

# NOTICE OF MEETING



## COASTAL ESTUARY CATCHMENT PANEL MEETING

A Coastal Estuary Catchment Panel Meeting of Byron Shire Council will be held as follows:

Venue	Conference Room, Station Street, Mullumbimby
Date	Thursday, 21 October 2021
Time	11.30am

Phillip Holloway  
Director Infrastructure Services

I2021/1648  
Distributed 14/10/21



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## CONFLICT OF INTERESTS

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**What is a “Conflict of Interests”** - A conflict of interests can be of two types:

**Pecuniary** - an interest that a person has in a matter because of a reasonable likelihood or expectation of appreciable financial gain or loss to the person or another person with whom the person is associated.

**Non-pecuniary** – a private or personal interest that a Council official has that does not amount to a pecuniary interest as defined in the Code of Conduct for Councillors (eg. A friendship, membership of an association, society or trade union or involvement or interest in an activity and may include an interest of a financial nature).

**Remoteness** – a person does not have a pecuniary interest in a matter if the interest is so remote or insignificant that it could not reasonably be regarded as likely to influence any decision the person might make in relation to a matter or if the interest is of a kind specified in the Code of Conduct for Councillors.

**Who has a Pecuniary Interest?** - a person has a pecuniary interest in a matter if the pecuniary interest is the interest of the person, or another person with whom the person is associated (see below).

**Relatives, Partners** - a person is taken to have a pecuniary interest in a matter if:

- The person’s spouse or de facto partner or a relative of the person has a pecuniary interest in the matter, or
- The person, or a nominee, partners or employer of the person, is a member of a company or other body that has a pecuniary interest in the matter.

N.B. “Relative”, in relation to a person means any of the following:

- (a) the parent, grandparent, brother, sister, uncle, aunt, nephew, niece, lineal descends or adopted child of the person or of the person’s spouse;
- (b) the spouse or de facto partners of the person or of a person referred to in paragraph (a)

**No Interest in the Matter** - however, a person is not taken to have a pecuniary interest in a matter:

- If the person is unaware of the relevant pecuniary interest of the spouse, de facto partner, relative or company or other body, or
- Just because the person is a member of, or is employed by, the Council.
- Just because the person is a member of, or a delegate of the Council to, a company or other body that has a pecuniary interest in the matter provided that the person has no beneficial interest in any shares of the company or body.

### Disclosure and participation in meetings

- A Councillor or a member of a Council Committee who has a pecuniary interest in any matter with which the Council is concerned and who is present at a meeting of the Council or Committee at which the matter is being considered must disclose the nature of the interest to the meeting as soon as practicable.
- The Councillor or member must not be present at, or in sight of, the meeting of the Council or Committee:
  - (a) at any time during which the matter is being considered or discussed by the Council or Committee, or



- (b) at any time during which the Council or Committee is voting on any question in relation to the matter.

**No Knowledge** - a person does not breach this Clause if the person did not know and could not reasonably be expected to have known that the matter under consideration at the meeting was a matter in which he or she had a pecuniary interest.

**Non-pecuniary Interests** - Must be disclosed in meetings.

There are a broad range of options available for managing conflicts & the option chosen will depend on an assessment of the circumstances of the matter, the nature of the interest and the significance of the issue being dealt with. Non-pecuniary conflicts of interests must be dealt with in at least one of the following ways:

- It may be appropriate that no action be taken where the potential for conflict is minimal. However, Councillors should consider providing an explanation of why they consider a conflict does not exist.
- Limit involvement if practical (eg. Participate in discussion but not in decision making or vice-versa). Care needs to be taken when exercising this option.
- Remove the source of the conflict (eg. Relinquishing or divesting the personal interest that creates the conflict)
- Have no involvement by absenting yourself from and not taking part in any debate or voting on the issue as of the provisions in the Code of Conduct (particularly if you have a significant non-pecuniary interest)

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## RECORDING OF VOTING ON PLANNING MATTERS

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### Clause 375A of the Local Government Act 1993 – Recording of voting on planning matters

- (1) In this section, **planning decision** means a decision made in the exercise of a function of a council under the Environmental Planning and Assessment Act 1979:
- (a) including a decision relating to a development application, an environmental planning instrument, a development control plan or a development contribution plan under that Act, but
- (b) not including the making of an order under that Act.
- (2) The general manager is required to keep a register containing, for each planning decision made at a meeting of the council or a council committee, the names of the councillors who supported the decision and the names of any councillors who opposed (or are taken to have opposed) the decision.
- (3) For the purpose of maintaining the register, a division is required to be called whenever a motion for a planning decision is put at a meeting of the council or a council committee.
- (4) Each decision recorded in the register is to be described in the register or identified in a manner that enables the description to be obtained from another publicly available document, and is to include the information required by the regulations.
- (5) This section extends to a meeting that is closed to the public.



**BYRON SHIRE COUNCIL**  
**BUSINESS OF MEETING**

**1. APOLOGIES**

**2. DECLARATIONS OF INTEREST – PECUNIARY AND NON-PECUNIARY**

**3. ADOPTION OF MINUTES FROM PREVIOUS MEETINGS**

- 3.1 Adoption of Minutes from Previous Meeting ..... 5

**4. STAFF REPORTS**

**Sustainable Environment and Economy**

- 4.1 Update on 'Coast, Estuary and Catchment' Projects ..... 13  
4.2 Wetland Dieback within the Belongil Catchment - preliminary assessment..... 20  
4.3 'Bringing Back the Bruns' - Causeways and Fish Passage Improvements ..... 38



## BYRON SHIRE COUNCIL

### ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

3.1

### ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

#### **Report No. 3.1      Adoption of Minutes from Previous Meeting**

**Directorate:** Infrastructure Services

5 **Report Author:** Dominika Tomanek, Executive Assistant Infrastructure Services

**File No:** I2021/1638

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10 **RECOMMENDATION:**

**That the minutes of the Coastal Estuary Catchment Panel Meeting held on 20 May 2021 be confirmed.**

15 **Attachments:**

1 Minutes 20/05/2021 Coastal Estuary Catchment Panel, I2021/792 , page 8 [↓](#)



## Report

The attachment to this report provides the minutes of the Coastal Estuary Catchment Panel Meeting of 20 May 2021 .

5

### Report to Council

The minutes were reported to Council on

### Comments

10

In accordance with the Committee Recommendations, Council resolved the following:

**Report No. 13.24      Report of Coast Estuary Catchment Panel 20 May 2021**  
**File No:                      I2021/981**

#### **21-203 Resolved:**

1. That Council notes the minutes of the Coastal Estuary Catchment Panel Meeting held on 20 May 2021.
2. That Council adopts the following Panel Recommendation:

#### **Report No. 3.1      Adoption of Minutes from Previous Meeting**

File No: I2021/777

#### Panel Recommendation 3.1.1

That the minutes of the Coastal Estuary Catchment Panel Meeting held on 10 September 2020 be confirmed.

