Logue Brook Dam
Visitor Facilities and Services
Relocation Feasibility Study

Assessment of Relocation Options for

Waroona Dam (Lake Navarino)
Harvey Dam
Drakesbrook Dam (Lake Moyanup)

Prepared for the Department of Water
By Richard Hammond, Landscape Architect
February, 2007
Executive Summary

Project Objective
This Study identifies the physical capability and potential for relocation of recreation facilities and activities currently established at Logue Brook Dam to Waroona Dam, Drakesbrook Dam and Harvey Dam.

Project Scope
This Study has not considered water quality or quantity issues for each of the dams, these factors will be considered separately by the Department of Water. Advice was sought from key stakeholders including the Shires of Waroona and Harvey, Department of Water, Department of Environment and Conservation, Department of Sport and Recreation, Department of Fisheries and Water Corporation. Community and stakeholder consultation for any new or enhanced recreation will occur if the Logue Brook Dam proposal is approved by Government.

Existing Recreation Opportunities
The Study uses a transparent methodology of site inventory to identify established visitor sites and facilities and land and water based activities currently being provided that would be effected if Logue Brook catchment were closed to visitor access.

Existing established visitor facilities and activities are:

Logue Brook Dam: a tourist park, supply and service, a range of accommodation types, camping, day use sites, boat launching, power boating, water skiing, fishing, marroning, swimming, sailing, canoeing, kayaking, bushwalking, sightseeing, cycling and picnicking.

Harvey Dam: a concrete boat launching site, Gibbs Pools day use site, electric boating, sailing, fishing, marroning, swimming, canoeing, kayaking, bushwalking, cycling, sightseeing and picnicking.

Waroona Dam: a resort, supply and service, a range of accommodation, camping, day use sites, boat launching, power boating, water skiing, fishing, marroning, sailing, canoeing, kayaking, swimming, bushwalking, kayaking, bushwalking, cycling, sightseeing and picnicking.

Drakesbrook Dam: a day use site, picnicking, sailing, canoeing, kayaking, fishing, marroning and swimming.

Assessment of Suitability for Relocation
The Study identifies both generic and use specific ‘suitability factors’ as a basis for selection of sites suitable for development of visitor facilities and services that support recreational activities. Key factors are: physical characteristics, proximity to infrastructure, aesthetic appeal and conflict potential.

Relocation Options – Potential Facilities and Activities
This study identifies options for the potential relocation of visitor facilities and major activities. The options presented indicate physical ‘feasibility’ and will be influenced by other factors outside the scope of this preliminary study, such as social impact assessments, public preferences and review of options, political influences, managerial capability, costs and master development planning. Other options and combinations of options will likely evolve as any future project development unfolds.

The options are summarised in the Suitability Assessment table below.
Summary of Suitability Assessment
Established and potential recreation facilities and activities - Logue Brook Dam, Harvey Dam, Waroona Dam and Drakesbrook Dam

**NOTE:** THIS ASSESSMENT IS BASED ON PHYSICAL ASSESSMENT CRITERIA ONLY AND DOES NOT CONSIDER WATER QUALITY OR AVAILABILITY.

<table>
<thead>
<tr>
<th></th>
<th>Logue Brook Dam</th>
<th>Waroona Dam</th>
<th>Harvey Dam</th>
<th>Drakesbrook Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land-based facilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caravan park/resort</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Brockman Holiday Park to be relocated</td>
<td>Highly Suitable for full service facility</td>
<td>Highly suitable for new or expanded full service facility</td>
<td>X</td>
</tr>
<tr>
<td>Camping</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Brockman Holiday park to be relocated</td>
<td>Two sites Suitable or Highly Suitable for camping facilities</td>
<td>Two sites Suitable or Highly Suitable - new or expanded.</td>
<td>X</td>
</tr>
<tr>
<td>Day use sites</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Four sites to be relocated</td>
<td>Four sites Highly Suitable for day use development</td>
<td>Six sites Highly Suitable for day use development</td>
<td>✓</td>
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<tr>
<td><strong>Land-based activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycling</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Limited catchment access to cyclists</td>
<td>Development of cycle trails Highly Suitable</td>
<td>Development of cycle trails Highly Suitable</td>
<td>X</td>
</tr>
<tr>
<td>Bushwalking</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Limited catchment access to hikers</td>
<td>Development of walking tracks Highly Suitable</td>
<td>Development of walking tracks Highly Suitable</td>
<td>X</td>
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<tr>
<td><strong>Water-based facilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boat launch ramp</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>One formal, one informal ramp to be relocated</td>
<td>Expansion of existing formal ramp Highly Suitable</td>
<td>Three informal ramps, expansion Suitable</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Water-based activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power boating and water skiing</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Power boating and skiing to be relocated</td>
<td>Western sector of surface water Suitable</td>
<td>Zoned use areas Limited Suitability for expanded use</td>
<td>X</td>
</tr>
<tr>
<td>Sailing, canoeing and kayaking</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>All surface activity to be relocated</td>
<td>Central and eastern sectors Highly Suitable</td>
<td>Zoned use areas Highly Suitable</td>
<td>✓</td>
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<tr>
<td>Fishing and marroning</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Fishing and marroning to be relocated</td>
<td>Limited Suitability for expanded use</td>
<td>Limited Suitability for expanded use</td>
<td>✓</td>
</tr>
<tr>
<td>Swimming</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Swimming to be relocated</td>
<td>Highly Suitable for water play/swimming</td>
<td>Highly Suitable</td>
<td>✓</td>
</tr>
</tbody>
</table>
Tourist resort and/or caravan park

Options: develop one or more sites to provide some or all of the facilities and services currently provided at Lake Brockman Holiday Park (Logue Brook Dam).

H1 – Harvey Dam (south side): Highly Suitable (full service development).
W1 – Waroona Dam (south side): Highly Suitable (full service development).
W3 - Lake Navarino Forest Resort (north side): Suitable (expansion – full or partial).

Camping ground

Options: integrate with tourist camp/resort or develop separate sites similar to those currently provided at Lake Brockman Holiday Park.

H1 – Harvey Dam (south side): Suitable (integration but separate facilities).
W1 – Waroona Dam (south side): Suitable (expansion of existing camping sites or integration with tourist camp/resort).
W2 – Waroona Dam (south side): Highly Suitable (new campground).

Day use sites

Options: develop one or more focus sites for specific day use activities similar to those currently provided around Logue Brook Dam.

H2 – Harvey Dam (south side): Highly Suitable (water, picnic, fish).
H3 – Harvey Dam (south side): Highly Suitable (water, nature, fish).
H4 – Harvey Dam (south side): Highly Suitable (water, adventure, ski).
W4 – Waroona Dam (east end): Highly Suitable (water, nature, sail).
W5 – Waroona Dam (east end): Highly Suitable (water, nature, fish).
W6 – Waroona Dam (east side): Highly Suitable (water, ski, picnic).
W7 – Waroona Dam (north end): Highly Suitable (water, boat, picnic).
W8 – Waroona Dam (west side): Limited Suitability (information, picnic).
W9 – Waroona Dam (below dam): Limited Suitability (picnic, nature).
W10 – Waroona Dam (south side): Highly Suitable (water, boat, picnic).
D1 – Drakesbrook Dam Highly Suitable (picnic, sail, swim)

Boat launching

Options: provide formal or informal sites with built or natural terrain boat launching facilities similar to those provided on Logue Brook Dam.

Harvey Dam – established formal built ramp: Highly Suitable (retain or expand).
Harvey Dam - informal natural terrain sites: Suitable (define as part of master planning).
Waroona Dam - designated natural launch areas: Suitable (retain and enhance).
Waroona Dam – informal natural terrain sites: Suitable (define as part of master planning).

Mountain biking and Bushwalking

Options: provide facilities to service specific user groups similar to those provided at Logue Brook Dam and Lake Brockman Holiday Park.

Harvey Dam, Waroona Dam: Highly Suitable (integrate with resort/camping and day sites).

Power boating and water skiing

Options: permit or prohibit power boating and skiing on Harvey Dam; intensify or retain the current use level on Waroona Dam.

Harvey Dam - western zone: Suitable (integrate with land based facilities).
Harvey Dam – central/eastern zones: Not Suitable (non-power boat zone).
**Fishing and marroning**
*Options:* retain or intensify the level of fishing and marroning activity to compensate for possible loss of Logue Brook Dam.

Harvey Dam: **Limited Suitability** (establish sustainable level of use).
Waroona Dam: **Limited Suitability** (establish sustainable level of use).
Drakesbrook Dam: **Limited Suitability** (establish sustainable level of use).

**Sailing, canoeing and kayaking**
*Options:* maintain or expand the use of non-motorised watercraft on three dams.

Harvey Dam – western zone: **Not Suitable** (power boat preference).
Harvey Dam – central/eastern zones: **Highly Suitable** (non-power boat zone).
Waroona Dam – central zone: **Not Suitable** (power boat preference).
Waroona Dam – quiet zones: **Highly Suitable** (non-power boat zone).
Drakesbrook Dam: **Highly Suitable** (non-power boat zone).
Logue Brook Dam – Visitor Facilities and Services
Relocation Feasibility Study

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1. User Profiles and Demand Indicators
2. Site Selection Suitability Factors
Preface
The Department of Water is currently assessing a proposed trade of water between the Water Corporation and Harvey Water involving Stirling Dam, Samson Brook Dam and Logue Brook Dam. The project is proposed for implementation in 3 stages.

Stage 3 has implications for the future recreational use of Logue Brook Dam (LBD). Under the proposal, the primary purpose of LBD would change from ‘irrigation and recreation’ to ‘irrigation and drinking water supply’. If the trade were approved, recreation on and immediately around LBD would be prohibited in order to meet stringent public health requirements for a public drinking water source.

Part 1 – Introduction

1.1 Study Brief – Scope of Project
The scope of this study is to determine the feasibility and potential for relocation of recreation facilities and activities currently established at Logue Brook Dam (Lake Brockman) to other sites in the Southern Darling Range, specifically Waroona Dam (Lake Navarino), Drakesbrook Dam (Lake Moyanup) and Harvey Dam.

The study is to consider relocation in terms of a direct transfer of recreation activities, facilities, opportunities and experiences through the creation of new sites or enhancement of established facilities and sites. It deals specifically with physical site conditions and factors that determine feasibility and potential for relocation.

The aim of the study is to identify the type, estimated quantity and quality of recreation at Logue Brook Dam (Lake Brockman) and determine if established visitor facilities, services and experiences could be transferred to other dams.

The study and report is based on available project documentation, site observation, technical analysis, consultation reports and stakeholder comments. It is not within the scope of this document to summarise or reiterate all previous work, issues or preferences.

1.2 Background
Harvey Water conducted a community consultation process late in 2005 and prepared a report to the Department of Water identifying issues concerned with a possible trade of water involving Logue Brook Dam. The community expressed concern that the consultation process was inadequate and there was no substantive data on alternative recreation sites should Logue Brook catchment be closed. The Minister for Water Resources announced that a ‘landmark community dialogue’ would be undertaken. The Department of Water held the Logue Brook Dam Dialogue Forum in July, 2006. The Dialogue forum actively engaged the community and allowed all views to be heard and considered.

After the Forum, there was still an inadequate amount of information available on possible alternative recreation opportunities in Waroona and Harvey to replace those that could be lost from Logue Brook Dam. Accordingly, in October, 2006, the Department of Water was asked to determine the feasibility of relocation of recreation sites and activities at Logue Brook Dam to Waroona Dam, Drakesbrook Dam or Harvey Dam. This report has been prepared for that purpose.
Part 2 - Regional perspective

The reservoirs and rivers of the Southern Darling Range are of immense importance to the people of Western Australia as a focus for recreation, a sense of naturalness and well being and as a source of local area income. Visitors to the area help support local businesses and provide employment in the local Shires. The dams that are the focus of this study are strategically located in close proximity to the Murray River and Lane Poole Reserve to the east and numerous other rivers and reservoirs in the Darling Range to the north and south. Excellent road access to Logue Brook, Waroona, Harvey and Drakesbrook dams from the population centres of the coastal urban zone ensures that visitors from Perth, Rockingham, Bunbury, Collie and Mandurah can visit the area within a two-hour drive.

