Carnarvon Ministerial Advisory Committee

Policy Settings (pre March 2015) for the Carnarvon Horticultural Precinct

May 2015

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1 Introduction

The Western Australian State Government has a number of existing policies and plans for the management of water, water distribution, agriculture and regional development that are relevant to the Carnarvon irrigation area. These are:

- Agriculture and the Gascoyne Food Bowl Initiative;
- Gascoyne Regional Development Plan (2010) and the draft Gascoyne Regional Investment Blueprint (2015);
- The formation and operation of the Gascoyne Water Assets Management Cooperative (GWAMCO) and the Gascoyne Water Cooperative (GWC);
- Water resource management through the *Lower Gascoyne water allocation plan (2011)*; and
- Water supply and associated agreements.

This document provides a summary of current Government positions and policies on the Carnarvon irrigation area that have developed over the last 15 years. It also gives background and context to the development of initiatives in the area. This will help inform Carnarvon Ministerial Advisory Committee (CMAC) members' recommendations and proposed changes on the governance, engineering and economics of the system to the Minister for Water and the Minister for Agriculture and Food.

2 Agriculture

2.1 Background

Agricultural policy is established under the agriculture and food related Acts and Regulations in Western Australia, and set by the Minister for Agriculture and Food through the Department of Agriculture and Food WA (DAFWA) to benefit consumers and producers of agricultural products in the State.

Irrigated agriculture along the banks of the Lower Gascoyne River has been undertaken since the early 1900s. Originally growing bananas and vegetables, production has expanded to include many different tropical and temperate crops.

Carnarvon is an important supplier of horticultural produce to Western Australia's domestic market, especially during the winter months, when approximately 60 per cent of Perth's vegetables are supplied from the Carnarvon horticultural district. At full water availability, production can be worth up to $100 million per annum and about 40 per cent of Perth's fresh import supplies.

The Carnarvon horticultural district is approximately 2 000 hectares in area, of which approximately 1 550 hectares is cultivated at any one time (unpublished data DAFWA 2015). Major crops include bananas, table grapes, tomatoes, capsicum, cucurbits (pumpkin, cucumber and melons), avocados and mangoes.

The total volume of horticultural produce in 1999 was 36 255 tonnes, worth $39.95 million. In 2009, the area produced 53 082 tonnes, worth $75.8 million. The volume and value of product in the Carnarvon horticulture district has increased significantly over the past 15 years. The peak of $104 million in 2012 (an increase of 38 per cent on 2011 crops) was driven in part by the value of the tomato crop, worth $22 million more than in 2011.[1]

This increase is largely due to the implementation of new technologies, innovation, more reliable water sources and State Government investment in research and development. This research has led to improvement in water efficiency, using the valuable water resource to ensure that

[1] https://www.agric.wa.gov.au/bananas/carnarvon-plantation-industry-production-statistics

horticulturalists can produce large quantities of product efficiently. These advances, coupled with Carnarvon's physical isolation from other areas means it is less likely to be affected by pest infestations or disease, and enhances the quality and sustainability of horticulture in the region.

3 Gascoyne Food Bowl Initiative

In recognition of the importance of the Carnarvon horticultural industry to the provision of fresh fruit and vegetables for local and export markets, on 10 December 2008, the Government announced the Gascoyne Food Bowl Ministerial Committee (Ministerial Committee) to provide guidance and advice to Government on a range of options related to water, agriculture, horticulture and the associated infrastructure requirements to unlock and maximise the agricultural production potential of the Gascoyne region.

The Ministerial Committee comprised the Minister for Agriculture and Food (Chair), Minister for Water, and Minister for Regional Development. At the time, these were (respectively) the Hon. Terry Redman MLA, Dr Graham Jacobs MLA and the Hon. Brendon Grylls MLA. The initiative involved the departments of Agriculture and Food, Water, Regional Development and Lands and the Gascoyne Development Commission.

In 2008, the following were implemented and constitute the Gascoyne Food Bowl Initiative (GFBI):

- Gascoyne Food Bowl Local Consultative Committee (LCC) – whose recommendations informed the Gascoyne Food Bowl Project (Section 3.1);
- Gascoyne Irrigation Pipeline Project (GIPP) (Section 5.3);
- Carnarvon Floodplain Management Committee (Section 3.1), which in implementation became the Carnarvon Stage 2 Flood Mitigation Works project (Section 6.6); and
- Carnarvon Artesian Basin Advisory Group (CABAG) (Section 6.5.3).

Subsequently to implement the Gascoyne Food Bowl LCC recommendations a further $25 million Royalties for Regions funding was provided to DAFWA in 2012 for the Gascoyne Food Bowl Project (GFB Project) (Section 3.3).

Gascoyne Food Bowl Initiative projects have received over $76.05 million in investment funding through the State Government's Royalties for Regions program. By partnering with the Commonwealth and GWAMCO investment, it will deliver over $102.1 million in infrastructure and related projects.

TABLE 1: GASCOYNE FOOD BOWL INITIATIVE PROJECTS AND FUNDING

Funding Source	Royalties for Regions	Cooperatives	Commonwealth
Carnarvon Artesian Basin Advisory Group	$0.043 M		
Gascoyne Irrigation Pipeline Project	$6.011 M	$4.472 M	$6.6 M
Stage 2 Flood Mitigation Works	$45.0 M		$15.0 M
Gascoyne Food Bowl Project	$25.0 M		
TOTAL	**$76.05 M**	**$4.472 M**	**$21.6 M**

3.1 Gascoyne Food Bowl Local Consultative Committee

The Gascoyne Food Bowl LCC was established in 2009 and made recommendations to inform the Gascoyne Food Bowl Project. It was chaired by Ms Wendy Duncan MLC and provided the vehicle for growers and the community to have input into maximising the potential of the existing horticulture area, opening up additional land to the horticultural precinct and a new bore field water supply. The LCC provided advice to the Ministerial Committee on the development and expansion of the Carnarvon horticultural precinct.

The LCC comprised representatives from the key stakeholders of the Carnarvon Horticulture precinct being Carnarvon Growers Group, Gascoyne Water Cooperative, GWAMCO, the Shire of Carnarvon and the Gascoyne Development Commission (GDC) along with three community representatives. Officers from the Departments of Agriculture and Food, Regional Development and Lands, Water, LandCorp and the GDC provided technical information and support to the LCC.

The LCC first met in April 2009 and, following a public comment period on a discussion paper, delivered its findings and recommendations in October 2010. The October 2010 LCC Report provided a suggested path forward for the expansion of the Carnarvon horticultural district and included a three phase approach to future land release.

The Ministerial Committee accepted the LCC Report and considered the LCC recommendations on 24 February 2011.

TABLE 2: KEY DECISIONS OF THE MINISTERIAL COMMITTEE - CARNARVON HORTICULTURE LAND RELEASE

Phases		Land	Water
Phase one	In fill- full utilisation of existing resources	Greater use of existing horticultural land	Fully utilising existing Basins B-L allocations and water market trading
Phase two	Amalgamation - extension of current landholding boundaries to include adjacent land	Release of adjoining land for amalgamation	Market access through water trading and established release mechanisms
Phase three	Public release of unimproved land and new water allocations to the market	Public release of unimproved land and new water allocations to occur simultaneously and be linked. Recommendation has support. Look to advice from agencies (DAFWA and Department of Water) as to how these links will be managed.	
		Release of unimproved land. Market access through Expressions of Interest (EOI).	Existing and potential growers access new water allocations through EOI Purchaser can apply for water through the open market, including the proposed additional 4 gigalitres (GL).

3.2 Gascoyne Food Bowl Project Stage I

Upon completion, the GFBI Project will deliver three core outcomes:

- sourcing and delivering additional water (4 GL per annum) for horticultural production by identifying and developing new production bores and connecting to water delivery infrastructure;
- electrification of the northern borefield (existing and new production bores); and

- the identification and release of an additional 400 hectares of horticultural land. The distribution of suitable additional areas is shown in Figure 1.

The first stage of the project was the development of nine new production bores in the northern borefield in 2010. The nine production bores were drilled and developed by DAFWA (at a cost of approximately $2 million) between 2008 and 2010 following the no river flow conditions in the period leading up to late 2010. The bores were transferred to GWAMCO at no cost and in turn GWAMCO accepted responsibility for equipping the bores with pumps and generators.

A licence for up to 2.78GL/year of groundwater abstraction from the northern borefield was obtained from the Department of Water (DoW). This is a staged licence that can increase the entitlement up to the allocation limit of 3.6GL/year, dependent upon infrastructure development.

3.3 Gascoyne Food Bowl Project Stage II

The Gascoyne Food Bowl Project Stage II was established in 2012. Its goal is to significantly increase horticultural production in the Carnarvon area through the provision of new land and water resources for irrigation expansion. This project has $25 million funding from the State Government's Royalties for Regions program under the Water and Natural Resource Management program over four years (2012-16), with DAFWA as the lead agency. The project directly arose to implement the Gascoyne Food Bowl LCC recommendations and is a component of the greater Gascoyne Food Bowl Initiative.

DAFWA is developing land and water infrastructure for an economically robust expanded horticultural precinct and sustainable soil, water and catchment management practices for the Carnarvon horticultural district. The GFB Project proposes a 400 hectare expansion of the horticulture industry and identification of suitable soil for further future expansion of 800 hectares. This project will contribute to the economic diversity and growth of the Gascoyne region by increasing the value of agricultural production. It will lead to increased food security for Western Australians and the opportunity to grow domestic markets and develop export market opportunities.

It aims to increase horticultural production in the Carnarvon area to between $100 million and $150 million per annum through the provision of new land (400 hectares) and water resources for irrigation expansion.

The ownership and operation of the Gascoyne Food Bowl northern borefield expansion has not yet been determined. However, it has been decided that DAFWA will not be the long term owner or operator of the Gascoyne Food Bowl Initiative assets nor the bulk water service provider from the borefield it is establishing.

Additional Water

To focus groundwater investigations, DAFWA commissioned an airborne electromagnetic (AEM) helicopter survey to better understand the aquifer in the Subarea B–L area. The work was complemented by the DoW, which acquired data over the Subarea A area. Completed in 2013, the survey included all of the Lower Gascoyne River allocation area – from the coast east to Rocky Pool. Following this analysis, in 2013–14 DAFWA paid $300 000 for 12 exploratory holes and one production bore. Since that time, GWAMCO has invested $150 000 in additional infrastructure including substantial contribution towards the northern collector main, equipping three additional bores (of the exploratory holes) and connecting those bores to the mains and generators to power the pumping equipment.

This component aims, through the AEM survey data analysis, to identify the potential location, quantity and quality of aquifers to the east of the existing Carnarvon horticultural precinct. After potential targets were identified, exploratory drilling began to establish the soundness of the data

and location of suitable sites for production bores. Exploratory drilling commenced in September 2014 and will be completed by June 2015.

DAFWA will report water information to the DoW and aquifer modelling will follow so that the DoW can reassess the water allocations in Subarea B–L in the current Lower Gascoyne water allocation plan. The new borefield will go through the normal licensing assessment process by the DoW.

Running along the same infrastructure corridor as the power line, DAFWA (using GFB Project funding) is planning the installation of a collector main to take water from the borefield expansion area to connect into the existing irrigation supply system.

On completion of the drilling program, a pipeline will be designed and constructed to enable the delivery of 4GL/year of water to new horticultural precincts by connecting the new Gascoyne Food Bowl borefield to an existing pipeline. This new pipeline will have a sufficient diameter to convey additional water from east of the new borefield towards Rocky Pool, should the need arise to develop the resource in the future.

The Gascoyne Food Bowl pipeline is proposed to have the capacity to deliver 400L/second instantaneous supply. This is more than double the flow rate available from the existing northern borefield and will benefit all growers, especially during peak crop demand periods.

