EXECUTIVE SUMMARY

Introduction

This report represents the second in a series describing the ecological and physical condition of a major river system in Queensland. The first study, of the Maroochy River catchment, provided a pilot for testing and validating the methodology developed by J.R. Anderson for the Department of Primary Industries, Queensland. The present report provides an assessment of the Upper Condamine River and tributaries, in terms of the physical and environmental condition of these streams at the time of survey, relative to the presumed pristine original condition of the catchment. Local remnant sites within the catchment that remain in very good condition give an indication of the original state of the whole catchment. The basic approach was to estimate the ecological condition in terms of the condition of the instream habitat. The condition of attributes recognised as being important to instream and riparian fauna and flora is surveyed.

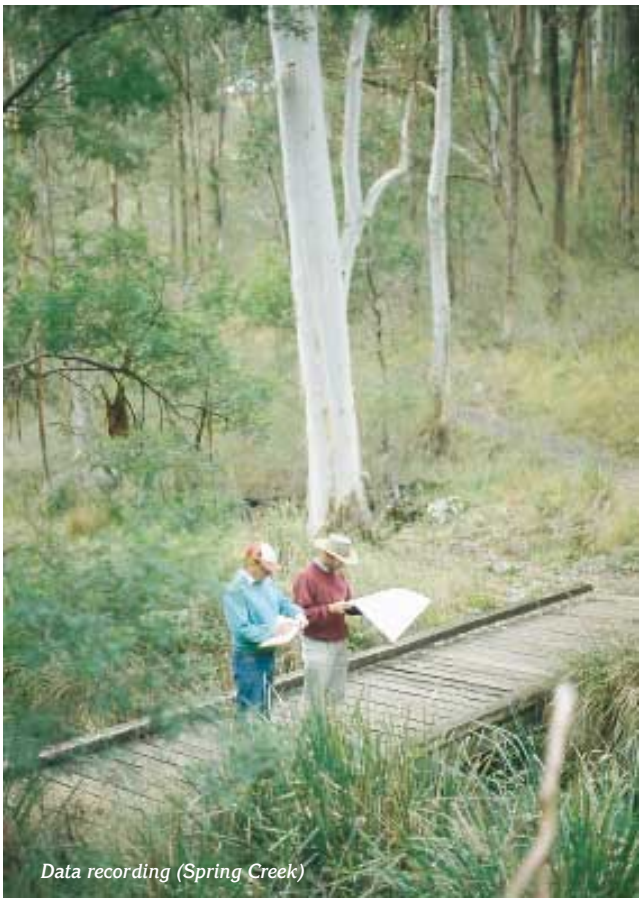
The data identify processes and causes of deterioration in condition, and thereby pinpoint actions that would have to be taken to reverse the deterioration. One important outcome is to establish priorities so that limited resources can be focused on the most serious problems. In addition, processes which can be most efficiently tackled to reduce degradation or which can start the process of rehabilitation may be identified. Establishing the size, extent and seriousness of the problem is a necessary first step in improving the condition of rivers and streams throughout Queensland.

Study Area

The study area encompasses the Condamine River and its tributaries, upstream of the confluence with Myall Creek (southwest of Dalby) (see Map 1). The catchment area of this system is 13 292 km^2. The Great Dividing Range bounds the area in the east, rising to almost 1 400m in places. The southern boundary is formed by the Herries Ranges, presenting a much lower (to 800 m) border than in the east. Tributaries of the Condamine River flow through relatively narrow valleys at the headwaters, with a gradual broadening to wide alluvial plains near the Condamine River. The Condamine River catchment is part of the Murray-Darling Basin, which extends across four states. Approximately 60 km upstream of the confluence with Myall Creek, the Condamine River divides into two sections. At this point the Condamine River proper and the Condamine River (North Branch) are formed. Approximately 35 km downstream of this point the two sections rejoin.

Environs of Oakey Creek

METHODOLOGY



Data recording (Spring Creek)

The "State of the Rivers" methodology provides a comprehensive method for classifying the current physical and ecological condition of rivers and streams. The basis of the classification is to divide the catchment under investigation into "homogeneous stream sections" which represent stream sections sharing similar natural features and condition ratings. The delineation of these "homogeneous stream sections" involves a progressive division of the catchment into smaller and smaller units. Initially, the catchment is divided into major subcatchments. Using a variety of information, boundaries for stream division are established, until the boundaries form the "homogeneous stream sections". Attributes such as soil type and geology, vegetative cover, bank slope, stream gradients and sediment types are used to aid in the subdivision process. Boundaries for subsections may be located at natural barriers (such as waterfalls and wetlands) and artificial barriers (such as dams and weirs). Sites where major changes to attributes are likely to affect the natural features of the stream are also utilised as boundaries. An extensive reconnoitre survey is undertaken to make the initial sub-division into streams of homogeneous sections.

