

Swan Apsley Catchment Plan

"Working together to look after our catchment and community"

2013 - 2018

Glamorgan Spring Bay Natural Resource Management Committee



February 2013 version

Acronyms used:

CTCCatchments to CoastGSB NRMCGlamorgan Spring Bay Natural Resource Management CommitteeNRM StaffNatural Resource Management Staff at the Glamorgan Spring Bay CouncilDPIPWEDepartment of Primary Industries, Parks, Water and EnvironmentGSBCGlamorgan Spring Bay CouncilICMIntegrated Catchment Management

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Swan Apsley Catchment Management Plan

"Working together to look after our catchment & our community"



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Acknowledgements

This revision of the Swan Apsley Catchment Plan (2003) would not have been possible without:

- o The Glamorgan Spring Bay Council, and their dedicated staff.
- o The Glamorgan Spring Bay NRM Committee



Glamorgan Spring Bay Natural Resource Management Committee

- o The commitment, guidance, and financial investment from NRM South.
- o The original contributions of Tom Teniswood, Landcare Coordinator (1998 - 2003), The Moulting Lagoon and Swan Apsley Management Plan Committee.
- o The ground breaking work of the Little Swanport Catchment Committee (LSCC) and the professional staff that have supported them over many years.
- o The Australian Government Caring for Our Country Program.
- o The attendees of the review workshops.
- o The support, knowledge and guidance provided by a number of government and/or private organisations that assist land managers and facilitators. In particular:

Department of Primary Industry, Parks, Water and the Environment (DPIPWE) Tasmanian Aquaculture and Fisheries Institute (TAFI) Forestry Tasmania (FT) Tasmanian Parks & Wildlife Service (PWS)



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Outline

This document is a review of the draft Swan Apsley Catchment Plan 2003.

The plan aims to:

- o give an overview of the catchment's natural, economic and social structure;
- o highlight some possible risks to its assets;
- o provide some advice and resources for best practice natural resource management; and
- o present a framework to allow on-ground works to proceed in an integrated and coordinated way.

The plan has been produced by the Catchments to Coast partnership between the Glamorgan Spring Bay Council, NRM South and the Glamorgan Spring Bay Natural Resource Management Committee (GSB NRMC). Workshops were held with technical specialists and community members in 2010.

The draft reviewed plan was endorsed by Council prior to a public consultation period. Any feedback received was considered by the working group for inclusion in the final plan.

It is a guide for interested land managers, Council, NRM South, State/ Federal Government and the broader community.

"Tasmania must continue to be a leader in best

environmental practice, not just because it protects the integrity of ecosystems and the environment generally, but because increasingly these will provide market benefits in the future..."

(Nixon 2007)

PSLA

SW_A





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1. Introduction

This document is a review of the *Draft Swan Apsley Catchment Management Plan 2002*. The draft plan has guided the GSB NRMC in planning and overseeing catchment management initiatives over the last six years. It remains a valuable reference document.

The NRMC is a non-political Section 24 special committee of the GSB Council (GSBC)¹. The primary objective of the NRMC is to provide a means to exchange information and progress NRM issues between community (via the committee) and GSBC. The NRMC has broad stakeholder and community representation and has met regularly since its inception in 2005. The NRMC replaced the GSB Landcare Management Committee, which had a similar function and was responsible for the development of the *Draft Swan Apsley Catchment Management Plan 2002*.

A lot has changed in our catchment since 2002. This document is an attempt to summarise these changes, and what they'll mean for the management of the catchment over the coming years. As such, the catchment management objectives and actions section has been updated to reflect changes within the catchment and new information that's come to light since the first report was written.

We hope you'll find this document interesting and useful, and that it inspires you as we work together to maintain and improve the health of our catchment for years to come.

Opposite is a timeline of some significant events which have occurred which have had some effect on the catchment and its management. These events are relatively recent in the scheme of things given the extensive time, pre European settlement, that the catchment was occupied by the Tasmanian Aboriginals. However, they give an indication of how an integrated catchment management approach is necessary to progress the management of complex social, political and environment landscapes.

"A water catchment or watershed is an area or basin of land bounded by natural features of hills or mountains from which all run-off water drains and flows to a river, stream, lake, wetland or estuary."²

We all live in a catchment.

2 Tasmanian Land and Water Management Council, 1997. Integrated Catchment Management – What it is and how to do it. Prepared by Catchment Management Working Group, eds. Sprod, D. and D.N. Wright, Tasmania.



Mount Peter as seen from flooded field near Swan River by Diane Bricknell

¹ Established under Section 24 of the Tasmanian Local Government Act 1993

TIMELINE

1918	Proclamation of a sanctuary for water fowl on Moulting Lagoon		
1929	Floods		
1930	The Great Depression and World War II- Wattle bark stripping (Acacia mearnsii) and snaring of		
to1950s	wildlife for skins was a major source of employment and income for the community.		
1959	Wildlife sanctuary declared on part of Moulting Lagoon		
1960	Rivers and Water Commission introduced Water Licences		
1969	Major flood event		
1970	Phytophthora Cinnamomi (cinnamon root rot fungus) identified in the dry forests.		
1970	Tas Pulp and Forest Holdings commenced integrated harvesting throughout the upper catchment.		
1970	Dolphin Sands subdivision initiated.		
1974	Floods		
1976	Hardings Falls Dam proposal.		
1977	Douglas Apsley National Park proposed		
1979	Freycinet Vineyard plants first vines		
1980	Ramsar ³ nomination for Moulting Lagoon		
1980	Aquaculture industry commenced In the Swan River estuary.		
1981	Lake Leake road sealed		
1982	Drought		
1983	Coles Bay road sealed		
1985	Forest Practices Act		
1985	Major wildfire event - burnt 15,000 ha of the catchment		
1987	Introduction of broad acre irrigation systems.		
1988	Moulting Lagoon Game Reserve declared		
1988	Drought		
1989	Douglas Apsley National Park declared		
1990	Falmouth link road constructed and sealed		
1995	Threatened Species Protection Act		
1995	Major wildfire event -burnt 17,000 ha of the catchment		
1997	Natural Heritage Trust (NHT) 1 federal funding for drought and landcare		
1998	Moulting Lagoon catchment committee formed		
1999	Weed Management Act		
1999	The Environment Protection and Biodiversity Conservation Act.		
1999	Moulting Lagoon Game Reserve Management Plan		
1999	Websters Walnut plantation commenced.		
1999	Interest in other intensive cropping increased - grapes, olives, walnuts, avocado's		
2000	Water Management Act 1999		
2001	Environmental Water Requirements for the Swan River determined (DPIWE)		
2002	Australian Government Envirofund (NHT2)		
2002	Swan Apsley Catchment Management Plan		
2003	Coombend Vineyard established		
2003	Moulting Lagoon Game Reserve Management Plan		
2005	Glamorgan Spring Bay NRM Committee established		
2006	Swanwick subdivision expansion		
2006	Drought		
2006-08	Moulting Lagoon and Great Swanport water quality monitoring and habitat mapping.		
2007	Large scale 10000 ha fuel reduction burn conducted within the catchment.		
2008	Caring For Our Country commenced funding NRM projects		
2009	Tasmanian Cat Management Act		
2011	Floods		
2011	Review of the Swan Apsley Catchment Management Plan commenced.		
2013	Wildfire event burnt 4.900 Ha of the Catchment		

DECLARATION OF THE FREYCINET NATIONAL PARK

On 11 January 1906, all of the Crown land on Freycinet Peninsula and Schouten Island was proclaimed a game preserve under Section 3 of The Game Protection Act 1905 for a period of five years to protect all kangaroo, deer and possum from capturing, hunting and killing.

On 29 August 1916, Freycinet Peninsula and Schouten Island were gazetted Scenic Reserves under the Scenery Preservation Act 1915, making Freycinet National Park one of the oldest national parks in Tasmania.

On 29 January 1992, an area of 1 920 hectares, including the Friendly Beaches, was added to Freycinet National Park.

As a result of recommendations of the Regional Forest Agreement, an additional 4873 hectares was added to the Park on 30 April 1999.

Reference: Freycinet National Park Management Plan 2004

3 Ramsar wetlands are recognised as Wetlands of International Importance by the Ramsar Convention, an agreement to promote the conservation of wetlands worldwide.



2. A brief tour of the Swan Apsley Catchment...

The Swan Apsley Catchment is one of 48 administrative water catchment management areas as defined by the Tasmanian State government for the purposes of water management planning. The catchment is bounded to the north by the Scamander-Douglas and South Esk catchments; to the west by the Macquarie catchment; and to the south by the Little Swanport Catchment.

The Swan Apsley Catchment is defined by the watersheds of the Swan, Apsley, Meredith and Stoney Rivers, and covers approximately 138 000 hectares. The most northern of the catchment's major rivers, the Apsley River springs from the upper reaches of Mount Punter, and flows through the Douglas-Apsley National Park. The Swan River is the catchment's largest river, with two major tributaries, known as the West and North branches. The headwaters of the North branch rise from the dolerite peaks of Mt. St John. Further south, the West Swan and Cygnet Rivers, stem from the Snow Hill Marshes – Snow Hill is the catchment's highest point at 971 metres. Further south still, the Shaw River and other tributaries of the Meredith flow down between White Grass Ridge and the Kelvedon Hills; the Stoney River follows a similar line, shadowing the Meredith to the north of the Kelvedon Hills. Forestry operations are carried out in these areas, but for the most part, the upper sections of this catchment are still largely covered by native forests.

As the rivers flow down through the slopes and into the floodplains of the mid-catchment, they slow down. Much of the best farming land within the catchment is found within the floodplains. The same families have worked many of these farms since European settlement, and the area has a rich history of cropping and sheep grazing.

The Swan Apsley's coastal zone is where the human population of the catchment congregates, and where the rivers' flows slow to a crawl.

Strained through myriad river mouths and the wetlands of Moulting Lagoon and the Great Swanport estuary, the waters of the Swan and Apsley rivers finally flow out to meet the ocean in the sheltered surrounds of Great Oyster Bay.



Moulting Lagoon courtesy of Maurice Banks





3. Benefits of healthy catchments

Healthy catchments provide us with the social, economic and environmental benefits that are essential to maintain a vibrant community.

SOCIAL BENEFIT

Without a vibrant, happy community, we will not have the human resources needed to generate or support a healthy economy. Without an educated, active population, we would not have the will or capacity to protect and enhance the living environments upon which we all depend.

ECONOMIC BENEFIT

Without a strong local economy, our children will be forced to move away, and our community will struggle to survive. Without the money provided by a prosperous local economy, it will be difficult to protect the living environment of our catchments upon which our social and economic wellbeing depend.

ENVIRONMENTAL BENEFIT

A thriving living landscape is essential to support a strong local economy – without a healthy environment, we cannot farm, harvest or fish sustainably. We cannot provide visitors with inspiring destinations that will drive our local tourism market.

Living landscapes, both wild and tamed, provide us with opportunities to grow our food, provide us with clean, plentiful water, give us space to work and play in, and give us the joy and peace of mind that comes from living within a beautiful, functional environment.





Tourism enterprises within the Catchment area make a significant contributuion to the local economy. Image courtesy of Wineglass Bay Cruises



Tree planting in Swansea



Yellow Sandbanks Jetty on the Swan River in Spring

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4. Our vision for the Swan Apsley Catchment

In 1998, the Glamorgan Spring Bay Landcare Management Committee worked with the local community to develop a vision for the Swan Apsley Catchment. The vision is still relevant today, and has only been updated to recognise the growing understanding of the potential impacts of climate change:

To provide current and future generations with a healthy catchment with a diverse natural environment.

To have a balanced and sustainable use of natural resources for an economically viable community.

To have enhanced water quality through sound land and water management.

To recognise that current and future management needs to consider the emerging potential impacts of climate change.

WHO'S ON BOARD?

The GSB NRMC has continued to develop an integrated catchment management approach to natural resource management (NRM) in the GSB municipality. This has mainly been through the development of the *Catchments To Coast* program, which is funded primarily by the GSB Council and NRM South, who receive funding from the Australian and Tasmanian Governments. The Catchments To Coast staff work closely with a broad number and range of land managers, government agencies and technical specialists to develop and undertake a range of NRM initiatives on public and private land. The program aims to develop and strengthen links between legislation, plans and programs. The revised Swan Apsley Catchment Plan will form a key guiding component of the program by identifying actions for the team to progress. The plan recognises that there are many players in integrated catchment management and NRM, and that gaining the commitment and cooperation from a range of key players is an essential part of implementing positive changes.



Glamorgan Spring Bay NRM Committee and guest speaker Senior Constable Margaret Little



5. Achievements to Date (since 2002)

The following list is a snapshot of some of the achievements since 2002:

- Increasing and ongoing commitment of the Glamorgan Spring Bay Natural Resource Management Committee and the Council to NRM and catchment management
- Development of the Catchment To Coast partnership between the GSB NRMC, Council and NRM South (2008 to present)
- Purchase of Quik Spray unit for use by members of the Council, the Catchment To Coast team, East Coast Primary Producers and individual landholders for weed control
- Strategic weed control in sixteen priority private land conservation covenants
- Ongoing strategic coastal weed control across land tenure throughout the entire Municipality
- Development of a weed action plan for the Moulting Lagoon RAMSAR wetland, including the first stage of on-ground works in collaboration with key land holders / managers
- Mapping and determination of priorities for protection of the nationally significant *Callitris oblonga* (South Esk Pine) vegetation communities along the Aspley River
- Ongoing participation in National Tree Day events in Swansea
- Development and ongoing implementation of the Shorebird Project to protect shorebird values throughout the Municipality
- Ongoing support of community groups participating in Clean Up Australia Day
- Ongoing support of landholders with property management planning
- Coordination of field days and workshops
- Ongoing control of priority Declared Weeds and Weeds of National Significance in line with the Glamorgan Spring Bay Weed Management Plan (draft revised 2008 – 2013)
- Ongoing development of partnerships with key agencies and organisations involved with natural resource management including NRM South, DPIPWE and Southern Water
- Support for smaller rural landholders in developing and implementing weed action plans.

6. A brief history of Natural Resource Management within the Swan Apsley Catchment

THE PAST

It has long been recognised within the community and by major land managers within the catchment that Integrated Catchment Management was needed to ensure the ecosystems and assets within the catchment remain healthy and viable. Work on this began with the formation of the Moulting Lagoon Catchment Management Committee in 1998. The committee prepared a plan, however its momentum waned due to lack of ongoing support and funding. In 2001 the "Environmental Water Requirements of the Swan River" was produced by the Department of Primary Industries, Water and Environment. This document was the impetus to bring together another committee and with funding from the Australian Government Envirofund (NHT II), the first Swan Apsley Catchment Management Plan was prepared and made public in 2002.

THE SWAN APSLEY CATCHMENT TODAY – A LIVING LANDSCAPE

The Swan Apsley Catchment today is a diverse landscape, managed and owned by a broad range of stakeholders. 44% of the area is privately owned, 34 % is State Forest managed by Forestry Tasmania and the remaining 21% is National Parks and Crown land. Glamorgan Spring Bay Council owns less than one percent of the catchment area; however they have a number of leases and licenses over Crown Land, mostly along the coastal zone within townships. The Council also have a significant role in land use, planning and regulation.



Land use within the catchment is reasonably diverse. 46% of the area is managed for conservation or reserved for various reasons. Approximately two-thirds of the catchment (64%) is in more or less natural condition, much of which is either

formally reserved, or simply not in use for any intensive land uses.

About 12% of the catchment is used for production forestry, most of which is managed as native forests. rather than plantations. Grazing is the second major land-use within the catchment, utilising 11% of the land – this is split more or less evenly between areas of grazing on native pastures and grazing on modified pastures.



Hazards from Pelican Bay by Steve Everts



A brief history (continued)

Contained within the native pastures are significant areas of native grassland communities. Some native grasslands are among the most threatened vegetation communities within Tasmania.

Although irrigated cropping and horticultural enterprises bring significant income to the region, through various enterprises including vineyards and walnut orchards, they occupy only 1% of the catchment area. Similarly, the area occupied by intensive land uses, including residential areas, commercial zones, extractive sites (mines and quarries), airstrips and recreational facilities, occupy only 1% of the catchment. A further 1% of the catchment is covered by water, in the form of rivers, streams and wetlands, as well as a much smaller area of artificially created water bodies, including reservoirs and dams.



ovenanted land in the Swan Apsley Catchment

Meetus Falls Forest reserve



Grazing at The Bend, courtesy of S. Sinclair and H. Edginton



Grape picking at The Bend vineyard, courtesy of S. Sinclair and H. Edginton



Recreational facility at the Duck Park, Swansea



Building in a residential area in the Swan Apsley Catchment, courtesy of K. Walters, M. Brown and S. Webb

Catchments consist of a broad range of environmental elements, and what touches one, affects the others. It can sometimes be difficult to clearly separate issues that are so tightly interconnected.

