High Pathology Avian Influenza

H5N1- clade 2.3.4.4b

Preparedness Planning

Magpie Goose

Date: MAY 2026

Northern Territory Government- DLPE

NORTHERN TERRITORY GOVERNMENT

Document title	High Pathology Avian Influenza H5N1- clade 2.3.4.4b Preparedness Planning: Magpie Goose
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Acronyms	Full form
NT	Northern Territory
DLPE	Department of Lands, Planning and Environment
DAF	Department of Agriculture and Fisheries

Contents

Purpose and Audience

In the Northern Territory (NT), the Northern Territory Department of Agriculture and Fisheries (NT DAF) is the lead agency for biosecurity emergencies and leads all phases of emergency management for a H5 bird flu incursion in the NT. The aim in response to the H5 Bird flu will be to minimise impacts on NT wildlife populations, domestic animals, people and the environment. Eradication of H5 bird flu in wildlife is not considered feasible and will not be attempted. Management will eventually transition following H5 bird flu becoming endemic within wildlife populations.

Objectives for a response in wildlife will vary, but may include:

- Ensuring public safety and Work Health and Safety (WHS),
- Identifying the source, extent and spread of diseases,
- Minimising the conservation impact of disease where possible,
- Enhance the surveillance of wild bird populations to identify at risk populations and monitor impacts,
- Managing animal welfare,
- Enhancing biosecurity for captive wildlife.

Within this context, this document is designed to assist wildlife managers to:

- Enable early detection of H5 avian influenza and infection in other susceptible species at priority sites.
- Implement biosecurity measures to reduce the risk of H5 avian influenza establishment and spread.
- Minimise risks to human, animal, and environmental health posed by H5 avian influenza.
- Ensure land/wildlife managers and biosecurity representatives working within the site, or deployed during an incident, are prepared for outbreak response and recovery.
- Establish communication, surveillance, and reporting protocols consistent with relevant legislation, emergency management arrangements, animal welfare requirements, and workplace health and safety obligations.

This document identifies sites of significance, including areas where key species are likely found. Some sites relate to species-specific risks - for example, wetlands important for populations of magpie geese or major shorebird aggregation areas, while others are recognised as matters of national significance, such as islands. Collectively, this information outlines which actions are eligible or ineligible for cost-sharing and highlights any further work required to refine each action. This supports more targeted planning and helps clarify the appropriate cost-sharing arrangements.

Broadly, preparedness and response actions aim to:

- protect people by reducing contact with infected birds and contaminated environments,
- prevent virus spread, including via footwear, clothing, or equipment,
- minimise stress and build resilience in wildlife populations.

This document outlines actions to support conservation and management of a potential an H5 avian influenza outbreak in wildlife populations. It aligns with Commonwealth priorities and obligations and informs future management and investment decisions to mitigate impacts on wildlife.

Introduction

This is a Preparedness document for the Magpie Goose that focuses on catchment scale planning to inform preparedness activities for High Pathology Avian Influenza, H5N1, clade 2.3.4.4b (herein referred to as HPAI). Specifically, the plan relates to the Magpie Goose across ten wetland and riverine systems in the Northern Territory (NT): Moyle River, Daly River, Finniss River, Adelaide River, Mary River, Blyth River, Arafura Swamp, North-East Arnhem Coast/ Buckingham River, Blue Mud Bay and Tiwi Islands. These ecosystems represent a range of floodplain, swamp, and riverine habitats that are seasonally influenced by the wet-dry tropical climate of the Top End. The sites were selected for their ecological importance and relevance to Magpie Goose populations. Kakadu National Park, managed as a distinct area by DECEEW and encompassing key Magpie Goose habitats, is subject to separate HPAI preparedness and response plans.

The Magpie Goose is highlighted because of its ecological importance, large populations, cultural significance, and potential influence on avian disease dynamics. Additional species of concern- including marine and migratory species with national or jurisdictional relevance- are addressed in complementary Preparedness documents. Collectively, these documents identify species and locations that could be substantially affected by the introduction of HPAI, whether through ecological impacts, proximity to urban or sensitive environments, or their connection to Matters of National Environmental Significance and threatened species. They also set out actions for preparedness, emergency response, and post-outbreak recovery.

An Emergency Response to the arrival of HPAI will be activated via the National Management Agreement (NMA) at the scale deemed appropriate by a potential outbreak. The agreement functions in parallel with the Emergency Animal Disease Response Agreement (EADRA), providing interoperability of governance and decision-making, led by the Department of Agriculture, Forestry and Fisheries.

Vaccination or translocation are not considered to be viable options for management of wild bird populations in the NT. Instead, actions will focus on HPAI preparedness (e.g., surveillance and population monitoring, mitigating existing threats via feral animal and weed control), response (e.g. carcass removal from some locations, management of public access to infected areas) and recovery (e.g., population monitoring).

Species at Risk- Magpie Goose (*Anseranas semipalmata*)

This section outlines key ecological and conservation aspects of the Magpie Goose, with a focus on its population distribution, movement ecology, cultural and ecological value, and emerging disease risks posed by HPAI.

The Magpie Goose is a waterbird species endemic to northern Australia and southern Papua New Guinea (Bayliss et al., 2017; Traill & Brook, 2011). As the sole extant representative of the family Anseranatidae, it is taxonomically distinct among waterfowl, displaying unique ecological and behavioural traits-including colony breeding, complex vocalisations, strong fidelity to floodplain wetlands, and partially webbed feet with strong claws (Corriveau et al., 2022; Traill et al., 2010).

In the Northern Territory (NT), the species is abundant across the coastal and sub-coastal floodplains of the Top End. A significant proportion of the global population is found in floodplain systems such as the Adelaide, Moyle-Finniss, South Alligator, and Mary River catchments, where dense aggregations form during the wet season breeding period (Bayliss et al., 2017; Bayliss & Ligtermoet, 2018; Bayliss & Yeomans, 1990; Frith & Davies, 1961; Whitehead & Saalfeld, 2000).

Magpie Geese are ecologically significant freshwater, wading, herbivores that shape wetland vegetation through tuber and seed consumption, influence nutrient cycling, and serve as prey for larger predators (Clancy, 2020; Franklin, 2008; Traill et al., 2009; Traill & Brook, 2011). Their presence is a strong indicator of floodplain health and hydrological change in wetlands across the Top End.

Culturally, the species is targeted by recreational hunters and has historically been a vital traditional food source for many First Nations communities, contributing significantly to food security and cultural identity (Bayliss & Ligtermoet, 2018). Harvest by First Nations hunters, has been estimated to provide an economic contribution of over $1.2 million per year, based on replacement market value (Griffiths, unpublished data, Clancy, 2020). Recreational and subsistence hunting also contributes between $10 and $25 million annually to the NT economy, supporting approximately 100 jobs (Clancy, 2020).

Distribution and Movement

Magpie Geese are nomadic waterbirds whose movements and breeding success are primarily shaped by seasonal hydrology and the availability of floodplain resources (Tracey et al., 2004). Unlike Northern Hemisphere waterfowl with regular migratory patterns, Magpie Geese shift irregularly across the landscape in response to rainfall and wetland conditions, often moving between natural floodplains and agricultural areas. Satellite telemetry and aerial survey data have recorded individuals travelling over 100 km in search of suitable habitat, although many remain within protected areas such as Kakadu National Park (Bayliss, 1989; Corriveau et al., 2022; Traill et al., 2010). Such nomadic movements connect wetlands and other habitat locations and could move viruses such as HPAI.

Wetland systems in the NT- including the Moyle, Daly, Adelaide, Mary, Finniss, and Blyth Rivers, as well as Arafura Swamp, North East Arnhem Coast/ Buckingham River, Blue Mud Bay, and the Tiwi Islands- are essential to the species' life cycle, providing breeding, foraging, and roosting habitat (Bayliss et al., 2017). The population is largely rainfall-dependent, as their breeding success relates directly to the magnitude and timing of the annual wet season.

Threats

Magpie Goose populations have experienced substantial fluctuations (Clancy, 2019, 2020; Nye et al., 2007). The species is sensitive to environmental changes that impact breeding success and habitat availability. Major threats include:

- Wetland loss and degradation due to agriculture and invasive species, including weeds (e.g., *Olive Hymenachne*, Para grass and Mimosa and feral animals (e.g., pigs and buffalo) (Clancy, 2020)
- Altered hydrological regimes and other impacts linked to climate change (Dutra et al., 2018)
- Inappropriate fire regimes (Clancy, 2020).

Effective management of floodplain nesting and feeding habitats is essential for ensuring sustainable Magpie Goose populations. These habitats span diverse land tenures across the Top End, including Aboriginal freehold, parks/reserves, and pastoral leases. Notably, 31% (1,376 km²) of key habitat in the western Top End lies within Mary River and Kakadu National Parks.

Aboriginal-managed lands and pastoral areas also support significant habitat. While pastoral activities generally align with habitat conservation, conflicts may arise from the use of introduced pasture species in floodplains.

Landowners are responsible for controlling feral animals and declared weeds. Key threats include:

- Introduced weeds such as *Mimosa pigra* and *Olive Hymenachne.* Introduced pasture grasses (e.g., para grass, aleman grass) which displace native food plants and reduce habitat quality.
- Feral pigs and buffalo degrade wetlands through vegetation loss, erosion, and altered hydrology.

Engagement with land managers, especially on pastoral lands, is needed to assess and support habitat management. While efforts such as buffalo removal (17,000+ in Arnhem Land from 2020-2025) and weed control have been substantial, the efficacy of these efforts on Magpie Goose populations remains unclear due to limited data.

Current Population Management Actions

Population Monitoring

Wetland ecosystems are the focus of the Northern Territory's Magpie Goose long-term annual aerial monitoring program, which offers critical insight into population trends and ecological health. The population fluctuates according to year-to-year rainfall patterns (Figure 1), with the best breeding seasons being those with higher rainfall, particularly early rains in the wet season build-up October-December (Whitehead et al., 1992). However, recent monitoring data indicates that that the population has potentially not continued to recover towards historically higher population numbers, despite several good wet seasons over the past 5 years (Welch 2025).

Long-term monitoring of the population shows the substantial variation over time. A population decline was observed between 2016 and 2017, when numbers decreased from over 1.5 million to

fewer than 900,000 (Figure 1). This decline was likely driven by a combination of poor wet season rainfall, limited breeding success, and habitat degradation (Clancy, 2020; Welsh et al., 2024). The event highlighted the species' sensitivity to environmental variability and reinforced the importance of sustained monitoring- not only for conservation management but also to detect and respond to emerging threats such as HPAI.

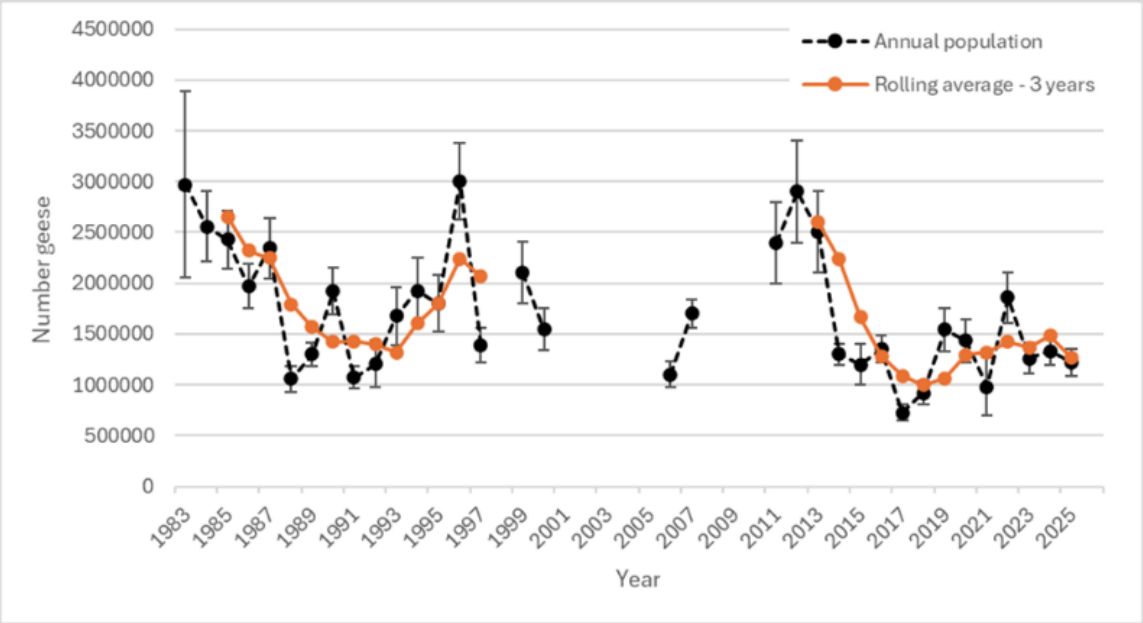


Figure 1: Long term population trend of the Magpie Goose 1983 – 2025 (end of Wet Season surveys).

Analysis of population data over the past 10 years indicates that several floodplain catchments in the western Top End have consistently supported the highest magpie goose population over time (nearly 70% on average). These include the Moyle/Daly catchments to the west of Darwin and the Adelaide/ Mary/ South Alligator/ East Alligator catchments from Darwin to Kakadu (Figure 2a). These same catchments also support the large majority of annual nesting (over 85% on average), with the Moyle River catchment supporting around 30% on average, highlighting this particular catchment's importance for both population stability and reproductive success.

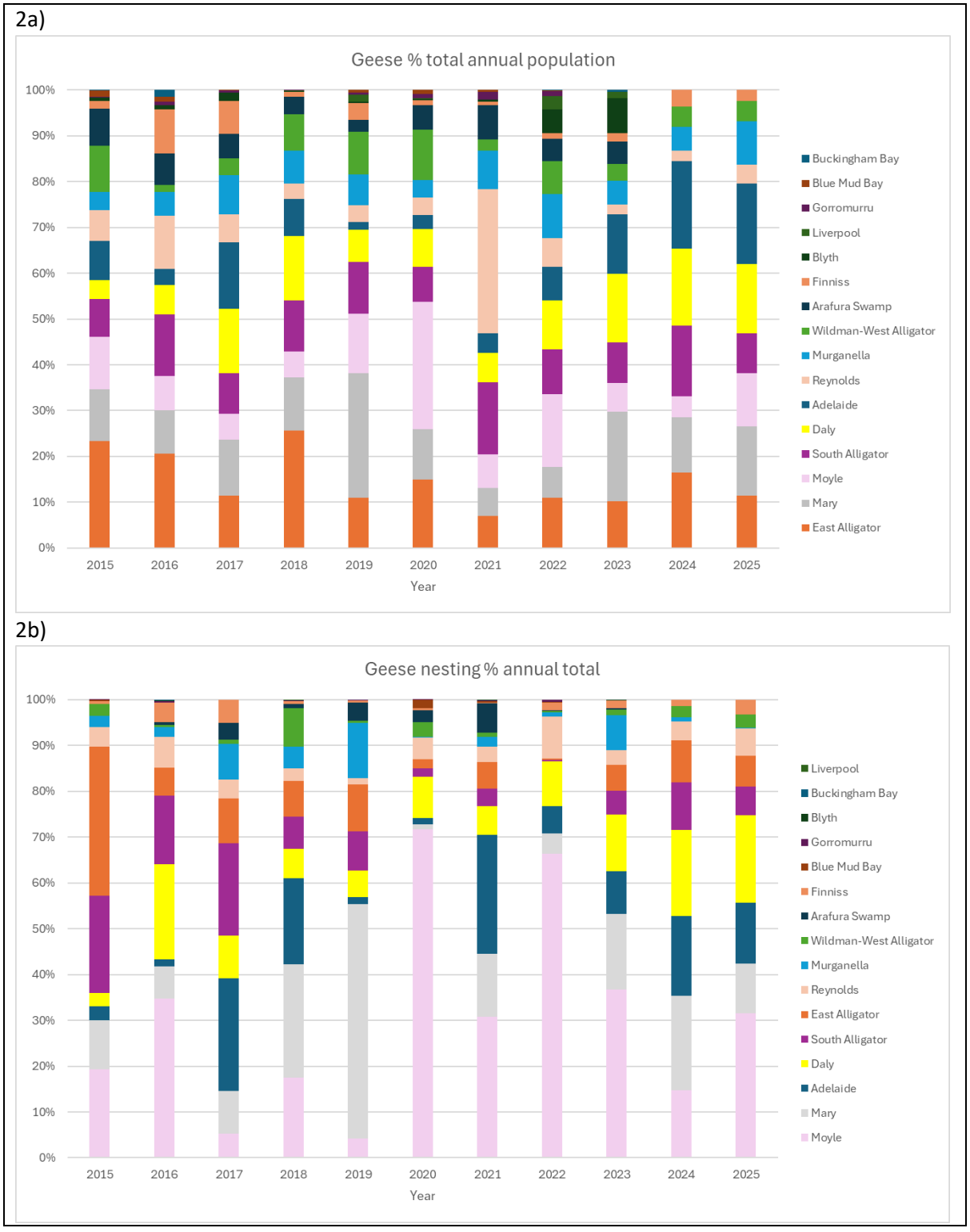


Figure 2: Magpie Goose (a) population trends by river catchments (April-May) and (b) nesting trend data.