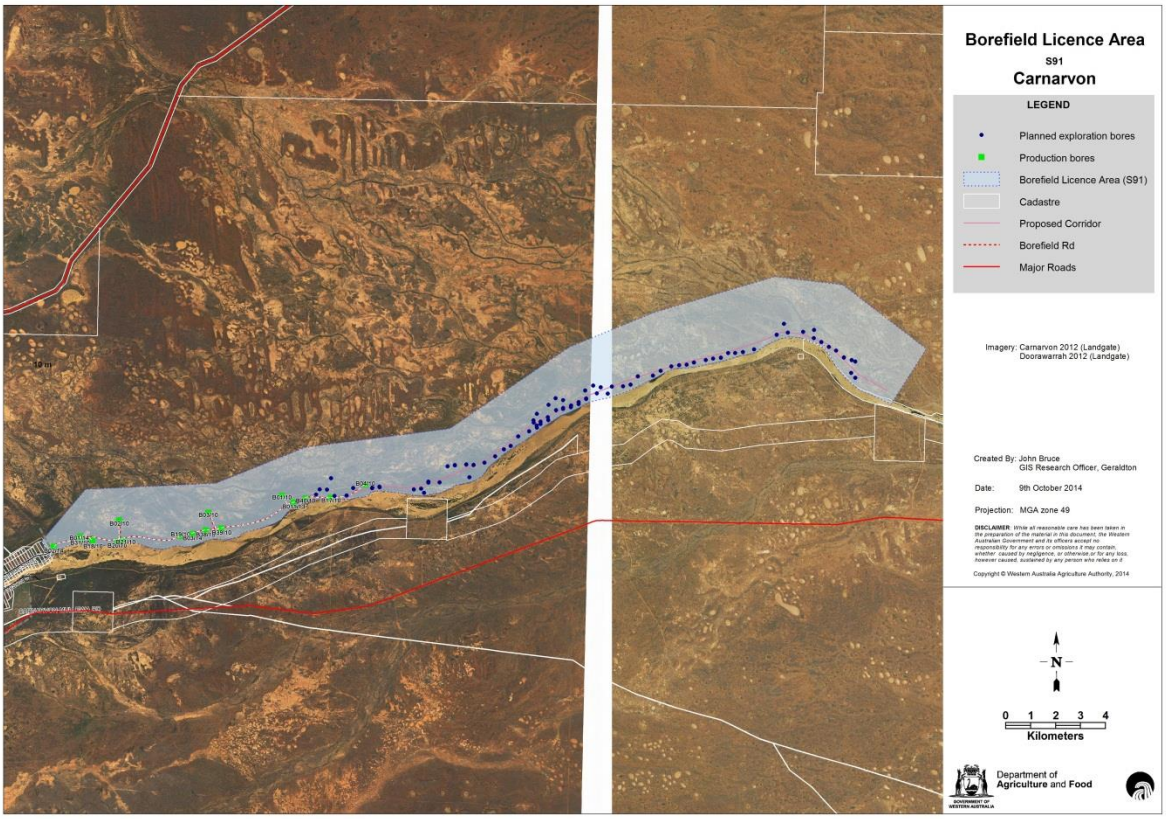

FIGURE 1: PRELIMINARY MAP INDICATING PROPOSED EXPLORATION AND PRODUCTION BORES, AND INFRASTRUCTURE CORRIDORS (DAFWA).

The High Density Polyethylene pipe (HDPE) collector main will be connected into the 2012 Gascoyne Irrigation Pipeline 900 mm supply main at McGlades Road to provide optimum pressure and serviceability. The preliminary design for the proposed GFBI pipe was based on a borefield of approximately 33 km (McGlades to near Rocky Pool), a supply of 10 L/second per bore and a peak flow of 20 L/sec per kilometre of river frontage.

After the release of the *Lower Gascoyne water allocation plan* (DoW October 2011), the GFBI planning was revised on the basis of the expectation of a 3.6 GL/year licence for the GWC/GWAMCO managed Stage1 northern borefield area, and a provisional allocation of 3.3 GL/year (with an option for 4 GL/year subject to evaluation) from the GFBI project Stage 2 borefield.

In addition to GFBI planning, CMAC commissioned a review of irrigation infrastructure to address issues related to the pressure in the irrigation area, southern borefield design, and integration with the GFBI northern borefield. The results of the review by engineering consultants GHD, and supplementary modeling requested by DAFWA indicates satisfactory peak flow requirements can be achieved.

Electrification

Horizon Power will be the asset owner of the power line for the northern borefield. The first stage of installation was completed in November 2014 and opened by the Hon. Ken Baston MLC, Minister for Agriculture and Food on 17 December 2014.

The second stage will extend the electrification of the northern borefield completed in Stage I into the new borefield and will be completed by September 2015. Electricity will be supplied via the design and construction of a high voltage open aerial power line for the combined length of the northern borefields.

The electrification of the northern borefield to 24 kms costs approximately $6 million, funded from the $25 million Royalties for Regions GFB Project and is expected to result in significant cost savings to GWC/GWAMCO, which previously relied on diesel generators.

Electrification will lower pumping costs relative to diesel generation currently being used in the northern borefield, and allow the borefield to be fully utilised in the future. When looped into the southern borefield power supply, it will create a much more consistent and reliable electricity system with fewer disruptions to growers and the general community caused by power outages and maintenance requirements.

While the GFB Project will fund the installation of the power line, GWC/GWAMCO are responsible for connection of mains power to the bores, including the cost of switchboards and connections to individual bores.

Land Development

The final major component of the GFB Project, following identification of at least 400 hectares of suitable land for horticulture, is the planning and approvals processes. The Department of Lands (DoL) is leading the tenure change process, including native title negotiations where necessary. The new land releases are seen as a key driver for the Carnarvon horticultural industry to increase opportunities for existing and new producers to market their produce both domestically and internationally.

The GFBI land releases are seen as a key driver for the Carnarvon horticultural industry to increase opportunities for existing and new producers to market their produce both domestically and

internationally. The process of developing the 400 hectares of identified land requires several processes, including obtaining environmental and planning approvals, assessing soil types and flood risk, and engaging with tenure change processes.

Tenure change involves especially complex and potentially lengthy processes, including Native Title negotiations. The Department of Lands (DoL) is leading the tenure change process on land that has already been assessed as having suitable soil types and acceptably low flood risks, via DAFWA's five class land capability ratings process, which is adapted from the Food and Agriculture Organization of the United Nations (FAO) (1976, 1983) interpretative systems. Ratings range from Class I, which has a very high capability for the proposed land use, to Class V, which has a very low capability. To ensure land released for horticulture will be productive and suitable for a broad range of crops only Class I-III land was selected. Major land qualities that are relevant to horticulture in the Carnarvon area include flood hazard, soil salinity and site drainage potential.

Ground based electromagnetic surveys (EM) in combination with soil sampling was used to quantify the soil and land attributes while hydraulic modelling (GHD and Department of Water, DoW 2010) provided a benchmark to determine flood risk.

The land identified for horticulture development was determined through DAFWA's five class land capability ratings process, adapted from Food and Agriculture Organisation (1976, 1983) interpretative systems. Ratings range from Class I (very high capability for the proposed land use) to Class V (very low capability). To ensure land released for horticulture will be productive and suitable for a broad range of crops only Class I-III land was selected as these have the major land qualities relevant to horticulture in the Carnarvon area, including flood hazard, soil salinity and site drainage potential. Ground based electromagnetic surveys (EM) in combination with soil sampling was used to quantify the soil and land attributes while hydraulic modelling (GHD and DoW 2010) provided a benchmark to determine flood risk.

The groundwater bores may be completed before the new land is released. If these bores can be connected to the irrigation distribution system there may be opportunity to use this water in the interim. A draft policy for "interim water use" has been developed by DAFWA. It proposes that the bores developed as part of the project can be used on an interim basis until land is ready for release. It is recognised that new water obtained from the extension of the northern borefield is ultimately reserved for new land, however it could be temporarily available during 2016 if required, subject to connection.

Market Analysis

Studies analysing the addition of 400 hectares of irrigated production in the Gascoyne horticultural region have been undertaken to understand the potential economic impact on the region. The modelling assumes that 50 per cent of the new land released will be used for fruit production and the remaining 50 per cent allocated to vegetables.

The total value added of agri-food industries for the additional 400 hectares of land is estimated at $40 million. At primary farm production level, an increased value of about $11 million is estimated.

The additional growth[2] generated in the economy, as the extra primary produce passes through different sectors until sold in the retail and export market, is estimated at a further $29 million. These are known as the non-farm sectors and include: manufacturing, wholesale, retail, export, etc, which are linked to the primary produce sector in terms of the flow of goods and services.

Contribution of agri-food industries in various measures $million

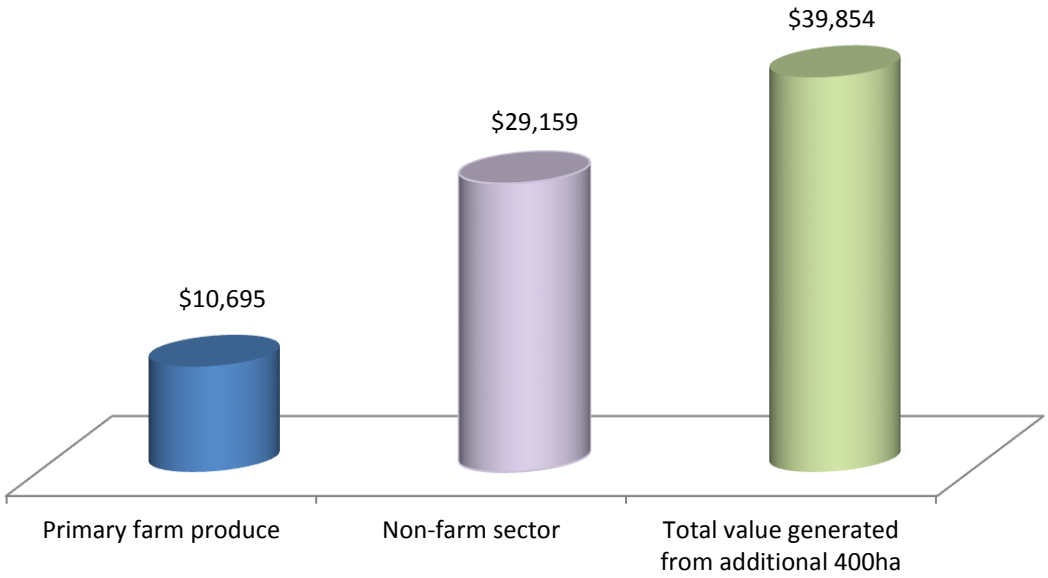

FIGURE 2: COMPARISON OF AGRI-FOOD INDUSTRIES VALUE ADD CONTRIBUTION (DAFWA).

Of $29 million generated from the non-farm sectors, the retail sector is the largest contributor (60 per cent), while the export sector is the smallest (3 per cent). The processing and distribution sectors contribute 17 and 20 per cent respectively.

It is estimated that an additional 100 full time employees will be employed in primary farm production and an additional 105 full time employees through the non-farm sector (assuming minimum wages).

In addition to domestic market analysis, the project will also commission a study to identify important emerging export market opportunities. The study will link rapidly growing high value horticultural imports in target markets in Asia and the Middle East with production capacity in the Gascoyne.

The export market opportunities report will inform current growers and new investors on prospective export markets and help guide export strategies.

[2] Value added refers to the value of the industry's direct contribution to the economy. More specifically, for every dollar added at primary farm production, it will generate about $1.56 and $4.39 in the economy for fruits and vegetables, respectively.

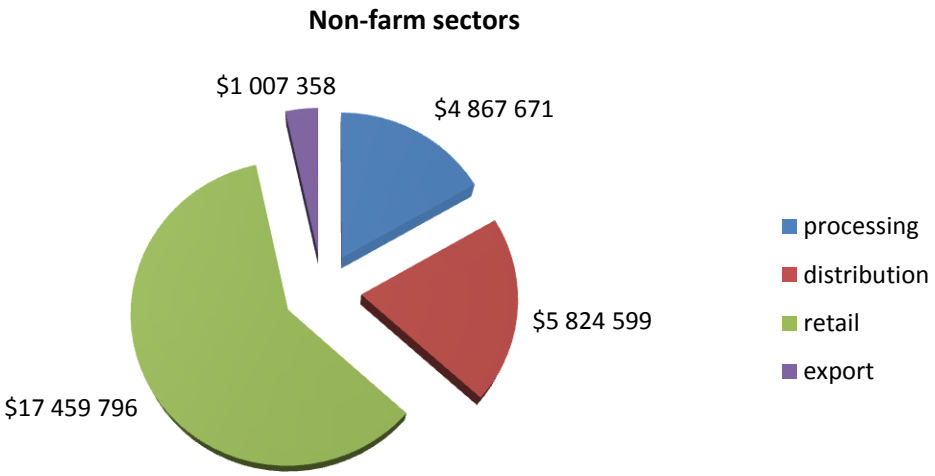

FIGURE 3: COMPARISON OF NON-FARM SECTORS CONTRIBUTION (DAFWA).

Land release

The GFB Project includes identifying and initiating land tenure change process on 400 hectares of land within the areas shown in Figure 4.

