




EXECUTIVE SUMMARY

ES.1 SUMMARY

Reach Environs

The condition of the reach environs for the Tully and Murray Rivers catchment showed a wide variety of ratings within and between the subcatchments. The Upper Tully River and Nitchaga Creek subcatchment rated good to very good, with the majority of the reach environs of the Jarra Creek, Dallachy Creek, Hull River and Coastal Tributaries, Murray River, Meunga Creek and Kennedy Creek, and Coastal Creeks subcatchments rating between moderate and very good. The Lower Tully River, Davidson Creek and Echo Creek, Banyan Creek, Lagoons and Lower Tully River Tributaries subcatchments rated considerably lower, the majority being rated as poor to very poor.

These lower ratings were associated with sugarcane production and/or the occurrence of grazing of various types. Throughout the entire catchment the most common land use recorded was national park or reserve, although this was closely followed by sugarcane production.

Grazing was recorded as the predominant form of local disturbance within the reach environs. Stream crossings were also frequently recorded; however, this could be attributed to the need for easy access into the streams for survey purposes. Overall, the greater part of the reach environs was considered to have high to extreme disturbance.

Bank Stability

Throughout the catchment, stream bank stability was rated as predominantly good with most banks being considered stable. However, the Davidson Creek and Echo Creek subcatchment rated lower than average with 81% of its stream length rated as having moderate stability and 13% rated as unstable; this could be attributed to the high incidence of grazing in the area. The Banyan Creek subcatchment was rated as from very unstable to stable, but with the majority of the stream length being stable.

Within the streams of the catchment, erosion was observed to be the most prevalent process occurring along 88% of the stream length. Erosion was most commonly recorded at bends for both the upper and lower banks. However, erosion of the upper banks was recorded at a significantly higher percentage of sites. Along the remaining 12% of the catchment's stream length, aggradation was occurring predominantly at bends.

Throughout the catchment, the factors which were considered to affect the stability of the stream banks were mainly flows and waves, followed by the clearing of vegetation.

Bed and Bar Stability

Most of the stream beds within the





• Aggrading bed: Boggy Camp Creek (#188)

catchment were considered to be in stable to very stable condition; however, ratings were recorded across the range. The Jarra Creek and Lower Tully River subcatchments rated lower than the rest of the catchment with the majority of their stream beds being rated as moderately stable to unstable.

Aggradation was the dominant process within the stream beds, occurring along 63% of the stream length. Bars occurred mainly as point bars, as mid-channel islands with encroaching vegetation, and alternately along the stream.

The predominant factor recorded as affecting the stability of the stream bed was bank erosion, followed by agriculture or grazing. Other factors recorded were channellisation, bed deepening, sand and gravel extraction, entrapment of sediment and mining.

Channel Diversity

Channel habitat diversity for the entire catchment was rated low or very low for 64% of the stream length. The Lagoons subcatchment rated very low for its entire stream length; this can be attributed to the fact that pools were the only habitat recorded – a characteristic of this stream environment.

Runs were the most common habitat type recorded throughout the catchment, followed by pools. The substrate within these habitat types tended to be mainly in the sands or clay fines categories, but ranged from fines to boulders.

Too much significance should not be attached to the low channel diversity rating within the catchment. The analysis of the data collected during the survey is based on the principle that the more habitat types recorded within a surveyed reach, the better the rating. Due to the factors which play a role in the formation of the streams within the catchment and to the size of the run and pool habitats, only two



• Large pool on the North Murray River (#229)

or three habitat types from a potential of eight were recorded at the survey sites. This produced the generally low channel diversity ratings. This should not, however, be interpreted as indicating that any particular problem exists within the streams; it simply indicates that the stream habitat types surveyed in the stream reaches were not diverse.

Riparian Vegetation

The riparian vegetation within the catchment ranged from a rating of very poor for 28% of the stream length to very good for 29%. Ratings for the individual subcatchments were also across the range. The Upper Tully River and Nitchaga Creek subcatchment, for example, was rated mainly as very good, while the Davidson Creek and Echo Creek subcatchment rated predominantly very poor. The poor classifications can be attributed to the very narrow width of the riparian vegetation and to the prevalence of exotic species within the area. The mean width for riparian vegetation for the entire catchment was 17 m, but ranged from 0.1 m in the Lower Tully River Tributaries and Murray River subcatchments to well over 50 m in a number of the other subcatchments.

Due to the inaccessibility of some areas within the catchment, such as areas with dense forests or steeper slopes, stretches of better riparian vegetation possibly escaped assessment by the survey team.

The most common native riparian vegetation species recorded in the catchment were *Callitris* spp. followed by *Eucalyptus* spp., *Lomandra* sp., lawyer cane (*Calamus* sp.), and *Pandanus* sp. The structure was generally good where these communities occurred, with both tall and low trees, shrubs, vines, rushes, herbs and grasses. Exotic species consisted of a mean of 22% of the riparian vegetation, and were mainly grasses, low trees, herbs and vines. The exotic species most frequently

recorded were snakeweeds (*Stachytarpheta* spp.), raspberry (*Rubus rosifolius*) and Guinea grass (*Panicum maximum*).

The riparian zones of estuarine areas were dominated by mangrove and salt-marsh communities.

