# Regional Water Strategy

Far North Coast – Executive Summary



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# Acknowledging First Nations people

The NSW Government acknowledges First Nations people as its first Australian people and the traditional owners and custodians of the country's lands and water. First Nations people have lived in NSW for over 60,000 years and have formed significant spiritual, cultural, and economic connections with its lands and waters.

Today, they practice the oldest living culture on earth.

The NSW Government acknowledges the Bundjalung and Githabul people as having an intrinsic connection with the lands and waters of the Far North Coast Regional Water Strategy area. The landscape and its waters provide the First Nations people with essential links to their history and help them to maintain and practice their traditional culture and lifestyle.

We recognise the First Nations people/Traditional Owners as the first managers of Country. Incorporating their culture and knowledge into management of water in the region is a significant step towards closing the gap.

Under this regional water strategy, we seek to establish meaningful and collaborative relationships with First Nations people. We will seek to shift our focus to a Country-centred approach, respecting, recognising and empowering cultural and traditional Aboriginal knowledge in water management processes at a strategic level.

We show our respect for Elders past and present through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places where First Nations people are included socially, culturally and economically.

As we refine and implement the regional water strategy, we commit to helping support the health and wellbeing of waterways and Country by valuing, respecting and being guided by First Nations people/Traditional owners, who know that if we care for Country, it will care for us.

We acknowledge that further work is required under this regional water strategy to inform how we care for Country and ensure First Nations people/Traditional owners hold a strong voice in shaping the future for First Nations communities.

Artwork by Nikita Ridgeway.

Water is our most precious resource. Water supports the essential needs of Far North Coast communities and is vital for maintaining the region's aquatic environments and Aboriginal cultural heritage. It is central to the region's liveability and supports its industries and employment.

The NSW Government is committed to ensuring healthy, reliable and resilient water resources. We want the Far North Coast region to remain a place where people want to live, work and play, both now and in future generations. This means making the best use of existing water resources and preparing for future uncertainties, such as a more variable and changing climate, changing industries, and growing populations and water needs.

The Far North Coast region lies within the traditional lands of the Bundjalung and Githabul nations. The region is bounded by escarpments and ranges to the north, south and west, the ocean to the east, and the Queensland border to the north. Water plays a central role in the landscape, which features many interconnected rivers, creeks, groundwater aquifers, wetlands and estuaries.

Water is critical to the economic prosperity of the Far North Coast region, its social fabric and liveability, and the health of the environment. Water is also intrinsic to the region's Aboriginal cultural heritage, and the many waterways and aquatic habitats have deep spiritual significance for the region's First Nations peoples.

As well as meeting the daily needs of households and towns, water is important for many industry sectors. This includes agriculture and food production, which is a significant driver of regional economic prosperity and local employment.

Like all regions across Australia, the Far North Coast faces a more variable and changing climate. As the population grows, water demands for human consumption, agriculture and industrial use will increase. This can drive land and water resource development, disrupt natural water cycles and put ecosystems under greater stress. At the same time, a changing climate could increase the likelihood of water becoming less available, less reliable and reducing in quality. Flooding is a major concern in the Far North Coast region. Early in 2022, parts of the region experienced the largest and most devastating flooding on record. During community consultation, we heard that the community in the region considers flooding a critical and persistent risk. Climate change is expected to worsen this risk.

The Far North Coast Regional Water Strategy aims to present a comprehensive and balanced package of actions that delivers on its objectives and aligns with the priority actions of the NSW Water Strategy.<sup>1</sup> It recognises that water is essential for all stakeholders, including First Nations people, the environment, primary producers and regional communities.

Getting the balance right means recognising limits and trade-offs, and understanding the stresses on the region's water resources and natural environment. We may have to make some difficult choices. But there are also opportunities to improve water access and governance for Aboriginal people, improve the resilience of water supplies, restore river, wetland and floodplain habitats, and to develop alternative water supplies. These improvements can positively benefit all water users.