Survey Method

The survey methods employs a "snapshot" approach, such that various key components of the stream and banks are recorded. Assessment is made along reaches of varying length at each site. Each survey takes approximately 45 to 60 minutes and involves a team of two to three people. Thus, between 8 and 10 sites can be surveyed per day. Two teams can therefore survey up to 200 sites over a two-week period. A large number of sites are surveyed, in an attempt to adequately portray the variability in stream type present in the catchment. The present survey was undertaken over a two-week period in July 1993. A total of 297 sites were surveyed, representing 251 subsections. The total length of major streams surveyed was 3 918.95 km. Components examined included:

reach environs - the condition of the vegetation and land adjacent to the stream is assessed

channel habitat diversity - the range of habitat types is determined, as well as channel dimensions and sediment size distributions5

stream bank stability - the types, extent and causes of bank instability are recorded as well as an assessment of the dominant processes recurring in the reach

stream bed and bar stability	- the extent and causes of instability, as well as the major processes occurring, are recorded
riparian vegetation	- the composition, coverage, width of riparian zone and extent of invasion by weed species are recorded
aquatic vegetation	- species groups, the proportion of exotic species and the area of stream bed coverage are recorded for the major aquatic vegetation types
aquatic habitat	- the types and extent of coverage of both instream and overhanging bank cover are recorded
scenic and recreation values	- the actual and potential recreational activities, values and recreational setting are recorded.

Data Analysis

Once collected, the data are stored in a set of linked databases. The condition ratings for each attribute are produced from a set of formulas which employ various weighted combinations of the raw data. Each of these ratings is scored as a percentage, with 100% representing pristine conditions and 0% being highly degraded. The general condition categories used in this report are outlined below:

Condition Rating Categories

Condition Category	Stability Rating	Rating (%)
Very Poor	Very Unstable	0 - 20
Poor	Unstable	21 - 40
Moderate	Moderately Stable	41 - 60
Good	Stable	61 - 80
Very Good	Very Stable	81 - 100

An overall consideration of the entire Upper Condamine River catchment (including tributaries) is initially presented, with presentation of individual subcatchments following. A total of 13 subcatchments were defined based on major tributary. These subcatchments were further subdivided for analysis on the basis of altitude (greater than or less than or equal to 460 m) or similarity of landform. For some subcatchments, this subdivision was not undertaken, as all or most sites were below or above the specified altitude division. Map 2 shows the major subcatchments, while Map 3 shows the division process.

RESULTS

Overall Catchment Condition

Maps 4 - 12 show the results for each attribute examined.

reach environs

The reach environs of most stream lengths were in very poor to moderate condition (i.e. were identified as being highly to extremely disturbed). Major land uses identified (grazing and cropping) were considered to contribute significantly to the disturbance of the reach environs, with roads, bridges/culverts, water extraction and river trust activities also being significant disturbance factors.

bank stability

Most (72%) banks were stable or very stable, with only 11% being unstable or very unstable. Most (94%) banks were also undergoing some erosion, generally all along the length of the stream, or at bends. Major factors identified as affecting the stability of banks included presence of stock, clearing of riparian vegetation, excessive flow to streams and runoff.

bed and bar stability

Beds were generally less stable than banks, with only 50% of stream lengths having stable or very stable beds. Both erosion and aggradation were recorded at a large proportion of sites. Agricultural practices and grazing were the major factors identified as affecting the stability of beds.

