Hotham-Williams
NRM Plan
2015-2025

PEEL-HARVEY
CATCHMENT COUNCIL (Inc.)

Acknowledgements

Preparation of this Plan is an initiative of the Peel-Harvey Catchment Council through funding from the Australian Government.

It has been authored by Andrew Del Marco with support from Mel Durack, Hotham-Williams NRM Officer and Thelma Crook, Rivers 2 Ramsar Project Manager. Community consultation to support the Plan has been carried out by Mel Durack, Thelma Crook, Darralyn Ebsary, Kim Wilson and Andrew Del Marco.

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The project team thank the members of the Hotham-Williams Catchment community who have attended meetings, shared their knowledge and participated in surveys towards development of this Plan.

The Shire of Boddington is thanked for its financial support towards the Hotham-Williams NRM Officer and this Project.

Reader's note

This Report has been prepared to guide coordinated natural resource management and landcare activities in the Hotham-William Catchment. It has not been endorsed by any organisation, and does not necessarily represent the views of Peel-Harvey Catchment Council or Australian Government.

The Report represents the work of Andrew Del Marco, CEnvP 606 (recognised under the Certified Environmental Practitioner Scheme, http://www.cenvp.org/). The report has been prepared through a process of community consultation, review of technical documents and professional analysis.

Preferred reference

Del Marco A (2015) *Hotham-Williams NRM Plan*, A report to the communities of the Hotham-Williams Catchment and the Peel-Harvey Catchment Council, Western Australia, July 2015, Perth.

Australian Government

IRONBARK ENVIRONMENTAL

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

This project is supported by the Peel-Harvey Catchment Council through funding from the Australian Government.

Statement of acknowledgement of Traditional Owners

The author acknowledges the Noongar people of the Binjareb, Whadjuk and Gnaala Karla Boodja dialect groups as the Traditional Owners of the Hotham-Williams Catchment and wider Peel-Harvey Catchment. The continued connection and stewardship of the land by Traditional Owners, and groups such as the Gnaala Karla Boodja Working Group, is recognised and respected.

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A Background

1. Introduction

Natural Resource Management (NRM) is not just simply about management of the environment, but management of the natural resources which underpin agriculture, tourism, recreation, mining and entire landscapes. It underpins the health of the communities, farming enterprises, land, water and wildlife of the Hotham-Williams Catchment.

This Plan sets out a possible future for NRM in the Hotham-Williams Catchment over the next 5 to 10 years and possibly beyond. It has been developed by consultants and staff of the Peel-Harvey Catchment Council in consultation with the communities of the Hotham-Williams Catchment. Ideally, the Hotham-Williams community will take this Plan as a starting point for future work, projects and local NRM coordination.

Preparation of a Plan is one of three main recommendations of the Business Case: Hotham and Williams Investment in a Local Natural Resource Management Officer and supported by the Hotham-Williams Catchment Environmental Alliance(Peel-Harvey Catchment Council, 2013).

The Plan works on a number of levels, in particular to:

- Propose a long-term vision and objectives for natural resource management that is broadly supported by the community.
- Outline possible future NRM programs and projects. These are based on ideas that have been put forward by community members or are recommendations of past projects and studies.
- Provide a framework by which the community can consider how they wish to coordinate future NRM programs and works.

Together, the Plan's objectives and prospective projects should provide guidance to any future Hotham-Williams NRM management body and NRM staff.

What is NRM?

Natural Resource Management (NRM) refers to the management of natural resources such as land, water, soils, plants and animals with a particular focus on how management affects the quality of life for both present and future generations (PHCC, 2013). It includes sustainable agricultural production, environmental management, conservation, and the sustainable use of natural resources.

NRM is undertaken by farmers, landowners, any manager of land, local and state government, industries that use or manage land, and groups in the community that have a specific role or interest in land management (e.g. traditional owners, biosecurity groups, catchment, bushcare groups etc.).

This plan uses the term NRM in preference to 'landcare' to encourage ownership of the document by all land managers and professionals.

Landcare is primarily a community-based movement that carries out NRM. There are subtle differences between NRM and Landcare, and sometimes the two terms are interchangeable.

1.1 What the Plan covers

The Plan relates to the variety of natural resource management sectors and issues including soils, water, vegetation, biodiversity, and the activities that interact with these resources: agriculture, mining, recreation, conservation and land development.

For each sector the Plan starts to answer such questions as: 'what can be done to improve management of natural resources in the Hotham-Williams Catchment', and partly answers the question of 'how it could be done'.

The Plan does not answer questions such as 'in what priority order should we implement projects' or 'who should implement the projects'. These are best answered by a local community-based NRM body, working in partnership with other stakeholders such as the Peel-Harvey Catchment Council (PHCC) and others. The question of 'how will projects be funded' is also not answered, but some discussion of resources and funding is included in Section 11.

The Plan applies to all land tenure in the Catchment, including Freehold land, Crown Reserves and unallocated Crown Land.

1.2 Who is the Plan for?

The NRM Plan is being produced for all communities, community groups, government organisations and land managers of the Hotham and Williams Catchment. In particular, the Plan is designed to guide the work of a future community-based Hotham-Williams NRM committee or body.

Even though the Plan is being prepared by the Peel-Harvey Catchment Council (PHCC), it is the land managers and communities of the Hotham and Williams catchment that will make the Plan successful. The PHCC is committed to working with the Hotham-Williams communities to use the Plan to identify priorities for future investment in NRM.

1.3 The Hotham-Williams Community

Figure 1 is designed to illustrate the diversity of the Hotham-Williams Community. The community is in reality many organisations and groups of people drawn and connected to the area for a variety of purposes – to live, work and enjoy. The NRM Plan is designed to assist all communities of the catchment to better manage natural resources. It is also designed to help all communities work together to carry out natural resource management.

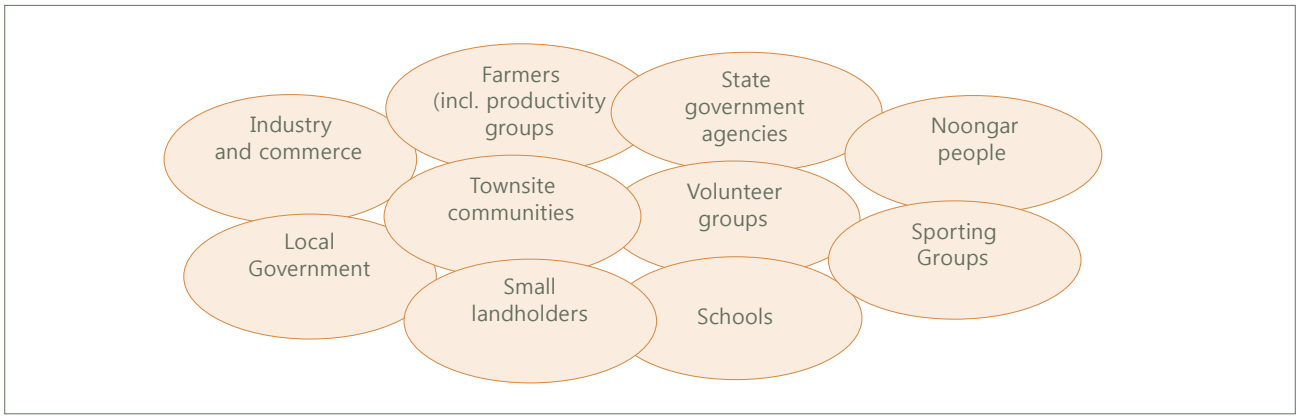

Figure 1: Major groups of the Hotham-Williams community

1.4 Background to NRM in the Hotham-Williams

The Hotham-Williams has a long and proud history of Landcare[1] and NRM.

> *"Over many years, even before the Decade of Landcare (1990 – 2000), local landholders, local governments and the wider community undertook practices to improve natural resources of the Hotham and Williams Catchment. During the Decade of Landcare these NRM projects were supported by a team of Community Landcare Professionals (CLCs) who accessed public and private funds and worked with local landholders, local governments and the community to deliver a number of significant NRM projects across the landscape".*
>
> (Peel-Harvey Catchment Council, 2013).

This work was supported by groups such as the East Yornaning LCDC, Wandering Productivity Group, Williams Landcare and the Boddington Farm and Landcare Group (to name a few).

Over this time (1990 – 2000's), programs such as the Western Power Greening Challenge and plantings of oil mallees made a significant impact on the landscape as well as the farmers and communities involved in the projects. The Greening Challenge alone included the planting and fencing of four (4) million trees and shrubs across the Hotham River Catchment.

With changes to government Landcare funding in the mid-2000's, organised community landcare activity received less financial support and the Hotham-Williams was left without professional Community Landcare Coordinators (CLC) after 2008. This had a significant impact on the local communities and organised NRM.

Today, groups with an NRM focus such as the Hotham Declared Species Group, Boddington Rivers Action Group, Friends of Reserves Boddington Inc., Williams Landcare and the Hotham-Williams Catchment Environmental Alliance (HWCEA) still operate, but need greater support.

In 2012/13, the HWCEA commissioned the Peel-Harvey Catchment Council to prepare a Business Case to assess the feasibility of re-employing a NRMO in the catchments. The recommendations of the study were that a NRMO should be employed with the support of a community-based NRM structure and guided by a NRM Plan (PHCC, 2013). Hence, this Plan has been prepared to guide future NRM work in the Catchment.

[1] The terms *Landcare* and *NRM* are often used interchangeably. In this Plan they can effectively be regarded as meaning the same. Landcare has a stronger connection to grass-roots community action.

2. The Hotham-Williams Catchment at a glance

The Plan covers all of the surface water catchments of the Hotham and Williams Rivers, an area of 573, 350 hectares located approximately 130 km south east of Perth (Table 1 &Figure 2).Together, the area forms the largest part of the Murray River catchment and makes up almost half of the Peel-Harvey Catchment.

The western third of the Hotham-Williams Catchment is contained within the Darling Plateau and is heavily forested (about 90%). The central and eastern thirds of the Catchment have been extensively cleared for agriculture (80% and 80% cleared respectively) except for large blocks of native vegetation that make up the Dryandra Woodland. The agricultural areas of the Catchment, sometimes referred to as the Western Wheatbelt, are amongst the most reliable and productive of all Wheatbelt Districts.

Table 1: Selected statistics related to natural assets (Statistics current to 2014, unless stated)

Hotham and Williams	
Area of Hotham-Williams Catchment (ha)	573,349
Area of Hotham River Catchment (ha)	429,662
Area of Williams River Catchment (ha)	143,687
Population (estimated, 2011)	4,500
Area of mapped native vegetation (ha)	186,550
Percentage native vegetation cover (%)	33%
Area of Subsystem in DPaW Estate (ha)	74709
Percentage of Subsystem in DPaW estate (%)	13%
Area of Subsystem in Conservation reserves (Conservation Pk, Nature Res. & National Park) (ha)	4610
Percentage of Subsystem in Conservation Reserves (%)	1%
Number of recorded threatened flora species (no.)	27
Number of recorded populations of threatened flora (No.)	100
Recorded number of threatened fauna species or species protected under International Agreement (no.)	40
Total length of mapped watercourses (km)	2912
Total length of waterways in good or near-pristine condition (2001)	217
Percentage of waterways in good or near-pristine condition (%) (2001)	7%
Area of land under rural production (2003) (ha)	435086
Percentage of Subsystem under rural land use (%)n (2003)	76%
Area under Mining tenement (ha) (2014)	208013
Percent under mining tenement % (2014)	36%
Value of agricultural production ($, 2006)	$129.3 million

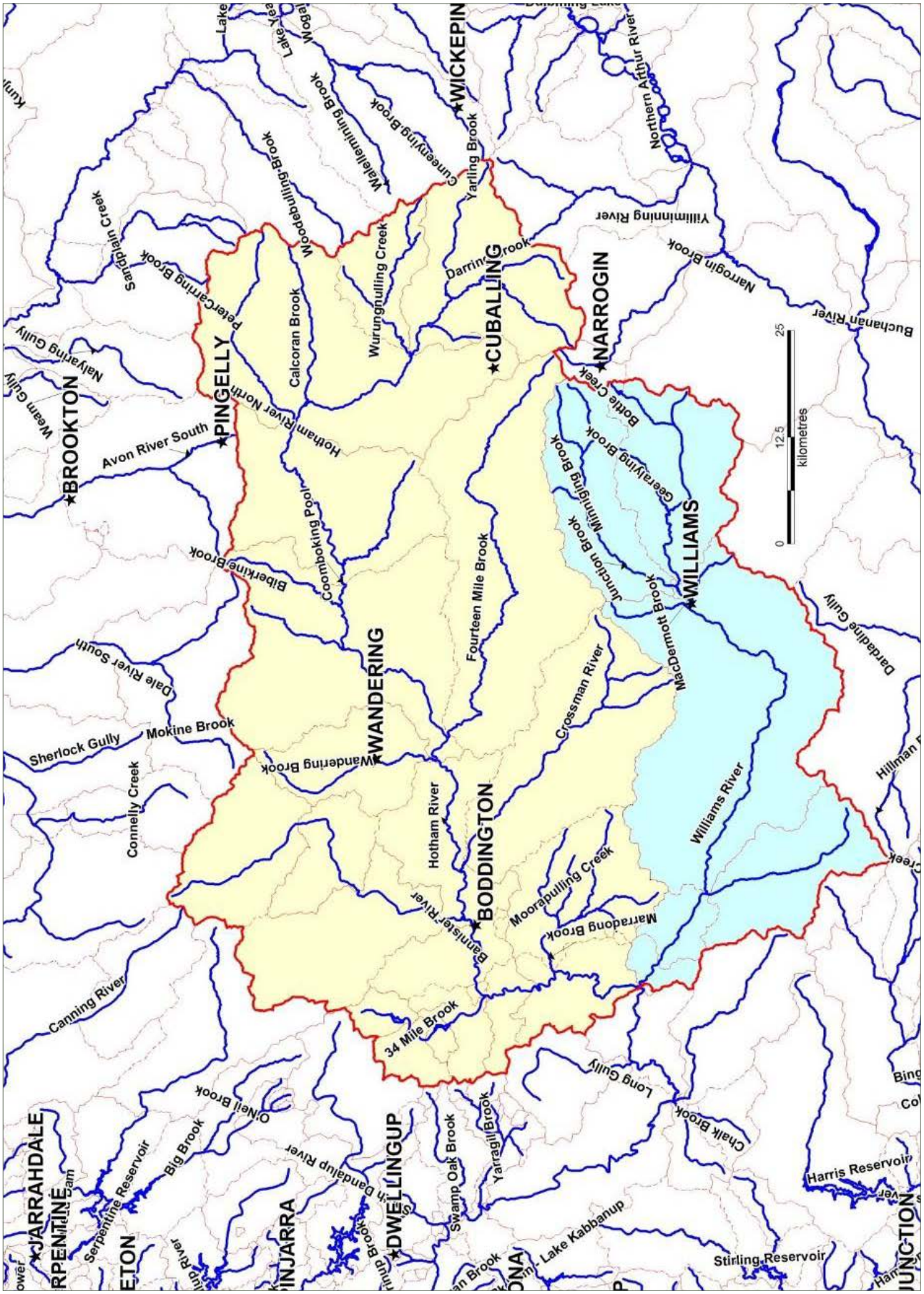

Figure 2: The Hotham (yellow) and Williams (blue) River Catchment and sub-catchments

2.1 Climate

The following brief discussion on climate complements the presentation of natural resources in Section 7 (soils, farmland and landscapes), Section 8 (rivers, creeks and subcatchments) and Section 9 (biodiversity). Climate shapes and influences all aspects of natural resource management and is of growing relevance to NRM given that the climate across the southwest of Australia, including the Catchment, is changing and is predicted to change further.

