

BAC Environmental Biosecurity Surveillance Guideline and Reporting Plan

By Matilda Davis, Biosecurity Officer, Butchulla Aboriginal Corporation's Land and Sea Program, 2021



Above: Butchulla Rangers conducting tree health surveys with Janet McDonald, DAF. Photo by Dr. Geoff Pegg, DAF.

1 Contents

Pages 3. **2 Objective**

Pages 3-5. **3 High Risk Sites**

Page 5. **4 Surveillance Strategies**

Pages 5-7. **5 Forest Health Assessment and Sampling Methods**

5.1 Conducting Tree Health Assessments

5.2 Collecting Samples

5.3 Conducting Myrtle Rust Assessments

Page 8. **6 Identifying Signs and Symptoms, 7 Diagnostic Plan and 8 Environmental Biosecurity Pest List**

Pages 9-12. **9 2021 Surveys on K'gari**

9.1 Suspect Non-native *Phytophthora* Sites on K'gari

9.2 Myrtle Rust Sites on K'gari

Page 12. **10 Acknowledgements**

2 Objective

This plan outlines species and sites of significance and strategies to identify weeds, pests and pathogens impacting on the health of different forests and vegetation communities on K'gari. The objective of this plan is to outline environmental biosecurity surveillance and reporting strategies to be implemented in the Butchulla Aboriginal Corporation's Forest Health Surveillance surveys. This plan should also be integrated in the activities conducted by the Butchulla Aboriginal Corporation's cultural guides, cultural advisers, cultural monitors, and community rangers. If cultural guides, cultural advisers, cultural monitors, and community rangers identify weeds, pests, and pathogens during their activities on K'gari, they can refer to this plan to report the identified environmental biosecurity threats. A printed copy of this plan and the *BAC K'gari Environmental Biosecurity Threat Map and Plan* is included in every BAC Environmental Biosecurity Kit and BAC Work Brief. Every report made should be added to the *BAC K'gari Environmental Biosecurity Threat Map and Plan* and the plan should be updated as necessary. Printed copies included in the BAC Environmental Biosecurity Kits and BAC Work Briefs should be replaced and staff notified with every update made.

3 High Risk Sites

We identify sites for surveillance by assessing the environmental biosecurity risks associated with the sites.

Vehicle, passenger and equipment entry points:

- River Heads boat ramp – Kingfisher Bay
- River Heads boat ramp – Wanggoolba creek barge
- In-Skip point – Hook Point

Risks:

- Soil (fungal pathogens) and weed seeds
- Insects as hitchhikers
- Vertebrate hitchhikers

Camping grounds:

- E.g Central Station, K'gari Camp, Eastern Beach multiple sites

Risks:

- Vehicles, tents and other camping equipment are potential carriers
- Weed seeds
- Soil
- Firewood
- Insect borers and associated fungi

Residential and tourist accommodation areas:

- Eurong
- Happy Valley
- Orchid Beach

- Kingfisher
- Cathedrals
- Dilli Village
- Dundubara

Potential carriers:

- Plants and plant material transported from the mainland to K'gari
- Turf
- Mulch
- Soil

Risks:

- Pests
- Pathogens
- Invasive weeds and weed seeds
- Exotic plant species
- Plant species that are not endemic to K'gari

Tourist hot spots:

- Eli Creek
- Boorangoora – Spiritual significance
- Lake Wabby – Men's/spiritual site
- Wanggoolba – Women's site
- Central Station
- Champagne Pools – cultural heritage
- Wathumba

Potential carriers:

- Watercrafts and floaties

Risks:

- Aquatic weeds
- Invasive frog/toads and their eggs
- Invasive fish and their eggs
- Water-borne pathogens

Potential carriers:

- Vehicles
- Camping and 4wd equipment

Risks:

- Pests (like cane toads)
- Soil-borne pathogens
- Water-borne pathogens
- Weeds and weed seeds

Culturally and ecologically significant tree species and environments:

- Develop baseline information on forest/vegetation systems in these areas to enable health monitoring over time

Vegetation communities:

- Rainforest
- Wetlands

- Mangrove systems
- Heathland
- Coastal dune systems
- Lake systems
- Species
- Refer to K’gari flora cultural values

4 Surveillance Strategies

Remote Imaging:

- Earth Engine/Google earth images – searching for dead/dying trees
- Aerial surveillance – low level flying capturing data on presence/absence of dieback.

