# Bremer River Catchment Action Plan 2018-2021

May 2018

## Resilient Rivers Initiative


City of
Ipswich
SCENIC RIM
Regional Council

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# Executive summary

The Resilient Rivers Initiative vision is "By 2045, the catchments of South East Queensland (SEQ) will support a resilient, productive, liveable and growing region." The development of the Bremer River Catchment Action Plan has been identified as a priority as part of the Resilient Rivers Regional Strategy (2015-2025) to achieve this vision.

The primary focus of the Bremer River Catchment Action Plan (CAP) is to address the very high risk of flooding, erosion, sediment and pollutant movement through the catchment and its impact on downstream creeks, the Brisbane River and Moreton Bay.

The catchment is approximately 2032 km$^2$ and flows through Scenic Rim Regional Council and Ipswich City Council areas. It contains regionally important assets including water supply infrastructure, high value agricultural and horticultural lands, Ipswich Central Business District (CBD), RAAF Base Amberley and high value recreation spaces and bushlands. It will also undergo significant change due to large areas of urban development in the lower catchment including the Ripley Valley Priority Development Area, Ebenezer and Citiswich industrial areas.

Water connects all of these assets as it flows through the catchment as surface run-off, groundwater and river flows supporting aquatic ecosystems, drinking water and irrigation requirements.

Currently the Bremer River is the worst performing catchment in SEQ according to the 2017 Healthy Land and Water report card and requires strategic, coordinated investment across multiple stakeholder groups to improve its condition.

The Bremer River CAP has been developed by the Project Team with input from stakeholders through a series of meetings and workshops. The CAP has been endorsed by the relevant councils and presents a prioritised list of actions which will help to deliver the goals of the Resilient Rivers Initiative. Table 1 outlines the recommended actions to be undertaken between 2018-2021.

**Table 1:** Bremer River Catchment Action Plan (CAP) 2018-2021 priority actions.

| On-Ground Actions | Measures of Success |
|---|---|
| Deliver at least six co-ordinated rural partnership projects to improve waterway health in priority locations (see Table 3 and Figure 3). | Minimum of eleven on-ground works completed |
| Improve erosion and sediment control compliance in new developments with increased on-ground auditing of sites. | |
| Implement collaborative weed control and revegetation in priority locations (see Table 3 and Figure 3). | |
| Deliver at least two bed and bank stabilisation projects in priority locations (see Table 3 and Figure 3). | |
| Revegetate and re-engage at least three priority floodplain/wetlands and riparian locations in the upper catchment reaches to provide multiple benefits in priority locations (see Table 3 and Figure 3). | |
| Restore fish habitat and remove barriers to fish passage in three priority locations (see Table 3 and Figure 3). | |
| Develop a Bremer River education and engagement program to build understanding of its history, values and flood resilience. | |
| **Research, Planning and Policy Actions** | **Measures of Success** |
| Formalise a rural partnerships network with the potential creation of a new central coordinator role to assist in the coordinated delivery of on-ground works. | To be determined as part of reporting framework |
| Improve the current understanding of sediment and nutrient sources and transport across the Bremer Catchment. | |
| Refine and apply regional water quality models to help prioritise waterway works and measure potential benefits. | |
| Co-ordinate floodplain management strategies and Southern Freight Rail planning to investigate the potential for catchment works to improve flood resilience of RAAF Base Amberley, Ipswich CBD and other areas containing critical infrastructure and understand broader regional flood response. | |
| Investigate the impact of altered hydrology from new urban areas on bank stability, geomorphology and flooding and identify required development outcomes to address this. | |
| Determine the value/services provided by floodplains and wetlands in terms of flood mitigation, nutrient cycling, urban cooling, habitat, recreation to provide a business case for the preservation of corridors. | |
| Develop precinct or corridor scale plans to inform stormwater, flood and waterway management projects. | |
| Identify flow requirements to improve Bremer Estuary water quality and compare this to current Moreton Plan water allocations and water usage. | |
| Co-ordinate planning of road upgrades near the RAAF Base Amberley to ensure works extend to local access roads to address flooding, traffic and fauna connectivity. | |

# About this action plan

## Scope and purpose

The Bremer River Catchment Action Plan (CAP) 2018-2021 has been prepared as part of the Resilient Rivers Initiative which has the following vision:

**"By 2045, the catchments of South East Queensland will support a resilient, productive, liveable and growing region."**

This vision is documented in the Resilient Rivers Regional Strategy (2015-2025) which also has the following supporting goals:

- Keep soil on our land and out of our waterways to support agricultural productivity and improve water quality.
- Help protect our region's water security so it can support the current and future population of SEQ.
- Improve the climate resilience of our region.
- Promote partnerships with strong leadership to deliver a coordinated approach to catchment management in SEQ.

The purpose of the Bremer River CAP is to:

- Succinctly present the issues and opportunities across the Bremer River Catchment based on the best of our knowledge and understanding and reflecting the values of the community.
- Identify catchment-wide actions to mitigate risks within the context of the Resilient Rivers Initiative to achieve the vision and supporting four goals.
- Provide a single strategic framework and rationale for coordinated investment by stakeholders based on agreed prioritised actions.
- Align with and inform other plans including the Ipswich City Council Waterway Health Strategy (currently being updated), the Brisbane River Strategic Floodplain Management Strategy (2018) and the Bremer River Floodplain Management Strategy (under development) (see 'Relationship with other Plans' and Figure 2 for more details).


**Figure 1:** Bremer River Catchment location

## Intended use

The Bremer River CAP has been developed as a succinct, high level document for use by:

- Resilient Rivers Taskforce – presents rationale for investment in the Bremer Catchment and priority actions.
- Project stakeholders – provides direction and basis for detailed project planning and further conversations between stakeholders.

## Relationship with other Plans

A vast amount of work has been, and is currently being, undertaken across the Bremer River Catchment. The Bremer River CAP builds on this work to present actions which require collaborative implementation and investment to achieve the Resilient Rivers Initiative Vision and goals. Figure 2 presents the relationship between the Bremer River CAP and these other plans and strategies. A summary of the key documents used in the development of the plan is provided in Attachment 1.

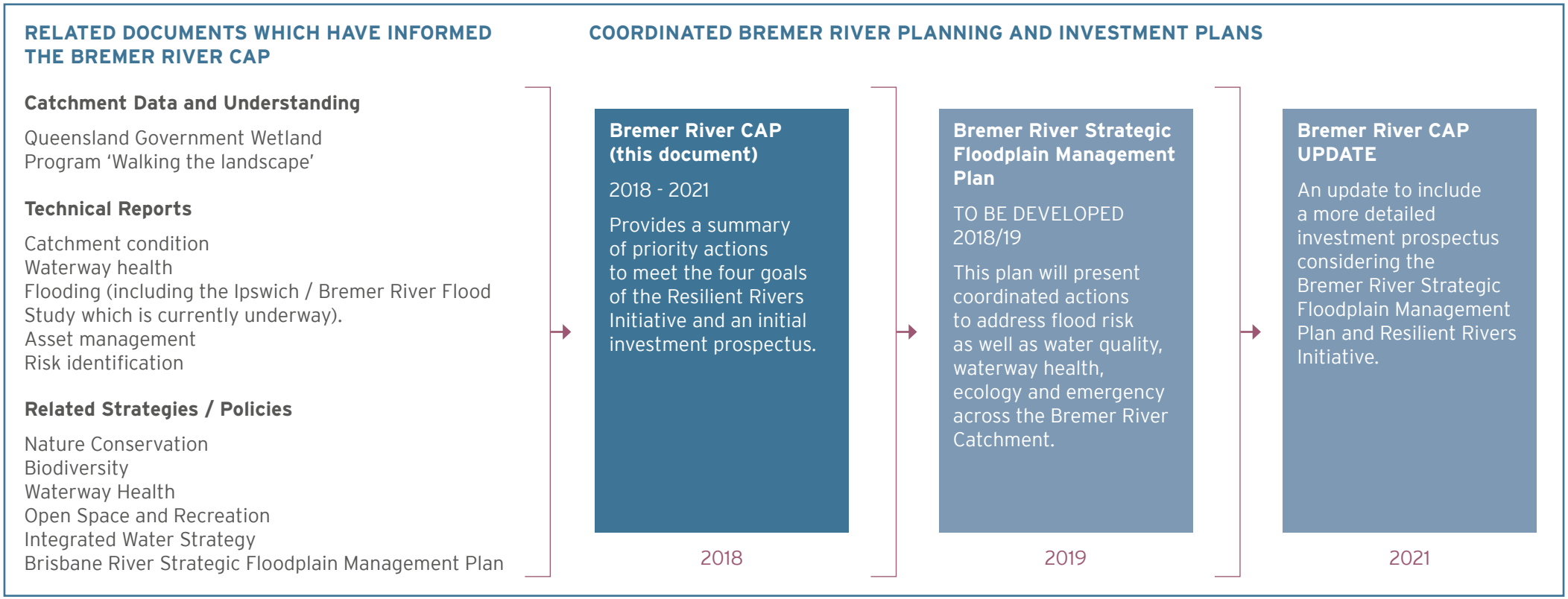



**Figure 2:** Bremer CAP relationship with other plans.

# Development of the Bremer River CAP

Development of the Bremer River CAP occurred during the period September 2017 – June 2018 and was overseen by a project team consisting of representatives from Council of Mayors (SEQ), Ipswich City Council, Scenic Rim Regional Council, Seqwater, Healthy Land and Water, Queensland Urban Utilities, Queensland Government Departments of Environment and Science, Natural Resources, Mines and Energy and Agriculture and Fisheries.