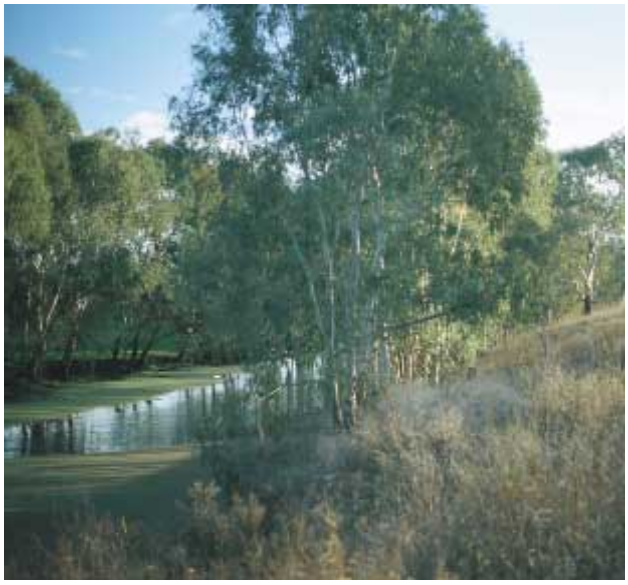
channel diversity and habitat types

Most stream lengths had very poor or poor channel diversity. This reflects the domination by two channel habitat types (pools and riffles) throughout the catchment. Sediments were mostly in the silt range for pools, being slightly coarser in riffles. However, a range of sediment types, from clays to boulders, was recorded throughout the catchment. The diversity of fauna and flora throughout the catchment may be low, reflecting the poor range of channel habitats found. Biological monitoring needs to be undertaken to determine the natural diversity of fauna and flora, as well as changes to this diversity.

Stable beds (Dalrymple Creek)

riparian vegetation

Most of the stream lengths in the catchment were rated as having riparian vegetation in very poor condition. It was dominated by grasses and herbs, with medium and small trees, rushes and shrubs also being recorded from a large number of sites. Exotic weed species formed a large proportion of the understorey and ground cover (a mean of 37% of the species composition). The width of the riparian zone was generally less than 21 m and was similar to the upper bank width, emphasising the importance of the latter as a refuge area for riparian vegetation. Upper banks are often unsuitable for agricultural and grazing activities, although the occurrence of grazing was common throughout the reach environs.



Very poor riparian vegetation
(Condamine River upstream of Warwick)

aquatic vegetation

Most stream lengths had aquatic vegetation in poor or very poor condition. The dry conditions experienced throughout the survey, and in the five years prior to it, influenced this result. In addition, other characteristics, such as water quality, availability of propagules, suitability of sediment, light and flow regimes, may significantly influence the distribution of aquatic vegetation.

aquatic habitat

Most (61%) stream lengths were rated as having aquatic habitat in very poor or poor condition, reflecting the poor instream cover and habitat diversity. Instream cover was not dominated by any one type, although logs, leaves and twigs, roots, rocks and pools deeper than 1 m were the most commonly occurring types. The dominant stream bank cover was canopy cover (61% of sites). Passage for aquatic organisms (including fish) was generally very restricted, both at the time of survey and when considered at the level of the water mark (normal water level).

scenic and recreation values

Most (90%) sites were classified as undeveloped rural, having settings in a rural landscape that has been modified from the original natural state. While relatively few current recreational activities were recorded for the catchment, the potential for river-based activities was high. The scenic value of much of the catchment was low, largely as a consequence of the clearing of vegetation and grazing activities. A combined scenic/ recreation value indicated most sites had poor to moderate values.

overall condition

The majority of stream lengths had either moderate or degraded overall condition ratings.

Summary of Subcatchments Condition

Ashall and Fourteen Mile Creeks

The condition of the reach environs was mostly very poor, as a consequence of natural drainage and channel modification, roading and grazing activities. Banks were generally stable to very stable, although erosion was recorded at all sites, occurring all along the banks and at bends. Clearing of riparian vegetation, roads, excessive flow to streams, presence of stock and runoff were identified as major disturbance factors. Beds were moderately stable to very stable, although erosion was recorded at all sites. Agricultural/grazing activities were the major disturbance factors identified. Channel diversity ratings were generally very poor, with runs constituting the dominant habitat type. The condition of the riparian vegetation was very poor, being dominated by herbs and grasses. Exotic weed species formed an average of 42% of the riparian vegetation and the riparian zone had a mean width of 8.8 m. Very little aquatic vegetation was recorded and hence the condition rating was very poor. The aquatic habitat rating of most stream lengths was very poor, with passage for aquatic organisms generally being very restricted. Scenic/recreation values were poor to moderate, as no current recreational activities were recorded and only a few potential activities being identified. The overall condition rating for the subcatchment was poor, suggesting that significant remedial action would be required to prevent further degradation. This could be in the form of planting of vegetation along river banks and fencing streams from cattle.

