Australian Government

Department of the Environment, Water, Heritage and the Arts

Threatened Ecological Community Nomination Form - for listing or changing the status of an ecological community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Nominator details Note: Nominator details are subject to the provision of the *Privacy Act 1988* and will not be divulged to third parties if advice regarding the nomination is sought from such parties	
1. Full name	
Steve Burgess	
2. Body, organisation or company name (if applicable)	
Mary River Catchment Coordinating Committee	
3. Contact details	
Email:mrccc@ozwide.net Phone:5482 4766 Fax:	Postal Address: PO Box 1027 GYMPIE 4750
4. Declaration: I declare that the information in this nomination and its attachments is true and correct to the best of my knowledge.	
Signed (If available, please attach an electronic signature when submitting by email):	
5. Date signed **31/03/2008**	

Nominated Ecological Community - Summary of eligibility	
6. Name of Ecological Community	
Riffle/pool/sandbank community of the Mary River (Queensland) floodplain	
7. Category for which the ecological community is nominated under the EPBC Act	
Current listing category o Critically Endangered o Endangered o Vulnerable X Unlisted	Proposed listing category o Critically Endangered o Endangered X Vulnerable
8. Criteria that form the basis for this nomination	
X Criterion 1 – Decline in geographic distribution. **X** Criterion 2 – Small geographic distribution coupled with demonstrable threat. **o** Criterion 3 – Loss or decline of functionally important species. **X** Criterion 4 - Reduction in community integrity. **o** Criterion 5 - Rate of continuing detrimental change. **o** Criterion 6 – Quantitative analysis showing probability of extinction.	

Important notes for completing this form

- Complete the form as far as possible. It is important for the Threatened Species Scientific Committee to have comprehensive information and the best case on which to judge an ecological community's eligibility against the EPBC Act criteria for listing (Attachment A).
- Nominations that do not meet the EPBC Amendment Regulations 2000 will not proceed. Division 7.2 of the EPBC Amendment Regulations at http://www.environment.gov.au/epbc/about specifies the required information for a nomination. If after research you find the information is not available, please state this under the relevant questions (as described in subregulation 7.05(3) of the EPBC Act Regulations).
- To ensure you have the most up to date information, it is recommended that you contact the relevant Natural Resource Management authority. For details see: www.nrm.gov.au.
- Keep in mind that the purpose of the questions is to help identify why the ecological community is eligible for listing in the nominated conservation category.
- The purpose of the form is to assist the Committee to gain an understanding of the ecological community. In that sense, it is important that you consider the full, national extent of an ecological community, not just its occurrence in specific areas or regions.
- The questions are separated into themes, which indirectly or directly relate to the criteria for listing. The Committee provides the following general description of what kind of information informs its judgements against the EPBC Act criteria for listing (Attachment A).
- For all facts and all information presented - identify your references and sources of information. Document the reasons and supportive data. Indicate the quality of facts/information and any uncertainty in the information. For example was it based on a peer-reviewed research publication or anecdote; or on observed data, an inference/extrapolation from the data, or a reasonable premise not yet supported by hard data?
- Personal communications - The opinion of appropriate scientific experts may also be cited (with their approval) in support of a nomination. If this is done the names of the experts, their qualifications and full contact details must also be provided at the end of this nomination.
- Confidential material – Identify any confidential material and explain the sensitivity.
- Tables – Can be included at the end of the form or prepared as separate electronic documents included as appendixes or attachments. Refer to tables in the relevant area of the text.
- Maps - If maps cannot be supplied electronically, please provide them in hardcopy.
- Cross-reference relevant areas of the nomination form where needed.