The Resilient Rivers Taskforce reviewed aspects of the Plan as it proceeded. The Taskforce was supported by the executive level Catchment Action Plans Working Group, which nominated the representatives for the project team.

Ipswich City Council and Scenic Rim Regional Council provided funding, coordination and project management capacity on behalf of the project team. E2Designlab was contracted to provide technical assistance to the project team throughout the development of the Bremer River CAP.

A broader stakeholder group was established with representatives from the project team in addition to representatives from community, industry and primary producer groups that represented the diverse interests across the catchment.

The collaborative process was undertaken to develop the Bremer River CAP following the five step process provided by the Resilient Rivers Taskforce.

### STEP 1: CATCHMENT DESCRIPTION

Literature review and meetings with project team to build understanding of catchment condition. A key input was the use of the 'Walking the Landscape – Bremer Catchment Story'.

### STEP 2: CATCHMENT VALUES AND ISSUES

Identification of assets and threats via workshop with broader stakeholder group.

### STEP 3: RISKS AND TREATMENT ACTIONS

Identification of risks to assets and preferred treatments via stakeholder engagement.

### STEP 4: PRIORITISATION OF ACTIONS

Investigation of the feasibility and likelihood of success via workshop with broader stakeholder group.

### STEP 5: PUBLISHING

Finalisation the action plan document and seek endorsement from collaborators.

A risk approach was taken in the development of the Bremer River CAP, testing a detailed Risk Treatment Plan which was developed for the Lower Brisbane-Redlands Coastal Catchment Action Plan 2018-2021.

Project stakeholders were consulted at all stages of Plan development through a series of meetings and workshops and the time and effort they provided is greatly appreciated.


**Image:** Wordcloud summarising the key catchment aspirations identified by stakeholders at workshop one.

# The Bremer River Catchment

## Rationale for regional investment in the Bremer River catchment

### THE BREMER RIVER CATCHMENT IS A PRIORITY FOR THE REGION AS IT:

- Is the worst performing catchment in South East Queensland according to the 2017 Healthy Land and Water Report Card with very poor riparian cover and estuarine water quality.
- Provides water supply for numerous towns and irrigation for horticultural and agricultural lands.
- Is located across two local government areas.
- Contains high value agricultural and horticultural land, with a large area of irrigated agriculture in the Fassifern Valley.
- Contains high ecological and conservation values, with large areas of bushland especially in Scenic Rim.
- Contains economically and socially significant including the City of Ipswich where flooding is a concern in some locations.
- Contains the RAAF Base Amberley which is the Australian Air Force's largest base.
- Is a major contributor of flows and pollutants to the Lower Brisbane River and Moreton Bay environments.

### VALUE IN PROTECTING CATCHMENT ASSETS

The Bremer Catchment contains many valuable assets which require protection including:

- Agriculture is the top industry of employment in the Scenic Rim, generating 1885 local jobs in 2015/16, and valued at $187 million in 2010/11[1]. This accounts for around 16% of the total value of agriculture in SEQ which was estimated to be more than $1.16 billion[2]. A decline of 2% in primary production would cost the sector almost half a billion dollars over the next 20 years[3].
- The City of Ipswich Gross Regional Product was $8.96 billion in 2015/16 and the majority of local employment is within the manufacturing industry[4]. New major industrial areas are also planned in Ebenezer, Swanbank and Citiswich.
- The Bremer River is valued and used by the community for walking, running, cycling, picnics, fishing and generally enjoying nature[5].
- The contribution of the RAAF Base Amberley to the Greater Brisbane Economy was estimated to be $583 million in 2015/16 with potential to grow to $1.2 billion by 2019-22. This regional activity would be lost without the Base's presence and operations[6].

### WHOLE OF CATCHMENT APPROACH REQUIRED

Water management is a catchment issue as freshwater flows generated in the upper catchment flow down to the estuary. The Bremer Estuary is also influenced by the tidal connections with the Brisbane River.

The 2017 Healthy Land and Water Report card identifies that the failing grade for the Bremer River Catchment is largely due to the poor condition of the estuary section, especially the elevated levels for turbidity and total nitrogen. The health of the freshwater section is recognised as fair, but with a very poor riparian condition along the whole waterway.

Even though the condition of the freshwater sections are currently scoring fair, previous research by Jon Olley[7] has estimated high volumes of sediments are generated by gully erosion in these upper reaches and therefore works to address this (e.g. channel stabilisation and riparian revegetation) can improve the condition of downstream environments, such as the Bremer Estuary. These improvements will require a coordinated effort across the catchment to improve current practices.

### NEED FOR COLLABORATION AND COORDINATION

The management and use of assets within the Bremer River Catchment is complicated due to the number of stakeholders and requires coordination and collaboration.

The key organisations involved are:

#### In-stream environments

The Queensland Government sets Water Quality Objectives and Environmental Values for waterways and regulate in-stream works and Environmentally Relevant Activities (such as Sewage Treatment Plants (STPs) which may impact on water quality and fish passage.

### Land management

Land use planning and approvals of new development and pollution of waters on private lands is mainly controlled by local governments. State Government largely administers control over the removal of vegetation, extraction of surface and ground waters and weed control.

### Water supply

Water supply and irrigation water is administered by the state government with drinking water, recycled water and irrigation scheme water managed by Seqwater. Owners of private land adjacent to waterways have a statutory riparian right to take water for stock or domestic purposes.

### Other key infrastructure

New roads and rail corridors are delivered by a combination of federal, state and local governments. Wastewater infrastructure is owned and operated by Queensland Urban Utilities. Stormwater networks are managed by local governments. Open space and conservation zones are owned and managed by both state and local governments.

### Other catchment stakeholders

There has been a lot of work undertaken across the Bremer River Catchment by landholders, community, Natural Resource Management (NRM) groups, river improvement trusts and industry representative groups to improve waterway health including the adoption of on-ground Best Management Practices (BMPs), weed management, riparian restoration and waterway stabilisation.

[1] https://statistics.qgso.qld.gov.au/qld-regional-profiles
[2] ShapingSEQ - South East Queensland Regional Plan 2017
[3] The South East Queensland Natural Resource Management Plan – Update 2014 Report
[4] https://economy.id.com.au/ipswich/
[5] http://hlw.org.au/reportcard/#/zone/1259/2017/condition
[6] Economic Contribution of RAAF Base Amberley, A report for the Department of Defence - 17 March 2017, KPMG
[7] Healthy Country Science & Planning Final Report Prepared for Healthy Waterways by Olwyn Crimp, 2011