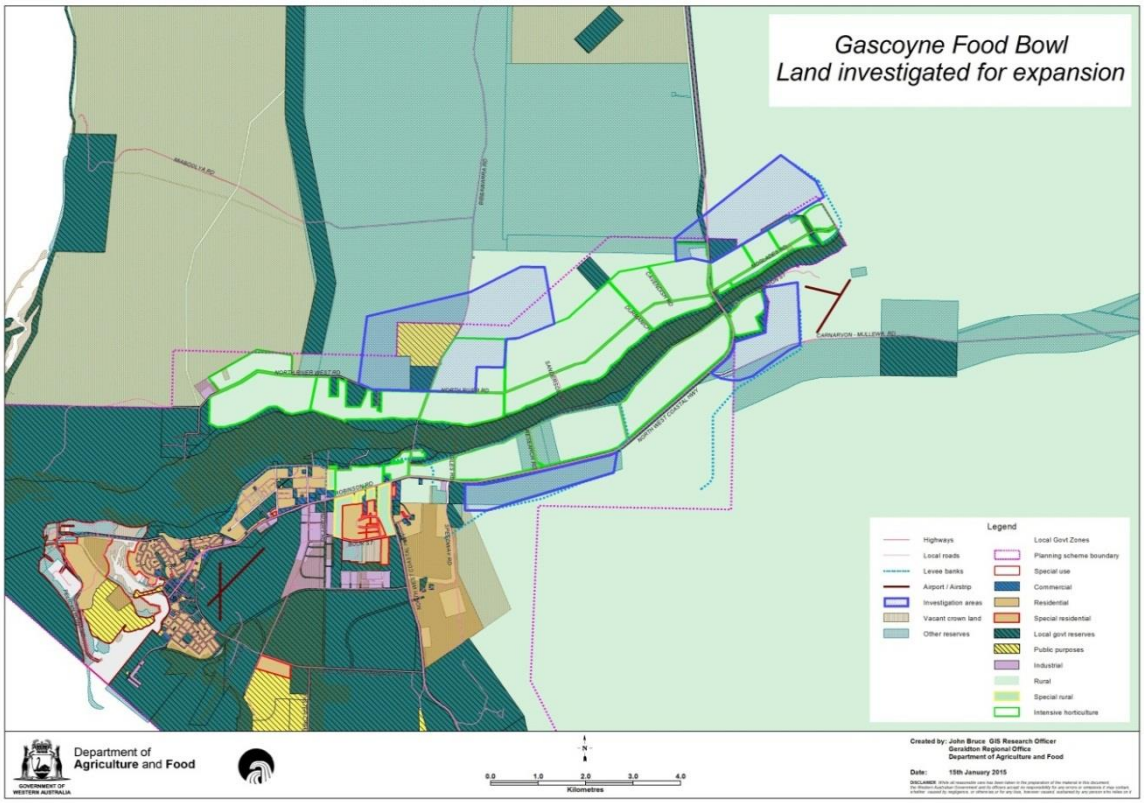

FIGURE 4: PRELIMINARY MAP INDICATING SUITABLE AREAS OF SOILS FOR HORTICULTURE UNDER THE GFB PROJECT, SUBJECT TO CONSULTATION AND FURTHER ANALYSES (DAFWA).

Approximately 62 hectares of land for potential prolongation is additional to the proposed land release area. The prolongation of land was included in the Gascoyne Food Bowl Project following requests from the local advisory group, with agreement that prolongation parcels met certain criteria. These criteria included:

- No entitlement to new GFB Project water;
- Parcels must be bordering existing grower properties;
- Parcels must not exceed 6 hectares; and
- Parcels met the same land selection process criteria with respect to soil types, floodways, etc as required for the 400 hectares of new land.

The land selection process for the new land was conducted with rigorous attention to soil types, floodways, environmental constraints, existing infrastructure, existing planning laws, and designed to complement the existing horticultural district. The DoL is a key stakeholder in taking the GFB Project lands process forward to land release, which is proposed to be a staged process that will take place following successful completion of Native Title negotiations and tenure change processes.

New applicants for GFB Project land will be subject to the same processes as existing landholders in procuring water entitlements. This would include becoming a member of the GWC and following the required processes to obtain water from the distribution system.

4 Regional Development

Regional Development policy is established under the appropriate Acts and Regulations and is set by the Minister for Regional Development through Department of Regional Development (DRD) and the Development Commissions.

The Gascoyne Development Commission (GDC) was created under the *Regional Development Commissions Act 1993* (WA) recognising the critical economic and social importance of ongoing development in key regional centres.

The GDC is responsible to the Minister for Regional Development and advocates regional priorities in State forums. The Chairman of the GDC board is a member of the Regional Development Council, which is the peak advisory body to State Government on regional development issues. The GDC CEO also advises the Regional Development Council.

The GDC's objectives are to promote, facilitate and monitor development in the region, by increasing the economic base, infrastructure, employment and services.

The Gascoyne Development Commission's Strategic Plan 2010 – 2020 identifies a 'prosperous horticulture industry' as one of its desired outcomes. Its priorities under this outcome are to:

- develop a high value export market;
- increase diversification;
- increase the horticultural area;
- create more employment opportunities;
- improve water infrastructure;
- position Carnarvon as a major marketing and distribution base for the North West; and
- create a cohesive industry.

4.1.1 State Government Royalties for Regions investment in the Gascoyne

To date (2008 – 09 to 2014 – 15), $218.7 million has been invested across all sectors of the Gascoyne region's economy (not just in irrigated agriculture in Carnarvon) through the State Government's Royalties for Regions program. This has been across a range of infrastructure projects and services to build upon regional strengths and provide a platform to enable the region to achieve diversification and long-term sustainability.

This investment has been guided by the Gascoyne Regional Development Plan 2010 – 2020 and the draft Gascoyne Regional Investment Blueprint. Both plans set an aspirational vision for the future of the Gascoyne, creating the pathway for the Gascoyne to become an internationally recognised tourist destination, a reliable global provider of quality food products and a maritime hub for energy project supply chains.

The $218.7 million investment includes a targeted $150 million Royalties for Regions investment through the Gascoyne Revitalisation Plan (GRP) for major infrastructure and community priority projects. The GRP funding commenced in 2010 – 11 and is funded over six years. The GRP aims to:

- build increased economic and socio-economic development capability and capacity;
- provide the community with an enhanced quality of life conducive to expected growth; and
- potentially generate employment opportunities for local businesses in the planning, works and operational stages of the proposed projects/initiatives.

A key feature to the GRP is having local people informing funding/project decisions. This includes:

- funded projects being drawn from the Gascoyne Development Plan 2010 – 2020, which was developed by the GDC and the four Gascoyne local governments in December 2009; and
- a local decision making body (originally through the Gascoyne Revitalisation Steering Committee, now replaced by the Gascoyne Advisory Group) has been established to identify, develop and recommend initiatives for GRP funding.

Some of the Royalties for Regions projects/programs investing in the economic and social development of the Gascoyne Region include:

- Gascoyne Food Bowl Initiative (the Gascoyne Food Bowl Project, Carnarvon Flood Mitigation Works, GIPP, CABAG);
- Carnarvon Heritage Precinct One Mile Jetty Interpretive Centre;
- Carnarvon Library and Art Gallery;
- Carnarvon Police and Justice Complex;
- Carnarvon Town Centre and Fascine Redevelopment;
- Carnarvon Community College;
- Exmouth Harbour;
- Exmouth Town Centre and Foreshore Revitalisation;
- Exmouth Multi-Purpose Service Redevelopment;
- Exmouth Recreation Centre - Upgrade works;
- Shark Bay Community Recreation Centre;
- Denham Foreshore and Existing Marina Improvements;
- Monkey Mia Jetty;
- Gascoyne Junction Rebuilding and Enhancement of the Town Centre;
- Coral Bay Seasonal Staff Accommodation;
- Country Age Pension Fuel Card; and
- Tourism WA Regional Events projects.

Further to the $218.7 million targeted investment, the GDC will also be able to access State project funding across five years to implement state-wide economic, social and community development projects in its Regional Investment Blueprints.

4.1.2 Gascoyne Regional Investment Blueprint

The Gascoyne Regional Investment Blueprint (Blueprint) is an aspirational plan, developed through extensive consultation and strongly supported by evidence; designed to map the way forward for the region, identifying opportunities, barriers and strategies to guide investment and development. The draft Blueprint was released for community consultation and review in April 2015.

The Blueprint establishes the evidence, framework and strategies for the Gascoyne to grow further through informed investment decisions; and contribute more in a national and global environment. It includes consideration of megatrends; the unique characteristics of the Gascoyne; and the regional drivers and inhibitors that will influence development.

It sets out the framework for achieving the Vision for the Gascoyne, structured around a number of Strategic Themes, including *Intensifying and Expanding Food Production*. It provides the comprehensive evidence base for informed decision making; coordinates public and private sector investments and establishes a strategy to identify and implement key projects and actions.

The Gascoyne horticulture industry is the third largest employer in the region. The Gascoyne's mild sub-tropical climate, secure water supply and abundant land provide the opportunity for quality horticulture products to be produced for both domestic and international markets.

The comparative advantage of the Gascoyne region in food production needs to be further actioned for the region to achieve its economic potential. This includes continued introduction of partial and complementary cropping onto pastoral land and the attraction of domestic and international investment into horticultural, pastoral and aquaculture production. Global demand for quality food is expected to grow rapidly in coming years as Asian countries grow in population and affluence. The aspirational target for food production in the Gascoyne region is listed in the Blueprint as:

	2015	**2050**
Area under cultivation	1 200 ha	3 600 ha
Value of Annual production	$ 80 million	$232 million
Employment - total workforce	375	1 100
Direct international export	No	Yes

4.1.3 Planning – Gascoyne Regional Planning and Infrastructure Framework

Planning policy is established under the various planning related Acts and Regulations and set by the Minister for Planning through the Department of Planning and implemented by local government.

The Gascoyne Regional Planning and Infrastructure Framework (March 2014) outlines the key strategies to support a whole-of-government approach to building strong and healthy communities in the Gascoyne. The four strategies for Carnarvon acknowledged in this plan are:

- prepare local planning strategy and review local planning scheme;
- provide the requisite hard and social infrastructure to facilitate and support growth of Carnarvon's population and local economy;
- undertake flood management and mitigation works; and
- identify sufficient and appropriately located land to accommodate growth.

5 Formation of the Cooperatives

Currently two cooperatives exist in the Carnarvon horticulture district – the Gascoyne Water Assets Management Cooperative (GWAMCO) and the Gascoyne Water Cooperative (GWC). In late 1996 Government approved the implementation of the Council of Australian Governments (COAG) strategic framework for the reform of the Australian water industry. Two key commitments in COAG's water reform agenda were the transfer of operational responsibility for the management of irrigation schemes to local bodies, and full cost recovery for water with transparent subsidies.

The following text is taken from State Water Strategy, Irrigation Review, Final Report 2005 and provides a background to the formation of the Carnarvon Irrigation Cooperatives.

> *"The process of privatising the irrigation scheme began in 1998 with the creation of the Carnarvon Business Unit by the Water Corporation. In 1999, the Carnarvon Irrigation Steering Committee (CISC) was formed with 12 grower members representing various water users including scheme users, mixed users and private bore only users. After much investigation and consultation the Gascoyne Water Cooperative was incorporated in August 2001. The cooperative then entered into a 12-month Operations and Management contract to run the irrigation distribution on behalf of the Water Corporation.*
>
> *At the same time, the Department of Environment announced the abolition of the conjunctive allocation system. Growers previously held a conjunctive licence that gave them access to groundwater from Basin A and scheme water from Basins B – L, up to a combined limit of 72 megalitres per annum per property. Instead, growers will be issued with a groundwater licence to abstract water from Basin A only and will need to apply to the Gascoyne Water Cooperative to access the scheme supply. The 72 megalitres would now be applied only to private bores for each property with a prolongation into the riverbed (Basin A). Furthermore, this allocation is under review by the DoE.*
>
> *Licences for the scheme distribution system allow it to take a bulk water entitlement of 5,000 megalitres and for this to be distributed equitably among the 176 growers. Grower meetings were held and the proposed allocation system demonstrated and discussed. The proposed system was based on the history of use over the previous five years. The new allocation of water entitlements was 1.5 times the average annual scheme use for all growers. This meant that growers would be allocated more water than they had ever taken from the scheme, with a minimum base entitlement set at five megalitres.*
>
> *At this point GWC was managing the distribution system on behalf of the Water Corporation, effectively as a subcontractor. The next step is for the cooperative to acquire the "business" and distribution assets. In September 2002, irrigators met and voted to form the Gascoyne Water Asset Management Cooperative (GMAMCO). The intention was to have the agreements signed and the business transferred by December 31, 2002. However, the Water Corporation's construction of a dedicated town water supply main was delayed, resulting in the transfer being deferred to July 1, 2003.*
>
> *On July 1, 2003 GWC commenced trading in its own right, leasing the assets, operating the business and raising revenue on behalf of its members (including raising funds held in trust, on behalf of the yet to be incorporated GWAMCO). In February 2004, GWC was able to offer additional water entitlements. When the allocations were calculated initially, the actual scheme losses were unknown. GWC and the Water Corporation made conservative assumptions that 14 per cent was the upper bound for all calculations. After running the system for a year, GWC determined that the actual water losses were in the order of five to six per cent, i.e. well within the margin allowed in the bulk entitlement. It was also decided to release a proportion of the company allocation of 750 megalitres which had been reserved for new members.*

As a result, in February 2004 GWC announced an additional share and water entitlement issuance. Every grower member of GWC was sent a letter explaining the issue, together with an application for additional water entitlements. At the same time, an application to dispose of unwanted shares and entitlements was also attached in case some shareholders had been issued with more water than they needed or wished. No member applied to dispose of any water entitlements; while some members, with properties in excess of 40 hectares, applied for as much as 200 megalitres as they had the opportunity to secure water for full development of their properties .