The Far North Coast Regional Water Strategy will help set the region up so it is prepared for a changing climate and support it to be an attractive place to live, work and visit.

<sup>1.</sup> Department of Planning, Industry and Environment 2021, NSW Water Strategy, dpie.nsw.gov.au/water/plans-and-programs/nsw-waterstrategy/the-strategy

#### Figure 1. Map of the Far North Coast region



## Purpose of the Far North Coast Regional Water Strategy

Pressure on valuable water resources is increasing and the climate is changing. We need to prepare our regions for the future now. Regional water strategies do this by bringing together the best and latest climate evidence with a wide range of tools and solutions to plan and manage the water needs of regional NSW over the next 20 years.

The Far North Coast Regional Water Strategy identifies the critical challenges we need to tackle over the coming decades.

It also lays out the strategic priorities and actions that will set us up to respond to these challenges. The actions that make up the regional water strategy provide a foundation for building resilience in the region's water systems. Meaningful engagement and a collaborative approach to planning and decisionmaking will be key to achieving sustainable and equitable outcomes over the strategy's 20-year horizon and beyond.



Image courtesy of Destination NSW. Murwillumbah district, Northern Rivers.

## What the future climate could look like in the Far North Coast region

The future climate is uncertain. There could be more extreme wet and dry periods than what has been seen in the past. Our analysis of different climate scenarios tells us that droughts could become hotter and longer. There could be higher evaporation rates and more unpredictable rainfall and river flows. We need to plan for this uncertainty and fully understand the future risks we face.

#### Figure 2. What the future climate could look like in the Far North Coast region



## Key regional challenges – what we will focus on first

The Far North Coast Regional Water Strategy identifies 7 key challenges that are the initial focus for the region:

- Declining catchment and river health
- Competition for low flows
- Saltwater intrusion into freshwater sources
- Aboriginal people's rights and access to water
- Water security for industries in the Far North Coast
- Water security for towns and communities in the Far North Coast
- Flood risks to individuals, businesses and communities.



Image courtesy of Destination NSW. Tweed River, Murwillumbah.



# Declining catchment and river health

The decline in catchment and river health threatens aquatic and riparian ecosystems, as well as downstream estuarine health. This decline negatively affects Aboriginal peoples' connection to Country and cultural sites associated with waterways. Communities and towns have an increased need to treat poor quality water for consumption, and there are reduced opportunities for water-based recreation. Industries are also directly impacted by poor water quality, particularly those operating in estuaries, such as aquaculture. Other sectors, such as tourism, are indirectly impacted through loss of amenity.

Clearing forests and native vegetation in the region has allowed water to flow through the landscape much more quickly. Some agricultural practices have reduced carbon in soil which affects its capacity to take in water. Other land management practices, such as providing stock access to riverbanks and creeks, causes erosion and decreases bank stability.

The condition of riparian vegetation is generally low across the region, except in protected or forested areas. This is often due to weed infestations and vegetation clearing, which leads to large areas devoid of native vegetation or with poor vegetation diversity.

Many of the region's rivers, creeks and estuaries are suffering from poor water quality, particularly due to increased sediment and nutrient loads. In some locations, smothering by fine sediments has led to low numbers and diversity of fish, shellfish and crustaceans. These aquatic species have also been affected by instream structures that modify flow and drainage, and prevent native fish migration.

Freshwater inflows are critical to the health and function of the region's estuaries. Our new climate data and hydrologic modelling show that the annual volume of freshwater flows in the Far North Coast region catchments may decrease by about 4–24% under a dry climate scenario, and that all parts of the flow regime may be affected.

The Far North Coast Regional Water Strategy will address river health, hydrologic connectivity and water quality by improving catchment and riparian management, and restoring river hydrology.



On average, there is enough water across the Far North Coast region to meet urban and rural water demands each year. However, competition for low flows during the drier spring months places many of the region's rivers and creeks under increased hydrologic stress. Low flows maintain connectivity between river pools, provide riffle flow and aeration, and deliver freshwater to sensitive estuaries and intermittently closed and open lakes and lagoons. These river functions are critical for river and ecosystem health and to support water-dependent industries. Climate change is likely to increase pressure on low flows in the future because it will reduce flows while increasing water demands for irrigation.