Inland freshwater lakes are a limited resource in the Darling Range and community demand upon water bodies for recreational pursuits is intense. Therefore creative planning solutions and active management of the limited resources available for recreation are essential.

Logue Brook Dam, Waroona Dam, Harvey Dam and Drakesbrook Dam are reservoirs that provide for a wide range of recreation opportunities and activities on the Darling Scarp within the Shires of Waroona and Harvey. Waroona, Drakesbrook and Logue Brook dams are the closest large ‘recreation’ dams to the Perth metropolitan region and are favoured as a focus for many active and passive water based activities, particularly during the summer season. Restrictions placed on recreational activities in other catchments in the area have also placed increasing pressure on the facilities and services provided at the remaining dams.

2.1 User profiles and demand indicators

Previous studies have identified a number of specific user groups that frequent the Southern Darling Range. Current user trends, activity preferences and preferred settings are also identified. Formulation of conclusions and options in this report was influenced by the profiles and available visitor preference studies. Refer to Appendix 1.

2.2 Statistical data

There are few reliable visitor surveys or user counts available. Given the lack of adequate quantitative data, some conclusions and recommendations in this Study are based on the observations and impressions of users and management staff. The figures suggest that large numbers of visitors only use the reservoirs of the Southern Darling Range during peak periods of the year.

The lack of user figures is a serious impediment to recreation planning and development. There is a urgent need for more quantitative monitoring of recreation usage and the resulting impacts on the natural environment. There is also a need to recognise historic and traditional uses of the area in conjunction with projections of future community use patterns and needs.
Part 3 - Inventory of Established Visitor Facilities, Activities and Experiences – Logue Brook Dam (Lake Brockman)

3.1 Tenure and management authority

The Logue Brook dam has a catchment of 3780 hectares of which 93% is State forest vested in the Conservation Commission of WA and managed by the Department of Environment and Conservation (DEC). While most of the shoreline of the reservoir is within the State forest zone, current recreational uses occur on lands and waters managed by several authorities, including DEC, Department for Planning and Infrastructure (DPI) and Water Corporation. The Department of Conservation and Land Management, now DEC, and Water Corporation jointly prepared the Logue Brook Reservoir and Catchment Area Management Plan (1990-2000). The plan is still in effect.

3.2 Major sites and visitor facilities

Lake Brockman Tourist Park (L1) provides a full service facility with cabins, bunkhouse, information shelter, powered and un-powered tent and caravan camping sites, ablution facilities, petrol bowser and kiosk/café. Semi-permanent sites cater for long-term caravan park visitors and residents. The Park is open all year, but has its peak business on long weekends and holidays. Numerous client groups use the Park including water skiers, fishers, bushwalkers, cyclers and some searching for a forest retreat. Day visitors may stop for information and a snack. A public boat ramp is located adjacent to the Park.

The Tourist Park is managed on a 15-year lease agreement between the Park Manager and the DEC.

Camp Logue Brook, located on private land north-west of Lake Brockman, provides a setting for educational, recreational, spiritual and social activities. The camp has chalets, communal hall and commercial kitchen. Key land based activities include volleyball, basketball, tennis, ropes course, orienteering, horse riding, mountain biking, abseiling and archery. Water focused activities include swimming, canoeing, rafting, water skiing/tubing, fishing and marroning.

Picnic sites with minimal facilities are provided by DEC in four locations around the lake. These are: Clarke Picnic Site (L5) with tables, a toilet and barbecues; Brockman Picnic Site (L3) with tables, a toilet and barbecues; The Rock (L2) with a toilet only; and Saddleback (L4) with a table only.

A natural surface launching ramp is provided at the north end of the saddle dam at Brockman. Informal sites and activities occur throughout the year around the perimeter of the lake within State forest. As the water level drops, driving above the waterline is possible and activity focal points become more dispersed. No facilities are currently provided for dispersed activities. Wild camping is prohibited outside designated areas, but does occur throughout the year.

3.3 Water based activities

Power boating and water skiing - Skiing is a favourite activity on Lake Brockman with a very dedicated and increasingly large group of enthusiasts. There are limited opportunities for inland water skiing in the Perth metropolitan region, therefore Lake Brockman is highly valued by users and is intensely used during peak periods. There is often congestion at take-off and landing sites. Use of the water surface is largely self-regulated, but there are still hazards to skiers and other users of the reservoir as a result of power boating and skiing activities.
A zoning plan over the water surface restricts high speed boating to the central portion of the water surface with speeds under 5 kph in speed-restricted zones. Disregard of the zoning restrictions is common. Policing is infrequent, but regulations are strictly enforced and citations given to infringers when caught. Intense use at the take-off and landing zones includes boat preparation, parking, picnicking, swimming and occasionally camping. There are toilets at only three designated picnic areas outside the Tourist Park.

The level of jet ski activity on Lake Brockman is unknown. Skiing occurs year round when sufficient water is contained in Lake Brockman, but summer months and long weekend holidays are favourite periods. Calm water periods, often morning and late afternoon, are preferred. Skiing occurs until after sunset during periods of ideal conditions.

*Fishing* - Fresh water fishing in the Darling Range dams, lakes and streams has been a popular part of recreation for many visitors for many years. The social significance of the activity is highly valued by many enthusiasts. Fishing in Lake Brockman is regulated and monitored by the Department of Fisheries. The lake is regularly stocked with trout as part of a guided Stocking Strategy. The lake is also one of the few remaining waterbodies in the region where redfin perch, which are known to predate on juvenile trout and marron, have not become established. A freshwater fishing review is currently underway in the State and new strategies may be utilised. Fish are taken by lure only from the shore or trolling from boats during the open season. Conflicts with other users are most pronounced on Lake Brockman during early morning and late afternoon periods when both fishers and skiers often enjoy ideal conditions for their sports.

*Swimming* – Swimming in Lake Brockman is a popular activity as a focus in its own right and as an adjunct to other activities such as power boating, water skiing and picnicking. Favoured sites focus on activity points such as boat launching areas, picnic sites, granite rocks and the shoreline adjacent to the Tourist Park. Conflicts between swimmers and other boating activities can be significant during seasonal periods when water levels are variable.

*Marroning* - Marroning is an activity unique to Western Australia and has been a social activity for generations. It is popular around Lake Brockman with enthusiasts staking claim to a favoured section of shoreline several days prior to opening day of the season in January. The season commences on the Friday in January that is nearest to the dark phase of the moon and extends for 23 days. Policing and monitoring of the activity is done by Department of Fisheries’ officers on an irregular basis during the closed season while routine patrols are undertaken throughout the recreational marron season. Problems associated with recreational marroning include fires and fireplaces close to the waters edge, lack of nearby toilets and driving vehicles off-road and camping outside designated sites.

*Sailing, canoeing, and kayaking* - The use of non-motorised craft such as sailboats and canoes on Lake Brockman is a common activity favoured by Camp Logue Brook clients, school groups and families. While most popular during warmer summer months, these uses occur all year around. The speed-restricted zones are the preferred areas for the activity, but sailing and canoeing does occur in all areas of the reservoir. Conflicts with powerboats and skiers are common with boat wash and collision risks present.

### 3.4 Land based activities

*Bushwalking* - Bushwalking is currently not a major activity in the Logue Brook catchment, but is enjoyed by some families, nature enthusiasts, walkers and school groups. Visitors to the area ask about walking opportunities. There are few designated walking tracks but roads and tracks and the perimeter of the reservoirs are commonly used. The Bibbulmun Track is located approximately 20 kilometers to the east.
A common theme in comments from area clients and individual/group users is the desire for more designated walking opportunities both in association with the water features and the forests. (Source: personal comment by the manager, Lake Navarino Forest Resort).

*Wild camping* - Camping is a favoured activity in the Logue Brook area and is encouraged in designated sites at the Tourist Park. Camping is prohibited outside the defined areas. There is inadequate capacity/facilities to cope with the number of visitors during peak periods resulting in serious problems and conflicts. Wild camping outside of designated areas is illegal but common, particularly when campsites are full. Activities around the lakeshore are largely unregulated with resultant overcrowding and conflicts between individuals/families and large groups, between skiers and fishers and between those seeking a quiet camp and those preferring a noisy camp. There is evidence of fire debris on the foreshore, particularly during marroning season.

*Picnicking* - Picnicking is a very popular activity around Lake Brockman in association with recreational pursuits such as skiing, sightseeing, fishing, marroning or swimming. Four minimum facility sites have been provided around the lake by DEC. Each has a limited range of facilities that may include a toilet, tables, fireplaces and information. Picnicking is popular at favoured take-off and landings locations at high water mark. The demand for this activity regularly exceeds the capacity of the existing facilities. Problems associated with dispersed picnicking around the reservoirs include lack of toilets, health and water contamination risks, litter and rubbish, soil compaction, loss of vegetation, bushfire risks, minimal management presence and unregulated user conflicts.

*Horse riding* – This activity is increasingly popular with visitors to the area. Camp Logue Brook is a major proponent of this activity and provides a hub for horse riding and grooming. Guided rides utilise roads, firebreaks and specially designed trails in the Logue Brook Dam area. There appear to be few conflicts with other user groups although use of the main road around the dam during peak periods may present some risks to users.

*Cycling* - Mountain/bush biking is a growth activity in the Darling Range and across WA. An indication of its popularity is the community support and popularity of the Munda Biddi Trail being built from Mundaring to Albany. The Logue Brook sector of the Munda Biddi Trail uses the bush track along the northern shoreline of the lake and crosses over the dam wall. The Tourist Park is a popular stopping point for visitors using the trail. Mountain bike riding is known to occur on other roads and tracks throughout the area, but numbers are currently low.

*Orienteering/rogaining* - Organised cross-country running and walking enthusiasts use the Lake Brockman area for organised events. Use is infrequent as successive challenges are seldom held in the same area, but the diverse terrain and vegetation cover are a desirable setting for this activity. Rogainers require a wild camp as a base for any event and prefer not to use established campgrounds.

*Adventure sports* - There are a number of known adventure activities currently occurring in the Logue Brook area in association with Camp Logue Brook. The potential for both water and land based activities is excellent. The area is also suited to ropes courses, tree climbing, bmx biking and other sports associated with well managed adventure or school camps.

### 3.5 Visitor experiences and perceptions

Identifying preferred visitor ‘experiential values’, let alone attempting to translocate them, is immensely difficult, perhaps impossible. There are no definitive social surveys or perception studies that focus specifically on user responses to landscape settings, personal preferences or visitor choices to use the Logue Brook catchment, Lake Brockman and the immediate area.
Observation, management comments, personal interviews, submissions to plans and comments during public forums suggest that the current user groups at Logue Brook Dam value the ‘unique physical and social character’ of the site as it exists and the experiences that it provides.

Key indicators that suggest preferred visitor experiences include:
- A lack of visible supervision and management;
- A sense of wildness;
- Minimal facilitation; and,
- Communal interaction in a wild, but not necessarily natural setting.

3.6 Facilities at Logue Brook Dam requiring relocation
- A tourist park – a full service facility with a range of accommodation types, visitor supplies, services, food and amenities;
- Formal and informal camping with support facilities;
- Minor day use areas – 4 basic sites;
- Boat launching facilities.

3.7 Activities at Logue Brook Dam requiring relocation
- Power boating and water skiing;
- Fishing;
- Marroning;
- Sailing;
- Canoeing;
- Kayaking;
- Bushwalking;
- Sightseeing;
- Cycling;
- Picnicking.
Datum and Project Information

Vertical Datum: AHD
Horizontal Datum: GDA 94
Projection: MGA 94 Zone 50

While all reasonable efforts have been made to ensure the accuracy of this data, no responsibility is accepted for any inaccuracies and persons relying on this data do so at their own risk.
Part 4 - Inventory of Established Visitor Facilities and Activities at Alternative Sites

4.1 Waroona Dam (Lake Navarino)

The reservoir is the great attraction and focus for many recreational and tourism activities in the Waroona Shire including fishing, swimming, skiing, tubing, marroning, picnicking and canoeing. While use does occur year round, most activities are seasonally restricted by regulation, water level or weather. During peak weekends, conflicts are common between user groups resulting in safety risks to visitors. Informal observation suggests that up to ninety boats have been counted on and around the Lake on a summer Sunday afternoon.