Transfer of assets from Water Corporation to GWAMCO

The Cooperatives were designed to be independent from Government and are registered under the *Cooperatives Act (2009).* As part of the formation of the GWC, the distribution irrigation assets were transferred from the Water Corporation to the co-operative in 2005 and a bulk water supply agreement was entered into. The assets were approximately 44 kms of distribution pipelines and associated valves and meters.

Following additional consultation with growers undertaken by the then Department of Environment in 2004, the transfer of assets was approved and completed in 2004/2005. However, the transfer of assets was delayed as three Motions of Disallowance have been lodged by members of Parliament. The boards of both GWC and GWAMCO are deeply concerned that no prior consultation was initiated. The CEO and the board have received no official complaints about their management from any member of GWC or prospective member of GWAMCO and the latest operational return to the Economic Regulation Authority (ERA) showed no written complaints from co-operative shareholders during the previous 12 month reporting period. At this stage the Transfer Order has been deferred for a period of three months to allow for more public consultation.

Consistent with Government policy of the day the assets were transferred by order of the Government at no cost to the co-operative and no payment to the Water Corporation.

Pricing structure for Cooperatives

The pricing structure was set with a fixed charge to be paid by growers directly into GWAMCO's asset replacement fund. The ratio of fixed to variable parts of the charge was set to a relatively high proportion of GWC's revenue from the fixed charge. This was to reduce the risks associated with fluctuations in water demand, thus protecting GWC's long term viability (Table 3).

TABLE 3: WATER CHARGES FOR GASCOYNE WATER AT TIME OF ASSET TRANSFER

Entity	**Type of Charge**	**2004**
Asset Co-operative	Fixed Charge	$1 900
Management Co-operative	Fixed Charge	$0.076 / kilolitre
	Consumption	$0.147 / kilolitre

The price GWC charged growers for water was proposed to progressively increase over a period of 15 years until it fully recovers the cost of bulk water and GWC's costs of supplying that water to the farm gate (including the fixed asset charge described above). In the interim the shortfall in the revenue raised by GWC and the costs of supplying water was met by a Government-funded operating subsidy.

An Operating Subsidy commenced in 2003 and was due to go until 2018. It was paid directly to GWC by the DoW. The Operating Subsidy finished in 2013 as a result of the upgrade and replacement of the Gascoyne irrigation pipeline.

5.1 GWAMCO

GWAMCO is a private irrigator co-operative, whose sole purpose is to own and manage the infrastructure assets. As such it does not trade but simply collects an asset levy from members to provide for future asset replacement. GWAMCO has tasked GWC, which is the trading co-operative, with managing the irrigation water supply management.

GWAMCO was created in 2004 to facilitate the transfer of assets of the Carnarvon irrigation district from the Water Corporation, as part of a series of COAG reforms.

The purpose behind creating a separate asset owning, mutual entity was twofold. Because it will not trade, GWAMCO will provide asset protection against potential failure of the operating co-operative and as a mutual it will have a tax benefit for the members as the principal (members' mutual funds) is non-taxable.

GWAMCO has a Board of Directors with one Board Member being common to GWC, the operator of the irrigation system. It is registered under the *Cooperatives Act 2009 (WA),* governed by Rules (the constitution of a co-operative) and publishes an Annual Report. A recent rule change voted upon in November 2014 allows for the two boards to have common directors should the members so wish.

At the time of GWAMCO's creation the northern borefield did not exist and the Gascoyne irrigation pipeline (which has since been replaced) and meters were transferred to the co-operative at no cost from the Water Corporation.

5.2 GWC

GWC has the mission statement "Irrigating Carnarvon into the future", which clearly sets out the aspiration of the co-operative. GWC is registered under the *Cooperatives Act 2009 (WA*), governed by Rules (the constitution of a co-operative) and publishes an Annual Report.

In 2001, GWC was incorporated and managed the distribution system to irrigators, under contract, on behalf of the Water Corporation until 1 July 2003 when GWC took full ownership of the irrigation water distribution business in Carnarvon and leased the piped irrigation infrastructure from Water Corporation. The Western Australian Government, in line with COAG policy agreed to transfer the Carnarvon Irrigation distribution scheme to local ownership.

Since that date, GWC has been delivering irrigation water to its members, maintaining the pipeline assets and collecting revenue from the members as well as collecting Asset Contributions which were held in trust for the future formation of GWAMCO. Since 2001 GWC has a Board of Directors with (one Board Member common to GWAMCO).

GWC membership (shares) runs with horticultural land. Shares are distributed in accordance with long standing agreement relating to individual properties. Those shares deliver an entitlement to a specified amount of water (which can be reduced according to the availability or 'seasonal announcement' of water on a pro rata basis). Members purchase water delivered via the scheme by way of an annual fixed charge based upon their share allocation, and a consumption charge based upon the water they actually use.

It is also possible to 'trade' water entitlement with another member, through:

- Temporary Trading – a member may conduct an Internal Annual Transfer (for the current season) and thus trade their current water allocation so long as they retain a minimum of 5ML/yr. The trade must be affected between members and be approved by GWC by completion of the appropriate forms.

- Permanent Transfers – an internal permanent transfer may only be affected by lodging with GWC a request in the prescribed form, for the approval of the o-operative. A minimum of 5ML/yr must be retained, and the trade effected between members.

5.2.1 GWC Operations

GWC operates under an Operating Licence granted by the ERA to provide irrigation water and non-potable services in the Gascoyne region.

In 2011 the ERA conducted a review of GWC, which concluded that GWC did not have an effective asset management system in place. This was the second consecutive unsatisfactory review of the system. However, since then, GWC has replaced the majority of its water mains and undertaken a complete review and upgrade of its asset management plan.

In July 2013 the ERA was satisfied with the progress made by GWC, with only minor concerns (as below) which have now been rectified. These included:

- improve its customer complaint procedures;
- update the replacement cost in the new pipeline and the northern borefield Asset Registers to reflect life cycle costing;
- regularly test contingency plans and maintain evidence of the testing and any action to be taken;
- include the projected financial position for at least the next five years in the Financial Plan in addition to income and expenditure forecasts;
- update GWAMCO's Capital Expenditure Plan for asset renewal, incorporating life cycle costing; and
- notify the ERA of significant changes to the Asset Management System within ten business days. [3]

The ERA's conclusions from July 2013 Operational Audit and Asset Management System Review are attached at Appendix 4.

5.3 Gascoyne Irrigation Pipeline Project (GIPP)

The GIPP involved construction of a new irrigation distribution pipeline and was undertaken 2011–2012, officially opening in April 2012. The project replaced the old asbestos concrete pipe, now decommissioned, with a new 31 kilometre modern high density polyethylene pipeline. The upgrade of the GIPP provided for increased water flows for existing plantations and new horticultural developments in Carnarvon and allowed for more efficient use of water, more effective distribution and in turn benefits the environment by not overstressing water resources.

The GIPP is now servicing 180 growers and 1 550 hectares under horticulture in the Carnarvon horticultural precinct, with provision for future Gascoyne Food Bowl expansion of the precinct by 400 hectares. The scheme life of the pipeline is estimated at 50 years.

Installation of supervisory control, data acquisition and telemetry controls has led to better data collection and availability consistent with the National Water Initiative.

GWC owns the Gascoyne irrigation pipeline. The project was delivered by GWC and GWAMCO, funding held by the DoW. The $17.083 million project was funded by the State Government's Royalties for Regions Program ($6.011 million); Commonwealth ($6.6 million) and GWAMCO ($4.472 million). The project was completed $2.8 million under budget and the savings were split between

[3] http://www.erawa.com.au/cproot/11607/2/Gascoyne%20Water%20Cooperative%20Limited%20-%20Operational%20Audit%20and%20Asset%20Management%20System%20Review.pdf, pages 42 & 75.

the State (about half the savings returned to Royalties for Regions fund) and half to the Cooperatives (see Table 4).

TABLE 4: FUNDING SOURCES AND AMOUNTS FOR THE GASCOYNE IRRIGATION PIPELINE

	Royalties for Regions (State Government)	**Federal Government's Water for the Future**	**Gascoyne Water Cooperative**
Funding Contribution	$7.4m	$6.6m	$5.9m
Project Savings	$1.389m	$0.0m	$1.428m
Cost of Contribution	$6.011m	$6.6m	$4.472m

This project was seen as one of the critical first steps to providing security of water supply to the Carnarvon horticultural precinct and its future expansion. The upgrade of the GIPP will have substantial economic, social and environmental benefits for the Gascoyne Region into the future.

6 Water resources

6.1 Water resource

Water resources policy is established under the various water related Acts and Regulations and set by the Minister for Water through the DoW.

The water supply for Carnarvon is sourced from the Lower Gascoyne River aquifer system. It is a regional unconfined to semi-confined system contained within floodplain sediments of the Gascoyne River. The sediments host two distinct aquifers in hydraulic connection: the Riverbed sand aquifer and the underlying Older alluvium aquifer. For management purposes the aquifer system is divided into two main subareas: Subarea A and Subarea B–L (FIGURE 5 below).

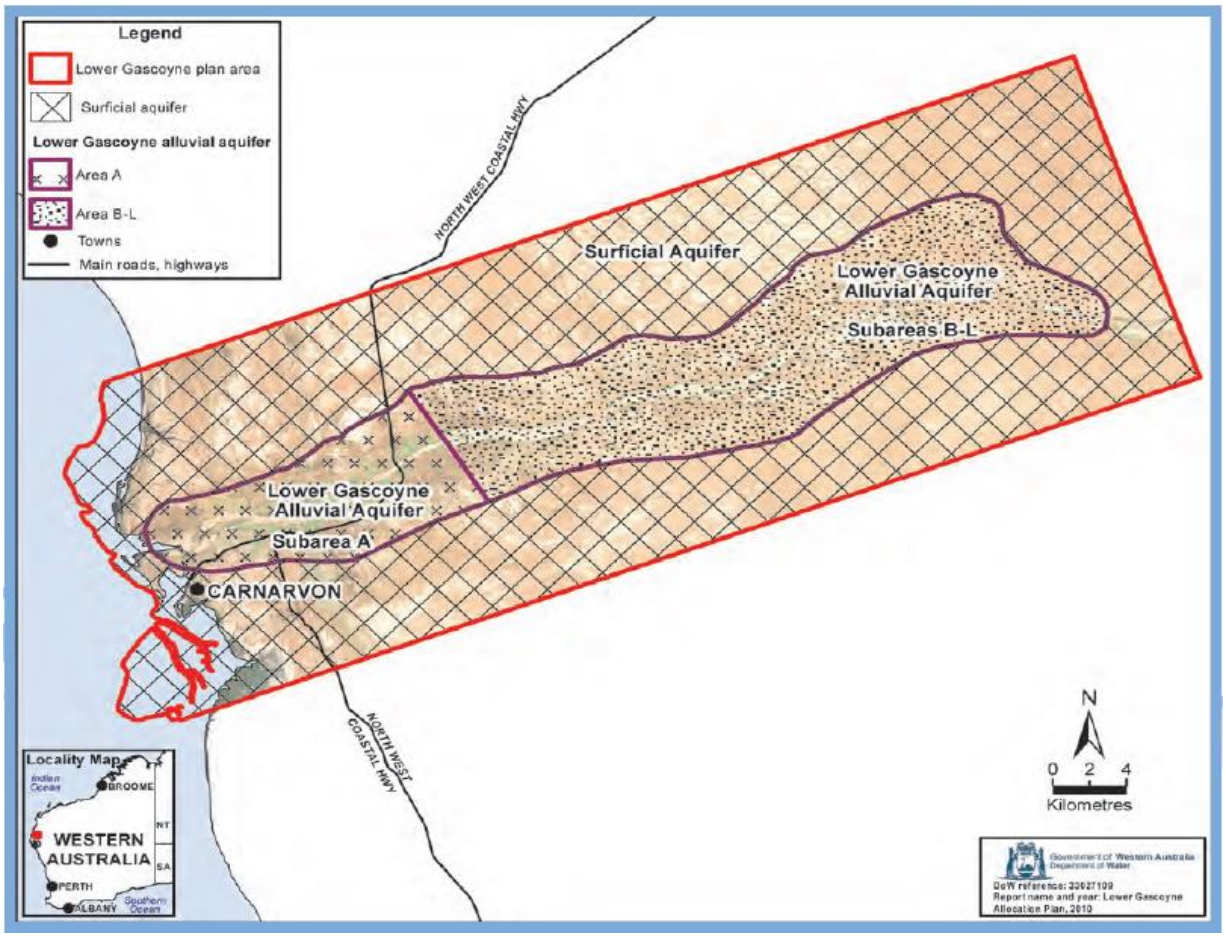

FIGURE 5: AQUIFER SYSTEM AND SUBAREAS AS OUTLINED IN THE LOWER GASCOYNE WATER ALLOCATION PLAN, DOW (OCTOBER 2011)

6.2 Lower Gascoyne water allocation plan

The DoW allocates groundwater from the Lower Gascoyne River aquifer system in accordance with the *Lower Gascoyne water allocation plan*, which was released in October 2011. The plan built on long standing "rules of the river", the previous 2004 allocation plan and advice from the Carnarvon Water Allocation Advisory Committee (CWAAC). The plan defines:

- the groundwater resources in the plan area;
- the water resource and water management objectives that will be used to determine the effectiveness of the plan and its management;
- allocation limits set for each resource for consumptive use (both licensed and exempt-from-licensing);

- allocation and licensing policies (legislative requirements, licensing policies and rules) that provide the guidance and decision-making framework for all licences in the plan area;
- monitoring and measurement program to track how the resource is responding; and
- how the plan will be implemented and regularly evaluated.