Highly disturbed reach environs (Ashall Creek)

Myall Creek

Lower Myall Creek (460 m and above)

Most stream lengths had reach environs in moderate condition, with grazing activity being identified as the major disturbance factor of the reach environs. Banks were generally very stable. Erosion was recorded for all reach lengths, mostly at bends or all along the stream length. Presence of stock was the major factor identified as affecting bank stability. Bed stability was generally only moderate, with erosion being the dominant process recorded. Agricultural/grazing activities and erodibility of banks were the major factors affecting bed stability. Channel diversity was either very poor or poor, with most sites being dominated by pools. The riparian vegetation was mostly in very poor condition and was comprised of grasses, herbs and small and medium trees. The riparian zone had a mean width of 21 m. An average of 24% of the riparian vegetation was comprised of exotic weed species. There was no aquatic vegetation recorded for this subcatchment. Aquatic habitat ratings were generally very poor or poor, with passage for aquatic organisms being very restricted. Scenic/recreation values were generally moderate, with few recreational activities being recorded for the area (although a number were considered potentially suited) and the scenic value of most sites being low or moderate. The overall condition rating of most stream lengths was moderate.

Upper Myall Creek (460 m and above)

The condition of the reach environs was poor to moderate, with grazing being the major disturbance factor identified. Banks were moderately stable to very stable, although erosion was recorded from most sites, occurring all along the reach length. The presence of stock was a major determinant of bank stability. Beds were moderately stable to very stable, although both erosion and aggradation were recorded. Agricultural/ grazing activities and erodibility of banks were the major disturbance factors identified. Channel habitat diversity was poor or very poor, with riffles being the dominant habitat type. Most of the riparian vegetation was in very poor condition and was dominated by grasses, herbs and small and medium trees. The riparian zone had a mean width of 23.6 m. An average of 21% of the riparian vegetation was comprised of exotic weed species. The condition of the aquatic vegetation was very poor. Generally good condition ratings were obtained for the aquatic habitat, although passage for aquatic organisms was very restricted. Scenic/ recreation values were generally moderate. No recreational activities were recorded for the area, while a number were considered potentially suited. The scenic value of most sites was moderate. The overall condition rating of most stream lengths was moderate.

Comparison of Lower and Upper Myall Creek

The upper subcatchment displayed attributes which were in generally better condition than those of the lower subcatchment.

While Myall Creek is not as degraded as many other subcatchments in the Upper Condamine River catchment, rehabilitation of the riparian vegetation, control of exotic species and the fencing from cattle (with controlled access for watering) are still required to prevent further degradation.

Oakey Creek

Lower Oakey Creek (below 460 m)

The condition of the reach environs most mostly poor, with grazing being identified as the major disturbance factor. Banks were generally stable or very stable, although erosion was recorded from most sites and occurred around obstacles or all along the reach length. The presence of stock and the clearing of riparian vegetation were the major factors affecting bank stability. Beds were moderately stable to very stable, although erosion was again recorded from most sites. Agriculture/grazing and erodibility of banks were the major disturbance factors identified. Channel habitat diversity was mostly very poor, with pools and riffles constituting the dominant channel habitat types. The condition of the riparian vegetation was generally poor. It consisted mostly of herbs, grasses and small and medium trees. The riparian zone had a mean width of 15 m. An average of 40% of the riparian vegetation was comprised of exotic weed species. The condition of the aquatic vegetation was very poor, as was the aquatic habitat. Passage for aquatic organisms was very restricted. Scenic and recreation values were poor to moderate, with a number of current and potential recreation activities being identified and the scenic value of most sites being low. The overall condition of most stream lengths was poor, although some sites in good and very good condition were also recorded.

Widespread erosion (Lower Oakey Creek)

Upper Oakey Creek (460 m and above)

A generally moderate condition rating was recorded for reach environs in this subcatchment. Grazing was the major disturbance factor identified. Most banks were stable, although erosion (mostly at irregular intervals along the reach lengths) was recorded from most sites and some aggradation was also recorded. Presence of stock, runoff and excessive flow to streams were the major disturbance factors identified. Beds were generally moderately stable to very stable, with erosion again being the dominant process. Agricultural/ grazing activities and erodibility of banks were the major factors identified as affecting bed stability. Channel diversity was mostly poor, with both pools and riffles being the dominant channel types. The riparian vegetation was mostly in very poor condition. It was comprised of grasses, herbs and small and medium trees. The riparian zone had a mean width of 19.4 m. Exotic weed species comprised 25% of the riparian vegetation. The condition of the aquatic vegetation was very poor. The aquatic habitat condition was mostly moderate, with passage for aquatic organisms being very restricted. The scenic/recreation value of most stream lengths was moderate. Although no current recreation activities were identified, the potential for a large number of activities was recognised. The scenic value of most sites was moderate. The overall condition of most stream lengths was moderate.