*Lake Navarino Resort* provides a full service development with cabins, tent camping, caravan sites, ablution facilities, activity rooms, fuel, restaurant and café. It is open all year, but has its peak business on long weekends and holidays between September and May. A broad range of individuals and groups use the Resort. They include weekend water skiers, fishers, bushwalkers and some wanting a forest retreat. Day visitors may stop for information, fuel and a meal.

*Navarino Campground*, located on the south side of the lake is designed for approximately 20 group and individual sites. On holidays and long weekends, there is no effective limit on the numbers of campers. Many visitors must then find space outside designated camping sites. Intense overcrowding and conflicts between user groups commonly occur. Toilets are provided, but are inadequate during peak periods. The site is very popular with individuals, families and groups intent primarily on water based activities, but some choose to use the camp as a base for bushwalking and sightseeing. Up to 1200 people have been counted in and around the campground on one Boxing Day.

*Waroona Dam Visitor Information Site* is located above the dam wall adjacent to the Resort. Picnic tables, shelter, parking and memorial interpretation are provided, but there is currently no visitor information. Excellent views to the reservoir are possible. The Water Corporation recently redeveloped the site as part of the dam remedial works program.

*Waroona Dam Picnic Site* is located below the dam wall and receives low levels of use. A toilet and tables are provided. The Water Corporation recently redeveloped the site as part of the dam remedial works program.

*Boat launching* sites are designated in three locations – two on the northern prong and one to the south of the dam wall. A toilet is provided at the southern location.

*Other recreational activities* known to occur in the Waroona catchment include camping in State forest (wild camping), marroning and exploring along Drakes Brook above the dam, horse riding, mountain bike riding, driving for pleasure and viewing wildflowers in spring, but little is known of these ‘informal’ activities.

The Waterous Trail, a designated loop off the main Munda Biddi cycle trail, traverses the area, crossing the dam wall.

4.2 Drakesbrook Dam (Lake Moyanup)

This reservoir is relatively small and is nestled in a scenic natural basin. It is generally kept full to nearly full throughout the year which helps maintain its scenic and functional appeal. Land based recreational activity is largely restricted to a reserve of land vested in the Water Corporation and leased to the Shire on the western shoreline of the reservoir. The remainder of the perimeter is located on private land. Primary land based activities are picnicking and sightseeing, while non-motorised craft, swimming, fishing, marroning and water sports are popular water based activities.
Drakesbrook Dam Picnic Site managed by the Shire of Waroona, is located on the western flank of Lake. This site is popular with residents of the town year round. The setting is very attractive, but usage has taken a toll on vegetation and surface terrain. Facilities provided include toilets, bbqs, picnic shelters and tables. The site is unpowered. The Shire and community have commenced implementation of a site redevelopment plan.

4.3 Harvey Dam

This reservoir was originally built in 1919 as the primary source of water for the town of Harvey. The reservoir has been the focus for limited non-motorised recreational activities over the years with a dedicated group of picnickers, fishers, marroners, bird watchers and canoers/kayakers. Tenure issues and the potential for the water to be used as future drinking supply has limited development opportunities for facilities or visitor services around the perimeter of the dam.

Recent changes in Water Corporation strategic planning suggest that Harvey Dam water will not be used as a public drinking supply. There are no built facilities on the largely inaccessible northern shoreline of the reservoir.

Gibbs Pool Amphitheatre is located below the dam wall. Facilities include an amphitheatre, picnic tables, toilets, play equipment, gardens and extensive parking. The site is located on Water Corporation land and is managed by the Shire of Harvey.

Boat launching is provided on the south side of the dam near the dosing plant.
Part 5 – Relocation Potential - Suitability factors

5.1 Generic site selection factors

Physical characteristics
- Sufficient area for proposed facility;
- Appropriate topography with some gently sloping to flat terrain;
- Diverse aspect opportunities;
- Ability to cater for a range of visitor types and needs;
- Diverse vegetation patterns, structure, edge;
- Attractive landscape setting and visual character, feature views a bonus;
- Uniqueness of setting and attractions;
- Stable soils with few drainage problems.

Infrastructure
- Ease of access to main roads, walking and cycle tracks;
- Economical access to services and utilities.

Aesthetic
- High degree of year around visual appeal;
- Appropriate sense/degree of naturalness;
- Proximity to water desirable;
- Unique sense of place suited to desired facility/activity.

Political and Managerial
- Compatible tenure, few development/use restrictions;
- Compatible adjacent land uses, businesses;
- High degree of predictable sustainability;
- Certainty of tenure;
- Compliance with requirements of the Native Title Act 1994;
- Ability to provide a spectrum of desired opportunities;
- Compatibility with strategic and management plans;
- Management responsibility;
- Regional context.

Potential Conflicts
- Established services and facilities;
- Meeting community expectations and needs;
- Established recreation sites and activities.

Site selection factors used as the basis for selection of sites suitable for specific facilities and services are included in Appendix 3.
Part 6 – Assessment of Suitable Relocation Sites

6.1 Harvey Dam - Physical Capability

Caravan/camping (H1)

H1 – this is a large land area with a diverse topography and vegetation cover suited to a full service camping, caravan, resort style development. Land cover types include dense woodland, open woodland and grassland. Views to the reservoir, plantations, pastoral fields, steeply forested northern flanks and diverse shoreline are available from around and within the property are extraordinary. Opportunities exist for lookout points, nature trails and linkages to new and existing regional cycle and walking tracks. The configuration of the shoreline is variable depending on water level, but is generally gently sloping with grass and herbaceous cover suited to picnicking and access for non-motorized water sports.

H1 has direct access to mains utilities (water and power) and the main sealed Harvey-Quindanning Road and a gravel road to a boat ramp and day use site within the H1 precinct. A master development plan would be required to determine most appropriate access, facility placement and site circulation. Site topography and vegetation cover suit a functional division between various accommodation types, activities and family or group user types. Effective zoning of water activities would complement design solutions for a land based visitor hub.

The land tenure over the majority of the site is Water Corporation. The tip of the peninsula is held by the State of WA. Chlorine tanks and a dosing plant are located immediately adjacent to H1 and could present hazards to visitors. A safe buffer zone and access route to the potential development site will require negotiation to ensure a safe distance is maintained. The minimum exclusion zone around the tanks is 50m, but the Department of Consumer and Employment Protection recommends at least 250m zone. A recent Risk Assessment, prepared by Water Corporation in accordance with EPA risk criteria methodology, indicates that residential type activities, including access/exit roads, should not be located within a 235m zone. Source: N Herbert, Water Corporation, December, 2006.

Conclusion: H1 has excellent potential for provision of full service visitor facilities. Development will require compliance with EPA/Water Corporation siting and design guidelines due to proximity of the dosing plant.

Key Issues:
- Master planning/site design;
- Visitor safety;
- Design constraints due to exclusion zone around dosing plant;
- Security of land tenure;
- Current and future management.

Day use picnicking (H2, H3 and H4)

Three large sites suited to development of nature based, minimum development visitor facilities are located on the southern shore of the reservoir.

H2 is a historically significant location between the shoreline and Harvey-Quindanning Road. The gently sloping edge zone between high water mark and dense vegetation rehabilitation zone is particularly suited to a day use feature area with facilities such as parking, information shelter, 4-5 tables, toilet and perhaps barbecues. Located in a proposed ‘quiet’ water zone the activity focus would be on picnicking, swimming, fishing, non-motorised craft and family activities.
Soils are stable. Views to the reservoir and landscape to the north are expansive and diverse. There is a sense of naturalness and remoteness as there are few obvious non-natural intrusions within the viewshed. A road link to the main road would be easily achieved and a walking track could link the site to H1, the accommodation hub.

Water level in the reservoir will determine the size of the open area with all facilities being located above high water mark. The land tenure is Water Corporation. Tourism based farm stay accommodation businesses are located immediately south of the reservoir.

**Future potential:** this site could provide a hub for non-motorised water sports and expanded picnic family facilities for year round use.

**H3** is a hilly peninsula with an extraordinary sense of remoteness. There are numerous locations suited to nature based day use facilities including scattered or clustered picnic tables, information displays, toilets and perhaps barbecues. The fringe of the site includes feature old growth trees and grassy fringes with the interior a dense zone of replanted vegetation. Both offer attractive settings for visitor facilities and activities. Soils are stable. The adjacent section of reservoir is akin to a naturally established wetland with a diverse shoreline configuration, dead stags and abundant birdlife. Views are both expansive and enclosed with an exceptional sense of naturalness. A single residence is visible to the northeast from some positions in H2 and H3. Located in a non-motorised zone, the area would particularly suit activities such as nature study, bird watching, fishing and non-motorised craft, particularly small canoes.

Access is possible from a number of locations on the Harvey-Quindanning Road. A loop track is established. Land tenure is Water Corporation. Nearby landowners include tourist accommodation.

**Future potential:** this site would suit a nature study educational focus and perhaps a nature based retreat centre, including accommodation, meeting hall and outdoor classrooms.

**H4** is a significantly disturbed land area used as a gravel source for many years. The surface terrain of much of the area has been scarified but is still unnaturally rough. Revegetation has resulted in a diverse cover ranging from sparse to locally dense. The fringing vegetation on the western slope is naturally established and extends to a distinctive peninsula. The landform drops steeply into the reservoir with little to no fringing grassland. Soils are stable. The adjacent section of reservoir may be suited to powerboats and water-skiers with a relatively large area of open water. Land based facilities could include parking, information, tables, toilets and barbecues. Internal views within H4 vary from disturbed to highly natural depending on viewer position. Views to the reservoir and to the rugged slopes to the north are attractive, but proximity to the pine plantation and views to the dam wall limit the sense of naturalness.

H4 may be suited as a day use base for a particular user group partial to motorised watercraft. The disturbed landscape area could potentially be suited to motorised or BMX bikes. The uses would be compatible with the nearby ramp and dosing plant infrastructure. A loop access track exists with direct links to the Harvey-Quindanning Road. Land tenure is Water Corporation. A nearby landowner could be affected by watercraft noise and an increase in visitation to the area with a reduction in privacy, however built facilities are unlikely to be visible from the residence.

**Future potential:** this site could become a hub for active recreational pursuits requiring a lower degree of naturalness, greater exposure and proximity to the reservoir zone allocated to motorised craft.
Conclusion: All three identified potential day use sites are highly suited to development of short stay visitor facilities and activities.

Key Issues:
- Site inventory, assessment and development planning;
- Visitor hazards due to proximity to the dosing plant;
- Land ownership/tenure;
- Management.

Note: All sites identified in this study were also identified as sites with exceptional potential for development of recreation and associated facilities in the Southern Darling Range Recreation Study, Cleary and Muench, (2001).

H5 Gibbs Pool Amphitheatre. The highly developed end of the visitor facility spectrum is well serviced at the intensively developed day use site below the dam. Facilities include an amphitheatre, kids playground, toilet, gazebos, barbecues, extensive gardens, formal paths and water access.

This site is a valued Harvey community asset used as a focus for family and community events, special concerts and social gatherings. It would complement the visitor facilities, services and activities being considered for development in this study.

Boat launching
An established boat ramp is centrally located just north of the dosing plant and adjacent to H1 (prospective accommodation hub) and is ideally suited to boating activities. A fully engineered and constructed boat-launching ramp is in place currently providing reservoir access for non-motorised boats and watercraft. Electric motor craft are currently permitted. The sloping terrain and raised ramp provide access during periods of variable water levels. A small defined car park, signing and toilet provide a base for visitors using the facility.

The ramp is purportedly under-utilised during all but exceptionally busy holiday periods. Capacity to widen the current ramp and expand the parking facilities is excellent. Proximity to both the large peninsula suited to an accommodation hub (H1) and a prospective day use facility (H4) is an advantage. Proximity to the dosing plant appears not to be a problem, but should be further reviewed for compliance with health regulations and safety standards. The land tenure is Water Corporation.

