

Values and Pressures of Chapman Brook



Gilgie

The Chapman Brook supports a valuable biological diversity. This encompasses three native fish and three freshwater crayfish, all of which are found only in south-west Western Australia.

Exotic fish and crayfish species are absent with the exception of one individual mosquitofish found at the site on reach 2.

The aquatic macroinvertebrate community of the Brook includes insects, worms, mites and snails. Evidence suggests that some species expected to occur naturally in these reaches were absent; further sampling is needed to determine if this is typical of the community in the Brook.

The movement of aquatic biota may be influenced by in-stream barriers including nine minor dams, two gauging stations and a number of road crossings. The influence of these structures on biota needs to be confirmed.

Water quality was generally within guidelines across all sites (reach 1 and 2) with one exception: total nitrogen was slightly elevated in one sample at reach 1; evidence suggests fertiliser is a possible source.

Fringing vegetation occurred along approximately 50% of the reaches with an average width of 22m. Exotic species were absent from the vegetation at the site on reach 2, but formed a moderate proportion of the shrub layer at the site on reach 1. This highlights the need for further revegetation and riparian weed management (reach 1) to improve condition and prevent the spread of weeds.

The extent of bank erosion was low at both sites assessed, and a moderate to high density of vegetation cover on the banks suggests reasonable protection from future erosion.

Mean annual flow in Chapman Brook for 2001 to 2012 was 40% lower than for 1975 to 2012, most likely due to climate change (reduced rainfall), and human use including storage in dams (approximately 10% of mean annual flow can be held in dams in this catchment).

A key management objective is to maintain and enhance existing flows and focus on protection of permanent water refugia which support stream ecology during warm dry months. The lower reach of the Chapman Brook, near the confluence with the Blackwood River, may provide a permanent water refuge for aquatic species during summer. Further work is required to confirm this and to identify other refugia in Chapman Brook.



Restricted Gilgie



Western Minnow

This snapshot is a joint initiative of the South West Catchments Council & the Department of Water through funding from the Australian Government and the Government of Western Australia.

More Information

A number of studies have been conducted that examine the condition and values of the Chapman Brook. These are available through the South West Catchments Council.

Most information in this snapshot came from a collaborative study by South West Catchments Council and the Department of Water. For further details of the study please contact South West Catchments Council.

Chapman Brook Blackwood River Basin

A snapshot of the condition of the Chapman Brook



Lower catchment of the Chapman Brook



Nightfish



Western Pygmy Perch



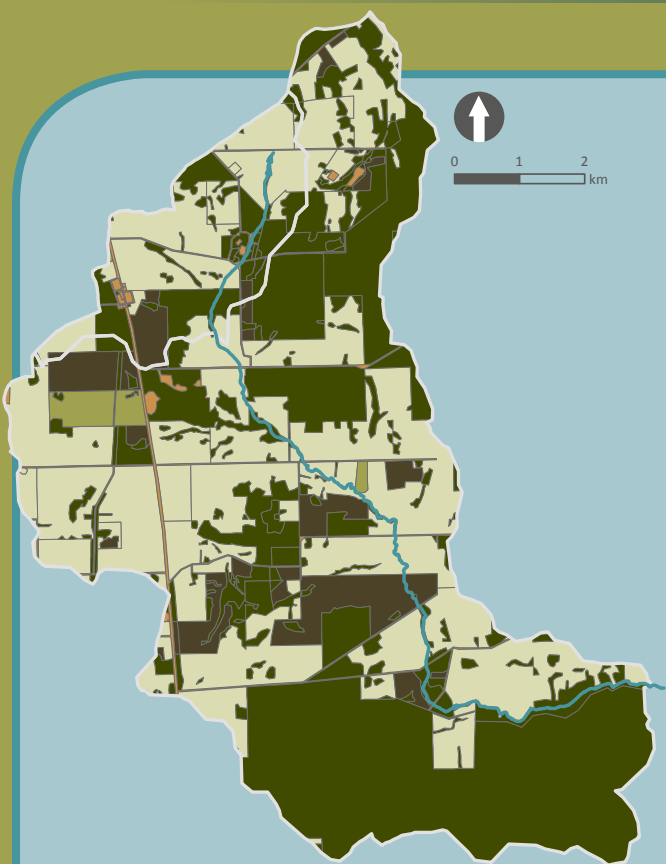
Smooth Marron



This snapshot provides a summary of waterway condition for the Chapman Brook, based on assessments conducted in 2012 to 2013. A number of key values and threats to the system are highlighted.



