

EXECUTIVE SUMMARY

ES.1 SUMMARY

reach environs



The condition of the reach environs varied across the Dawson River catchment, although the majority of stream lengths were rated in moderate condition (refer Map 3). Very poor or poor condition ratings were mostly in the Western Tributaries, Southern Tributaries, North Upland Tributaries, and Don/Callide Tributaries of the Dawson River, whilst good to very good ratings were recorded mostly in the Upper and Regulated Dawson River subcatchments. The poor condition ratings for this attribute generally reflect the extent of clearing of vegetation along the stream for cropping, as well as exposure to cattle grazing and watering.

Similarly, subjective assessments of disturbance within the reach environs rated 85% of sites as being moderately to very highly disturbed. The most commonly identified cause of disturbance was grazing activity (90% of sites), with road, bridge, culvert, ford, and ramp structures also being identified at a large proportion of sites.

The most extensive land use recorded adjacent to sites in the catchment was grazing of beef cattle on native pastures (mostly in areas cleared of native timbers).

It is interesting to note that areas in moderate to good condition were often subjected to cleared native pasture grazing and other types of native pasture grazing. In contrast, areas with low condition ratings were often associated with more intense forms of land use including rainfed cropping, grazing of improved pastures, urban development, and other industry. While grazing activities were considered to contribute significantly to the disturbance of the reach environs, it appears that grazing management influences the extent of such disturbance.

bank stability

The stability of the banks throughout the catchment was generally good, with most banks being stable or very stable (refer Map 4). The exception was the Western Tributaries subcatchment, which was recorded as displaying unstable banks in 50% of subsections.

Erosion was the most extensive process occurring throughout the catchment (refer Map 4), being recorded as the dominant process in 94% of subsections. Erosion was most commonly found on bends, at obstacles, or in irregular locations along reach lengths in both lower and upper banks. Aggradation processes were dominant in the remaining 6% of subsections and were generally found on bends, at obstacles, or all along reach lengths in lower banks, and at bends in upper banks.

Whilst in some cases the occurrence of these processes is consistent with the natural morphology of the streams affected, the occurrence of erosion and slumping in irregular locations and of aggradation all along reach lengths would tend to suggest unnatural damage and disturbance. In line with this rationale, the presence of stock and clearing of vegetation were identified as the major factors contributing to the disturbance of banks.

Subjective assessments of potential for further degradation (through assessments of instability and susceptibility to erosion) were generally low to moderate throughout the catchment.

bed and bar stability

Condition ratings for bed and bar stability indicated most stream lengths were moderate to very stable. Less stable beds were encountered in the Southern, South Upland and North Upland subcatchments (refer Map 5).

Stream bed erosion was common throughout the catchment, although aggradation was also widespread with bars of various types being recorded at 49% of sites and in all subcatchments. The widespread occurrence of instream sand bars may indicate increased sediment supply to the stream system.

Grazing activities and the erodibility of banks were identified as the major factors contributing to the disturbance of beds. Fallen trees and rock outcrops were recorded as the major factors maintaining bed stability.

Wide ranges of sediment types and levels of organic matter were recorded in stream beds during cross-sections within the catchment. Bar sediments were generally angular and either disc or blade shaped, and were generally moderately compacted. These characteristics suggest that bars would not be highly mobile except during high flow periods.

channel diversity

Channel diversity throughout the catchment was mostly very low to low (refer Map 6). Generally, channel diversity was highest in the North Upland and Don/Callide subcatchments. Run habitat was the most commonly identified channel habitat type throughout the catchment, followed by pools and then riffles.

Low channel diversity may be related to natural features such as topography, geology and weathering, or artificial processes such as channelisation and accelerated rates of erosion and aggradation. While the latter was identified as a factor influencing bed stability in some subcatchments, a clear relationship was not evident.

The significance of the generally low channel diversity is difficult to determine without knowledge of the pre-disturbance extent of diversity. It is possible that this catchment has naturally poor channel diversity and supports a fauna and flora assemblage adapted to such low diversity.

riparian vegetation

The riparian vegetation throughout the catchment was generally in very poor to poor condition (refer Map 7). These ratings can generally be attributed to the loss of riparian vegetation through clearing and invasion of weed species characteristic of those sites. The extent of clearing is demonstrated in the recorded widths of riparian zones at sites. These widths varied considerably throughout the catchment, from a mean of 8.0 m in the Western Tributaries subcatchment to 35.6 m in the Regulated Dawson River study area.