Additional sites suited to boat launching are available where gently sloping terrain provide a natural ramp to the water surface. A short section of old road at H2 is actively used for small boat launching and could complement the prospective day use site.

Cycling
There are no formal cycling trails currently located in the Harvey Dam area. The Munda Biddi Trail is located approximately 5 kilometres to the east. The possibility of a specially built track linking visitor facilities and sites around the reservoir is excellent.

Future potential: The Munda Biddi trail will require significant realignment due to mining activity in the southern Darling Range and the possible closure of Logue Brook catchment. Alternative alignments could include an expanded western loop to provide better access to nearby towns such as Waroona, Yarloop and Harvey and to business and feature sites at Harvey Dam.

Conclusion: There is excellent potential for provision of a range of special purpose cycling tracks in the Harvey Dam area with possible links to the Munda Biddi Track to the east.
Key issues:
- Location of tracks;
- User conflicts;
- Provision of support facilities and services;
- Land ownership/tenure;
- Visitor safety;
- Management and maintenance.

**Bushwalking**
There are no formal walking tracks currently located in the Harvey Dam area. The potential for a range of walking tracks suited to a spectrum of user groups is excellent. Possible walks could include an around the dam trail, links to Stirling Dam, Harvey town site, to vista points, to neighbouring accommodation sites or linking the day use focus sites.

**Conclusion:** There is excellent potential for a broad spectrum of walking trails from short distance nature focus to long distance adventure bushwalks. Links to key visitor hubs is highly desirable.

Key issues:
- Trail location, design;
- Land ownership/tenure;
- Visitor safety;
- Management and maintenance.

**Recreational fishing and marroning**
Harvey Dam is a popular destination for recreational angling and marroning. While there are no accurate estimates of participation rates regarding user numbers or seasonal patterns on Logue Brook or Harvey Dams, over 20,000 recreational licences are issued annually in WA to fish for marron and finfish. Fishing and marroning is done both from the shore, paddle craft and from electric powered craft and is particularly popular in the areas where trees have been left below high water mark. Marroning on the other hand is a strictly shore based activity and the use of boats to fish for marron is prohibited.

The recreational marron fishery relies on the sustainable management of the wildstock population and no additional stocking is undertaken to enhance the fishery. The trout fishery on the other hand is a ‘put and take’ fishery which relies on routine stocking events as trout have a limited capacity to form self sustaining populations in Western Australia.

The absolute carrying capacity of the trout fishery at Harvey Dam is unknown, however Department of Fisheries’ officers state that Waroona, Drakesbrook and Harvey Dams are ‘considered to be at maximum stocking capacity’ and that ‘overstocking trout would be extremely detrimental’. There is undoubtedly a finite area available for these activities.

Unregulated activities associated with fishing and marroning can have a negative impact on land base resources. Wild camping, toileting and discarding of rubbish can seriously degrade the natural setting if designated facilities are not available or are not utilised.

**Conclusion:** Increasing numbers of recreational fishers would place severe strain on the fishery of Harvey Dam, increase the level of conflict between fishers and degrade the desired experiential level. Potential conflicts between user groups would likely increase dramatically if water skiing were approved as well. Additional numbers of recreational anglers and marroners would require a highly visible management presence, effective zoning, on-going support from user groups and review of bag limits and seasonal access.
Key issues:
- Capacity and sustainable levels of use;
- Lack of data;
- Stocking levels;
- Visitor safety;
- User conflict resolution;
- Illegal marroning;
- Management and use monitoring;
- Policing and enforcement;
- Zoning.

Swimming
Water play is a favoured activity in Harvey Dam, particularly in association with key water access points around the shoreline, such as the boat launching ramp and proposed day use site H1. During periods of low water, swimming is dispersed as vehicles have access to a greater area. Visitors with boats swim from any position in the reservoir. Underwater stags, boats and other craft, floating debris and algal blooms can be seasonal hazards. There is currently no defined safe swimming area.

Conclusion: Harvey Dam could support additional use by swimmers if safety concerns were addressed. Designated areas could be identified in association with primary visitor facilities and sites.

Key Issues:
- Visitor safety;
- User conflicts;
- Designated sites;
- Water quality;
- Location and design of visitor sites and facilities;
- Zoning of water activities;
- Management and use monitoring.

Power boating, jet skiing and water skiing
Power boating and water skiing are activities that arouse human passions – both positive and negative. While Harvey Dam was considered a future drinking water source, fuel-powered craft have not been permitted. Water Corporation advised in July, 2006 that Harvey Dam was no longer being considered as a future drinking water source. Therefore, should that restriction be lifted, both activities may be considered for inclusion into the recreational spectrum suited to Harvey Dam.

Harvey Dam is physically suited to seasonal power boating and water skiing. The shape of the basin, shoreline configuration and surface area is compatible with basic requirements for the activities. The land based support facilities could be located in association with the established ramp, which would require expansion to cater for additional parking bays and number of daily launchings. Other facilities and activities such as non-motorised boating, swimming, fishing, picnicking, camping and other ‘quiet’ uses of the area could be affected. Noise intrusion may affect local residents/businesses and use of the amphitheatre. Businesses could benefit from customer servicing and provision of supplies. Alternatives to Harvey Dam for these activities within the Shires of Harvey and Waroona are limited to Waroona Dam.
**Conclusion:** Introduction of power boating and water skiing to Harvey Dam is physically possible. Existing and proposed recreational facilities, services and activities could be affected. An intensive management plan considering the needs and constraints for all water-based activities will be required to ensure minimal conflict between user groups on land and water.

**Key Issues:**
- Sharing/zoning of areas suited to all water based activities;
- User safety;
- Natural hazards, such as underwater tree stumps (which provide habitat for marron) and floating debris;
- Noise abatement;
- Access and launching point management;
- Support land based facilities;
- Compliance with Department for Planning and Infrastructure standards and gazettal of water ski areas;
- Management, policing, regulation and monitoring.

**Non-motorised craft**
Canoeing, kayaking and sailing are currently low use activities on Harvey Dam, but do have committed user groups. Conflicts with water-based user groups are currently uncommon, but increased use by boats and other water-based activities could result in increased potential for conflict. Launching of non-motorised craft is possible around the shoreline when the water level is low and is associated with shore based picnicking and other forms of water play. Land based issues include access, parking, toileting and support day use facilities.

**Conclusion:** The opportunity for expanded use of Harvey Dam by non-motorised craft is excellent, but is contingent upon provision of appropriate land based visitor facilities, zoning, and the spectrum of recreational activities that are encouraged, approved or expanded. An intensive management plan considering the needs and constraints for all water-based activities will be required to ensure minimal conflict between user groups on land and water.

**Key Issues:**
- Conflicts with powered craft;
- User safety;
- Natural hazards;
- Access points;
- Support land-based facilities;
- Zoning;
- Management, policing and monitoring.

6.2 Harvey Dam - Social Suitability

Establishment of an expanded spectrum of visitor facilities and services would have a dramatic impact on the social setting of Harvey Dam and its environs. It could also have a dramatic impact on the economy and social fabric of the Shire of Harvey – either positive or negative. The more developed end of the recreation opportunity spectrum will be enhanced while the less developed will be diminished by increased visitation and activity. The ultimate character of proposed facilities, services, activities and experiences would need to be determined as part of a community consultation and master planning stage of the project.

The social desirability and suitability of each component of the plan will require identification, assessment and judgement. Options will likely be conceived and evaluated.
The community and their representatives would need to be involved in determining whether water skiing or a caravan park or a resort or day use sites are ‘socially’ desirable. Government and private developers will help determine whether they are politically and economically feasible.

Note: Release of the Harvey Dam from the future ‘drinking water’ category opens an extraordinary opportunity for tourism related facilities and services to be evaluated. A more expansive and inclusive tourist precinct could complement the development of visitor services and recreation activities identified in this study. A long term vision is required through a Master Development Plan for the area.
6.3 Waroona Dam – Physical Capability

Waroona and Drakesbrook Dams are the primary focus of the Waroona Waterways Recreation and Tourism Master Plan, prepared for the Water Corporation in 2003. The Master Plan identifies a number of sites physically suited to development of recreation and tourism facilities and services around Lake Navarino. These include new or expanded day use and accommodation/camping facilities and possible expansion of the established Resort. A number of land and water based activities are also described and assessed in terms of suitability. The Plan provides a basis for the comments in this study.

Caravan/camping (W1, W2 and W3)

W1 – this is a large land area with gently sloping topography and jarrah/marri vegetation cover suited to a full service camping, caravan, resort style development. A small 20 bay minimum facility camping ground is currently located in the eastern sector of the potential development area. Land cover varies from uniformly dense to open woodland with grassland fringing the reservoir. Views to the water and surrounding forests are expansive from within the property. The setting is naturally established with few evident human influenced modifications and has a high degree of naturalness. The configuration of the shoreline is variable depending on water level, but is generally gently sloping with stable soils and grass cover suited to public access and activity. The entire site is owned freehold by the Department of Water.

Opportunities exist for lookout points, nature trails and linkages to new and existing regional cycle and walking tracks, including the Bibbulmun Track and Munda Biddi Trail. Road access to Lake Navarino from Waroona is via sealed bitumen roads to the Resort and dam wall. A high quality gravel surfaced Scarp Road Scenic Drive provides visitor access around the reservoir throughout the year. A spur road to the camping ground is established. Mains power terminates at the Resort and mains drinking water is not currently available.

A heavily used boat launching day use site is located immediately adjacent to W1 on the western flank. Development of a caravan facility/resort would complement the established activities at this site.

A master development plan would be required to determine the most appropriate access, facility placement and site circulation. Site topography and vegetation cover suit a functional division between various accommodation types, activities and family or group user types. The current zoning of water activities would influence design solutions for a land based visitor hub.

Conclusion: W1 has excellent potential for a large capacity full service visitor facility.

Key Issues:
- Master planning/site design;
- Possible conflict with facilities and services currently provided by Lake Navarino Resort;
- Visitor safety;
- Provision of utilities;
- Land tenure;
- Current and future management.
W2 - this is a moderately sized area with a gently sloping topography and jarrah/marri vegetation cover similar to W1 suited to a full service camping, caravan, resort style development or day use area. Land cover varies from uniformly dense to open woodland with grassland fringing the reservoir. Views to the water and surrounding forests are expansive from within the property. The setting is naturally established with few evident human influenced modifications and has a high degree of naturalness. The configuration of the shoreline is variable depending on water level, but is generally gently sloping with stable soils and grass cover suited to public access and activity. The entire site is owned freehold by the Department of Water.

Opportunities exist for lookout points, nature trails and linkages to new and existing regional cycle and walking tracks, including the Bibbulmun Track and Munda Biddi Trail. The site is located on a portion of the reservoir where power boating is prohibited. Road access to Lake Navarino from Waroona is via sealed bitumen roads to the Resort and dam wall. The high quality gravel surfaced Scenic Drive provides direct access to the southern boundary of this site. Mains power terminates at the Resort and mains drinking water is not currently available.

A master development plan would be required to determine the most appropriate access, facility placement and site circulation. Site topography and vegetation cover suit a functional division between various accommodation types, activities and family or group user types. The current zoning of water activities would influence design solutions for a land based visitor hub with a focus on non-motorised visitor activities.

**Conclusion:** W2 has excellent potential for a full service visitor facility with a moderate capacity.

**Key Issues:**
- Master planning/site design;
- Possible conflict with facilities and services currently provided by Lake Navarino Resort;
- Visitor safety;
- Provision of utilities;
- Land tenure;
- Current and future management.

W3 – is a portion of State forest vested in the Conservation Commission of WA and managed by DEC. It is currently leased as a full service caravan park and resort. The site was originally established as a work camp during construction of the dam. Visitor services and facilities provided by the Resort include a range of accommodation styles ranging from tent camping to on site vans and self contained chalet/cabins, communal kitchens, ablutions, a restaurant/kiosk, conference facilities, fuel and a small range of essential supplies.