Chapman Brook Blackwood River Basin Lower Blackwood Catchment



Catchment Description

The Chapman Brook, in the lower catchment of the Blackwood River, extends 20 km from the top of catchment to the confluence with the Blackwood River. The assessment covered 15 km of the Brook with a catchment area of 65 km².

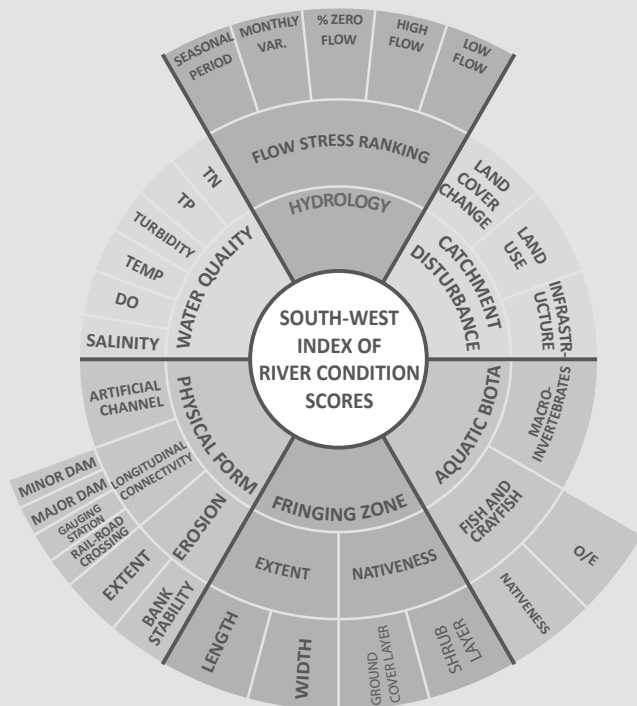
Land use in the catchment includes;

- 46% conservation/minimal use
- 43% grazing
- 7% intensive/irrigated agriculture
- 2% urban/transport/mining
- 1% plantation forestry.

LAND USE 2007 (DoW 2012)

CONSERVATION / MINIMAL USE	INTENSIVE & IRRIGATED AGRICULTURE
PLANTATION FORESTRY	URBAN / TRANSPORT / MINING
GRAZING	WATERWAY

Methods for Assessing River Condition



Ecological Themes

Hydrological Change is assessed using the Flow Stress Ranking, which assesses the current hydrological pattern (e.g., seasonal flows, magnitude of high flows, and period of no flows) against expectations of flow without the influence of vegetation clearing and damming.

Catchment Disturbance is the primary pressure indicator of the SWIRC. Catchment Disturbance assesses the amount of human derived disturbance in a catchment, considering land uses, infrastructure types and loss of vegetation. Impacts of different land uses and infrastructure types are weighted according to their varying influences on river condition. Additional stress due to loss of vegetation is factored.

Aquatic Biota is the primary response indicator of the SWIRC. For this study, aquatic biota was assessed based on comparison of observed communities of fish and macroinvertebrates (richness, abundance and the presence of exotic species) against expectations for a healthy ecosystem.

Fringing Zone assesses the buffering protection provided by streamside vegetation to inputs from adjacent land use, and provides an indication of bank stability, shade and the organic material provided for habitat and food to support the aquatic food-web.

The quality of the fringing zone is assessed based on the extent (width and longitudinal continuity) at a reach scale and proportion of exotic species present at a site.

