THEO TULK RESERVE

Sign at Theo Tulk Reserve by unknown author

PLAN OF MANAGEMENT

Theo Tulk Reserve

Plan of Management

As adopted by

Clarence Valley Council

18th April 2006.

Summary
Clarence Valley Council engaged North Coast Environmental Planning to prepare a Plan of Management for Theo Tulk Reserve at Goodwood Island in 2005.

The reserve was dedicated to Council by Theo Tulk as a development contribution for a subdivision of land in 1986.

The reserve has been degraded over time and is in need of management in order to retain and enhance the unique biodiversity values contained within this small parcel of land. Biomanagement Ltd have made approaches to Council expressing an interest in managing the reserve.

The reserve contains a range of plant communities and endangered ecological communities and protected plants scheduled under the Threatened Species Conservation Act and the Fisheries Management Act. Works identified in the Plan of Management aim to protect these plants and communities in order for Council to manage the reserve within the framework of the legislation.

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PART ONE. BACKGROUND

Introduction

Theo Tulk Reserve is comprised of an area of 15.38 hectares and is located on Goodwood Island in the estuary of the Clarence River (Figure 1). Theo Tulk Reserve, Lot 1 DP 739652, is public land dedicated to the former Maclean Shire Council in 1986. The reserve is owned and managed by Clarence Valley Council under the provisions of the Local Government Act 1919.

The former owner, Theo Tulk, dedicated the land to Council, as part of a subdivision development, expressing a wish for the land to be a permanent Flora and Fauna reserve. On the 11th of June 1986 the former Maclean Shire Council resolved to accept dedication of Lot 2 D.P. 620615 as a natural passive reserve.

The provisions of the Local Government Act 1993 require Council to prepare a Plan of Management for land classified as community land and to manage the subject land in accordance with the Plan of Management.

The Local Government Act requires the Plan of Management to identify the category of land, objectives and performance targets for management.

Land categorised as a natural area must be further categorised according to requirements of the Local Government Act.

Theo Tulk Reserve is zoned 1(b) Rural (General Rural Land) under the provisions of the Maclean Local Environmental Plan (2001). This zoning is inconsistent with the classification and category of land under Chapter 6 Part 2 of the Local Government Act and also in consideration of endangered ecological communities and protected mangroves on the reserve.

Theo Tulk Reserve would be more appropriately zoned as Environmental Protection (Conservation). Land to the east of the reserve is currently zoned as 7(a) Environmental Protection, Theo Tulk contains similar biological attributes on its northern perimeter and along the drain at the western end of the reserve.

Legislation

Local Government Act 1993

Chapter Six, Part Two of the Local Government Act requires all land vested in a council to be classified as operational or community land. This can be by way of the Local Environmental Plan or a resolution by Council.

Operational land is land which facilitates the carrying out by council its functions, or land which may not be open to the general public, such as a works depot or a council garage.

Community land, such as Theo Tulk Reserve, comprises land, generally, such as a public park. The use and management of community land is to be regulated by a Plan of Management. Until a Plan of Management is adopted, the nature and use of the land must not change.

Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 (TSC Act) outlines the protection of threatened species, communities and critical habitat in New South Wales. The Theo Tulk Reserve supports Saltmarsh, Swamp Oak, Lowland Rainforest and Swamp Sclerophyll forests identified as Endangered Ecological Communities under Schedule 1 of the TSC Act. The Osprey, listed as vulnerable under this Act, nests on this site. The European Red Fox is listed as a key threatening process under this Act. Refer also to Fauna section of this plan.

Fisheries Management Act 1994

The objects of this Act are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. Mangroves within the riparian zone of Theo Tulk Reserve are protected under Part 7 of the Fisheries Management Act. Schedule 6 of the Fisheries Management Act lists Key Threatening Processes and includes *Degradation of native riparian vegetation along New South Wales water courses.*

Maclean Council Local Environmental Plan 2001

Theo Tulk Reserve is subject to the provisions of the Maclean Shire Council Local Environmental Plan 2001 and is zoned 1(b) Rural (General Rural Land) Zone.

Mapping

Mapping of the Reserve boundary and management units was completed by Clarence Valley Council using cadastral data provided by the Land Information Centre for use in Council's **G**eographic **I**nformation **S**ystem (GIS). As the name suggests this system is an information system only therefore some discrepancies will exist between boundaries displayed on the Figure and survey accurate boundary locations.

Category of Land

Theo Tulk Reserve is classified as community land and is categorised as a natural area following the provisions of the Local Government Act. The Local Government Act requires land categorised as a natural area to be further categorised as one or more of the following:

Bushland

Wetland

Escarpment

Watercourse

Foreshore

Theo Tulk Reserve supports three endangered ecological communities listed under Schedule 1 of the Threatened Species Conservation Act. These communities are indicative of foreshore, wetland and bushland areas that have been categorised in this Plan of Management under the provisions of the Local Government Act.

Core objectives for management of each category, wetland, bushland and foreshore are set down in the provisions of Chapter 6, Part 2, Public Land, of the Local Government Act and are included in Table 1 – Management.

Natural Resource Values

Theo Tulk Reserve is located on Goodwood Island within the Lower Clarence Estuary. The reserve supports one of the few remaining areas of remnant floodplain vegetation of this size on the Clarence River Floodplain.

Vegetation

Theo Tulk exhibits a high level of diversity supported on a relatively small area of land. The Reserve is an important riverine vegetation corridor and one of the few relatively intact floodplain remnants and is therefore important to conserve.

