

Values and Pressures of Upper Chapman Brook

The Upper Chapman Brook supports a valuable biological diversity. This encompasses three native freshwater crayfish and five native fish species, including the threatened mud minnow and the priority 1 pouched lamprey.

Seven of these species are found only in the south-west. Evidence suggests the Brook supports key spawning and nursery habitats for several species. Two exotic species were found in low abundance across two sites: yabby and mosquitofish.

The aquatic macroinvertebrate community includes the priority four freshwater mussel and a new larval form of caddisfly. Evidence suggests that some species expected to occur naturally in reach 1 and 3 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 two minor dams and a number of road crossing points. The influence of these structures on biota needs to be confirmed.

Water quality was within guidelines with a few exceptions: total nitrogen was elevated in samples from reaches 2 to 4, turbidity was elevated in a sample from reach 2 and dissolved oxygen was low at the site on reach 3.

Fringing vegetation covered 100% of the length of reach 1 with an average width of 50 m. Reach 3 and 4 had vegetation covering 62% of the length with an average width of over 20 m. By contrast, reach 2 was less well vegetated, with only 24% of the reach length covered, with an average width of 13 m.

The proportion of exotic species in the ground cover layer was moderate to high at all sites except the site on reach 1, where very few exotic species were found. Cover of exotic species was low or absent in the shrub and tree layers at all sites.

The extent of bank erosion was low at the sites on reach 1 and 4 and the risk of further erosion is low due to the stabilisation provided by the dense vegetation cover on the banks. By contrast the extent of erosion was high at the sites on reach 2 and 3 despite moderate to dense vegetation cover stabilising the banks – this suggests the erosion may be caused by other factors e.g. scouring during high flow events.

There is limited flow data available for Upper Chapman Brook, however in Chapman Brook a 40% decline in mean annual flow has been measured (2001 to 2012 compared to 1975 to 2012), most likely due to climate change (reduced rainfall), and human use including storage in dams. Farm dams in the Upper Chapman Brook catchment can hold approximately 7% of mean annual flow for the Brook (compared to 10% in the Chapman Brook).

Parts of the Upper Chapman Brook were dry during summer, however sites on reaches 2 and 3 were wet. Fish and crayfish data suggests the site on reach 3 was providing a refuge for biota during summer. Further work is required to identify other refugia in the Upper Chapman Brook.



Gilgie

Mud Minnow

Western Minnow

Nightfish

Restricted Gilgie

Koonac



Smooth Marron



Western Pygmy Perch



South-West Goby

Upper Chapman Brook Blackwood Basin

A snapshot of the health of the Upper Chapman Brook

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 Upper 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.



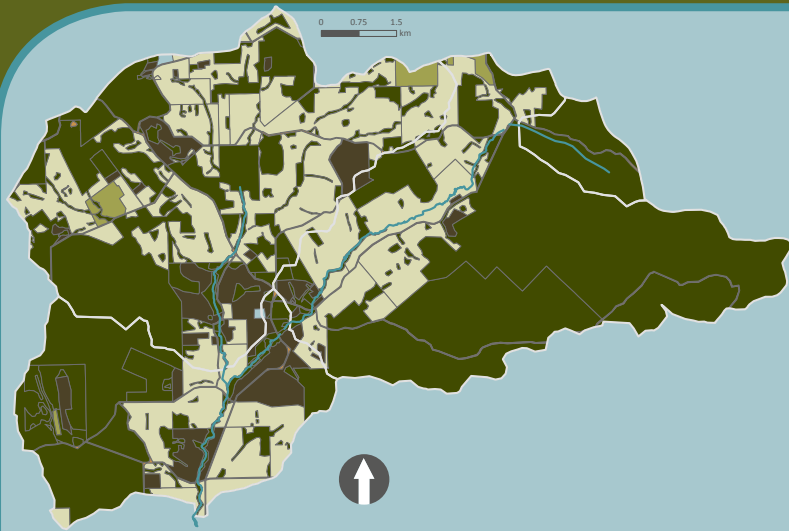
Lower catchment of the Upper Chapman Brook

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





Upper Chapman Brook Blackwood River Basin Lower Blackwood Catchment



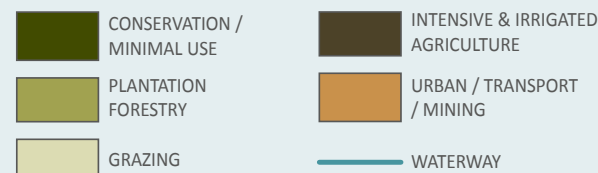
Catchment Description

The Upper Chapman Brook, in the lower catchment of the Blackwood River, extends 20 km from the top of catchment to the confluence with the Chapman Brook (2.5 km upstream from the confluence with the Blackwood River). The assessment covered 15 km of the Brook with a catchment area of 94 km².

Land use in the catchment includes;

- 61% conservation/minimal use
- 29% grazing
- 7% intensive/irrigated agriculture
- 2% urban/transport uses
- 1% plantation forestry.

LAND USE 2007 (DoW 2012)



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.

