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COUNTRY

## **Outdoor Activity – Gould’s Lagoon Discovery Trail (all ages)**

Overview: The Gould’s Lagoon Discovery Trail is a self guided walk that can be enjoyed by individuals, or led by a teacher/guide. It is an interpretive walk consisting of 9 discovery points starting on Whitestone Drive (shown on MAP), and finishing at the car park area adjacent to the duck board platform and bird hide of the lagoon. The Discovery Trail encourages students/ participants to take the time to view wetland habitats and animals more closely, to have fun exploring, to appreciate the changes to Gould’s lagoon over time, and to consider the future of the wetland.

This info pack can be read by individuals walking the trail to learn about the wetland and neighbouring macrophyte beds and the animals and plants that live there. Alternatively, it can be used as a resource for teachers/guides to lead the Discovery trail. This info pack contains specially developed information relevant to each of the 9 Discovery Points that can be read out to students/participants to inform them about the interesting environment they are visiting. Several activities can also be undertaken as part of the walk to further engage students/participants.

Currently there is no signage at the site, so it is essential you print out and take this info pack with you, including 9 discovery points and a map, so you can get the most out of the interpretive walk. Prior to the excursion it is recommended that teachers/guides should review the information provided for each of the 9 discovery points and select what is most relevant for their school age group. Follow the walking marked on the map to explore the diverse and fascinating world of wetland plants and animals. This discovery experience is most beneficial when each student/participant has a ‘Wetland Wildlife Detective’ activity sheet to fill in as they explore. Sourcing the required materials prior to visiting the site will enable the completion of the ‘Wonderful Waterbugs’ activity to engage students/participants further.

## Gould's Lagoon Discovery Trail - Info Pack

### Site orientation:

Upon arrival at Gould's Lagoon we recommend a drop off and starting point ~70m along Whitestone Drive (shown on MAP). Four discovery points are located to the north of the starting point before the trail crosses the main road and continues along the western edge of the wetland. Upon completion of the trail be sure to turn around and follow the same route back to the car park at Hestercombe Road as walking along Main Road (to complete a full circuit of the wetland) is strongly discouraged due to a narrow verge and fast moving traffic.



**Location and access:**

There is currently no marked trail on the ground so self guided walkers or teachers/guides running the interpretive walk should attempt to follow the safest path. Make sure children are supervised closely when crossing main Road, and where Hestercombe Road hugs the wetland. Sloped ground can get slippery in wet conditions so care must be taken.

A special feature of this walk is the bird hide, which is wheelchair accessible. Plan your walk for early morning or late afternoon when the beautiful bird life is at its best. The bird hide allows you to observe activity in the lagoon without disturbing the wildlife. A pond dipping platform allows visitors to investigate what lives in the water and the activities provided by the board walk introduce topics such as life cycles and animal footprints in a fun and interactive way.

**Distance:**

1600 m long track.

**Walk time:**

30 mins nonstop, 50 mins with Discovery points, 90 mins with activities.

**Tide times:**

It is recommended the arrival to the site is scheduled to coincide with low tide to provide good views of macrophyte beds. Consult a tide table

<http://www.bom.gov.au/oceanography/tides/> to determine the appropriate time and date to visit.

**Safety:**

Using the maps and other materials provided brief the class/group on where you are going, how long it will take, what time you will return and what they will need to bring. Complete a safety briefing for your group highlighting the risks and controls for the activity. There are hazards such as steep inclines, slippery surfaces, prickly bushes, and deep water nearby. It is essential that all participants wear enclosed footwear, and a first Aid kit is carried by teachers/guides with first aid training.

**Materials Required:**

- Appropriate shoes and clothing (hat, sunglasses, sunscreen)
- First aid kit
- Gould's lagoon Discovery Trail Info Pack, Activities and Map
- Field sheets and pencil, for students to record observations and facts
- Dip netting equipment (nets, containers and trays) and magnifying glasses to view aquatic invertebrates
- Binoculars (if available)
- Cameras (if available)

**Ensure that children wear:**

- Hat, sunscreen and insect repellent applied at home/school
- Closed in walking shoes
- Suitable walking clothes – long pants are strongly recommended

## DISCOVERY POINT 1

### Types of wetland

*Orientation: Walk to a vantage point on the hill to point out:*

- 1) Tidal wetlands along the Derwent foreshore,*
- 2) Large area of underwater macrophytes beds (edges visible along foreshore at low tide)*

#### **What are coastal wetlands?**

Coastal wetlands can be saline, brackish or freshwater.