3. That Council does not adopt Panel Recommendation(s) 4.1 as shown in the attachment to this report, but instead adopts the Management Recommendation(s) as follows:-

#### **Report No. 4.1      'Bringin Back the Bruns' - project update**

File No: I2021/735



## BYRON SHIRE COUNCIL

### ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

3.1

#### Management Recommendation

That the Coastal and Estuary Panel:-

1. Note the update and support the 'Bringing Back the Bruns' project.
2. Receive further advice on the positive changes to fish movements due to the 'Bringing Back the Bruns' causeway removal thus far.
4. That Council adopts the following Panel Recommendation:

#### **Report No. 4.2 Coastal Management Program for the Richmond River**

File No: I2021/736

#### Panel Recommendation 4.2.1

That Council notes the update on the development of a Coastal Management Program for the Richmond River estuary and catchment.

5. That Council adopts the following Panel Recommendation:

#### **Report No. 4.3 Overview of ICOLL Recent Openings - Tallow and Belongil**

File No: I2021/745

#### Panel Recommendation 4.3.1

That Council notes the overview on the recent ICOLL openings at Tallow and Belongil Creek.



**M I N U T E S   O F   M E E T I N G**



**COASTAL ESTUARY CATCHMENT PANEL  
MEETING**

Venue	Conference Room, Station Street, Mullumbimby
Date	Thursday, 20 May 2021
Time	4.30pm

*I2021/792  
Distributed 13/05/21*







# BYRON SHIRE COUNCIL

## ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

## 3.1 - ATTACHMENT 1

### BYRON SHIRE COUNCIL

COASTAL ESTUARY CATCHMENT PANEL MEETING MINUTES

20 MAY 2021

**Minutes of the Coastal Estuary Catchment Panel Meeting held on Thursday, 20 May 2021**

**File No:** I2021/792

**PRESENT:** Cr C Coorey, Cr J Hackett, Cr M Lyon

Staff: Phillip Holloway (Director, Infrastructure Services)  
James Flockton (Flood and Drainage Engineer)  
Chloe Dowsett (Coastal & Biodiversity Coordinator an)  
Orla Seccull (Coastal and Estuary Officer)  
Peter Boyd (Biodiversity and Agricultural Projects Officer)

Community Representatives: Mathew Lambourne, and Duncan Dey

*Cr Lyon (Chair) opened the meeting at 4:35 pm and acknowledged that the meeting was being held on Bundjalung Country.*

#### **APOLOGIES:**

Mary Gardner

Tim Hochgrebe

#### **DECLARATIONS OF INTEREST – PECUNIARY AND NON-PECUNIARY**

There were no declarations of interest.

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### **ADOPTION OF MINUTES FROM PREVIOUS MEETINGS**

**Report No. 3.1      Adoption of Minutes from Previous Meeting**  
**File No:              I2021/777**



## BYRON SHIRE COUNCIL

### ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

3.1 - ATTACHMENT 1

## BYRON SHIRE COUNCIL

COASTAL ESTUARY CATCHMENT PANEL MEETING MINUTES

20 MAY 2021

### Committee Recommendation:

**That the minutes of the Coastal Estuary Catchment Panel Meeting held on 10 September 2020 be confirmed.**

(Lyon/Coorey)

*The recommendation was put to the vote and declared carried.*

### BUSINESS ARISING FROM PREVIOUS MINUTES

There was no business arising from previous minutes.

Cr Lyon left the Chambers at 5:03 PM and Cr Coorey became a chair.

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## STAFF REPORTS - SUSTAINABLE ENVIRONMENT AND ECONOMY

**Report No. 4.1      'Bringin Back the Bruns' - project update**  
**File No:              I2021/735**

### Committee Recommendation:

1. That the Coastal and Estuary Panel note the update and support the project.
2. That Council would like to understand if there have been any positive changes to fish movements due to the Bringing Back the Bruns causeway removal thus far.

(Coorey/Hackett)

*The recommendation was put to the vote and declared carried.*

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**Report No. 4.2      Coastal Management Program for the Richmond River**  
**File No:              I2021/736**

### Committee Recommendation:

**That Council notes the update on the development of a Coastal Management Program for the Richmond River estuary and catchment.**



# BYRON SHIRE COUNCIL

## ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

## 3.1 - ATTACHMENT 1

### BYRON SHIRE COUNCIL

COASTAL ESTUARY CATCHMENT PANEL MEETING MINUTES

20 MAY 2021

(Coorey/Hackett)

*The recommendation was put to the vote and declared carried.*

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**Report No. 4.3**  
**File No:**

**Overview of ICOLL Recent Openings - Tallow and Belongil**  
**I2021/745**

**Committee Recommendation:**

**That Council notes the overview on the recent ICOLL openings at Tallow and Belongil Creek.**

(Coorey/Hackett)

*The recommendation was put to the vote and declared carried.*

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*There being no further business the meeting concluded at 6.36 pm.*



STAFF REPORTS - SUSTAINABLE ENVIRONMENT AND ECONOMY

**Report No. 4.1      Update on 'Coast, Estuary and Catchment' Projects**

- 5    **Directorate:**                      Sustainable Environment and Economy
- Report Author:**                Chloe Dowsett, Coastal and Biodiversity Coordinator  
   Orla Seccull, Coastal & Estuary Officer  
   Scott Moffett, Drainage & Flood Engineer, IS - Works -  
   Infrastructure Planning
- 10   **File No:**                            I2021/1462

**Summary:**

This report provides the Panel members with an update on current projects and programmes being undertaken by Council in the coast, estuary and catchment portfolio, including:

- 15        • Coastal Management Programs
- ICOLL Entrance Opening Strategies
- Byron Bay - Main and Clarkes Beach Dune Stabilisation Project
- 'Bringing Back the Bruns'
- Floodplain Projects

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**RECOMMENDATION:**

**That the Coast and Estuary Catchment Panel note the staff update on 'Coast, Estuary and Catchment' projects.**

25







## Report

### Coastal Management Programs – background and update on preparation

5 Coastal Management Programs (CMP) set out the long-term strategy for the coordinated management of the coastal zone by council, public authorities, land managers and the community. The development of a CMP is a staged process comprising four key stages. Initially it was expected that the new process would enable a Council to work through the stages in up to 3 years, however this may be more likely to look like up to 5 years.

10 CMP's provide a unique opportunity for Council, state government agencies and their communities to achieve a strategic and coordinated approach to manage coastal risks and improve coastal habitats and environments, for both environmental and social benefit within the Byron Shire. Preparation of a CMP provides an opportunity to improve engagement with various landowners, Traditional Owners, coastal managers and stakeholders gaining support for the CMP.

