and animal health surveillance

Each year, NAQS veterinarians conduct examinations on domestic

1 www.agriculture.gov.au/import/before/sending/airports/airport-locations

2 www.agriculture.gov.au/biosecurity/avm/vessels/first-point-entry-and-non-first-point-entry

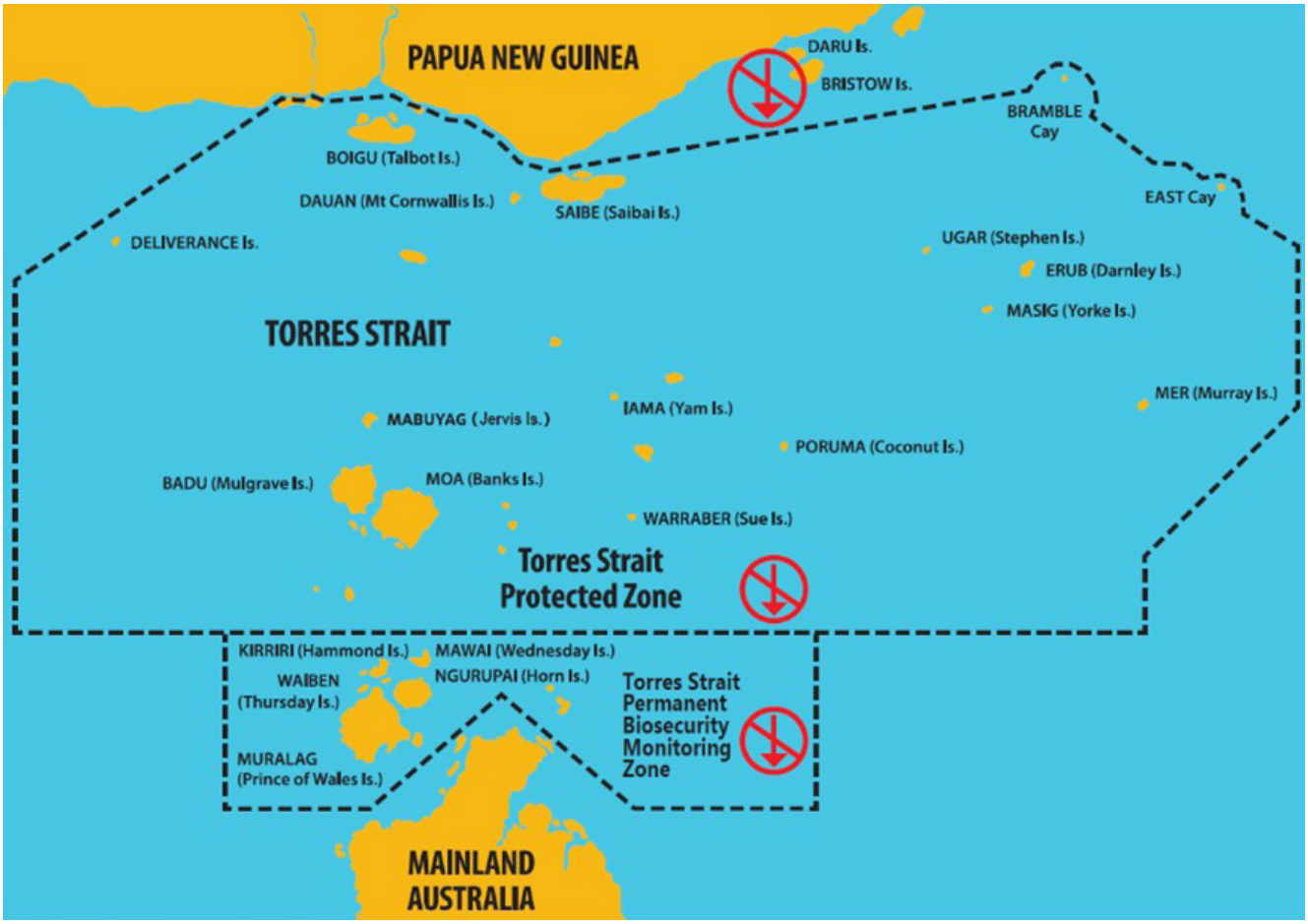

Figure 1 Map of the Torres Strait region, showing boundaries of the Torres Strait Protected Zone (TSPZ) and the Torres Strait Permanent Biosecurity Monitoring Zone (TSPBMZ). To help manage biosecurity risks, movements are regulated between Papua New Guinea and the TSPZ, from the TSPZ to the TSPBMZ, and from either zone to the mainland, as indicated by the red icons.