Six discrete vegetation communities are evident including Mangroves on the riparian zone, Saltmarsh on the intertidal zone, introduced pasture grass adjacent to the access track running east west, Lowland rainforest remnant south of the east west road reserve, Brush Ironbark Wattle located on the eastern and western perimeter of the access track that is part of the north-south road reserve providing entry to the reserve.

The Mangrove community on Theo Tulk reserve includes four mangrove species; *Avicennia marina* (Grey Mangrove) and *Excoecaria agallocha* (Milky Mangrove), *Bruguiera gymnorrhiza* (Black Mangrove) and *Rhizophora stylosa* (Red Mangrove). Mangroves are protected plants according to the provisions of the Fisheries Management Act (1994).

The Saltmarsh community is dominated by *Sporobolus virginicus var.minor* (Marine couch) and secondarily *Sarcocornia quinqueflora* (Samphire).

The central portion behind the north levee is dominated by Swamp Oak and Broad-leaved Paperbark wetlands in low-lying sections that differ from the wetland within the riparian zone (pers.comm. Jane Bronotte).

Riparian species include *Casuarina glauca, Alphitonia excelsa* (Red Ash) and *Cupaniopsis anacardioides (*Tuckeroo). This community intergrades as ecotone between the mangrove and Saltmarsh communities. Significant weeds impact this ecotone including Morning Glory and Lantana the dominant species (pers.comm. Jane Bronotte).

The Brush Ironbark Wattle community, located within the eastern section of the reserve, includes rainforest emergents and significant old growth eucalypt trees bearing hollows providing habitat for a range of fauna. Rainforest species include *Acmena smithii* (Lillypilly), *Jagera pseudorhus* Foambark Tree, *Commersonia bartramia* (Brown Kurrajong), *Ficus macrophylla* (Moreton Bay Fig) and *Gmelina leichharditii* (White Beech) among others.

The rainforest community has suffered disturbance, the most recent being weed infestation, with the Lantana the dominant species. Continued weed control currently being

implemented by volunteers will enhance the opportunity for regeneration of a vigorous plant community.

A valuable monitoring mechanism would include regular photos taken from set photo points to ascertain recruitment and regeneration rates of plant communities.

A preliminary plant species list compiled by Jane Bronotte and Mal Cullen for Bio-Management is included as Appendix 1. This species list is not a final list and will be updated in future reviews of the Plan of Management.

Fauna

A field fauna survey was not conducted as part of the preparation of this Plan of Management. A list of birds collated by the *Clarence Valley Birdos* is attached in Appendix 2.

A field fauna survey is recommended, to identify fauna utilising the reserve and in particular threatened species, when funding may become available. A field fauna survey during the planning process is not considered essential because works identified will have minimal impact on habitat. Works will be low impact and will also provide protection for plant communities and as a result will improve habitat conditions for native fauna.

Foxes have been reported in and around adjacent properties and it should be noted that the Fox is listed as a key threatening process under Schedule 1 of the Threatened Species Conservation Act 1995. The Threat Abatement Plan for the European Red Fox *Vulpes vulpes* contains actions to mitigate the threat imposed by the fox. Actions to implement the Threat Abatement Plan should be implemented where possible.

Current Condition Of The Land

Theo Tulk reserve is an important Clarence floodplain vegetation remnant currently supporting six different vegetation communities, three of these are listed as Endangered Ecological Communities under the Threatened Species Conservation Act and Mangroves are protected under the Fisheries Management Act.

The reserve has been modified through the construction of levees on 3 sides (north, south and east) a flood mitigation drain and the installation of a floodgate in 1976 (Appendix 5).

The vegetation communities, ecological functions and estuarine processes have been altered since these works. The former Clarence River County Council surveyed contour levels and general landuse of Goodwood Island in 1972. The survey showed the reserve as approximately 30% Swamp (ie. Wetland) 60% heavily timbered and the foreshore consisting of approximately 10% as grazing (appendix 4 & 5).

An Osprey nest in current use is located on a relatively short constructed pole at the north-eastern end of the reserve. The Osprey is listed as vulnerable under Schedule 2 of the Threatened Species Conservation Act.

A number of service easements run through the reserve and include the main and branch powerlines and water main, the latter lacks adequate identification markers. The main powerline, water main and telecommunications line appear to service the town of Iluka. The branch powerline appears to service the houses adjoining the southern boundary of Theo Tulk Reserve.

A second powerline was constructed at the time of subdivision to service the four houses that adjoin the south-eastern section of the reserve. This second line runs through the Swamp Oak, Rainforest and Swamp Sclerophyll communities causing fragmentation

Foreshore erosion is occurring at a rapid rate and this may be a result of natural estuarine processes and wind wave action. Natural estuarine processes on Theo Tulk reserve are exacerbated through human activities such as boating, camping and four-wheel drive access on the foreshore. These impacts include soil compaction restricting native vegetation recruitment and establishment, disturbance of the bank used as access for favourite fishing spots, boat-wash emanating from passing powered boats and boats mooring from the bank. The road reserve on the northern side should be surveyed to determine it precise location.

Erosion of the foreshore is occurring at the northern end of the Reserve. This section is under pressure by visitors wishing to access the water. It can only be assumed without a hydrological survey that this is a natural process, however wash and pedestrian and vehicular access to the foreshore are likely contributors to the worsening problem.