The Catchment's climate is generally described as Mediterranean, with most rainfall falling in the months of June to September, and highest temperatures occurring in the months of November to March. Average annual rainfall across the Catchment generally increases from east to west, with the annual average being 506.7 mm for Wandering (1998 – 2015).

The Catchment's climate is predicted to change, as parts of changes predicted for the south west of Australia. Climate modelling by CSIRO (2007)predicts a:

- decrease in winter rainfall in south western Australia of up to 15% by 2030, and further decreases into the future
- For the near future (2030), the annually averaged warming across all emission scenarios is projected to be around 0.5 to 1.2 °C above the climate of 1986–2005.

These two predictions are made with 'high confidence' by CSIRO (2007) and suggest that climate change trends that commenced in the 1970's are likely to continue in coming decades.

The drying and warming trends have significant implications for water availability, river conditions, biodiversity and land use, including agriculture. All future NRM programs and projects can assist the Catchment community adapt and be resilient to these drying and warming conditions.

2.2 Land use

By area, the main land uses in the catchment are cropping/grazing and conservation/State Forest (Table 2). By financial value, the most significant land uses are mining, industry, and transport.

While the land use figures are somewhat dated (2003) they are considered generally reflective of current land use, except for mining which has increased in area since 2003.

Table 2: Land use in the Hotham and Williams Catchment

Land Use Categories	Area(ha)	%
Cropping	428,132	74.7%
Conservation and natural	130,960	22.8%
Mixed grazing	5,711	1.0%
Industry, manufacturing and transport	1,497	0.3%
Mining (2015 estimated)	5,000	0.9%
Artificial waterbodies	576	0.1%
Horticulture	466	0.1%
Plantation	314	0.1%
Viticulture	250	0.0%
Intensive animal use	213	0.0%
Residential	99	0.0%
Total	**573,218**	**100.0%**

Land use statistics in Table 2 are based on 2003 Department of Environment data gathered as part of the Peel-Harvey Water Quality Improvement Plan

Land use case study: mining

In terms of dollar value, the most significant land uses in the Catchment are mining of gold, copper and bauxite which occur in the western areas of the catchment. In the 2010-2011 financial year the estimated the value of minerals mined and processed in the entire Peel Region was almost $3.4 billion, most of which is produced from the Hotham-Williams Catchment (Peel Development Commission, 2014).

The main mining operations are the Newmont Boddington Gold Mine and South32 Boddington Bauxite Mine, which together directly employ over two thousand people, many of whom live in the Catchment.

The Newmont Boddington Gold Mine is located 17 kilometres from Boddington and is projected to become the largest gold mine in Australia, producing both gold and copper. The mine's current expansion is envisaged to see production through to the year 2052.

The mining of bauxite by South32 (formerly BHP Billiton) occurs through a large north-south belt of the Catchment generally on the eastern side of the jarrah forest over both State Forest and private lands.

2.3 Local government

The Hotham-Williams Catchment include all or large parts of the Shires of Boddington, Cuballing, Wandering, and Williams, and lesser parts of the Shires of Narrogin, Wickepin, Pingelly and Collie (Figure 3).

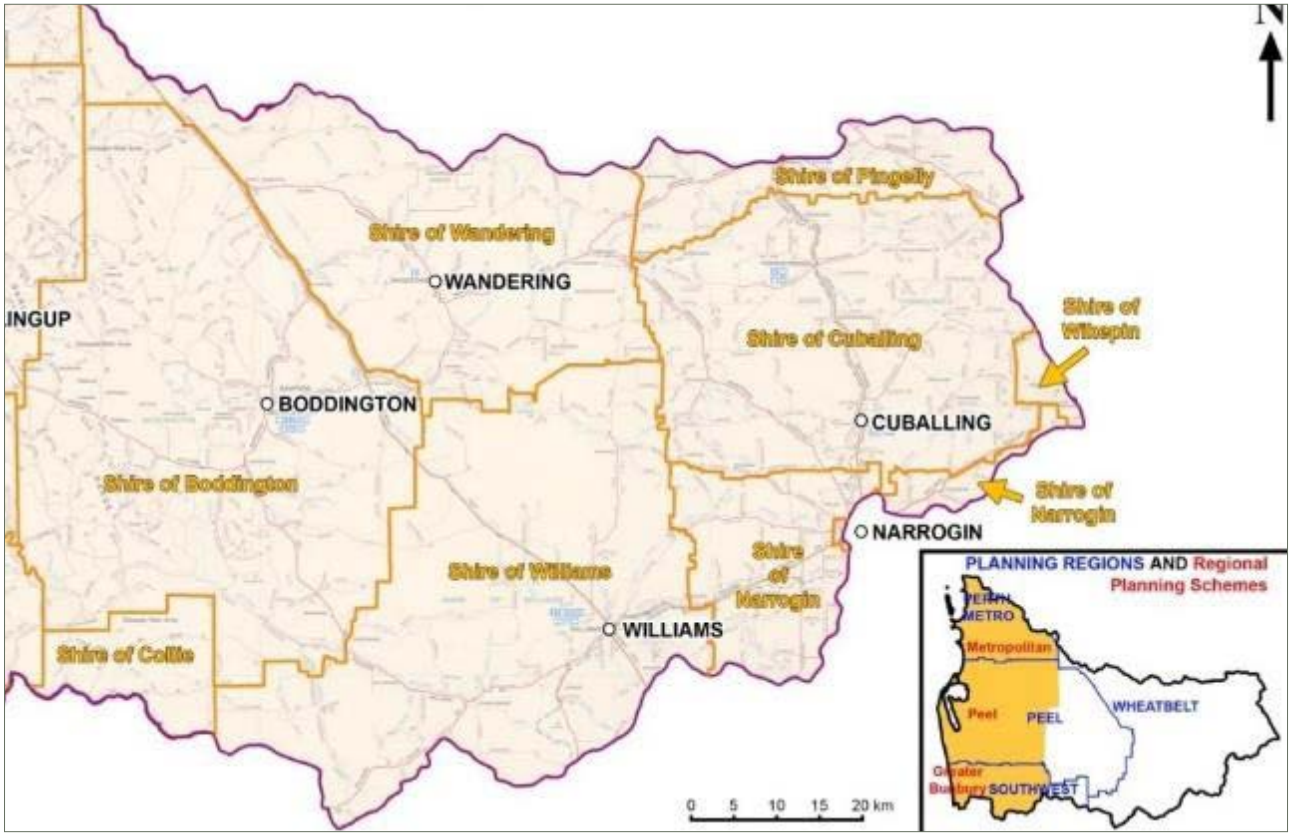

Figure 3: Local governments of the Hotham-Williams Catchment

2.4 Population and services

It is estimated that 4500 people live in the Hotham-Williams Catchment, spread across the townsites and districts of Boddington, Wandering, Williams, Cuballing, Popanyinning and Quindanning.Services and activities for the catchment community revolve around these towns as well as nearby Narrogin, Pingelly and Wickepin.

The townsite of Boddington, with approximately 1000 residents is the largest population centre in the Catchment. The Shire of Boddington, together with its Marradong Country alliance partners, has a Growth Plan to support a population increase of an additional 4000 people across Boddington, Wandering and Williams by 2050 (Hames Sharley 2012).

Most community activities are orientated around the local schools, sporting clubs, fire brigades, local events, local governments, and the support of farming. The communities of Boddington, and to a lesser extent Wandering, also have strong connections to mining.

Most people in the catchment associate most strongly with their local town or district. Links to other townsites or districts in the Catchment are numerous but secondary to people's association with their own town, district or local government. This is important to bear in mind when engaging the local community in the NRM Plan and the delivery of NRM projects.

Community connections to natural resources are direct, in terms of farming activities, farm water supply, and the use of natural areas for recreation (such as State Forest and Hotham River). It is estimated that over half of the Catchment's residents live on a farm or property over 40 hectares.

3. How the Plan is being developed

This Plan has been prepared to stimulate community involvement in NRM initiatives in the Hotham-Williams Catchment. It has been prepared through a process of targeted community consultation, literature review and a more comprehensive assessment of key reference documents. The process is summarised in Figure 4.

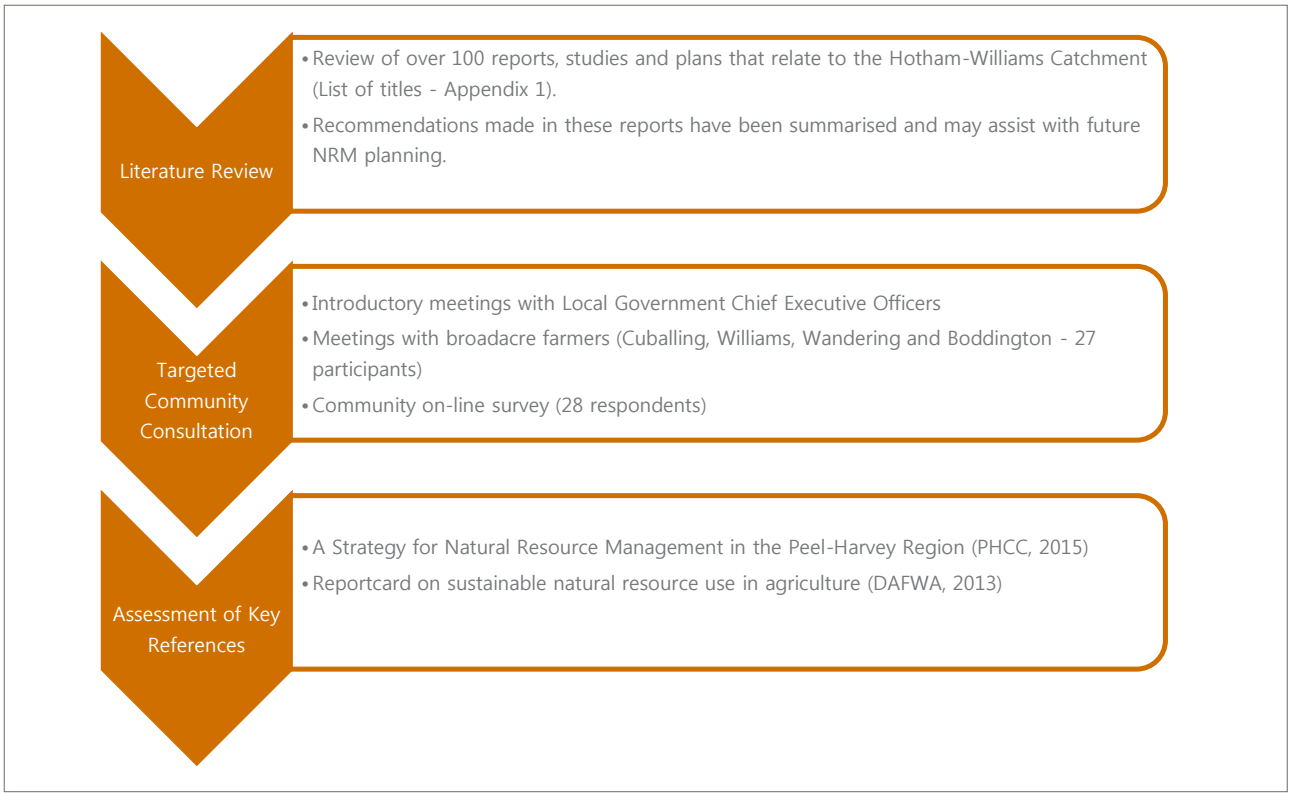

Figure 4: How information was collected to prepare the Plan

Figure 5: Meeting with farmers, Cuballing, September 2014

Targeted consultation has focused on the local community and landholders (e.g. Figure 5). Some preliminary discussions with local government, state agencies and industry representatives have also occurred. As the Plan is further developed additional consultation will occur with the community, as well as local government, State Government and industry.

The results of community consultation to date are used in Sections 7 to 10 and an overview is provided below.

3.1 Community survey

A community survey was conducted in late 2014 to gauge the community's views in regard to natural resource management. All landholders in the Catchment were invited to participate in the survey, and a total of 28 responses were received. Figure 6 provides a summary of responses. While the results should not be regarded as representative of the cross-section of views in the Catchment (given the relatively small number of respondents) they may suggest a high importance placed on feral animal management, rivers and creeks, fire management, soil health, weeds and bushland management.

