

Watercourse Survey in the Bremer Barker Catchment

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SUMMARY: Of the major issues identified within the Bremer Barker catchment, improving the health of the watercourses was rated as a high priority. A plan was formulated to assess the state of the watercourses which would involve the community in its implementation. The aim was to develop a community assessment guide to report on current stream conditions which would also act as a baseline for comparison with future stream conditions.

To facilitate community participation, expressions of interest were sought through flyers and newspaper articles. Workshops and hands-on training sessions were held. With the assistance and permission of landholders and the help of community volunteers, 237 reaches were surveyed over two months. The data collected were entered into an Excel database, then linked with a Geographic Information System. An indication of the current state of the majority of the streams was obtained, highlighting management issues in regard to riparian vegetation, bed and bank stability and unrestricted stock access. The results of the survey are available to the community through access to the GIS data and the written report.

The Watercourse Survey highlighted

- the need for changes in watercourse management
- the interest, willing participation and environmental responsibility of landholders
- the merit of an assessment kit for community use
- the success of community involvement in watercourse assessment
- the usefulness of a GIS database for future planning

1. BACKGROUND

The Bremer Barker catchment, South Australia, is located approximately 35 kilometres southeast of Adelaide and lies within the Murray Darling Basin. The area of 61,200 hectares incorporates a diverse geographical and social landscape. The main towns in the catchment are Mt Barker, Nairne, Littlehampton, Callington, Kanmantoo, Harrogate, Dawesley, and Langhorne Creek. The main watercourse is the Bremer River that flows into Lake Alexandrina. Significant tributaries are the Nairne, Dawesley, Mt Barker, Western Flat and Rodwell Creeks. The total length of the stream network exceeds 1000 kilometres. (Figure 1)

In 1992, concerns were expressed by commercial irrigators in the lower part of the catchment over increasing salinity and decreasing water quality. As a result, the Bremer Barker Catchment Group was formed as a community initiative, to achieve sustainable land and water management in the catchment through community consultation and awareness-raising.

Eleven landcare groups now exist within the catchment, with many of these formed following the initial community consultation held during 1993/94 to prepare the Bremer Barker Catchment Plan. The plan provides a regional approach dealing with the major environmental issues of the catchment. Central to the health of the catchment is good water quality.

2. AIM OF THE WATERCOURSE SURVEY

Of the major issues identified within the catchment, improving the health of creeklines and increasing community knowledge of the issues involved in creek revegetation, erosion and fencing (BBCG, 1996) were rated as priorities. To this end, an assessment of the current state of the watercourses was deemed necessary.

The Bremer Barker Catchment Group sought and received funding from the Murray Darling Basin Commission to employ a Natural Resource Officer in 1996/97 to assist in the design of a watercourse survey which would involve the community in its implementation.

The aim of the survey, as defined by the Watercourse sub-committee, was "to develop a community guide to report on the current condition of the watercourses within the catchment". The guide will provide a method for stream assessment that directs present and future data collection, and will include information and reference material for remedial action. The stream assessment is seen as the baseline for comparison with future conditions.

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3. DEVELOPMENT OF THE SURVEY

In January 1998, two Project Officers were employed to assist in the development and implementation of the survey.

Aerial photographs of the catchment and cadastral, drainage line, soil landscape, contour and catchment boundary data were combined to set up a GIS using ArcView V3.0a and ArcInfo. This information was obtained from Primary Industries and Resources SA (PIRSA), the Department of Housing and Urban Development (DEHUD) and the Department of Environment, Heritage and Aboriginal Affairs (DEHAA).

Third order and higher streams were identified and divided into reaches. Time constraints dictated the length of streams to be surveyed, but it was considered that a comprehensive picture of stream condition could be achieved by this selection. Aided by aerial photographs, areas of visible erosion, artificial barriers (dams, culverts, roads) and changes in vegetation and landforms were delineated.

Measuring sites were selected from representative sections along each reach. Ratings assigned to vegetation cover and erosion enabled a map of the Bremer Barker catchment to be produced showing stream classification (Figure 2).