Comparison of Lower and Upper Oakey Creek

The attributes of the upper subcatchment were generally in better condition than those for the lower subcatchment.

The condition of the Oakey Creek subcatchment is generally poor and remedial action will be required to prevent further degradation.

Condamine River (from Dalby to Warwick)

The reach environs were mostly in moderate condition, with grazing activity being identified as the major disturbance factor. A number of protected areas were recorded. Banks were mostly stable or very stable, although erosion was recorded at all sites, occurring at bends or at irregular intervals along the river's length. Factors affecting the stability of banks included stock access and watering and the clearing of riparian vegetation. Beds were generally moderately stable, although both erosion and aggradation were recorded. Major factors leading to disturbance of beds included agricultural/grazing activities and erodibility of banks. Channel habitat diversity was mostly poor or very poor, with pools constituting the major channel habitat type. The riparian vegetation was dominated by grasses, herbs and rushes and was in very poor to moderate condition. Exotic weed species formed a mean of 29% of the riparian vegetation. The mean width of the riparian zone was 33.5 m, the largest value for the entire Upper Condamine River catchment. The condition of the aquatic habitat was generally poor, with passage for aquatic organisms being very restricted. Many recreational activities were recorded from the area, with additional potential activities also being recorded. Scenic values varied, with sites in protected areas being higher in scenic value than other sites. Overall scenic/recreational values for this subcatchment were moderate to good. The overall condition was also moderate to good, with many stream lengths in this subcatchment generally in good condition. Maintenance of the riparian zone in good condition will be important in preventing further degradation

Condamine River (upstream of Warwick)

The reach environs were in moderate condition. Grazing, roads, bridges/culverts and water extraction were the major disturbance factors identified. Banks were generally stable, although erosion was recorded at all sites, occurring at irregular intervals along the reach length. The clearing of riparian vegetation and the presence of stock were the major disturbance factors identified. Beds were generally very stable,

although both erosion and aggradation were recorded. Agricultural/grazing activities were the dominant factors affecting bed stability. Apart from the Condamine River gorge section, channel diversity was very poor, with pools representing the major channel habitat type. The riparian vegetation was in very poor condition and consisted of grasses, herbs and rushes. The riparian zone had a mean width of 16.9 m. An average of 45% of the riparian vegetation consisted of exotic weed species. The condition of the aquatic vegetation was very poor. Aquatic habitats were generally in moderate condition, although passage for aquatic organisms was very restricted. Scenic/recreational values were mostly moderate, with a number of recreational activities (current and potential) being recorded and scenic values of most sites being moderate to high. An overall moderate condition rating was recorded for this subcatchment. The presence of protected areas in this subcatchment has helped to reduce degradation. Remedial action to alleviate the effects of grazing in non-protected areas will be essential to prevent further degradation.

Hodgson Creek

Lower Hodgson Creek (below 460 m)

The condition of the reach environs was generally poor or very poor. Factors contributing to disturbance of the reach environs included roads, river trust activities, water extraction and grazing. Banks were moderately stable to stable, with erosion being recorded from all sites, mostly all along the reach length or at bends. The presence of stock and the clearing of riparian vegetation were the major factors identified as affecting bank stability. Beds were moderately stable or very stable, with erosion being recorded at all sites. Agricultural/grazing activities, erodibility of banks and canalisation were the major factors identified as affecting bed stability. Channel diversity was either poor or very poor, with the major channel habitat type being pools. The riparian vegetation was mostly in very poor or poor condition and comprised grasses and trees. The riparian zone had a mean width of just 6.6 m. Exotic weed species formed an average of 53% of the riparian vegetation. Aquatic vegetation condition ratings were very poor. The majority of reach lengths had aquatic habitats in very poor condition, with passage for aquatic organisms being very restricted. Scenic/recreation ratings were mostly poor or moderate, with few current or potential activities being recorded and low scenic values. The overall condition of the subcatchment was poor, reflecting the poor condition ratings for the reach environs and riparian vegetation in particular, and the presence of some erodibility of banks at all sites.