# Catchment overview

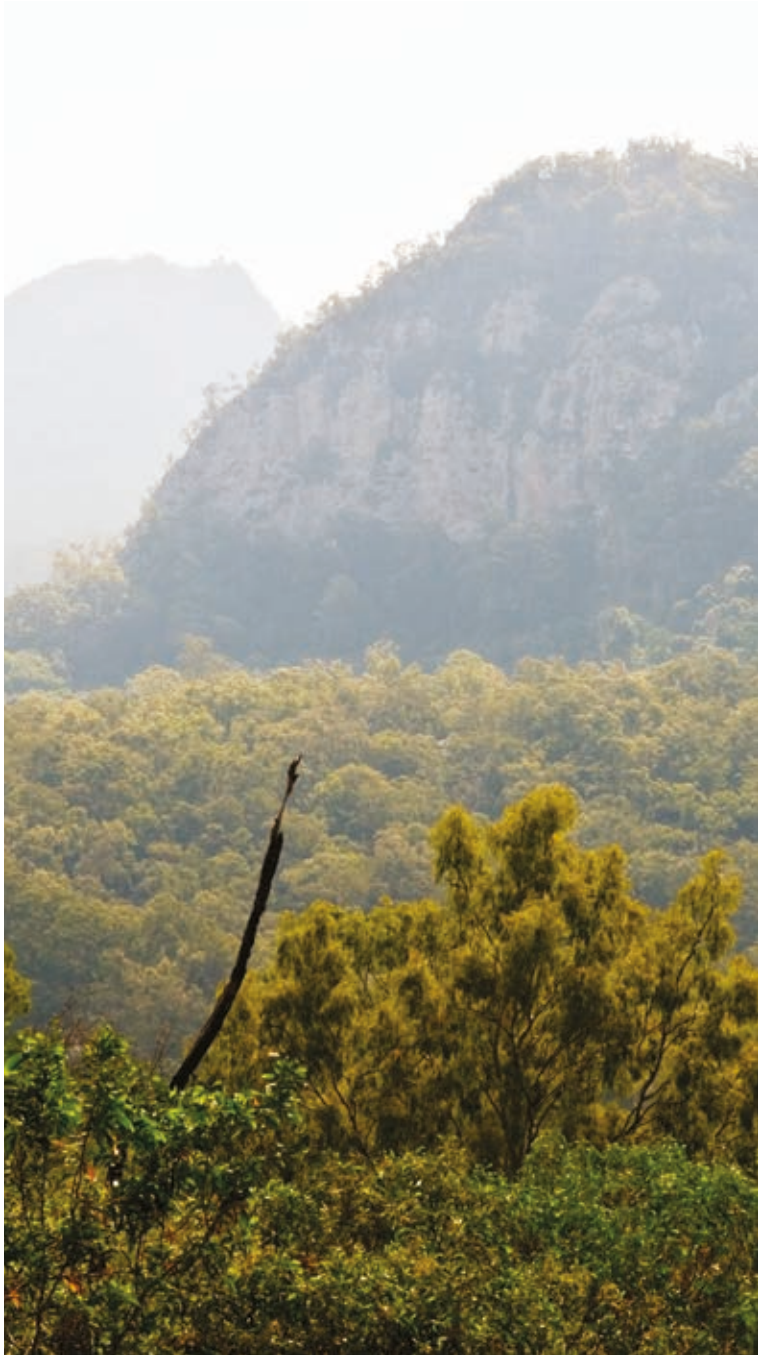
The Bremer River Catchment is approximately 2032 km$^2$ and flows 82 km through Scenic Rim Regional Council and Ipswich City Council areas to its confluence with the Brisbane River at Riverview. The tidal limit of the Bremer River is approximately 19 km upstream of the confluence. The major tributaries of the Bremer River include Warrill Creek, Western Creek, Franklin Vale Creek, Reynolds Creek, Purga Creek and Bundamba Creek.

The catchment supports a diverse range of land uses including grazing, crop production, bushland, industry, rural residential, urban development and commerce. The lower parts of the catchment are mostly urbanised while the upper parts of the catchment are predominantly rural.

The steep slopes of the catchment contain areas of highly permeable basalt and the lower parts contain large areas of alluvium which readily store and transmit groundwater.

The catchment has been severely impacted by past land practices including vegetation removal and channel modifications which have led to issues such as loss of biodiversity and habitat, erosion, salinity outbreaks, weed encroachment and declining water quality. The majority of the catchment has been cleared of vegetation, however areas of threatened vegetation communities (such as the endangered Swamp Tea-tree Forest) still exist. The Bremer River Catchment contains dispersive soils which are highly vulnerable to erosion. Hillslope and gully erosion are key issues for the catchment and generate significant volumes of sediment. Other channel modifications have also occurred across the catchment including straightening and inclusion of levees and weirs as well as the conversion of lower order streams into piped stormwater networks in urban areas.

The engagement of floodplains is a natural process which has many benefits. However, flooding in parts of the Bremer River Catchment also creates a risk for the community in low lying areas and puts some high value infrastructure such as the Ipswich CBD and RAAF Base Amberley at risk.



# Key catchment assets and threats

The catchment includes a number of key natural and built assets which were identified as being of regional significance and which are at threat in the context of the four goals of the Resilient Rivers Regional Strategy. A summary of these assets and threats are provided below.

**Table 2:** Bremer River Catchment Assets and Threats

| Assets | Services provided | Related RRI Goals | Threats to asset | Source of threat |
|---|---|---|---|---|
| **Natural assets**<br>Parklands and recreation (especially waterside parks and linear parks)<br>Recreational fisheries<br>Waterways (upper Bremer River, Bremer Estuary)<br>Floodplains and wetlands<br>Terrestrial ecosystems (riparian and native remnant vegetation)<br>Significant and protected fauna<br>Receiving aquatic environments (Brisbane River and Moreton Bay) | Tourism<br>Recreation<br>Habitat<br>Biodiversity<br>Connectivity<br>Amenity<br>Ecosystem services including nutrient cycling supporting clean air and water | Climate resilience<br>Keeping soil on land | Extreme weather (drought and flood) impacts to natural and built assets<br>Bed and bank erosion resulting in soil loss and impacting ecosystems services and habitats | Flood flows and inundation damaging built parkland infrastructure, creating public health and safety risks and increasing risk of bed and bank erosion.<br>Droughts and floods impacting fauna and habitat quality through loss of vegetation cover, fragmentation, declining water quality, sedimentation, erosion and scour, altering hydrology.<br>Soil loss from bed and bank erosion resulting from loss of vegetation cover and increased flow velocities.<br>Waterways vulnerable to disturbance due to historic degradation (erosion, removal of vegetation, altered flows etc). |
| **Productive lands**<br>Grazing land and soils<br>Horticultural land and soils<br>Intensive agriculture (feedlots, dairy, piggeries)<br>Agroforestry (native hardwood forestry and planted forestry) | Jobs<br>Local food production | Keeping soil on land<br>Climate resilience | Loss of high value soil and land due to hillslope and gully erosion<br>Flood damage to infrastructure | Hillslope and gully erosion resulting in loss of highly productive soils and land can be caused by overstocking or drought which reduces pasture cover, removal of vegetation, lack of crop cover.<br>Flood flows and inundation resulting in loss of soil, fences, pumps and other infrastructure.<br>Drought resulting in lack of water availability, loss of crops and pasture cover which impacts productivity and increases risk of soil loss. |

| Assets | Services provided | Related RRI Goals | Threats to asset | Source of threat |
|---|---|---|---|---|
| **Water supply and infrastructure**<br>Drinking water supply (Lake Moogerah, Reynolds Creek)<br>Water treatment plants<br>Farm dams<br>Warrill Valley Water Supply Scheme<br>Other surface water extraction<br>Groundwater<br>Recycled water supply (Bundamba Advanced water treatment plant) | Drinking water for local towns<br>Water for domestic stock watering and irrigation<br>Water for industry and indirect potable (future) | Water security<br>Climate resilience | Water availability and poor water quality impact on water security<br>Extreme weather events (drought and flood) impact on water supply availability and water quality and damage to infrastructure | Pathogens, sediment, hazardous chemicals, nutrients and salinity impacting water quality and treatment processes.<br>Climate variability, reduced catchment runoff, over extraction impacting water availability.<br>Accessibility to water supplies impacted by riparian weeds or bank erosion.<br>Flood inundation impacting treatment processes and damaging assets. |
| **Wastewater infrastructure**<br>Sewerage treatment plants / pump stations | Wastewater treatment and disposal | Climate resilience | Flood damage to infrastructure | Flood inundation impacting treatment processes and damaging assets. |
| **Stormwater and associated infrastructure**<br>Stormwater network infrastructure<br>Levees | Stormwater conveyance<br>Stormwater treatment<br>Urban cooling<br>Flood mitigation | Climate resilience | Flood damage to infrastructure | Flood risk especially in older areas (e.g. CBD) where infrastructure is under capacity. Levees can also shift flood risks to other areas.<br>Impact on green stormwater assets from sediment due to poor erosion and sediment control and poor design which can impact urban cooling potential. |
| **Transport and critical Infrastructure**<br>Key access rail, roads, bridges and rail<br>RAAF Base Amberley | Connectivity to critical services<br>Trade/commerce<br>Transport<br>Food security and national security | Climate resilience | Disconnection of critical access routes and flood damage to infrastructure | Flood inundation and damage to critical transport networks preventing access to critical services and impacting RAAF Base Amberley operations. |

| Assets | Services provided | Related RRI Goals | Threats to asset | Source of threat |
|---|---|---|---|---|
| **Economic hubs**<br>Ipswich CBD<br>Urban growth areas (Ripley Valley Priority Development Area, other future urban areas)<br>Existing and new business and industrial areas (Citiswich Industrial Park, Ebenzer Regional Industrial Area) | Jobs<br>Tourism<br>Trade<br>Commerce | Keeping soil on land<br>Climate resilience | Soil loss associated with new development<br>Extreme weather events (drought and flood) impacts to infrastructure and human health | Soil loss associated with new developments (especially during construction and building phases).<br>Flood flows and inundation damaging infrastructure, impacting accessibility and creating public health and safety risks.<br>Unmitigated hydrology change and associated gully erosion impacting infrastructure and public health and safety (especially in areas with highly erodible soils).<br>Extreme heat events resulting in human health impacts. |
| **Cultural and Social assets**<br>Indigenous and European heritage | Cultural and spiritual values and well-being | Climate resilience<br>Partnerships | Flood damage to assets | Flood flows and inundation resulting in loss or damage to cultural heritage assets. |

# Catchment Action Plan

The following have been identified as high priority actions to be undertaken across the Bremer River Catchment during this first catchment action plan cycle (2018-2021). Estimated budget and timeframes are detailed in the Priority Action Investment Prospectus (Attachment 2).

