Final Report

De-risking Phase II: NT Through Sustainable Development Precincts

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Peer Review Statement

The CRCNA recognises the value of knowledge exchange and the importance of objective peer review. It is committed to encouraging and supporting its research teams in this regard.

The authors confirm that this document has been provided to CRCNA and project representatives for review.

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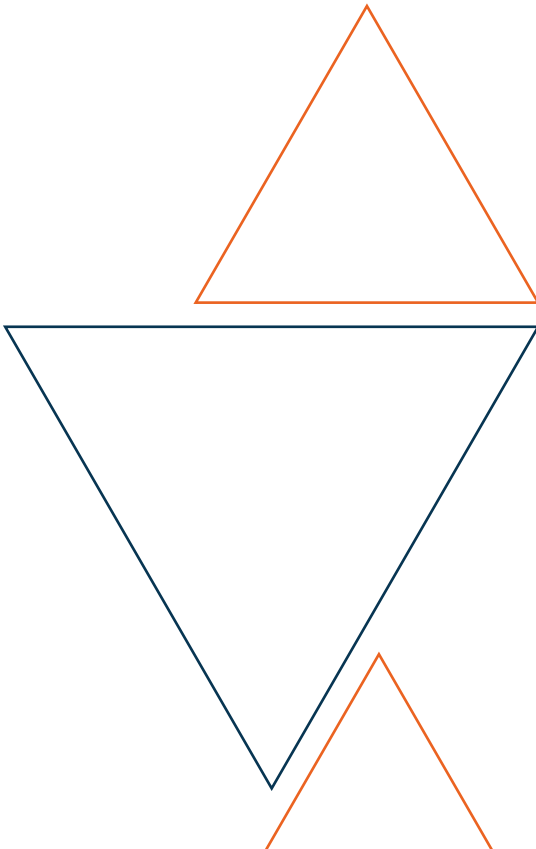
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Acronyms and Abbreviations

CDU	Charles Darwin University
CRCNA	Cooperative Research Centre for Developing Northern Australia
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAF	Department of Agriculture and Fisheries (Northern Territory)
DDRF	Douglas Daly Research Farm
DLI	Department of Logistics and Infrastructure (Northern Territory)
DLPE	Department of Lands, Planning and Environment (Northern Territory)
DRMAC	Daly River Management Advisory Committee
DTBAR	Department of Trade, Business and Asian Relations (Northern Territory)
EPBC	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
GL	Gigalitres
Ha	Hectares
JCU	James Cook University
MCA	Multi criteria analysis
NAMF	Northern Australia Ministerial Forum
NAUA	Northern Australia University Alliance
NESP	National Environmental Science Program
NLC	Northern Land Council
NT	Northern Territory
NTCA	Northern Territory Cattlemen's Association
NT Farmers	Northern Territory Farmers Association
ONA	Office of Northern Australia
RDANT	Regional Development Australia Northern Territory
SDP	Sustainable Development Precinct
TRaCK	Tropical Rivers and Catchments Knowledge research consortium
WABSI	Western Australian Biodiversity Science Institute

Definitions

Economic Strategy	NT Government's Rebuilding the Economy: Northern Territory Economic Strategy 2025
Phase I	De-risking, brokering and prioritising agricultural development in the Northern Territory by NAJA Business Consulting Services
Phase II	De-risking Phase II: NT Through Sustainable Development Precincts
Regional Plan	Development of a regional economic development plan that forms its own policy settings and enables economic development and protects important environmental and cultural assets
The project	De-risking Phase II: NT Through Sustainable Development Precincts



L to R: Jim Turnour, James Cook University, Anthony Curro, CRCNA, Nicole Paas, Northern Territory Department of Agriculture and Fisheries and Allan Dale, CRCNA at Oolloo Crossing, Douglas Daly

Project Participants

The project team would like to thank the project participants for their invaluable contributions, time and commitment throughout the duration of this project. Their active engagement, feedback and willingness to collaborate have been essential in driving meaningful progress and ensuring the project's recommendations are informed by a broad range of perspectives and across sector insights.

- Northern Territory Government agencies
- Charles Darwin University (CDU)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Douglas Daly property owners
- Environment Centre NT (ECNT)
- James Cook University (JCU)
- Northern Land Council (NLC)
- Northern Territory Cattlemen's Association (NTCA)
- Northern Territory Farmers Association
- Regional Development Australia NT (RDANT)

"Now is the time to establish a system of agricultural economic development planning in the Northern Territory."



Foreword

Northern Australia has always presented vast and unique opportunities that have long been recognised but remain largely unrealised. Policy makers have highlighted the complexities of developing Northern Australia, including the opportunities it presents and the accompanying challenges that exist.

Now is the time to establish a system of agricultural economic development planning in the Northern Territory (NT). This will enable a new policy system to be developed; which acknowledges the reality that Australia's agricultural landscape is diverse; that the challenges of developing agriculture in the NT are unique; and that a one-size-fits-all approach to policy does not promote sustainable agricultural development in the North.

This will likely entail place-based and purpose-built policies that recognise the potential of each jurisdiction, their regions, and industries. The introduction of nature repair and carbon markets provides a timely opportunity to rethink how we approach land development and advance sustainable agriculture in Northern Australia

Territory landscapes, with their mosaic approach to agriculture, means that not every part of the landscape will – or should, ever – be developed. With only 0.22 percent of land cleared for agricultural production (DLPE, 2024), and two distinct climate zones, the NT is far from comparable to other states and territories in Australia. Road infrastructure and conditions in the NT are also highly variable and through the Top End's wet season, road conditions and closures are subject to rapid change. Despite this, the NT's successes and challenges continue to be benchmarked against the other states.

In developing this report, we have found ourselves in a desirable position: engaging with the regulators responsible for implementing and overseeing the system, while walking alongside the farmers who experience its impacts firsthand. These farmers know their land intimately and steward it with a deep sense of responsibility. However, it has become clear that the current system does not always operate in the best interests of the land, nor those who care for it.

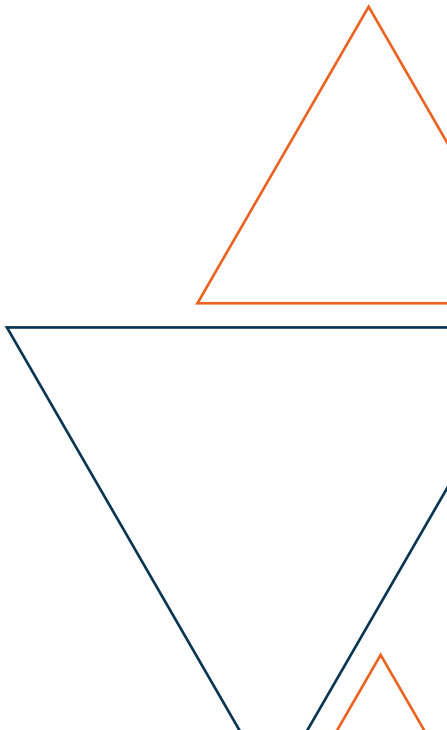
The voices and interests of Aboriginal Territorians must also be central to this conversation. Around 48% of the NT is tenured as inalienable Aboriginal freehold land, including around 80% of the NT's coastline (NTG, 2025), which is managed under trust in accordance with the *Aboriginal Land Rights Act 1976*. As a significant land holder and with strong cultural history, Aboriginal people can provide deep knowledge of the land that can strengthen agricultural development outcomes.

The diversity of Aboriginal knowledge and interests need to be fully considered. Ongoing inclusion in the process of land development policy can also foster opportunities of genuine Aboriginal-led economic development on Aboriginal land.

By bringing agricultural producers, Traditional Owners and government agencies together, we can make genuine progress towards better regional economic, environmental and social outcomes.

The CRCNA Phase I report, published in 2020, identified the key challenges facing the NT agriculture industry, and specifically the Douglas Daly region in the Top End. This report (Phase II) builds on this work and outlines a clear and achievable pathway for regional economic development in agriculture - one that trusts both farmers, regulators, and Aboriginal Territorians to deliver appropriate outcomes. It must strike the right balance between protecting environmental and cultural values while enabling sustainable economic growth.

Through delivery of this report by the NT Department of Agriculture and Fisheries, it has become evident that there is a need for both wider stakeholder facilitation and substantive policy thinking and reforms beyond the current frameworks that reside in the Northern Territory. Agricultural producers must be part of the conversation, as must regulators, but they cannot and should not carry this burden alone. Policy development must involve all stakeholders to ensure it is fair, considered and equitable. Industry bodies have an important role to play, but impartial facilitation is critical. The Department of Agriculture and Fisheries, through a dedicated land and industry development function, has assumed the role of guiding these processes — delivering outcomes that are balanced, robust, and in the best interests of the Northern Territory.



Executive Summary

The CRCNA De-risking *Phase II: NT Through Sustainable Development* Project is a collaboration between the Department of Agriculture and Fisheries (DAF) Industry Development team, CRCNA, James Cook University (JCU), and other Northern Territory Government agencies.

The Northern Territory-focused project is part of a wider collaboration between the CRCNA and the Northern Territory (NT), Queensland (QLD) and Western Australia (WA) governments to enable knowledge sharing and collaborative approaches to support sustainable agricultural development across Northern Australia.

This project is also the extension of the 'De-risking, *Brokering and Prioritising Agricultural Development* in the Northern Territory' project completed by NAJA Business Consulting Services (Phase I). The Phase I report explored barriers to agricultural development in the following areas:

- Complex land tenure arrangements
- Limited understanding of water availability and soil suitability
- Secure water rights and water infrastructure
- Transport and communications infrastructure
- Supportive regulatory environment
- Supportive investment environment

The Phase II Project aims to answer the central research question:

"How can improved prioritisation and planning practice support new Sustainable Development Precincts in the Northern Territory?"

To address the central research question, the project focussed on establishing a sustainable agriculture development precinct with clearly defined outcomes aimed at overcoming the barriers identified in the Phase I report.

As the project evolved, a clear development pathway emerged, highlighting the necessity of a robust planning framework supported by policy that enables economic growth. This framework must also ensure water security, comprehensive land resource mapping, integrated transport and communications infrastructure, and provisions for future expansion, all while preserving vital environmental and cultural values.



The Douglas Daly region was selected as the case study area to advance research, focused on improving planning practices for agricultural development, as it is recognised as one of the most prospective agricultural regions in the NT. The case study presents an overview of the region's historical context, water and soil resource information, and identifies the key challenges that face agricultural development progression in the region.

While previous coordination efforts have been fragmented and have not unlocked the regions full potential, the current context presents a unique opportunity. The region's unzoned status and absence of a local government authority allows for the creation of a tailored, regional planning framework. This flexibility, if strategically harnessed, can enable coordinated growth, maintain agility in responding to local needs, and create a more attractive environment for investment. However, aging road infrastructure remains a limiting factor, underscoring the need for a comprehensive planning approach that supports infrastructure renewal and long-term regional connectivity.

To guide solutions, this report presents a set of recommendations designed to strike a balance between environmental and cultural values and sustainable economic development. These recommendations are informed by extensive collaboration with local farmers, industry and other key stakeholders, whose contributions have been integral throughout the case study process.

The report proposes the development of a regional economic development planning framework for the Douglas Daly region to support informed policy decisions and enable coordinated development in the absence of a statutory planning instrument.

Recommendations:

1. Strengthen the central development function within the Department of Agriculture and Fisheries to advance economic growth in agriculture.
2. Develop a strategic framework outlining the core components of a regional economic development plan tailored to the Douglas Daly region, linking with regional economic development plans under the NT Government's Economic Strategy.
3. Through ongoing implementation of Recommendation 2 (above), utilise the Douglas Daly region as the best practice benchmark for ongoing regional planning for agriculture.
4. Advocate for targeted infrastructure upgrades within the Douglas Daly region to support long-term development.
5. Establish the Douglas Daly Research Farm (DDRF) as a sustainable and best practice research and development (R&D) facility.
6. Invest in the capacity building for Traditional Owners to ensure inclusive and culturally responsive development.

Further detail and proposed pathways for implementation are outlined in the Recommendations section of the report.

This planning framework will complement proposed regional economic development planning, a strategic initiative under the NT Government's *Rebuilding the Economy: Northern Territory Economic Strategy 2025* (Economic Strategy), intended to unlock regional growth.



Introduction

The Northern Territory (NT) remains largely undeveloped in terms of agricultural development, with only 0.22 percent of its land cleared for agricultural production and just 0.3 percent cleared for infrastructure such as major townships and roads (DLPE, 2024).

Yet, its potential for agricultural expansion is considerable, with significant opportunities to grow a sustainable and prosperous agricultural sector that can unlock regional economic potential.

Recognising this opportunity, the NT Government's 2025 *Rebuilding the Economy: Northern Territory Economic Strategy 2025* positions agriculture as a strategic priority sector for driving regional growth. Agriculture is a large contributor to regional economic growth through the farming industry and associated support and logistics services.

However, development in the NT is increasingly contested, with strong advocacy to keep the landscapes intact and undeveloped. This report aims to outline clear pathways that balance economic opportunity and preservation of environmental and cultural values, guided by input from both the community and industry.

Delivered in partnership with the CRCNA, this report outlines the findings of the Phase II *De-risking the NT through Sustainable Development Precincts* project. It builds on the outcomes of Phase I and aligns with broader national efforts to coordinate growth across Northern Australia.

DAF, in its role as an industry facilitator, is uniquely positioned to drive sector growth as the conduit between farmers, industry and Aboriginal Territorians, helping to unlock opportunities that enable inclusive, regionally led growth. Strategically, DAF's Industry Development team brings broad knowledge and skills in land development, project facilitation, market development, economic analysis and planning. This capability, coupled with DAF's facilitation role, makes it an effective enabler of growth.

The NT's agricultural industry is currently valued at $1.4 billion and is projected to reach around

$2 billion by the end of the decade. Without the implementation of the actions and recommendations outlined in this report, the agricultural industry may continue to see growth but not at the levels required to support regional economic growth outcomes within the NT.

There is also an immense opportunity for Aboriginal Territorians to drive self-determined agricultural development and enterprise on their land, fostering economic empowerment, employment, training and skills for Aboriginal Territorians on country.

While statutory planning has been completed in urban centres, regional planning is limited and is not within the jurisdiction of local government. This report presents a framework to address that gap and build coordinated, sustainable, and regionally led agricultural development across the NT.

The potential economic value of this planning framework will be significant in the NT.

The implementation of the framework will boost economic growth and attract further investment by creating a more attractive and predictable investment environment. A well-structured planning framework will lead to increased productivity within the region, job creation, and a more resilient economy.



$1.4B

Current value of the NT agricultural industry — projected to grow to $2 billion by 2030



0.22%

of NT land is cleared for agricultural production (DLPE, 2024)

Approach

To support the objectives of this report, a comprehensive program of research and collaboration was undertaken. These activities resulted in a suite of publications and findings that collectively inform the recommendations presented.

Through research collaboration with the project participants the team developed the following:

- **Appendix A: Best Practice in Precinct Planning**

  Outline the features and principles integral to the successful development of a sustainable precinct model.

- **Appendix B: Multi Criteria Analysis**

  Develop a framework for assessment of assets that could form a defined precinct area and assess the opportunities to determine the priority case study area.

- **Appendix C: Douglas Daly Case Study**

  Provides an overview of the Douglas Daly region, including its development history and future opportunities for agricultural growth and diversification.

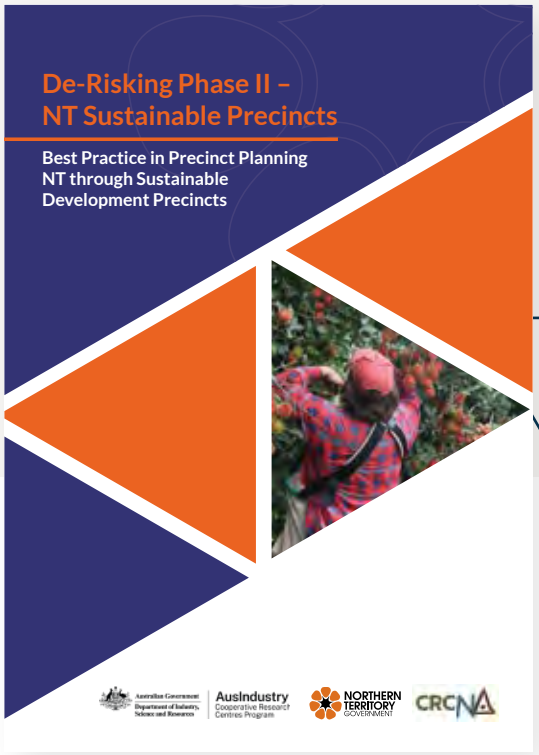
In addition to internal project outputs, further research was undertaken in collaboration with the National Environmental Science Program (NESP) and CRCNA that align with the case study region and agricultural de-risking efforts. These research partnerships supported deeper analysis of planning challenges and opportunities in the case study region, resulting in the following supporting studies:

- **Appendix D: Supporting Regional Planning in Northern Australia: A scoping study**
- **Appendix E: Strengthening regional planning and development assessment in the Douglas Daly region of the Northern Territory: Analysis Report**
- **Appendix F: Strengthening regional planning and development assessment in the Douglas Daly region of the Northern Territory: Solutions Report**

Together, these resources provide a robust foundation for advancing regional planning and de-risking agricultural development in the NT.

“These resources provide a robust foundation for advancing regional planning and de-risking agricultural development in the NT.





Best Practice in Precinct Planning

Successful regional development is underpinned by effective strategic planning, to ensure that growth is sustainable, efficient and well-integrated.

Well-planned precincts foster connectivity, encourage multi sector investment, and provide essential services that cater to evolving needs. Without strategic planning, growth can become fragmented, leading to inefficiencies, environmental degradation, and missed economic potential.

Currently, regional planning outside of the town areas of Darwin, Palmerston, Litchfield, Katherine and Alice Springs is limited. This has highlighted the need for a specific precinct-based planning model to support economic growth sectors to provide certainty for investors and a framework that preserves environmental and cultural values.

To address this, the Best Practice in Precinct Planning approach at **Appendix A** was developed during the initial stages of the project to support the identification of Sustainable Development Precincts (SDP).

The SDP concept applies a master planning methodology to identify and activate precinct parameters for development potential that are investment-ready and suited to diversified agricultural development.

Integral features of a SDP include:

- suitable soils and availability of water
- proximity to transport and logistics corridors
- compatibility with environmental and cultural values
- existing or planned infrastructure (e.g. communications, power, accommodation, workforce access, markets)
- readiness to support both large and small-scale development
- ease of access to existing business or supporting services

The NT's landscape characteristics do not provide the opportunity for large-scale, contiguous agricultural development and is more suited to a strategic development approach. To reflect this, precincts were identified surrounding established communities with supporting infrastructure. Northern area precincts have a smaller extent than the southern regions due to the ability to intensify. The precinct areas are diverse with an existing mix of land uses and zonings and include potential brownfield and greenfield development sites.

The key purpose of precinct planning is to provide de-risked land that is investment-ready and suitable for purpose. An evidence-based approach underpins the SDP framework, combining technical land and water assessments with economic viability analysis.

Ideally, planned precincts would be released to market with:

- land parcels sized for development and market
- tenure suitable for development for the relevant industries
- land zoned suitably for development for the relevant industries
- suitable and available water resources
- specific soil suitability studies
- environmental approvals in place prior to land release
- Native Title approvals in place prior to land release
- Aboriginal land claims (including any nearby beds and banks) finalised
- land clearing permits approved
- infrastructure (water, energy, communication) that is reliable and suitable for use
- all-weather road access
- supply chain opportunities for access to market
- community infrastructure
- available workforce
- acknowledgment and consideration for areas of cultural and environmental significance.

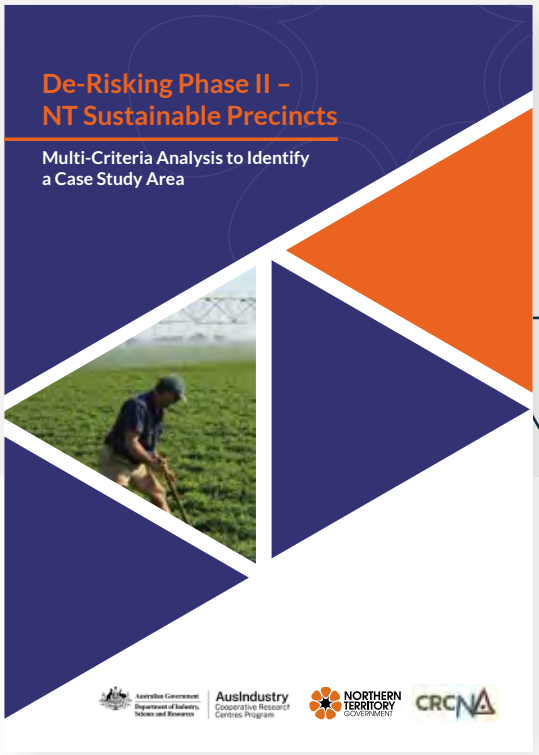
The SDP model creates the potential for agricultural development on private, pastoral, Crown and Aboriginal land through government assistance for investors. This assistance will provide a clear pathway through regulatory processes.

Key issues that will determine the success of the SDP model were raised in the Phase I report and have been identified as issues that will need to be addressed as part of this program of ongoing work.

As precinct planning progresses, these practices will evolve, with the case study area serving as a pilot to refine and scale the SDP model. By identifying and activating strategically located, investment-ready land, SDPs provide a platform for balanced, sustainable development that ensures a sensible approach to development while protecting environmental and cultural values.

"The key purpose of precinct planning is to provide de-risked land that is investment-ready and suitable for purpose."





Multi-Criteria Analysis

The Multi-Criteria Analysis (MCA) at **Appendix B** was developed based on the principles of the Sustainable Development Precinct (SDP) model to identify a priority region for piloting improved planning and sustainable agricultural development. Its aim was to build a robust evidence base to inform the selection of a significant case study area that could demonstrate best practice in precinct planning.

Government agencies collaborated to develop the assessment criteria. DLPE were integral throughout the research phase, providing technical expertise, data and analysis through extensive mapping of the land soil types, agricultural suitability assessments, and water resources mapping. The analysis considered various completed studies, such as:

- land use planning
- soil and land resources
- Historical Mapping the Future program
- vegetation
- water resources
- water allocation planning
- biodiversity
- sacred sites

Priority assessment criteria

Three criteria were identified as essential to enable successful and sustainable agricultural development:

- Soil quality and volume/area – suitable soil is the vital foundation for vegetation and agriculture, supporting the security of food, animal feed, fuel, natural fibres and a range of ecosystem functions. Without good soils, farming efforts can be futile.
- Water availability – irrigated agricultural production requires access to quality water. Without it, agribusiness is limited to dryland or livestock production.
- Logistics routes for all weather access – reliable logistical routes are critical for the timely delivery of agricultural products in good condition. The same is true for the provision of goods and services to the farming site and surrounding community.

"Without good soils, farming efforts can be futile."

Supporting assessment criteria

Additional factors were considered to determine the most viable area to undertake the case study location:

- Land suitable for agricultural development – relative to the priority criteria of water and soil studies that specifically identify areas suitable for development, this land may form a mosaic structure across the greater region and ideally have sufficient supply/area to support agricultural activities.
- Land tenure – private, Crown, pastoral and Aboriginal land
- Existing infrastructure (power, water, roads and communications) – the presence of amenities already at or around the site typically reduces both expenditure and level of work required to create investment-ready land and indicates the existence of some form of established community nearby.
- Market opportunities – depending on the location and type of agricultural product the opportunity varies significantly between crops and regions. This is especially the case with horticulture where early seasonal maturity provides a market premium. While the NT is close to Southeast Asian markets, there are numerous supply chain considerations to be overcome.
- Workforce availability or attraction potential – attracting, housing, and retaining workers depends on access to established communities that offer social and financial benefits.

Precinct identification

Eleven precinct areas were identified through the multi-criteria analysis, based on priority assessment criteria and supporting assessment criteria. These include both established and prospective precincts, highlighting ongoing sustainable development opportunities in existing precincts.

Further opportunities for agricultural development may exist outside of these precinct areas.

The below table provides the areas identified, and whether it is an existing or new precinct:

Precinct Location	Existing/Future
Barkly	Future
Douglas Daly	Existing
Gunn Point Agricultural Precinct	Existing
Katherine	Existing
Lambells Lagoon Horticultural Precinct	Existing
Larrimah Agricultural Precinct	Existing
Marrakai Heights	Future
Marrakai Downs	Future
Mataranka	Existing
Western Davenport	Existing
Wildman Agriculture Precinct	Existing

Table 1 - Identified precinct areas

Case Study Selection

Following a comprehensive evidence-based multi-criteria analysis, the Douglas Daly region was selected as the case study area to pilot improved planning and support the sustainable growth of agriculture in the NT.

The Douglas Daly is the most extensively studied region in the NT from an agricultural perspective, however a comprehensive assessment of its development potential has not been fully consolidated. This lack of integration further justified the region's selection as a focus for best practice planning to determine the development potential of the region alongside environmental and cultural values.

The decision was also influenced by a combination of deteriorating infrastructure, suitable soils that are not under agricultural production and the clear needs identified within the local community.



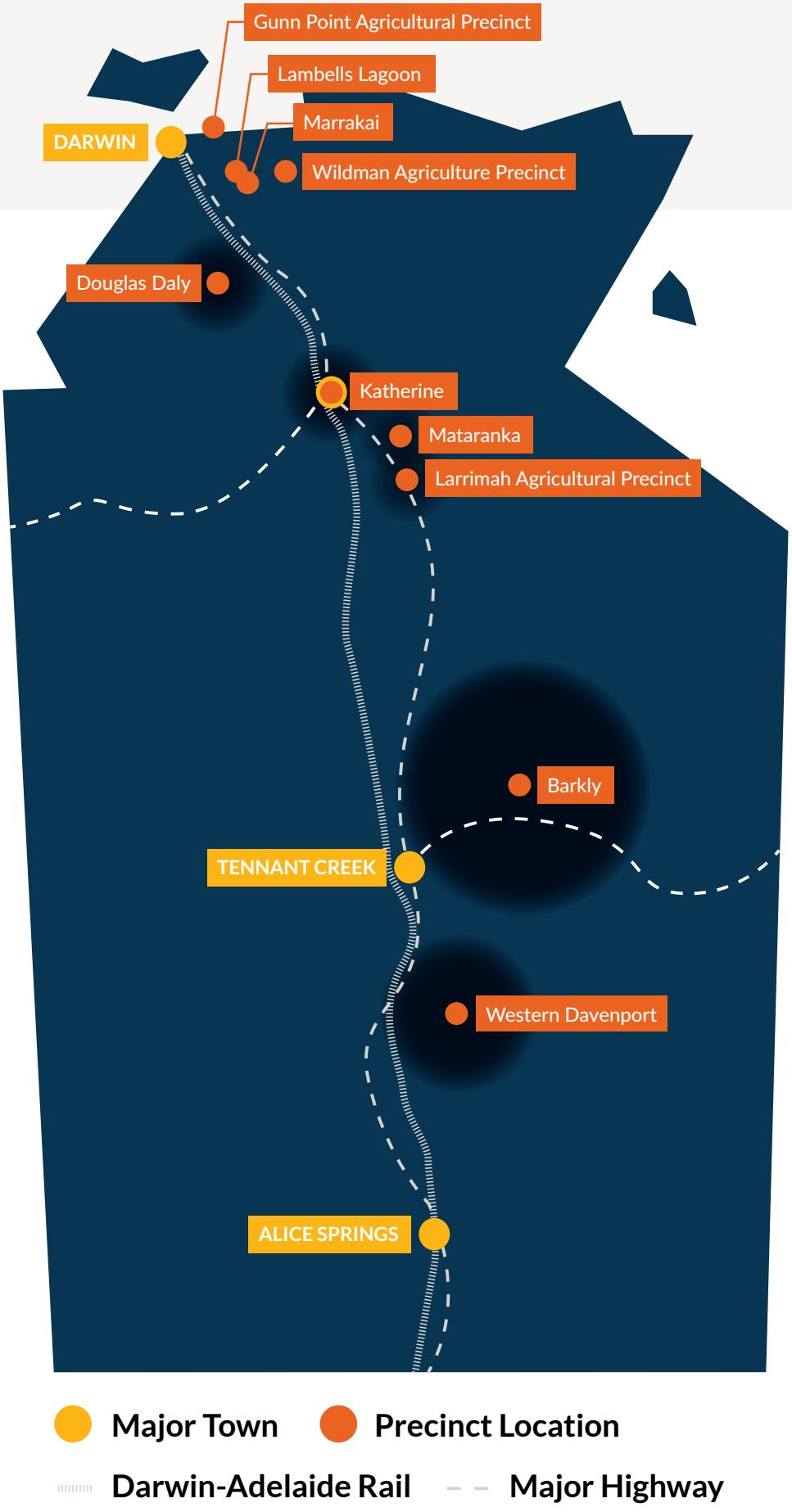
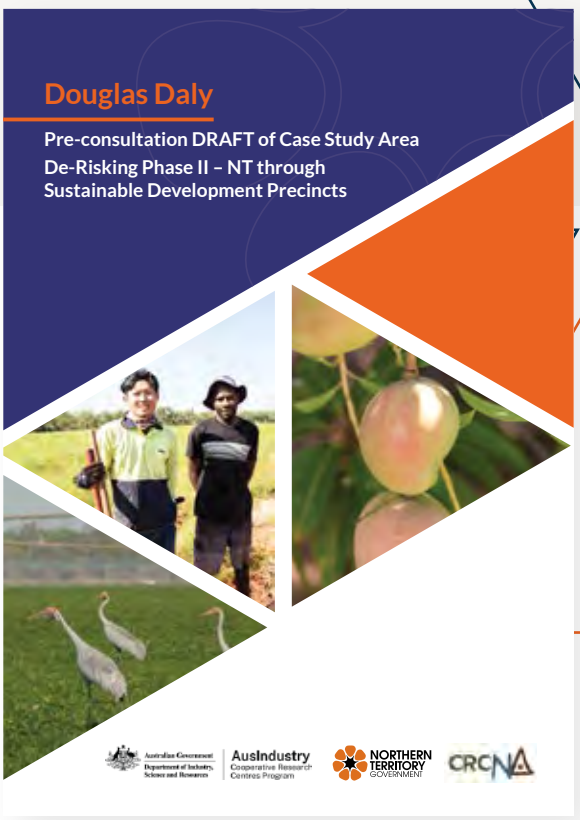


Figure 1 – NT Precinct Map

Case Study Area: Douglas Daly region



The purpose of the Douglas Daly case study is to provide a comprehensive foundation for strategic planning and stakeholder engagement within the region. It provides a comprehensive overview of the region's history, development, current land uses, natural resource availability, and environmental and cultural significance.

From this foundation, the project aims to investigate, co-design, and collaborate with stakeholders to uncover key strengths, opportunities, and challenges within the region and the broader NT agricultural sector.

The central objective is to stimulate growth and support expansion for existing landowners, especially in areas with potential for further agricultural development and diversification. By highlighting the role of sustainable precinct models, the case study also explores how such approaches can deliver meaningful benefits to landowners and contribute to broader regional advancement.

Prepared in advance of the stakeholder engagement phase, the case study informed discussions by presenting relevant context and enabling participants to share their preferences, limitations, and lived experiences. These insights focus on unlocking opportunities for land use that can strengthen and guide long-term development in the Douglas Daly region and across the NT.

The Region

The Douglas Daly region is well known for agricultural production and has evolved since its initial development for horticulture in the 1980s. From the early cropping era to cattle grazing and assorted horticulture, the district has progressed to become one of the NT's key valuable agricultural production areas.

Early development, led by the former Agricultural Development and Marketing Authority (ADMA) in the 1980s established project farms focused on broadacre grain cropping under strict lease conditions. Infrastructure such as on-farm facilities and grain depots were established, but limited market access, unsuitable farming practices, and isolation led many early farmers to exit the region.

A second stage of land release known as Stray Creek in the early 2000s introduced several freehold parcels with mandated development conditions to encourage investment and growth.

While cattle production remains the prominent industry, Douglas Daly has become a diversified agricultural region with other enterprises emerging. Surrounding pastoral properties have expanded operations past cattle production and diversified in various horticulture projects.

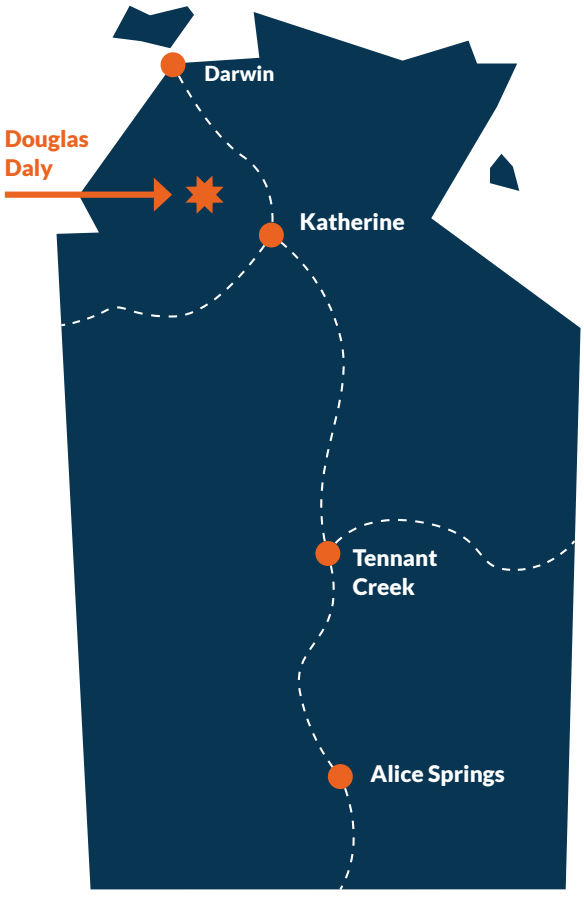


Figure 2 – Douglas Daly locality map

Tenure

The Douglas Daly case study area features a mix of land tenures, including freehold, pastoral leasehold, and Aboriginal land trusts.

The most prominent land use across the freehold properties is cattle production on improved pastures alongside a variety of other agricultural enterprises, such as hay, fodder and forestry (African mahogany and sandalwood), and intensive horticulture including melons, pumpkins, turf and cotton.

Surrounding pastoral leases include Douglas, Douglas West, Douglas River, Jindare, Claravale, Dorisvale, Tipperary East and Tipperary West Stations. Adjacent to these are the Upper Daly Aboriginal Land Trust and Wagiman Aboriginal Land Trust, with a number of Section 19 grazing leases to adjoining landowners.

The Douglas Daly Research Farm (DDRF) spanning 3,100 hectares, supports research and extension activities focused on beef production, fodder crops, and agricultural diversification.

With about 2,500 hectares of cleared land, DDRF conducts trials on agricultural systems, irrigated cropping, and cattle performance including crossbreeding and rotational grazing strategies.

Infrastructure

The region's road network includes both sealed and unsealed surfaces. Many unsealed roads are in poor condition and pose access challenges even during the dry season, highlighting the need for targeted upgrades to improve year-round connectivity. Telecommunications coverage is limited, and while some areas have mains electricity, most properties still rely on generators for power.

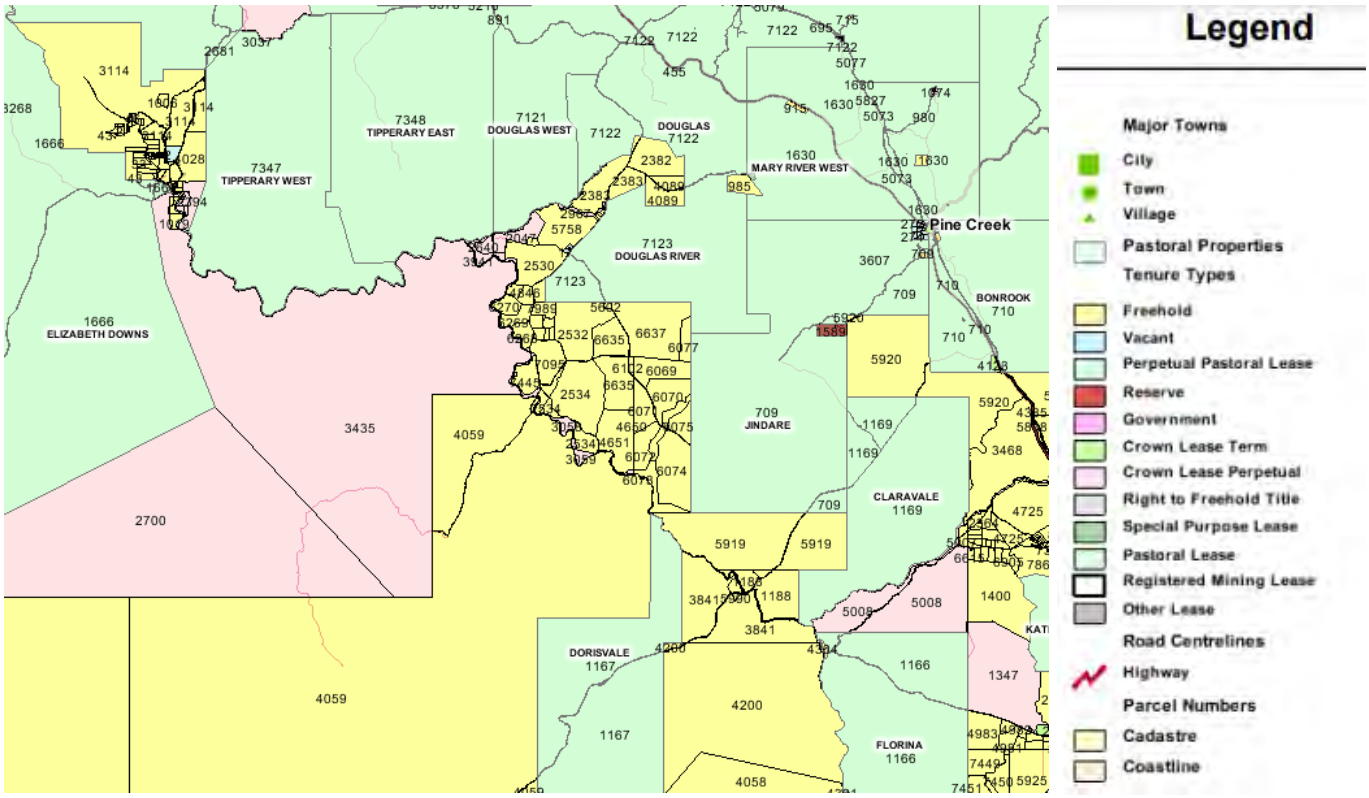


Figure 3 – Land tenure type map

Water

The region relies heavily on water sourced from both groundwater and surface water systems.

The Oolloo Dolostone aquifer, a key karstic formation within the Daly groundwater basin, underpins agricultural production by providing a reliable, high-quality water supply with low salinity and strong yields.

The groundwater aquifer sustains dry season flows in the Daly River, one of northern Australia's few large perennial river systems known for its ecological and cultural importance.

The Oolloo Dolostone Water Allocation Plan 2019-2029 guides the sustainable management of the aquifer, balancing environmental, cultural, and consumptive needs while enabling water trading within the plan area.

An Aboriginal Water Reserve is also within this framework, reserving a portion of the consumptive pool for exclusive use or trade by eligible Aboriginal landholders. The reserve and broader allocations are reviewed regularly to ensure long-term water security and equitable access.

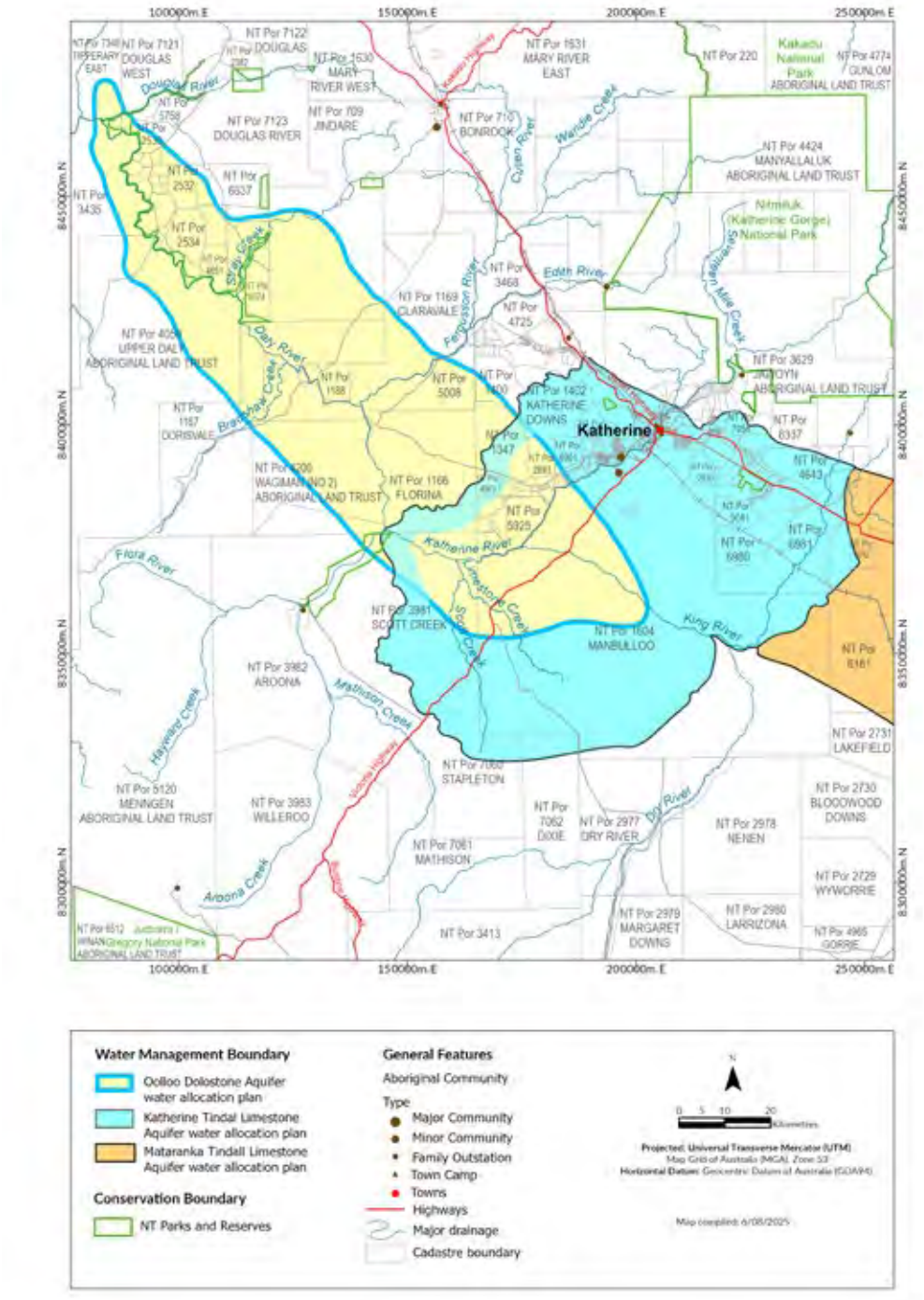


Figure 4 – Oolloo Dolostone Aquifer Water Allocation Plan Boundary map

Source: Oolloo Dolostone Aquifer Water Allocation Plan 2019-2029.

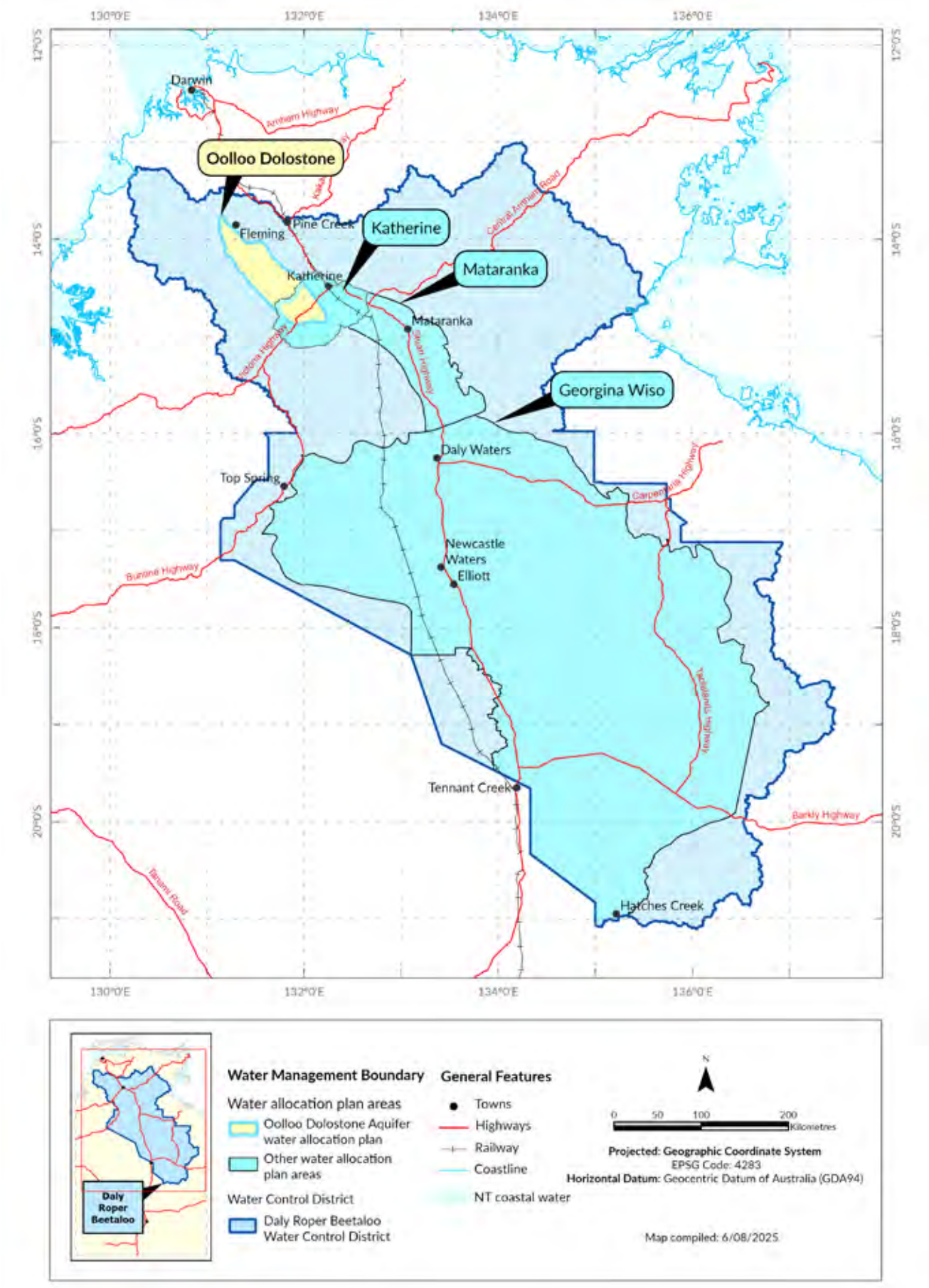
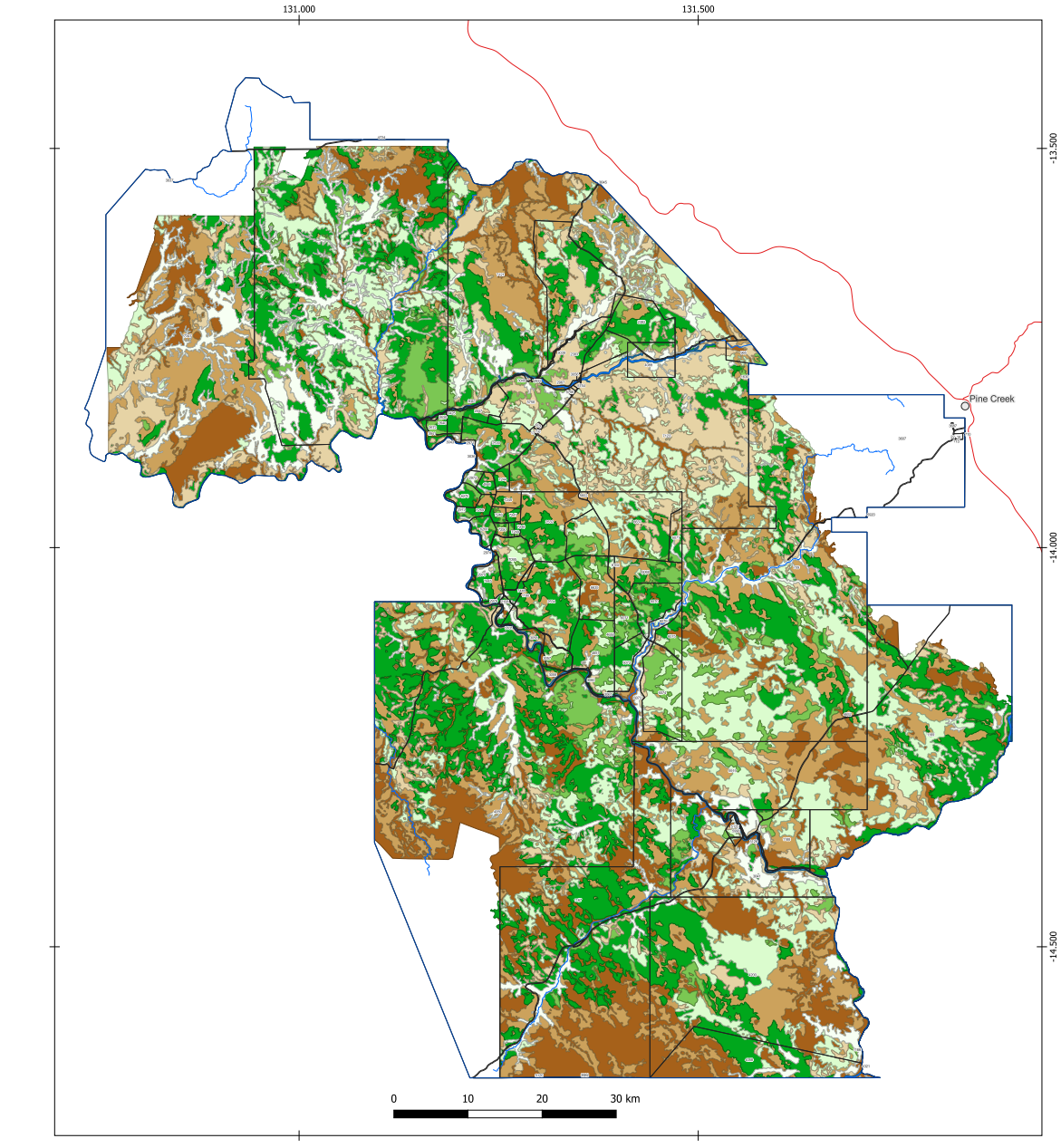


Figure 5 – Oolloo Dolostone Aquifer plan area in the Daly Roper Beetaloo Water Control District map

Source: Oolloo Dolostone Aquifer Water Allocation Plan 2019-2029.

Soil

The dominant land systems in the region are Blain soils of various sub-classifications. Blaine soils are typically deep sandy red Kandosols. They are characterised by being highly siliceous at the surface, earthy, increasing to clay loam subsoil. Though low in fertility and water-holding capacity, these well-drained, moderately acidic soils are well-suited to overhead irrigation and have demonstrated strong productivity for broadacre cropping and horticulture in the Top End.



Symbol	Class	Class Description
	A	Arable with few or slight limitations.
	B	Arable with slight to moderate limitations.
	BW	Land with seasonal waterlogging and/or inundation limitations but possibly has pasture potential.
	C	Marginally arable suited to permanent improved pastures given minimal soil disturbance at establishment.
	CW	Land with seasonal waterlogging and/or inundation limitations.
	D	Non-arable, marginal country potentially suitable for rough native pasture grazing or surface-established semi-improved pastures at low stocking rates.
	E	Non-agricultural or at best rough grazing of native pasture.
	Water Body	Water Body

Figure 6 – Soil classification map

Conservation areas

The region contains several conservation areas that protect key sections of the Douglas and Daly Rivers systems. These include the Douglas River/Daly River Esplanade, Stray Creek, Tjuwaliyn (Douglas) Hot Springs, Butterfly Gorge Nature Park, and Umbrawarra Gorge Nature Park.

The Daly River middle reaches are declared a conservation site of national significance with stretches flowing through the Tipperary and Fish River pastoral properties.

Flora and fauna

The region supports diverse flora and fauna, including several threatened species. The Daly River hosts eight of the Northern Territory's nine species of freshwater turtle species, notably the pig nosed turtle which is an internationally significant species. The river is also home to two nationally threatened elasmobranchs: the critically endangered freshwater whipray and the vulnerable freshwater sawfish. Additionally, the Daly River is a popular recreational fishery, particularly known for barramundi.

Heritage

The region includes several NT declared heritage sites of historical significance.

- Fenton Airfield, a former WWII bomber base located on Douglas Station and accessible via Oolloo Road.
- B24-D Liberator wreck "Nothing Sacred" The crash site of the "Nothing Sacred" is located on Douglas West Station, around 4.8km northwest of the Heritage listed WWII Fenton Airfield.

Douglas Station also features historic gold mining sites. Other WWII history in the greater area includes the nearby Adelaide River War Cemetery which is a Commonwealth heritage listed site.



Stakeholder Engagement

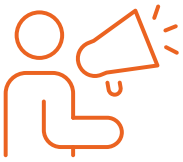
Stakeholder insights are essential for shaping strategies that promote meaningful development in Douglas Daly and across the NT. The consultation throughout the project engaged residents and industry stakeholders in the Douglas Daly region through key questions and projected outcomes.



Objectives

The objectives of the stakeholder engagement and co-design process were to:

- Seek input and generate ideas from stakeholders on the case study area identified, with the goal to identify the strengths, opportunities and challenges across the region and broader NT agricultural industry
- Pursue input from stakeholders on best practice precinct planning
- Establish relationships with key stakeholders to inform future decision making
- Validate concepts
- Build confidence and trust in the department, through implementing a transparent consultation process.



Approach

In line with the stakeholder engagement plan, stakeholders were asked open ended questions through individual semi-structured interviews.

Stakeholders were provided with:

- Engagement questions specific to their involvement and knowledge of the agricultural sector. i.e. industry or grower
- The draft Douglas Daly pre-consultation case study document including data on the region, its history, the lands current uses, natural resources, and opportunities and constraints.

Stakeholders were asked to provide input and feedback on the draft case study document and given the opportunity to share their experiences through the stakeholder questions, to assist in affecting change. The intent of the engagement was to create a research and action plan with key priority outcomes to support emerging issues facing the region in a precinct development context.

Stakeholders

Internal (NT Government)	External
• Chief Minister and Cabinet • Chief Minister and Cabinet – Strategic Aboriginal Policy • DLPE – Rangelands Division • DLPE – Office of Water Security • DTBAR – Opportunity Activation • DLI – Planning • DLI – Land Development	• Douglas Daly property owners/lessees • NT Farmers Association • NT Cattlemen's Association • Northern Land Council • Commonwealth Scientific and Industrial Research Organisation • Environment Centre NT • Charles Darwin University • Other key stakeholders as required

Table 2 - Stakeholders

Process

Stakeholder engagement was undertaken as per the engagement plan formulated with the DAF Communications Team to ensure the engagement met the requirements of the project milestones, while ensuring government policies and procedures were adhered to.

Internal engagement with other NT Government agencies was completed through a Precinct Steering Committee as well as separate conversations with relevant stakeholders.

Stage 1

Stage 1 of external stakeholder engagement commenced in November 2022, which included key industry bodies:

- Regional Development Australia Northern Territory (RDANT),
- Commonwealth Scientific and Industrial Research Organisation (CSIRO),
- NT Farmers Association,
- Northern Territory Cattlemen's Association (NTCA) and
- Environment Centre NT (ECNT).

Stage 2

Stage 2 consultation commenced in July 2023, with on-property meetings held with Douglas Daly growers. DAF Industry Development representatives were accompanied by a representative from NT Farmers Association for these introductions. These conversations provided further insight into the opportunities and limitations of the region and the NT's agriculture industry in general. Growers were also provided the opportunity to provide general feedback on the Douglas Daly Research Farm (DDRF) and how it can be best utilised to benefit the needs of the region, growers and industry.

Stage 2 also included engagement with the Northern Land Council (NLC), which focused on agricultural development and regional planning to facilitate economic opportunities on indigenous land.



Feedback

Various perspectives from the different Government, industry and grower stakeholder groups identified the strengths, opportunities and limitations across the case study region and broader NT agricultural industry. The Industry Development Team received tangible confirmation that this project holds very real potential for affecting change.

A summary of common themes throughout the stakeholder engagement were:

- social licence surrounding agriculture
- unclear regulatory processes
- market access and availability
- need for infrastructure upgrades
- building a sense of community
- environmental sensitivities
- pace of agricultural development

Participants provided feedback on the fundamentals of a sustainable development precinct.

Stage 2 Douglas Daly grower engagement summary:

Douglas Daly region
General comments about the region
• Tourism has decreased with the closure of the Hot Springs • Properties in region are mainly used for finishing cattle (final stage of beef production) rather than breeding • Crown land grain silo site – presents an opportunity and could be used to store fertiliser
General comments about own property/properties
• Considering how they can become carbon neutral to meet targets
What are the opportunities and how do they present themselves in a precinct area?
• Service industries could visit • Health care – the Adelaide River clinic used to send a nurse out to visit which is no longer
What would you like to see in the region?
Increase in tourism • More families return to the region • How could this be incentivised with current land values
What do you see as the current issues facing agricultural development in the Northern Territory?
• Timeframes - agriculture takes years to develop and water licences needs to consider this with monitoring and future plans • Uncertainty for growers – changing agendas and government staff turnover • Trust for the regulator - Hesitant to tell anyone anything as it may get taken off them
What new research programs would you like to see at the Research Farm?
• Cotton rotation crops and their sustainability • Research that is useful to growers in the region • Other crops such as fodder and fibre • Would like to see the irrigation infrastructure used for research purposes rather than commercial operations • Pilot a mapping project for the region – riparian areas, biodiversity etc.