Scenic values (Condamine River upstream of Warwick)

Upper Hodgson Creek (460 m and above)

The reach environs were generally in very poor condition and were affected by roads, bridges/culverts, grazing and water extraction. Banks were mostly moderately stable to stable, with both erosion and aggradation being recorded. The presence of stock was identified as the major disturbance factor. Beds were generally moderately stable to very stable and eroding, with some aggradation also being recorded. Agricultural/ grazing activities were identified as the major disturbance factors. Channel diversity was poor or very poor, with channel habitats being dominated by riffles and pools. The riparian vegetation was in very poor condition and consisted of herbs, grasses and rushes. The riparian zone had a mean width of only 4.7 m. An average of 69% of the riparian vegetation was comprised of exotic weed species. Most stream lengths had aquatic vegetation in very poor condition. Aquatic habitat condition ratings were also very poor. with passage for aquatic organisms being very restricted. Poor scenic/recreation ratings were recorded, as no current activities and few potential activities occurred and scenic values were low. The overall condition of this subcatchment was poor.

Comparison of Lower and Upper Hodgson Creek

The reach environs in the lower subcatchment were generally more disturbed. Banks were more stable in the upper subcatchment. Aggradation was more prevalent in lower subcatchment stream beds. Channel habitat diversity was slightly greater in the upper subcatchment. The riparian vegetation was in better condition and contained a lower proportion of exotic weed species in the lower subcatchment. The condition of the aquatic habitat condition was slightly better in the upper subcatchment, as was the overall condition rating.

Urgent remedial action is required in both subcatchments to prevent further degradation of a considerably degraded area of the Upper Condamine River catchment.

Kings Creek

Lower Kings Creek (below 460 m)

Very poor condition ratings for the reach environs were generally recorded. Grazing activities, roads and water extraction were identified as major factors leading to disturbance of the reach environs. Most banks were stable or very stable, although all sites recorded eroding banks, mostly all along the reach length. The presence of cattle was identified as the major disturbance factor. Beds were generally very stable, although erosion was recorded from most sites. Agriculture/grazing activities were the major factors affecting bed stability. Channel diversity was generally very poor, with pools constituting the

Reach environs (Lower Kings Creek)

major channel habitat type. The riparian vegetation was mostly in very poor condition and was dominated by grasses, herbs and rushes. The riparian zone had a mean width of 14.6 m. Exotic weed species formed an average of 53% of the riparian vegetation. Very little aquatic vegetation was recorded, although it ranged in condition from very poor to very good. The condition of the aquatic habitat was generally very poor, although moderate and good ratings were also recorded. Passage for aquatic organisms was generally very restricted. Few recreational activities were undertaken, while a number were considered potentially suited. Most sites had only low scenic values. Combined scenic/recreation values were poor or moderate. The overall condition ratings for this subcatchment were generally moderate.

Upper Kings Creek (460 m and above)

The reach environs were in very poor condition. Bridges/culverts, roads and grazing activities were identified as major disturbance factors. Banks varied from unstable to stable. Most stream lengths were eroding, particularly all along the reach length or at bends. The presence of stock was the major disturbance factor identified. Beds were moderately stable to very stable, with both erosion and aggradation being recorded. Major factors affecting bed stability included agriculture/grazing activities, erodibility of banks and channellisation. Channel diversity was generally very poor or poor, with pools and riffles being the dominant habitat types. The riparian vegetation was in very poor condition and consisted mostly of grasses and herbs. The riparian zone had a mean width of 8.1 m. An average of 90% of the riparian vegetation was comprised of exotic weed species. Very little aquatic vegetation was recorded and thus the condition rating was very poor. Aquatic habitat ratings were generally good, although passage for aquatic organisms was very restricted. Scenic and recreational values were poor to moderate, as no recreational activities are undertaken (although a number were considered potentially suited) and all sites had low scenic values. The overall condition of most stream lengths was poor.

Comparison of Lower and Upper Kings Creek

The condition of most attributes examined was better in the lower subcatchment than in the upper subcatchment, except for aquatic habitat.

Immediate remedial action is required in the upper subcatchment to prevent further degradation, while significant action is also required for the lower subcatchment.

Dalrymple Creek

The condition of the reach environs was generally poor. Water extraction, roads and grazing were identified as major factors contributing to disturbance of the reach environs. Bank stability varied considerably, ranging from unstable to very stable. Erosion was recorded from all sites, mostly at irregular intervals along the reach length. Factors identified as affecting bank stability included presence of stock, excessive flow to streams and the clearing of riparian vegetation. Bed stability was generally only moderate, with both aggradation and erosion being recorded. Factors affecting stability included agriculture/grazing activities and erodibility of banks. Channel diversity was generally poor, although pools and riffles were both common throughout the subcatchment. The riparian vegetation was mostly in very poor condition and was dominated by grasses, herbs and small and medium trees. The riparian zone had a mean width of 12.9 m. Exotic weed species comprised, on average, more than half (52%) of the riparian vegetation. The condition of the aquatic habitat was generally very poor to moderate, with passage for aquatic organisms being very restricted. The scenic/recreational value of most sites was poor, although a number of current and potential recreational activities were recorded. The scenic value of most sites was low. The overall condition of this subcatchment was poor to moderate. The condition of most attributes in this subcatchment was poor. Substantial rehabilitation of the riparian vegetation, in conjunction with a weed control program, will be required to prevent further degradation. In addition, fencing from cattle and provision of controlled access for watering will be necessary.