The methodology for determining how much water can be allocated is fully described in the plan[4] and the groundwater modelling results are reported by CyMod Systems 2010b.[5]

Freshwater is defined to be water with total dissolved solids (TDS) of less than 1000mg/L for Subareas A–L. However, due to the blended nature of the supply from Subarea B–L, an alternative trigger for individual bores of <850mg/L can be used.[6]

The plan is designed to achieve the following outcomes:

- continued provision of good quality water from subarea B–L to meet town water supply demand;
- support growth of the horticultural industry by making additional water available in Subarea B–L, through water service providers; and
- avoid permanent salinity damage to the water resource by addressing the over-allocation in Subarea A and redistribute water abstraction from areas of poor water quality to areas of high water quality. [7]

6.2.1 Low Aquifer Storage (LAS)

The plan acknowledges the seasonally variable supply of water and the need to balance consumptive use with the maintenance of the resource. The plan sets out management triggers to respond to changes in the status of the groundwater resources (freshwater)[8] where there is Low Aquifer Storage (LAS) and how to respond to these events. Part of managing the groundwater resources is setting out the rules that restrict the rate of abstraction in Subarea A in response to increasing salinity.

Under the management triggers in the plan, when an LAS event is declared the DoW's response is to temporarily increase the allocation limit from Subarea B–L by up to 2 GL/yr for a period of 12 months to offset restricted availability to licensees in Subarea A. Another temporary 12 month increase of the same or lesser amount may be permitted following this period subject to a reassessment of the subarea B–L aquifer storage levels. Following the 12 month or 24 month period the allocation limit will return to the limit in the plan. Further temporary increases to the allocation limit will only be issued beyond the initial 24 month period if an assessment of aquifer storage levels and modelling show that no adverse effects will occur. The temporary relief water from Subarea B-L is distributed through the irrigation network to Subarea A to meet demand.

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[4] Department of Water, 2011: *Lower Gascoyne allocation methods report. Background information and description of method used in preparing the Lower Gascoyne water allocation plan.* Western Australian Department of Water.

[5] CyMod Systems, 2010b: *The Assessment of Groundwater Resource of the Gascoyne Aquifer system Using GASFAMS v1.1, volume 2.* Unpublished report produced for the Western Australian Department of Water.

[6] The relationship of conductivity to mg/L TDS is calculated by a formulae that has been tailored to the area. For groundwater at normal salinity levels this = (conductivity at 25 deg*5.15)+95.16. For example 146 mS/m= 850 mg/L TDS and 176 mS/m = 1000mg/L TDS.

[7] http://www.water.wa.gov.au/PublicationStore/first/100376.pdf, p7.

[8] Freshwater is defined to be water with total dissolved solids (TDS) of less than 1000mg/L for Subarea A and <850mg/L for Subarea B–L.

The plan also allows for the temporary decrease to Subarea B–L allocation if required to protect public water supply and in-situ values. If the DoW, in conjunction with Water Corporation, determines that there is an unacceptable risk to the public water supply or in-situ values then a temporary decrease to the allocation limit in Subarea B–L to 10.7GL/y may be applied.

6.3 Evaluation of the Lower Gascoyne water allocation plan

Evaluation of water allocation plans is a part of the DoW's adaptive management approach to continually improve implementation of the plan and management of the water resources in a plan area. The evaluations are carried out internally each year, with a statement produced and published every three years. The following key outcomes of the evaluation that will influence policy decisions made under the plan are:

- improvements to the triggers for when low aquifer storage is declared to include both quality *and* quantity of the water stored, as it was previously limited to quantity; and
- adapting several local licensing policies in the plan.

The intent of the changes to the local licensing policies in the plan were discussed with CWAAC, CMAC and the Minister for Water in late 2014 and approved for use by the Minister for Water in March 2015. The improvements to the local licensing policies in Subarea A will facilitate better access to both freshwater and water with higher salinity, under certain circumstances. A statement documenting the changes to the plan is scheduled for release in June 2015.

6.4 Water allocation licences

6.4.1 Water Allocation Limits

The *Lower Gascoyne water allocation plan 2011* has set out the sustainable yields for the groundwater aquifers in Carnarvon. The area is separated into five sources (Table 3) with a total sustainable limit of 18.0GL/yr for irrigation. The take from these sources has been restricted by the lack of borefield infrastructure in the northern borefield and salinity conditions in Subarea A.

The surface water flows in the Gascoyne River are not licenced or restricted to a known volume.

Water allocation limits are the annual volume of water set aside for consumptive use from a water resource. The allocation limit consists of three components:

- licensable components (including general licensing and licensed public water supply);
- reserves (including future public water supply reserves); and
- unlicensable components (including water for exempt unlicensed use such as stock and domestic water use).

The allocation limits set in the plan are based on the modelled ability to abstract a given volume of fresh water from each of the subareas of the Lower Gascoyne system in any given year at 80% reliability. The 80% reliability of supply means that in eight years out of ten, licensees should be able to take their full entitlement. In the remaining two years the volume of freshwater that can be taken will be less than their licensed entitlement. This level of reliability of supply is a manageable risk to the resource, while still giving a moderate level of certainty to licensees that they will be able to receive their full entitlement in most years.

Water set aside for licensing in the Lower Gascoyne is the allocation limit minus the water set aside for exempt unlicensed use, public water supply and public water supply reserves. For details of the method and information used to set allocation limits see the *Lower Gascoyne methods report* (DoW 2010a).

TABLE 5: ALLOCATION LIMITS AS DEFINED IN THE LOWER GASCOYNE WATER ALLOCATION PLAN (2011) AND UPDATED TO 1 JANUARY 2015.

Source	Sustainable yield[1]	Reserved amount	Licensed amount	Average take
Subarea A (grower self-supply, restricted)	6.1	0.0	8.2 (2.1 over allocation limit)[2]	4.5
Subarea A – Unrestricted pumping from flowing river	Not Set	0.0	NA	1.0
Subarea A – Surface Water	NA	NA	NA	NA
Subarea A – tainted water[8]	NA	NA	NA	NA
Subarea B-L South Borefield Irrigation Scheme (Water Corp)[3]	5.0	0.0	5.0	5.0
Subarea B-L South Borefield Irrigation Scheme (Water Corp) LAS Relief Water[4]	0.0	NA	NA	NA
Subarea B-L GWAMCO North Borefield[3]	3.6	0.8	2.8	1.0
Subarea B-L GFBI North Borefield[6]	3.3[7]	3.3	NA	NA
Subarea B-L Unrestricted pumping (south or north)	NA	NA	NA	NA
Subtotal Irrigation Supply	**18.0**	**4.1**	**NA**	**11.5**
Subarea B-L South Borefield Town Water Supply (Water Corp)	3.6	1.8[9]	1.8	1.2
Yandoo surficial	0.1	0.0	0.0	NA
Subtotal Other	**3.7**	**1.8**	**NA**	**1.2**
Total	**21.7**	**5.9**	**NA**	**12.7**

A surface water allocation limit is not set for the Carnarvon irrigation district as flows are highly variable from year to year, however it still requires a licence when it is used.

The DoW may amend allocation limits if new hydrogeological information allows yield estimates to be refined or if monitoring indicates the plan's water resource objectives are not being met. The DoW will publish any amendments to the allocation limits.

6.4.2 Growers accessing Subarea A

There are approximately 160 private licence holders (growers) in Subarea A, who self-supply with privately operated bores. Twenty surface water licences have also been issued. There are an estimated additional 20 growers who do not self-supply through water licences and receive all their water via their co-operative share allocations.

Growers have access to the river bed via an easement that provides the legal right to maintain and operate water infrastructure. The number of bores on any given easement can vary, although most have 1–3 operational bores.

Individual entitlements vary according to the hydrological characteristics of the river bed in each location. Entitlements are intensively managed by the DoW to ensure usage is appropriate, and salinity thresholds are not breached. All bores and easements in Subarea A have Government owned meters installed and are read monthly by DoW staff.

Historically the total take from Subarea A has never exceeded the allocation limit due to the dual controls of monthly take and water quality for each licensee:

- The volume of water that can be assigned to an easement is assessed through the licencing process and the licensee can only take up to 10 000kL/month from each easement; and
- Abstraction is ceased if a bore reaches 1000 mg/L TDS, so as to protect the aquifers.

In recent years, there had been a trend of increased reliance on the GWC irrigation supply and declining usage of private bores. However, the limited irrigation supplies during 2013 and 2014 have prompted a renewed interest in maintaining private, self-supply bores.

Groundwater in Subarea A is likely to experience elevated salinity during long periods of no-flow river conditions that constrains groundwater production. Salinity thresholds are primarily in place to protect the aquifer during these no-flow periods.

6.4.3 Recouping Water Entitlements in Subarea A

Currently, Subarea A has a combined total of licenced entitlements of 8.2 GL/yr, which is greater than the sustainable yield of 6.1 GL/yr (2.1 GL/yr over allocated). There is a significant risk of permanent aquifer damage if it is overdrawn. However, the average take over the past 10 years has been 4.5 GL/yr i.e. Subarea A is over allocated but under-used relative to its sustainable limit.

A key action of the water allocation plan is the recovery of water entitlements to reduce the over-allocation of Subarea A by 2.1 GL/yr from under-utilised licensed groundwater and to ensure sustainability of the resource into the future. This was established in the 2011 allocation plan to occur every three years after the release of the plan and with the renewal of licences in March 2014. However in late 2013 the DoW determined that it was not practical to implement this recouping strategy at that time because of flood damage to infrastructure, LAS conditions and saline taint resulted in unusual water usage over the preceding three years. Thus it was determined it would be difficult to systematically assess water usage and recouping criteria.

Effective implementation of the recouping strategy requires collection of three years' of metered water use and salinity data, under normal storage conditions, to accurately determine where water entitlements are being under-utilised and where recouping can occur. The recouping strategy will be resumed in 2017 or 2018, based on metered and water quality and quantity data collected from three water years' of 'normal water storage' from January 2014 onwards. CWACC's role is to provide local advice on local conditions and extenuating circumstances for DoW to consider.

The recoup of water at the time of transfer or trade has been in place since the release of the *Lower Gascoyne water allocation plan* in October 2011 and Local Licencing Rule 6.2 specifically outlines the processes for the assessment of unused water entitlements at time of sale of a property in the Lower Gascoyne. This assessment also considers the usage and salinity history of the property as well as any exceptional circumstances of that specific property during the preceding ten years. This extended period allows the assessment to consider seasonal variation. It is the responsibility of the vendor (or their appointed agent) to inform prospective purchases that a review of the allocation at transfer will occur. The DoW can provide a presale assessment of transferable allocation to improve certainty to both parties. These processes are consistent with *Statewide policy no. 11. Unused Water Entitlements Policy 2013.*

6.4.4 Water Corporation – Southern borefield

The Water Corporation is the principal supplier of water, wastewater and drainage services in Western Australia and also provides bulk water for irrigation. It is owned by the Western Australian Government and is accountable to the Minister for Water the Hon. Mia Davies MLA.

The Water Corporation operates under an Operating Licence granted by the ERA to provide town water supply, sewerage and bulk water irrigation water supply in Carnarvon.

The Water Corporation has a licence from DoW to take 1.8 GL/yr of water for public water supply. This allocation is used to supply drinking water to the Carnarvon town site. In addition there is 1.8 GL/yr reserved for scheme water (thus a total allocation limit of 3.6 GL/yr for scheme water).

In order to facilitate the transfer of the irrigation distribution pipeline and assets to the Cooperatives, a separate water supply main into town was constructed in 2005 to avoid the risk of contamination of town water through irrigation at an estimated capital cost of $1.1million. This cost was covered by Government as an operating subsidy.

The Water Corporation has an Memorandum Of Understanding with the Department of Health to ensure water is consistent with the Australian Drinking Water Framework and Guidelines.

The Water Corporation also has a licence to take 5 GL/yr of water for irrigation use. This water is supplied to the GWC at the delivery point, Brickhouse pump station. Details on the supply of water to GWC from Water Corporation are outlined in a supply agreement (see Section 7.1.3).