We've chosen to use the themes defined by the Tasmanian State of the Environment Report 2009¹ to help define the broader values of the Swan Apsley Catchment – in doing so, we hope to make our plan more easily integrated with developments at a State level. The State of the Environment Report (SOER) defines five major themes; Air, People, Natural Values, Water and Places. For the purposes of our catchment plan, we'll focus on People, Natural Values and Water.



Our Catchment Plan focuses on three major themes: People, Natural Values and Water.

¹ Tasmanian Planning Commission, 2009. State of the Environment Report: Tasmania 2009. Tasmanian Planning Commission, Tasmania.



7.1 People

i. Cultural heritage

Aboriginal Heritage

Evidence confirms that Aboriginal nations have inhabited Trowunna (Tasmania) for at least 37,000 years ¹. A number of bands from the Paredarerme nation, (also known as the Oyster Bay nation), occupied the Swan Apsley Catchment area at the time of European invasion². The Paredarerme's territory covered 7,800 square kilometres. Bands living within the catchment area include; the Linetemairrener (North Moulting Lagoon); the Loontitetermairrelehoinner (North Oyster Bay); and Toorernomairremener (Schouten Passage)³. Each of these bands had custodial and ceremonial responsibilities for their territory. The Paredarerme had their own language and laws, and required trade, ceremony and treaties to keep the peace⁴.

To gain access to Linetemairrener, Loontitetermairrelehoinner or Toorernomairremener territory, nations and bands from other parts of Trowunna had to negotiate a formal agreement in order to enter, similar to a visa and passport system⁵. All Tasmanian bands travelled extensively, both within their nation's territory and outside it (permission dependent). Well-defined travel roads used by the Aboriginal Tasmanians can still be found today. Such roads were usually along the borders of territories, designed for 'maximum access and minimum trespass'⁶.

The contemporary Aboriginal community in Tasmania is strong, vibrant and resilient. Today, descendants of the Paredarerme nation live in the Swan Apsley Catchment area, and elsewhere in Tasmania and Australia. The Swan Apsley Catchment area is rich in sites of seen and unseen Aboriginal heritage, particularly in the coastal zone and near waterways. Ancient roads, ochre deposits, stone quarries, tool making sites, middens, camping places and cider gum trees (scarred in ancient rituals) are just some of the priceless pieces of the Aboriginal cultural landscape in the Swan Apsley area today⁷. It is imperative that such valuable heritage be protected.

Further information:

First Australians 2008, *First Australians: The untold story of Australia*, Episode 2 Her Will to Survive, directed by Becky Cole, Special Broadcasting Service Corporation.

Gammage, B. 2011 *The Biggest Estate on Earth: How Aborigines Made Australia,* Allen and Unwin, Sydney. Plomley, N. 2008, *Friendly Mission: The Tasmanian Journals and Papers of George Augustus Robinson 1829-1834,* Queen Victoria Museum and Art Gallery and Quintus Publishing, Hobart.

Reynolds, H. 2006, The Other Side of the Frontier, University of New South Wales Press Ltd., Sydney.

1 Parks and Wildlife Service, 2000. Freycinet National Park, Wye River State Reserve Management Plan 2000, Parks and Wildlife Service, DPIPWE.

- 5 Ryan, L. 1996, *The Aboriginal Tasmanians*, Allen and Unwin, Sydney.
- 6 Ryan, L. 1996, The Aboriginal Tasmanians, Allen and Unwin, Sydney.

² Boyce, J. Van Diemen's Land, Black Inc. Books, Melbourne.

³ Ryan, L. 1996, *The Aboriginal Tasmanians*, Allen and Unwin, Sydney.

⁴ Lehman, G. n. d. Aboriginal History and Culture: Bicheno Townscape Project Dossier, Australia Council for the Arts.

⁷ Calder, G. 2010, Levee, Line and Martial Law, Fullers Bookshop, Launceston.

Other Heritage

The first evidence of European knowledge of the area comes from Abel Tasman's voyage of 1642, during which he named Schouten Island. Nicolas Baudin visited the area as part of a scientific expedition in 1802, which extensively charted, drew and collected scientific specimens from the area. The expedition camped on Schouten Island, and made many records of the local flora and landscapes during their time there. Many of the area's place names came from this visit – Freycinet Peninsula is thought to have been named after one or both of two brother officers who joined Baudin on this voyage. This French connection is celebrated biannually by the local "France to Freycinet" Festival, held in Swansea.

Exploitation of the catchment's resources began in earnest in the early 1800s, with the advent of sealing in Great Oyster Bay. Sealers were soon followed by whalers in the 1820s – in 1824, George Meredith set up a whaling station in Parsons Cove, in what is now a freehold area within Freycinet National Park.

Farming also began during this period, with the first farming settlers sailing up the coast from Hobart. They hauled their boats over the Forestier Peninsula isthmus at what is now Dunalley, to avoid the difficult journey around the Tasman Peninsula.

The European's arrival pressured and challenged the established society of the Paredarerme nation (also known as the Oyster Bay nation). European diseases and weapons threatened the survival of the bands living in the Swan Apsley area.



Franklin Street Swansea in the 1800s



Newly refurbished East Coast Heritage Centre, Historical Society and Visitor Information Centre



People (continued)

From 1823, conflict between the Paredarerme and the Europeans escalated⁸. The Aboriginal Tasmanians were skilled in cultural and technological adaption⁹. This, coupled with the need and determination to protect their people and land resulted in a war of resistance¹⁰. The Paredarerme bands united in their effort to rid their country of the Europeans. No official record of deaths on either side of the frontier was kept at this time. In 1834, after years of conflict, the surviving Paredarerme people were forcibly removed from their homes during George Augustus Robinson's 'Friendly Mission'. The Paredarerme were exiled to Flinders Island¹¹.

Lime from the shells at Richardsons Beach was manufactured at Coles Bay, which was shipped to Swansea to make mortar. Other extractive industries within the area included some coal and tin mining in the 19th century, and as recently as 1997, there was a licence to quarry red granite from the coastal area on western side of the Hazards.

Many fine examples of colonial architecture are still visible within the catchment today.



- 8 Calder, G. 2010, Levee, Line and Martial Law, Fullers Bookshop, Launceston.
- 9 Calder, G. 2010, *Levee, Line and Martial Law,* Fullers Bookshop, Launceston.
- 10 Reynolds, H. 2006, *The Other Side of the Frontier*, University of New South Wales Press Ltd., Sydney.

11 Plomley, N. 2008, Friendly Mission: The Tasmanian Journals and Papers of George Augustus Robinson 1829-1834, Queen Victoria Museum and Art Gallery and Quintus Publishing, Hobart.

ii. Population and settlement patterns today

The main towns of the Swan Apsley Catchment are Swansea (population: 840, average age: 54 years), Bicheno (639; 49 years), Coles Bay (473; 48 years) and Cranbrook (114; 42 years), and compared to other towns statewide, the populations of these towns tend to be older. (The median age for all Tasmanians is 39.9 years).¹²

There are two relatively new communities which are growing in size, Dolphin Sands which is spread along the sandy spit of Nine Mile Beach, and Swanwick which is on the eastern side of the Swan River mouth. With the exception of Cranbrook, all of these towns are situated directly on the coast, where most of the permanent population resides. The catchment's population is swelled by an influx of tourists over the summer months, who also spend most of their time within the coastal zone.

Community facilities within the catchment include primary schools and childcare centres at Bicheno and Swansea, and an aged care facility in Swansea. Public tennis courts are found in Swansea, Bicheno and Coles Bay, and recreation grounds and ovals are found in Bicheno, Swansea and Cranbrook. Swansea is also home to a branch of the State Library and a local historical society, which is equipped with a public reading room.

The Glamorgan Spring Bay Council has an office in the town of Swansea. Medical centres, local volunteer Ambulance and Fire brigades, SES in Swansea, police and pharmacies are available at Swansea and Bicheno.

iii. Economic

Tourism is an important industry in the catchment with visitors coming from everywhere especially to visit the world-renowned Freycinet National Park. Freycinet National Park has moved ahead of the Gordon River and Lake St Clair to become the second most popular National Park destination in Tasmania after Cradle Mountain. The Douglas Apsley National Park, Moulting Lagoon and the spectacular coastline of the Swan Apsley Catchment is supported by a range of visitor experiences and services.

The towns of Bicheno, Swansea and Coles Bay focus on employment opportunities in tourism, fishing, grazing, forestry, aquaculture, with a more recent focus on horticultural crops including viticulture, olives and walnuts. The forest industry downturn has had an impact on employment in both primary and downstream processing of forestry operations.



12 Australian Bureau of Statistics, 2010. ABS Website – Population by Age and Sex, Australian States and Territories, 2010. http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3201.0



7.2 Natural

i. Native vegetation

The Swan Apsley Catchment contains a diverse range of native vegetation communities and associated plant species, and is fortunate to retain large areas of this in relatively intact form. The catchment is recognised as a "hotspot" of plant endemism – this means that there are many species found within the catchment that do not occur anywhere else.

Generally speaking, the vegetation in the higher sections of the catchment tends to be in better and less fragmented condition than the vegetation closer to the coast – higher up in the catchment, much of the land is reserved or contained within State forests, whereas towards the coast, large areas have been cleared for agriculture and the vegetation becomes increasingly fragmented by development.

Although ecosystems tend to be healthiest when least disturbed, native vegetation does not need to be present in large unbroken swathes to be valuable within the catchment landscape.

Remnant stands of trees can provide habitat for more mobile species of animals, such as birds and marsupials, and can also improve productivity of grazing land through provision of shelter for stock. Intact riparian vegetation is invaluable in maintaining the health of the catchment's river systems, helping to guarantee downstream water quality and quantity for human consumption.

Forty-seven distinct native vegetation communities are recognised from within the catchment: eleven of these are listed as threatened at a State level. Of the catchment's fortyseven native vegetation communities, seven of these account for more than three-quarters of the catchments native vegetation cover¹.

The catchment is dominated by dry eucalypt forests and woodland – some of the most common vegetation communities include *Eucalyptus pulchella* (white peppermint) dry forest and woodland and forests and woodlands dominated by *Eucalyptus amygdalina* (black peppermint). Also common are *Eucalyptus delegatensis* (gum-topped stringybark) dry forests and woodlands, *Eucalyptus obliqua* (stringybark) dry forests and woodlands, and a wetter variation of *Eucalyptus delegatensis* forest. Much of the area used for forestry in the catchment utilizes these vegetation communities.

LOCAL ENDEMIC PLANTS

Approximately 25% of Tasmania's native plant species occur nowhere else except in Tasmania. A number of these 'endemic' plants occur only within a relatively small area and these are known as 'local endemics'. The Swan Apsley Catchment is a hot-spot for local endemics and one of these is the threatened Tasmanian velvetbush (Lasiopetalum micranthum). It's a low spreading shrub with slender branches that are covered in rust coloured hairs. It occurs only on shallow, dry dolerite soils in dry sclerophyll forest. Whilst it occurs in a few reserves, most populations are located on private land. Threats to this species include loss of habitat due to land clearance and agricultural development.



Lasiopetalum micranthum

1 Vegpatch

Not all of the most common vegetation communities are forest. Lowland grasslands cover 5% of the catchment, and much of the area covered by these communities are important for the many graziers, who with careful management and specialist advice, have worked to develop grazing regimes that benefit both the grasslands and their stock.

Some vegetation communities play a valuable role in maintaining balance within local ecosystems. Areas of saltmarsh are particularly important for the region, acting as nurseries for fish, feeding grounds for local and migratory birds, and a natural filter to trap sediments and associated nutrient that would otherwise wash into lagoons and estuaries. The largest areas of saltmarsh within the Swan Apsley are located within the Apsley Marshes/ Moulting Lagoon complex. The vegetation of these saltmarshes is comprised largely of saline sedgeland/rushland and succulent saline herbfields.

About 48 660 hectares, or almost 35%, of the catchment's native vegetation is protected within formal reserves – a further 14 825 hectares, or about 11%, is held within informal reserves (i.e.; reserves not backed by legislative protection).

Of the formal reserves, there are two national parks – Douglas-Apsley National Park, and Freycinet National Park. Moulting Lagoon Game Reserve also falls within this category. Smaller nature reserves on public land within the catchment include Dry Creek (East, South and West) Nature Reserves, Dead Dog Hill Nature Reserve and Little Christmas Island Nature Reserve. There is a large State Reserve at Wye River, and a smaller State Reserve at Lookout Rock in Bicheno. There are also significant areas of private sanctuaries and conservation covenants within the catchment.

LOWLAND NATIVE GRASSLANDS

'Lowland Native Grasslands of Tasmania' include two distinct ecological communities, both of which are present within the Swan Apsley Catchment: lowland kangaroo grass (*Themeda triandra*) and lowland silver tussockgrass (*Poa labillardierei*) grasslands. These grasslands can be extremely rich in plant species with herbs such as lilies, daisies and orchids often occupying the spaces between native grass tussocks. They provide vital support to a diverse range of plants and animals that are important for maintaining and improving biodiversity.

These grasslands are nationally threatened ecological communities. They are some of Tasmania's most fragmented ecosystems and the most depleted vegetation formations in the State.



Kangaroo grassland by Nicky Meeson



22

Natural (continued)

COVENANTS AND NATURE CONSERVATION

A conservation covenant is a legally binding agreement that is registered on a land title, used to protect special areas and their natural values. In the Swan Apsley Catchment there are 48 covenants areas covering 6,540 hectares. Perhaps the greatest threat to the health of the private protected areas is that posed by environmental weeds. Gorse is the biggest problem and to tackle this, an ongoing effort has begun. The Private Land Conservation Program identified those covenant areas which needed attention and through a project funded by the Australian government, the locally based (Glamorgan Spring Bay Council and NRM South) Catchments To Coast team was armed with a quick spray unit and sent forth to get on top of the gorse. The landowners have benefited greatly and have promised to maintain the program themselves over the years to come. It's a fantastic program which will see all gorse within covenants controlled.

Dean Vincent *(Coordinator)* Protected Areas on Private Land Program Department of Primary Industries, Parks, Water & Environment





ii. Native animals

The Swan Apsley is home to a broad range of native animals that bring life, movement and colour to the catchment landscapes.

Commonly observed land-based residents of the catchment include bandicoots, echidnas, brushtailed possums, pademelons and wombats. Many of these animals have become accustomed to peopled landscapes, and are found thriving in areas of farmland, forestry or even residential areas. Many reptiles also make their home here – tiger snakes, blue-tongued lizards, and skinks are common within the catchment.

Many birds call the Swan Apsley their home, although some are migratory, and are only present within the catchment for part of the year. Common native birds within the catchment include green rosellas, magpies, native hens, wattlebirds and forest ravens. The coastal wetlands, beaches and estuaries of the catchment are especially rich in bird life - cormorants, gulls, and a variety of ducks and wading birds are commonly seen in these places. Moulting Lagoon draws bird watchers and hunters alike with its diverse bird population. The lagoon is important habitat for the native black swan - thousands of swans inhabit the lagoon throughout the year. Their moulting gives the lagoon its name, as tides of feathers wash up on the lagoon's shoreline. Birds Australia recognises two Important Bird Areas (IBAs) within the catchment one at Moulting Lagoon for water birds, and a second within the Douglas Apsley for woodland birds.²



Bruce Press from Reptile Rescue, courtesy of Reptile Rescue

REPTILE RESCUE

Founded in 1999, Reptile Rescue is an incorporated charity that coordinates the relocation of errant snakes throughout Tasmania. The organisation is manned by volunteers and is reliant on charitable donations and private funding to maintain service to the community.

Trained Reptile Rescue volunteers undertake the safe removal and relocation of snakes. All volunteers are trained to safely manage venomous snakes, including snakebite first aid. The Glamorgan Spring Bay Council has supported the local Reptile Rescue program with the provision of resources for equipment, assistance with travelling costs and communication about the service. Reptile Rescue also undertakes Snake Awareness, and Management training programs across Tasmania.