15 Council embarked on developing CMP's for its coastline in 2019. The commencement of CMP preparation was instigated after the Department for Primary Industries and Environment (DPIE) strongly advised Council to include catchments in the CMP process rather than do a separate catchment management plan.

20 However, regarding CMP preparation there are several key issues being encountered which includes lack of guidance to local councils in the catchment space.

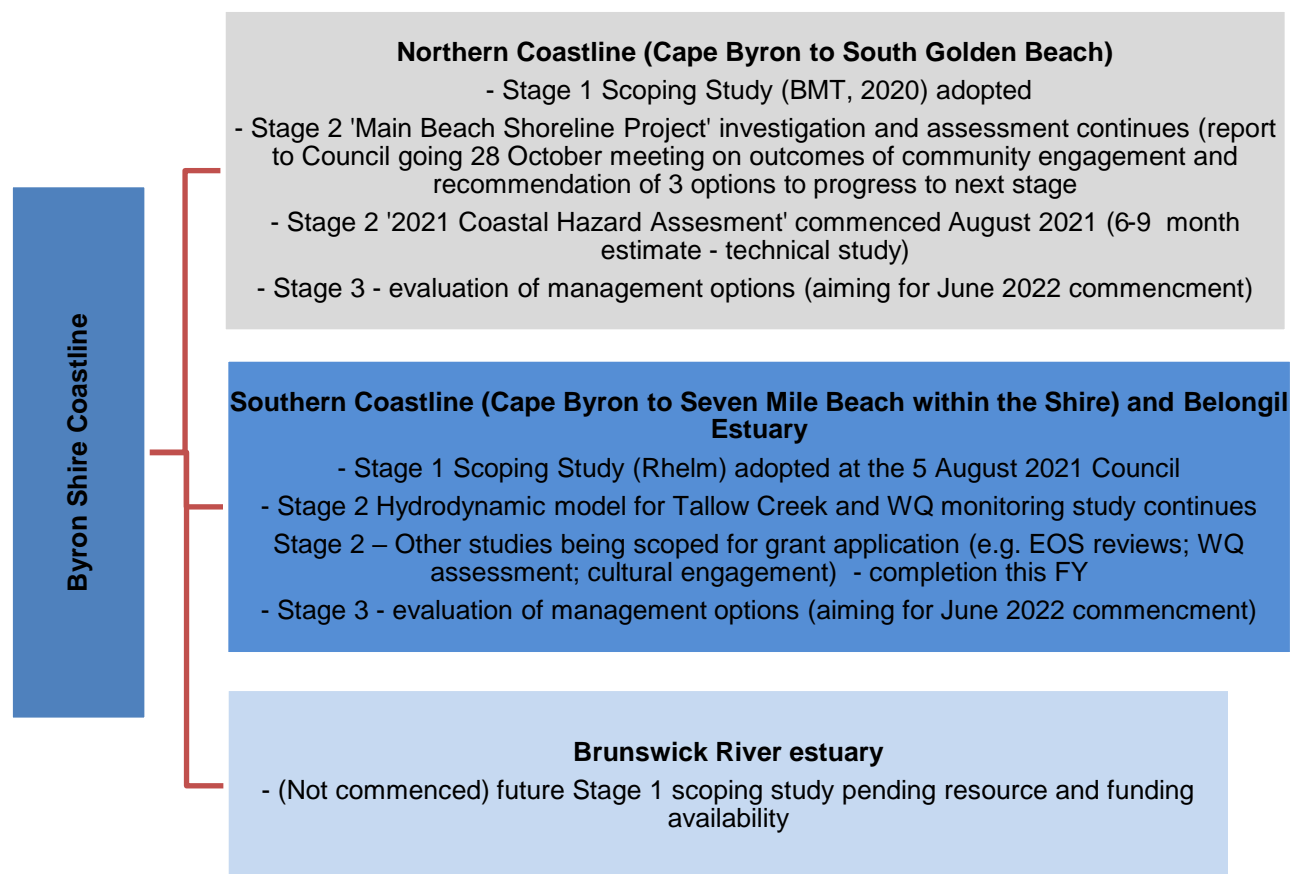
25 Best practice management of the coastal zone currently aims towards a connected catchment / floodplain-to-coast approach through CMP preparation. However, information is needed on how to include broader catchment issues and effectively integrate catchment, coast and marine policy and governance.

### Project Status

The diagram below provides an overview of the two separate coastal areas and the one estuary within Byron Shire. Along with the project actions for these area to date.

30 The Brunswick River is an estuary and will be dealt with outside of the Northern Coastline CMP.





5 The CMP for the Southern Byron Shire Coastline and the Belongil Creek catchment focuses on key management issues and threats to the coastal areas from Broken Head in the south to Cape Byron in the north, also including the coastal creeks and lakes including Belongil Creek estuary, Tallow Creek estuary, Ti Tree (Taylor's) Lake and their wider catchments.

10 The CMP will be a long-term strategy to guide Council and other stakeholders in the management of these popular but environmentally sensitive areas. As noted in the CMP update, Council adopted the Stage 1 Scoping Study for the southern Byron Shire coastline and the Belongil Creek estuary at its 5 August 2021 meeting.

An outcome of Stage 1 was the identification of studies and activities required to fill key data gaps and to answer questions relating to priority management issues.

These include:

- Coastal hazard assessment
- 15 • Review of Entrance Opening Strategies
- Mapping of an erosion escarpment, a coastal vulnerability area and verification of existing mapping of coastal wetlands and littoral rainforests.
- Identification of water pollution sources.



- An audit of the coastal planning framework for Byron Shire.
- Preliminary mapping of Aboriginal cultural heritage and values in the coastal zone.
- Ongoing implementation of the Community and Stakeholder Engagement Strategy.
- Activities involving engagement of Aboriginal cultural knowledge holders.

### 5 ICOLL Entrance Opening Strategies:

Review of both Belongil and Tallow Creek Entrance Opening Strategies (EOS) are outlined in the Forward Plan of the Stage 1 Scoping Study. They are recommended as investigations to complete in the second stage of the CMP considering the outcomes of other stage 2 investigations (such as the Coastal Hazard Assessment Study which has just commenced. Hence, the reviews are anticipated to not occur until around April 2022.

A recent resolution from the 5 August 2021 Council meeting has raised the need for a review of the Belongil EOS to be completed sooner, therefore, an initial preliminary review of the EOS proposed to be reported to Council by the end of the 2021. This will be internal staff review.

A more detailed technical review will build on the knowledge base and consideration of the items first assessed in the preliminary review, along with outcomes of other studies.

Staff have commenced the review with the intention to report to provide a preliminary report to Council on the outcomes to the 25 November 2021 meeting.

### Byron Bay - Main and Clarkes Beach Dune Stabilisation Project

Main and Clarke's Beach dunes have experienced significant erosion and recession removing the front face, large volumes of sand and the majority of dune vegetation.