Plate 4. Foreshore erosion (note: left of photo soil compaction and general lack of vegetative structure. Note also rubbish dumping)

The Mangroves and Saltmarsh areas are in a degraded state due to four-wheel drive vehicles churning up the soil causing compaction and erosion and degrading areas of Saltmarsh (Plate 1).

Plate 1 Four-wheel drive damage through Saltmarsh

Casuarina trees located through the Saltmarsh and riparian zone are being cut down presumably for campfires (Plates 2 & 3).

Plate 2. Casuarina Stump (used as firewood?).

Plate 3. Evidence of campfire.

Those parts of the Reserve that are accessible by vehicles are in a degraded state due to lack of management and pressures from unauthorised activities such as general rubbish and greenwaste dumping, camping and four wheel drive access. The Mangroves and Saltmarsh have been damaged through four-wheel drive vehicle access with deep wheel ruts evident from recent damage.

There are no signs advising people that camping is prohibited on Theo Tulk Reserve with the exception of a sign along the road adjacent to Goodwood Island wharf. Signage prohibiting camping at the entrance to the reserve adjacent to the houses is essential advising visitors that Theo Tulk is a Clarence Valley Council dedicated Flora and Fauna reserve.

Management Issues

Theo Tulk Reserve is categorised as a Natural Area and further categories identified include bushland, wetland and foreshore. Core objectives of these categories are listed below and generally include conservation, protection, restoration, education and mitigative measures. The Local Government Act is prescriptive in terms of objectives required for inclusion in a Plan of Management. The core objectives required for inclusion under the Local Government Act are listed under Chapter 6, Part 2, Achievement of Performance Targets.

The identification of three endangered ecological communities, listed under the Threatened Species Conservation Act, imposes a responsibility on Council to manage activities that may impact on these areas.

Flood levees and a floodgate constructed in the early 1970s by the former Clarence River County Council (Appendix 3) requires ongoing maintenance and management. Floodgate management may also provide environmental benefits.

<u>Impacts</u>

Impacts currently compromising the integrity of Theo Tulk Reserve and requiring improved management include the following:

1. Camping;
2. Rubbish dumping including greenwaste;
3. Four wheel drive access through Saltmarsh and mangroves;
4. Habitat fragmentation;
5. Weed infestation;

6. Soil compaction;
7. Erosion.

Achievement of Performance Targets

Theo Tulk is relatively isolated reserve that has been neglected in terms of management and maintenance. It is difficult for Council to maintain the reserve due to a lack of resources targeting the reserve including skilled staff and funding.

Biomanagement Ltd, have expressed interest in management of the reserve and currently have an interim arrangement through discussions with the former Maclean Shire Council in January 2003.

Biomanagement Ltd is a local company set up to buy and/or manage environmentally significant land in the ecological interests of that land and the whole community.

Biomanagement Ltd has recently become involved in restoration activities on Theo Tulk Reserve including construction of a fence in order to provide a barrier to restrict vehicular access from an endangered ecological community (Saltmarsh) protected under the Threatened Species Conservation Act and Mangroves protected under the Fisheries Management Act. These actions are required by legislation to maintain the reserve as a natural area. Biomanagement sourced funding from the Recreational Fishing Trust's *Clarence Pilot Fish Habitat Grant Program* to fund these activities. Vehicle access is damaging the Saltmarsh located on the reserve, an endangered ecological community listed under Schedule 1 of the Threatened Species Conservation Act, and as such the land manager has an obligation to protect this plant community.

Management Actions and Performance Targets (Table 1) for Theo Tulk have been developed through identification of impacts and pressures on the sensitive ecological values of the reserve in combination with addressing core objectives listed under Chapter 6, Part Two of the Local Government Act.

Council as owner and land manager of the reserve is required to ensure that management of the reserve addresses the core objectives prescribed by the Local Government Act and does not allow activities to occur that are not consistent with these objectives.

Objectives

Core objectives determined by the Local Government Act for each category include the following:

Natural Area

1. To conserve biodiversity and maintain ecosystem function in respect of the land, or the feature or habitat in respect of which the land is categorised as a natural area, and
2. to maintain the land, or that feature or habitat, in its natural state and setting, and
3. to provide for the restoration and regeneration of the land, and
4. to provide for community use of and access to the land in such a manner as will minimise and mitigate any disturbance caused by human intrusion, and
5. to assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the *Threatened Species Conservation Act 1995* or the *Fisheries Management Act 1994.*

Bushland

1. To ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and
2. To protect the aesthetic, heritage, recreational, educational and scientific values of the land, and
3. To promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion, and
4. To restore degraded bushland, and
5. To protect existing landforms such as natural drainage lines, watercourses and foreshores, and
6. To retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and
7. To protect bushland as a natural stabiliser of the soil surface.

Wetland

1. To protect the biodiversity and ecological values of wetlands, with particular reference to their hydrological environment (including water quality and water flow), and to the flora, fauna and habitat values of the wetlands, and
2. To restore and regenerate degraded wetlands, and
3. To facilitate community education in relation to wetlands, and the community use of wetlands, without compromising the ecological values of wetlands.

Foreshore

1. To maintain the foreshore as a transition area between the aquatic and the terrestrial environment, and to protect and enhance all functions associated with the foreshore's role as a transition area, and
2. To facilitate the ecologically sustainable use of the foreshore, and to mitigate impact on the foreshore by community use.