Perhaps not the most obvious of the catchment's fauna are invertebrates, such as native bees, flies, butterflies, beetles and bugs, which are important to the area's ecology. They pollinate plants, both native and crops, are integral to soil health, and provide the basis of many food chains within the catchment. In the catchment's rivers and streams, they are perhaps even less obvious, but no less important. Surveys of waterways within the catchment over the last five years have found instream aquatic invertebrate populations to be quite healthy and diverse³. Instream aquatic invertebrate health is often used as a means of assessing the health of waterways. These aquatic creepy crawlies also form the basis of a food chain, which feeds larger animals, including platypuses, native fish and frogs.

² Birds Australia, 2010.Home→Conservation→OurProjects→Important Bird Areas→IBA Results. Accessed 25th May 2012. http://www.birdsaustralia.com.au/our-projects/iba-results.html

³ DPIPWE, 2011. Waterways reports can be obtained from the DPIPWE website, via http://www.dpiw.tas.gov.au/inter.nsf/ WebPages/JMUY-6BV8GJ?open Assessed 25th May 2012



Natural (continued)

iii. Geodiversity

Rocks are the bones across which the skin of a landscape is stretched.

The geology of the Swan Apsley is perhaps most obvious in the catchment's mountains. The upper catchments of both the Swan and Apsley stem from the Eastern Tiers, which are formed from Jurassic dolerite, a relatively hard rock type that provides the basis for the sharp escarpments seen in parts of the Tiers.

Dolerite extends broadly through the mid-catchment, and is occasionally interspersed with Triassic sandstones, a softer rock laid down by sedimentary processes, composed of sand that once formed the ocean floor. Within the lower mid-catchment, on the flatter valley floors, more recent alluvial deposits of Tertiary and Quaternary sediments are seen.

In the lower catchment, areas of marine and Aeolian coastal sands form the softer landscapes of the coastal areas, which we see as dunes, beaches, and sandbars within the estuaries. Moulting Lagoon/Great Oyster Bay is considered a site of geoconservation significance – the spit at Nine Mile Beach is one of only two mid-bay spits in the State.⁴

Across the waters on the Freycinet Peninsula, the mountains are shaped by a dramatically different rock type. The Hazards are formed from Devonian era red granite, another hard rock type, with smaller sections of grey granite, dolerite, Triassic mudstones and sandstones also present.

The landforms of the Hazards are among a number of significant geoconservation sites recognised and protected within the catchment; others include the Freycinet Peninsula Soils, the Douglas River Gorge, and the dune system at Butlers Point on Moulting Lagoon⁵.



The Hazards and Freycinet Peninsula by Diane Bricknell

 Parks and Wildlife Service, 2003. Moulting Lagoon Game Reserve Management Plan. Parks and Wildlife Service Tasmania. Department of Tourism, Parks, Heritage and the Arts. Hobart.
 DPIPWE, 2010. Natural Values Atlas Report. Generated on 17th November 2010. /www.naturalvaluesatlas.tas.gov.au/

iv. Soil diversity

Generally speaking, the soils you can expect to encounter within a landscape are determined by the underlying geology.

In the upper and mid sections of the catchment, soils in the Swan Apsley are dominated by stony dark brown clay-loams, which have developed on top of the Jurassic dolerite beneath. Where sandstone intrudes among this dolerite-dominated zone, some areas of sandy-loam, yellow brown sandy clay and medium clay have developed. In the floodplains, rich alluvial soils have been formed by the ceaseless eroding wash of water down rivers, forming red-black clay-loams with good structure that have been farmed for the last 170 years.⁶ Large areas of these good alluvial soils (about 36%) are subject to flooding.⁷ Alluvial soils are soils which consist of earth and sand left behind on land which has been flooded or where a river once flowed.



As any good farmer or gardener will tell you, healthy systems begin with healthy soils. Healthy soils provide the opportunity for native vegetation communities to thrive, and for farmers to grow healthy produce.

It takes a very long time for soils to develop. But it can take remarkably little time for soils to be degraded, or even to disappear entirely, as often witnessed in flood events.

v. Threatened species and communities

The Swan Apsley is home to many threatened species, both plant and animal, as well as a range of threatened vegetation communities, which make up about 4.3% of the catchment's vegetation.

Some of these threatened vegetation communities have become threatened due to their placement in the catchment – areas of *Eucalyptus viminalis-Eucalyptus globulus* (white gum-blue gum) coastal forest and woodland has been removed due to its proximity to the coast, and hence to human populations. Other communities have been removed due to their placement atop attractive, productive land – *Eucalyptus ovata* (black gum) forest and woodland tends to occur in areas which are damper than those surrounding them, a desirable feature for arable lands. And some communities were probably not especially extensive in the first place – *Melaleuca pustulata (warty paperbark)* scrub occurs almost exclusively within the Swan Apsley Catchment.

6 D'Emden, R., 2002. Draft Swan Apsley Catchment Management Plan, March 2002.

⁷ Thompson, C. 1996. *Swan River Valley Farm Business and Water Audit*. Chris Thompson, Serv-Ag Pty Ltd, Tim Douglas and Alan Barrett, Agricultural Management and Marketing Pty Ltd for the East Coast Primary Producers Association Inc, Tasmania.



Natural (continued)

STATE LISTED THREATENED VEGETATION COMMUNITIES

THREATENED VEGETATION COMMUNITY	AREA WITHIN CATCHMENT	% OF TOTAL CATCHMENT VEGETATION COVER
Eucalyptus globulus dry forest and woodland	1722.39	1.43
Eucalyptus amygdalina forest and woodland on sandstone	634.46	0.53
Eucalyptus ovata forest and woodland	580.05	0.48
Eucalyptus amygdalina inland forest and woodland on Cainozoic deposits	440.32	0.37
Riparian scrub	397.74	0.33
Eucalyptus viminalis - Eucalyptus globulus coastal forest and woodland	317.72	0.26
Melaleuca pustulata scrub	317.34	0.26
Eucalyptus tenuiramis forest and woodland on sediments	299.02	0.25
Allocasuarina littoralis forest	273.27	0.23
Callitris rhomboidea forest	153.19	0.13
Fresh water aquatic sedgeland and rushland	95.50	0.08
Total coverage of threatened communities within the catchment		4.34 %

CRANBROOK (or warty) PAPERBARK

Although the 'official' common name of *Melaleuca pustulata* is 'warty paperbark', it is known locally as 'Cranbrook paperbark'. It's a spreading shrub up to 2 metres tall that produces a mass of yellow flowers in spring.

It's notably abundant around the Cranbrook / Cherry Tree Hill area, which is perhaps the main reason for its local common name. It is listed as a threatened species under State legislation but, due to its local abundance, farmers often question this listing. However, Cranbrook paperbark is another 'local endemic' with a limited range: 98% of its natural range occurs only within the Swan Apsley Catchment. The main threats to it include land clearing, competition from gorse and grazing of small shrubs by stock.



Melaleuca pustulata

Some of the threatened vegetation communities in turn support threatened flora and fauna species. The blue gum dominated forests, *Eucalyptus globulus* dry forest and woodland, and the *Eucalyptus globulus – Eucalyptus viminalis* coastal forests and woodlands, as well as the black gum forests, provide important foraging habitat for swift parrots (*Lathamus discolor*), a brightly coloured, migratory species which visit Tasmania from the mainland over the summer months to breed. The parrots feed predominantly on the nectar of the flowering blue gums (although they may also forage in black gums) and range up and down the east coast of the State.

Other key threatened fauna for the area include the recently listed Tasmanian devil (*Sarcophilus harrissi*), wedge-tailed eagles (*Aquila audax fleayi*), the green and gold frog (*Litoria raniformis*), and the new holland mouse (*Pseudomys novae-hollandiae*).

Threatened vascular flora that occur within the catchment number 134 species – this amounts to almost 30% of all the threatened vascular flora species in Tasmania. These species includes a wide range of plant forms – orchids, herbs, grasses, sedges, rushes, ferns, shrubs and trees – that occur in a wide range of habitats from the coast to the forests.

NATIONALLY LISTED THREATENED VEGETATION COMMUNITIES

Lowland Native Grasslands of Tasmania

Eucalyptus ovata – Callitris oblonga Forest



Eucalyptus ovata by Tony Rodd

BLACK GUM – SOUTH ESK PINE FOREST

Black gum (*Eucalyptus ovata*) – South Esk pine (*Callitris oblonga*) forest is unique to Tasmania. It occurs along the banks of a few rivers, mainly within the Swan Apsley Catchment and the South Esk catchment to the north.

It is listed nationally as a threatened ecological community due to its restricted distribution and its vulnerability to ongoing threats. Such threats include the loss of key species through woody weed invasion (notably gorse), too frequent fires and continual grazing which suppresses regeneration.

The community also supports a number of nationally and State listed threatened plants and animals. South Esk pine itself is one of these species.



Callitris Oblonga



Natural (continued)

vi. Estuarine, coastal and marine

Being a coastal catchment, the rivers and streams of the Swan Apsley Catchment drain to the sea.

Stretching along approximately 277km of coastline, the coastal zone of the Swan Apsley Catchment supports a broad range of land uses and environments. Most human settlement is found within this zone as are large areas of essentially "natural" environments, including formally reserved areas such as Freycinet National Park, and the internationally important Ramsar wetlands of Apsley Marshes and Moulting Lagoon. Both of these sites provide critically important habitat for many native species, perhaps most visibly for local and migratory birds.

Just south of Moulting Lagoon, the Swan, swelled by the waters of the Cygnet and Wye Rivers, joins the estuarine system from the west, flowing into the Greater Swanport subsystem near the community of Dolphin Sands. The Great Swanport is a long, narrow estuary which runs behind Nine Mile Beach, which begins at the southern end of Moulting Lagoon. It is considered to be of high conservation significance, and contains healthy populations of seagrass and other aquatic macrophytes. These sorts of habitats are critical for local fish, which use them as nurseries, and it is here that many of the fish caught by recreational and commercial fishers first begin their lives.

Further south, other major rivers of the catchment, the Meredith and Stoney Rivers, drain directly into Great Oyster Bay. Smaller estuaries are found at the mouths of these rivers. Smaller coastal lagoons within the catchment include Saltwater Lagoon, Freshwater Lagoon and Bryans Lagoon.

But it is not only formal reserves that support native plants and animals. The beaches of the coast are of great importance for many shorebirds, many of which are listed as threatened both at a State and National level.

A large estuarine system exists in the mid-catchment, which is formed by the two subsystems of Moulting Lagoon and Great Swanport.

The waters of the Apsley River percolate down through the Apsley Marshes, into Moulting Lagoon. Moulting Lagoon is a large body of shallow water, which supports a complex range of habitats, including fragile, low-lying saltmarshes, coastal grassland and ancient sand dunes supporting coastal woodlands⁸. At least thirteen threatened plant species are found in this area, and as a Ramsar site, it is considered to be a wetland of international significance, primarily due to its ability to support large numbers of waterbirds at key stages of their lifecyles.⁹ The aquatic vegetation of Moulting Lagoon is dominated by the rare, grass-like, largefruit seatassel (*Ruppia megacarpa*), and supports about a quarter of the

⁸ Temby, N. and C. Crawford, 2008. Coastal and Estuarine Resource Condition Assessment – A baseline survey in the Southern NRM Region, Tasmania. June 2008. Final Report to the NHT. Tasmanian Aquaculture and Fisheries Institute, University of Tasmania. 9 Ibid.

State's population of this plant.¹⁰Anecdotal evidence suggests that siltation within Moulting Lagoon may have led to a change in the underwater habitats – it is said that Sherbourne Bay was once deeper, with larger areas of hard sand, and that the area was suitable for flounder fishing¹¹.

mac·ro·phyte \'ma-krafīt\
noun:
A plant, esp. an aquatic
plant, large enough to be
seen by the naked eye.

The Great Swanport estuary and Great Oyster Bay support several oyster farming businesses who are reknown for growing some of the finest oysters

in the world. Oyster farmers are very reliant on healthy estuarine and marine environments to grow top quality produce.



A tray of Melshell oysters

¹⁰ DPIPWE, 2010. Threatened Species Notesheet – Ruppiamegalocarpa. Available at http://www.dpiw.tas.gov.au/inter.nsf/ WebPages/SLEN-5P27QC?open

¹¹ Temby, N. and C. Crawford, 2008. Coastal and Estuarine Resource Condition Assessment – A baseline survey in the Southern NRM Region, Tasmania. June 2008. Final Report to the NHT. Tasmanian Aquaculture and Fisheries Institute, University of Tasmania.



Natural (continued)

GOVERNOR ISLAND MARINE NATURE RESERVE

Tasmania has one of the most biologically diverse and productive marine environments in the world with 80 per cent of the plants and animals in southern Australian waters found nowhere else.

Governor Island Marine Nature Reserve, adjacent to Bicheno, is one of a network of reserves created to protect our unique marine life. It is one of the best temperate dive locations in the world known for its spectacular sheer rock walls, massive granite boulders and caves all covered in a multi-coloured patchwork of invertebrate animals (including sponges, sea-whips, sea fans, sea-tulips, yellow zoanthids, jewel anemones, bryozoans and hydroids). A reserve since 1991 fish life is prolific with boarfish, banded morwong, butterfly perch and large crayfish commonly seen.

Governor Island supports Tasmania's largest breeding rookery of crested terns (*Sterna bergii*) of approximately 1,000 breeding pairs during summer.





Diving on the sponge gardens (Courtesy of John Smith)

Below about 20 metres where there is insufficient light for algae to grow, marine life is dominated by invertebrate animals like seawhips, sponges, hydroids and feather stars. A male blue-throated wrasse swims amongst them (Courtesy of John Smith)

Saltmarshes provide a range of values including drought reliable bird nesting and foraging sites, fish spawning grounds and nurseries, and rare endemic plant and insect habitats. They also support a range of ecosystem services including provide flood and erosion control, filtering water from the catchment and trapping sediments. Human use values, such as bird watching and fishing are also values associated with coastal saltmarshes.

The Swan Apsley Catchment contains approximately 1,600 hectares of saltmarsh habitat (Prahalad and Pearson, 2012), with the two most significant marshes complexes, both in terms of size and values, being found in Moulting Lagoon and Apsley Marshes. Smaller saltmarsh clusters are found at Kelvedon Lagoon, Meredith River and Saltwater Creek. On the eastern shores of Moulting Lagoon a large percentage of the saltmarsh sites are found within the Moulting Lagoon Game Reserve, whilst elsewhere within the catchment sites are generally on private land.

For the most part, humans have been the key threatening process for saltmarshes through coastal development and other land modification such as infill and draining, grazing and other agriculture practices, trampling by foot traffic and vehicles, dumping of rubbish and the introduction of weeds. Future threats to coastal saltmarsh extent will be as a result of climate change and relative increases in sea-level and coastal erosion (see McIntosh et al., 2005). Within the catchment several initiatives are underway to help improve the condition of saltmarsh communities. Weed removal, fencing and mapping of future extent under sea level rise conditions are some examples of the ways in which collaborative planning and management is occurring in the catchment to enhance saltmarsh communities and their prospects in the future.

References:

Prahalad and Pearson (2012) Southern Tasmanian Coastal Saltmarsh Futures - A Preliminary Strategic Assessment. NRM South, Hobart, Tasmania.



Triabunna Saltmarsh



Natural (continued)

MOULTING LAGOON WATERBIRD COUNT

Twice each year, in February and July, teams of people spread out around the shores of Moulting Lagoon to count the many hundreds of birds that make their home there. The count has been going on since the mid 1980s and we have continuous twice yearly counts from 1992. It has only been called off once in all that time due to bad weather. The count is a joint effort between the Parks and Wildlife Service and the Wildlife Management Branch of DPIPWE but is only made possible because of the large number of dedicated



volunteers that assist every year. The lagoon has been divided into six zones for ease of counting and teams of a minimum of two go to each zone. The information obtained from the count is used for a number of things. Firstly, it helps to determine the impact of shooting in what is the single most popular public hunting area in Tasmania. Secondly, it helps to monitor the health of the area because birds are sensitive to changes in their environment. Like the well known canary in the coal mine, they are used as indicators of change.

Moulting Lagoon was listed in 1982 as a Wetland of International Importance under the Convention on Wetlands (Ramsar, Iran, 1971). This intergovernmental agreement is commonly known as the Ramsar Convention and sites listed under it as Ramsar sites. One of the obligations under the convention is to alert the Ramsar Bureau "at the earliest opportunity, of any change in the ecological character of the site". Information from the counts will help us to do that if the need arises.