- The saltmarshes in Ralphs Bay at Lauderdale is a saline wetland.
- Murphy's Flat and Dromedary marshes near Bridgewater in the Upper Derwent estuary are brackish wetlands
- Gould's lagoon is an example of a freshwater wetland

Tidal wetlands are:

- the most common wetland type in the Derwent estuary
- highly productive as they receive nutrient inputs from the land, and are flushed by the sea
- especially rich in plant and animal life.

**Ecological services** - Tidal wetlands provide a range of major services and benefits to estuarine ecosystems.

For example they:

- act as water filters for the land, by trapping substances and contaminants to purify water before it reaches the waterway;
- reduce erosion by buffering the shore/bank from storms;
- act like a giant sponges, to provide protection from floods by absorbing and slowly releasing water;
- provide habitat for a wide range of plants and animals.

**Social and economic assets** - Wetlands are also an important to people and to our economy.

For example they:

- are places of natural beauty and tranquillity
- have significant Aboriginal and historical cultural values
- provide food, fibre and medicines
- offer sporting and recreational activities
- offer opportunities for nature-based tourism
- provide productive fishing grounds, and a refuge and nursery area for many recreational and economically important fish species (such as bream, trout and whitebait); and,
- and, can provide a window on the past.

## **A focus on Derwent wetlands**

### **Gould's Lagoon has changed over time**

- Gould's Lagoon occurs at the top of a natural bay and used to be open to tidal in flow.
- Now it is totally blocked from tidal inundation by the railway line, so is no longer a brackish lagoon, but a freshwater pocket wetland.
- Other lagoons and pocket wetlands used to occur at Austin's Ferry Boat Ramp, Wentworth Park and Bellerive Beach, but have been lost due to urban development.
- If you look to the top of the hills you can see Gould's Lagoons small catchment. Human activities in this catchment area have changed over time, from being native bushland, to farming paddocks and orchards to a heavily built urban area. So the area is heavily impacted.

### **Gould's Lagoon is locally important**

- Gould's Lagoon is important as its one of the few remaining remnant wetlands within the Derwent estuary. Another one occurs in Risdon Cove.
- it provides important habitat for a wide range of animals and plants
- It provides a refuge when adverse conditions such as drought prevail.
- Glenorchy Council and the local community have realised the natural values of this wetland and there are many examples of good management that we will have a close look at along our walk.

### **Murphy's Flat Conservation Area**

- the largest wetland in the Derwent estuary, Murphy's Flat is located upriver from Bridgewater about 5km upriver from here.
- the vicinity is well known for its large population of black swans
- Murphy's Flat serves as a nursery for the sandy flathead and also provides important shelter for other juvenile native fish.
- Backwater areas of the reserve are of particular biological significance with unique plants, and an abundance of gastropod molluscs



## DISCOVERY POINT 2

### Aquatic Herbland Community

***What role do macrophytes play, and what threats do they face?***



*Orientation: From a vantage point over the Derwent estuary you can see where macrophytes occur. They are especially visible along the edges of the foreshore at low tide.*

- Macrophytes are aquatic flowering plants that can be either above water (emergent), entirely below water (submergent), or floating.
- Macrophytes often occur in large 'meadows' or 'beds' that go unnoticed as they are under water. At low tide the margins of these beds along shorelines may become visible as they are exposed at low tide.

*Can you see green a grass like fringe along the exposed mudflats in front of you?*

- There are extensive macrophytes at Granton, Bridgewater, Austin's Ferry and Gagebrook.
- Beds often contain a mixture of species, depending upon light and salinity, and can also grow in association with seagrasses which more commonly occur in marine environments.