Opportunities and limitations

What opportunities have you considered?

- Higher value horticulture eg. bananas and melons
- Agritourism
- Opportunities on Aboriginal land

What are the limitations you face?

- Road network inferior to support high value horticulture
- Closest fuel is 80km away
- Transport – not enough trucks
- Infrastructure - bridge across Daly River at Oolloo crossing to access Upper Daly ALT land
- Markets

Regulatory Processes

Are the guidelines and requirements of processes clear from the outset?

- No, unclear whether some crops are considered a pastoral use

Water

- Have had their water allocation reduced under the 'use it or lose it' provision – future plans and time to develop not considered by Water Resources

What are the current challenges of water trading?

- Unclear who to contact for the Special Aboriginal Water Reserve

What benefits, if any, do you see in the use of a water trading platform?

- Identifying who is interested in trading and their contact details

Infrastructure

What would you prioritise as future essential infrastructure and how does it look?

- Roads
  - » Some of the road network is dirt without a gravel base and closed to heavy vehicles
  - » Connector road to Katherine
- Communications
  - » Mobile connectivity across the region
  - » Benefits more than just agriculture

Table 3 – Stakeholder engagement summary

Outcomes

The semi-structured interviews proved to be effective in producing perspectives of participants understandings, motivations and long-term aspirations for the region. These conversations also played a critical role in shaping key recommendations to guide the project's implementation phase while ensuring alignment with the overarching research question

Alignment with the NESP

This project leveraged further investment through the National Environmental Sciences Program (NESP) Marine and Coastal Hub under the 2021 Research Plan. The Hub engaged the Cairns Institute, James Cook University (JCU) and TropWATER (JCU) to deliver the study in partnership with the Resilient Landscapes Hub and the CRCNA.

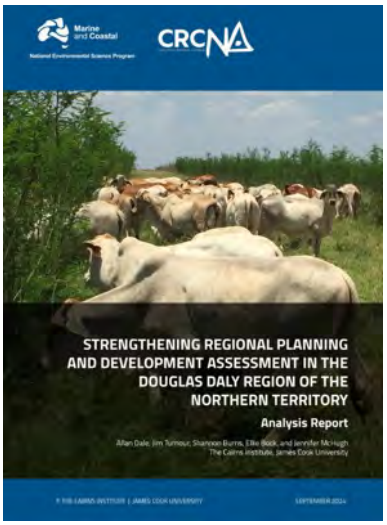
NESP project reports focussed on the Douglas Daly region include:

- Project 1.32: Supporting Regional Planning in Northern Australia: A scoping study
- Project 3.1: Planning for Ecologically Sustainable Development in Northern Australia, exploring three key regions in the north including Western Australia's Pilbara region, Queensland's Gilbert River District, and the Douglas Daly region in the NT.

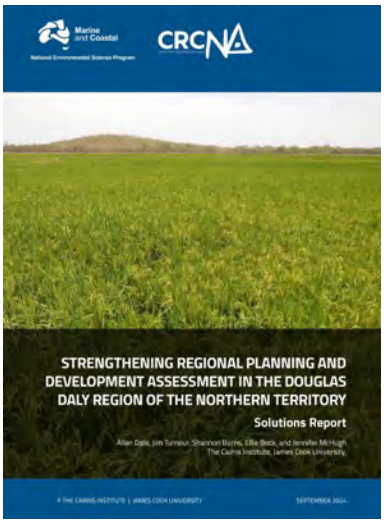
The following NESP project reports are included as appendices:



Appendix D



Appendix E



Appendix F

These NESP project reports recognise the prosperity of Northern Australian communities rests on the expansion of current industries and new enterprises. It underscores that effective economic development must integrate people, economy, and environment considerations to achieve lasting outcomes.

By analysing regional planning processes and practices across Northern Australia, the reports provided a better understanding of the challenges and obstacles and recommended a way forward. They examined current planning frameworks, interviewed stakeholders with specific interests, identified information deficits, assessed data storage and access issues, and reviewed planning case studies.

By focusing on three key northern regions of Queensland's Gilbert River District, the Northern Territory's Douglas Daly, and Western Australia's Pilbara, the projects were able to identify critical barriers within current regional planning frameworks and practices. Despite their unique contexts, each region faces similar tensions between diverse economic development drivers, the protection of fragile ecosystems, and the pursuit of strong Aboriginal governance, cultural preservation, and livelihood aspirations across the landscape.

In the Douglas Daly region, tensions between all three of these legitimate aspirations are long standing and significant. Here, these tensions have long led to suggestions that a more regionalised, engaged and evidence-based approach might be needed to support planning, development assessment and nature positive investment decisions.



Project 1.32: Supporting Regional Planning in Northern Australia: A scoping study

Australia's Northern development agenda is being shaped by major policy reforms such as updates to the EPBC Act and the National Water Initiative and by the rise of Nature Positive market opportunities. These shifts underscore a national commitment to balancing economic growth with ecosystem stewardship and social wellbeing.

In the Northern Territory, there is a clear economic imperative to expand and diversify agriculture. Much of the Territory's most productive land also supports high biodiversity and rich cultural values, creating an inherent tension between development and conservation. Despite a decade of prioritising growth and recognizing these trade-offs, planning systems have not kept pace: few tools exist for rigorous trade-off analysis or integrated decision-making across sectors.

To fill this gap, the project's analysis phase probed the current regional planning and development assessment system in the Douglas Daly region. By cataloguing its strengths and weaknesses, we have laid the groundwork for fresh, evidence-driven approaches that can better harmonize economic, environmental and cultural objectives.

Project 3.1 Strengthening Regional Planning and Development Assessment in the Douglas Daly Region of the Northern Territory

Analysis Report

The Analysis Report examines how the Douglas Daly catchment's regional planning and development assessment system can better support ecologically sustainable growth. It begins by mapping the existing governance framework through a literature review.

The Douglas Daly is one of the few places in the NT where collective approaches to planning to achieve an appropriate balance between development and the environment have been attempted.

The NT Government established the Daly River Management Advisory Committee in 2006 to develop options for the sustainable use and conservation of natural resources within the catchment. The goal of DRMAC was to promote the highest standards of management of land, water and other resources in the region 'so that the important values people associate with the Daly River are protected' (DRMAC 2009). The independently chaired DRMAC structure advised on the

development of an adaptive management decision-making framework to allow balancing of the needs of catchment development and conservation, with a particular focus on vegetation clearing and water resource management. The membership of DRMAC included representatives from traditional landowners, production, tourism, recreation and conservation sectors and government (DRMAC 2009). The process was also strongly supported by a range of innovative and integrated science projects from the Tropical Rivers and Catchments Knowledge research consortium (TRaCK).

To enhance the depth of the literature analysis, this independent study was facilitated external to the Northern Territory Government. It engaged eight key NTG agencies involved in regional planning and development decision-making across the Douglas Daly region, its broader catchment and across multiple industry sectors. Focusing initially on these agencies was a strategic step toward fostering early government buy-in and laying the groundwork for a more innovative and collaborative planning approach.

The following questions were explored:

- What do you think are the key features of the regional planning and development assessment system in the Douglas Daly region?
- What role do you and your institution play in that system?
- What aspects of regional planning and development assessment system in the Douglas Daly region are currently working well?
- What parts of the system need improvement?
- What are your priority views about how the system can be strengthened?

All interviews were conducted under formal ethics approval and aimed to explore agency specific perspectives, responsibilities and constraints. These insights were further enriched through informal conversations with a range of community groups, industry representatives, and Traditional Owner organisations, helping to contextualise the institutional viewpoints within broader, on-the-ground realities.

Findings reveal that, despite strong high-level policy support for northern development, practical challenges are stalling both economic opportunities and the protection of biodiversity and cultural values. The report highlights enduring tensions between agricultural expansion, ecosystem conservation and Aboriginal land aspirations, and shows that current assessment laws and processes often struggle to balance these equally legitimate goals.

Stakeholders identified several core weaknesses in the current planning and development system: it is overly complex, siloed and poorly integrated, decisions often lack robust scientific underpinning, workforce capacity is stretched, and tenure and regulatory arrangements can be confusing. Regional infrastructure gaps (roads, communications) and short assessment timeframes further hinder progress, as do the absence of reliable collective-action mechanisms, functional offset frameworks, clear policy delivery systems and accessible finance, including for Traditional Owner engagement.



To strengthen the system, respondents prioritised establishing visionary, collaborative decision-making structures and investing in governance capacity across Traditional Owner groups, government planners and local communities. They called for ongoing scientific mapping, modelling and data-integration programs; place-based approaches to biodiversity and carbon offsets; whole-catchment water and bio-regional planning; as well as strategic investments in infrastructure, local supply chains and sustainable-farming demonstration projects. Complementary measures include third-party facilitation of trade-offs, rigorous resource-demand mapping and unwavering adherence to agreed policy frameworks.

The above findings suggest that there is a significant need for more knowledge-based and engaged trade-off analysis over these key tensions between development, water availability, cultural values, vegetation management and estuarine and marine health. Trade-off analysis thinking, however, has been previously attempted through the auspices of previous DRMAC arrangements in the Douglas Daly. Several interview participants deeply valued the opportunity for science-based, whole of community and inter-sectoral dialogue during the period that DRMAC was in operation. However, others lamented a lack of mechanisms to keep the member parties accountable to outcomes of the process. Others suggested the process may have been unsustainable, as it was instituted for a relatively narrow advisory purpose.

Overwhelmingly, however, most participants independently suggested the need for visionary and early approaches to reinvigorating collaborative decision-making for sustainable development in the catchment. This suggests there is a strong appetite for the establishment of a durable, well facilitated and evidence-based collaborative planning framework to both determine a shared vision and the key strategic interventions needed to secure this vision over time.

Solutions Report

Leveraging the insights and analytical groundwork of the Analysis Report, the Solutions Report developed targeted recommendations to strengthen the regional planning and development assessment framework for landscape-scale outcomes in the Douglas Daly catchment. The recommendations will underpin future negotiations to advance these improvements and foster shared decision-making. This collaborative process will also guide the prioritisation of continued research partnerships and support from the NT Government and CRCNA beyond the final report of this project.

The Solutions Report was developed closely with the NT Government agencies, the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), the National Environmental Sciences Program (NESP) Marine and Coastal Hub and the Cooperative Research Centre for Developing Northern Australia (CRCNA).

To progress from problem identification to solutions, a workshop of key agencies was held in April 2024, alongside additional informal discussions with key catchment stakeholders. These processes contributed to the identification and road-testing of the proposed solutions.

The key potential and suggested solutions revolve around the establishment of the necessary pre-conditions of success for new approaches to integrated regional planning and development assessment within the Douglas Daly region based on the previous governance systems analysis.

The key focus of the next steps include:

- building cross-governmental and regional consensus about appropriate models for development within the region;
- ground truth the potential of these conceptual models as a foundation for evidence based trade-off analysis, and the integration of Commonwealth supported bio-regional planning and water allocation planning; and
- build long-term local institutional capacity for the sustainable development of agriculture, tourism and land management businesses and their associated communities in the region. This could include attracting new and evolving ecosystem service markets and offset management through the landscape-scale delivery of conservation works.

Drawing on the Analysis Report's identification of critical weaknesses within the regional planning system that undermine sustainable development in the Douglas Daly, we have outlined a preliminary suite of potential systemic interventions for improving the health of the regional governance system. These systemic pathways are intended to guide the establishment of a durable partnership framework toward more integrated, resilient and effective regional planning outcomes.

Potential systemic interventions include:

- a cohesive investment in Aboriginal nation building and country-based strategic planning
- establishing an Integrated Agricultural Research and Development Hub
- collective approaches to managing trade-offs between development potential and biodiversity risks
- progression of a pilot bioregional planning approach
- trialling new approaches to ecosystem service market and offset framing

These priorities will inform the development of a longer-term collaborative approach between NT Government agencies, the Australian Government, Land Councils and Traditional Owners, industry, conservation sector and community stakeholders and the CRCNA and NESP Hubs.

The report at **Appendix F** unpacks the proposed solutions in more detail.

NESP Recommendation

The NESP project reports explored priorities for more regionally-based approaches to improving the system of planning and development decision-making in the Douglas Daly and the project paid collective attention to the Douglas Daly because it remains one of the most prospective regions for agricultural development in the NT, primarily due to the availability of water, relatively secure land tenures, and the availability of cleared or plantation land for development.

Despite this, the region also retains high biodiversity and cultural values. While development could happen with relatively low environmental and cultural impacts, if poorly managed, development equally could result in poor environmental, cultural, social and economic outcomes for the region. Equally, a continued focus on sticking with lower value outcomes arising from agriculture, on the other hand, will perpetuate the limited economic opportunities available for people in the Douglas Daly region.

The next step forward involves NT Government agencies, CRCNA, WABSI and NESP (in collaboration with all key agencies and community and industry stakeholders) in progressing the further co-design, development and implementation of these potential solutions outlined above through one or several emerging investment opportunities.

These include:

- working closely with the Office of Northern Australia (ONA) to explore the progression of this region as a priority for improved regional planning reforms linked to current regional planning reforms under the EPBC review and the refresh of the Developing Northern Australia Whitepaper Action Plan. This might involve directly pinning the approach developed within the priority work areas being established through revamped arrangements servicing the Northern Australian Ministerial Forum (NAMF); and/or
- progressing a cohesive proposal under the Australian Government's current Innovation Precincts funding arrangements; and/or
- a prioritised and enhanced approach to improved regional planning under usual NT Government budgetary processes; and/or
- longer-term inclusion of investment in these potential solutions as innovative approaches to be developed under any future NESP or CRCNA-related programs.

Even at a modest level, the cost of such an approach could be as little as $1.5 million per annum for at least a five-year trial period. The benefit returned, however, would far outweigh this through improved agricultural production, enhanced social benefits and enhanced environmental management.

It is anticipated that the steps considered above will enable a strong, long-term and collaborative approach to resolving these problems through growing partnerships between the Australian Government, the NT Government and key stakeholders with an interest in the Douglas Daly.



Recommendations

These recommendations were co-designed with industry partners and key stakeholders, also drawing on NESP's findings around agricultural de-risking and more efficient development approvals in the case study region.

Implementing these recommendations will require sustained investment and coordinated collaboration across the Australian and NT Governments, Traditional Owner groups, and industry.

Recommended action	Responsible entity and partners	Proposed implementation
Recommendation 1		
Strengthen the central development function within the Department of Agriculture and Fisheries to advance economic growth in agriculture.	Department of Agriculture and Fisheries	Through collaboration across NT and Australian Government agencies and with key industry stakeholders, efforts will be coordinated to ensure alignment of priorities, streamline regulatory processes, and leverage combined expertise and resources.
Recommendation 2		
Develop a strategic framework outlining the core components of a regional economic development plan for the Douglas Daly region, linking with regional economic development plans under the NT Government's Economic Strategy. Core components will include: • Road, communications, power, water, community and social infrastructure • Land resource assessments • Water resource assessments • Flood study • Environmental and heritage values • Cultural values	NT Government Australian Government Industry Traditional Owners	Secure support both financial and in-kind from the NT and Australian Governments or other available sources to initiate implementation. Establish a working group with representation from NT Government, industry and Traditional Owners to complete the following: • Gap analysis: Identify gaps in existing technical studies and where new or updated data may be required. • Inform policy: Establish policy and regulatory frameworks that encourage sustainable and considered regional development. • Cultural story: Identify and protect cultural values. • Identify growth areas: Recognise further development opportunities and growth within the region. • Infrastructure planning: Inform and integrate land use with transport, utilities, community and social infrastructure. • Natural resource management: Develop an aligned regional conservation works program.

Recommendation 3		
Through ongoing implementation of Recommendation 2 (above), utilise the Douglas Daly region as the best practice benchmark for ongoing regional planning for agriculture.	NT Government Australian Government Industry Traditional Owners	Establish the Douglas Daly region as the leading example that demonstrates the value and impact of effective regional planning for agriculture. Recognise alignment with and inform national policy settings in a Northern Australian context. Replicate and adapt to other regions within the NT to support ongoing regional economic development plans.
Recommendation 4		
Advocate for key enabling infrastructure upgrades within the Douglas Daly region.	NT Government Australian Government Industry	Prepare an Economic Assessment that identifies the economic value and growth potential of the region. Inform priority infrastructure investments based on criteria including economic impact, development potential, and alignment with NT/ national priorities. Advocate and identify infrastructure investment pathways.
Recommendation 5		
Establish the Douglas Daly Research Farm (DDRF) as a sustainable and best practice research and development (R&D) facility.	Department of Agriculture and Fisheries Australian Government and other funding bodies Industry	Continue to deliver research and development (R&D) efforts that promote industry development. Strengthen collaborative relationships between DAF, Douglas Daly agricultural producers, and industry representatives and funding bodies to lead the R&D direction and to align activities to the needs of industry and the region. Build capacity and increase adoption of best management practices for sustainable agriculture.
Recommendation 6		
Invest in Traditional Owner capability.	Department of Agriculture and Fisheries NT Government Traditional Owners	Strengthen whole-of-government strategic relationships with Land Councils and Traditional Owners. Support Aboriginal led-economic development within the Douglas Daly region. Foster collaboration and knowledge sharing relating to agriculture.

Implementation of the recommendations

Many of the recommendations have commenced implementation during the project, prior to the completion of this final report. A summary of these implementation activities is provided below.

Recommendation 1

Strengthen the central development function within the Department of Agriculture and Fisheries to advance economic growth in agriculture.

- DAF have implemented the 2025-2028 Strategic Plan to foster sustainable economic agriculture and fisheries industry growth across all regions.
- This project funded the establishment of the Industry Development team in DAF since the project commenced in 2021.
- The DAF Industry Development team are continuing beyond the project's conclusion due to the project identifying the ongoing requirement of the central development facilitation role and implementation of the recommendations.
- Two Industry Development team members have actively worked on this project from commencement to completion, contributing consistent leadership and expertise.
- These efforts have helped foster cultural change within the NT Government, enhancing understanding and support for agricultural development.
- The Indigenous Pastoral Program, within the DAF Industry Development team, delivers targeted support to increase participation of Aboriginal Territorians in the pastoral industry.
- The Market Development function, within the DAF Industry Development team, has broadened its scope to include emerging opportunities in Nature Repair markets, while also strengthening access to and expansion of traditional market pathways.
- Planning is underway for the future of the team and expansion of its facilitation role moving forward.

Recommendation 2

Develop a strategic framework outlining the core components of a regional economic development plan for the Douglas Daly region, linking with regional economic development plans under the NT Government's Economic Strategy.

- This project, along with the NESP initiatives, has confirmed that regional planning is a critical mechanism to support sustainable growth while protecting environmental and cultural values.
- The DAF Industry Development team have been strategically positioned to lead the process, leveraging its unique ability to collaborate across NT and Australian Governments, industry, Traditional Owners and growers, offering a facilitative role distinct from regulatory bodies.
- Key partners have been identified, and in-principle support has been secured to advance the next phase of work.
- A range of technical studies and data have already been completed and now need to be consolidated into a cohesive knowledge base to guide planning and investment.
- Additional water resource assessments are in progress, including catchment-scale groundwater and surface water flow characterisation to inform water planning and licence decisions
- Engagement with local growers highlighted infrastructure constraints as a key barrier to economic expansion in the region.
- NT Government agencies have reached in-principal consensus on a fit-for-purpose development planning framework tailored to the strategic needs of the Douglas Daly.
- Opportunities to foster Aboriginal economic development have been identified and integrated into broader planning efforts, ensuring inclusive growth and long-term regional resilience.

Recommendation 3

Through ongoing implementation of Recommendation 2, utilise the Douglas Daly region as the best practice benchmark for ongoing regional planning for agriculture.

- Other precincts were identified and prioritised through the multi-criteria analysis process.
- These will be progressed following the completion of Recommendation 2.

Recommendation 4

Advocate for key infrastructure upgrades within the Douglas Daly region.

- Conducted an initial desktop economic assessment to provide an understanding of the potential economic growth and forecast uplift opportunities.
- Collaborated with the NT Farmers Association to access and integrate current regional economic data.
- Identified available funding pathways.
- Identified key infrastructure constraints alongside emerging strategic opportunities.

Recommendation 5

Establish the Douglas Daly Research Farm (DDRF) as a sustainable and best practice research and development (R&D) facility.

- Identified and submitted proposals for relevant funding programs aimed at enhancing the R&D capabilities at DDRF.
- Explored opportunities to incorporate natural asset management and emerging nature repair markets into local agricultural practices.
- Pilot project on the nature repair market underway, with methodologies currently in early development, positioning the region to benefit from early adoption opportunities.
- Formed the Douglas Daly Research Farm Advisory Committee, bringing together local growers to guide research priorities, on-farm practices, and management strategies.
- Secured support from regional growers, reaffirming the critical role of DDRF in driving innovation and productivity in the region.

Recommendation 6

Invest in Traditional Owner capability.

- Established relationships with Land Councils to understand and support their preferred models for long-term, collaborative regional governance.
- Evaluated the feasibility of Indigenous-led development initiatives and provided strategic guidance to progress these opportunities.
- Delivered insights into the region's planning and development landscape, highlighting potential opportunities and emerging large-scale management opportunities to inform a shared regional vision.





Conclusion

Partnering with the CRCNA on this project has proven invaluable. Drawing on their recognised expertise, this project has identified new opportunities and demonstrated how to set the stage for deeper collaboration well beyond this project's formal completion.

This relationship has opened many doors, both strategic and practical and underscored the importance of cross-sector and cross-jurisdictional cooperation in regional development.

Collaboration with Western Australia and Queensland will ensure shared learning across northern Australia, amplifying regional insights, aligning strategies, and presenting a united and pragmatic narrative to the Australian Government.

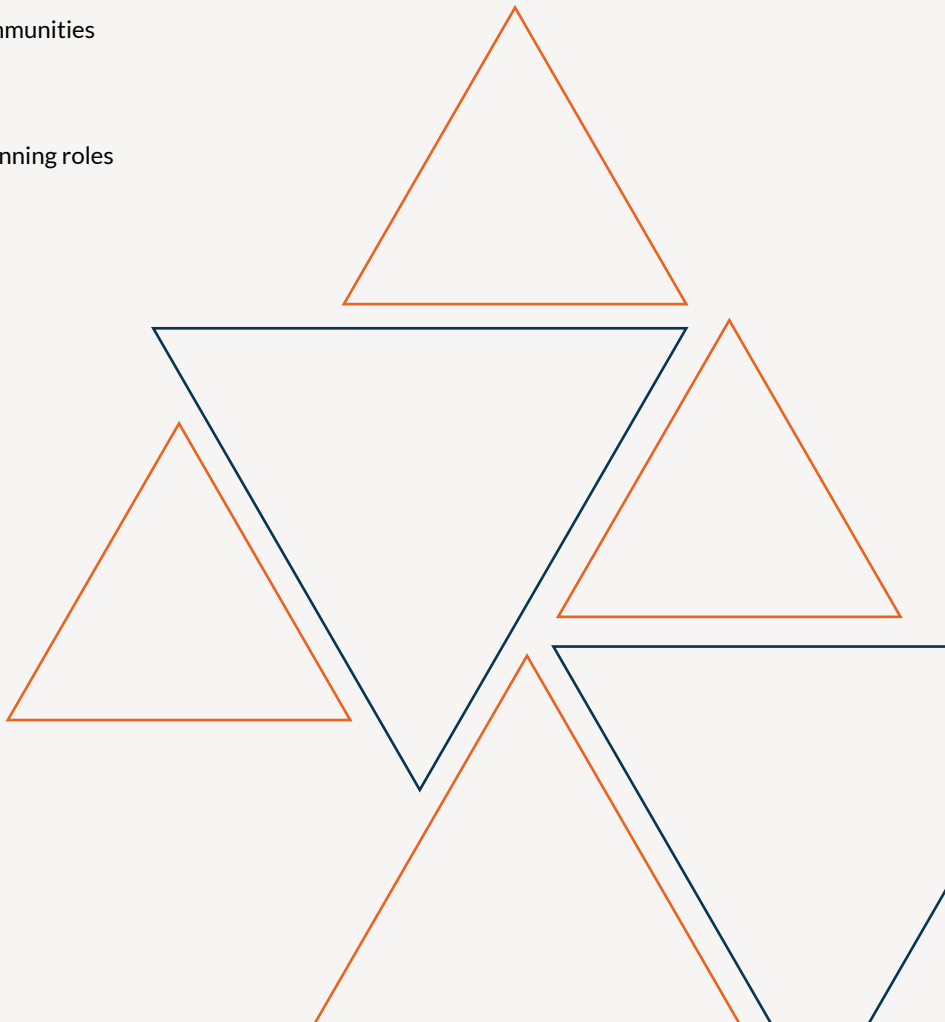
The Northern Territory stands at a pivotal moment; ready to embark on a new phase of economic growth. Realising this growth requires coordination and a forward-looking regional planning approach that:

- Promotes diverse and resilient economic development
- Balances growth with the protection of significant cultural and environmental assets
- Reduces land-use conflicts and enhances certainty for landholders and investors
- Attracts and retains across sector investment
- Provides stability and clarity for businesses, communities and towns
- Supports regional infrastructure planning
- Recognises and empowers local government planning roles

The Douglas Daly case study has balanced aspirations for development while protecting the environment and preserving cultural heritage. It provides a replicable framework for other regions across the NT for best practice economic regional planning.

The framework outlined in this report provides a better planning process for sustainable development in Northern Australia. The framework aligns with National and NT level frameworks to enable a jointly endorsed economic regional plan. A bilateral agreement between the Australian and NT Government using this framework, will achieve sustainable economic development in the Northern Territory.

This report recommends adoption of the framework for economic regional planning, to facilitate secure long term sustainable development, whilst balancing community aspirations, environment protection, and celebrating cultural heritage.



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Appendices

Appendix A: Best Practice in Precinct Planning

Appendix B: Multi Criteria Analysis

Appendix C: Case study: Douglas Daly pre-consultation draft

Appendix D: Supporting Regional Planning in Northern Australia: A scoping study

Appendix E: Strengthening regional planning and development assessment in the Douglas Daly region of the Northern Territory: Analysis Report

Appendix F: Strengthening regional planning and development assessment in the Douglas Daly region of the Northern Territory: Solutions Report



Appendix A

Best Practice in Precinct Planning





De-Risking Phase II – NT Sustainable Precincts

Best Practice in Precinct Planning NT through Sustainable Development Precincts



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1

Best Practice in Precinct Planning

Background

Between 2018 and 2020, the Cooperative Research Centre for Developing Northern Australia (CRCNA) completed a study into 'De-risking, brokering and prioritising agricultural development in the Northern Territory' (Phase I).

This study formed part of a wider collaboration between the CRCNA and the Northern Territory (NT), Queensland (QLD) and Western Australian (WA) governments, all aimed at supporting the development of new agricultural activity across northern Australia. The final report was published in November 2020.

The Phase I report's recommendations proposed to enable pathways to sustainable (economic, environment, and social) development. These include:

- developing an efficient approach to converting parts of pastoral leases to freehold
- de-risking agricultural precincts that provide certainty for investors
- enabling Aboriginal agricultural development
- targeting infrastructure to facilitate development
- providing a supportive regulatory environment
- strategic de-risking in coordinated and targeted research, and
- improving trust, relationships and culture in development assessment and approval.

The next stage (Phase II) research project *De-Risking the NT Through Sustainable Development Precincts*, seeks to answer the core question: how can improved prioritisation and planning practice support new sustainable development precincts in the Northern Territory? This Phase II project is due for completion by October 2024.

What is a sustainable development precinct (SDP)?

Sustainable development precincts are identified through a master planning approach, to support and grow the economy and region by targeting investors and new demand markets.

Integral features of a sustainable development precinct within an agribusiness context include suitable soils and availability of water evidenced by science and robust regulation, as well as access to critical transport and logistics routes whilst supporting environmental and cultural values.

An SDP may also include existing or future infrastructure such as communications, power and water, accommodation, workforce availability, market opportunities or land access for ancillary use, noting these features are dependent on the investment readiness of the area.

An SDP should provide ease of access to existing business or supporting services, and stimulate broad community activity and regional growth to maximise economic and social benefit.

Identification of precinct areas

Historically the Territory does not offer opportunity for large-scale agricultural development and is more suited to a mosaic model approach.

Precinct areas have been identified by applying varying boundary distances around existing cities and townships with established infrastructure networks and community facilities. Northern area precincts have a smaller radius than the southern regions due to the ability to intensify. The precinct areas are diverse with an existing mix of land uses and zonings and include potential development sites that are both brownfield and greenfield.

Eleven precinct areas were identified during the multi-criteria analysis (MCA) based on technical studies, including soil and water, access to logistics routes and other supporting criteria. Further opportunities for agricultural development may exist outside of these precinct areas.

2

What is best practice in precinct planning?

The key purpose of precinct planning is to provide de-risked land that is investment-ready and suitable for purpose. Land uses should be considered, planned and provided for in master plans and land-use plans based on an assessment of the lands' capacity. An evidence-based approach will underpin the development of SDPs, through government-led technical studies to identify the most suitable land uses, site opportunities and infrastructure requirements, and economic assessments to determine commercial viability.

Planned precincts would ideally be released to the market with:

- land parcels sized for development and market
- tenure suitable for development for the relevant industry
- land zoned suitably for development for the relevant industry
- water resources available and suitable for use
- specific soil suitability studies rather than broad-scale theoretical assessments
- environmental approvals addressed prior to land release
- Native Title approvals addressed prior to land release
- Aboriginal land claims (including any nearby beds and banks) finalised
- land clearing permits approved
- infrastructure (water, energy, communication) that is reliable and suitable for use
- road access all year round
- supply chain opportunities for access to market
- community infrastructure
- available workforce
- acknowledgment and consideration for areas of cultural and environmental significance within the precinct.

Progress is being made to develop regional land use planning outside of major cities and towns that supports the identification and protection of land suitable for agricultural development.

Having these prior approvals in place builds investor confidence and allows proponents to focus on their relevant industry expertise, rather than the development approval processes where they may have limited knowledge.

Supporting industry

The Territory has opportunities to grow the economy and facilitate sustainable development of private, pastoral and Aboriginal land through government assistance for investors. That assistance is not necessarily a financial contribution from government, instead a clear pathway through the industry-perceived red tape.

Government must also promote a can-do culture within and between departments that process approvals and permits inside the parameters of legislation. Case study findings in Phase I suggested a single point of entry or single department as a contact point to streamline processing.

For investors to conduct their due diligence prior to investing there needs to be increased guidance and education surrounding land development processes. This increase in information would further explain legislative requirements for different forms of land tenure and what is necessary and permitted for development. For instance, a pastoral lease is a limited property right and does not provide the leaseholder with the same rights that attach to freehold land. Specific conditions are assigned to pastoral leases, including a time period and the type of activity permitted. This information is not readily available and typically only becomes apparent when accessing and interpreting legislation.

Clear benchmarks for the relevant processes and sample documentation should be provided by government agencies. This will provide options for proponents to submit their own applications rather than engaging costly consultants. One example of vague process requirements is the perceived lack of clear direction provided for the self-referral process administered by the Northern Territory Environment Protection Authority (NTEPA).

To advance development of precinct planning, various land development models - including public private partnerships (PPPs) - may be provided to assist financial support for interested land tenure holders.

3

Issues facing the progression of agricultural precinct development

Key issues raised in Phase I of the project were:

- environmental approval process
- water availability and licencing
- land available and ready for development
- lack of precincts for small-scale development
- approval pathways
- distance and cost to markets
- resilient and reliable infrastructure
- skilled labour availability
- support service availability.

Legislation

Legislative control of planning and development of land in Australia occurs at the federal, state/territory and local government levels.

Land development in the Territory is controlled through legislation that applies depending on the scale and use of development and the tenure of the land. The following legislation and guidelines impact on precinct development:

NT legislation & guidelines

- *Crown Lands Act 1992*
- *Environment Protection Act 2019*
- *Northern Territory Pastoral Land Act 1992*
- *Planning Act 1999 and*
- *Water Act 1992*
- *Waste Management and Pollution Control Act 1998*

NT regulations & guidelines

- Northern Territory Planning Scheme 2020
- NT EPA Recommended Land Use Separation Distances (Guidelines)

Commonwealth legislation

- *Native Title Act 1993*
- *Environment Protection and Biodiversity Conservation Act 1999* (the *EPBC Act*)

The major areas of federal government legislation that impact on the planning process concern the protection and conservation of natural resources and heritage considered to be of national importance. The *Environment Protection and Biodiversity Conservation Act 1999* (the *EPBC Act*) is the Australian Government's key piece of environmental legislation. The objectives of the *EPBC Act* include conserving Australia's biodiversity and protecting the environment, especially matters of national environmental significance.

Current federal and territory legislation is effective and appropriate for allowing precinct planning and development to occur in the Northern Territory.

Policy and planning alignment

A range of strategic and master planning activities are being developed across government to coordinate and secure private sector investment.

These activities are all guided by the overarching principles outlined below:

Overarching principles

- **Economic growth and resilience**

  Investment, exports and import displacement, and economic activity should exceed the cost of the SDP program and result in new jobs; increased business and workforce capability and resilience; and economic growth and diversification.

- **Bankable investment environment**

  Investment proposals should not be rendered unviable by complexity, cost and delay associated with public policies and processes, such as the regulatory system. De-risking and coordinated facilitation are essential to creating a favourable environment for investment.

- **Commercial focus**

  Investments in SDPs should make sense economically and be supported by strong commercial underpinnings.

4

- **Strategic infrastructure investment**

  Infrastructure investment should be coordinated with the SDP program, with investment decisions informed by robust and comprehensive business cases.

- **Customer-focused services**

  Businesses should be able to deal with one customer-focused and responsive touchpoint that fulfils a client management role for government.

- **Sustainability**

  Precincts will be designed with key sustainability principles, including contribution to net zero emissions (utilising and maximising renewable energy), efficient water use (including reuse), and circular economy principles.

- **Industry and investor engagement**

  Development of an SDP should be underpinned by ongoing industry and investor engagement to ensure the final product will be desirable and achieve the investment outcomes being sought.

Precinct development approach

Building an evidence base for precinct planning

An evidence-based approach will underpin the development of SDPs, through government-led technical studies to identify the most suitable land uses, site opportunities and infrastructure requirements, and economic assessments to determine commercial viability.

Best practice:

- Localised studies and assessments specific to the vicinity.
- Managing cultural and environmental values within precincts.

Building partnerships with key stakeholders

The Government will involve stakeholders at an early stage through workshops that bring experts and stakeholders together to review the findings of economic and technical studies, and provide input into SDP design and development.

Best practice:

- Collaboration with stakeholders to better understand and meet their needs.
- A focus on Aboriginal-led economic development and leadership.

Regulatory de-risking/Alignment

The government will secure key regulatory approvals for SDPs in advance, so that individual investor proposals can be progressed without unnecessary delay.

Best practice:

- Streamlined processes to allow for high value agricultural and manufacturing developments in targeted areas.

Translation in master planning

SDPs are a component of the government's broader strategic and master planning activities, to help position the Territory to take advantage of market conditions. SDPs will be identified and aligned with master plan processes and key strategy development.

Best practice:

- The government will undertake planning measures at the regional level to ensure agricultural land is preserved for its intended use.
- Further master planning at the sub-regional level will identify new community infrastructure requirements including, but not limited to, roads, rail and schools.

Enabling infrastructure planning and investment

Critical enabling infrastructure will be available supported by clear and robust business cases to prioritise investment potentially including roads, utilities (such as water, electricity, gas, stormwater, waste management), and digital connectivity.

Best practice:

- Precincts will allow for targeted infrastructure planning to support future growth enablers for ongoing private economic activity and investment in the precinct.

Business concierge services for investment attraction

The government will establish a dedicated office to actively manage investor support and business set-up in SDPs including through promotion and attraction.

Best practice:

- A one-stop-shop for investors to easily access information and receive the guidance required for investment within the Northern Territory.

Conclusion

Refinement of the best practice in precinct planning will continue to evolve as we develop the precincts further using the focal case study area as a learning experience

The master planning approach is used to identify strategic opportunities in areas where resource, infrastructure or capability are complemented by competitive advantages and suitable market conditions at a regional, industry or project level. Considered alongside key constraints and enablers, an evidence base for an SDP can be developed. While master plans will identify and quantify opportunities at an industry or regional level, an SDP will activate the opportunity by delivering investment ready locations.

Best practice in precinct planning seeks to improve regulatory processes and approvals that enhance development in the Northern Territory and support a sustainable, liveable, prosperous and resilient path of progression.



Appendix B

Multi Criteria Analysis





De-Risking Phase II – NT Sustainable Precincts

Multi-Criteria Analysis to Identify a Case Study Area



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1

Executive summary

The Cooperative Research Centre for Developing Northern Australia (CRCNA) in partnership with the Northern Territory (NT) Department of Industry, Trade and Tourism (DITT) have commenced the Phase II De-risking Agricultural Development Program.

Based on the findings of Phase I of the program, CRCNA has made several strategic investments in exploring barriers to agricultural development across the north. One of these investments seeks to answer: how can improved prioritisation and planning practice support new sustainable development precincts in the Northern Territory. Consequently, the CRCNA and DITT have jointly invested in the "De-risking the NT Through Sustainable Development Precincts" project.

This project aims to resolve this research question and will be developed and implemented within the context of the emerging *NT Agribusiness Strategy*. Overall, this research will seek to improve planning and assessment practice for sustainable development precincts.

The Territory has long been known for its mosaic agriculture model of development, and as such, DITT has worked closely with the Department of Environment, Parks and Water Security (DEPWS) to identify and prepare to progress precinct opportunities within the Northern Territory. Eleven precinct areas were identified based on technical studies, including soil and water, access to logistics routes and other supporting criteria. This report outlines the multi-criteria analysis-based (MCA) approach.

Each precinct area was evaluated based on the objectives set out in the *Best Practice Sustainable Precinct Planning and Development Framework*.

Flowing on from this MCA-based approach, one precinct has been identified as the focal area to progress a case study that can support improved practice in planning new priority agricultural development areas and improved development assessment within those spaces. DITT aims to apply its emerging *Planning and Development Framework* in progressing priority activities within this focus precinct.

Background

Between 2018 and 2020, the CRCNA completed a study into 'De-risking, brokering and prioritising agricultural development in the Northern Territory' (Phase I). This study formed part of a wider collaboration between the CRCNA and the Northern Territory, Queensland (QLD) and Western Australian (WA) governments, all aimed at supporting the development of new agricultural activity across northern Australia. The final report was published in November 2020.

The Phase I report's recommendations proposed to enable pathways to sustainable (economic, environment, and social) development. These include:

- developing an efficient approach to converting parts of pastoral leases to freehold
- de-risking agricultural precincts that provide certainty for investors
- enabling Aboriginal agricultural development
- targeting infrastructure to facilitate development
- providing a supportive regulatory environment
- strategic de-risking in coordinated and targeted research, and
- improving trust, relationships and culture in development assessment and approval.

The next stage (Phase II) research project De-Risking the NT Through Sustainable Development Precincts, seeks to answer the core question: how can improved prioritisation and planning practice support new sustainable development precincts in the Northern Territory? This Phase II project is due for completion by October 2024.

The report responds to a specific milestone within that project that aims to explore the application of a multi-criteria approach in identifying priority precincts to be progressed by the NT Government, and more specifically, a focal precinct to trial. The focal area will evaluate and improve best practice approaches to precinct planning and development.

2

Definition of a sustainable development precinct (SDP)

Sustainable development precincts are identified through a master planning approach, to support and grow the economy and region by targeting investors and new demand markets.

Integral features of a sustainable development precinct include suitable soils and availability of water evidenced by science and robust regulation, as well as access to critical transport and logistics routes whilst supporting environmental and cultural values.

An SDP may also include existing or future infrastructure such as communications, power and water, accommodation, workforce availability, market opportunities or land access for ancillary use, noting these features are dependent on the investment readiness of the area.

An SDP should provide ease of access to existing business or supporting services, and stimulate broad community activity and regional growth to maximise economic and social benefit for more than one proponent.

Goal and objectives

Build a multi-criteria analysis and evidence base to prioritise a significant case study area for improved practice in planning and development of sustainable agricultural growth in the Northern Territory.

Selection and justification of criteria used

Determining priority assessment criteria

Three priority criteria were deemed essential for achieving successful and sustainable agricultural activities.

Findings and discussions contained in the CRCNA 'De-risking, brokering and prioritising agricultural development in the Northern Territory' Phase I report confirmed that favourable soil and water studies – specifically water availability assessments and land resource mapping – are critical features of suitable agribusiness sites.

Also highlighted in the report was the potential for poor product quality and subsequent value loss when transported over vast distances and/or rudimentary roads.

Based on these results, it is determined that the combination of the three priority criteria provides optimal foundations for profitable farming opportunities. Details of each criteria are below.

Priority criteria:

- **Soil quality and volume/area** – suitable soil is the vital foundation for vegetation and agriculture, supporting the security of food, animal feed, fuel, natural fibres and a range of ecosystem functions. Without good soils, farming efforts are futile.
- **Water availability** – irrigated agricultural production is highly dependent on water. Agribusiness opportunities are limited to dryland and pasture/livestock without sufficient volumes of, and appropriate access to, good quality water.
- **Logistics routes for all weather access** – effective logistical routes are critical for the delivery of agricultural products in a timely manner, in good condition, and for the right price. The same is true for the provision of goods and services to the farming site and surrounding community.

Supporting criteria:

- **Land suitable for agricultural development** – relative to the priority criteria of water and soil studies that specifically identify areas suitable for development, this land may form a mosaic structure across the greater region and ideally have sufficient supply/area to support agricultural activities .
- **Land tenure (pastoral and Indigenous land)** – the Territory Economic Reconstruction Commission (TERC) Final Report endorses the facilitation of sustainable development on both Aboriginal land and the pastoral land estate. The inclusion of these tenures will seek to continue with proposals and initiatives for diversification of industry, and the support of cultural development, in line with the TERC implementation plan recommendation.
- **Existing infrastructure (power, water, roads and communications)** – the presence of amenities already at or around the site typically reduces both expenditure and level of work required to create investment-ready land and also indicates the existence of some form of established community nearby.

3

- **Market opportunities** – depending on the location and type of agricultural product the opportunity varies significantly between regions. The NT is in close proximity to international market opportunities, however the long distances between towns/cities within the Northern Territory affect the level of opportunity. International markets rely on supply chain and logistics routes to get product to market. The Territory lends itself to filling seasonal market gaps with the opportunity to supply produce to Australia.
- **Workforce availability or attraction potential** – workers are more likely to commit to employment in locations that offer a balance of financial and social benefits. Easy access to established communities is typically a more attractive option than remote areas, which can feel very isolated for many people, resulting in poor staff retention.

Research Design and Methods

Internal stakeholder engagement between DITT and DEPWS resulted in the formulation of the assessment criteria. DEPWS were integral throughout the research phase providing technical expertise, data and analysis through extensive mapping of the Territory for land soil types, agricultural suitability assessments and water resources mapping.

Studies completed by NTG:

- land use planning – NT Planning Commission
- soil data/land resources - DEPWS
- vegetation
- water resources – DEPWS
- water allocation planning
- biodiversity
- sacred sites.

Stakeholder engagement

Stakeholders within relevant NT Government departments were involved in the identification of precinct areas and the multi-criteria analysis process, providing technical advice and expertise specifically historical data, scientific research, legislation detail, processes and practices, former contentious issues and potential impediments going forward in each area.

The below areas provided input:

- DEPWS Rangelands Division
- DEPWS Water Resources Division
- DITT Fisheries
- DITT Strategic Policy and Reform.

Industry stakeholders will be formally engaged through the next phase of stakeholder engagement to ensure the outcomes are accepted and desirable.

Structure of Analysis

Studies carried out at each of the nominated locations were assessed using a points system reflecting importance of site criteria. Comparison of results identified the precinct area that would best support the case study focal area.

Evaluation Criteria

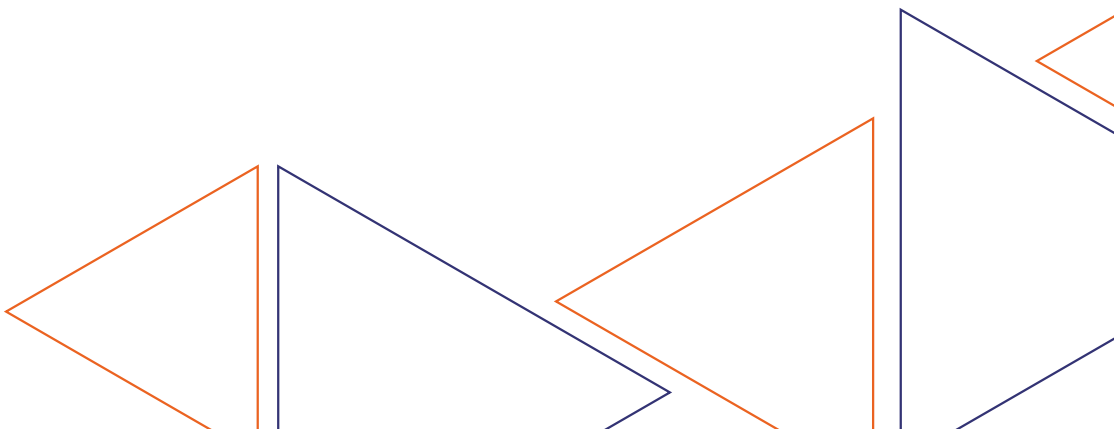
The following point system has been used to identify the area with the most potential that should be used as the focal area case study.

2 – optimal

1 – adequate

0 – requires further investment/investigation*

*This can be further investment in soil and water studies or infrastructure



4

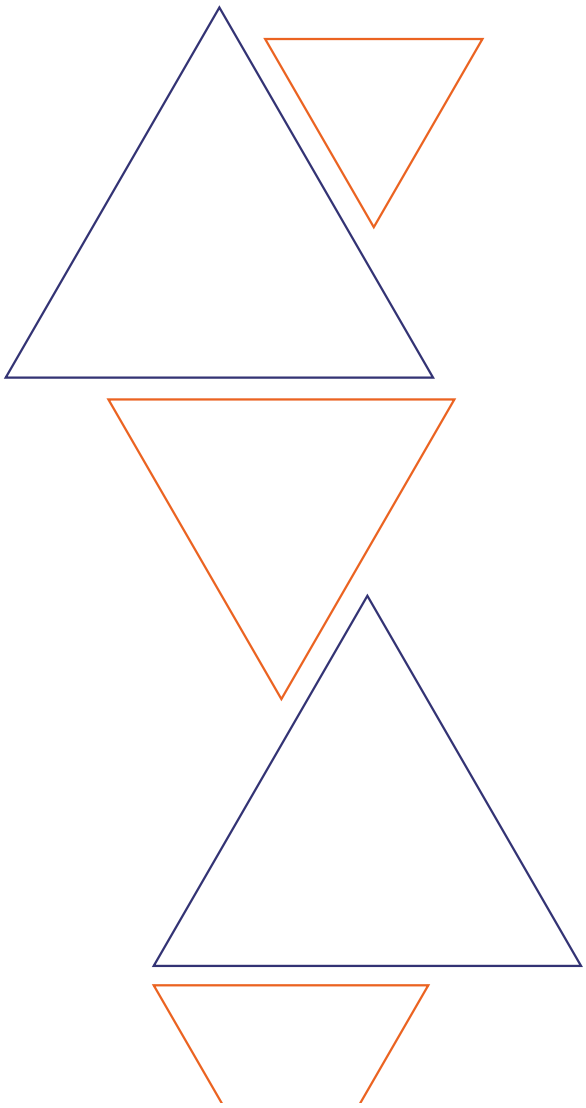
Identification of precinct areas within the Northern Territory.

The following precincts were identified taking into account the selection process outlined above. The below table provides the areas identified and whether it is an existing or new precinct. The precincts were identified in collaboration with Department of Environment, Parks and Water Security based on technical data and supporting criteria.

Precinct Location	Existing/Future
Barkly	F
Douglas Daly	E
Gunn Point Agricultural Precinct	E
Katherine	E
Lambells Lagoon Horticultural Precinct	E
Larrimah Agricultural Precinct	E
Marrakai Heights	F
Marrakai Downs	F
Mataranka	E
Western Davenport	E
Wildman Agricultural Precinct	E

Both existing and future precinct identification has been included due to the opportunities that are still present in existing precincts.

An outline of each individual precinct is detailed below, including technical references that support the inclusion of the area.



5

Barkly

The Barkly Tablelands region consists largely of cattle stations with open grass plains. Land tenure in the region includes pastoral, crown, Aboriginal land trust and Aboriginal-owned freehold.

The area covers four broad geomorphic zones of black soil plains, laterite plains, bedrock hills and desert country. The black soil plains, commonly referred to as the Barkly Tablelands is an extensive and largely treeless black soil plain extending some 500km from northwest to southeast and some 200km from northeast to southwest.

It is situated above the Georgina Basin, a large geological basin with extensive aquifers formed in fractured and cavernous limestone. This makes groundwater widely available and often the best option for stock supplies.

The area has a semi-arid subtropical climate. Rain occurs predominantly during the summer months with average annual rainfall varying from around 400mm in the south through to 600mm in the north. An approximate frost line limit zigzags across the region and forms an approximate half-way split between the northern and southern parts of the Barkly Region. Isohyets and the frost line limit will become critical when determining the prospective horticulture areas.

The largest town in the region is Tennant Creek, approximately 1,000km south of Darwin and 500km north of Alice Springs. Tennant is the service hub for the surrounding region and has education and health facilities and an airstrip.

The Barkly is in a strategic position logistically with access from the Barkly Highway linking to the east coast of Australia whilst also being in close proximity to the Stuart Highway with Darwin to Adelaide links.

The energy sector is looking at the Barkly to produce clean renewable energy through solar farms with Sun Cable planning to build the world's largest solar farm in the Barkly to provide 20% of Singapore's energy needs by 2027.

Barkly	Points awarded
Soil quality and volume/area	0
Water availability	0
Logistics routes for all weather access	0
Land suitable for agricultural development	0
Land tenure	1
Existing infrastructure – power, water, roads and communications	0
Market opportunities	1
Workforce availability or attraction potential	0
TOTAL	**2**

References:

Water Resources, DIPE 2003
Land Systems of the Barkly Region, 1947-48
Regional Plan 2021-2022, Barkly Regional Council

6

Douglas Daly

The precinct area consists of extensive existing agricultural development with a mix of land tenure including freehold and pastoral leases.

The region provides numerous competitive advantages for plant-based agriculture and horticulture. There is potential for brownfield cropping development where existing and successful cattle and hay production farming enterprises exist.

Stage 1 of Douglas Daly was developed by Agricultural Development and Marketing Authority (ADMA) in 1980 which established project farms on land excised from the Douglas and Oolloo pastoral leases. Strict conditions around broad-acre rain-fed cropping of grains were imposed on farmers and grain handling infrastructure was built in both Douglas Daly and Katherine. Stage 2 known as Stray Creek was the release of seven blocks between 2000-2002 excised from the Stray Creek pastoral lease.

The landforms, vegetation and soils across the precinct are diverse and include: sandy or loamy red earths, yellow earths or skeletal soils underlain by limestones, shales and other sediments.

Perennial rivers throughout the region support irrigation development, domestic and stock use. The region may have future opportunity for wet season surface water harvest within the catchment. There is also a managed aquifer recharge site identified on Stray Creek which would treat and then inject water into the Oolloo Dolostone aquifer which has capacity for artificial storage in the aquifer at the end of each wet season. A water allocation plan exists for the Oolloo Dolostone Aquifer 2019-2029.

With existing public infrastructure, roads, school and community facilities, Douglas Daly is an attractive area for families. The closest town is Adelaide River 100km away which has a number of facilities and a community health centre. To the north, the major cities of Palmerston and Darwin are 190km and 210km away respectively. To the south, the major town of Katherine is 200km away.

Cattle, forestry (African mahogany and sandalwood), melons, turf, rain-fed hay and fodder make up some of the agricultural diversity of the region. Cotton is envisaged to be the most pivotal plant-based agricultural crop going forward, incorporating rotations of sorghum, rice, legumes, maize or other high value crops.

The region has the highest rate of land clearing in the Territory. In November 2003 a clearing moratorium was declared in the Daly River region affecting freehold and pastoral leases. The moratorium was extended in 2007 with an emphasis on water allocation planning. In 2008 the clearing moratorium was formalised by Interim Development Control Order 17 which expired in 2010. The moratorium did not prohibit land-clearing but introduced a more stringent approval process and greater protection for riparian zones within 1,000m of the Daly River. Special provisions for the Daly River catchment are now included in the freehold land clearing guidelines.

Douglas Daly	Points awarded
Soil quality and volume/area	2
Water availability	1
Logistics routes for all weather access	1
Land suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	1
Market opportunities	1
Workforce availability or attraction potential	1
TOTAL	**9**

References:

Land Resources of the Daly River Basin, NRETAS 2006
Oolloo Dolostone Aquifer Water Allocation Plan 2019-2029

7

Gunn Point

N.T. Portion 2626 – Crown Lease in Perpetuity

N.T. Portion 4476 – Perpetual Pastoral Lease

Owned by the Northern Territory Land Corporation, N.T. Portion 2626 has an area under title of 26,070 hectares. Three 100-hectare sites have been selected to form the Gunn Point Emerging Agribusiness Precinct.

N.T. Portion 4476 has an area of 760,049 hectares under title and is owned by Koolpinyah Station Pty Ltd.

The three sites for lease are being established for the purposes of marketable crop trials where there is no current commercial production harvested in the Northern Territory. These trials will explore the viability of agricultural opportunities with potential for growth on a broader scale.

A land capability assessment carried out in 2017 found soil landscapes that are predominantly deep, gravelly, sandy or loamy surfaced red earths on gently undulating plains.

Groundwater resource investigations in 2020 confirmed the presence of a productive aquifer however the water chemistry analyses indicate the groundwater underlying the northern parts of the peninsula are impacted by salt water intrusion. The water quality is therefore best suited for farming purposes towards the inland portions of the site, away from the coastal regions.

The area is accessible via Gunn Point Road approximately 50km from the Stuart Highway at the Howard Springs intersection and entrance to the city of Palmerston. The city of Darwin is another 20km further northwest. The short distances between Gunn Point and these major town centres makes this site excellent for workforce potential and community service access.

Potential crops identified as suitable for growth here are monsoonal tropical, tropical citrus and fruit row crops.

An Aboriginal Areas Protection Authority (AAPA) abstract of records was provided in December 2021 as part of research carried out for an alternative project that did not go ahead. These records indicate that there are some registered and recorded sacred sites located on the parcel, including restricted work areas. The limitations associated with these identified AAPA sites do not affect the current areas flagged for agricultural development.

Gunn Point	Points awarded
Soil quality and volume/area	2
Water availability	0
Logistics routes for all weather access	0
Land suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	0
Market opportunities	1
Workforce availability or attraction potential	2
TOTAL	**7**

References:

Gunn Point - Department of Environment, Parks and Water Security

8

Katherine

Katherine's rich natural assets and strategic positioning to interstate and overseas markets present multiple opportunities for growth.

The precinct area consists of extensive existing agricultural development scattered around the township. The region provides numerous competitive advantages for plant-based agriculture and horticulture. There is potential for further development where there are existing and successful cattle and hay production farming enterprises.

Potential horticulture sites were identified in the Katherine Land Use Plan 2014 in the Florina, Manbulloo and Venn areas. The region has significant areas of well-draining, deep soils with properties capable of irrigated cropping. DEPWS are currently completing further continuous mapping as part of the Mapping the Future program.

A water allocation plan exists for the Tindall Limestone aquifer in the Katherine region. As stated in the plan, the aquifer *"… represents one of the Territory's highest yielding, good quality groundwater resources. The geological makeup of the Tindall formation is a karstic system featuring spring discharge, sinkholes, limestone outcrops and intricate cave systems."*

The main tributary of the Daly River is the Katherine River, with the remaining key tributaries including the Flora, Fergusson, Edith, and Douglas rivers. The region may have future opportunity for wet season surface water harvest within the catchment. There are also managed aquifer recharge sites identified on the King River which would treat and then inject water into the aquifer which has capacity for artificial storage in the aquifer at the end of each wet season.

Katherine is a regional hub located 320km southeast of Darwin. Connected by rail, the town is at the crossroads of two major highways: Victoria Highway to Western Australia and Stuart Highway, linking Darwin and Southeast Asia through the Port of Darwin to our southern states.

The Katherine Agribusiness and Logistics Hub is being developed to support agricultural industry close to the town.

Katherine	Points awarded
Soil quality and volume/area	1
Water availability	0
Logistics routes for all weather access	1
Land suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	1
Market opportunities	1
Workforce availability or attraction potential	2
TOTAL	**8**

References:

Katherine Land Use Plan, Northern Territory Planning Commission 2014
Water Resource Availability Map within 150km of Katherine, DIPE 2002

9

Lambells Lagoon

Sections 1580 and 1695 Hundred of Guy – Vacant Crown

The first stage of Lambells was developed in the 1990s with further agricultural expansion opportunities identified in this location.

Owned by the Crown, the area covers 2,171.5 hectares over two titles.

The landforms, vegetation and soils across the site are diverse and include: flat plains of gravelly yellow massive earths, low hills and gentle side slopes. Wetlands and poor draining soils are scattered throughout the site. Groundwater found north in Black Jungle is free of salinity.

Access to Section 1580 is from either side of Arnhem Highway and Goode Road with Section 1695 accessible from Lambells Lagoon Road. The sites are approximately 15km from the Stuart Highway.

The closest neighbouring communities are Palmerston and Darwin at 30km and 50km respectively. These major centres provide ease of access to excellent community services and resources.