How to lodge your nomination

Completed nominations must be lodged either:

1. by email to: **epbc.nominations@environment.gov.au**

OR

2. by mail to: The Director
   Ecological Communities Section
   Department of The Environment and Water Resources
   GPO Box 787
   Canberra ACT 2601

Further information

The Threatened Species Scientific Committee has developed guidelines to assist nominators. The guidelines are attached to this form (Attachment A). They include the statutory criteria and guidelines for the 'critically endangered', 'endangered' and 'vulnerable' categories. The guidelines also include indicative thresholds, which may be used by the Committee to assess whether an ecological community is eligible for listing against the criteria prescribed by the EPBC Regulations. It should be noted that the Committee does not adhere strictly to these thresholds, but has regard to them when making judgements about ecological communities on a case-by-case basis.

More detailed information on all categories for threatened ecological communities can be found in Section 182 of the EPBC Act and the statutory criteria can be found in Division 7.1 of the EPBC Regulations 2000. These are available at: **www.environment.gov.au/epbc/about/index.html**

For questions regarding nominations contact:
The Director
Ecological Communities Section
Department of The Environment and Water Resources
GPO Box 787
Canberra ACT 2601
Telephone (02) 6274 2317
Fax (02) 6274 2214

Section 1 – Conservation Assessment

Information in this form is required for assessing ecological communities nominated as threatened under the EPBC Act. Provide answers in the space below each question. If no or insufficient information exists to answer a question, please indicate that no information available instead of leaving the space blank.

Conservation Theme

1. *The conservation theme for the assessment period commencing 1 October 2008 (for which nominations close 31 March 2008) is 'rivers, wetlands and groundwater dependent species and ecosystems of inland Australia'. How does this nomination relate to the Conservation Theme?*
The riffle/pool/sandbank sequences of the inland alluvial floodplain reaches of the Mary River and it's tributaries provide a unique combination of flow conditions and habitat and that are essential for the continued survival of a number of threatened aquatic and semi-aquatic species of international significance. These species form part of a diverse ecological community which is distinctively characteristic of this mix of habitats, is very limited in geographic distribution and is under imminent threat from expanding water infrastructure demands and sand and gravel extraction.

Classification

By nominating a broader community, you will enable the Committee to consider the national extent and condition of the community and determine the limits of the listed ecological community.

2. *What is the name of the ecological community? Note any other names that have been used recently, including where different names apply to different jurisdictions.* For example, is it known by separate names in different States or regions?
Riffle/pool/sandbank community of the Mary River (Queensland) floodplain
3. *What authorities/surveys/studies support or use the name?*
Mary River and tributaries rehabilitation plan Mary Basin Water Resource Plan (supporting documents, Technical Advisory Panel reports) "Country to Coast" Burnett Mary Regional Group. Priority Action Plan. Mary River Cod, Queensland Lungfish and Mary River Turtle EPBC listings & recovery plans.
4. *How does the nominated ecological community relate to other communities that occur nearby or that may be similar to it? Does it intergrade with any other ecological communities and, if so, how wide are the intergradation zones? Please describe how you might distinguish the ecological community in areas where there is overlap.*
The community is found in the mostly perennially flowing floodplain reaches of the Mary River and its tributaries, upstream of tidal influence, downstream of the confined headwater streams. The stream channel in these reaches is generally deeply incised into the floodplain alluvium, with unconsolidated sandy/loamy banks stabilized by riparian vegetation, which would typically be classified as RE12.3.1, RE12.3.2 or RE12.3.7 (in its undisturbed state) under the Queensland regional ecosystem classification. The distinctive features are a mostly perennial, shallow riffle zone providing oxygenation, a sandy/gravelly stream bed, deep pool habitat with snags, large woody debris and submerged macrophytes and sandy/loamy banks extending to the water's edge. Distinctive, typical aquatic flora are *Vallisneria nana* dominating the riffle zone and *Hydrilla verticillata* dominating the pools (although this has been displaced by introduced *Egeria densa* in recent years). Distinctive fauna species include the Mary River Cod, Queensland Lungfish, a large diversity of freshwater turtle species (up to 6 species) including Mary River Turtle, resident populations of eel-tailed catfish and regular runs of freshwater mullet.