Aquatic Vegetation

At the time of survey, the condition of the aquatic vegetation in streams across the catchment was rated mainly as very poor. This low rating is in part attributable to the nature of the streams and in part to the fact that where vegetation was present, it tended to provide a low percentage of stream – bed cover. The low rating is also due to the fact that about 50% of the vegetation that was present consisted of exotics.

Where aquatic vegetation occurred, the most common growth form recorded was that of submerged species: these consisted mainly of *Blyxa* spp., *Vallisneria* spp. and filamentous algae. Floating and emergent forms were also recorded where aquatic vegetation was present. The exotic emergents Para grass (*Urochloa mutica*) and *Hymenachne amplexicaulis* were frequently encountered.

Aquatic Habitat

Across the catchment, the aquatic habitat ratings were mainly moderate to poor. Individual logs and branches, and leaves and twigs from riverbank vegetation were the most common instream habitat types recorded within the catchment. Bank physical features and bank vegetation also provide shade and shelter for the stream. Canopy cover was present at 86% of the sites surveyed, while vegetation overhang was recorded at 65% of sites.



• Good overall condition: Boulder Creek (#8)

At the time of the survey, several of the streams in the catchment were obstructed by artificial or natural features which restricted the passage of fish and other aquatic organisms. Most of these obstructions could be passed by fish with flow levels at one-third of the bank height; however, one weir and one rapid in the Upper Tully River and Nitchaga Creek subcatchment were considered to be impassable. Features which restricted movement were mainly weirs, rapids, fords and log jams.

Scenic, Recreation and Conservation Value

The scenic and recreation value was rated mainly as moderate to good. The most common recreation opportunity recorded was “undeveloped rural” (i.e. recreational settings in rural landscapes that are modified) followed by “semi-natural” (i.e. infrequent, low-level disturbances; native forestry; remnant areas; reserves) and “near-pristine” (national parks, or undeveloped naturally vegetated areas).

The entire Upper Tully River and Nitchaga subcatchment was rated as having very good scenic and recreation value, while all of the Lagoons had good scenic and recreation value. Other subcatchments which were rated as being good for the greater part of their areas included Jarra Creek and the Hull River and Coastal Tributaries. The most popular actual recreational activity recorded throughout the catchment was small-boat fishing, while several potential recreational activities were identified, such as shore fishing, nature appreciation, birdwatching, photography, barbecues and picnics, bushwalking and camping.

Conservation values throughout the catchment were mainly rated as moderate to good. Over a third of the Upper Tully River and Nitchaga Creek, Jarra Creek, and Meunga Creek and Kennedy Creek subcatchments were considered to have very good conservation value. Very good ratings were also given to small areas of most of the remaining subcatchments.



• Mongera Creek (#2) choked by the introduced Para grass

ES.2 OUTCOMES

- The stream reach environs and riparian zone have been subjected to very high levels of disturbance and degradation; vegetation has been cleared and exotic species have invaded in association with various grazing activities and sugarcane production. The Davidson Creek and Echo Creek, Lower Tully River Tributaries and the Lower Tully River subcatchments are in the worst condition with the majority of their stream lengths being rated as poor.
- Stream banks are relatively stable. Erosion is the dominant process occurring. The Davidson Creek and Echo Creek subcatchment was assessed as being less stable than the rest of the catchment.
- The majority of the stream beds are stable to very stable. Aggradation is the major process.
- Channel habitat diversity was low for most of the stream length. Run and pool habitats dominated.
- Riparian vegetation is in moderate to very poor condition. This is attributed to the narrow width of the strip of remaining vegetation in combination with the prevalence of exotic species. The Davidson Creek and Echo Creek subcatchment rated the lowest in the catchment for riparian vegetation condition.
- Aquatic habitat was found to be moderate to poor, attributable to the limited cover provided by instream habitat types, bank physical features and bank vegetation.
- The passage of fish and other aquatic organisms was somewhat restricted in most subcatchments by both artificial and natural features – mainly weirs, rapids, fords and log jams.
- Very good conservation ratings were given to areas within all the subcatchments except for the Davidson Creek and Echo Creek subcatchment and the Lagoons.
- At the time of the survey, streams within the Tully and Murray Rivers catchment were predominantly in moderate overall condition.
- Grazing and/or intensive agricultural activities were identified to be the major disturbances affecting stream and riparian attributes.

ES.3 CONCLUSIONS

Management practices within the riparian zone and reach environs of the streams should focus on minimising further degradation and on the rehabilitation and revegetation of degraded areas.

Retention and management of all existing areas of riparian vegetation should be promoted and the re-establishment of riparian vegetation along streams should be encouraged, particularly where stream bank erosion could occur. In addition, the clearing of vegetation within the riparian zones of watercourses should be restricted.

Introduced pasture grasses have impacted on instream and riparian values of the streams within this study area. Action should be undertaken to eradicate these species from our waterways and control measures should be implemented to prevent their escape from areas of intended use.

Although the stream beds and stream banks were predominantly stable, some erosion was apparent along almost all the stream banks and aggradation was occurring in most streams. Attempts should be made to maintain stability and to stabilise problem areas, particularly where the erosion problems are of critical importance to catchment health.

In most cases, poor condition ratings and bed and bank instability were associated with cattle grazing in the area and/or agricultural practices extending to the stream bank. Minimisation of these activities in the stream environs and the riparian zone is essential for the maintenance and improvement of the catchment's present condition and for rehabilitation of degraded areas.

Guidelines should be developed for the construction of instream structures so that fish and other aquatic organisms can pass these structures.