*Their functional roles*

- Healthy macrophyte beds have a dense network of roots, known as 'rhizome mats', that increase the stability of the sediment.
- They 'clean' the water and sediment by trapping nutrients, enabling energy to enter the wetland and estuarine food web

*Their natural values*

- Macrophyte beds and seagrass play a key ecological role in Australia's coastal ecosystem
- In mid and upper estuaries they are then major primary producers providing food and shelter for a diversity of invertebrates, fish and birds
- They provide essential habitat for a wide range of fish (e.g., Whitebait and Bream), and invertebrates in the mid and upper estuary
- Swans, coots and a range of ducks feed on these plants in short dives, or bobbing for them from the surface

*Threats to macrophyte and seagrass beds*

- They have been lost, fragmented and damaged by development and poor catchment management, and continue to be lost at an alarming rate
- Major impacts include:
  - sewage and stormwater discharges
  - pollution in urban runoff
  - Physical damage or removal by dredging, land reclamation, or anchor drag from boats

### DISCOVERY POINT 3

#### Wetlands are biodiversity hotspots

INSERT PHOTO OF GOULDS LAGOON FROM A DISTANCE

*Orientation: Walk close to Gould's Lagoon, and stop to consider the role of wetlands*

*Wetlands are one of the most biologically diverse systems on earth.*

The high diversity of animal and plant communities in wetlands is because they:

- are highly productive, collecting nutrients from land runoff and coastal waters
- are good sources of nutrients in water food cycles, providing feeding and breeding places for unique or rare birds, fish, frogs, invertebrates and other animals
- contain diverse habitats due to varied environmental conditions in a relatively small area (for example, wetlands commonly have expansive areas of marshes, underwater grasses, tidal flats and reed beds)
- provide vital refuge for many plants and animals during dry times
- provide nursery areas for many species, some of which are economically important (fisheries)

Many different types of plants occur around wetlands. These can be divided into broad plant communities

- Aquatic herblands
- Reed swamps
- Wet scrub
- Fringing woodland

Many animals are attracted to the water and plant life in wetlands, including birds, platypus, frogs and snakes. By far the most abundant animals in a wetland are insects.

*What animals and plants can you see?*

Explore users of the wetland by becoming a wetland detective (see activity).

**Activity: Wetland Detective (Gr 1 – 6)**

## DISCOVERY POINT 4

### Reed swamps



*Orientation: Walk down to the wetland edge and have a close look at the vegetation*

- One of the dominant plant types in natural undisturbed wetlands are sedges and rushes.
- They occur in clumps or in large patches in shallow areas and along the banks of wetlands. Collectively known as reed swamps, sedges and rushes are good at trapping sediments to stop silt reaching waterways.
- Reeds and rushes are called ‘hydrophytes’ as they are adapted to living in wet, oxygen-poor soils.
- There is a large variety of sedges and rushes. The tallest type we have is called Phragmites, and produces a large seed head that looks like duster. Others have leaves that are long cylindrical spines.
- Sedges and rushes play an important role in slowing water flow through wetlands, and also strip nutrients out of the water when they undergo seasonal growth. But this nutrient is recycled into the wetland as flower heads die-off.
- Firmly anchored in the muddy sediment the roots and stems of sedges and rushes provide feeding and attachment sites for millions of tiny invertebrates.
- Because they grow in dense clumps, they provide good hiding habitat for fish, frogs, and birds.
- This part of Gould’s lagoon is a hot-spot for Eastern Banjo Frogs, also known as the Pobble-Bonk. This name describes their call, which sounds like bonk-bonk-pobble-bonk.
- In disturbed wetlands sedges and rushes are often cleared from the banks. Besides being highly destructive, this also reduces water quality, and reduces the diversity and abundance of animals.

*If you sit quietly at the edge of a patch of sedge or rush you may hear frogs, and you may see the variety of birds that shelter among this tall vegetation.*



**DISCOVERY POINT 5**  
**A diverse bird community**



*Orientation: From the road edge you get good views over the wetland*

*The most visible type of animals in wetlands are birds*

- Water sources draw birds from everywhere. Especially wetlands, with their sheltered pools, dense reed beds, and adjoining thick scrub.
- Common birds that live in wetlands year round, and feed directly on wetland plants and animals include:
  - swans, teal, mallard, ducks and grebes who feed on aquatic herbs floating in the water or attached to the muddy bottom
  - moorhens, swamphens, crakes and rails, who feed on roots, shoots and insects
  - egrets, herons, bitterns, terns and cormorants, who feed on frogs, fish and large insects
  - birds of prey such as harriers and falcons, who feed on snakes, frogs, insects, and small mammals
- Many other bush birds just come to wetlands to drink, shelter and roost.
- In addition to resident birds, wetlands are also important habitats for many migratory species.
- Some birds that travel from other parts of Australia or the world and visit Gould's lagoon are Latham's Snipe, Australasian Shoveller and the Hard-head.
- Wetlands form part of an international network of wetlands that sustain the many millions of birds that migrate across the world, with the Derwent estuary being one of the southern most stopover points for ~33 species including the Latham's snipe, Australasian Bittern.