animals in the Torres Strait as part of NAQS' 'early warning' surveillance program for exotic pests and diseases. These domestic animal surveys serve not only as an opportunity to test the animals in the region for specific target diseases, but also enable NAQS veterinarians to reinforce the importance of biosecurity.

The local NAQS Biosecurity Officers assist the NAQS veterinarians with preparing and delivering these surveys. The presence of the NAQS officers based in the Torres Strait provides a recognisable and accessible point of contact for any community members to approach regarding any suspect pest or disease events.

As with all NAQS surveys, domestic animal health surveys in the Torres Strait are conducted with permission from and in collaboration with Traditional Owners and local authorities. In particular, NAQS works closely with Torres Strait Regional Authority (TSRA) rangers to monitor the size and health of animal populations — both domestic (owned) and feral (pest) species — in Torres Strait. In addition to domestic animal surveys, NAQS veterinarians also conduct opportunistic surveillance on feral animal species in the Torres Strait, in collaboration with TSRA-led pest species management activities.

Recognising the natural pathways that exist for insect pests and vectors to spread in the region, NAQS maintains a number of surveillance activities within the Torres Strait and NPA region, including adult fly trapping (for Old World screw-worm fly), light trapping (for exotic vectors of bluetongue virus and other diseases) and mosquito trapping (for Japanese encephalitis virus [JEV] and other flaviviruses).

Japanese encephalitis virus

In 1995, JEV was first recognised in the Torres Strait by Queensland Health. Three cases of JEV, with two deaths, were recorded in Badu island.[3] NAQS officers assisted Queensland Health in conducting surveillance for the virus in wading birds, and domestic and feral pigs. In 1996, NAQS established a JEV surveillance program that spanned the Torres Strait and northwestern coastal areas of Cape York Peninsula, utilising small herds of sentinel pigs to monitor for the virus. Over time, the surveillance methodology was refined to

3 Hanna JN, Ritchie SA, Phillips DA, Shield J, Bailey MC, Mackenzie JS et al. 1996. An outbreak of Japanese encephalitis in the Torres Strait, Australia, 1995. Medical Journal of Australia; 165(5): 256–260. doi.org/10.5694/j.1326-5377.1996.tb124960.x

include mosquito saliva collection onto FTA (Flinders Technology Associates) cards and, by 2011, the sentinel pig surveillance program for JEV was phased out. Currently, NAQS conducts ongoing monitoring for JEV in the NPA region every wet season (approximately December to June) through mosquito trapping, using FTA cards to collect mosquito saliva. These cards are tested for a number of flaviviruses, including JEV, contributing to Queensland Health's mosquito-borne diseases surveillance program.[4]

NAQS also conducts opportunistic sampling of pigs in the region, with samples tested for JEV and other NAQS target diseases. Due to the role that pigs play in amplifying JEV, and restrictions put in place by local authorities on where pigs can be kept, pig ownership in the Torres Strait has declined since JEV was first detected in the region. However, a few smallholder pig owners persist in the Torres Strait, and a few islands have feral pigs.

Screw-worm fly

Another zoonotic biosecurity risk of concern in the Torres Strait region is Old World screw-worm fly (SWF) (*Chrysomya bezziana*). This fly, which is endemic in PNG and many other tropical regions of the world, lays eggs on wounds or moist body openings of any mammal, including humans. The eggs hatch to become aggressive, flesh-eating maggots, causing debilitation, disfiguration and, in severe cases, death. For many years, NAQS monitored for incursions of SWF through monthly adult fly–trapping at several sites on Saibai, Boigu and Dauan Islands — those closest to PNG.