Horticulture in the area includes mangos, melons, bananas, pineapples, pumpkins and plant nurseries.

Lambells Lagoon	Points awarded
Soil quality and volume/area	1
Water availability	0
Logistics routes for all weather access	2
Land suitable for agricultural development	0
Land tenure	1
Existing infrastructure – power, water, roads and communications	1
Market opportunities	1
Workforce availability or attraction potential	2
TOTAL	**8**

References:

REPORT_Water-Resources-of-the-Howard-River-Region.pdf (greeningaustralia.org.au)
Territory Stories - Land units of the Lambells Lagoon - Middle Point area

10

Larrimah

N.T. Portions 4478 and 4663 - Crown Lease in Perpetuity

N.T. Portions 5130, 6365 and 6366 - Perpetual Pastoral Lease

Portions 4478 and 4663 cover 5,712.6 hectares over two titles and are owned by the Northern Territory Land Corporation. Portions 5130, 6365 and 6366 are privately owned and make up an area of 405,070 hectares over three titles.

The landforms vegetation and soils across the site include versatile land associated with suitable agriculture such as predominantly deep, well-drained, sandy surfaced red earths on level to very gently undulating plains and lower pediment slopes. The area includes pastoral land, and land considered unsuitable for irrigated agriculture. Seasonal rainfall in the region makes this site appropriate for only a very restricted range of dryland crops.

The Tindall Limestone aquifer lies beneath the studied area deeming this site subject to the proposed Tindall Mataranka – Daly Waters Allocation Plan.

Larrimah town site is located along the Stuart Highway approximately 180km south of Katherine and 500km south of Darwin.

Suitable farming options are dryland and irrigated crops including mangos, citrus and melon, as well as intensified beef production.

Larrimah	Points awarded
Soil quality and volume/area	1
Water availability	1
Logistics routes for all weather access	1
Land suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	0
Market opportunities	1
Workforce availability or attraction potential	0
TOTAL	**6**

References:

Territory Stories - Soil and Land Suitability Assessment for Irrigated Agriculture in the Larrimah Area, Sturt Plateau
Mataranka Tindall Limestone Aquifer Water Allocation Plan - Department of Environment, Parks and Water Security

11

Marrakai Heights

N.T. Portions 1170, 1299 and 3054 – Perpetual Pastoral Lease

N.T. Portion 6247 and 6248 – Freehold

N.T. Portion 2301 – Crown Lease in Perpetuity

All 164, 314 hectares are privately owned and include both Woolner and Marrakai stations.

Marrakai Downs - AROWS

N.T. Portions 2851, 4021, 4125 and 4126 – Crown Lease in Perpetuity

Owned by the Northern Territory Land Corporation, the area comprises 30,258 hectares over four titles. Sub-leased to adjoining owners of Mt Keppler Station for the purposes of grazing, the sub-lease expired at the end of April 2022.

The landforms, vegetation and soils across both the north and south sites are diverse and include: higher hills and ridges, low hills and rises, sandy and clay soil plains of variable depths, floodplains, drainage systems and riverbanks. Proterozoic dolostone aquifers may offer potential for future groundwater resource development.

Marrakai's closest neighbouring town is Batchelor approximately 40km away , with the larger city of Darwin approximately 90km away. The town of Adelaide River is located 55km away and Palmerston City 70km, making Marrakai an attractive area for families in close proximity to multiple communities with health and educational facilities.

Entrance to the site is from Marrakai Road (unsealed) which can be accessed from both Stuart and Arnhem Highways.

Rice is grown on neighbouring Mt Keppler, and cattle, mahogany, melons, mangoes, turf, hay and fodder make up some of the agricultural diversity of the greater region.

The Adelaide River Off-stream Water Storage (AROWS) is a proposed reservoir located to the west of the site, approximately 5km directly north of Lake Bennett. The area will store water harvested from the Adelaide River during the wet season flows. An objective of the AROWS project is to enable agricultural development and industrial activities in the region.

Marrakai Heights	Points awarded
Soil quality and volume/area	0
Water availability	0
Logistics routes for all weather access	1
Land suitable for agricultural development	0
Land tenure	1
Existing infrastructure – power, water, roads and communications	0
Market opportunities	1
Workforce availability or attraction potential	1
TOTAL	**4**

Marrakai Downs - AROWS	Points awarded
Soil quality and volume/area	0
Water availability	0
Logistics routes for all weather access	1
Land suitable for agricultural development	0
Land tenure	2
Existing infrastructure – power, water, roads and communications	1
Market opportunities	1
Workforce availability or attraction potential	1
TOTAL	**6**

References:

Digital soil mapping of the Fitzroy, Darwin and Mitchell catchments (csiro.au)
Land suitability of the Fitzroy, Darwin and Mitchell catchments (csiro.au)
Hydrogeological characterisation of the Mary–Wildman rivers area, Northern Territory (csiro.au)
Groundwater flow modelling of the Mary–Wildman rivers area, Northern Territory (csiro.au)

12

Mataranka

N.T. Portions 2255, 3960 and 6181 - Crown Lease in Perpetuity

N.T. Portions 1636, 1604, 5417 and 7018 – Freehold

N.T. Portion 2731 – Perpetual Pastoral Lease

A total area of 807,797 hectares over six titles includes a variety of ownerships including private, Aboriginal land trust and Northern Territory Land Corporation.

A mixture of sandy red earths, red earths, earthy sands and lateritic podzolics can be found scattered across the site indicating good potential for agriculture. The Tindall Limestone aquifer lies beneath the studied area deeming this site subject to the proposed Tindall Mataranka – Daly Waters Allocation Plan.

The Stuart Highway runs north-south through the district, offering excellent logistical supply routes and access to surrounding communities.

Katherine is Mataranka's closest neighbouring community at a distance of about 100km and Darwin is just over 400km to the north of the Mataranka region.

There has been success in farming cattle, melons and mangoes in the area and the zone holds good potential for horticulture.

Mataranka is known for its natural hot thermal springs, with the town and surrounds a popular attraction for tourists and locals alike.

Mataranka	Points awarded
Soil quality and volume/area	1
Water availability	1
Logistics routes for all weather access	1
Land supply suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	1
Market opportunities	1
Workforce availability or attraction potential	0
TOTAL	**7**

References:

Territory Stories - Land Resources of Elsey Park, Mataranka, N.T. (nt.gov.au)

13

Western Davenport

N.T. Portions 653, 655, 704, 1092, 2286, 3375 - Perpetual Pastoral Lease

N.T. Portions 718, 1736, 2844 – Freehold

This emerging farming precinct covers approximately 2,876,100 hectares and is a mix of privately-owned and Aboriginal trust land.

Studies found a variety of soils including predominantly deep, aeolian derived, red earthy sands, sandy-surfaced red earths and level sand plains which are all suitable for a range of irrigated cropping uses. Also present are shallow stony soils, loose dune sands and areas subject to intermittent flooding which are only suited to a limited range of crops.

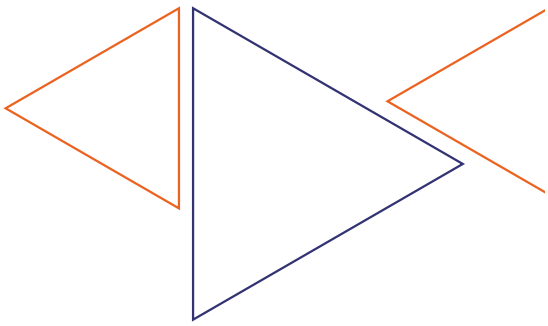
The water control district of almost 2,450,000 hectares sits over several part portions and water extraction in this area is subject to the Western Davenport Water Control District Water Allocation Plan.

Stuart Highway is the main transport corridor that runs through the centre of the region providing good access to the town centre of Alice Springs approximately 250km to the south, and the capital city of Darwin roughly 1000km from the northern most point of the zone.

Research has identified potential for production of a diverse range of crops including stone fruit, nuts, and temperate subtropical fruits.

A site of conservation significance exists in the northeast portion of this precinct with several threatened species being identified. The preservation area has multiple current management strategies in place including site-specific plans, national recovery plans for threatened species, and numerous threat abatement plans.

Western Davenport	Points awarded
Soil quality and volume/area	1
Water availability	1
Logistics routes for all weather access	1
Land supply suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	0
Market opportunities	1
Workforce availability or attraction potential	0
TOTAL	**6**



References:

Territory Stories - Soil and Land Suitability Assessment for Irrigated Agriculture in the Ali Curung Area, Western Davenport District
Territory Stories - Western Davenport Water Allocation Plan 2021-2022 (nt.gov.au)

14

Wildman

NT Portions 2623, 2624, 3611 and 5088 – Crown Lease in Perpetuity

Owned by the Northern Territory Land Corporation, the area comprises 26,000 hectares over four titles and has been earmarked for agricultural development since the early 1980s.

The landforms, vegetation and soils across the site are diverse and include: drainage lines, swamps, low hills and rises, alluvial plains with some clay soils and sandy soil plains of variable depth. A large percentage of soils are greater than 1m depth, some greater than 1.5m deep with a high percentage of the soil types classified as moderate to high land capability for agriculture.

The site experiences high wet season rainfall, is located in a low-risk cyclone area and is provided a water licence of 8,021ML on NT Portion 5088. The proponent will be required to apply for additional water on the remaining NT Portions included in the precinct. By securing additional water, the site will have the capacity to accommodate multiple agricultural and horticultural activities.

Wildman's closest neighbouring communities are Palmerston and Darwin at approximately 115km and 135km respectively. These major centres provide ease of access to excellent community services and resources. Entrance to the site is by sealed road, via the Point Stuart Road which intersects the Arnhem Highway.

The suitable crop types for the site include, but are not limited to: bananas, mangoes, melons, hay/forage crops, Kakadu plum, rain-fed forestry, beef cattle and buffalo production.

Cattle and agritourism make up some of the agricultural diversity of the greater region.

Wildman	Points awarded
Soil quality and volume/area	2
Water availability	1
Logistics routes for all weather access	0
Land suitable for agricultural development	1
Land tenure	1
Existing infrastructure – power, water, roads and communications	0
Market opportunities	1
Workforce availability or attraction potential	1
TOTAL	**7**

References:

Water Resources 2016
Soil and Land Suitability Assessment 2016

15

Results

Locations	Total points
Barkly	2
Marrakai Heights Agricultural Precinct	4
Larrimah Agricultural Precinct	6
Marrakai Downs	6
Western Davenport	6
Gunn Point Agricultural Precinct	7
Mataranka	7
Wildman Agricultural Precinct	7
Katherine	8
Lambells Lagoon Horticultural Precinct	8
Douglas Daly	**9**

Evaluation Outcome

Based on the scoring system, the location of Douglas Daly has been deemed the most suitable focal area for the project continuation of De-Risking Phase II.

Conclusion

As a result of the evidence based multi-criteria analysis, the area of Douglas Daly has been prioritised for improved practice in planning and development of sustainable agricultural growth in the Northern Territory.

The next step of the focal case study area will include the identification of cultural and environmental significant areas within the determined area.

This multi-criteria analysis may be further refined, taking into consideration the feedback and input received regarding the *NT Agribusiness Strategy*, which is currently in the consultation phase. In line with the implementation of the strategy, Territory-wide precinct identification and planning will assist to prioritise detailed and location specific land and water capability studies to build confidence and encourage investment in the industry.

The basis of these learnings provides the opportunity to collaborate with other jurisdictions for the development of Northern Australia.

Appendix C

Douglas Daly Case Study





Douglas Daly

Pre-consultation DRAFT of Case Study Area

De-Risking Phase II – NT through Sustainable Development Precincts







Australian Government
Department of Industry, Science and Resources

AusIndustry
Cooperative Research Centres Program

NORTHERN TERRITORY GOVERNMENT

CRCNA

Document title	Douglas Daly
Contact details	Department of Industry, Tourism and Trade

Version	Date	Author	Changes made
1	June 2022	Department of Industry, Tourism and Trade	First version

Abbreviations	Full form
CRCNA	Cooperative Research Centre for Developing Northern Australia
DEPWS	Department of Environment, Parks and Water Security
DITT	Department of Industry, Tourism and Trade
DDRF	Douglas Daly Research Farm
EOI	Expressions of Interest
NT	Northern Territory
SDP	Sustainable Development Precinct

DISCLAIMER

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2

1. Introduction

The Territory has long been known for its mosaic agriculture model of development, and as such, DITT has worked closely with the Department of Environment, Parks and Water Security (DEPWS) to identify and prepare to progress precinct opportunities within the Northern Territory. Eleven precinct areas were identified based on technical studies, including soil and water, access to logistics routes and other supporting criteria.

Each of the eleven precinct areas were evaluated based on the objectives set out in the *Best Practice Sustainable Precinct Planning and Development Framework* using a multi-criteria analysis-based approach. As a result of the evidence based multi-criteria analysis, the area of Douglas Daly has been prioritised as the case study area for improved practices in planning and development of sustainable agricultural growth in the Northern Territory.

This case study has been developed as part of the CRCNA project 'De Risking the NT through Sustainable Development Precincts' and broader approach to identify and develop key sustainable development precincts in line with the recommendations of the Territory Economic Reconstruction Commission Final Report.

The CRCNA project follows on from the Phase I report and seeks to answer the core question: How can improved prioritisation and planning practice support new sustainable development precincts in the Northern Territory?

To explore the question, the case study provides a comprehensive history of the regions development, along with exploring the current uses, natural resource availability and environmental and cultural areas. With this the project seeks to identify, research and co-design the case study with stakeholders to identify the strengths, opportunities and challenges across the region and broader Northern Territory agricultural industry.

The goal is to stimulate growth, and encourage expansion for existing property owners in the Douglas Daly region where there is potential for further agricultural development and diversification. The project aims to identify advantages of how precincts can benefit current land owners and support ongoing advancement.

The stakeholder engagement phase of the project will seek input for preferences, limitations and experiences with the focus on diversification of land activities that will support, strengthen, and cultivate progression of the current situation.

3

2. The Region

2.1. Location

The Douglas Daly region is well situated to access road, rail and sea freight networks with Darwin located approximately 200km to the North and Katherine 200km to the south. Douglas Daly is an attractive area for families with existing public infrastructure, including a primary school and community facilities. A community health centre is located in the nearby town of Adelaide River 100km away. The closest police station is located at the community of Daly River.

The NT Government Douglas Daly Research Farm situated in the region is a mixed farming research and demonstration facility covering an area of 3,100 hectares. It has been pivotal in exploring the potential of the area and carrying out trials to assist the emerging agriculture industries of the region.

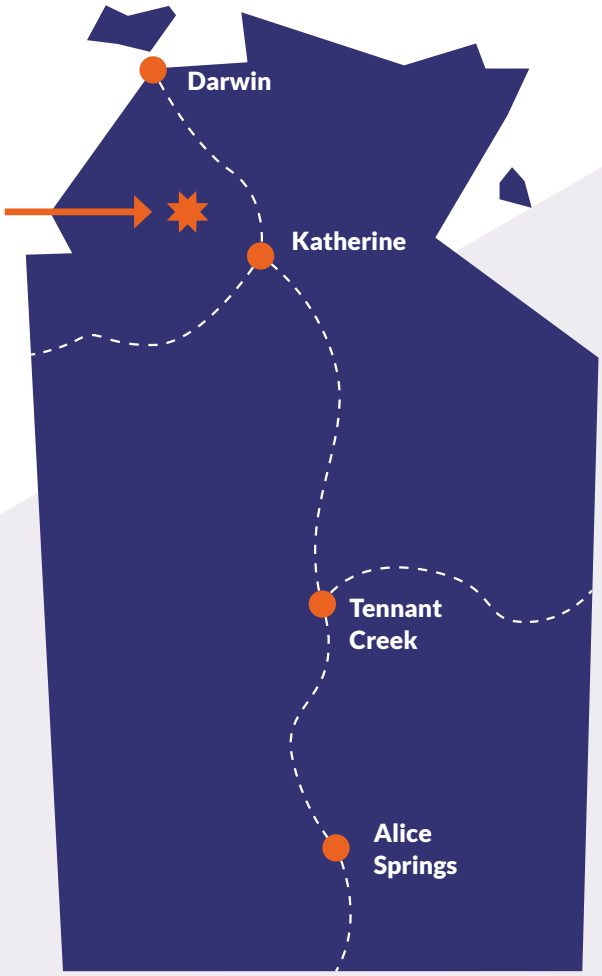


Figure 1 - Locality map

4

2.2. History

The Douglas Daly region is well known for agricultural diversity and has experienced significant change since the area was first developed for horticulture in the 1980s. From the early cropping era to cattle grazing and assorted horticulture, the district has progressed to become a valuable region of agricultural production.

The Douglas Daly Research Farm (DDRF) facility was established in the 1960s to investigate and research the development and extension of agriculture in the Top End. Early research in the area was focused on peanuts and cotton as potential crops to grow in the Katherine–Daly basin. Various crops followed such as sorghum, safflower, guar, soybean, maize and sesame as well as introduced pasture species sown into cleared and non-cleared areas. Cattle management, breeding, nutrition, market requirements, grazing and carrying capacity trials have been assessed over the years to identify best management practices for the cattle industry. A primary school was established on DDRF in 1982 to cater for the growing demand of families moving into the region with the expansion of agriculture.

With the region showing agricultural potential, Stage 1 of Douglas Daly was developed by the Agricultural Development and Marketing Authority (ADMA) from 1980 which established project farms on land excised from the Douglas and Oolloo pastoral leases. Strict conditions were imposed on farmers around broad acre rain-fed cropping of particular grain crops with initial lease conditions. ADMA provided some on-farm infrastructure along with the construction of supporting grain handling depots in both Douglas Daly and Katherine. The limited marketing opportunities for produced grains coupled with the use of southern farming practices and the remote living situation saw many of the original farmers leave the district after a few years.

The development of improved pastures and the availability of live cattle export markets in Southeast Asia resulted in a new focus on beef production in the 1990s. The Douglas Daly region was used not only for growing out cattle for export, but also as a depot despite road conditions being challenging, with the live export port in Darwin being less than 250km away.

Improved cattle production resulted in increased supplementary feed requirements between station yards, in holding depots and during transport by ship. Fodder crop production became an important industry for the Top End and the region to supply high quality fodder and fodder cubes for transporting cattle by ship to Asian markets.

Stage 2 of the Douglas Daly land release known as Stray Creek was the release of seven freehold land parcels in the early 2000s which were excised from the Stray Creek pastoral lease. To ensure future growth, Stray Creek properties were sold with development lease conditions attached that required purchasers to make a certain dollar amount of improvements before receiving freehold titles. Dollar amounts differed between properties.

In the mid-2000s, the introduction of managed investment schemes in plantation forestry resulted in the development of a plantation estate of African mahogany in the region with investment companies purchasing numerous properties. These non-irrigated forestry plantations were developed predominately on freehold land previously cleared for improved pastures with the majority integrating cattle operations.

Although cattle production is still the prominent industry, Douglas Daly has become a more diversified agricultural region with other enterprises emerging. A number of pastoral leases surround the freehold area of the region and properties have expanded operations past cattle grazing. Tipperary Station has been the site of a wide range of agricultural and horticulture projects over the past 40 years.

Tipperary was the first pastoral lease in the Territory to apply for a non-pastoral use permit, allowing pastoral properties to diversify tenure on 30% of their land for up to 30 years. They were also granted the first licence in the Territory to commercially grow opium poppies. In 2019 it was the first commercial cotton trial harvested in the Territory in 15 years. Around the same time an orchard of 3,500 lemon trees were planted with plans to expand to 10,000 trees.

Tourism operations were established in the early days with the Douglas Daly Holiday Park formally named The Corn Patch Caravan Park being built circa 1987.

5

2.3. Current uses

The diverse mix of tenure in the region allows a range of land uses with private freehold properties, pastoral leases, aboriginal land and conservation areas.

Agricultural development includes centre-pivot irrigation supported by groundwater extraction, small scale horticulture and improved pasture for cattle grazing. The majority of land clearing has occurred on the freehold land with the extent shown in Figure 2. Freehold property identification names and tenure types are shown in Figure 3.

2.3.1. Freehold properties

The most prominent land use across the freehold properties is cattle production on improved pastures with a diverse range of agricultural enterprises. Rain fed hay, fodder and forestry (African mahogany and sandalwood) are also prominent throughout the region with intensive horticulture such as melons, pumpkins, onions, turf and cotton.



Figure 2 - Aerial imagery showing the distribution of cleared blocks for cropping and improved pastures.

6



Figure 3 - Property identification names and tenure.

7

2.3.2. Pastoral leases

The pastoral properties that surround the region are Douglas, Douglas West, Douglas South, Jindare, Claravale, Dorisvale, Tipperary East and Tipperary West.

Tipperary East pastoral lease (N.T. Portion 7348) has applied and been granted a number of non-pastoral use permits for various horticultural and agricultural activities including poppies, mangoes, fruit trees and commercial production of hay. The most recent permit granted was for the purposes of growing cotton, sorghum, soybeans and corn and was issued on 31 July 2020.

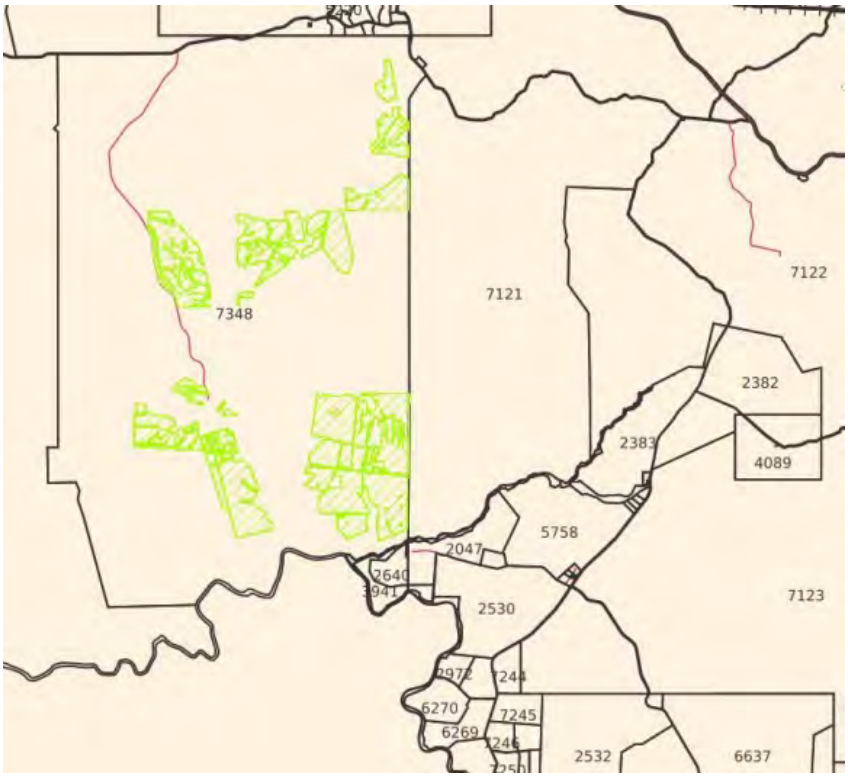


Figure 4 - Current non-pastoral use permits on Tipperary East pastoral lease.

Source: NR Maps.

8

2.3.3. Aboriginal land

The Upper Daly Aboriginal Land Trust and Wagiman Aboriginal Land Trust areas have a number of Section 19 grazing leases to adjoining landowners.

Section 19 of the *Aboriginal Land Rights Act* allows for government, businesses, organisations and individual people to apply to a land council for leases over specific areas of Aboriginal land. The land council consults with traditional owners and other affected Aboriginal groups and communities to make a decision on each lease proposal.

2.3.4. Douglas Daly Research Farm

The Douglas Daly Research Farm (DDRF) is 3,100 hectares with approximately 2,500 hectares of cleared land mainly for improved pastures with some wet season fodder and grain crops. Paddocks range in size from 2 hectares to 300 hectares depending on the trial types and land usage.

DDRF undertakes research, development and extension activities, with a focus on beef cattle production from improved pasture production systems, investigating potential irrigated crops and fodder and diversification of pastoral land into more intensive agricultural production. Recent research has been centred on cattle, such as Brahman versus Composites, Senepol crossbreeding, improved heifer performance and fertility, and rotational grazing.

Since the 1970s DDRF has maintained a breeder herd of cattle to examine production parameters in order to improve overall production. Sentinel cattle herds are used to identify and monitor the spread of any new arboviruses through the National Arbovirus Monitoring Program. The sentinel herds are bled monthly with insects on the animals being collected for identification. Insects are also collected from the surrounding environment using light traps.

While agricultural research is the main priority for DDRF, other organisations and government agencies have used the facility as a base for staff and temporary accommodation for work and research carried out on the research farm and in the surrounding region. These organisations include the Bushfire Council of the NT, CSIRO, the Australian Geographic Society, Charles Darwin University (CDU), the NT Department of Environment, Parks and Water Security (DEPWS), the Tropical Rivers and Coastal Knowledge (TRaCK) research group and interstate universities.

In 2020, 200 hectares of under-utilised land on DDRF was released through an EOI process for a commercial horticulture grower to undertake agricultural or broad-acre farming activities. The successful proponent is growing melons and was granted a licence term for three years with an option to extend for a further two years.

The office complex has a clean and a dirty laboratory, which have been used for different kinds of sample processing. Other buildings include machinery sheds, workshop, a power generator shed, hay storage, general storage sheds, staff accommodation and a community library. There are four grain silos with grain drying and handling equipment.

The facilities at DDRF make it ideal for training, such as Chemcert/SmartTrain, bushfire training, first aid courses, low-stress cattle handling workshops, pasture schools and grader, backhoe and bulldozer operator courses. The Australian Defence Force has also utilised the facilities during its training exercises.

2.3.5. Tourism

The commercially operated Douglas Daly Holiday Park is currently the only accommodation provider in the region. Located on the Douglas River Esplanade it offers camping sites, cabin accommodation, pool, kiosk, restaurant and fuel facilities.

There are established campgrounds surrounding the conservation areas that can be reserved through the Northern Territory Parks booking system. Campgrounds are available at Crystal Falls, Tipperary Crossing, Stray Creek and Oolloo Crossing with the Tjuwaliyn (Douglas) Hot Springs Nature Park currently closed.

There are many tourism operators in the nearby Daly River community including fishing safari tours and a number of caravan parks and accommodation providers.

2.4. Infrastructure

The road network is a mix of sealed and unsealed surfaces. Overall access is good and reliable, except for the heaviest of rainfall events with several creeks which may cut Oolloo Road for short periods during the wet season.

Telecommunications in the area include limited mobile coverage.

Power exists to part of the region with majority of properties powered by generators.

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3. Natural Resources

3.1. Climate

The seasonal conditions of the region are characterised by the wet dry tropics where rainfall is received for seven months of the year from October to April with the remaining five months receiving little or no rain. Annual mean rainfall is 1,246mm with the mean number of days of rain ≥ 1mm at 67 and the mean number of days of rain ≥ 10mm at 33. Mean monthly minimum temperatures range between 13 to 24°C and mean monthly maximum temperatures range from 31 to 38°C.

The Bureau of Meteorology official meteorological recording station at Douglas Daly Research Farm has been recording daily climate data since 1968.

3.2. Water availability

Rivers

Perennial rivers throughout the region support irrigation development, domestic and stock use. The Daly River is one of only a few large perennial river systems in northern Australia and is well recognised for its natural and cultural values. (Erskine WD, 2003)

Aquifers

The Oolloo Dolostone aquifer that underlies the region is the uppermost formation of the Daly groundwater basin, located just north of the Douglas and Daly River confluence and extending southeast to beyond the Katherine River. The extent of aquifer boundaries are shown at Figure 5.

The Oolloo Dolostone aquifer is an important karstic aquifer with its groundwater discharging into the Daly River, maintaining flow throughout the dry season and supporting the associated riverine ecosystems. It currently provides reliable, good quality water supply for agricultural production with low salinity. Typical bore yield is around 50L/sec and ranges up to 150L/sec. Water level ranges up to 38 metres below ground.

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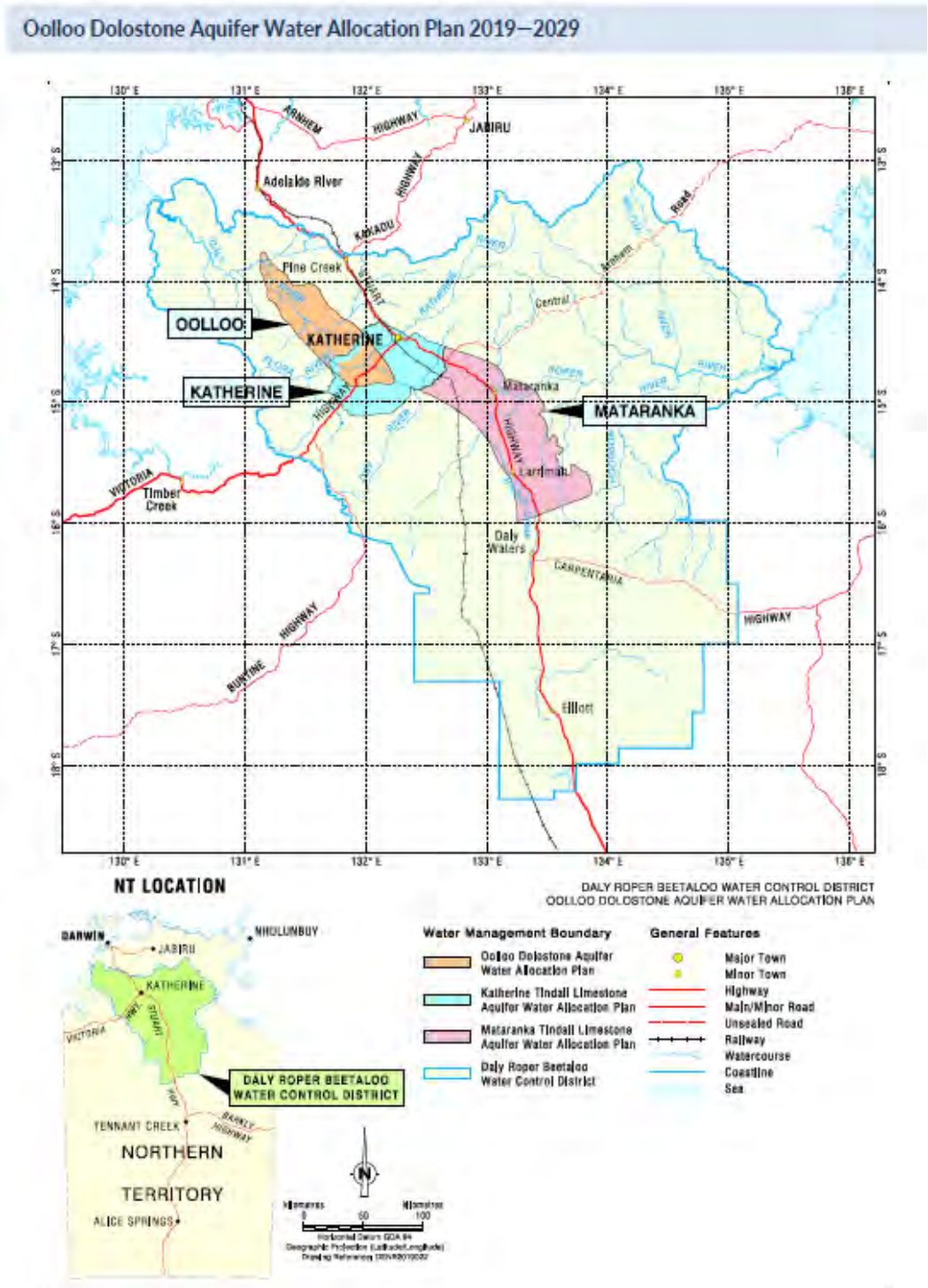


Figure 5 – Aquifer locations

Source: Oolloo Dolostone Aquifer Water Allocation Plan 2019-2029.

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Water Allocation Plan

A water allocation plan exists for the Oolloo Dolostone aquifer 2019-2029 to ensure water resources are managed in a manner that protects and maintains environmental and cultural values while providing a sustainable volume of water for consumptive beneficial use.

In the Northern Territory, water entitlements have been allocated on a first-in first-served basis, with each decision based on its merits along with the cumulative impact on the water resource and other users of the resource. As per the Act, licences are generally issued for a maximum 10-year period, with an option of renewal. The distribution of water licences in the region is shown in Figure 6.

The provision for trading water is enabled by the *Trading Licensed Water Entitlements Policy* which allows all or part of a water licence to be transferred within a water allocation plan area. To date there has been one water trade within the southern zone of the Oolloo Dolostone aquifer for 500ML which expired on 30/04/2021.

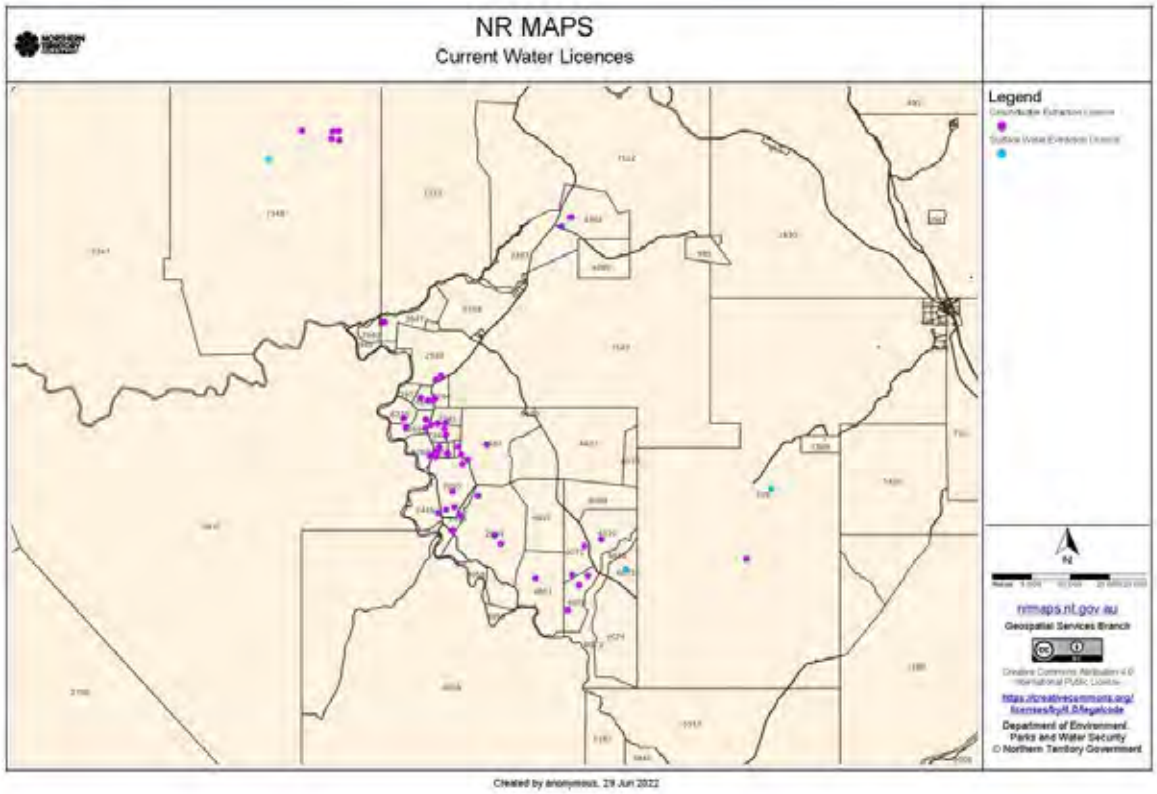


Figure 6 – Water extraction licences

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Strategic Aboriginal Water Reserve

A reserved percentage of water exists within the consumptive pool of the water allocation plan exclusively accessible to eligible Aboriginal people to use or trade. The total area of the Groundwater Management Zone (GMZ) is 527,687 hectares of which 125,609 hectares is eligible Aboriginal land with locations shown at Figure 7.

The accessible Strategic Aboriginal Water Reserve available in the water allocation plan as at 20 August 2019 was 9,825ML/year.

Further water provision may become available to the Strategic Aboriginal Water Reserve in the future through surrendered, amended or cancelled licences or changes to the estimated sustainable yield following a review of the water allocation plan. In line with the *Strategic Aboriginal Water Reserve Policy Framework*, water required for public water supply, rural stock and domestic use must be made before provisioning the Strategic Aboriginal Water Reserve.

If the status of Aboriginal land changes, then the Strategic Aboriginal Water Reserve is reviewed as part of the water allocation plan review, which must occur at least every five years.

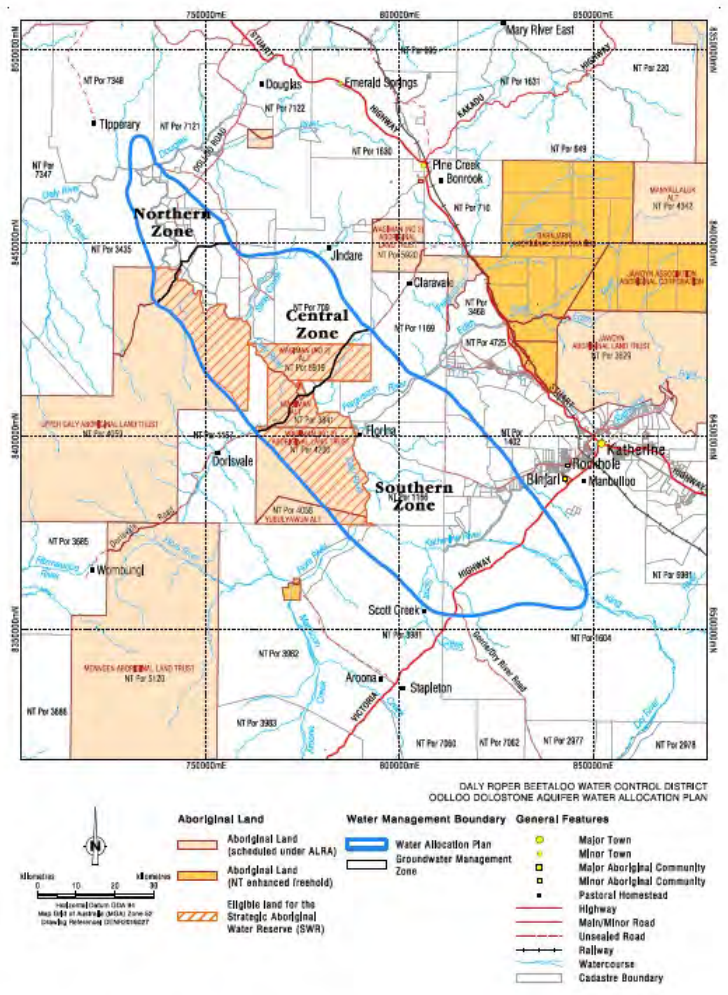


Figure 7 - Aboriginal land overlying the Oolloo Dolostone aquifer in the Northern, Central, Southern Zones.

Source: Oolloo Dolostone Aquifer Water Allocation Plan 2019-2029.



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3.3. Soil suitability

The majority of land systems in the area are Blaine soils of various sub-classifications. Blaine soils are typically deep sandy red Kandosols. They are characterised by being highly siliceous at the surface, earthy, increasing to clay loams at depth (1.0 – 1.5m) of low fertility, moderately acid and have low water-holding capacity.

The soils are well drained and suited for overhead irrigated farming systems. They have over time proved to be highly productive for annual agricultural/horticultural and other broad-acre cropping systems in the Top End.

3.4. Technical studies

Extensive studies have been completed including soil, water, flora and fauna.

Further details will be obtained during stakeholder engagement process with DEPWS.



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4. Environment and Cultural

4.1. Conservation areas

The regions conservation areas protect a significant section of the Douglas and Daly Rivers riverine systems. The areas include:

- Douglas River/Daly River Esplanade
- Stray Creek
- Tjuwaliyn (Douglas) Hot Springs
- Butterfly Gorge Nature Park
- Umbrawarra Gorge Nature Park

The Daly River middle reaches is declared a conservation site of national significance.

The middle reaches of the Daly River runs through two pastoral properties - Tipperary and Fish River - with smaller portions of the Site at the eastern and western ends of this river section comprising a mixed tenure including freehold and Crown leasehold land. The small communities of Daly River and Nauiyu occur in the western part of the Site.

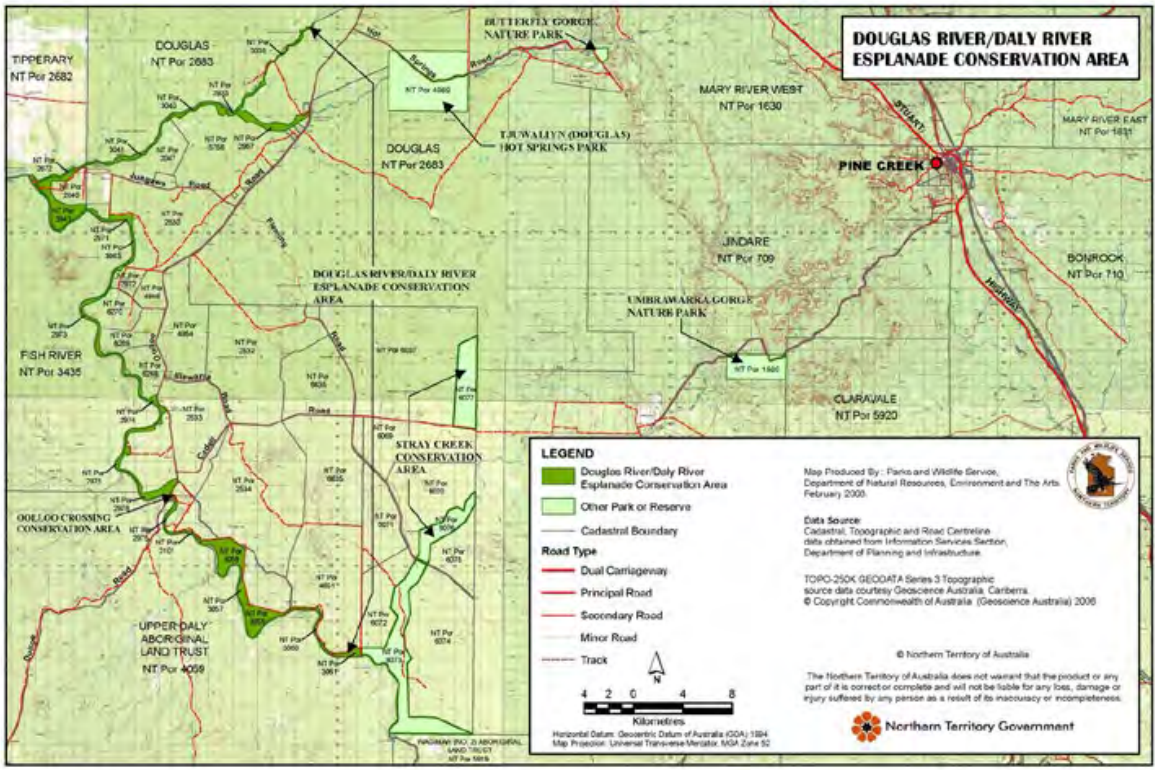


Figure 8 - Conservation areas

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4.2. Flora and fauna

Diverse flora and fauna has been studied with a range of threatened species present in the region. Eight of the nine species of freshwater turtles found in the Northern Territory are present in the Daly River (Price et al 2002). The high profile pig nosed turtle (*Carettochelys insculpta*) is a flagship species. It is of considerable international concern, being the sole remaining member of a once widespread family with the best Australian populations of the species found in the Daly River (Georges et al 2002).

Furthermore, at least two nationally threatened species of elasmobranchs, the freshwater whipray (*Himantura chaophraya*) and the freshwater sawfish (*Pristis microdon*) are also present. According to (Pogonoski et al 2002), these species are critically endangered and vulnerable, respectively. The Daly River is also an important recreational fishery for barramundi (*Lates calcarifer*).

Further details will be obtained during stakeholder engagement process with DEPWS flora and fauna branch.

4.3. Heritage

NT Declared Heritage Sites:

- Fenton Airfield

Fenton Airfield was a WWII bomber base located on Douglas Station with public access off Oolloo Road.

- B24-D Liberator wreck "Nothing Sacred"

The crash site of the "Nothing Sacred" is located on Douglas West Station. It lies approximately 4.8km northwest of the Heritage listed WWII Fenton Airfield.

Douglas Station has a range of gold mining heritage sites.

Other WWII history in the greater area includes the nearby Adelaide River War Cemetery which is a Commonwealth heritage listed site.

4.4. Cultural

Traditional custodians and further information will be obtained during stakeholder engagement process with Land councils.



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5. Opportunity

5.1. Precinct planning

How can improved prioritisation and planning practice support new sustainable development precincts in the Northern Territory?

The Phase I report's recommendations proposed to enable pathways to sustainable (economic, environment, and social) development. These include:

- developing an efficient approach to converting parts of pastoral leases to freehold
- de-risking agricultural precincts that provide certainty for investors
- enabling Aboriginal agricultural development
- targeting infrastructure to facilitate development
- providing a supportive regulatory environment
- strategic de-risking in coordinated and targeted research, and
- improving trust, relationships and culture in development assessment and approval.

What is best practice in precinct planning?

The key purpose of precinct planning is to provide de-risked land that is investment-ready and suitable for purpose. Land uses should be considered, planned and provided for in master plans and land-use plans based on an assessment of the lands' capacity. An evidence-based approach will underpin the development of SDPs, through government-led technical studies to identify the most suitable land uses, site opportunities and infrastructure requirements, and economic assessments to determine commercial viability.

Planned precincts would ideally be released to the market with:

- land parcels sized for development and market
- tenure suitable for development for the relevant industry
- land zoned suitably for development for the relevant industry
- water resources available and suitable for use
- specific soil suitability studies rather than broad-scale theoretical assessments
- environmental approvals addressed prior to land release
- Native Title approvals addressed prior to land release
- Aboriginal land claims (including any nearby beds and banks) finalised
- land clearing permits approved
- infrastructure (water, energy, communication) that is reliable and suitable for use
- road access all year round
- supply chain opportunities for access to market
- community infrastructure
- available workforce
- acknowledgment and consideration for areas of cultural and environmental significance within the precinct.

5.2. Horticulture

With the establishment of the Northern Territory's first cotton gin on Tarwoo Station 35km north of Katherine, cotton growers will no longer be required to send their product to the Queensland-based cotton gin for processing.

Further detail to be added during stakeholder engagement process with Industry groups.

5.3. Livestock

Further detail to be added during stakeholder engagement process with Industry groups.

5.4. Tourism

The flora and fauna of the region and extensive conservation areas provide significant tourism potential including:

- four-wheel driving
- fishing safaris
- wildlife watching
- camping
- agritourism farm experiences.

5.5. Emerging industries

The development of the industrial hemp industry presents an opportunity for the region, with broad-scale hemp expected to have competitive farm gate return in comparison to other broad acre crops such as cotton, sorghum and soybean. The Territory does not currently have a suitable processing facility for industrial hemp production.

Further detail to be added during stakeholder engagement process with Industry groups.

5.6. Future water security

Where demand exceeds supply and a resource nears full allocation there is a need to look at other alternatives to ensure that water is being optimally managed to encourage highest value and efficient use of water. There is opportunity to increase water resource availability and improve water distribution efficiency within the limitations of the water allocation plan. Development of policy mechanisms such as the management of unused water, encouraging trading and water markets may provide new opportunities into the future.

Surface water development is yet to be explored in detail due to the reliance on groundwater in the region. With the draft *Northern Territory Surface Water Harvesting Policy* released for public consultation in late 2022, there is opportunity for secure access to suitable quality water particularly over the dry season. Water flow modelling studies would need to be completed to quantify the extent of availability in the catchment that could be utilised without having an impact on groundwater recharge, surface water base flows and environmental and cultural values associated with water.

Storage of wet season flows is also an opportunity through managed aquifer recharge (MAR) weirs to purposefully recharge water into the aquifer for subsequent recovery and environmental benefit. MAR sites have been identified within the Oolloo Dolostone aquifer which has capacity for artificial storage at the end of each wet season. The potential sites are on Stray Creek in the northern zone and the Fergusson River in the southern zone. The Stray Creek site is considered to be the most prospective site with analytical analysis indicating that 5.5GL could be recharged into the aquifer over the wet season with one 2-metre high weir. If a series of five weirs were used, recharge would increase to 27GL during the wet season (Jacobs Group, 2017).

The provision for trading water is enabled by the *Trading Licensed Water Entitlements Policy* which allows all or part of a water licence to be transferred within a water allocation plan area. A peer-to-peer water market could be established similar to the water ledger trading platform in Mareeba-Dimbulah irrigation district in Far North Queensland.

Continued research into water resource availability will provide information for new development and greater certainty and security to existing users.

5.7. Future infrastructure

A number of infrastructure projects are planned to provide for new opportunities and encourage the future growth of the region. This creates a foundation for informed investment decisions along with certainty in business planning and workforce development.

The *Department of Infrastructure, Planning and Logistics 10 Year Infrastructure Plan 2018-2027* has allocated $60 million for the Douglas Daly connector road. This road network will link the Edith Farms area north of Katherine with the existing Fleming Road in the Stray Creek area of Douglas Daly. This will significantly reduce travel time between Douglas Daly and Katherine, as well as providing a new logistics route for access to further opportunities.

A public weighbridge may be returned to service on Oolloo Road following an expressions of interest (EOI) process undertaken by the Department of Infrastructure, Planning and Logistics in early 2022 for the redevelopment of a Crown land site to support the agricultural and cattle industry in the region. The 4.8 hectare site includes four grain silos, a weighbridge, sheds and other improvements which have not been operational since 1994. If the weighbridge is reinstated to operational capacity by the successful proponent following completion of the EOI process, it will be required to comply with the *National Measurement Act 1960*.

The nearby community of Daly River is receiving $4.35 million in upgrades to the public boat ramp with works expected to be complete in late 2022. These upgrades will provide improved access and additional amenities to create more opportunities for the fishing tourism sector.

The Katherine Logistics and Agribusiness Hub is being developed by the Department of Infrastructure, Planning and Logistics as a new land release for the purpose of supporting agricultural

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industries and servicing surrounding communities. The hub will also support the growth of the resource, defence, transport and tourism sectors. It is strategically located near the intersection of the Katherine railway terminal, Victoria Highway and proposed future heavy vehicle bypass route, within Manbulloo Station.

Telecommunications - Regional Connectivity Program - The Douglas Daly ($904,950) project will deploy one new Telstra macro cell base station in the Douglas-Daly region, providing new and improved coverage to the area.

6. Constraints

Although the region has long been recognised for its agricultural potential irrigation development has been limited by concern and debate over water allocations, in-stream ecology, tree clearing and fishing and cultural values.

Key issues facing the progression of agricultural precinct development raised in Phase I of the project were:

- environmental approval process
- water availability and licencing
- land available and ready for development
- lack of precincts for small-scale development
- approval pathways
- distance and cost to markets
- resilient and reliable infrastructure
- skilled labour availability
- support service availability.

The region has the highest rate of land clearing in the Territory. In November 2003 a clearing moratorium was declared in the Daly River region affecting freehold and pastoral leases. The moratorium was extended in 2007 with an emphasis on water allocation planning. In 2008 the clearing moratorium was formalised by Interim Development Control Order 17 which expired in 2010. The moratorium did not prohibit land-clearing but introduced a more stringent approval process and greater protection for riparian zones within 1000m from the Daly River. Special provisions for the Daly River catchment are now included in the freehold land clearing guidelines.

7. Engagement

7.1. Engagement strategy

Workshop objectives:

The engagement strategy includes workshops with key stakeholders to:

- identify strengths across the broader Northern Territory agricultural industry
- discuss advantages of how precinct areas can benefit current land owners and future growth
- obtain input into preferences around improving water trading
- seek feedback on benefits and limitations of the non-pastoral use permit process
- obtain experiences in approaching all relatable development processes and suggestions for improvement
- ascertain where infrastructure could be prioritised
- assess other avenues where the Northern Territory can assist in agricultural development.

Research objective questions have been prepared specifically for land owners and industry groups.

7.2. Key stakeholders

During the stakeholder engagement phase, we will collaborate with key stakeholders to understand their needs and negotiate traditional owner involvement and aspirations. These stakeholders include:

- Environment Centre NT
- CSIRO
- Regional Development Australia NT
- Charles Darwin University
- Douglas Daly property owners
- NT Cattlemen's Association
- NT Farmers
- DEPWS Rangelands Division
- DEPWS Water Resources Division
- DITT Fisheries
- DITT Strategic Policy and Reform
- Northern Land Council.

8. Conclusion

Based on our findings about the region from historic data and extensive studies we seek to enter the consultation and stakeholder engagement phase of this case study project to identify where further research could support future growth and investment.

The stakeholder engagement process will identify future planning, improvement of processes, further research and growth incentives that will be explored in detail in the Action and Research Plan.

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Appendix D

Supporting Regional Planning in Northern Australia – A Scoping Study





Marine and Coastal

National Environmental Science Program

FINAL REPORT
Project 1.32



Supporting Regional Planning in Northern Australia: A Scoping Study

Allan Dale, Mitchell Sheppard, Damien Burrows and Yvette Williams

Supporting Regional Planning in Northern Australia: A Scoping Study

Allan Dale, Mitchell Sheppard, Damien Burrows and Yvette Williams

James Cook University

Marine and Coastal

National Environmental Science Program

Supported by the Australian Government's
National Environmental Science Program

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Front Cover image: Coastal view from Far North Queensland hinterland (Image: James Cook University stock image)

Back Cover image: Loooking across the blue waters of the Coral Sea towards Double Island. (Image: Simon Bradfield)

This report is available for download from the NESP Marine and Coastal Hub website at www.nespmarinecoastal.edu.au

Acknowledgement to Country

The Marine and Coastal Hub acknowledges Aboriginal and Torres Strait Islander people as the first peoples and Traditional Owners and custodians of the land and waterways on which we live and work. We honour and pay our respects to Elders past, present and emerging.

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Executive Summary

The development of northern Australia is a national priority, creating both challenges *and* opportunities for public and private sector decision-makers. Sustainable development decision-making seeks to balance the short and long-term impacts of development on the environment, the economy and society. Ongoing economic, social and environmental challenges facing northern Australia, however, and limits within the current frameworks for regional planning, have led to calls for more sophisticated sustainable development planning at the regional scale. Doing so would mean integrating global sustainable development goals (SDGs), with national, state and territory concepts of Ecologically Sustainable Development (ESD), and more local and corporate Environmental, Social and Governance (ESG) concepts.

This report explores and assesses the current regional planning frameworks across Queensland, the Northern Territory and Western Australia through literature review, interviews and a number of brief case studies. Our results demonstrate that there is significant value in taking regional, place-based approaches to sustainable development planning, assessment and approval. The work indicates that there is potential for leveraging existing bilateral relationships between counterpart agencies in the Commonwealth and state/territory governments and local governments to enable the progressive expansion and refinement of regional planning effort. Barriers to progress, however, include the capacity of governments and northern stakeholders to engage in meaningful decision-making (particularly local councils, various industries, the environment sector, Traditional Owners and research bodies). There is also a limited focus on building durable, adaptive and purposeful partnerships at regional scale between these parties. Planning and development assessment laws are also not always fit for purpose. They can be siloed and duplicative, disadvantaging economic, social, environmental *and* cultural outcomes. Moreover, there are large data gaps in northern datasets for the environment, economy and society. Much existing data is not adequately informing decision-making, and there can be limited data sharing between agencies, and trust issues between agencies and stakeholders. Building regional scale planning partnerships and knowledge management frameworks could help overcome these limitations.

The report further explores the *preconditions of success* to supporting increasingly Commonwealth-inspired regional planning agenda. These particularly include the need to refine proposed outcome standards supporting regional planning effort, while developing novel process standards to support coordinated and integrated decision-making that collectively: (i) halts and reverses the decline of Australia's environmental condition; (ii) limits the stagnation of economic development in northern Australia; and (iii) better enables Indigenous people to achieve their aspirations. Such standards must go beyond the biophysical aspects of desired outcomes, and better incorporate social, cultural and economic considerations in accordance with the principles of sustainable development decision-making.

Further, as state and territory governments hold most of the statutory power for regional and land use planning, any Commonwealth initiatives to support regional planning will require strong bilateral (or even trilateral) partnerships. This will enable the positive negotiation of shared priorities, the development of outcome and process standards, and the resolution of resourcing requirements. Moreover, governments will need to actively seek to build stable, long-term planning and delivery partnerships at the regional scale, and considerable effort will be needed to develop collaborative knowledge systems and decision-support tools that create a trusted evidence-base to inform negotiated decision-making at that scale. Overall, these approaches should be underpinned by independent and long term monitoring of the health of the regional planning governance systems being established. This will require reporting frameworks for any agreed process and outcome standards, and could be evaluated using newly emerging, theoretically-informed approaches such as Governance Systems Analysis.

The report proposes that next step research efforts should involve building a stronger, evidence-based, inclusive and engaged *community of practice* for regional planning in northern Australia, and undertaking *sentinel case studies* in Queensland, the Northern Territory, and Western Australia. Cohesive stakeholder networks have now been established through this research, in addition to the aligned research agenda of the NESP Marine and Coastal and Resilient Landscape Hubs and the Cooperative Research Centre for Developing Northern Australia. A future research focus that uses these networks can be uniquely placed to facilitate the development of a strong community of practice and to support future case studies. The opportunities for sentinel case studies include research partnerships that can help analyse the impact of regional planning, and further identify the strengths and limitations of regional planning contributing to such impact. Future case studies would need to be negotiated among the Commonwealth, the States/Territories and potential regions.

1. Introduction

The economic development of northern Australia has become a national priority over the past decade. From 2015, the White Paper on Developing Northern Australia (the White Paper) was a catalyst for the Commonwealth's bilateral and bipartisan northern Australian agenda, mobilising billions of dollars of Commonwealth, state and territory government investment and promulgating an extensive range of policies aimed at stimulating economic development (Department of Prime Minister & Cabinet 2015). This effort has included the establishment of a major concessional loans facility, substantive infrastructure spending, labour market programs and large investments in productivity focused research and development.