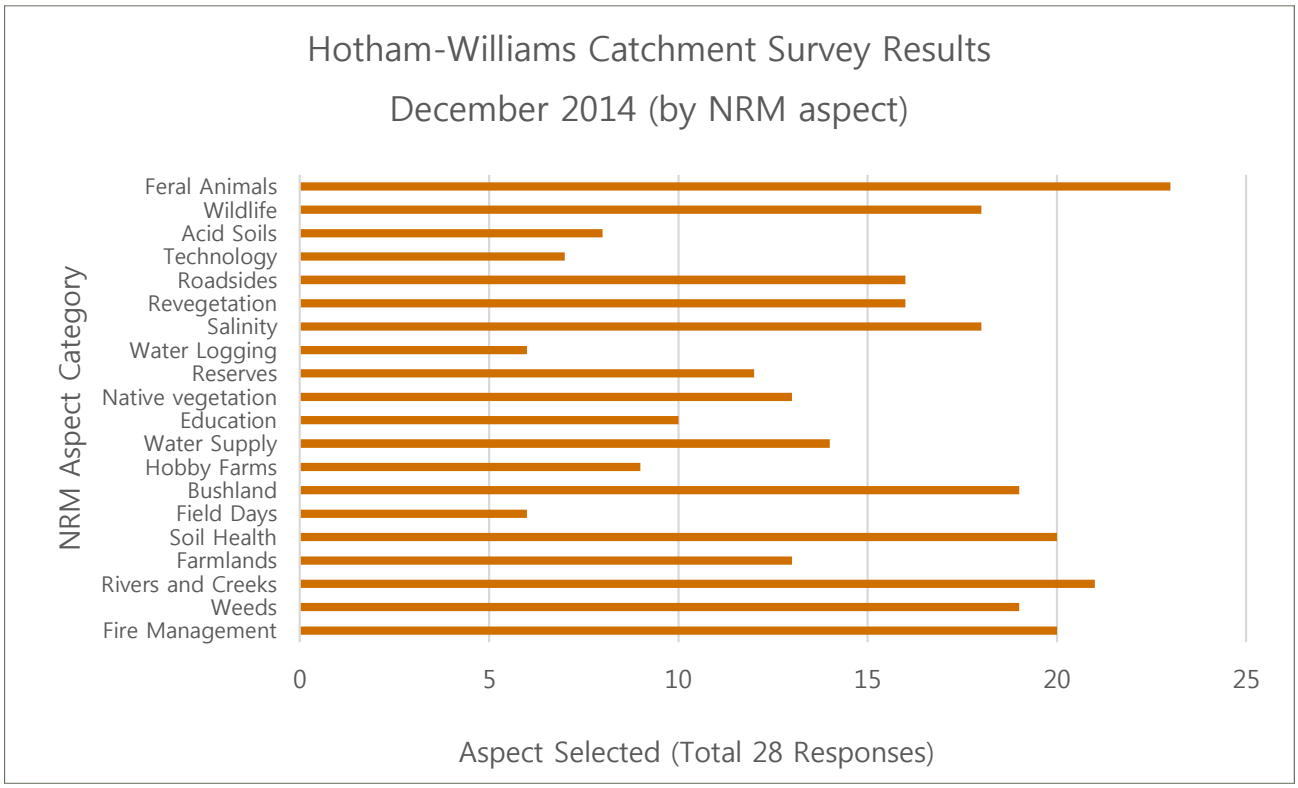

Figure 6: Hotham-Williams Catchment Survey results

3.2 Local Government Strategic Community Plans

Another perspective of community priorities, including NRM, is provided through an analysis of Strategic Community Plans prepared by local governments of the Catchment. In the most recent Community Plans for eight of the major local governments of the Catchment, the most significant NRM issues were habitat protection, regeneration and rehabilitation, and recognition of heritage and culture. These issues were generally ranked as second priority following economic development.

3.3 Relationship to the Peel-Harvey Regional NRM Strategy

The Plan is a voluntary initiative designed to encourage the increased involvement of all stakeholders (landholders, community groups, government and industry) in natural resource management in the Hotham-Williams.

The Plan has been written in a way so as to complement the Regional NRM Strategy, prepared by the Peel-Harvey Catchment Council in 2014/15on behalf of the regional NRM community. The regional strategy, Binjareb Boodja Landscapes 2025, sets directions for NRM for the whole Peel-Harvey Catchment (Figure 7), including the Hotham-Williams Catchment (Peel-Harvey Catchment Council, 2015). The Objectives and Goals of Binjareb Boodja Landscapes 2025 are presented in Appendix 2.

Figure 7: Peel-Harvey Catchment

Alignment of Hotham-Williams projects with the regional NRM strategy may increase the likelihood of resources being allocated to the Catchment. Accordingly, all of the proposed objectives in the Plan align with those of the Regional Strategy (Appendix 3). As NRM projects are developed by the Hotham-Williams community to implement the Plan, they should also support achievement of the Regional Strategy objectives. Strong communication links should be formed between the Hotham-Williams Community and Peel-Harvey Catchment Council to ensure strong alignment of implementation priorities (Figure 8).

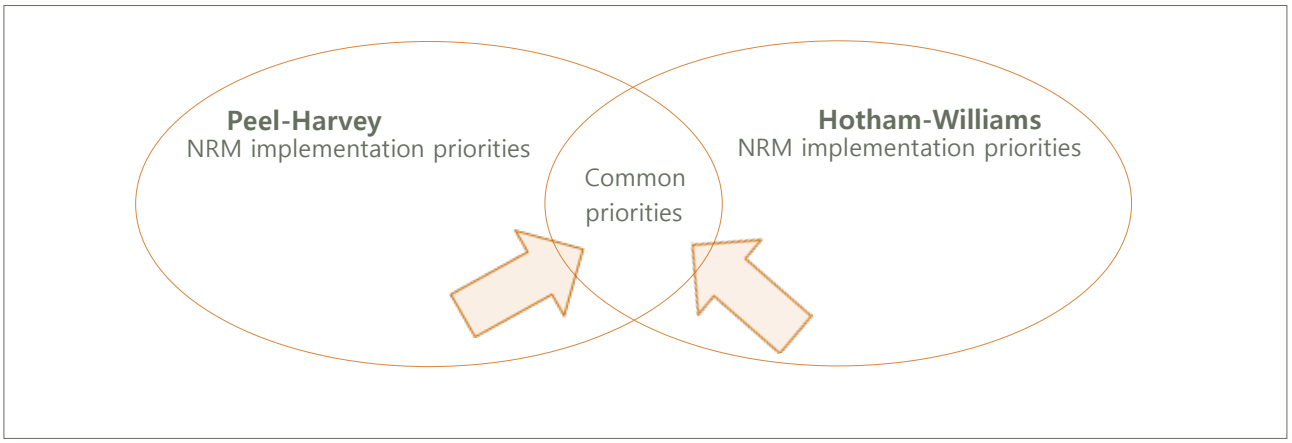

Figure 8: Alignment of implementation priorities at the regional and Hotham-Williams

NRM, NRM Plans and the law

This Plan is a guidance document to encourage greater community participation in land management. The Plan does not focus on the legislative responsibilities that landowners and government have to manage and protect natural resources. Instead, it encourages voluntary practices and activities that can improve the condition of natural resources.

NRM and Landcare are supported through various state and federal government initiatives and policies. The Plan has been prepared in recognition of these initiative and policies, as well as numerous other local government, community and industry initiatives.

In some instances, implementation of the Plan can make use of legal tools to assist the community achieve NRM goals (e.g. control of pests, weeds and diseases under the Biosecurity and Agricultural Management Act 2007). Hence, implementation of the Plan may also complement (but not replace) existing legislation such as:

- Biosecurity and Agricultural Management Act 2007
- Wildlife Conservation Act 1950
- Environmental Protection Act 1986
- Soil and Land Conservation Act 1945
- Rights in Water and Irrigation Act 1914
- Environment Protection and Biodiversity Conservation Act 1999 (Cmwlth.)

B

Vision, Goals & Objectives

4. Vision

The NRM Plan is based on a proposed Vision and Objectives so that the community can see the long-term aims of the Plan.

The proposed Vision and Objectives are yet to be considered by the Hotham-Williams community. Settling on a Vision and Objectives can be challenging, and so it is suggested that representatives of the community be convened to discuss a number of options.

Visions statements should paint a picture of what the catchment's natural resources will look like in the long term. They provide guidance and act as a 'test' of future project ideas and opportunities.

4.1 Options for Vision statements

The following options for vision statements are for the community's consideration. A preferred vision statement should be considered and supported by any future community-based NRM Management Body/Structure for the Catchment.

VISION OPTION 1

The Hotham-Williams community and economy are strong and profitable based on active management of our soil, water and biodiversity resources across the landscape.

VISION OPTION 2

Hotham-Williams has successfully integrated natural resource management into all farming and land management practices across the landscape. The community and local economy are strongly connected to, and support, NRM and vica-versa.

VISION OPTION 3

The Hotham-Williams Catchment is an area renowned for its innovative and sustainable farming and land management practices, a landcare-aware community, and the active management of its rivers, creeks, bushland and native vegetation.

VISION OPTION 4

Communities of the Hotham-Williams Catchment are sustainably using, farming and managing soil, land and water resources and has turned around the health of its rivers and creeks, and protected and connected its bushland and native vegetation.

5. Proposed Goals and Objectives NRM Plan

The following Goals and Objectives are proposed to guide future NRM investment in the Catchment. Each of the five Goals is given meaning through a number of Objectives. The Objectives can be made into SMART objectives (Specific, Measureable, Achievable, Realistic and Timely) through further work with the Hotham-Williams Community. Future NRM projects should sit comfortably under one or more Objectives of the Plan.

Natural Resource Objectives	**Goal 1. Healthy productive soils and landscapes** a) Soils are actively managed to improve health, sustain land uses and reduce off-site impacts b) Biosecurity threats to farms and production areas are actively managed. c) Revegetation areas are protected and actively managed. d) All water resources are protected and used wisely.
	Goal 2. Rivers, creeks, valley floors and subcatchment are managed and restored a) Degraded areas are actively managed to restore natural functions, and production where appropriate. b) Rivers and creeks are actively restored and managed for their water supply, ecological, landscape, social and cultural values. c) Focused management of sub-catchments is encouraged to restore river and creek water quality for water supply, ecological, landscape, social and cultural values. d) Management of stormwater is supported and improved, including townsite stormwater management.
	Goal 3. Biodiversity, native vegetation and habitats are conserved a) Bushland, native vegetation and habitats are protected, restored and managed for their biodiversity values and long-term health. b) Biosecurity threats to biodiversity are managed to protect local biodiversity and water resources.
	Goal 4. Community and cultural values are understood and celebrated a) Cultural values of natural areas are acknowledged and managed appropriately (Aboriginal and European cultural heritage) b) Opportunities for sustainable eco-tourism and recreational usage of natural areas are embraced.
Community Support objectives	**Goal 5. Community is engaged, informed and supported to manage natural resources** a) All sectors, including community, government and industry are actively involved in catchment management of natural resources. b) Natural resource managers are supported to better understand and manage natural resources. c) Natural resource managers work with others to achieve catchment-scale change (co-ordination and facilitation) d) The community's understanding and appreciation of natural resources, and Landcare activity, is increased.

Prospective Projects

6. Introduction

Sections 7 to 10 present prospective projects to achieve Goals 1 to 4 of the Plan. These projects are designed to address 'what can be done to improve management of natural resources in the Hotham-Williams Catchment', and in part 'how it could be done'.

To develop the prospective projects, Sections 7 to 10 cover:

- What are the key natural assets, including those of special importance to the community?
- What are processes threatening the continued use or presence of these resources?; and
- What other key matters of importance (to the community) affect natural resource management?

These three questions are answered below under the categories of:

- Soils and farms (Goal 1, Section 7)
- Rivers creeks, valleys and subcatchments (Goal 2, Section 8),
- Biodiversity, native vegetation and habitats (Goal 3, Section 9)
- Community and cultural values (Goal 4, Section 10).

The prospective projects have been largely developed from the ideas and views expressed during targeted community consultation.

The prospective projects designed to address Goal 5 are based on feedback received during community consultation and wider consideration of the long-term needs of NRM in the Catchment.

Interconnection

Key principles of NRM are the interconnectedness between natural resources and an integrated approach to how these resources are managed. While Sections 7 to 10 address natural resources under four major headings and appear to compartmentalise natural resources, it is important to be mindful that.....

NRM exists to manage natural resources that are part of an ecosystem and each natural resource is part of a management system, under the care and control of many land managers.

7. Soils, farmland and landscapes

7.1 Background

The location, soils and climate of the Hotham-Williams makes it one of the most productive areas of the Wheatbelt. Assisting landholders to manage the area's soils, along with other natural resources on farms, is one of the Plan's priorities. Figure 9 summarises the key assets, threats and matters of importance related to the area's soils and agricultural production capability. Note that there is significant cross-over between achievement of 'soils, farmland and landscapes' Objectives and the achievement of Objectives related to rivers, creeks and valleys (Section 8) and biodiversity (Section 9).