In 2015, after many years of monitoring without detecting any SWF, NAQS modified its surveillance strategy for SWF, replacing trapping in the Torres Strait with quarterly trapping at several sites in the NPA. Monitoring on the mainland was adopted since an incursion of SWF on the mainland would have a greater risk of establishment and spread, due to the abundance of wild and free-roaming animal host species and suitable habitat for the fly. NAQS also conducts opportunistic surveillance for SWF by inspecting feral and domestic animals for myiasis during other surveillance operations in the region.

NAQS has been at the forefront of SWF surveillance for many years, distributing maggot collection kits to medical clinics, pastoralists and other stakeholders across the north for decades, and developing a polymerase chain reaction (PCR) assay to improve the efficiency of trap sample diagnostics. Both the maggot kits and PCR assay have since been adopted nationally as part of Australia's Screw-Worm Fly Surveillance and Preparedness Program.[5]

NAQS Torres Strait Biosecurity Officer George Wosomo meeting traditional visitors arriving on Saibai

Culicoides species midge trapping

NAQS conducts monitoring for *Culicoides* spp. midges using light traps at several strategic sites across northern Australia. The

4 www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/surveillance/reports/mosquito-borne

5 www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/screw-worm-fly/

trapping sites are chosen based on areas identified as being at higher risk for windborne entry of these midges;[6] the NPA is the location of one of these sites. The number and species of midges in each trap sample is determined by entomologists, with results contributing to the National Arbovirus Monitoring Program.[7] NAQS contributes a significant amount of resources to this national monitoring program, such as providing diagnostic and reference entomology services.

Culicoides spp. are vectors for a number of important arboviruses, including bluetongue virus (affecting ruminants) and African horse sickness (affecting equids). Monitoring for these vectors provides early warning of any changes that may affect the transmission of these diseases, such as introduction of new exotic midge species, or changes in the distribution of endemic species.

Torres Strait inspection role

The NAQS Torres Strait Biosecurity Officers are responsible for the inspection of aircraft and vessels entering the Torres Strait from international waters and other countries, as well as aircraft, vessels and cargo that are being moved from the TSPZ to the TSPBMZ, or from either zone to the mainland of Australia. During 2019, the following number of items were inspected by NAQS Torres Strait Biosecurity Officers:

- Flights: 13 988 units inspected from 6470 aircraft movements
- Cargo: 9403 units inspected from 3381 cargo movements
- Vessels over 7 metres: 40 units inspected from 328 vessel movements
- Traditional vessels: 39 808 units inspected from 2145 traditional vessel movements from PNG to the Torres Strait.

From the 2145 traditional vessels inspected in 2019, the only animal products identified were feathers (six vessels) and animal skins (four vessels). The majority of these items were inspected and deemed suitable to enter the country, except for a goanna skin that was returned to the origin Treaty Village. No meat, meat products or live animals were identified during these inspections.

Based on the 2019 data, it appears that the risk of entry of animal diseases that can potentially be spread through the movement of animal products (such as African swine fever) is very low. Due to the closure of the international border between Australia and PNG in 2020 in response to the COVID-19 global pandemic, the volume of movements between the Torres Strait and PNG has reduced significantly, further reducing this risk. During this period, NAQS has continued to conduct surveillance operations and public awareness in the Torres Strait through its Biosecurity Officer network.

While the methods may have changed over the last two centuries, the strong local culture of managing health and biosecurity risks for the common good of the community remains. NAQS' active presence in the Torres Strait region for the past 30 years has helped reinforce this culture — NAQS staff in the Torres Strait and NPA region are not only Biosecurity Officers, but they are all also proud members of (in some cases, leaders in) their local communities. Using local biosecurity champions with access to the scientific expertise within NAQS (and the broader department) strengthens Australia's frontline biosecurity surveillance and risk management in this unique part of the country.

6 Eagles D, Walker PJ, Zalucki MP, Durr PA 2013. Modelling spatio-temporal patterns of long-distance *Culicoides* dispersal into northern Australia. *Preventative Veterinary Medicine*; 110(3–4): 312–322. doi.org/10.1016/j.prevetmed.2013.02.022

7 www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-arbovirus-monitoring-program/