Legal Status

5. *What is its current conservation status under Australian State/Territory Government legislation?*
Not listed
6. *Does the ecological community provide a habitat for any listed threatened species? If so, please note whether the species are listed on State/Territory and/or national lists and the nature of its dependence on the ecological community.*
1. Mary River Cod (EPBC)– feeding and breeding habitat 2. Mary River Turtle (EPBC) – feeding and breeding habitat 3. Australian lungfish (EPBC)– feeding and breeding habitat 4. Giant Barred Frog (EPBC) – feeding and breeding habitat where riparian vegetation is intact 5. White-faced snapping turtle (EPBC nominated) - feeding and breeding habitat 6. Vallisneria nana – NCA (rare) 7. Macro-invertebrate species yet to be classified

Description

7. *List the main features that distinguish this ecological community from all other ecological communities?*

Characteristic features can be biological (e.g. species of plants and animals characteristic to the community; a type of vegetation structure), or associated non-biological landscape characteristics (e.g. soil type, habitat feature, hydrological feature). Please limit your answer to those features that are specific to the ecological community and can be used to distinguish it from other ecological communities.

The aquatic community which inhabits the riffle/pool/sandbar sequences of the mostly perennial non-tidal floodplain reaches of the Mary River and its tributaries. Distinctive species are Mary River Cod, Mary River Turtle and Queensland Lungfish. More fully described in section 4.

8. *Give a description of the biological components of the ecological community.*

For instance, what species of plants and animals commonly occur in the community; what is the typical vegetation structure (if relevant).

Distinctive fauna species include the Mary River Cod, Queensland Lungfish, a large diversity of freshwater turtle species (up to 6 species) including Mary River Turtle, resident populations of eel-tailed catfish and regular runs of freshwater mullet.
Typical submerged macrophytes in the riffle zone are *Vallisneria nana*, *Myriophyllum verrucosum.*
Typical macrophytes in pools are *Hydrilla verticillata, Ceratophyllum demersum*
Typical native floating nacrophytes = *Nymphoides indica, Azolla pinnata.*
Where intact, riparian vegetation can generally be classified as RE12.3.1, RE12.3.2 or RE12.3.7 under the Queensland VMA.
A typical list of fish species is attached in Table 1.

9. *Give a description of the associated non-biological landscape characteristics or components of the ecological community.*

For instance, what is the typical landscape in which the community occurs; is it associated with a particular soil type; what major climatic variables drive the distribution of the ecological community.

The community is found in the mostly perennially flowing low-gradient floodplain reaches of the Mary River and its tributaries, upstream of tidal influence, downstream of the confined headwater streams. The stream channel in these reaches is generally deeply incised into the floodplain alluvium, with unconsolidated sandy/loamy banks stabilized by riparian vegetation,. The distinctive features are a mostly perennial, shallow riffle zone providing oxygenation, a sandy/gravelly stream bed, deep pool habitat with snags, large woody debris and submerged macrophytes and sandy/loamy banks extending to the water's edge.

10. *Provide information on the ecological processes by which the components interact (where known).*

Ecological information on the major threatened species is attached in Table 2, drawn from Brizga et al 2006.
The crucial functional elements are the provision of a very diverse range of instream and riparian physical habitats in close proximity to each other , with a high degree of variability both spatially and temporally. These habitats are important at different times of the year and different stages of the life cycle of a number of long-lived threatened species such as Mary River Cod, Mary River Turtle and Lungfish. Shallow riffle zones provide zones of oxygenated water, the variation in depth between these and the deep pools nearby provides gradients in depth, light and temperature. Temporal variation in flow regime triggers species movement and provides high flow events which flush out accumulated macrophytes and poor-quality water Water depths can range up to 20 metres over a few days, with associated huge variation in suspended sediment and water clarity. The sand banks at the water's edge provide crucial nesting habitat for turtle species. When intact, the riparian vegetation provides instream woody debris and provides breeding habitat for stream frogs, as well as controlling macrophyte growth and helping regulate water temperature. The high diversity of turtle species (up to 6 species) and having 3 species of large vertebrates which breathe air and also extract oxygen directly from the water (2 cloacal ventilating turtle species and lungfish) are a distinctive feature of this community . A great deal more study is needed to investigate the functional relationships that support this diversity of threatened species that have such a limited shared geographical distribution.