Numbers of birds seen have shown some interesting patterns over the years. Some, such as ducks and swans show seasonal variations and also strongly reflect changes in weather conditions. The largest number of swans ever seen at the lagoon (18 788) was in February 2002, a very dry year in eastern Tasmania. Other species such as herons, gulls and oystercatchers show much less variation and have remained remarkably steady over the years. Despite the many changes that have taken place around the lagoon in the time since listing, the bird numbers indicate that it has remained relatively unaffected.

More information about the lagoon, the counts and the ecological character is available in the Moulting Lagoon Management Plan available through the PWS and in the soon to be released Ecological Character Description or ECD.

Stewart Blackhall, *Wildlife Biologist, Wildlife Management Branch* Department of Primary Industries, Parks, Water and Environment

7.3 Water

A catchment is defined by its water. From the upper headwaters where the rains first fall, it flows down through the upper slopes of the catchment, washes across the floodplains and percolates through the coastal zone before flowing out into the sea.

The health of a catchment can be partially understood through an examination of various aspects of the water cycle. Following the indicators used in the *State of the Environment Report 2009*, these aspects include;

- Water quantity and use
- Water quality
- Groundwater
- Aquatic health

- Riparian vegetation
- Wetlands
- Coasts and estuaries
 water quality

A broad review of the water assets of the Swan Apsley was prepared by NRM South in September 2011 and informs much of the following overview¹

i. Water quantity and use

The rivers of the Swan Apsley Catchment are considered to be among the State's driest, most variable stream systems². The volume of water flowing down them can vary substantially over the course of the seasons, as well as from year to year. As a result, water capture, use and storage issues have been of significant interest to farmers, local government, State planners and regional water management authorities.

Water demand within the catchment for town water peaks over summer, coinciding with an influx of visitors to the region. During dry summers, demand often exceeds supply on the Swan River, putting the catchment under stress³ It is common for settlements within the Swan Apsley to be subject to water restrictions over the summer months. Swansea township until 2011 was on a permanent boil water alert.

The sustainable yield for the surface waters of the Swan Apsley Catchment, which refers to the "volume and/or rate of water that can be extracted from that system while maintaining an acceptable level of aquatic ecosystem health"⁴, has been estimated at 35,620 megalitres (ML) annually. The water allocation for extraction within the catchment annually over the years from 2004 to 2008 was 1,169 ML per year, which represents 3.3% of the estimated sustainable yield.



Water monitoring in action

NRM South, 2011. Report: Water quality in the Swan Apsley Catchment: Rivers, Estuaries and Groundwater, Hobart, Tasmania.
 CFEV database, 2005.Conservation of Freshwater Ecosystem Values Project, v1.0, Water Resources Division, Department of Primary Industries and Water, Tasmania.

 ³ DPIWE, 2001. *Report on water availability in Tasmania*.Background report – Water Development Plan for Tasmanian Project.
 4 State of the Environment Report, 2009. Indicator: Sustainable Yield. Accessed 15th November 2010. http://soer.justice.tas.gov. au/2009/indicator/101/index.php



Water (continued)

Since the original catchment plan was written, the State government, Glamorgan Spring Bay Council and Hobart Water initiated the \$8.5 million Swansea Water Project, a scheme designed to provide Swansea with high quality, potable drinking water. Hobart Water was subsumed into Southern Water in 2009, who since then have been managing the roll-out of this project, which has lifted water quality to Australian Drinking Water Guidelines standards through the construction of a new treatment plant, the installation of new pipelines and construction of a 400 megalitre (ML) storage dam. The treatment plant was commissioned through late 2010 and early 2011, and since then, for the first time, Swansea has potable water which meets or exceeds National Drinking Water Standards.¹



Meetus Falls by Maurice Banks

A sewage treatment plant effluent reuse scheme was brought online in Bicheno in 1999 – the water recycled from this scheme is used to irrigate the neighbouring golf course. Another sewage treatment plant effluent reuse scheme was implemented in Swansea in November 2001 – the water recycled by this scheme is used for cropping and pasture application via a boom sprayer.²

The Tasmanian Irrigation Development Board (TIDB) now Tasmanian Irrigation (TI) is investigating the feasibility of an irrigation water development based in the Swan River valley. This investigation is at a very early stage, and TI has yet to undertake research on irrigator demand, land capability, hydrology or environmental heritage – as such, no estimates for the potentially irrigable area, water volume or project costs were available.³

The Water Management Act 1999 provides for the development of water management plans for individual catchments. Water management plans are developed in consultation with stakeholders to ensure the sustainable development and management of a water resource. Water management plans are generally implemented by the Department of Primary Industries, Parks, Water and the Environment (DPIPWE). No water management plans have been written for the Swan Apsley Catchment as yet.



Water demand within the catchment peaks over summer, coinciding with an influx of visitors to the region

¹ Southern Water, 2010. Annual report, 2009-2010. Southern Water, Tasmania.

² Andy Crawford, pers. Comm. Catchment and Environmental Scientist, Southern Water, Tasmania.

³ Water Technology, 2011. Water technology.net – The website for the water and waste water industry. Website accessed 20th April 2011. http://www.water-technology.net/glossary/water-quality.html

ii. Water quality

Water quality refers to the biological, chemical and physical characteristics of water and its general consumption – these attributes affect the water's ability to sustain life and its suitability for human consumption¹.

A review of the water assets of the Swan Apsley has found that water quality data across the catchment is extremely patchy, especially in the mid-catchment – this makes it difficult to comment on water quality catchment wide. From the data that is available, it's thought that water quality is moderate to good in the lower Apsley, Swan and Meredith Rivers, although the Meredith has shown signs of declining water quality in recent years². Fish kills have occurred on a number of occasions, although this is possible due to a combination of factors, particularly low flows.

Water quality within the Swan Apsley Catchment is reported on annually by DPIPWE through a catchment-based Waterways Report³. Measurements taken during this sampling include water temperature, pH, salinity, turbidity, suspended solids, dissolved oxygen, heavy metals, and nutrient levels.



Figure 1. DPIPWE staff undertaking flood gauging at Apsley River gauging station using acoustic doppler instrumentation to measure river discharge. (Photo taken 11/8/2009)

¹ Water Technology, 2011. Water technology.net – The website for the water and waste water industry. Website accessed 20th April 2011. http://www.water-technology.net/glossary/water-quality.html

² NRM South, 2011. *Report: Water quality in the Swan Apsley Catchment: Rivers, Estuaries and Groundwater*, Hobart, Tasmania 3 DPIPWE, 2011. Waterways reports can be obtained from the DPIPWE website, via http://www.dpiw.tas.gov.au/inter.nsf/ WebPages/JMUY-6BV8GJ?open



Water (continued)

DPIPWE Water Monitoring Activities in Swan/Apsley Catchment

The Water Assessment Branch within Department of Primary Industries, Parks, Water and Environment (DPIPWE) operate four stream gauging stations within the Swan Apsley Catchment. These are Swan River at Grange, Swan River upstream Hardings Falls, Apsley River upstream Coles Bay Rd, and Meredith River at Swansea. Information gathered from these gauging stations is used by various organisations as well as the general public. Some uses for this information include: flood warning; urban water management; water restrictions, river health and hydrological modelling.

DPIPWE visit over eighty gauging stations across the State on a routine basis (approx 5 visits per year) and during flood events in order to capture flow data that is essential in providing accurate "real-time" and historical flow information. Further information and access to data collected by DPIPWE can be viewed at http://www.dpipwe.tas.gov.au/water



Figure 2. DPIPWE undertaking wade gauging at Swan River gauging station using hand held acoustic doppler meter. Discharge is calculated by measuring velocity and depth at a series of points across the river. This method used by many water agencies incorporates an area x velocity discharge calculation and is commonly known within this industry as a "Current Meter Gauging".
iii. Groundwater

By definition, groundwater is hidden beneath the earth, and its very inaccessibility means that as a resource, it is relatively poorly understood. There are two significant aquifers in the Swan Apsley – one at Dolphin Sands, and a second at Bicheno. Data available for both of these aquifers is quite limited, although has been collected at times in the past.¹

Groundwater within the Swan Apsley does not form a large part of the water supply for the catchment population, although it is locally important for the community living at Dolphin Sands. A rain fed coastal aquifer exists beneath the sandspit at Dolphin Sands/Nine Mile Beach, which is an important domestic and fire-fighting water source for local residents, especially during periods of dry weather when rainwater tanks run dry.

An assessment of the water resources of south-east Tasmania identified this aquifer as a regionally important groundwater system².

There is also an aquifer present at Bicheno, but the high salinity of the water in this aquifer makes it generally unsuitable for extraction for domestic supplies³.

Ground water levels in both aquifers have risen in both aquifers over the last five to ten years – it's thought that the more recently wet weather conditions are recharging the aquifers to normal levels.⁴



A ground water spear at Dolphin Sands

NRM South, 2011. Report: Water quality in the Swan Apsley Catchment: Rivers, Estuaries and Groundwater, Hobart, Tasmania.
 CSIRO, 2009.Water availability for the Derwent-South East region. Report seven of seven to the Australian Government from the CSIRO Tasmania Sustainable Yields Project, CSIRO Water for a Healthy Country Flagship, Australia.
 NRM South 2011. Report: Water quality in the Swan Ansley Catchment: Rivers, Estuaries and Groundwater, Hobart, Tasmania

³ NRM South, 2011. Report: Water quality in the Swan Apsley Catchment: Rivers, Estuaries and Groundwater, Hobart, Tasmania 4 Ibid



Water (continued)

iv. Aquatic health

Since the initial catchment management plan was written, aquatic health within the catchment has been assessed by a number of projects, working at varying levels of detail and scope.

In a more tightly focused assessment of river health, the annual Waterways reports for the Swan Apsley conduct a yearly survey at their sampling site on the West Swan River below Jam Creek. Using the Australian River Assessment System (AUSRIVAS), they sample benthic macro invertebrates (river-floor dwelling invertebrates greater than 1mm in length), and compare the number of species they find during sampling with what would be expected in a healthy river system. In all surveys undertaken since 1998, sampling has produced an assemblage of these tiny animals that would indicate a healthy river system.¹

At the broader end of the spectrum the Conservation of Freshwater Ecosystem Values (CFEV) project undertook a largely desktop assessment of freshwater ecosystem values across Tasmania. This assessment rated 88% of the rivers and streams within the catchment as being in near natural condition – a further 7% were considered significantly altered, and 5% were listed as severely altered. This assessment corresponded with a similar assessment of macroinvertebrate health across the catchment, where 87% of waterways were thought to contain a healthy assemblage of native aquatic animals.

Sediment input into the river systems was varied – about 44% of rivers and streams were considered to show no to minimal human-induced changes in sedimentation levels, with a further 24% showing low impacts, and another 30% showing moderate changes to sediment levels.

1 DPIPWE, 2010. DPIPWE website. 2008 Waterways report – Swan Apsley Catchment. Accessed 15th November 2010. Waterways Monitoring Reports http://www.dpiw.tas.gov.au/inter.nsf/WebPages/JMUY-6BV8GJ?open

v. Riparian vegetation

Riparian vegetation plays a number of very important roles within the catchment. It acts as a sediment trap, reducing the sediment and associated nutrient loads that wash into waterways, which can negatively affect river ecosystems and water quality. In shading streams, it provides the dappled light conditions required by native aquatic animals to thrive, keeping water temperatures and nutrient levels relatively stable.

The desktop assessment of riparian vegetation health across the catchment showed variable but generally good coverage of native riparian vegetation across the catchment¹ – assessments were made of riparian buffers of fifty metres either sides of the catchments rivers and streams. The riparian strips of the upper catchment are generally still very well vegetated, but in lower lying areas, riparian vegetation is less intact.

Across the catchment, about 6% of streams have low to no native riparian vegetation. About 10% of riparian strips are mostly covered in native vegetation, with the remaining 83% of riparian areas have very high (more than 80%) coverage of native vegetation – an excellent basis for the maintenance of catchment health and water quality.



Riparian vegetation in the Swan Apsley Catchment, by Nicky Meeson.

1 CFEV database, 2005. Conservation of Freshwater Ecosystem Values Project, v1.0, Water Resources Division, Department of Primary Industries and Water, Tasmania.



Water (continued)

vi. Wetlands

According to the Tasmanian Wetlands Strategy, wetlands "are areas of marsh, fen, peatland or water, whether natural or modified, permanent or temporary, fresh, brackish or salt. Wetlands include lakes, subterranean karst wetlands, impoundments, wetlands associated with rivers, and marine and coastal wetlands such as mudflats, estuaries and seagrass beds"¹.

It is important to note that wetlands are not necessarily always wet – some of them go through natural dry phases – this is often seen in wetlands that are in estuarine or shallow marine areas, or in rivers and creeks.

Most of the wetlands in the Swan Apsley Catchment have been given a highnaturalness rating by the CFEV project – 76.5% of wetlands are thought to fall within this category. The remaining wetlands are considered to be significantly (5%) or severely (18.5%) altered from their natural conditions.

Within these wetlands, water quality is generally quite good, and is measured against expected levels of nutrients and turbidity – almost a third (29.3%) of the catchment's wetlands show minimal to no human-induced change to water quality, and a further 47% show only small human-induced changes².

Some baseline studies have been conducted within the Moulting Lagoon and regular monitoring is undertaken by the oyster industry. This is discussed in the next section.

1 DPIWE, 2004.Tasmanian Wetlands Strategy. Written by the Resource Management and Conservation Division, Copyright Government of Tasmania. ISBN/ISSN 0 7246 6314 2

² Temby, N. and C. Crawford, 2008. Coastal and Estuarine Resource Condition Assessment – A baseline survey in the Southern NRM Region, Tasmania. June 2008. Final Report to the NHT. Tasmanian Aquaculture and Fisheries Institute, University of Tasmania.

RAMSAR WETLANDS

Ramsar wetlands are recognized as 'Wetlands of International Importance' by the Ramsar Convention, which is an agreement to promote the conservation and sustainable use of wetlands worldwide. The treaty was signed in Ramsar, Iran, in 1971. Moulting Lagoon and Aspsley Marshes are two Ramsar wetlands that occur within the Swan Apsley Catchment.

Moulting Lagoon

Moulting Lagoon is a large wetland at the northern end of Great Oyster Bay. It provides year round habitat and breeding sites for around 80% of Tasmania's black swan population. Other Tasmanian waterfowl and shorebirds, as well as many international migratory birds, utilize the Lagoon's habitat for refuge and/or breeding at different times of the year. It also supports threatened and other significant vegetation communities and flora.

Numerous Aboriginal heritage sites are recorded within the Moulting Lagoon area. Since European settlement recreational hunting has occurred in the area and the Moulting Lagoon Game Reserve continues to provide licensed hunting of a number of duck species between March and June.

Apsley Marshes

Apsley Marshes occurs mostly on private land, which adjoins the northern shores of Moulting Lagoon. It is a unique and complex system of freshwater marsh and intertidal saltmarsh that supports ten different wetland plant communities. It is one of the most floristically diverse wetlands in Tasmania supporting several threatened plants, including the threatened swamp everlasting.

Similarly to Moulting Lagoon, it provides habitat for black swans and other Tasmanian and migratory birds, including the threatened Australasian bittern and white-bellied sea-eagle. It is a migratory route for short-finned eels and the threatened Australian grayling as well as spawning habitat for black bream.





Water (continued)

vii. Coasts and estuaries water quality

In 2008, baseline surveys were conducted in the Moulting Lagoon and Great Swanport estuarine system, as part of a statewide project to undertake a broader coastal and estuarine resource condition assessment (CERCA)¹. This study attempted to identify trigger levels which would help land managers decide what were the appropriate water quality levels within this particular estuary, and as well as identify when a change in management approach was needed.

There is little data available regarding water quality within the Swan Apsley's estuaries overall. Almost all (98.6%) of the catchment's estuaries are considered to be significantly altered from their natural condition², but there has been no detailed study of the water quality within them.

WATER QUALITY MONITORING FOR SHELLFISH QUALITY ASSURANCE

The Swan River and Great Oyster Bay water quality is monitored by the Tasmanian Shellfish Quality Assurance Program. The program implements the Australian shellfish quality assurance program which assures that shellfish is harvested from clean unpolluted waters.

Our catchment hosts five oyster farms utilising eight leases with the Tasmanian Government. These farms are approved for harvesting by the Tasmanian Shellfish Quality Assurance Program. Monthly water samples are taken from locations in the Swan River and out in great oyster bay. The water samples are analysed for bacteria and algal content. Meat samples are also conducted annually to monitor the health of the oyster. All data collected provides valulable insight into the health of our catchment.



