

Aquatic ecosystem condition reports

2008 panel assessment of creeks and rivers in the Mount Lofty Ranges, Murray–Darling Basin, Northern & Yorke and Kangaroo Island regions

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EPA 962/11: This information sheet describes the outcome of the panel assessment of creeks and rivers in the Mount Lofty Ranges, SA Murray-Darling Basin, Northern and Yorke and Kangaroo Island Natural Resources Management (NRM) regions during 2008

Introduction

The Environment Protection Authority (EPA) coordinates a monitoring, evaluation and reporting (MER) program on the aquatic ecosystem condition of South Australian creeks and rivers. This MER program is designed to meet several objectives:

- Providing a statewide monitoring framework for creeks and rivers that revolves through the NRM Regions with sufficient frequency to allow for State of the Environment Reporting purposes.
- Describing aquatic ecosystem condition for broad general public understanding.
- Identifying the key pressures and management responses to those pressures.
- Providing a useful reporting format that can support environmental decision making within government, community and industry.

This information sheet provides a summary of the scientific work used in assessing monitoring data from the creeks and rivers. Aquatic ecosystem science is not always rigid and precise; it is often open to different interpretations in several respects. Therefore, the EPA has decided that the best way to assess the condition of streams is through an expert panel deliberation that uses a consistent descriptive modelling approach. The panel members comprised three environmental consultants, three biologists from the biomonitoring team at the Australian Water Quality Centre (AWQC), and two biologists from the EPA (the authors of this assessment). All have at least five years experience in monitoring and assessing a range of streams across South Australia.

This information sheet is a technical document that contains relatively sophisticated concepts and content. It summarises the scientific assessment of data collected from creeks and rivers in the Mount Lofty Ranges, SA Murray–Darling Basin, Northern and Yorke and Kangaroo Island during 2008.

The assessment

The sites included in this assessment were selected from a subset of previously sampled sites in the four NRM regions and designed to provide a wide spatial coverage of each region. Sites were also selected to ensure the biological changes that occur in response to the range of stressors and disturbances in each region were included. This meant that sites with few obvious disturbances (eg national parks) through to severely disturbed catchments (eg urban streams or those subject to industrial discharges) were in the suite of sites assessed in 2008.

The expert panel of eight experienced aquatic biologists individually rated each site using a descriptive model for interpreting change in aquatic ecosystems in relation to increasing levels of disturbance (Davies and Jackson 2006). The assumption was that biological (ecological) condition deteriorates as the degree of human disturbance in the catchment increases, and conversely, the best condition occurs where there is little to no human disturbance of the environment (Figure 1).