11. *Does the ecological community show any consistent regional or other variation across its extent, such as differences in species composition or structure? If so, please describe these.*

Due to a very specific and limited geographical extent, variations between communities probably reflect varying stages of degradation, rather than geographical variation.

12. *Identify major studies on the ecological community.*

Mary River and Tributaries Rehabilitation Plan.
Supporting studies by the Technical Advisory Panel for the Mary Basin Water Resource Plan and the South East Queensland Water Supply Strategy.
EIS for the proposed Traveston Crossing Dam
Studies in support of the Mary River Cod rehabilitation plan
Studies in support of the Lungfish recovery plan
Mary catchment: River Process Study. (2003)

Distribution

13. *Describe the national distribution in Australia. If possible, include appropriate bioregions (see Attachment A) where the ecological community occurs and attach a map showing its distribution.*

Limited to perennial, non-tidal floodplain main stream and tributaries of the Mary River (South East Queensland bioregion) only

14. *What is the national distribution (in ha) for the ecological community? Identify whether any values represent extent of occurrence or area of occupancy (as described in Attachment B); explain how it was calculated and datasets used.*

a. *What is the current distribution (in ha)?*
b. *What is the pre-European extent (in ha)?*
c. *What is the estimated percentage decline of the ecological community?*
d. *What data are there to indicate future changes in distribution will occur?*

Part B.
The Mary River and Tributaries Rehabilitation Plan included a comprehensive evaluation and classification of stream reaches throughout the Mary Catchment (Stockwell 2000) (appendix A). From this, the reaches that provided the appropriate geomorphological and hydraulic habitat elements, bank and bed substrates and historical observations were chosen to used as an approximation to estimate extent of pre-european distribution. (Combined with knowledge of the overlap of distributions and habitat requirements recorded in the literature for Mary River Cod, Mary River Turtle and Queensland lungfish – specific summary data sources included the EPBC SPRAT database and the habitat requirements listed by the Technical Advisory Panel for the Mary Basin Water Resource Plan and the South East Queensland Water Supply Strategy (summarized and attached – Brizga et al 2006-appendix B) . The stream reaches selected to represent this distribution is attached in Appendix C. The total length of these reaches sums to 487 km. This compares with a predicted pre-European estimate for Mary River Cod alone of 700 km (Brizga et al 2006). Assuming an average stream width of 15m gives an estimate of pre-european extent of less than 750 ha.

Part A.
The data from Stockwell 2000 was combined with the known distribution of Queensland lungfish, Mary River Cod and Mary River Turtle to eliminate those reaches which no longer provided suitable habitat or evidence of populations. These data included data reported by Queensland Water Infrastructure from the studies conducted for the EIS for a proposed dam at Traveston Crossing. The records from this study added greatly to the documented distribution of Mary River Turtle in the upper floodplain reaches. Reaches that have been directly impacted by impoundment (eg. the Mary River and Tinana Creek barrage Barrage storages) were removed from list. The reaches remaining account for 410 km of stream length.

124km of this stream length lies in Tinana Creek, a major coastal tributary that is now separated from the main stream by 2 tidal barrages. It is no longer possible for freshwater species to travel between the two streams – completely fragmenting the populations which were once interlinked. Although this equates to more than 400 km of stream reaches that contain lengths of suitable habitat, within these reaches the deep pool habitat has been severely degraded by infilling from bank and bed instability resulting from flow modification, loss of riparian vegetation and sand and gravel extraction. Brizga et al (2006) estimate that the current distribution of Mary River Cod (a good indicator of deep pool habitat) accounts for 170 km of stream length. Bearing in mind that some of this is in tributaries that are above the flood plain, it could be estimated that the current extent of riffle/pool/sandbank community that supports cod, turtle and lungfish populations is somewhat less than 170km, and is now divided between two completely disconnected streams (from the point of view of the freshwater species).