The landform is gently undulating with a jarrah/marri closed forest vegetation association. The resort facilities are located on a raised landform with no direct vehicular access to the reservoir. Views to the water and the natural setting are filtered by vegetation, but are nonetheless attractive. The Waterous Loop Trail off the main Munda Biddi Trail is located on the southern margin of the resort.

Usage patterns suggest that resort visitation occurs year around, with peak numbers during summer long weekends and holiday periods. The business is currently focused on meeting the needs of water skiers, fishers and other water sport enthusiasts. The Master Plan identified the potential for expansion of commercial opportunities at the Resort with a focus on nature-based activities, specialist retreats, up-market dining and special events. The seasonal nature of the business, however, with its peaks and troughs were recognised as presenting management and financial difficulties for the lessee.
A relatively small portion of the lease area is currently being utilised. Expansion capability to the east of the currently developed area along the shore of the northern prong of the reservoir is excellent. A newly designed and purpose built caravan park and resort could complement the established facilities and enhance the appeal of Lake Navarino. An active boat launching site and day use site is located immediately to the north-east.

**Conclusion:**

W3 has excellent potential for expansion of the established Lake Navarino Resort.

**Key Issues:**

- Master planning/site design;
- Integration with facilities and services currently provided by Lake Navarino Resort;
- Implications for the current lease holder/service provider;
- Visitor safety;
- Access to the reservoir;
- Provision of utilities;
- Land tenure and lease arrangements

**Day use picnicking**

W4 and W5, located on the south-eastern prong of the reservoir, offer a pleasant sense of remoteness and suitability for day use site development. Both sites are currently accessible by narrow dirt spur tracks off Scenic Drive and are popular with fishers, marroners and sight-seers, particularly when the water level is high. Access tracks to the sites are linked during periods of low water creating a loop option. There are currently no facilities provided at either site with evident site degradation, loss of vegetation, litter, toilet waste and informal parking sites. Views to the reservoir and beyond are expansive. Soils are stable.

Both sites feature an attractive transition zone between forest and expansive openness of the fringe zone and water surface. Features include granite rock outcroppings, permanent creeks, a healthy jarrah/marri forest and riparian streamside association with hints of a wetland.

Both sites are highly suited to the development of day use visitor services with a nature-themed focus that could include defined parking bays, picnic tables, toilets and access to interpreted nature trails, key fishing spots and the regional cycle and bushwalking track networks. Located in a non-motorised zone, the sites would suit activities such as nature study, bird watching, fishing and non-motorised craft, particularly small canoes and kayaks. Both sites are within the freehold land owned by the Department of Water.

**Conclusion:**

There are numerous sites around the perimeter of Lake Navarino that are suited to the development of day use facilities. Sites W4 and W5 have exceptional appeal due to their remote setting and diversity of natural features.

**Key Issues** (applicable to W4 – W10):

- Site inventory, assessment and development planning;
- Visitor hazards and safety;
- Level of facilitation;
- Security of tenure;
- Management and maintenance.
**Future potential:** There are currently no day use sites on Lake Navarino that are not affected by motorised boating. Development of sites with a ‘quiet’ nature study educational focus may appeal to user groups that are currently not visiting the area.

**W6** is a moderately large area of forest located between the reservoir and Scenic Drive with a gently sloping to hilly topography and jarrah/marri vegetation cover suited to a number of day use facilities designed to support and complement established water based activities. Land cover varies from uniformly dense to open woodland with grassland fringing the reservoir. Views to the water and surrounding forests are generally focused on the northern prong from within the property. The configuration of the shoreline is variable depending on water level, but is generally gently sloping with stable soils and grass cover suited to public access and activity.

The shoreline of the northern prong of the reservoir and fringing forest vegetation is currently used by boaters and skiers as a launch and take off area. The site includes both freehold land owned by the Department of Water and State forest managed by the Department of Environment and Conservation.

The western sector of the site is located on a portion of the reservoir where power boating is permitted, activity occurs without support day use facilities. Opportunities exist for land-based facilities designed to service the boating community, in addition to lookout points, nature trails and linkages to new and existing regional cycle and walking tracks. Road access to Lake Navarino from Waroona is via sealed bitumen roads to the Resort and dam wall. The high quality gravel surfaced Scarp Road Scenic Drive provides direct access to the southern boundary of this site. Mains power terminates at the Resort and scheme drinking water is not currently available.

A master development plan would be required to determine the most appropriate access, facility placement and site circulation. Site topography and vegetation cover suit a functional division between various accommodation types, activities and family or group user types. The current zoning of water activities would influence design solutions for a land based visitor hub with a focus on non-motorised visitor activities.

**Conclusion:** W6 has excellent potential for a full service visitor facility with a moderate capacity designed to support water-based activities.

**W7** is an established boat launching site located where Scarp Road Scenic Drive joins the northern prong of Lake Navarino from the west. The sloping terrain, proximity to Scarp Road and expansive area provide a highly suitable focus area for boat launching with supporting day use facilities. There is a large area available for parking, circulation and base use, but there are currently no support facilities. The adjacent forest cover varies from uniformly dense to open woodland with grassland fringing the reservoir. Views to the water and surrounding forests are generally confined to the northern prong and surrounding landscape. The configuration of the shoreline is variable depending on water level, but is generally gently sloping with stable soils and grass cover suited to public access and activity all around the prong.

The northern tip of the prong, including the boat ramp is zoned for non-motorised use, but provision is made for passage of powerboats through the zone at less than 5 kph. Conflicts are evident between user groups and compliance, monitoring and policing are issues of concern.

The site is located on State forest managed by the Department of Environment and Conservation.
**Conclusion:** W7 has excellent potential for boat launching and development of a comprehensive day use facility to include defined activity areas, toilets, tables and perhaps shelters.

**W8** is a site suited to a major visitor information and orientation hub due to its location adjacent to Navarino Resort on Inverell Road, the main access into the recreation area. It is the first site visited by many visitors to the Lake Navarino area. The Waterous Cycle Trail is located between the car park and the reservoir. The site was redesigned and developed by the Water Corporation in 2004. Facilities include sealed parking bays, picnic tables, heritage memorial and shelter. View potential is excellent, but selective removal of understorey is required. There is currently no site orientation or interpretive information.

**Conclusion:**
This is an attractive day use site suited to a major role in visitor information, orientation and interpretation. The potential as a visitor information/orientation focus is currently unrealised.

**W9** is a long-established informal day use site developed by the Water Corporation for public enjoyment, river access and interpretation of remedial dam works and management issues. The site was upgraded in 2004 to provide effective site definition, picnic tables, a refurbished toilet, river access and visitor parking for coaches and small vehicles. The site is located in an attractive narrow valley setting with minimal potential for expansion. Private land is located on the western boundary of the picnic site. The tenure is Water Corporation.

**Conclusion:**
This attractive day use site provides facilities for a limited number of visitors and is a favourite of local residents. Site capacity is fully utilised.

**W10** a favoured location for day use activities including boat launching, ski set up, take-off and landing, swimming, picnicking and hanging around. The gently sloping terrain is ideally suited to dispersed boat launching around the shoreline. During peak periods the number of visitors, boats and cars with trailers is extremely high with resulting safety, circulation congestion, functional problems, risks and hazards. User monitoring, policing and patrols occur on an infrequent basis. There is significant evidence of misuse of adjacent forested landscape, including bush camps, fires, toileting, damage to vegetation and compaction. A single toilet cubicle in located in the area. The land is freehold, owned by the Department of Water.

**Conclusion:**
W10 is ideally suited as a focus area for day use facilities and activities. A Site Development Plan is urgently required to deal with access, site definition, vehicle control, formalised boat launching, separation of conflicting uses and provision of appropriate day use facilities.

**Power boating, jet skiing and water skiing**
Skiing is a favourite activity on Lake Navarino with a dedicated and increasingly large group of enthusiasts. There are limited opportunities for inland water skiing in Western Australia generally and the Perth metropolitan region specifically, therefore Lake Navarino is highly valued by users and is intensely used during peak periods. There is often congestion at take-off and landing sites. Use of the water surface is largely self-regulating, but there are still hazards to skiers and other users of the reservoir as a result of boating and skiing activities.
The area available for water skiing is finite. A zoning plan for the water surface restricts high speed boating to the central portion of the reservoir (82.7 hectares of surface high water) with speeds under 5 kph in speed-restricted zones. Disregard of the zoning restrictions is common. Policing is infrequent, but regulations are strictly enforced and citations given to infringers when caught. Intense use at the take-off and landing zones includes boat preparation, parking, picnicking, swimming and occasionally camping. There are toilets at only one designated picnic site and at Navarino Camp around the perimeter of the reservoir.

The use of jet skis on Lake Navarino is increasingly common. The activity is illegal unless a skier is being pulled and both a driver and an observer are on board.

Issues associated with the activities include intrusive noise, conflicts with other user groups, user safety, regulation, policing, compliance with international collision rules and relevant State legislation, illegal wild camping and associated implications such as litter and toileting, compliance with surface zoning, intensive use of take-off and landing areas, access, seasonal closures, surface water levels, parking and support facilities and control of the numbers of boats in a limited water area.

**Conclusion:**

Power boating and water skiing are extremely popular activities suited to Lake Navarino. While there are no known criteria to determine carrying capacity for this activity, advice on the observed level of congestion, visitor risk, conflicts with other users and impacts on land based support sites suggests that Lake Navarino is at or beyond its capacity level during peak periods.

**Key Issues:**
- Visitor safety and hazards;
- Congestion and conflicts with other water based activities;
- Noise;
- Policing, monitoring and management;
- Zoning of water surface;
- Shore based facilities;
- Support services.

**Boat launching (W7, W10)**

Two sites are designated in the Master Plan for boat launching and ski set-up. These are located on the northern prong adjacent to Scarp Road Scenic Drive and the southern prong south of the dam. The sites have limited definition and are largely self-regulated facilities. There is a toilet at the southern site only. The terrain is gently sloping with stable soil suited to vehicle and boat activities during periods of variable water levels. The sites are expansive, not defined and without physical restrictions. The sites can become congested during peak period with resultant visitor hazards both on the water and land.

Boat launching also occurs at numerous additional locations around the reservoir during periods of low water and high use as vehicular access is unrestricted and boat launching possible due to the sloping shoreline. Dispersing the activity reduces congestion in the designated areas, but makes provision of support shore based facilities and management difficult.

**Conclusion:**

Current launching sites are inadequate in number and lack the minimum level of support facilitation. There are numerous locations within the area zoned for power boating suited to boat launching. Development of launching facilities would ideally be linked to development of overnight or day use land based facilities such as W1 and W5.
Key Issues:
- Visitor safety and hazards;
- Congestion and conflicts with other water based activities;
- Noise;
- Policing, monitoring and management;
- Zoning of water surface;
- Road access, topography;
- Shore based facilities.

Cycling
Mountain biking is a growth activity in the Waroona area. Over 16,000 visitors are estimated to use the Munda Biddi Trail annually. Numbers that use the Waterous Trail to Waroona Dam are unknown. Bike riding is known to occur on roads, firebreaks and tracks throughout the area, but numbers are low. The diversity of topography and vegetation associations in the area are highly suited to mountain biking.

Conclusion:
Mountain bike riding is an activity that is increasingly valued by Western Australians and visitors to the Lake Navarino area. Safe, sustainable and challenging opportunities abound for development of an extensive network of trails suited to a wide range of riders.

Key Issues:
- Links to support visitor facilities and services;
- Track design, construction and costing;
- Visitor safety;
- Trail conflicts with other users;
- Track management and use monitoring;
- On-going maintenance.

Bushwalking
Walking is currently not a major activity in the Waroona area, but is enjoyed by increasing numbers of families, nature enthusiasts and adventure/school groups. There are no designated walking tracks around Lake Navarino, but roads, tracks and the perimeter of the lake are commonly used. A common theme in visitor comments to Resort staff suggest that more designated walking opportunities would be popular with visitors.