Key natural assets

- Soil-landscape systems under agricultural production (as mapped by the Department of Agriculture and Food WA)
- Water supplies
- Established safe, clean food production systems
- Remnant vegetation on farms, rock outcrops, and low production areas

Threats and threatening processes

- Soil acidification
- Soil water repellence & compaction
- Impact of climate change on farm water supply
- Salinization/waterlogging
- Soil erosion (wind and water)
- Feral animals, including feral pigs and rabbits
- Weeds, including Cape Tulip and Juncus acutus in valleys
- Loss of productive land to salt/salt outbreaks
- Management of kangaroo populations
- Over-grazing of remnant vegetation (esp. ridgeline vegetation
- Isolated pockets of bush leading to decline of species

What's important to the community

- Sustainability (in all senses)
- Help farmers farm.
- Farm water supply/fresh water
- Water management – catching and using water where it lands.
- Soil health
- Biosecurity
- Continuation of the work of the Hotham-Williams Declared Species Group
- Revegetation for multiple benefits
- Better management of farm remnant vegetation
- Small landholders (impact on broadacre farming)
- Fencing to protect and manage remnant vegetation
- Fencing of salt affected areas
- Responsible management
- Re-fencing of remnant vegetation
- Management of neighbouring crown reserves (e.g. river reserves)
- Loss of paddock trees
- Significant past revegetation efforts

Figure 9: Soils, farmland and landscape assets, threats and important considerations

Soils and landscapes

The Hotham-Williams Catchment occurs within two soil-landscape systems of the Darling Plateau, described as the Eastern Darling Zone and the Southern Zone of Rejuvenated Drainage (Tille et al, 1998) (Figure 10).

The Eastern Darling Range Zone comprises undulating to rolling terrain with sizeable portions of the original plateau surface remaining with some broad poorly drained flats. Valleys formed by river dissection are 20 - 100 metres deep with narrow valley floors.

The Southern Zone of Rejuvenated Drainage occurs between the Eastern Darling Range Zone and the 'Meckering Line', which represents the inland limit of active surface drainage. The Zone consists of an erosional surface of gently undulating rises and low, sometimes rounded hills. Small areas of lateritic remnants with breakaways are also included. Valley floors are relatively broad with stream channels that flow in most years.

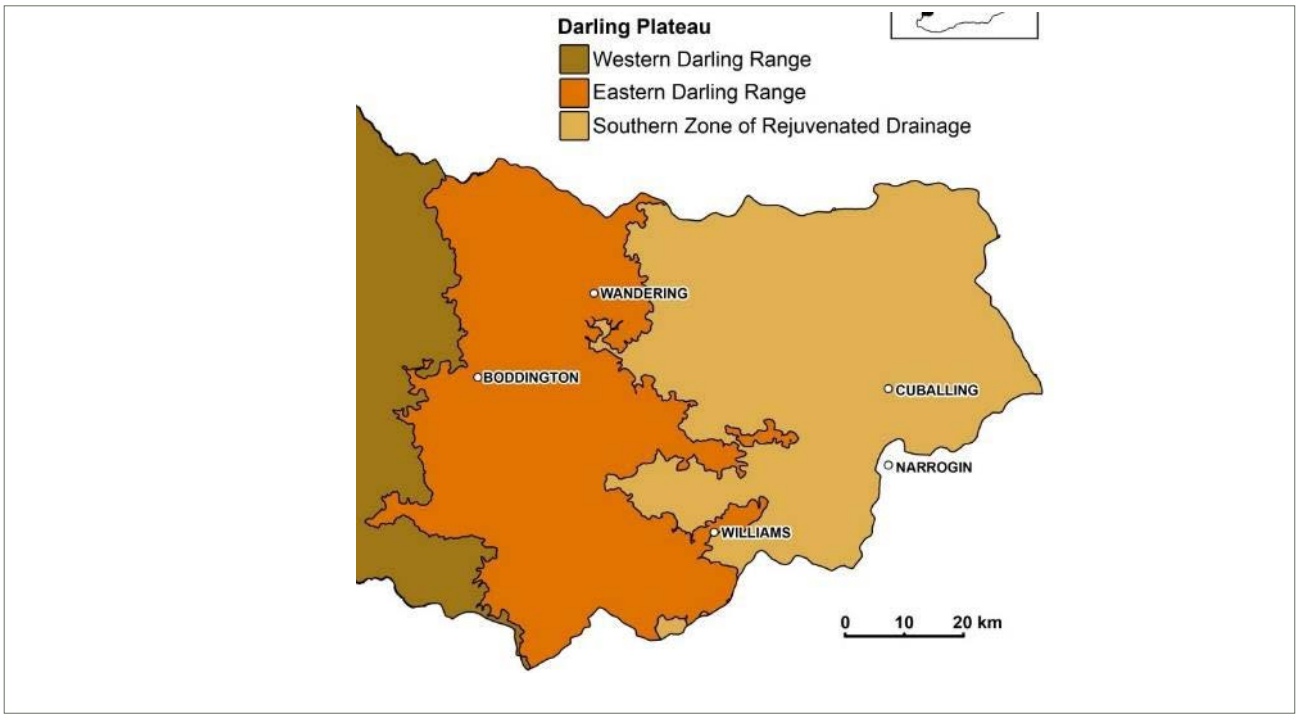

Figure 10: Major landscape zones, Hothan-Williams

Farmlands

Perennial native vegetation has been cleared from 386,799 hectares (67%) of the Catchment to enable cropping and grazing and other minor land uses. This has led to an increase in recharge of groundwater aquifers, rising water tables and the salinization of some land, generally valley floors. Saline seeps are also found on hill slopes in association with geological faults and dykes (Land Assessment, 2005).

Over the past 20 years, the Catchment's farming community has largely learnt to work with the problem of salinization of land and its impact on production. Many trees have been planted in recharge areas or locations where salt has appeared, and some effort has been made to make productive use of salt-affected land. Further opportunities exist in this area.

Generally, while many groundwater aquifers have reached a new post-clearing equilibrium in the western third of the Catchment, new areas of dryland salinity are still appearing in the Catchment, even where works and revegetation have been carried out in recharge and discharge areas. Midslope salinization continues to be a management concern for landholders in parts of the Catchment.

The acidification of soils, largely due to the use of ammonium-based fertilisers such as superphosphate, is a significant issue on cropped land, especially in the central and eastern parts of the Catchment. The addition of lime to increase soil pH is now widespread and is often limited by farm budgets.

Erosion of soils is now a lower risk due to the use of no-till farming methods, the retention of stubble or the complete removal of grazing from farming operations. Erosion of soils along ridgelines and along watercourses is still likely to be an issue in some areas.

The importance of soil compaction and water repellence on a Catchment-scale is yet to be determined.

A summary of the status and condition of soils of the Hotham-Williams Catchmentis provided in Table 3(DAFWA, 2013).

Table 3: Status and condition summary of soil parameters in the Hotham-Williams

Soil asset characteristic	Status/risk	Trend
Soil acidity	Poor	Likely deterioration
Wind erosion	Moderate risk	Variable
Water erosion	Moderate risk	Stable
Soil organic carbon levels	Moderate	Measures not available
Soil compaction	Moderate risk	Stable
Water repellence	Poor	Likely deterioration
Dryland salinity	Moderate risk	Variable
Nutrient status (phosphorus)	Well in excess	Stable
Nutrient export	Not assessed	

Many farming operations in the Hotham-Williams, like elsewhere in the Wheatbelt, are getting larger. Farmers are time-poor, and looking for measures that will increase both productivity and sustainability of their operations. Average farm size in the Western Central Wheatbelt is 2650 ha (2133 ha arable) (D'Emden, Llewellyn & Flower, 2009).

Soil and landform mapping to support NRM

A variety of regional-scale landform and soil-landscape mapping is available for the Hotham-Williams Catchment. Soil-landscape system mapping has been undertaken by the Department of Agriculture and Food WA (DAFWA), with a licenced digital copy held by the PHCC.

Alternatively, landforms of the Catchment have been mapped by McArthur, Churchward and Hick, (1974) into various soil units under the categories of lateritic landforms, erosional land forms, and depositional landforms.

More recently, DAFWA has released mapping of the condition of land resources of the south west of Australia, including the Hotham-Williams Catchment. Check out https://www.agric.wa.gov.au/soil-constraints/report-card-south-west-western-australia

All of the above mapping has been undertaken at a regional scale, and as such is useful for district scale projects, but of more limited value for local project planning.

Through consultation for this Plan, landholders have expressed an interest in increasing their knowledge of soils and soil management.

A significant change to broadacre farming practices in the catchment has been the uptake of no-till seeding methods since the mid-1990's. As at 2008, ninety-three percent (93%) of growers were using no-till practices over their entire operations (D'Emden, Llewellyn & Flower, 2009).

More recently, there has been some consideration and trialling of deep ripping and spading of cropping areas as a means of combatting non-wetting soils, and increasing the effectiveness of liming.

Another trend on broadacre farms over the past twenty years has been a decline in sheep numbers, more so in the central and eastern parts of the Catchment. Some farms which previously operated as cropping-grazing systems are now cropping only.

While intensive agricultural enterprises take up a small part of the catchment by area, their economic contribution is significant and in some parts, growing (get pers. comm.). The main intensive operations are piggeries, vineyards, and feedlots. Intensive agriculture provides economic and employment benefits to the community, and creates additional opportunities and risks for natural resource management.

7.2 Prospective projects: soils, farmland and landscapes

The prospective projects in Table 4 are to achieve Objectives under Goal 1.

Goal 1: Healthy productive soils and landscapes

Objective a)	Soils are actively managed to improve health, sustain land uses and reduce off-site impacts.
Objective b)	Biosecurity threats to farms and production areas are actively managed.
Objective c)	Revegetation areas are protected and actively managed.
Objective d)	All water resources are protected and used wisely.

Table 4: Prospective projects – soils, farmland and landscapes

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
1.1.	Understanding and managing soil health for production and sustainability	Increase landholder's understanding of factors influencing soil health, and options to manage soil acidity, waterlogging, compaction, water repellence and other soil health parameters.	• Field days with experts in relation to soil acidity, waterlogging, water repellence and compaction • Tapping into related projects in the SWCC and Wheatbelt regions (e.g. SWCC's Soil Health on Focus Farms project) • Promote existing field trials • Identify and promote benchmarks for soil health (e.g. soil carbon levels etc.)	• Soil health underpins farm productivity and has wider benefits, such as the prevention of erosion and degradation of waterways and bushland. Increased understanding of causes of soils acidity, waterlogging etc.may lead to different management approaches in the future	Entire catchment, with focus on Wandering, Cuballing and Williams.	Primary: Broadscale farmers Secondary: Small lot landholders
1.2.	Support farmer forums/on-line forums to share farmer knowledge and results of farm trials related to soil and land management	• Increase the effectiveness of landholder's budgets to manage soil health parameters for production and sustainability. • Share the knowledge and experience of Catchment farmers and other land managers	• Convene or support a farmer forum (e.g. on-line forum) to promote existing field trials, field days and results of other farm trials. • Promote or conduct a comparative trial of new products and practices to manage soil health. For example, new water repellence products available, liming techniques, species to use in restoration of salty waterlogged areas etc. • Report and circulate results, including through field days etc.	• Dissemination of the results of trials and research is often patchy and some farmers may require assistance to access results and new information • New products are being released onto the market which may make management of water repellence more cost-effective. Reducing water repellence has productivity and ecological benefits as it reduces nutrient and soil runoff into waterways.	Entire catchment, with focus on Wandering, Cuballing and Williams	Primary: Broadscale farmers
1.3.	Awareness Raising of Carbon Farming Issues	• Raise landholder's awareness of carbon farming options including soil management techniques, pasture management, and environmental plantings.	• Ensure local landholders are provided access to field days and information materials	• Carbon farming activities provide farmers and land managers with the potential to benefit financially from reducing carbon pollution while at the same time improving resource management.	Entire catchment	Primary: Broadscale farmers

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups

1.4.	On-farm revegetation for multiple benefits	• Encourage and support farmers to consider, plan and implement on-farm revegetation and restoration of areas which are under-productive.
		• Provide additional feed sources for stock, plantings for farm timber, biodiversity, or water management.
		(Project 1.4 complements Project 3.2 Fencing Remnant Vegetation)
			• Support farmers to plan, fence and implement targeted on-farm revegetation for the following purposes:
			  • Stock feed
			  • Stock movement and management
			  • Windbreaks that connect patches
			  • Revegetation of eroded and degraded hilltops
			  • Revegetation of laneways
			  • Lowering of water tables
			  • On-farm timber use.
			• Project delivery may be packaged as part of whole-farm planning.
			• Co-funded on-ground projects
				• On-farm revegetation has lost some appeal due to the massive revegetation exercises in the past (fatigue) and the absence of markets for timber products (e.g. oil mallees). However, there is some appetite for targeted revegetation for specific purposes. This revegetation is to improve farm productivity and viability (e.g. stock feed plantings)	Entire catchment	Broadacre farmers

1.5.	Managing upland or mid-slope salt outbreaks	• Provide assistance to landholders to determine the causes and characteristics of salt-affected areas, and manage sites	• Identify salt-affected areas across catchment (through rapid regional assessment process and landholder EOI process • Assess water quality of mid slope outbreaks (e.g., pH) • Support remediation works, which may include revegetation and/or use of perennial crops.	• Salt seeps are appearing midslope and are impacting on productivity. • Need a greater understanding of the seep's water quality for ecological and productivity purposes	Entire catchment	Broadacre farmers, small lot landholders

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups

1.6.	Strategic biosecurity program (agricultural component)	• Develop a strategic agricultural weed control program.
		• Develop a strategic pest animal control program
			• No project defined as yet:
			• Community is not ready to establish a Recognised Biosecurity Group, however weeds and feral animals are high on their agenda. For example, feral pigs continue to be a spot-problem coming out of State Forest around Boddington and parts of Wandering districts. Community needs assistance to mobilise efforts to address key problems when and where they occur.
				• A strategic, targeted approach to biosecurity is required to support current landholder and community efforts.
				• Target species include:
				  • Feral pigs
				  • Feral cats
				  • Foxes
				  • Cape tulip
				  • Cottonbush
				  • Weeds on roadsides
					Entire catchment (or selected areas as determined)	DPaW, DAFWA, landholders, Local Govt., Boddington Friends of Reserves.