3.1 Implementation

Photopoints were set up for each measuring site using a Global Positioning System and aerial photographs. This provides a permanent record of watercourse conditions at specific sites at fixed times with the GIS providing the capability to hotlink the photographs to the database.

To facilitate community and landcare group participation, a Stream Assessment Kit was compiled using data sheets adapted from "An Index of Stream Condition" (Department of Natural Resources and Environment, 1997). The data sheets (Figure 3) are designed to include measurements of factors, not only those relating to the stream itself, but also vegetation layers, the percentages of native and exotic species, the width of the buffer zone and vegetation density.

The Kit also contained

- ◆ a booklet of explanatory notes and colour photographs of various stream conditions (Figure 4) to ensure reasonable consistency and accuracy in the assessment,
- ◆ information sheets on environmental weeds, native plants, freshwater macroinvertebrates and frogs of the Mt. Lofty Ranges and
- ◆ identification booklets on eucalypts, understory and weed species found in the Bremer Barker catchment.

3.2 Community involvement

Landholder and community participation was of major importance to the survey. All landholders with watercourses on their properties were advised of the stream assessment and permission was obtained to walk the creeklines. People willing to participate in the assessment process received information and were invited to attend hands-on training sessions where they were each supplied with a copy of the Kit.

Assistance with the creekline traverses and collection of information was provided by the Project Officers, members of the Bremer Barker Catchment Group and the Marion and Bremer Barker Catchment Group Green Corps teams, as well as landholders, landcare groups and volunteers from the community. Community participation exceeded expectations with many volunteers willing to assess further reaches.

4. RESULTS

Of the 329 kilometres of streams to be surveyed, 150 kilometres were assessed and the resulting information entered into the GIS database.

4.1 Reporting

Results collated for each sub-catchment now provide a comprehensive library of images stored in the GIS.

Landholders and the community are able to access this information to determine current issues along their watercourses and obtain, with assistance from the staff, copies of maps and data from the Mt Lofty Ranges Catchment Resource Centre at Mt Barker.

The data are presented more specifically in the watercourse report (BBCG, 1998) which provides both written and diagrammatic information relating to the survey, and suggests remedial actions which can be undertaken to help improve the watercourses.

4.2 Current conditions and issues

The survey indicated that

- ◆ native riparian vegetation covers only 9% of the catchment with the dominant vegetation being pasture grasses, scattered trees and shrubs,
- ◆ woody weeds occur along a third of the surveyed watercourses,
- ◆ over one third of the watercourses has stable banks in good condition, but bed deepening and channel incision are evident in some areas and
- ◆ stock have unrestricted access to over two thirds of the surveyed creeks.

Common to all Bremer Barker sub-catchments are issues involving lack of riparian vegetation, weeds, unrestricted stock access and bed and bank stability which will form the bases for designing management strategies to improve watercourses and water quality.

The involvement of the community has made them aware of specific problems in their area, and they can now make informed decisions about reparation work.

5. CONCLUSIONS

Apart from recording the physical state of the watercourses in the catchment to obtain a baseline for future comparisons, this survey was important for its community involvement.

The Bremer Barker Catchment Group has shown that a survey designed to be implemented by the community generates interest and participation from a wide cross section of people indicating a positive change in attitude towards environmental responsibility. Without the high degree of community support, the extent of the survey would not have been achieved.

By providing the community with a survey method from which on-going assessment can be undertaken, a method for monitoring and evaluating the success of remedial work that is currently being carried out is available.

The Bremer Barker Catchment Group is confident that any future changes in stream condition will be identified with the application of the same survey methods.

The GIS data and information available to the community will enable the Bremer Barker Catchment Group to identify priority issues and support any future watercourse work which may be undertaken.

6. REFERENCES

Bremer Barker Catchment Group Inc., (unpublished 1998). "A Community Guide to Stream Assessment". Bremer Barker Catchment Group Inc., Mt Barker, South Australia.

Bremer Barker Catchment Group Inc., (1996). "Catchment Plan for the Bremer Barker Catchment". Bremer Barker Catchment Group Inc., Mt Barker, South Australia.