Glengallan Creek

The condition of the reach environs was generally poor, due mainly to grazing activities. Bank stability was generally only moderate, with erosion being recorded from most sites, occurring all along the stream length or at bends. The presence of stock, excessive flow to streams and the clearing of riparian vegetation were all identified as major factors affecting the stability of banks. Bed stability was also moderate, with both erosion and aggradation being recorded. Erodibility of banks and agricultural/grazing activities were identified as major disturbance factors. Channel diversity was generally poor, with pools dominating and riffles being common. The condition of the riparian vegetation was generally very poor and was dominated by grasses, herbs and rushes. The riparian zone had a mean width of 14.7 m. Exotic weed species formed an average of 48% of the riparian vegetation. The condition of the aquatic vegetation was very poor. The condition of the aquatic habitat was very poor or good, although passage for aquatic organisms was generally very restricted. Scenic/recreation values were mostly moderate, with most sites having low or moderate scenic values and very few current recreational activities recorded (although the potential for recreation was considerable). The overall condition of this subcatchment was poor. The major remedial actions required to prevent further degradation include fencing from cattle and controlled access for watering, rehabilitation of the riparian vegetation and the implementation of a comprehensive weed control program.

Bank erosion and grazing effects (Glengallan Creek)

Swan and Emu Creeks

The condition of the reach environs was very poor or poor, with the major disturbance factors identified being grazing, river trust activities and water extraction. A small number of protected areas were recorded. Banks were mostly stable to very stable. Erosion was, however, recorded from most sites, occurring all along the reach length. The presence of stock, clearing of riparian vegetation and excessive flow to streams were the major disturbance factors identified. Beds were moderately stable to very stable, with both erosion and aggradation being recorded. Agriculture/grazing activities, erodibility of banks and bed deepening were major factors identified as affecting bed stability. Channel diversity was mostly poor, with both pools and riffles being common throughout the subcatchment. The riparian vegetation was in poor condition and consisted of grasses, herbs and small and medium trees. The riparian zone had a mean width of 14.4 m. An average of 56% of the riparian vegetation consisted of exotic weed species. The condition of the aquatic vegetation was very poor, while that for the aquatic habitat was moderate. Passage for aquatic organisms was very poor. The scenic/recreation value of most sites was poor to moderate, with a number of current and potential recreational activities being recorded and the scenic values of most sites being low. The overall condition rating was poor or moderate. Moderate degradation was observed in this subcatchment. Rehabilitation of the riparian zone, along with a comprehensive weed control program and greater control of stock access to streams, will be required to prevent further degradation.

Southern Creeks

The reach environs were generally in moderate condition, with grazing activity being the major disturbance factor identified. Banks were mostly very stable, although erosion was recorded from most sites, occurring all along the reach lengths. Grazing was the major disturbance factor identified as affecting bank stability. Bed stability was generally only moderate, with aggradation being the dominant process recorded. Agriculture/ grazing activities and erodibility of banks were the major factors identified as affecting bed stability. Channel diversity was mostly very poor or poor, with the dominant habitat type being pools. The condition of the riparian vegetation was generally very poor, although some very good sites were recorded. Exotic weed species formed an average of 33% of the riparian vegetation. The mean width of the riparian zone was 18.5 m. The condition of the aquatic vegetation was generally very poor, although some very good sites were recorded. The aquatic habitat was generally in moderate condition, with passage for aquatic organisms being restricted. Moderate scenic/recreational values were recorded, with a number of current and potential activities being recorded and the scenic value of most sites being moderate. The overall condition of most streams was poor to moderate. The high recreation value, along with the relatively low level of degradation in this subcatchment, emphasises the importance of undertaking action to prevent further degradation.