Major public and private sector investments in development across the north's natural resource sectors, namely in the energy, minerals, tourism, water and agricultural sectors (Office of Northern Australia 2021), involve significant land use change and the modification of catchments, estuaries and terrestrial ecosystems. Further, development is concentrated on, and increasing in, coastal regions (Clark & Johnstone 2016a; b). An imperative is that the north's contribution to national productivity is irrefutable, as evidenced by the region supporting 14 of 31 Commonwealth-declared major projects, totalling $110 billion. To facilitate this and future development, the Commonwealth is prioritising enabling infrastructure, supply chains and Indigenous economic development, while building skills and services over the next five years (Office of Northern Australia 2021). Despite this, however, the north remains a largely undeveloped and under-planned landscape with a small, fragmented population. It is also an Indigenous domain, with Traditional Owner rights extending across some 78% of the landscape (NAILSMA 2020) and wider interests across 100% of that landscape.

Increasing the policy complexity is the fact that, in the face of economic opportunity, lies internationally and nationally significant environmental and cultural values that are under increasing threat. Australia's extinction rate, for example, exceeds 10% of the 273 endemic mammalian species since European settlement (Woinarski *et al.* 2015) and an additional 25 taxa are likely to become extinct within the next 20 years (Reside *et al.* 2021). Cumulative impacts of development and threatening processes are driving this loss (Samuel 2020). Given its relatively intact values, these risks and impacts are particularly pertinent within the northern Australian landscape; one increasingly seen as being key to national development.

Key threats to environment and cultural values in the north particularly include changing fire regimes, changed surface and groundwater regimes, climate change, disrupted ecosystem and population processes, habitat loss, fragmentation and degradation, invasive species and diseases, and human induced resource exploitation and pollution (Reside *et al.* 2021). Moreover, coastal hazards driven by climate change (e.g, sea-level rise, extreme events, inundation and erosion) are posing risks to both vulnerable ecosystems and built environments (Department of Climate Change 2009). Overall, northern recovery efforts are insufficient in addressing biodiversity and ecosystem loss and the degradation of cultural values. Adaptive landscape planning that can mitigate future risk and further loss is lacking.

Consequently, northern development is a heavily contested agenda, evidenced by social and regulatory tensions between economic development, Indigenous aspirations and environmental and cultural protection (Dale & Marshall 2020). This has yielded multifaceted policy problems for the achievement of sustainable development in northern Australia, including resolving decision-making uncertainty for industry, managing the cumulative impacts or piecemeal development, enabling adaptive and resilient planning systems, and empowering Traditional Owner, pastoral, farming and resource and defence sector communities as the primary custodians of the land in economic and environmental terms. As the northern Australia agenda matures, new approaches to regional planning for sustainable development are increasingly being seen as being important to resolve these tensions.

1.1. The Northern Australian Story

For the purposes of this research, northern Australia is (at a minimum) defined as "all of the Northern Territory and those parts of Queensland and Western Australia above the Tropic of Capricorn". It is also often seen to be inclusive of more southerly parts of Queensland and WA serviced by the Northern Australia Infrastructure Facility or NAIF (Office of Northern Australia 2021). The region accounts for some 53% of the Australia's landmass, extending 12 nautical miles offshore in adjacent territorial seas (See Figure 1.1).



Figure 1.1. Map of northern Australia (Office of Northern Australia 2021).

Northern Australia is a place of outstanding environmental, social and cultural value but is also under increasing economic development pressure due to, amongst other things:

- increased demand for water allocations and major water infrastructure to support irrigated agricultural expansion;
- current and proposed major mining and gas operations, seeking to increase production and exports of iron-ore, coal, petroleum and liquefied natural gas in response to increasing global resource and energy demands; and
- the construction of major onshore and offshore renewable energy projects to support Australia's transition to net-zero greenhouse gas emissions by 2050.

For non-government and government investors and decision-makers alike, this poses the important policy question of how to effectively balance economic development with defence, environmental, cultural and social values for sustainable development outcomes.

A socially important part of the Australian landscape

Northern Australia is home to a multicultural population of some 1.3 million people, which is nearly matched by the one million visitors it attracts each year (Office of Northern Australia 2021). However, due to its vast landmass and its geographically remote settlements, almost half of the north's population is concentrated in the coastal cities of Townsville, Cairns, Mackay and Rockhampton (Queensland) and Darwin (Northern Territory).

Demographically, northern Australia's population is young. The median age is 35 to 39 years, with the largest age cohorts being 25 to 29 and 30 to 34 (Office of Northern Australia 2021). There is a significant deficit observed in people aged over 65 compared to the rest of Australia (Taylor *et al.* 2022). These trends are likely determined by the generally younger age profile of Indigenous communities and non-Indigenous migration patterns for different life stages, with employment opportunities sought generally by younger people, and amenity and lifestyle sought by older people (Dyrting *et al.* 2020). This demographic pattern is reflected in the overall higher employment to population ratios and participation rates in the north relative to the south (Australian Bureau of Statistics 2022).

Concerningly, Indigenous Australians still experience significantly lower employment and life expectancy and higher death rates than non-Indigenous people in both northern and southern Australia (Taylor *et al.* 2022). Across all populations, male to female population ratios also vary greatly between regions. Male populations are higher in the Pilbara, for example, due to the male-dominated workforce, but lower in regions with high concentrations of Indigenous Australians or retirees, namely Central Australia and northern Queensland respectively (Taylor *et al.* 2022). This may be due to the lower life expectancies of males compared to females and influenced by higher early death rates for Indigenous north Australians.

A significant proportion the Northern Territory, the Kimberley region of Western Australia, and parts of Far North Queensland around the Gulf of Carpentaria and Cape York Peninsula, rank as the most socio-economically disadvantaged in the country (Australian Bureau of Statistics 2018). These socio-economic patterns are correlated to regions with higher Indigenous populations, reflecting continuing economic marginalisation and poor employment opportunities for Aboriginal and Torres Strait Islander communities throughout northern Australia (Taylor *et al.* 2022). Continued marginalisation from economic participation and high rates of poverty, especially for remote Indigenous communities, presents a significant barrier to the Commonwealth's *Closing the Gap* policy.

This social and economic profile of northern Australia, and the general poverty and social inequities that exist relative to the south, provides a compelling reason for social and economic change in the north, but also one requiring culturally and locally appropriate models.

A place of significant economic potential

Several economic analyses in recent years outline the nature of the existing economy and the huge economic potential of northern Australia over the coming decade. The White Paper set an early benchmark for the size of the economy. Prior to its publication, in 2011, northern Australia had an annual export value of $96 billion, comprising around 54% of the national seaport export base (Bureau of Infrastructure, Transport and Regional Economics 2011). Much of this economic value sits within the resources and energy sectors, and as Dale (2013) has previously suggested over a decade ago, the north's mining boom helped Australia traverse the worst aspects of the Global Financial Crisis in 2008. Dale (2013) also suggests that economically, for resources and energy alone, the north punches above its proverbial (population) weight (also see ALGA 2013). New pressures for critical minerals linked to a rapidly decarbonising global economy will continue to drive such growth (DISR 2022).

Agricultural development is perhaps the most significant economic driver of emerging land use change, and so more recently, the CRCNA has developed and provided a *State of the North* report that outlined potential growth in the agriculture, aquaculture and forestry sectors (CRCNA 2020). For the coming decade, these include the potential for:

- 1,400 to 2,300 new direct jobs in aquaculture, including a 50-fold expansion on the area available for freshwater pond aquaculture;
- 600 new jobs in the forestry sector derived from 13 million hectares of forest with commercial potential;
- strategic approaches in air freight unlocking high value export opportunities;
- $13 billion export potential in the beef and live cattle sector;
- over $800 million in untapped agricultural potential in northern Queensland alone;
- rotational soybean and sugar production systems worth $46 million; and
- significant agricultural processing opportunities.

Queensland's recently released Bradfield Regional Assessment and Development Panel report particularly defined the future economic opportunity available through combined approaches to water-based agricultural, energy and industrial development (BRA&DP 2022). Combined with the need to overcome a fragile boom-bust economy, the north's available resources, relative position in the ASEAN and Indo-Pacific region, future export demand, and available water and land resources, all mean development pressures will continue to grow. It positions the north as an important economic driver in Australia's economic growth.

An internationally important environmental landscape

In addition to its traditional economic potential, northern Australia is a place of outstanding environmental value. A total of 43 bioregions make up the four terrestrial ecological zones; the North Eastern Australia Tropical Rainforests, the Mitchell Grasslands, the North Australian Tropical Savanna, and the Arid Shrublands and Desert. Similarly, the marine estate spans four diverse marine zones; the North-West, the North, the Coral Sea and the Great Barrier Reef. Deep social, cultural and spiritual connections to northern Australia's environment are also reflected in seven iconic World Heritage places, from the marine ecosystems of the Great Barrier Reef, Shark Bay and the Ningaloo Coast, to the desert country of Kakadu, Uluru - Kata Tjuta and Purnululu, and the oldest rainforest on earth, the Wet Tropics.

Northern Australia provides vital ecosystem services and sanctuary to hundreds of thousands of species, many of which are endemic. However, cumulative impacts of development, and multiple threatening processes, pose a significant challenge for protecting and conserving these environmental and cultural values. Cumulative impacts are direct, indirect and interacting impacts on the environment from past, current and future human development and natural processes (Cuddington *et al.* 2013). The most common of the key threats to species and ecosystem services in the north are changing fire regimes, changed surface and groundwater regimes, climate change, disrupted ecosystem and population processes, habitat loss, fragmentation and degradation, invasive species and diseases, human induced resource exploitation and pollution (Reside *et al.* 2021).

Climate change is often framed as the greatest threat to the north's high profile World Heritage places. Realised impacts of climate change on the north-eastern coast have driven rapid population declines and redistributions to higher elevations in many endemic rainforest specialist species of the Wet Tropics (Williams 2016), while also causing extensive coral cover changes on the Great Barrier Reef after four mass bleaching events since 2016 (Australian Institute of Marine Science 2022). The changing climate threatens vital regulating ecosystem services across the north. For example, the north Australian tropical savanna acts as an important carbon sink during the wet season (Devi Kanniah *et al.* 2010). Increasing annual precipitation and bushfire proneness in the north (CSIRO 2020), however, could increase dry season biofuel loads and transform the area into a carbon source by mid-century (Devi Kanniah *et al.* 2010). Significant emission reductions and carbon sequestration and storage is critical to reversing current trends in biodiversity loss and ecosystem service disruption (Intergovernmental Panel on Climate Change 2021).

While climate change is a key threat to northern ecosystems, species are often subject to multiple threatening processes. Species vulnerability increases cumulatively as the number of interacting threatening processes increases (Pintor *et al.* 2019). Concerningly, 86% of species listed as threatened under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) are subject to multiple interacting threatening processes, and therefore have an increased vulnerability to extinction (Reside *et al.* 2021). Multiple interacting threats, however, are challenging to predict and manage. Interventions for one threat can exacerbate impacts resulting from another (Stobo-Wilson *et al.* 2020). Habitat restoration remains a major national priority for threat abatement, as it has multiple benefits (DAWE 2021). High priorities include restoring degraded habitats subject to land use changes from intensive agriculture, mining and urban development, and halting further environmental decline from increasing salinisation, erosion and disease and/or decreasing water quality and hydrological flows (Reside *et al.* 2021).

Threat abatement offers many co-benefits such as increased carbon sequestration and decreased agricultural costs in invasive species control (Reside *et al.* 2021). Most species, however, require multi-pronged abatement strategies and integrated management of threatening processes based on quality data. As such, the north's environment is particularly attractive in national debates about landscape preservation and resilience building, as it remains relatively intact and can be restored more effectively.

The overall quality and quantity of baseline ecological data and knowledge of northern Australia is largely lacking. This is due to an overdependence on outdated course-resolution data sets and historically low surveying and ground truthing efforts across the north (Pintor *et al.* 2019). Consequently, this impacts the reliability of models used to measure impacts of threatening processes on biodiversity (Pintor *et al.* 2019).

Exacerbating this issue further, is the limited empirical evidence of how threatening processes may have changed from past ecological baselines (Pintor *et al.* 2019). Further, public and private actors, including many multi-jurisdictional government departments and multi-sectoral industries, contribute to an uncoordinated and fragmented approach to data collection, curation, integration, analysis and use. Accordingly, a majority of northern Australian-specific ecological data sets do not comply with acknowledged FAIR principles (findability, accessibility, interoperability and reusability) and are not cognizant of the interrelationships and transboundary nature of biodiversity and ecosystem services.

These limitations are further reinforced by each jurisdiction having differing triggers and data requirements for environmental approvals, and the differing data standards for independently controlled data sets which inform decision-making (Samuel 2020). Moreover, reactive development planning, assessment and approval frameworks often operate on an limited evidence-base, despite the complexities of ecosystem functions and threatening processes. This means cumulative impacts are insufficiently managed and northern Australia's environmental values are placed at greater risk (Hardy *et al.* 2021).



Figure 1. 2. Northern Australia ecological and marine zones (Department of the Prime Minister and Cabinet 2015).

The north as an Indigenous domain

Importantly, the north is a strong Indigenous domain; a place where Indigenous Traditional Owners have extensive interests, rights and a lived presence in the landscape. Approximately 20% of the region's population is Indigenous (Taylor *et al.* 2022) and 78% of the landscape is covered by varying forms of Indigenous land rights (Office of Northern Australia 2021), ranging from exclusive and non-exclusive native title to Aboriginal freehold land held in trust (see Figure 1.3). Legal recognition of sea country rights has developed greatly in the past 15 years, with the Northern Land Council granted exclusive ownership of 85% of the Northern Territory's coastline in the landmark Blue Mud Bay case. The largest grant of native title for sea country has also secured in the Torres Strait. Sea country rights will be further recognised across northern Australian coastlines in the coming future, including within the Great Barrier Reef. Cultural and economic interests in fresh water resources are also being increasingly recognised through statutory water planning processes across the north (e.g. see BRA&DP 2022). To stress these wider points, across the north, Traditional Owners have long had, and continue to have, custodial, historical and cultural interests across the entire land and seascape. These expanding land, water and sea country rights across northern Australia have multifaceted implications for non-government and government decision-makers.

These emerging rights and interests mean more co-governance is needed in the northern Australian landscape. Traditional Owners have expressed serious concerns with current government policies and programs aimed at delivering on their priorities and aspirations, while also acknowledging distinct power imbalances between themselves and governments (DCCEE&Water 2022). Major progress is required to equitably share benefits and enable Traditional Owner agency in decision-making processes that affect their rights and interests. This requires understanding who speaks for country across northern Australia, and ensuring those people are engaged with the relevant non-government and government decision-makers. Currently, this is done on an ad-hoc basis, leading to consultation fatigue due to a lack of resources for relevant representative bodies, such as the Prescribed Body Corporates and Land Trusts in northern Australia. Moreover, stakeholder consultation must transition away from reactive consultation with poorly resourced bodies holding title rights, to early and meaningful capacity building and engagement which empowers those who speak for country, while strong dispute resolution processes for managing internal and external conflict.

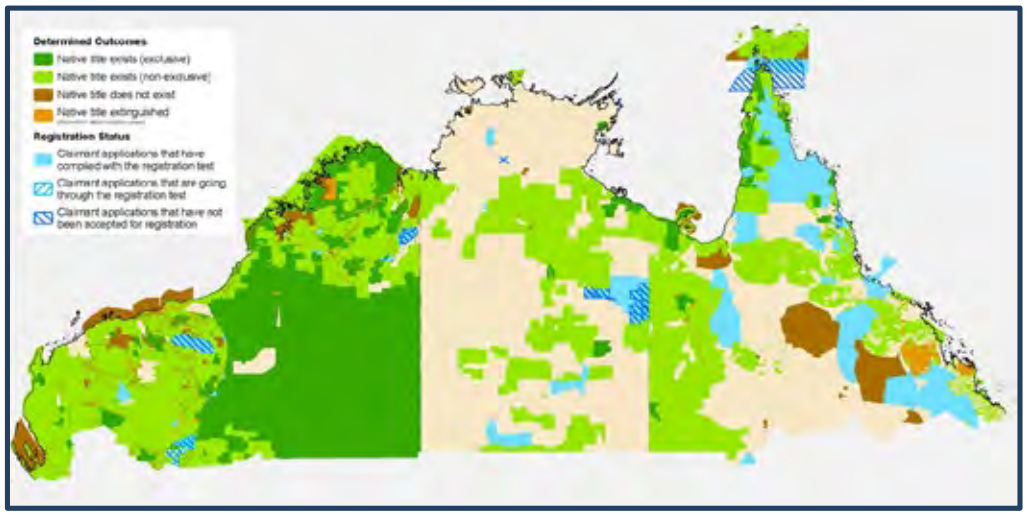


Figure 1. 3. A map of native title determinations and claimant applications in northern Australia (National Native Title Tribunal 2022). Note that this map does not include land granted under Commonwealth land rights legislation, Queensland land rights legislation or land trusts in Western Australia.

1.2. Tensions Between These Values

Conceptually, sustainable development aims to meet the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development 1987). As such, the concept has real application in resolving deep tensions between economic development, environmental values and Indigenous interests in the northern landscape.

A consistent, agreed definition, however, is lacking in the way that sustainable development is applied in a northern Australian context. Definitions and parameters vary greatly across the United Nation's Sustainable Development Goals (SDGs), legislative objectives for ecologically sustainable development (ESD), and corporate reporting on environmental, social and governance (ESGs) matters. This creates decision-making uncertainty about what constitutes sustainable development. This raises questions on what is that we are actually trying to achieve via decision making in the north?

In thinking about this, Dale (2014) suggests that we first need to speculate about how the future of the north might look if we don't resolve or reconcile some of the key tensions embedded within sustainable development debates. Dale (2014) posited that, depending on how successful the nation is in charting this next critical phase of northern development, two vastly different scenarios could emerge. Dale (2014) suggests that, if decision making about the future of the north falters, then a *Failed State Scenario* could emerge. However, with engaged decision making based on sound evidence, a much brighter future could emerge. Further, Dale (2014) also suggests that this could look something like the emergence of a *Stable Alliance of Dynamic Regional Economies* across northern Australia.

In Dale's (2014) *Failed State* scenario, one could imagine fast growth mining towns with limited infrastructure and services and little sense of community, and an unstable boom-bust economy based on the strength of the resources and energy sectors, exchange rates and commodity prices. There could be further decline of the social wellbeing of remote Indigenous communities.

Finally, under this scenario, one could imagine a wider population retreat from northern Australia. Climatic risks could see the insurance industry seeking to reduce its exposure. Rising fuel prices could push the cost of travel and cooling beyond reach for many. At the same time, northern Australia could continue to lose market share from international and domestic tourism (also see Prideaux 2013). Equally, regulatory complexity and increasing corporate market intervention could cause further declines in family-based pastoralism.

Without capable, resourceful individuals out in the landscape (both empowered Traditional Owners and pastoralists), it could no longer be manageable, leaving country exposed to rampant hot fires, biosecurity risks and progressive weed and feral animal invasion.

Dale's (2014) *Dynamic Regional Economies* scenario envisages several stable and vibrant regional economies, linked together by a common purpose and direction. Each region would generally have its own economic and service centres, ensuring both an urban and rural dynamic to maintain home-grown capacity and to attract and retain human capital from elsewhere. Under this scenario, there would need to be a greater spread of national investment across regions.

For the first time, government money aimed at securing the future of Indigenous communities would be devolved more directly to regions and communities. A real effort would be put into preparing workforces to move to the north and to stay there. Land and tenure reform supporting Indigenous communities and the pastoral estate would also lead to a more equitable, decentralised spread of wealth. Nevertheless, under this scenario, major regional cities would enjoy considerable growth as service industry centres (health, education, welfare and public administration) as well as defence, export ports and technology hubs.

A regionally aggregated and managed ecosystem services economy could also see a new layer of economic activity emerge under this scenario in the north (e.g., see CSIRO 2012). Dale *et al.* (2014) considers that under this economy, Traditional Owners and pastoralists across the north would gain a real and paid role for the management of landscapes, delivering environmental services such as habitat conservation, protection of water resources, and abatement of greenhouse gas emissions.

New agricultural development would retain a mix of larger corporate and small to medium enterprises. Resource extraction industries in each of these regions would start strategically re-investing in the social and economic future of communities. A better process for managing project assessment and approvals would result in real and lasting community development initiatives established alongside major project development (e.g. through sustaining employment for Indigenous ranger groups).

Under this scenario, regions would also be more resilient to climate change and natural disasters (Dale 2014). Strategic investment in transport and communications infrastructure and new technologies would mean regions being less frequently isolated in disasters.

Planning laws would have ensured that communities are not located in harm's way. This capacity for dealing with risk would itself present an opportunity for the region, with northern Australia becoming a high-end knowledge provider and exporter in disaster risk reduction, management and response, climate change adaptation, water, food and energy security.Avoiding Dale's (2014) *Failed State* scenario and securing the improved alternative, however, means building a governance systems that enable sustainable development at scale within the northern landscape. Such an approach needs national imagination and effort.

1.3. The Drive Towards Regional Planning for Sustainable Development

As a consequence of these competing landscape pressures, there has been a renaissance of Commonwealth and State/Territory thinking about more place-based approaches to the achievement of sustainable development outcomes within the north, including:

- The previous Australian Government's **Regions of Growth** planning sponsored by the Office of Northern Australia, and the emerging **Precincts and Partnerships Program,** which aims to provide a strategic, nationally consistent way for funding and coordinating projects that transform places in rural and regional Australia;
- **Regional Deals** (such as in the Barkly) sponsored by the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts;
- **Regional Economic Development Planning** supported through the north's eight Regional Development Australia (RDA) Boards;
- **Regional Natural Resource Management (NRM) Planning** supported through Commonwealth, State and Territory funded regional NRM boards;
- **Regional Drought Resilience Planning** (and some aspects of climate resilience planning) supported via the Commonwealth, State and Territory governments; and
- **Regional Approaches to Preventative Health** supported through Commonwealth Primary Health Networks and regional hospital boards.

An increasingly significant national driver of this more regional approach, however, has arisen through the 2020 independent review of the *EPBC Act* (the Samuel Review). The review recommended the development of whole-of-government regional plans aligned to a proposed strengthening of national environmental outcome standards, inclusive of:

- **Regional recovery plans** to coordinate the management of cumulative impacts for multiple threatening processes in regions while identifying areas of current and future critical habitat and suitable offset obligations; and
- **Ecologically sustainable development plans** to address environmental, economic, Indigenous and social priorities in regions of significant development pressure by balancing competing land uses and establishing suitable development zones.

Further, the Samuel review acknowledged that Strategic Environmental Assessments (SEAs) under the *EPBC Act* might also provide greater development certainty for proponents within regional approaches by offering streamlined approval for multiple actions. It could also deliver improved ESD outcomes if developed in accordance with applicable regional recovery and ecologically sustainable development plans. The review noted that any prospective regional planning efforts would require the integration of statutory roles and responsibilities of the Commonwealth with State/Territory and local government planning and development approval processes. An overarching objective would be to identify where development could, and should not occur, in addition to priority restoration and recovery areas, providing decision-making certainty. A sense of community ownership and the adaptability of regional plans through design, implementation, monitoring and evaluation phases was stressed.

The above suggests that there is a multitude of growing Commonwealth-sponsored regional planning approaches of significance to the north, together with existing State, Territory and regional frameworks. All of these approaches additionally herald the need for a significant new push towards regional planning that better supports development assessment and investment decision making. This emerging policy agenda presents great opportunities for the north, as well as significant risks if such processes are not well conceptualised and executed.

1.4. Scoping Study Objectives

To deliver on the need to support this emerging re-focus on the achievement of sustainable development through regional planning approaches, this scoping study aims to add value to sustainable development decision-making across the north. It seeks to do this through critical analysis of current governance frameworks for regional planning at the Commonwealth and state/territory levels, and proposes key pre-conditions for future success in this field that:

- de-risks economic investment and development in northern Australia;
- protects and enhances the north's significant environmental and cultural values; and
- empowers Traditional Owners in the achievement of their future aspirations.

In doing so, it also aims to establish a forward research strategy that provides a pathway for building a long-term community of practice and sentinel case study approaches that: (i) inspire and inform ongoing practice across this important region; and (ii) informs future research investment under the NESP's Marine and Coastal Hub and Resilient Landscapes Hub.

2. Methodology

This scoping study has been one of 13 projects commissioned by the Marine and Coastal Hub (the Hub) under the 2021 Research Plan. The Hub engaged the Cairns Institute, James Cook University (JCU) and TropWATER (JCU) to deliver the study in partnership with the Resilient Landscapes Hub and the Cooperative Research Centre for Developing Northern Australia (the CRCNA). Joint cash and in-kind funding was arranged through the National Environment Science Program (NESP), JCU and CRCNA. Ethics approval was granted by JCU's Ethics Committee and participatory aspects of the research were conducted in confidence in accordance with the ethics approval.

Multiple stakeholders with an interest in regional planning in the north were engaged throughout the research process. The project team held regular meetings and correspondence with the Queensland, Western Australia and Northern Territory governments and with the Department of Agriculture, Water and the Environment's Environmental Protection Reform Division and Environmental Approvals Division. In addition, the project team coordinated efforts with the team for the Resilient Landscape Hub's 'Socioeconomic Insights for Resilient Landscapes' project and the Western Australia Biodiversity Science Institute (WABSI).

2.1. Stakeholder Consultation

Through deep stakeholder engagement, the research design was aimed at building a clear view of the future preconditions of success in regional and place-based approaches to achieving ESD in the north, as well as an agreed future research and extension pathway forward in relation to these issues. This was achieved through a series of targeted interviews and feedback workshops, and input received on a draft version of the report (see Figure 2.1).

Extensive stakeholder mapping was completed to compile a list of priority interview targets among people involved in land use planning, development assessment and approval, and environmental management. The first round of stakeholder engagement comprised some 42, one hour confidential interviews across Commonwealth, Queensland, Northern Territory and Western Australia government departments, industry and community sectors, environmental non-government organisations and Traditional Owner support institutions (see Table 2.1).



Figure 2. 1. Research engagement design.

Interviewees were asked seven questions designed to qualitatively analyse their views on:

- the value of regional planning in achieving improved environmental, cultural, social and economic outcomes for the north;
- key features of the north's regional planning system;
- each sector's role in the north's regional planning system;
- strengths, limitations and priority areas for improving the north's regional planning system; and
- priority data layers and/or knowledge systems to support decision-making.

SECTOR	NUMBER OF INTERVIEWEES	CHARACTERISTICS
Commonwealth government departments	12	A range of departmental divisions responsible for: • Land use planning • Development assessment and approval • Environmental protection, compliance and enforcement • Industry, infrastructure, water and agriculture policy • Major development financing • Domestic and international trade • Local government
Queensland, Northern Territory and Western Australia government departments	17	
Industry	6	A range of industry representatives and peak body groups involved in agriculture, extractive industries, and infrastructure.
Environment non-government organisations	3	Environment groups involved in advocacy, conservation planning and land management.
Traditional Owner support institutions	4	Northern Australia institutions representing and supporting Traditional Owners responsible for land and sea country management, land rights and business enterprises.

Table 2. 1. Interview participants (n = 42).

The second round of stakeholder engagement involved four, two hour hybrid (in-person and online) feedback workshops with each jurisdiction. Participants were selected from a wider range of Commonwealth, Queensland, Northern Territory and Western Australia government departments (see Table 2.2). The workshop discussions focused on:

- emerging findings from the scoping study;
- sustainable development and place-based approaches to development decisions;
- key development pressures and challenges for sustainable development in the north;
- the preconditions of success for protecting and enhancing the environmental, cultural, social and economic values of northern Australia; and
- an emerging research plan to support regional planning across the north.

This resulted in us finding broad levels of comfort about the preconditions for future success of regional and place based approaches and the identification of key options and selection criteria for future sentinel case studies for trialling improve approaches to regional planning.

Table 2. 2. Joint-government feedback workshop participants (n = 52).

JURISDICTION	NUMBER OF PARTICIPANTS	CHARACTERISTICS
Commonwealth	19	A range of departmental divisions responsible for: • Land use planning • Development assessment and approval • Environmental protection, compliance and enforcement • Industry, infrastructure, water and agriculture policy • Major development financing • Domestic and international trade • Local government
Queensland	12	
Northern Territory	11	
Western Australia	10	

Following each round of engagement, adaptive learning was applied to ensure individual input informed the design and delivery of proceeding stages of consultation. Through this process, final outputs were co-designed and tailored to research-user needs and enabled foundational partnership building for long-term research capacity (see Figure 2.2).

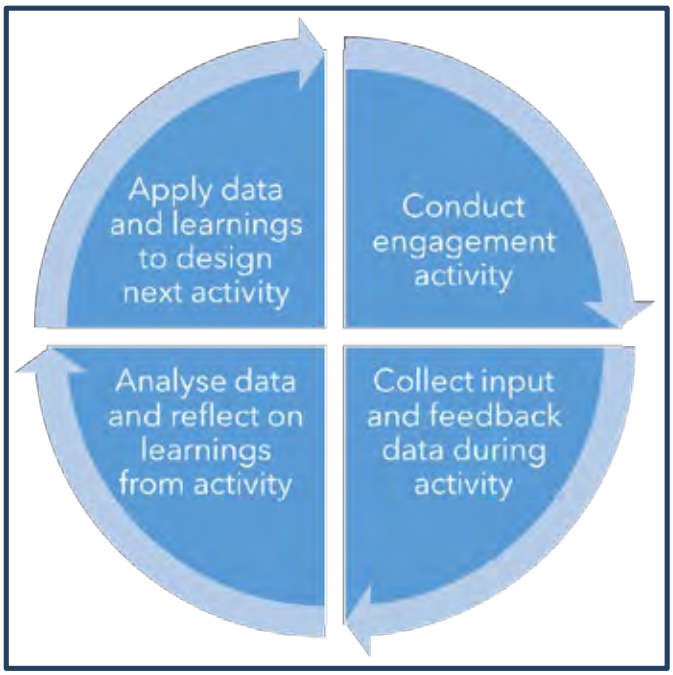


Figure 2. 2. Adaptive learning process applied to stakeholder engagement.

2.2. Data Collection and Analysis

Data collection and analysis was undertaken in three phases:

1. **Literature review** based on a thorough review of the academic and grey literature regarding sustainable development, land use planning and development assessment and approval within the context of northern Australia;
2. **Data collection**, where data was collected through the targeted interviews. Interviews were not recorded to ensure privacy and general notes were taken by the project team and used for thematic analysis. Workshop feedback on the preliminary results was captured through structured discussion and the targeted use of Mentimeter questions and an evaluation feedback form provided to participants; and
3. **Data analysis**, where interview data were analysed by theoretical coding techniques and refined in forum processes. This meant manually sorting the interview data into themes based on questions asked of research participants. Analysing and re-analysing the data was an iterative process and provided the basis for the report's findings. This report's resultant pie-graphs were also interpreted in accordance with the findings of both the literature review and interviews and refined through the feedback workshops.

3. Positioning Sustainable Development in Regions

3.1. Sustainable Development Decision-Making

More than ever, sustainability has crept to the front of society's consciousness. The concept of sustainable development has evolved incrementally since the late 20th century. What ultimately determines the success (or failure) of sustainable development is public and private sector decision-making within the landscape (Figure 3.1). Commonly referred to as sustainable development decision-making (SDDM), it aims to achieve sustainability via equal consideration and balance of short to long-term impacts of development to the environment, economy and society (World Commission on Environment and Development 1987).

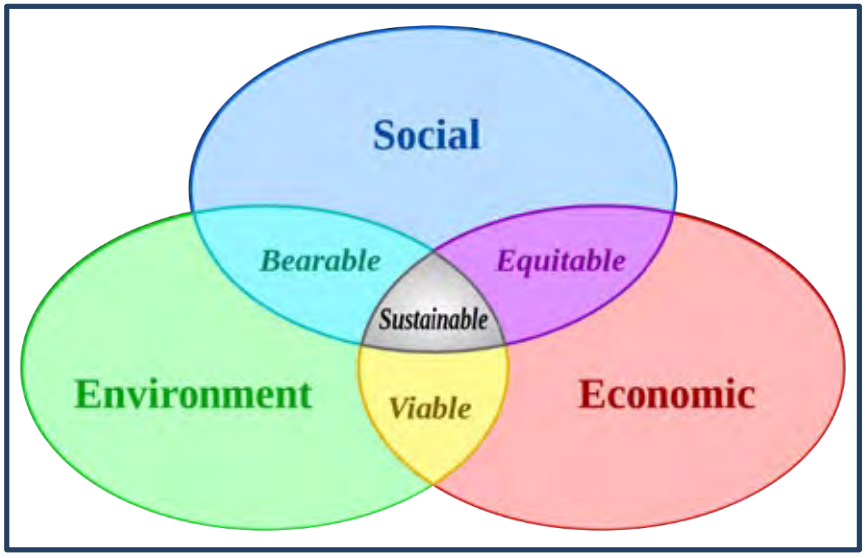


Figure 3. 1. Domains of sustainable development (World Commission on Environment and Development 1987).

For SDDM, cohesive planning, negotiating trade-offs and achieving this balance at appropriate scales is extremely difficult as each domain in Figure 3.1 is defined by contradictory parameters of success. For example, sustainable economic development seeks to continuously increase natural, human, social, manufactured and financial capital sustainably over time (Moldan *et al.* 2012). Naturally, this can conflict with environmental sustainability, as this domain demands a "limits to growth" approach to maintain natural resources and ecosystem services essential for current and future generations (Moldan *et al.* 2012).

Further, both domains are not feasible without social sustainability, as social values, identities, relationships and institutions are maintained at macroscales (national to local), and social cohesion is delivered at a microscale by meeting the needs of individuals through adequate access to health, wellbeing, shelter, education and cultural expression (Moldan *et al.* 2012).

Socio-ecological theory suggests that each domain of sustainable development must be holistically managed as they are symbiotic (Whitehead 2017). That is, impacts to one domain, will have corresponding impacts in respect of other domains. Therefore, SDDM should also seek to build socio-ecological system resilience through increased adaptive capacity to withstand internal and external pressures (Garmestani *et al.* 2013).

This involves addressing multifaceted challenges arising from SDDM. First, all decisions are made within complex socio-ecological systems. These are dynamic, with multiple interacting social and ecological subsystems at several spatial, temporal and organisational scales (Gallopin 2006). Second, decisions must equitably resolve multiple, diverse and conflicting stakeholder values and goals to deliver acceptable trade-offs (Kandakoglu *et al.* 2019). Third, the process of quantitatively and/or qualitatively evaluating the short and long-term impacts of decisions are subject to varying degrees of uncertainty (Kandakoglu *et al.* 2019).

To overcome these challenges, often at regional scale, multiple-criteria decision-making (MCDM) methods are widely used to help decision-makers optimise the resolution of complex problems with multiple indicators, objectives and decision criteria (Sousa *et al.* 2021). The type of MCDM tools used depend on the type of decisions under consideration, but overall, the application of MCDM is a developing field, with many journal articles stating that future research should improve the knowledge base for SSDM (Sousa *et al.* 2021). Insufficient journals, however, explore the importance of balancing power relationships among decision actors.

Because of this predominant focus of more technocratic approaches (see Dale *et al.* 2002), effective MCDM tools are often not readily or successfully employed by decision-makers in Australia. Rather, SDDM needs to balance multi-sectoral and multi-jurisdictional concepts, including the global Sustainable Development Goals (SDGs), nationally or provincially applied forms of ecologically sustainable development (ESD), and the corporate application of environmental, social and governance (ESG) concepts (Figure 3.2).



Figure 3. 2. Drivers of Sustainable Development Decision Making in Australia.

3.2. The 2030 Agenda for Sustainable Development

In 2015, all United Nations Member States adopted the *2030 Agenda*, which includes 17 Sustainable Development Goals (SDGs) as outlined in Figure 3.3. Australia's progress on social and economic focused SDGS, such as SDGs 1–9 and 16–17 has been largely positive, with 60 of 88 SDG indicators having been achieved and/or on track towards achievement (Sustainable Development Report 2022). However, for matters concerning environmental sustainability, which are directly related to public and private sector decisions that result in the development of the environment, there are highly concerning trends. Most notably, major challenges remain with Australia's SDG indicator scores decreasing or stagnating at <50% of the required rate (Sustainable Development Report 2022), including:

- carbon dioxide emissions, imports and exports;
- the mean percentage area of protected terrestrial, freshwater and marine sites important for the global persistence of biodiversity;
- the change in aggregate extinction risks across groups of species listed on the IUCN Red List of Threatened Species; and
- the mean annual percentage of permanent deforestation.



Figure 3. 3. The 17 SDGs under the United Nations 2030 Agenda.

Systemic inabilities to resolve these complex problems are reflected in Australia's recent *State of the Environment Report 2021*. It stresses that the nation's environment is in a poor state and continues to deteriorate (DCCEE&W 2022). Of relevance to northern Australia, major national findings within the report outline:

- the highest mammalian extinction rate in the world and one of the highest rates of species decline in the developed world;
- some 19 ecosystems demonstrating evidence of imminent collapse;
- consecutive coral bleaching events reducing resilience in the Great Barrier Reef; and
- some 7.7 million hectares of terrestrial threatened species habitat cleared or substantially degraded since 2000–2017.

Overall, Australia's progress towards sustainable development is hindered by decision-making relevant to both development *and* the environment. These decisions are often made locally, and they are largely made by multiple jurisdictions across various government departments in accordance with environmental law where ESD is the primary objective.

3.3.Ecologically Sustainable Development

The concept of ESD originated from the United Nation's Stockholm Declaration. Principle 2 states that "the natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management as appropriate" (United Nations 1972). Later, in 1987, the World Commission on Environment and Development developed the most quoted definition of sustainable development:

> ***"Development that meets the needs of present generations while not compromising the ability of future generations to also meet their needs"***
>
> (World Commission on Environment and Development 1987)

ESD was formally recognised in Australia in 1992 under the *National Strategy for Ecologically Sustainable Development*. Here, ESD was defined as "using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased" (Department of the Environment and Energy 1992). Since 1992, ESD has become a common objective (to varying degrees) of environmental law at all levels of government. At Commonwealth level, the *EPBC Act's* Section 3A objects, reflect the principles of ESD and require decision-makers to apply:

- short, and long-term economic, environmental and social considerations;
- the precautionary principle in the absence of scientific certainty to prevent serious or irreversible environmental damage;
- intergenerational equity to ensure the health, diversity and productivity of the environment for future generations is maintained;
- conservation of biodiversity and ecological integrity; and
- improved valuation, pricing and incentive mechanisms.

At the state and territory level, the principles of ESD are explicitly or implicitly enshrined as objects of development planning, assessment and approval legislation. In Western Australia, for example, the objects of the *Planning and Development Act 2005* reference the need to "promote the sustainable use and development of land in the State." This is the same for the objects of the Northern Territory's *Planning Act 1999*, however, ESD is also an express object of the *Environmental Protection Act 2019*. In Queensland, ESD is the object of the *Environmental Protection Act 1994*, but the concept of ecological sustainability is preferred under the *Planning Act 2016.* Nonetheless, it equally requires the balance and integration of ecological protection, economic development and social/cultural wellbeing.

The application of ESD to date has been described as a discretionary process rather than an outcome (Bates 2019). For example, under section 136 of the *EPBC Act*, the minister may determine the weight to afford ESD among various other considerations when approving actions. Rather, ESD should facilitate the balance of economic and social development with environmental protection (Bates 2019). Uncertainty in interpretation and application of ESD has the potential to be disproportionately skewed in favour of economic, environmental or social values, depending on the biases of the decision making frameworks being applied. Thus, siloed decision-making within regions is often not upholding the principles of ESD, nor achieving the objects of environmental law. This is because intended ESD outcomes are not clearly articulated and a national framework for integrated implementation, monitoring and evaluation is lacking (Samuel 2020). Accordingly, trade-offs between environmental, economic and social values are often not appropriately managed.

In particular, in environmentally-focused decision-making, social dimensions, such as social capital, social infrastructure, social justice, equity and governance, are often not afforded due weight (Cuthill 2010; Dale *et al.* 2002). These issues are amplified for northern Australia due to geographic remoteness, higher rates of socio-economic disadvantage, and limited baseline data and knowledge regarding the capacity of ecosystems to sustainably support development. Consequently, ESD uncertainty increases decision-making risk and acts as a barrier to balanced northern development. This threatens irreplaceable environmental and cultural values *and* drives further disadvantage. As such, in the northern Australian context, the priority for addressing ESD uncertainty is often a matter of equity.

Equity and fairness as a driving principle of ESD is often considered through the lens of intergenerational equity. Intergenerational equity requires the fulfilment of three fundamental sub-principles, which Weiss (1992) considers includes the:

- **Conservation of options** whereby each generation conserves biodiversity and cultural diversity to ensure ecologically robust options are available for future generations to solve their problems and satisfy their needs;
- **Conservation of quality** whereby each generation maintains the integrity of nature and culture to ensure they are passed on in a condition no worse than receive; and
- **Conservation of access** whereby each generation conserves future generations' equitable rights of access to the resources available to past generations.

Current development decision-making can fail these duties owed to both current and future generations, as evidenced by continuing economic poverty, unprecedented rates of biodiversity loss, and the projected worsening impacts of anthropogenic climate change. ESD, however, should also extend to intragenerational and interspecies equity (Preston 2018). This requires balancing the three principles to ensure the equitable distribution of the benefits and burdens that result from natural resource development (Preston 2018). Specifically, this means ensuring a fair process (procedural justice) with a power sharing result (distributive justice) (Preston 2018). Often, however, existing statutory decision-making processes can be incapable of considering and balancing these multifaceted benefits and burdens, and thus, are not distributed equitably and so fail to achieve fair results.

Further, current decision-making processes often can exclude, or do not adequately engage the participation of stakeholders directly or indirectly affected by a development decision (O'Faircheallaigh 2015).

Instead, in places with inadequate planning, decision-making can disadvantage economic development proponents seeking to minimise investment risks. Alternatively, where development applications are indeed made, this lack of planning means that current development decisions can disproportionately favour proponents and are subject to political influence, while impacted Traditional Owners and communities may not be afforded adequate decision-making agency or legal standing to challenge (O'Faircheallaigh 2015).

Nevertheless, despite the current shortcomings of ESD in practice, domestic and international statutory environmental protections cannot regress under the 'non-regression in environmental law' principle which was implied by the United Nations' General Assembly in agreeing that "it is critical that we do not backtrack from our commitment to the outcome of the United Nations Conference on Environment and Development" (United Nations 2009).

3.4. Environmental, Social and Governance

Because of a range of regulatory and market drivers, environmental, social and governance (ESG) reporting is an increasingly key component of corporate business strategy. As investment projects occur locally, this means collectively, the ESG thinking of corporations has a big role to play in considering the cumulative impact of development at regional scale.

ESG reporting is used to quantitatively and/or qualitatively measure a corporation's environmental and social risks and impacts, in addition to their ability to create and maintain non-financial, long-term stakeholder value (PwC Australia 2022a). Measuring performance may be used to inform investment decision-making. In part, this is achieved via the significant positive relationship between ESG and corporate financial performance (Friede *et al.* 2015).

Nonetheless, ESG reporting is highly influenced by regulations and each corporations' motivation to legitimise their business operations (Deegan 2019). Legitimacy theory states that legitimacy is attained when corporate actions are accountable and aligned to societal norms, values and beliefs (Suchman 1995). Moreover, there is a growing recognition that corporations have a responsibility to society generally, and should seek to maximise the value afforded to stakeholders beyond their shareholder base (Deegan 2019).

This rationale forms the basis of 'social licence', a concept based on legitimacy, credibility and trust, and one becoming increasingly important for corporations seeking to mitigate their environmental, cultural and social risks arising from business operations (Prno and Slocombe 2012).

ESG emerged from the United Nations *Who Cares Wins: Connecting Financial Markets to a Changing World* report in 2004. It provided guidelines and recommendations on the integration of ESG issues in asset management, securities brokerage and financial research (United Nations Global Compact 2004). The following year, the Principles for Responsible Investment (PRI) were developed to facilitate a sustainable global finance system. This has since grown substantively and multiple international ESG reporting frameworks now exist.

Current global ESG trends highlight the strengthening of reporting on sustainable finance, greenhouse gas emissions (GHG emissions), and natural capital risks and opportunities (PwC Australia 2022b). Further, New Zealand, the United Kingdom and the European Union have recently mandated Taskforce on Climate Related Financial Disclosures (TCFD) reporting for various private sectors. Existing reporting frameworks, however, are not standardised or comparable.

This results in inconsistent and quality-variable ESG disclosures within and across sectors (Lokuwaduge and Heenetigala 2017). Further, unless nationally mandated, framework compliance and the extent of information disclosed remains voluntary and variable (Lokuwaduge and Heenetigala 2017). This presents a challenge for those corporations seeking to demonstrate sustainability progress, and for investors wanting to compare ESG performance. In response, universal metrics and recommended disclosures were established through the World Economic Forum in 2020 (World Economic Forum 2020). The resultant 22 quantitative metrics are aligned to the 17 SDGs and are categorised into four key areas; governance, environmental, human capital and prosperity.

In Australia, the profile of ESG has increased due to growing stakeholder expectations and literacy on the topic, in addition to progression in international reporting frameworks and increasing demand for sustainable finance (PwC Australia 2021). In 2018, the Australian Securities and Investments Commissions' *Climate Risk Disclosure by Australia's Listed Companies* report recommended, but did not mandate, disclosure of climate risks in accordance with the TCFD framework.

Subsequently, in November 2021, the Australian Prudential Regulation Authority (APRA) released its *Prudential Practice Guide CPG 229 Climate Change Financial Risks* report. This aimed to assist the financial sector to better manage climate-related financial risks via governance arrangements, risk management, scenario analysis and relevant disclosures. Similarly, ASIC continues to provide guidance on climate-related financial risk disclosure and avoiding product greenwashing. These matters are also becoming a common theme for climate litigation in Australia.

Accordingly, Australian corporations are becoming increasingly engaged with ESG reporting. In 2021, 70% of ASX 200 companies had sustainability strategies, with 44% have them embedded into their core corporate strategies (PwC Australia 2021). Only around 30% of corporations, however, had clearly articulated KPIs and/or net-zero targets with clear timelines for implementation (PwC Australia 2021). Moreover, 76% of corporations lacked a Reconciliation Action Plan endorsed by Reconciliation Australia (PwC Australia 2021).

Despite international reporting advancements, the greatest challenge for Australian corporations was standardised and comparable ESG reporting due to a lack of regulatory guidance (PwC Australia 2021). Moreover, corporations tend to only report on regulated ESG matters, such as corporate governance, Scope 1 and 2 greenhouse gas emissions, and occupational health and safety (Lokuwaduge and Heenetigala 2017). They are less likely to report on ESG matters which could negatively affect their reputation or perceived legitimacy (Lokuwaduge and Heenetigala 2017). As such, there is a correlation between the requirements of the legal system and the content and quality of ESG reporting (Lokuwaduge and Heenetigala 2017).

These considerations demonstrate the need for greater alignment of ESG reporting in practice in northern Australia to other initiatives that promote regional sustainability metrics, including implementation of the SDGs and ESD. Equally, there is a need for ESG actions to deliver local benefit within some regional context, rather than diverting corporate effort away from the regional or local scales they reside within.

Continued effort is needed to standardise ESG reporting to enable performance comparison by investors to ensure more informed investment decisions and SDDM. Lastly, effective stakeholder engagement is a strong driver of enhancing corporate ESG capability and could also help align ESG towards improved regional outcomes.

3.5. The Challenge for Sustainable Development in the North

Achieving sustainable development in northern Australia means integrating SDGs, ESD and ESG thinking and action at regional and local scales. Significant tensions outlined above in the northern Australia landscape, however, and the lack of public policy framing to resolve these tensions, lies at the heart of achieving positive outcomes. This challenge, however, presents an opportunity for emerging new approaches to regional planning in the north.

Rising above boom-bust cycles to develop a sustainable economy, for example, is a challenge for the north (Dale 2013). Under the refreshed *Our North, Our Future* strategy, the ONA has been seeking to address this by developing master plans for three "regions of growth", including the corridors of Mount Isa to Townsville, the Beetaloo Basin through Katherine to Darwin, and Broome through Kununurra to Darwin (Office of Northern Australia 2021). These aimed to deliver a 20-year blueprint for the north's economic development supported by five-year action plans and regular progress reports (Office of Northern Australia 2021).

Similarly, Austrade has sought to attract increased international investment by promoting northern Australia's strong trade and export markets with the Asia-Pacific region, the continued greater capital expenditure compared to the south, and the high percentage of global top-tier investment corporations operating in the north (The Australian Trade Commission 2015).

Northern investment opportunities, however, have targeted sectors that have performed historically well, including resources and energy, agriculture, advanced manufacturing, major infrastructure and tourism (The Australian Trade Commission 2015). Future opportunities in agricultural expansion and aquaculture were identified in the CSIRO's previous Flinders and Gilbert Agricultural Resource Assessment (FGARA) studies and more recent NAWRA work, which aimed to inform major water infrastructure development in the Darwin (Northern Territory), Fitzroy and Mitchell catchments (Queensland) (Petheram *et al.* 2018a; b; c). Accordingly, investment interest in agribusiness and food, and policy and research focus on strengthening supply chains and market access across the north have followed in recent years (Dale and Marshall 2020; Rosair *et al.* 2020; Rosair *et al.* 2021).

More recently, each jurisdiction aspires for stronger Indigenous economic growth through the *Northern Australia Indigenous Development Accord* (the Accord) and Indigenous Reference Group (IRG). The IRG and Accord aim to maximise the economic potential of Indigenous Australians while ensuring their interests are properly considered in the development and implementation of government policies and programs (National Indigenous Australians Agency 2019). If successfully implemented, the Accord will lend great support to *Closing the Gap* and new approaches to Reconciliation Action Planning within regions with large Indigenous populations which disproportionately experience higher rates of disadvantage.

Many, however, have raised the complex challenges for the north's economic development through implementation of the White Paper. The north's ability to attract and retain population remains an endemic issue, as demonstrated by a negative net migration exchange rate, which is only stabilised by the large non-migrating Indigenous population (Taylor *et al.* 2022). Moreover, jobs growth has declined in all sectors (excluding tourism, health care and social assistance) and Indigenous Australians continue to face lower employment opportunities overall (Taylor *et al.* 2022). This demonstrates barriers to achieving both the *Indigenous Accord* and *Closing the Gap* policies.

High population growth and employment rates have tended to be concentrated in Townsville, Cairns and Darwin, with the Pilbara also having a high employment-to-population ratio (Taylor *et al.* 2022). However, in the case of the Pilbara for example, outside the resources and energy sector, population and economic growth has not been observed, despite the significant revenue generated from mining iron-ore (Taylor *et al.* 2022). This highlights the over-reliance of the northern Australian economy on the resources and energy sector to sustain its economy and reinforces its vulnerability to boom-bust economic cycles. Further, these factors present major policy issues for generating sustainable growth beyond the population centres of Townsville, Cairns and Darwin.

Challenging operating conditions for business are strong drivers of past and current trends in population and economic growth. Particularly, the development, delivery and serviceability of infrastructure in northern Australia is limited by the nature of geographically remote settlements and the tyranny of distance (Regional Australia Institute 2013). Rural and remote areas are disproportionately affected as they are subject to higher costs of, and poor access to critical infrastructure and essential services owing to a lack of skilled labour across dispersed and small populations (Regional Australia Institute 2013). Moreover, corporations must contend with navigating northern Australia's complex land tenure system.

Complex tenure types may overlap and cross borders, such as a mining or petroleum leases covering freehold and crown land, pastoral leases and native title. In these cases, significant resources are required to effectively negotiate and resolve complex tenure disputes (Dale *et al.* 2013). Particularly, in the Northern Territory, there have been ongoing tensions between Traditional Owners, governments and pastoralists over conflicting rights related to land, sea and water resources.

Regulatory burdens stemming from land tenure complexity are often barriers for small to medium sized corporations engaging in the diverse economic development opportunities across the landscape *and* can prevent Traditional Owners from using their land to realise their cultural and economic aspirations (Dale *et al.* 2013). This is further exacerbated by duplicative development assessment and approval processes for proponents and their lack of access to environmental and cultural data required for environmental approvals, especially in undeveloped areas (Samuel 2020).

Despite the many challenges for economic development, there remains investment interest and development pressure across the landscape. If development aspirations are realised, it will result in significant land use changes and exploitation of natural resources across northern Australia's sensitive environs and culturally significant places. This presents a major challenge for decision-makers to effectively balance the north's unique environmental, social and economic values for sustainable outcomes. If the current development focused paradigm is applied without caution, it could result in problematic outcomes for the environment and society. Therefore, significant policy effort must be applied to de-risk decision-making.

In effect, these northern development pressures are occurring within a strong Indigenous domain and in largely natural landscapes; all locations with limited public policy planning or effort to resolve tensions within the landscape. Of national concern is the current development-focused paradigm's potential to contribute to environmental decline and exacerbation of threatening processes, in a time when the north's environment is under increasing pressure. Traditional Owner's also demand more significant equity in development within their estates. Consequently, the current multi-jurisdictional and multifaceted decision-making framework for planning, assessing and approving development operates in a heavily contested landscape.

Historically, proponents, environmentalists, and Traditional Owners have all been frustrated by the lack of government prioritisation and planning for development, and the duplicative nature of statutory assessment processes. These problems increase the investment of time and money required to attain approval and to see returns on investment. This has encouraged substantial research into de-risking investment and development in the north (see Dale and Marshall 2020; Rosair *et al.* 2020a; b).

Similarly, policy makers and regulators are grappling with these wicked problems (Hardy *et al.* 2021), such as how to achieve sustainable development within a poorly coordinated decision-making framework to effectively mitigate cumulative impact, while protecting and conserving biodiversity and cultural heritage.

Consequently, defining sustainable development (in SDG, ESD or ESG terms) in northern Australia, let alone a setting a benchmark for measuring success, is a challenge by its very nature. Place-based alignment between the global intent of SDGs, the national and jurisdictional requirements for ESD, and local corporate desire of ESG are essential. More effective regionalised approaches to planning and delivery may indeed provide an answer.

4. Existing Regional Arrangements and Case Study Analysis

By drawing on the planning literature, this section unpacks the current arrangements for, and performance of, regional planning in northern Australia. It starts with a review of the current arrangements for land use planning and development decision making processes across the north. It then explores how such processes might be working to deliver sustainable development outcomes. It in part, does this via three brief case studies of northern regions.

While there are many emerging new Commonwealth-inspired approaches to regional planning for sustainable development in the north (as outlined above), land use planning and development decision making tend to most significantly influence the achievement of such outcomes. Development planning responsibilities can be either progressed strategically through land use planning legislation, and/or assessed and approved on a project-by-project basis under aligned or related planning and environmental law. In northern Australia, however, laws that regulate development planning, assessment and approval are shared in a complex way by all three levels of government, with decision-making responsibility assigned based on a project's scale and its possible impact on protected or regulated matters.

Since federation, state and territory governments have held most of the statutory decision-making power for land use planning and development assessment and approval. However, an *Intergovernmental Agreement on the Environment* was executed in 1992 following a High Court ruling which established the Commonwealth's power to enact international environmental obligations into domestic laws under the Constitution's external affairs power. Accordingly, in the absence of strong arrangement for tri-lateral cooperation, northern Australia's statutory planning frameworks have become highly complex, with each jurisdiction administering independent land use planning systems for development assessment and approval. Queensland, Western Australia and the Northern Territory all approach development planning and assessment differently, with different legal definitions of development, objectives for sustainable development, triggers for referral and assessment, and different assessment criteria, such as protected matters and/or regulated activities.

Land use planning is a statutory process whereby regulators set long-term visions and limits to development within a defined area. All levels of government need land use planning because it provides an enabling framework for evaluating the impacts of proposed development on the environment, society, and the economy. Without adequate land use planning arrangements, decision-makers lack the necessary strategic guidance needed. This increases risks associated with making individual development decisions in isolation. For this reason, proactive, coordinated, and integrated land use planning, developed in partnership between government and non-government stakeholders, can build a shared understanding of landscape values, challenges and priorities. This can be achieved through the application of planning instruments that devise clear planning objectives and stipulate the types of development which are prohibited or that require further assessment for approval. Planning instruments are enforceable at varying scales (including regional), depending on the scope of the issues they are designed to address. Importantly, any regional inconsistencies between multiple applicable planning instruments for a defined area are most often resolved by affording the prevailing authority to the highest-ranking statutory plan.

In Queensland, the Northern Territory and Western Australia, however, formalised land use planning tends to have most influence in major urban settings. This means that, with northern Australia being a highly decentralised and largely rural and remote landscape, there are generally weak land use planning arrangements, and many decisions are strongly influenced by Commonwealth responsibilities under the *EPBC Act*. Without more integrative and bilateral regional planning efforts, most development decisions are explored through the lens of more silo-based natural resource legislation in each jurisdiction (e.g., state and territory based vegetation management laws, tenure management systems, water management laws, environmental and cultural heritage protection laws, etc.). These more fragmented regulatory arrangements across the wider northern Australian landscape are outlined in detail in Dale and Marshall (2020), Rosair *et al.* (2020) and Rosair *et al.* (2021), so are not repeated here. This landscape-scale regulatory fragmentation has led to all key sectors involved in the development debate becoming frustrated by the lack of government prioritisation and planning for development, and duplicative statutory requirements for development assessment and approval (see Dale and Marshall 2020, Rosair *et al.* 2020 and Rosair *et al.* 2021). These concerns also led Hardy *et al.* (2021) to call for more integrated environmental assessment approaches, effectively as a precursor to improved regional planning.