**Activity: Bird Identification (Gr 1 – 6)**

## DISCOVERY POINT 6

### Human Use and Impacts

- As well as being one of the most biologically diverse systems on earth, wetlands are also one of the most threatened natural systems in the world.
- Threats to wetlands in Tasmania include:
  - land clearing
  - urban development
  - damage from recreational activities
  - altered flows due to barriers such as dams
  - pollution from upstream and local activities
  - fire
  - introduction and spread of pest species like weeds, rabbits and cats.
- A century ago, wetlands were found in most of the bays and coves up and down the Derwent. Most of these wetlands were filled in over time, to make way for buildings, factories, parks and even tips. Today, only a few of these wetlands remain - for example at Goulds Lagoon and Risdon Cove.

*Look around you and try and find evidence of:*

#### *1-land clearing and reclamation*

- Here we can see a mowed lawn, a road, a railway, and houses. This area has been substantially modified from its natural state before humans arrived here.
- parts of the wetland have also been reclaimed or filled in to provide greater land area.
- The loss of vegetation has immediate impacts on the plants and animals that lived there, but also affects drainage through the soils, and erosion.

*Q: What are some of the problems for native wetlands animals when you remove fringing vegetation?*

*Think about*

- *the loss of hiding places for wallabys and kangaroos who come to the wetland to drink and rest.*
- *the loss of high perches for birds like harriers and falcons, who come to wetlands to hunt for prey.*

#### *2-Sources of pollution*

- Massive urban development has occurred up river from Gould's lagoon in past decades.
- Future development is planned (e.g., on the high side of the Brooker Hwy), meaning even greater pollution loads for this wetland

*Q: What are some of the types of pollution that reach Gould's lagoon (e.g., oil from roads, paint from houses, soap from washing machines, herbicides and pesticides from gardens and farms)*

*Q:How is this pollution likely to affect wetland plants and animals?*

#### *3-Altered flows*

- Flows are altered by:
  - Changes in land use up stream, and
  - Barriers to flow
- Before urban development:

Rain falling in the catchment would soak into the ground and slowly move towards the wetland in groundwater. Excess water would flow on the surface and collect in

creeks, where it would be filtered by reeds and other vegetation before entering the wetland.

- Now:  
Drainage lines above the wetland have been piped and lined. The absence of natural creeks means that rainfall is collected on rooftops and streets and funnels down to wetlands more quickly, resulting in flooding. As water seeks through soil and plants it is filtered. But when drainage lines are pipes and lined stormwater arriving at wetlands is largely untreated.
- The major barrier to flow at this site is the railway line and road through the middle of the wetland. It used to be a brackish wetland but now there are no tidal inflows, so is a totally freshwater system.
- the inventory of Tasmanian wetlands shows that in 1981 51% of known wetlands were disturbed, and 12% were severely disturbed or destroyed

#### *4-Weeds and pests*

- Introduced plants and animals are very common in wetlands and cause a wide range of problems.

*Look around you. Can you see evidence of weeds or pests?*

- cats and rats predate birds
- livestock tramples vegetation
- weeds replace native vegetation, and are often not used by native animals.
- The term “weed choke” is used to describe wetland weed infestations that cause a barrier across a waterway. This affects flows as well as the movement of fish, platypus, and other animals.
- Get rid of the weed! Pull it out and replant the edge of the river

***Activity- Identify Wetland Management Issues (Gr 4 – 10)***

***Activity- Score the Naturalness of Gould’s Lagoon (Gr 4 – 10)***

## DISCOVERY POINT 7

### Wetland Invertebrate Communities



*Orientation: walk out along the duckboard platform and look into the water.*

- Healthy wetlands contain an incredibly abundant and diverse community of microscopic animals.
- Invertebrates play a major role in wetlands as they busily work away processing nutrients and feeding on microscopic algae and bacteria in the sediment and in the water.
- Common aquatic invertebrates in wetlands include flies, worms, leeches, spiders, snails, clams, shrimp, crayfish, and a whole raft of tiny 'waterbugs'.
- Some types are sensitive to water pollution, while others are very resistant. So looking at the invertebrate community can provide an indication of how polluted a wetland is.