Recent media coverage evidence the value and importance that beach condition is to protect it for all that use or benefit from it. This project aims to restore the sand dune ecosystems of Main and Clarkes Beach within the Byron Bay Embayment, using 'soft stabilisation' techniques described in the 'Coastal Dune Management Manual' (DPIE, 2001).

The aim of the project is to:

- help protect the dunal system against short to medium-term erosion and inundation;
- restore/rehabilitate the dunal ecosystem and habitat; and
- improve public beach access and amenity.

The project will involve 'beach scraping' which redistributes sand within the system to artificially speed up dune building (volume and height), rehabilitation of dune ecosystems and habitat, and restoration of public beach access ways (including removal of some access ways).



The expected outcomes are:

- increase in sand volumes and coastal hazard risk reduction
  - restoration/rehabilitation of dune ecosystems and habitat
  - restoration of public beach access ways
- 5
- improved beach amenity
  - improved benefit for the Byron Bay community

A funding application was submitted in August 2021 to the Coast and Estuary Grants Program for a funding amount of \$82,000 (50%). Total project cost is \$164,000.

### Bringing Back the Bruns

#### 10 Fish Habitat Restoration Program – successful grant

Contracting, sub-contracting and design discussions have commenced with partners North Coast Local Land Services (NCLLS) and Soil Conservation Service for the *Bringing Back the Bruns* project on the Brunswick River in Mullumbimby. The project has been extended by 6 months due to the delayed release of the funding agreement to NCLLS.

#### 15 Fisheries Habitat Action Grant (2019) – Mullumbimby Riparian Riverbank Project

1.8km of primary and follow up weed control was completed at the end of September. A community information day was held Saturday 9 October 2021, identifying the weeds of the area, community bush protection and regeneration.

#### Causeways and Fish Passage Improvements

- 20 This is a long-term project that has received immense success in recent years, due to numerous causeways needing renewal and Department of Primary Industries (DPI) grant.

At the meeting a separate presentation will be given to the Panel on this work by a DPI staff member.

### Floodplain Projects

- 25 During the last 12 months Council has adopted the North Byron Flood Risk Management Study and Plan. This was a large body of work that assessed all flood risk and potential mitigation within the Brunswick River catchment. Including Simpsons and Marshalls Creek.

- 30 Staff have sought grant funding to commence some actions from the plan. Council are awaiting the outcome of the 2021 DPIE Floodplain Management Grants applications for overland flow path studies of Ocean Shores and New Brighton, the Byron Bay Drainage Upgrade Project and the Federation Bridge Debris Deflector project.



## BYRON SHIRE COUNCIL

### STAFF REPORTS - SUSTAINABLE ENVIRONMENT AND ECONOMY

4.1

Council Incident Management System Flood Warning System is now operation and in use by Council and local SES.

#### **Financial Implications**

NA

#### **5 Statutory and Policy Compliance Implications**

NA



**Report No. 4.2      Wetland Dieback within the Belongil Catchment - preliminary assessment**

**Directorate:** Sustainable Environment and Economy

**Report Author:** Chloe Dowsett, Coastal and Biodiversity Coordinator  
Scott Moffett, Drainage & Flood Engineer, IS - Works - Infrastructure Planning

**File No:** I2021/1482

**Summary:**

This report provides the Panel members with the outcomes of a preliminary assessment into the dieback of wetland within the area of Drainage Union lands of the Belongil Catchment.

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**RECOMMENDATION:**

**That the Panel notes the outcome of the preliminary assessment into the dieback of wetland within the area of Drainage Union lands of the Belongil Catchment.**

<Section5>

**Attachments:**

- 1 Australian Wetlands Consulting - Preliminary Assessment of Wetland Dieback in Belongil Catchment Drainage Union Land, E2021/99382 , page 23[↓](#)



## Report

Recently there has been concern regarding Council's current Entrance Opening Strategy (EOS, 2019) due to perceived impact to agricultural land within the Drainage Union lands of the Belongil catchment.

The concern is that dieback of Swamp Paperbark Forest (Melaleuca wetland) is a result of Council's mismanagement of the catchment hydrology which will lead to 'ecological collapse' within the catchment. This mismanagement assertion includes both the management of the Belongil entrance and the operation of the Byron Bay Sewerage Treatment Plan (BBSTP) in relation to water re-use and non-compliance with STP Conditions.

A site inspection conducted on Thursday, July 15 of lands within the catchment was attended by Councilors, staff, agencies, consultants, stakeholders and the media.

At the 5 August 2021 **Res 21-298** was made that Council:

1. *Undertakes a review of the current Opening Strategy for the Belongil ICOLL to determine whether it is impacting adversely on upstream lands within the Drainage Union catchment and/or flooding issues within the Byron Bay township.*
2. *Reviews its performance in comparison to the earlier 2001 Opening Strategy (Belongil Estuary Management Plan – Parker and Pont 2001).*
3. *Supports that this review should also address the likely impacts of the new Overland Flow Route on the ICOLL and from increased effluent flows proposed from the Byron Bay Sewage Treatment Plant (BBSTP), both upstream on Drainage Union lands and downstream at the mouth opening. (Lyon/Ndiaye)*

As outlined in the 'Coast, Estuary and Catchment' Projects update report review of the current EOS for Belongil (2019) has commenced. To inform the review Council commissioned a preliminary assessment by Australian Wetlands Consulting of the potential causes of dieback of Swamp Paperbark Forest (Melaleuca wetland) within the catchment, along with any knowledge gaps and need for additional investigations.

The report is provided as an attachment to this report (Attachment 1).

The report authors will provide an overview of the outcomes of the report to the Panel with discussion of the content.

## Financial Implications

NA



**Statutory and Policy Compliance Implications**

NA





## Technical Memorandum

Preliminary response to potential causes of Melaleuca dieback within the Belongil Catchment

To: Scott Moffett

From: Damian McCann

Date: 30<sup>th</sup> July 2021

Pg/Attach.: 14

Job ref: 1-211444

### Introduction and background

Significant dieback within Swamp Paperbark Forest has occurred within private land in a portion of the Belongil Creek Catchment and has been reported to Council by the President of Belongil Drainage Union. The Union asserts the dieback is a result of Council's mismanagement of the catchment hydrology which will lead to ecological collapse within the catchment. In response Council have requested AWC prepare a preliminary assessment of the potential causes of the dieback along with any knowledge gaps and need for additional investigations.

There are two key aspects of the Belongil Creek catchment hydrology which Council controls: discharge from the Byron STP and the Belongil Creek entrance opening. Both are licensed activities guided by plans of management developed in consultation with regulatory bodies and other stakeholders.