Putting the oysters into the Swan River lease and how the oysters dangle in the ocean, courtesy Cassie Melrose (Melshell Oysters)

1 Ibid.

42

2 CFEV database, 2005. Conservation of Freshwater Ecosystem Values Project, v1.0, Water Resources Division, Department of Primary Industries and Water, Tasmania.

8. Climate Change

Tasmania has a naturally variable climate, and rainfall within the State is variable in both in space (where it falls), over time (when it falls), and seasonality (how it varies over the course of each year).

Scientific evidence indicates that climate change is a reality¹. Climate change will present both challenges and opportunities.

This area of scientific prediction is ever evolving and it is important that we have the capacity to adapt our management accordingly.

The effects of climate change are predicted to have broad ranging impacts across a range of natural values. This is a complex topic, addressed in depth in many reports, including one from the Department of Primary Industries, Parks, Water and the Environment, which examines the vulnerability of Tasmania's natural areas to climate change².

Some of the physical effects of potential climate change identified by this report included;

- increased levels of atmospheric carbon dioxide (CO2)
- temperature increases
- changes in rainfall patterns
- increased storm frequencies
- · diminishment of snow and frost events
- increases in wind speeds, and associated decreases in humidity
- flow-on effects from changes to oceans and ocean currents on landbased weather systems
- changes in the physical marine environment
- sea level rise

The interaction between current stressors, including fire, invasive plant and animal species, wildlife diseases and pathogens, and land use change, with climate change are difficult to predict, but changes in climate are considered likely to exacerbate these pressures, and provide new opportunities for the expansion of the range of a number of pest species and pathogens.

The CSIRO Tasmanian Sustainable Yields Project predicted no extra specifically

1 DPIWE website: Home→ Managing Our Natural Resources → Climate Change → Climate Futures for Tasmania http:// www.dpiw.tas.gov.au/inter.nsf/WebPages/MCLE-5X88FU?open Accessed 24/3/2011.

2 Department of Primary Industries, Parks, Water and Environment, Resource Management and Conservation Division (2010). Vulnerability of Tasmania's Natural Environment to Climate Change: An Overview. Unpublished report. Department of Primary Industries, Parks, Water and Environment, Hobart.



Flooded Swan River by Diane Bricknell



Climate Change (continued)

climate change related impacts on a range of sites considered to be of very high integrated conservation value within the Swan Apsley – these sites included Moulting Lagoon estuary, the Ramsar wetlands of Moulting Lagoon and Apsley Marshes, and Saltwater River – however, acknowledged that all of these sites were already being impacted upon by recent extreme climatic events (i.e.; periods of ongoing drought, and record rainfalls with the associated flood events)³.

Through the *Climate Futures for Tasmania* (CFT) Tasmanian councils are fortunate to have access to the highest resolution climate modelling conducted worldwide.

Based on its climate modelling work, CFT has partnered with the Southern Tasmanian Councils Association to develop climate scenarios for the Southern Tasmanian region. The modeling has developed a regional climate profile and municipal climate profiles for the 12 individual local government areas in the southern region.

The climate impact scenarios provide a sound knowledge base for identifying localised climate related risks and subsequently in informing appropriate decisions to manage the risks.

The fine scale CFT scenarios show that climate change impacts in southern Tasmania are typically predicted to affect the frequency, intensity and duration of features of our climate such as temperature and rainfall.

Overall for the southern region the scenarios predict that there will be:

- increases in the number of summer days particularly in the Derwent Valley and the East Coast areas
- an increase in annual temperature of 3C experienced in the west coast of the southern region, the Derwent Valley, Huon and Central Highlands municipalities
- increase in the heat waves (3 or more days above 28°C) in the Derwent Valley area
- an overall increase in warm spells across the southern region
- moderate increases in rainfall in the East Coast, Tasman and Greater Hobart areas
- decreases by 6 10% in rainfall in the northern Central highlands area
- changes as in the seasonality of the rainfall with the inland areas of the southern region experiencing higher rainfall over winter and lower rainfall throughout summer and the northern Central Highlands experiencing decreased rainfall in all seasons.⁴

The science, politics and social implications of climate change are forever changing. New reports and information is being published daily, with implications for the management of natural resources and the communities that depend upon them. It will remain crucial for integrated catchment management initiatives to be considered in light of the new knowledge and practices that emerge. There will be both threats and opportunities that may result in significantly different futures to what we are considering now.

³ CSIRO (2009) Water availability for the Derwent-South East region. Report seven of seven to the Australian Government from the CSIRO Tasmania Sustainable Yields Project, CSIRO Water for a Healthy Country Flagship, Australia.

⁴ STCA website: http://stca.tas.gov.au/cc/rccap-%e2%80%94-regional-councils-climate-adaptation-project/ Accessed May 2012.

9. Land & Water Management

9.1 Urban Development

Urban and suburban expansion can lead to significant changes in catchment land use and associated pressures on the landscape. Urban expansion within the catchment is generally confined to the sensitive coastal zone. Increased density and spread of housing can lead to conversion and fragmentation of coastal habitats, impacting on the range of native plant and animal species. For some species which need to move over a large area throughout different phases of their life cycles, this can pose real problems.

Roads and associated traffic on them which pass through native fauna habitat can be a risk to native animals and birds, who die by the thousands on roads annually. Scavengers, such as Tasmanian devils and birds of prey, are particularly vulnerable to these impacts, as they spend more of their time on the road, looking for things to eat.

Civilisation also brings with it a range of pest animals, plants and diseases – these will be discussed in a later section of the report.

The Glamorgan Spring Bay Council plays a significant role in urban planning and development. Currently, along with all the other Council's in the southern region they are working closely together on the Southern Tasmanian Regional Planning Project (STRPP). This initiative aims to achieve the following outcomes:

- A comprehensive regional land use strategy for the region.
- An infrastructure investment strategy for the region.
- The development of coordinated, consistent and contemporary planning schemes for all councils involved, based on the common strategy.

These project outcomes will significantly influence the way the Southern region develops over the next 20 years and beyond and will greatly assist those who interact with the planning scheme in the future⁵.

⁵ STCA website: http://stca.tas.gov.au/rpp/ Accessed May 2012.



Building site located in the catchment area, courtesy of Peter Blythe Building



Land & Water Management (continued)

9.2 Public Reserve Management

There are many public reserves in Glamorgan Spring Bay. Most of this land is Crown land which is governed by the *Crown Lands Act 1976*. Crown Land Services Branch facilitates the appropriate management, use and development of Crown land, including the licensing, leasing, sale and rental of Crown properties. Different Crown land titles are subject to different legislation depending upon their status. National Parks and Conservation Areas are managed by the Parks and Wildlife Service under the *National Parks and Reserves Management Act 2002*. Many public reserves, mostly within the town boundaries are leased or licensed to the Glamorgan Spring Bay Council to manage on behalf of the public. There is a broad number of State and Federal Acts which impact on how public land is to be managed.

There are a number of plans that assist in prioritising the management of public reserves. These include the Freycinet National Park Management Plan 2004, Douglas-Apsley National Park Management Plan 1993 and the Moulting Lagoon Game Reserve (Ramsar Site) Management Plan 2003. Vegetation management plans are in development for all the public reserves managed by the Glamorgan Spring Bay Council.



Freycinet National Park

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9.3 Recreational uses

The Swan Apsley Catchment is a natural playground for both locals and visitors to the area. There are a broad range of recreational activities that when undertaken in a responsible manner will have little if any impact on the values of the catchment. However without appropriate management and due care some recreational activities can have significant impacts on the values of the catchment.

Inappropriate four-wheel driving damages sensitive environments, especially those which are naturally fragile – notable examples in the Swan Apsley are its coastal dune systems, beaches and saltmarshes. Within Moulting Lagoon, problems with people driving off track have escalated over the past ten years⁶, especially in the area around Breakfast Point. On this section of the Lagoon, people leave the legal track during wet conditions, and drive across the highly sensitive samphire habitat – this ecosystem can take up to 30 years to regenerate from 4WD damage.

Associated impacts from inappropriate four-wheel driving can also include disturbance and associated breeding failure of shorebirds. Off-road vehicles can easily damage shorebird populations, either directly, by squashing eggs or vulnerable chicks, or indirectly, by scaring the parents away from the nest, leaving their eggs or chicks vulnerable to predators and exposure. These impacts can also be caused by people walking too close to nesting birds, especially with uncontrolled dogs, by trail-bikes, horses or roaming domestic pets.

6 Steve Everts, pers. comm. Parks and Wildlife Service, DPIPWE.

DOGS ON BEACHES PROGRAM Dog Management Policy

The Glamorgan Spring Bay Dog Management Policy 2008-2013 was developed by the Council as a requirement under the Tasmanian Dog Control Act 2000. The objectives of the Dog Management Policy are to:

- Ensure owners of dogs in the Glamorgan Spring Bay Municipal area comply with the requirements of the Dog Control Act, 2000;
- Actively promote responsible dog ownership through education and information, supported by regulatory measures when required and;
- Provide for reasonable exercise and recreational needs of dogs and their owners whilst respecting the rights of the broader public and protecting natural values.

The Glamorgan Spring Bay Council worked closely with the Parks and Wildlife Service and BirdLife Tasmania to ensure that the

resulting Declared Areas (covering public land owned or managed by Crown Land, Council and the Parks and Wildlife Service) would protect migratory and local shorebirds known to inhabit and visit many beaches throughout the municipality.



A Dog Management Policy has been implemented by the Glamorgan Spring Bay Council





Land & Water Management (continued)

Illegal boating activities are also of concern within the lagoon. Speed boats, jet-skis, and windsurfers straying into out-of-bounds areas are frequently observed disturbing migratory and resident birds, many of whom feed on the sandflats when the tide is low. Noisy watercraft within these reserve areas also negatively impact on the recreational pursuits of other, quieter, users.

Hunting is an important recreational pastime in the catchment, and game licenses can be obtained from the State Government to take a selection of ducks, deer, wallabies, and brown quail.

Shooting within the catchment is largely focused around the Moulting Lagoon Game Reserve – duck season generally runs for three months, from the start of March to the beginning of June annually⁷. Bag numbers for individual waterbird species are set by the State government with advice from the Game Management Liaison Committee. Hunters may obtain recreational game licences to take five different duck species; these include Pacific black duck, mountain duck, Australian wood duck, chestnut and grey teal. The DPIPWE Wildlife Management Branch undertakes annual statewide surveys of these (and other) species and a long running bi-annual survey is undertaken to determine the status of the populations specific to Moulting Lagoon.⁸

Since 2006, the use of lead shot for shooting wild ducks in wetlands or other waterbodies on public or private land has been banned – a positive change for wetland and waterbird health.⁹

Not everyone is happy with the way in which shooting is managed on the lagoon. Protestors annually mark the beginning of the season with a protest, where they aim to scare the ducks away from the hunters using noise and flags.



Wake boarding on the Swan River. Most of the recreational users of our rivers act in a responsible manner, and are aware of the impacts irresponsible use can have. Image courtesy of S. Morey, A. Fidler, S. Griggs and D. Burnaby





⁷ DPIPWE website, 2010. Home \rightarrow Managing our Natural Resources \rightarrow Recreational Game Licences http://www.dpipwe.tas.gov. au/inter.nsf/WebPages/STAY-56A73G?open

8 Stewart Blackhall, Wildlife Management Branch, DPIPWE, pers.comm.

⁹ DPIPWE website, 2010. Lead shot to hunt ducks in Tasmania – information sheet. http://www.dpipwe.tas.gov.au/inter.nsf/ WebPages/LBUN-6MN4V7?open

9.4 Production Forestry

Forestry Tasmania manages approximately 46 800 Ha within the catchment (33%). Currently 17 000 Ha is managed for production forestry. This equates to 12% of land cover within the catchment. These forestry activities provide an important source of employment for the local community.

Production forestry also occurs on some private land within the catchment including small lots of plantation forestry which are primarily forestry, which are primarily used for hardwood plantations.

The majority of timber harvesting occurs on State Forest, and includes areas of native forest that are essentially intact, areas of multi-aged forest, areas of even-aged regrowth and regeneration, and a small proportion which has been converted to hardwood plantation(<1%). The majority of harvesting in this catchment uses various forms of selective logging. A very small proportion of operations use "clear fell" harvesting methods.

Many of the major impacts identified in the original catchment plan are now minimised by the controls required under the *Forest Practices Act 1985*. In 1987, the first draft of the *Forest Practices Code* was released, with the most recent revision of this document released in 2000. The latest review of this document by the Forest Practices Authority (FPA) is currently on hold, pending clarification from the government on matters of future forest policy.¹⁰ The introduction of the *Forest Practices Act* and the *Forest Practices Code* brought about significant improvements in the quality of Tasmanian forestry activities; however, there are still areas in which forestry practices could be further improved.

Forestry burns can lead to a local reduction in air quality directly after burns. The

risk of smoke impacting on local communities is now managed by the Forest Industry in conjunction with the Bureau of Meteorology and the Forest Practices Authority.

As Forestry Tasmania manages State Forest for multiple use, the road network established throughout the forest provides access for the general public. This access provides opportunity for the introduction of weeds, soil-borne diseases and at times unexpected fires.



Forest fuel reduction burn

10 Forest Practices Authority, 2011.Home page → News. Accessed 26th April 2011. http://www.fpa.tas.gov.au/index. php?id=40&tx_mininews_pi1[showUid]=43&cHash=08fa458f5176ef1bd57704ada4782e8d



Land & Water Management (continued)

9.5 Fishing

Wild fisheries are invaluable to the Swan Apsley's local commercial fishing industry, as well as to recreational fishers. Figures for the catchment itself are difficult to find, but several statewide studies of fishing impacts have been undertaken.¹¹

When wild fisheries are harvested inappropriately, environmental impacts can include;

- **bycatch** the death of species such as sea birds and non-target marine species (e.g.; non target fish or dolphins),
- habitat damage (i.e.; bottom trawling causing disturbance of the sea floor, anchors damaging reefs)
- the introduction of marine pests and diseases - on dirty boats, equipment, or in ballast water,
- trophic cascades this is when changing the population size of one species within the food chain directly influences the numbers of other populations within it. The removal of a top predator species can impact both on numbers of their natural prey species, or on those of introduced pests (i.e.; the removal of large rock lobsters allows urchins to invade and damage new areas).

These environmental impacts flow on to become economic and social impacts; as numbers of fish populations drop, they can become "commercially extinct", damaging commercial harvests and

SHARK REFUGE AREAS

These areas are set aside as important marine habitat to protect sharks, particularly school and gummy sharks. Fishing is restricted in these sheltered habitats so sharks, skates and rays can

breed and raise their young.



110 WATERS ape Boullange

Many species are protected with seasonal closure. For example:

SPECIES	SEASON
Abalone	Open to fishing all year round.
Banded Morwong	Closed to fishing from 1 March 2013 to 30 April 2013 inclusive.
Striped Trumpeter	Closed to fishing from 1 September 2013 to 31 October 2013.
Octopus	Open to fishing all year round.
Rock Lobster and Giant Crab (Female)	Open to fishing for the 2012/2013 Rock Lobster season from 3 November 2012 to 30 April 2013.
Rock Lobster and Giant Crab (Male)	Open to fishing for the 2012/2013 Rock Lobster season from 3 November 2012 to 31 August 2013.
Scallops	Open to fishing from the Saturday before Easter, 23 March 2013 to 31 July 2013 inclusive. A closure for scallop fishing has been declared in the D'Entrecasteaux Channel until further notice to protect scallop stocks and reduce the likelihood of long term closures. See the scallop page for more information.
Squid / Calamari	Seasonal closures apply for squid, including southern calamari, in some east coast waters including Great Oyster Bay and Mercury Passage from 15 October 2013 to 14 November 2013 inclusive.

recreational fishing opportunities. Surprisingly, recreational takes of some fish species far outstrip those of commercial takes. The recreational take of flathead, for example, is six times that of the commercial take statewide¹².

¹¹ State of the Environment Report, 2009. Natural Values Chapter 🗲 Harvesting of Wild Fisheries 🗲 Issue Report. http://soer. justice.tas.gov.au/2009/nat/4/issue/45/index.php

¹² State of the Environment Report, 2009. Website: Natural Values Chapter --_ Harvesting of Wild Fisheries 🗲 Issues report http://soer.justice.tas.gov.au/2009/nat/4/issue/45/index.php Accessed 12th December 2010.