**Table 3:** Catchment Action Plan – actions, implementation pathways, costs, benefits, locations, timeframes and stakeholders.

| Action # | Actions / Treatments | Risk/s addressed (RRI focused) | Possible implementation pathway / staging | Costs | Benefits | Priority locations | Approx timeframe | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| **On-Ground Actions** | | | | | | | | |
| 1 | **Deliver at least six co-ordinated rural partnership projects to improve waterway health in priority locations** | Water security – water availability and water quality<br>Climate resilience – resilience during flood events<br>Keeping soil on land – hillslope, gully, bed and bank erosion<br>Partnerships – engaged community | Continuation of working with rural landholders to deliver on-farm projects such as waterway stabilisation, fencing, off-stream watering points, weed control and revegetation, contour banks, strip tillage, precision technologies and use of treatment systems such as high efficiency sediment basins, bioreactors and constructed wetlands. Potential to use existing Best Management Practice benchmarking to inform and monitor on-ground works.<br>Identification of alternative funding mechanisms should also be investigated as part of this action.<br>This work should be undertaken as part of the rural partnerships network (see Action #8). | High | Shared resources, knowledge and coordinated delivery of planned works | Moogerah Dam and Reynolds Creek catchments (to protect drinking water supply)<br>Franklin Vale and Western Creek (to address channel instabilities)<br>Upper Bremer River (Rosevale) (to continue previous Healthy Country work) | 2018 - ongoing | BRN<br>DAF<br>Seqwater<br>Growcom<br>Agforce<br>QFF<br>BCA<br>Landcare<br>ICC / SRRC<br>Landcare<br>DES / DNRME<br>HLW |
| 2 | **Improve erosion and sediment control compliance in new developments with increased on-ground auditing of sites** | Keeping soil on land – bed and bank erosion<br>Partnerships – engaged community | Regionally consistent approach and political support for erosion and sediment control through:<br>• Capacity building<br>• Compliance | Low | Reduced erosion and sediment entering waterways and improved water health | New development areas such as Ripley Valley | 2018 - ongoing | ICC / SRRC<br>DES / EDQ<br>HLW<br>MBA<br>HIA |

| Action # | Actions / Treatments | Risk/s addressed (RRI focused) | Possible implementation pathway / staging | Costs | Benefits | Priority locations | Approx timeframe | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| 3 | **Implement collaborative weed control and revegetation in priority locations** | Water security – water quality<br>Keeping soil on land – bed and bank erosion Climate resilience – resilience during flood events<br>Partnerships – engaged community | Collaborative approach to the removal of weeds in combination with revegetation of native plants along the riparian corridor. | High | Water quality improvement, bed and bank stability and biodiversity | Moogerah Dam and Reynolds Creek catchments<br>Additional priority locations may also be identified as an outcome of Actions #9/10 | 2018 - 2020 | SRRIT / IRIT<br>SRRC<br>Seqwater<br>BRN<br>BCA<br>Landcare<br>Growcom<br>Agforce<br>QFF |
| 4 | **Deliver at least two bed and bank stabilisation projects in priority locations** | Keeping soil on land – bed and bank erosion Climate resilience – resilience during flood events | Undertake bed and bank stability works in priority locations. | High | Reduced sediment transport and erosion risk to infrastructure and improved waterway health | Ironpot Creek and Bundamba Creek<br>Additional priority locations may also be identified as an outcome of Actions #9/10 | 2019 - 2021 | ICC<br>DES |
| 5 | **Revegetate and re-engage at least three priority floodplain/ wetlands and riparian locations in the upper catchment reaches to provide multiple benefits in priority locations** | Keeping soil on land – bed and bank erosion<br>Climate resilience – improved flooding and catchment cooling | Revegetation of upper catchment floodplain and tributaries to align with future flood risk management plans and planned habitat corridors to provide multiple benefits (slow flows, provide habitat, nutrient and sediment cycling and groundwater recharge). Potential to use environmental offsets or Australian Carbon Credit Units as a delivery/ funding mechanism. | High | Water quality improvement, flood mitigation, increased groundwater recharge and improved biodiversity | Priority locations to be determined in Bremer Floodplain Management Strategy.<br>Additional priority locations may also be identified as an outcome of Actions #9/10 | 2019 - 2021 | SRRC / ICC<br>QRA<br>BRN<br>BCA<br>Landcare<br>DAF / DES / DNRME |
| 6 | **Restore fish habitat and remove barriers to fish passage in three priority locations** | Climate resilience – resilience during drought and flood events | Removal of fish barriers and restoration of fish passage and habitats at three priority locations. Fish barrier removal sites have been identified within Greater Brisbane Fish Barrier prioritisation study (2018). Fish habitats and refugia also need to be considered in waterway improvement works. | Med / High | Improved fish connectivity and resilience which supports healthy recreation fisheries and ecotourism | Warrill Creek<br>Bremer River<br>Bundamba Creek | 2019 - 2021 | ICC/SRRC<br>DAF |

| Action # | Actions / Treatments | Risk/s addressed (RRI focused) | Possible implementation pathway / staging | Costs | Benefits | Priority locations | Approx timeframe | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| 7 | **Develop a Bremer River education and engagement program to build understanding of its history, values and flood resilience** | Climate resilience – resilience during flood events<br>Partnerships – engaged community | Creation of a community education and engagement program to improve understanding of the Bremer River history, its values and its flooding characteristics to help build appreciation for the River and flood resilience. | Low | Improved flood resilience, community understanding and appreciation of the Bremer River | Catchment wide with a focus on communities which experience flooding | 2019 - 2021 | ICC / SRRC<br>Traditional owners<br>BRN<br>QRA |
| **Research, planning and policy actions** | | | | | | | | |
| 8 | **Formalise rural partnerships network with the potential creation of a new central coordinator role to assist in the coordinated delivery of on-ground works** | Partnerships – ensure coordination of resources | 1. Develop a network of partners to communicate current activities and programs. | Low | Communication and potential shared funding of planned on-ground actions between active stakeholders | Moogerah Dam and Reynolds Creek catchments (to protect drinking water supply) | 2018 - ongoing | BRN<br>Seqwater<br>ICC/SRRC<br>DAF |
| | | | 2. Undertake a scoping exercise to see what other programs exist and what has been successful in terms of cost and long term change. | Low | Identification of cost effective designated program to support coordinated delivered of on-ground works | Franklin Vale and Western Creek (to address channel instabilities) | 2019 | Growcom<br>Agforce<br>QFF<br>BCA |
| | | | 3. Establish a dedicated coordinator of works program based on outcomes of scoping exercise. | Med / High | Designated resource responsible for planning of coordinated on-ground actions, providing rural landholders with a central point of contact. | Upper Bremer (Rosevale) (to continue previous Healthy Country work) | 2019 - ongoing | Landcare<br>DES<br>HLW |
| 9 | **Improve the current understanding of sediment and nutrient sources and transport across the Bremer Catchment** | Keeping soil on land – hillslope, gully, bed and bank erosion | 1. Collate existing data and identify data gaps and best options for addressing gaps.<br>2. Undertake project to address gaps (identified in step 1) and identify priority locations to manage sediment (e.g. geomorphic assessment / sediment tracking / transect project). | Low<br>Med (TBD) | Improved understand of priority erosion hotspots, bed and bank stabilisation | Warrill catchment | 2018<br>2019 - 2020 | ICC / SRRC<br>HLW<br>ARI<br>Seqwater |