Public Interest

Harvest Management

The Magpie Goose is currently managed in accordance with the Wildlife Management Program for the Magpie Goose (2020-2030), a formal wildlife management program under the *Territory Parks and Wildlife Conservation Act 1976*. A 2025 mid-term review, found that more focus is needed to ensure that magpie goose habitats are protected from threats such as weeds and feral animals.

Under the management program, regulation of the recreational harvest aims to sustain the population while balancing cultural, recreational, and conservation values (Clancy, 2020; Welsh et al., 2024). The management program estimates an annual sustainable harvest of up to 8.4% of the Magpie Goose population approximately 60,000 First Nations subsistence hunting and 40,000 recreational hunting, during the waterfowl season from mid-August to early January. In addition, permits are issued pest mitigation of agriculture crops (maximum 15,000) and commercial use (maximum 5,000).

All harvests are regulated under permit, except for First Nations subsistence hunting, which is recognised as an unalienable right under s122 of the *Territory Parks and Wildlife Conservation Act 1976*.

Susceptibility to HPAI

The likely arrival of HPAI in Australia is considered a key future threat to the Magpie Goose population. The coastal floodplains of the NT are high-risk geographic locations where both the entry and exposure risks converge and are also areas that support dense waterbird populations (1.0 HPAI Preparedness Resource Document_NT).

The Magpie Goose is considered to be a vulnerable species to HPAI. While specific studies on the species and the impacts of HPAI are limited, we can draw on broader insights into HPAI ecology among wild waterfowl elsewhere. For instance, the Goose/Guangdong H5 lineage (Gs/Gd) of HPAI gained unprecedented spillover capability, infecting diverse wild waterfowl species worldwide, causing more severe outbreaks than any other lineage (Kuiken, 2024). Waterfowl like Canada Geese have been indicated as potential reservoir or amplifier species for HPAI (Jimenez et al., 2025). However, to date there's no direct research confirming the susceptibility to HPAI, viral shedding potential, or specific role in HPAI ecology regarding Magpie Geese. This represents a gap in knowledge warranting targeted investigations (Morris et al., 2023; Puryear & Runstadler, 2024).

Given Magpie Goose distribution and behaviour, the following scenarios are plausible:

- Magpie Goose presence and movement through wetlands, especially in floodplain systems, may expose the species to HPAI viruses entering aquatic systems, making them possible indicators of viral incursion into wild ecosystems.
- Potential Amplifiers or Spreaders- if Magpie geese can tolerate HPAI infection, they may harbor and disseminate the virus across wetland landscapes, particularly during congregating or seasonal dispersal.
- Magpie Geese experience mass mortality and a subsequent population decline - particularly during times of year when they congregate in large numbers (e.g., nesting season), and/or if juveniles cannot tolerate infection.

See Risk HPAI Risk Assessment Link for the full risk assessment considering the risk of entry and exposure of HPAI.

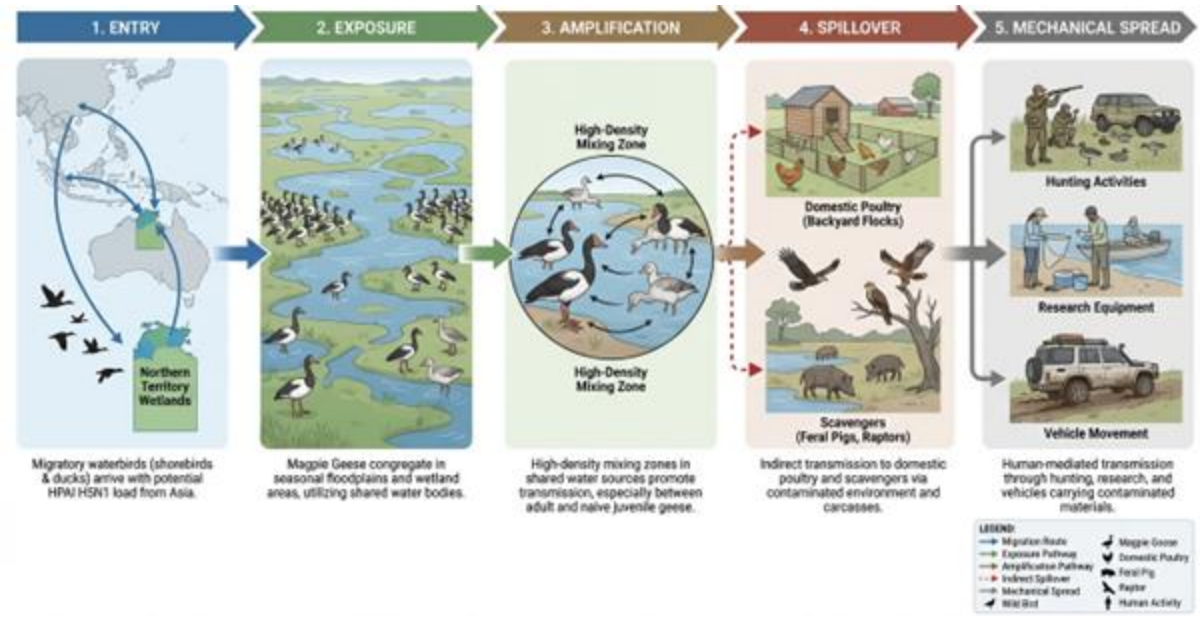


Figure 3: HPAI (H5N1, Clade 2.3.4.4.b) Risk Pathway- Magpie Geese, Northern Territory Wetlands

Recommended Biosecurity Controls

Biosecurity preparedness for HPAI at target magpie goose sites should be designed to operate at a landscape scale that could remain adaptable to changing conditions, associated wildlife movements and a potential HPAI incursion.

NT HPAI Wildlife Actions Register

The Wildlife Actions Register accompanies this document and summarises the actions considered in HPAI preparedness planning for the NT. It outlines key management activities, their alignment with the National Management Agreement (NMA), cost-sharing eligibility, and the likely lead agency for implementation.

The register is a living document and will continue to be updated as Australia's HPAI situation evolves. It identifies which actions are eligible or ineligible for NMA cost sharing and notes any further work required to develop each activity. Overall, these actions aim to:

- protect people by reducing contact with infected birds and contaminated environments
- prevent the virus spreading via footwear, clothing, or equipment
- minimise additional stress on wildlife populations

Activities that may be subject to restriction may include, but are not limited to:

- tourism
- access to public spaces (e.g., beaches, lakes, wetlands).
- bird banding
- population monitoring or management activities

- research and environmental studies (with or without interaction with wildlife)
- pest animal control activities
- wildlife translocations
- recreational hunting.

There may be regular activities undertaken at the site that are essential to the health and welfare of the wildlife population, such as monitoring or maintenance activities. Permits or restriction exemptions may be required for certain activities if deemed appropriate by government authorities. A summary of all action is provided in Tables 3, 4, 5 and 6.

All Activities

Table 1: Activities during all phases

#	Management Category	Management Activity	Relative Priority - e.g., high/medium/low	Expected conservation benefit (to support implementation in emergency settings)	Biodiversity Outcome if No Action is Taken	Biodiversity Outcome if Action is Implemented
1	Control measure	**Long-term Population Monitoring - Magpie goose**	High	Supports conservation management of an iconic species, informs sustainable cultural harvest, and provides baseline data for detecting HPAI-related population impacts.	Mass mortality events may remain undetected until severe population decline occurs, potentially leading to collapse of harvestable populations and loss of ecological function.	Early detection of population impacts enables targeted management interventions, adaptive harvest controls and maintenance of sustainable, resilient populations.
2	Control measure	**Long-term monitoring- Wildlife Populations**	Medium	Supports ecosystem health assessment, early detection of population declines, and evaluation of HPAI impacts and recovery outcomes.	Population declines and local extinctions may occur without detection	Early warning of disease impacts supports evidence-based recovery planning, prioritisation of interventions and improved conservation outcomes.

Preparedness Activities

Table 4: Preparedness - Including resilience building and management activities

#	Management Category	Management Activity	Relative Priority - e.g., high/medium/low	Expected conservation benefit (to support implementation in emergency settings)	Biodiversity Outcome if No Action is Taken	Biodiversity Outcome if Action is Implemented
3	Surveillance	**Risk-Based Wildlife Surveillance (early detection)**	High	Critical for early detection of HPAI incursions, enabling timely response activation, reduced disease spread, and coordinated community engagement in emergency procedures.	Delayed detection may allow uncontrolled spread of HPAI across wildlife populations and into poultry systems, increasing biodiversity loss and economic impacts.	Rapid detection supports early containment, targeted response measures and maintenance of market and tourism confidence through proof-of-freedom evidence.

4	Surveillance	**Develop culturally appropriate wildlife biosecurity protocols**	High	Strengthens culturally informed preparedness and response capacity, integrates traditional ecological knowledge, and supports effective collaborative management.	Reduced compliance, mistrust and delayed reporting in remote and culturally sensitive areas may hinder response effectiveness.	Strong community participation improves surveillance coverage, reporting rates, cultural legitimacy and on-ground biosecurity outcomes.
5	Control measure	**Develop Carcass Management / Disposal Guidelines**	High	May reduce environmental viral loading, minimises secondary transmission risk, and improves responder safety and operational consistency.	Infected carcasses may increase scavenger exposure, environmental contamination and ongoing viral persistence in wetlands and waterways.	Effective carcass management reduces environmental viral load, breaks transmission pathways and protects sensitive wetland ecosystems.
6	Risk Assessment	**Data, Mapping and Modelling**	Medium	Improves risk assessment, resource prioritisation, epidemiological modelling, and evidence-based decision-making during preparedness and response activities.	Responses may be poorly targeted, inefficient and unable to prioritise high-value biodiversity assets.	Data-driven decision-making enables precise targeting of surveillance and protection measures for threatened species and MNES sites.
7	Risk Assessment	**Identify HPAI activities relevant to Threatened Species/ MNES**	High	Supports protection of threatened species and MNES, reduces risk of local population decline or extirpation, and enables rapid implementation of targeted response measures.	Highly vulnerable species or genetically distinct populations may suffer irreversible decline or extinction before interventions are mobilised.	Early prioritisation enables rapid activation of targeted protections and improves survival prospects for vulnerable species
8	Risk Assessment	**Develop Integrated Wildlife Response Plan**	High	Improves preparedness, coordination and operational efficiency while reducing the likelihood of fragmented response actions and ineffective resource allocation.	Fragmented governance and unclear responsibilities may delay response actions and reduce effectiveness.	Coordinated multi-agency mobilisation enables rapid, consistent and effective wildlife response operations across jurisdictions.
9	Risk Assessment	**Establish Decision Triggers & Wildlife Biosecurity Controls**	High	Supports timely and evidence-based decision-making, reduces disease spread risk, and strengthens implementation of proportionate control measures.	Delayed or inconsistent decisions may increase transmission and ecological damage.	Objective and defensible trigger mechanisms support timely implementation of effective biosecurity and containment measures.
10	Communications	**Communications Strategy**	High	Reduces misinformation and public concern, improves stakeholder coordination, and supports effective implementation of response measures.	Public confusion, misinformation and poor compliance may increase wildlife disturbance, illegal access and disease spread.	Clear and coordinated communication improves public confidence, stakeholder cooperation and adherence to biosecurity measures.

11	Control measure	**Feral Pest Control/Culling - Pigs and Buffalo**	Medium	Improves habitat condition and native species resilience while reducing scavenger-mediated spread	Habitat degradation and scavenger-mediated spread may increase wildlife vulnerability to HPAI and reduce recovery capacity.	Improved habitat condition and reduced scavenger pressure strengthen ecosystem resilience and native species survival.
12	Control measure	**Weed Reduction Activities**	Low	Enhances habitat resilience and supports healthier wildlife populations	Habitat degradation may concentrate birds into small refugia, increasing transmission risk and ecological stress.	Improved habitat distribution supports dispersed populations, reducing disease transmission and enhancing resilience.

Response Activities

Table 5: HPAI Incident Response Activities. Where indicated activities may be eligible under NMA cost-sharing arrangements, noting approval is at the discretion of the National Management Group. Eligible costs are those that are above and beyond the resource costs of a party that exists for / or are required to carry out its Normal Biosecurity and normal conservation commitments. NMA- Schedule 3

#	Management Category	Management Activity	Relative Priority - e.g., high/medium/low	Expected conservation benefit (to support implementation in emergency settings)	Biodiversity Outcome if No Action is Taken	Biodiversity Outcome if Action is Implemented
13	Control measure	**Humane Euthanasia**	Medium	Primarily supports animal welfare outcomes while reducing unnecessary suffering and maintaining public confidence in response activities.	Infected wildlife may experience prolonged suffering and continue shedding virus into the environment.	Reduced animal suffering and lower viral shedding contribute to improved welfare and biosecurity outcomes.
14	Surveillance	**Establish Surveillance in Outbreak Areas**	High	Defines extent of infection, improves situational awareness, and reduces risk of undetected spread to wildlife, livestock and humans.	Disease spread beyond the initial outbreak zone may remain undetected, increasing risk to wildlife and poultry sectors.	Enhanced surveillance enables targeted containment and protection of uninfected populations and ecosystems.
15	Surveillance	**Establish Surveillance for Surrounding Outbreak Areas**	High	Improves early detection at surrounding high-risk sites and reduces broader ecological and agricultural impacts.	Secondary outbreaks in isolated or high-value ecological areas may remain undetected until severe impacts occur.	Early detection in surrounding areas supports rapid protective actions and reduces risk to sensitive ecosystems.
16	Control measure	**Strategic and Targeted Feral Animal Control (Buffalo/Pig)**	Medium	Reduces potential for scavenger-mediated disease spread and lowers risk of HPAI transmission into unaffected areas and spillover species.	Feral animals may amplify environmental contamination and contribute to ongoing disease spread.	Reduced scavenger activity lowers environmental viral loads and supports outbreak containment.

17	Control measure	**Consider immediate hunting suspension- Magpie Goose Harvesting**	High	Reduces human-mediated spread risk, limits disturbance to infected wildlife populations, and protects community and cultural values.	Human-assisted spread through contaminated equipment, vehicles and movement between sites may accelerate disease transmission.	Reduced movement-related transmission supports containment and enables earlier recovery of hunting activities.
18	Control measure	**Limit Non-essential Access**	High	Reduces disturbance-driven dispersal and minimises mechanical spread through fomites, vehicles and human movement.	Increased human disturbance may disperse infected birds and spread virus between colonies and wetlands.	Reduced disturbance and human-mediated spread help localise outbreaks and support wildlife recovery.
19	Environmental Management	**Implement Carcass Disposal**	High	Reduces environmental contamination and wildlife exposure risk while supporting effective outbreak containment.	Persistent carcasses may contaminate wetlands and maintain long-term environmental reservoirs of virus.	Removal and safe disposal reduce environmental contamination and improve conditions for ecosystem recovery.
20	Environmental Management	**Decontamination Procedures**	High	Maintains operational biosecurity and reduces risk of cross-site contamination and spillover transmission.	Personnel, vehicles and equipment may become vectors for disease spread between sites.	Strong biosecurity protocols maintain operational integrity and minimise human-assisted transmission.
21	Communications	**Distribute Communications Products**	High	Supports compliance with response measures, improves public understanding, and maintains stakeholder confidence.	Poor awareness and misunderstanding may result in non-compliance, unauthorised access and increased spread risk.	Consistent messaging improves compliance, supports containment measures and enhances public trust.