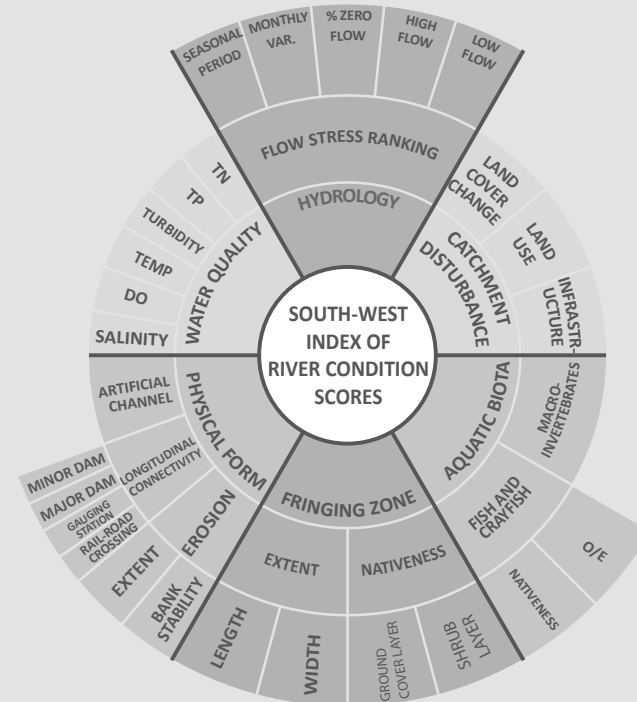
A biological hotspot, the HEVAE is recognised for its unique aquatic ecosystems (swamplands, permanent freshwater rivers and streams) which support a diverse number of plant and animal species.

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.

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 Upper Chapman Brook 2012/2013

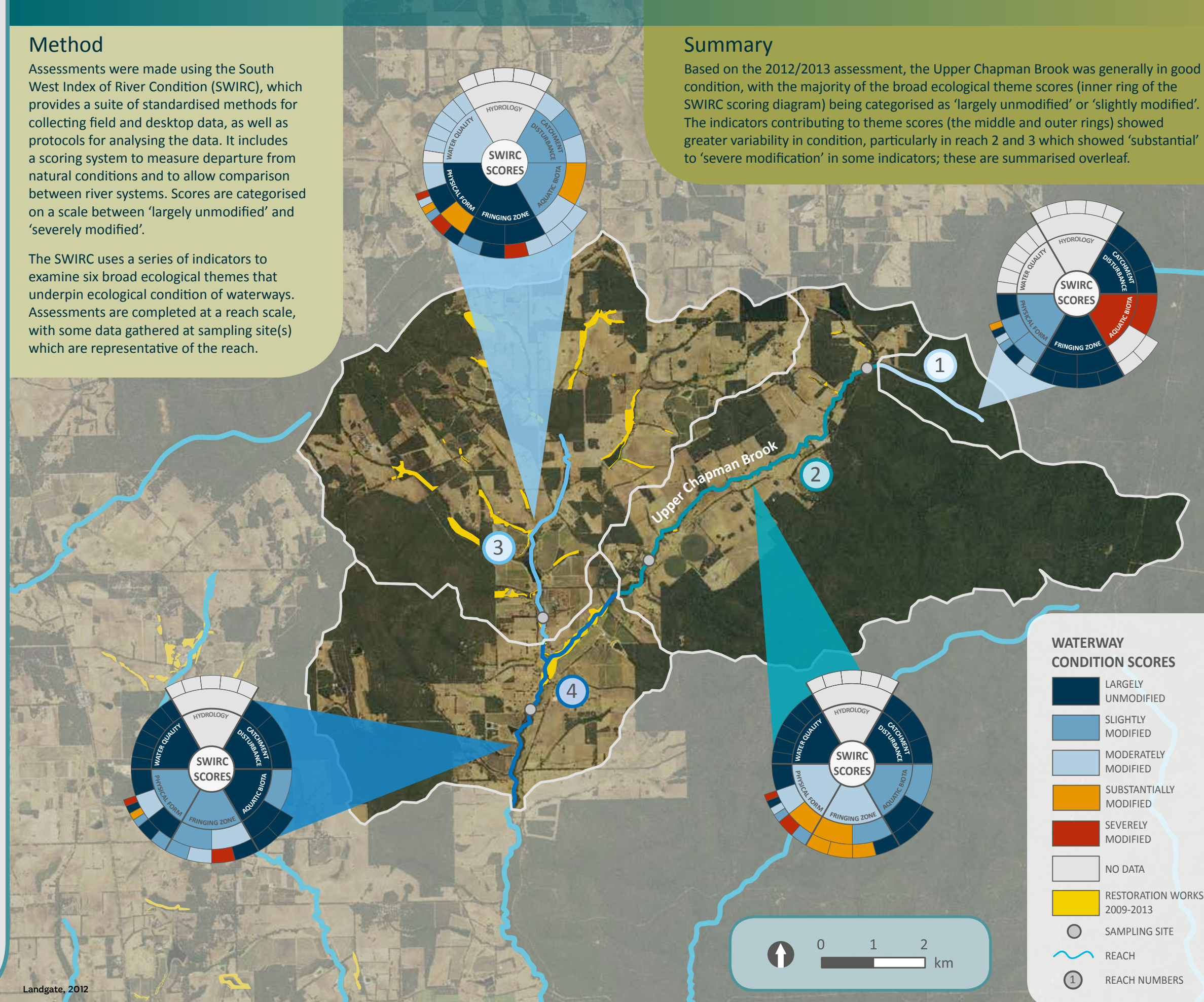
Method

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 Upper 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) showed greater variability in condition, particularly in reach 2 and 3 which showed 'substantial' to 'severe modification' in some indicators; these are summarised overleaf.



WATERWAY CONDITION SCORES