6.4.5 Gascoyne Water Asset Mutual Cooperative – Northern borefield

The DoW has granted GWAMCO a groundwater licence for 2.78 GL/yr from the western half northern borefield with progressive staged development to the estimated sustainable limit of 3.6 GL/yr by the end of 2015. GWC does not have a groundwater allocation.

As can be seen from Appendix 3, GWAMCO does not currently take all of its current licenced entitlement (2.4 GL in 2014; 0.9 GL in 2013 and 1.5 GL in 2012) or have adequate borefield infrastructure to access its total allocation limit.

It is important to note that although there is a licensed allocation this does not automatically mean that this volume can be abstracted. For example, the GWAMCO northern borefield has an approved allocation limit of 3.6 GL/yr, but the current borefield does not have the capacity to take this volume. Thus GWAMCO's licenced entitlement is only 2.87 GL/yr until it develop the infrastructure for that borefield. The DoW has licenced GWAMCO with a progressive staged development pending infrastructure development up to the estimated full entitlement of 3.6 GL/yr.

6.4.6 Department of Agriculture and Food WA - Gascoyne Food Bowl Initiative

The *Lower Gascoyne water allocation plan* (2011) set aside an allocation of 3.3 GL/yr of groundwater to be developed from an expansion of the northern borefield. The information gathered through the Gascoyne Food Bowl Initiative investigations by DAFWA will be used to support the expansion of

the Carnarvon horticultural district from 1200 ha (8.6 GL/yr licensed entitlement), to 1600 ha, which will require a licensed entitlement of approximately 12.6 GL/yr.

Currently there is no water licence to DAFWA or a third party for this extended part of the northern borefield.

The current drilling and production bore testing will confirm the available water and an appropriate entitlement (proposed by DAFWA to be 4.0 GL/yr). This proposed take will be assessed using the updated Gascoyne Floodplain Aquifer Modelling System (GASFAMS) model and licence assessment process by the DoW in 2015/2016 financial year. This entitlement will be transferred with the borefield infrastructure to the preferred bulk water supplier (as DAFWA will not operate this borefield).

6.5 Adapting the water allocation limits to changing conditions

6.5.1 Revision of water allocation limits

There are a number of investigation programs and planning activities scheduled over the next three years that will improve plan implementation and adaptive management of the Lower Gascoyne River water resources in Subarea B-L. Most notably using the AEM survey results, the 'Gascoyne Food Bowl Initiative northern borefield drilling project', and associated hydrogeological investigation work to upgrade GASFAMS.

The allocation of groundwater to supply the expansion will be supported by information derived from the upgraded GASFAMS. This model provides the scientific basis to review allocation limits set in the plan and will be used to refine the allocation limits in Subarea B-L.

Any revision in these limits will be used to make decisions on how much water can be made available for the expansion of the Carnarvon horticultural district.

The following work programme is required to enable the revision of the allocation limits:

- Stage 1: AEM Survey (completed in 2013)
- Stage 2: Northern borefield expansion drilling results (DAFWA underway)
- Stage 3: Update and verification of the GASFAMS conceptual hydrogeological model
- Stage 4: Interpretation and verification of the hydrogeological information
- Stage 5: Update and peer review of GASFAMS
- Stage 6: DoW review of the allocation limits using the updated model
- Stage 7: Amendment to the plan detailing the changes to the allocation limits and any associated licensing rules or polices to support the changes.

The stages are planned to be co-funded by the DoW and DAFWA as part of the Gascoyne Food Bowl Initiative. The first stage is complete and Stage 6 is expected to be fully completed by December 2016. It has been agreed between the DoW and DAFWA that the model will be upgraded and run to assess the Gascoyne Food Bowl Initiative borefield sustainable take by the end of 2015 calendar year. All of the changes to the model, allocation limits and monitoring will be communicated through regular stakeholder and licensee contact by the DoW, and will be presented in the 2017 plan evaluation statement. If policy amendments to the plan are required they will be discussed, and set, through consultation with CWAAC and key stakeholders.

In response to a lack of flow between 2011 and 2014, detailed modelling work was undertaken by the DoW to assess whether the southern borefield could supply 5 GL/yr for 2015 and 2016 without a river flow. The results showed that there was reasonable confidence that the additional water can be extracted over both years.

Fortunately a flow occurred in March 2015 and the predictions were not tested. However, as a result of the drought period the understanding of how the aquifer performs under extended no flow periods was greatly enhanced. The improved understanding will enable the DoW to develop a robust seasonal response plan and increase supply reliability over extended drought periods. Development of a five year Seasonal Response Plan will be undertaken as part of the hydrogeological model upgrade proposed for 2016.

6.5.2 Middle Gascoyne Water for Food project

The Middle Gascoyne Water for Food project was approved by Cabinet in November 2014. The project allocated $2.6 million over the next four years to investigate the scale and quality of the alluvial aquifers, between Rocky Pool and the Kennedy Ranges in the pastoral areas around 40 – 130 kms upstream from the existing Carnarvon horticultural district. Water for Food is a part of the greater program Seizing the Opportunity Agriculture, which is a $300 m Royalties for Regions funded initiative. It is helping to enable the agricultural sector to seize the opportunity of rising global demand and increase agriculture production by encouraging private sector investment and engagement. DRD is currently exploring common needs across a number of agriculture projects under Seizing the Opportunity Agriculture initiative. Carnarvon Horticultural Precinct water provision and the GFBI are projects that would benefit from being linked in to the broader agenda for expanding State agriculture by engaging with private sector investment.

The Middle Gascoyne Water for Food project aims to define the volume of good quality water availability in the Middle Gascoyne River channel and set local allocation limits, monitoring and management strategies for use of groundwater in this area. The outcomes of the project will be linked to the management of the Lower Gascoyne plan area through the allocation planning process. This includes identifying the connectivity between the Lower and Middle Gascoyne River alluvial aquifers and if additional abstraction in the Middle Gascoyne could affect recharge, through flow and abstraction in the Lower Gascoyne area.

If there is significant new water located in the Middle Gascoyne, this would open up opportunities for industry to evaluate and make proposals relating to horticulture, the grow-on beef industry and other innovative agribusinesses. The distance from the Carnarvon irrigation district would appear to be cost prohibitive to link any water abstraction in the Middle Gascoyne to the irrigation water scheme for Carnarvon.

6.5.3 Carnarvon Artesian Basin Advisory Group (CABAG)

CABAG was established to develop strategies and suggest incentives to promote the sustainable use of Carnarvon Artesian Basin water on pastoral lands for diversified ventures. CABAG's role was to recommend the appropriate Government incentives and contributions by pastoralists to progress pastoral diversification.

The project produced a draft business case for sustainable diversification opportunities using Carnarvon Artesian Basin water. This document consolidates existing information on previous diversification trials in the Gascoyne and provides recommendations for options for using artesian water on pastoral lands. The committee only accepted a draft business case as the necessary economic data required to underpin the options analysis was unable to be completed (due to inability to secure the economic expertise required for this). As a consequence, CABAG was unable to provide adequate advice on sustainable development options for the Carnarvon Artesian Basin aquifer to strengthen the regional and state economy.

The project was successful in:

- Improving local licensing rules (removing water licensing burden) leading to modifications in monitoring and reporting of water use; thus forming an addendum to the Carnarvon Artesian Basin water allocation plan; and
- Providing recommendations by means of the draft business case to industry and Government in promoting sustainable water use thereby supporting the Pastoral Reform Agenda and expanding opportunity.

CABAG was funded by State Government's Royalties for Regions Programme for $43 642 and was led by the DoW.

6.5.4 New Water Resources Bill

In February 2015 the State Government gave consent for the DoW to draft the new Water Resources Management Bill that will replace the 1914 *Rights in Water and Irrigation Act* and five other acts regarding the management of water in Western Australia. It will consolidate the existing six Acts into one Act that will be simpler to understand and easier to administer. This Bill will set Western Australia up for the future and modernise legislation governing the management of, and access to, the State's valuable surface and groundwater resources.

The Water Resources Management Act comes after consultation with major water users and advisory groups, and learnings from water reform activities in other States. After the release of the 2013 public position paper 'Securing Western Australia's Water Future', the Government consulted widely, including holding State-wide public forums and establishing an industry reference group. A key message from stakeholder engagement was to proceed with the reform.

In 2012 the Government updated laws governing the water services sector - water, sewerage, irrigation and drainage services - by creating a new *Water Services Act* 2012. For more information, visit http://www.water.wa.gov.au

6.6 Gascoyne Stage 2 Flood Mitigation Works

The Gascoyne Stage 2 Flood Mitigation Works project comprised the full design of the four major levees - Lawson Street levee, Nickol Bay levee, South River Road levee and McGlades Road levee - totalling 16 kilometres in length and ranging in height from one to six metres. The system of levees will mitigate the effects and damages caused by severe flooding and provide a level of flood protection to the existing horticulture district and the proposed Gascoyne Food Bowl Initiative expansion. The four levees will reduce the impact of major river flooding in the greater Carnarvon horticultural district and minimise disruption to regional transport. The levees will protect a number of grower properties for flows above 6 metres at Nine Mile Bridge and will give very broad benefits to the entire area (north and south of the river) for levels above 7 metres. They will protect key water infrastructure in the region, including parts of the $17.083 million upgraded GIPP and the Great Northern Highway.

The levees were completed in June 2014. The project is ongoing and is being delivered by Main Roads Western Australia.

The State carries significant roles in the long-term life cycle for this project as asset owner and asset manager including responsibility for asset maintenance and responsibility for residual risk and liability issues. The DoL has ownership of the levees on behalf of the State and will monitor and implement the maintenance schedule for the upkeep of the levees. An amount of $2 million in Royalties for Regions funding has been quarantined for asset management and maintenance of the levees by the DoL.

TABLE 6: FUNDING SOURCES FOR THE GASCOYNE STATE 2 FLOOD MITIGATION WORKS.

Royalties for Regions – Gascoyne Revitalisation Plan	$25 million
Royalties for Regions – Water and Natural Resource Management	$20 million
Commonwealth Regional Development Australia Fund	$15 million

7 Water Service Provision and Charges

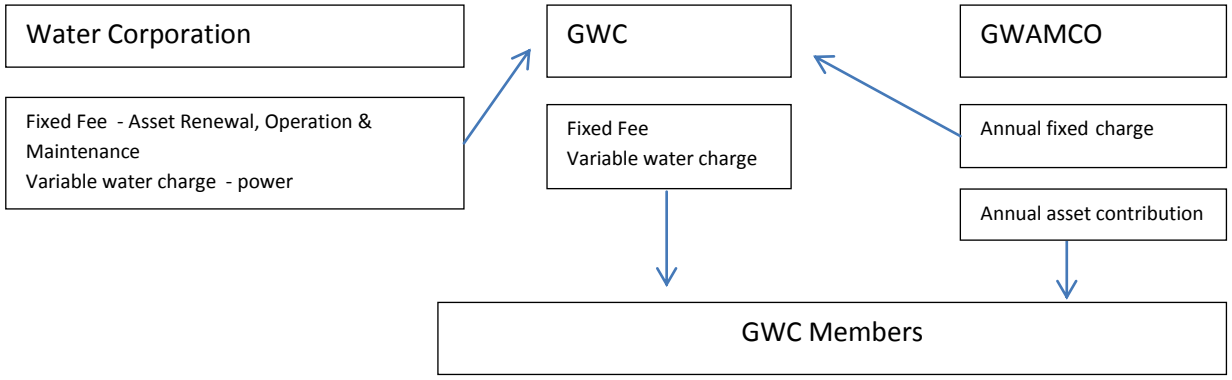

FIGURE 6: THE RELATIONSHIP BETWEEN WATER SERVICE PROVISION PARTIES AND THEIR CHARGES

7.1.1 GWAMCO

GWAMCO charges an annual asset contribution of $2 000 per member. This contribution is designed to replace existing assets, as and when required. This charge has contributed to the recent collector main (Gascoyne irrigation pipeline) replacement and will continue, with the same objective of asset renewals. GWAMCO is also able to levy an annual fixed charge to its members based upon the volume of water allocated to that member. GWAMCO had an annual fixed charge of $0.07 per kL of allocation to GWC between 2003 and 2012. This charge was designed to cover overheads, including general repairs and maintenance. However, since 2013 GWAMCO has not been levying that charge on its members. All fees are set by the Board (directors) of the Co-operative at budget review meetings.

7.1.2 GWC

GWC maintains and operates the western half of northern borefield and Gascoyne Irrigation Supply Pipeline (Section 5.2). GWC does not have a groundwater allocation.

GWC charges its members an annual fixed charge of $0.24 per kL of allocation, and a variable charge of $0.10 per kL actually used. There are also a series of penalty charges for over-use. The annual fixed charge is designed to cover overheads, including general repairs and maintenance. The variable charge covers costs that fluctuate depending on water usage, mainly diesel pumping costs, and in the future electricity charges for pumping.

In turn GWC pays Water Corporation for the supply of bulk water as outlined in the water supply agreement. All GWC fees are set by the Board (directors) of the Co-operative at budget review meetings.