1.7.	Sharing experiences in in relation to regional production, including practices to improve sustainable production.	• Encouragement of regional production groups and networking. • Increase awareness among farmers of the new practices, including effective control of crop pests and diseases.	• Online forum for farmer networking and discussion. • Link in with field days and online forums • Linked to Project 1.2	• Cross-over between production and NRM build community and provides new opportunities for uptake of new practices	Entire catchment	Broadacre farmers
1.8.	Maintaining farm water supplies	• Increase on-farm water security for areas where supplies are reduced through salinity, changes in pH (acidity) or rainfall decline.	• Use an EOI process to gauge farmer interest in the project. Project will help farmers to identify solutions, and where possible fund improved water supply protection.	• There may be an increase in the percentage of farm dams going salty due to lower rainfall and reduced runoff (minimum tillage methods)	Wandering and Cuballing	All residents, including farmers

7.3 Explanatory notes: Projects 1.1 to 1.8

Projects under Goal 1 encapsulate four aspects of NRM that have been often raised through the community consultation period, and often associated with agriculture and farmland, both large and small lots:

- Soil management and health
- Biosecurity – as related to agriculture
- Management of revegetation
- Water resource protection and availability

All of the projects under Goal 1 can be closely linked to agricultural production and other direct land uses in the Catchment (e.g. mining, townsite development).

While the projects under Goal 1 have been framed as largely stand-alone projects, they can be packaged or combined with other projects under Goal 1 or other goals. This will vary as resourcing opportunities are made available.

There are close links between Projects 1.1, 1.2, 1.3 and 1.7 which are broad projects to increase landholder's knowledge and access to local information on soil management and disease/pest management. The thrust of these projects is to increase access to knowledge and information, and not necessary create new knowledge (e.g. increase landholder's awareness of field days, existing trials and on-line forums). A similar approach should apply to Projects 1.3.

Projects 1.4, 1.5, and 1.8 are largely distinct projects to address specific concerns raised through the consultation process: management of on-farm revegetation, mid upland/mid-slope salt outbreaks, and farm water supplies.

Project 1.6 (Strategic biosecurity program) is a high-level project designed to provide coordination and policy support to existing and future initiatives to manage biosecurity threats to agriculture (and the environment – Project 3.5).There are number of community efforts to control weeds, feral animals and other pests in parts of the Catchment, and most landholders are actively managing pests and weeds on their properties. However, in light of changing government policies related to biosecurity management, there is no operative landscape-scale partnership between the community and government which facilitates coordinated efforts to control pests and weeds.

The formation of a Recognised Biosecurity Groups by the Catchment community under the Biosecurity and Agricultural Management Act (2007) may form part of the implementation of Project 1.6.

8. Rivers, creeks, valleys floors and subcatchments

8.1 Background

There are 2912 km of mapped watercourses in the Hotham-Williams Catchment. Only 7% of these watercourse reaches have been assessed to be in good or better condition (Figure 12) (Hamilton, 2002).

The Hotham and Williams Rivers, and their confluence, the Murray River, are one of the few major river systems of the Perth and Peel Regions that have not been dammed. Both the Hotham and Williams Rivers were once fresh, but are now saline or brackish due to the extent of vegetation clearing.

The importance of rivers and creeks for their social and ecological values, and management of river corridors is an issue of interest and concern raised frequently in community consultation. Rivers and creeks connect farms, people and towns and are a common element that binds the various communities of the Hotham-Williams. Their role in maintaining the area's biodiversity is likely to be significant. The condition of rivers and creeks is symptomatic of how water and land are managed throughout the catchment.

Key natural assets

- Hotham, Williams, Crossman and Bannister Rivers
- Creeks such as Fourteen Mile Brook
- River pools such as Ranford Pool
- River reaches such as Hotham River around Pumphreys Bridge
- Yornaning Dam
- Valleys on farmland, various conditions

Threats and threatening processes

- Salinization and acidification
- Loss of productive valley areas to waterlogging and salt
- Erosion of banks and sedimentation
- Insufficient management of river reserves
- Drying climate, less water in river pools, less recharge of aquifers
- Lack of water recycling and/or catching rainfall
- Weed infestation such as Juncus acutus, Bridal Creeper and Typha
- Uncontrolled grazing and related impacts such as loss of understorey
- Loss of native species, such as native fish and riparian fauna.
- Poorly planned stormwater management in towns or roadside drainage
- Agricultural clearing
- Risk of fire in river corridors

What's important to the community

- Fencing of river and creek corridors
- Better management of public river Reserves
- Control of weeds in priority areas and high conservation areas
- Control of Juncus acutus
- Feral animal control
- Restoration of degraded areas to return productivity and environmental values
- Fire management of river corridors

Figure 11: River, creeks and valley assets, threats and important considerations

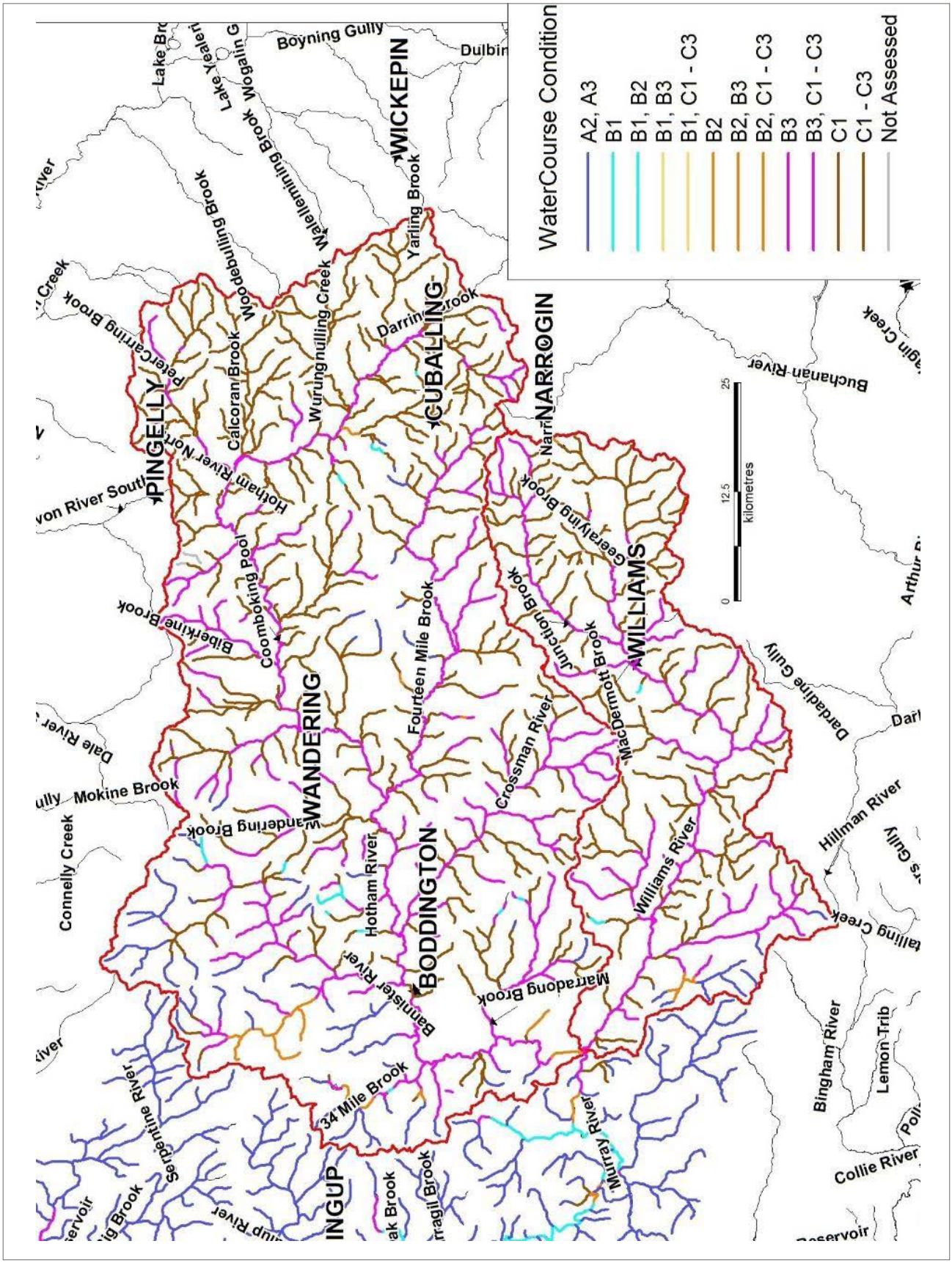

Figure 12: Watercourse condition rating as assessed in 2001 using the Pen & Scott (1995) methodology

8.2 Prospective projects: rivers, creeks, valley floors and subcatchments

The prospective projects in Table 5 are to achieve Objectives under Goal 2.

Goal 2: Rivers, creeks, valley floorsand subcatchments are managed and restored

Objective a) Degraded areas are actively managed to restore natural functions, and production where appropriate.

Objective b) Rivers and creeks are actively restored and managed for their water supply, ecological, landscape, social and cultural values.

Objective c) Focused management of sub-catchments is encouraged to restore river and creek water quality for water supply, ecological, landscape, social and cultural values.

Objective d) Management of stormwater is supported and improved, including townsite stormwater management.

Table 5: Prospective projects - rivers, creeks and valley floors

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
2.1.	Fencing river and creek corridors	• Protect river and creek banks and beds • Restore and rehabilitate riparian habitats • Enable farmers and other landholders to control stock access to rivers and creeks (Project 2.1 is closely linked to Project 2.6)	• Assistance package to farmers and local governments to erect fencing on rivers and creeks. • Should include weed control, restoration and revegetation components to enable long-term viability • Co-funded on-ground projects	• During consultation process to prepare the NRM Plan, landholders have expressed an interest in restoring the vegetation that is already present, rather than planting new areas.	Entire catchment	Broadacre farmers, small lot landholders
2.2.	Assessing river condition and health (selected river reaches)	• Determine key aspects of the health and condition of the Catchment's major Rivers, or selected river reaches. • Findings are to guide River Action Plans and river restoration works (Projects 2.2, 2.3 and 2.8 are closely linked)	• Use existing river studies by industry, government and community to frame study objectives. (e.g. use of biological indicators of river health). • Establish baselines to identify the 'what' and 'where' of river condition and health.	• The condition of the Catchment's major river systems is of concern to the community. • There is no recent study which presents an accurate picture of overall river health. • Friends of the Reserves – Boddington has quarterly water test results of up to 17 sampling locations between Matchbrook Road and Albany Highway, Crossman from April 2001 to present (ongoing activity). Test results cover water body temperature, pH, EC & NTU (Greg Marston, pers. comm.).	Major rivers	PHCC, community, Research organisations, industry, Local Govt., DoW and Water Corporation

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
2.3.	Prepare River Action Plans for key river reaches	• Create plans that are implementable, scientifically based and supported by the community. (Projects 2.2, 2.3 and 2.8 are closely linked)	• River Action Plans identify key areas where restoration works are required. • Use results of Project 2.2 (above) to guide the Plans	• River Action Plan will ensure that resources to improve river health are allocated to the most effective works and activities	Major rivers	All stakeholders
2.4.	Restoring key river pools	• Restore a number of pools in the Catchment's rivers for ecological, social and cultural benefits	• Identify appropriate river pools, such as Pumphreys Bridge (camp site) and Darmininning Pool. • Develop restoration plans to achieve ecological and cultural aims • Implement plans • Co-funded on-ground projects	• Rivers and river pools are highly valued by the community. • They are important for ecological, social and economic reasons. • Many river pools have become degraded or are in need of better management.	River pools (e.g. Ranford Pool)	All relevant land managers.
2.5.	Restoring production in valley floors	• Restore degraded valley floors to productive land (e.g. controlled grazing for stock)	• Implement known solutions, such as saltbush revegetation • Promote results of trials into species which may be used in rehabilitation of salty, waterlogged areas • Trial alternative management options for salty land • Trial methods to control Juncus acutus • Co-funded on-ground projects	• Numerous valley floors in the catchment are impacted by salt, waterlogging or even weeds, such as the Spiny rush (Juncus acutus)	Entire catchment	Broadacre farmers, Saltland Pastures Association, DAFWA
2.6.	Managing fire, ferals and fauna in fenced riparian areas	• Assist land managers (private and public) to increase active management of riparian areas, including river reserves. (Project 2.6 closely linked to Project 2.1)	• Assemble information materials and hold education events for landholders who have, or live near riparian corridors. • May include field days. • Co-funded on-ground projects	• Many creek-lines are now fenced. This has increased vegetation growth and stability of bed and banks, but created challenges for weed and feral animal control. These areas may provide increased habitat for kangaroos	Entire catchment	Broadacre farmers, small lot landholders

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
2.7.	a) Hotham River Weed management and restoration project (Boddington)	• To identify and control key weeds on the Hotham River around Boddington.	• Identify and map priority weed species, including Bridal Creeper and Arum Lily • Determine control options and prioritise • Undertake control • Preferably follow-up control with revegetation and restoration	• Hotham River around Boddington townsite is of important social, cultural and ecological value. • Local community is concerned that weeds are overtaking native species in and around the river	Hotham River Boddington	Shire of Boddington, Boddington community, other stakeholders.
	b) Williams River Weed management and restoration project	• To identify and control key weeds on the Williams River, follow-up on previous projects to control bridal creeper Follow-up on past weed control projects (conducted in 2012/13)	• Identify and map priority weed species, including bridal creeper and arum lily • Determine control options and prioritise • Undertake control • Preferably follow-up control with revegetation and restoration	• Williams River is of important social, cultural and ecological value. • Williams Landcare Group and local community are concerned that weeds are overtaking native species in and around the river.	Williams River, around Williams	Williams Landcare Group, Shire of Williams, Williams community, other stakeholders
2.8.	Focused sub-catchment restoration program	• Improve water quality in selected sub-catchments (Projects 2.2, 2.3 and 2.8 are closely linked)	• Identify 1-3 sub-catchments where water quality improvement is a priority for farmers and land managers. • Establish water quality improvement goals • Determine specific actions. • Co-fund implementation	• Past landcare work has demonstrated that water quality improvement is achievable in small sub-catchments (e.g. saline water has been made fresh enough for farm use)	To be determined	All land manager sectors
2.9.	Townsite stormwater management project	Improve water quality in priority subcatchments in townsites or other intensively developed areas. • Take advantage of opportunities to also achieve, ecological, cultural social and economic benefits.	• Work with local governments and local communities to identify priority townsite catchments for stormwater retrofits and other stormwater management actions. • Develop and implement projects, including on-ground works and long-term maintenance regimes.	• Stormwater management is a growing concern as the Catchment's townsites and rural residential areas expand. • Retrofits of stormwater infrastructure in selected areas can yield significant improvements in water quality, and provide examples for future developments. • New stormwater infrastructure should implement latest practice water sensitive urban design.	Townsites including Boddington, Williams, Wandering and Cuballing.	Local governments

8.3 Explanatory notes: Projects 2.1 to 2.9

Projects 2.1 to 2.9 are primarily targeted to achieve Goal 2. However, they will also contribute other goals and objectives in the Plan given the inter-connected nature of natural resources and the movement of water through the landscape. This is a good and necessary aspect of the projects.