Physical Form indicators examine aspects of aquatic habitat at three scales:

1. erosion (extent and bank stability) assesses potential impacts to microhabitat;
2. artificial channel evaluates impacts to macrohabitats; and
3. longitudinal connectivity assesses the availability of the whole system as habitat to aquatic biota and the potential for natural flushing. This considers the presence of dams and road and rail crossings and other in-stream structures.

Water Quality is both an indicator responding to catchment disturbance and a stressor for aquatic biota.

Water quality is assessed through field measured and modelled data for nutrients, turbidity, temperature, dissolved oxygen and salinity. Data is compared against available guidelines and literature based on tolerance of aquatic biota.

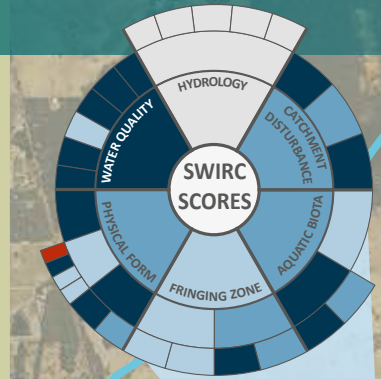
Additional contaminant data are collected where required. This is reported separately; not included in the standard scoring suite.

A Snapshot of the Condition of Chapman Brook 2012/2013

Method

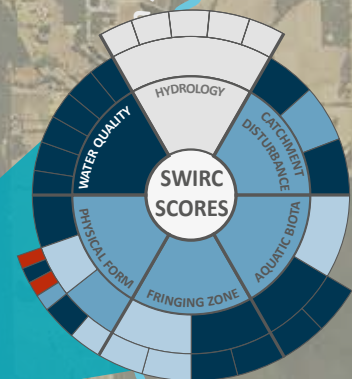
Assessments were made using the South West Index of River Condition (SWIRC), which provides a suite of standardised methods for collecting field and desktop data, as well as protocols for analysing the data. It includes a scoring system to measure departure from natural conditions and to allow comparison between river systems. Scores are categorised on a scale between 'largely unmodified' and 'severely modified'.

The SWIRC uses a series of indicators to examine six broad ecological themes that underpin ecological condition of waterways. Assessments are completed at a reach scale, with some data gathered at sampling site(s) which are representative of the reach.



Summary

Based on the 2012/2013 assessment, the Chapman Brook was generally in good condition, with the majority of the broad ecological theme scores (inner ring of the SWIRC scoring diagram) being categorised as 'largely unmodified' or 'slightly modified'. The indicators contributing to theme scores (the middle and outer rings) were all within the 'largely unmodified' to 'moderately modified' categories with the exception of three indicators that showed 'severe modification'; these are summarised overleaf.



WATERWAY CONDITION SCORES

- LARGELY UNMODIFIED
- SLIGHTLY MODIFIED
- MODERATELY MODIFIED
- SUBSTANTIALLY MODIFIED
- SEVERELY MODIFIED
- NO DATA
- RESTORATION WORKS 2009-2013
- SAMPLING SITE
- REACH
- REACH NUMBERS

Restoring the Lower Blackwood Together

The South West Catchments Council (SWCC) works with the community to care for our south west environment.

One area SWCC works in is the Lower Blackwood High Ecological Value Aquatic Ecosystem (HEVAE), a nationally recognised aquatic ecosystem. The HEVAE incorporates the lower reaches of the Blackwood River and tributaries including the Upper Chapman and Chapman Brooks, McLeod and Rushy Creeks.

A biological hotspot, the HEVAE is recognised for its unique aquatic ecosystems (swamplands, permanent freshwater rivers and streams) which support a diverse number of plant and animal species. Many of the species are threatened

including the white bellied frog, the orange bellied frog, Balston's pygmy perch and a Reedia sedge community.

SWCC have partnered with landholders along the tributaries to restore and protect riparian areas on private land. This has involved removing aggressive weeds- predominantly blackberry, fencing off riparian areas and revegetating with local species.

SWCC will continue to support local landholders with riparian restoration. For advice or to find out about funding opportunities please contact SWCC on email: swcc@swccnrm.org.au or phone: (08) 9780 6193.