Conclusion:
The forest landscape setting of Lake Navarino is highly suited to a range of short and long distant bushwalking. Landform terrain, diverse vegetation associations and extraordinary natural features are of great appeal to walkers. All sites identified in this study suited to day use and accommodation would be suitable hubs for walkers.

Key Issues:
- Links to support visitor facilities and services;
- Track design, construction and costing;
- Visitor safety;
- User conflicts with other users;
- Track management and use monitoring;
- On-going maintenance.
**Fishing and marroning**

Fresh water fishing and marroning have been popular recreational sports on Lake Navarino for many years. Both activities are highly valued by enthusiasts as a source of food and for social and recreational reasons. The activities are managed by the Department of Fisheries. The recreational marron fishery in Lake Navarino was recently closed for several years to allow stocks to re-establish following the draining of the dam for remedial works. The marron fishery was reopened in 2006 as a ‘trophy water’ with an increased size limit and reduced bag limit to allow fishers the opportunity to target ‘trophy’ sized marron. The reservoir is regularly stocked with trout and despite a recent attempt to eradicate redfin perch, a large population of feral species is still present. Marron and fish stocks are subject to over-collection that could lead to collapse of the fishery. Conflicts between fishers/marroners and other recreational users, particularly power boaters, are well documented and have been instrumental in the designation of water activity zones. Most conflicts occur during early morning and late afternoon periods.

While the exact number of fishers and marroners is unknown, the level of reported conflict suggests that both activities are at or very near capacity on Lake Navarino. Previous closure of the Samson Brook catchment in 2002 resulted in a significant increase in fishing and marroning at Lake Navarino. The Lake is highly suited to fishing and marroning with relatively easy access, expansive open water and a long diverse shoreline. Access to favoured sites is by boat or from land based locations – all requiring support facilities including launching ramps, parking bays, toilets and picnic tables.

**Conclusion:**

Lake Navarino is highly suited to recreational fishing and marroning. Substantive data and user comments suggest that both activities may have reached capacity in terms of resource sustainability and social acceptability, but further research is required to confirm this assumption. It may be possible to intensify fishing and marroning activities through increased stocking levels, seasonal restrictions, reduced bag limits and/or better enforcement, but this will no doubt have an impact on the quality of the fishing experience.

**Key Issues:**

- Access;
- Land based support facilities;
- Monitoring, management and policing;
- Possible conflicts between with other water-based activities;
- Sustainability/fragility of the fisheries.

**Non-motorised craft**

The use of canoes, kayaks and sail craft is a common activity on Lake Navarino preferred by individuals, families and adventure/school groups. The speed-restricted zones on the reservoir (41.5 hectares at high water) are preferred for these activities. Warmer summer months are favoured. The diverse shoreline, expansive views and open water are highly suited to these ‘quiet’ activities, although the area allocated to non-motorised watercraft is relatively small. Conflicts with power boats are common with collision risks and wave wash mentioned as hazards.

The Recreation and Tourism Master Plan recommends that non-motorised craft remain on Lake Navarino but encourages the primary activity focus be located on Drakesbrook Dam. A number of land based support facilities are required for this activity including launching sites, toilets, picnic facilities and parking bays.
Conclusion:
The use of non-motorised water craft is suited to Lake Navarino but may be disadvantaged by motorized activities.

Key Issues:
- Access;
- Conflicts with other water based activities;
- Land based support facilities;
- Possible conflicts with other water-based activities;
- Monitoring, management and policing.

6.4 Waroona Dam – Social Suitability

Waroona Dam (Lake Navarino) has a long history of recreational use and at times, conflict. The water in the reservoir is shared between irrigation and recreation. Variable volumes and seasonal water levels ensure that ‘there is never enough water to satisfy everyone’s need’. Lake Navarino is undoubtedly the focus for many water sports valued by the community including fishing, marroning, canoeing, water skiing, boating and swimming but it is equally important as a setting for social interaction inherent in the pursuit of each favoured activity.

Varying social needs and expectations have generally been satisfied, but there have been notable conflicts between user groups, their activities and their advocates. The limited number of fresh water lakes or reservoirs available for recreational activities in the Southern Darling Range has led to concentration of use and created conditions ripe for conflict. Lack of a visible management presence and effective policing of regulations has contributed to some competition and conflict between user groups – both water and land based.

Note: The Waroona Waterways Recreation and Tourism Master Plan provides an effective framework that addresses the key planning, management and development issues that must be resolved to ensure effective provision and management of recreational facilities and activities of Lake Navarino and Lake Moyanup. Until the key issues noted in the Plan are addressed, there is little expectation that Lake Navarino could cope with expansion or intensification of recreational facilities or activities.
While all reasonable efforts have been made to ensure the accuracy of this data, no responsibility is accepted for any inaccuracies and persons replying on this data do so at their own risk.

Datum and Project Information
Vertical Datum: AHD
Horizontal Datum: GDA 94
Projection: MGA 94 Zone 50
6.5 Drakesbrook Dam - Physical Capability

Drakesbrook Dam (Lake Moyanup) is a relatively small reservoir in a scenic natural landform basin used for grazing. The reservoir is generally kept full throughout the year. Only a small section of the perimeter of the reservoir is in public ownership, hence public access is restricted. The western flank of the reservoir is managed for day uses. The visitor facilities and services provided are managed by the Shire of Waroona under a licence agreement with the Water Corporation.

**Day use**

D1 - The *Waroona Waterways Recreation and Tourism Master Plan* (2003) supports continued use of Lake Moyanup for picnicking, non-motorised watercraft, swimming and fishing. A site development and enhancement plan has been prepared by the Shire and is being incrementally implemented. Established facilities include picnic shelters, barbecues, tables and toilets. The site is a favourite of local residents and special adventure and educational groups, but receives only low to moderate levels of use throughout the year. Potential for expansion of site facilities is severely limited by land tenure and limited area suited to support facilities. Slight expansion of the established day use site boundaries is possible with agreement from the Water Corporation.

Sensitive redesign of site access, circulation and facilitation could allow some additional capacity. The Master Plan supports water-based activities such as swimming, fishing, marroning and use of non-motorised craft such as canoes, sailboats and kayaks. Motorised boats are not permitted. A boat off-loading site is located adjacent to the picnic site. The picnic site and nearby dam are destinations for local walkers and cyclists, but there are no designated tracks for either. Access into the private land is discouraged.

**Conclusion:** A minor expansion of the established picnic/day use site and water based activities is possible. The site is physically limited, but is suited to a minimum development visitor facility. It has excellent access to the reservoir for non-motorised craft and activities. Relocation of some non-motorised water based activities from Logue Brook Dam is feasible – particularly for organised water sports such as those offered by Camp Logue Brook.

**Key Issues:**
- Site redevelopment;
- Expansion and enhancement of site access, parking, presentation, furniture and facilitation;
- Management and maintenance;
- Access and land tenure;
- Visitor safety.

6.6 Drakesbrook Dam – Social Suitability

Minor expansion of visitor facilities and services at Drakesbrook Dam are unlikely to have a dramatic impact on the social setting of the dam, the Town of Waroona or its environs. Increased usage will not alter the recreation opportunity spectrum or facilities currently being offered. The character of proposed facilities, services, activities and experiences will continue to be determined as part of a community consultation and site development process currently being utilised by the Shire.
Part 7 - Relocation Options for Facilities and Activities
(from Logue Brook Dam to Waroona Dam, Harvey Dam and/or Drakesbrook Dam)

Assessment codes:

Highly Suitable – physical conditions present to support the facility or activity; few if any apparent impediments to development or introduction of the activity.

Suitable – physical conditions present to support the facility or activity, but with some reservations, such as scale of site, possible user conflicts or management requirements.

Limited Suitability – existing sites with limited expansion or development capability.

Not Suitable – physical conditions with severe limitations likely to limit introduction or expansion of visitor facilities or activities.

7.1 A tourist camp or resort

Site H1 - Harvey Dam

Option 1

Develop (or relocate) a full service facility with a range of accommodation types, visitor supplies, services, food and amenities.

Opportunities:

- Expansive undeveloped site with excellent physical attributes;
- Prominent peninsula with expansive shoreline;
- Conditions suited to provision of a broad spectrum of visitor services;
- Few conflicts with established commercial businesses;
- Ease of access to main road;
- Proximity to established boat ramp;
- Ease of connection to mains power and water;
- Proximity to main supply centre of Harvey;
- Stable tenure;
- Clean slate site with many design options;
- Potential for expansive development.

Constraints:

- Proximity to chlorine dosing plant, possible visitor hazards;
- Proximity to established caravan park and camping facilities in Harvey;
- Tenure (possible);
- Proximity to privately owned land;
- Road access constraints due to dosing plant buffer restrictions;
- Some steeply sloping terrain.

Recommendation: Highly suitable.

Site W1 - Waroona Dam

Option 2

Develop (or relocate) a full service facility with a range of accommodation types, visitor supplies, services, food and amenities.

Opportunities:

- Expansive site with excellent physical attributes;
- Conditions suited to provision of a broad spectrum of visitor services;
- Camping sites established;
- Established user groups including water skiers, hikers and water sports enthusiasts;
• Proximity to established boat launch and take-off location;
• Proximity to Munda Biddi Trail;
• Surrounded by State forest;
• Clean slate site with many development options;
• Potential for expansive development.

Constraints:
• Possible conflict with established caravan park/resort;
• Noise from power boats;
• Could encourage additional interest in activities that may be at full capacity;
• Some negative user patterns;
• Distance from major utilities;
• Uncertain tenure/management structure.

Recommendation: Highly suitable.

Site W3 - Expansion of Lake Navarino Forest Resort – Waroona Dam
Option 3
Develop (or relocate) a full service facility with a range of accommodation types, visitor supplies, services, food and amenities.

Opportunities:
• Expansive site with suitable topography and vegetation cover;
• Attractive forest setting;
• Established facility with support utilities and infrastructure;
• Established user groups familiar with facilities;
• Opportunity to upgrade facility standards and presentation;
• Ease of access - proximity to bitumen access road;
• Resident care-taker/lease holder.

Constraints:
• Some evidence of site decline due to dieback;
• Distance from waters edge;
• Established site with some design limitation;
• Lease commitments and expectations.

Recommendation: Suitable.

Sites H1, W1, W2 and W3 - Combination of options
Option 4
Develop (or relocate) a full service facility with a range of accommodation types, visitor supplies, services, food and amenities.

This option suggests development of two or three smaller accommodation and/or resort style facilities at Harvey Dam and Lake Navarino. The preferred site on Harvey Dam is H1. Preferred sites on Lake Navarino are W1, W2 and W3.

Opportunities:
• Greater selection of visitor facilities possible;
• Smaller development footprints at each site;
• Less impact on a single site;
• Dispersal of visitor activities;
• Economic advantages to a wider range of support communities.

**Constraints:**
• Duplication of facility and infrastructure costs;
• Greater level of development impact on natural settings;
• Increased management requirement.

**Recommendation:** Suitable.

### 7.2 Formal and informal camping
Small camp sites with limited support facilities – a facility suited to tent or caravan camping with basic support structures such as ablutions, campers kitchens and barbecues, but without covered accommodation, kiosk, restaurant or other facilities commonly found in a resort/caravan park. Integration with a full service caravan park/resort is possible assuming a degree of separation can be maintained.

**H1 - Integration of camping with potential caravan park/resort - Harvey Dam**

**Option 1**
Develop a camping ground with limited support facilities suited to tent or caravan camping with basic support structures as part of a larger adjacent but separate full service resort.

**Opportunities:**
• Integral component of full service caravan park/resort;
• Access to caravan park utilities and infrastructure;
• Access to the reservoir;
• Diverse topography, vegetation cover and view options;
• Ease of access, proximity to Harvey-Quindanning Road.

**Constraints:**
• Proximity to caravan park – reduced sense of identity and separation;
• Large numbers of people in a single visitor complex;
• Proximity to dosing plant.

**Recommendation:** Suitable.

**W1 - Integration of expanded camping with established caravan park/resort – Lake Navarino**

**Option 2**
Develop an expanded camping ground with limited support facilities that complements the character and style of facilities currently in place at Navarino Camp.