Goal 2 originally focused on rivers, creeks and valleys, but has been expanded as a result of comments received through the consultation period, to include water management at the subcatchment scale. While most community comment on water resources has focused on the health of rivers and creeks, the connection between river health and each river's catchment was raised by some larger stakeholders and cannot be ignored. Operating at the subcatchment scale will require greater coordination and input of resources.

Each of the projects under Goal 2 has been packaged as a distinct project as far as possible. However, there are strong connections and some logical sequences between the projects.

Projects 2.2 (Assess river health) and 2.3 (River action Plans) form a logical sequence, and inform or enhance most of the other projects under Goal 2, especially Projects 2.8 and 2.9.

Projects 2.1 and 2.4 to 2.7 (five projects) focus on various aspects of riparian management, and address management issues which have been widely raised during community consultation (stock control in rivers, weed management in riparian corridors etc.). These 5 projects could be undertaken without strong reference to subcatchment management, but would be greatly enhanced where they occur within a subcatchment context or initiative.

Project 2.8 is the project which encourages a subcatchment approach, and can give added meaning and enhance other projects. Project 2.8 has been suggested on the basis of stakeholder feedback and anecdotal evidence from landholders that water quality has improved significantly in two subcatchments in the Hotham-Williams following significant landcare works, including revegetation, over the past 20 years.

Project 2.9 targets stormwater management, given the role that this plays in influencing subcatchment water quality. Stormwater management will be a growing issue as towns expand within the Catchment.

For all above projects working on rivers, there will have to be a huge amount of community involvement and the community will need to be involved in the prioritisation of projects.

9. Biodiversity, native vegetation and habitats conserved

9.1 Background

Around 33% of the Catchment is vegetated, with 186,550 ha of native vegetation on public and private lands (Figure 14). The most noteworthy areas on public land are the Dryandra Woodland, Tutanning Nature Reserve and Boyagin Nature Reserve. The western parts of the Catchment border State Forest. There are many areas of woodland and bushland on private lands and these play a very important role in maintaining biodiversity and farm health and productivity.

Key natural assets

- Dryandra Woodland, Tutanning Nature Reserve, Boyagin Nature Reserve, Lavender Nature Reserve, Williams Nature Reserve
- Marradong Timber Reserve
- State Forest
- Bushland on private lands
- Local Crown bushland reserves
- Watercourses and river pools
- Threatened fauna, such as numbat, woylies
- Threatened flora
- Habitat trees
- Roadside vegetation
- Revegetation

Threats and threatening processes

- Drying climate and related changes
- Feral animals, including foxes and cats
- Altered fire regimes
- Loss of river pools
- Insufficient management of reserves
- Weed infestation
- Uncontrolled grazing and related impacts such as loss of understorey
- Fragmentation and isolation of species
- Disease, such as Phytophthora dieback
- Poorly planned or situated development
- Mining
- Invasive native species (e.g. corellas, Rainbow Lorikeets)
- Salinity
- Erosion
- Pig hunting culture

What's important to the community

- Fencing of native vegetation
- Control of weeds in priority areas and high conservation areas
- Feral animal control
- Restoration of priority natural areas
- Wildlife corridors/ecological connections
- Revegetation for habitat
- Fire management
- Protection of habitat trees
- Revegetation for climate benefits

Figure 13: Biodiversity assets, threats and important considerations

The Hotham-Williams Catchment is home to many of the native fauna species which have disappeared from the wider Avon-Wheatbelt region and the Perth-Peel regions. Dryandra is well-known for supporting the largest population of the State's fauna emblem, the numbat, and its supports numerous other species of note: woylies, tammar wallabies, red-tailed phascogales and Chuditch. A number of these species are in a precarious state, for example, only 1000 numbats are thought to be remaining in the wild across the state. Other threatened fauna species, such as Carnaby's Black Cockatoo are also found in parts of the Catchment, and in need of special protection.

Conservation Planning and Action

A significant challenge for the Catchment in relation to biodiversity is the scale of the challenge versus the available resources across the community, government, and industry sectors. This challenge can be made significantly more manageable through collaborative conservation planning and action at the highest levels. Collaborative approaches will also yield better conservation outcomes. In this regard, a prospective project is included to undertake Conservation Action Planning in the Catchment (or parts of the Catchment). CAPs encourage landscape-scale approaches to conservation.

Conservation Action Plans (CAPs)

Preparation of one or more CAPs is a prospective project of the Hotham-Williams NRM Plan. Producing a CAP may provide a way forward for management of the Dryandra Woodlands across public and private lands, and even the wider region.

The Conservation Action Planning (CAP) Framework was developed by The Nature Conservancy in the USA as a tool to plan, implement and measure the effectiveness of conservation projects. CAP processes are being used in Western Australia and South Australia by community groups and NRM regions (e.g. Gondwana Link and Cape to Cape Catchments Group).

One of the main aims of CAP is to redirect projects from small sites (tens or hundreds of hectares) to conserving and preserving large landscapes (hundreds of thousands of hectares) that can sustain biodiversity at a regional scale.

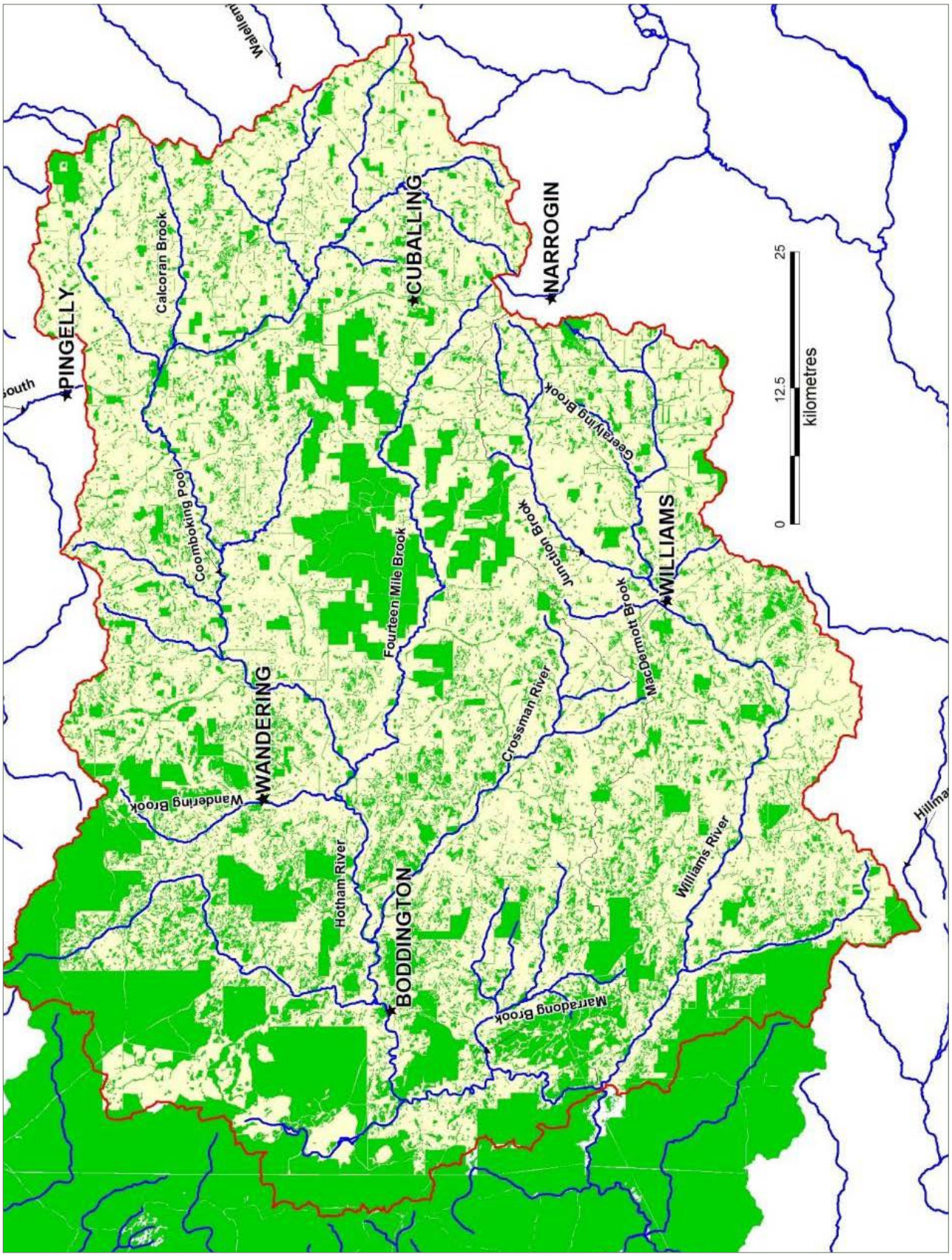

Figure 14: Native vegetation extent in the Hotham-Williams Catchment

9.2 Prospective projects: Biodiversity, native vegetation and habitats

The prospective projects in Table 6 are to achieve Objectives under Goal 3.

Goal 3: Biodiversity, native vegetation and habitats are conserved

Objective a) Bushland, native vegetation and habitatsare protected, restored and managed for their biodiversity values and long-term health.

Objective b) Biosecurity threats to biodiversity are managed to protect local biodiversity and water resources.

Table 6: Prospective projects - biodiversity, native vegetation and habitats

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
3.1..	Prepare Conservation Actions Plan(s) for all of Catchment or parts of Catchment (or similar strategic conservation Plan)	• Prepare one or more CAPs for the Catchment. • A CAP process may be useful for conservation planning of the Dryandra Woodland area (public and private), or larger areas • A CAP can address priorities for conservation, and enhancement of ecological linkage (reduce fragmentation)	• A CAP process involves: • Determining the area for which the CAP is being undertaken; • Gather a project team • Identify key biodiversity values to be protected, key threats, key actions; • Address biodiversity values, bushland protection, ecological connectivity, threatening processes, and develop priority actions • Actions are prioritised. (Note: Community interest in a CAP is yet to be gauged)	• There is no landscape-scale plan which prioritises actions to conserve biodiversity in the Catchment. • Current action could be made more effective by bringing together stakeholders with an interest in biodiversity conservation in the Catchment.	The greater Dryandra Woodlands area, entire Catchment	All stakeholders with an interest in biodiversity conservation.

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
3.2.	Fencing remnant vegetation	• Fence significant areas of remnant vegetation, including those on hilltops/ridgelines. • Maximise biodiversity conservation outcomes. • Protect existing areas of natural bushland on farmlands for ecological and production values • Ensure fire management considerations are included.	• Fencing program • Trial fauna exclusion to assess impact of kangaroo grazing on recruitment; • Assessment of habitat quality for significant fauna. • Bring back the understorey. • Manage weeds, erosion and other impacts on biodiversity and production • Co-funded on-ground projects	• Remnant vegetation on hill-slopes and ridgelines will benefit from fencing to control stock access. Aids natural regeneration, creation of habitat, reduces soil erosion. Many of the patches of native vegetation in the Catchment provides habitat for significant fauna, such as Red-tailed Phascogale (*Phascogale calura*) and Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*). • Protection of remnant vegetation on farms provides windbreaks for stock and crops and increases farm productivity.	Entire catchment	Broadacre farmers, small lot landholders. Land vesting agencies of Crown Land: State Govt., and Local Govt.
3.3.	Effective use of fire and management of feral animals in remnant vegetation	• Increase local knowledge of various techniques to manage remnant vegetation, including use of fire and control of feral animals. • Evaluate options for use of fire in managing remnant vegetation	• Establish trials for burning regimes etc. • Tap into research and knowledge in community, NRMs, Govt. and universities. • Share findings through field days and information materials. (Note: DPaW may soon release a Fire Operations Tool for general public use)	• Farmers and other land managers often ask 'How frequently should remnants be burnt?' • We fear fire and try to stop it, rather than utilise it for bushland management. • Many of the patches of native vegetation in the H-W provides habitat for significant fauna, such as Red-tailed Phascogale (*Phascogale calura*) and Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*).	Entire catchment	Broadacre farmers, small lot landholders, research organisations, Local Govt., Volunteer Bush Fire Brigades, DFES.
3.4.	Feral cat and fox control program	• Reduce predator impact on native wildlife associated with key areas (e.g. Dryandra Woodland) and key cat hotspots (e.g.townsite rubbish tips)	• Work in partnership with landholders, DPaW, Local Govt. and others. • Use baiting, trapping and other approved methods • Carry out monitoring to assess effectiveness and native animal responses	• Foxes and feral cats have been shown to be significant threats to the native animals of Dryandra Woodland and Tutanning Reserve (e.g. native species such as Woylies and Numbats), • The cat bait, Eradicat® is now available for feral cat baiting programs	Dryandra Woodland, Tutanning Nature reserve, other key natural areas	DPaW, landholders, Local Govt., Boddington Friends of Reserves.