4.1. Statutory Regional Planning Frameworks in Northern Queensland

The *Planning Act 2016* (Qld) and *Planning Regulations 2017* (Qld) provides the foundation for regional planning in Queensland. The object of the *Planning Act* is to establish an "efficient, effective, transparent, integrated, coordinated, and accountable system of land use planning, development assessment and related matters that facilitates the achievement of ecological sustainability." Of note, under the Act, the concept of ecological sustainability differs from ESD, but still requires the balance and integration of ecological protection, economic development and social/cultural wellbeing. Table 4.1 summarises key entities and functions, and Figure 4.1 depicts the Queensland planning framework.

Development planning

Queensland's statutory planning system sets out the state's interests through State Planning Policies (SPPs). Examples include SPPs related to livable communities and housing, economic growth, environment and heritage, safety and resilience to hazards, and infrastructure. There are also guiding planning principles (e.g. seeking accountability, an outcomes focus, integrated effort, etc.). SPPs and guiding principles are implemented through regional plans and local planning schemes. Within the context of regional plans, local planning schemes are the primary drivers for ensuring state, regional and local planning objectives are coordinated, integrated, and ultimately achieved. As such, local governments are key stakeholders, and local planning schemes are key tools, for achieving sustainable regional development. They establish a strategic framework for managing regional and local growth and change. Within a regional context, they regulate local development by stipulating the rules (e.g. assessment categories, assessment codes and benchmarks), establishing zones designating land use (e.g. residential, industrial, and rural), and identifying overlays requiring further planning considerations (e.g. exposure and proximity factors). Local planning schemes must adhere to applicable SPPs and regional plan provisions. These include being: (i) developed in accordance with the Minister's guidelines and rules; (ii) approved by the planning minister; and (iii) reviewed within 10 years of commencement. Local governments may also develop temporary local planning instruments to address urgent issues, and local government infrastructure plans to identify locally shared infrastructure for supporting the community and future planned development, such as water, sewerage, and public transport.

Table 4. 1. Key entities and functions within Queensland's planning framework.

ENTITY	FUNCTION
Minister for State Development, Infrastructure, Local Government and Planning	Under the *Planning Act*, the minister has various powers including: • 'calling-in' certain development applications to make decisions on developments that are in the state's economic and environmental interests • streamlining assessment and approval process for essential infrastructure and services under ministerial infrastructure designations • directing or issuing notices on specified actions for local governments to protect or give effect to a state interest (i.e., amending local planning schemes or guiding current or future development assessment) • declaring an applicable event (i.e., public health emergencies or natural disasters) to permit extensions/suspensions to statutory planning timeframes, to extend essential service operating hours, or to issue temporary use licenses to change or vary existing development approval conditions
Department of State Development, Infrastructure, Local Government and Planning	The department supports the minister by providing professional and technical expertise, administrative services, policy development, and corporate resources to assist land use planning arrangements. Functions include the design and implementation of the state's regional plans, in addition to supporting the assessment of coordinated projects.
Local Government	Local government is responsible for developing local planning schemes which must comply with SPPs and regional plans. Local government decide development applications under local planning schemes.
Development Tribunals and the Planning and Environment Court	Development Tribunals and the Planning and Environment Court hear matters relating to planning and development and environmental protection. A person may appeal to a Development Tribunal for informal, non-legal dispute resolution proceedings regarding local planning decisions of local government or private building certifiers. Alternatively, a person may initiate proceedings in the Planning and Environment Court with an originating application or an appeal of a decision under the *Planning Act*.

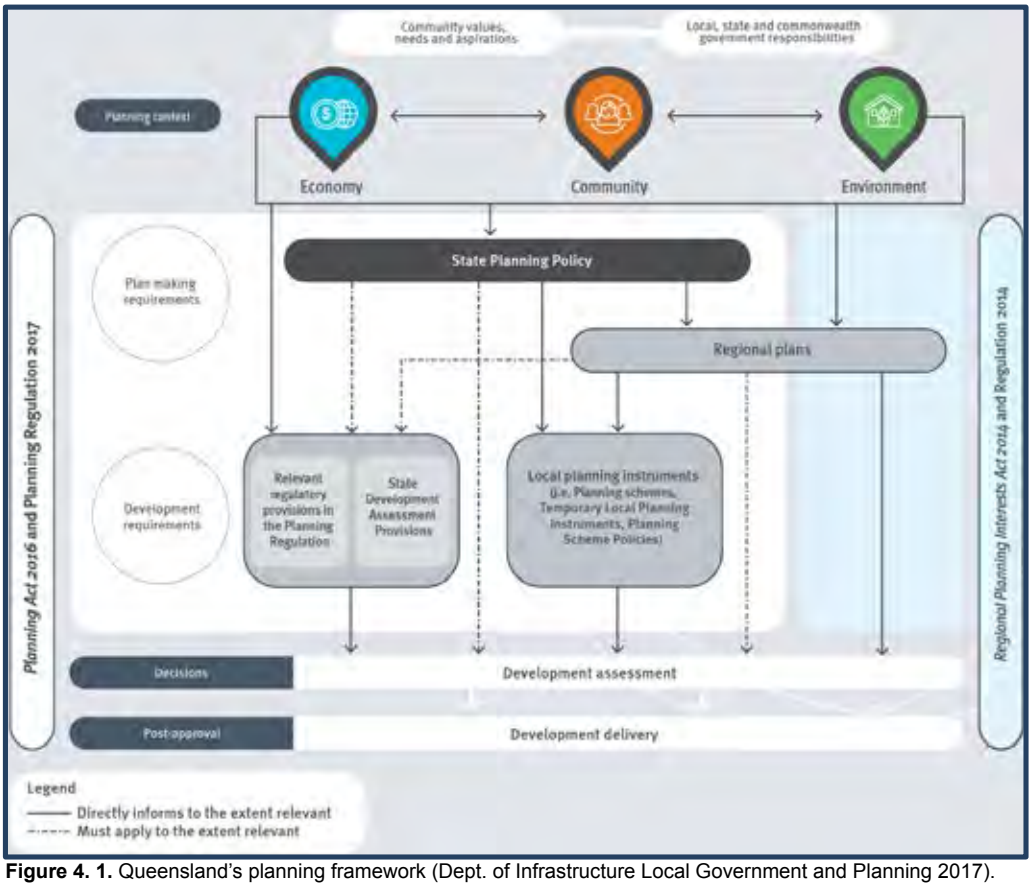


Figure 4. 1. Queensland's planning framework (Dept. of Infrastructure Local Government and Planning 2017).

Development assessment and approval

Development assessment is separated into three categories: (i) prohibited development; (ii) accepted development; and (iii) assessable development. Applications for development permits are required for assessable development, not required for accepted development, and barred for prohibited development. Accordingly, applicants must submit a development application to the assessment manager, which is typically the local government responsible for assessing and deciding the application in accordance with the development assessment rules.

Applications that affect state interests will trigger referral to the department and/or State Assessment and Referral Agency, who conduct their own assessment in accordance with the State Development Assessment Provisions before making a final decision. Moreover, major projects may be considered differently and declared a coordinated project by the Coordinator General under the *State Development and Public Works Organisation Act 1971* (Qld). These declarations are made by the Coordinator General, or on proponent application.

Assessable development applications are further categorised as being either code assessable or impact assessable. Both categories are assessed against the benchmarks outlined in the applicable local planning scheme, regional plan and SPP. Importantly, code assessments must only be assessed against these prescribed benchmarks, whereas the assessment manager may also consider other relevant matters under impact assessments. What constitutes 'relevant matters' is not defined under the *Planning Act* and so, broad discretion is applied by the assessment manager. Nonetheless, the public must be notified, and submissions considered prior to making a decision. The assessment manager must also consider other matters for both categories of assessment set out by the regulations.

Following code assessments, applications must be approved if they are compliant with the assessment benchmarks. Applications may only be refused if conditions cannot be imposed. Correspondingly, for impact assessable applications, the assessment manager may approve all or part of an application, impose conditions of approval, or refuse an application entirely.

Once approved, an assessment manager may grant preliminary approval (which does not authorise development to commence) prior to issuing formal approval via a development permit, which binds the owner, successors in title, and occupiers of the premises.

4.2. Statutory Regional Planning Frameworks in The Northern Territory

Regional and local land use planning in the Northern Territory is regulated by the *Planning Act 1999* (NT) (*Planning Act*), the *Planning Regulations 2000* (NT), and the *Northern Territory Planning Scheme 2020* (NT) (*Planning Scheme*). Unlike the planning frameworks of Queensland and Western Australia, the Northern Territory government is solely responsible for land use planning, resulting in a comparatively streamlined and simplified land use arrangements. Nonetheless, local governments may be notified of development proposals.

The *Planning Act's* object is to "plan for, and provide a framework of controls for, the orderly use and development of land." Its criteria for achieving its objects are based on themes of sustainable development and use of resources, environmental protection, and community consultation. However, these themes are not defined under the Act, and ESD is not referenced. Table 4.2 summarises key entities and functions of prescribed consent authorities who have authority to make development decisions within the planning framework.

Table 4. 2. Key entities and functions within the Northern Territory's planning framework.

Entity	Function
Minister for Infrastructure, Planning and Logistics	Under the *Planning Act*, the minister has various powers including: • making, amending and/or repealing planning schemes • issuing exceptional development permits and interim development control orders • revoking or modifying development permits • delegating decision-making power • generally directing the Development Consent Authority (DCA) and making development decisions outside of DCA division areas
Development Consent Authority (DCA)	Under the *Planning Act*, the DCA "has the powers that are necessary …to the performance of its functions or the exercise of its powers" including making development decisions, enforcing planning rules, holding public hearings, and reporting to the minister on development applications, planning scheme amendments and exceptional development permits as they relate to the divisions of Darwin, Palmerston, Litchfield, Batchelor, Alice Springs, Katherine, and Tennant Creek. The DCA's chairperson and each division's local council representative and two community members meet monthly.
Northern Territory Planning Commission	Under the *Planning Act*, the Planning Commission has functions relating to the Planning Scheme including: • conducting regular reviews • consulting the community prior to preparing integrated strategic plans, guidelines, and assessment criteria • providing advice to the minister about matters within the objects of the Act, significant development proposals, and future land use and development The Planning Commission comprises of a chairperson, the DCA's chairperson, the Heritage Council, the Northern Territory Environment Protection Authority, a Local Government Authority representative and five other minister appointed members.
Department of Infrastructure, Planning and Logistics	The department's planning division comprises of the Development Assessment Services branch and the Lands Planning branch which supports the minister and consent authorities by assessing development applications and planning scheme amendments, providing professional and technical support, developing strategies and plans, supporting proponents and the public on the Northern Territory's planning framework and enforcing the *Planning Act*.

Development planning

The Northern Territory's statutory *Planning Scheme* promotes the objects of the *Planning Act* by establishing land use planning arrangements to control development occurring on zoned land. Notably, with the exception of Darwin, Katherine, Tenant Creek, Alice Springs, and some 23 remote towns, which have strategic land use plans, most of the Northern Territory is unzoned. It is therefore unplanned, due to small, sparsely populated settlements and large areas covered by Aboriginal land.

For zoned areas, the *Planning Scheme* establishes a strategic framework for strategic planning policies and strategic land use plans, including:

- **zoning requirements** for residential, commercial, industrial, recreational, rural, infrastructural, and other zones, in addition to guidance on suitable development types;
- **overlays** where specific development requirements must be met due to proximity or exposure factors;
- **assessment tables** detailing applicable assessment categories, overlays, and general/specific development requirements;
- **subdivision and consolidation** processes for zoned and unzoned land; and
- **Aboriginal Community Living Areas** requirements for land use planning.

Consent for development occurring on unzoned land is only required under the *Planning Act* for proposed subdivisions or clearing of more than one hectare of native vegetation. Therefore, most development on unzoned land is not controlled by the *Planning Act*, but may require approval under other environmental statutes, such as development proposals assessed under the *Environmental Protection Act 2019* (NT), or proposed subdivisions of pastoral land under the *Pastoral Land Act 1992* (NT). Moreover, the only strategic planning policy developed for the Northern Territory is the *NT Compact Urban Growth Policy*, which must be considered by the planning minister and the DCA when making decisions.

Development assessment and approval

Development consent is separated into four categories: (i) permitted; (ii) merit assessable; (iii) impact assessable; and (iv) prohibited development. Development consent is not required for permitted development and may only be granted to prohibited development if its ancillary purpose is listed in the *Planning Scheme's* Schedule, or it relates to a heritage place and has received approval under the *Heritage Act 2011* (NT).

Development assessment and approval from a consent authority is required for merit assessable and impact assessable development applications. The *Planning Act* sets out the decision-making process consent authorities must follow when assessing development applications. Importantly, for applicable development applications, consent authorities must act in accordance with decisions made by the Northern Territory Environment Protection Authority on environmental assessments and approvals. Further, consent authorities may consider any matter deemed relevant.

Following assessment, consent authorities may approve or alter the development conditionally or unconditionally or refuse consent. Consent authorities must immediately supply a development permit to the proponent, which may include conditions.

The proponent and persons who made submissions (including local councils) must be notified of all decisions with detailed reasons and explanation of rights of review. Further, significant developments are declared for proposed development which may have a significant impact on the natural environment or the existing amenity of the land and require special assessment and approval. Here, the planning minister may request a report from the NTPC prior to determining the application or referring the application to a consent authority.

4.3. Statutory Regional Planning Frameworks in Northern Western Australia

Western Australia's State Planning Framework comprises the *Planning and Development Act 2005* (WA) (*P&D Act*) and *Town Planning Regulations 1967* (WA), the *State Planning Strategy 2050* (SPS), and various state and regional policies, strategies, position statements and guidelines. The PDA's object is to "provide for an efficient and effective land use planning system" and "promote the sustainable use and development of land in the State." Sustainable use and development is not defined under the Act, and ESD is not referenced. Table 4.3 summarises key entities and their functions, and Figure 4.2 depicts the SPF.

Table 4. 3. Key entities and functions within Western Australia's planning framework.

ENTITY	FUNCTIONS
Governor of Western Australia	Under the P&D Act, the Governor has various roles, including approving state planning policies, planning schemes and amendments, and improvement plans. The Governor also has various statutory powers, including making planning regulations and local planning laws; modifying or suspending laws to give effect to planning schemes; and prohibiting, restricting, regulating, or permitting non-conforming development.
Minister for Planning	Under the *P&D Act*, the minister has various powers, including: • making minor amendments to regional planning schemes; • ordering local government to prepare or adopt local planning schemes or amendments, and/or amending them to be consistent with regional planning schemes/state planning policies; • amending local planning schemes to conform with improvement schemes; • enforcing *P&D Act* provisions and making subsidiary legislation; • delegating decision-making power; and • generally directing the WAPC.
Western Australian Planning Commission (WAPC)	Under the *P&D Act*, the WAPC's functions include advising the minister on Western Australia's planning framework; preparing state and region planning policies, strategies, schemes, and plans; providing professional and technical advice; undertaking research and review functions; and developing, maintaining, and managing land it holds. Further, the *P&D Act* lists various statutory powers of the WAPC to do "all things necessary or convenient to be done for or in connection with the performance of its functions."
Department of Planning, Lands and Heritage	The department supports the WAPC and the minister by providing professional and technical expertise, administrative services, policy development, and corporate resources to assist land use planning arrangements. The department also administers some delegated functions of the WAPC, including deciding subdivision and development applications.
Local Government	Local government is responsible for developing local planning schemes which must comply with state planning policies and regional planning schemes. Local government also administers some delegated functions of the WAPC, including deciding development applications under local and region planning schemes.
Development Assessment Panels (DAPs)	Under the *Planning and Development (Development Assessment Panels) Regulations 2011* (WA), DAPs are independent of the department and report directly to the minister. DAPs comprise five members from local government and technical backgrounds. Proponents may choose for their development application (valued between $2–10 million) to be assessed and approved by DAPs rather than local government.
State Administrative Tribunal	Under the *State Administrative Tribunal Act 2004* (WA) and P&D Act, the SAT hears matters and reviews decisions of government made under the PDA and local and region planning schemes.



Figure 4. 2. The State planning framework for Western Australia (Western Australia Planning Commission 2017).

Development planning

Land use planning is regulated by the *P&D Act* in Western Australia. The Act establishes the key planning institutions and their functions listed above, in addition to enabling all planning schemes, strategies and policies. The SPS furthers the *P&D Act's* objectives by outlining the state's strategic vision for land use planning, and by establishing six guiding principles with supplementary guidance to inform all state, regional and local planning schemes, strategies and policies. The six guiding principles include:

- **community** to enable diverse, affordable, accessible and safe communities;
- **economy** to facilitate trade, investment, innovation, employment and community;
- **environment** to conserve natural assets through sustainable development;
- **infrastructure** to ensure infrastructure supports development;
- **regional development** to build the competitive and collaborative advantages of regions; and
- **governance** to lift community confidence in development processes and practices.

Non-statutory state planning policies (SPPs) sit under the SPS and provide decision support to the WAPC, while also coordinating and informing local government planning. SPPs are categorised into four themes: (i) environment; (ii) community, urban growth and settlement; (iii) economy, infrastructure, and regional development; and (iv) design of the built environment. Under the *P&D Act*, local governments must consider SPPs in designing and/or amending their local planning scheme. Further, each region of Western Australia has its own regional strategy and various sub-regional strategies. For example, in north Western Australia, *Planning and Infrastructure Frameworks* are in-force for the regions of the Kimberley, Pilbara, Gascoyne and Mid-West. These regional strategies provide specific guidance to coordinate and integrate state objectives with local planning action relevant to specific regions.

Part 5 of the *P&D Act* provides for local governments preparing or adopting local planning schemes. The *P&D Act* and regulations stipulate that local planning schemes must establish local planning objectives; reserve land for public purposes; define zones designating land use; outline development assessment and approval procedures; include administration and enforcement guidelines; and conform with other applicable provisions of the Act. Importantly, environmental review is mandated for local planning schemes under the *Environmental Protection Act 1986* (WA). Here, the Environmental Protection Authority (EPA) may independently investigate or require local governments to undertake an environmental review of a proposed local planning scheme. Subsequently, the EPA may provide an environmental report on the local planning scheme to the environment minister and make recommendations such as imposing conditions to the scheme. Disputes arising between the planning and environment ministers may be referred to the Governor for resolution.

The *P&D Act* also provides for interim development orders, planning control areas and improvement plans. Interim development orders regulate, restrict or prohibit development while regional or local planning schemes are developed. The WAPC employs planning control areas to protect land identified for future public purposes. Improvement plans are subject to existing planning schemes and facilitate further development for areas that require special planning. Once an improvement plan is in place, an improvement scheme may be developed which outlines development control provisions and overrides existing planning schemes.

Development assessment and approval

Applications for proposed development are only required if it occurs in the boundary of an in-force planning scheme or interim development order, or on land where there is a registered heritage place under the *Heritage of Western Australia Act 1990* (WA). Notably, for development involving heritage places, the proposal must be referred to the Heritage Council for consideration, and approval may be required under other environmental legislation, such as approval to clear native vegetation under the *Environmental Protection Act*.

Statutory decision-making authority rests with the responsible authority, which for local planning schemes is local government, and for region planning and improvement schemes is the WAPC. However, the WAPC delegates its authority to local government for region planning schemes. Therefore, local government is the primary decision-makers for development applications in Western Australia. Importantly, DAPs may decide development applications valued between $2–10 million. Development applications must be lodged with the relevant local government.

Assessment processes often involve a public comment period whereby the local government must consider submissions. Further, the Model Scheme Text included in the regulations sets out the general development requirements which apply to development applications for local and/or region planning scheme areas. The local government may consider any matter they deem relevant, but general requirements include compliance with, or consideration of, local and region scheme provisions, *Environmental Protection Act* provisions, heritage conditions, amenity, and risks and impacts on the natural environment. Following assessment, the local government may decide to approve, approve with conditions, or refuse development.

4.4. Known Health of the Regional Planning System in the North

Across northern Australia, current development decisions are inadequately addressing environmental, social and economic challenges, despite increasing development pressures. As mentioned previously, all sectors are frustrated by the lack of government prioritisation and planning for development, and duplicative statutory requirements for development assessment and approval (Dale and Marshall 2020; Rosair, Paul *et al.* 2020; Rosair, Paul *et al.* 2021). Much of this concern arises as state and territory planning frameworks are actually not responsible for directly regulating most the relevant matters affecting development decision making, such as land tenure; natural resource management (i.e., permits for allocating water, clearing vegetation or top soils, impacting threatened species or heritage, emitting pollution or waste, or extracting minerals); Aboriginal and Torres Strait Island cultural heritage and sacred sites; and essential services (i.e. education, health and aged care, and social services) (Bates 2019). Consequently, this lack of integrated and coordinated decision-making across the northern landscape results in regulatory tensions. It can either stifle development *or* perpetuate unsustainable development through poor coordination of critical component decision points. Consequently, weak regional land use planning, accompanied by fragmented decision making under poorly connected legislative instruments, means decision making about significant development of environment, social and economic consequence, tends to be managed via more isolated Environmental Impact Assessment (EIA) processes. Further, it has been suggested that dominant decision-making tools, such as EIA, yield managed environmental decline rather than sustainable development (Samuel 2020).

EIA only assesses impacts to protected matters in a single location and on a project basis. As a result, EIA increases and exacerbates cumulative impacts (social, economic and environmental) and does not provide decision-makers with an adequate understanding of the complex, dynamic socioecological interactions within the landscape they are attempting to manage (Whitehead *et al.* 2017). Efforts to broaden assessment scopes through strategic environmental assessments (SEA) have also suffered similar problems to EIA, such as failure to understand their contextual purpose and their inability to deliver more cohesive sustainable development outcomes (Banhalmi-Zakar *et al.* 2018; O'Faircheallaigh 2015). Further, advancements in societal expectations for ecological and social resilience require consideration of non-linearity, dynamic feedback loops, and stochasticity, yet EIA-based decision-making processes fail to adequately incorporate these matters (Banhalmi-Zakar *et al.* 2018). Consequently, across all levels of government, interest has significantly grown for regional approaches to development planning, assessment and approval.

Increasing regionalism and regionalisation across Australia represents a paradigm shift from current longstanding fragmented governance systems structured around centralised decision-making power (Peterson *et al.* 2010). Specifically, regionalisation is the process of transferring centralised power to regions for improved subsidiarity, while regionalism is a political ideology focused on increasing regional self-determination and decision-making authority (Hoshiro 2019). Both involve top-down and bottom-up governance and there are contrasting views on the existence of a causal relationship, namely, whether regionalisation is the precursor to regionalism (Hoshiro 2019). Nevertheless, strong political will (regionalism) and appropriate statutory and policy arrangements (regionalisation) can together facilitate regionally integrated and coordinated decision-making frameworks. There are multiple co-benefits of establishing such frameworks, primarily, as they are better equipped to recognise and address complex, dynamic challenges arising from socioecological systems (Peterson *et al.* 2007).

More regional approaches that can more powerfully integrate social, economic, and environmental planning can better coordinate other statutory arrangements related to more formalised regional land use planning, particularly land tenure and environmental approvals controlled under separate legislation. Such approaches present an unique opportunity for reform to address increasing fragmentation of government, institutionalisation of decision-making silos, and exclusion of key stakeholders in decision-making processes (Scott 2009).

Regional planning can be used integrate and coordinate whole-of-government planning frameworks for a defined region within a state or territory (Bates 2019). It can facilitate discussions of future land use and competing uses across all levels of government, multiple sectors, and the affected communities. It can also identify important regional values, and determine suitable locations for development (Stoeckl *et al.* 2022). Accordingly, integrated regional planning approaches may encompass all facets of proactive policy making and reactive development decision making, and may cover terrestrial, coastal and marine environments. Ultimately, such approaches can seek to create regional identity and ownership of development outcomes (Stoeckl *et al.* 2022). Accordingly, all regional planning requires significant data requirements and must leverage local knowledge systems to create a comprehensive evidence-base to inform decision-making.

As outlined in our analysis above, across northern Australia, statutory arrangements do actually exist to support regional planning, but there is much to be done to make sure they fully explore sustainable development pathways and integrate more project-based decision making. In Queensland, regional plans have been prepared for all of the state's regions under the *Regional Planning Interests Act 2014*. In the Northern Territory, strategic land use plans were developed under the *Planning Act* for the regions of Darwin, Katherine, Tenant Creek, Alice Springs. In Western Australia, under the *P&D Act*, there are various regional policies and strategies, in addition to legislative mechanisms for developing region planning schemes for northern regions of the state. However, while each framework has broadly comparable objectives for sustainable development, in a pan-northern sense, they are limited by differing scopes of purpose, application, and enforceability, differing legal definitions and triggers for referral and assessment, differing criteria and benchmarks by which development applications are assessed, and differing scopes of regulated matters controlling development decisions.

Across the north, this results in an uncoordinated approach to addressing pan-northern environmental, social and economic challenges for sustainable development.

Further reinforcing these regionally-oriented integration issues is Australia's nationally fragmented governance framework (i.e., northern jurisdictions and sectors not working together, or competing against one another), and major capability, capacity and power imbalance issues for local governments, industry and Traditional Owner groups engaging with geographically removed, centralised decision-makers from elsewhere (Dale 2013). While the purpose of reginal planning is to focus on values, risks and priorities specific to a region, there still needs to be more nationally coordinated policy responses which are consistent to effectively addressing the wicked problems regional planning is better suited for.

4.5. Case Studies of Existing Regional Planning Systems

To help add contextual depth to the above literature review, three simple literature-based case studies have been selected to profile the sort of complex decision-making issues that may best be resolved and adaptively managed by partnership-based approaches to long term regional planning.

These regions were selected because of existing and active collaborations between the regions, the three jurisdictions involved and the CRCNA, and past NESP arrangements. They are also regions experiencing significant development pressure, have strong Indigenous interests, and hold important ecological and cultural values. Water and agricultural development are a common theme consistent across all three regions.

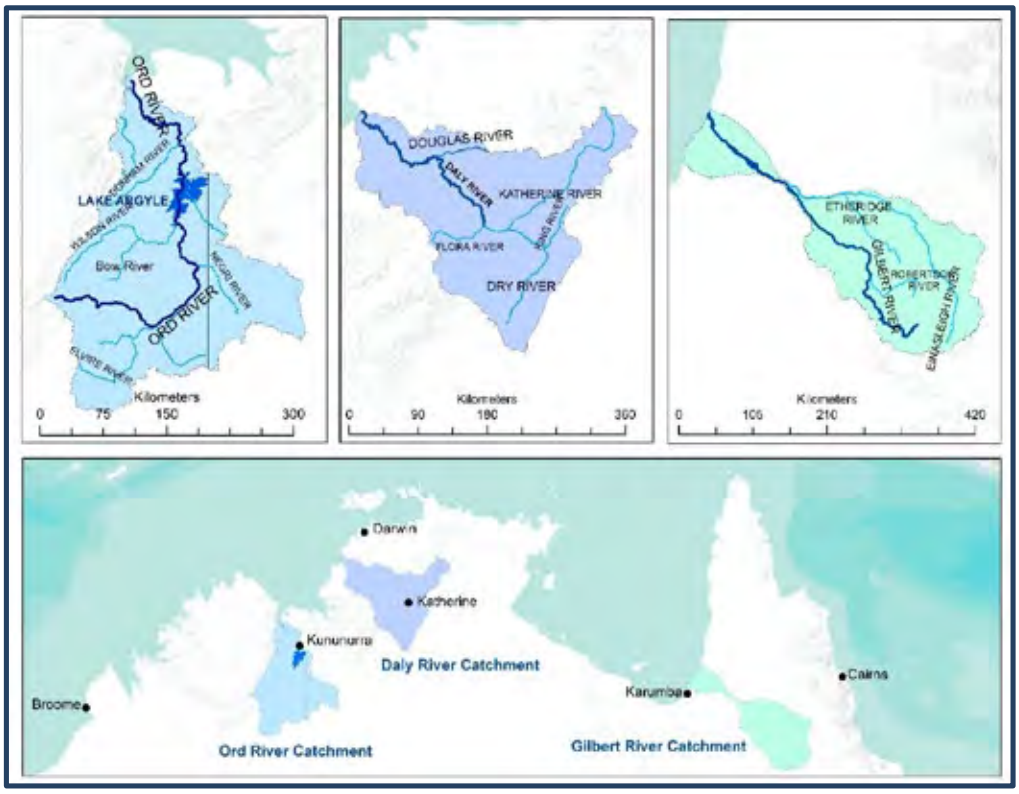


Figure 4. 3. Map of the Gilbert River region (Far North Queensland), Douglas Daly region (Northern Territory), and Ord River region (northern Western Australia).

The three regions are the Gilbert River region of Far North Queensland, the Douglas Daly of the Northern Territory, and the Kimberley region of Northern Western Australia (Figure 4.3).

The Gilbert River region

Background material from this case study has been drawn from existing publicly available material about the Gilbert River catchment and from inputs kindly provided by Michele Burford (Griffith University), Michael Douglas (UWA), Damien Burrows, Nathan Waltham (TropWATER JCU) and Shannon Burns (JCU).

1. Regional background and resource values

The Gilbert River includes the traditional lands of the Ewamian and Tagalaka peoples. The catchment has a population of around 2,000 people and drains into the Gulf of Carpentaria. The region covers approximately 46,000km^2 in north-west Queensland, with a predominantly monsoonal and highly variable climate. There are major agricultural opportunities associated with the available water, but the largest existing uses of land and water are pastoral operations, mines, tourism and fishing. There are a few emerging agricultural developments in parts of the Gilbert, and some proposals for large new cropping-based developments.

The region has a complex estuarine environment and coastal vegetation that includes extensive mudflats, which can be bare or support saline grasslands and saltmarsh communities. The upland areas are vegetated with dry rainforests, eucalypt woodlands and low Acacia woodlands. The region's vegetation is largely intact, with less than 5% of any catchment being cleared. The Gulf Savanna NRM Plan identifies that the region remains one of the least studied areas for biodiversity in Australia. A combination of local knowledge and sporadic data collection, however, has identified a rich and diverse array of vertebrate fauna. This includes at least 118 mammals, 196 reptiles, 63 amphibian and 455 bird species, including a number of endangered species such as the Golden Shouldered Parrot, Gouldian Finch, Star Finch, Red Goshawk, Northern Quoll and the Yakka Skink. Areas of high biodiversity value are found in the Einasleigh Uplands. Important wildlife refuges also occur within the wetland aggregations along the Gulf Coast and along riparian corridors.

In the Gulf river systems and estuaries there have been a number of relevant studies gathering information on the environmental values, but limited recording of the cultural values. Natural resource studies have included CERF, TRACK, NERP and NESP projects, as well as the CSIRO led FGARA (Flinders and Gilbert) studies, and most recently, an FRDC modelling study. There have been very few studies of the catchment's freshwater environment. The Flinders, Gilbert and Mitchell catchments, however, all have highly productive estuaries (Burford and Faggotter 2021). Freshwater waterholes are refugia in the dry season for many important species, including sawfish, barramundi, and crocodiles. Annual wet season flooding ensures sufficient connectivity for fish and other species to move up and down the rivers and out onto the floodplains and wetlands where they feed and breed (O'Mara *et al.* 2021).

Migratory shorebirds include critically endangered and endangered species and other *EPBC Act* listed Matters of National Environmental Significance found at or near the mouths of all three rivers. Some water bird species are at nationally or internationally significant numbers during summer months (Driscoll 2014). Several endangered species have also been identified in Waltham (2013). Finally, the region also has significant geological heritage values. There are also limited protected areas across this catchment area.

2. *Development opportunities and emerging threats to values*

The Gilbert River is earmarked for significant water development, primarily in the form of water extraction and water capture for irrigated agriculture. Preliminary cotton and sorghum development has already occurred in some limited areas and more areas are being investigated. The Queensland government's Gulf Water Plan (2007) identifies some 464 gigalitres of water reserved for potential agricultural, industrial, and urban uses. As part of the North Queensland Irrigated Agriculture Strategy, CSIRO conducted the Flinders and Gilbert Agricultural Resource Assessment. The 2013 final CSIRO report concluded that, in the Gilbert catchment, large instream dams could support 20,000 to 30,000 ha of irrigation in 85% of years (Petheram *et al.* 2013). CSIRO has also produced a report regarding Indigenous water values, rights, interests and development objectives in related catchments (Lyons and Barber 2013).

More specific development actions that might be considered in the future development of the catchment include the Green Hills dam, major private sector water storages and the innovative use of groundwater resources, under-ground dams, bed sand storage and managed aquifer recharge particular to the Gilbert catchment (BRA&DP 2022). There are also significant future mining (critical minerals) development opportunities as well as additional tourism development potential. Knowing some of these development pressures, however, it is important to point out that significant water development could reduce productivity in the estuaries due to a decrease in nutrient loads (Burford and Faggotter 2021), reduce connectivity in rivers (O'Mara *et al.* 2021) and contribute to the loss of wetlands and floodplains used by a range of species (Molinari *et al*. 2021a; 2021b; 2022). Alvarez (2015) also surveyed a number of complex management issues related to grazing, biosecurity, and erosion within the region. These combined works suggest emerging development effort would need deeper understanding of:

- highly seasonal rainfall and interannual variability will effect freshwater limnology;
- the impacts of shifting to more turbid water under development or hydrology changes (Waltham *et al.* 2013; 2016; McJannet *et al.* 2014);
- how the delivery of freshwater flows will influence fisheries production;
- the impact water extraction on groundwater dependent ecosystems;
- how impacts interact with cattle and invasives (particularly pigs); and
- the modelled impact of other complex issues like climate change and associated mangrove die back.

3. The current regional planning and development assessment system

The current system of land and natural resource planning in the region is highly fragmented and poorly integrated (Dale and Marshall 2020). Dale and Marshall (2020) note that while the region has a formal regional plan, most decisions are both promoted or regulated by more fragmented pieces of natural resource management legislation. Extensive water resource planning drives the aspiration for agricultural and industrial development in the Gulf rivers. Specifically, the Gulf Water Plan (2007) has been amended to provide greater water allocations for use. In the national context, biodiversity considerations related to development are separately managed through both the Commonwealth's *EPBC Act* and the *Nature Conservation Act 1992* (Qld).

In the context of the Gilbert, the *EPBC Act* provides a legal framework to protect and manage internationally and nationally important flora, fauna, ecological communities, and heritage places. In any regional context, the Act aims to balance the protection of these crucial environmental and cultural values with our society's economic and social needs by creating a legal framework and decision-making process based on the guiding principles of ESD. If developers conclude that they might have a significant impact on any MNES, then they need to apply for approval to proceed under the *EPBC Act*. This approval process is in addition to any state or local government approvals that might be required. When a proponent wants an action assessed for environmental impacts under the *EPBC Act*, they must refer the project to the Department of Climate Change, Energy, the Environment and Water. There are five different levels of assessment, depending on the significance of the project. Each level involves considering technical information assembled by the proponent and comments made by the public. Once a project has been assessed by the department, the Department makes a recommendation to the minister or their delegate on whether the project should be approved. In addition to considering potential impacts on MNES, in making a decision, the minister also considers the social and economic impact of the project (DAW&E 2020). There is regional potential to support these decision making frameworks through research work that has also been previously undertaken to support stakeholders in the Gilbert with the appropriate use of data created for the NESP Northern Australia Environmental Resources Hub to help prioritse threatened species and threatening processes (Pintor *et al.* 2019).

As in all regions in Queensland, The *Planning Act 2016* and *Planning Regulations 2017* (Qld) provide the foundation for Queensland's land use and decision making. Major projects may be declared a coordinated project by the Co-ordinator General under the *State Development and Public Works Organisation Act 1971* (Qld). Regional vegetation management plans, however, also provide a significant regionally-oriented planning and decision-making frameworks for vegetation clearing in the catchment. Complimentary to this, the Queensland *Nature Conservation Act* provides the framework for the creation and management of protected areas including national parks, conservation parks, resources reserves, nature refuges, coordinated conservation areas, wilderness areas, world heritage management areas, international agreement areas and protection of native species. The regulations under this Act provide detailed rules regulating activities in protected areas and a permit and licensing system for the taking or keeping of native wildlife. Separate State legislation protects more culturally important areas and sites within the region (Dale and Marshall 2020).

Gulf Savanna NRM is the designated Regional NRM Body for the region, and they are currently updating their NRM plan. There is a broad alliance of local governments in the south (North West ROC) and the north of the region (FNQROC). Finally, native title representative bodies and Registered Native Title Body Corporates (RNTBCs) have key roles to play, though many land and sea claims across the region are yet to be resolved.

4. Opportunities for regional planning innovation

There are several innovative opportunities of value in considering more regional approaches to address ESD interests in the Gulf region. These include the following:

- any attempt at improving regional planning for development assessment in the region would need to be fundamentally partnered the region's local governments, the resources and agricultural sector, Gulf Savanna NRM, Traditional Owners and their representative bodies and the research community. It must also invest in and support the planning and engagement capacity of both Traditional Owners and farmers;
- new regional approaches to planning for development need to ensure there is a revitalized framework for supporting water development, including determining viable volumes, extraction times and the building of acceptable water storage structures; and
- in terms of offsetting arrangements in the Gulf, as a largely intact landscape, it is important to recognise that there are few opportunities to replace newly cleared ecosystems. There are, however, if sustainable limits of vegetation removal can be determined, long term opportunities for stewardship payments that could secure ecosystem health across the wider pastoral and Indigenous estate within the region.

The Douglas Daly region

Background material in this case study has been drawn from emerging research kindly supplied by the NT Department of Industry, Tourism and Trade (DITT). This work is being progressed as part of the department's shared investment with CRCNA in de-risking agricultural development through improved sustainable development precincts. Other inputs have been drawn from publicly available literature related to the Douglas Daly region.

1. Regional background, resources and values

The Douglas Daly includes the traditional lands of the Wagiman, Wardaman, Jawoyn and Malak Malak peoples (King *et al.* 2021). While a region of significant fish biodiversity and cultural value, the Douglas Daly is well situated for potential agricultural development through its direct access by road, rail, and sea freight networks with Darwin.

Broadly, Darwin is located approximately 200 km to the north of the region and Katherine 200 km to the south. The region is an attractive area for migration and families with existing public infrastructure, including a primary school and community facilities. A community health centre is located in the nearby town of Adelaide River, while the closest police station is located at the community of Daly River.

The Northern Territory Government's Douglas Daly Research Farm is importantly situated firmly within the region, providing an important mixed farming research and demonstration facility. The Research Farm has been pivotal in exploring the potential of the area and carrying out trials to assist the emerging agriculture industries of the region.

Perennial rivers throughout the region support irrigation development, domestic and stock use. The Daly River is one of only a few large perennial river systems in northern Australia and is well recognised for its natural and cultural values (Erskine 2003).

The Oolloo Dolostone aquifer which underlies the region is the uppermost formation of the Daly groundwater basin, which is located just north of the Douglas and Daly River confluence, extending south-east to beyond the Katherine River. The Oolloo Dolostone aquifer is an important karstic aquifer, with its groundwater discharging into the Daly. This maintains flow throughout the dry season and supports associated riverine ecosystems. It currently provides reliable, good quality water supply with low salinity, making it attractive to agriculture.

The majority of land systems in the area are Blain soils of various sub-classifications. Blain soils are typically deep sandy red Kandosols. They are characterised by being highly siliceous at the surface, earthy, increasing to clay loams at depth (1.0 – 1.5m) of low fertility, moderate acidity and with low water holding capacity. The soils, however, are well drained and suited for overhead irrigated farming systems. They have proved to be highly productive for annual agricultural/horticultural and other broad-acre cropping systems in the Top End.

Extensive natural resource and environmental studies have been completed including soil, water, flora and fauna. The region's conservation areas also protect a significant section of the Douglas and Daly Rivers riverine systems. These key areas include: (i) the Douglas River/Daly River Esplanade; (ii) Stray Creek; (iii) Tjuwaliyn (Douglas) Hot Springs; (iv) Butterfly Gorge Nature Park; and the Umbrawarra Gorge Nature Park. The Daly River middle reaches have been declared a conservation site of national significance.

Diverse flora and fauna has been studied, with a range of threatened species present. Eight of the nine species of freshwater turtles found in the Northern Territory are present in the Daly River (Price *et al.* 2002). The high profile pig nosed turtle *(Carettochelys insculpta)* is a flagship species because it is of considerable international concern, being the sole remaining member of a once widespread Family, and because the best Australian populations of the species are found in the Daly River (Georges *et al.* 2002). At least two nationally threatened species of elasmobranchs, the Freshwater whipray *(Himantura chaophraya)* and the Freshwater sawfish *(Pristis microdon)* are also present. According to Pogonoski *et al.* (2002), these species are critically endangered and vulnerable, respectively. The Daly River is also an important recreational fishery for Barramundi (*Lates calcarifer*).

Northern Territory declared Heritage sites include the Fenton Airfield and a B24-D Liberator wreck, the Douglas Station has a range of gold mining heritage sites. Other World War II history in the greater area includes the nearby Adelaide River War Cemetery which is a Commonwealth heritage listed site.

The region is well known for agricultural diversity and has experienced significant change since the area was first developed for horticulture in the 1980s. From the early cropping era to cattle grazing and assorted horticulture, the district has progressed to become a valuable region of agricultural production.

With the Research Farm facility established in the 1960s, early research was focused on peanuts and cotton as potential crops to grow in the Katherine-Daly basin. Various crops followed, such as sorghum, safflower, guar, soybean, maize, and sesame as well as introduced pasture species sown into cleared and non-cleared areas. Cattle management, breeding, nutrition, reproduction, market requirements, grazing and carrying capacity trials have been assessed over the years to identify best management practices for the cattle industry.

With the region showing agricultural potential, Stage 1 of Douglas Daly was developed by Agricultural Development and Marketing Authority (ADMA) from 1980. ADMA established project farms on land excised from the Douglas and Oolloo pastoral leases. The limited marketing opportunities for produced grains coupled with the use of southern farming practices and the remote living situation saw many of the original farmers leave the district after a few years. Improved cattle faming is emerging and now fodder crop production has become an important industry for the Top End. The region aims to supply high quality fodder and fodder cubes for transporting cattle by ship to Asian markets.

Stage 2 of the Douglas Daly land release, known as Stray Creek, included seven freehold land parcels in the early 2000s which were excised from the Stray Creek pastoral lease. To ensure future growth, Stray Creek properties were sold with development lease conditions attached that required purchasers to make a certain improvements before receiving freehold titles.

In the mid-2000s, the introduction of Managed Investment Schemes in plantation forestry resulted in the development of a plantation estate of African mahogany in the region with investment companies purchasing numerous properties. These non-irrigated forestry plantations were developed predominately on freehold land previously cleared for improved pastures with the majority integrating cattle operations.

Although cattle production is still the prominent industry, the Douglas Daly has become a more diversified agricultural region with other enterprises emerging. Pastoral leases surrounding the freehold area have expanded operations past cattle grazing. Tipperary Station, for example, has been the site of a wide range of agricultural and horticulture projects over the past 40 years. Tipperary was the first pastoral lease in the Territory to apply for a non-pastoral use permit, allowing pastoral properties to diversify tenure on 30% of their land for up to 30 years. They were also granted the first license in the Territory to commercially grow opium poppies. In 2019, it included the first commercial cotton trial harvested in the Territory in 15 years. Around the same time an orchard of 3,500 lemon trees were planted with plans to expand to 10,000 trees.

2. *Development opportunities and emerging threats to values*

Through improved regional prioritisation and planning practice, it is likely there will be opportunities to progress sustainable development. These opportunities could include:

- **Horticulture:** with the establishment of the Northern Territory's first cotton gin 35 km north of Katherine, cotton growers will no longer be required to send their product to the Queensland for processing, increasing demand for local water resources;
- **Pastoralism:** with the growth of additional cropping opportunities and systems, there will be continued intensification of grazing in the pastoral estate;
- **Tourism:** the flora and fauna of the region and extensive conservation areas provide significant tourism potential including four-wheel driving, fishing safaris, wildlife watching, camping and agritourism farm experiences; and
- **Emerging industries:** the development of the industrial hemp presents opportunity, with broad scale as hemp expected to have competitive farm gate return in comparison to other broad acre crops such as cotton, sorghum and soybean.

A number of infrastructure projects are additionally planned to provide leverage for new opportunities and to encourage the future regional growth. This creates a foundation for informed investment decisions, along with certainty in business planning and workforce development. Some $60 million has been allocated in the context of the Department of Infrastructure, Planning and Logistics' 10 Year Infrastructure Plan (2018-2027) for the Douglas Daly connector road.

A public weighbridge may be returned to service on Oolloo Road following an expressions of interest (EOI) process in early 2022 to support the agricultural and cattle industry. The nearby community of Daly River is receiving $4.35 million in upgrades to the public boat ramp with works expected to be complete in late 2022. These upgrades will provide improved access and additional amenities for the fishing tourism sector.

The Katherine Logistics and Agribusiness Hub is being developed by the NT government as a new land release for the purpose of supporting agricultural industries and servicing surrounding communities. The hub will also support the growth of the resource, defence, transport and tourism sectors. It is strategically located near the intersection of the Katherine railway terminal, Victoria Highway and a proposed future heavy vehicle bypass route. Telecommunications infrastructure is also improving in the region.

Importantly, with this type of agricultural development planned, Stoeckl *et al.* (2013) combined data and information from multiple independent projects to explore the potential impacts of development on Indigenous and non-Indigenous residents of the Daly catchment.

Through an integrated model that combined economic, hydrological and ecological data and models, the research team assessed the impact of six different types of economic development on water resources, aquatic habitat resources, and the incomes of Indigenous and non-Indigenous people. They found that the potential impacts on different stakeholders, particularly Indigenous people, would be highly divergent, meaning more trade off analysis is required. As such, while regional social and economic benefits are intended through development opportunity, this general increase in development pressure signals the need for a more place-based approach to managing the region's values. This particularly includes its surface and groundwater resources, vegetation and the region's incredible natural and cultural values.

3. *The current regional planning and development assessment system*

In the national context, biodiversity considerations related to development in the region are managed through both the Commonwealth's *EPBC Act* and various Northern Territory statutes. Again, the *EPBC Act* aims to balance the protection of the region's crucial environmental and cultural values by creating a legal framework and decision-making process based on the guiding principles of ecologically sustainable development (DAW&E 2020).

A Water Allocation Plan exists for the Oolloo Dolostone Aquifer (2019-2029). This was developed to ensure water resources are managed to protect and maintain environmental and cultural values while providing a sustainable volume of water for consumptive beneficial use.

In the Northern Territory, water entitlements have historically been allocated on a first in, first served basis, with each decision based on its merits along with the cumulative impact on the water resource and other users of the resource. As per the *Water Act 1992* (NT), licences are generally issued for a maximum 10 year period, with an option of renewal.

Ground water planning has been well institutionalised in the region, though there is currently concern about potential over-allocation in parts of the catchment. Where future demand exceeds supply and a resource nears full allocation, there is a need to look at other alternative sources to ensure that water is being optimally managed to encourage highest value and efficient use of water. There is opportunity to increase water resource availability and to improve water distribution efficiency within the limitations of the Water Allocation Plan.

Development of policy mechanisms such as the management of unused water, encouraging trading and water markets may provide new opportunities into the future. Surface water development is yet to be explored in detail due to the reliance on groundwater in the region.

The provision for trading water is enabled by the NT's Trading Licensed Water Entitlements Policy which allows all or part of a water licence to be transferred within a water allocation plan area. There has only been one water trade within the southern zone of the Oolloo Dolostone Aquifer for 500 megalitres (which expired in April 2021).

A reserved percentage of water exists within the consumptive pool of the Water Allocation Plan which is exclusively accessible to eligible Aboriginal people for use or trade. The total area of the Groundwater Management Zone (GMZ) is 527,687 hectares, of which 125,609 hectares is eligible Aboriginal land. The accessible Strategic Aboriginal Water Reserve, as of August 2019, was 9,825 megalitres per year. Some 4,078 megalitres per year is within the Southern GMZ and 6,737 megalitres per year is in the Central GMZ.

Further water provision may become available to the Strategic Aboriginal Water Reserve in the future through surrendered, amended or cancelled licences or changes to the estimated sustainable yield following a review of the Water Allocation Plan. In line with the Strategic Aboriginal Water Reserve Policy Framework, water required for public water supply and rural stock and domestic use must be made before provisioning the Strategic Aboriginal Water Reserve. If the status of Aboriginal land changes, then the Strategic Aboriginal Water Reserve is reviewed as part of the water allocation plan review.

Again, as in the Gilbert River case, there is not a clearly integrated regional planning effort to guide emerging development in the catchment. This remains the case despite previous research work by Adam *et al.* (2015) that suggests effective trade off negotiation is possible in the Daly. Adams *et al.* (2015) applied a novel approach to scenario planning that coupled optimal land-use design and social evaluation of environmental outcomes. Four land-use scenarios combined differences in total clearing levels. The research team assessed the performance of the scenarios in terms of the number of stakeholder objectives met and the degree to which existing land-use policies were compromised.

Based on the range of benefits and potential adverse impacts emerging for each scenario, it was considered that, with effective negotiation, best preference scenarios could be achieved within the catchment.

4. *Opportunities for regional planning innovation.*

Building on the above and earlier case study thinking covered by Hardy *et al.* (2021), there are several innovative opportunities of value in considering more regional or place based approaches to addressing ESD interests in the Douglas Daly. These include:

- the fact that more defined sustainable development precinct planning can provide de-risked land that is investment-ready and suitable for purpose. Appropriate land and water uses could be considered, planned and provided for in more targeted Master Plans and Land Use Plans based on an assessment of land and water capacity. An engaged and evidence based approach could underpin the development of such precincts, while targeted technical studies could identify the most suitable land uses, site opportunities and infrastructure requirements. Within this context, targeted economic assessments could be used to guide commercial viability for new investors, and effective trade off analysis between key stakeholders within the catchment;
- the provision for trading water, which is enabled by the NT's Trading Licensed Water Entitlements Policy. This could allow all or part of a water licence to be transferred within a water allocation plan area. A peer to peer water market could emerge in the future, encouraging more efficient water use. Continued research into water resource availability will provide information for new development and help underpin more cooperative water use decisions that give certainty and security to existing users; and
- consistent with the findings of the Jacobs Group (2017), water flow modelling studies would need to be completed to quantify the extent of availability of water in the catchment that could be used without impacting groundwater recharge, surface water base flows and environmental and cultural values associated with water.

The Ord Valley - Eastern Kimberley Region

Background material in this case study has been drawn from inputs kindly supplied by the Western Australian Department of Primary Industries and Regional Development (DPIRD). Other inputs have been drawn from available literature on the region.

1. *Regional background, resources and values*

The Ord River is one of the most significant waterways in Australia. The Traditional Owners are the Miriuwung and Gajerrong peoples, who have inhabited the area for many thousands of years. This catchment provides water to an iconic agricultural project, the Ord River Irrigation Scheme, supports local tourism and sustains a unique Kimberley environment (WA DoW 2014). Available water currently underpins the new progression of the largest development of irrigated land in the Ord River Irrigation Area (ORIA) since the 1960s. Overall, the Ord-East Kimberley Irrigation Expansion Project plans to increase the current irrigation area by 15,400 ha in the short term, with potential for further expansion beyond this in Western Australia and into the Northern Territory.

The Western Australian government has already signed an agreement with Kimberley Agricultural Investment (KAI) for development of the Goomig (7,400 hectares) and Knox Plain (5,500 hectares) expansion areas. An additional 1,000 ha will be developed within existing agricultural areas at the Ord West Bank, Packsaddle Plain and Ord East Bank (WA DoW 2014). Available land for development has been impacted by Typhonium sp. in Kununurra; a listed perennial herb (Biodiversity and Conservation Act)

Key historical milestones in the water-based development of the East Kimberley that have previously been identified by the WA DPIRD include:

- the development of the first experimental crops in the Ord Valley in 1924;
- conception of the Ord Irrigation District in 1959;
- construction of the diversion dam and the M1 area (10,000 hectares) in 1962;
- the construction of Lake Argyle Dam (servicing 14,500 hectares) in 1971;
- the construction of a 30 megawatt hydroelectric power station in 1996;
- the signing of the Ord Final Agreement with local Traditional Owners in 2005;
- the decision to progress the planned Ord-East Kimberley Expansion Project in 2008;
- the commencement of construction of the extended Main Channel (M2) to service the Goomig and Knox areas in 2010;
- the announcement of the preferred proponent for Goomig (7,400 hectares) and Knox (5,500 hectares) in 2012, with development proceeding soon after at Goomig; and
- the commencement of clearing on Knox and NT proponent announcement in 2022.

2. *Development opportunities and emerging threats to values*

The full supply level of the Lake Argyle Dam is 10,760 gigalitres; a very significant amount of water by Australian standards. Currently, some 905 gigalitres per year are secured to meet current and future irrigation demand. This is high security water for irrigation, with 95% reliability. Shifting Australian and New Zealand Environment Conservation Council (ANZECC) water quality guidelines and trigger values, however, are now creating the need for a rethink of on-farm water discharge to the environment, particularly regarding chemical use.

Future demand opportunities include:

- maintenance of historic water demand (15,000 hectares) over the life of Ord Stage 1;
- the full development of Stage 2 with a proposed addition of 35,000 hectares; and
- increased demand for irrigation, hydroelectric power and environmental flow.

Maintaining water reliability and the risk of successive dry years will be a major challenge.

3. *The current regional planning and development assessment system*

The priority set by government is for secure and reliable water supplies to maximise the irrigation potential of the region, while at the same time supporting hydro-electricity generation and sustaining a healthy downstream river environment.

The Western Australian Department of Water and Environmental Regulation (DWER) is responsible for managing and licensing water from the Ord River under the rights provided under the *Rights in Water and Irrigation Act 1914* (WA). Its Ord surface water allocation plan supports the government priorities through setting water allocation limits on the total volume of entitlements that can be issued, and water release and water sharing rules managed though licences.

The water release rules are particularly important during times of below-average storage and dry periods and ensure effective water sharing. These rules were set using a water balance model that weighs up hydrology, water demands, reliability, releases to meet the different needs, and operational constraints. As irrigation expands, the water release rules will be adjusted slightly to maintain a 95% reliability of supply for each phase of irrigation development (WA DoW 2014).

Again, as with the Gilbert River and Douglas Daly cases, there remains a limited level of highly integrated regional planning aimed at resolving major sustainability tensions in the catchment. In the national context, biodiversity considerations related to development in the region are managed through both the Commonwealth's *EPBC Act* and Western Australia government legislation (DAW&E 2020). Both aim to balance the protection of the region's crucial environmental and cultural values by framing decision-making processes based on the guiding principles of ecologically sustainable development (DAW&E 2020).

4. *Opportunities for regional planning innovation*

There are several innovative opportunities of value in considering more regional approaches to address sustainable development interests in the Ord River region. These include:

- exploring significant opportunities to increase water use efficiency. Currently the M1 channels not automated or lined and Ord Stage 1 farms are not water recycling;
- dealing with new water discharge standards, presenting a great opportunity for partnerships to improve farming practices and the environmental impact of chemical use, with significant implications for near offshore waters in the Joseph Bonaparte Gulf;
- any approach to more regional planning in the Ord needing strong collaboration between the Commonwealth and Western Australian governments, together with the region's key stakeholders, including: (i) the Mirriuwung Gajerrong Corporation (MG); (ii) the Shire of Wyndham-East Kimberley (ii) the Ord Irrigation Cooperative (OIC); (iii) the Ord River District Cooperative (ORDCO); (iv) the Northern Australian Crop Research Alliance (NACRA); and the Kimberley Development Commission (KDC).

5. Research Survey Results and Findings

5.1. Key Research Findings

Regional planning has many definitions and purposes. Based on an extensive literature review, interviews, case studies and feedback workshops, our research establishes that there is no single regional planning system for northern Australia. Instead, it is a complex system encompassing multiple domains of regional planning effort (i.e., regional NRM planning, regional land use planning, regional infrastructure planning, etc.). These efforts are often sponsored at different scales of governance (i.e., by the Commonwealth, by the state or territory governments, or by regions themselves). The Commonwealth sponsors multiple approaches to regional planning, contributing very different elements of the sustainable development puzzle in the north. Each jurisdiction also has various policy and legislative powers for engaging in different forms of regional planning. Consequently, participant responses in interviews were often based on people's individual interpretations of what constituted regional planning. They were also influenced by their own agency's roles and responsibilities. Accordingly, our review of interview discussions required broad thematic analysis to identify and interpret cross-cutting themes.

5.2. The Value of Regional Planning in Achieving Improved Economic, Environmental, and Social Outcomes for the North

Participants focused on either decision processes or outcomes when they were asked "what value regional planning offered in achieving better outcomes for the north?" Accordingly, place-based approaches to decision making and improved development outcomes were the two major themes identified from analysis of participant responses

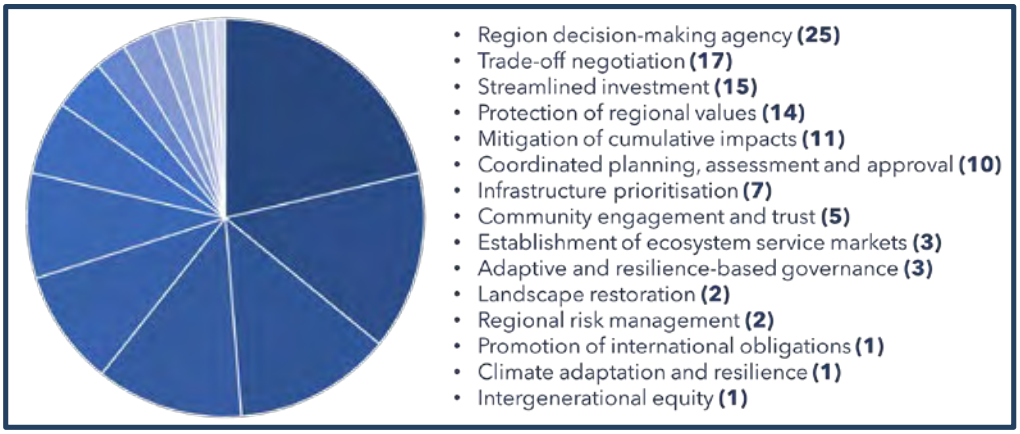


Figure 5. 1. Pie chart depicting most common participant responses (and the number of responses) to the value of regional planning in achieving improved environmental, social and economic outcomes in northern Australia.