PART TWO – MANAGEMENT

Management objectives included in this plan are core objectives prescribed by Chapter 6, Part 2 of the Local Government Act. The actions have been identified in order to achieve the objectives. Performance Targets are a means by which the actions can be assessed for implementation.

Theo Tulk reserve has been classified as a natural area and further categorised into bushland, wetland and foreshore categories. The reserve contains protected plant communities and any works should protect these communities from impacts that have been identified in this plan.

Objectives	**Actions**	**Performance Targets**
N1. To conserve biodiversity and maintain ecosystem function in respect of the land, or the feature or habitat in respect of which the land is categorised as a natural area.	1.Restrict vehicles to designated parking and access tracks.	1.Vehicles restricted to designated areas & access tracks & .Biodiversity and ecosystem function conserved,.
	2.Protect sensitive Saltmarsh, Lowland rainforest, floodplain vegetation & Mangroves by restricting vehicle access & providing appropriate pedestrian access.	2.Fencing constructed, access provided & Saltmarsh rehabilitated & protected.
	3.Manage & contain weeds.	3.Weed control works containing weeds to a nil or low level.
	4.Construct educational signage to provide information on estuarine processes, protected plant communities and threatening processes & impacts.	4.Signage constructed & information provided.
	5.Maintain road reserve in current state as rustic road to protect vegetation.	5. Road maintained as rustic road and vegetation intact and in good condition.
	6.Prohibit camping on the reserve to protect the biodiversity and ecosystem function of the land.	6. Camping and evidence of camping absent from the reserve and biodiversity and ecosystem function of the land maintained.
	8.Provide & maintain 'No Camping' sign at the entrance of Theo Tulk Reserve.	8. 'No Camping' sign constructed & maintained at the entrance of Theo Tulk Reserve.

N2. To maintain the land, or that feature or habitat, in its natural state and setting.	1.Restrict vehicle access to areas containing endangered ecological communities and identify designated areas for vehicle access tracks and parking. 2.Limit constructed facilities to low-key design (ie. seating and protective installations such as boardwalk & fencing to protect sensitive habitats).	1.Vehicles restricted from endangered ecological communities and designated areas identified for vehicle access tracks and parking. 2.Constructed facilities low-key & limited in size.
N3. To provide for restoration and regeneration of the land.	1.Manage & contain noxious & environmental weeds. 2. Provide fencing to restrict vehicle access & to encourage natural regeneration. 3.Plant locally sourced species only when required. 4.Investigate options for restoration of riverbank erosion.	1.Weeds contained. 2.Fencing constructed to encourage natural regeneration of endangered ecological communities. 3.Locally sourced plant species planted in areas without natural regeneration. 4.Investigation completed.
N4. To provide for community use of and access to the land in such a manner as will minimise and mitigate any disturbance caused by human intrusion.	1.Restrict vehicles to designated parking and access tracks. 2.Construct low-key design installations such as boardwalk and fencing to minimise disturbance to sensitive plant communities. 3. Investigation of the appropriateness of allowing companion animals onto Theo Tulk Reserve and adoption of a policy.	1.Vehicles restricted to designated parking and access tracks and natural vegetation regeneration ongoing. 2. Low-key design boardwalk and fencing constructed and access to sensitive areas halted. 3.Investigation complete & policy adopted.

	4.Implementation of the adopted policy to control companion animal access as determined by the policy.	5..Policy implemented & enforced as appropriate.
N5. To assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the *Threatened Species Conservation Act* 1995 or the *Fisheries Management Act* 1994.	1. Restrict vehicle access to designated parking and access tracks. 2.Provide & maintain boardwalk to control pedestrian access over Saltmarsh. 3.Provide and maintain fencing to protect endangered ecological communities. 4. Ensure Council compliance staff monitor activities that impact on matters protected under the TSC Act and FM Act. 5.Implement actions of the European Red Fox Threat Abatement Plan where applicable on Theo Tulk Reserve.	1.Vehicle impact on Saltmarsh and Swamp Oak communities reversed. 2.Boardwalk constructed & Saltmarsh maintained in good condition. 3. Fencing provided and maintained and endangered ecological communities protected. 4.Activities impacting on matters protected under the TSC Act and the FM Act monitored by compliance staff. 5.Relevant actions implemented.
B1. To ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land.	1. Restrict vehicles to designated parking areas and access tracks. 2.Conduct a fauna survey to determine fauna species utilising the reserve and provide for their protection. 3.Construct low-key design installations such as boardwalk and fencing and provide signage to direct visitors to the reserve to avoid impact and ensure ongoing ecological viability of the land.	1. Vehicles restricted to designated parking areas and access tracks and ecological viability improved. 2.Fauna survey conducted and species list compiled for monitoring. 3. Boardwalk, signage and fencing constructed and maintained.

B2. To protect the aesthetic, heritage, recreational, educational and scientific values of the land.	1. Provide low-key design installations to ensure that the aesthetic value of the reserve is maintained. 2.Provide boardwalks to maintain recreational values. 3. Minimise constructed facilities to maintain heritage, educational and scientific values of the reserve.	1.Design of constructed facilities low-key. 2.Boardwalks provided and maintained. 3. Constructed facilities limited to those essential for protection of ecology of the reserve.
B3. To promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion.	1.Provide fencing to protect sensitive habitats. 2.Construct boardwalks to allow access without compromising ecological values of the reserve. 3.Manage & contain noxious & environmental weeds. 4.Develop Operational Plan for levee maintenance to include Part 5 assessment (EP&A Act); 5.Permit access for maintenance of levee, floodgate & other services. 6. Undertake action to rezone Theo Tulk Reserve to an appropriate Environmental Protection zoning.	1. Fencing constructed & maintained. 2. Boardwalk access provided to minimise disturbance. 3. Noxious & environmental weeds contained to a nil or low level. 4.Operational Plan & Part 5 assessment developed and works undertaken in accordance with the Plan & assessment; 5.Access available for maintenance of levee, floodgate & other services. 6. Rezoning process undertaken and the outcome implemented.
B4. To restore degraded bushland.	1.Manage & contain noxious & environmental weeds. 2.Restrict vehicle access to designated areas only.	1.Noxious & environmental weeds contained to a nil or low level. 2.Vehicles restricted to designated areas.