9.6 Aquaculture

Aquaculture is a growing industry in the catchment since its establishment in the early 1980s. Operations include oysters, mussels and abalone production. Farmers lease waters from the Tasmanian government, lease holders must possess a license to grow specific shellfish, seaweed and fish species.

The size of the leases in the catchment give an indication of the industries restraints for expansion. The marine farm zone in the Swan River is 590 ha. The DPIPWE marine farm management plan allows a maximum of 14% of the zone to be farmed. The farms currently utilize this 14% and therefore under the plan cannot expand only relocate leases.

Great Oyster bay has 2 zones totalling 19 476 ha. The DPIPWE marine farm management plan allows a maximum of approximately 19% of the zones to be farmed. The farms currently utilize less than 4% and therefore under the plan can expand leases with consultation.

Further zones are that currently not being utilized in the Great Oyster Bay are a significant zone near Swansea and 1 ha zones near Webber Point, Picnic Island and north of Little Swanport.

Land based aquaculture in the catchment includes abalone farms and an oyster nursery. They are a major employer in Bicheno and Swansea.



Catch of the day by Maurice Banks



Land & Water Management (continued)

9.7 Horticulture

Viticulture – Vineyards are becoming an increasingly important product in the Swan Apsley. Craigie Knowe vineyard is one of the oldest vineyards in the catchment and on the east coast. Other vineyards include those established on the properties of Spring Vale, Milton, Gala, Melrose and The Bend. East coast Tasmanian wines are becoming renowned for their quality and uniqueness. Coombend Estate situated on Moulting Lagoon is now owned by the well known Brown Brothers from Victoria. Other boutique vineyards include the Apsley Gorge and Freycinet Vineyards.



The Bend Vineyard, Courtesy of S. Sinclair and H. Edginton

Walnuts – Walnuts Australia Pty Ltd (WAPL), a wholly owned subsidiary of Webster Limited, owns 540 hectares of walnut orchards in Tasmania and manages or has access to a further 80 hectares of Joint Venture orchards in Tasmania.

The Swansea orchard is one of WAPL's three main orchards. The others are in Tabbita and Leeton in the Riverina district in NSW. Tasmanian walnuts are hulled and dried in Tasmania and then shipped to the Tabbita orchard where all walnuts are graded for size and quality and bagged for sale. Both domestic and export sales are dispatched from this facility.

WAPL is a significant land owner and manager in the catchment and an important local employer.



Walnuts Australia farm, north of Swansea

9.8 Agriculture

After forestry, the largest active land-use within the Swan Apsley Catchment is grazing, which occupies about 11% of the catchment land area. Grazing for fine wool has been the main stay of the catchment since settlement and is a critical component of the landscape, environmentally, socially and economically.

Impacts associated with poorly-managed grazing can include erosion of soils from overstocking, degradation of native grasslands and bush remnants, impact on riparian vegetation, conversion of native ecosystems and the associated biodiversity losses.

Cropping is also an important land use in the catchment particularly in the productive flood plains of the Swan Valley. Impacts from cropping can include erosion issues and also potentially water quality issues from excess nutrient and chemical runoff. Significant land use changes such as conversion from forest or woodland to pasture, or grazing conversion to cropping can impact upon the hydrology of the catchment in different ways, such as causing water tables to rise in localised areas resulting in salinity.





Land & Water Management (continued)

9.9 Water Storage & Extraction

Water extraction and storage processes within the catchment takes many forms – dams, whether on or off-stream, flow regulation or other forms of abstraction (removal or withdrawal from surface water or groundwater).

Issues caused by poorly planned water extraction and storage activities include;

- Changes to river flows and groundwater levels, which create conditions that are unfavourable for local aquatic ecosystems, or for meeting the needs of the human population,
- Changes to natural hydrological patterns and processes within and between rivers, streams, wetlands and groundwaters, which in turn can affect the geomorphology of local river systems (i.e.; by changing channel width and rates of erosion and scouring),
- Disruption of flow and associated sediment and nutrient transport by in-stream dams and weirs, which can create conditions idea for the development of algal blooms or the establishment of introduced species.
 - The creation of in-stream barriers to fish movement by the construction of in-stream dams and weirs.

A 2008 report looking at water use in the Swan Apsley found a total of 79 registered water extraction entitlements within the catchment, most of which are placed in the subcatchments of the coastal zone¹³. Southern Water holds the licenses for 48 of these – 24 come from the Swan River to supply domestic water for Swansea; the other 24 come from the Apsley River and supply domestic water to the townships of Bicheno and Coles Bay. The total annual demand for water entitlements within the catchment in 2008 was 7,121 ML.

23 licensed dams are known from the catchment – a further 202 unlicensed dams have also been identified. At present, no permit is required for dams that are less than 1 ML if they are not on a watercourse, and if the water they hold is only used for stock and domestic purpose. The annual extraction volume of licensed dams within the catchment is 2637 ML; for the unlicensed dams its estimated at 282.8 ML, about 9.7% of the total volume of water extracted annually.

FISH LADDERS

In 2010, in a joint project between GSB NRMC and Inland Fisheries, a fish ladder was constructed at the weir on the Swan River. The weir was built to store water for the Swansea town water supply many years ago, but once constructed, it acted as a barrier to many of the fish species which populate the river. The fish ladder has partially solved this problem, and has restored connectivity to the upper river reaches. Future catchment management discussions will consider the installation of similar structures on other weirs further up the river.



13 Hydro Tasmania Consulting, 2008. DPIW – Surface water models Swan and Apsley Catchments. Unpublished report. Hydro-Electric Corporation, Hobart, Tasmania.

10. Known threats

10.1 Salinity

Salinity describes an "increased accumulation of excessive salts in land and water at sufficient levels to impact human and natural values"¹⁴.

Dryland salinity is caused by rising water tables, which dissolve natural salts contained in the soil, bringing them to the surface, where they;

- negatively impact upon the productivity and sustainability of agricultural systems- annual losses to the State's agricultural industry in 2006 were estimated at \$11.25 million
- threaten native vegetation communities especially those in low-lying areas, notably native grassland remnants, wetlands and woodlands,
- can damage infrastructure including roads, bridges, buildings, drainage systems and steel structures.¹⁵

Although some level of salinity is a natural part of the Tasmanian landscape, land management practices past and present can exacerbate its effects. The activities identified as the main drivers for increasing salinity issues in the state included land clearance, and conversion of perennial deep-rooted vegetation (i.e.; forested land) to land uses that require lower annual rainfall (i.e.; annual cropping, irrigated agriculture, or urban developments).¹⁶

At present, the Swan Apsley is fortunate to only have relatively small areas of agricultural land affected by salinity, and in areas where it is affected, the effects are moderate – meaning that plant and tree vigour is reduced, bare patches caused by salinity are usually less than one square metre, and where no salt tolerant plant species are yet present.¹⁷ Studies on salinity within the Swan basin have been conducted.



The Bend vineyard courtesy of S. Sinclair and H . Edginton



Result of salinity



linity

¹⁴ State of the Environment Report, 2009. Natural Values Chapter
Salinity http://soer.justice.tas.gov.au/2009/nat/4/issue/68/
ataglance.php

¹⁵ NRM Tasmania, 2010. NAP and NRM → Dryland Salinity. http://www.nrmtas.org/about/DrylandSalinity.shtml 16 Ibid.

¹⁷ State of the Environment Report, 2009. Natural Values Chapter → Salinity → Land systems containing areas of salt-affected agricultural land. http://soer.justice.tas.gov.au/2009/image/557/index.php



10.2 Acid sulfate soils

i. What are acid sulfate soils (ASS)?¹⁸

Acid sulfate soils (ASS) are defined as natural soils that contain sulfides (mostly iron sulfides), usually in microscopic form. Most of these sulfides were formed by bacterial activity in underwater sediments over thousands of years, which is why many of areas of sulfur rich sediments are found in the coastal plains, wetlands and estuaries of today.

In an undisturbed and waterlogged state these soils are harmless, but when disturbed and/or exposed to oxygen through drainage, excavation or climate change, a process of oxidation can produce sulfuric acid in large quantities. In an undisturbed state these soils are called Potential Acid Sulfate Soils (PASS). Once they are disturbed and start oxidising, they are called Actual Acid Sulfate Soils (AASS). They are collectively referred to as Acid Sulfate Soils (ASS).



Result of acid sulphate soil runoff



Acid sulphate soil sample

After rain and particularly following prolonged dry periods, the sulfuric acid in AASS is released into the surrounding environment. As the acid moves through the soil profile it may 'mobilise' or cause the release of heavy metals and other toxins from the soil, which eventually flow into surrounding waterways. At worst toxic 'slugs' of metal-rich acid runoff can move downstream and flow into estuaries, reducing oxygen levels in the water, significantly decreasing water quality, killing fish and damaging sensitive ecosystems. This process caused extensive environmental damage in NSW in 1987 when flooding mobilised aluminium and acid from disturbed ASS into the Tweed River.

ASS runoff has significant environmental, economic and social impacts on coastal communities. Besides the impacts on the environment acid runoff has been attributed to the decline or failure of some agriculture, fishery and aquaculture industries. The ecological damage can also affect valuable tourist resources including fishing grounds, swimming areas and other water sports areas. Acid discharges can damage infrastructure services and structures such as pipes, foundations, drains, bridges and flood controls.

High levels of iron and manganese may precipitate in receiving waters, causing aesthetic issues, staining infrastructure, coating aquatic vegetation and preventing photosynthesis or blocking the gills of aquatic fauna. High levels of some elements such as aluminium and arsenic may also have human health implications.

18 DPIPWE website, 2010. Home → Managing our Natural Resources → Land Management & Soils → Soil Management → Acid Sulfate Soils. http://www.dpipwe.tas.gov.au/inter.nsf/WebPages/SWEN-83NVBG?open

ii. Acid sulfate soils in the Swan Apsley

Mapping conducted by the Department of Primary Industries, Water and the Environment have identified a number of areas within the catchment through computer modeling as being likely to contain potential acid sulfate soils (PASS). Coastal areas identified as containing PASS in the catchment include parts of the Apsley Marshes and Moulting Lagoon, the Swan River floodplain, and Dolphin Sands. Marine underwater and intertidal areas within the catchment identified as containing PASS include parts of Moulting Lagoon and the Swan Estuary. Inland, Shepherds Hut Lagoon near Swanwick has also been identified as a likely source of PASS¹⁹.

Just because an area contains potential acid sulfate soils, this does not necessarily mean that they will develop into actual acid sulfate soils (AASS).

Within the Swan Apsley, processes identified as most likely to trigger the creation of AASSs include over-extraction of water from river systems, protracted periods of extreme dry weather, or digging of ditches or other construction works which might expose the PASSs to the air.

The issues of water diversion and extraction are considered to be of particular concern for the upper Apsley Marshes and Moulting Lagoon as a whole. Seasonal fluctuations in groundwater lead to natural cycles of wetting and drying, and any acid build-ups are usually washed away by reasonable rainfall. However, water extraction upstream means that as less fresh water enters these areas, ground water levels may drop further, causing more soils to become oxidized and therefore release higher, potentially damaging levels of sulfuric acid into the local ecosystems.

There is anecdotal evidence that a quite dry period in 2009 may have already initiated this process – this is currently being investigated by DPIPWE²⁰.

When the levels of acidity rise within areas of AASSs, this can also exacerbate other issues. Metals already present in the sediments, such as iron, can be released by increasing acidity. When washed into local ecosystems this precipitate, or "flock," can be toxic to gill fish and oysters – in the Swan Apsley, this could be devastating to local native ecosystems as well as local aquaculture, fishing and tourism businesses.

¹⁹ Ibid.

²⁰ Rob Moreton, pers. comm.



10.3 Habitat change

Habitat loss has been identified as the main cause of biodiversity decline world-wide. $^{\scriptscriptstyle 21}$

i. Development

Habitat change can be very slow and incremental, as seen when landscapes with woodland remnants slowly degrade to become treeless, or faster and more dramatic, as when native vegetation is converted to make way for housing subdivisions or roads.

ii. Land Use Change

The *Tasmanian State of the Environment Report 2009* emphasises how a change in catchment vegetation cover "especially from deep-rooted to shallow-rooted types (or vice-versa)—can change hydrological processes including the water runoff/infiltration balance which is central to maintaining water quantity, quality and flow regimes in both groundwater and surface water." It also estimates that 10.9% of the catchment's native vegetation has been cleared, which is comparatively little compared to many other eastern and northern catchments in Tasmania.²²

Generally, it is easier to observe and monitor habitat change on land than it is in estuarine and marine – apart from being the landscapes we live within and observe daily, land-based ecosystems tend to be cheaper to study, although advances in aerial and satellite-based monitoring systems are slowly closing this information gap.

22 SOER, 2009.State of the Environment Report 2009 \Rightarrow Indicators \Rightarrow Native Vegetation Clearing \Rightarrow Indicator description. Website http://soer.justice.tas.gov.au/2009/indicator/2/index.php



Swan River in flood

²¹ Dirzo, R. and P.H. Raven, 2003. *Global State of Biodiversity and Loss*. Annual Review of Environment and Resources. Vol. 28, pp 137-167. Published November 2003.

10.4 Fire

Humans have been altering fire regimes within Tasmania for thousands of years. At present, fire management and associated changes to fire regimes are often planned to minimise damage to property and human life – light, fuel reduction burns around populated areas are a common means of reducing the risk of a major fire breaking out. Other changes in the fire regime may be blamed upon "recreational incendiarists", arsonists who set fire to things for reasons best known to themselves.

Changes to the frequency, distribution patterns and intensity of fire within the landscape can effect serious local habitat change. Many Tasmanian ecosystems require fire at some stage of their life-cycles, but if these become too frequent, this can lead to certain species being removed from the landscape. Oyster bay pines, a local threatened species endemic to the East Coast, require fire to cause mature capsules held on the trees to open and drop seeds. However, if the area is burnt again before the seedlings generated by this seed drop are allowed to grow to maturity, this can result in the loss of Oyster Bay pines from the local ecosystem²³.

Large wildfires have occurred within the catchment in the last three decades. In 1985 15 000 Ha was burnt in a single fire event, then in 1995, a similar event resulted in 17 000 Ha being burnt. A number of smaller fires occurred around Coles Bay between 2003 and 2007. Larger fires occurred around Friendly Beaches in 2006 and 2007, and a major fire broke out south of Bicheno in 2004, the same year that a smaller fire threatened the township.²⁴ In January 2013 a bushfire just south of Bicheno destroyed properties and other infrastructure and burnt an area of over 4,900 Ha.

In an effort to prevent large scale damaging wildfires from occurring, cooperative Fuel Reduction Burns (FRB's) are undertaken. These FRBs are timed to occur during seasons when it is anticipated that they will do as little damage to local ecosystems as possible.

A fuel reduction burn was conducted north of Bicheno in 2007 where approximately 10 000 hectares was burnt in a joint operation between the Tasmanian Fire Service, the Parks & Wildlife Service and Forestry Tasmania . More of these large scale FRB's are planned to be undertaken throughout the catchment in future years.

The PWS has worked closely with other relevant agencies such as the Tasmanian Fire Service and the State Emergency Service to develop Strategic Fire Management Plans for the Three Regions of the PWS. A strategic fire management plan has been developed for Northern Tasmania which includes part of the Swan Apsley Catchment. The plan covers:

- · Legal context of the plan
- Risk assessment of the existing situations that quantifies likelihood and consequences, based on historical fire weather plus data from maps developed of Values at Risk
- Based on the risk assessment, a map of fire management zones presented with explanatory objectives and prescriptions, with three zone categories based on the COAG recommendations
- · Wildfire prevention mitigation strategies
- · Wildfire suppression
- · Wildfire preparedness strategies

More information about the plan is available from the PWS or the SES.



²³ Parks and Wildlife Service, 2003. Online notesheet – Fire management – Fire, flora & fauna. http://www.parks.tas.gov.au/file. aspx?id=6525 Accessed 12th December 2010.

²⁴ State of the Environment Report, 2009. Year of fire, 2002-08. http://soer.justice.tas.gov.au/2009/image/644/index.php



10.5 Weeds

Weeds may be most easily described as "plants out of place" – they can be exotic introductions from overseas, or native species growing outside their natural range. About 30% of the plant species known within Tasmania are exotic plant species which have become "naturalised" - this means they form self-sustaining populations in the local environment.²⁵

Weeds are not just a problem for gardeners – they cost Tasmania millions of dollars annually in lost revenue within agricultural and forestry operations, and in money spent directly on control works in these and more natural environments. In 2007, conservative estimates of the cost of weeds to Tasmanian agriculture was around \$57 million – that's 7% of the gross annual value of the industry to the State²⁶.