| Action # | Actions / Treatments | Risk/s addressed (RRI focused) | Possible implementation pathway / staging | Costs | Benefits | Priority locations | Approx timeframe | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| 10 | **Refine and apply regional water quality models to help prioritise waterway works and measure potential benefits** | Keeping soil on land – hillslope, gully, bed and bank erosion<br>Climate resilience – resilience during flood events | Refine the Healthy Land and Water regional water quality model to provide improved understanding of freshwater vs estuary environments (potential sub catchment breakdown) to inform prioritisation and selection of on-ground works. | Med | Tool to test scenarios to identify priority locations for on-ground works, bed and bank stabilisation | Focus on model being able to separate freshwater and estuarine areas | 2018 - ongoing | ICC / SRRC<br>HLW<br>Seqwater<br>DES |
| 11 | **Co-ordinate floodplain management strategies and Southern Freight Rail planning to investigate the potential for catchment works to improve flood resilience of RAAF Base Amberley, Ipswich CBD and other critical infrastructure and understand broader regional flood response** | Climate resilience – flood management | Coordination between Southern Freight Rail planning (current), Brisbane River floodplain management strategy (being finalised) and Bremer River floodplain management strategy (to be done 2018) to ensure opportunities for infrastructure to deliver catchment flood improvements are included in planning and design phases. | Low | Coordination of infrastructure design to provide multiple benefits, alignment of investment in flood studies and infrastructure planning, flood mitigation for critical infrastructure | Focus on design of Southern Freight Rail to provide flood improvements for downstream areas | 2018 | Qld Gov<br>QRA<br>ICC / SRRC<br>ARTC<br>RAAF Base Amberley<br>Seqwater |
| 12 | **Investigate the impact of altered hydrology from new urban areas on bank stability, geomorphology and flooding and identify required development outcomes to address this** | Keeping soil on land – bed and bank erosion<br>Climate resilience – improved flooding and city cooling | Undertake a study to determine if and how Bremer waterways are impacted by altered hydrology from new urban areas (e.g. bank stability, geomorphology and flooding). Determine appropriate development responses to address these impacts (e.g. waterway stability objectives, inclusion of rainwater tanks or green infrastructure). | Med | Improved understanding and communication of need to provide flow management in developments which can reduced bed and bank erosion and provide flood mitigation, urban cooling, improved amenity, green links and multiple use public open spaces | Focus on areas with newly planned development (e.g. North Ipswich / open space planning precinct) or areas with existing issues (e.g. Ipswich CBD (retrofit) | 2019 - 2020 | ICC<br>EDQ<br>Stormwater QLD<br>HLW<br>DES<br>DSDMIP |

| Action # | Actions / Treatments | Risk/s addressed (RRI focused) | Possible implementation pathway / staging | Costs | Benefits | Priority locations | Approx timeframe | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| 13 | **Determine the value/ services provided by floodplains and wetlands in terms of flood mitigation, nutrient cycling, urban cooling, habitat, recreation to provide the business case for the preservation of corridors.** | Keeping soil on land – sediment capture<br>Climate resilience – improved flooding and catchment cooling | Undertake a study which can identify the services provided by floodplains and wetlands and assign the environmental, social and economic benefits provided by floodplains and wetlands to help justify their preservation. Potential for work to inform new Planning Scheme. | Med | Improved understanding and communication of need to protect wetlands and floodplains, protection of high value ecosystems | Focus in new development areas and upper catchment areas | 2019 | ICC / SRRC<br>DES<br>HLW |
| 14 | **Develop precinct or corridor scale plans to inform stormwater, flood and waterway management projects.** | Keeping soil on land – bed and bank erosion<br>Climate resilience – improved flood management | 1. Development of precinct integrated water management plan along the Western growth corridor to identify suitable regional solutions for waterway, stormwater and/or flood management.<br>2. Proposed discussions to understand how infrastructure charging could support stormwater planning in the future. | Med<br>Low | Holistic approach to waterway stormwater and flood management to provide multiple benefits and provide direction to developers<br>Adequate resources allocated to enable community infrastructure and stormwater upgrades to both be delivered. | Western growth corridor (new infrastructure)<br>Ipswich CBD (address existing flood issues through upgrades) | 2019 - 2020<br>2020 | ICC<br>Qld Gov (DSDMIP, EDQ, DES) |
| 15 | **Identify flow requirements to improve Bremer Estuary water quality and compare this to current Moreton Plan water allocations and water usage** | Water security – water availability | Study to determine the flow required to improve the water quality of the Bremer Estuary and compare this to the current water allocations and water usage across the Moreton Water Resource Plan area. | Med | Improved understanding of flow requirements and current water use, improved estuarine condition | Warrill catchment | 2020 | ICC / SRRC<br>Seqwater<br>DNRME / DES<br>HLW<br>DAF<br>QFF<br>DAF<br>Growcom<br>Agforce |

| Action # | Actions / Treatments | Risk/s addressed (RRI focused) | Possible implementation pathway / staging | Costs | Benefits | Priority locations | Approx timeframe | Stakeholders |
|---|---|---|---|---|---|---|---|---|
| 16 | **Co-ordinate planning of road upgrades near the RAAF Base Amberley to ensure works extend to local access roads to address flooding, traffic and fauna connectivity** | Climate resilience – flood management | Stakeholder involvement in planning and design or Cunningham Highway upgrades (Ipswich bypass) to ensure local access roads flooding and traffic implications are considered as well as ensure fish passage / terrestrial underpass. | Low | Coordination of infrastructure design to provide multiple benefits, flood mitigation for critical infrastructure | Focus on design of Western Ipswich Bypass and Cunningham Highway upgrades to consider local RAAF base Amberley access roads | Unknown | Qld Gov (DTMR)<br>QRA<br>ICC<br>RAAF Base Amberley |

## STAKEHOLDER ACRONYM LIST

**DAF** - Department of Agriculture and Fisheries

**DES** - Department of Environment and Science

**DNRME** - Department of Natural Resources, Mines and Energy

**DSDMIP** – Department of State Development, Manufacturing, Infrastructure and Planning

**EDQ** – Economic Development Queensland (Part of DSDMIP)

**HLW** - Healthy Land and Water

**ICC** – Ipswich City Council

**SRRC** – Scenic Rim Regional Council

**QFF** – Queensland Farmers Federation

**BRN** – Bremer River Network

**BCA** – Bremer Catchment Association

**SRRIT** - Scenic Rim Rivers Improvement Trust

**IRIT** - Ipswich Rivers Improvement Trust

**QRA** - Queensland Reconstruction Authority

**ARTC** - Australian Rail Track Corporation

**MBA** – Master Builders Queensland

**HIA** – Housing Industry Association (QLD)

**ARI** - Australian Rivers Institute, Griffith University

# Assets and investment map

Figure 3 provides a spatial representation of key assets of the catchment and priority investment areas. This visual guide complements the actions in Table 3.