Generally, those areas with riparian vegetation in good condition had wider riparian zones and fewer weed species, and included a variety of vegetation structural levels and associated ground covers. Further, sites with better riparian zone condition ratings were often found within Protected Areas, such as National Parks and State Forests. The Upper Dawson River subcatchment displayed the highest condition ratings in the Dawson River catchment.

Eucalypt-dominated communities were the most commonly identified vegetation types within the riparian zones of the catchment, followed by brigalow, softwood scrub, and cypress pine communities. Grasslands and medium (10-30 m) and small (<10 m) trees were the most dominant structural types of vegetation recorded. At many sites, grazing activity, the clearing of riparian vegetation, and the invasion of exotic species have resulted in significant changes to natural vegetation community structures. Along river banks this has particular importance, as weed grasses and herbs are often shallow-rooted and provide little protection against bank erosion.

The proportion of weed species in riparian zones varied considerably between subcatchments, with the highest proportions of exotics occurring in sections of the Don/Callide subcatchment. The extent of occurrence of weed species was generally associated with the presence of grazing and cropping activities or other forms of disturbance. Important weed species identified during the survey included rubber vine, parthenium weed, prickly acacia, noogoora burr, and prickly pear (see *Appendix 2* for a list of scientific names)

aquatic vegetation

Condition ratings for aquatic vegetation within the catchment indicated very low to low abundance at the time of survey (refer Map 8). These results most likely reflect the extremely dry conditions operating over the region throughout the survey period and the high turbidity of streams that carried water. However, of all aquatic vegetation recorded, the most prolific structural types were floating filamentous algae and emergent rushes and sedges.

Further studies would be required to determine the factors influencing the distribution and abundance of aquatic plant species in the Dawson River catchment. These factors may include the availability of propagules, appropriate water quality and suitability of flow regimes.

aquatic habitat

Throughout the catchment, the condition of aquatic habitat was generally poor to moderate (refer Map 9). Similarly, subjective assessment of overall habitat value for aquatic life rated the majority of sites (71%) as very poor to good. Subcatchments that exhibited aquatic habitat in mostly good to very good condition included the Upper Tributaries subcatchment and the Upper Dawson River subcatchment.

Individual branches, individual logs, and leaf and twig cover were the most commonly recorded instream habitat attributes, while overhanging stream cover was predominantly provided through bank vegetation canopy cover. The fact that aquatic habitat in this catchment is provided predominantly by vegetative debris emphasises the importance of riparian zones to aquatic organisms.

Passage for aquatic organisms was generally very restricted at the time of survey, mostly reflecting the dry conditions. Additionally, assessments of passage at the water mark indicated restrictions remained at 69% of sites due to the presence of low features, log and branch jams, fords, and weirs. In most cases, water levels of one to two thirds of bank full were required to overcome these restrictions, with the exception of the regulated section of the Dawson River which would require flood level flows for weir structures to be overtopped. These results suggest that moderate flows in streams are important for maintenance of aquatic organism communities, and emphasises the importance of fish ladders on weir structures.



scenic, recreational, and conservation values

Almost all sites within the catchment (90%) were described as ‘undeveloped rural’ (recreational settings in modified rural landscapes, with good road access and moderate human contact). Of the remaining sites, 9% were classed as ‘natural’ (either ‘near-pristine’, ‘semi-natural’, or ‘roaded natural’), and 1% as ‘developed rural’ or ‘undeveloped rural’.

Condition ratings indicated that the majority of stream lengths displayed moderate to good scenic and recreational value (refer Map 10). Similarly, subjective assessments rated half of all sites as having moderate to good value. Most sites were valued on the basis of their scenic rural setting or inherent natural beauty. Subcatchments which displayed the highest scenic and recreational value included the Upper Dawson River, Regulated Dawson River, and South Upland Tributaries subcatchments.

Recreational activities recorded as being currently undertaken at sites included shore-based fishing, barbecues and picnics, swimming, and camping.