Post Incursion Activities

Table 6: Post-incursion activities to build population resilience and ensure population management is appropriate.

#	Management Category	Management Activity	Relative Priority - e.g., high/medium/low	Expected conservation benefit (to support implementation in emergency settings)	Biodiversity Outcome if No Action is Taken	Biodiversity Outcome if Action is Implemented
22	Environmental Management	**Weed Reduction/ Land Management**	Medium	Restores habitat quality, supports ecosystem resilience, and reduces conditions that may facilitate disease spread.	Degraded habitats may limit recovery of surviving populations and reduce long-term ecosystem resilience.	Restored habitats improve ecosystem functionality and support recolonisation and population recovery.
23	Environmental Management	**Feral Pig and Buffalo control**	High	Supports wildlife recovery, improves habitat resilience, and maximises post-outbreak survivor recruitment and population stability.	Feral pests may suppress recovery of vulnerable native species through predation, habitat destruction and disturbance.	Reduced pest pressure supports rapid recovery and stabilisation of native wildlife populations following HPAI impacts.

Disease Surveillance

NT DAF is responsible for disease surveillance and a **response plan** outlining the approach has been prepared. A summary is provided below:

Active Disease Surveillance

- Targeted sampling: Regular collection of faecal samples or swabs at key sites
- Sentinel species monitoring: Focused surveillance of species known to be highly susceptible to HPAI (e.g., waterfowl, gulls) that may serve as early indicators of virus presence.

Passive Disease Surveillance

- Mortality monitoring: Systematic reporting and investigation of shorebird mortality events.
- Behavioural monitoring: Observation for signs of illness in shorebird populations, including lethargy, neurological signs, or unusual behaviour.

Disease Surveillance Priorities

- High-priority sites: sites supporting large shorebird concentrations or threatened species.
- High-risk periods: Peak migration periods (September-November, March-May) when birds are arriving from or departing to regions where HPAI may be present.
- Trigger events: Increased rainfall within region and increased surveillance following HPAI detections in nearby regions or along the flyway.

Management of Harvest

If the event of a H5 bird flu outbreak detected in the NT, Magpie Goose harvest will be managed as follows:

- Harvest by permit (i.e. pest mitigation, commercial and recreational hunting) – Advice from the NT Department of Health will determine the level of risk associated with consumption of infected Magpie Geese. Annual monitoring will be conducted to estimate change in population size. Based on Magpie Goose Wildlife Management Program 2020-2030, the Minister Environment will declare bag limit for the following hunting season based on the results of the population monitoring. A communication strategy and targeted consultation will occur with relevant stakeholders.
- First Nations harvest - Advice from NT Department of Health will be sought in the first instance. Subsistence harvest is not regulated under legislation, therefore the risks to human health and the sustainability of the Magpie Goose population will need to be managed via a communications strategy and targeted consultation with people living in remote communities.

Restricted Access

In a scenario where Magpie Geese are impacted by HPAI, closing an area through controlled/ restricted access may be an appropriate measure to reduce indirect disease spread and minimise additional stress on affected birds; acknowledging that the virus is likely to spread very quickly across the Top End via natural movement of highly-mobile bird species such as Magpie Geese and other water birds.

Restricting human access to key habitats may limit human-mediated transmission of the virus via contaminated footwear, vehicles, boats, or equipment, and reduce disturbance that might cause

birds to flush, disperse, or mix with other flocks. Lowering disturbance aligns with conservation guidance that seeks to avoid increasing contact rates or forcing birds into new areas where transmission risk could increase, particularly during outbreaks already driven primarily by bird-to-bird and environmental transmission.
Restricting access would function as a supporting risk-management measure, rather than a standalone solution. AUSVETPLAN recognises the use of restricted or control areas, enhanced surveillance, and biosecurity actions as appropriate responses where HPAI poses a risk to wildlife, while avoiding ecologically damaging interventions such as culling wild birds.

In the Magpie Goose context, area closures would help facilitate targeted monitoring, carcass management where appropriate, while acknowledging that overall outbreak outcomes depend on integrated actions including surveillance, biosecurity, and adaptive management rather than access restrictions alone.

Feral Pest Species Reduction

Under AUSVETPLAN, routine culling or population reduction of wild animals (including feral species) is not recommended as a primary HPAI emergency response measure to eradicate disease in wild birds. There is little evidence that this effectively reduces virus transmission, and it may increase disease spread by causing animals to disperse, mix more widely, or experience stress. However, AUSVETPLAN does allow for targeted feral pest control as a supporting, risk-based action where there is a clear and defensible link to biosecurity or outbreak management objectives, rather than disease eradication in wild birds. For example, controlling feral scavengers may be considered where they are spreading contaminated material (e.g., moving carcasses between sites), interfering with surveillance or carcass management, or increasing the risk of transmission to poultry or sensitive wildlife areas.

Any such action must be site-specific, proportionate, coordinated with surveillance and access restrictions, and designed to minimise disturbance to infected or susceptible bird populations. In practice, AUSVETPLAN places much greater emphasis on restricted access, biosecurity, surveillance, and carcass management, with feral animal control used only where it clearly supports those measures and does not exacerbate disease spread or ecological harm.

Carcass Management

Although in most situations, it is considered appropriate to leave wild bird carcases in situ, carcass removal may be justified in some situations e.g., public places, in close proximity to poultry operations and densely populated public spaces to reduce potential disease transmission and improve social amenity. Carcass management will typically be carried out by specially trained personnel; however, a public guidance document is available via the DAFF website, should this be necessary. The use of appropriate PPE is essential to ensure carcasses are removed safely.

Population Monitoring

Continuation of the Northern Territory's Magpie Goose long-term annual aerial monitoring program, which offers critical insight into population trends and ecological health is critical for informing HPAI preparedness, response and recovery strategies. The species' sensitivity to environmental variability and high-risk status, reinforces the importance of sustained monitoring- not only for conservation management but also to detect and respond to HPAI.

A Northern Territory Wildlife Monitoring Plan has been developed to support this activity.

Key Sites/ Locations at Risk

The NT coastline (>10,000 km) extends between longitudes 129-138° E and latitudes 11-16.5° S, adjoining the Timor Sea, Arafura Sea, and Gulf of Carpentaria. It is characterised by mangrove-backed mudflats, estuaries, and monsoonal floodplains inundated during the November-April wet season, which recede in the dry season, concentrating waterbirds in residual wetlands (Chatto, 2005). Permanent freshwater lakes are rare, instead, seasonally inundated wetlands dominate, forming habitat mosaics used at different times of year by mobile but non-migratory Magpie Geese, especially during late wet season nesting and dry-season resource scarcity (East et al., 2008).

Generally, Magpie Geese are highly abundant on the coastal and sub-coastal floodplains of the Northern Territory's Top End, particularly in catchments such as the Adelaide, Moyle-Finniss, South Alligator, and Mary Rivers, where dense wet-season breeding aggregations form (Figure 2a and 2b).

For each site, the associated access, adjacent activities, and intensity of use by people and activities affecting risk and movement of HPAI were considered. This includes activities such as tourism, public access, bird-specific research (e.g., bird banding), ecological population monitoring, general research/ecological surveys, pest control, and recreational hunting). The sites are defined by National Catchment Boundaries (Geoscience Australia - Product catalogue, 2025) (Figure 5). They are:

- Moyle River
- Daly River (encompassing the Reynolds River)
- Finniss River
- Adelaide River
- Mary River
- Blyth River
- Arafura Swamp
- Northeast Arnhem Coast/ Buckingham River
- Blue Mud Bay
- Tiwi Islands

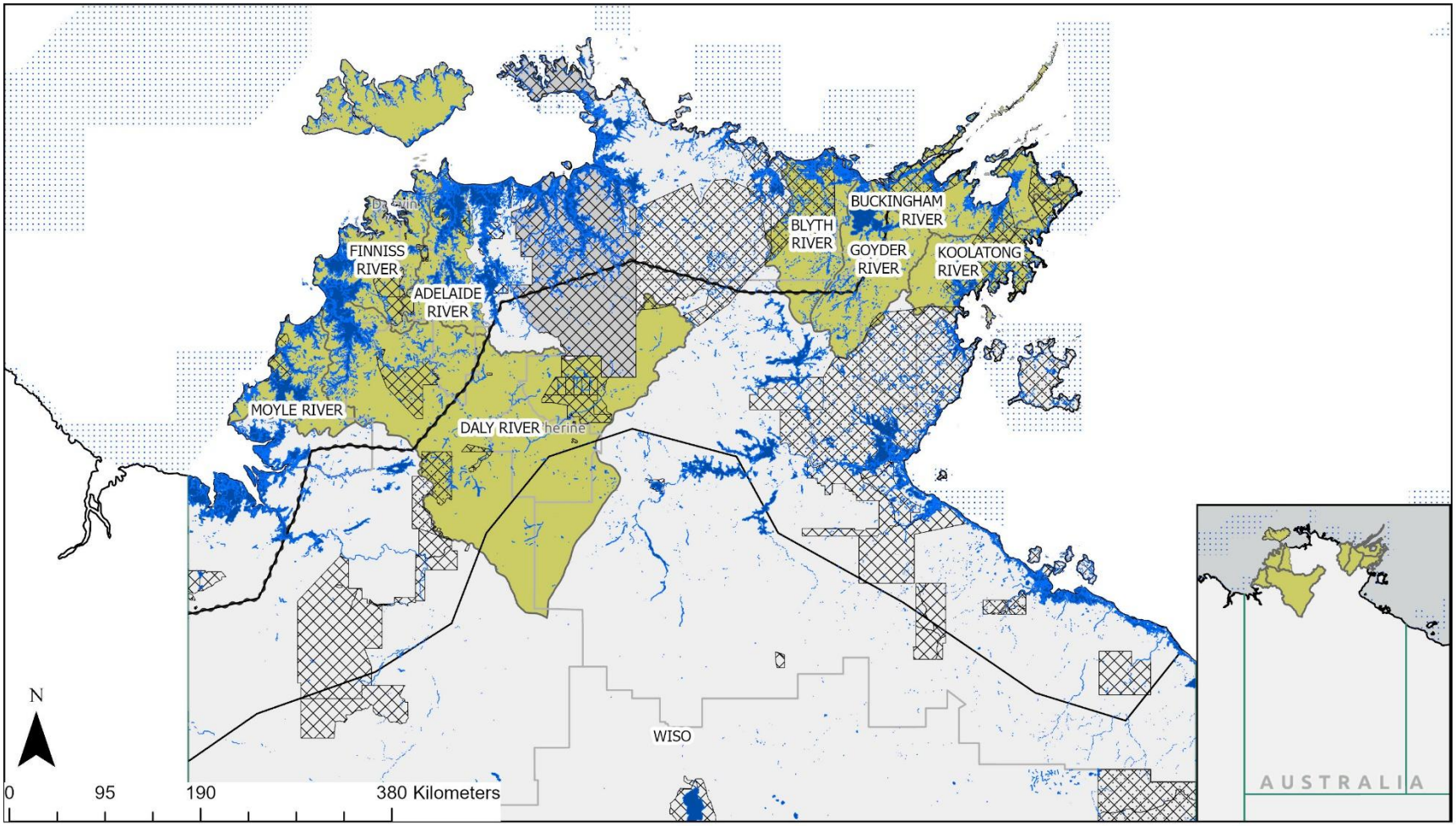


Figure 4: Key sites/ geographic locations in the Northern Territory relevant to this report are shaded green, represented by National Catchment Boundaries (Geoscience Australia - Product catalogue, 2025). CAPAD, Indigenous Protected Areas, Hatched areas constitute separate management areas/ units and are not considered in this report. Distribution of Magpie geese in the Northern Territory, Australia - breeding (hatched line) and non- breeding (solid) distribution, modified from IUCN Red List (Birdlife International 2016). Breeding areas are considered particularly important.

Profile

The following detail can assist in forming the information required for a potential NMA Response Plan. This includes a description and estimated number of Magpie Geese. Additionally, the catchment profile information can help define the 'vicinity' as per the AUSVETPLAN Avian influenza Response strategy template. The intention is to provide habitat information, as well as estimates, not precise numbers, of susceptible species in the vicinity. This information requires updating on a case-by-case basis. There is significant variation in the distribution, density, and habitats of wildlife between and within regions in the Northern Territory, which may change seasonally, and the information presented here is relevant at a catchment scale.

Magpie Goose

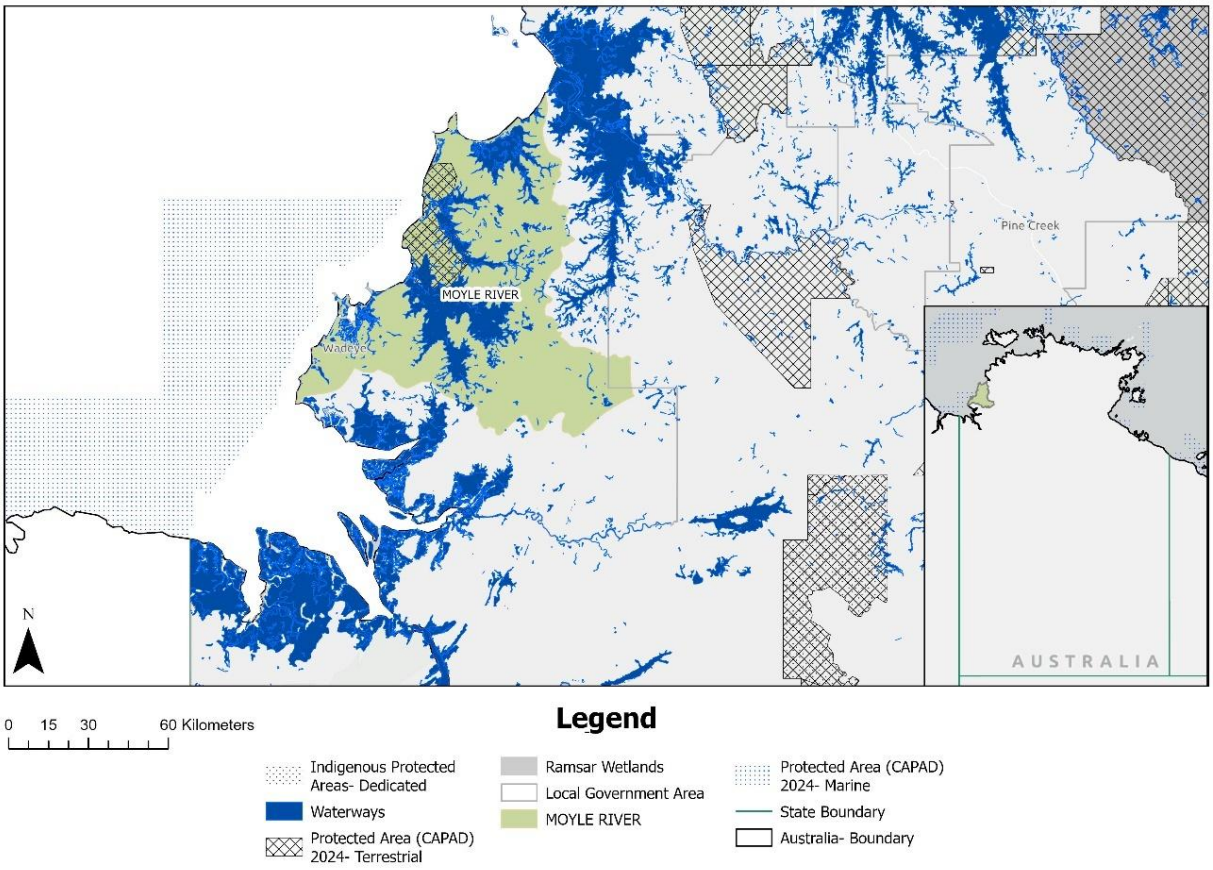
Table 7: Baseline information on Magpie Goose taxonomy, distribution*, ecology, and conservation status. *Distribution excludes Kakadu National Park and the Alligator Rivers Region as this is managed via Park Australia management programs. Conservation status: TPWCA- Territory Parks and Wildlife Conservation Act 1976. Information collected based on Appendix 2 Wildlife Health Australia HPAI Toolbox. Note that Northeast Arnhem Coast/ Buckingham River has never recorded nesting, and the population is relatively low. The buffalo damage is considerable.