Department of Natural Resources and Environment, (1997). "An Index of Stream Condition". Waterway and Floodplain Unit, Victoria.

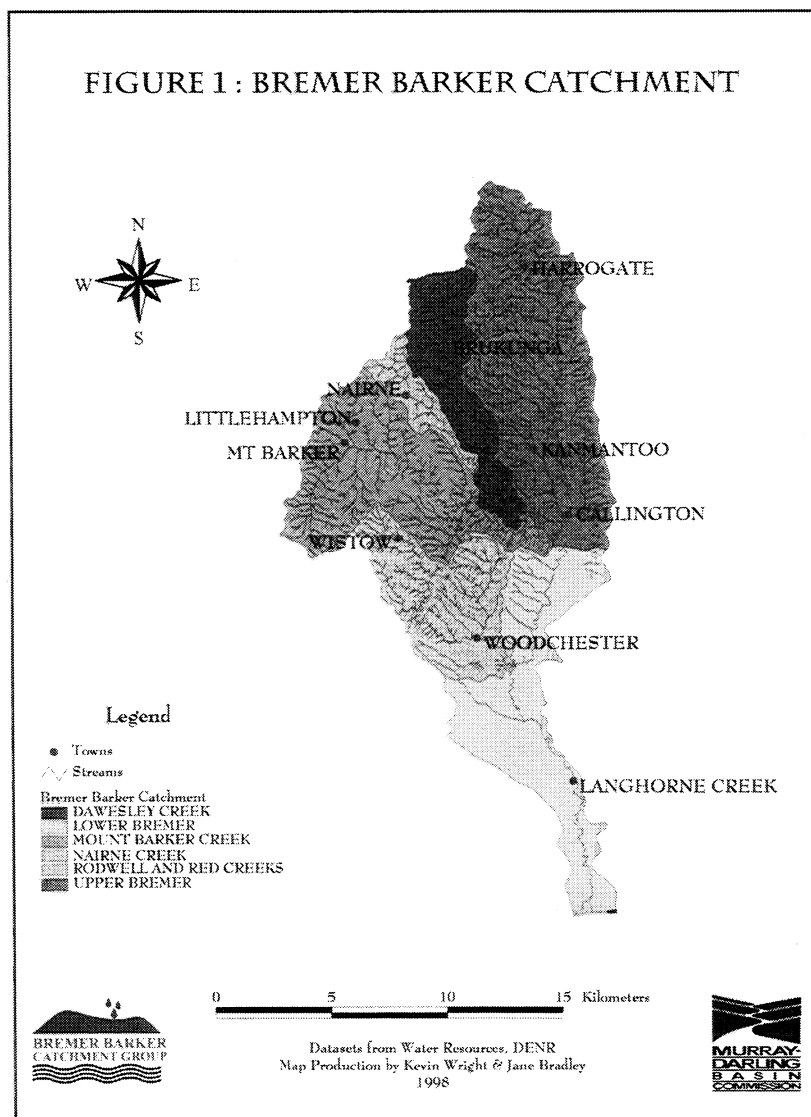
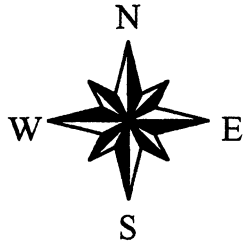





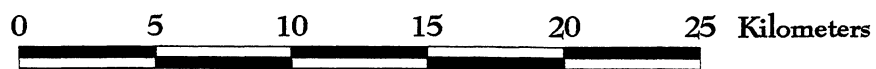


FIGURE 2 : BREMER BARKER CATCHMENT STREAM CLASSIFICATION



Legend

- Stream Classification**
-  1 Poor
 -  2 Moderate
 -  3 Good
 -  4 Excellent
-  Subcatchments



Datasets from Water Resources, DENR
Map Production by Kevin Wright & Jane Bradley
1998



FIGURE 3 : STREAM CONDITION ASSESSMENT DATASHEET

Reach No: WF24

Site No: 1

Date:

Stream Name: Western Flat Creek

Data Collectors:

REACH DESCRIPTION

(include key features in site sketch such as bridges, roads, fences, property boundaries, buildings, location of transects etc)

OWNER/GROUP:

CONTACT:

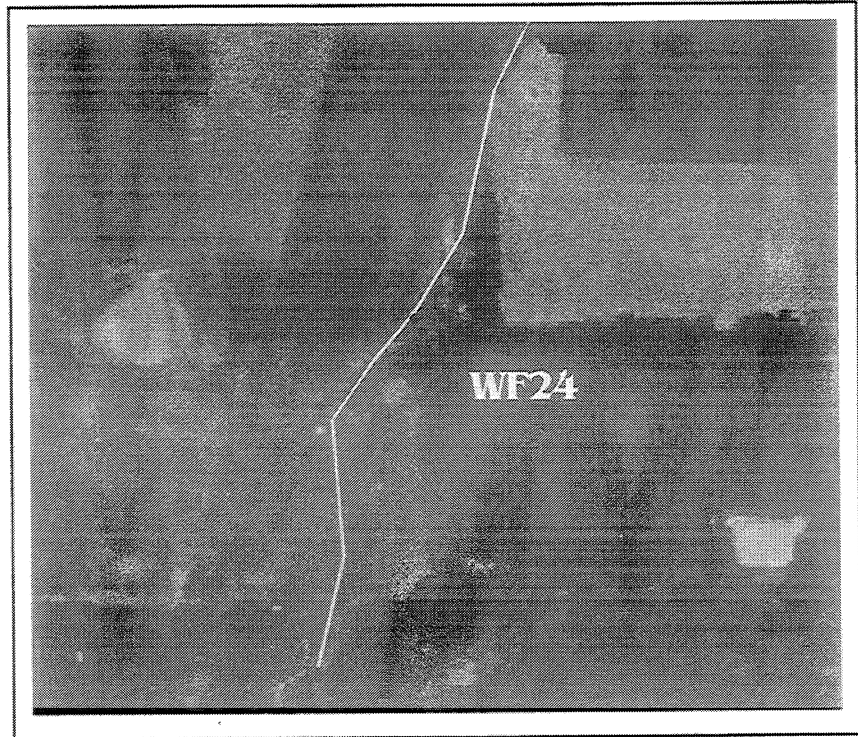
MAP NO: 8390 9999

EASTING: 302 226

NORTHING: 61 135 12

PHOTO NO: 27/28

FILM NO: 19



BRIEF DESCRIPTION OF PHOTOPOINT SITE:

Fallen trees in creek. Photopoint on left hand bank facing downstream. Transect begins approximately 10m downstream from large *E camaldulensis*.

STREAM CONDITION:

Mean Bank Height: (to nearest 0.5 metres)
(see explanatory notes)

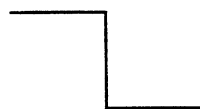
 m

Channel Width: (to nearest 0.5 metres)
(see explanatory notes)

 m

Bank Shape:

V = vertical
(+/- slumped or undercut toe)



M = moderate
(30-60)



S = steep
(60-80)



Flat
(<30)



FIGURE 4 : EXAMPLES OF WATERCOURSE CONDITION

GOOD



Parameters

- ◆ Good toe vegetation
- ◆ Good riparian vegetation
- ◆ Variety of native species
- ◆ Fallen logs which provide fish habitat
- ◆ No evidence of bank erosion
- ◆ Restricted stock access
- ◆ Permanent water

MODERATE



Parameters

- ◆ Sparse toe vegetation
- ◆ Some riparian vegetation
- ◆ No evidence of bed deepening
- ◆ Fallen logs which provide fish habitat
- ◆ Some bank erosion
- ◆ Unrestricted stock access
- ◆ Some permanent pools

FAIR



Parameters

- ◆ No toe vegetation
- ◆ Some riparian vegetation
- ◆ Evidence of toe erosion
- ◆ Evidence of bank erosion
- ◆ Unrestricted stock access
- ◆ No permanent water