Subjective evaluations of conservation merit of sites within the catchment identified 9% as displaying very high qualities. Sites were rated in terms of their value as aquatic habitat, riparian habitat, and as wildlife corridors (see *Appendix 1 — Datasheet 11* for a list of criteria).

overall condition

The overall condition of most stream lengths was moderate. Areas where poorer overall condition was reported tended to be in the Southern Tributaries and North Upland Tributaries where grazing was the most common reach environs land use. Subcatchments in relatively good overall condition were the Upper Dawson River and Regulated Dawson River subcatchments.



ES.2 CONCLUSIONS

The Dawson River catchment *State of the Rivers* survey produced **eight** major findings:

- widespread degradation of the riparian zone, resulting from clearing of natural vegetation, the invasion of exotic species, and generally high disturbance levels in the reach environs
- aquatic habitats in generally poor condition due to low levels of instream and overhanging stream cover, low diversity of instream habitat attributes in most stream beds, and generally low diversity of channel habitat types
- relatively stable banks throughout the catchment, displaying moderate to low susceptibility to the dominant process of erosion
- relatively stable beds and bars throughout the catchment, although aggradation processes were dominant at more than half the sites surveyed
- generally high scenic and recreation values described at the majority of sites
- a number of sites identified with significant conservation values
- most stream lengths surveyed within the catchment described as being in moderate to poor overall condition at the time of survey and
- grazing activities identified as the most common detrimental influence impacting upon stream and riparian attributes.

Several inferences can be drawn from these findings and the results that are detailed in the main body of this Report concerning the principal factors influencing the present state of stream systems in the Dawson River and major tributaries catchment.

It is clear from this study that riparian vegetation management should be a priority within the catchment. Riparian zones are a vital link between land and water environments serving many important functions for both ecological and human purposes. Riparian vegetation maintains water quality by acting as a nutrient and sediment buffer during runoff events, provides organic material, habitat, and shade for both terrestrial and aquatic organisms, acts as a wildlife corridor for native species' migration, protects banks from erosion processes, and increases the scenic and recreational value of riverine systems. However, the value and effectiveness of the riparian zone in carrying out these functions is significantly influenced by its structural diversity, width and integrity (species diversity, the impact of exotics, and overall ground cover).

In order to address the problems associated with the generally poor condition of riparian vegetation in the catchment, efforts should be made to increase awareness in the community of the important role riparian zones fulfill in the riverine environment, and to promote the conservation and rehabilitation of the existing vegetation. Further, re-establishment of riparian vegetation should be considered in highly degraded areas.

The condition of aquatic habitat in the catchment is another issue that should be addressed in order to facilitate the natural functioning of the stream ecosystems. Instream habitat diversity (including channel habitat diversity, vegetative debris, aquatic vegetation, rock outcrops, and man-made structures) is essential for maintaining the natural range of aquatic species, as the greater the range of habitats and microhabitats available the greater the number of species that can be supported by the stream system. Activities such as the removal of instream debris and channelisation should be discouraged within the catchment. Additionally, riparian zones, as the primary source of vegetative debris and therefore aquatic habitat, should be rehabilitated to promote this function.

While the majority of banks and stream beds in the catchment were rated as relatively stable, erosion was apparent on almost all stream banks and in approximately half of the beds. Although erosion is essentially a natural process, it was evident during the survey that in some cases processes were operating at excessive and unnatural rates. Additionally, it was apparent that in the majority of these cases, the stability of the banks and beds was directly related to the presence of cattle grazing in the area, and often the associated clearing of the riparian vegetation. For this reason, it is concluded that management practices to minimise grazing in the stream environs (especially where extensive clearing has occurred) would be a valuable component of any remedial action plan implemented within the catchment.



Very good overall condition: Callide Creek (#211)

Lastly, it is of interest that a high proportion of good overall condition, good riparian vegetation, and good aquatic habitat ratings were associated with stream lengths found in Protected Areas (National Parks, Environmental Parks, State Forests and Timber Reserves). This result emphasises the effectiveness of such areas in maintaining high quality physical and ecological conditions. However, it is also the case that many sites that were described as having very high conservation merit during the survey may not currently have protective management strategies in place. Community groups and landholders may wish to consider a system of protective management agreements in order to preserve a representative network of riverine systems in the Dawson River catchment. Such a system would not only aid in sustaining riverine environments and mechanisms, but would also protect scenic and recreational values within the catchment.