Location	Moyle River	Daly River	Finniss River	Adelaide River	Mary River	Arafura Swamp	Northeast Arnhem Coast/ Buckingham River	Blue Mud Bay	Tiwi Islands
Conservation Status (TPWCA)	Least Concern (considered threatened in some other jurisdictions)								
EPBC Status (EPBCA)	Marine Protected Species								
Recovery Plan?	No								
Associated Plan/s	Wildlife Management Program for the Magpie goose (2020-2030) Annual and Biannual Aerial Surveys (since 2011) Site-Based Conservation and Land Management Activities Ramsar Wetland Management								
Total Individuals in most recent annual survey (Welch, 2025)	119,219	115,438	24,144	73,959	261,261	61,477	4,556	729	99,038
Average of Geese % Total Annual Total (Figure 1)	10.75	10.52	3.09	8.91	12.77	5.74	N/A	0.60	0.24
Average of Nests % Total Annual Total (Figure 2)	30.19	10.96	1.80	11.20	15.44	2.12	N/A	0.31	0.03
Age Structure	Mixed age classes, juvenile recruitment in wet season								
Other Population Info	Population fluctuates with wet/dry season resource availability								
Movements in/out site	Seasonal movements linked to flooding and drying- Local dispersal during dry season. Disperse across floodplain after rains								
Known Stressors	Drought, wetland drainage, hunting pressure, habitat modification, invasive species								
Previously Illness Events?	May suffer from botulism after drought however no documented events reported								
Previous Mortality Events?	Mortality low, natural predation and environmental factors - floods/drought, Predator-related chick loss								
Baseline Mortality Info	Natural mortality low, predation on juveniles noted, variable by season								
Colony Nesting?	Yes - Nests on ground in shallow marshes and grass tussocks in colonies								
Communal Feeding?	Yes - Grazes aquatic vegetation and grasses primarily in communal grazing flocks in groups up to several hundred								
Communal Roosting?	Yes - Roosts communally in dense patches								
Scavenger?	No. Scavenging rare, primarily herbivorous								
Close Association with Waterfowl/Waders?	Strongly associated with freshwater wetlands and floodplains. Often co-occurs with waders and waterfowl species.								
Research Activities	Aerial Population Surveys (since 2011), Magpie Goose Management Plan and Review, Recreational Harvest/ Hunting								

Tourism Involvement	Low	Moderate	Moderate	High	High	Low	Low	Low	Low
Harvest Categories	First Nations subsistence	First Nations subsistence Commercial (minor) Recreational (minor)	First Nations subsistence Recreational (minor)	First Nations subsistence Recreational (major) Pest mitigation	First Nations subsistence Recreational (minor)	First Nations subsistence	First Nations subsistence	First Nations subsistence	First Nations subsistence
Public/Political Interest	High due to cultural and conservation interest								

Moyle River

Map



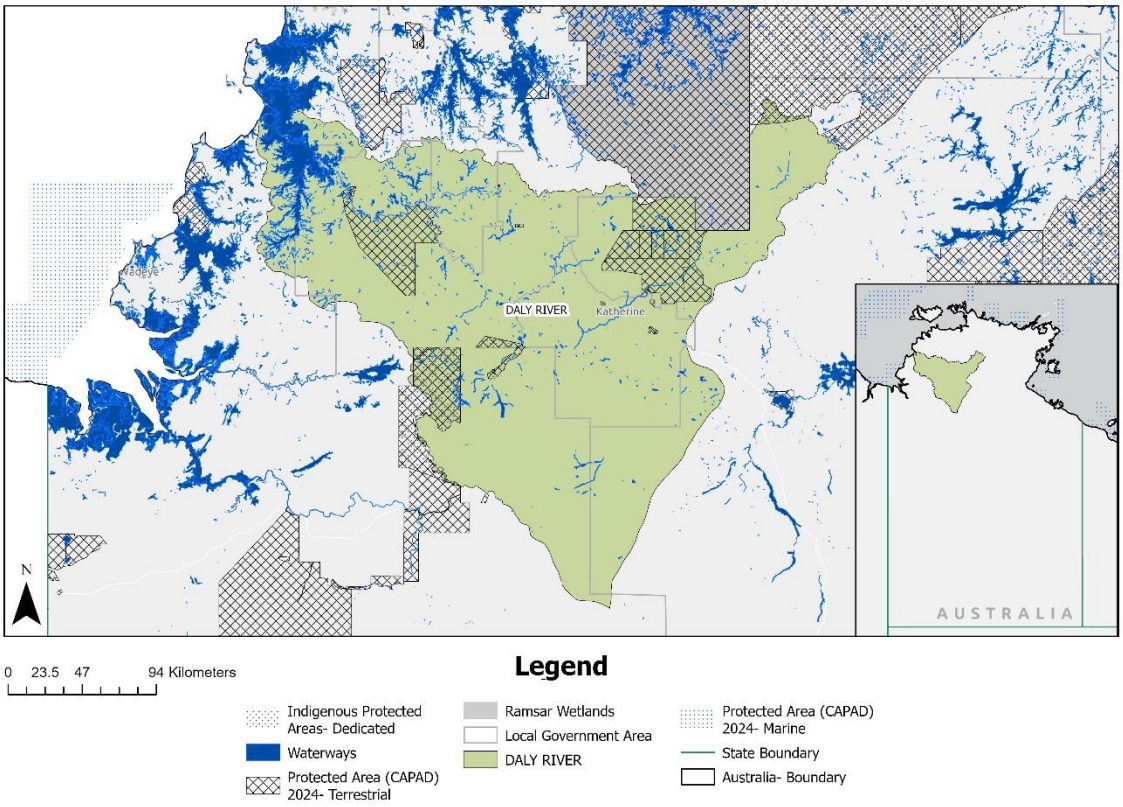
Key Detail/ Summary:

Location	Moyle River
Site Overview	
Coordinates (approx.):	13°58′ S, 129°44′ E
Catchment Area	~7,085 km²
River Length	~133 km
Proximity to urban areas	Very remote from major urban centres. Closest community: Wadeye (~30 km from river mouth), one of the NT's largest remote Indigenous communities.
Ecological and Land Context	
Tenure and Access Description	The Moyle River, located in northwestern Northern Territory, flows through Aboriginal freehold land and discharges into the Timor Sea near Wadeye. Accessibility varies seasonally and is often restricted during the wet season. Access via 4WD access during dry season
Ecosystem Description	Forms part of the Darwin Coastal IBRA subregion and supports ecologically complex floodplain, wetland, and estuarine habitats critical for biodiversity. The floodplain supports 801 km² of grasslands, sedgelands, and swamps providing key habitat for waterbirds. Its estuarine and wetland systems also serve as vital nursery and refuge areas for aquatic species year-round.
Fauna and Ecological Significance	Provides critical habitat e.g., Important Bird Area (IBA). Seasonal aggregations and breeding colonies are characteristic, with many species relying on dry season refuges and nesting sites in swamps and woodlands.

Wildlife Density & Diversity	High - Seasonal congregations
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High - Large wild Anseriformes population
Cultural and Social Context	
Cultural and Social features	Part of the Marri-Jabin Indigenous Protected Area (71,200 ha), managed by Thamarrurr Rangers.
Key Stakeholders	Traditional Owner groups, Northern Land Council, ranger teams, freehold landowners, pastoralists, tourism operators, and NT Government agencies.
Local Government Authority	Victoria Daly Regional Council
Conservation Management organisations	Thamarrurr Rangers, Marri-Jabin, based in Wadeye.
Land Use and Human Activity	
Key Land Use Types	Marri-Jabin Indigenous Protected Area (IPA), Stage 1, Natural wetlands, low-intensity grazing
Human Use	Road (restricted) and boat access, traditional land use, ecological research. Minimal development within the catchment, no major infrastructure or commercial agriculture. Traditional land use (e.g.,, fishing, hunting, cultural practices). Remoteness and access constraints. Accessibility varies seasonally and is often restricted during the wet season.
Human Activity frequency	Seasonal or intermittent - Cultural visits, egg collection, commercial crocodile egg harvest via helicopter during wet season, recreational fishing (estuarine section), fieldwork.
Risk and Management	
Site biosecurity implications	Land use in the surrounding area is predominantly natural or marshland environments. No intensive agricultural or poultry operations within close proximity. Collaboration with community and Traditional Rangers in the area is essential.
Management Implications	Floodplain and wetland systems are vulnerable to climate change impacts, feral pest species, habitat loss and degradation.
Surveillance and Monitoring	Continued community-led monitoring, informed by local and traditional knowledge, is essential for early detection of disease risks and ecological changes. Ongoing surveillance for HPAI risk is warranted due to: Large seasonal waterbird aggregations. Potential flyway connections for migratory birds.

Daly River

Map



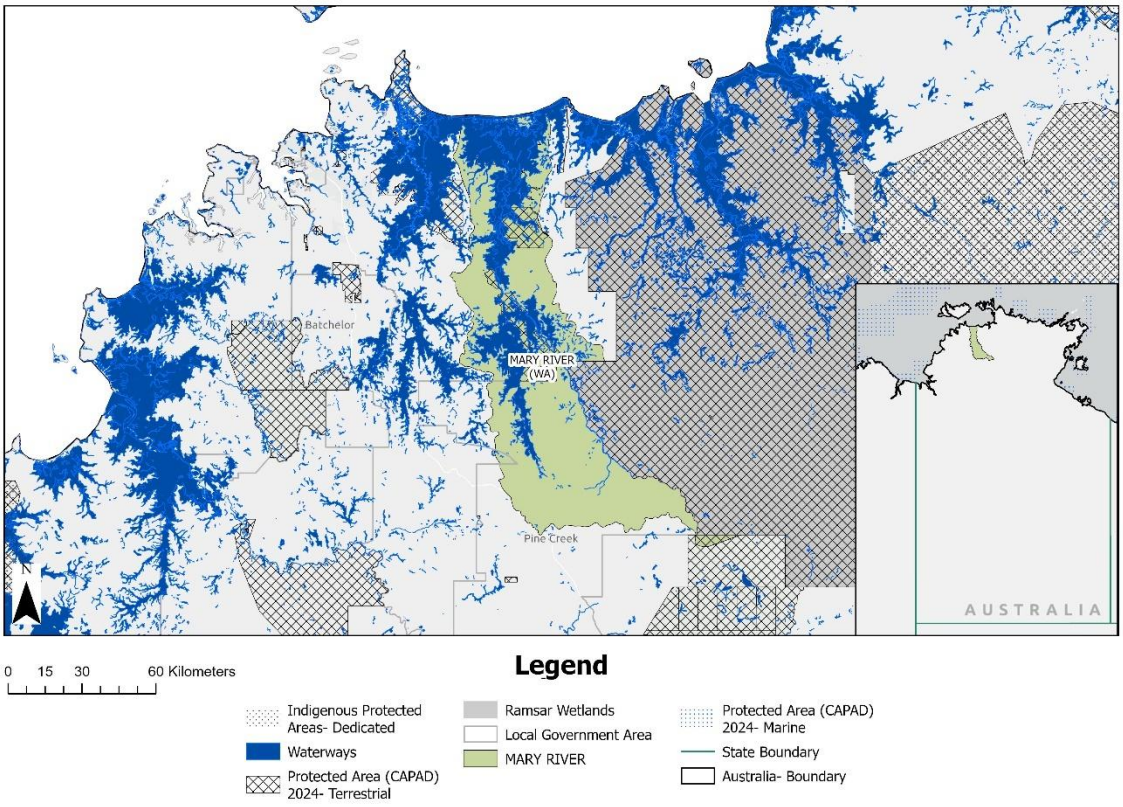
Key Detail/ Summary:

Location	Daly River
Site Overview	
Coordinates (approx.):	14.2°S, 129.6°E
Catchment Area	~ 52,600 km²
River Length	~150 km
Proximity to urban areas	Remote from major urban centres but high and frequent visitation to the Daly River and transit to Moyle region- eco-tourism, frequent ranger access, production and conservation lands Closest community: Nauiyu community and nearby Woolianna agriculture/tourism precinct
Ecological and Land Context	
Access and Tenure Description	Tenure across the catchment includes Aboriginal land, pastoral leases, freehold (small area) and conservation areas, with co-management arrangements in place in some locations. Infrastructure includes public roads, crossings, and river-based facilities- boat ramps, campgrounds, and tourist lodges. While land use remains largely natural or lightly modified in many areas, expanding agriculture and water extraction in region. Some communities and homesteads exist along the river.
Ecosystem Description	Remote-Seasonal Road access, active use by locals/tourists. Riverine, floodplain and estuarine wetland, perennial river. The Daly River forms part of the Daly River catchment, located in the Western Top End of the Northern Territory, the river drains a large area and flows northwest into the Timor Sea. The Daly River runs approximately 320 km from the confluence of the Katherine and Flora Rivers to the mouth catchment, covering parts of the Daly Basin and

	Sturt Plateau bioregions. It flows year-round, supported by strong baseflow from regional aquifers.
Key biological features	The Daly's floodplain is distinct from the Hyland Bay & Moyle system but also includes extensive seasonal inundation zones. Mangroves located in the lower estuary, provide key fish nursery habitats and shoreline protection. The lower Daly includes broad estuarine zones with seasonal variation in salinity and flow, supports high aquatic productivity. Within the IBRA framework, the river spans the Daly Basin and extends into the Victoria Bonaparte and Arnhem Plateau bioregions. Key features defining the subregion include lateritic soils, tropical savanna landscapes, and highly seasonal rainfall driving wet-season flooding. The catchment supports a mosaic of vegetation types, including open eucalypt woodland dominated by *Eucalyptus miniata* and *E. tetrodonta*, riparian forests, and seasonally inundated wetlands and sedgelands.
Fauna and Ecological Significance	Ecologically, the Daly supports diverse aquatic and terrestrial fauna. The region also supports notable populations of freshwater turtles, fish, and crocodiles. Many of these species hold cultural and subsistence value for Traditional Owners.
Wildlife Density & Diversity	High - Seasonal congregations
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High - Large wild Anseriformes population (≥1000 pairs).
Cultural and Social Context	
Cultural and Social features	Moderate - Supports wildlife and occasional cultural use.
Key Stakeholders	Traditional Owner groups, ranger teams, freehold landowners, pastoralists, tourism operators, and NT Government agencies.
Local Government Authority	Victoria Daly Regional Council
Conservation Management organisations	Malak Malak Rangers
Land Use and Human Activity	
Key Land Use Types	Agriculture, wetlands, tourism
Human Use and Activity frequency	Fishing, tourism, traditional land use, mining, boat-based recreation, public road access. Accessibility varies seasonally, with public roads and river crossings often impassable during the wet. Commercial crocodile egg harvest via helicopter during wet season increased activity during the dry season linked to tourism, research, and recreational fishing.
Risk and Management	
Site biosecurity implications	Land use surrounding the river remains a mix of natural vegetation, grazing land, and small-scale agriculture. There are no known large poultry or intensive livestock operations nearby. Community and ranger collaboration is critical for managing ecological and biosecurity risks, particularly given the area's ecological sensitivity
Management Implications	The Daly's wetlands and river systems are highly sensitive to changes. Invasive species such as feral pigs and weeds pose a threat to habitat integrity and bird breeding sites. Climate change impacts-especially increased rainfall variability-could affect ecological function.
Surveillance and Monitoring	Community-led monitoring supported by ranger groups and informed by Traditional Ecological Knowledge is vital. Continued surveillance for ecological change and emerging disease risks should focus on the post-wet season period, when bird concentrations peak. Collaborative efforts strengthen early detection and response capability. Ongoing surveillance for avian disease risks such as HPAI is warranted due to: - Significant seasonal aggregations of waterbirds and the potential for migratory connections. - Wetlands and floodplains are at risk from invasive species and altered water regimes driven by climate change and water extraction.