Competition for water negatively affects the reliability of water for irrigated agriculture. Unreliable water supplies can seriously threaten the long-term viability of existing industries and can discourage future investment in emerging industries.

Competition for low flows also affects groundwater systems. Many of the region's alluvial and coastal sand groundwater systems are highly connected to surface water flows. This means that reductions in surface flows can reduce recharge rates. This impacts both the health of groundwater-dependent ecosystems and consumptive users of groundwater.

A lack of stream gauging has made it difficult to effectively implement cease-to-pump rules. Sand-dominated coastal streams are not suited to conventional stream gauges and identifying reliable long-term gauging sites is difficult. Additionally, very few pumps for surface water or groundwater in the region are metered. This makes it difficult to ensure water is extracted legally and shared equitably during low-flow periods.

The Far North Coast Regional Water Strategy will help to reduce stress on the region's waterways and improve water access for landholders and industry by addressing competition for water in low-flow periods.



# Saltwater intrusion into freshwater sources

Global sea levels are rising, mostly from increasing greenhouse gas concentrations in the atmosphere and associated glacial and ice sheet melt. Between 1966 and 2009, sea levels around the coastline of Australia rose at an average rate of 1.6 mm/year which equates to about 7 cm over the past 50 years.<sup>2</sup> Although this rise seems small, it is already causing saline water to move upstream and into some of the region's groundwater sources.

Increased water salinity may negatively affect:

- coastal wetlands, and freshwater and estuarine habitats such as mangroves that are critical for fauna breeding and recruitment
- town water security and water users who currently access and rely on freshwater close to, or within, current tidal limits
- Aboriginal communities' abilities to practice culture and protect important cultural sites and assets.

The magnitude of sea level rise and its impacts will vary by location due to geological factors, ocean currents and localised thermal expansion or contraction of oceans. The extent to which the sea level rises will also depend on how much greenhouse gas emissions are reduced in the coming years. The average projection for sea level rise along coastal NSW is between 0.30 m and 0.45 m by 2070. For the Far North Coast region, the average projection is between 0.24 m and 0.58 m by 2070.

Larger sea level rises are possible beyond these scenarios. The Intergovernmental Panel on Climate Change states that sea level rise will continue for centuries to millennia due to continuing deep ocean warming and ice sheet melt. It projects that the global mean sea level rise by 2100 could be up to nearly 2 m (for a very high greenhouse gas emissions scenario). Storm surges may also contribute to higher sea levels during the more frequent and intense low-pressure systems caused by climate change.

The severity of impacts from sea level rise, saltwater intrusion and altered catchment hydrology is likely to worsen as growing populations and industries increase the demand for freshwater in coastal areas.

Saltwater intrusion in freshwater and estuarine systems poses significant risks to water users in lowlying areas across the region because it increases salinity levels. A large portion of water entitlement in the region is extracted below the tidal limit. Saltwater intrusion into groundwater is caused by sea level rise and over-extraction of groundwater and freshwater. Areas where groundwater and surface water systems are highly connected are particularly vulnerable.

We need to form a clearer regional picture of the combined effects of changes to catchment hydrology and sea level rise. This will help us develop appropriate local management responses.

The Far North Coast Regional Water Strategy aims to improve our understanding of, and ability to respond to, the threat on freshwater coastal waterways and aquifers from sea level rise, groundwater extraction and changes in catchment hydrology.

<sup>2.</sup> Siebentritt, M. 2016, Understanding sea-level rise and climate change, and associated impacts on the coastal zone: Coast Adapt Information Manual 2, National Climate Change Adaptation Research Facility, coastadapt.com.au/information-manuals



The people of the Bundjalung and Githabul nations have been the custodians of the lands and waterways in the Far North Coast region for tens of thousands of years. Water is deeply entwined with Aboriginal culture. Healthy waterways are essential to the culture and wellbeing of Aboriginal communities across the Far North Coast region, providing food, kinship, connection, recreation, stories, songlines and healing.