TABLE 7: GWC AND GWAMCO FEES AT TIME OF FORMATION (2004) AND IN 2013

	2004	**2013**
GWC Fixed Fee	$0.10 per kL of allocation	$0.24 per kL of allocation
GWC variable charge	$0.07 per kL of allocation	$0.10 per kL of allocation actually used
GWAMCO asset contribution	$1900 / member	$2000 /member
GWAMCO annual fixed charge	$0.04 per kL of allocation	$0.07 per kL of allocation
WC Fixed Fee	$587 000	$766 860
WC Variable fee	$514 000	$514 000

TABLE 8: GWC AND GWAMCO FEES AT TIME OF FORMATION (2004) THROUGH EACH YEAR TO 2015

Year	GWAMCO Asset	GWAMCO Fixed (kL)	GWC Fixed	GWC Consumption (kL)
2004	1900	0.04	0.1	0.07
2005	1900	0.04	0.04	0.15
2006	1900	0.04	0.05	0.15
2007	1900	0.04	0.06	0.15
2008	1900	0.06	0.06	0.15
2009	1900	0.1	0.07	0.05
2010	1900	0.1	0.07	0.05
2011	1900	0.1	0.07	0.07
2012	1900	0.1	0.18	0.09
2013	2000	0.07	0.24	0.1
2014	2000	Nil	0.24	0.1
2015	2000	Nil	0.24	0.11

TABLE 9A: CASE STUDY EXAMPLE OF THE IMPACT OF THE SEASONAL ANNOUNCEMENTS BY GWC ON GROWERS.

Example 1 Joe Bloggs – Water Entitlement of 10 000 kL; Full allocation year; uses all 10 000 kL [NB Any member must be a member of both Cooperatives]:

Entitlement	GWAMCO		GWC		Total
	Fixed Asset	Fixed Charge	Fixed Charge	Variable Charge	
Full allocation	$2 000	$0	0.24 x 10 000kL = $2 400	0.11 x 10 000kL = $1 100	$5 500 ($0.55kL)
80% allocation	$2 000	$0	0.24 x 10 000kL = $2 400	0.11 x 8 000kL = $880	$5 280 ($0.66kL)
60% allocation	$2 000	$0	0.24 x 10 000kL = $2 400	0.11 x 6 000kL = $660	$5 060 ($0.84kL)
40% allocation	$2 000	$0	0.24 x 10 000kL = $2 400	0.11 x 4 000kL = $440	$4 840 ($1.21kL)

TABLE 9B: CASE STUDY EXAMPLE OF THE IMPACT OF THE SEASONAL ANNOUNCEMENTS BY GWC ON GROWERS.
Example 2 Sammy Snake – Water Entitlement of 120 000 kL; Full allocation year; uses all 120 000kL [NB Any member must be a member of both Cooperatives]:

Entitlement	GWAMCO		GWC		Total
	Fixed Asset	Fixed Charge	Fixed Charge	Variable Charge	
Full allocation	$2 000	$0	0.24x 120 000kL = $28 800	0.11x 120 000kL = $13 200	$44 000 ($0.37kL)
80% allocation	$2 000	$0	0.24x 120 000kL = $28 800	0.11 x 96 000kL = $10 560	$41 360 ($0.43kL)
60% allocation	$2 000	$0	0.24x 120 000kL = $28 800	0.11 x 72 000kL = $7 920	$38 720 ($0.54kL)
40% allocation	$2 000	$0	0.24x 120 000kL = $28 800	0.11 x 48 000kL = $5 280	$36 080 ($0.75kL)

7.1.3 Water Corporation Water Charges

2003-2013 water supply agreement

In 2003, the Water Corporation entered into a 10 year water supply arrangement to supply bulk water to GWC for distribution to its irrigation customers. Under the agreement, GWC is charged:

- an annual fixed bulk water charge; and
- a variable charge.

The fixed charge is based on GWC's proportion (73%, representing 5 GL of the 6.8 GL allocation for the southern borefield) of the cost of asset renewals, operations and maintenance of the collector main, borefield and pumps. The fixed charge covers operational and maintenance costs such as repairs or water quality sampling for regulatory requirements.

The variable charge is based on GWC's portion of the actual electricity expenses incurred for operating the assets.

The original annual fixed bulk water charge of $587 000 was set in 2003 when the water service agreement was signed. This has been escalated by CPI each year and in 2012–13 was $766 860.

The pricing model used to determine the charges was based on a nationally agreed framework. The pricing framework was set at the "lower bound" in that it did not include the costs for pre-2003 assets. Under this renewals approach assets originally constructed are not recovered (sunk cost). An Operating Subsidy is paid to the Water Corporation for the difference between the full cost of supplying the water and the revenue from GWC.

The renewals charge was intended to be sufficient to cover operational, maintenance and administrative costs and make provision for future asset refurbishment and replacement.

The fixed charge consists of predicted asset renewals (upgrades and replacements), annualised over a 150 year period and the anticipated operations and maintenance costs for the 10 year term of the agreement.

In 2013, a 'wash-up' of the charges to GWC was conducted. It was found that the renewals charge had been overestimated, resulting in a credit to GWC for the extra costs paid. However, the operations and maintenance had been seriously underestimated (due to the leaks and bursts on the collector main). Overall, the fixed charge paid by GWC resulted in the Water Corporation significantly under-recovering its costs.

Post 2013 water supply agreement

Water Corporation reviewed the charges to GWC as the 2003 Water Supply Agreement expired on 30 June 2013. Revised fixed fees and variable fees were proposed.

Fixed fee

A revised annual fixed charge of $1.2 million was proposed, charged annually in arrears in June each year, to fund the estimated renewals cost of the scheme.

The forecast increase in repair costs to the southern collector main has prompted the Water Corporation to estimate the cost of pipe replacement. The plan to replace the main has been estimated at $25 million (in 2013 dollars), see Table 10.

GWC's proportion of the total cost of replacement would be 73 per cent of the total estimate, on the basis of its 5 GL share of the total 6.8 GL that is supplied through the Southern Collector Main. The replacement of the main would significantly reduce the estimated cost of repairs and therefore the ongoing operating costs of the scheme.

TABLE 10 ESTIMATED MAIN REPLACEMENT COSTS

Items	Estimated cost of replacement (2013 Dollars)
Contractor's Preliminaries	$1 524 559
Provisional Quantities And Sums	$280 000
DN800 Distribution Main	$4 558 440
DN630 Distribution Main	$6 051 269
DN800 Principal Supply	$4 646 070
DN630 Principal Supply	$4 652 340
Water Corporation Non-Directs	$3 256 902
Total Estimate	**$24 969 580**

Operations and Maintenance

A change to the operations and maintenance charge was also proposed based on estimated costs for the financial year. At the end of each financial year, the charges would be recalculated based on actual costs, and either a debit or credit will be raised based on the under or over payment by GWC.

The operations and maintenance charge is now calculated separately from the fixed charge due to the variability of these costs from year to year. A number of the Water Corporation's large North West customers choose for their costs to be determined in this manner as it results in more cost-reflective pricing.

Under this calculation method, the operations and maintenance charge was estimated to be 29c/kL for an allocation to GWC of 5 GL/year ($1.4 million per annum). This would bring the current charges to around $2.6 million a year. Further, the operations and maintenance charge was estimated to increase to around 70 c/kL (in today's dollars) over a ten-year term of the agreement, bringing total charges to around $4.7 million a year. However, the charge would be reduced following the replacement of the collector main (due to a reduced need to fix leaks and bursts).

In recognition of the significance of this proposed increase and this current review, the Minister for Water determined in March 2014 to continue to charge the historical charge, pending Government review of current arrangements.

Horizon Power costs

Under the existing 2003-2013 agreement the Water Corporation charges the electricity costs of delivering water to the GWC under the variable charge.

Water Corporation is charged by Horizon Power at rates set by the Government. The 2013 State Government budget stated that from 1 July 2014 there would be a move to cost reflective pricing for 830 government agencies including the Water Corporation. Water Corporation is currently charged at the N2 tariffs below. In contrast Horizon Power's tariffs for business are set out below with GWC currently sitting under the L4 tariff.

TABLE 11: TARIFFS CHARGED BY HORIZON POWER FOR WATER CORPORATION (N2 TARIFF) AND GWC (L4 TARIFF)

N2 Tariff (Water Corp)	Cost
Supply charge - **dollars** per day	$6.2604
Electricity charge - cents per unit	57.9480c
L4 Tariff (medium/large businesses at low/medium voltage)	
Supply charge - cents per day	54.9960c
Electricity charge - cents per unit for first 1650 units per day	36.1369c
Electricity charge - cents per unit for more than 1650 units per day	32.6175c

Government announcement 2014

In 2013/14 the Water Corporation received a total Operating Subsidy of $566 million across the State. This covers discounts for pensioners and concession card holders, subsidy for the "uniform tariff" for residential customers as well as subsidies for where the Government has set or capped water and wastewater charges less than the true cost.

In October 2014 the WA Statement Government announced a series of budgetary saving measures. This included a 10 per cent per annum (7.5 per cent in 2014-15) reduction in operating subsidy payments to the Water Corporation matched by a requirement for these agencies to identify offsetting expenditure savings. The Water Corporation is working towards these targets.

7.1.4 Current Government Policy on Operating Subsidies

7.1.4.1 Water Corporation

The Water Corporation is paid an Operating Subsidy to cover the shortfall in revenue from bulk water sales to GWC and the cost of supplying that bulk water as approved by Cabinet in 2003. Any increase in the level or structure of charges to GWC is expected to require Cabinet approval.

The borefield assets (bores and collector main) are shared with town water supply so the operating subsidy has been estimated based on the assets and proportional water use. The Operating Subsidy associated with providing water to GWC is calculated by subtracting the revenue from GWC from the proportional costs. are outlined below. :

TABLE 12: GWC REVENUE AND ESTIMATED PROPORTION OF OPERATING SUBSIDY SINCE 2003 (Note numbers have been rounded)

	REVENUE		**COSTS**				**TOTAL**
$ nominal	**Revenue from bulk water sales ($)**	**Revenue from reimb of energy costs ($)**	**Capital - pre 2003 assets ($)**	**Capital - post 2003 ($)**	**Opex excl energy ($)**	**Opex – energy ($)**	**Total OS (costs – revenue) Millions**
2003/04	587 000	513 800	1 308 600	38 300	265 400	513 800	**$ 1.02**
2004/05	596 400	212 400	1 954 500	52 300	98 3400	212 400	**$ 1.51**
2005/06	616 900	174 600	2 112 200	84 300	229 500	174 600	**$ 1.81**
2006/07	643 000	287 400	2 245 600	92 700	195 300	287 400	**$ 1.89**
2007/08	665 600	215 100	2 322 200	109 300	248 400	215 100	**$ 2.01**
2008/09	694 200	252 400	2 339 600	124 900	362 000	252 400	**$ 2.13**
2009/10	709 200	302 300	2 219 000	131 900	703 700	302 300	**$ 2.35**
2010/11	733 100	331 000	2 123 900	130 400	909 600	331 000	**$ 2.43**
2011/12	752 300	340 500	2 044 000	126 400	635 500	340 500	**$ 2.05**
2012/13	766 8900	513 900	1 986 700	123 200	795 200	513 900	**$ 2.14**
2013/14	785 300	357 600	1 930 300	120 900	811 100	357 600	**$ 2.08**

7.1.4.2 GWC Operating Subsidy

As part of formation of the Cooperatives and recognising the need to allow them time to build up the asset renewal fund, GWC received an Operating Subsidy from 2003. The Operating Subsidy was paid from Government, progressively reducing over 15 years (to 2018). It finished in 2013 as GWC/GWAMCO installed a new pipeline. The money was paid by the DoW and amounts from the annual reports are outlined below:

TABLE 13: OPERATING SUBSIDY PAID TO GWC SINCE 2003

Year	Operating Subsidy paid to GWC ($)
2003	1 163 000
2004	844 204
2005	867 851
2006	884 144
2007	853 106
2008	820 325
2009	404 998
2010	771 042
2011	483 296
2012	393 187
2013	54 624
2014	

Appendix 1 Details of Memorandum of Understanding (Royalties for Regions): Gascoyne Food Bowl Project

Project Budget

Item of Expenditure	Cost ($'000)	RfR	GWC	DAFWA
Land Expansion				
Land Use Plan	250	200		50
Land Development for expansion	3 000	3 000		
Economic modelling and analysis	110	20		90
Water Resource Development				
Phase 2 Northern borefield Development	22 130	19 430	2 700	
Top water optimisation strategy for additional water resources from Basin A-L	550	550		
Natural Resource Management				
Gascoyne Catchment Plan	1 700	1 500		200
Improved Farm Practices for improved soil retention and improved water use efficiency	600	300		300
Total Cost	**28 340**	**25 000**	**2 700**	**640**

NB Figures valid at time of MoU (2011)