The Byron STP operating license (3404) permits wastewater to be discharged into the upper Union Drain. The current average daily discharge to the drain (excluding urban reuse) as noted in the 2020 Annual Return (NSW EPA, 2020) is approximately 3.6 ML/day. This includes flows from the decommissioned South Byron STP, which were transferred to West Byron STP in 2005. In recognition of potential impacts upon adjoining farm land (properties becoming wetter), an alternative flow path is being commissioned through the Byron Arts and Industrial Estate but will not be operational until 2022. The option to discharge into the Upper Union Drain will be maintained after this new discharge arrangement is in place.

Water | Ecology | Management

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Australian Wetlands Consulting Pty Ltd  
ABN 81 140 533 919





The Belongil Creek estuary entrance has been mechanically opened under a conditional interim licence since 2001 based on the draft Belongil Estuary Study and Management Plan (2001). The Plan was originally developed in response to environmental impacts within the catchment including fish kills, acid sulfate soil production and peat fires, which resulted from prevailing land use and an ad hoc opening regime. A condition of the interim 2001 licence requires Council to develop a sustainable long-term Opening Strategy based on a comprehensive understanding of the system, conditions and processes. In 2019, Council engaged Alluvium Consulting to prepare a long-term and sustainable Entrance Opening Strategy and associated Environmental Management Plan (collectively called an Opening Strategy) for Belongil Creek (Alluvium, 2019). The Opening Strategy seeks to minimise the impacts on natural littoral processes and the fragile ecosystems which exist within the Belongil Creek catchment, while also protecting the community and existing built assets from flooding. It aims to provide a balanced approach to managing the entrance for flood mitigation purposes while supporting the many key values of the catchment.

The Opening Strategy was developed in consultation with numerous agencies and key stakeholders (National Parks, Marine Parks Authority, Arakwal, Department of Planning Industry and Environment, Belongil Drainage Union) and guides decisions of when and how to open the Belongil Creek mouth.

The current regime outlines a decision support framework which guides entrance management decision making based on the estuary water level, the rainfall forecast, ocean levels and berm heights. There is some flexibility in the framework with a 'watch' level of 1.0m AHD and 'act' level of 1.1m AHD. The EOS is about to undertake a minor review to incorporate more recent information regarding ICOLLs and State-wide best practice management in relation to accompanying rainfall being used as a measure to reduce the possibility of fish kill; and lessons learnt thus far from the implementation of the current strategy.

Extensive monitoring of hydrology, water quality and hydrology occurs in support of STP discharge and entrance opening events with the results of monitoring reported to State agencies and the Wastewater Steering Committee and are publicly available.

#### Scope of this report

Management of the Belongil Creek catchment is complex. While there is a desire to maintain a natural opening regime and estuarine processes, substantial catchment changes (construction of the Union Drainage scheme, agriculture and urban development) make some degree of active management unavoidable. Consideration of all these issues is beyond the scope of this preliminary report which will focus on potential causes for dieback of Paperbark Swamp Forest within the Vidal property.





This report considers the following:

- The nature and extent of the dieback occurring
- Possible causes of dieback
- Historical photos and other records which provide historical context and potential duration over which dieback has been occurring
- The assertion by the Drainage Union that the dieback results from elevated STP discharge and the new Entrance Opening Strategy (2019)
- Gaps in knowledge and data and suggestions for additional monitoring

Areas considered in this report are shown in Attachment 2.

#### Nature and extent of dieback occurring

The area of dieback extends from the southern boundary of Lot 181 DP 755695 (268 Ewingsdale Road) the former chicken abattoir south east through Lot 11, DP1143215 (Tom Vidal's land) before meeting the Union Drain. The extent of dieback is shown in aerial imagery from July 2021 in

*Figure 1.* LiDAR shows this extent to be generally lower than surrounding lands and is an overland flow path. There has been extensive tree fall through the area along with loss of foliage. The vegetation in this area generally comprises a dense canopy of semi-mature Paperbark (*Melaleuca quiquenervia*) a sparse mid-storey and dense ground cover comprising a mosaic of wetland plants (*Phragmites australis*, *Eleocharis equisetina*, *Typha orientalis*), ferns (*Pteridium esculentum*, *Hypolepis muelleri*) and non-native grasses (*Urochloa mutica*, *Setaria sphacelata*). Council's mapping shows this area is Class 2 acid sulfate soils.

#### Processes for acid production on coastal floodplains

Coastal floodplains comprise mosaics of sedimentary deposits high in iron sulfides. These soils produce sulfuric acid when subjected to periods of wetting and drying which is then washed into waterways and is toxic to plants and aquatic life (Tulau, 2007). The acid dissolves iron and aluminium, also toxic to downstream aquatic environments, with the iron flocculating under certain conditions smothering plants and waterways.

Wetting and drying of potential and actual acid sulfate soils will move sulfuric acid to the soil surface and laterally through soils, leading to export downstream. These two pathways are shown in *Figure 2*. These processes are accelerated when floodplains are drained and developed for agriculture and urban development (Anorov et al., 2008). It appears that a prolonged dry period in 2018-2019 in which the watertable lowered and oxidised acid layers, followed by rain mobilised large quantities of sulfuric acid and dissolved iron which turned Belongil Creek a reddish colour (See Plate 1). Review of aerial imagery





from this time suggests acid export occurred between at least March and May, 2019. Attachment 1A is from March 2019.

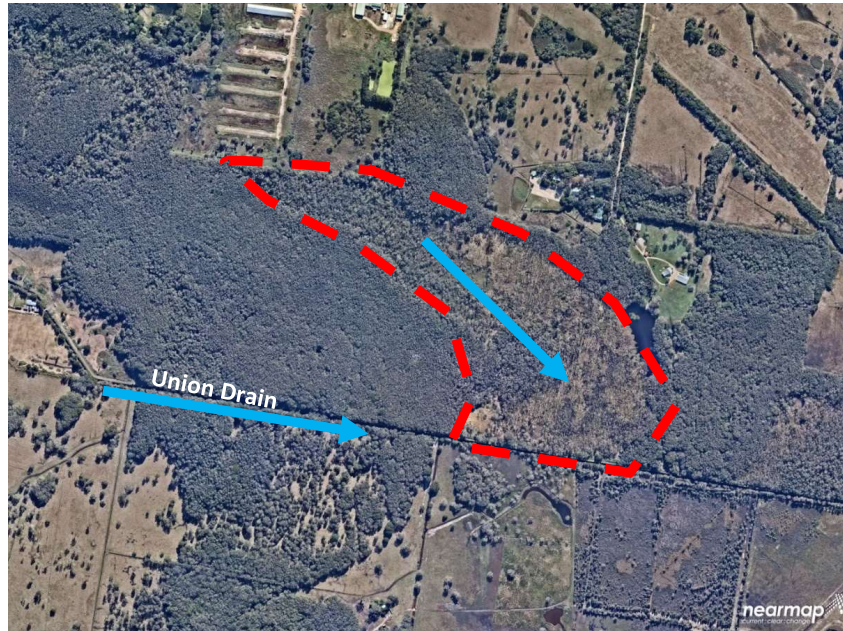


Figure 1 Area of dieback and general direction of flow. Source Nearmap July 2021



Plate 1: Belongil Creek at Ewingsdale Bridge in May 2019, with iron rich flows





### Groundwater seepage

- Seepage occurs when the groundwater level is higher than the drain water level.
- Most of the seepage occurs when the groundwater level is between the surface and the minimum low tide level in adjacent drains.
- This can lead to frequent, chronic acid discharge and high acid export rates.
- *This is an important pathway at high hydraulic conductivity sites.*