	3.Plant endemic species propagated from locally collected seed.	3.Endemic species propagate & planted where needed.
B5. To protect existing landforms such as natural drainage lines, watercourses and foreshores.	1.Investigate modification of floodgate to allow tidal exchange & if appropriate implement works. 2.Protect foreshore vegetation; 3.Investigate erosion processes and implement feasible recommendations.	1.Recommendations of investigation implemented. 2.Foreshore vegetation with good structure & floristics evident. 3.Erosion investigation complete & feasible recommendations implemented.
B6. To retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term.	1.Investigate realignment of north-south running powerline and easement to reduce fragmentation of vegetation. 2.Protect, conserve & repair vegetation on the reserve.	1.Recommendations of investigation implement. 2.Vegetation protected, conserved and impacts managed to repair damage to vegetation.
B7. To protect bushland as a natural stabiliser of the soil surface.	1.Loosen soil & mulch to reintroduce soil structure where soil compaction is evident. 2.Manage & contain noxious & environmental weeds to release native plants from competition. 3.Plant endemic species in & adjacent to eroded areas.	1.Soil friable & vegetation re-established. 2.Noxious & environmental weeds managed & contained to a nil or low level. 3.Endemic species planted in and adjacent to eroded areas & viability monitored.
W1. To protect the biodiversity and ecological values of wetlands, with particular reference to	1.Remove deep wheel ruts through the Saltmarsh community through careful levelling	1.Wheel ruts removed & Saltmarsh condition monitored & improved.

their hydrological environment (including water quality and water flow), and to the flora, fauna and habitat values of the wetlands.	of ground surface & reinstatement of Marine Couch. 2.Investigate efficiency of floodgate & modify if appropriate to reinstate tidal exchange. 3.Provide & maintain boardwalk to control pedestrian access over Saltmarsh.	 2. Floodgate efficiency investigated & modified if appropriate to reinstate tidal exchange. 3.Boardwalk constructed & Saltmarsh maintained in good condition.
W2. To restore and regenerate degraded wetlands.	1.Provide fencing to protect Saltmarsh wetland. 2.Remove deep wheel ruts through the Saltmarsh community by careful levelling of ground surface & reinstatement of Marine Couch.	1.Fencing to protect Saltmarsh wetland. 2.Wheel ruts removed & Saltmarsh condition monitored & improved.
W3. To facilitate community education in relation to wetlands, and the community use of wetlands, without compromising the ecological values of wetlands.	1.Develop educational material & appropriate signage & identify an effective delivery mechanism about the function & legislative protection of Saltmarsh, mangroves & remnant floodplain vegetation. 2.Provide the opportunity for workshops & field days where appropriate. 3.Develop recording system/tools to monitor biodiversity values of the Reserve. 4.Provide & maintain educational booth similar to Brooms Head lagoon.	1.Educational material & appropriate signage developed & delivered. 2.Workshops & field days delivered & assessed for effectiveness. 3.Recording system/tools developed & biodiversity values of the Reserve recorded regularly. 4.Educational booth constructed & maintained.
F1. To maintain the foreshore as a transition area between the aquatic and the terrestrial	1.Provide & maintain fencing in order to provided protection for the foreshore area and	1. Fencing constructed & maintained & foreshore & Saltmarsh transitional areas

environment, and to protect and enhance all functions associated with the foreshore's role as a transition area.	the transitional Saltmarsh community. 2.Provide boardwalk and platform area to access the foreshore without compromising the sensitive habitat of the foreshore including the Saltmarsh & Mangrove communities.	protected & in good condition. 2. Boardwalk & platform constructed & maintained providing protection for the sensitive Saltmarsh & Mangrove communities.
F2. To facilitate the ecologically sustainable use of the foreshore, and to mitigate impact on the foreshore by community use.	1.Construct boardwalk and fishing platform to protect the foreshore and to allow ecologically sustainable use of the foreshore. 2.Include Theo Tulk Reserve in Council's compliance program, particularly during holiday periods, to ensure that unauthorised activities such as camping are not continued. 3.Provide & maintain fencing to ensure that the sensitive environment is protected from the impacts of vehicles. 4.Protect foreshore vegetation; 5.Investigate erosion processes and implement feasible recommendations.	1. Boardwalk & fishing platform constructed & maintained & ecological sustainable use of the foreshore managed & maintained. 2. Unauthorised activities on the Reserve, such as camping, discontinued. 3.Fencing provided & maintained & sensitive environments protected. 4.Foreshore vegetation with good structure & floristics evident. 5. Erosion investigation complete & feasible recommendations implemented.