Drive through surveys. Using the existing road network on K’gari, an annual assessment should be completed to look for forest health issues. Mapping of location of any issues you identify. If tree decline is identified:

- Assess level of tree decline recording host species, number of trees dead or dying or with symptom identified
- Establish monitoring plots to enable continued assessment of issues identified
- Blitz surveys – define a distinct target area and survey everything, capturing images of all fungi and insects. This could be focussed on tourist hot spots.
- QPWS Health Check sites – add forest health monitoring/assessment methods to existing programs

5 Forest Health Assessment and Sampling Methods

5.1 Tree Health Assessment

The following information was provided by Janet McDonald, Department of Agriculture and Fisheries:

Surveys are conducted over the spring/summer period, as this is the critical period for pest and disease spread and appearance of symptoms.

In the field, tree health is measured as % of canopy defoliated (loss) using the criteria described in Table 1. Stem and branches are inspected for borers and cankers which are recorded as high, medium, or low incidence.

Figure 2. visually demonstrates this process of mapping and categorising according to the percentage of canopy defoliated.

Manual and electronic mapping using paper maps and relevant software can be used to record, manage, and report data. Data is then transferred into ArcGIS for analysis and presentation.

Table 1. Tree health as measured by % foliage loss			
Category	Foliage loss	Symbol on map	% of crown healthy
1	0-25% foliage loss	● Green	>75% crown healthy
2	25-50% foliage loss	● Yellow	50-75% crown healthy
3	>50% foliage loss	● Red	<50% crown healthy
4	Tree dead	● Black	
5	Tree removed	● Grey	



Figure 2

David Smith

- (a) Score 1 = 0-25% foliage loss ● >75% crown healthy
- (b) Score 2 = 25-50% foliage loss ● 50-75% crown healthy = Score 2
- (c) Score 3 = >50% foliage loss ● <50% crown healthy = Score 3

5.2 Collecting Samples

Refer to *Forest Health Surveillance Field Collection Techniques DAF* provided by Janet McDonald, Department of Agriculture and Fisheries.

Collecting Root and Soil Samples for *Phytophthora* Testing:

For environmental biosecurity measures to minimise further dispersal of non-native *Phytophthora* when working in sites where it is suspected, refer to *BAC K'gari Environmental Biosecurity Threat Plan*.

1. Identify tree death and dieback
2. Document the date and location (use GPS in BAC Forest Surveillance Kit – refer to *BAC Environmental Biosecurity Surveillance Equipment*) discovered and species impacted

3. Select a healthy host (tree) near dead or symptomatic hosts (trees), the pathogen is more likely to be detected on the roots of a living host
4. Scrape away the leaf litter and surface soil and dig down until the roots of the host are reached (use small shovel in BAC Forest Surveillance Kit – refer to *BAC Environmental Biosecurity Surveillance Equipment*)
5. Dr. Geoff Pegg and Dr. Louise Shuey can assist in identifying the roots of the host
6. Collect roots and some rhizosphere (soil surrounding roots)
7. Collect from 4 points around the tree and combine the samples collected from each point in plastic bag, label the resealable plastic bag with the site name, identified host and symptoms (e.g., Postan's Road, Xanthorrhoea, test for *Phytophthora*)
8. Repeat this process with at least 3 trees per site and fill hole with soil after
9. Provide samples to Dr. Geoff Pegg and Dr. Louise Shuey, who will submit these samples to the laboratory at the Ecosciences Precinct in Meanjin (Brisbane) to undergo *Phytophthora* (refer to *BAC Phytophthora Pamphlet*) baiting studies.