The historical dispossession of land and the effect of colonial-era settler laws continue to affect the ability of Aboriginal people in the Far North Coast region to access water and to care for Country. Fences and locked gates on public land such as Crown land and state conservation areas prevent Aboriginal people from accessing Country, carrying out cultural practices and using traditional cultural knowledge to care for and manage waterways.

Access to Country and waterways and the important sites they hold is critical to providing a purpose and pathway for young people to connect to culture. These sites provide spaces for healing, as well as for food, medicine and teaching. Current water legislation and water management processes do not adequately bring the Far North Coast region's Aboriginal people into decision-making; nor do they fully reflect Aboriginal perspectives, approaches and values. Aboriginal people in the Far North Coast region want a 'seat at the table' when it comes to decision-making, at both the state and local levels.

Investing in the time and resources needed to bring Aboriginal people into decision-making processes will help build respect and trust between all parties. It will also help identify the different needs, challenges and interests of each Aboriginal community.

The Far North Coast Regional Water Strategy provides an opportunity to improve Aboriginal people's access to water and their ability to care for Country by addressing government water management processes and the ongoing effects of colonisation.



Image courtesy of Destination NSW. Tweed Eco Cruises, Tweed Heads.



#### Water security for industries in the Far North Coast

Water-dependent industries are facing an uncertain future in the region due to climate variability and climate change. New modelling shows that the reliability of existing water access licences is likely to be less than originally thought and may reduce in the future. Saltwater intrusion also threatens existing supplies of high-quality water in low-lying areas close to the coast and in coastal groundwater systems.

Existing and prospective Far North Coast region businesses find it hard to gain access to additional water to mitigate these risks or to support new or expanding industries.

The 2017–20 drought highlighted the need to shift from a reactive to a proactive management approach to weather extremes. The drought showed that the crops currently grown in the Far North Coast region are vulnerable to extended dry periods, particularly the more recently grown horticultural crops.

Our modelling shows that dry periods are likely to increase in frequency and intensity, and traditional surface water sources may be less reliable than previously thought. Currently, there are few alternative water sources available in the region that are readily accessible and able to mitigate the water security risks of drought.

For water sources where no additional licences can be allocated, additional water can be accessed through permanent or temporary trade of existing water access licences, in line with water sharing rules. The rules aim to maximise flexibility for water users without negatively affecting the environment or the reliability of other water access licences. Although trade is allowed and annual water use in most areas is generally well below the long-term average annual extraction limits, very little trade occurs in the region's catchments. Water users have noted many barriers to trade, including lack of meters, restrictive trade rules and limited market information.

Water sharing plan rules also allow for low-flow to high-flow conversions in many Far North Coast region water sources. However, licence-holders in the region have not taken up conversions to high-flow access.

Water prices across the region for both regulated and unregulated sources are some of the highest in NSW. This can make it difficult for producers to afford water when they need it. At Toonmumbar Dam in the upper reaches of the Richmond River catchment, the cost of water increases with decreasing water use because it becomes more difficult for WaterNSW to recover the costs of operating the dam. As a result, WaterNSW operates the dam at a loss, despite water charges being high compared to other large regulated systems in NSW.

The Far North Coast Regional Water Strategy will help grow the viability of regional industries by improving the certainty of access to secure water supplies.



Image courtesy of iStock. Sugar cane fields, Murwillumbah.

#### Water security for towns and communities in the Far North Coast

Population growth is putting pressure on town water supply systems in the Far North Coast region. The risks to these systems could increase with the increasing frequency and severity of dry periods likely to occur in the future.

Our new long-term climate data shows risks of extended droughts are greater than previously thought. Climate change is likely to lead to future reductions in winter rainfall and higher temperatures. This may result in a reduction in overall water availability and an increase in evaporation from storages.