Figure 1. Theo Tulk Reserve

References

Harden, G, J, 1990 *Flora of New South Wales Volume 1,* University of New South Wales Press, Sydney

Harden, G, J, 1991 *Flora of New South Wales Volume 2,* University of New South Wales Press, Sydney

Harden, G, J, 1992 *Flora of New South Wales Volume 3,* University of New South Wales Press, Sydney

Harden, G, J, 1993 *Flora of New South Wales Volume 1,* University of New South Wales Press, Sydney

http://www.legislation.nsw.gov.au

NSW National Parks and Wildlife Service, 2001, *Threat Abatement Plan for Predation by the Red Fox (Vulpes vulpes).* NSW National Parks and Wildlife Service, Hurstville.

Slater P., P, & R. 2001. The Slater Field Guide to Australian Birds revised ed. Sydney.

Appendix 1. Plant list

PRELIMINARY PLANT SPECIES LIST
for
THEO TULK RESERVE GOODWOOD ISLAND
prepared by Jane Bronotte with assistance from M Cullen T Kelly & P Nelson

TREES

Acmena hemilampra	White LilyPilly
Acmena smithii	Common LilyPilly
Acronychia imperforata	Beach Acronychia
Agiceras corniculatum	River Mangrove
Alphitonia excelsa	Red Ash
Acacia aulacocarpa	Brush Ironbark Wattle
Acacia longifolia spp	Coast Wattle
Alphitonia excelsa	Red Ash
Aphananthe philippinensis	Rough leaved Elm
Avicennia marina var. *australasica*	Grey Mangrove
Banksia integrifolia	Coast Banksia
Breynia oblongifolia	Breynia
Bruguiera gymnorhiza	Black mangrove
Callistemon salignus	Willow/white bottlebrush
Casuarina glauca	Swamp She Oak
Commersonia bartramia	Brown Kurrajong
Cryptocarya triplinervis	Three veined Laurel
Cupaniopsis anacardioides	Tuckeroo
Eleocarpus obovatus	Hard Quandong
Eucalypt spp.	
Eucalyptus intermedia	Pink Bloodwood
Eucalyptus grandis	Flooded Gum
Eucalyptus gummifera	Red Bloodwood
Eucalyptus tereticornis	Forest Red Gum
Euroschinus falcata var. *falcata*	Ribbonwood
Excoecaria agallocha	Milky Mangrove
Flindersia schottiana	Cudgerie/Silver Ash
Ficus fraseri	Sandpaper fig
Ficus macrophylla	Moreton Bay fig
Ficus obliqua	Small leaved fig
Gmelina leichhardtii	White Beech
Glochidion ferdinandi	Cheese Tree
Glochidion sumatranum	Umbrella Cheese Tree
Guioa semiglauca	Guioa
Hibiscus tiliaceus	Cottonwood Hibiscus
Jagera pseudorhus	Foambark
Melaleuca quinquenervia	Broad leaved Paperbark
Melaleuca stypelioides	Prickly leaved Paperbark
Mischocarpus pyriformis	Yellow Pearfruit
Myoporum acuminatum	Mangrove Boobialla
Notolaea longifolia	Large Mock Olive
Polyscias elegans	Celery Wood
Pittosporum undulatum	Sweet pittosporum
Rhodomyrtus psidioides	Native guava
Streblus brunonianus	Whalebone tree
Syzygium luehmannii	Riberry

Trema aspera	Native Peach

VINES

Cayratia clematidea	Slender Grape
Coelospermum paniculatum	Coelospermum
Diplocyclos palmatus	Native Bryony/Striped Cucumber
Flagellaria indica	Whip Vine
Geitonoplesium cymosum	Scrambling Lily
Maclura cochinchinensis	Cockspur Thorn
Malaisia scandens	Burny Vine
Parsonia spp.	Silkpod
Passiflora hibbertiana	Native passionfruit
Sarcopetalum harveyanum	Sarcopetalum/Pearl vine
Smilax australis	Smilax/Austral Sarsparilla
Stephania japonica var. *discolor*	Snake Vine

HERBS/SHRUBS/GRASSES/PALMS/EPIPHYTES

Alternanthera spp	
Cordyline spp	
Dianella spp	Dianella
Livistonia australis	Cabbage palm
Lomandra spp	Lomandra
Ottochloa gracillima	Ottochloa
Pseuderanthemum variable	Small jungle flower
Sarcocornia quiqueflora	Beaded glasswort
Sporobolus viginicus	Sand Couch

WEEDS—environmental & noxious

Ageratum houstonianum	Bluebillygoat weed
Ambrosia artemeslifolia	Ragweed
Baccharis halimifolia	Groundsel (noxious)
Bidens pilosa	Cobblers peg
Chrysanthemoides monilifera subsp *rotundata*	Bitou bush (noxious)
Callisia fragrans	Callisia
Cardiospermun grandiflorum	Balloon vine
Conyza albida	Fleabane
Conyza bonariensis	Fleabane
Gomphocarpus fruticosus	Narrowleaf Cotton Bush
Ipomoea cairica	Coastal Morning Glory
Lantana camara	Lantana (noxious)
Passiflora spp	Passionfruit
Paspalum spp.	Paspalum
Richardia brasiliensis	Brazil Weed
Senna pendula var. *glabrata*	Cassia
Sida rhombifolia	Paddys Lucerne
Solanum mauritianum	Wild tobacco tree
Solanum seaforthianum	Potato Vine
Verbena bonariensis	Purple top Verbena

Appendix 2 Bird list

Theo Tulk Fauna and Flora Reserve*
Bird List
Saturday March 15, 2003 & Saturday October 15, 2005