Above: Dr. Louise Shuey covering over the holes made from collecting root and rhizosphere (left). Labelled samples collected from Postan's road (right). Photo by Matilda Davis, BAC.

5.3 Conducting Myrtle Rust Assessments

Refer to *Myrtle Rust Survey Pre-fire DAF* and *Myrtle Rust Survey Post-fire DAF* provided by Forest Pathologists, Dr. Geoff Pegg and Dr. Louise Shuey, Department of Agriculture and Fisheries. For unburnt sites simply note on the survey that the site assessed is unburnt.

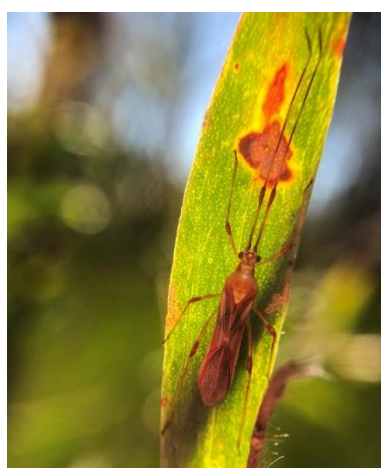
6 Identifying Symptoms and Signs

A symptom is the host's response to a pest or pathogen. A sign is the agent (pest or pathogen) causing the symptom. Many hosts share similar symptoms to a variety of pests and pathogens, so it is important to search for and identify the 'sign' where possible to confirm the cause of the symptom.

Example:

Myrtle rust symptoms like leaf blighting and deformity are often consistent with insect damage. It can be difficult to distinguish insect damage from myrtle rust symptoms, so when examining symptoms consistent with myrtle rust, we search for the sign (myrtle rust spores or insects) to help us to determine the cause.

When examining rust-like symptoms on *Melaleuca quinquenervia* (broad-leaved paperbark) foliage, I found a Mirid insect, and no myrtle rust spores. From this I can determine that the symptoms were likely caused by the Mirid insect, not myrtle rust.



Above: Mirid insect on *Melaleuca quinquenervia* (broad-leaved paperbark). Photo by Matilda Davis, BAC.

7 Diagnostic plan

All environmental biosecurity detections must be reported to [Report a biosecurity pest or disease | Department of Agriculture and Fisheries, Queensland \(daf.qld.gov.au\)](https://www.daf.qld.gov.au/report-a-biosecurity-pest-or-disease), exotic weeds and marine pests and pathogens can also be reported using this link, or report to the Exotic Plant Pest Hotline on 1800 084 881.

All suspected animal diseases must be reported to Biosecurity Queensland on 13 25 23 or the Emergency Animal Disease Watch Hotline on 1800 675 888.

8 Environmental Biosecurity Pest List

[The National Priority List of Exotic Environmental Pests, Weeds and Diseases - Department of Agriculture](#)

9 2021 Surveys on K'gari

9.1 Suspect Non-native *Phytophthora* Sites on K'gari

Significant Tree Death and Dieback at Central Station Hill, opposite camping area:

Significant tree death and dieback was identified along a hill side area on the western side of the Central Station campground. Most trees dead or dying were brush box (*Lophostemon confertus*) but symptoms were also identified on satinay (*Syncarpia hillii*) and white cypress-pine (*Callitris columellaris*). Dead and dying trees of these species were identified and transect counts were conducted to determine the levels of impact. Root and soil samples were collected from this site on the 16th of September 2021. Dr. Geoff Pegg and Dr. Louise Shuey submitted these samples to the laboratory at the Ecosciences Precinct in Meanjin (Brisbane) to undergo *Phytophthora* (refer to BAC *Phytophthora Pamphlet*) baiting studies. To date the results from these samples have been negative but *P. cinnamomi* or other species cannot be eliminated without further testing. Conditions at the time of sampling were dry, reducing the probability of detecting active spores. Dr. Louise Shuey and I returned to the site and collected more samples on the 25th of November 2021, after weeks of heavy rain. The probability of detecting active ... spores in these root and soil samples is higher due to the wetter conditions when collecting the samples. While we were at the site, I identified myrtle rust alongside the road. This was the first confirmed myrtle rust detection around Central Station. Dr. Geoff Pegg and BAC's Blayde Foley, recorded more myrtle rust in the area while Dr. Louise Shuey and I collected root and soil samples. Monitoring plots should be established, and additional assessment conducted at this site to determine the extent and progression of the tree death and dieback and potential causes and casual agents.