### Surface run-off

- Shallow groundwater and evaporation leads to accumulation of acid salts on the surface.
- Rainfall saturates the soil profile and causes surface run-off to the drain.
- Acid discharge events are usually more infrequent, with lower acid export rates.
- *This is a more important pathway at sites with low hydraulic conductivity or very low elevation.*

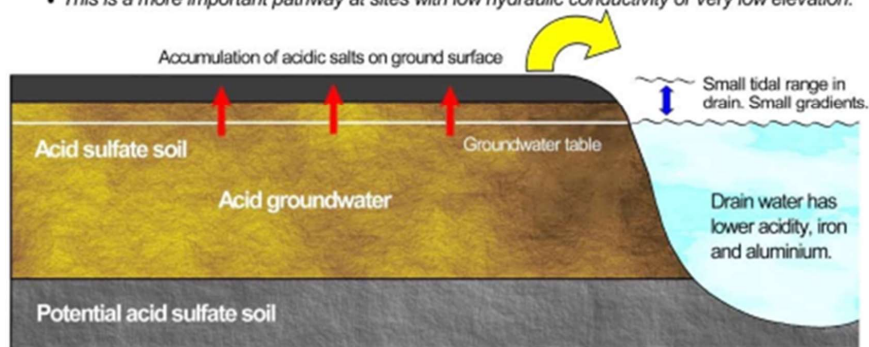


Figure 2 Two pathways for acid export – lateral groundwater seepage and surface run-off. Processes occurring within the dieback area require confirmation. (Source, Tulau, 2007).

Potential for impact by Council activities - drain conveyance capacity and hydraulic loading of the catchment

A review of historical imagery suggest that tree dieback has been occurring through this location for at least 30 years. Attachment 1B shows the subject area in 1997 with the same general pattern of impact being visible. Attachment 1C shows the area in 1987 with the same shape of dieback clearly identifiable.





Attachment 1D is from 1965 and shows the affected area and the broader floodplain context and how the Union Drain has dissected the original creek flowpath which includes the subject area.

The dieback in the subject location is possibly episodic, triggered by a combination of processes and factors including drain management, prevailing rainfall, and prolonged groundwater lowering. The location corresponds with a localised flow path originating in the Arts and Industrial Estate, through Lot 181 DP755695 which for over 30 years has delivered elevated and eutrophic stormwater downstream (See Attachment 2). The area was historically cleared for sand mining and grazing with the vegetation in the area generally less than 30 years old. Further interrogation of historic photographs may assist in confirming when the impact first began and what sequence of land use activities has occurred.

Discharge into the upper Union Drain flows south under Ewingsdale Road through Lots 181 DP755695, 10 and 11 DP114345 (See Attachment 2). The average STP discharge rate of 3.8ML/day corresponds to around 44L/s or 0.044m<sup>3</sup>/s. Past survey completed by AWC shows the Union Drain (prior to enlargement in 2020 by the Drainage Union) had a cross sectional area of around 5.8m<sup>2</sup> when flowing past the Vidal property (see Figure 3) and a theoretical conveyance capacity of between 4m<sup>3</sup>/s and 5m<sup>3</sup>/s. At 4m<sup>3</sup>/s, the discharge from the STP is less than 1% of drain conveyance capacity and could not conceivably inhibit drainage of the area in question sufficient to cause stress and dieback of *Melaleucas* due to prolonged inundation.

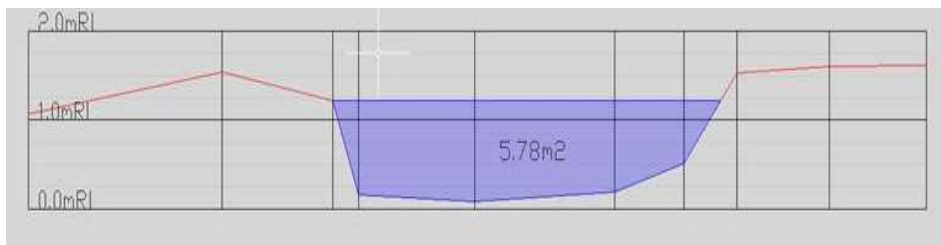


Figure 3 Surveyed cross section of the Union Drain flowing past the Vidal property prior to enlargement in 2020 (Source, AWC)

The Belongil Entrance Opening Strategy prohibits entrance openings in the absence of rainfall however STP discharge always occurs meaning this water is held in the catchment and will create wetter conditions compared to if there was no STP discharge. This will be detrimental for terrestrial plants such as pasture grasses and allow water tolerant plants to establish. *Melaleuca quiquenervia* is highly tolerant of prolonged inundation - as evidenced by the *Melaleuca* wetland cells within the Byron STP and the 24 hectare irrigation area, suggesting the dieback is caused by other factors.





The area of dieback is in a discreet location and there is no evidence of a similar process occurring on other parts of the Vidal property or the catchment (though this should be investigated and confirmed). In fact there is increased Melaleuca recruitment in the property immediately south of the Union Drain, opposite the Vidal property and in paddocks to the north of Ewingsdale Road possibly due STP discharge in combination with the Entrance Opening Strategy facilitating Melaleuca recruitment as the catchment becomes wetter.

One possible means of rehabilitating the area in question is to top up the groundwater (possibly with treated wastewater) and improve drain management to prevent oxidation of acid layers as is done within the Byron STP 24 hectare irrigation area. This approach is consistent with recommendations within the Estuary Management Plan (Parker and Pont, 2001) and the Acid Sulfate Soils Remediation Guidelines for Coastal Floodplains in NSW (Tulau, 2007).

#### **Conclusion and additional investigations**

There are competing objectives within the Belongil Creek catchment with farmers needing to drain their lands efficiently to enable cropping and grazing however historically this has come at a cost of poor water quality, fish kills, acid events and peat fires (Parker and Pont, 2001). Council is required to manage entrance openings under strict criteria including prevention of flooding in town and avoidance of poor water quality and fish kills. Via ongoing ecological monitoring Council must also demonstrate that vegetation health is not declining.