Gannet, Australian
Cormorant, Little Pied
Cormorant, Little Black
Darter, Australian
Cormorant, Pied
Great Cormorant
Pelican, Australian
Egret, Cattle
Egret, Little
Egret, Great
Heron, White-faced
Heron, Striated
Ibis, Australian White
Duck, Wood
Duck, Pacific Black
Teal, Chestnut
Kite, Whistling
Kite, Brahminy
Osprey
Sea-Eagle, White-bellied
Eagle, Wedge-tailed
Kite, Black-shouldered
Kestrel, Australian
Rail, Buff-banded
Lapwing, Masked
Sand-plover, Greater
Sand-plover, Lesser
Stint, Red-necked
Tattler, Grey-tailed
Turnstone, Ruddy
Godwit, Bar-tailed
Whimbrel
Curlew, Eastern
Greenshank, Common
Oystercatcher, Pied
Gull, Silver
Tern, Crested
Tern, Little
Tern, Common
Pigeon, Crested

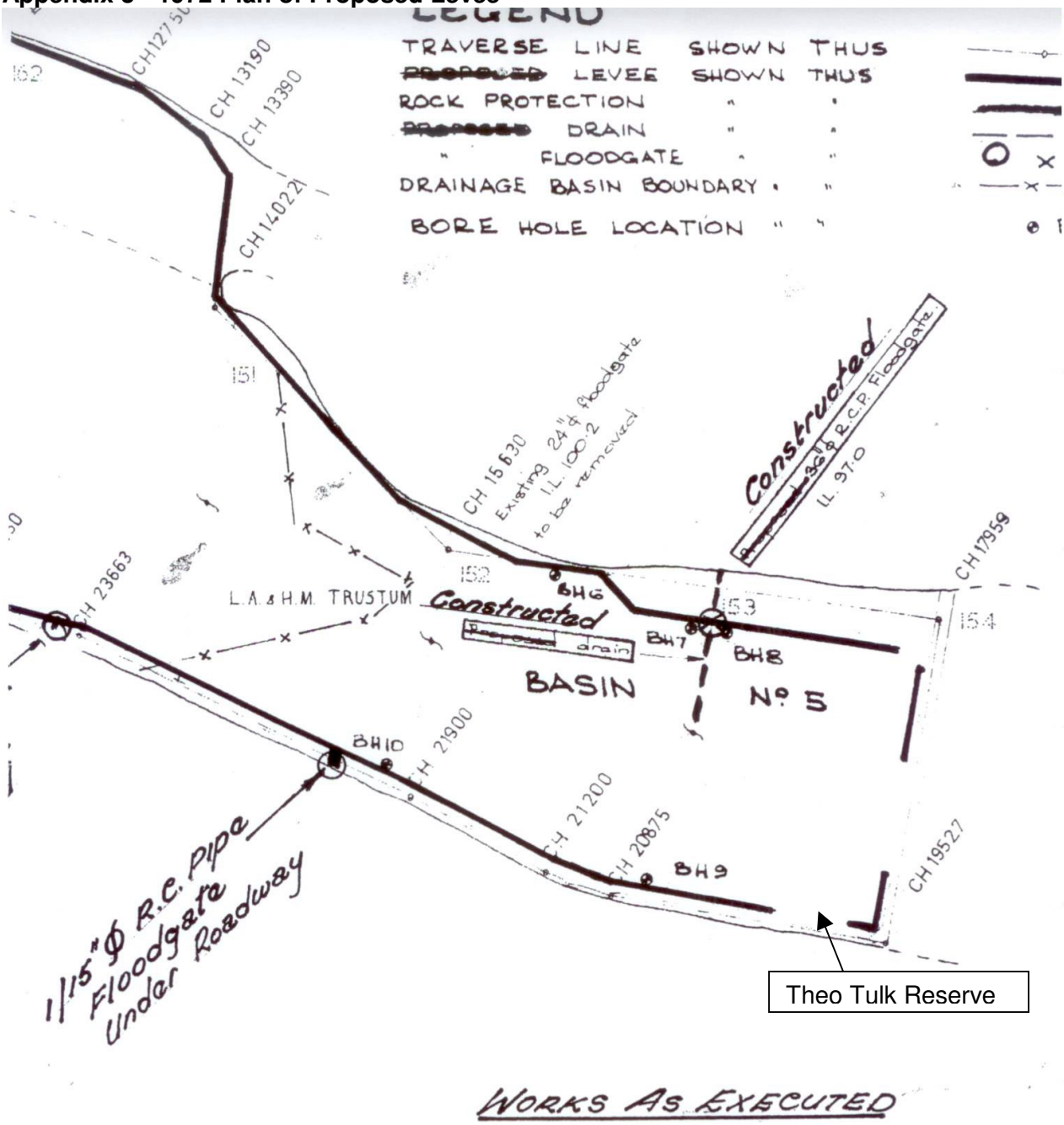
Dove, Peaceful
Dove, Bar-shouldered
Turtle-Dove, Spotted
Pigeon, White-headed
Galah
Black-Cockatoo, Glossy
Lorikeet, Rainbow
Lorikeet, Scaly-breasted
Lorikeet, Little
Parrot, Australian King
Rosella, Eastern
Cuckoo, Fan-talied
Cuckoo. Shining-Bronze
Coucal, Pheasant
Kingfisher, Sacred
Bee-eater, Rainbow
Dollarbird
Frogmouth, Tawny (Sept 05)
Swift, Fork-tailed
Swallow, Welcome
Martin, Tree
Cuckoo-shrike, Black-faced
Cuckoo-shrike, White-bellied
Triller, Varied
Robin, Eastern Yellow
Whistler, Golden
Whistler, Rufous
Shrike-thrush, Little
Shrike-thrush, Grey
Flycatcher, Restless
Flycatcher, Leaden
Fantail, Grey
Fantail, Rufous
Wagtail, Willie
Whipbird, Eastern
Reed-warbler, Australian
Grassbird, Tawny
Fairy-wren, Superb
Fairy-wren, Variegated
Gerygone, Mangrove
Thornbill, Yellow
Thornbill, Brown
Sitella, Varied
Wattlebird, Little
Friarbird, Noisy
Honeyeater, Blue-faced
Miner, Noisy
Honeyeater, Lewin's
Honeyeater, Scarlet
Honeyeater, Brown
Honeyeater, Striped
Silvereye
Mistletoebird
Finch, Red-browed
Oriole, Olive-backed
Figbird
Drongo, Spangled
Magpie-lark
Woodswallow, White-breasted
Butcherbird, Pied
Butcherbird, Grey
Currawong, Pied
Magpie, Australian
Crow, Torresian