*Q: Take a close look at the water. Can you see any waterbugs?*

**Activity: Wonderful Waterbugs (Gr 4 – 10)**

## DISCOVERY POINT 8

### Fringing wet scrub and woodland



**need photo of fringing woodland**

*Orientation: walk the track along the northern edge of Gould's Lagoon and you will pass through some thick scrub and woodland.*

What is wet scrub?

- It contains mainly woody shrubs such as woolly tea tree (*Leptospermum lanigerum*), and prickly moses (*Acacia verticillata*).
- It often grows to a few meters height, and is so thick and dense it is often too hard to walk through.
- It grows in close association with sedgeland and rushland
- It is most extensive in floodplains, or along the banks of wetlands.

Wet scrub is common in wetlands throughout the Derwent estuary

- Large tracts of wet scrub occur in the Upper Derwent in Murphy's Flat and Dromedary marshes.

Wet scrub is habitat for:

- A wide variety of wildlife shelter in wet scrub. Such as small and medium sized mammals (bandicoots, antechinus, and native rats). It provides cover and protection for these shy creatures so they can access the edges of the wetland, or move about within the dense vegetation foraging for food.
- Frogs, lizards, birds, and many invertebrates also live among wet scrub, or use it at some stage during their annual life cycle.
- Dense mats of spider webs, cocoons made of leaves and twigs, and colourful beetles and dragonflies can be found in wet scrub.

Fringing woodlands

Tall trees and bushes are an important component of natural wetlands as they;

- nourish the soils and water by dropping leaf litter.
- shield wetlands from winds
- provide perching and nesting sites for wetland birds.
- provide cover and protection for shy animals
- act as corridors for forest animals enabling them to access wetland without having to move through exposed open areas.
- are essential for the support some animals life-cycles (e.g., the pupae of some moths and butterflies fed on tree species, while adults feed on nearby wetland plants).

Swamp gums (*Eucalyptus ovata*)

- As their name suggests, swamp gums can tolerate poorly drained swampy areas with sand or clay soils.

- They are the most common tree in woodlands that fringing wetlands of the Derwent estuary.
- Swamp gums are an important food plant for swift parrots, as well as many other birds, possums and invertebrates.
- Much of the woodland that once fringed wetlands of the Derwent estuary has been cleared. As a result most wetlands are now bounded by paddocks, roads, or housing.
- Due to habitat loss swamp gums are a community type that is listed as 'endangered' under Tasmanian State Legislation.



## DISCOVERY POINT 9

### How to care for wetlands

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*Orientation: walk about 60 meters back from the edge of Gould's Lagoon and take a look at the pool of water in the gully. This is a man made water sensitive urban design feature.*

There are many things that can be done by the community, industry and the Government to help protect and restore wetlands.

Clean water before it enters the wetland:

- Despite the abundance of waterbirds, frogs and aquatic invertebrates at Gould's Lagoon this wetland is under increasing pressure.
- While extensive land clearing for urbanisation and agriculture has occurred in the past, continued expansion of housing in the catchment will further affected surface and ground water quantity and quality.
- In the coming decade increased flows and increased pollution can be expected to enter this wetland.
- Glenorchy City Council have taken considerable steps to remove sediment from the storm water entering the site
- Sediment traps have been installed in the tree major gullies entering the wetland so it doesn't fill in with dirt.
- Here we can see a form of 'water sensitive urban design' which involves digging a ditch and a raised bank. This effectively slows the movement of water under high rainfall events, to let sediment settle out of water before it drains into the wetland.
- There are two other sediment traps at gullies to the west and south of the wetland.

Revegetation, and weed removal

- Retaining native vegetation in drainage lines, and along the banks of wetlands not only improves the look of wetlands, but also saves money and work in the long term.
- This is because native vegetation plays a range of vital roles:
  - it acts as a buffer, reducing water contamination and soil erosion.
  - It prevents weeds such as gorse and blackberries from invading and spreading
  - it provides homes for many native birds which can significantly reduce agricultural pests.

*You can become involved in wetland care and restoration by joining a community group, or taking part in annual events like 'Clean Up Australia Day'.*

*Perhaps your school can revisit this site each year to keep it clean!*