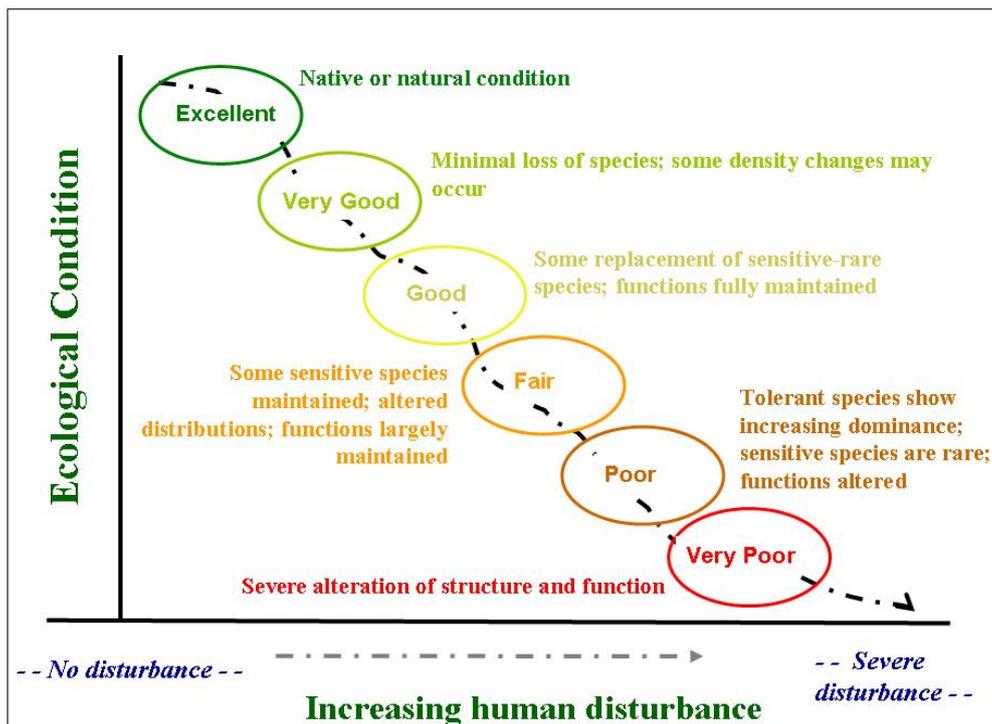


Figure 1 Human disturbance gradient showing the six different ecological condition grades or ratings ranging from excellent (best) to very poor (worst) with a brief definition of each condition

The process used to rate the sites started with each panel member being asked to review the paper by Davies and Jackson (2006) to ensure they understood and agreed with the basic concepts used to assess and communicate the ecological condition of sampled sites to the general public.

Each panel member was then sent a spreadsheet and asked to review the range of data collected from the sampled sites, including macroinvertebrate species lists and abundances that were derived from laboratory processed samples, water chemistry results, selected habitat data and other summary biological measures. A workshop was then held to discuss the major differences between the six condition ratings to be applied.

A conceptual model of the typical ecological responses to the range of disturbances in the four NRM regions was presented and this was subsequently edited several times following the workshop into the final version presented in Table 1. During the workshop, each panel member individually rated the condition of several sites and the results were then compared in an attempt to provide an opportunity to discuss differences in interpreting the data among the assessors. Following this, each panel member then assessed all other sites over the following few weeks and the results were sent in to the authors where they were collated and combined to produce an overall or final rating for each site (Table 2).

The final ratings were derived by selecting the most common rating (also called the mode) assigned by the panel for each site. In cases where two ratings were possible, a conservative approach was taken and the poorer rating was selected. If the ratings were too variable to provide a clear result for a particular site, then one high and one low rating were omitted and the most common rating was recalculated to provide the final result for the site.

The ratings in the conceptual model range from Excellent with no obvious human disturbances to Very Poor where major disturbances have degraded the stream to such a level that only the most tolerant species are able to survive. Some of the better condition classes were, however, not considered to be present for the regions sampled in 2008, despite the presence of large areas of native vegetation on the western side of Kangaroo Island. Presumably the effects from a recent fire on Kangaroo Island, prolonged drought and the extent of land clearance in the southern parts of South Australia contributed to the lack of Excellent or Very Good sites.

Most streams occurred in largely cleared catchments used for agriculture, where the main areas of remnant vegetation are limited to hilltops, roadsides and along creeklines. Consequently, sites sampled from the four NRM regions ranged from Good to Very Poor. However, since the ratings relate to individual sites assessed rather than the catchment as a whole, it is likely that future work will identify sites and stream reaches in these regions in better condition than those assessed in 2008.

It is also possible that the upper reaches of some streams from the western end of Kangaroo Island in the Flinders Chase National Park (eg Rocky, Breakneck and North-West rivers and Ravine des Casoars) or small coastal streams on the Fleurieu Peninsula may still be in an Excellent condition, and other streams with well vegetated catchments from the Mount Lofty Ranges (eg First and Sixth creeks) are likely to be in a Very Good condition on occasions.

The results for the 67 sites assessed showed that seven sites were Good, 31 were Fair, 22 were Poor and seven were Very Poor (Table 2). These results included 18 sites that were dry and therefore assessed using only the vegetation, riparian, sediment and land use measures. It was decided after the panel workshop that dry sites should also be assessed even though water quality and macroinvertebrate data were not available. While dry at the time of sampling, these sites and streams could provide habitat for an aquatic community during wetter periods. Rather than being assessed by all panel members, these sites were assessed only by the primary author of this assessment (EPA principal aquatic biologist) using the conceptual model in Table 1, with a provisional assessment of each dry site provided (Table 2).

Of the 49 sites assessed by each panel member (one member only rated 47 sites), 20 sites were assigned a rating within one class of each other and 29 sites were assigned a rating of two or more classes from each other. Some members consistently provided a better rating than the others and conversely, some provided a generally poorer rating for sites. Subsequent discussion with several panel members indicated they did not consistently refer to the conceptual model and did not spend much time reviewing their final ratings to ensure similar sites were provided with the same condition rating. This probably contributed to at least some of the variation in results from the panel members.