TOTAL: 104

List compiled by:
Clarence Valley Birdos

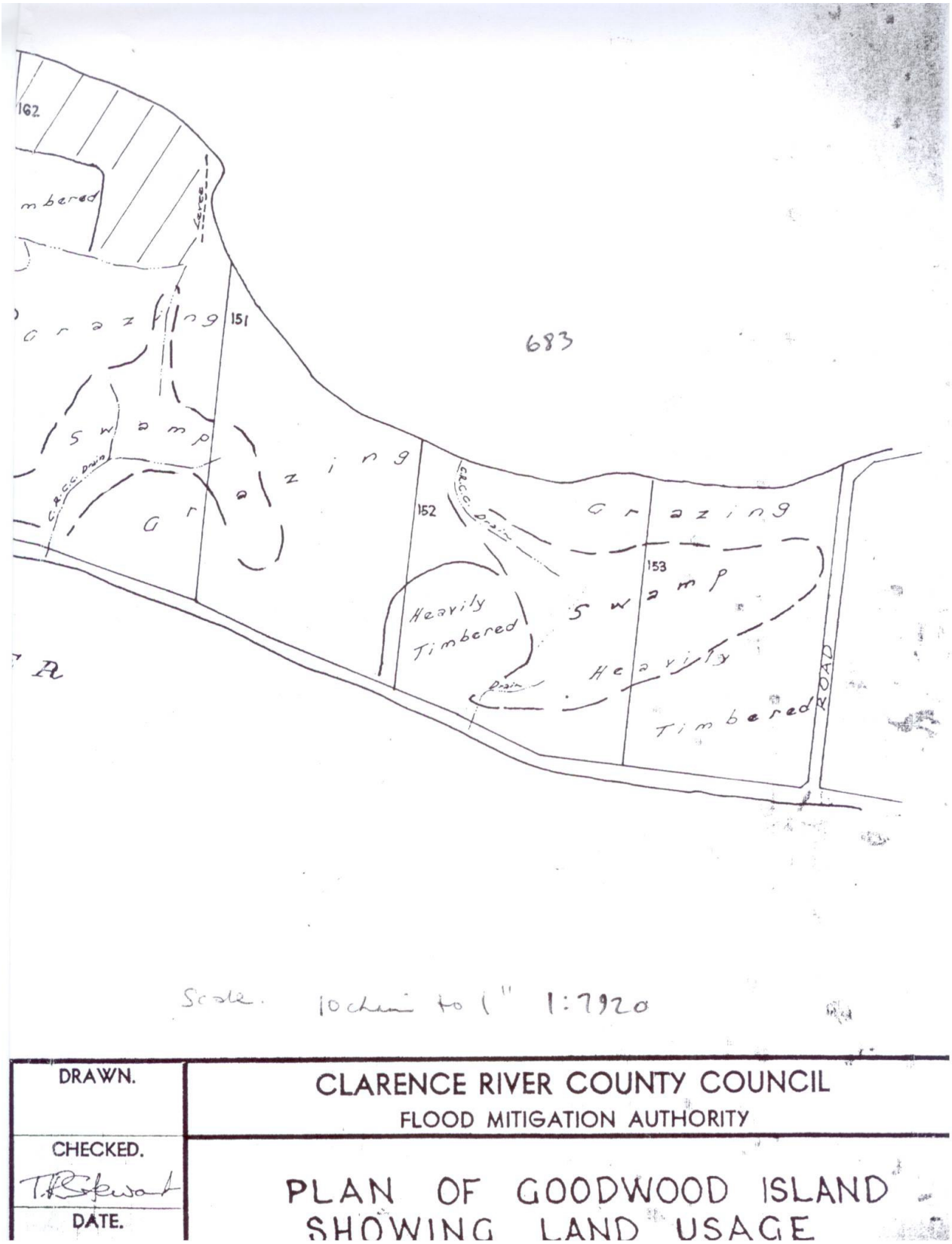
*Within 5 km of the Reserve

Appendix 3 - 1972 Plan of Proposed Levee



Appendix 4 – Plan of Goodwood Island Land Usage

circa1972



Appendix 5 Contour Plan of Theo Tulk Reserve