Part C
Based on the estimates from part A and B, the extent of the diverse community occupying the riffle/pool/sandbar sequences of the Mary River floodplain has declined more than 65% since European settlement.

Part D
Water infrastructure plans for the Mary Basin threaten a large proportion of the remaining suitable riffle/pool/sandbar sequences on the Mary floodplain with inundation and severe flow modification. Taking a greatly increased amount of water from Obi Obi Creek and via Baroon Pocket Dam (to supply the Northern Interconnector Pipeline) is anticipated to have a major effect of flows and pool structure in Obi Obi Creek (Brizga et al 2005), and the proposed Traveston crossing dam threatens to directly inundate a large part of the remaining good pool/riffle/sandbar sequences on the main trunk of the river. The extreme dry-time flow impacts of the proposed dam (which is designed to supply its yield via a pipeline out of the catchment) are expected to extend downstream at least as far as Fisherman's Pocket. (Brizga et al 2006 , Burgess 2008). Additional long-term effects on infilling deep pool habitat following flood events may continue well past this point.
The anticipated flow effects in Obi Obi Creek would degrade a further 26km of stream reaches with suitable pool/riffle/sandbar sequences, and the direct inundation and flow modification effects of the Traveston Crossing proposal would degrade another 91 km of stream reaches with suitable sequences in the main stream and Yabba Creek. . If the Traveston Crossing proposal proceeds it would effectively isolate the communities in the upper floodplain and lower Obi Obi Creek from the lower floodplain communities. (The Tinana Creek communities are already fragmented from those on the main stream.) If these proposals go ahead as planned, the impacts to Obi Obi creek will start being felt by 2009, and the impacts of the Traveston proposal by 2011

15. *Is the ecological community considered to be naturally rare or restricted, based on its original (pre-European) distribution?*
An ecological community is considered to be naturally restricted if it has a pre-European area of occupancy that is less than 10 000 ha or a pre-European extent of occurrence that is less than 100 000 ha (refer to attachment A).

The full pre-European extent of the distinctive vertebrate species is unknown, but the combination of flow conditions, floodplain geomorphology, bioregion and climate, would seem to suggest that the conditions needed to maintain the full diversity of species in the community (particularly cod , lungfish and Mary River Turtle populations together) could have been restricted to the area described in section 14 at the onset of European settlement – less than 750 ha. (Naturally restricted). Similar physical conditions exist in places on the Burnett and Brisbane Rivers, but the same range and diversity of species has not been recorded in these places. Figure 4 shows the location of the Mary River and major tributaries

16. *What is the typical size (in ha) for a patch of the ecological community (if known)?* Explain how it was calculated and the datasets that are used. Relevant data includes the average patch size, the proportion of patches that are below 10 ha or 100 ha in size.

Pools in the sequences vary in length from tens of metres to several kilometres in length. A typical section of pool/riffle sequences from the mid flood plain is shown in figure 3. A map of notable species distribution along this section of the river , along with the occurrence of major sand deposits is shown in figure 4

17. *Quantify the percentage or area required for a patch to be considered viable.*
This refers to the minimum size of a remnant that can remain viable without active management. What would you consider is the smallest area for which a patch of the ecological community can be considered viable? It may be determined through the requirements for dominant native species, level of species diversity, or the nature of invasive weeds.

Rather than area being the most relevant geometric measure of viability, the most important criteria are the maintenance of flow over the riffle zone (about 10 cm minimum), the maintenance of depth (1 metre minimum) in the pool, and maintaining waters-edge access to the sand. Rampant weedy macrophyte growth resulting from low flows, high nutrients and lack of shading from riparian vegetation is a major threatening process to the viability of a pool/riffle/sandbar sequence.