Town water supplies in the Far North Coast currently come mostly from surface water sources. Ensuring resilient water supplies requires a diverse set of water sources. However, diversifying to other water sources, such as purified recycled water for drinking, can be difficult. Public perception of purified recycled water and the regulatory frameworks governing reuse schemes can make it difficult for local councils to pursue reuse as a feasible augmentation option.

Regional solutions for improving access to water for towns are difficult to plan and implement. There are several regional solutions that are beyond the capacities of individual councils to implement, but that could be considered in their planning processes. The inability to consider these options can lead to inefficient investment decisions, higher capital and operational costs, and less resilient systems. Examples of regionalscale augmentations that can benefit multiple local councils include regional desalination, network interconnections and infrastructure sharing.

The Far North Coast Regional Water Strategy aims to improve the resilience of town water supplies by planning for the uncertainties of population growth and projected climate change.

# Flood risks to individuals, businesses and communities

Flooding is a vital, natural process that supports the region's diverse ecosystems. Floods provide significant groundwater recharge events and connections between rivers and their wetlands and floodplains, such as the Tuckean Swamp, Ballina Nature Reserve and Big Scrub in the lower Richmond River. Floodplains and their ecosystems are integral to Aboriginal culture and traditions. Floods are also responsible for the productive soils valued by landholders on the Far North Coast region's floodplains. Flooding is a key driver of estuarine productivity – it transports carbon and nutrients into the estuary, and provides breeding cues for species such as prawns. This can bring significant economic benefit to local communities.

However, development on the floodplain has meant that floods can have significant impacts on people and businesses, damaging infrastructure, creating safety risks and causing financial and economic loss.

Achieving integrated flood risk management in multijurisdictional catchments can be challenging. Local councils are generally responsible for managing floods within their boundaries. However, the Richmond River catchment contains 5 local government areas. This means that development or geomorphic changes in one local government area can influence flood behaviour in downstream local government areas. This can make it more challenging to implement an integrated and consistent approach with clear roles and responsibilities.

Flooding is a major concern in the Far North Coast region. Early in 2022, parts of the region experienced the largest and most devastating flooding on record. During community consultation we heard that the community in the region considers flooding a critical and persistent risk. Climate change is expected to worsen this risk.

The Far North Coast Regional Water Strategy aims to support local councils to improve their understanding and management of flood behaviour and flood risks.

#### A plan to improve water outcomes for the Far North Coast

We need to prepare now for a future where water sources and services may come under greater stress. We need to take action to improve the health, reliability and resilience of our water sources so that they can service all stakeholders and their interests.

The vision for the Far North Coast is to support the delivery of healthy, reliable and resilient water resources for a liveable and prosperous region. To achieve this, we need to position the region so there is the right amount of water of the right quality delivered in the right way for people, Aboriginal communities, towns, industries and the environment. Although the needs of these interest groups can compete, the strategy uses a mix of objectives and solutions to maximise the benefits to the whole region.

There is no single solution that can address the challenges ahead. This strategy sets out 25 actions to meet the 7 key challenges of the region. It will also ensure the Far North Coast region can meet future challenges. The actions aim to:

- take a holistic approach to land and water management
- · improve our understanding of the region's water resources
- ensure water resource development and use is sustainable and equitable
- prepare for future climatic extremes.

Collectively, the actions will ensure the Far North Coast region is well-placed to adapt to a more variable climate.

The actions in the Far North Coast Regional Water Strategy were developed using a number of robust economic, hydrologic, and environmental assessments.<sup>3</sup> Getting the balance of actions right means understanding the stresses on the region's water resources and natural environment, and recognising the limits and trade-offs. While we may have to make some difficult choices, there are also opportunities for the region including:

- improving water governance
- delivering opportunities for Aboriginal people to be involved in water decision-making
- improving data collection, monitoring and information
- restoring riparian and estuarine habitats
- developing more resilient water supplies.



Image courtesy of iStock. Killen Falls, Tintenbar.