The results were subsequently written up into an individual aquatic ecosystem condition report for each site that included the overall rating, key points, and details about the location, findings, special environmental values, and the pressures and management responses being adopted to protect or improve stream environments in the future. It was evident, however, that while writing these reports there were three sites where the grade assigned using the panel results appeared to be inconsistent with either the conceptual model or how other sites were assessed using similar datasets. Consequently, the final ratings for the following sites were changed by the primary author of this assessment for the following reasons:

- 1 Hadrian Creek was assigned a Good rating by the panel but was subsequently changed to Fair due to the dominance by organic feeding macroinvertebrates, presence of only a few sensitive species in very low numbers, and large cover of filamentous algae and weedy aquatic plants.
- 2 Heathfield Creek was assigned a Fair rating by the panel but was changed to Very Poor because the macroinvertebrate community was dominated by organic feeding species, lacked any sensitive species, and the water in the creek was turbid and very enriched with nutrients because all the flow was being discharged from a

wastewater treatment plant. The latter severely altered the physical, chemical and biological features of the creek which, according to the conceptual model, justifies placing the stream among the most disturbed category.

- 3 Sturt River was assigned a Poor rating by the panel but was changed to Fair because the site sampled provided habitat for at least six rare and sensitive species of macroinvertebrates, which is probably too many to justify the worse result. All were present in very low numbers. The community was dominated by large numbers of snails and other organic feeding species, and showed several indicators of obvious enrichment of the site (eg very high phosphorus concentration, large cover of filamentous algae, presence of weedy aquatic plants and organic sediments). The data and panel results were comparable to the site sampled from Spoehr Creek, assigned a Poor rating, but differed due to the latter site only providing habitat for one sensitive and rare species.

Table 1 Conceptual model of ecological responses to a disturbance gradient in the Mount Lofty Ranges, Murray–Darling Basin, Northern & Yorke and Kangaroo Island NRM regions

| Rating | Excellent | Very good | Good | Fair | Poor | Very Poor |
|-----------------------------|--|---|--|---|---|--|
| Stressor description | As naturally occurs: if still present, is likely to occur on the western side of Kangaroo Island in the upper reaches of Rocky, Breakneck and North-West rivers and the Ravine des Casoars in the Flinders Chase National Park and some small coastal catchments on the Fleurieu Peninsula. However, given the level of vegetation clearance, landscape modification and invasion by pest species, the Excellent condition may no longer occur in these regions. | Least impacted: not common in these regions due to the extent of vegetation clearance, landscape modification and invasion by pest species. Small coastal streams and parts of the Finnis River catchment on the Fleurieu Peninsula and streams from the western side of Kangaroo Island are likely to represent this condition on occasion, particularly from the permanently/near permanently flowing freshwater streams. | Best condition sites showing initial signs of nutrient enrichment: only likely to occur in small coastal catchments and parts of the Finnis River catchment on the Fleurieu Peninsula, First and Sixth creeks in the Mount Lofty Ranges and streams on western Kangaroo Island. Sites from these areas are likely to represent this condition on occasion due to the presence of permanently/near permanently flowing freshwater streams. Elsewhere the level of clearance and associated agricultural development are likely to cause significant nutrient enrichment and sediment effects. | Moderate nutrient enrichment: likely to commonly occur in both regions due to the extent of vegetation clearance and associated agricultural development. | Gross nutrient enrichment: likely to commonly occur in the eastern and middle sections of Kangaroo Island and the low-to-mid altitude streams in the Mount Lofty Ranges due to the extent of vegetation clearance and associated agricultural development. Ephemeral streams are likely to show extensive enrichment effects due to the lack of dilution flows. | Severely altered: may occur in the Mount Lofty Ranges and eastern side of Kangaroo Island from urban stream reaches, downstream from wastewater discharges and highly degraded ephemeral streams in agricultural settings. Sites assigned to this rating will probably be affected by a toxicant or other disturbance that significantly limits the diversity and abundance of aquatic life. |