Six Mile and Thanes Creeks

The condition of the reach environs was generally moderate, with grazing activities, roads and bridges/ culverts being the main disturbance factors identified. Banks were generally very stable, although both erosion and aggradation were recorded, generally at bends or at irregular intervals along the reach length. Beds were only moderately stable, with both aggradation and erosion being recorded. Factors identified as affecting the stability of beds included agriculture/grazing activities and erodibility of banks. Channel diversity was mostly very poor, with pools being the dominant habitat type recorded. The condition of the riparian vegetation was generally very poor and dominated by herbs, grasses, rushes and small and medium trees. An average of 26% of the riparian vegetation consisted of exotic weed species. The mean width of the riparian zone was 15.4 m. The condition of the aquatic vegetation was very poor. Moderate condition ratings for the aquatic habitat were mostly recorded, with passage for aquatic organisms being very restricted. The scenic/recreation value of most sites was moderate and a number of current and potential recreation activities were recorded. Scenic values of sites was mostly moderate. The overall condition rating for most stream lengths was poor or moderate. As this subcatchment is popular as a recreation area, it is important that the condition of the stream and its environs be maintained. Further degradation should be prevented by action such as the planting of riparian vegetation.

Southwest Creeks

The reach environs were mostly in moderate condition, with grazing being the major disturbance factor identified. Banks were generally unstable, with erosion being the dominant process recorded, occurring mostly all along the reach lengths or at bends. Beds were stable to very stable, although both erosion and aggradation were recorded. Agriculture/grazing activities and erodibility of banks were the major factors identified as affecting bank stability. Channel diversity was generally very poor, with both pools and runs being the dominant channel habitats recorded. The riparian vegetation was in very poor condition (although some moderate and very good sites were recorded). It comprised grasses, herbs and small and medium trees. The riparian zone had a mean width of 22.2 m. Only 7% of the riparian vegetation comprised exotic weed species. The condition of the aquatic vegetation was very poor, as was the condition of the aquatic habitat. Passage for aquatic organisms was very restricted. Moderate scenic/recreational values were recorded, with few current and potential recreational activities recorded and the scenic value of most sites was low to moderate. The overall condition of most stream lengths was poor or moderate. Remedial action to prevent further degradation will be required.

Summary

The condition of the reach environs was influenced by the associated land use. The generally poor condition ratings for most streams reflect the extent of clearing of riparian vegetation for cropping and pasture, as well as exposure to cattle. The stability of most banks was good. Erosion occurred throughout the study area, with aggradation also being recorded. Susceptibility to further degradation of banks was low to moderate. Beds were generally less stable than banks, with a greater contribution from aggradation being recorded. Channel diversity was very poor or poor, with most stream lengths being dominated by one habitat type (pools). The riparian vegetation was in very poor condition, as a consequence of clearing and the presence of exotic species. The width of the riparian zone varied considerably. Very little aquatic vegetation was recorded and reflects the dry conditions experienced throughout the survey. The condition of the aquatic habitat was generally poor and can be related, in part, to the clearing of riparian vegetation. Passage for aquatic organisms was very restricted. Scenic and recreational values were moderate to high. The overall condition of the catchment was moderate.

Conclusions

The survey has shown that many of the streams of the Upper Condamine River catchment are subject to some level of degradation. This degradation is shown in three important areas:

- Widespread degradation of the riparian zone,
- Aquatic habitats in generally poor condition and of low diversity and,
- A need for stock management to minimise detrimental impacts on the riparian and instream environments.

Within the riparian zones the presence of riparian vegetation was identified as the major natural feature responsible for slowing degradation of the riverine environment. To improve the condition ratings for this zone it would be important to protect this remnant vegetation, re-establish a good width riparian zone and provide buffer strips along streams to ensure natural processes operate. This would provide wildlife corridors and refuges, organic material, shade and shelter for instream communities and help to maintain good water quality.

Across the catchment the better overall condition and aquatic habitat ratings occurred within protected areas in the catchment, emphasising the effectiveness of such areas to preserve natural systems. Poor condition ratings in other areas are due to the lack of debris cover, deep waterholes and vegetation cover along the banks. To improve the situation within the streams for the aquatic habitat and thus increase the numbers of fish and other organisms, natural processes need to be allowed to re-establish. For this to occur the riparian vegetation zone needs to be functioning naturally.

Degradation of the stream banks through the presence of grazing stock was identified as a significant factor during the survey. If the riparian zones of these streams are to recover and operate naturally, management of the use of these areas for grazing needs to focus on allowing for vegetation regeneration through lower grazing pressure and reduction of bank and bed erosion through controlled access to watering points.