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups

3.5.	Strategic biosecurity program (environmental component)	• Develop a strategic environmental weed control program.
		• Develop a strategic pest animal control program
		• Includes control of Weeds of National Significance (WONS)
			• No project defined as yet.
			• Community is not ready to establish a Recognised Biosecurity Group, however weeds and feral animals are high on their agenda. For example, feral pigs continue to be a spot-problem coming out of State Forest around Boddington and parts of Wandering districts. Community needs assistance to mobilise efforts to address key problems when and where they occur.
				• A strategic, targeted approach to biosecurity is required to support current landholder and community efforts.
				• Target species include:
				  • Feral pigs
				  • Feral cats
				  • Foxes
				  • Cottonbush
				  • Bridal creeper
				  • Weeds on roadsides
					Entire catchment (or selected areas as determined)	DPaW, DAFWA, landholders, Quindanning/ Williams and Hotham Declared Species Groups, Local Govt., Boddington Friends of Reserves.

3.6.	Implement key actions of local bushland reserve management plans	• Protect and maintain the biodiversity and cultural values of local bushland reserves	• Identify key reserves through information in Literature review. • Seek support and involvement of reserve managers, such as local government	• Reserve management plans have been produced for some reserves (e.g. Crossman West Flora and Fauna Reserves. • Resources to implement the Plans are limited and support is required.	Specific reserves	Local governments, Boddington Friends of Reserves

3.7.	Assessment or Reassessment of roadside vegetation and roadside management	• To ensure all LGs have useful data on which to base roadside management
		• Maintain or improve high standards of management of roadside vegetation
			• Work with local governments and Roadside Conservation Committee to determine potential timing of projects
			• Undertake Roadside Assessment Projects
			• Consider and implement recommendations of Roadside Conservation Assessment reports
				• Current editions of Roadside Surveys and Mapping:
				  • Boddington (2010)
				  • Cuballing (pre 1996, requires re-doing)
				  • Wandering (not completed)
				  • Williams (2014)
				  • Narrogin (2009)
					All Local governments	Local government

9.3 Explanatory notes: Projects 3.1 to 3.7

Projects under Goal 3 (Biodiversity, native vegetation and habitats conserved) cover a diverse range of topics, areas and land managers.

At a strategic level, Project 3.1 (Conservation Action Planning) and Project 3.5 (Strategic Biosecurity program – environmental component) aim to set long-term directions for biodiversity conservation and biosecurity management. Current approaches in the Catchment in these two areas are largely patchy across time and space, and there is great potential for improved collaboration between government and the general community.

While community interest in preparing a Conservation Action Plan (Project 3.1) is currently unknown, it has been recommended as a key project to increase collaborative efforts between government and other stakeholders in the catchment community. An example of such collaboration may be the opportunity to better integrate State Government management of Dryandra Woodland and State Forest with management of surrounding areas under private and local government management.

Projects 3.2, 3.3 and 3.4 address more specific aspects of biodiversity management, namely fencing of remnant vegetation, use of fire to manage bushland, and the control of foxes and cats. Foxes and cats are two of the most significant feral animal threats to native fauna in the Catchment.

Project 3.6 (Implement local bushland reserve plans) and Project 3.7 (Roadside vegetation management) are focused on local crown land. Successful implementation of these two projects will require close collaboration between local governments and their communities.

10. Community and cultural values

10.1 Background

Natural resources are of great importance to the communities of the Hotham-Williams for their cultural and social significance. This has been made obvious through comments received from the community survey and initial discussions with local residents and Traditional Owner representatives.

Noongar People have special spiritual and cultural connections to country and Wadjelas (white people) value rivers, bushland and the landscape for environmental and historic values, recreation, tourism and education.

Figure 15 summarises some of the key natural assets, threats and important considerations related to natural resource community and cultural values in the Hotham-Williams Catchment.

Key natural assets

- Boyagin Rock
- Pumphreys Bridge Pool
- State Forest
- Dryandra Woodland
- Local bushland reserves
- Hotham River
- Williams River
- River pools, such as Ranford Pool
- Marradong Timber Reserve

Threats and threatening processes

- Loss of cultural knowledge
- Insufficient management or mis-management of sites and areas
- Inappropriate development
- Poor consultation with Noongar People or the wider community
- Loss or degradation of river pools
- Poor management of recreational usage
- Poor planning

What's important to the community

- Bushland reserves and State Forest
- Sacred sites and sites of ethnographic significance
- Protection and restoration of culturally significant sites
- Local history stories on areas
- Celebrating what's been done and achieved with landcare
- Learning and building on past experience
- Tourism and recreational potential
- Recreational sites, such as Ranford Pool
- Hotham River and Williams River
- Dryandra Woodland
- Boyagin Rock Nature Reserve
- Tutanning Nature Reserve
- Pumphreys Bridge
- Reconciliation Action Plans
- Municipal Heritage Inventories

Figure 15: Community and cultural values - assets, threats and important considerations

Noongar cultural values associated with natural assets

The cultural and social significance of natural assets in the Hotham-Williams is strongly linked to the area's rivers and creeks. For example, the Hotham and Williams Rivers are listed sites of cultural significance to Noongar People. Boyagin Rock is another natural area of special significance to Noongar People.

Noongar people have a special role to play in NRM and raising the community's awareness of natural resource values. The recognition of native title rights through the Noongar Recognition Bill 2013 will create opportunities for Noongar People to work on NRM in the south west, and the Hotham-Williams Catchment.

Social and recreational values

Natural assets of appeal and interest to the wider community include Dryandra Woodland, State Forest areas, and river and bushland areas, particularly those in close proximity to townsites.

The river pools of the Hotham and Williams Rivers are of particular importance, and have long been of social and recreational importance. These include the Hotham River around Boddington townsite, Ranford Pool, and Hotham River at Pumphreys Bridge.

The development and management of multi-use trails and river reaches for recreational use and tourism provides an opportunity for all community sectors to work collaboratively on natural resource management. It also provides great opportunities for tourism, environmental education and raising awareness of past achievements (e.g. Hotham River Fish Ladder, Boddington).

School involvement in NRM

Children are the next generation of community leaders, land managers and parents. Young people enjoy opportunities to do and learn things outside, and this creates an invaluable connection to nature. Landcare and NRM provide a great opportunity to get school children actively and practically involved in their environment, in ways which can be directly related to the curriculum.

Key to successful school NRM programs are champions within the schools, and access to educational resources which directly relate to the National Curriculum. Teachers need support to integrate NRM into their teaching programs and activities.

10.2 Prospective projects: Community and cultural values

The prospective projects in Table 7 are to achieve Objectives under Goal 4.

Goal 4: **Community and cultural values are understood and celebrated**

Objective a)	Cultural values of natural areas are acknowledged and managed appropriately (Aboriginal and European cultural heritage)
Objective b)	Opportunities for sustainable eco-tourism and recreational usage of natural areas are embraced.

Table 7: Prospective projects - community and cultural values

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
4.1.	Celebrating and learning from past NRM achievements (eco-tourism potential – may link to Marradong Country)	• Increase community's awareness of what has been achieved through catchment activities over the past 25 years. • Inspire community members to increase involvement in community-based NRM.	• Find and research achievements • Publish or communicate achievements • Catchment tour/field days • Promote past projects such as the fish ladder and frog pond in Boddington • Community or school planting days can be tied into these 'celebrations'.	• There a number of success stories (farmscale and sub-catchment scale) across the H-W. These includeHotham River fish ladder, Yornaning Dam Project, Hotham-Williams Western Power Greening Challenge, and salty creeks which are turning brackish due to past revegetation • What can other farmers and community learn from these achievements?	Entire Catchment	All community sectors, including community groups, schools and LGs
4.2.	Noongar cultural values project	• Support local communities to recognise Noongar cultural values in publicly accessible natural areas	• Work with local Noongar community to identify key sites for possible future projects. • Sites of interest may include Boyagin Rock, Pumphreys Bridge	• Noongar People have strong connections to land & natural areas. • Celebrating these connections is important for NRM, and reconciliation between Noongars and Wadjelas	Entire Catchment, focus on specific significant sites	All community sectors
4.3.	Hotham-Williams Eco-tourism assessment and prospectus	• Assess potential to enhance existing ventures or create new opportunities.	• Identify current and potential ventures which are closely linked to natural areas. • Work with local government, including Marradong Country to investigate possible future opportunities for eco-tourism	• There are already some important eco-tourism ventures in the Catchment, mostly focused on Dryandra Woodlands. • Promotion of the Catchment's natural attractions will have positive social and economic benefits.	Entire Catchment	Marradong Country Initiative, local governments, local industry
4.4.	Hotham-Williams Eco-education Program	• To support teachers and schoolchildren to learn more about NRM and landcare in their Catchment	• Liaise with teachers who are interested in including local Catchment projects/NRM in their curriculum. • Review existing educational resources and opportunities for students and curriculum • Develop educational resources where gaps exist	• Children and young people enjoy practical outdoor learning experiences, and learning about their environment. • Connection to nature is an important part of a child's development. • Local schools have been involved in landcare projects in the past	All of Catchment with focus on sites near towns	Teachers, Schools, children

11. Implementation

11.1 Background

Goal 5, community engagement and support for NRM, underpins implementation of the Plan.

The prospective Projects to achieve Goal 5 focus on coordination and community support in more specific ways than the Projects to address Goals 1 to 4. However, each of these projects also address objectives under one or more of Goals 1 to 4.

Like all prospective projects in this Plan, projects under Goal 5 require the support and ownership of relevant stakeholders before they can be developed into substantive project proposals.

None of the projects to address Goal 5 relate to professional support for community based NRM or the creation of community-based structure to drive NRM in the Hotham-Williams. Both these items are significant issues (NRM Officer support and NRM community structure), and are discussed in Sections 11.4 and 11.5. Both require significant community discussion before they can be progressed.

11.2 Prospective projects: Supporting community engagement in NRM

The prospective projects in Table 8 are to achieve Objectives under Goal 5.

Goal 5: Community is engaged, informed and supported to manage natural resources

Objective a)	All sectors, including community, government and industry are actively involved in catchment management of natural resources.
Objective b)	Natural resource managers are supported to better understand and manage natural resources.
Objective c)	Natural Resource managers work with others to achieve catchment-scale change (co-ordination and facilitation)
Objective d)	The community's understanding and appreciation of natural resources, and Landcare activity, is increased.

Table 8: Prospective projects - supporting community engagement in NRM

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
5.1.	Biosecurity Coordination Program	• Community is supported to address biosecurity using a planned, strategic and achievable approach.	• Determine shared priorities for control of pests, weeds and diseases in the Catchment, or parts of Catchment. • Increase landholder understanding of existing regulations related to the control of weeds. • Work with key stakeholders to determine implementation approach (administration, governance, funding etc.).	• tablishment of Recognised Biosecurity Groups. • Control of pests and weeds is a major issue raised by community. • Community needs support to become more involved in biosecurity initiatives. • Project should assist the work of the Hotham Declared Species Group • State Government support for biosecurity has changed, and funding is now directed through the es	Entire Catchment	All stakeholders, including DAFWA
5.2.	Strategic environmental plans for Local Governments	• Work with local government to determine 5 – 10 objectives (under a longer-term vision)	• Idea yet to be canvassed with LGs. Idea developed following meeting with Shire of Boddington staff	• Local government may require assistance to integrate NRM into Council policies and operations	All Local governments	Local government

5.3.	Strategic roadside management plans	• To minimise the future impact of road widening and maintenance on biodiversity and roadside vegetation.	• Work with local governments to proactively address the potential impact of future road infrastructure and management projects on vegetation.
			• This may include the:
			  • formal identification of areas of significant roadside vegetation, and
			  • planning of strategic projects to avoid, minimise and mitigate the impacts of future road maintenance and construction activities.
				• Clearing of roadside vegetation is a by-product of some road infrastructure and maintenance programs.
				• Minimising the impact on the environment often requires a strategic approach.
				• Options are limited when considered on a project-by-project basis
				• Local governments need assistance to be proactive and strategic in this area.
				• This project may assist LGs to comply with Clearing of Native Vegetation Regulations.
					All local governments	Local governments In collaboration with Roadside Conservation Committee and DPaW

	Project name	Project aims	Project description	Project Rationale	Geographic coverage	Target groups
5.4.	Training road maintenance staff in roadside management techniques	• Ensure road maintenance staff has a sound understanding of sound environmental management practices.	• Provide regular training to work crews and shires in roadside management, with support from the Roadside Conservation Committee	• Road maintenance crews work in close contact with the environment. • Simple measures undertaken by staff can often have a significant positive impact on the environment (or prevent unnecessary damage).	All Local governments	Local government, Roadside Conservation Committee
5.5.	Strategic fire management plans	• Address the fire management implications of NRM, revegetation and management of native vegetation	• Assessment of key risk areas related to shelterbelts, roadsides and bushlands. • Implementing works to reduce risks whilst protecting biodiversity, soils and watercourses	• A drying climate, climate volatility and the growth in areas of revegetation has increased the need to proactively plan for fire control and response.	All Local governments	Local governments and volunteer fire brigades

5.6.	Property planning for small lot landholders (e.g. hobby farmers)	• Provide opportunities for owners of small lots and hobby farms to learn and share knowledge on land management and stock management.	• Conduct a series of property planning workshops, focusing on:
			  • Fire management
			  • Weed management
			  • Feral animal and domestic animal disease management
			  • River corridor management
				• Small rural holdings occur throughout the H-W and are important part of the rural and social fabric of the catchment. These landholders need assistance to ensure that they manage land responsibility and do not threaten the viability of broadacre farming through poor management of weeds, feral animals, fire and vegetation.	As required	Small lot landholders

5.7.	Habitat for the future	• Assist land managers (farmers, local governments, state government, industry) to create long-term habitat for threatened wildlife.	• Assess loss of paddock trees, roadside vegetation and other cleating. • Possibly link project to iconic species such as Black Cockatoo, Phascogales etc • Identify strategic and secure revegetation sites • Implement revegetation	• Paddock trees are disappearing, partly due to clearing for wider machinery sweeps • Clearing of roadside vegetation impacts on habitat trees • Industry sector is also keen to manage impact of loss of habitat trees.	All lands where clearing may occur	Landholders, local government, industry, community groups

11.3 Prioritisation of projects

The Plan includes numerous prospective projects, only a number of which can be implemented in any given period. To ensure that the community and other investors get the most out of finite resources invested into NRM, a transparent and evidence-based prioritisation system should be used to prioritise the implementation of projects. A prioritisation process can be undertaken using relatively simple criteria and analyses, and involve representatives of the Catchment community to maintain transparency.