| Rating | Excellent | Very good | Good | Fair | Poor | Very Poor |
|-----------------------------------|---|--|--|--|--|--|
| Biological assemblages | Native assemblages; usually with many rare or sensitive species present; typically high EPT ¹ richness; often low abundances; no symptoms of stress and no introduced aquatic species present. Note that ephemeral habitats may have a rich fauna of colonising insects (eg beetles, waterbugs and dipterans) but usually there is a similar abundance of all species. | Best of what is left assemblages; high richness; intolerants and specialist taxa dominate abundances; may include some introduced species present in low abundances. | Typical assemblages for least impacted streams; good richness; generalist assemblage that includes at least some rare and sensitive species; emerging symptoms of stress in relation to nutrients and fine sediments; at least some remnant native vegetation present. | Impaired assemblages; generalists and tolerant taxa dominate numbers which usually includes some very abundant taxa; sensitive and rare taxa, if present, present in very low numbers; usual absence of some taxa expected for the available habitats present; at least some trees present in the local catchment and banks. | Degraded assemblages; tolerants and generalists dominate but numbers usually reduced, although 1–2 generalist taxa may be present in high abundances; only 1–2 rare or sensitive species present in low abundances or absent; often few or 1–2 scattered trees in the local catchment and banks. | Severely degraded assemblages with few taxa and generally low abundances; may have large numbers of one tolerant taxon such as oligochaetes, mosquito larvae, amphipods (<i>Austrochiltonia</i>) or chironomids (eg <i>Chironomus</i> , <i>Procladius</i> and <i>Tanytarsus</i>); can include organic feeders from highly polluted waters such as syrphid larvae; vegetation often completely comprised introduced species with little to no remnant native vegetation. |
| Water chemistry conditions | As naturally occurs; no human contaminants present and pest species not impacting on water quality (eg nutrients, hormones). | Best condition sites with associated water quality; high proportion natural features means well oxygenated and low in nutrients and turbidity. | Largely unremarkable water quality with at least some nutrients present at higher than expected concentrations, coupled with at least one plant indicator showing emerging signs of enrichment effects (eg either chlorophyll <i>a</i> >10 ug/L, | Fair water quality with generally saturated dissolved oxygen (when sampled during the day), at least one nutrient present at high concentrations and high algal and higher plant growths (eg either chlorophyll <i>a</i> >10 ug/L, macrophyte cover >10% cover | Poor water quality with generally saturated dissolved oxygen (when sampled during the day), nutrients present at high concentrations and high plant productivity evident at the site (eg usually chlorophyll <i>a</i> >10 ug/L, macrophyte cover >10% cover and | Very poor water quality with at least one parameter likely to be at a toxicant concentration that limits aquatic diversity; often very low dissolved oxygen and may be saline and enriched in nutrients but algal and plant growth limited. |

| Rating | Excellent | Very good | Good | Fair | Poor | Very Poor |
|--|--|---|--|--|---|---|
| | | | macrophyte cover >10% cover and/or filamentous algae >35% cover) but site not overwhelmed. | and/or filamentous algae >35% cover) evident on occasions. | filamentous algae >35% cover most of the time). | |
| Physical habitat and flow patterns | Natural habitat and flow patterns; no farm dams present; range of sediment types and not always anaerobic. | Near natural habitat and flow regimes; mostly well vegetated catchments with few dams present; range of sediment types and not always anaerobic. | Good habitat structure and flow patterns; extent of dam development has not caused an obvious loss of riffle habitats; range of sediment types and not always anaerobic. | Fair habitat structure and flow patterns; many dams may be present in the catchment; anaerobic fine sediments usually present except when large algal growths present. | Poor habitat structure and flow patterns; may have many dams present in the catchment; anaerobic fine sediments usually present except when large algal growths present. | Severe modifications to physical habitat and flow patterns; little to no remnant native vegetation remaining; cleared agricultural or urban sites; anaerobic fine sediments often dominate. |
| Human activities and sources in the catchment | No obvious human disturbances but may include roads and sparse residential housing that is seweraged; no point sources and diffuse pollution not detectable by the extent of native vegetation surrounding the waterway. | No significant human disturbances but may include some seweraged housing and roads; no point source discharges and diffuse pollution not obviously affecting the aquatic ecosystem due to the extent of native vegetation surrounding the waterway. | Effects of human disturbance becoming obvious; point sources may be present but do not dominate flows; good riparian zones help to mitigate diffuse pollution effects. | Point and diffuse source enrichment effects evident; riparian zone not effective at mitigating nutrients and fine sediment entering waterway. | Obvious point and diffuse source enrichment effects present; unbuffered channel; major changes to catchment land use with little remnant vegetation remaining and agriculture and/or urban uses dominate. | Severe point and/or diffuse source effects that may include toxicant responses; effects dominate water quality and biological response with little signs of the original waterway evident; unbuffered channel that has undergone extreme modifications in an agricultural or urban setting. |

¹ EPT = Ephemeroptera + Plecoptera + Trichoptera which refers to a commonly used biological index that counts the number of species and/or individuals of the mayflies, stoneflies and caddisflies collected, with these insects expected to represent the more sensitive macroinvertebrate species in a sample.