Mary River

Map



Key Detail/ Summary:

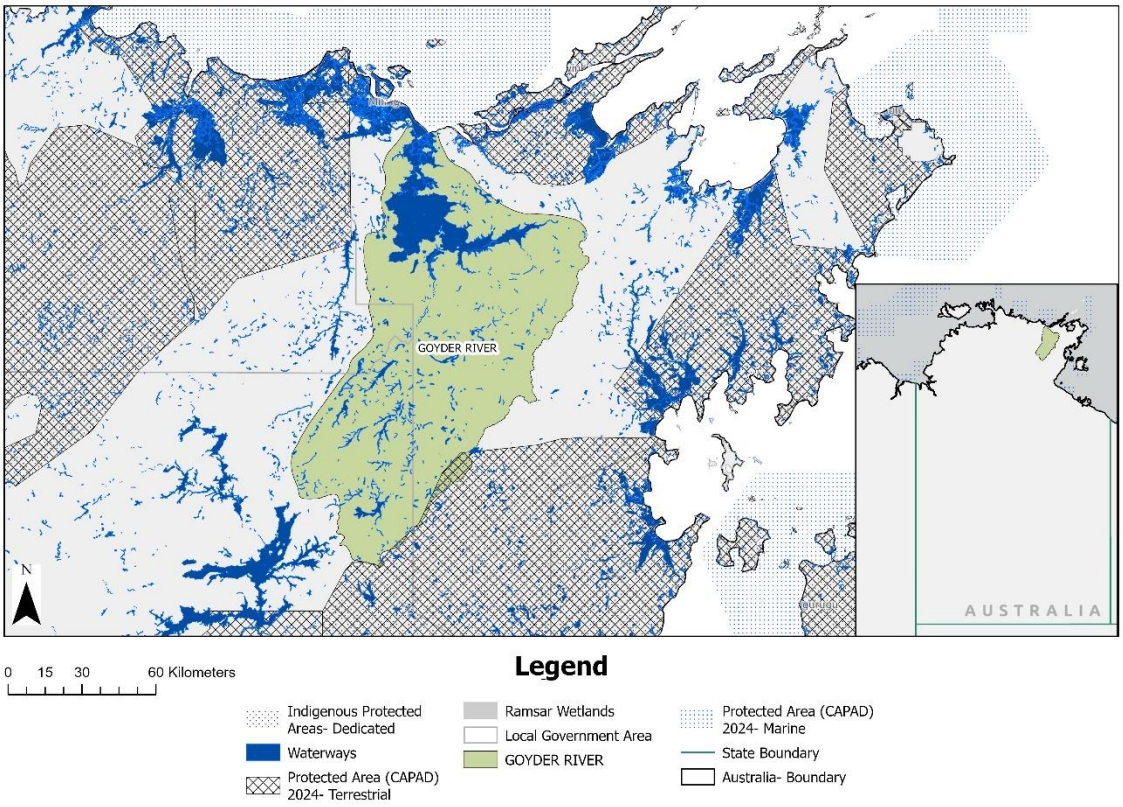
Location	Mary River
	Site Overview
Coordinates (approx.):	12.7°S, 131.6°E
Catchment Area	8,000 KM^2
River Length	Approximately 225 km from the Arnhem Plateau to Chambers Bay
Proximity to urban areas	Relatively close to Darwin - Near highways or peri-urban areas. Closest community: Marrakai (rural area)
Ecological and Land Context	
Access and Tenure Description	The majority of the land is Aboriginal freehold, pastoral leasehold, or conservation estate, including Mary River National Park. Infrastructure includes sealed and unsealed roads, floodplain crossings, boat ramps, and tourism facilities within national parks. Permanent infrastructure is minimal outside of homesteads and park-managed areas.
Ecosystem Description	Extensive freshwater river and floodplain, Eucalyptus and Melaleuca woodlands. The river lies within the Darwin Coastal IBRA bioregion, specifically the Mary River- Alligator Rivers subregion. Key landscape features include seasonally flooded blacksoil plains, coastal mangroves, and upland woodlands on lateritic and alluvial soils. The climate is tropical monsoonal, with rainfall concentrated between November and April. The Mary River is one of the largest floodplain systems in northern Australia, Mary River flows northward from the Arnhem Plateau into Chambers Bay on the Van Diemen Gulf. The floodplain expands dramatically during the wet season,

	supporting extensive wetlands, billabongs, and seasonal waterbird habitats. It is ecologically significant for both resident and migratory species and is partly protected within the Mary River National Park and surrounding conservation areas.
Key biological features	The Mary River region supports a diverse and ecologically rich landscape shaped by extreme wet-dry seasonal cycles. Key biological features include: • Floodplain wetlands, including permanent and seasonal billabongs, sedgelands, and open water lagoons. • Significant waterbird breeding and feeding areas, supporting large aggregations of Magpie geese, brolgas, egrets, ibis, and ducks during and after the wet season. • Important habitat for migratory shorebirds, including species listed under international agreements (e.g., JAMBA, CAMBA, ROKAMBA). • Aquatic biodiversity, including native fish, freshwater turtles, and estuarine crocodiles. • High productivity during the wet season, which drives nutrient cycling and supports food webs.
Fauna and Ecological Significance	The Mary River floodplain is of high conservation value, supporting habitat for 12 bird species listed under the EPBC Act and 77 marine and migratory species. It is also considered one of the Northern Territory's most important breeding sites for the Magpie goose. The area is directly adjacent to the World Heritage-listed Kakadu National Park, Ramsar-listed wetlands, and the Mary River Coastal Floodplain Site of Conservation Significance. Ecologically it supports diverse aquatic habitats including floodplain wetlands, paperbark swamps, and permanent billabongs. These habitats provide critical feeding and nesting areas for a wide range of species.
Wildlife Density & Diversity	Extremely high - Major aggregations and species diversity.
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High - Large wild Anseriformes population (≥1000 pairs).
Cultural and Social Context	
Cultural and Social features	Culturally, the river holds strong significance for Traditional Owners, who maintain customary rights and practices across the floodplain. Songlines, sacred sites, and traditional knowledge are deeply tied to the river's seasonal dynamics. Community ranger programs are active in conservation, fire, and feral animal management.
Key Stakeholders	Key stakeholders include Traditional Owners and ranger groups, NT Parks and Wildlife, pastoral leaseholders, tourism operators, and conservation NGOs. Land management is often collaborative.
Local Government Authority	Victoria Daly & Coomalie SC
Conservation Management organisations	Parks and Wildlife Commission
Land Use and Human Activity	
Key Land Use Types	Wetlands, grazing, ecotourism
Human Use/ Activity frequency	High activity- Tourism, pastoral properties, traditional land use, wildlife control, pest monitoring, fishing, 4WD and helicopter access. Varies seasonally, roads are generally passable during the dry season, but access is low during the wet. High and frequent - eco-tourism, frequent ranger access Commercial crocodile egg harvest via helicopter during wet season
Risk and Management	
Site biosecurity implications	• Surrounding land use is predominantly natural or managed for low-intensity grazing, • No known large-scale poultry or intensive livestock operations in proximity. • Collaboration with Traditional Owners and ranger programs is key to managing biosecurity risks.

Management Implications	The Mary River floodplain is highly vulnerable to altered hydrology, particularly due to sea-level rise and saltwater intrusion, which have already caused "wetland dieback" in some areas. Invasive species, such as feral pigs and para grass, threaten habitat structure and waterbird breeding. Ongoing pressures from grazing and unsuitable fire regimes also pose risks.
Surveillance and Monitoring	Community-led ecological monitoring is essential, particularly during and after the wet season when bird activity peaks. Integrating Traditional Ecological Knowledge enhances understanding of ecosystem trends and supports early detection of disease outbreaks and ecological shifts. Surveillance efforts should prioritise wetlands with high bird densities and migratory species presence. Ongoing surveillance is recommended due to the presence of large seasonal bird aggregations and potential connections to international migratory flyways.

Arafura Swamp/ Goyder River Catchment

Map



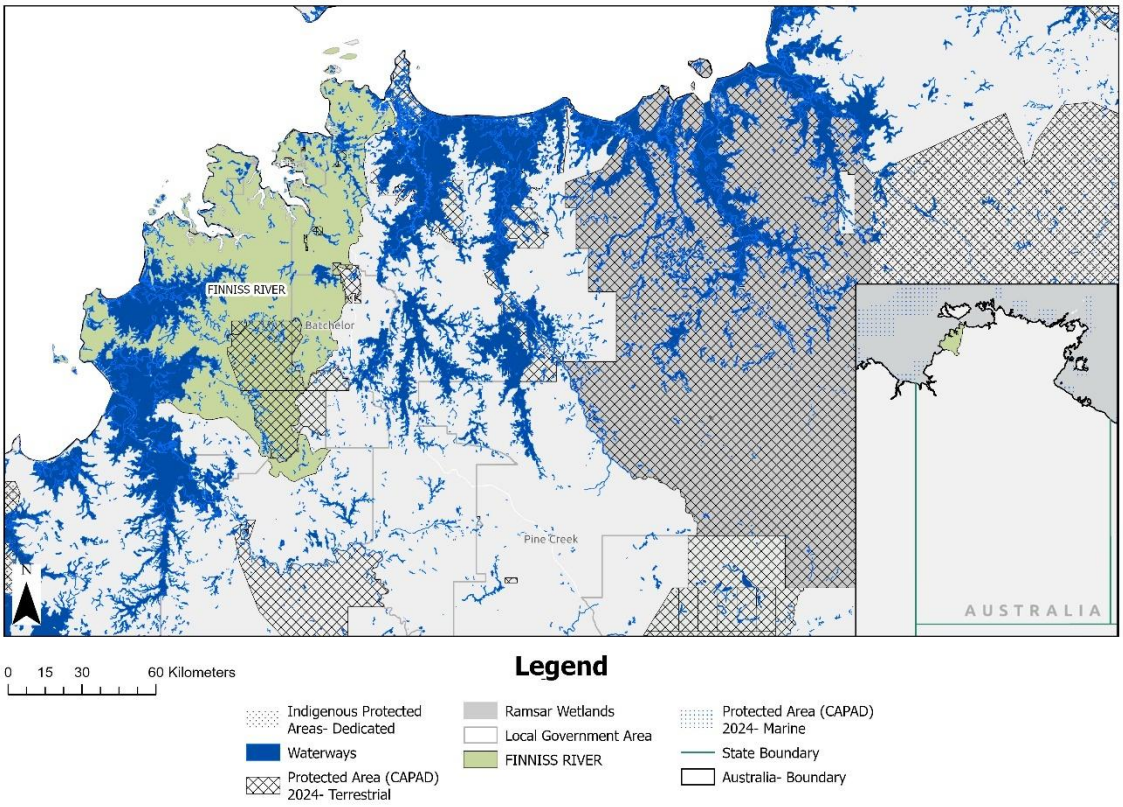
Key Detail/ Summary:

Location	Arafura Swamp
Site Overview	
Coordinates (approx.):	~ 12.25°-12.60° S, ~ 134.90°-135.25° E (NE Arnhem Land)
Catchment Area	~10,391 km² (Goyder River basin)
River Length	Goyder River: ~171 km from its source in the Mitchell Ranges to its confluence with the Glyde River, flowing through the swamp.
Proximity to urban areas	Extremely remote from urban centres – dry season only unpaved road access Closest community: Ramingining.
Ecological and Land Context	
Access and Tenure Description	Aboriginal freehold land, the area is designated as an Indigenous Protected Area (IPA) known as the Arafura Swamp IPA (Gurruwiling), involving Traditional Owners and conservation partners.
Ecosystem Description	Permanent freshwater marsh, paperbark forests, seasonal wetlands, moderate agricultural interface. The Arafura Swamp is located in Arnhem Land, about 450- 500 km east of Darwin. The swamp occupies the floodplain of the Goyder and Gulbuwangay Rivers and lies adjacent to the tidal coastal plain of Castlereagh Bay. The Arafura Swamp spans parts of the Arnhem Coast and Central Arnhem bioregions. The subregions include low plateau surrounds, escarpments, and the floodplain basin of the swamp. Key Features include: • Extensive paperbark swamp and perennial springs feeding the floodplain. • Seasonally flooded plains and billabongs with large water depth variation (wet vs dry season) up to ~2 metres change. • Surrounding sandstone hills, woodlands, sinkholes, floating mats and rainforest patches. Minimal road access, some outstations, seasonal tracks. Small scale, ranger outstations and visitor amenities

Key biological features	The Arafura Swamp is one of the largest seasonally inundated freshwater ecosystems in northern Australia. It spans up to 1,300 km² during the wet season and retains substantial areas of open water and swamp throughout the dry season due to permanent spring-fed inputs. Vegetation communities are highly diverse, with more than 100 recorded plant species and approximately 25 distinct plant assemblages. These include large paperbark (Melaleuca spp.) forests, floodplain sedgelands, floating aquatic mats, and open water lagoons. Transitional zones link the swamp to surrounding tropical savannas and sandstone escarpments.
Fauna and Ecological Significance	Identified as a Key Biodiversity Area by BirdLife International and a Site of Conservation Significance. The Arafura Swamp supports breeding populations of many waterbird species, including the Magpie goose, and provides habitat for four bird species listed under the EPBC Act and 15 listed marine and migratory species. The area regularly supports very high aggregations of waterbirds.
Wildlife Density & Diversity	Extremely high - Major aggregations and species diversity.
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High - Large wild Anseriformes population (≥1000 pairs).
Cultural and Social Context	
Cultural and Social features	The Arafura Swamp holds cultural significance for the Yolŋu people, including Traditional Owners from the Ramingining community. The swamp and its surrounding Country continue to be used for customary practices such as hunting, fishing, and gathering. Indigenous land management remains active across the region, including fire management, species monitoring, and seasonal access decisions.
Key Stakeholders	Key stakeholders include Yolŋu Traditional Owners, the Ramingining community, and the Arafura Swamp Rangers. Conservation partners such as Bush Heritage Australia play a role in supporting land management and planning initiatives.
Local Government Authority	Unincorporated / Native Title
Conservation Management organisations	Arafura Swamp Rangers
Land Use and Human Activity	
Key Land Use Types	Seasonal wetland, Indigenous land management
Human Use and Activity frequency	activity- Research, traditional land use, restricted seasonal access, permits required, Indigenous ranger access only. Commercial crocodile egg harvest via helicopter during wet season Relatively low, constrained by distance, seasonality, traditional use for hunting, fishing, gathering.
Risk and Management	
Site biosecurity implications	• Land use across the Arafura Swamp catchment remains predominantly natural, with large areas of intact wetland and tropical savanna. • There are no known intensive poultry or agricultural operations within close proximity to the swamp system. • Ongoing collaboration with Yolŋu Traditional Owners and Indigenous Ranger groups is critical for managing site access
Management Implications	• Feral buffalo and cattle, along with invasive weed species, continue to impact wetland structure, water quality, and habitat availability. • Protection of key breeding and foraging areas is essential to maintain ecological function and biodiversity values.
Surveillance and Monitoring	Continued, community-led ecological monitoring is essential, particularly during peak waterbird breeding and migration periods. Monitoring should integrate scientific and Traditional Ecological Knowledge to detect emerging disease risks and respond to changes in habitat condition. Ongoing surveillance for HPAI (Highly Pathogenic Avian Influenza) risk is warranted due to: • Large seasonal aggregations of waterbirds, including Magpie geese and migratory shorebirds. • Possible connectivity with international flyways, particularly for migratory species during the wet season.