The prioritisation of projects should be supported by professional NRM officer support and a community based NRM management structure.

11.4 Professional support for community based NRM

The successful implementation of this Plan relies upon the support and involvement of the Hotham-Williams community. As described earlier in Section 1.3, this community is in fact made up of many communities and groups: it is diverse, complex, and dynamic.

However, as demonstrated over two decades, Landcare and NRM require the community to be supported by professional staff who understand the community, and understand NRM. It is essential that these people are part of the community and have numerous skills, including the ability to attract resources (e.g. funding and corporate sponsorship) and encourage collaboration across the community.

In 2013 – 2014, a Business Case to support employment of a Natural Resource Management Officer in the Hotham-Williams was prepared (PHCC, 2013). This study recommended that a NRM Officer position or positions was warranted, and should be accompanied by the creation of a 'Community-based NRM Management Structure' and supported by an overarching Hotham-Williams NRM Plan (such as this Plan).

Today, the Hotham-Williams has a part-time NRM Officer based out of Boddington and the beginnings of a NRM Plan. Both these initiatives require a Community-based NRM Management Structure in the Hotham-Williams Catchmentto enable them to be effective and worthwhile.

A significant challenge for the community is to determine how its needs are best served by professional NRM Officers located in the Catchment. Organisations such as the Peel-Harvey Catchment Council may continue to support the community in meeting this challenge. For information on the Roles and Responsibilities of a NRMO, see Appendix G of the NRMO Business Case report (PHCC, 2013).

11.5 A community-based NRM Management Structure

This report purposely makes no recommendations in regard to the establishment of a Community-based NRM Structure apart from endorsing the recommendation of the Hotham-Williams NRMO Business Case that such a group should be established.

NRM and Landcare in the Hotham-Williams is best managed by the community, for the community. External groups such as the PHCC have an important role to play and can provide essential support services to the Catchment, but leadership on Hotham-Williams NRM needs to come from the Hotham-Williams community.

To assist the community consider options for a Community-based NRM Structure, Appendix 4 has been prepared to outline four (4) community-based models that already operate in the Peel-Harvey Catchment:

- Community-based Incorporated Group (e.g. Landcare SJ Inc.)
- Community Panel (e.g. Harvey River Restoration Taskforce)
- Community-based Biosecurity Group (e.g. Peel-Harvey Biosecurity Group)
- Land Conservation District Committee (e.g. Coolup LCDC)

Each of these models has different advantages and disadvantages and was created under different circumstances for slightly different purposes.

The Hotham-Williams community is encouraged to start to consider which community-based model of management (H-W Structure) may be best suited to the Catchment and community. Some of the considerations that may help frame this discussion include:

1. Is the H-W structure required to cover all NRM issues, or particular issues (e.g. biosecurity)?
2. What is the relationship between the H-W Structure and the PHCC, if any? How will this relationship be formalised?
3. What is the relationship between the Hotham-Williams Structure and local governments, state government and industry?
4. What type of body will the H-W Structure be? (e.g. representational, or skills-based?)
5. How will the H-W Structure acknowledge the size and diversity of the H-W Community? (e.g. will it be one group, multi-group, or a layered structure with subgroups)
6. Will the H-W Structure directly employ staff, or will staff be employed through a third party?
7. What level of staff management will the H-W Structure want, if any? How will this be achieved?
8. What types of support will the Hotham-Williams Structure require (e.g. IT systems, financial management, accounts, recorded-keeping, project monitoring and evaluationetc.).

The Peel-Harvey Catchment Council plans to provide support to the Hotham-Williams Catchment community in the future, including follow-up stakeholder meetings/workshops, to further discuss plans for the community-based model of management (H-W Structure).

11.6 External support, resources and funding

A brief discussion of external support, resources and funding is included to acknowledge that no plan can be implemented without tangible resources, both financial and in-kind.

At this stage, financial and non-financial resources for collaborative NRM in the Hotham-Williams are being provided via organisations such as the Peel-Harvey Catchment Council and Shire of Boddington. These funding streams should be complemented by other sources to provide longer-term stability for NRM in the Catchment. In the future, all sectors of the community – government, industry and landholders – should be asked to play some role in supporting NRM, financially or in-kind. The existence of a NRM Plan should assist in demonstrating the benefits of providing these funds.

Finally, it is important to note that Landcare and NRM are made most successful when many organisations and community members provide their time and in-kind support for the common good.

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Appendices

Appendix 1: Hotham-Williams Catchment Literature Review Document List

Note: This is a list of the literature review documents only. The full literature review and document recommendations are located in separate documents. Contact the Hotham-Williams NRM Officer for more information (Email: hotham-williams@peel-harvey.org.au).

Doc. No.	Document Reference
1	Peel-Harvey Catchment Council (2008) RS01 Hotham Williams Murray River Salinity Recovery Project Report September 2008. Contains: 1. GHD (2008) Preliminary Salinity Situation Statement for the Hotham-Williams-Murray Catchment Part 1: Conceptual Hydrogeological Analysis November2008 2. Peel-Harvey Catchment Council (June 2008) Hotham Williams Murray River Salinity Recovery Project Community Workshop Dryandra 25th June 2008. (Presentation). 3. Monitoring Data & Site Review Information a. Dept. of Water Flow Gauging Station Data b. Peel-Harvey Catchment Council (2004) Sampling and Analysis Plan Hotham/Williams Salinity Snapshot c. Williams Hotham Snapshot Results 2007 4. GHD (2008) Report on Preliminary Salinity Situation Statement – Hotham Williams Murray Catchment Part 2: LUCICAT Model November 2008.
2a & b	Department of Agriculture & Raper G.P. (2005) Groundwater Study of the Boddington Townsite March 2005 Resource Management Technical Report 252.
3a, b & c	Shire of Boddington (2011) Municipal Heritage Inventory 2011. Relevant Heritage Location Maps x 2
4a, b, c, d & e	Department of Agriculture & Ghauri S. (2002) Groundwater Study of the Wandering Townsite Resource Management Technical Report 260.
5	Water Authority of Western Australia (1989). Vegetation Strategies to Reduce Stream Salinities of Water Resource Catchments in South-West Western Australia. Report No. WS 33.
6	Department of Agriculture WA & Patabendige D.M. (1992). East Yornaning Catchment Planning Project Final Report with an Evaluation of the Usefulness of Airborne Geophysics in Catchment Planning to Control the Problem of Salinity.
7	Peel-Harvey Catchment Council (no date). The Future of Natural Resource Management in the Peel-Harvey Catchment.
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10	Land Assessment Pty Ltd & Peel-Harvey Catchment Council (2005). Peel-Harvey Catchment Natural Resource Management Plan Main Report – Draft for Public Comment & Appendices.

Doc. No.	Document Reference
11	Hicks, P. (2003) Biodiversity in the Peel-Harvey Catchment Part one: a review and inventory of biodiversity assessment and compilation of the existing relevant biological and physical data and information retrieval systems.
12	Hick P. (2004). Biodiversity in the Peel Harvey Catchment. Part 1: Biodiversity Setting Part 2: The Bioregions Part 3: Field Validation and Results Part 4: The Data Processing Model and Technical Specifications Power Point Presentation of Project Field Validation Data
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Appendix 2: Vision, objectives and goals for NRM in the Peel-Harvey Catchment

Our Vision (Benang Kaadadjan)

'The Peel-Harvey catchment is once again a flourishing network of interconnected, productive landscapes, with diverse, healthy and resilient ecosystems, globally and locally recognised, acknowledged and embraced for its environmental significance. It is wisely managed by a community that values it—people working together for a healthy environment.'

People (Baalap)

An Engaged and Active Community

- P1 Effective Natural Resource Management
- P2 Resource Managers are Supported to Improve Natural Assets and Productivity
- P3 Cultural Heritage Values are Embedded Across NRM Activities
- P4 Our Community Understands, Values and Respects the Region's Natural Resources

Biophysical (Boodja)

A Healthy Catchment that Supports Life and Livelihood

- B1 Wetlands and Waterways are Healthy and Productive
- B2 Soils are Healthy and Productive
- B3 Coastal and Nearshore Areas and Processes are Resilient and Valued
- B4 Biodiversity is Conserved
- B5 Natural Water Resources are Managed and Used Wisely

Knowledge (Kaadadjan)

Science and Knowledge Underpin Natural Resource Management

- K1 Influence Decision Making for Better natural resource management
- K2 Increase the Effectiveness of Natural Resource Management
- K3 Land Managers to use Best Knowledge and Technology

Appendix 3: Links between Plan and the Regional NRM Strategy objectives

Major links between the objectives of the Hotham-Williams NRM Plan and the Peel-Harvey Regional Strategy

Goals and objectives of Hotham-Williams NRM Plan	Major link to Goal in Regional NRM Strategy (See Appendix 2)
Goal 1 Healthy productive soils and farms	**B2, B4, B5**
a. Soils are actively managed to improve health, sustain land uses and reduce off-site impacts	B2
b. Biosecurity threats to farms and production areas are actively managed.	B2
c. Revegetation areas are protected and actively managed.	B2, B4
d. All water resources are protected and used wisely.	B5
Goal 2 Rivers, creeks, valleys and subcatchments are managed and restored	**B1, B2, B4, B5**
a. Degraded areas are actively managed to restore natural functions, and production where appropriate.	B1, B2, B4, B5
b. Rivers and creeks are actively restored and managed for their water supply, ecological, landscape, social and cultural values.	B1, B2, B4, B5
c. Focused management of sub-catchments is encouraged to restore river and creek water quality for water supply, ecological, landscape, social and cultural values.	B1, B5
d. Management of stormwater is supported and improved, including townsite stormwater management.	B1, B5
Goal 3 Biodiversity, native vegetation and habitats are conserved	**B1, B4**
a. Bushland, native vegetation and habitats are protected, restored and managed for their biodiversity values and long-term health.	B1, B4
b. Biosecurity threats to biodiversity are managed to protect local biodiversity and water resources.	B4
Goal 4 Community and cultural values are understood and celebrated	**P3, P4**
a. Cultural values of natural areas are acknowledged and managed appropriately (Aboriginal and European cultural heritage)	P3
b. Opportunities for sustainable eco-tourism and recreational usage of natural areas are embraced	P4
Goal 5 Community is engaged, informed and supported to manage natural resources	**P1, P2, K1, K2, K3**
a. All sectors, including community, government and industry are actively involved in catchment management of natural resources.	K1, K2, K3
b. Natural resource managers are supported to better understand and manage natural resources.	K1, K2, K3
c. Natural Resource managers work with others to achieve catchment-scale change (co-ordination and facilitation)	P1, P2,
d. The community's understanding and appreciation of natural resources, and Landcare activity, is increased.	P4

Appendix 4: Examples of NRM Leadership Structures in the Peel-Harvey

Type of group	Community-based Incorporated Group	Community Panel	Community-based Biosecurity Group	Land Conservation District Committee
Example of group	Landcare SJ Inc.	Harvey River Restoration Taskforce	Peel-Harvey Biosecurity Group	Coolup LCDC
Group objectives	NRM	NRM, with a focus on river restoration	Biosecurity	NRM, in particular soil and land management
Type of structure	Community Association with a Management Board	Community Panel, with broad representation including government and industry support and representation	Community-based with local and state government support and representation.	Statutory committee, community based.
Created under specific legislation	No	No	Group created with the intention of becoming a Recognised Biosecurity Group under BAM Act.	Yes, Soil and Land Conservation Act 1945 (SLC Act 1945)
Representation on management group	Management Board - Community, LCDC, and Shire of Serpentine-Jarrahdale (also a management sub-committee meets in intervals)	Water Corporation, Dept of Water, Landcare Australia, Harvey Water, local governments, LCDC, other community members, industry reps	Each local government, community rep. from each locality, DAFWA rep. between 9 -15 members.	Landowners, with representation from the local government and Commissioner for Soil and Land Conservation.
Incorporated	Yes	Yes	No (hosted by Landcare SJ Inc.)	No
Meetings	Bi-monthly	Bi-monthly	Monthly	Monthly
Constitution	Yes	Yes	No, (Terms of reference)	No, (Operation prescribed under Act)
ABN	Yes	No	No.	Yes
Operational plan	Yes, Business Plan (under review)	Yes, Strategic Directions (under review)	Operational Plan and strategic plan	Yes
Staff employment	Yes, Landcare SJ (Shire payroll)	No, staff employed via Local Govt.	No, staff employed via Landcare SJ	No, but possible
Staff management	Management Committee	Via HRRT Community Panel and PHCC		
Financial mgtmt.	Staff of Landcare SJ	PHCC	Landcare SJ	Yes, treasurer on committee
Insurance coverage	Yes, directly via Landcare SJ	Yes, directly via HRRT	Public indemnity and volunteer cover (directly to group)	Yes, under DAFWA -Public liability
OHS system	Yes, policies and procedures	Yes, via PHCC	No	No
Special comments	Landcare SJ Inc. is a Community Association with financial support from the local government, community and business ventures (e.g. Cockatubes).	Establishment through trust fund contributed by Water Corporation (offset for loss of riparian habitat due to dam project) Industry representation via Alcoa Australia and Harvey Water.	Peel-Harvey Biosecurity Group received matching funding from DAFWA for establishment. Presently, the Peel-Harvey Biosecurity Group is not recognised under the BAM Act as a rate is not levied on landholders	LCDC have the power to levy a rate on landholders. LCDCs must hold a public re-nomination process for members every 3 years; LCDC's can apply for a $500 administration grants each year

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