**Opportunities:**
• Expansion of established camping ground; or
• Integral component of full service caravan park/resort;
• Access to caravan park utilities and infrastructure;
• Access to the reservoir;
• Diverse topography, vegetation cover and view options;
• Direct access to both motorised and non-motorised zones;
• Ease of access via Scenic Drive/Scarp Road.
Constraints:
- Proximity to caravan park – reduced sense of identity and separation;
- Large numbers of people in a single visitor complex;

Recommendation: Suitable.

W2 - Stand alone camping ground – Lake Navarino
Option 3
Develop a camp ground with limited support facilities suited to tent or caravan camping with basic support structures such as ablutions, campers kitchens and barbecues.

Opportunities:
- Green fields site; or
- Possible component of an integrated full service caravan park/resort at W1;
- Access to reservoir;
- Diverse topography, vegetation cover and view options;
- Sense of naturalness;
- Proximity to established boat launching site;
- Direct access to non-motorized zones;

Constraints:
- Distance from established utilities.

Recommendation: Stand alone option - Highly suitable.
Integrated option - Suitable.

7.3 Day use sites
Attractive focal points for short stay visitor enjoyment and activity.

H2 – Harvey shoreline day use site
Option 1
Introduce (relocate) day use facilities to include facilities such as picnic tables, barbecues, visitor information, shelters and other activity support facilities as guided by a site development plan.

Opportunities:
- Proximity to Harvey-Quindanning Road;
- Direct access to water with expansive shoreline;
- Established feature trees and extensive regeneration zone;
- Attractive setting with expansive view potential;
- Potential for small boat launching;
- Water area cleared of stags;
- Pastoral heritage interpretation potential.

Constraints:
- Relatively small area of land between the road and reservoir;
- Some road noise possible.

Recommendation: Highly Suitable.
H3 – Harvey shoreline day use site
Option 2
Introduce (relocate) day use facilities to include facilities such as picnic tables, barbecues, visitor information, shelters, retreat centre and support facilities for other activities as guided by a site development plan.

Opportunities:
- Proximity to Harvey-Quindanning Road, loop access potential;
- Direct access to water;
- Established feature trees and extensive regeneration zone;
- Access to both Central and East water zones;
- Peninsula with extensive shoreline;
- Attractive setting with both expansive and enclosed view potential;
- Potential for small boat launching with emphasis of non-motorised craft.

Constraints:
- None.

Recommendation: Highly Suitable.

H4 – Harvey shoreline day use site
Option 3
Introduce (relocate) day use facilities to include facilities such as picnic tables, barbecues, visitor information, adventure courses, cycle trails, shelters and other activity support facilities as guided by a site development plan.

Opportunities:
- Ease of access from Harvey-Quindanning Road;
- Direct access to water with expansive shoreline;
- Established feature trees and extensive regeneration zone;
- Expansive view potential;
- Large land area;
- Topographic diversity;
- Proximity to potential caravan park/resort and established boat launch;
- Water area cleared of stags;
- Proximity to Water West, potential power boat zone;
- Disturbed quarry terrain suited to some adventure recreational activities.

Constraints:
- Disturbed quarry terrain;
- Proximity to dosing plant;

Recommendation: Highly Suitable for specific activities

W4 and 5 – Waroona shoreline day use site
Option 4
Introduce (relocate) day use facilities to include facilities such as picnic tables, barbecues, visitor information, lookout points, nature trails and other activity support facilities as guided by site development plans.
Opportunities:
- Sense of naturalness and remoteness;
- Proximity to reservoir, non-motorised zone;
- Special features - rock outcropping, stream and mature forest;
- Existing access track;
- Proximity to access road via Scarp Road Scenic Drive;
- Extensive shoreline, variable configuration.

Constraints:
- Some site disturbance due to past site use.

Recommendation: Highly Suitable.

W6 – Waroona shoreline day use site
Option 5
Introduce (relocate) day use facilities to include facilities such as picnic tables, barbecues, visitor information, shelters and other activity support facilities as guided by a site development plan.

Opportunities:
- Proximity to favoured boating area and ramp;
- Adjacent to both motorised and non-motorised water zones;
- Diverse sloping terrain with mature forest;
- Broad shoreline with sloping access suited to boating activities;
- Easy access from Scarp Road Scenic Drive;
- Expansive views to northern prong of Lake Navarino.

Constraints:
- Some site disturbance due to uncontrolled activity;

Recommendation: Highly Suitable.

W7 – Waroona shoreline day use site
Option 6
Introduce (relocate) day use facilities to include facilities such as defined car park, picnic tables, barbecues, visitor information, shelters and other activity support facilities as guided by a site development plan.

Opportunities:
- Established boat launching site;
- Adjacent to Scarp Road Scenic Drive, ease of access;
- Low speed zone;
- Gently sloping terrain suited to vehicle parking, circulation and visitor facilities;
- Expansive shoreline;
- Proximity to Navarino Forest Resort;
- Closest water access point to Waroona.

Constraints:
- Some disturbance due to lack of facilities and site definition;
- Possible conflicts between user groups.

Recommendation: Highly Suitable, expansion desirable with site definition.
W8 and W9 – Water Corporation day use sites
Option 7
Retain established day use facilities. Complement intensified visitor numbers and activity with improved information, orientation and interpretation.

Opportunities:
- Established sites with historical patterns of use;
- Visitor information and first contact;
- Proximity to Navarino Forest Resort and established cycle trail;
- Proximity to Invarell Road for easy access;
- Valley position with enclosed sense of place and river access for W9;
- Expansive view potential with visitor orientation potential for W8.

Constraints:
- Limited capacity and expansion capability;
- No direct access to surface of reservoir.

Recommendation: Limited Suitable, no expansion desirable or possible.

W10 – Waroona shoreline day use site
Option 8
Introduce (relocate) day use facilities, particularly those supporting boating, to include facilities such as defined car park, picnic tables, barbecues, visitor information, shelters and other facilities as guided by a site development plan.

Opportunities:
- Established user patterns;
- Established toilet;
- Gently sloping terrain suited to boat launching throughout the year;
- Expansive shoreline;
- Attractive forest setting adjacent to shoreline suited to support facilities;
- Proximity to motorised boating zone;
- Proximity to Invarell Road for easy access;
- Proximity to the established Navarino Camp and Forest Resort.

Constraints:
- Conflicts between user groups;
- Visitor risks and safety;
- Limited area between reservoir and forest for vehicle circulation and parking;
- Lack of support facilities for boaters – tables, shelters, site definition.

Recommendation: Highly Suitable, expansion possible with greater site definition

7.4 Boat launching facilities

Option 1
Provide expanded (relocate) facilities for boat launching and associated activities at Harvey Dam, Lake Navarino and Drakesbrook Dam.
Sites suited to expanded use for boat launching:
  • Harvey Dam - H1 (expansion of existing ramp), H2, H4.
  • Waroona Dam – W1, W2, (non-motorised craft only) W4, (non-motorised craft only) W6, W7 (expansion), W10 (expansion of existing launching area).
  • Drakesbrook Dam – D1 (non-motorised craft only).

Opportunities – Harvey Dam:
  • Established user patterns and formal ramp;
  • Boat launching ramp for non-motorised and electric craft;
  • Quiet zones established;
  • Easy of road access;
  • Expansion of established ramp possible.

Opportunities – Lake Navarino:
  • Established user patterns and expectations;
  • Informal boat launching sites and some support facilities established;
  • Quiet zones established for non-motorised craft;
  • Ease of access to lakeshore;
  • Site conditions support additional or expansion of established launch areas.

Opportunities – Drakesbrook Dam
  • Established user patterns and expectations;
  • Small support site with basic facilities including a toilet;
  • Minimal seasonal water level variation;
  • Ease of road access;
  • Sloping terrain suited to boat launching.

Constraints – Harvey Dam:
  • Possible conflicts with other water-based activities;
  • Congestion possible with expansion option;
  • Variable water level.

Constraints – Lake Navarino:
  • Possible conflicts with other water-based activities and other established uses;
  • Variable water level.

Constraints – Drakesbrook Dam:
  • None.

Recommendation: Highly Suitable, expansion possible on all dams.

Note: Due to the generally sloping terrain around the perimeter of all three dams, suitable boat launching sites are plentiful. Designation of formal sites is desirable to supplement the established ramps if new boating activities are approved.

7.5 Mountain biking

Option 1
Provide expanded links, services and facilities to support cyclists at Harvey Dam, Lake Navarino and Drakesbrook Dams and encourage all service providers to do the same.
Opportunities:
- Diverse terrain and vegetation associations;
- Attractive landscapes with expansive view potential;
- Ease of access;
- Proximity to support services and facilities;

Constraints:
- Possible conflicts with other users.

**Recommendation:** Highly Suitable, development of expanded network desirable.

*Note:* All sites identified as caravan park/resort, campgrounds and day use sites are suited to provision of facilities and services that support cyclists.

### 7.6 Bushwalking

**Option 1**
Expand opportunities for links, services and facilities to support bushwalkers at Harvey Dam, Lake Navarino and Drakesbrook Dam as guided by strategic and area management plans.

Opportunities:
- Diverse terrain and vegetation associations;
- Attractive landscapes with expansive view potential;
- Ease of access;
- Proximity to support services and facilities.

Constraints:
- None.

*Note:* All existing and potential caravan park/resorts, campgrounds and day use sites are suited to provision of facilities and services that support bushwalkers.

### 7.7 Power boating and water skiing

**Option 1**
Introduce power boating and water skiing to Harvey Dam while intensifying the activities on Waroona Dam and continuing to prohibit them on Drakesbrook Dam.

**Opportunities – Harvey Dam:**
- Expansive area of open water; few obstructions;
- No current motorised craft usage patterns or expectations;
- Possible introduction of innovative control methods, capacity limits, permits and seasonal limitations;
- Established launching ramp with support facilities, including a toilet;
- Proximity to support facilities if sites H1, H2 and H3 are developed;
- Enhanced business/supply opportunities within the Shire of Harvey.

**Opportunities – Lake Navarino**
- Expansive area of open water; few obstructions;
- Established usage patterns and expectations;
- Established launching patterns, some with support facilities, including a toilet;
- Proximity to support facilities at Lake Navarino Resort and potentially at sites W1, W2, W5, W6, W7 and W10;
• Enhanced business/supply opportunities within the Shire of Waroona.

**Constraints – Harvey Dam:**
• Intrusive noise;
• Proximity to the newly developed Harvey amphitheatre day use picnic site;
• Objections from neighbours;
• Introduction of a new user group that may conflict with established user groups, notably fishers and marroners;

**Constraints – Lake Navarino:**
• Conflicts with current users, particularly during peak periods;
• Intensifying user activity will require greater level of management/policing/control;
• Possible overuse and capacity constraints.

**Recommendation:** Suitable

**Option 2** – Intensify power boating and water skiing on Lake Navarino through greater regulation, use of permits and prohibiting conflicting uses within the portion of the reservoir zoned for power boat activities; prohibit these activities on Harvey Dam and Drakesbrook Dam.

**Opportunities – Lake Navarino**
• Expansive area of open water; few obstructions;
• Established usage patterns and expectations;
• Established launching patterns, some with support facilities, including a toilet;
• Proximity to support facilities at Lake Navarino Resort;
• Enhanced business/supply opportunities within the Shire of Waroona.

**Constraints – Lake Navarino:**
• Conflicts with current users, particularly during peak periods;
• Inadequate support facilities including parking areas, launching ramps and toilets;
• Intensifying user activity will require greater level of management/policing/control;
• Likelihood of significant opposition from some user groups;
• Possible overuse and capacity constraints.

**Recommendation:** Unsuitable

### 7.8 Fishing and marroning

**Option 1**
Intensify fishing and marroning on Harvey Dam, Lake Navarino and Drakesbrook Dam.

**Note:** There is inadequate scientific data to safely establish sustainable levels of angling and marroning on Harvey Dam, Lake Navarino or Drakesbrook Dam. It is predictable that closure of Logue Brook Dam would place a significant additional pressure on fish and marron resources in the remaining dams and impact on the quality of the experience of fishers and their support groups and the sustainability of the fishery.
Opportunities – Harvey Dam:
- Established user patterns and expectations;
- Boat launching ramp for non-motorised and electric craft;
- Quiet zones established;
- Expanded number and quality of support facilities if site developments occur.