Dieback of vegetation within the Vidal property is likely the result of historic disturbance – land clearing, drainage works in combination with seasonal rainfall patterns which continue a cycle of wetting and drying and acid production. There is no clear hydraulic connection between STP discharge and the affected area, however the Entrance Opening Strategy maintains a higher creek level than occurred in the past, with creek water levels routinely above 1.0mAHD. This current regime is potentially facilitating the spread of wetland vegetation into former grazing and cropping lands, though the full extent of this spread has not been investigated. The catchment is not on the verge of ecological collapse but a holistic approach to managing catchment health is required (Anorov et al. 2008). Council intends to prepare a holistic plan for the Belongil Catchment via the preparation of a Coastal Zone Management Plan (CZMP) which will develop strategies for sustainable catchment management.

The combination of STP discharge into the Upper Union Drain and the current entrance opening strategy is creating a wetter catchment compared to the past 50 to 80 years, but still not as wet as prior to the drainage network being constructed in the early 1900s to 1950s when the Belongil floodplain would be inundated for weeks and months at a time. The area of dieback within the Vidal property is a





legacy issue which should be addressed – possibly through the addition of recycled water and construction of drainage controls such as floodgates to raise groundwater levels.

#### **Additional Investigations**

While the observed dieback is likely not caused by Council operations, the dieback and associated acid production is cause for concern. Better understanding of the causes for the acid production could allow the area to be rehabilitated which would benefit land holders and the Belongil estuary. The following investigations are suggested:

- Review historic aerial photographs to confirm how long the dieback has been occurring
- Carry out soil and groundwater testing and monitoring to understand operating conditions.
- Confirm the extent of wetland recruitment in the catchment within former farming and grazing lands
- Complete a catchment assessment to confirm the preliminary observation that dieback is not occurring elsewhere in the catchment
- Consider options for rehabilitation of the affected area including improved drain management and additional flooding to avoid prolonged drawdown of the water table.





#### References

Anorov, J. M., Dale, P. E., Powell, B. and Greenway, M. (2008) 'An Interdisciplinary Approach for Understanding and Managing a Sub-tropical Coastal Wetland Ecosystem: Native Dog Creek, Southeast Queensland, Australia', *The Proceedings of the Royal Society of Queensland. Royal Society of Queensland, 114*, pp. 19-32.

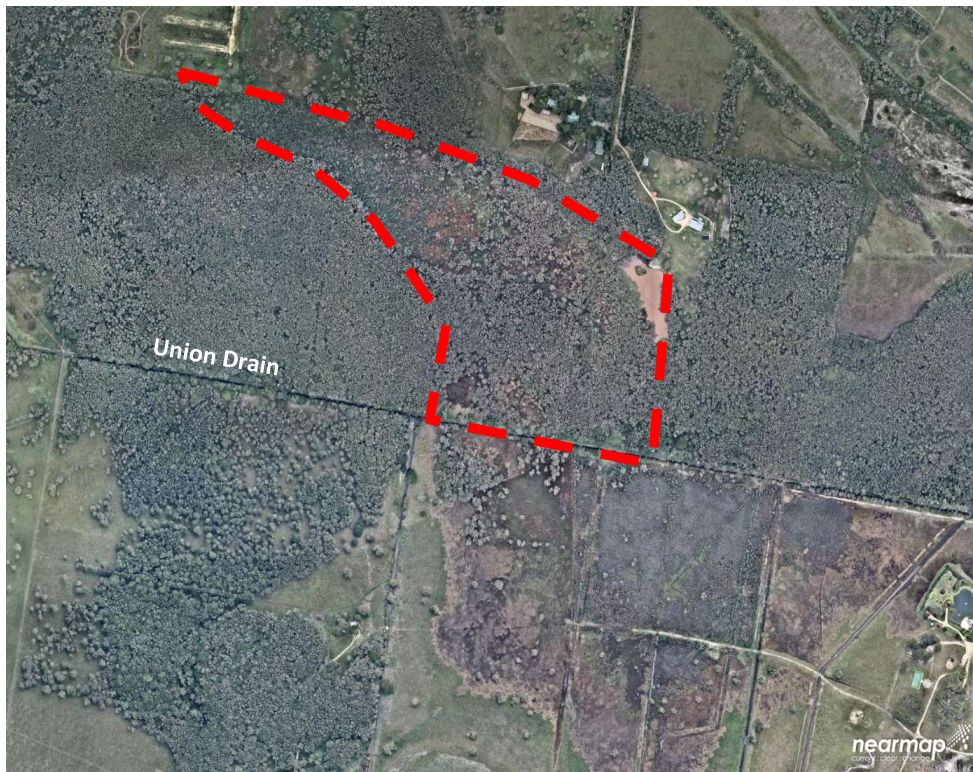
Alluvium (2019). *DRAFT Belongil Creek entrance opening strategy*. Prepared for Byron Shire Council

Environment Protection Authority – NSW (2020). *Byron sewage treatment works, Statement of Compliance – Licence 3404 Annual Return, : 27-4-2019 To: 26-4-2020*.

Parker, P. and Pont D. (2001). *Belongil Estuary Study and Management Plan*. Prepared for Byron Shire Council.

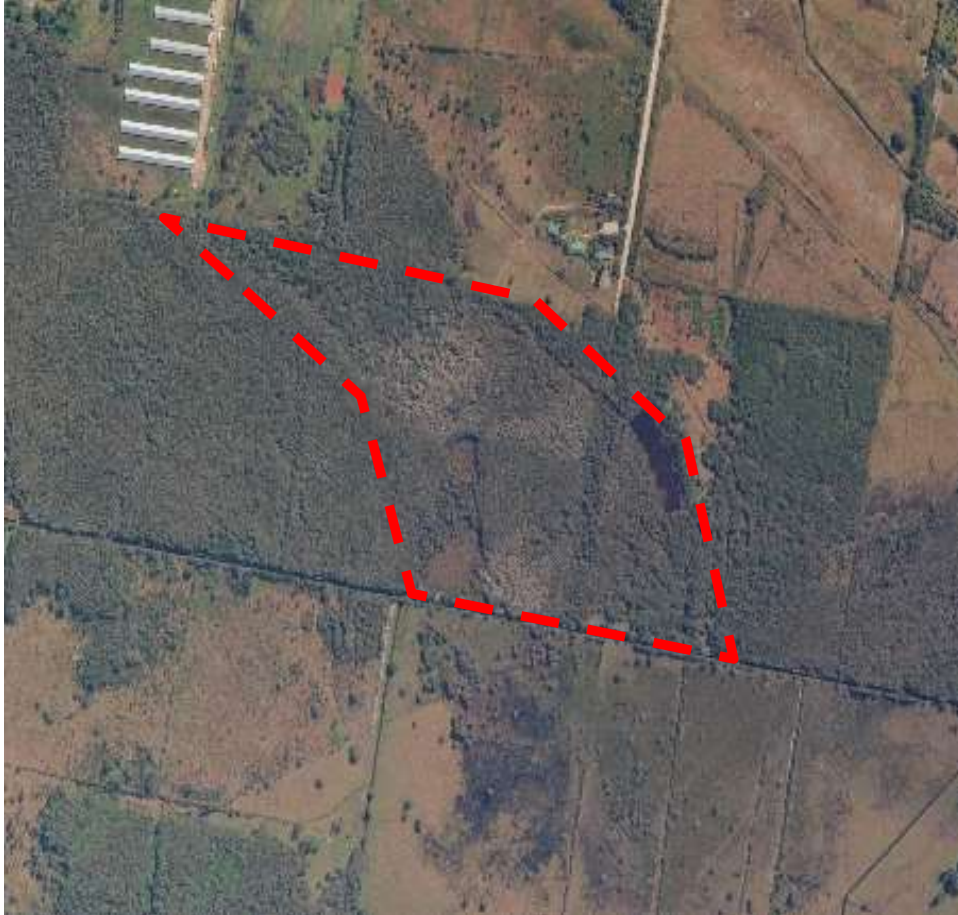
Tulau, M.J. (2007). *Acid Sulfate Soils Remediation Guidelines for Coastal Floodplains in New South Wales*. Department of Environment and Climate Change.