Table 2 Ratings given by each panel member and final 'overall' grade for each of the 67 sites monitored in the Mount Lofty Ranges, Murray Darling Basin, Northern & Yorke and Kangaroo Island NRM regions during 2008

Provisional ratings are shown for dry sites that were only assessed by the primary author using a more limited suite of non-wet indicators and the three sites assigned a different grade from the panel process are highlighted in the right hand column using uppercase text.

| Site name | Habitat | NRM region | Excellent | Very Good | Good | Fair | Poor | Very Poor | Panel rating | Provisional rating for dry sites | Final rating |
|--|---------|------------|-----------|-----------|------|------|------|-----------|--------------|----------------------------------|------------------|
| Aldgate Creek, Aldgate | Riffle | AMLR | | | 6 | 1 | 1 | | Good | | Good |
| Baker Creek, near Tungkillo | DRY | MDB | | | | | | | | Fair | Fair |
| Breakneck River, Kangaroo Island | Edge | KI | | 2 | 2 | 4 | | | Fair | | Fair |
| Breakneck River, Kangaroo Island | Riffle | KI | | | 2 | 4 | 2 | | Fair | | Fair |
| Broughton River, near Koolunga | Dry | NY | | | | | | | | Fair | Fair |
| Brownhill Creek, Mitcham | Edge | AMLR | | 1 | 4 | 3 | | | Good | | Good |
| Bull Creek, near Ashborne | Dry | MDB | | | | | | | | Fair | Fair |
| Chambers Creek, Coromandel Valley | Edge | AMLR | | | 1 | 6 | 1 | | Fair | | Fair |
| Cobbler Creek, Salisbury East | Dry | AMLR | | | | | | | | Very Poor | Very Poor |
| Congeratinga Creek, near Second Valley | Dry | AMLR | | | | | | | | Fair | Fair |
| Cox Creek, near Stirling | Edge | AMLR | | | | 2 | 6 | | Poor | | Poor |
| Cox Creek, near Stirling | Riffle | AMLR | | | 2 | 1 | 5 | | Poor | | Poor |
| Deep Creek, near Norton Summit | Edge | AMLR | 1 | 3 | 1 | 2 | 1 | | Good | | Good |
| Deep Creek, near Norton Summit | Riffle | AMLR | | 5 | | 3 | | | Good | | Good |
| Dog Trap Creek, near Delamere | Edge | AMLR | | | 1 | 4 | 3 | | Fair | | Fair |
| Dry Creek, Wynn Vale | Edge | AMLR | | | | | 1 | 7 | Very Poor | | Very Poor |

| Site name | Habitat | NRM region | Excellent | Very Good | Good | Fair | Poor | Very Poor | Panel rating | Provisional rating for dry sites | Final rating |
|--|---------|------------|-----------|-----------|------|------|------|-----------|--------------|----------------------------------|--------------|
| Dry Creek, Valley View | Edge | AMLR | | | | 2 | 6 | | Poor | | Poor |
| Echunga Creek, near Mount Bold Reservoir | Edge | AMLR | | 3 | 4 | 1 | | | Good | | Good |
| Eleanor River, Kangaroo Island | Edge | KI | | | | | 5 | 3 | Poor | | Poor |
| Eyre Creek, near Watervale | Dry | NY | | | | | | | | Fair | Fair |
| Fourth Creek, Morialta | Edge | AMLR | | 1 | | 6 | 1 | | Fair | | Fair |
| Fourth Creek, Morialta | Riffle | AMLR | | | 1 | 6 | 1 | | Fair | | Fair |
| Freshwater Creek, near Spalding | Edge | NY | | | 1 | 4 | 3 | | Fair | | Fair |
| Freshwater Creek, near Spalding | Riffle | NY | | | 1 | 5 | 2 | | Fair | | Fair |
| Gawler River, Gawler | Dry | AMLR | | | | | | | | Very Poor | Very Poor |
| Gawler River, Virginia Park | Edge | AMLR | | | | | 5 | 3 | Poor | | Poor |
| Gilbert River, Stockport | Dry | NY | | | | | | | | Fair | Fair |
| Gould Creek, near Macclesfield | Dry | MDB | | | | | | | | Fair | Fair |
| Hadrian Creek, near Cherry Gardens | Edge | AMLR | | 2 | 3 | 3 | | | Good | | FAIR |
| Hahndorf Creek, near Hahndorf | Edge | AMLR | | | 1 | 1 | 5 | 1 | Poor | | Poor |
| Harriet River, Kangaroo Island | Edge | KI | | | | 6 | 2 | | Fair | | Fair |
| Harrison Creek, near Tungkillo | Dry | MDB | | | | | | | | Poor | Poor |
| Heathfield Creek, Heathfield | Riffle | AMLR | | | | 5 | 1 | 2 | Fair | | VERY POOR |
| Inman River, off Victor Harbor Bypass, Victor Harbor | Edge | AMLR | | | | 5 | 3 | | Fair | | Fair |