Place-based decision making

Figure 5.1 depicts a strong focus on the value of collective agency at scale in decision making; one which stressed the local ownership of outcomes. Specifically, stakeholder decision making agency was viewed as the most valuable attribute of regional planning. Participants often cited the scale at which decisions are made as being the primary determinant of the extent of stakeholder agency and ownership in development decisions.

At a regional scale, participants acknowledged that it was more feasible to identify and understand diverse stakeholder values, priorities, knowledge systems and relationships, and to mediate arising conflicts to reach an agreed consensus. This is reflected in subsequent findings, namely, participants highlighting the value of identifying important regional values which could support the equitable negotiation of trade-offs between environmental, social and economic considerations. Further, participants recognised that at regional scale, greater stakeholder engagement was possible in that it could foster broader community trust and transparency building in decisions while also providing a platform for shared learning.

These findings reflect the benefits of place-based approaches. These are typically implemented from regional to local scales to address complex policy issues which require whole-of-government and cross-sectoral participation. While place-based approaches are more common for health and social service programs, our research suggests that there is a desire from government and non-government stakeholders to apply such thinking to development planning, assessment and approval decision making.

Here, participant responses seen in Figure 5.1 are strongly aligned to the key elements the Commonwealth Department of Social Services' Placed-based Evaluation Framework, which includes:

- promoting community strengths and prioritising preventative action over intervention;
- identifying community priorities, valuing local knowledge, and building social and cultural relationships;
- committing to strategic learning and adaptation through the use of data and evidence;
- continually building stakeholder capacity and capability;
- actively engaging and partnering with all stakeholders to enable collective and active participation; and
- striving for greater equity in decision making.

Participants emphasised that regional planning, as a formal place-based approach at the right scale, requires the participation of an entire region. All regions are made up of diverse individuals, public and private organisations, and all levels of government. Therefore, participants agreed that building strong governance arrangements and long-term, stable partnerships were essential to implementing regional planning policies or programs.

Improved development outcomes

In addition to decision processes, Figure 5.1 identifies specific decision outcomes from regional planning, namely improved development outcomes. Streamlining public and private investment was viewed as the most valuable development outcome from regional planning. Participants acknowledged current investment uncertainty across the north and the ability of regional plans to overcome this barrier by articulating where development could and could not occur. In turn, this could de-risk investment decision making and stimulate economic growth throughout northern Australia. However, participants also identified that de-risking decision-making would require an integrated and coordinated approach to development planning, assessment and approval, which was likely to be more feasible at a regional scale. Participants believed that achieving positive development outcomes, such as minimising cumulative impacts and managing risk better, would flow from integrated and coordinated approaches to regional planning. This is because multiple layers of development decision making that occur within a region, which are regulated by different levels of government based on scope or impact, could be strategically assessed and managed, rather than relying on current project-by-project decisions which lack clear compliance against approval conditions.

Figure 5.1 also highlights the value of prioritising infrastructure across the board through regional planning. Infrastructure development, delivery and serviceability in northern Australia is limited by geographically remote settlements separated by long distances. Participants suggested that rural and remote communities would benefit the most from regional planning as it could identify priority infrastructure needs and optimal locations to reduce high operating costs and to improve access to essential services. Similarly, participants also viewed regional planning as an opportunity to support new and emerging markets for ecosystem services and carbon sequestration, especially in rural and remote communities where significant resource-based development may not have occurred. This would provide an alternate economic pathway for regions which have not benefited equally from the resources and energy sectors. Northern Australia is uniquely positioned to capitalise on emerging sustainability markets, particularly across tropical savannas, with 99% of native vegetation uncleared, and along the north's vast coastlines, the existence of extensive seagrass meadows and mangrove forests. Promoting such markets globally would support Australia's international obligations, including reaching net-zero by 2050 and meeting various SDGs, while enhancing domestic action on strengthening climate adaptation and resilience.

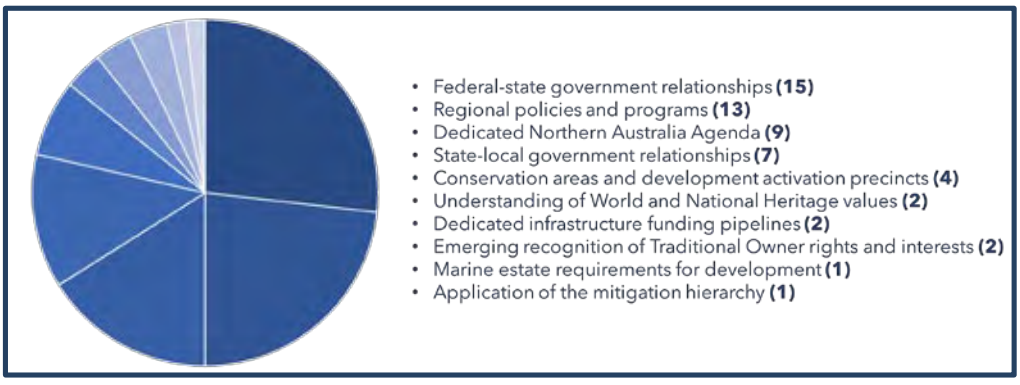


Figure 5.2. Pie chart depicting most common participant responses to the strengths of current regional planning in northern Australia.

5.3. Strengths and Limitations of Regional Planning in Northern Australia

Participant responses to this question focused on wider views of the system relating to the strengths and limitations of current regional planning in northern Australia.

Regional planning strengths

Figure 5.2 demonstrates that most participants viewed counterpart relationships between Commonwealth and state/territory and state/territory and local governments as the greatest *potential* strength of current regional planning systems in northern Australia. They often qualified it as something that could be strong if applied in practice, but needed more focused effort to meet the potential benefits. As such, participants acknowledged the current lack of strong trilateral relationships, particularly the disconnect between the Commonwealth and local governments. Nevertheless, participants also recognised the growing national and state/territory interest in regionally focused government policies and programs.

Participants also often cited the benefit of having a dedicated, high-profile and well-funded northern Australia agenda because of its potential to coordinate whole-of-government action and to facilitate economic growth. Further, participants from state and territory government departments reinforced their respective efforts in driving regional initiatives, including reforms to existing statutory regional plans in Queensland, and designing and implementing development activation precincts in the Northern Territory. Participants also highlighted established institutions that were well positioned to support future regional planning, such as the Northern Australia Infrastructure Facility, Prescribed Body Corporates, Land Councils, Natural Resource Management bodies and Regional Development Associations.

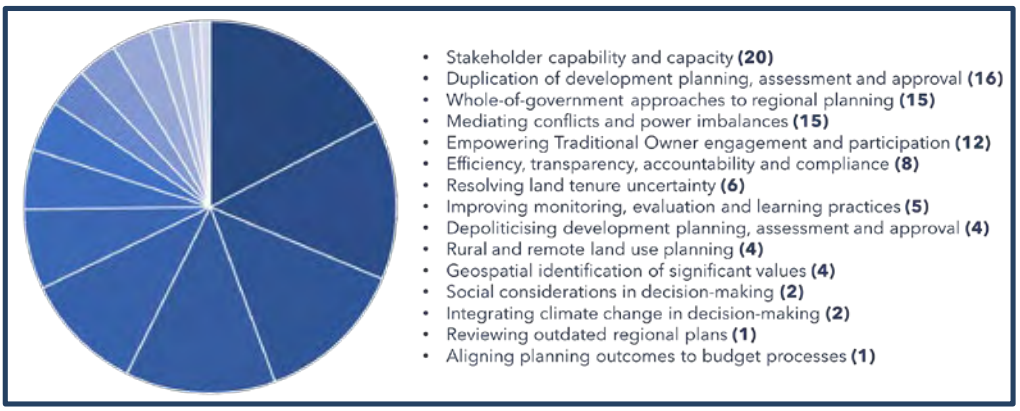


Figure 5. 3. Pie chart depicting most common participant responses to limitations of current regional planning in northern Australia.

Regional planning limitations

Figure 5.3 emphasises the significant perceived limitations of stakeholder capability and capacity to engage and participate in current decision-making processes. People particularly raised this in regard to the engagement of Traditional Owner groups and non-profit organisations. Industry representatives interviewed consistently stated issues of over-consultation, resulting in engagement fatigue and a lack of strategically coordinated engagement from government departments. Participants reported that this resulted in duplication of consultation on related matters. Further, Traditional Owner groups, industry and non-profit organisations reinforced the existence of major power imbalances in engagement and governments' exclusive control of policy design and implementation. Consequently, most participants acknowledged that current decision-making processes skewed outcomes in favour of large corporations, thus creating an economic development-focused paradigm where smaller business, environmental and cultural values were not equally considered.

Moreover, certain industry groups expressed that current development laws were not fit for purpose and were responsible for driving inequity across small to medium enterprises. For example, small to medium enterprises sometimes have to operate under the same regulations as multinational corporations, while at the same time, they do not possess the same legal and financial resources to navigate complex legal systems. As such, aspirations to expand operations or to capitalise on growth opportunities in the north are limited by the lack of a single entry point for development approvals. Rather, particular actions may require small to medium enterprises seeking multiple duplicative approvals from different state/territory and Commonwealth government departments, such as environmental approvals, water licences and vegetation clearing permits, while also contending with complex land tenure arrangements. Participants highlighted a lack of a whole-of-government approach to development planning, assessment and approval, and the over-reliance on self-referral systems. Further, participants recognised that collectively, these issues increased risk factors for environmental and cultural values while also eroding public trust in decision-making.

5.4. Data Priorities and Knowledge Management Considerations for Supporting Decision-making

The need for evidence-based decision making underpinned by current and high quality data, in addition to ensuring effective and efficient knowledge management, was regularly raised in interviews when participants were asked about their views current data gaps and knowledge management considerations.

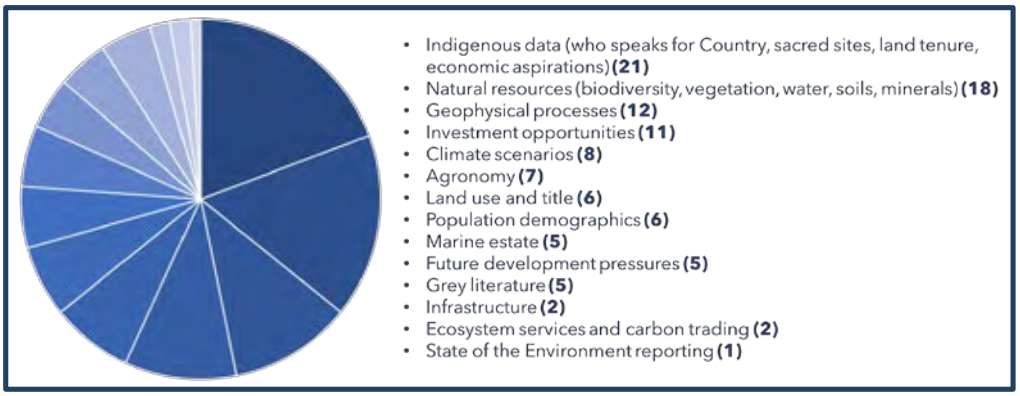


Figure 5. 4. The most common participant responses on data gaps for regional planning in northern Australia.

Data priorities to support decision-making

Figure 5.4 illustrates high-level data gaps identified by participants across environmental, social and economic domains. The majority of government department participants stated their priorities in addressing current access issues to traditional knowledge and data necessary to improve Indigenous policy and development outcomes. Specific challenges quoted included understanding who speaks for country across northern Australian regions, identifying important cultural and environmental assets for Aboriginal and Torres Strait Island heritage, and Indigenous economic opportunities overlayed with land tenure.

The primary barrier to overcoming these challenges was seen to be finding solutions to properly recognise, incorporate and protect Indigenous Cultural Intellectual Property (ICIP) in decision making processes, and the significant progress required to develop culturally appropriate knowledge management systems in partnership with Indigenous peoples. Industry participants acknowledged similar access issues to cultural heritage information, data and associated challenges with seeking development approvals. Nonetheless, examples of positive progress were recognised, including healthy country planning and Indigenous Land Use Agreements.

Most participants referred to the lack of nationally accessible data platforms for priority environmental datasets, such as biodiversity, vegetation, soils and water, resulting in a lack of environmental baselines. Each jurisdiction controls separate land information systems with varying degrees of data coverage, currency and quality, with data disproportionately skewed in favour of protected matters. Further, within each jurisdiction, datasets are often controlled by separate department agencies and limited data sharing occurs between agencies or with other jurisdictions.

Participants acknowledged the extensive, high-quality data collected by central data agencies, including CSIRO, Geoscience Australia, the Bureau of Meteorology and the Australian Bureau of Statistics, however, they also stated difficulty in finding, accessing, interoperating and reusing this data. Accordingly, participants believed such data was not being effectively used, nor was it consistently informing decision-making. This sentiment was reiterated for academic research and data collected by universities.

Participants also raised major trust and transparency concerns in government decision making as observed by diminished public trust in public policy and development decisions. Moreover, industry participants highlighted the significant resources required to collect data for development assessment and approval requirements. Industry participants emphasised that this was often hindered by the lack of publicly available data, which also acted as a significant barrier for private sector investment decision making. Conversely, environmental organisation participants stated that the lack of enforceable standards for proponents undertaking environmental assessments have resulted in varying degrees of quality and consistency for published environmental impact statements, resulting in reduced public trust about the impact of development on the environment. They emphasised that proponents are not required to share their data, which perpetuates duplication of future data collection efforts and drives inefficient use of public and private resources.

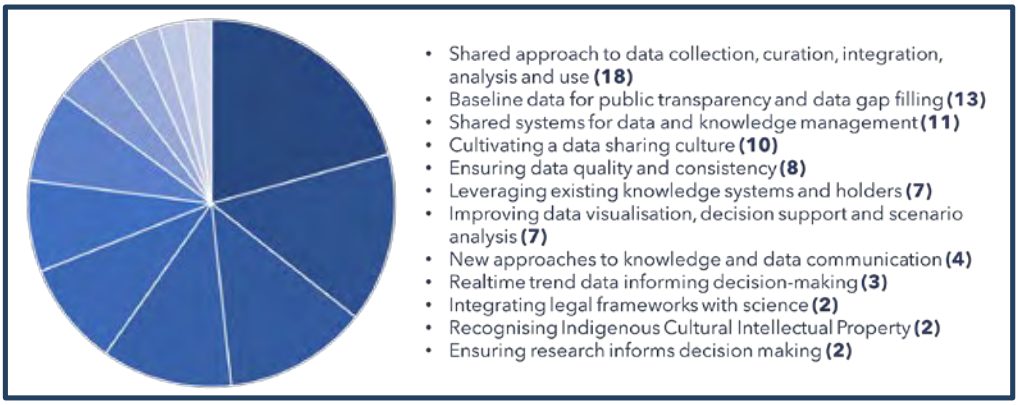


Figure 5.5. The most common participant responses in regard to knowledge management considerations for regional planning in northern Australia.

Knowledge management considerations for decision making

Figure 5.5 demonstrates key considerations for knowledge management in overcoming data challenges to inform evidence based decision making. Participants recognised that successful design and implementation of regional planning would require a nationally coordinated and shared approach to data collection, curation, integration, analysis and use. Participants cited various examples of this occurring in purpose-specific information silos, including the Commonwealth's Digital Environmental Assessment Program and Western Australia's biodiversity data and information management program, in addition to existing data platforms such as Geoscience Australia's Digital Earth and the Atlas of Living Australia.

Participants, however, also regularly raised that as a result of a lack of data curation, data was either fragmented, not fit for purpose, or non-compliant with the FAIR principles. Further, some government department participants indicated that external datasets were not used for decision making, but rather, internally controlled datasets were preferred and this represented the extent of inquiry used to make decisions. They also expressed gaps in capability and expertise needed to interpret complex datasets despite being in key decision making roles.

Participants suggested that setting up the right knowledge management frameworks and systems at the regional planning scale could effectively address the challenges and limitations of integrated data and knowledge use. Participants recognised that at a regional scale, whole-of-government and cross sectoral approaches to data sharing and knowledge management were more feasible. Collectively designing and implementing knowledge systems at regional scales has been successfully demonstrated in the past, with multiple co-benefits (i.e., the knowledge system developed under the Reef 2050 Integrated Monitoring and Reporting Program).

In the context of regional planning, Traditional Owner groups recognised that ICIP could be better managed by Traditional Owners while directly informing decisions that affected their rights and interests. Similarly, government department participants believed that cultivating a culture of open data sharing across public and private sectors would be more feasible with regionally negotiated long-term partnerships and leadership, as stakeholders would have agency and ownership in decision-making processes and outcomes.

6. Discussion: Preconditions for Success

This section outlines our key research findings based on analysis of what we heard from the literature, the case studies and from interview processes. These emerging findings were also tested through our feedback forums with Queensland, Northern Territory, Western Australia, Commonwealth departments. Together, these findings explore the *preconditions for success* for any coming and nationally-supported approaches to regional planning across the north (no matter what ESD policy themes drive such planning to emerge). A very significant emerging driver of such new approaches is most likely to be in relation to emerging regional planning efforts seeking to achieve environmental outcomes associated with the *EPBC Act,* though it is likely that there will also be increased efforts for more placed-based approaches to economic development, and for supporting Traditional Owner interests in country.

These preconditions for success, as articulated below, set the scene for our recommendations about improving support for regional planning into the future, and hopefully framing future regional planning efforts to achieve ESD outcomes within northern Australia.

6.1. Refinement of National Outcome Standards and the Development of Process Standards

As mentioned, there are several national ESD-like drivers for improved regional planning effort across the north. While there are many reasons for a renewed regional approach, a dominant driver relates to the major policy tensions that led to the ANAO Audit and Independent Review of the *EPBC Act.* As a surrogate for potential problems facing a lack of regional planning effort across multiple Commonwealth policy interests, in the case of national environmental policy, the Independent Review found the Act is not effective in protecting listed MNES.

The report hones in on the potential failure of regional or place-based approaches to set clear visions and to mediate trade-offs between competing landscape-scale tensions. It found that, while there were concerns about the environmental outcomes emerging from the operation of the *EPBC Act*, there had equally also been deep concern within the development industry and among landholders concerning complexity, delay and uncertainty in *EPBC Act* processes (see Dale and Marshall 2020). Finally, Traditional Owners had also long been concerned the Act was not effectively framing their relationship with development in ways that positively protected *and* enabled diverse Indigenous interests in the landscape.

Consequently, we broaden the advice of Dale *et al.* (2019) in relation to the implementation of the Independent Review, suggesting that, with respect to any move towards increased regional planning across Commonwealth interests, for each area of regional planning intervention, consistent and strong national *process standards* must be developed in parallel with strong *outcome standards* to help each intervention collectively: (i) halt and reverse the decline of Australia's environmental health and biodiversity; (ii) halt the stagnation of economic development; and (iii) better enable Indigenous people to achieve their aspirations.

The setting of strong national outcome standards in relation to any nationally-inspired regional planning intervention is important as they can set the foundations and clear objectives for what Commonwealth action is seeking to achieve at the state/territory, regional and even project levels. For all interventions, consistent with the definition of the environment in the *EPBC Act* context, clear national outcome standards for managing social, economic and cultural impacts need to be enacted alongside biophysical standards. This will help manage significant dissatisfaction from local communities, Traditional Owners, economic and social interests in relation to local project-based decisions. Following on from regional efforts, in the context of assessment at the project scale, these standards should be considered and delivered at early stages of subsequent project development processes, rather than at the end.

It is more important, however, that sitting above these outcome standards developed for each regional planning intervention, are clear process standards that set shared expectations between the Commonwealth, State/Territories, local government, industry and the community, about planning/decision making at various scales. This suggests that any nationally inspired regional planning intervention, should establish strong and adaptively monitored and managed process standards as a foundation for Commonwealth involvement. While we do not provide definitive process standards in Section 6.3 below, we do outline what the theoretical/empirical literature is suggesting as being a reasonable expectation.

It is important to stress, however, that there are existing robust approaches for setting performance benchmarks, monitoring and continuous improvement in setting and managing of such *process standards* for regional planning. This can be done and is being done in many contexts globally. At this point, we simply draw attention to approaches from the governance systems literature (e.g. see Dale *et al.* 2013), right down to more localised application of business excellence frameworks (e.g. Vogel and Zammit 2012). Culturally, Australian governments tend to take an audit-based approach to policy analysis, which simply provides an external point-in-time review of program efficiency.

This generally does not tackle or address potential governance system dysfunction, leading to occasional independent reviews when policy failure can no longer be ignored. We should note, however, that process standard monitoring frameworks are rarely applied in an ongoing and adaptive way within Commonwealth and state/territory regional planning frameworks. **We consider that this is the main reason for significant implementation failure in cases such as those recognised in the Independent Review.** Without the adoption and mobilisation of agreed process standards and their implementation, monitoring and regularised review, then no matter how well intended, it is possible that future Commonwealth supported reforms could fail to deliver impact for the environment, the economy and Traditional Owners.

6.2. Genuine Bilateral Partnership to Define Priorities and Standards

The vast majority of responsibility for regional planning effort in the north sits with the Queensland, Western Australian and Northern Territory governments. For this reason, any Commonwealth supported approaches to regional planning, no matter what the policy or legislative driver, will need to be based on strong bilateral partnerships. These partnerships will be particularly important in seeking to achieve shared priorities, resourcing of, and agreement about, relevant outcome and process standards. Without such partnerships and agreements in place, Commonwealth supported regional planning efforts are likely to struggle to have impact. Equally, Queensland, the Northern Territory and Western Australian government approaches to regional planning, without strong Commonwealth collaboration and the potential to lever Commonwealth policy and resources, may themselves struggle to deliver substantive impact. Successful regional planning in fact needs to be based on cohesive partnerships between Commonwealth, state/territory and local governments.

At the state/territory scale, strong bilateral (or even trilateral) partnership agreements could establish the primary foundation for reaching agreement about the outcome and process standards being sought through any regional planning efforts between the Commonwealth and the individual state/territory governments. Outcome standards will depend on the thematic focus of the regional planning effort (e.g., environment, infrastructure, economic development), but the resultant state/territory process standards would need to encourage:

- stable and durable governance arrangements for partnership-based approaches between the Commonwealth and the relevant state/territory governments;
- stable frameworks for collaborating at the regional scale with local governments and state/territory-based peaks, including key industry sectors, and the social development and environmental management sectors and Traditional Owners;
- strong collaborative research and data-oriented partnerships with key knowledge-based institutions of relevance to the jurisdiction (i.e., NESP Hubs, universities, CRCs, RDCs, CSIRO, Geoscience Australia, ABAREs, etc.);
- a cohesive set of visions, goals, strategies, delivery systems and associated targets for progressing agreed outcome and process standards within regions;
- a clear basis for establishing boundaries for integrated regional planning effort based on sensible economic, socio-cultural and ecological principles;
- the agreement of key delivery mechanisms for implementing regional planning and delivery interventions to achieve agreed outcome and process standards;
- agreed multi-criteria based prioritisation of regional planning efforts and programs;
- in the context of development approval, agreed triggers and delivery mechanisms for impact assessment consistent with agreed outcome and process standards;
- agreed mechanisms for empowering the economic, social and environmental management capacities of councils, key industry sectors, NRM and environment management groups, and Traditional Owner-based land and sea institutions; and
- clear, nationally consistent and comparable mechanisms for long term monitoring and reporting (i.e., via State of the Environment reporting) of outcome and process standards emerging from regional planning efforts.

In general, effort towards more integrated approaches to regional planning may need to be prioritised and sequenced by joint agreement between the Commonwealth, state/territory and local government, depending on economic, social development or ecological priorities.

In relation to consideration of the environment under the *EPBC Act*, for example, overall, at the Queensland, Northern Territory and Western Australian scale of planning, it is essential to see the Commonwealth and the jurisdictions agree outcome and process standards, and to prioritise those parts of the landscape in need of various levels of intervention through shared regional approaches (i.e., priorities for landscape protection and enhancement, policy frameworks for the orderly delivery of ecosystem service markets, etc.).

It should be noted that achieving this revamped approach towards the development and implementation of process standards, will however, likely require new sets of skills in both the Commonwealth and state/territory governments. These skills will need to include complex collaboration building, governance systems analysis and stakeholder capacity building.

6.3. Development of Stable, Long-Term Government-Stakeholder Partnerships at Regional Scale

The core precondition for success within regional planning across the north indeed rests on the successful development of strong, long-term and stable governance systems within regions of focal effort (i.e., regions agreed as priorities between the Commonwealth, state/territory and local governments, in addition to the regional communities themselves). Again, the preconditions for success within regions could be defined through the development and agreement of appropriate process standards which commits all parties to working together before venturing into longer term regional planning arrangements.

Integrated regional planning

The region, however defined across both Commonwealth, state or territory governments, is the primary scale for integrating vision setting and effort alignment for the achievement of agreed social, economic, cultural and environmental landscape outcomes and interests. Without these agendas being strongly integrated in all regional planning, environmental outcomes will be marginalised, development investors will face investment uncertainty, and the economic and social benefit of emerging ecosystem service markets will not be realised.

Indeed, the achievement of agreed Commonwealth/state/territory level outcome and process standards at this regional scale would need to demonstrate:

- a stable and durable governance system or arrangement being established and fostered as a basis for the development of the required partnership approaches between the Commonwealth, state/territory and local governments;
- similarly stable frameworks for collaborating with key industry sectors, the social development and environmental management community and Traditional Owners;
- strong collaborative research and data-oriented partnerships with key knowledge-based institutions of relevance to the region (i.e., NESP Hubs, universities, CRCs, RDCs, CSIRO, Geoscience Australia, ABAREs, etc.);
- the exploration and establishment of a clear vision and delivery system for progressing economic, environmental and social development opportunities and trade-offs;
- the establishment and progression of cohesive regional land use and infrastructure plans that are able to achieve both the needs of the *EPBC Act* and other Commonwealth-driven regional efforts (e.g. Regional/City Deal Agreements);
- the regional interpretation of any national or agreed state/territory outcome standards (i.e., translating into regional targets) and the alignment of shared regional efforts across the key players to enable the achievement of these targets. In respect to environmental targets, for example, this could in effect, represent an integrative regional *EPBC Act*/NRM planning layer within the wider system;
- clear regional outcome and process standard monitoring approaches, perhaps through some form of '*State of the Region*' reporting and an integrated approach to identifying/aligning research and development effort to the achievement of agreed regional targets; and
- a clear strategy for empowering the economic and environmental management capacities of councils within the region, key industry sectors, NRM and environment management groups and Traditional Owner-based land and sea institutions.

Overall, this regional scale of collaborative effort is essential to setting regional scale targets associated with the delivery of any agreed process and outcomes standards at state/territory scales. In the context of environmental interests, for example, this might mean demarcating those parts of the landscape in need of various levels of protection and enhancement and establishing the framework for the orderly delivery of ecosystem service markets (derived from both *EPBC Act* negotiated offsets and other voluntary and regulated markets). Alternatively, in respect to development and infrastructure planning, the approaches taken might mean the establishment of clear areas of focus with refined approaches to development assessment and approval. This type of approach, for example, might even deliver a finer level of planning at sub-regional scales, through for example, development precinct type approaches.

Development precinct planning

To increasingly enable a strong focus on sending the right market signals to private capital for development investment, strong economic development areas or precinct planning could be encouraged within the overall regional planning system. In the context of managing environment-development tensions, for example, these might be prioritised to ensure minimal impacts on MNES and national *EPBC Act* outcome standards. Development precinct planning enables a focus on sending the strongest possible messages and incentives for private sector development investment, but equally provides for a more intense focus on understanding, avoiding, mitigating and offsetting biodiversity impacts. Not too dissimilar to regional scale, to achieve any agreed national, state/territory and regional process standards, any emerging development precinct plans would need to demonstrate:

- a clear basis for establishing boundaries for development precinct effort based on regionally agreed or state/territory or local government based priorities;
- a stable and durable governance arrangement being established in situ for partnership based approaches between state/territory and local governments;
- stable frameworks for collaborating with the region's key industry sectors, the social development and environmental management community and Traditional Owners;
- strong collaborative and research and data oriented partnerships with key locally-oriented and knowledge-based institutions of relevance;
- the establishment of a cohesive vision, targets and delivery system for economic, environmental and social development opportunities and trade-offs;
- the enablement of cohesive precinct land use and infrastructure plans that are able to achieve higher scale outcome and process standards (i.e., Regional/City Deals);
- enabling delivery mechanisms for local interpretation of standards (translating into precinct level targets and effort alignment to achieve these targets); and
- a clear strategy for empowering the economic and environmental management capacities of local governments within the precinct, key industry sectors, NRM and environment management groups, and Traditional Owner institutions.

Overall, this development precinct scale of planning is essential to set the foundations for effective development investment attraction in Australia's north. It helps drive precinct scale targets associated with the national and state/territory standards, and it demarcates those parts of the landscape of most value for development and investment attraction, while also establishing the framework for the orderly delivery of local ecosystem service markets. In general, effort towards development precinct planning may need to be prioritised by joint agreement between the Commonwealth, state/territory and local government, depending on economic, social or ecological priorities (particularly identified in any regional plans).

Whole of life cycle project planning and impact assessment

Importantly, it's the outcome and process standards and frameworks established at the regional or precinct scale that set the scene for what is genuinely expected at the project scale within regions; projects being those activities that are the focus of development assessment and approval. Projects are in fact, by integrating international, national, state/territory, and regional obligations for ESD, the place where ESD is actually achieved in ways that do not deliver unintended and undesirable cumulative impacts within regions. It is also the place where ESG efforts can be harnessed to achieve regional ESD aspirations.

Achieving this can be guided by national outcome and process standards being contextually applied within regions and development precincts. This means development culture and practice shifting towards the achievement of outcome *and* process standards. Culturally, we think that this means encouraging a “cradle to grave” approach to developers assessing and managing their environmental, socio-economic and cultural impacts.

In the context of current national development approval systems, to date, the operation of the *EPBC Act* has encouraged a one-off project approvals (point in time) culture, versus developers building a longer term, strong and socially responsible relationship with their host communities, industries and the environment. Indeed, perhaps the greatest cultural failure of the *EPBC Act* has been that it hasn’t encultured or supported developers to establish and maintain strong and accountable local project-based governance arrangements and relationships that ensure commitments established under impact assessments and project approvals are actively implemented, monitored and adapted as conditions and opportunities change throughout the life-cycle of the project.

This past project-based approach has encouraged proponents to consider *EPBC Act* requirements as a hurdle to overcome at project inception, rather than as an opportunity and a responsibility to be managed at all stages in the project’s lifecycle.

Again, changing this culture can be managed through applying well negotiated outcome and process standards at all scales, and unambiguously articulating them at the project scale. Key process standards related to project assessment and approval would need to include:

- well negotiated terms of reference for triggered projects, specifically seeking interpretation and achievement of higher level outcome *and* process standards consistent with the granular detail established at state/territory and regional scale;
- clearly established governance and engagement approaches at project scale that ensure clear partnerships between state/territory and local governments;
- single point coordination of advice/responses in regard to Commonwealth, state/territory and local regulatory, planning scheme and by-law requirements;
- stable frameworks for collaborating and engaging with key project stakeholders and potential partners, including key industry sectors, infrastructure managers, the social development and environmental management community and Traditional Owners;
- strong collaborative and research and data-oriented partnerships with key locally-oriented and knowledge-based institutions of relevance to the region;
- where possible, independent third party facilitation of these governance/engagement arrangements with recourse to departmental/ministerial communication if required;
- clear relationships to outcome/process requirements set in regional or precinct plans;
- an unambiguous focus on securing reduced impact through avoidance, mitigation and offset mechanisms, showing how regional outcome standards are to be achieved;
- strong requirements for effective social, economic and cultural impact assessment embedded within all impact assessment processes; and
- impact assessment processes that establish and set the longer term governance arrangements and partnerships for negotiating active implementation, monitoring and review of emerging and approved impact assessment recommendations.

Increased attention to Indigenous interests in land and sea country

There has been a growing demand from Traditional Owners across northern Australia that their engagement in the business of regional to project scale planning and development consider them as co-governance partners, or even potential equity or partners, rather than as mere stakeholders. This mean deep involvement in all aspects of economic, social and environmental aspects of planning. Key steps required to help achieve this include:

- Traditional Owner input into the development of any refined national, state/territory, regional and development precinct outcome and process standards;
- the stronger integration of socio-economic and cultural heritage assessment requirements within outcome standards;
- the much more structured negotiation with Traditional Owner interests in regional planning and project impact assessment, implementation, monitoring and review; and
- the creation of new ecosystem service market opportunities for Traditional Owners, both as the provider of ecosystem services and as delivery agent for market products.

The task, however, of supporting Traditional Owner Institutions to be fully able to engage and to take advantage of these opportunities, sits with wider Australian, state and territory government efforts; particularly those associated with: (i) the *Closing the Gap* agenda; (ii) continued resolution of native title rights over land and sea country, water and ecosystem services; and (iii) the efforts of the Indigenous Reference Group (IRG) within the northern Australian agenda. Together, these processes are starting to align thinking that the following preconditions need to be met if Traditional Owners are to genuinely benefit from the vision articulated in processes, such as the Independent Review of the EPBC. These include:

- supporting Traditional Owner land and sea country institutions to strongly articulate and codify their rights and interests in their 'whole-of-country' estates as a basis for underpinning their own (quadruple bottom line) development aspirations and negotiating with any external parties that have an economic interest in their country;
- long term approaches to strengthening the governance of these land and sea country institutions. This will need to be a long haul support agenda, and there might be new ways of drawing appropriate resources and partnerships into that approach;
- building on the principles established in current Commonwealth and state/territory procurement policies and applying these in the provision of ecosystem services and other services at the project level. These principles could, for example, be integrated into project scale socio-economic benefit share agreements; and
- supporting Traditional Owner groups to be planning to achieve their aspirations on a 'whole-of-estate' approach (i.e., including land and sea areas that might not be formally held in Indigenous tenures), enabling such groups to partner with any economic activity within those estates (e.g. via appropriate procurement in roads development, cultural heritage management, etc.). This might also mean encouraging groups to draw on the skills of people within their wider traditional membership (e.g. lawyers, doctors, etc).

To achieve success, implementation of national process and outcome standards for regional planning will need to see cooperation across Commonwealth agencies and between state/territory governments, but more importantly, directly with Traditional Owners, to progress these issues. Coming *Voice to Parliament* and state/territory treaty processes across the north might also provide some impetus and focus on such proactive and progressive reforms.

Creation of a national ecosystem service policy framework

Traditional Owners, pastoralists and other land and sea managers across the vast northern Australian landscape are the stewards of internationally and nationally significant ecological and cultural assets. While this opportunity is frequently seen as an environmental agenda, it also has potentially huge economic and social benefits across the north. Through the Independent Review of the *EPBC Act*, the Australian government is starting to recognise and consider the vast potential and positive benefits that might arise from land and sea stewards across the nation (but particularly within northern Australia), and providing/trading high value products in emerging landscape services (or ecosystem services) markets. This could particularly be founded on or influenced by offsetting from *EPBC Act* decision-making and project assessment and approval processes. For many years, many Traditional Owners and farmers have already been progressing the development, marketing, and delivery of these services. Together with market brokers, policy makers, regulators, and customers, they represent an important part of the growing ecosystem services sector.

If carefully fostered, and with the right national policy framework, Traditional Owners and other land and sea stewards such as pastoralists can lead a partnership-based approach focused on fostering the size and health of this emerging new economic/industry sector. Indeed, the sector has the potential to create new economic opportunities to complement existing industry sectors such as grazing and tourism. Driven by ESG trends, at this embryonic stage in the sector's development, rapidly growing ecosystem service investment markets at least include:

- philanthropic/voluntary landscape (ecological, carbon and cultural service) markets;
- emerging international and regulated offset markets (ecological and water);
- Australia's Emissions Reduction Fund and international carbon markets;
- regulated offset markets under Commonwealth/state/territory laws (ecological/water);
- more direct Commonwealth/state/territory/local investment in cultural, ecological and social services;
- high value socially and environmentally sustainable commodity/product markets; and
- landscape management (or landscape services delivery) markets.

A real opportunity exists for the nation's Traditional Owners, the farming community and other land and sea stewards to be supported to explore and develop the size and scope of this emerging sector. Achieving this, however, will require the development of a strong national policy framework for the fostering and development of a national ecosystem service market system, and investment in the emerging ecosystem service market sector, particularly including service providers (i.e., Traditional Owners, farmers and other land and sea country owners and managers), service purchasers, ecosystem and cultural service delivery agents, market brokers or aggregators and the research and development community.

6.4. Organic Development of Collaborative Knowledge Systems, Decision Support and Data Curation

Data and knowledge management systems were routinely raised as significant issues of concern throughout the literature review, case studies and interviews. In the results section, we analyse the most pressing concerns about data gaps and what it might take to establish appropriate knowledge management systems to support regional planning at the national, jurisdictional and regional scales. Our findings were predominantly informed by repeated and passionate calls for the development of more purposeful, cohesive and long term data partnerships at all scales. At each scale, this will require a key institution(s) being given the trusted role of building and curating long term data and knowledge management partnerships and systems that can routinely support regional planning across the north.

Previous cost-benefit analyses of the development of durable and genuinely collaborative knowledge management partnerships have routinely shown the big cost benefit of such approaches, versus more stop-start, silo-based approaches to such issues. Feedback from our government feedback forums indicates that there is an evenly divided view of priorities about whether such effort should be focussed at doing this at the national, jurisdictional or regional scales. This just reminds us that getting more integrated information systems at all scales are genuinely important in achieving good outcomes in regions, as well as reminding us that building a strong regional planning system overall is a genuinely polycentric venture.

Based on our findings, we consider that the key design features of such approaches to building collaborative and integrated information systems at all three scales include:

- the need to be focused on creating data and knowledge management systems specifically aimed at improving decision making at regional scales across the north;
- the building of strong data partnerships that are cross government, cross agency, and have the trust of industry, community, Traditional Owner and research sectors;
- a stronger focus on filling priority data gaps identified by this research;
- consideration that, once core baseline data systems are identified and agreed, real effort is needed to bolster the long-term capacity of core specialist data providers, ensuring data transparency, and progressive improvements in data gaps;
- with stronger systems of data and knowledge integration at scale, then foundation processes for open data sharing back across line agencies/sectors can commence;
- the building and a strong culture of curating the quality and continuous improvement of foundation data layers, ensuring data quality and consistency across regions;
- continuously identifying, reviewing and enhancing new data and knowledge sets that could be valuable to regional planning and fostering their development;
- by working across the partnership, exploring new ways for improving data visualisation, decision support and scenario analysis at regional scales;
- exploring new approaches to knowledge/data communication to build trust in data and science nationally, at the state/territory levels, and within regions;
- building stronger real time trend data and reporting to inform decision-making;
- ensuring strong systems for the protection of the cultural and intellectual property of Traditional Owners, particularly through empowering the development of Traditional Owner-based knowledge systems at the appropriate tribal scales;
- stronger integration of data/knowledge systems needed for regulatory efforts; and
- better systems for gathering and managing the very extensive grey literature developed by development project proponents and isolated science projects.

The current development of multiple approaches to data and knowledge management in support of regions can be highly inefficient, and supports stop start progress. Most importantly, however, it undermines trust in data and knowledge ultimately used in regional decision making. Building data partnerships at all three scales will need to be a long term and adaptive venture. The alternative will be the regular re-invention of such data systems.

The priority data gaps identified by this research include: (i) cultural heritage, land rights/ interests; (ii) natural resources (including biodiversity, vegetation, water, soils, minerals); (iii) geophysical processes; (iv) investment opportunities; and the development of more robust climate scenarios, including flood mapping, drought and cyclone risk.

WABSI Case Study: Biodiversity data – Leading the digital journey in Western Australia

Despite the substantial amount of biodiversity data collected each year by industry and government, in Western Australia, the Environmental Protection Agency recognised several key challenges: improve efficiency for environmental assessments from project inception to final decision, for both proponent and regulator; improve regulator confidence in informed decision-making at project level and at landscape (cumulative impact) scale; improve public trust in Environmental Impact Assessment decisions through transparency and visibility of data and methods underpinning decisions; and provide assurance that compliance with Ministerial conditions are proceeding as planned through continuous monitoring, assessment and reporting.

To help address the challenges, WABSI established a Digital Environmental Working Group, a strong collaboration of senior stakeholders from industry, government, regulators and the science community. The Group has actively led a cultural shift, changing the way biodiversity data is collected, managed and used to generate value; supporting the Western Australian Government's *Streamline WA* and *Environment Online* initiatives.

WABSI facilitated the establishment of an *Index of Biodiversity Surveys for Assessments*, to capture and consolidate survey data and make it publicly accessible, and a whole-of-state biodiversity data platform, the *Biodiversity Information Office of Western Australia*. Next, a *Shared Analytic Framework for the Environment (SAFE)* was developed, depicting capabilities which work together across the information and analytic supply chain to provide input decision support and reporting tools for environmental assessments. SAFE aligns with recommendations in the Independent Review of the *EPBC Act.* It is a management tool, providing a framework and language to facilitate a consistent view of the capabilities and their interdependencies; and help align effort and prioritise investment across these capabilities.

WABSI is now progressing a collaborative, regional approach to unlock latent value of shared data, exploring the feasibility of a *Shared Environmental Analytics Facility (SEAF)*. SEAF will improve environmental outcomes through accelerating benefit realisation of streamlining investments and enabling cumulative environmental assessment. It will inform environmental, social and governance reporting and enable environmental reporting on-Country. The WABSI led successful digital journey has established Western Australia as a clear leader in environmental information management and a model for other jurisdictions nationally and internationally.



6.5. A Focus on Monitoring Long-term Health of the North's Regional Planning System

With stronger outcome and process standards articulated and agreed for regional planning effort at the national, state/territory and regional scale, then the foundations are set for building a system for monitoring the actual health of the system of regional planning for social, economic, environmental, and cultural outcomes across the north.

This could in fact be achieved by ensuring there are strong reporting frameworks regarding the achievement of outcome and process standards at all three scales. In the absence of such agreed standards at scale, it would be fair to assume there is not a firm commitment to solving the systemic issues facing the future of the north, including long term social and economic disadvantage among Indigenous Australians, environmental loss and decline, continuing instability in the northern Australian economy, and increasing costs of living/ declining livability.

If a more radical approach to monitoring the health of the long-term system of governance for improving outcomes through integrated planning across the north is taken, than there are indeed very sophisticated approaches available to all parties collaboratively working towards continuous improvement in the overarching governance system. Dale *et al.* (2013) have theoretically developed and empirically trialed the development of such systems. This work was done in the context of monitoring the overall system of governance impacting social, economic, environmental, and cultural outcomes in the Great Barrier Reef; a similarly complex and extensive landscape of significant importance to both Australia as a nation and the globe.

Dale *et al.* (2013) suggest that there are surprisingly few risk assessment methods that can pinpoint those key parts of complex governance systems most likely to influence good outcomes at any particular scale. They propose and later trial (Dale *et al.* 2016) a new risk assessment method for analysing such complex governance systems. As a case study of international significance, they trialled the application of Governance Systems Analysis (GSA), a novel analytical framework that identifies the governance themes, domains and subdomains most likely to influence environmental, cultural and socioeconomic outcomes emerging from socially and environmentally complex landscapes. The GSA process identifies multiple governance subdomains that present high, medium, or low risk of failure in producing positive outcomes within the landscape. This enabled the determination of 'whole-of-system' governance problems that could undermine outcomes. Developed as an evidence rich and consensus building/collaborative approach, such analysis enables exploration of the most critical governance system reforms needed to address the desired outcomes for complex places such as northern Australia. Such an approach is needed to avoid the significant risk of wholesale system failure as reported by the Independent Review of the *EPBC Act*.

7. Conclusions and Next Steps

The above analysis takes a "preconditions of success" approach to the promotion and progressive development of regional planning approaches in northern Australia. Through this, we aim to establish an active basis for ongoing dialogue that we hope can influence national, state and territory policy and program deliberations on significant coming activity in this space. Both the CRCNA and the NESP Marine and Coastal and Resilient Landscapes Hubs will continue to work with the Commonwealth, Queensland, Northern Territory and Western Australian governments in this context, as well as key stakeholders across the north. Ongoing and active considerations on improvement in the current regional planning system, however, are best informed and guided by further research effort in this space. Consequently, this next section draws on this research to suggest a potential investment focus in the out years of the Marine and Coastal Hub Research Plan and CRCNA focus.

7.1. Towards a Community of Practice

Capacity limitations have consistently shone through as being a major constraint to the progression of quality regional planning across the north. This deficit exists both across all government agencies, stakeholders and the research and development sectors. Consequently, we consider that a big part of building a strong foundation for improved regional planning across northern Australia comes from building a strong and adaptive community of practice for regional planning across the north. This means building a cohesive and evidence-based dialogue and research sharing platform about progress and best practice. Key design features of an emerging community of practice would include:

- establishing a strong web-based knowledge sharing platform across the north;
- holding targeted knowledge and practice sharing events and webinars;
- seeking to keep all sectors engaged in the ongoing discussion; and
- ensuring the network shares emerging research, new policy and planning developments, and the practical experiences of those involved across the north.

The NESP Hubs and CRCNA would appear to be well placed to host a strong community of practice approach, enabling active influence occurring between practice and policy.

7.2. Sentinel Case Studies and Supporting Data Layers

It is not the role of research to lead regional planning in the northern Australian context, but it can certainly support regional planning approaches through either:

- actively supporting improved regional planning effort and innovation through collaborative analysis that informs collective improvement decisions; and
- more foundational data and knowledge building to support decision-making about the substantive issues being planned (i.e., biodiversity surveys, economic analysis, etc.).

This project, as a research project, is fundamentally interested in research into, and research that is supportive of, improved approaches to regional planning across the north. However, it also identified several common research themes that might be worth considering in more localised regional planning. Both research agenda might be supported through research involvement through sentinel case studies within different jurisdictions across the north.

Research supporting improved regional planning through sentinel case studies

As mentioned above, throughout the literature review, case studies, interviews and government forums, there appeared to be strong support for contributing knowledge to a wider northern Australian community of practice with respect to regional planning. It was also considered that this might be well informed by real-world sentinel case studies supporting improved practice. Such case studies could either be:

- more passive analysis of the impact of regional planning, and the further identification of the strengths/weaknesses of the regional planning process contributing such impact. Such approaches might have a more indirect impact of regional planning improvement within the case study areas and more widely; or
- more embedded research supporting those involved in actual regional planning partnerships to explore the theoretical foundations of healthy approaches to regional planning and shared analysis of the governance system underpinning such planning. In this context, as intended in the afore mentioned GSA framework, researchers and regional planning practitioners could work together in ways where research directly impacted improved outcomes within the case study regions *and* more widely.

For both theoretical, ethical, and practical reasons, the second approach is preferred by our research team, as it enables embedded research to occur within trusted relationships. This approach is also far more likely to lead to direct and substantive impacts. Such an approach could operate on at least a three-year timeframe and would involve:

- researchers and the key stakeholders within candidate regions jointly agreeing that there is value in such a shared partnership approach;
- co-design of the research approach to enable research and analysis of the governance system underpinning the existing regional planning effort; and
- strong mechanisms for the researchers and regional planning stakeholders to jointly agree about priority regional planning system improvements which might benefit from more detailed research, analysis, and action to resolve or to improve.

For these reasons, identification of future sentinel case studies will need to be negotiated with the Commonwealth, Queensland, Northern Territory and Western Australian governments, and with potential regions that might wish to participate. These needs lend support to a staged approach to development of long-term research processes that might support case regions. The timing for this is also good given that new approaches to policy supporting regional planning across a range of Commonwealth agencies, including weakly-linked work related to the reform of the *EPBC Act*, the refreshed northern Australia agenda, the ongoing City/Regional Deals program and new approaches to Regional Drought Resilience Planning.

Key criteria that have been raised that might help guide a future approach to regions include:

- working in regions where there is a shared Commonwealth, state/territory and regional desire to improve shared outcomes through regional planning;
- the need to support regions experiencing real tensions or opportunities between environmental values, economic development and Indigenous aspirations values;
- the desire to build on and support existing regional planning momentum rather than starting from scratch; and
- the value of sentinel case studies in all three jurisdictions.

Foundational data and knowledge building

There could be endless additional investment in the development of foundational data and knowledge sets that might help inform regional planning in the north. Our results section has already articulated the highest priorities or acknowledged data gaps across the north. Key cultural and natural resource data sets were seen to be a major gap, and this was particularly seen to be an issue in the context of the marine estate and the marine-terrestrial interface. Because this project is embedded within the Marine and Coastal Hub, specific data deficiencies also considered to of great significance across the north have included:

- sea grass distribution and health across the northern coasts;
- dugong distribution across the northern coasts.

Within the future allocation of resources within the Hub (via its research plan), attention will need to be paid to resolving foundation data and knowledge gaps.

7.3. Embedding Strong Knowledge Systems Within Regions

The need to build strong data and knowledge management partnerships and systems to support regional planning at national, jurisdictional, and regional scales came through as one of the strongest priorities for improvement. While the Commonwealth, Queensland, Northern Territory, and Western Australia governments may continue to explore how to progress such reforms at those scales, the involvement of the NESP Hubs in the design and delivery of key data layers and knowledge sets in these systems will remain a future priority.

Much work, however, is needed to consider how to do this more effectively in regions, particularly when there are shared Commonwealth, state/territory, and regional needs. As such, from a future research point of view, we consider that it is important to prioritise supporting regions (most effectively embedded within the sentinel case study approach), to explore effective processes that conceptualise and co-design such partnership-based knowledge management systems. For this reason, we think that particular attention should be given to supporting the design of such systems, synthesising learnings and sharing those learnings through the proposed pan-northern community of practice. Because of substantive progress already being made in key aspects of improving data analytics emerging through the Western Australian Biodiversity Science Institute (WABSI), the Marine and Coastal Hub proposes a strong collaborative relationship between these institutions.

While the Marine and Coastal Hub has a primary concern here to improve regional planning through collaborative approaches to governance systems analysis, WABSI has been increasingly focused on building strong data and collaborative data analytics systems to support regional decision making. In this context, they have been particularly focused on the interface between environment and economic decision making. WABSI (2022) contend that, each year, a substantial amount of information about biodiversity is collected by industry and government through development planning and assessment processes. They consider that unlocking latent value from data collection and curation means not just sharing data but developing crucial analytics at the right scale to get the greatest value possible for proponents, regulators, Traditional Owners, and the wider community. They also consider that to achieve better outcomes from regional planning, more must be done to leverage placed-based successes in data sharing and curation, with existing services and capabilities across the public and private sectors, and the science/research community. The challenge is to address barriers and inefficiencies in the current management of regions.

Because of the logical interface between improved governance systems analysis and improved partnership building for data and knowledge curation, synthesis and use, we strongly propose that, within sentinel case study approaches, there be an embedded research and development effort that supports the design, evaluation, and review of approaches to regional data and knowledge partnerships and management systems.

8. Recommendations

In summary, synthesising the details revealed across the key methods and approaches applied by this research, the key emerging recommendations are as follows:

Recommendation 1:

No matter what the driver for regional planning effort in the north that is seeking to achieve the SDGs and/or ESD principles, there are several foundational *preconditions for success*. These at least include the following considerations:

(i) There is a need for the refinement of clear outcome standards and the development of strong process standards to underpin any nationally-inspired regional planning effort;

(ii) As the Queensland, Northern Territory, and Western Australian governments hold primary statutory responsibility for regional planning, any nationally-inspired effort will require genuine bilateral cooperation and agreement on priorities, standards and delivery;

(iii) Any regional planning effort in northern Australia will need to be based on the development of stable, long-term, place-based partnerships between governments and stakeholders, but particularly Traditional Owners, communities and industry;

(iv) All regional planning effort needs to stimulate the partnership-based development of well curated and integrated knowledge and data management systems, with deeply nested support systems at national and state/territory scales; and

(v) All regional planning effort should have independent and long-term governance systems monitoring that informs and underpins continuous improvement in the health of each place-based partnership.

Recommendation 2:

Future research effort related to improving regional planning and the resultant outcomes should prioritise:

(i) The establishment of a stable, long-term community of practice among Commonwealth, state/territory, and local governments, Traditional Owner, industry and community parties to regional planning. Prioritisation and continuous improvement of regional planning effort could become a core focus of the Northern Australian Ministerial Forum;

(ii) The establishment of at least one sentinel case study in each jurisdiction aimed at informing continuous improvements in regional planning practice. The identification of future sentinel case studies should be negotiated between the Commonwealth, Queensland, Northern Territory, and Western Australian governments, and with potential regions that might wish to participate.

(iii) Within each sentinel region, genuine effort should be given to exploring and evaluating the development of long-term and equitable knowledge and data management partnerships and systems, including greater Commonwealth/state/territory coordination of supportive systems at those scales.

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Appendix E

Strengthening regional planning and development assessment in the Douglas Daly - Analysis Report





Marine and Coastal

National Environmental Science Program

CRCNA



STRENGTHENING REGIONAL PLANNING AND DEVELOPMENT ASSESSMENT IN THE DOUGLAS DALY REGION OF THE NORTHERN TERRITORY

Analysis Report

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The Cairns Institute, James Cook University

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Disclaimer

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Cover images

Front: Cattle grazing in leucaena, Douglas Daly Research Farm. Credit Dr. Ian Biggs, CRCNA.

Back: Brolgas in peanut crop, Douglas Daly Research Farm. Credit Dr. Ian Biggs, CRCNA.

This report is available for download on the NESP Marine and Coastal Hub website:

www.nespmarinecoastal.edu.au

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Acknowledgement

We acknowledge the Traditional Owners of Country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past and present.

Executive summary

Our nation's current northern Australian development policy settings actively encourage the ecologically sustainable development (ESD) of the north. The highly contested nature of northern development, however, together with operational challenges facing the north's regional planning and development assessment system, currently hinder economic development in rural, remote and Aboriginal communities. At the same time, these factors contribute to a failure to secure internationally significant biological and cultural values within the landscape.

These problems are deeply evident in the Douglas Daly catchment in the Top End of the Northern Territory (NT). Here, conservation, cultural and development tensions suggest that a more regionalised, cooperative, engaged and evidence-based approach is needed to support planning, development assessment and nature positive investment decisions.

The Douglas Daly region has been considered particularly worthy of new and innovative approaches to regional planning and development assessment improvements because:

(i) there is currently substantial allocated water available that is under-utilised, as well as potential for additional surface water allocations;

(ii) there is substantial cleared land available for more value-rich development (some 32,000 ha), including a potential shift from plantation forestry to higher value crops (potentially up to an additional 10,000 ha);

(iii) the region has outstanding terrestrial, aquatic biodiversity and cultural values; and

(iv) the region presents significant opportunities for Aboriginal-led development of water and land resources.

This **Analysis Report** explores opportunities for improving the prevailing system of regional planning and development assessment across the NT, and more particularly within the Douglas Daly catchment. Findings from this work will lead to a series of recommended next steps focused on the design of potential solutions for strengthening the current governance system (the **Solutions Report**). This report has been developed closely with the NT Department of Industry, Tourism and Trade (DITT), the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), the National Environmental Sciences Program (NESP) Marine and Coastal Hub and the Collaborative Research Centre for Developing Northern Australia (CRCNA).

Our analysis of the current regional planning and development assessment system of the Douglas Daly involves a preliminary governance systems analysis of the key decision-making activities that influence catchment-based outcomes important to sustainable development within the catchment and community. This is based on a literature analysis of ten important governance system sub-domains. The work is further supported by the consideration of detailed interviews with eight important government stakeholders and less formalised, preliminary dialogue with other critical stakeholders with strong interests in the

catchment. From this governance systems analysis, several key pre-conditions of success for new approaches to integrated planning and development assessment within the Douglas Daly catchment have been identified to underpin the design of new approaches.

1 Background and context

As part of an ongoing process of policy and planning activities to derisk new development, the NT Government, in partnership with the CRCNA, has sought to consider priority regional planning and development assessment issues facing key agricultural development areas. This means prioritising and focusing on places where development pressures most intensely intersect with the Commonwealth's *Environment Protection and Biodiversity Conservation (EPBC) Act* whilst also considering new directions that emerge from the review of the existing National Water Initiative (NWI).

This work has focused on areas of known development interest, agricultural development potential, and where it is important to minimise the risks to the important natural and cultural values that are also a feature of developments throughout the NT. Ultimately, such development will require the free prior and informed consent (FPIC) of the region's Traditional Owners, who are increasingly and justifiably seeing themselves as the leaders of, or financial equity partners in, such development.

Supported by the CRCNA, the NT Department of Industry, Tourism and Trade (DITT) has recently identified 11 potential agricultural development areas worthy of further consideration for staged development (DITT 2022). These are areas where agricultural development may be possible, and indeed highly desirable if, but only if, effective trade-offs can be reasonably negotiated across multiple landscape values and competing stakeholder interests.

Within this process, by considering a range of multi-criteria analysis factors (DITT 2022), the Douglas Daly region has been identified as a high priority region of great potential value for exploring revitalised and new approaches to bioregional planning, water planning and development assessment. Further consideration of these issues has been seen to be particularly important in the context of emerging Commonwealth policy interests related to the reform of the *EPBC Act* and drought policy, as well as current processes related to the review and further development of the NWI.