Above: Dr. Louise Shuey collecting root and rhizosphere at suspect site (Central Station).
Photo by Matilda Davis, BAC.

Significant Grass Tree Dieback at Postan's Road:

Significant *Xanthorrhoea* (grass tree) death and dieback was identified along a roadside on Postan's Road. Dead and dying trees of these species were identified and transect counts were conducted to determine the levels of impact. Root and soil samples were collected from this site on the 23rd of November 2021. Dr. Geoff Pegg and Dr. Louise Shuey submitted these samples to the laboratory at the Ecosciences Precinct in Meanjin (Brisbane) to undergo *Phytophthora* (refer to *BAC Phytophthora Pamphlet*) baiting studies.



Above: Grass tree dieback. Photos by Matilda Davis, BAC.



Above: Dr. Louise Shuey collecting root and rhizosphere at suspect site (Postan's road). Photo by Matilda Davis, BAC.

Significant Native Hoop Pine Death and Dieback at Lake Allom:

Significant native hoop pine death and dieback was identified surrounding Lake Allom. Root and soil samples were collected from this site in November of 2021. Dr. Geoff Pegg and Dr. Louise Shuey submitted these samples to the laboratory at the Ecosciences Precinct in Meanjin (Brisbane) to undergo *Phytophthora* (refer to *BAC Phytophthora Pamphlet*) baiting studies.



Above: Severe dieback symptoms on native hoop pine. Photo by Dr. Geoff Pegg, DAF.

Boorangoora (Lake McKenzie) Hiker's camp:

Some QPWS staff members have reported mature *Lophostemon confertus* (brush box) dieback in the Hiker's camp at Boorangoora (Lake McKenzie). Unfortunately, BAC's Rangers and DAF's Dr. Geoff Pegg and Dr. Louise Shuey did not have sufficient time to survey this site during our most recent trip in November of 2021. This site will be assessed, and root and soil samples collected to be tested for non-native *Phytophthora* at the next opportunity.

9.2 Myrtle Rust Sites on K'gari

For myrtle rust sites and severity on K'gari refer to *Myrtle Rust on K'gari* by Dr. Geoff Pegg and Dr. Louise Shuey, DAF included in *BAC Cultural Fire Management and Myrtle Rust*.

Kingfisher Bay ornamental gardens surrounding shop:

Myrtle rust has been detected on introduced *Backhousia citriodora* (lemon myrtle) in the ornamental gardens surrounding the shop. I first detected this on the 16th of October 2020.



Above: Myrtle rust on introduced *Backhousia citriodora* (lemon myrtle) in the ornamental gardens surrounding the shop at Kingfisher Bay. Photos by Matilda Davis, BAC.

Dilli Village (campground and swimming hole):

Myrtle rust has also been detected on mature *Melaleuca quinquinervia* (broad-leafed paperbark) trees in the campground and by the swimming hole.

10 Acknowledgements

I acknowledge the following people and organisations for their contributions to this project. Galangoor nyin (thank you).

Australian Heritage Grant

Plant Biosecurity Science Foundation

Dr. Geoff Pegg, Forest Pathologist, Forest Production and Protection Team Leader,
Department of Agriculture and Fisheries

Dr. Louise Shuey, Senior Forest Pathologist, Forest Production and Protection, Department
of Agriculture and Fisheries

Janet McDonald, Forest Health Surveillance Project Leader, Forest Production and
Protection Horticulture and Forestry Science, Department of Agriculture and Fisheries