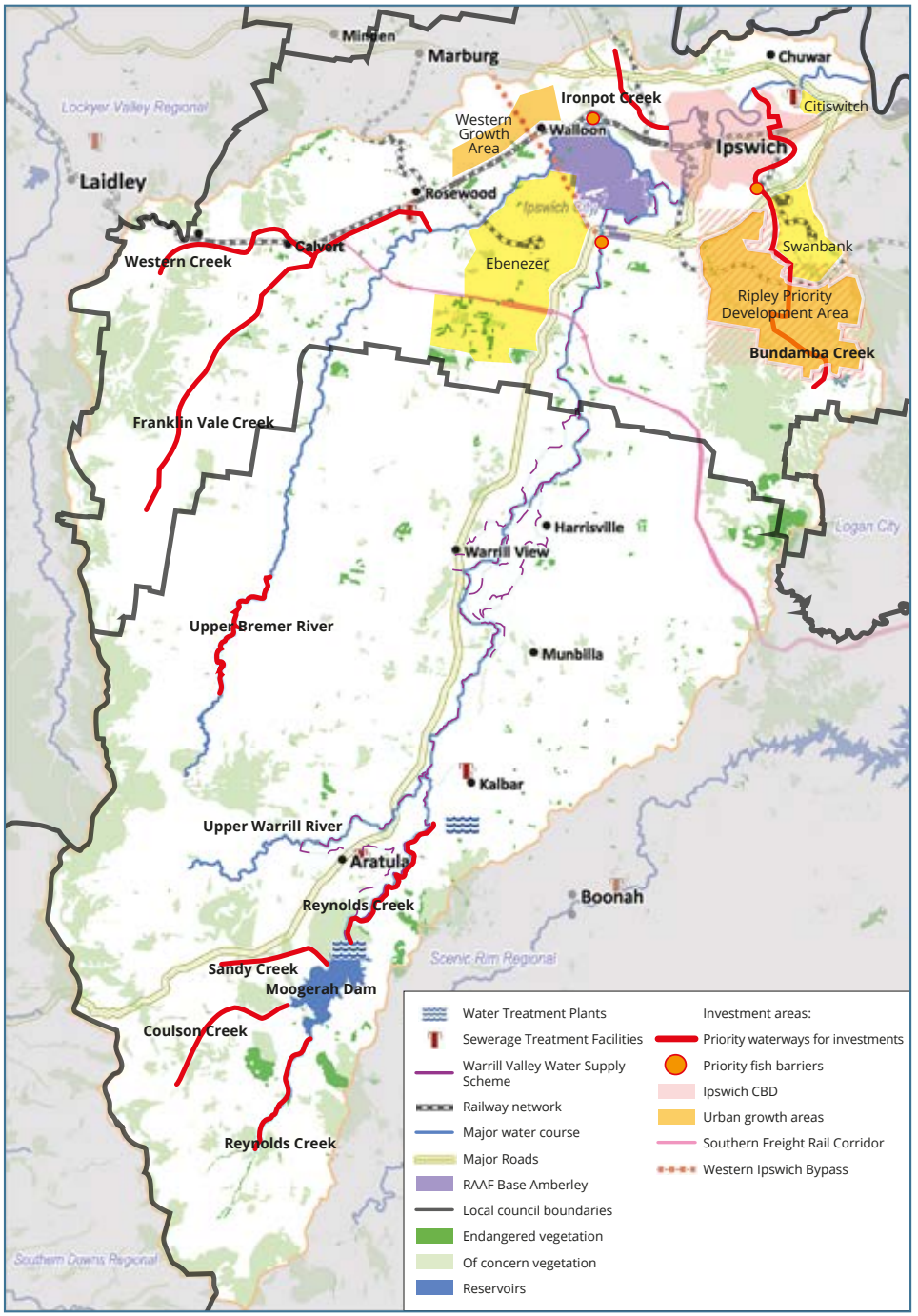



**Figure 3:** Bremer River Catchment key assets and on-ground priority action locations

# Review of progress

## EMERGING PLANS AND STRATEGIES

There are a number of key projects which are currently underway which will identify actions which should be considered in the future review of the Bremer River CAP including:

- The Draft Brisbane River Strategic Floodplain Management Plan which has recently been released, provides a number of flood mitigation recommendations relevant to this catchment area to protect regionally important assets.
- Bremer River Flood Model is currently being developed for the whole catchment which will provide an improved understanding of flood extent and risk.
- The Bremer River Strategic Floodplain Management Plan will commence preparation in 2018 and is likely to identify a range of flood mitigation and waterway health improvement actions to protect assets in the catchment.

## MONITORING, REPORTING AND EVALUATION

Progress on action implementation will be monitored through the reporting framework to be established under the Resilient Rivers Initiative, including an evaluation to be conducted in 2019. The reporting framework will incorporate the Healthy Land and Water Report Card (water quality) and other key information sets.

There are a number of priority actions presented in this CAP which can be used to further inform actions and monitor progress (e.g. sediment tracking and use of models). A review of the CAP would be beneficial at the completion of these priority actions.

This CAP and supporting documents is due to be updated by June 2021 with relevant information that arises.

# Attachment 1 - Previous studies and planning activities

| Document title | Prepared by | Description |
|---|---|---|
| SEQ Regional Plan 2017 (Shaping SEQ) | Department of Infrastructure, Local Government and Planning, 2017 | Sets out the strategic framework for the environmentally sustainable management of regional growth, including population change and economic development. The Plan operates in conjunction with other statutory planning tools, including state planning policies, local government planning schemes, regulatory requirements and development assessment processes. |
| Local Government Planning Scheme Policies | Ipswich City Council and Scenic Rim Regional Council | Present Council's future plan and provides detailed direction on land use, development, infrastructure and protection of assets in the local Council area. |
| Waterway Health Strategy | Ipswich City Council (update currently being undertaken) | Presents the vision for Ipswich waterways, summarises catchment condition and identifies actions to improve waterway health. |
| Integrated Water Strategy | Ipswich City Council, 2015 | Long-term planning document for all elements of the water cycle. |
| Nature Conservation Strategy | Ipswich City Council, 2015 | Strategic vision and objectives supported by key actions for achieving nature conservation outcomes across Ipswich. |
| Biodiversity Strategy | Scenic Rim Regional Council, | Strategic vision, objectives, strategies and actions to protect and enhance Scenic Rim's biodiversity. |
| SEQ NRM Plan Update | SEQ Catchments, 2016 | Regional assessment and mapping of natural asset condition, identification of risks and target setting. |
| Walking the landscape – Bremer Catchment Story | Department of Environment and Heritage Protection, Queensland Government | Systematic and transparent synthesis process that integrates existing data with expert knowledge to present a common and robust whole-of-landscape understanding of environmental processes. |
| Healthy Waterways and Catchments Report Card | Healthy Land and Water, 2016 | Scores for water quality, habitat, riparian condition and community benefits presented for monitored locations along waterways in the Bremer River catchment. Actions are also provided to address catchment pressures. |
| Healthy Country – Biophysical characteristics: Lockyer, Bremer and Albert-Logan Catchments | SEQ Catchments, 2009 | Review of the biophysical characteristics of the Lockyer, Bremer and Logan-Albert Catchments. |
| Healthy Country Program 2007-2011 Report | SEQ Catchments, 2011 | Reports presenting the development and trial of efficient and cost-effective participatory community and science-based approaches to reducing exports of rural diffuse sources of sediment and nutrients and to improving waterway health through stabilizing and rehabilitating degraded waterways and facilitating land stewardship. Upper Bremer was one of the focus areas. |

| Document title | Prepared by | Description |
|---|---|---|
| Healthy Country Program 2012-2015 – Implementation and Monitoring of Targeted Works in the Upper Warrill | SEQ Catchments, 2012 | Presents summary of actions undertaken in the Upper Warrill area to demonstrate current best management practices. |
| The Greater Brisbane Urban Fish Barrier prioritisation study | Catchment Solutions, 2018 | Presents the top 50 priority ranked fish barriers. |
| Bremer River and Warrill Creek Fish Barrier Assessment Report | Catchment Solutions, 2018 | Presents outcomes of assessment of barriers upstream of Berry's Weir and recommendations to further improve fish passage in the Bremer River Catchment. |
| Bremer River Catchment Management Strategy – Stage 2 | WBM for Bremer Catchment Association, 1999 | Presents a series of actions required to help maintain and improve Bremer River environmental values at a sub catchment level. |
| Bremer River Water Quality Improvement Plan – Receiving Water Quality Modelling | WBM for Healthy Waterways, 2006 | Tested various management strategies with respect to improvement of ambient water quality in the Bremer River. |
| Bremer River Water Quality Monitoring Program Report | Bremer Catchment Association, 2005 | Presents data from BCA water quality monitoring program. |
| Assessing values and condition of waterways in Ipswich City Council Local Government Area | Alluvium, 2014 | Presents condition of all Ipswich waterways based on a synthesis of existing data and waterway condition assessment. |
| Ipswich City Council geomorphology and vegetation assessment of waterways | Alluvium, 2014 | Presents geomorphic condition of all Ipswich waterways based on high level desktop and field-based assessment. |
| Soils of Ipswich Field Guide | Ipswich City Council, AECOM | Identifies soils at risk of erosion so that appropriate ESC measures can be planned and implemented when undertaking activities in ICC. |
| Ipswich City Council Stormwater quality Offsets Implementation Plan 2015 | Ipswich City Council, BMT WBM 2015 | Developed to assist Council determine the most appropriate and cost-effective use of 'Voluntary Water Quality Offset payments' accepted by Council as an alternative to on-site compliance with load-based stormwater quality pollutant load reduction objectives listed in Council's planning scheme, in response to the SPP Water Quality State Interest. |
| Creek Corridor Plans for Bundamba Creek, Ironpot Creek and Deebing Creek | Ipswich City Council (2015 –2017) | Holistic planning of creek corridor identifying condition, pressures and identification of actions. |
| Upper Black Snake Creek Improvement Plan | Ipswich City Council, 2014 | Investment strategy for the improvement of the Upper Black Snake Creek based on a total water cycle management approach. |

| Document title | Prepared by | Description |
|---|---|---|
| Bremer River Estuary and Catchment Audit (Dry-Weather) Technical Report | CRC for Coastal Zone, Estuary and Waterway Management, 2003 | Understanding pollutant sources to the Bremer River and management strategies required to improve the health of the river. |
| Riparian Condition Assessment of the Waterways of Ipswich | Ipswich Rivers Improvement Trust 2009 | Outcomes of riparian environmental weed survey and recommended weed control strategies. |
| Natural Asset Management Plan - Moogerah Dam and Reynolds Creek | Seqwater 2012 | Natural asset management plan for water supply catchments. |
| Seqwater Watershed, In-Storage and In-River Risk Assessment and Priority Area Plan for Water Quality Southern Region – Lake Moogerah and Reynolds Creek | Seqwater 2011/2012 | Risk assessment of water supply catchments. |
| Protecting Moreton Bay: How can we reduce sediment and nutrients loads by 50 | Olley et al | Summary of studies generating sediment and nutrient budgets and potential actions. |
| The Provenance of Sediment in Three Rural Catchments in SEQ | Laceby, Patrick | Thesis on the Healthy Land and Country project and presents sediment and nutrient properties for three focal areas including Upper Bremer |