Finniss River

Map



Key Detail/ Summary:

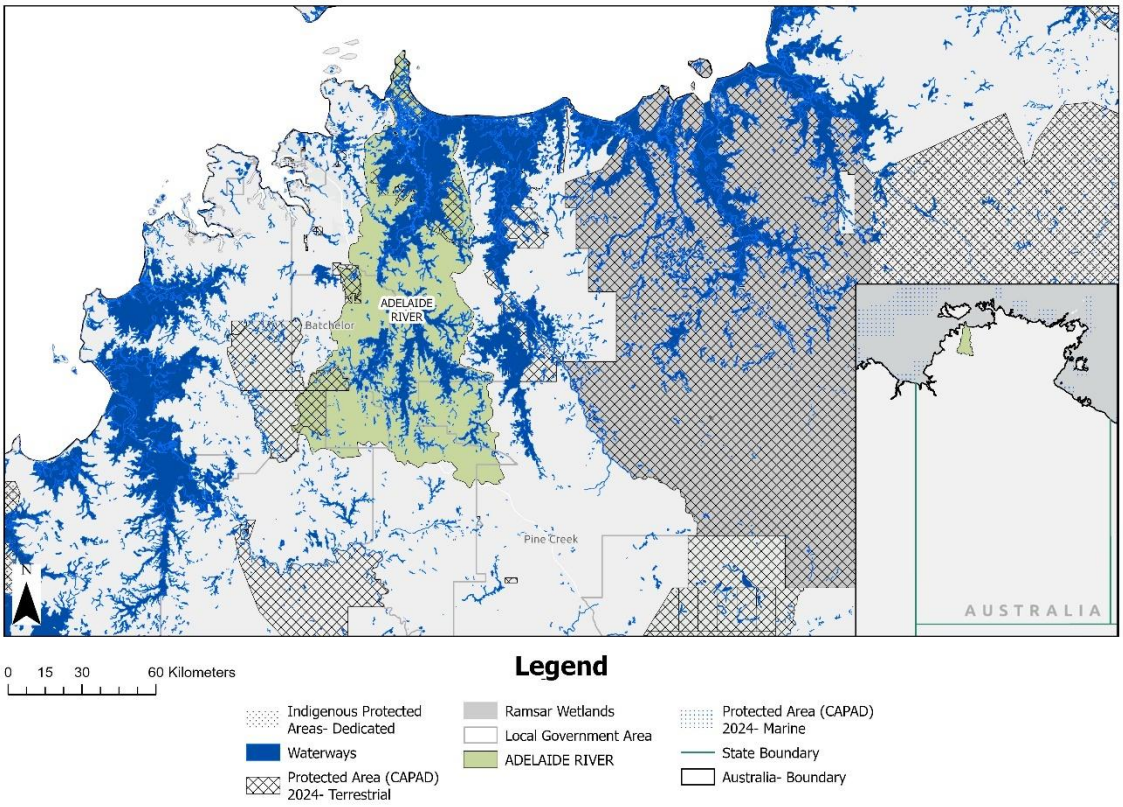
Location	Finniss River
Site Overview	
Coordinates (approx.):	12°52'S, 130°59'E
Catchment Area	The Finniss River catchment covers approximately 8,000 km², draining from the Darwin Coastal bioregion into the Timor Sea. The catchment includes Darwin and includes Litchfield NP.
River Length	Approximately 150 km from its headwaters near Litchfield National Park to the river mouth near Fog Bay.
Proximity to urban areas	Relatively close to Darwin but much of the catchment is remote with seasonal road access, active use by locals/tourists. Closest community: Dundee Beach (rural) and Bachelor
Ecological and Land Context	
Access and Tenure Description	The river corridor includes freehold, pastoral lease, and public land, with sections managed under Indigenous Land Use Agreements (ILUAs) and conservation tenure. Road access is seasonal and primarily unsealed, with several informal tracks leading to key wetland areas. Public access points are often not signposted, and road conditions vary significantly with rainfall. There are no formal visitor facilities in the floodplain, although camping infrastructure is occasionally established. Access is or controlled in areas with cultural sensitivity or conservation significance. Pastoral tracks, fences, bores, and some remote monitoring stations. There is no intensive development within the floodplain itself.
Ecosystem Description	Estuarine-freshwater wetlands, mangroves, seasonal floodplains. The Finniss River flows through a mixed landscape of Eucalyptus open forest, seasonal floodplains, and estuarine-freshwater interfaces. It lies within the Darwin Coastal IBRA subregion.
Key biological features	The Finniss River system hosts a diverse range of ecological habitats, shaped by seasonal monsoonal flooding and prolonged dry periods. The floodplain wetlands, ephemeral

	billabongs, and estuarine margins are central to the site's ecological function. These flood-dependent ecosystems are dominated by aquatic macrophytes such as Nymphaea, Eleocharis, and Oryza species, which proliferate during the wet season, providing important food and cover for waterbirds and aquatic fauna. The surrounding woodland and grassland habitats are characterised by Eucalyptus open forests with an understory of native grasses and sedges, contributing to habitat heterogeneity. The ecological productivity of the site increases significantly during the wet season (December to April), when extensive flooding recharges surface water systems and drives nutrient exchange. These seasonal dynamics are essential for sustaining large aggregations of waterbirds, fish spawning cycles, and amphibian activity. Shallow floodplain wetlands function as breeding and feeding grounds for key species, and their extent and duration are critical in determining reproductive success and survival rates, particularly for iconic species such as the Magpie Goose (*Anseranas semipalmata*), whose population dynamics are closely tied to wetland availability.
Fauna and Ecological Significance	The Finniss River wetlands are recognised as important habitat for a broad assemblage of waterbirds, many of which are considered high-risk species for avian influenza transmission due to their migratory behaviour and gregarious roosting patterns. These birds rely on shallow, nutrient-rich wetlands for feeding, nesting, and moulting, and often congregate in high densities during and immediately after the wet season. The estuarine and freshwater interface also provides foraging grounds for migratory shorebirds, such as the common greenshank, sharp-tailed sandpiper and Latham's snipe. All of which are protected under international migratory bird agreements (e.g., JAMBA, CAMBA, ROKAMBA). In addition to avifauna, the floodplain supports native fish (e.g., Leiopotherapon unicolor), amphibians, and reptiles, as well as feral species such as pigs and water buffalo that may disturb nesting habitat and contribute to pathogen spread through wetland degradation.
Wildlife Density & Diversity	High - Seasonal congregations
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High - Large wild Anseriformes population (≥1000 pairs).
Cultural and Social Context	
Cultural and Social features	The Finniss River Traditional Owners, include the Wadjigan, Warai, and Kungarakan peoples. Magpie Geese are not only ecologically and culturally significant, traditionally harvested for food during specific seasons in accordance with traditional knowledge and local management practices. Customary use of the floodplains includes hunting, fishing, and the gathering of plant materials for food and medicine. Seasonal movement across Country continues today, supported by Indigenous Ranger programs and community access rights. Sacred sites are present throughout the river corridor, and appropriate cultural protocols must be observed in any research, surveillance, or management activities. Recognition and inclusion of Indigenous land management perspectives, particularly Traditional Ecological Knowledge (TEK), are vital for developing effective and culturally respectful biosecurity responses.
Key Stakeholders	Key partners include Traditional Owner groups and Indigenous Ranger programs (e.g., Wadjigan Rangers), NT Parks and Wildlife, the Northern Land Council, local pastoral leaseholders, recreational hunting groups, and conservation NGOs. Community awareness campaigns focused on early signs of avian disease, biosecurity best practices, and reporting pathways will be essential, particularly during the wet season when access and activity peak. Training for Indigenous Rangers in wildlife health monitoring, sample collection, and field hygiene should be supported through partnerships with NT Government biosecurity units and research institutions. Existing networks (e.g., Landcare, birdwatching groups) can also be leveraged for citizen science-based surveillance and risk communication.
Local Government Authority	Litchfield Municipality
Conservation Management organisations	Bulgul Rangers
Land Use and Human Activity	
Key Land Use Types	Natural vegetation, mixed farming

Human Use and Activity frequency	Moderate and regular - Use by rangers, locals, and researchers. Recreation, hunting, traditional land use, birdwatching, accessible roads and public areas. Moderate use- recreational hunting, fishing, and camping. Customary access by Traditional Owners. In the dry season, parts of the river are accessible via 4WD tracks and bush roads. Boat access is possible near the estuary and Fog Bay. Commercial crocodile egg harvest via helicopter during wet season
Risk and Management	
Site biosecurity implications	The site presents a biosecurity risk due to the seasonal density of waterbirds, habitat complexity, and human activity. Precautionary biosecurity should be implemented, including: • Decontamination protocols for boots, boats, and field equipment • Suspend the waterfowl recreational hunting season • Restriction of access to known breeding sites during high-risk periods • Signage at access points about disease reporting and hygiene • Monitoring of feral animal activity and possible control programs • Community engagement to report unusual bird deaths or illness An emphasis should be placed on empowering local landholders and Traditional Owners with the tools and knowledge to implement practical, context-sensitive biosecurity measures in the field.
Management Implications	Management must balance conservation priorities, cultural rights, and disease risk mitigation. There is a need to strengthen coordination between biosecurity agencies, Indigenous ranger groups, and conservation bodies to ensure early detection and a rapid, locally appropriate response to any HPAI outbreak. Access planning, seasonal closures, and adaptive land-use strategies should be considered. Investment in remote surveillance, training, and infrastructure support (such as mobile field kits and communications
Surveillance and Monitoring	Continued, community-led ecological monitoring is essential, particularly during peak waterbird breeding and migration periods. Monitoring should integrate scientific and Traditional Ecological Knowledge to detect emerging disease risks and respond to changes in habitat condition. Ongoing surveillance for HPAI (Highly Pathogenic Avian Influenza) risk is warranted due to: • Large seasonal aggregations of waterbirds, including Magpie geese and migratory shorebirds. • Possible connectivity with international flyways, particularly for migratory species during the wet season.

Adelaide River

Map



Key Detail/ Summary:

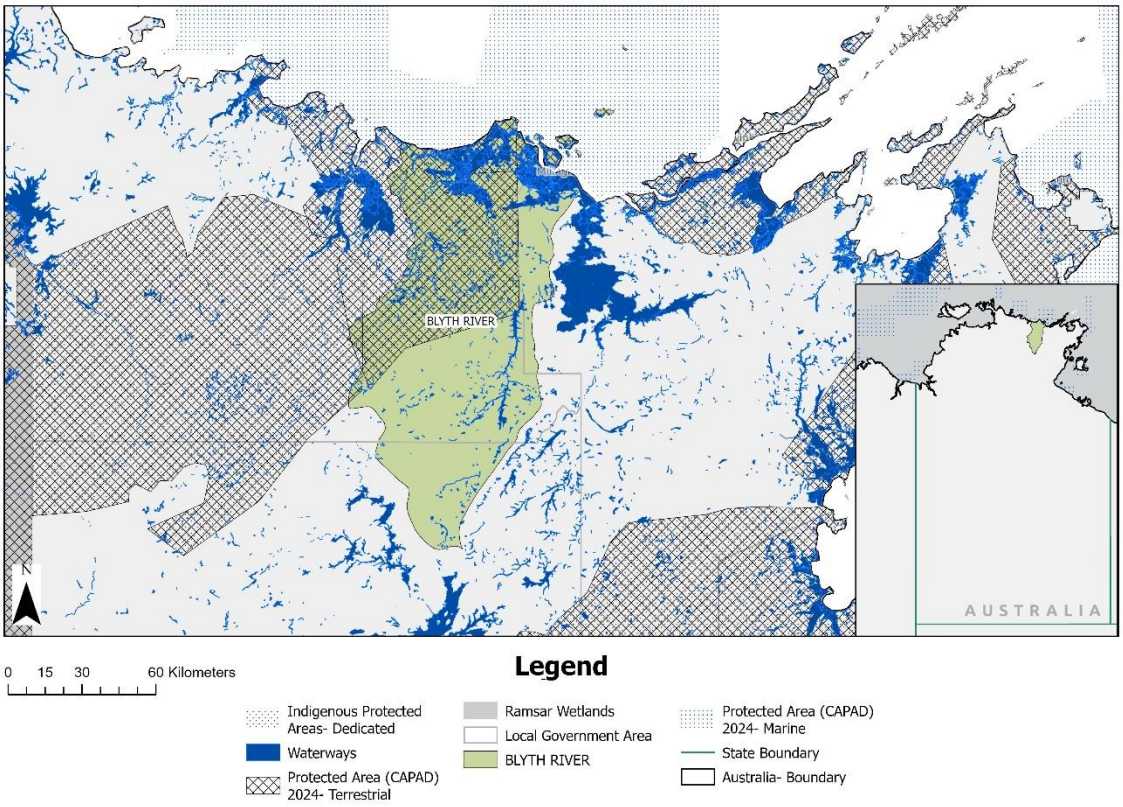
Location	Adelaide River
Site Overview	
Coordinates (approx.):	~ 13°10'S, 131°10'E
Catchment Area	Approx. 7,640 km², encompassing all creeks and tributaries feeding into the Adelaide River including Margaret River, Burrell Creek, Howley Creek, and others.
River Length	~ 238 km from headwaters in Litchfield National Park to the river mouth at Adam Bay
Proximity to urban areas	Relatively close to Darwin - Near highways or peri-urban areas. Closest community: Marrakai, Humpty Doo (rural areas)
Ecological and Land Context	
Access and Tenure Description	Tenure across the Adelaide River floodplain is mixed. Conservation reserves such as Fogg Dam and Harrison Dam protect key wetlands and bird habitats. Surrounding lands are held under a combination of pastoral leases, Aboriginal freehold title, and rural residential or agricultural allotments. Traditional Owners retain strong connections to the area, with Indigenous Ranger groups involved in land management and species monitoring. Unsealed roads and tracks that become seasonally inundated, informal boat ramps and river launch points. The town of Adelaide River provides road crossing infrastructure (Stuart Highway) which connects to other major roads. Conservation reserves (including Fogg Dam, Harrison Dam) have visitor facilities, observation platforms, and signage in some areas, but many wetlands lack formal entry points, interpretative signage, or biosecurity infrastructure. Road and track access and infrastructure associated with dams (Fogg and Harrison Dam), conservation reserves, tourism enterprises, and some pastoral infrastructure.
Ecosystem Description	Freshwater river, floodplain, estuarine wetland, monsoon rainforest, Eucalyptus woodland. The Adelaide River, located within the Pine Creek IBRA subregion of the Northern Territory, flows through a landscape shaped by the Pine Creek Orogen- the river supports seasonally inundated floodplains, freshwater wetlands, and riparian forest corridors. The region's monsoonal climate drives ecological productivity, with annual rainfall ranging from 1000 mm

	inland to 1600 mm near the coast, sustaining Eucalyptus woodlands, tall open forests, and patches of monsoon rainforest along river margins.
Key biological features	The Adelaide River floodplain is a highly dynamic wetland system shaped by annual monsoonal flooding, which drives ecological productivity and habitat diversity. The river and its associated wetlands support a mosaic of habitats including seasonally inundated grasslands, Melaleuca swamps, permanent lagoons, and riparian forests. These features provide critical breeding, foraging, and refuge areas for a wide range of species. Flood pulses sustain aquatic vegetation, support nutrient cycling, and maintain the hydrological connectivity essential for fish migration, bird movements, and invertebrate life cycles. Seasonal inundation patterns shape species distribution and behavior, making the Adelaide River system particularly important for waterbirds and wetland-dependent fauna in both wet and dry seasons
Fauna and Ecological Significance	The Adelaide River floodplains are globally and nationally significant for waterbirds. They regularly support large populations of Magpie geese and other species. In addition to avifauna, the river supports important aquatic fauna including native fish and reptiles. Saltwater crocodiles are abundant in lower reaches, while freshwater crocodiles are also present. The location is key in ecological connectivity, providing nursery habitats, the presence of large congregations of waterbirds, their nesting colonies (notably for Magpie geese), and significant predator-prey biomass (e.g., high densities of rats and pythons in some wetlands) contribute to the ecological distinctiveness and potential disease risk of the Adelaide.
Wildlife Density & Diversity	High - Seasonal congregations
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High - Large wild Anseriformes population (≥1000 pairs).
Cultural and Social Context	
Cultural and Social features	Traditional Owners include the Warray and Kungarakan peoples. Many waterbird species, especially Magpie geese, are embedded in customary practices both for subsistence and ceremonial purposes. Beyond traditional custodians pastoralists, tourism operators, anglers, birdwatchers, local communities (townships such as Adelaide River), and conservation researchers are significant stakeholders. Tourism is common in the lower river and around conservation reserves and Fogg Dam/Harrison Dam, which also serve as sites of education and research. Access for recreation, hunting, fishing is seasonally important
Key Stakeholders	Key stakeholders in the Adelaide River catchment include Traditional Owner groups (Warray, Kungarakan, and others), Indigenous Ranger Programs, Northern Land Council, Department of Lands, Planning and Environment (NT), Parks and Wildlife, conservation NGOs, local pastoralists and landholders, tourism operators, and supporting scientific institutions such as Charles Darwin University and CSIRO. Users dependent on the river for livelihood and culture span sectors from fishing, tourism, customary harvest, agriculture, and water supply
Local Government Authority	Coomalie Shire Council
Conservation Management organisations	Parks and Wildlife Commission
Land Use and Human Activity	
Key Land Use Types	Mixed agriculture, peri-urban, floodplain
Human Use and Activity frequency	High activity- public access via roads and cruises, boat ramps, traditional land use, highway access. Commercial crocodile egg harvest via helicopter during wet season. Diverse and seasonal recreational activities. During the dry season access is via roads and tracks, during the wet season many roads become impassable. Customary harvest by Indigenous communities. Tourism operators common particularly around estuarine zones and reserves.
Risk and Management	
Site biosecurity implications	Key biosecurity measures may be considered for this site e.g: • disinfection for boats, footwear, equipment used near wetlands, • restricting access to critical nesting or roosting sites during high-risk periods, • strong community engagement for reporting bird mortality • signage at all access points, • regular monitoring of feral animal activity, • ensuring domestic poultry or birds kept in adjacent lands are biosecure.