| Site name | Habitat | NRM region | Excellent | Very Good | Good | Fair | Poor | Very Poor | Panel rating | Provisional rating for dry sites | Final rating |
|--|---------|------------|-----------|-----------|------|------|------|-----------|--------------|----------------------------------|--------------|
| Inman River, Inman Valley Road, near Victor Harbor | Edge | AMLR | | | 2 | 6 | | | Fair | | Fair |
| Inverbrachie Creek, near Woodside | Edge | AMLR | | | | | 4 | 4 | Very Poor | | Very Poor |
| Jacob Creek, near Rowland Flat | Edge | AMLR | | | | | 6 | 2 | Poor | | Poor |
| Jupiter Creek, near Echunga | Edge | AMLR | 1 | 2 | 5 | | | | Good | | Good |
| Kenton Creek, Gumeracha | Edge | AMLR | | 1 | | 3 | 4 | | Poor | | Poor |
| Kersbrook Creek, near Kersbrook | Edge | AMLR | | | 2 | 1 | 5 | | Poor | | Poor |
| King George Creek, Kangaroo Island | Riffle | KI | | | | 1 | 5 | 2 | Poor | | Poor |
| King George Creek, Kangaroo Island | Edge | KI | | | | 1 | 5 | 2 | Poor | | Poor |
| Light River, Pinkerton Plains | Edge | NY | | | | 3 | 5 | | Poor | | Poor |
| Little Para River, Burton | Dry | AMLR | | | | | | | | Very Poor | Very Poor |
| Malcolm Creek tributary, near Kersbrook | Edge | AMLR | | | 4 | 4 | | | Fair | | Fair |
| McHarg's Creek, near Ashborne | Edge | MDB | | | 4 | 4 | | | Fair | | Fair |
| Meadows Creek, near Willunga | Edge | MDB | | | | 5 | 3 | | Fair | | Fair |
| Millbrook Creek, near Millbrook Reservoir | Edge | AMLR | | 1 | 1 | 1 | 5 | | Poor | | Poor |
| Millbrook Creek, near Millbrook Reservoir | Riffle | AMLR | | 1 | 2 | 2 | 2 | 1 | Fair | | Poor |
| Mount Barker Creek, near Callington | Edge | MDB | | 1 | 2 | 5 | | | Fair | | Fair |
| Nairne Creek, near Petwood | Dry | MDB | | | | | | | | Fair | Fair |
| Onkaparinga River, near Hahndorf | Edge | AMLR | | | 2 | 5 | 1 | | Fair | | Fair |
| Panatalinga Creek, Reynella East | Dry | AMLR | | | | | | | | Poor | Poor |