Royalties for Regions – Payment schedule

Deliverable	Payment details and timing	Amounts payable ($000)	Amounts paid ($000)	Date of payment
Execution of the MoU	Execution of this MoU	1 161	1 161	30 Jun 2012
Payments will be subject to progress, being demonstrated in relation to the activities and Milestones stated in the Project Timeframe	October 2012	2 344	1 000	25 Feb 2014
	March 2013	2 525	5 000	30 May 2014
	October 2013	4 430	-	-
	March 2014	4 860	-	-
	October 2014	9 680	-	-
Total		**$25 000**	**$7 161**	

Project Milestones

Main Activities / Milestone	Milestone Date	Responsibility	Status
Land Expansion			
Development of Land Use Plan			
• Consultation with Shire of Carnarvon and key stakeholder agencies)	June 2012 and November 2013	DAFWA	Ongoing
• Technical Studies (soils) completed	June 2013	DAFWA	AEM & EM38 surveys complete
• Expansion areas concept design complete	October 2013	DAFWA	Preliminary design complete
• Recommendation to Senior Officers Group of new land identified for expansion	November 2013	DAFWA	Awaiting review by DoL
• Design concept plan to State Lands to initiate tenure change (including Native Title) to occur (approx 12-18 months)	December 2013	DAFWA	Design with DoL for review
• Irrigation Area Structure Plan (IASP) contract awarded	February 2014	DAFWA	Delayed – awaiting drilling results
• Expression of Interest (EOI) to determine market interest and servicing scenario	March 2014	DAFWA	Delayed – awaiting drilling results
• Recommendation to Senior Officers Group regarding servicing of land identified for expansion	April 2014	DAFWA	Delayed – awaiting drilling results
• IASP modified following EOI and Scheme amendment submitted to Shire	November 2014	DAFWA	
• WAPC approval for structure plan and scheme amendment	April 2015	Shire of Carnarvon	
Economic Assessment: includes 1) Economic Impact of Project and 2) Opportunities and Impacts of Increased Production			
• Completed	December 2013	DAFWA	Preliminary work completed
• Reviewed and Updated	October 2014	DAFWA	
Completion of land development for identified 400 ha expansion			
• Design survey	April 2014	DAFWA	Land identified
• Headworks (power, roads, mainlines, fencing) installed	April 2015	DAFWA	
Preliminary development of additional 800 ha for future horticulture			

Main Activities / Milestone	Milestone Date	Responsibility	Status
• Design Survey	April 2014	DAFWA	
• Headworks (power, water, mainlines, fencing) scoped and costed.	October 2015	DAFWA	
Water Resource Development			
Northern borefield Phase 2 Development			
• Design contract awarded for planning Hydro and engineering and civil works	April 2014	DAFWA	Commenced
• Scope and contract specs completed	June 2013	DAFWA	Completed
• Hydrogeological investigation and Supervision contract awarded	December 2013	DAFWA	Completed
• Existing NBF electrification completion	April 2014	DAFWA	Design completed – work starts June 2014
• Aircore investigatory drilling commenced	January 2014	DAFWA	Contractor approved
• Formal agreement with Gascoyne Water Cooperative (GWC) to fund equipping of bores and continued borefield development	To be determined	DAFWA	NA
• Production bores drilled	April 2015	DAFWA/GWC	
• Pump testing commenced	April 2015	DAFWA/GWC	
• Program completed	June 2015	DAFWA/GWC	
Topwater Optimisation Strategy for Sub Area A-L' (for additional water resources)			
• Consultation scoping	April 2012	DAFWA	Delayed
• Engineering design	December 2013	DAFWA	Delayed
• Construction	October 2014	DAFWA	
• Testing and evaluation	August 2015	DAFWA	
• Water allocation application	November 2013	DAFWA	
Natural Resource Management (NRM)			
Gascoyne Catchment Management Plan			
• Evaluation of catchment impact on flood levels	December 2013	DAFWA	Completed

Main Activities / Milestone	Milestone Date	Responsibility	Status
• Consultation discussion of results	March 2014	DAFWA	Delayed
• Management Plan completed	October 2014	DAFWA	
• Plan implementation completed	October 2015	DAFWA	
Development of sustainable soil, land and water management practices			
• Consultation and planning	January 2012	DAFWA (with joint management committee, incl Carnarvon Growers Association (CGA) and Shire)	Commenced
• Implementation completed	July 2015	DAFWA (with joint management committee, incl CGA and Shire)	

Appendix 2 Lower Gascoyne River Water Allocation Summary – March 2014

Source	Sustainable yield[1]	Reserved amount	Licensed amount	Average take	Actual 2012	Actual 2013	Actual 2014	Actual 2015 (March)	Estimated 2015
Subarea A (grower self-supply, restricted)	6.1	0.0	8.2 (2.1 over allocation limit)[2]	4.5	3.0	2.5	4.1	0.67	3.6
Subarea A – Unrestricted pumping from flowing river	∞	0.0	NA	1.0	0.4	0.0	1.1	0.23	1.1
Subarea A – Surface Water	NA	NA	NA	NA	0.0	0.02	0.3	<0.1	0.3
Subarea A – tainted water[8]	NA	NA	NA	NA	0.0	0.02	0.0	0.0	0.0
Subarea B-L South Borefield Irrigation Scheme (Water Corp)[3]	5.0	0.0	5.0	5.0	6.3	6.1	4.0	0.76	4.0
Subarea B-L South Borefield Irrigation Scheme (Water Corp) LAS Relief Water[4]	0.0	NA	NA	NA	0.1	1.4	NA	NA	NA
Subarea B-L GWAMCO North Borefield[3]	3.6	0.8	2.8	1.0	1.5	0.9	2.4	0.81	3.0[5]
Subarea B-L GFBI North Borefield[6]	3.3[7]	3.3	NA	NA	NA	NA	0.1	<0.1	0.5
Subarea B-L Unrestricted pumping (south or north)	NA	NA	NA	NA	0.6	0.0	0.0	0.0	0.0
Subtotal Irrigation Supply	**18.0**	**4.1**	**NA**	**11.5**	**11.9**	**10.9**	**12.0**	**2.57**	**12.5**

Source	Sustainable yield[1]	Reserved amount	Licensed amount	Average take	Actual 2012	Actual 2013	Actual 2014	Actual 2015 (March)	Estimated 2015
Subarea B-L South Borefield Town Water Supply (Water Corp)	3.6	1.8[9]	1.8	1.2	1.1	1.2	1.2	0.37	1.2
Yandoo surficial	0.1	0.0	0.0	NA	0.0	0.0	0.0	0.0	0.0
Subtotal Other	**3.7**	**1.8**	**NA**	**1.2**	**1.1**	**1.2**	**1.2**	**0.37**	**1.2**
Total	**21.7**	**5.9**	**NA**	**12.7**	**13.0**	**12.0**	**13.2**	**2.94**	**13.7**

Footnotes

[1]The sustainable yield (limit) was determined following extensive consultation with industry and other stakeholders. It relied on the Gascoyne Floodplain Aquifer Modelling System (GASFAMS) model for the Lower Gascoyne area and assessed different scenarios of salinity and abstraction rate against recorded river flow lengths of 10 years. The model was peer reviewed using the adopted Australian standard by Dr Merrick and was seen as fit for purpose. The allocation limits also equate to an 80 per cent reliability (8 out of 10 years), an international benchmark. Higher sustainable limits resulted in medium to long term damage to the aquifer and less water for the industry in the lower salinity range required. The salinity threshold also matches DAFWA advice about maintaining soil health.

[2]*Lower Gascoyne water allocation plan* (DoW 2011) outlines the pathway to recover historical over-allocation in Subarea A.

[3] Water provided by (a) the Water Corporation from the southern borefield to the irrigation industry and (b) the GWAMCO northern borefield to be used to meet C-Class shares held by members of the Gascoyne water cooperatives.

[4]Low Aquifer Storage (LAS) period declared in September 2012 by the Minister for Water. LAS relief water licenses for this LAS period run from Oct to Sept as per the water licence year. LAS relief water licence Oct 2012 to Sept 2013 for 2.0GL of which 1.2GL used, Oct 2013 to Sept 2014 is for 1.5GL with all to be used at a rate of no more than 0.375GL/quarter.

[5]Current emergency drilling and production bore development by GWAMCO may increase this amount in 2014. The table can be modified depending on the results of the production bore development. Early indications are that four bores have been developed with a total production of 4ML/day.

[6]Identified for horticulture expansion under the Gascoyne Food Bowl Initiative (GFBI) and reserved for horticulture purposes at the request of the Minister for Water and the Minister for Agriculture.

[7]Allocation limits will be reviewed periodically as information is collated by DAFWA as set out in Table 7 (pg 26) of the allocation plan. The next planned review will use the airborne electromagnetic and GFBI drilling data to update the GASFAMS model and rerun the allocation scenarios. This is currently scheduled for 2015.

[8]The "tainting" of the river bed sands aquifer occurred in 2012 as a consequence of the major 2010–11 flood and smaller flow in 2012 and is considered to be a once in a 50 year event. There is approximately 1.3 GL of tainted water available for abstraction from the RBS aquifer in Subarea A. The uptake of licenses to abstracted against this tainted water in Subarea A is unknown. Early indications are that it will be limited, with three ground water licenses issued to date. Monitoring to confirm tainting issue reset out of early 2014 river flows.

[9]The reserved town water supply is not available for another use, even temporarily, as outlined in the allocation plan.

[10]Additional information is covered by Carnarvon Water Source Protection Plan.

Appendix 3 GWC – Asset Management System and Operating Licence Review

The following excerpts are drawn from the report prepared by Quantum Assurance for the Economic Regulation Authority (ERA) dated July 2013 (Gascoyne Water Cooperative Limited Operational Audit and Asset Management System Review). They relate to findings with respect to the Asset Management System (page 75) and Operating Licence Compliance (page 42).

Asset Management System

The review of the Asset Management System has shown that the system is operating effectively and meeting the expected performance standards under the Authority's licence.

The policies, procedures and supporting information to operate and maintain the system have improved since the previous review with revision of the Asset Management Plan and better definition of most policies and procedures. Several gaps remain in respect of:

- *Updating the replacement cost of the new HDPE pipeline and the Northern borefield Asset Registers and in the Gascoyne Water Asset Mutual Co- operative's (GWAMCO) Capital Expenditure Plan to reflect life cycle costing;*
- *Regularly testing the contingency plans;*
- *Including the projected financial position in the Financial Plan; and*
- *Updating the AMS Review section of the AMS for the requirement to notify the Authority of any (significant) changes to the asset management system within 10 business days.*

The review confirmed that out of 12 recommendations from the previous review report dated August 2011, 6 recommendations have been completed and 6 have been partially completed. The partially completed recommendations mainly relate to incorporating asset life cycle costing, regular testing of the contingency plans and including the projected financial position in the Financial Plan.

The review recommended that GWC:

- *Updates the replacement cost in the new HDPE pipeline and the Northern borefield Asset Registers to reflect life cycle costing, although audit acknowledges that this has already been recorded as an action item in GWC's AMS Improvements and Action Plan;*
- *Regularly tests the contingency plans and maintains evidence of the testing and any action to be taken;*
- *Includes the projected financial position for at least the next 5 years in the Financial Plan in addition to the income and expenditure forecasts;*
- *Updates GWAMCO's Capital Expenditure Plan for asset renewal, incorporating life cycle costing. The audit acknowledges that this action is already recorded in GWC's AMS Improvements and Action Plan; and*

- *Updates the AMS Review section of the AMS for the requirement to notify the Authority of any (significant) changes to the asset management system within 10 business days.*

Operating Licence

Through the execution of the Audit Plan and assessment and testing of the control environment, the information system, control procedures and compliance attitude, the audit team members have gained reasonable assurance that GWC has complied with its Water Services Operating Licence performance and quality standards and obligations during the audit period 1st May 2011 to 30th April 2013.

The audit reviewed the action taken on the previous audit recommendations in the audit report dated August 2011 and confirmed that all of the 14 previous recommendations had been implemented.

The following improvements were recommended in this audit:

- *Reviews and update the Customer Complaints Procedure Manual in order to align it with the customer complaints handling requirements of the licence.*
- *Where a final response to the complainant cannot be provided within 15 business days of receipt of a complaint, the officer handling the complaint should respond within 15 business days by written communication to the complainant.*
- *Ensures that if a dispute has not been resolved within 15 business days, the customer is informed of the option of referring their complaint to the Department of Water.*
- *Reviews the figures in the "Days taken to close complaint" column of the Complaints Register to ensure correct entries.*
- *Updates the Complaints Register in order to enable monitoring and recording of outcomes to complaints (i.e. add another column).*
- *Ensures the newsletters are accessible through GWC's website.*

The audit confirmed that GWC has fully complied with its information reporting obligations for the period 1st July 2010 to 30th June 2012. The audit made several recommendations to GWC to improve the strength of its internal controls over its complaints handling obligations. Otherwise, the control environment is considered to be effective.