Management Implications	Integrating Traditional Ecological Knowledge alongside scientific monitoring will be essential for identifying changes in bird behaviour or mortality.
Surveillance and Monitoring	Continued, community-led ecological monitoring is essential, particularly during peak waterbird breeding and migration periods. Monitoring should integrate scientific and Traditional Ecological Knowledge to detect emerging disease risks and respond to changes in habitat condition. Ongoing surveillance for HPAI (Highly Pathogenic Avian Influenza) risk is warranted due to: • Large seasonal aggregations of waterbirds, including Magpie geese and migratory shorebirds. • Possible connectivity with international flyways, particularly for migratory species during the wet season.

Blyth River

Map



Key Detail/ Summary:

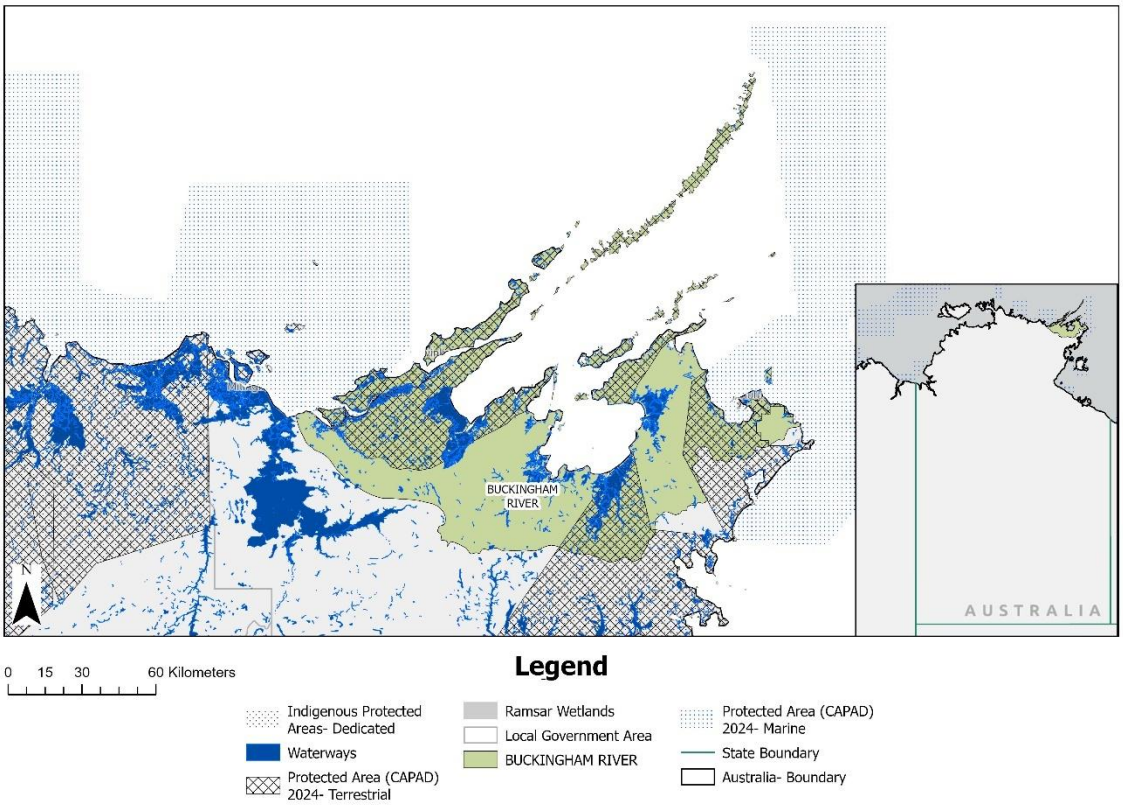
Location	Blyth River
Site Overview	
Coordinates (approx.):	-12° 03′ S, ~ 134° 35′ E
Catchment Area	Approximately 9,219 km²
River Length	~ 175 km from headwaters to the Timor Sea
Proximity to urban areas	Extremely remote from urban centres – dry season only unpaved road access Closest community: Maningrida
Ecological and Land Context	
Access and Tenure Description	Land tenure in the Blyth catchment is predominantly Aboriginal freehold and traditional ownership. The floodplains of Blyth and Cadell lie on traditionally owned lands, managed under Indigenous governance. Compared to more developed rivers, the Blyth retains relatively low infrastructure and human alteration, enhancing its ecological integrity. Indigenous land management is central to ecological stewardship. Road and track infrastructure is sparse. Few formal roads penetrate the floodplain. Access may exist via river launches, small craft, or walking/bush tracks. There is minimal signage, visitor infrastructure, or formal amenities. There is negligible infrastructure in the core wetland zones. Any infrastructure is likely to ranger outposts, occasional airstrips, small shelters, or remote monitoring stations.
Ecosystem Description	Estuarine wetlands, mangroves and floodplain interface. The Blyth River lies within the Arnhem Coast IBRA subregion of northern Australia. The catchment traverses low-lying coastal plains (< 50 m elevation), underlain by sandy soils derived from the Arafura and Pine Creek basins, with extensive floodplains and a complex estuarine-coastal interface. Upstream reaches may interface with sandstone escarpments or higher ground characteristic of the Arnhem Plateau, ecological interest is in the floodplain-estuary continuum and wetland connectivity.
Key biological features	The Blyth River's seasonal flooding regime underpins a dynamic wetland network of billabongs, shallow inundated grasslands, swamps, channels, and riparian corridors. In wet

	seasons, vast expanses of floodplain become inundated, promoting the growth of aquatic macrophytes, sedges, and emergent vegetation that provide food and cover for aquatic fauna and waterbirds. The river's hydrological connectivity between main channel, lagoons, floodplain depressions, and estuarine zones is critical for fish migration, dispersal of invertebrates, nutrient transport, and maintenance of wetland productivity. Transition zones between fresh and brackish waters form rich ecological zones. the Blyth system supports strong habitat continuity across spatial scales, making it resilient to seasonal extremes and sustaining species that depend on wet-dry cycles.
Fauna and Ecological Significance	The Blyth and Cadell floodplains have been recognised as an Important Bird Area (IBA) with populations of species such as pied herons, brolgas, great knots, and pied oystercatchers. The floodplain and adjacent mudflats also host large numbers of Magpie geese, whistling ducks, egrets, shorebirds, and migratory waterfowl. Fish diversity is high in the Blyth system, including species adapted to both freshwater and estuarine conditions. Riparian and floodplain habitats additionally support reptiles, amphibians, and mammals adapted to inundation cycling, such as water monitors, snake species, and small marsupials. The relatively undisturbed nature of the Blyth system enhances its value as a biodiversity stronghold in Arnhem Land.
Wildlife Density & Diversity	Moderate - Year-round presence but no large groups
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	Moderate - wild Anseriformes population
Cultural and Social Context	
Cultural and Social features	The Blyth River floodplain is integral to the lives of Traditional Owners in Arnhem Land. Because the area is remote and less developed, social pressure is lower than in more accessible river systems. Nonetheless, the river plays a role in local livelihoods, cultural tourism, and as a reference landscape for Indigenous management. Maintaining cultural protocols, respect for sacred areas, and community engagement are essential for preparedness planning.
Key Stakeholders	Traditional Owner groups and Indigenous Ranger programs managing the Blyth-Cadell lands. Supporting actors include Northern Land Council, Territory Government (e.g., Parks & Wildlife, Department of Environment), NGOs focused on wetlands and bird conservation, researchers/universities, and local communities (though small) that may occasionally engage in fishing or traverse the floodplain for access or customary use.
Local Government Authority	Unincorporated / Native Title
Conservation Management organisations	Djelk IPA Rangers
Land Use and Human Activity	
Key Land Use Types	Remote, traditional lands, natural wetland systems
Human Use and Activity frequency	Traditional land use, tourism, remote access only via boat, charter, helicopter, Indigenous ranger programs. Seasonal or intermittent - Cultural visits, egg collection, fieldwork. Fishing, cultural visitation, and Indigenous seasonal use dominate. The river is remote, with low human population density, minimal tourism, and recreational infrastructure. Access is via bush tracks, rivers, or seasonal pathways, during the dry season, certain floodplain areas may be accessible by 4WD, but wet season flooding restricts movement widely. Commercial crocodile egg harvest via helicopter during wet season
Risk and Management	
Site biosecurity implications	Given the ecological connectivity, bird aggregations, and human-wildlife interface access control during high-risk periods (e.g., breeding season, large bird congregations) should be considered. Mortality reporting systems and community-based surveillance (through ranger networks) should be established. Monitoring of feral animal presence and movement is warranted. Any movement of equipment between wetlands must incorporate biosecurity hygiene. Remote locations may require self-contained kits and emergency protocols for sample preservation and transport.
Management Implications	Engagement of Indigenous land managers is crucial. Proactive preparation for disease events is a priority. Integrating surveillance and ecological monitoring with cultural management aims can strengthen resilience. Buffer zones, seasonal restrictions, and adaptive strategies may be needed if disease risk intensifies.

Surveillance and Monitoring	Continued, community-led ecological monitoring is essential, particularly during peak waterbird breeding and migration periods. Monitoring should integrate scientific and Traditional Ecological Knowledge to detect emerging disease risks and respond to changes in habitat condition. Ongoing surveillance for HPAI (Highly Pathogenic Avian Influenza) risk is warranted due to: • Large seasonal aggregations of waterbirds, including Magpie geese and migratory shorebirds. • Possible connectivity with international flyways, particularly for migratory species during the wet season.

Northeast Arnhem Coast/ Buckingham River

Map



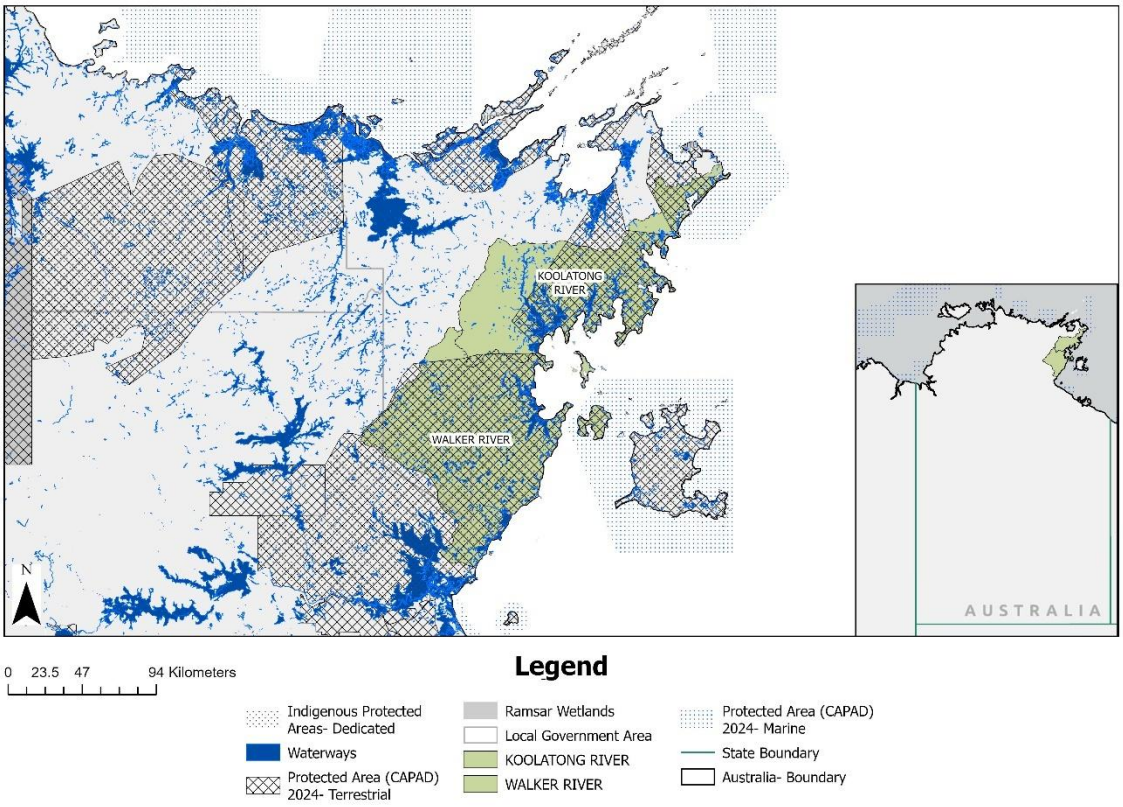
Key Detail/ Summary:

Location	Northeast Arnhem Coast/ Buckingham River
Site Overview	
Coordinates (approx.):	~ 12°06', ~ 135°49'
Catchment Area	Approximately 7,510 km²
River Length	~ 59 km from headwaters to its mouth at North East Arnhem Coast/ Buckingham River
Proximity to urban areas	Extremely remote from urban centres – dry season only unpaved road access Closest community: Gapuwiyak, Yirrkala, Nhulunbuy
Ecological and Land Context	
Access and Tenure Description	Tenure is Aboriginal freehold land, under the Arnhem Land Aboriginal Land Trust. Sparse formal infrastructure, likely boat access sites near river mouth and landing points. Few roads/tracks, much travel by boat or along coast. Minimal built infrastructure in wetland zones. Some fisheries infrastructure where commercial fishing occurs. Possible ranger outstations, cultural resource sites.
Ecosystem Description	Intertidal estuarine wetland, floodplain-mangrove complex, remote. Northeast Arnhem Coast/ Buckingham River lies on the northern coast of Arnhem Land, in northeast Top End, approximately 120 km west of Nhulunbuy. The coastal and floodplain habitat is dominated by intertidal mudflats, salt flats, and seasonally inundated floodplains backed by these saline flats. Mangroves are confined to lower river reaches, inland areas include floodplain grasslands and scattered patches of dry coastal vine thicket. The bay is part of a remote, relatively undisturbed landscape characterised by strong tidal influence and periodic wet-season inundation.
Key biological features	Northeast Arnhem Coast/ Buckingham River is recognized for its vast intertidal mudflats, saline flats, seasonally flooded coastal plains, and the coastal floodplain-bay continuum that supports extremely large congregations of shorebirds and waterbirds. The mud and salt flats provide rich benthic invertebrate food resources, particularly during low tides, which support migratory shorebirds of global significance. Mangrove patches near the

	river mouth act as breeding and roosting sites for colonial waterbirds. The seasonal floodplains inland from the saline zones provide feeding and resting habitat, especially in wet season when freshwater supply inundates the plains. Hydrological dynamics (tidal pulses, seasonal inundation, freshwater input during wet season) underpin habitat turnover: when floodplains are inundated, they create ephemeral wetlands, refugia, and foraging areas, in dry times, the habitat contracts, concentrating bird populations. This natural fluctuation is key to maintaining ecological function, species diversity, productivity, and supports both resident and migratory species.
Fauna and Ecological Significance	North East Arnhem Coast/ Buckingham River is an Important Bird Area (IBA). The site supports globally significant populations of migratory shorebirds. Notably, Black-tailed Godwits, Great Knots, and Eastern Curlews are recorded on the bay's flats. Waterbird breeding colonies are present in the mangrove fringes e.g.,: Pied Herons, Intermediate Egrets, Little Egrets, Great Egrets and Rufous Night-Herons. Other species of conservation concern include Magpie geese and brolgas which use adjoining floodplains.
Wildlife Density & Diversity	Extremely high - Major aggregations and species diversity.
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	Low - colony nesting species
Cultural and Social Context	
Cultural and Social features	North East Arnhem Coast/ Buckingham River is part of Arnhem Land's traditional country and is controlled by Indigenous groups (Yolngu), with deep cultural connections to land, coastal resources, and birdlife. Traditional ecological knowledge, customary harvest, and cultural practices are important in shaping land and seascape use. Socially, the bay is relatively remote. Closest communities are Galiwin'ku (on Elcho Island, ~ 15 km NW) and Gapuwiyak (~ 25 km south) which access the bay/floodplain for food, resources, and fishing.
Key Stakeholders	Traditional Owners / Yolngu groups / Arnhem Land Aboriginal Land Trust, Northern Land Council (NT), NT Fisheries & Marine Resource Agencies, Bird conservation organisations (BirdLife, local NGOs), Local Indigenous Ranger programs, Commercial and recreational fisheries operators and nearby communities (Gapuwiyak, Galiwin'ku)
Local Government Authority	East Arnhem Shire Council
Conservation Management organisations	Gong Dal Aboriginal Rangers Gumurr Marthakal Rangers Yirralka Rangers
Land Use and Human Activity	
Key Land Use Types	Coastal, remote, Indigenous land management, some hunting/fishing
Human Use and Activity frequency	Predominantly Indigenous traditional use, small scale / recreational fishers, maybe tourists. Access is constrained by remoteness: road access , water/boat access. Seasonal accessibility fluctuates with tides and floods. Traditional Land Use, minimal access by helicopter or sea only
Risk and Management	
Site biosecurity implications	Given ecological importance and human use a biosecurity risk exists. Engagement with Traditional Owners is important for early detection and preparedness activities such as control of feral animals.
Management Implications	Maintaining minimal disturbance during key seasons (bird breeding, migrations) may reduce disease risk.
Surveillance and Monitoring	Continued, community-led ecological monitoring is essential, particularly during peak waterbird breeding and migration periods. Monitoring should integrate scientific and Traditional Ecological Knowledge to detect emerging disease risks and respond to changes in habitat condition. Ongoing surveillance for HPAI risk is warranted due to: • Large seasonal aggregations of waterbirds, including Magpie geese and migratory shorebirds. • Possible connectivity with international flyways, particularly for migratory species during the wet season.

Blue Mud Bay/ Koolatong and Walker Rivers

Map



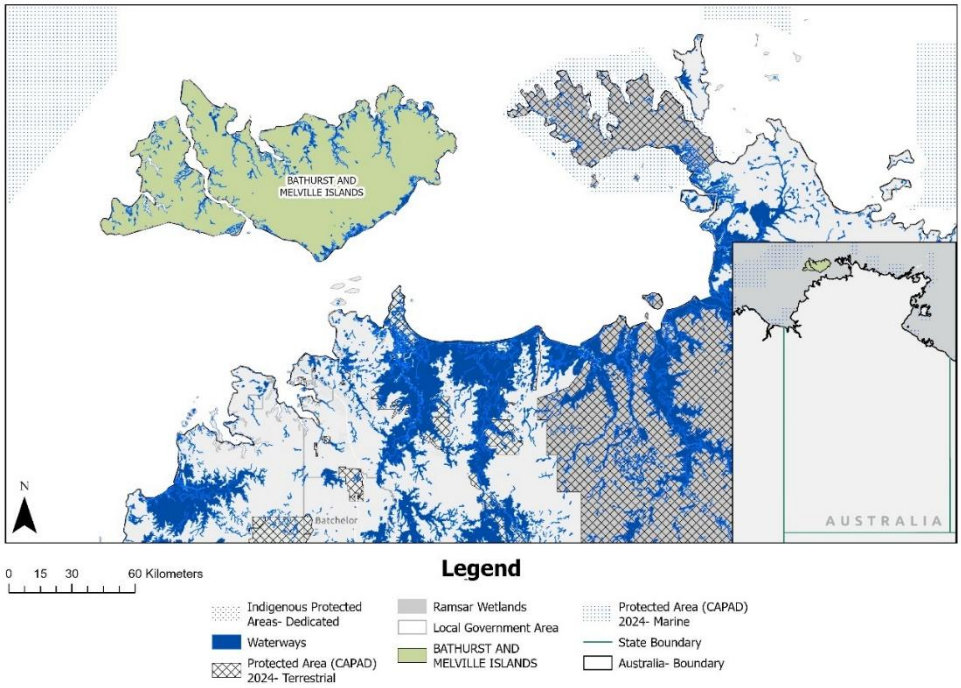
Key Detail/ Summary:

Location	**Blue Mud Bay / Koolatong and Walker Rivers**
Site Overview	
Coordinates (approx.):	~12°27'S, 136°39'E
Catchment Area	Approximately 14,000- 18,000 km², depending on inclusion of the Koolatong, Cato, and Rose River systems.
River Length	Major rivers entering the bay include the Rose (~100 km), Cato (~80 km), and Koolatong (~140 km), all flowing from Arnhem Land uplands to the coast.
Proximity to urban areas	Extremely remote from urban centres – dry season only unpaved road access Closest community: Yirrkala, Nhulunbuy
Ecological and Land Context	
Access and Tenure Description	The area is Aboriginal freehold land, managed under the Arnhem Land Aboriginal Land Trust. Minimal formal infrastructure, access via boat, seasonal 4WD tracks, and air, ranger bases support ecological monitoring. signage or public infrastructure. Ranger bases, community infrastructure in nearby homelands. No major roads or facilities within wetland zones. Possibly temporary field camps.
Ecosystem Description	Coastal intertidal wetlands, estuarine basins, mangrove flats. Blue Mud Bay lies within the Arnhem Coast bioregion and represents one of the most ecologically intact estuarine-coastal systems in northern Australia. The region represents an interface between freshwater inflows and marine tidal processes creates a biologically rich and spatially dynamic wetland mosaic.
Key biological features	The bay's ecological complexity is driven by seasonal flooding and tidal exchange, which sustain diverse estuarine, freshwater, and saline habitats. Mangrove forests fringe tidal creeks and mudflats, supporting fish nurseries and bird nesting colonies. Vast intertidal mudflats, saltpans, and seasonally flooded grasslands provide feeding and roosting habitat for thousands of migratory and resident shorebirds and waterbirds. Key habitat types include open saline flats, mangrove forests, riparian corridors along the rivers, and ephemeral

	floodplain wetlands. Flood recession enhances food availability and drives productivity pulses critical for fish, invertebrates, and water-dependent species.
Fauna and Ecological Significance	Blue Mud Bay is internationally recognised for its birdlife. The site regularly supports Grey-tailed Tattler, Eastern Curlew, and Great Knot. Mangrove and floodplain zones support breeding colonies of egrets, herons, and Magpie geese, with brolgas and whistling ducks common across inland wetlands. The bay is also ecologically significant for marine fauna: dugongs, saltwater crocodiles, turtles, and commercially important fish rely on the estuarine productivity. Floodplain areas support semi-aquatic mammals, reptiles, and amphibians, as well as feral species (buffalo, pigs) that alter ecological function and increase biosecurity risks.
Wildlife Density & Diversity	High - Seasonal congregation, migratory habitat
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	Low - but colony nesting species
Cultural and Social Context	
Cultural and Social features	The region is deeply embedded in Yolŋu culture. Cultural knowledge systems guide land use, species understanding, and seasonal access. Fishing, hunting, and gathering continue to be key activities, with strong links to waterbirds and wetlands.
Key Stakeholders	• Yolŋu Traditional Owners (multiple clans) • Northern Land Council • Local Indigenous Ranger groups
Local Government Authority	Unincorporated / Native Title
Conservation Management organisations	Yirralka Rangers
Land Use and Human Activity	
Key Land Use Types	Coastal wetlands, Indigenous land management Indigenous tenure
Human Use and Activity frequency	Low tourism. activity- Cultural fishing, traditional land use, ecological research, remote access only. Subsistence fishing, hunting, and gathering by Yolŋu people, some fishing (subject to agreements), Research and ranger patrols. Commercial crocodile egg harvest via helicopter during wet season
Risk and Management	
Site biosecurity implications	Important activities may include: • Mortality reporting system via ranger groups and land councils. • Education materials for local residents and fishing licensees. • Regular monitoring during peak bird congregation and breeding seasons.
Management Implications	• Protect key bird habitats (mudflats, nesting colonies, floodplain wetlands). • Limit disturbance during breeding and migration periods. • Support Indigenous-led monitoring and biosecurity programs. • Regulate external access and promote hygiene standards for field staff and researchers. • Assess long-term risks from climate change (e.g., sea-level rise, altered wet-dry cycles).
Surveillance and Monitoring	Continued, community-led ecological monitoring is essential, particularly during peak waterbird breeding and migration periods. Monitoring should integrate scientific and Traditional Ecological Knowledge to detect emerging disease risks and respond to changes in habitat condition. Ongoing surveillance for HPAI risk is warranted due to: • Large seasonal aggregations of waterbirds, including Magpie geese and migratory shorebirds. • Possible connectivity with international flyways, particularly for migratory species during the wet season.

Tiwi Islands/ Bathurst and Melville Islands

Map



Key Summary/ Detail

Location	Tiwi Islands
Site Overview	
Coordinates (approx.):	11°20′ to 11°45′ S, 130°30′ to 131°30′ E
Catchment Area	~ 8,000 km² (Tiwi Land Trust area) covering Melville, Bathurst and many smaller islands
River Length	No large mainland "rivers" as such, drainage is via many creeks, wetlands, springs, and minor watercourses.
Proximity to urban areas	Extremely remote from urban centres and separated by water - Accessible only by air or boat, no direct public roads. Closest community: Wurrumiyanga, Milikapiti, Pirlangimpi
Ecological and Land Context	
Access and Tenure Description	The Tiwi Islands are Aboriginal freehold land, vested in the Tiwi Aboriginal Land Trust. Traditional Owners maintain strong customary management regimes, with increasing formal governance under an Indigenous Protected Area (IPA) framework. Forestry plantations (on Melville), tourism, some mining, and commercial fisheries are among supplementary land uses, but most lands are managed for traditional uses, conservation, and community livelihood. Basic infrastructure: roads, harbours / boat ramps. Remote tracks, ferry or boat access for coastal / marine surveillance. Ranger outposts and marine rangers operate in many locations. Plantation forestry infrastructure (roads, plantation plots) on Melville. Community infrastructure in major settlements. Fisheries along coasts.
Ecosystem Description	Island wetlands, Eucalyptus and monsoon forests, intertidal systems. The Tiwi Islands lie off the northern coast of the Northern Territory. The landscapes are composed of sandy and lateritic soils, rises, plains, coastal cliffs, rocky headlands, interspersed with perennial springs and rainforest patches, eucalypt woodlands, and extensive mangrove and wetland systems.
Key biological features	The Tiwi Islands represent a biodiversity hotspot, with exceptionally high species richness, many endemic and threatened taxa, and relatively intact ecosystems due to their isolation. There are eleven plant taxa entirely endemic to the Islands, and many more plant and animal species that are threatened, rare or have restricted distributions. Vegetation includes well-developed eucalypt forests, rainforest patches around springs, melaleuca and acacia woodlands, mangroves, and coastal beach and rocky headlands.

	Wetland ecosystems, including intertidal mudflats, coastal creeks, seasonal inundated flats, and estuarine zones, support large populations of waterbirds, migratory shorebirds, seabirds, and marine fauna (e.g., turtles, dugongs, dolphins). The hydrological connectivity between coastal, estuarine, and terrestrial zones (especially via creeks and mangrove fringe) underpins seasonal breeding, foraging, and migrations. Because many wetlands dry in the dry season and refill in the wet, the islands' ecological dynamics are strongly tied to rainfall and tidal cycles
Fauna and Ecological Significance	The Tiwi Islands support numerous threatened and migratory species. There are ~ 31 threatened animal species and 19 threatened plant species recorded within the IPA boundary. Birdlife includes both resident waterbirds and internationally migratory species, many using coastal estuaries, seagrass beds, mangroves, and intertidal mudflats as feeding or breeding grounds. Sea turtles, marine mammals (dugongs, dolphins), saltwater crocodiles are also present. Fauna endemism is strong.
Wildlife Density & Diversity	High - Seasonal congregations, Seabird colonies.
Existing Ecological Threats	Feral animals (pigs, buffalo and horses) and weeds (Mimosa)
Reservoir Hosts (e.g., Nearby Domestic Bird Presence)	High- colony nesting and presence of poultry or domestic ducks/geese.
Cultural and Social Context	
Cultural and Social features	The Tiwi people maintain strong cultural, spiritual, and social ties to the Islands' land, sea, wildlife, and cultural sites. The population is relatively low (~2,600) in communities such as Wurrumiyanga, Milikapiti, Pirlangimpi. Social infrastructure is concentrated in these towns. Activities include hunting, fishing, gathering, arts, cultural tourism. Tourism is but growing, commercial fisheries and plantations are present.
Key Stakeholders	• Tiwi Traditional Owners, clan groups, Tiwi Land Council • Tiwi Indigenous Rangers and Sea Country Rangers • NGOs, researchers, universities involved in ecology and conservation science • Tourism operators, plantation forestry entities, fishing community
Local Government Authority	Tiwi Islands Regional Council
Conservation Management organisations	Tiwi Aboriginal Rangers
Land Use and Human Activity	
Key Land Use Types	Forestry, traditional land use.
Human Use and Activity frequency	Tiwi communities fishing, gathering, arts, and some tourism. Access to remote parts of islands is by transport, seasonal conditions. Visitors typically require permits or coordination through Land Council. Some commercial activity (plantation forestry, fishing) operates, especially near transport hubs or accessible coastlines. Commercial crocodile egg harvest via helicopter during wet season. Moderate activity- ranger programs, traditional land use, research, air and road access.
Risk and Management	
Site biosecurity implications	Needed measures include: • hygiene and disinfection protocols for boats, equipment, footwear, mortality event reporting systems via Ranger network, • public awareness in communities, • regulation of domestic bird keeping, • monitoring of feral animal populations, • controlling introductions of invasive species, • where feasible restrict access during bird breeding / gathering seasons, • ensure monitoring of waterbird health.
Management Implications	The IPA Plan of Management (2023-2033) provides a governance framework that must embed biosecurity and disease risk assessments. Land use changes should be evaluated for disease risk and ecological impact. Ensuring Traditional Owners have decision making authority, and that resources (ranger capacity, funding, partner agencies) are sufficient to carry out needed surveillance and response is critical in forming an effecting response to HPAI.
Surveillance and Monitoring	Recommended activities: • Regular monitoring of waterbird populations especially in coastal estuaries, mangrove fringes, mudflats, wetland patches.

	• Detection and investigation of bird mortality or disease symptoms through Ranger network and community reports. • Monitoring of threatened/endemic species populations and their habitat condition. • Marine surveillance (marine mammals) in coastal waters.

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