This potential agricultural development area consists of extensive existing cropping and pastoral development with a mix of land tenures, including freehold, pastoral leases and Aboriginal Land Trust areas (DITT 2022a). The region provides numerous competitive advantages for more intensive pastoralism, plant-based agriculture and horticulture. There is also potential for new brownfield cropping development where existing and successful cattle and hay production farming enterprises exist in alignment with significant Traditional Owner economic interests in land and water resources. The region has an extensive and complex development history and is perhaps one of the best understood catchments in the NT from a scientific viewpoint. Despite all of these factors, some gaps remain in environmental and development-related information.

This high development potential within a complex social and biophysical environment means that the region has been considered particularly worthy of the development and application of new and innovative approaches to regional planning and development assessment for the following reasons:

(i) there is substantial allocated water available that is currently under-utilised, as well as the potential for new surface water allocations;

(ii) there is substantial existing cleared land available for development (some 32,000 ha), including a significant potential to shift from plantation forestry to higher value crops (up to 10,000 ha);

(iii) the region has outstanding terrestrial and aquatic biodiversity and cultural values; and

(iv) the region presents significant opportunities for Aboriginal-led development of water resources.

The economic imperative for agricultural development and diversification in the NT is clear, as articulated in the NT Agribusiness Strategy (DITT 2022). Importantly, however, the high biodiversity value of land in the NT often correlates strongly with high land productivity, creating the potential for conflict between agricultural development opportunities and cultural and biodiversity values. Over the last decade, however, despite high prioritisation of development in the NT and awareness of potential risks, little attention has been given to improving planning and trade-off analysis to support improved decision-making within the region.

This analysis stage of our project addresses this shortfall by seeking to understand the strengths and weaknesses associated with the current system of regional planning and development decision-making related to the Douglas Daly region. It explores the current health of this system with the view of recommending potential new approaches that could help to ensure the achievement of genuine sustainable development outcomes in the region.

Conservation, Aboriginal interests and development tensions within the region suggest that a regionalised, engaged and evidence-based approach is required to support sustainable development decision-making, including development assessment and offsetting. This preliminary scan of the governance system concerning regional planning and development assessment decision-making has involved comprehensive input from key agencies with expertise in and experience dealing with these complex issues within this important NT development area and catchment.

Building on the findings and analytical foundations outlined in this **Analysis Report**, our resultant **Solutions Report**, will enable progress towards the establishment of recommendations that can strengthen the regional planning and development assessment system affecting landscape-scale outcomes in the Douglas Daly catchment. This will provide a basis for future negotiations regarding the further progression of such improvements in the catchment. Finally, this process should enable shared decision-making to prioritise future stages of research collaboration and support via the NT Government and the CRCNA, beyond June 2024.

2 Contextualising the Douglas Daly Region

In a cultural sense, we acknowledge the Douglas Daly region's cultural foundations as an Aboriginal domain; one deeply affected by several disturbing phases of recent colonial history. A respectful, ground-up articulation of the history of lower parts of the catchment is provided in the recently published works of Morris et al. (2023). The wider Douglas Daly catchment is home to many cultures, towards the lower catchment; Morris, et al. (2003) eloquently describe how the wider region is comprised of nine languages and fifteen dialects. More specifically, the Ooloo-Dolleston aquifer water planning areas, which drive agricultural water use in the region, lie under land which has been home for centuries to the Larbaunyun, Wagiman South, Wagiman North, Dagoman (Wujalawun), Wardaman (Wungayatiawun) and Wardaman (Yubulyawun) peoples (NT Government 2019).

Two major Aboriginal Land Trusts are embedded within the Douglas Daly agricultural development area; the Upper Daly and Wagiman (No. 2) Aboriginal Land Trusts. From the outset, any new and emerging approaches to dialogue around the future of the catchment must empower inform, and support the region's Traditional Owners leaders and include them in discussions and debates.

Also, of importance in future dialogue about the region are old and new pastoral, agricultural and forestry-based producers, who have worked hard to establish a viable and highly prospective agricultural economy within the region.

Building on these combined foundations, we finally acknowledge the deep, good-willed and scientifically informed cross-sector and community dialogue that has previously existed through the region's Daly River Management Advisory Committee (or DRMAC) deliberation processes. The Northern Territory Government established the DRMAC in 2006 to develop options for the sustainable use and conservation of natural resources within the catchment. Its goal was to promote the highest standards of management of land, water and other resources in the region 'so that the important values people associate with the Daly River are protected' (DRMAC 2009). It advised on the development of an adaptive management decision-making framework to allow balancing of the needs of catchment development and conservation, with a particular focus on vegetation clearing and water resource management. The membership of DRMAC included representatives from traditional land owners, production, tourism, recreation and conservation sectors and government (DR MAC 2009). DRMAC was strongly supported by a range of innovative and integrated science projects from the Tropical Rivers and Catchments Knowledge research consortium (TRaCK).

Finally, we acknowledge that much background material provided in this case study below has previously been drawn together from related research supplied by DITT (2022b). This work has progressed over the last two years as part of the Department's, the CRCNA's and NESP MaC Hub's separate investments in landscape-scale de-risking for agricultural development in the north, all related to improved planning and program delivery in defined sustainable development areas. Much of this work has been progressed jointly between the CRCNA and DITT. Other inputs have been drawn from publicly available literature about agency and stakeholder views about the region.

In a geographic sense, we are interested in supporting better decision-making with respect to agricultural development and nature positive thinking within the more confined Douglas Daly Agriculture Development Area. This area, and the associated tenures, are best demarked through Figure 1. For the purposes of this work, however, we recognise that decisions of relevance to biodiversity and wider cultural interests in land need to be contextualised within the wider Douglas Daly Bioregion, while decisions related to water need to relate to the wider Douglas Daly Catchment (see Figure 2). This also means ensuring the consideration of a cultural lens that accommodates the aspirations of all Traditional Owners with an interest in this wider bioregional and catchment scale context.

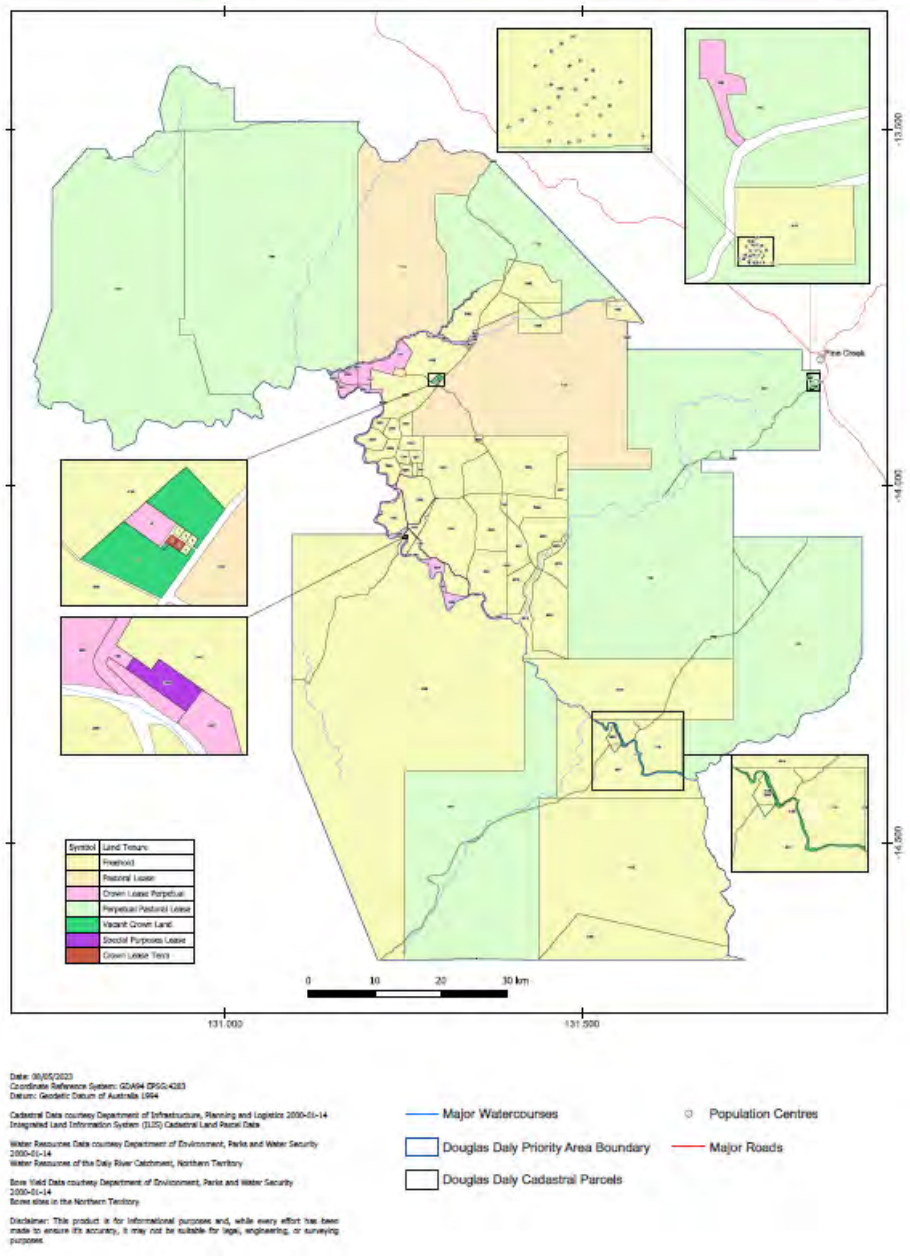


Figure 1: Map of the Douglas Daly Agricultural Development Area and associated tenures. (Source: NT DITT).

2.1 The history of agricultural development in the Douglas Daly Region

The Douglas Daly region is well known for its agricultural diversity. The region has experienced significant change since the area was first developed for horticulture in the 1980s (DITT 2022a). From the early cropping era to cattle grazing and assorted horticulture, the district has progressed to become a valuable region of agricultural production. With the Douglas Daly Research Farm facility established in the 1960s, early research was focused on peanuts and cotton as potential crops for the Katherine-Daly basin (DITT 2022a). Various crops followed, such as sorghum, safflower, guar, soybean, maize, and sesame as well as introduced pasture species sown into cleared and non-cleared areas.

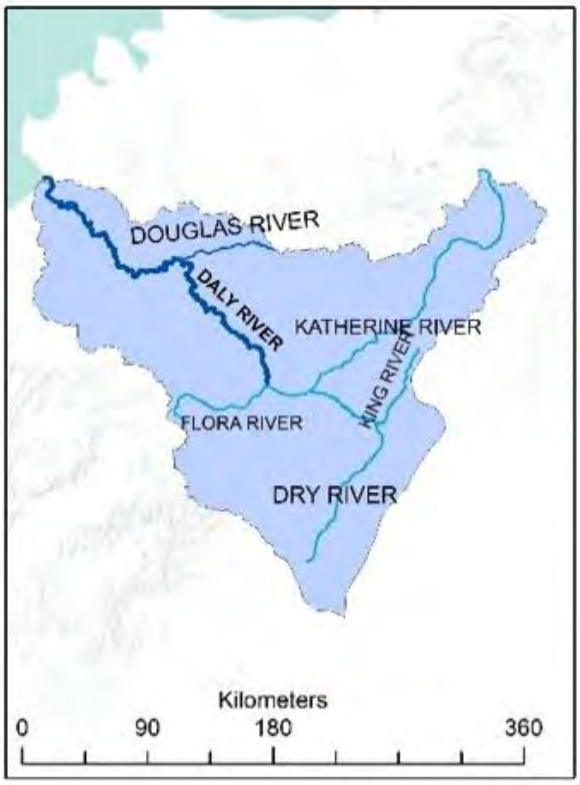


Figure 2: Map of the wider Douglas Daly catchment area (Source: TropWATER, JCU).

Cattle management, breeding, nutrition, reproduction, market requirements, and grazing and carrying capacity trials have been assessed over the years to identify best management practices for growth and value-adding in the cattle industry. With the region showing agricultural potential, Stage 1 of Douglas Daly was developed by the Agricultural Development and Marketing Authority (ADMA) in 1980 (DITT 2022b). ADMA established project farms on land excised from the Douglas and Oolloo pastoral leases. The limited marketing opportunities for the grains that were being produced, coupled with the use of southern farming practices and remote living conditions, saw many of the original farmers leave the district after a few years. Improved cattle farming has been emerging more recently, and now fodder crop production has become an important industry in the region; it has strong potential to supply high quality fodder and fodder cubes for cattle during shipment to Asian markets (DITT 2022b).

Stage 2 of the Douglas Daly land release, known as Stray Creek, included seven freehold land parcels in the early 2000s, which were excised from the Stray Creek pastoral lease. To ensure future growth, Stray Creek properties were sold with development lease conditions attached, requiring purchasers to make certain improvements before receiving freehold titles (DITT 2022b). In the mid-2000s, the introduction of Managed Investment Schemes (MIS) in plantation forestry resulted in the development of a plantation estate of African mahogany in the region, with investment companies purchasing numerous properties (DITT 2022b). These non-irrigated forestry plantations were developed predominately on freehold land previously cleared for improved pastures, and many of these integrated cattle operations. Although cattle production is still the prominent industry in the Douglas Daly, the region has become a more diversified agricultural region with other emergent enterprises. Pastoral leases surrounding the freehold area have expanded operations beyond cattle grazing. Tipperary Station, for example, has been the site of a wide range of agricultural and horticulture trials and projects over 40 years. It was also the first pastoral lease in the NT to apply for a non-pastoral use permit, allowing pastoral properties to diversify tenure on 30 % of their land for up to 30 years (DITT 2022b). The Station was also granted the first NT license to commercially grow opium poppies. Finn 2019, it conducted the first commercial cotton trial in the NT in 15 years, and an orchard of 3,500 lemon trees was also planted, with plans to expand to 10,000 trees (DITT 2022b).

2.2 Agricultural development resources and values

The Douglas Daly Agricultural Development region is well situated for potential agricultural and other development opportunities through its direct but problematic access by road, rail, and sea freight networks with Darwin. Darwin is located approximately 200 kilometres to the north of the region, and Katherine is 200 kilometres to the south. The region is an attractive area for the migration of families as it has existing public infrastructure, including a primary school and other community facilities (DITT 2022b). A community health centre is located in the nearby town of Adelaide River, and the closest police station is in the nearby Daly River community. The NT Government's Douglas Daly Research Farm is centrally situated right in the heart of the region. It provides an important mixed farming research and demonstration facility, which has been pivotal in exploring the potential of the area and in carrying out trials that assist the region's emerging agriculture industries (DITT 2022b).

The majority of land systems in the Douglas Daly Agricultural Development Area are Blain soils of various sub-classifications. Blain soils are typically deep sandy red Kandosols. They are characterised by being highly siliceous at the surface, earthy, increasing to clay loams at depth (1.0 – 1.5 m) of low fertility, moderate acidity and with low water holding capacity. The soils, however, are well drained and suited for overhead irrigated farming systems. They have proved to be highly productive for annual agricultural/horticultural and other broad-acre cropping systems in the Top End (DITT 2022b).

While there is a steady progression of agricultural intensification and alternative crops, new economic work is currently being planned to test various market/commodity opportunities within the limits of the significant water and soil resources and cleared land available for agricultural development and associated value-adding activities. DITT is currently planning this work in partnership with the CRCNA. Market limitations, factors related to the long-term

sustainability of Douglas Daly soils, and potent biosecurity risks such as progressive nematode problems, all need to be factored into such analyses. Either way, the Douglas Daly, with appropriate planning and support, is already on a pathway to developing a deeper and more value rich agricultural economy; one that could be managed to also contribute to improved environmental outcomes and Aboriginal-led development opportunities.

2.3 The region's water resources

Perennial rivers throughout the Douglas Daly Agricultural Development Area support irrigation development and domestic stock use. The Daly River is one of only a few large perennial river systems in northern Australia, and is well recognised for its natural and cultural values (Erskine 2003). The Oolloo Dolostone aquifer which underlies the region's productivity, represents the uppermost formation of the Daly groundwater basin, which is located just north of the Douglas and Daly River confluence, extending south-east to beyond the Katherine River (DITT 2022b). It is an important karstic aquifer that discharges groundwater into the Daly River, maintains flow throughout the dry season, and supports important associated riverine ecosystems. It currently provides reliable, good quality, low salinity water supply, making its use attractive as a resource for agricultural development.

Water resources in the Katherine section of the Basin are already fully allocated, and there has recently been management action to resolve potential allocation issues. Within the Douglas Daly Agricultural Development Area, however, there remains allocated water that is under-utilised. On top of this, there may be significant opportunity to improve the efficiency of water that is currently utilised. Newly established Aboriginal Strategic Reserves are also available for consumptive use if desired by Traditional Owners. Emerging policy work in the NT will also further consider the potential to allocate additional surface water opportunities within the Douglas Daly catchment.

2.4 The region's water resources

Extensive natural resource and environmental studies have been completed within the Douglas Daly Agricultural Development Area including soil, water, flora and fauna (DITT 2022b). The region's conservation areas also contribute to the protection of sections of the Douglas and Daly's riverine systems. These include: the Douglas River/Daly River Esplanade, Stray Creek, Tjuwaliyn (Douglas) Hot Springs, Butterfly Gorge Nature Park, and the Umbrawarra Gorge Nature Park. The Daly River middle reaches have been declared a conservation site of national significance (DITT 2022b). Questions remain about whether these protection mechanisms are sufficient and whether they retain and protect the landscape ecological processes required to retain and conserve the region's biodiversity.

Diverse flora and fauna have been studied, with a range of threatened species present. Eight of the nine species of freshwater turtles found in the NT are present in the Daly River (Price *et al.* 2002). The high-profile pig-nosed turtle *(Carettochelys insculpta)* is a flagship species because it is of considerable international concern as the sole remaining member of a once widespread Family and because the best Australian populations of the species are found in the Daly River (Georges et al. 2002). If poorly managed, increased agricultural development has the potential to threaten these values.

DITT (2022b) suggests that at least two nationally threatened species of elasmobranchs, the Freshwater whipray *(Himantura chaophraya)* and the Freshwater sawfish *(Pristis microdon)* are also present. According to Pogonoski *et al.* (2002), these species are critically endangered and vulnerable, respectively. The Daly River is also an important recreational fishery for Barramundi (*Lates calcarifer*). NT declared Heritage sites include the Fenton Airfield, a B24-D Liberator wreck, and a range of gold mining heritage sites at Douglas Station. Within the greater area is the Commonwealth heritage-listed Adelaide River War Cemetery (World War II) (DITT 2022b).

3 Identified development opportunities

Through improved regional prioritisation and planning practice, as suggested by DITT (2022b) it is likely there will be opportunities to progress sustainable development, including those outlined below.

- **Horticulture and cotton:** High-value cropping systems are now emerging in the Douglas Daly (e.g. melons), and this will increase demand for local water resources. Through a general shift to higher value cropping systems, including the new development through the establishment of the NT's first cotton gin some 35 kilometres north of Katherine, Douglas Daly cotton growers will no longer be required to send their product to the Queensland for processing;
- **Pastoralism:** Building on the shift to more intensive fodder cropping and with the growth of additional cropping opportunities and more integrated systems (e.g. such as cotton seed protein for animal consumption), there will be continued intensification of grazing in the pastoral estate;
- **Tourism:** Building on proximity to Darwin, the flora and fauna of the region and extensive conservation areas provide significant tourism and recreational potential, including four-wheel driving, fishing safaris, wildlife watching, camping, and agritourism farm experiences;
- **Emerging industries:** The development of a broad-scale industrial hemp opportunity is possible as hemp is expected to have competitive farm gate return in comparison to other broad acre crops such as cotton, sorghum and soybean;
- **Forest rotations:** These are currently ending, but they could be expanded with emerging opportunities for value adding efforts;
- **Aboriginal-led development:** The Wagaman and Upper Daly Land Trusts and the establishment of an Aboriginal Water Reserve, enable opportunities for Aboriginal participation in a water-based economy, either directly through agriculture, water leasing opportunities, or through providing emerging water-based ecosystem service markets; and
- **Ecosystem service economy**: The strategic revegetation of nature corridors to support biodiversity and management of the regions cultural and environmental values through direct investments and emerging nature positive markets.

3.1 Additional infrastructure development plans

A number of additional infrastructure projects are planned to provide leverage for new opportunities and to encourage future regional growth. This creates a foundation for more informed investment decisions, along with certainty in business planning and workforce development.

The Department of Infrastructure, Planning and Logistics' 10 Year Infrastructure Plan 2018–2027 has allocated $60 million to work on the Douglas Daly connector road (DITT 2022b). A public weighbridge on Oolloo Road may be returned to service following an expressions of interest process undertaken in early 2022 for the redevelopment of a Crown land site to support the agricultural and cattle industry. The community of Daly River is receiving $4.35 million in upgrades to the public boat ramp and works are now completed (DITT 2022b). These upgrades will provide improved access and additional amenities for the fishing tourism sector.

The Katherine Logistics and Agribusiness Hub, a new land release to support agricultural industries and service surrounding communities, is being developed. The Hub will also support the growth of the resource, defence, transport and tourism sectors. It is strategically located near the intersection of the Katherine railway terminal, Victoria Highway, and a proposed heavy vehicle bypass route, within Manbulloo Station. Telecommunications infrastructure is also improving in the region (DITT 2022b).

3.2 Conflicting and aligned development visions

At a policy scale, there are two explicit and conflicting non-government visions for the Douglas Daly catchment.

On the agricultural production side, both the Agribusiness Development Strategy (DITT 2021) and NT Farmers (and peak agricultural industry body) have an expansive vision for the growth of irrigated agriculture in the NT, and specifically in the Douglas Daly. NT Farmers consider that the 'plant-based agricultural and horticultural industry presents the NT agricultural sector with a significant opportunity to diversify crop production and enhance farm gate returns' (NT Farmers 2020). They particularly consider that, in this context, the Douglas Daly region has key competitive advantages such as proximity to key markets, suitable climate, and sufficient land and water for development. This vision encompasses a wide range of broadacre and more intensive horticultural crops, including cotton.

The wider conservation sector has deeply conflicting views, and has published a number of reports articulating significant concerns about water development in the NT overall, as well as specifically in the Douglas Daly. These are frequently focused on the potential for the cotton farm expansion, and concern regarding the abundance of cotton production proposals that are currently focused on the Daly River, an area they value for its environmental and cultural values and economic activities that depend on healthy rivers (Beaumont et al. 2022).

Within the published literature, it is clear that traditional owners (individuals and groups) within the region have a more nuanced view about the future of water use within the catchment (see Jackson 2024). These views range from the cultural and environmental protection of the catchment, in alignment with the conservation sector, to strong aspirations

for economic development utilising the water within the region. To date, traditional owners have had limited opportunity to undertake deeply engaged country-based mapping and planning processes to determine a cohesive Traditional Owner-led vision for these resources.

3.3 A summary of implications

Regional social and economic benefits are the goal of the progression of development opportunities. The general increase in development pressure to recognise these benefits, alongside conflicting and/or potentially aligned visions for the development of the region, both signal the need for a more place-based approach to managing the region's values. This particularly includes the region's agricultural potential, its surface and groundwater resources, and its natural and cultural values.

Agricultural and other development will need to take particular care of several of both the NT's regulated environmental values as well as the EPBC relevant values listed. Strong social and cultural values also contribute to the need to protect key riparian and aquatic ecosystem values within the catchment. In addition to strong Aboriginal cultural values, the region is important to recreational fishers and campers from both within and outside the region.

4 Methods and approach

A preliminary analysis of the complex governance system underpinning sustainable development outcomes in the Douglas Daly Agricultural Development Area has been applied to focus attention on systemic changes that could deliver better economic, social, cultural and environmental outcomes for the region. This analysis was undertaken by applying two primary methodological steps:

The first step involved a simplified application of the Governance Systems Analysis (GSA) approach developed by Dale et al., as outlined in three papers. The approach is firmly based on previous theoretical and empirical approaches applicable to this sort of complex systems analysis for societal decision-making. References to these theoretical and empirical foundations are: (i) for a theoretical background to GSA (Dale et al. 2013a); (ii) early empirical application and refinement of GSA (Dale et al. 2013b); and (iii) approaches to the detailed application of GSA. (Dale et al. (2016).

Dale et al. (2013a) suggest that governance systems concern social, economic and environmental themes across our society at any scale, and that these themes cannot be viewed in isolation from one another. Poor economic well-being, for example, often underpins and drives social dysfunction within society. Social and cultural factors can alternatively drive natural resource degradation. Natural resource degradation is also a well-known pre-cursor to economic decline in key industries. Sustainable development seeks to find the right trade-offs between these themes at local, regional, provincial and national scales. Failure to get the balance right can damage all three societal values.

Within social, economic and environmental themes at particular scales (for example, within the Douglas Daly), major governance activities can also be defined. These tend to represent distinct overarching, policy-driven activities that draw on particular expertise sets and have their own distinct stakeholder communities. Consequently, key structures operating within particular governance activities tend to build their own cultures and can operate as activity silos within the wider governance system. The key implication of importance here is that in undertaking governance analysis in complex governance systems, we must be aware that different governance activities need to be highly inter-connected, both between and within particular spatial and time scales.

In short, under this GSA inspired approach, we have identified the ten most significant regionally-oriented governance sub-domains or activities that influence sustainable development outcomes of relevance to the Douglas Daly Agricultural Development Area and more widely.

The second methodological step was an assessment of the governance health of each of those governance activities or ‘sub-domains’. The ten activities identified as substantial policy areas that are important to sustainable development outcomes within the region. These include those decision-making systems driven by the following policy or legislative foundations:

- land use planning policy and the NT Planning Act (1999);
- water allocation policy and NT Water Act (1992);
- water quality planning in the NT;
- environmental protection policy and the NT Environment Protection Act (2019);
- policy related to the national protection of environmental values and the Commonwealth Environment Protection and Biodiversity Conservation Act (1999);
- cultural heritage protection policy and the NT Sacred Sites Act;
- the Commonwealth/NT Regional Natural Resource Management (NRM) System;
- agricultural development policy and the NT Agribusiness Development Strategy;
- land tenure and management policy through the NT Crown Lands Act (1992) and Pastoral Lands Act (1992); and
- the Commonwealth's Aboriginal Land Rights Act (1976) and Native Title Act (1993).

For each major governance activity, we considered simple analysis based on:

1. a simple activity description and an outline of its intended outcomes;
2. the activity's policy and legislative foundations;
3. the current state of operation of the activity in the Douglas Daly;
4. known governance activity successes and challenges; and
5. priorities for governance activity improvement.

The results of this analysis are summarised later in this report.

4.1 Targeted interviews of key development agencies

To enable additional depth to this literature analysis, we interviewed 8 key government-oriented agencies involved in regional planning and development decision-making relevant to the Douglas Daly Agricultural Development Area, and the wider bio-region and catchment. This preliminary focus on government agencies was essential to ensure a tentative first step towards building a strong government commitment for doing things differently. Formal ethics approval was sought and received as part of the research process. These interviews, however, were contextualised through more informal dialogue with a range of community, industry and Traditional owner institutions.

The government-oriented agencies or organisations targeted for consultation, had a specific interest in regional level decision-making and represented a diversity of the most relevant interests. Higher-level strategic actors within each organisation were selected for interview.

The interviewee recruitment process considered the scope and objectives of the proposed research, and the relationship of the participants to the current and past systems of development decision-making across the Douglas Daly. Interviews were conducted in person or via online meeting platforms; they were not recorded to protect privacy. A short, non-identified and confidential summary synthesis of key points was collated for each interview. A thematic analysis of the interview materials was then undertaken, applying key aspects of the GSA framework.

The eight government-oriented agencies were asked the following questions.

- What do you think are the key features of the regional planning and development assessment system in the Douglas Daly region?
- What role do you and your institution play in that system?
- What aspects of regional planning and development assessment system in the Douglas Daly region are currently working well?
- What parts of the system need improvement?
- What are your priority views about how the system can be strengthened?

The literature-based governance systems analysis and interview data were integrated, allowing effective identification of the key system-wide governance problems and facilitating early thinking about potential solutions. These are developed more fully in our subsequent **Solutions Report**.

5 Key components of the Douglas Daly governance system

As a key step in GSA, instead of looking at the more complex domains and sub-domains of governance influencing sustainable development outcomes in the region, we have taken a simplified approach based on looking at the context surrounding each major legislative and/or programmatic effort of relevance to regional planning and development decision-making in the region. More detailed GSA approaches would be worth pursuing as time and resources become available. This task, however, has also been made substantively easier because of broader NT-wide work conducted in partnership between the CRCNA and the NT Government that previously explored the wider system of prioritising, planning for and development decision-making associated with new agricultural development. This work was conducted in 2019 and was largely carried out by NAJA Business Consulting Services (2020).

Combined with input from other literature and web-based sources, the following is an overview of the main legislative and programmatic activities contributing to regional planning and development decision-making in the wider Douglas Daly region. Table 1 summarises these activities.

Table 1: The key legislative and programmatic governance activities influencing regional planning and development-related decision-making in the Douglas Daly region (based on NAJA 2020).

Instrument	Jurisdiction	Type	Purpose
Planning Act (1999) and Major Projects	NT	Land Use Planning and Development	Provides for appropriate and orderly planning and control of the use and development of land.
Water Act (1992)	NT	Water Planning and Allocation	Provides for the investigation, allocation, use, control, protection, management and administration of water resources.
Water Quality and the Waste Management and Pollution Control Act (1998)	NT/Common-wealth	Planning and Action to Maintain and Improve Water Quality	Supports regulation, programs and efforts aimed at maintaining and improving water quality in surface and groundwaters.
Environment Protection Act (2019)	NT	Environmental Decision Making	Under the Act, projects with significant environmental impacts need assessment by the NT Environmental Protection Authority (EPA).

Key components of the Douglas Daly governance system

Environment Protection and Biodiversity Conservation Act (1999)	Common-wealth	Biodiversity Protection	Provides for the protection of the environment and the conservation of biodiversity.
NT Heritage Act (2011) and NT Sacred Sites Act (1989)	NT	Cultural Heritage Protection	Under the Heritage Act, it is an offence to knowingly damage a heritage place, to remove something from such places or damage or remove a heritage object, unless one of the exemptions applies. Of most relevance, these exemptions include when the activity is carried out under a work approval issued, or heritage agreement under the Act.
Regional NRM System	NT/Common-wealth	Natural Resource Management	A bilateral (Commonwealth/Territory) system to manage natural resource management issues and funding at regional scales.
NT Agribusiness Development Strategy (2022)	NT	Agribusiness Development	A NT Government strategy to develop agribusiness across the NT to 2030.
Crown Lands Act (1992) and Pastoral Lands Act (1992)	NT	Crown Land Administration and Pastoral Land Management	Legislation and program efforts that provides for the administration of crown and pastoral lands.
Aboriginal Land Rights (NT) Act 1976	Common-wealth	Land Rights in the NT and Native Title Resolution and Management	Legislation and other systems that provides for the granting of Traditional Aboriginal Land and support for Aboriginal development in the NT for the benefit of Aboriginal people.

5.1 NT Planning Act, regional growth management planning and Major Projects

The primary purpose of the NT *Planning Act (1999)* is to provide for appropriate and orderly planning and control of the use and development of land across the NT. Within the regional planning frameworks established by the Act, the Douglas Daly has the potential to be considered as an important sub-region, but it currently isn't. Importantly, it is also unincorporated as a Local Government area, meaning it has limited local and sub-regional planning capacity and control.

Regional and local land use planning in the NT is regulated by the Act, the *Planning Regulations (2000)* (NT), and the NT Planning Scheme 2020. Unlike WA and Queensland, the NT Government is solely responsible for land use planning, resulting in comparatively streamlined and simplified land use arrangements, but more limited local input and influence. Local governments may be notified of development proposals, but the *Planning Act's* object is to 'plan for, and provide a framework of controls for, the orderly use and development of land'. Its criteria for achieving its objectives are based on themes of sustainable development and use of resources, environmental protection, and community consultation. However, these themes are not defined under the Act, and Ecologically Sustainable Development (ESD) is not referenced. Based on Dale et al. (2022), Table 2 summarises key entities and functions of prescribed consent authorities who make development decisions within the wider NT planning framework.

Table 2: Key entities and functions within the Northern Territory's planning framework (Source: Dale et al. 2022).

Entity	Function
Minister for Infrastructure, Planning and Logistics	Under the *Planning Act*, the minister has various powers including: • making, amending and/or repealing planning schemes • issuing exceptional development permits and interim development control orders • revoking or modifying development permits • delegating decision-making power • generally directing the Development Consent Authority (DCA) and making development decisions outside of DCA division areas.
Development Consent Authority (DCA)	Under the *Planning Act*, the DCA 'has the powers that are necessary …to [enable] the performance of its functions or the exercise of its powers' including making development decisions, enforcing planning rules, holding public hearings, and reporting to the minister on development applications, planning scheme amendments and exceptional development permits as they relate to the divisions of Darwin, Palmerston, Litchfield, Batchelor, Alice Springs, Katherine, and Tennant Creek. The DCA's chairperson, each division's local council representative, and two community members meet monthly.
Northern Territory Planning Commission	Under the *Planning Act*, the Planning Commission has functions relating to the Planning Scheme including: • conducting regular reviews • consulting the community prior to preparing integrated strategic plans, guidelines, and assessment criteria

Key components of the Douglas Daly governance system

Entity	Function
	• providing advice to the minister about matters within the objects of the Act, significant development proposals, and future land use and development. The Planning Commission comprises of a chairperson, the DCA's chairperson, the Heritage Council, the Northern Territory Environment Protection Authority, a Local Government Authority representative and five other minister appointed members.
Department of Infrastructure, Planning and Logistics	The Department's planning division comprises of the Development Assessment Services and the Lands Planning branches which support the minister and consent authorities by assessing applications and planning scheme amendments, providing professional and technical support, developing strategies and plans, supporting proponents and the public on the Northern Territory's planning framework and enforcing the *Planning Act*.

The NT's Statutory Planning Scheme promotes the objectives of the Planning Act by establishing land use planning arrangements to control development occurring on zoned land. Notably, Darwin, Katherine, Tennant Creek, Alice Springs, and some 23 remote towns, which have strategic land use plans, are excluded from this Scheme. Most of the NT, however, including the Douglas Daly, is un-zoned. Regions such as the Douglas Daly, therefore, are largely unplanned in a land use context, due to small, sparsely populated settlements and large areas covered by Aboriginal land. For zoned areas, the Planning Scheme establishes a strategic framework for strategic planning policies and land use plans, including:

- zoning requirements for residential, commercial, industrial, recreational, rural, infrastructural, and other zones, in addition to guidance on suitable development types;
- overlays where specific development requirements must be met due to proximity or exposure factors;
- assessment tables detailing applicable assessment categories, overlays, and general/specific development requirements;
- subdivision and consolidation processes for zoned and un-zoned land; and
- Aboriginal Community Living Area requirements for land use planning.

Dale et al. (2022) outline the detail and relevance of the NT's planning system to regional planning. Consent for development occurring on un-zoned land is required under the Planning Act only for proposed subdivisions or clearing of more than one hectare of native vegetation. Consequently, most development on un-zoned land is not controlled by the Planning Act, but may require approval under other environmental statutes, such as

development proposals assessed under the Environmental Protection Act 2019 (NT), or proposed subdivisions of pastoral land under the Pastoral Land Act 1992 (NT). Moreover, the only strategic planning policy developed for the NT is the NT Compact Urban Growth Policy, which must be considered by the planning minister and the DCA in making decisions.

Under the Act, development consent is separated into four categories: permitted, merit assessable, impact assessable, and prohibited. Development consent is not required for permitted development and may only be granted to prohibited development if its ancillary purpose is listed in the Planning Scheme's Schedule or if it relates to a heritage place and has received approval under the Heritage Act 2011 (NT). Development assessment and approval from a consent authority is required for merit assessable and impact assessable development applications. The Planning Act sets out the decision-making process that consent authorities must follow when assessing development applications. Importantly, for applicable development applications, consent authorities must act in accordance with decisions made by the NT EPA on environmental assessments and approvals. Further, consent authorities may consider any matter deemed relevant.

Following assessment, consent authorities may approve or alter the development conditionally or unconditionally or refuse consent. Consent authorities must immediately supply a development permit to the proponent, which may include conditions. The proponent and persons who made submissions (including local councils) must be notified of all decisions with detailed reasons and explanation of rights of review. Further, significant developments are declared for proposed development which may have a significant impact on the natural environment or the existing amenity of the land and require special assessment and approval. Here, the planning minister may request a report from the NTPC prior to determining the application or referring it to a consent authority.

Within the context of the operation of this legislation, the general policy framework supporting agriculture and aquaculture development in the NT also includes the 'Major Projects' framework, and the activity of agencies, non-government organisations (NGOs), local governments and statutory bodies for which policy, planning, assessment and decision-making processes impact upon development outcomes (NAJA 2020). The NT Government's Major Project Status Policy Framework and associated support team has been established to assist major project proponents to navigate through government approval requirements. Under the policy, major project status is awarded to developments by the NT Government having regard to six main criteria:

- project significance (e.g. capital expenditure, employment);
- strategic impact (e.g. flow on benefits to other industries);
- complexity (government approval requirements and environmental, economic and social impacts beyond the project footprint);
- project feasibility;
- the proponent's capacity to deliver the project; and
- ancillary issues, such as the need for government support and local industry participation, local workforce development and social impacts on the community (NT Government, 2017).

NAJA (2020) suggested that while these criteria are used as a guide, ultimately, decisions on major project status are made at the discretion of the NT Government. If major project status is awarded to major development, the proponent, which could be the NT Government, receives: assistance with the identification of relevant approval processes; whole of government coordination and facilitation of the project related government approvals; and a dedicated government project case manager who works as a single point of contact on the project.

Seafarms Group Limited's Project Sea Dragon is the only agricultural or aquacultural project that has received major project status at this point in time.

5.2 NT Water Act and associated water planning

The NT *Water Act* provides for the investigation, allocation, use, control, protection, management and administration of water resources across the Territory. Under the auspices of the Act, a Water Allocation Plan exists for the Oolloo Dolostone Aquifer (2019-2029), but not for the wider Douglas Daly catchment. This Plan was developed to ensure water resources are managed to protect and maintain environmental and cultural values while providing a sustainable volume of water for consumptive beneficial use. In the NT, water entitlements have historically been allocated on a first in, first served basis, with each decision based on its merits along with consideration of the cumulative impact on the water resource and other users of the resource. As per the *Water Act*, licences are generally issued for a maximum 10-year period, with an option of renewal (DITT 2022b).

Groundwater planning has been well institutionalised in the region for some time, though there is currently some concern about potential over-allocation in the upper catchment (i.e. around the Katherine agricultural development areas. This tension has been eased recently through the application of processes aimed at re-allocating water that is not being used (i.e. a use it or lose it approach to licensing). There is, however, industry concern about these arrangements.

Consequently, in situations where future demand exceeds supply and as a resource nears full allocation, there is a need to look at other alternative sources to ensure that water is being optimally managed to encourage the highest value and efficient use. There is an opportunity to increase water resource availability and to improve water distribution efficiency within the limitations of the Water Allocation Plan. Indeed, the development of policy mechanisms such as the better management of under-utilised water, and encouraging trading and water markets, may provide new opportunities into the future. Surface water development is yet to be explored in detail due to the reliance on groundwater in the region.

The provision for water trading is enabled by the Trading Licensed Water Entitlements Policy which allows all or part of a water licence to be transferred within a Water Allocation Plan area (DITT 2022b). The NT Water Trade Register suggests that, to date, there have been three water trades within the southern zone of the Oolloo Dolostone Aquifer.

A reserved percentage of water exists within the consumptive pool of the Plan that is accessible exclusively by eligible Aboriginal people, to use or trade. The total area of the Groundwater Management Zone (GMZ) is 527,687 hectares, of which 125,609 hectares is eligible Aboriginal land. The accessible Strategic Aboriginal Water Reserve (SAWR)

available in the Water Allocation Plan as of August 2019 was 9,825 megalitres per year. Some 4,078 megalitres per year is within the Southern GMZ and 6,737 megalitres per year is in the Central GMZ, making both relevant to the Douglas Daly Agricultural Development Area.

Further water provision may become available to the SAWR in the future through surrendered, amended or cancelled licences or via changes to the estimated sustainable yield following a review of the Water Allocation Plan. In line with the SAWR Policy Framework, however, water required for public water supply, rural stock and domestic use must be made before a SAWR is allocated. If the status of Aboriginal land changes, then the SAWR is also re-considered in the allocation plan review (DITT 2022b). While a reasonable SAWR is available to Traditional Owners in the Douglas Daly, these reserves have not yet been used.

Under the NT Government's new surface water allocation policies, additional surface water allocations may be made available within the region into the near future. No doubt, if this occurs, it will trigger highly contested discussions between conservation, Traditional Owner and agricultural industry interests. New water trading policies are also currently emerging within the Northern Territory.

To help better understand the water allocation system in the NT system, a new CRCNA-funded Water Security Alliance is starting to resolve key knowledge gaps related to water allocation and use. In the context of the Douglas Daly, this work will focus on:

(i) review of water values at catchment scale (including a focus on EPBC listed species of significance);

(ii) a social review of emerging water development interests;

(iii) work within the Department of Environment, Parks and Water Security (DEPAWS) to account for climate change in the hydrological models;

(iv) hydrological and water quality knowledge relevant to the Oolloo Dolostone planning area, with a focus on determining where the water is actually coming from; and

(v) looking at the actual impact of proposed surface water take (including the mapping of floodplains and wetlands).

Underpinning some of these issues at the Territory scale is the new NT Water Plan. There is also early thinking about potential future legislative water reforms within the NT. A review of the Douglas Daly Water Plan is also likely to ramp up in future years. This process will need to better account for cultural values related to water, crop water demand, and the potential impact of climate change on water resources. Water allocation planning activities tend to operate with little connection to more integrated approaches to facilitating the development of the catchment. In particular, there is no clear or integrated regional planning effort guiding emerging development.

5.3 Water quality planning and regulation

Under the NT Waste Management and Pollution Control Act (1998), water pollution and waste discharge are regulated. Certain types of water-related developments could require approval under this Act. There is not a clear line of site between these legislative requirements and the Douglas Daly. Key factors currently of relevance to the operation of the Act in the NT include:

- **Waste Water Discharge Arrangements** – There is currently an increased focus on tailwater recycling with consideration of such arrangements;
- **Water Quality Management** – There is currently an increasing focus on more practice planning for water quality (i.e. the development of Water Quality Management Strategies in places such as the Adelaide River); and
- **Water Quality Monitoring** – There are few water quality monitoring efforts across the NT; most monitoring is passive and could be substantively increased.

Relative to the above policy settings, there are currently no cohesive arrangements for monitoring water quality changes within the Douglas Daly region.

5.4 Thematic analysis emerging from the interviews

The relatively new NT *Environment Protection Act 2019* superseded previous legislation aimed at protecting key environmental values in the NT and establishing an Environmental Protection Authority. This is the key legislative foundation for the coordination of development assessment in the NT, with well-developed triggers triggering impact assessment requirements and referral to the NT Environment Protection Authority (NTEPA). Biodiversity and conservation planning is also sponsored under this piece of NT legislation. In parts of the NT, more detailed biodiversity mapping work is increasingly occurring in support of improved decision-making (e.g. through Mapping for the Future programs at places like the Beetaloo and Gunn Point). While there are strong biodiversity sciences based within the Douglas Daly region through previous DRMAC arrangements, there remains a strong need to review and revisit biodiversity mapping in more detail. This sort of work is quite important in supporting the role of agencies such as the NT Department of Infrastructure, Planning and Logistics (DIPL) in considering development applications under Land Clearing Guidelines.

Interestingly, with anticipated development pressures in the early 2000's, under previous DR MAC arrangements, some more detailed and well engaged work was undertaken in the Douglas Daly, including threshold-based approaches to the consideration of applications. This work was subsequently written into the NT Land Clearing Guidelines, but was then removed in more recent iterations due to limited development pressure. An NT Offsets framework has also now been developed. It consists of 2 policies; one for Biodiversity and one for greenhouse gas emissions (DEPAWS, 2024). In this context, offsetting considerations for tree clearing are also under further development, with an offsetting policy currently under development but not yet practically applied.

5.5 Environment Protection and Biodiversity Conservation Act

In the national context, biodiversity considerations related to development decision-making in the Douglas Daly region are managed through both the Commonwealth's EPBC Act and bi-laterally related NT statutes. Again, the EPBC Act aims to balance the protection of the region's crucial environmental and cultural values by creating a legal framework and decision-making process based on the guiding principles of ecologically sustainable development (DAW & E 2020).

The EPBC Act is the Australian Government's central piece of environmental protection legislation (Dale and Marshall 2020). It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are defined in the Act as matters of national environmental significance (MNES). These include world heritage properties, national heritage places, wetlands of international importance, nationally threatened species and ecological communities and migratory species (Dale and Marshall 2020). The Act aims to balance the protection of these crucial environmental and cultural values with our society's economic and social needs by creating a legal framework and decision-making process based on the guiding principles of ecologically sustainable development. Specifically, the EPBC Act aims to:

- provide for the protection of the environment, especially MNES;
- conserve Australia's biodiversity;
- protect biodiversity internationally by controlling the international movement of wildlife;
- provide a streamlined environmental assessment and approvals process for MNES;
- protect Australia's world and national heritage; and
- promote ecologically sustainable development.

If developers conclude that they might have a significant impact on any MNES, then they need to apply for approval to proceed under the Act. This approval process is in addition to NT Government approvals that might be required. When a proponent wants an action assessed for environmental impacts under the EPBC Act, they must refer the project to the Department of Climate Change, Environment, Energy and Water (DCCEEW). This 'referral' is then released to the public, as well as relevant State, territory and Commonwealth ministers, for comment on whether the project will have a significant MNES impact (DAW&E 2020). The minister (or delegate) then decides whether the likely environmental impacts of the project are such that it should be assessed under the EPBC Act.

There are five different levels of assessment, depending on the significance of the project. Each level involves considering technical information assembled by the proponent and comments made by the public. Once a project has been assessed by the Department, it makes a recommendation to the minister or delegate on whether the project should be approved. In addition to considering potential impacts on MNES, in making a decision, the minister also considers the socio-economic impact of projects (DAW&E 2020).

A major problem facing the operation of the EPBC Act in the NT, however, has been the lack of regional context within which development decisions are made. Dale et al. (2022) show that an increasingly significant national driver of more regional approaches to planning in the north has arisen through the 2020 independent review of the EPBC Act (the Samuel Review). The review recommended the development of whole-of-government regional plans aligned to a proposed strengthening of national environmental outcome standards, inclusive of:

- regional recovery plans to coordinate the management of cumulative impacts for multiple threatening processes in regions, while identifying areas of current and future critical habitat and suitable offset obligations; and
- ecologically sustainable development plans to address environmental, economic, Aboriginal and social priorities in regions of significant development pressure, by balancing competing land uses and establishing suitable development zones.

Further, the Samuel review (2020) acknowledged that Strategic Environmental Assessments (SEAs) under the EPBC Act might also provide greater development certainty for proponents within regional approaches by offering streamlined approval for multiple actions. The review noted that any prospective regional planning efforts would require the integration of statutory roles and responsibilities of the Commonwealth with State, Territory and local government planning and development approval processes. An overarching objective would be to identify where development could, and should not occur, in addition to priority restoration and recovery areas, providing decision-making certainty and offset market guidance. A sense of community ownership and the adaptability of regional plans through design, implementation, monitoring and evaluation phases was stressed. This emerging policy agenda presents great opportunities for the north, as well as significant risks if such processes are not well conceptualised and executed (Dale et al. 2022).

Some of the opportunities and challenges for implementing these reforms in northern Australian catchments like the Douglas Daly, and to agricultural development in particular, include the potential to see more regionalised approaches to trade-off analysis. The challenges and opportunities Dale et al. (2020a) consider important include those outlined below:

- An Important Focus on Accreditation of State/Territory Systems - There is a need for reform to enable broader and comprehensive accreditation of State/Territory processes of development planning, assessment, and compliance. This needs to be a system based on active partnerships with the Territory. This could include a strong scale-based focus on shared decision-making, implementation, monitoring and review. These scales include:
  - (i) National Threat Abatement and Asset Management Planning;
  - (ii) Territory Environmental Protection and Biodiversity Conservation Planning;
  - (iii) Integrated Regional Land Use Planning (including EPBC/NRM Plans);
  - (iv) Development Precinct Planning; and
  - (v) ‘Whole of Life-Cycle’ Planning and Impact Assessment.

Dale et. al (2020a) consider that, without these subsidiary layers operating well, all of the focus on securing EPBC outcomes will come at the end of the development assessment process, creating unknown levels of development assessment uncertainty and risk for project proponents and communities, and leaving the DCCEEW exposed to localised conflict.

- The Risk of Delivery Failure in Applying National Outcome Standards - While Dale et al. (2020a) considered that the Outcome Standards approach proposed by the Interim Report is sound, the strongest risk ahead would likely be 'implementation failure' following completion of the review. As such, they considered it important that Process Standards be negotiated that set shared expectations between the Commonwealth, the Territory, local government, industry and the community about planning/decision-making at various scales.
- Increased Attention to Aboriginal Interests in Land and Sea Country - The Interim Report's focus on increasing Traditional Owner engagement in the business of environmental and cultural heritage protection will require:
  (i) Traditional Owner input into the development of national Process and Outcome Standards;
  (ii) the integration of socio-economic and cultural heritage assessment within Process and Outcome Standards;
  (iii) the full engagement of Traditional Owners across all scales of planning and project assessment; and
  (iv) the creation of significant ecosystem service market opportunities for Traditional Owners.

- Creation of a National Ecosystem Service Policy Framework - Dale et al. (2020a) considered that Traditional Owners, farmers and other land and sea managers across the landscape are the stewards of our nation's ecological and cultural assets. Through the Interim Report and the emerging Nature Positive agenda, the Australian Government is increasingly starting to recognise the potential of land and sea stewards to provide/trade high value products in emerging ecosystem services markets. This could be shaped by effective offsetting from EPBC decision-making and project assessment processes in places like the Douglas Daly.

Of importance to this governance system analysis, however, are the self-assessment and referral project guidelines used to trigger EPBC considerations of land clearing.

5.6 Sacred site protection and cultural heritage planning

Within the NT and across the north, there is an increasing level of focus on the protection of both spiritual, historical and physical cultural heritage. An example of this is significant conflict over the proposed extraction of water at Singleton Station in the NT. Planning

frameworks have traditionally been quite weak in considering landscape-scale cultural values, including regional land use planning, biodiversity and water planning frameworks. The NT *Sacred Sites Act* has been a long-standing foundation for the identification and protection of cultural heritage in the Territory.

Under the *Sacred Sites Act*, a sacred site is a place sacred to Aboriginal people, or of other significance according to Aboriginal tradition, and includes any land that, under a law of the NT, is declared to be sacred to Aboriginal people or of significance according to Aboriginal tradition. Custodians must be in agreement before a recorded site proceeds to registration. For this to happen, a custodian has to divulge a certain level of public information about the site to demonstrate that it meets the requirements of registration and placement on the public register.

The registration of sacred sites is the highest level of protection that can be afforded to a site. Registration of a site also enables land users to have the best possible information regarding the site's location and extent. For Aboriginal custodians, registration of a sacred site means that it will be accepted by a court as prima facie evidence that a place is a sacred site. The Act prohibits entry onto sacred sites, the carrying out of work on or use of sacred sites, and the desecration of sacred sites, other than in accordance with certificates issued by the Aboriginal Areas Protection Authority.

In relation to wider cultural heritage considerations, the NT *Heritage Act* protects both natural and cultural heritage places and objects. Cultural heritage places protected by the Act include buildings, a range of structures and places associated with European settlement and maritime heritage. In addition, all Aboriginal and Macassan archaeological sites are protected.

In short, the NT cultural heritage legislation operates more as a site-specific protection mechanism. There is little, if any, focus on considering cultural heritage protection and management at the regional scale or on effectively integrating cultural heritage considerations in regional planning. Cultural values are only broadly integrated into water planning processes at this point in time. There is, however, an increasing focus on modelling cultural values by proxy within water planning.

5.7 Regional NRM planning and delivery system

In support of sustainable natural resource management across the NT, the Commonwealth and the NT governments support the operation of the NT (NRM) Board. Across Australia, community-based regional NRM bodies were formalised to develop regional NRM plans to guide more local action on landscape-scale NRM issues from 2000 onwards. Within these modified or new structures, consequent projects (devised at cross-regional, regional, catchment and local levels) have been delivered through local community-based groups and other capable parties.

Territory Natural Resource Management (TNRM) is the regional, community-based organisation responsible for planning, coordinating and facilitating natural resource management activities across the NT. The NT Natural Resource Management (NRM) plan developed by TNRM with Commonwealth and NT government support, 'provides an overarching five year strategy for maintaining and enhancing the condition of our land and

water resources, the productivity of our soils and the health of our natural habitats and biodiversity' (TNRM n.d). The Territory NRM Plan has been drafted following broad Territory-wide consultation combined with the latest science. The Plan is broadly structured to cover four regions to reflect the diversity of the Territory, including the Gulf Savanna region that is inclusive of the Douglas Daly catchment. It builds the foundations for planning action and priorities in these regions over the five years, 2021–2025.

5.8 NT agribusiness development strategy

As a result of the parlous state of the NT economy, and particularly following the impact of COVID 19, the NT Government has been focused on expanding the role of agriculture in the growth and diversification of the NT economy. This has been most clearly represented through the development of the NT's Agribusiness Strategy (DITT 2022). The Strategy was facilitated by DITT through a series of industry forums across the NT during the COVID pandemic. The Strategy 'provides a shared framework to deliver growth across multiple primary industry sectors and was a key recommendation of the Territory Economic Reconstruction Commission (TERC) report in 2020' (DITT 2021).

The Strategy seeks to help the NT 'achieve a sustainable and diverse $40 billion economy by 2030, leading to more jobs and higher living standards'. Agriculture's targeted contribution to this would be $2 billion per annum across the NT. The primary calls to action from the Strategy include:

- establishing key sustainable development precincts;
- identifying integrated commercialisation opportunities across the supply chain;
- supporting Aboriginal-led industry development opportunities; and
- facilitating sustainable pastoral and Aboriginal land development.

Of great relevance to the implementation of the NT Agribusiness Strategy was an important piece of economic analysis undertaken by North Australian Agribusiness Management (2016). With significant implications for agricultural precinct development in the Douglas Daly, the study's main findings were:

1. There is strong potential for economically viable, irrigated multi-crop/year options for existing local farmers with existing farm infrastructure, but not for greenfield development;
2. Depending on the level of existing capital investment, the required net cash flow/year from the cropping system to sustain economic viability, ranges from $2,000/ha/pa (where existing farms require fencing, clearing, specialised land preparation, pumps and pivot installation), to around $2,500/ha/pa (where existing farms also require bores);
3. This net cash flow requires a multiple crop/year system for broadacre crop development. Under current farming systems, no large scale single broad acre crop can currently meet this requirement;

4. Several crops show potential for incorporation into a multi crop/year, cropping system that generates the net cash flow needed to support brownfield developments in the Douglas Daly. These include aromatic rice, peanuts, mung beans and fodder;
5. Multi crop/year cropping systems have not yet been successfully deployed in the NT and in northern Australia. There is a critical need to commercially test the proposed cropping systems in Douglas Daly growing conditions, in order to de-risk the investment opportunity. Crop cycle times and yields in the Douglas Daly conditions will be an important determinant of success. Genetic development and selection may be required;
6. A fodder-based cropping system could be easier to implement in the region in the shorter term. A fodder/mung bean system would be technically easy to implement, meet economic imperatives, and has no minimum scale required for post farm gate processing and handling. The size of the NT market for fodder may be a constraint, but there are also potential market opportunities in better quality fodder and possible export feed pellets;
7. There are attractive climatic conditions and sufficient suitable soils and water in the Douglas Daly for the minimum scale required to support post farm gate supply chain processing and handling requirements for these crops. There are also sufficient soil and water resources to support considerable expansion of these crops past the minimum supply chain needs;
8. There are sizable domestic and international markets and reliable prices for the proposed crops;
9. The current focus on land and water resource mapping which focuses on light sandy soils over ground water resources does not recognise the higher capital cost of this cropping system when compared with furrow irrigation from surface water catchments on heavier soils. This suggests that more focus and research effort should be directed to cropping systems and economics of surface water capture and furrow irrigation on heavier soils, in the north; and
10. This study has identified a potential international market opportunity in feed pellets that would significantly compliment any implemented Douglas Daly cropping system. Further assessment of this market opportunity was recommended.

The study considered that a grower and industry collaboration opportunity exists for the commercial trialling of a multi crop/year system using grower land and capital, and this could be progressed if appropriate support could be secured from supply chain partners and relevant research organisations. It was recommended that this opportunity be further developed with a view to fast tracking and complimenting research efforts in this area. It also particularly demonstrated that the process of reverse engineering development strategies from the starting point of economics and markets was more important than starting from the land and water resources available. The study was particularly useful in suggesting that a four-step iterative process was required that involves:

- determining capital development costs and defining the required net cash flow pa/ha to support these costs;
- selecting crops and markets and developing cropping systems to meet the required cash flow targets;
- considering post farm gate supply chain handling and processing requirements to determine required production scale; and
- selecting land, water, climatic and infrastructure resources needed to meet the crop system requirements.

The North Australian Agribusiness Management (2016) research is important in suggesting that, once the economics of cropping development opportunities becomes clearer, then some strong retrofitting of land and water availability could be considered to enable a wider range of medium to larger scale investors. This could then be followed up with more significant district wide planning and approvals. The report poses the following questions that will support decision logic:

- what is the capital expenditure required to develop a 100 ha irrigation farm (assuming this is a minimum farm area) on sandy soils of Douglas Daly;
- what net revenue is required to justify the capital expenditure?;
- what crops and cropping systems could generate the net revenue required?;
- how much soil and water resources are available in the Douglas Daly to generate the scale required for the supply chain for these crops (e.g. post farm gate processing)?;
- what are the market and supply chain factors of the selected crops that could drive development?;
- what are the technology research gaps that need to be addressed to make the opportunity a reality?; and
- what infrastructure or policy constraints or limitations in capital/finance/supply chains need to be resolved to develop the scale required?