Weeds impact upon productive landscapes by competing with and sometimes contaminating crops, and many are poisonous or otherwise damaging to livestock. In native ecosystems, they compete with native plants for space, light and nutrients, and in squeezing them out, reduce habitat available for native animals. In some cases, they harbour feral pest species, increase fire risk, or transform the natural environment by changing water flow regimes or the structure of the local geomorphology. Some weeds are damaging to human as well as animal health, and many impact on the aesthetic and recreational values of the areas they invade.

The *Glamorgan Spring Bay Council Weed Management "Plan"* is a comprehensive document that guides weed management within the Swan Apsley Catchment. The plan outlines strategic *weed led, site led and community led* approaches to weed management.

25 State of the Environment report, 2009. Natural Values Chapter → Plant Pests (Weeds) and Native Plant Diseases → At a glance. http://soer.justice.tas.gov.au/2009/nat/4/issue/82/ataglance.php 26 State of the Environment Report, 2009. Natural Values Chapter → Plant Pests (Weeds) and Native Plant Diseases → Issue Report. http://soer.justice.tas.gov.au/2009/nat/4/issue/82/index.php#indicatorintroduction



Bridal Creeper, courtesy of NRM South

i. Weed led approaches

Within Australia, thirty six types of weeds have been identified as Weeds of National Significance (WoNS) – these weeds are considered to pose an especially grave threat to the country's environment and economy. Eleven of these weed species are present in Tasmania; ten of these species are found within the Swan Apsley Catchment. These weeds are:

- Bridal creeper (Asparagus asparagoides)
- Serrated tussock (Nassella trichotoma)
- Boneseed (Chrysanthemoides monilifera)
- Gorse (*Ulex europaeus*)
- Blackberries (Rubus fruticosus agg.)
- Willows (Salix spp.)
- Asparagus fern (Asparagus scandens)
- English or Scotch broom (Cystisus scoparius)
- Canary or Montpellier broom (Genista monspessulana)
- African boxthorn (Lycium ferocissimum)

Of these ten WoNS, the top four are considered highest priority as current mapping indicates with concerted effort it may be possible to control and potentially eventually eradicate these weeds.

Other weeds that are declared under the *Tasmanian Weed Management Act 1999* including sea spurge (*Euphorbia paralias*), Spanish heath (*Erica lusitanica*), ragwort (*Senecio jacobaea*), Paterson's curse (*Echium plantagineum*), and pampas grass (*Cortaderia selloana*) are also **weed led priorities** in Glamorgan Spring Bay.



Spanish Heath, courtesy of NRM South

MOULTING LAGOON WEED MAPPING/ WEED CONTROL PROJECT

In 2011, detailed mapping of gorse around the perimeter of Moulting Lagoon was undertaken by the Catchments To Coasts team, with support from staff from the Parks and Wildlife Service. This mapping has helped to prioritise a long term on-ground weed control program involving the Catchments To Coasts team (with funding received from the Australian Government via NRM South), adjoining landholders and the Parks and Wildlife Service as the land manager responsible for the Moulting Lagoon Game Reserve. The impact of gorse is considered a significant threat to the Ramsar values of the wetland.



Gorse (Ulex europaeus), by Nicky Meeson



ii. Site led approaches

Site led priorities are determined by certain 'assets' that are require protection from weed invasion. These assets could be agricultural or forestry values, or natural environmental values, e.g.; the threatened Eucalyptus ovata/Callitris oblonga forests of the Upper Apsley, and the Ramsar wetlands of Moulting Lagoon and the Apsley Marshes, all of which are threatened by gorse.

iii. Community led approaches



Bicheno foreshore, site led approach to weed control

Controlling certain weeds or protecting certain locations from weeds might be of particular interest to a community or group. For example, control of capeweed, although not a declared weed,

is considered of great importance to many in urban recreational areas. Some groups or individuals may have an interest in removing certain weeds in particular areas such as the control of environmental weeds 'garden escapees' such as coastal daisy (Gazania sp.), bluebell creeper (Sollya heterophylla) and agapanthus in the foreshore and conservation reserves in Bicheno.



Volunteers at a Boneseed Blitz in Bicheno







Pampas Grass, courtesy of NRM South

10.6 Native plant diseases

The *State of the Environment Report 2009* classifies native plant diseases into five main groups²⁷:

- **Collar rot and root diseases** cause significant dieback in native forests. These include the cinnamon root rot fungus (*Phyptophthora cinnamomi*), and the naturally occurring Armillaria root rot fungus (*Armillaria* spp.)
- **Vascular fungi** which lead to infected trees suffering foliage wilting. The pathogenic myrtle wilt fungus (*Chalara australis*) falls into this category.
- **Defoliators** these are fungal pathogens that cause defoliation of trees in native forests and plantations, and include the Mycosphaerella leaf disease (*Mycosphaerella nubilosa* and *M. cryptica*).
- Branch, stem and twig cankers and lesions cause branch death and stem deformation in stressed trees stem cankers in this category include *Botryospha eriaribisand Cryphonectria eucalypti*.
- **Eucalypt crown dieback** this impacts members of the white gum family (*Eucalyptus viminalis, Eucalyptus dalrympleana*, and *Eucalyptus rubida*). It is uncertain what the root cause is of this condition, however, it is known to be exacerbated by *phytophthora*, climate change and El Niño events.

Within the Swan Apsley Catchment, the most serious of these diseases are cinnamon root rot fungus, *Armillaria* root rot fungus and eucalypt crown dieback.

Phytophthora (pronounced "fi-TOPF-thor-ah") or cinnamon root rot fungus, is a soil-based pathogen that infests the roots of a range of native species, and sometimes those of commercial grape plantings. It requires relatively warm,

moist soils, can grow as high as 800 m above sea level, and is widespread across the State. It kills its plant hosts by attacking their root systems, causing lesions and associated root rotting, which prevents the flow of nutrients and water to the rest of the plant. Visible symptoms of *phytophthora* can be difficult to recognise in the field – one sign is unexplained death of individual plant species within an otherwise healthy vegetation community.



Native plants killed by Phytophthora cinnamomi (or cinnamon root fungus), courtesy of Tim Rudman, DPIPWE

²⁷ State of the Environment Report, 2009. Natural Values Chapter
Plant Pests (Weeds) and Native Plant Diseases
Issue Report. http://soer.justice.tas.gov.au/2009/nat/4/issue/82/index.php#z30



Native vegetation communities which are particularly vulnerable to *phytophthora* include heathlands, moorlands, and dry eucalypt forest and scrub communities, including swamps, heaths, sedgelands, dry lowland forest on sandy or poorly drained soils, and low altitude rainforest on infertile soils.²⁸ It is present in many locations within the Swan Apsley, including around Moulting Lagoon and the Apsley Marshes, and in Douglas Apsley and Freycinet National Parks.

Although it can be spread naturally through water movement through the soil, in creeks or in man-made drains, the most significant vectors for spreading this pathogen are humans. *Phytophthora* is easily spread in contaminated soil or water through earth-moving or fire-fighting activities, by animals, or by people on dirty equipment, vehicles or shoes.

Some parts of the Swan Apsley are identified as *phytophthora* management zones – these included parts of Freycinet and Douglas Apsley National Parks. Some of these management areas are declared specifically to protect vulnerable populations of local threatened species, including the threatened heath species apsley heath (*Epacris apsleyensis*), bearded heath (*Epacris barbata*), tall heath (*Epacris grandis*), bordered heath (*Epacris limbata*), and the sand grass tree *Xanthorrhoea arenaria.*²⁹

Armillaria root rot and eucalypt crown dieback can work hand in hand to destroy remnant eucalypts in the landscape. The fungus can infect trees across a broad range of ecosystems, but will not necessarily cause them to show symptoms unless the trees are otherwise unhealthy or stressed. The armillaria fungus can then cause the roots of these trees to rot, which can result in the trees falling over even before their crowns have shown any significant symptoms.

Although particularly devastating in the Tasmanian Midlands, eucalypt crown dieback can be been seen in many locations within the Swan Apsley.

Another serious potential fungus threat, while not yet present in Tasmania, is myrtle rust (*Uredo rangelii*). This fungus was discovered in NSW in 2010, and can have a serious effect on a large number of plant species.³⁰

28 Ibid.

30 DPIPWE website, 2011. Home → Biosecurity → Myrtle Rust. Accessed 20th April 2011. http://www.dpiw.tas.gov.au/inter.nsf/ WebPages/MCAS-8DV22F?open

²⁹ Schahinger, R., Rudman, T., and Wardlaw, T.J. (DPIWE), 2003. Conservation of Tasmanian Plant Species & Communities Threatened by Phytophthora cinnamomi. Hobart, Tasmania.

10.7 Animal pests

Information on populations of feral animals is quite patchy - populations of most animal pests are considered to be on the rise across Tasmania – within the Swan Apsley, some of the more threatening terrestrial feral animals include foxes, feral cats, feral pigs, rabbits, deer, starlings, bumble bees and European wasps.

Foxes (*Vulpes vulpes*) are thought to have been deliberately introduced to Tasmania around 2000, and are considered the *"single most devastating introduced animal and threat to native vertebrate animals in Tasmania"*.³¹

Foxes prey on native animals and ground nesting birds, and until recently, their absence from Tasmania was a significant safeguard for populations of smaller native animals that have become extinct on mainland Australia (e.g.; the Tasmanian pademelon)³². Should they become established in the State, it has been estimated that they could cost the Tasmanian sheep industry alone up to \$8 million dollars per annum.³³

Many people are resistant to the idea that foxes have entered the State, as they have not seen evidence themselves. However, foxes can be extremely wary and elusive, and evidence collected by DPIPWE's Fox Eradication Program indicates a resident population of foxes at such a density that make it extremely unlikely that they would be detected by casual observers. Evidence of fox habitation found within Tasmania to date include a blood sample, several fox carcasses, and scats found at many locations statewide. The closest pieces of "hard" evidence (i.e.; not just a reported sighting) to the Swan-Apsley have included scats found at Conara (2005), St. Peters Pass and Seymour (2007), and Campbell Town (2008). A number of possible sightings within the catchment have been reported from in and around Swansea, at Nine Mile Beach, and inland from Bicheno. Credible sightings have been reported south and west of Swansea. Based on this evidence, a baiting program has been conducted in the catchment, focusing around Moulting Lagoon and the coastal zone north as far as Seymour.

³² Department of the Environment, Water, Heritage and the Arts, 2011. Action Plan for Australian Marsupials and Montotremes. Accessed 25th March 2011 http://www.environment.gov.au/biodiversity/threatened/publications/action/marsupials/9.html 33 State of the Environment Report, 2009. Animal pests and native animal diseases chapter. http://soer.justice.tas.gov.au/2009/ nat/4/issue/85/index.php



³¹ State of the Environment Report, 2009. Assessment of pest animals in Tasmania. http://soer.justice.tas.gov.au/2009/copy/40/ index.php



Feral cats (*Felis catus*) are a significant problem across Tasmania. Although the total feral cat population is difficult to estimate, it's thought that the population across Tasmania may be as high as 150 000, and that it may have doubled between 2005 and 2007 in response to the drop in Tasmanian Devil numbers due to devil facial tumour disease³⁴.

It's conservatively estimated that feral cats in Tasmania kill over **195000** native and **228 000** introduced animals annually,³⁵ although, in reality, numbers may be significantly higher. Cats eat a wide variety of native animals, including small mammals, birds, frogs, reptiles, fish and invertebrates. They're also implicated in livestock deaths, as they carry the disease toxoplasmosis.

Although completely feral cats are a serious threat, uncontrolled domestic pet cats can also cause serious damage to local animal populations, regardless of how well fed they are, as cats kill for fun as well as for food. Domestic cats that have not been desexed add to the feral cat problem, breeding with stray and feral populations, and adding to the number of unwanted pets which are often dumped by irresponsible pet owners. Freycinet has been identified as one of the native ecosystems most likely to be threatened by feral cats.³⁶

The *Cat Management Act 2009* was passed by Parliament after much public consultation, and came into effect on 1st July 2012. This Act specifically targets the breeding and sale of cats, the microchipping and desexing of cats, as well as the management of stray and feral cats, and has given local councils the ability to make by-laws in relation to cat management.³⁷

Domestic cats are a part of many households and are a valued companion pet to many people. GSB NRMC³⁸ promotes responsible pet ownership and the Cat Management Act 2009 encourages owners to have their pets desexed and microchipped.

Under the Act only registered breeders are permitted to breed cats. Cats sold or given away must be more than eight weeks old, desexed and microchipped. The Act also introduces powers to trap, seize or destroy stray and feral cats in certain circumstances and gives land owners and managers the statutory power to control cats found on their land.

³⁷ Department of Primary Industries, Parks, Water and Environment, 2011. Website: Home → Managing our Natural Resources → Cat Management Legislation. http://www.dpiw.tas.gov.au/inter.nsf/WebPages/HBAW-7HE28G?open. Accessed 22nd October 2010. 38 http://www.dpiw.tas.gov.au/internnsf/WebPages/SSKA-8TV2RP?open



Control of feral cats

³⁴ State of the Environment Report, 2009. Indicators 🗲 Animals Pests and Diseases 🗲 Indicator description. http://soer.justice. tas.gov.au/2009/indicator/84/index.php

³⁵ Trueman, P. 1991, The impact of domestic and semi-domestic cats on the wildlife of southern Tasmania. Unpublished Honours thesis, University of Tasmania, Hobart, Tasmania.

³⁶ Department of the Environment and Water Resources, 2009. Background document for the draft threat abatement plan for predation by feral cats, Commonwealth Government, Canberra. http://www.environment.gov.au/biodiversity/threatened/publications/pubs/draft-tap-cats-background.pdf

Rabbits (*Oryctolagus cuniculus*) have been a widespread problem since the time of the first European settlers, although there is some evidence that their numbers have been in decline over the last few years – this reduction may be to do with drought conditions reducing the availability of food, possibly in combination with the effects of the introduced diseases of myxomatosis and rabbit calicivirus (Rabbit Haemorrhagic Disease or RHD). Rabbits commonly overgraze areas of native and improved pasture, impact on the structure of native vegetation communities through the selective browsing of seedlings, and in doing so, cause losses to local populations of flora and fauna. Where rabbit burrows are dense, they can also cause significant soil erosion issues. Rabbit populations are especially dense around the township of Swansea.

Fallow deer (*Dama dama*) were introduced to the State as a target for recreational hunters. Deer can be very destructive in native ecosystems, selectively browsing the tender growth of seedlings, which over time alters the vegetation community structure, and therefore its ability to support native animals. They also cause significant impacts on agricultural, viticultural and walnut enterprises, grazing on valuable stock fodder, vines and plantation trees alike. Although in many areas deer are considered a pest, a permit is required from the Game Management Unit to shoot them. Within the Swan Apsley, a problem population of deer is present in Moulting Lagoon at the foreshore at Middlebank – these deer are thought to have been introduced to the area about fifteen years ago³⁹. This population is thought to be negatively impacting local vegetation communities, including areas of grassland and saltmarsh – their footprints are often observed along the shoreline in this area⁴⁰.

39 Steve Everts, pers. comm. Parks and Wildlife Service, DPIPWE. 40 Steve Everts, pers. comm. Parks and Wildlife Service, DPIPWE.



Rabbit



Other significant terrestrial pests found within the catchment include **common starlings** (*Sturnus vulgaris*), that occupy and degrade nesting hollows needed by native birds for breeding (i.e.; swift parrots), **european wasps**, which prey on native invertebrates and tadpoles with as yet little known consequences for local ecosystems, and **bumblebees**, which compete with native animals (including swift parrots and native bees) for food, and are suspected of reducing seed production and interfering with gene flow in native vegetation, and increasing the success of introduced weed species, with which they have evolved to pollinate.⁴¹

Mainland yabbies (*Cherax destructor*) were introduced to Tasmania for human consumption in 1968, and have been spread since then through farm dams and waterways statewide. They are tolerant of poor water quality, and threaten native ecosystems by potentially outcompeting native burrowing crayfish. Their burrowing activities have also been blamed for the collapse of dam walls.⁴²

In early 2012, the Tasmanian Government established the Invasive Species Branch (ISB) within the Department of Primary Industries, Parks, Water and the Environment. The ISB focuses on invasive plant and animals, including foxes and cats. Invasive species are defined as an introduced animal or plant that poses a significant threat to Tasmania's biodiversity, agricultural industries or community⁴³.