# Attachment 2 – Priority Action Investment Prospectus

**This attachment presents a high level description of the context and proposed pathways for the actions within the Bremer River Catchment Action Plan, including estimated budgets and timeframes. Note that some actions have been combined in this section where they are linked.**

## Rural Partnerships – rural partner network and coordinated on-ground works

2018-ongoing

**Action #8** Rural partnerships network – Informal meetings (in-kind time only) and/or development of dedicated coordination role (BRN could provide this but may require additional time in this part-time position to resource this role)

**Action #1** Co-ordinated on-ground works – Delivery of six projects in priority locations ($75k-$100k estimated per project but will depend on scope of project)

The predominant land uses across the Bremer Catchment area are private rural lands and therefore catchment improvement works will need to deliver on these lands to improve the health and resilience of the Bremer River.

There are a number of organisations conducting on-ground works with rural landholders in the Bremer Catchment including:

- ICC will be working with landholders in the Franklin Vale catchment
- Growcom is currently supporting the use of the Hort 360 Program in the Bremer
- DAF is working on a number of projects which will demonstrate a range of precision agricultural technologies
- Seqwater will be investing in multiple projects in the water supply catchment (within 5km of the intakes at Boonah/Kalbar and Moogerah Dam)
- HLW has on-ground works in the Upper Warrill Creek (Healthy Country Project funded by DES)
- Works being undertaken by community-led environment groups including the BCA, West Moreton Landcare Group, Boonah and District Landcare and various un-incorporated bushcare groups
- The Bremer River Network is an umbrella organisation that currently supports, and plan to support, any groups who have an interest in the health of the Bremer River via funds from the Bremer River Fund.

There is a strong opportunity for these works to be coordinated, allowing resources, knowledge and existing relationships to be shared. A central coordinator role will also present rural landholders with a point of contact and clarity on actions being undertaken across the catchment.

The following steps are recommended to assist in continued delivery of coordinated on-ground works in the Bremer River Catchment:

1. Informal coordination of interested stakeholders – e.g. bi-monthly meetings could be organised where stakeholders come together to discuss planned works and identify potential for collaboration.
2. Undertake a scoping exercise to see what other programs exist and what has been successful in terms of cost and long term change.
3. Development of designated central coordination role based on outcomes of scoping exercise – e.g. Bremer River Network could undertake this role with coordinated funding through the Bremer River Fund.

At least six projects should be delivered on-ground and works should be targeted in the following locations:

- Moogerah Dam and Reynolds Creek catchments (to protect drinking water supply)
- Franklin Vale and Western Creek (to address channel instabilities)
- Upper Bremer River (Rosevale) (to continue the work undertaken by Healthy Country).

There is potential to use existing BMP benchmarking tools to inform and monitor the on-ground works. The development of case studies could also be useful as communication products to be used within extension programs.

## New research and models to prioritise works - Sediment tracking and waterway health modelling to prioritise works and monitor progress

2018 - ongoing

**Action #9** Address current information gaps to improve understanding of sediment sources and transport through the Bremer Catchment (Understand data gaps $25k, sediment tracking study budget to be determined)

**Action #10** Refinement and use of HLW model to help prioritise waterway works and measure potential benefits (estimated $50k to refine model)

It is proposed that a two stage approach is undertaken to provide an updated understanding of the sediment sources and movement in the Bremer Catchment (with a focus on the Warrill Creek Catchment):

1. Ensure the new work builds on previous work by collating existing information to identify data gaps and then assess best options for addressing gaps
2. Address information gaps by undertaking sediment tracking or similar project (e.g. a geomorphic assessment of sediment risk from riparian areas based on classification of stream banks could inform sediment tracking assessments).

The outcomes of the geomorphic assessment / sediment tracking project could be used to inform a broader catchment model which addresses other elements of waterway health such as water quality, habitat and connectivity which can be used to identify priority locations and track progress.

It is understood that Healthy Land and Water have catchment models which are used to inform the Report Card scoring. At the moment this is done on a whole of catchment scale. It is proposed that this model is refined to allow for assessment of freshwater vs estuary environments as well as the input from critical sub catchments such as Deebing Creek and Bundamba Creek. This level of detail will assist in the identification of priority on-ground works and allow for analysis and reporting of progress, eg. via the Healthy Waterways Report Card, at a finer scale. This should build on previous work already undertaken on the catchment and it is also recommended that this project is promoted across the stakeholders in the Bremer for broader use and co-ordination.

## Bed and bank stabilisation projects

**Action #4** Stabilise two priority waterway reaches

2019-2021 (3 years), $200-$500k estimated

Channel stabilisation has already been identified as a priority action for a number of Ipswich waterways including Iron Pot Creek and Bundamba Creek. This prioritisation is based on outcomes from a previous waterway condition assessment. Outcomes of Actions #9/10 can also be used to inform priority locations based on erosion and sediment transport risk.

This program of works aims to rehabilitate at least two priority waterway reaches to reduce bed and bank erosion. The work will include scoping, design and delivery of channel stabilisation works which address existing bed and bank erosion and re-establish in-stream habitats.

## Floodplain and riparian revegetation

**Action #3** Collaborative weed control and revegetation

2018-2020 (3 years), $200k estimated

Seqwater is currently planning to undertake Cats Claw management along Reynolds Creek and in the tributaries discharging into the Moogerah Dam. There is an opportunity to combine these works with the Scenic Rim Rivers Improvement Trust program and also revegetation projects by the local Council and local catchment groups to combine native revegetation with weed management.

The Ipswich Rivers Improvement Trust is also about to commence weed control works in the Franklin Vale Creek catchment. There is potential for this to be coordinated with Ipswich City Council's Franklin Vale Initiative.

Revegetation works should aim to re-establish native species which can stabilise banks and reflect the local Regional Ecosystems. It is understood that the Queensland Government are preparing a Riparian Guideline which may be able to inform these works in the future.

Outcomes of Actions #9/10 can also be used to inform priority locations for riparian revegetation based on erosion and sediment transport risk.

**Action #5** Upper catchment floodplain and riparian rehabilitation

2019-2021 (3 years), $300k estimated

The Brisbane River Floodplain Management Strategy highlighted the importance of revegetating upper catchment floodplains and riparian zones to provide catchment flood mitigation. The Bremer River will likely investigate this further to identify priority locations for replanting. This investigation is likely to include the assessment of the the impact existing levees have on floodplain engagement. Location of works should also align with habitat corridors and look for opportunities to recreate threatened vegetation communities such as Blue Gum on alluvial plains and *Melaleuca Irbyana* where possible to provide multiple benefits.

Outcomes of Actions #9/10 can also be used to inform priority locations for riparian revegetation and floodplain restoration based on erosion and sediment transport risk.

## Erosion and sediment control

**Action #2** Improved erosion and sediment control on development sites

2018-ongoing, Low cost due to existing programs/ funding

State Government regulation and guidance is currently in place to ensure new urban development provides best practice erosion and sediment control during construction and building phases. This includes a new stormwater management design objective for sediment control on construction sites in the State Planning Policy 2017 which is now performance based. The Queensland Government also has a $2M program aimed at reducing the amount of sediment washing off building and construction sites flowing into Moreton Bay and the Great Barrier Reef.[9] Part of this funding is supporting Erosion Sediment Control capacity building for Local Governments and the construction and building industries which are being developed by the Department of Environment and Science (DES), Healthy Land and Water (HLW), the Local Government Association of Queensland, Master Builders Queensland and the Housing Industry Association (Qld). It is recommended that this training is undertaken in key growth areas in the Bremer Catchment.

Compliance is also an important component to ensure best practice erosion and sediment control is being delivered. Tools exist to assist Local Government compliance officers (who have delegation under the *Environmental Protection Act 1994*).