The report found that the total freehold land area in the Douglas Daly is 92,130 ha, of which 32,148 ha is cleared land. There are 41,541 ha of suitable soils (Cat A & B) for cropping, made up of 25,558 ha of Cat A soils (rice, mung bean) and 15,783 of Cat B soils (peanut based crop systems). There are 9,881 ha of forestry (mahogany and sandalwood) on good soils (Cat. A & B) in the Douglas Daly. The total land of suitable soils (Cat A & B), not used by forestry, is 31,660ha. There are 5,330 ha of Cat A & B soils (not already used for forestry) that are within 3km of existing 50+lt/sec bores (this area includes cleared and uncleared land).

Once specified that the areas need to be of sufficient size to accommodate a 50 ha pivot, the available Cat A & B soils within 3 km of existing bores were considered to drop to 4,413 ha (including cleared and uncleared land). This is made up of only 894 ha of Cat B soils suitable for peanut-based crop systems. It also included 3,519 ha of Cat A soils suitable for an aromatic rice/mung bean cropping system. The report considered that using a minimum

area of 30 ha of contiguous good soils for smaller pivots increases the potential development area significantly.

It is also considered that a 1,200 ha irrigated development is likely to require around 12-15,000 ML/year of water allocation, based on estimates around 10-12 ML/ha for a two crop system North (Australian Agribusiness Management 2016). At the time, the NT Department of Land Resource Management advised North Australian Agribusiness Management there was 60,000 ML/year of water available in the Douglas Daly ground water system.

It is estimated that the projected use for current developments, including irrigated sandalwood, is unlikely to exceed 20,000ML/year. North Australian Agribusiness Management (2016), therefore, considers that the Douglas Daly has sufficient water for a minimum 1,200 ha irrigated cropping development requiring around 10,000-15,000 ML and allowance for expansion. The report also did not investigate the possible use of on-farm surface dams to supply water for pivots and suggested that these could reduce the irrigation capital cost. The report showed that the drilling of bores is a major cost, estimated at around $5000/ha. On-farm surface water dams, however, require investigation of suitable sites with the right topography, a clay base to hold water, catchment rainfall studies to estimate water yields and appropriate water catchment and use policies.

5.9 Crown Lands Act and Pastoral Land Act

Land tenure in the Douglas Daly is a mix of freehold, crown and Aboriginal tenures under both the Commonwealth *Aboriginal Land Rights Act* and the *Native Title Act* (see Map 1). Four main types of land tenure are in place in the NT. The NT *Crown Lands Act* provides for decision-making about and the administration of crown lands across the NT. Crown land in the NT can be made up of a mix of reserves, unallocated crown land, and, more importantly, pastoral leasehold. At the broader NT level, most land in the Territory, outside of formal townships, is either Aboriginal freehold or pastoral leasehold land over which native title rights can exist.

The NT *Pastoral Lands Act* more generally provides for the conversion and granting of title to pastoral land and the administration, management and conservation of pastoral land. It facilitates the sustainable use of land for pastoral purposes and the economic viability of the pastoral industry. On pastoral leases, under the more specific NT *Pastoral Lands Act*, non-pastoral use (NPU) permits are required to conduct agricultural, horticultural, aquacultural or other non-pastoral grazing activity on pastoral stations. NPU decisions need to consider the environmental factors associated with changing land use from broadscale pastoralism.

5.10 Aboriginal Land Rights Act and Native Title Act

The Commonwealth *Aboriginal Land Rights Act* provides for the granting of Traditional Aboriginal Land in the NT for the benefit of Aboriginal people. The NT's Four Aboriginal Land Councils were also established under the Act. In the context of the Douglas Daly, the Northern Land Council is a statutory authority established to express the wishes and protect the interests of Traditional Owners, and other Aboriginal people in that Land Council's region. As mentioned previously, a number of Aboriginal Land Trusts exist in the Douglas Daly Agricultural Development Area.

Complementing the *Aboriginal Land Rights Act* is the Commonwealth's *Native Title Act*. This Act provides for native title in relation to land or waters and for related purposes. Once Native Title is determined, Prescribed Body Corporates (PBCs) are established to achieve the aspirations of native title holders and to deliver land use agreements to external parties.

Australia's national policy attention in relation to Aboriginal land rights is slowly seeking to improve the efficiency of current land rights processes, including the need to support traditional owners in using these rights, drawing benefits from them, and meeting the completely new challenges facing Traditional Owners post-determination (COAGSOWG, 2015; JCU & CSIRO, 2013). Consequently, on 10 October 2014, the Council of Australian Governments (COAG) announced an urgent 'investigation into Indigenous land administration and use, to enable traditional owners to readily attract private sector investment and finance to develop their own land with new industries and businesses in order to provide jobs and economic advancement for Indigenous people' (COAGSOWG, 2015).

Key findings included recommendations to support Aboriginal peoples' use of their land and water rights for economic development. The group identified five key areas where governments should focus their efforts (COAGSOWG, 2015, p1):

- gaining efficiencies and improving effectiveness in the process of recognising rights;
- supporting bankable interests in land;
- improving the process for doing business on Aboriginal land and land subject to native title;
- investing in the building blocks of land administration; and
- building capable and accountable land holding and representative bodies.

Linked with this work, COAGSOWG (2015) also identified several parallel Commonwealth processes that could influence this agenda. These included:

- a report by the Australian Law Reform Commission (ALRC) reporting on a two year inquiry into the connection, joinder and authorisation aspects of the Native Title Act 1993 (Australian Law Reform Commission, 2015);
- the Australian Human Rights Commission (Australian Human Rights Commission, 2015) facilitated Indigenous Leaders Roundtable on Property Rights in Broome on enabling economic development within the Indigenous estate (Aboriginal and Torres Strait Islander Social Justice Commissioner, 2015);
- the Forrest Review considered improvements that could be made to help create parity between Indigenous and other Australians, including through development on Indigenous land and land subject to native title (Forrest, 2014); and
- the Deloitte Access Economics' Review of roles and functions of native title organisations (Deloitte Access Economics, 2014).

6 Research results: Perceptions of system health

6.1 Preliminary issues identified by the NAJA Report

As a prelude to this more focused work in the Douglas Daly region, NAJA Business Consulting was engaged by the CRCNA, in partnership with the NT Government, to undertake a study into prioritising, derisking and brokering agricultural and aquacultural development in the NT. The report provided a roadmap for further sustainable agricultural development to realise the vision behind the Developing Northern Australia White Paper (Australian Government 2015). This was based on the consideration that, five years after the release of the White Paper, there remained unmet opportunities, and concerns continued over the environmental impacts of some development options.

This NT-focused work was part of a wider collaboration between the CRCNA and all three northern Australian jurisdictions (WA, NT and Queensland). The project explored the issues at hand and proposed innovative and NT-specific policy, regulatory and other solutions to facilitate sustainable agricultural development that balances economic, environmental and social outcomes.

The NAJA report specifically explored constraints identified that inhibit planning and assessment for sustainable agricultural development in the NT, reflecting broadly upon the:

(i) complex land tenure arrangements;

(ii) limited understanding of water availability and soil suitability;

(iii) security of water rights and water infrastructure;

(iv) transport and communications infrastructure;

(v) development of a supportive regulatory environment; and

(vi) fostering of a supportive investment environment.

Extensive stakeholder engagement informed the report. The report stressed that securing private sector investment in the development of the NT would still require serious collaboration between the Commonwealth and the NT Government. NAJA considered that opportunities for both governments to assist in brokering and derisking agricultural development could generally be grouped as follows:

- more effective soil and water resource assessment, allocation and supply (including targeted land use planning);
- refinement of approval processes;
- the strategic planning and delivery of supporting infrastructure (particularly transport and telecommunications);
- targeted research and development;

- market development and support;
- investment in lifting Aboriginal capacity to undertake agricultural development;
- investment support (such as Northern Australian Infrastructure Facility); and
- the development of more trust between all stakeholder sectors, industry, government agencies and investment.

Of great relevance to the Douglas Daly were the key recommendations relating to each of the themes proposed. These particularly included the development of orderly pathways for the transition of pastoral leases to more secure forms of tenure and the targeted derisking of prioritised agricultural development areas. Many of these recommendations are now being pursued through the NT Agribusiness Development Strategy (DITT 2022). The Strategy provides a shared framework to deliver growth across multiple primary industry sectors. It was a key recommendation of the Territory Economic Reconstruction Commission (TERC) report in 2020.

6.2 Thematic analysis emerging from the interviews

Some eight targeted interviews were conducted, and these particularly focused on government-related institutions involved in the assessment of planning and development. While there was preliminary communication with key regional stakeholders in the community, industry and traditional owner sectors, the issues and concerns of all sectors are well articulated in the public domain.

Some of the key themes that emerged from the agency-based interviews regarding the strengths of the current system are listed below, with the number of times each issue was raised in brackets:

- the capacity of the natural asset to enable sustainable agricultural development (3);
- DCCEEW and the National Water Grid Authority (NWGA) now have a stronger local presence and linkages within the NT (2);
- reasonable, deliberative and consistent regulatory frameworks are in place (2);
- the region is highly accessible (1);
- there is easy access to politicians and decision-makers (1);
- there are increasingly strong community expectations to deal with climate change and cultural values (1);
- the high potential capacity of Aboriginal, industry and conservation delivery sectors, if well supported (1);
- the existence of a northern Australian policy that is supportive of sustainable agriculture (1);
- a legacy of enthusiastic and informed collaboration arising from DR MAC (1); and
- a great legacy of scientific knowledge (e.g. TRaCK) (1).

Some of the key themes that emerged from people's expressed views of the weaknesses of the current system include:

- the planning and development assessment system is complex and poorly integrated (7);
- insufficient science behind planning and development decisions (4);
- limited system workforce capacity, and particularly community engagement (3);
- tenure and regulatory complexity (3);
- poor access and communications infrastructure in the region (2);
- fears of the past failure of collective action (2);
- limited local government capacity within the Douglas Daly (2);
- development assessment timeframes might be too short (1);
- the limited number of public spokespeople for collective action (1);
- limited professional development capacity among planners (1);
- dysfunctional offset frameworks (1);
- development of the economy without plans, infrastructure and at-scale supply chains (1);
- lack of clear delivery systems for complex national and NT policies (1);
- traditional finance being hard to attract (1); and
- government capacity for Traditional Owner engagement (1).

Some of the key themes that emerged from people's expressed views of priorities for system improvement include:

- visionary and early approaches to collaborative decision making (6);
- capacity investments in Traditional Owner governance and support (5);
- ongoing programs of mapping, scientific works and model improvement (5);
- capacity investments in government planning and engagement (4);
- opportunities for place-based approaches to biodiversity and carbon offsets (3);
- whole of catchment water planning, bio-regional planning and strategic assessment (2);
- investment in industry and community capacity locally (2);
- greater attention to the social and economic benefits of development (2);
- positive place-based approaches that can influence legislative and policy reform (2);
- the need to demonstrate and recognise sustainable farming systems (2);

- strategic investment in road and communications infrastructure (1);
- third party facilitative support to help broker trade-offs (1);
- the need to map resource demand (1); and
- government standing firm on agreed policy frameworks (1).

6.3 Implications from the results

This section has brought together the results from the broad GSA and more detailed interviews exploring the health of the governance system for regional planning and decision-making in the Douglas Daly catchment. From this work, clear points are emerging regarding strengths and weaknesses within the system, as well as potential areas that might be ripe for practical reform.

Based on these results, the following section dives more deeply and synthesises the key governance system problems that, if addressed, would influence better decision-making and sustainable development outcomes within the catchment. It also unpacks discussion related to potential and practical system reforms to guide further efforts.

7 Discussion: A preliminary systems analysis

Through this GSA work, we have identified several higher level and significant regional planning and development assessment system problems that, if left lingering, will continue to result in the continued slow decline of environmental, cultural and economic values in the region.

Competing and fragmented visions for the Douglas Daly

The analysis above exposes a significant policy tension within the Douglas Daly catchment between:

- a strong industry desire to expand the levels of production and value contributed by agriculture within the catchment, taking full advantage of available water resources and cleared land (best represented through the NT Farmers Report 2020);
- conservation sector and traditional owner concerns about the maintenance of aquatic and estuarine ecosystem services, recreational fishing and cultural values within the catchment (best represented by Beaumont et al. 2020); and
- Traditional Owner aspirations for nation-building at appropriate cultural scales to achieve greater economic self-determination (as articulated in DITT 2021).

Perhaps underpinning all this, however, is a somewhat common aspiration across sectors, which is the need to improve economic livelihoods, services and infrastructure in the region.

These conflicting visions are often played out in national and Territory-scale arenas, but within the Douglas Daly, there are no firm mechanisms to mediate between these conflicting visions. It is not so much individual regulatory frameworks that prevent effective development, but instead a lack of agreed and well-articulated vision and associated strategies required to fulfil such visions.

No cohesive framework for regional planning and trade-off analysis

The above findings suggest that there is a significant need for more knowledge-based and engaged trade-off analysis over these key tensions between development, water availability, cultural values, vegetation management and estuarine and marine health.

Trade-off analysis thinking, however, has been previously attempted through the auspices of previous DRMAC arrangements in the Douglas Daly. Several interview participants deeply valued the opportunity for science-based, whole of community and inter-sectoral dialogue during the period that DRMAC was in operation. However, others lamented a lack of mechanisms to keep the member parties accountable to outcomes of the process. Others suggested the process may have been unsustainable, as it was instituted for a relatively narrow advisory purpose.

Overwhelmingly, however, most participants independently suggested the need for visionary and early approaches to reinvigorating collaborative decision-making for sustainable development in the catchment. This suggests there is a strong appetite for the establishment of a durable, well facilitated and evidence-based collaborative planning framework to both determine a shared vision and the key strategic interventions needed to secure this vision over time.

7.1 Poorly conceptualised ecosystem service offset and market frameworks

One of the key reasons the Douglas Daly region faces continuing biodiversity risks, productivity and social decline is that there is no clear framework for effective alignment of multiple government ecosystem service markets, as well as social and governance (ESG) efforts that could be directed towards targeted improvement of biodiversity, water quality and socio-cultural values within the region. This signals the need for significant reforms in the current regional NRM system locally. If well fostered for the long-term, the system could provide a strong framework for:

- planning (spatially) the long-term priorities and actions for protecting, maintaining or improving important environmental and cultural values;
- establishing long-term delivery frameworks regionally, through capable delivery institutions, including pastoral stations and emerging Traditional Owner ranger groups; and
- regional mechanisms for aggregating, guiding and delivering effectively on market options.

Unfortunately, there is evidence that, at the national scale, the original intended bilateral and community-based design of the regional NRM system began deteriorating at least a decade ago (see Dale et al. 2020b). The regional NRM system has generally been relegated to a role focused on providing a government-service delivery model. At the same time, the wider range of potential investment options that could service delivery into the region has expanded and will continue to grow. These options include some of the varied government programs, and regulated and voluntary ecosystem service markets, including:

- the Federal National Landcare Program;
- Federal Farm Stewardship Programs;
- NT Regional NRM investment Programs;
- the Federal Emission's Reduction Fund (ERF);
- regulated offsets under the EPBC;
- emerging global community and biodiversity-based standard-based offset markets;
- global and national philanthropic investment markets;
- emerging corporate ESG obligations (globally to locally); and
- the voluntary efforts of local landholders (recognising the economic value of biodiversity).

Three critical factors will contribute to have extremely limited alignment of these investment markets towards the long-term and capable delivery of landscape-scale management. These include:

- a lack of a clear, landscape-scale plan prioritising those parts of the landscape where long-term and cohesive management action is required. This includes the progression of the government service, market and offset-based investment mechanisms outlined above in ways that integrate the intent of multiple-species based recovery plans;
- the lack of integrated systems for the mobilisation and brokerage of both the supply and demand sides of these investment opportunities within the catchment;
- the lack of stable investment in capable landscape scale-management delivery mechanisms, either through Aboriginal ranger groups, capable landscape-scale restorative ecology delivery-teams, or empowered pastoral land managers; and
- capable regional scale condition and trend reporting of progress made with investment.

7.2 Capacity limitations across multiple sectors

Sector capacity issues were consistently raised as a weakness within the current regional planning and development assessment system. Particular attention was drawn specifically to Aboriginal institutions, local government capacities, industry and landholder capabilities, consultancy sector capacities, and even the decision-making capacities of regulatory agencies. Across the Douglas Daly, there is no cohesive approach to lifting these capacities. This means there is a major barrier for all sectors to engage meaningfully in new and innovative regional approaches to planning, improved development assessment, and ecosystem service markets.

In particular, with Traditional Owners in the region having well defined Aboriginal Land Rights Act Land Trusts, as well as relevant native title determinations and water allocations, the opportunity now exists for substantive social, economic and cultural revival within the region, including further agricultural development with associated water allocations. Despite strong aspirations for nation building, there are few cohesive mechanisms to support such approaches. This leaves Traditional Owners in a weaker position to manage the country, where they have firm rights to resources. It also diminishes their capacity to be engaged in the management of the wider landscape.

8 Next steps and conclusions

This project has explored priorities for more regionally-based approaches to improving the system of planning and development decision-making in the Douglas Daly catchment. We have paid collective attention to the Douglas Daly because it remains one of the most prospective regions for agricultural development, primarily due to the availability of water, relatively secure land tenures, and the high availability of cleared or plantation land for development. Despite this, the region also retains high biodiversity and cultural values. While development could happen with relatively low environmental and cultural impacts, if poorly managed, it could result in very poor environmental, cultural, social and economic outcomes for the region.

Key government-based Douglas Daly agencies were brought together to consider the emerging outcomes from this **Analysis Report** in early 2024 and to further explore potential pathways for sustainable development of the region. Some of the strategies emerging from this are outlined in our subsequent **Solutions Report.**

It is hoped that the steps considered above will enable a strong, long-term, and collaborative approach to resolving these problems through growing partnerships between the Commonwealth, the NT Government, and key actors interested in Douglas Daly.

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Appendix F

Strengthening regional planning and development assessment in the Douglas Daly - Solutions Report





Marine and Coastal

National Environmental Science Program

CRCNA

DEVELOPING NORTHERN AUSTRALIA



STRENGTHENING REGIONAL PLANNING AND DEVELOPMENT ASSESSMENT IN THE DOUGLAS DALY REGION OF THE NORTHERN TERRITORY

Solutions Report

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Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Cairns Institute or James Cook University, WABSI, the RRRC or the CRCNA. For disclosure purposes, the lead author Allan Dale is the Chair of the annual Developing Northern Australia Conference, recently appointed Chair of the RRRC, and Chief Scientist for the CRCNA.

Cover images

Front: Rice crop on Adelaide River. Credit Dr. Ian Biggs, CRCNA.

Back: Storm over cotton – Illawarra Road Douglas Daly. Credit Dr. Ian Biggs, CRCNA.

This report is available for download on the NESP Marine and Coastal Hub website:

www.nespmarinecoastal.edu.au

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Acknowledgement

We acknowledge the Traditional Owners of Country throughout Australia and recognise their continuing connection to land, waters and culture. We pay our respects to their Elders past and present.

Executive summary

Our research is seeking practical solutions to resolve deep societal tensions embedded in the highly contested nature of northern development. Without a healthy system of regional planning and development assessment and approval, northern Australia faces faltering economic development in rural, remote and Aboriginal communities. At the same time, it contributes to a failure to secure internationally and nationally significant biological and cultural values within the landscape.

Through NESP Project 3.1, we have been exploring these issues in three key regions in the north. These include Western Australia's Pilbara region, the Gilbert River District in Queensland, and the Douglas Daly region in the NT. All three regions experience conflicting issues ranging across diverse drivers for economic development, the need to conserve sensitive ecosystems, and the need to enable strong Aboriginal governance, culture and livelihood aspirations in the landscape.

In the Douglas Daly region of the Northern Territory (NT), tensions between all three of these legitimate aspirations are long standing and significant. Here, these tensions have long led to suggestions that a more regionalised, engaged and evidence-based approach might be needed to support planning, development assessment and nature positive investment decisions.

Our recent Analysis Report (Dale et al. 2024) explores and more deeply analyses weaknesses within the prevailing system of regional planning and development assessment within the Douglas Daly, as well as opportunities for improving the system within the catchment. Building on findings from this work, through this Solutions Report, we explore a series of recommended next steps focused on the design of potential, new and innovative solutions for strengthening the current governance system within the Douglas Daly. Consequently, this Solutions Report has been developed closely with the NT Department of Industry, Tourism and Trade (DITT), other key NT agencies, the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), the National Environmental Sciences Program (NESP) Marine and Coastal Hub and the Cooperative Research Centre for Developing Northern Australia (CRCNA).

Our key potential and suggested solutions revolve around the establishment of the necessary pre-conditions of success for new approaches to integrated regional planning and development assessment within the Douglas Daly region based on our previous governance systems analysis.

The key focus of these next steps include:

- building cross-governmental and regional consensus about appropriate models for development within the region;
- the need to ground truth the potential of these conceptual models as a foundation for evidence-based tradeoff analysis, and the integration of Commonwealth supported bio-regional planning and water allocation planning; and

- the need to build long-term local institutional capacity for the sustainable development of agriculture, tourism and land management businesses and their associated communities in the region. This could include attracting new and evolving ecosystem service markets and offset management through the landscape-scale delivery of conservation works.

This second of two reports unpacks these potential solutions in more detail, enabling DITT to work progressively with the region's key stakeholders to progress regional planning and development assessment changes that can deliver Ecologically Sustainable Development (ESD) in the long-term and a bright and prosperous future for the region's residents and supporters.

1 Background and context

As part of an ongoing process of policy and planning activities to derisk new development, the NT Government, in partnership with the CRCNA, has considered priority regional planning and development assessment issues facing key agricultural development areas. This particularly means places where development pressures significantly impact on and intersect with both the Commonwealth's *Environment Protection and Biodiversity Conservation (EPBC) Act* and the NT's environmental and water-related policies, legislation and regulations. It needs to do this whilst also considering new directions emerging from the review of the existing Commonwealth National Water Initiative (NWI).

As mentioned in our preceding **Analysis Report**, this NT-wide work has focused on areas of known development interest, agricultural development potential, and on places where it might be possible to minimise the potential risks to those diverse and important natural and cultural values that are also a feature of developments throughout the NT. Ultimately, such development will require the free, prior and informed consent of the region's traditional owners, who are increasingly and justifiably seeing themselves as leading or being equity partners in any such development.

This potential agricultural development opportunity and the social, cultural and Aboriginal values of the Douglas Daly region have also been covered in the previous **Analysis Report**. For the purposes of both our **Analysis** and **Solutions Reports**, we refer here specifically to the current governance and future potential of the Douglas Daly Agricultural Development Area (see Figure 1), but we recognise that this area sits within a wider catchment, bio-regional and cultural context.

The area consists of extensive existing cropping and pastoral development with a mix of land tenures, including freehold, pastoral leases and Aboriginal Land Trust areas, creating a complex social and biophysical environment. This tenure mix, land capability and water availability provide big opportunities to support further sustainable development for these diverse communities through appropriate regional planning and development approval processes. This would suggest that the region is worthy of the development and application of such approaches. The economic imperative for agricultural development and diversification is well articulated in the NT Agribusiness Strategy (DITT 2022). Importantly, however, the high biodiversity value of land and aquatic ecosystems in the NT often correlates with higher land productivity, creating the potential for conflict between agricultural opportunity and cultural and biodiversity values.

Over the last decade, however, despite the high level of policy and industry prioritisation of agricultural development in the NT, and a growing awareness of potential risks, little attention has been given to improving planning and trade off analysis to support improved development decision-making within the region. Our **Analysis Report** consequently has explored the current health of this system with the view of recommending potential new approaches that could help to ensure the achievement of genuine sustainable development outcomes in the region. Based on this analysis, the **Solutions Report** proposes recommendations to strengthen the regional planning and development assessment system affecting landscape-scale outcomes in the Douglas Daly catchment. This will provide a basis for future negotiations regarding further progression of such improvements in the catchment. Finally, this process should enable shared decision-making to prioritise future stages of research collaboration and support via the NT Government, NESP and the CRCNA beyond 2024.

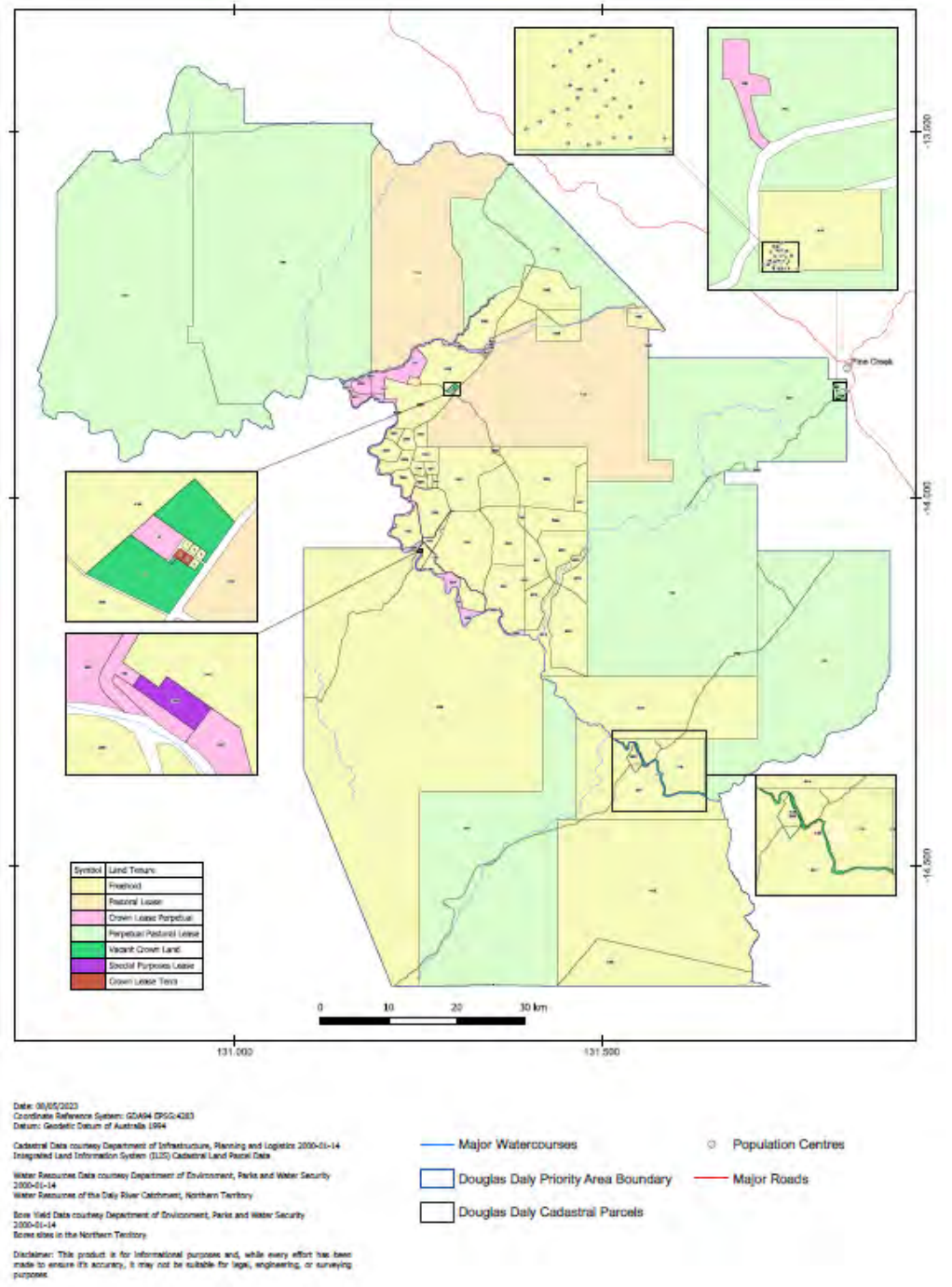


Figure 1: Map of the Douglas Daly Agricultural Development Area and associated tenures.

2 An analytical overview of the Douglas Daly System

Our Analysis Report outlined the main legislative and programmatic activities contributing to regional planning and development decision-making within the wider Douglas Daly region (see Table 1).

Table 1: The key legislative and programmatic governance activities influencing regional planning and development-related decision-making in the Douglas Daly region (based on NAJA 2020).

Instrument	Jurisdiction	Type	Purpose
Planning Act (1999) and Major Projects	NT	Land Use Planning and Development	Provides for appropriate and orderly planning and control of the use and development of land.
Water Act (1992)	NT	Water Planning and Allocation	Provides for the investigation, allocation, use, control, protection, management and administration of water resources.
Water Quality and the Waste Management and Pollution Control Act (1998)	NT/Common-wealth	Planning and Action to Maintain and Improve Water Quality	Supports regulation, programs and efforts aimed at maintaining and improving water quality in surface and groundwaters.
Environment Protection Act (2019)	NT	Environmental Decision Making	Under the Act, projects with significant environmental impacts need assessment by the NT Environmental Protection Authority (EPA).
Environment Protection and Biodiversity Conservation Act (1999)	Common-wealth	Biodiversity Protection	Provides for the protection of the environment and the conservation of biodiversity.
NT Heritage Act (2011) and NT Sacred Sites Act (1989)	NT	Cultural Heritage Protection	Under the Heritage Act, it is an offence to knowingly damage a heritage place, to remove something from such places or damage or remove a heritage object, unless one of the exemptions applies. Of most relevance, these exemptions include

			when the activity is carried out under a work approval issued, or heritage agreement under the Act.
Regional NRM System	NT/Common-wealth	Natural Resource Management	A bilateral (Commonwealth/Territory) system to manage natural resource management issues and funding at regional scales.
NT Agribusiness Development Strategy (2022)	NT	Agribusiness Development	A NT Government strategy to develop agribusiness across the NT to 2030.
Crown Lands Act (1992) and Pastoral Lands Act (1992)	NT	Crown Land Administration and Pastoral Land Management	Legislation and program efforts that provides for the administration of crown and pastoral lands.
Aboriginal Land Rights (NT) Act 1976	Common-wealth	Land Rights in the NT and Native Title Resolution and Management	Legislation and other systems that provides for the granting of Traditional Aboriginal Land and support for Aboriginal development in the NT for the benefit of Aboriginal people.

In relation to undertaking an over-arching NT-wide analysis of the regional planning and development assessment system of relevance to the Douglas Daly, NAJA (2020) specifically explored system constraints related to:

- complex land tenure arrangements;
- limited understanding of water availability and soil suitability;
- insecurity of water rights and water infrastructure;
- limits to transport and communications infrastructure;
- the need for the development of a functional regulatory environment; and
- the need to foster a supportive investment environment.

The NAJA report stressed that securing private sector investment in the development of the NT would still require serious Commonwealth and NT Government collaborative effort, and it generally grouped potential solutions as needing to involve:

- more effective soil and water resource assessment, allocation and supply;
- refinement of current approval processes;
- strategic land use planning and delivery of supporting infrastructure;
- targeted research and development;
- market development and support;
- investment in lifting traditional owner capacity to undertake agricultural development;
- investment support; and
- the development of more trust between all stakeholder sectors.

In addition to these findings, our **Analysis Report** (Dale et al. 2024) undertook eight targeted agency-focused interviews bolstered by additional but informal non-government sector discussions in late 2023 and early 2024 in industry, Aboriginal and community sectors. Some of the most consistent views about critical systemic strengths emerging from the formal interviews included that there is:

- capacity within the natural asset to enable sustainable agricultural development, with a reasonable level of accessibility to regional supply chains;
- a growing Commonwealth presence and interest in the region;
- the existence of reasonable, deliberative and consistent regulatory frameworks;
- limited local decision-making (e.g. via a Council), but high community expectations about the need to strengthen decision-making more locally;
- a high potential capacity in the traditional owner, industry and conservation delivery sectors;
- a legacy of enthusiastic and informed collaboration arising from previous Daly River Management Advisory Committee (DRMAC) arrangements; and
- a great legacy of scientific knowledge (e.g. TRaCK).

The key themes that emerged from people's expressed views about the weaknesses of the current system included that:

- the planning and development assessment is complex and poorly integrated;
- there is limited scientific data to underpin planning and development decisions;
- there is limited workforce capacity within key sectors involved in the system;
- there is considerable tenure and regulatory complexity;
- there is poor road access and communications infrastructure in the region;
- there are fears of the past failure of collective action approaches;

- there is limited local government capacity for decision-making within the Douglas Daly;
- there is a lack of an effective ecosystem service market or offset framework that can be applied to development in the region; and
- there are low levels of government capacity for community/traditional owner engagement.

The key raised themes that often emerged from people's expressed views of priorities for system improvement included the need for:

- visionary and early approaches to collaborative decision-making;
- capacity investments in traditional owner governance and support;
- ongoing programs of mapping, scientific works and model improvement;
- capacity investments in government planning and engagement;
- opportunities for place-based approaches to biodiversity and carbon offsets and markets;
- improved catchment-scale water plans, bio-regional planning and/or strategic assessment;
- investment in industry and community capacity locally;
- paying greater attention to the social and economic benefits of development;
- positive place-based approaches that can influence legislative and policy reform;
- the need to demonstrate and recognise sustainable farming systems;
- strategic investment in road and communications infrastructure;
- third party facilitative support to help broker trade-offs;
- the need to map resource demand; and
- government standing firm on agreed development policy frameworks.

This background section has summarised the results from the broad governance systems analysis and more detailed agency interviews exploring the health of the governance system for regional planning and decision-making in the Douglas Daly (Dale et al. 2024). From this work, clear points are emerging regarding strengths and weaknesses within the system, as well as potential areas that might be ripe for practical reform. Based on these results, this **Solutions Report** dives more deeply into, and synthesizes, the key governance system problems that, if addressed, would influence better decision-making and sustainable development outcomes within the catchment. It does this by unpacking discussions related to potential and practical system reforms to guide further efforts.

3 Methods and approach

A preliminary analysis of the complex governance system underpinning sustainable development outcomes in the Douglas Daly Agricultural Development Area was applied to focus attention on systemic reforms that could deliver better economic, social, cultural and environmental outcomes for the region. The details of the methods applied in this are outlined in Dale et al. (2024), but it basically involved a simplified application of the Governance Systems Analysis (GSA) approach developed by Dale et al. (2013). Dale et al. (2013) suggest that governance systems concern social, economic and environmental themes across our society at any scale, and that these themes cannot be viewed in isolation from one another. Sustainable development seeks to find the right trade-offs between these themes at local, regional, provincial and national scales. The GSA approach considers that failure to get the balance right can damage all three societal values. Under this GSA inspired approach, we identified the ten most significant regionally-oriented governance sub-domains or activities that influence sustainable development outcomes of relevance to the Douglas Daly Agricultural Development Area and more widely (see Table 1). The second methodological step involved an assessment of the governance health of each of those governance activities.

To enable additional depth to this literature analysis, we interviewed stakeholders from eight key agencies involved in regional planning and development decision-making relevant to the Douglas Daly Agricultural Development Area, and the wider bioregion and catchment. These interviews were backed up by more informal discussions with a wider range of stakeholders. Formal ethics approval was sought and received as part of the research process. Formal interviewees were asked:

- what do you think are the key features of the regional planning and development assessment system in the Douglas Daly region?;
- what role do you and your institution play in that system?;
- what aspects of regional planning and development assessment system in the Douglas Daly region are currently working well?;
- what parts of the system need improvement?; and
- what are your priority views about how the system can be strengthened?

The literature-based governance systems analysis and interview data was integrated, allowing effective identification of the key system wide governance problems, and facilitating early thinking about potential solutions, now developed more fully in this subsequent Solutions Report.

Through this GSA work, we have identified several higher level and significant regional planning and development assessment system problems that, if not addressed, will result in the continued slow decline of environmental, cultural, and economic values. These broadly included:

- competing and fragmented visions for the Douglas Daly;
- the lack of a cohesive framework for regional planning and trade-off analysis;
- poorly conceptualised ecosystem service offset and market frameworks;
- limited science and knowledge integration efforts; and
- capacity and capability limitations across multiple sectors.

To progress from problem identification to solutions, a workshop of key agencies was held in April 2024, alongside additional informal discussions with key catchment stakeholders. These processes have contributed to the identification and road-testing of the following solutions now proposed.

4 Potential systemic interventions

Based on the identified key weaknesses in the wider regional planning system affecting sustainable development outcomes in the Douglas Daly in our **Analysis Report**, the following is a preliminary potential set of longer-term pathways for improving the health of the regional governance system. It is hoped that these priorities can inform the development of a longer-term partnership arrangement between DITT, DCCEEW, NT Government agencies, Aboriginal, industry, conservation sector and community stakeholders and the CRCNA and NESP Hubs.

4.1 A cohesive investment in aboriginal nation building and country-based strategic planning

A foundational investment in empowering local Aboriginal groups is needed to support regional development. This requires a long-term stable Commonwealth/Territory investment in building local Aboriginal institutions and people's governance and planning capacity for self-determination in relation to development in the Douglas Daly. This is needed if Aboriginal people are to be effectively engaged in future development decisions, including regional planning and approval processes.

In the first instance, this means DITT working closely with the Northern Land Council to ensure that all relevant traditional owner groups associated with the Douglas Daly (and their appropriate institutions such as the Land Trusts), are each supported to:

- explore their interest in, and their preferred approach to building long-term collaborative governance regionally and at the traditional owner group level to lead, participate in, benefit from, and ensure the free, prior and informed consent for development;
- understand the planning and development context, the range of developments possible and emerging landscape-scale management opportunities. This needs to occur prior to supporting the development of a shared vision within and across traditional owner groups for the region;
- clearly define the roles and responsibilities of traditional owner representative institutions in planning and implementation of this vision;
- ensure the development of appropriate free, prior and informed consent protocols that need to operate within each traditional owner group's custodial area;
- progress to supporting the development of strong nation-based aspiration setting, and then working further towards consequent approaches to country-based planning; and
- the development of clear investment and implementation plans to support progress.

Within this context, the aspirations building process must ensure that there is a clear traditional owner understanding of existing water planning processes at play in the Douglas Daly, clear communication about the water rights available to traditional owners (under the current Aboriginal Water Reserve) and the associated eligible entities that can access that

water. Consequent strategic country-based planning processes must then be able to ensure that traditional owners are supported to understand the nature of those water rights and associated water development opportunities. In the context of the Douglas Daly region, these applications potentially include:

- the extractive use of those waters by traditional owners for agricultural development on available Land Trust lands. Such development might be entirely traditional owner-led development or explore joint venture partnerships with other agriculturalists;
- options for the potential leasing of existing water rights on a temporary or long-term basis to existing or new agriculturalists in other parts of the Douglas Daly; and
- the creation of ecosystem service market products that would enable traditional owners to contribute water back into the environmental and cultural values of the catchment.

Essentially, this sort of longer-term, stable and cross-governmental effort needs to be focused on supporting the Douglas Daly's traditional owners to build their preferred, well-governed nation building agenda, which can then be detailed in their own strategic and country-based plans. At this point in time, there are currently no cohesive, regionally-oriented support mechanisms for such efforts, despite the fact that they are essential to ensure that traditional owners are:

- well placed and enabled to engage in wider dialogue about conceptual models of development within the catchment;
- supported to maximise social and economic benefit from any water development;
- in control of any efforts focused on the assessment, protection and management of cultural values within the catchment;
- genuine partners in any emerging science efforts within the catchment; and
- gearing up to provide significant landscape-scale land and water management services.

4.2 Establishing an Integrated Agricultural Research and Development Hub

There is already an existing and significant agricultural economy in the Douglas Daly. At the very least, there is major opportunity to lift productivity, sustainability and social justice outcomes within the existing farming systems. This is before considering the fact that there is additional (uncontested) water available for consumptive use under the current water planning arrangements. As identified in our Analysis Report (Dale et al. 2024), the Douglas Daly region has been considered particularly worthy of new and innovative approaches to place-based agricultural development as:

- there is currently substantial allocated water available that is under-utilised, as well as potential for additional surface water allocations;

- there is substantial cleared land available for more intensive development (some 32,000 ha), including a potential shift from plantation forestry to higher value crops (potentially up to an additional 10,000 ha); and
- there is a higher proportion of freehold and other flexible tenures available within the region, including defined Aboriginal Land Trust lands available to traditional owners.

Consequently, one core objective for the future of the area needs to be getting improved economic, social and environmental outcomes from the existing resources. In effect, through the early efforts of an identified team within DITT that is focused on the development of agricultural precincts, there is already a foundationally solid institutional basis for progressing such an approach. Achieving this more successfully over a longer period of time, however, would rely on:

- supporting the emergence of an adaptive and strong growers collective of some form within the area, perhaps modelled on developments such as the Northern Australian Crop Research Alliance (NACRA) in the Kimberley's Ord River Irrigation district (NACRA n.d.);
- ensuring there is support for improved production and productivity across all key commodities (including value-adding opportunities), by at least including cattle production, fodder production, high value cropping, horticulture and forestry;
- developing more effective integrated farming systems that can be applied at property scale and exploring complementarities that might exist across these different farming systems;
- continued research into fine-tuning the profitability and sustainability of existing and new farming systems, including ensuring improved water quality outcomes;
- increasing water use efficiency and ensuring the greatest value possible can be achieved for every megalitre of water that has been allocated;
- planning out and progressing towards the delivery of the most critical forms of infrastructure (particularly transport and digital) and social services delivery into the area;
- exploring mechanisms to build healthy relationships between the farming sector, traditional owners and local and regional communities to ensure the development of stable workforces and enable the evolution of strong social communities within the area; and
- exploring how agricultural landholders might contribute to ecosystem service delivery; and
- locking in long term institutional relations and shared investment approaches to such a place-based approach to enhancing long-term agricultural development.

Consideration of the grower-led benefits of the NACRA approach in the East Kimberley's Ord River Irrigation Area (ORIA) would be beneficial in this case. Like the Douglas Daly, that

region has supported irrigated horticulture, grain, and other crops since the 1960s. NACRA's primary aim is to undertake research into suitable food and fibre crop species (both new and existing) to improve the region's competitiveness and to meet growing international and domestic demand. It is industry driven, outcomes-focused and has strong market influence due to the domestic and export activities of the partners. NACRA initially had a focus on the high trending functional food space, but has broadened its scope to include food and fibre crops of current and future interest (NACRA n.d.).

The success of such an approach could be easily measured and monitored through the collection of data focused on: (i) the value of production per megalitre of water available in the area; (ii) measures of economic and commodity diversity within the area; (iii) average incomes for people living within and adjacent to the agricultural development area; and (iv) the status and trend of water quality and riverine health within and at lower reaches within the catchment. Strong and long-term science partnerships could be developed to provide confidence in progress being made.

The DITT Team established to roll out agricultural precincts across the NT, through a strong partnership with the CRCNA, has already commenced the development of a research and development plan for the area, undertaking extensive engagement in devising the plan. Key early priorities have included improving extension approaches within the region, economic and supply chain analyses of various commodity options, plus this research and more place-based approaches.

4.3 Collective approaches to managing trade-offs between development potential and biodiversity risks

The Douglas Daly is one of the few places in the NT where collective approaches to planning to achieve an appropriate balance between development and the environment have been attempted. As mentioned in Dale et al. (2024), the NT Government established DRMAC in 2006 to develop options for the sustainable use and conservation of natural resources within the catchment. Notably, the goal of DRMAC was to promote the highest standards of management of land, water and other resources in the region ‘so that the important values people associate with the Daly River are protected’ (DRMAC 2009). The independently chaired DRMAC structure advised on the development of an adaptive management decision-making framework to allow balancing of the needs of catchment development and conservation, with a particular focus on vegetation clearing and water resource management. The membership of DRMAC included representatives from traditional landowners, production, tourism, recreation and conservation sectors and government (DRMAC 2009). The process was also strongly supported by a range of innovative and integrated science projects from the Tropical Rivers and Catchments Knowledge research consortium (TRaCK).

In our GSA of the Douglas Daly regional planning and development assessment system, several interview participants explained that they deeply valued the opportunity for science-based, whole of community and inter-sectoral dialogue during the period that DRMAC was in operation. However, others lamented a lack of well-considered mechanisms to keep the member parties accountable to agreed outcomes of the process. Others suggested the process may have been unsustainable in its basic design, as it was instituted for a relatively

narrow regulatory advisory purpose. One thing that is clear from the Dale et al. (2024) analysis, however, is that "visionary and early approaches to cross sector collaborative decision making" about the future of the region is the key to securing strong, environmental, social and economic outcomes for the region. This view was articulated by virtually all interview participants formally involved in the analysis. In short, participants were calling for a strong place-based collective impact approach to managing the complex trade-offs required.

Since the DRMAC time, there has been much development in the societal understanding of effective place-based approaches to collective planning and impact management. Indeed, there has been increasing acclaim for adopting place-based collective action approaches, and across the globe and nationally, there are numerous policies and pilot programs encouraging their adoption. For definitional purposes, we refer to place based initiatives as collaborative, long-term approaches to building thriving communities delivered in a defined geographic location (Queensland Government, n.d.). Collective place-based planning approaches are often characterised by partnering and shared design, shared stewardship, and shared accountability for outcomes and impacts. There is now a substantive global experience concerning the importance of such approaches, which at a minimum require:

- a trusted backbone institution with the capacity to mobilise collective agreement about the social, economic or environmental outcomes being sought at appropriate scales;
- collective analysis of, and agreement about, systemic governance system problems that need to be resolved to improve the regional and local outcomes being sought;
- the adoption of quick win actions to improve system health alongside more substantive, long-term strategic projects or activities required to radically improve outcomes; and
- ongoing adaptive monitoring and evaluation of the progress against outcomes being sought, as well as ongoing monitoring and evaluation of the health of the governance system contributing to those outcomes at scale.

Within Australia, and particularly within northern Australia, consideration of such initiatives, however, still remain housed in the margins of program design and Federal, State and Territory budgetary processes. They are not routinely applied in addressing complex policy and program delivery problems. This suggests that there is a systemic barrier to the routine allocation of resources to institutionalise place-based approaches at the appropriate scale. For such an approach to work in the development and implementation of a clear ESD model for the Douglas Daly, there would need to be a clear and committed backbone organisation or institution to help bring together the Federal and Territory governments, traditional owners, industry, the conservation sector, the community and the science community.

In particular, emerging, evidence-based partnerships will be critical to the development of effective and trusted frameworks for trade-off analysis and decision-making between development potential, cultural and biodiversity risks. Such frameworks might initially be better focused on reaching conceptual, but catchment-scale consensus, about preferable development models that help refine:

- aspirations and opportunities within the agricultural and traditional owner-based land-holding community for development, including irrigated agriculture;
- where real opportunities for development might be acceptable within the catchment (i.e. the where question);
- the most appropriate forms, or model of development (e.g. innovative off-stream storage versus large scale in-stream infrastructure development, or multi-functional farming models versus the development of traditional agricultural production system) that will minimise marine, aquatic and terrestrial impacts (i.e. the what question); and
- aligned infrastructure and service planning to ensure high value economic outcomes emerging from new development within the region (i.e. the how question).

These sorts of conceptual development thinking enable the negotiation of trade-off analysis activities that will eventually be needed to inform more detailed bio-regional and precinct planning. Within a collective impact framework, however, facilitated by a trusted backbone institution, clear consensus building about an agreed vision for the future of the region is needed. Only then can an agreement be negotiated about the most appropriate development model. From this point, priority actions can be agreed and progressively implemented to achieve (and to measure achievement of) the preferred model. This may indeed include the progression of key regulatory plan reviews related to regional land use planning, water allocation, bioregional planning and land-clearing guidelines.

While not particularly costly, there needs to be a strong bilateral and long-term commitment to such an approach, and political and departmental leadership at both levels of government needs to remain responsive to the negotiated outcomes secured by the independent backbone institution. There needs to be at least a ten year and adaptive commitment to the approach proposed.

4.4 Progression of a pilot bioregional planning approach

As a result of significant fragmentation in the governance system overseeing land use planning, development and conservation decision-making, major unresolved tensions exist between the opportunity to develop and the necessity for environmental conservation. In the Douglas Daly, this particularly plays out with respect to issues associated with tree clearing, activities that might increase the level of water extracted for productive use and anything that might reduce water quality within local and downstream parts of the Douglas Daly catchment. Not resolving these tensions will lead to long-term scenarios emerging that will likely include both economic stagnation within the local community and slowly declining natural and cultural values.

Nationally, these issues have been recognised through the Samuel's review of the Commonwealth's Environment Protection and Biodiversity Conservation Act. The Samuel review (2020) acknowledged that renewed approaches to regional and bioregional planning might provide greater development certainty for proponents, offering streamlined approval for multiple actions. It could also deliver improved ESD outcomes if developed in accordance with NT-based statutory plans. The review noted that any prospective regional planning efforts would require the integration of statutory roles and responsibilities of the Commonwealth with

state, territory and local government planning and development approval processes. An overarching objective of such regional/bioregional planning approaches would be to identify where development could, and should not occur, in addition to priority restoration and recovery areas, providing decision-making certainty. Samuel (2020) also stressed the need to enable community ownership and the need to ensure the adaptability of regional plans through the design, implementation, monitoring and evaluation phases.

Consequently, within this important region, and emerging out of any place-based approaches to the establishment of a clear model for development based on well negotiated trade-off analysis, it will be important for the Commonwealth to seek to build more purposeful and evidence-based partnerships with respect to the Douglas Daly, primarily involving the NT Government, industry and community sectors, traditional owners and researchers. Commonwealth involvement in such partnerships for regional/bioregional planning, however, would also need to be integrated across various DCCEEW programs (e.g. Natural Resource Programs, EPBC responsibilities and the National Water Grid Authority) and wider Commonwealth functions (see Dale et al. 2022).

Once a clear development model and appropriate trade-offs have been negotiated through a place-based regional planning approach, these partnerships would need to be given form and function through formalised plans (with consequent links to regional land use planning and water planning), ultimately resulting in the formalisation of some form of development precinct plan. Consistent with current proposed developments in the consequently proposed EPBC reforms, emerging bioregional planning could ensure clear delineation of core conservation areas, agricultural and infrastructure development areas, and restoration areas. They would also need to have formalized and well integrated links back into the NT planning system. A combined long-term planning approach to the design of ecosystem management actions across the conservation and restoration areas would need to be established through careful institutional design. This, however, cannot be planned without effective thinking about the most appropriate local offset frameworks, and longer-term approaches to coordination and delivery of market and other ecosystem service investments.

4.5 Trialing new approaches to ecosystem service market and offset framing

Implementation of effective bioregional planning and facilitating sustainable development decision-making within the Douglas Daly could still lead to cumulative impact and ecosystem decline if there is insufficient attention paid to the regional planning and delivery capacity needed. This is needed locally, within the catchment, to deliver long-term landscape-scale planning, investment attraction and coordinated on ground delivery. Some of these issues are broadly articulated in Dale (2014). This means, at the very least, the following preconditions of success need to be institutionalised well to meet the specific needs of the Douglas Daly catchment (or perhaps a wider catchment scale):

- a bilaterally agreed, long-term institutional capacity for catchment and conservation planning within the NT. Such an approach would need to be strongly linked to any bioregional planning approaches taken in the Douglas Daly. This type of long-term and adaptive planning would need to include the identification of:
  (i) spatially defined landscape values (biological and cultural) that need active

management; (ii) targets for the achievement of ecosystem health across these assets; (iii) a long-term and costed works program to secure these targets; and (iv) well-defined and stable delivery partnerships that can deliver these work plans locally over time. Existing institutional arrangements for both regional and localised aspects of natural resource management (NRM) (i.e. local Aboriginal Land and Sea Rangers, or the Territory NRM body) would seem to be the logical starting point for reviewing and strengthening these arrangements;

- core long-term and stable investments would also be needed to help build the foundation governing and delivery capacity of the region's Aboriginal institutions and traditional owners, pastoralists, farmers and specialist landscape restoration service providers;
- an agreed framework for designing appropriate offsets linked to the Environment, Social and Governance (ESG) responsibility of all enterprises operating in the region (particularly the larger corporates) or any new development activity. This involves the effective channelling of these offset arrangements into the long-term regional work programs. This effort needs to be complemented by bioregional-scale planning and negotiation for targeted attraction of global ecosystem service markets, private conservation sector investment interest, and wider corporate ESG and voluntary ecosystem service market efforts. Such work would also continue to need to be supplemented by the attraction of Commonwealth and NT Government investment programs focused on conservation and cultural outcomes;
- there is still relatively little land clearing in the Douglas Daly, but the wider pastoral estate continues to suffer impacts from long-term over-grazing in places and from feral and invasive species (e.g. weeds and pigs). As such, within the context of any bioregional planning undertaken, there is a need for focused innovation and design of refined offset frameworks for agreed land clearing. This could build on the previous work of DRMAC in relation to the development of innovative land clearing guidelines. This approach could provide both carbon and biodiversity offset benefits within the Douglas Daly. Conceptually, however, there is a need for a shift towards the negotiation of a clearing cap that sits within acceptable thresholds of loss, and longer-term offset investment in improved ecosystem health across the high conservation and restoration areas identified under any new bioregional plan in the Douglas Daly bioregion (e.g. versus like-for-like offsets). The recent development of a new NT Offsets Framework might assist with this approach;
- the development and delivery of a structured long-term on-ground works program targeting agreed bioregional priorities. To get engagement and long-term institutional capacity building, this at least needs to include: (i) purpose-built landscape delivery teams through institutions such as Aboriginal Ranger groups (with backup support from the Northern Land Council), Territory NRM or specific NT Government agencies; and (ii) agricultural industry service groups and dedicated local pastoralists and farmers focused on ecosystem service delivery (i.e. perhaps developed with NT Farmers and the NT Cattlemen's Association).

4.6 Building new knowledge in terrestrial, aquatic and marine condition and trend

Well-institutionalised and long-term science and knowledge management partnerships are also needed to synthesise, coordinate and inform any emerging evidence-based partnership frameworks and the more detailed planning and delivery mechanisms needed to achieve the outcomes intended above. These longer-term partnerships, which build stable knowledge management systems and research and development capacity focused on the region, will be essential in overcoming the significant gaps in foundational state and trend knowledge sets. As mentioned in our Analysis Report, some of these key state and trend knowledge gaps include:

- aquatic and marine ecosystems and their relationship to development pressures (e.g. including water quality, quality and aquatic ecosystem health);
- terrestrial biodiversity state and trend related to the importance to MNES and Territory-specific biodiversity values;
- cultural values within the landscape undertaken by traditional owner interests; and
- agricultural and minerals development potential and agricultural productivity.

These long-term science and knowledge partnerships are also needed to grow and mature the collective trade-off analysis, bioregional planning and long-term state and trend monitoring. This requires the establishment of a long term, placed-based knowledge building process that could mature towards the development of more sophisticated modelling, predictive and monitoring capacities, and the development of more engaged decision support tools to support trade-off analysis and condition and trend monitoring. Natural leadership for such a long term, place-based approach could emerge from Charles Darwin University's current integrated water security research developed in partnership with the CRCNA. There could also be linkages to CSIRO's emerging Australian Food Innovation Network. Indeed, this model of integrated science delivery might emerge across Northern Australia through the emerging Northern Australia Universities Alliance, and northern Australia wide discussions related to the future of the CRCNA beyond its current investment horizon.

Linked through these sorts of coordinated science and knowledge management arrangements, there might also be growth in the ability of the NT and the Douglas Daly region to explore the development of genuinely shared environmental knowledge systems that build on the Western Australian Biodiversity Sciences Institute's (WABSI's) Shared Environmental Analytical Facility (or SEAF) in the Pilbara region. Even a low-cost partnership approach to shared knowledge identification, storage, analysis and progressive update would be an important initiative here. Such an arrangement would have significant value to agricultural developers and conservation managers alike. There may also be potential to negotiate a pilot trial to such approaches with the Commonwealth's new Environmental Information Australia (EIA) arrangements based in Canberra.

5 Next steps and conclusions

This project has explored priorities for more regionally-based approaches to improving the system of planning and development decision-making in the Douglas Daly catchment. We have paid collective attention to the Douglas Daly because it remains one of the most prospective regions for agricultural development in the NT, primarily due to the availability of water, relatively secure land tenures, and the high availability of cleared or plantation land for development. Despite this, the region also retains high biodiversity and cultural values. While development could happen with relatively low environmental and cultural impacts, if poorly managed, development equally could result in very poor environmental, cultural, social and economic outcomes for the region. Equally, a continued focus on sticking with lower value outcomes arising from agriculture, on the other hand, will perpetuate the limited economic opportunities available for people in the Douglas Daly region.

It is considered that the next step forward involves DITT, CRCNA, WABSI and NESP (in collaboration with all key agencies and community and industry stakeholders) continuing to cooperate in progressing the further co-design, development and implementation of these potential solutions outlined above through one or several emerging investment opportunities. These include:

- working closely with the Office of Northern Australia (ONA) to explore the progression of this region as a priority for improved regional planning reforms linked to current regional planning reforms under the EPBC review and the refresh of the Developing Northern Australia Whitepaper Action Plan. This might involve directly pinning the approach developed within the priority work areas being established through revamped arrangements servicing the Northern Australian Ministerial Forum (NAMF); and/or
- progression of a cohesive proposal under the Commonwealth Government's current Innovation Precincts funding arrangements; and/or
- inclusion of a prioritised, but enhanced approach to improved regional planning under usual NT Government budgetary processes; and/or
- longer-term inclusion of investment in these potential solutions as innovation approaches to be developed under any future NESP or CRCNA-related programs.

Even at a modest level, the cost of such an approach could be as little as $1.5 million per annum for at least a five-year trial period. The benefit returned, however, would far outweigh this through improved agricultural production, enhanced social benefits and enhanced environmental management. It is anticipated that the steps considered above will enable a strong, long-term and collaborative approach to resolving these problems through growing partnerships between the Commonwealth, the NT Government and key stakeholders with an interest in the Douglas Daly.

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