41 State of the Environment Report, 2009. Indicators → Animals Pests and Diseases → Indicator description. http://soer.justice. tas.gov.au/2009/indicator/84/index.php

42 Inland Fisheries Service, 2009. Home \rightarrow Fishery Management \rightarrow Pest Fish \rightarrow Pest Fish Species. http://www.ifs.tas.gov.au/ifs/fisherymanagement/pestfish/pest-fish-species

43 DPIPWE website: http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/DREN-4VH82R?open Accessed May 2012



Flock of common starlings

10.8 Native animal diseases

Three diseases of native animals have been identified as being particularly threatening at a State and catchment level. These diseases are the Devil Facial Tumour Disease (DFTD), platypus mucormycosis, and amphibian chytridmycosis, which affects native frogs.

The **Tasmanian Devil Facial Tumour Disease** (DFTD) is a devastating and disfiguring disease afflicting the Tasmanian Devil, which has been known in Tasmania since 1996. This unusual, contagious cancer is thought to be spread when devils fight over food. The facial lesions grow into large tumours, which may spread throughout the body, and which eventually interfere with eating, causing the animals to starve to death, usually within a few months of the cancer first appearing. Once DFTD enters a devil population, it can spread rapidly, resulting in the deaths of up to 95% of the population. It is this dramatic drop in populations since the disease first appeared which has led to the Tasmanian devil being listed as endangered at both State and National levels.

Within the Swan Apsley, two incidences of this disease have been recorded from the Freycinet Peninsula, to the east of Moulting Lagoon, and at the eastern tip of Nine Mile Beach.⁴⁴

Platypus mucormycosis is a disease caused by the fungus *Mucor amphibiorum*, which is only known from platypuses in Tasmania. First observed in 1982, this disease causes the afflicted animals to grow ulcers on various parts of their bodies. These ulcers can become sites of secondary infection, and cause death through impacting the animals ability to forage and maintain a healthy body temperature.

It is not known exactly how this disease spreads through wild populations, nor how fast it is capable of spreading, or the potential impacts this may have on wild populations. Fortunately, there have been no confirmed cases of platypus mucormycosis within the Swan Apsley, however, the disease is known from the adjacent South Esk and Macquarie catchments⁴⁵.

45 DPIPWE, 2010. Home → Weeds, Pests and Diseases → Animal Diseases → Mucormycosis – Platypus Fungal Disease. http:// www.dpiw.tas.gov.au/inter.nsf/WebPages/SSKA-7AH66E



Tasmanian Devil facial tumour disease (DPIPWE photograph) Dorsal ulcer on platypus Photo: Josh Griffiths DPIPWE

⁴⁴ Save the Tasmanian Devil Program, 2010. Home → The Diseases → Tasmanian Devil Facial Tumour Diseases – FAQs – Published 25/03/2010. http://www.tassiedevil.com.au



Amphibian chytridmycosis is caused by the chytrid fungus *Batrachochytrium dendrobatidis*, and is a deadly disease that has devastated frog populations worldwide.

Frogs affected by the chytrid fungus may show wobbly movements, unusual posture or behaviour, ulcerated, peeling or discoloured skin, or swelling, and tadpoles may grow deformed mouthparts. The disease can also cause sudden death.

The disease is spread by the movement of infected frogs and tadpoles, as well as through movement of spores in water. Common vectors for spread include dirty or wet fishing gear, camping equipment, boots, waders, or vehicle tyres, and in water moved for use in fire fighting, drinking, or spraying on roads to reduce dust.

Fortunately, as yet, no signs of chytrid fungus have been observed within the Swan Apsley Catchment.

To prevent the spread of this disease, and some other water borne pathogens, all gear when camping, fishing, or otherwise visiting or working in freshwater environments should be kept clean and dry, and the transfer of plants, water, soil and animals between frog habitat should be avoided. Water disposal should also be undertaken carefully – it is better to dispose of excess water somewhere dry and stony than wet. These precautionary measures are especially important when moving from a known area of infection into a known "clean" area.⁴⁶

46 DPIPWE, 2010. Home → Weeds, Pests and Diseases → Animal Diseases → Frog Disease – Chytrid Fungus. http://www.dpiw. tas.gov.au/inter.nsf/WebPages/LJEM-673V89?open





flooded creek, Swansea by Diane Bricknell

Eastern banjo frog by Diane Bricknel

10.9 Estuarine and marine threats

Pests & Diseases

A large number of introduced marine and estuarine pests and diseases flourish in Tasmania's coastal waters. Some of the more serious known from the waters off the Swan Apsley include the long-spined sea urchin, the Northern Pacific seastar, the European green crab, and the seaweed wakame.⁴⁷

The **long-spined sea urchin** (*Centrostephanus rodgersii*) was first spotted in Tasmanian coastal waters in 1978. It is thought to have spread south to the State naturally via the East Australian Current, and since arriving, favoured by changing climatic conditions, it has spread rapidly down the east coast. This species is considered to be a very serious threat to the area, due to its aggressive grazing of seaweed and other marine organisms. In areas invaded by the urchin, "urchin barrens" are created, and constant grazing prevents the native underwater vegetation from becoming reestablished. These areas of seaweed are important habitat for native fish, and studies have shown that urchin invasion negatively impact on a variety of wild finfish, abalone, and rock lobster industries. Research has shown that very big (2kg or larger) rock lobsters can control the urchins, however, overfishing of this species in many areas has removed most lobsters of this size from the fisheries.

The **Northern Pacific seastar** (*Asterias amurensis*) is well known to most East coast residents as possibly our most recognisable marine pest. This five-legged marine predator can grow up to 50 cm in diameter, and prefers the sheltered waters of bays and estuaries. At home on soft sediments, rocky reefs, or artificial structures such as jetties, and capable of populating waters to 200 m deep, it aggressively predates both native species and economically important shellfish. The Northern Pacific seastar prefers bivalves, like mussels, oysters and scallops, but will eat pretty much anything, including sea cucumbers, sponges and drowned dogs, and the ability of a individual female to produce up to 20 million eggs make this species a successful invader of large areas of the State's coastal waters.

47 DPIPWE, 2010. Home → Sea Fishing and Aquaculture → The Marine Environment → Marine Pests → Pest Identification http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/LBUN-5KKSPR?open



Long spined sea urchin



Also present is the **European green crab** (*Carcinus moenas*), another voracious predator, which lives in the intertidal zone to depths of five metres. Growing to 8 cm, and not necessarily green, this aggressive predator out-competes native crabs for food and habitat, and negatively impacts upon aquaculture operations, especially those which grow shellfish.



European green crab

Wakame (pronounced "wah-kah-may") (*Undaria pinnatifida*) is a large brown algae which can grow up to two metres long. Sometimes known as Japanese kelp, it is thought to have first been introduced to the State in ballast water discharged by a Japanese ship visiting the Triabunna woodchip mill, and since first appearing in 1988, has spread extensively up and down the east coast. Wakame is a transformer species capable of completely altering the ecology of local ecosystems. It is fast growing – up to 1 cm per day – and can easily outgrow the native seaweeds, depriving them of light and hence killing them. With the native seaweed go the fish that rely on them for food and habitat – this puts pressure on surrounding ecosystems. It also impacts directly on the profitability of aquaculture operations, growing quickly on equipment, which requires regular cleaning to avoid sinking under the weed's weight. It can easily be spread by boat owners not cleaning their boats properly before leaving areas of infestation.

South of the catchment, an enterprising business has a facility that houses an *Undaria pinnatifida* research program. This program focuses on 'in-water' research, assessing growth cycles, colonization rates, tidal influences, water temperature and UV light absorption on fucoidan content, sporophyll size and population density..⁴⁸.



Wakame (Tasmanian Parks & Wildlife photograph))

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48 Marinova website, 2011. Capabilities page http://www.marinova.com.au/capabilities/Accessed 26th March 2011.
Serious marine pests known from other parts of the State, but not yet present in the waters off the Swan Apsley Catchment include the **Asian bag mussel** (*Musculista senhousia*), the **European fan worm** (*Sabella spallanzanii*) and the **European clam** (*Corbula gibba*).⁴⁹ **Rice grass** (*Spartina anglica*) is known from Little Swanport to the south, and Georges Bay to the north, where it has been eradicated. **Abalone viral ganglioneuritis** is a serious disease of abalones which has been found twice in processing facilities within the State, in 2008 and again in 2009. This disease has devastated abalone fisheries in Victoria, and remains a serious potential threat to the Tasmanian industry.⁵⁰

Other aquatic pests but not yet seen in Tasmania, but identified by DPIPWE as potential threats include **didymo** ("rock snot") (*Didymo spheniageminata*), **aquarium caulerpa** (*Caulerpa taxifolia*), **Asian paddle crab** (*Charybdis japonica*), **Chinese mitten crab** (*Eriocheir spp.*), and the **colonial seasquirt** (*Didemnum spp.*).





European fan worm

Abalone diseased with viral ganglioneuritis

Marine Debris

Marine debris has become one of the most widespread pollution problems facing our oceans. Marine debris is any persistent, human-created solid material that has deliberately or accidentally been released in the marine or coastal environment. Common items of marine debris include plastic bottles and bags, cigarette butts, packaging materials, rope and fishing gear. Marine debris is harmful to marine life including to protected species of birds, sharks, turtles and marine mammals. Marine debris may cause injury or death through drowning, injury through entanglement and internal injuries, or starvation following ingestion.

In 2009, the Australian Government made the *Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Marine Life* under the EPBC Act. Everyone can help to reduce the threat that marine debris poses; recycle and consume wisely to help reduce demand for materials that are possible sources of marine debris; dispose of rubbish responsibly and participate in clean up activities.

References

Tasmanian Parks and Wildlife Service, *Marine Debris*, 2013 Australian Government Department of Sustainability, Environment, Water, Population and Communities, *Marine Debris*, 2013

⁴⁹ DPIPWE, 2010. Home → Sea Fishing and Aquaculture → The Marine Environment → Marine Pests → Pest Identification http://www.dpiw.tas.gov.au/inter.nsf/ThemeNodes/LBUN-5KK5PR?open

⁵⁰ DPIPWE, 2010. Home → Sea Fishing and Aquaculture → Fishing → Ganglioneuritis. Abalone Viral Ganglioneuritis. http://www.dpiw.tas.gov.au/inter.nsf/WebPages/SCAN-75F423?open



11. Where to from here?

The Swan Apsley Catchment Plan is a strategic guiding document and a starting point for anyone to begin getting a handle on some of the values and issues in the catchment. It is also provides an opportunity to find out a little about some of the many projects that have been underway in the catchment over the years and of the potential for future work that needs to be done. Our knowledge about the catchment is changing every day and this document is only meant as a starting point and a guide, particularly for the Glamorgan Spring Bay Natural Resource Management Committee and other community / industry groups working in the catchment.

The following list of actions have come from a review of issues and a current understanding of the natural resource management climate in Tasmania and Glamorgan Spring Bay. It is meant as a guide to prioritising and progressing action. It is not at all comprehensive but it is a good start. We invite everyone to be involved whenever and however they can.



12. Recommended Actions

THEME	OBJECTIVE	ACTION	МНО	INDICATORS
GOVERNANCE	To ensure that the catchment plan and the delivery of actions remains	Continue to encourage the Glamorgan Spring Bay Council to be a driver of integrated catchment management in partnership with other key stakeholders	GSB NRMC and NRM / CTC staff.	ICM and NRM remaining key elements in strategic Council documents such as the Strategic Plan and Annual Plan.
	viable into the future	Continue the development, implementation and review of the Catchments To Coasts program in partnership with key stakeholders	GSB NRMC with support from NRM staff from Council	Regular reporting to the NRMC / NRM South / Council. Annual review of the program.
		Review implementation of catchment plan actions on an annual basis to track progress	GSB NRMC with support from NRM staff from Council	Annual report to the NRMC Committee
CLIMATE CHANGE	To ensure that the catchment community remains abreast of	Continue to seek, record and disseminate information about climate change to relevant stakeholders.	GSB NRMC and NRM / CTC staff.	Number of examples of information disseminated to stakeholders and records of outcomes / initiatives resulting.
	information, knowledge and opportunities in the climate change arena.	Initiate and participate in investigative work underway to further understand the implications of climate change when apppropriate, including research and monitoring initiatives.	GSB NRMC and NRM / CTC staff	Projects involved in and type of involvement and implications for the catchment.
		Attend information and knowledge building sessions, seminars, workshops etc tobuild climate change knowledge relevant to the catchment.	GSB NRMC and NRM / CTC staff	Document any relevant learning and file/ disseminated information to the NRMC and Council staff as appropriate.
SUSTAINABLE AGRICULTURE /	To ensure that opportunities for improving the sustainable	Encourage and support education and awareness raising regarding sustainable agriculture initiatives when opportunities arrive.	GSB NRMC and NRM / CTC staff	Number of workshops / field days / one on one sessions.
Horticulture / Viticulture	management of our natural resources are maximised.	Continue to develop and maintain networks with land managers in the catchment and seek opportunities (such as funding) collaboratively when appropriate.	GSB NRMC and NRM / CTC staff	Networks maintained. Partnerships developed. Funding or other initiatives successfully developed.
		Disseminate sustainable agriculture information to networks where relevant	GSB NRMC and NRM / CTC staff	No or articles, reports etc disseminated
NATIVE FLORA AND FAUNA	Continue to raise awareness of the vegetation values in the catchment,	Support landholders by providing information, knowledge and guidance, and linking to available programs, funding and technical advice.	NRM / CTC staff.	Information products distributed. Landholders assisted with gaining funding.
	and the relevant legislative and management requirements.	Communicate information and engage the wider community about the importance of remnant vegetation and local flora and fauna in the catchment	NRM / CTC staff.	Number of publications produced / disseminated.
	To both protect and ensure the ongoing viability of threatened species and Threatened Vegetation	To support landholders and the broader community in identifying and managing threatened species.	CTC/ Council/ DPIPWE and other specialists as required.	Production and distribution of information products. Opportunities for one on one support of landholders with professionals ie. botanists.
	Communities.	Communicate information about the importance and value of threatened species and communities in the catchment.	NRM / CTC staff.	Number / types of information produced / desiminated.
		Promote awareness of introducing damaging agents such as chytrid fungus or known weeds or diseases ie; phytophthora into the catchment by transients such as seasonal/ irregular contractors and tourists (with boats).	NRM / CTC staff.	No new introductions of invasive or harmful weeds and pathogens to known uncontaminated sites.
		Continue to provide support for land managers to protect and manage remnant vegetation and establish native vegetation as this provides the best habitat for threatened flora & fauna	The NRM / CTC staff.	Examples of support provided and outcomes (if any).
		Encourage and support research, monitoring and mapping of threatened species and vegetation communities by DPIPWE and other organisations.	The NRM / CTC staff.	Examples of research, monitoring and mapping undertaken and support provided.
		Improve our knowledge of the location, extent and condition of threatened vegetation communities within the catchment.	CTC/NRM staff with specialist support and with external funding as required.	Examples of improved knowledge of the location, extent and condition of threatened vegetation communities within the catchment.
	To protect existing and enhance degraded vegetation corridors to	To continue to support landholders with protected and reserved vegetation such as convenants.	CTC in partnership with DPIPWE staff and specialists	Examples of support provided.
	create connectea lanascapes for improved biodiversity.	To undertake landscape assesments to determine priority areas for ongoing protection, strategic management and rehabilitation.	CTC with specialist support	Number of assessments undertaken.
		Look for opportunities to promote a landscape approach to fire management within the catchment inclusive of multiple property owners / managers.	GSB NRMC	Minimal large scale catastrophic impacts from wildfire within the catchment.
	Restore natural fish migration in the rivers within the catchment	Establish fish ladders at all manmade barriers on the rivers within the catchment which prevent migration of native fish.	GSB NRMC, CTC, DPIPWE, Inland Fisheries	Fish ladders on all barriers as required.



Recommended Actions (continued)

Acronyms use	4:
CTC	Catchments to Coast
GSB NRMC	Glamorgan Spring Bay Natural Resource Management Committee
NRM Staff	Natural Resource Management Staff at the Glamorgan Spring Bay Council
DPIPWE	Department of Primary Industries, Parks, Water and Environment
GSBC	Glamorgan Spring Bay Council
ICM	Integrated Catchment Management



Notes:





Australian Government





Glamorgan Spring Bay Natural Resource Management





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