Attachment 1A: Subject Area in March 2019 with export of sulfuric acid apparent on the northern and southern side of the Union Drain





Attachment 1B: The subject area in 1997 showing substantial regrowth but also canopy discolouration.





Attachment 1C: The subject area in 1987 showing the same extent and regenerating vegetating





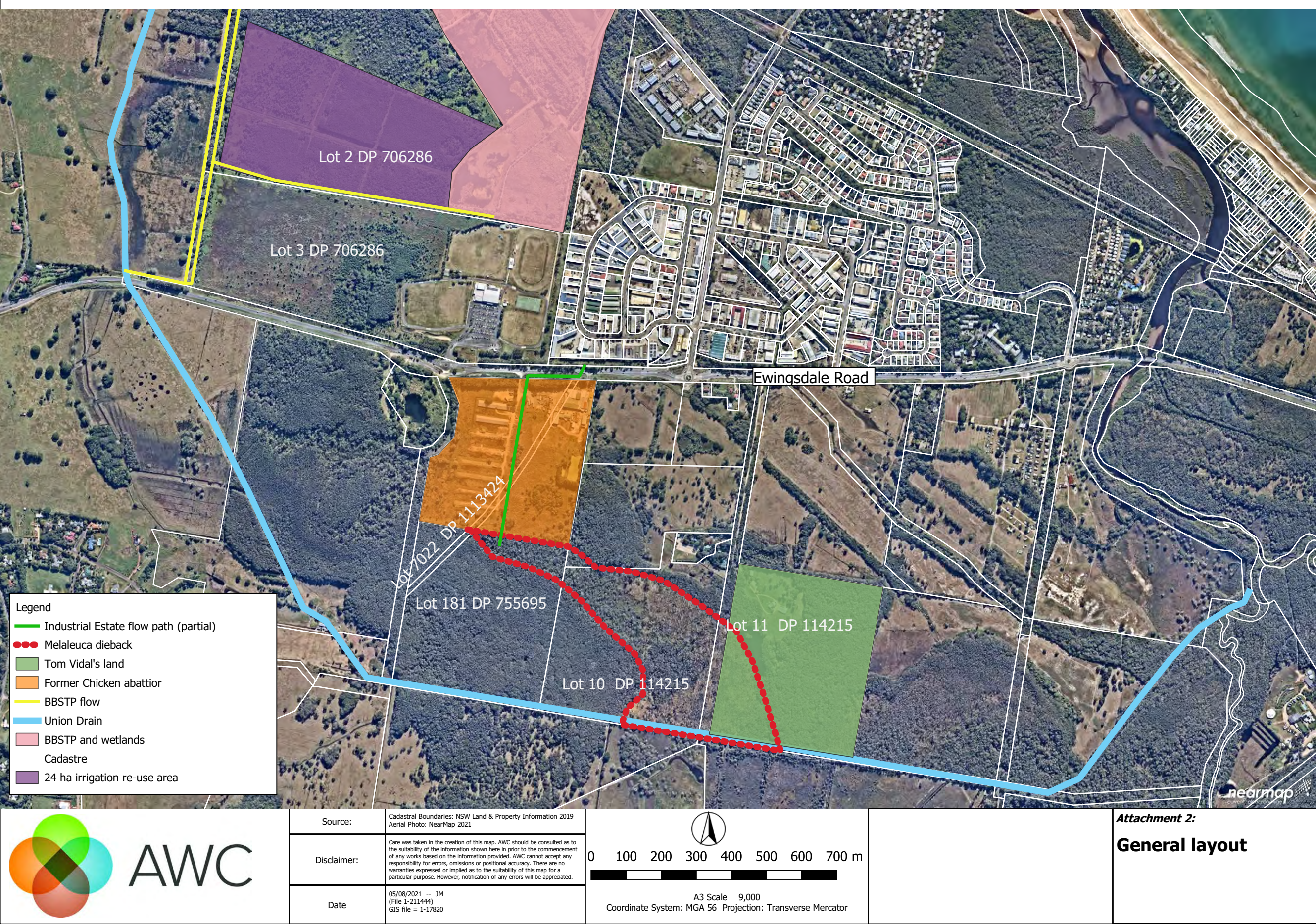
Attachment 1D: Subject area in 1965 clearly showing a flow path and broader floodplain wetland complex (green hatch) dissected by the Union Drain (blue arrows).





**Attachment 2**







**Report No. 4.3      'Bringing Back the Bruns' - Causeways and Fish Passage Improvements**

**Directorate:** Sustainable Environment and Economy

**Report Author:** Chloe Dowsett, Coastal and Biodiversity Coordinator

5    **File No:** I2021/1493

**Summary:**

This report provides an update on the 'Bringing Back the Bruns' projects being delivered including a presentation from a staff member of the Department of Primary Industries – Fisheries on improvements to causeways and fish passage.

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**RECOMMENDATION:**

15    **That the Coast and Estuary Catchment Panel note the presentation by a staff member of the Department of Primary Industries – Fisheries.**



## Report

### Causeways and Fish Passage Improvements

Council adopted the minutes from the previous Panel meeting (24 June 2021) and made the below resolution (Res 21-203):

5 That the Coastal and Estuary Panel:

1. *Note the update and support the 'Bringing Back the Bruns' project.*
2. *Receive further advice on the positive changes to fish movements due to the 'Bringing Back the Bruns' causeway removal thus far.*

10 DPI staff will provide a short presentation on the extent of the causeway works undertaken with the Shire, key outcomes, positive changes, and benefits to fish movements, along with recommendations for future causeway work.

### **Financial Implications**

NA

### **Statutory and Policy Compliance Implications**

15 NA