| Site name | Habitat | NRM region | Excellent | Very Good | Good | Fair | Poor | Very Poor | Panel rating | Provisional rating for dry sites | Final rating |
|--------------------------------------|---------|------------|-----------|-----------|------|------|------|-----------|--------------|----------------------------------|--------------|
| Pedler Creek, near Moana | Edge | AMLR | | | | 3 | 5 | | Poor | | Poor |
| Preamimma Creek, near Callington | Dry | MDB | | | | | | | | Poor | Poor |
| Reedy Creek, near Palmer | Edge | MDB | | 1 | | 3 | 4 | | Poor | | Poor |
| Rocky River, near Crystal Brook | Edge | NY | | | | 2 | 6 | | Poor | | Poor |
| Rocky River, near Crystal Brook | Riffle | NY | | | | 4 | 4 | | Poor | | Poor |
| Rodwell Creek, Woodchester | Dry | MDB | | | | | | | | Poor | Poor |
| Skillogallee Creek, near Auburn* | Edge | NY | | | | | 3 | 4 | Very Poor | | Very Poor |
| South Para River, Gawler* | Edge | AMLR | | | | 2 | 5 | | Poor | | Poor |
| Spoehr Creek, near Balhannah | Edge | AMLR | | | 3 | 1 | 4 | | Poor | | Poor |
| Stunsail Boom River, Kangaroo Island | Edge | KI | | | 1 | 5 | 2 | | Fair | | Fair |
| Sturt River, Coromandel Valley | Edge | AMLR | | | 3 | 1 | 4 | | Poor | | FAIR |
| Sturt River, Coromandel Valley | Riffle | AMLR | | | 3 | 3 | 2 | | Fair | | Fair |
| Tanunda Creek, near Bethany | Edge | AMLR | | | 1 | 3 | 4 | | Poor | | Poor |
| Tenafeate Creek, southeast of Gawler | Dry | AMLR | | | | | | | | Fair | Fair |
| Timber Creek, Kangaroo Island | Edge | KI | | | | | 6 | 2 | Poor | | Poor |
| Tookayerta Creek, Currency Creek | Dry | MDB | | | | | | | | Good | Good |
| Tookayerta Creek, near Mount Compass | Edge | MDB | | | 5 | 3 | | | Good | | Good |
| Tookayerta Creek, near Mount Compass | Riffle | MDB | | 2 | 3 | 3 | | | Good | | Good |
| Torrens River, near Gumeracha | Edge | AMLR | | | 3 | 4 | 1 | | Fair | | Fair |

| Site name | Habitat | NRM region | Excellent | Very Good | Good | Fair | Poor | Very Poor | Panel rating | Provisional rating for dry sites | Final rating |
|------------------------------------|---------|------------|-----------|-----------|------|------|------|-----------|--------------|----------------------------------|--------------|
| Torrens River, near Gumeracha | Riffle | AMLR | | | 2 | 3 | 2 | 1 | Fair | | Fair |
| Victoria Creek, Williamstown | Edge | AMLR | | | 3 | 5 | | | Fair | | Fair |
| Waitpinga Creek, near Waitpinga | Dry | AMLR | | | | | | | | Fair | Fair |
| Wakefield River, near Rhynie | Edge | NY | | | 4 | 4 | | | Fair | | Fair |
| Yankalilla Creek, near Normanville | Edge | AMLR | | 1 | 2 | 4 | 1 | | Fair | | Fair |
| Yettie Creek, near Williamstown | Edge | AMLR | | 1 | | 6 | 1 | | Fair | | Fair |

* Designates sites where one panel member did not provide a rating.

In the future

As this new approach to assessing the ecological condition of stream sites was being trialed using the 2008 data, it became evident that a number of improvements would be needed in future assessments. These included holding an initial workshop to:

- 1 discuss and agree on the major stressors and human disturbances that are present in the region(s) of interest; and
- 2 identify and agree on the macro-invertebrate species present in the region(s) and the community changes that occur in response to increasing levels of disturbance.

This information would then be used by each panel member to determine a condition rating for each site.

Photographs of the sites would also help the panel to understand the habitat features present at each site, particularly when assessing the condition of dry sites. In order to avoid panel members assigning a rating based on a preconceived understanding of a site or stream, the location of sites would be withheld from panel members in the future. A second workshop would also be held, if required, to work through refining the conceptual model for the region of interest, and discuss and agree on the final ratings for each sampled site.

Reference

Davies SP and SK Jackson 2006, 'The biological condition gradient: a descriptive model for interpreting change in aquatic ecosystems', *Ecological Applications*, Volume 16, pp 1251–1266.

Further information

Legislation

Legislation may be viewed on the Internet at: <www.legislation.sa.gov.au>

Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet
Adelaide Service SA Centre
108 North Terrace
Adelaide SA 5000

Telephone: 13 23 24
Facsimile: (08) 8204 1909
Website: <shop.service.sa.gov.au>

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