3. More information is available at: www.dpie.nsw.gov.au/water/plans-and-programs/regional-water-strategies/final/far-north-coast-regional-water-strategy

# Figure 3. Far North Coast Regional Water Strategy: overview of strategy vision, objectives, water security challenges and priorities



#### Figure 4. Summary of Far North Coast Regional Water Strategy actions



#### Figure 5. Priorities and actions identified to address the key regional challenges



Support landholder adoption of best practice

land management

Priority	Actions	Challenges addressed	
Priority 2:	Improve our understanding and management of the region's water resources		
Improve our understanding of the region's water resources	<b>Action 2.1:</b> Assess the vulnerability of surface water supplies to sea level rise and saltwater intrusion		
	<b>Action 2.2:</b> Identify environmental water needs to support healthy coastal waterways		
	<b>Action 2.3:</b> Characterise and plan for climate change and land use impacts on coastal groundwater sources		
	<b>Action 2.4:</b> Protect ecosystems that depend on coastal groundwater		
	Action 2.5: Improve monitoring of water extraction		
Priority 3:	Reduce the impact of water infrastructure on ecosystem health		
Ensure water resource development and use is sustainable and equitable	Action 3.1: Improve fish passage	(1)	
	Action 3.2: Implement fish-friendly water extraction		
	Action 3.3: Address cold water pollution	¢	
	Better manage competing demands for water		
	Action 3.4: Establish sustainable extraction limits for surface water and groundwater sources		
	Action 3.5: Reduce the take of low flows		
	Action 3.6: Address catchment-based impacts of increased harvestable rights limits		
	Action 3.7: Support Aboriginal business opportunities		

Priority	Actions	Challenges addressed
Priority 4:	Support local councils and water users to manage risks	3
Prepare for future climatic extremes	Action 4.1: Provide better information about water availability and climate risks	
	Action 4.2: Support local councils to provide a secure and affordable water supply for towns	
	Action 4.3: Support regional-scale, adaptive decision-making for town water supplies in the Far North Coast	
	Action 4.4: Support councils to improve flood risk management in the Far North Coast	
	Optimise use of existing water supplies	
	Action 4.5: Enhance coastal water markets	
	Action 4.6: Investigate increased on-farm water storage	
	Action 4.7: Investigate managed aquifer recharge in the Far North Coast region	
	Investigate alternative water supplies	
	Action 4.8: Develop a recycled water plan for the Far North Coast	

### Implementing the strategy

The strategy has a separate implementation plan that prioritises the delivery of actions over the life of the strategy. The implementation plan also outlines responsibilities and timeframes for delivery, so that we can monitor the progress of the actions, assess the effectiveness of the strategy and identify areas where we need to adapt.

Not all actions will be commenced at once, and funding will be a key consideration in planning when and how the actions will be implemented. The regional water strategies will be a key tool in seeking funding as future opportunities arise.

The implementation plan sets out priorities over the next 3 years. It also identifies the key partners who will be involved in implementing the strategy:

• NSW Government agencies will lead the implementation of actions that develop and review policies and regulatory arrangements, involve research, or deliver regional programs. They will also take action where there is a market failure or other need for government intervention.

- Local councils will be involved in actions that influence town water supply at the local level and actions directly related to local-level strategic planning.
- State-owned corporations such as WaterNSW will be involved in actions that require changes to the design, operation and management of major infrastructure, or the way water is delivered in regulated rivers.
- Community and industry groups and research organisations will be engaged in implementation. They may also partner with different levels of government to progress or deliver certain actions.

Each year, we will report on our progress in implementing the strategy actions. This will provide transparency to the community, and allow us to show what we have achieved and what we will deliver in the future.

The implementation plan is available at www.dpie.nsw. gov.au/water/plans-and-programs/regional-waterstrategies/final/far-north-coast-regional-water-strategy



Image courtesy of iStock. Lismore, NSW.

Image courtesy of Destination NSW. Richmond River, Casino,

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