Opportunities – Lake Navarino:
- Established user patterns and expectations;
- Boat launching ramps and some support facilities established;
- Quiet zones established for non-motorised craft;
- Expanded number of support facilities if development occurs.

Opportunities – Drakesbrook Dam
- Established user patterns and expectations;
- Small water body without powered boats;
- Focus on non-motorised craft and activities;
- Small support site with basic facilities including a toilet;
- Minimal seasonal water level variation;
- Generally wind protected;
- Relatively low level of current usage;
- Proximity to access, town of Waroona and support supplies and services.

Constraints – Harvey Dam:
- Possible conflicts with power boating if approved;
- Potential for collapse of both fisheries if level of use is not sustainable;
- Variable water level;
- Some projections that sustainable numbers of fishers would be exceeded.

Constraints – Lake Navarino:
- Possible conflicts with power boating and other established uses;
- Variable water level;
- Potential for collapse of both fisheries if level of usage is not sustainable;
- Some projections that sustainable numbers of fishers has already been reached;
- Lack of effective management presence, patrol and policing.

Constraints – Drakesbrook Dam:
- Limited size and shoreline diversity;
- Private property;
- Lack of formal ramp.

Recommendation: Suitable with caution, expansion capability unknown.

7.9 Sailing, canoeing and kayaking

Option 1
Maintain and/or expand (relocate) the use of non-motorised watercraft within designated safe zones on Harvey Dam, Lake Navarino and Drakesbrook Dam.

Opportunities – Harvey Dam:
- Established user patterns and expectations;
- Boat launching ramp for non-motorised and electric craft;
- Quiet zones established;
- Expanded number and quality of support facilities if site developments occur.
Opportunities – Lake Navarino:
- Established user patterns and expectations;
- Boat launching ramps and some support facilities established;
- Quiet zones established for non-motorised craft;
- Expanded number of support facilities if development occurs.

Opportunities – Drakesbrook Dam
- Established user patterns and expectations;
- Small water body without a history of powered boats;
- Focus on non-motorised craft and activities;
- Small support site with basic facilities including a toilet;
- Minimal seasonal water level variation;
- Generally wind protected;
- Relatively low level of current usage;
- Proximity to access, town of Waroona and support supplies and services.

Constraints – Harvey Dam:
- Possible conflicts with some other water-based activities;
- Variable water level.

Constraints – Lake Navarino:
- Possible conflicts with other water-based activities and other established uses;
- Variable water level;
- Lack of effective management presence, patrol and policing.

Constraints – Drakesbrook Dam:
- Limited size and shoreline diversity;
- Private property;

Note: All three reservoirs are suited to non-motorised watercraft and associated quiet activities. Provision for safe operation has been integrated into established management plans and zoning regulations. Sailing, canoeing and kayaking would likely benefit from improved visitor facilities and services provided at new day use sites and accommodation camps.

Introduction of power boating on Harvey Dam would have the potential to affect these activities. Effective management and policing could ensure few negative implications, but there are certain to be some objections. The Waroona Recreation and Tourism Master Plan recommends discouraging these activities on Waroona Dam in favour of expanded use of Drakesbrook Dam.

Recommendation: Suitable, expansion possible with caution.
Appendix 1 – User Profiles and Demand Indicators

User profiles

Sightseers. These users may visit the area as part of opportunistic sightseeing. They may have little information on the area and their visits may be the result of seeing road signs and maps.

Tourists. These users visit the area as a result of features being promoted by various media. They may be interested in particular features or events, such as historic or epicurean features, and will usually have researched this prior to their visit.

Adventurer/wanderers. These users will visit the area opportunistically, discovering the area as they move around. They may have completed limited research, sufficient to determine the area’s suitability for their activity. 4WD users are typical of this group.

Formal adventurers. These users visit the area as part of organised adventure activities. They are usually reliant on their organisers for information but are likely to return, having ‘discovered’ the area as part of the organised activity.

Dedicated recreation participants. These users visit the area primarily because they know it supports their chosen activity, such as water skiing. They are likely to return on regular basis providing they satisfy their activity requirements.

Recreation supporters. These users usually visit the area as invitees, family or friends of dedicated recreation participants. While their primary focus is the activities of other members of their group, they are likely to participate in other activities if they are available or promoted.

Getaway visitors. These users will often visit for a weekend and will base themselves in comfortable accommodation and possibly undertake activities or visit features from there. They are usually from the metropolitan area and their primary goal is to relax in a picturesque and comfortable environment.

Nature lovers. These users’ primary interest is in the natural features of the area. They may visit as small informal groups and may undertake ‘compatible’ activities such as bushwalking. Their visits may be seasonal and may avoid the busy periods.

Locals. These users have a local home base and may undertake a range of activities. Their visits can be of relatively short duration given that they live close by. They may avoid the peak times by visiting during known lulls in use or by travelling to other areas where the use is less.

User demand - Indicators

Predicted demand for recreational activities and experiences in the Southern Darling Range is as follows:

Growth of recreational facilitation and participation are likely to increase with:

- increases in population;
- increases in club and association memberships;
- general trends for increased leisure, tourism and recreation;
- increasing levels of community income and affluence;
- growth in related tourist and recreation industries such as accommodation, focused sport camps and health and fitness retreats;
- growth in the suppliers of commercially run nature based recreational services;
- changes in the provision and capacity of facilities; and
- requirements and demands of managers and recreation participants.
There is little documented statistical information held by management agencies relating to current use or projected growth of particular activities in the Southern Darling Range. The summary information listed below has been gathered from statistics held by management agencies and key recreation groups, other recreation studies, and the observations made by managers of the area.

- Most recreation activities focus on water bodies.
- There is an increasing demand for recreation, which is taxing existing facilities and management resources. There is an increasing demand in the region for ‘growth’ activities – specifically water skiing, power boating, camping, 4WDing, ‘wild camping’, marroning, trout fishing, cycling and canoeing/kayaking.
- Recreation sites within the region are usually filled to designed capacity during holiday weekends particularly over the warmer months. Facilities don’t cope at peak times and there is spill out of formal camp areas into ‘undesignated’ sites. A good example of this occurs during the opening of the marron season when there is an estimated 10,000 participants. The Southern Darling Range catchments are the focus for most of the 20,000 licensed marroners. Waroona, Logue Brook and Harvey Dams are regarded as premier marroning sites in WA.
- The area’s popularity can be partly attributed to its proximity to large population centres, particularly Perth, Rockingham and Bunbury. Surveys indicate that visitors are primarily intrastate, mostly (80%) from Perth. These population centres are expected to experience consistent growth in the future.
- Many people return to the same campsites or use areas over many years (and over more than one generation change). This strong attachment to places is difficult to address when established recreation activities or sites are closed or modified.
- There is a demand for two different camping experiences: one in formal (usually large) camp areas; and the other in more isolated, small ‘undesignated’ campsites.
- Different user groups demonstrate different behaviours, some of which are unacceptable in environments such as campgrounds. Management techniques have been partially successfully in influencing this behaviour.
- Statistics forecast a steady growth in population for Perth and the Bunbury region with a very rapid growth in the Mandurah-Peel Region.
- The main emerging trend in the last 3-4 years has been the growth in adventure experience and commercially run adventure activities and private camps.
- Winter (Easter to October) has seen growth in water sports such as rafting and canoeing, and mountain biking.

Demand was matched against appropriate recreation settings (called demand-setting evaluation).

- Water-skiing and power boating are popular activities at Waroona and Logue Brook Dams and there is continuing demand for these activities. There is no potential for expansion of these activities given the setting required, except by excluding other activities. Rostering activities over the busy season may provide for a greater number of users without increasing overall use.
- Camping activities have steady growth in the number of participants. The Navarino Campground has the potential for expansion, with adjacent forest providing an attractive setting. Related facilities, such as toilets, need to be upgraded. There are other areas suitable for camping around the dam but consolidation in one area is preferable for management reasons.
• Picnicking is a popular activity often associated with other activities such as water skiing, fishing, marroning or sightseeing. There is potential to expand this activity given the settings available. This should be done if associated activities increase in demand, the existing picnic sites are over-utilised (and either upgraded/expanded or closed).

• There is a demand for ‘wild’ camping that is not sufficiently addressed by management, with the result that this activity is ‘user provided’, often associated with activities such as marroning. There is evidence that a substantial amount of this activity is the preferred choice of people. It is not considered appropriate adjacent to either Warrona Dam or Drakesbrook Dam.

• There has been an increase in popularity of bushwalking but there are few tracks provided in the region. There is the potential to expand this activity to include scenic locations on the Scarp and in the valleys. In particular, walking tracks around and between Warrona and Drakesbrook Dams (along Drakes Brook) are likely options.

• There is a high demand for marroning during the season (23 days in January/February) and angling during the freshwater fishing season (1 September to 30 April). Waroona, Harvey and Logue Brook Dams provide a limited but adequate resource/shoreline for this activity. There is no potential for expansion of the activity except by rostering licensees over the season.

• Sightseeing may increase in demand, depending on how the area is promoted. There is the potential to increase this activity by promoting drives that connect features in the region, including Harvey, Waroona and Drakesbrook Dams. The dams, water bodies, the scarp and the forest are all potential features for sightseers.

Appendix 2 - Site Selection Suitability Factors

Facilities and services – specific site selection factors

Overnight accommodation
- Sizable land area suited to desired range of accommodation types;
- Level to gently sloping terrain;
- Attractive natural setting, features and attractive sense of place;
- Ability to cater for a range of visitor types and groups;
- Feature views and/or proximity to water (both active and potable);
- Ease of access – vehicles, cyclers and walkers;
- Sense of naturalness, seclusion, uniqueness;
- Stable soil, no drainage problems;
- Proximity to utilities and support infrastructure;
- Support facilities and services.

Day use facilities – picnicking, sightseeing, nature study, walking
- Vehicle access and parking for a range of vehicle types;
- Visitor safety;
- Facility design standards;
- Water quality;
- Support facilities – toilets, tables, shelters;
- Information- interpretive, orientation and instructional.

Activities – specific site selection factors

Water skiing/power boating
- Proximity to water;
- Sloping terrain;
- Hardened ramp structure;
- Access for cars/trailers;
- Circulation area for vehicles;
- Parking for long vehicles;
- Information, rules and regulations;
- Safety - lack of obstructions;
- Safe set up, take off and arrival area;
- Limited conflicts with other users;
- Limited conflicts with zoning regulations;
- Suitability during variable water levels;
- Support facilities – toilets, tables, shelters.

Swimming
- Proximity to water;
- Terrain, water depth and natural conditions to ensure safe visitor access;
- Vehicle access;
- Visitor safety;
- Water quality;
- Parking for vehicles;
- Limited conflicts with other users;
- Support facilities – toilets, tables, shelters.

Non-motorised water activities – sailing, canoeing and kayaking
- Proximity to water;
- Vehicle access, parking;
- Limited conflicts with other users;
• Visitor safety;
• No obstructions;
• Safe set up, take off and arrival area;
• Support facilities – toilets, tables, shelters.

Biking and bushwalking
• Interesting and attractive natural setting;
• Safety;
• Appropriate access and parking to trail head points;
• Support facilities that may include toilets, shelters, camp sites;
• Information and interpretation;
• Few conflicts with other user groups;
• Trail alignments suited to a range of interests and ability levels;
• Tracks and trails built to Australian Standard.

Fishing and marroning
• Proximity to water;
• Safe access to favoured locations;
• Terrain, water depth and natural conditions to ensure safe visitor access;
• Suitable habitat;
• Vehicle access;
• Low level of conflict with other user groups;
• Water quality;
• Parking for vehicles;
• Support facilities – toilets, tables, shelters, accommodation;
• Information.

Visitor experiences – site assessment factors
• Attractive setting;
• Positive visitor perceptions;
• Visitor safety;
• Enriching experiences;
• Relaxing;
• Visitor satisfaction.