[9] https://www.ehp.qld.gov.au/water/policy/urban-stormwater.html#erosion_and_sediment_control_esc

## Fish passage and habitat

**Action #6** Restore habitat and fish passage at three priority locations

2019-ongoing, $250-$300k estimated

Structures such as culverts, pipes, road crossings, dams and weirs can prevent the movement of native fish, impacting breeding and fish populations. The design of any new structures should be completed with an understanding of their requirements for fish passage. The removal or adaption of these structures can re-instate this movement and support native fish communities. Ipswich City Council and partners have already constructed the longest fish ladder in Queensland at Berry's Lagoon which has been very successful with a five-day monitoring program showing an average of 690 fish used the ladder at each day and 10 'new' fish species which have not been recorded in the Bremer River catchment in over 14 years including lungfish, yellow-finned bream, and forked tail catfish.

It is recommended that a further three sites are retrofitted at priority locations to improve fish movement and fish habitat. The Greater Brisbane Urban Fish Barrier prioritisation study identified a number of priority sites for the removal of fish barriers in the Bremer Catchment including:

- 'Runnymede' Sheet pile and gabion basket weir on Warrill Creek upstream of Cunningham Highway (#15 priority)
- DNRME V notch weir upstream of 'Runnymede' weir on Bremer River (#12 priority)
- DNRME V notch weir at Walloon on Warrill Creek (and 2 additional barriers upstream)
- Rock weir at Worley Park on Bundamba Creek

The Ipswich Nature Conservation Strategy identifies the platypus as an iconic species which is present in Ipswich waterways and is currently under threat from loss of habitat as well as declining water quality and pollution. A Fish Biodiversity Survey and Habitat Assessment Study could identify additional locations for the restoration of habitats to support the protection of threatened species in the Bremer.

## Community education and engagement with the Bremer River

**Action #7** Development of a Bremer River education and engagement program to build understanding of history, values and flood resilience

2019-2021, Less than $50k to scope and outline community engagement and education program

The Bremer River has a rich history and provides a range of values for the community including recreation and amenity. It is also understood that waterways are important cultural assets for the local Traditional Owners. There are many areas in the upstream sections which are not visited by the community and are therefore not understood in terms of their history and ecological value.

It is recommended that a community education and engagement program is scoped which focuses on building the communities understanding of the Bremer River in terms of its history, cultural values, ecological and recreational values and flooding characteristics. Key steps many include:

1. Identifying resources available (e.g. history of Bremer River, current signage and factsheets, flood notifications and alerts).
2. Determine materials required to address information gaps (e.g. signage, factsheets, books etc).
3. Collect stories and information to develop new materials to build awareness of cultural, ecological

and social significance of the Bremer River waterways.

## Coordinated infrastructure planning for regional flood improvements

**Action #11** Co-ordinated floodplain management strategies and Southern Freight Rail planning to improve flood resilience of critical downstream assets

2018 (In-kind time required)

The Southern Freight Rail Corridor will serve as a major freight link between Melbourne and Brisbane. The route identified for the corridor includes a link between Rosewood and Undullah which crosses the Bremer Catchment upstream of Ebenezer, RAAF Base Amberley and the Ipswich CBD. The Brisbane River Floodplain Management Strategy identifies this a priority opportunity to provide regional flood mitigation and is likely to be a focus in the Bremer Floodplain Management Strategy. The location of the rail corridor upstream of key assets such as RAAF Base Amberley and the Ipswich CBD could result in flood mitigation in these flood prone areas. This could also change the regional flooding response characteristics. It is understood that planning and design of the Southern Freight Rail is currently being undertaken.

It is proposed that meetings are held in the near future between stakeholders to ensure that the planning and design of the Southern Freight Rail Corridor can consider and include regional flood improvements identified in the flood management strategies.

**Action #16** Co-ordinated road upgrades to improve flood resilience of RAAF Base Amberley

Timing unknown (In-kind time required)

RAAF Base Amberley currently experiences significant flooding impacts which result in parts of the base (including the runway) being flooded and access roads being cut off (except parts of Cunningham Highway and Rosewood Road). The Western Ipswich Bypass will connect the Warrego Highway at Haigslea and the Cunningham Highway at Willowbank. This work will include an upgrade of a section of the Cunningham Highway near the RAAF Base Amberley.

It is proposed that meetings are held between stakeholders to ensure that the planning and design of the Cunningham Highway upgrades also consider opportunities to improve the flood immunity of local access roads and also address traffic implications for the biggest RAAF base in Australia. Designs should also consider terrestrial and aquatic passage. Note that the flooding requirements may change if flood levels are altered due to regional flood management solutions.

## Urban hydrology management

**Action #12** Investigate the impact of altered hydrology from new urban areas on bank stability, geomorphology and flooding and identify required development outcomes to address this

2019/2020, $90k estimated for study

Urban environments can be highly impervious and therefore can pose a flood risk (due to increased runoff volumes), channel erosion risk (due to increased flows) as well as heat exposure risk (due to urban heat island effect).

New urban development must meet the requirements of the State Planning Policy 2017 and the Local Council Planning Scheme in terms of flooding, waterway stability and design. The Planning scheme requires no worsening for flooding (ensure the drainage capacity is ok) and also mentions shade awnings and street trees in the design of buildings in the CBD. Ipswich City Council also undertakes precinct plans to inform the planning and design of open spaces across the city.

The State Planning Policy 2017 includes a design objective for waterway stability which applies 'if development drains to an unlined waterway within or downstream of the site where a risk of increased erosion exists due to changes in hydrology.'[10]

It is understood that this detention is not always required for developments in Ipswich as it is contested whether it is necessary based on the condition of the receiving environment.

It is proposed that a study be undertaken which determines if and how Bremer waterways are impacted by altered hydrology and identifies suitable solutions for the local area. For example:

- Waterway stability objectives and appropriate solutions for new urban developments which are suitable to address impacts in the Bremer waterways
- Feasibility of using smart rainwater tanks or green infrastructure in new developments or retrofits (including open space precinct plans) to reduce nuisance flooding or urban heat risks.

[10] https://dilgpprd.blob.core.windows.net/general/spp-july-2017.pdf

## Floodplain / wetland management

**Action #13** Determine the value / services of floodplains and wetlands to help justify protection

2019 ($75k estimated for study)

Currently floodplains and wetlands are preserved in flood prone land but there are limited requirements for the preservation of these values outside of the current flood regulation line for new urban development.

It is proposed that a study which identifies the services provided by these areas and can assign the environmental, social and economic benefits provided by floodplains and wetlands would be beneficial to help

justify why they need to be protected on rural lands and in new urban development areas. This will also help to support the Ipswich Waterway Health Strategy which has a number of actions focused on the protection of wetlands and floodplains.

## Precinct or corridor stormwater, flood and / or waterway management strategies

**Action #14** Develop precinct integrated water management plans for key growth areas

2019-2020 ($75k estimated per study)

Currently stormwater management plans and flood management plans are submitted for individual development sites which makes it difficult to understand how the proposed solution fits within a regional solution.

It is proposed that integrated water management plans are developed for the urban development areas along Western Growth Corridor to identify suitable regional solutions for waterway, stormwater and/or flood management which can be used in negotiations with developers to ensure that the solutions delivered address regional waterway and flooding outcomes.

Creek Corridor Plans have been developed in the past by Ipswich City Council which could be used as a template for this work.

Currently Ipswich is one of the only Councils in South East Queensland which does not have a Local Government Infrastructure Plan (LGIP) for stormwater (quantity or quality) to inform how infrastructure charges can be spent on stormwater projects.

It is proposed that discussions are held to understand how infrastructure charging could support stormwater planning in the future.

## Bremer Flows

**Action #15** Identify flow requirement to improve Bremer Estuary water quality and compare this to current Moreton Plan water allocations and water usage

2020 (Estimated $90k to undertake study)

A previous study by the Cooperative Research Centre (CRC) for Coastal Zone, Estuary and Waterway Management identified that the provision of environmental flows could improve the condition of the Bremer Estuary. Currently the poor water quality in the estuary is a key factor in the poor Healthy Land and Water report card score.

The Moreton Resources Operation Plan regulates the use of water in the Bremer Catchment for irrigation purposes and sets allocations for licenced users. Landholders adjacent to waterways are also able to extract water from the catchment without a licence for stock or domestic watering purposed. No new licences for groundwater or surface water extraction are available for the Moreton region.

It is proposed that an investigation is undertaken to re-investigate the required environmental flow to improve the condition of the Bremer Estuary. This study should compare this environmental flow volume to the total flows in the Bremer catchment and water that is currently allocated and currently used in the catchment to understand where trade-offs might need to occur.

Council of Mayors
South East Queensland

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