Functionality

18. *Is the present distribution of the ecological community severely fragmented? If so, what are likely causes of fragmentation?*
Severely fragmented refers to the situation in which increased extinction risk to the ecological community results from most remnants being found in small and relatively isolated patches. These small patches may go extinct, with a reduced probability of decolonisation.

The fragmentation between Tinana Creek and the main stream communities is already a problem. Increasingly, the communities in Obi Obi Creek are isolated from the communities further downstream by poor conditions around the confluence with the main stream (bank and bed instability) and at Moy Pocket (poor water quality, weedy macrophytes , mainly *Egeria densa*). Further downstream, dense carpets of floating macrophytes (water hyacinth and salvinia) often render many riffle/pool/sandbar sequences uninhabitable in times of low flow – further fragmenting communities which depend on appropriate oxygenation for survival.

19. *Has there been a loss or decline of functionally important species? If yes, which species are affected? How are they functionally important and to what extent have they declined?*
This refers to native species that are critically important in the processes that sustain or play a major role in the ecological community and whose removal has the potential to precipitate change in community structure or function sufficient to undermine the community's viability.

Not enough is known about the trophic interactions in these communities to comment on function, The distinctive large vertebrate species that characterise the community (Lungfish, Cod, Turtle species, Tandanus) are long lived and sit at the top of the food web. Very little work has been done on the trophic levels which support such a diverse range of large predators but it is significant that three of these species are listed as endangered or vulnerable. The key may lie in the field study of the ecology of the juveniles of these species, and in the macro-invertebrate species that support them. .Many of the macro-invertebrates are not usually identified further than the family level.
Long term locals comment on the apparent reduction in the numbers of young mullet from the upper catchment, which they regard as an important food for cod, and blame this on the tidal barrage, flow changes and inappropriate road crossings. (J Cutmore pers, com, E Jenke pers com.)

20. *Reduction in community integrity. Please describe any processes that have resulted in a reduction in integrity and the consequences of these processes e.g. loss of understorey. Include any available information on the rate of these changes.*
This recognizes that an ecological community can be threatened with extinction through on-going modifications that do not necessarily lead to total destruction of all elements of the community. Changes in integrity can be measured by comparison with a benchmark state that reflects as closely as possible the natural condition of the community with respect to the composition and arrangement of its abiotic and biotic elements and the processes that sustain them. Please provide a description of the benchmark state where available. For further information please refer to the Guidelines (Attachment A).

Flow modification causing bank collapse and infilling of deep pools, as experienced downstream of Baroon Pocket Dam.
Loss and degradation of riparian vegetation which also contributes to bank collapse and infilling of deep pools.
Sand and gravel extraction, in riparian zone of floodplain and in the river – leading to bed and bank instability.
High nutrient levels, couple with lack of riparian shading leading to profuse growth of introduced macrophytes.

Condition Classes

21. *The Committee recognises that ecological communities can exist in various condition states. In reaching its decision the Committee uses condition classes to determine the patches which are included or excluded from the listed ecological community (see www.environment.gov.au/epbc/publications/pubs/ecological-communities-listing-approach.pdf for details of the process of determining condition classes). What features do you consider to be most valuable for identifying a patch of the ecological community in good condition?*

Variables for establishing the condition class may include patch size, connectivity, native plant species diversity, overstorey foliage cover, understorey composition and cover and recognised faunal values.

Deep pool habitat (>1 m), macrophyte bed near a good riffle, good snags & large woody debris, intact riparian vegetation, relative absence of introduced macrophytes (particularly Egeria densa, Salvinia molesta and Eichornia crassipes), sand/gravel bed, intact exposed sand bank at water's edge,

Survey and Monitoring

22. *Has the ecological community been reasonably well surveyed? Provide an overview of surveys to date and the likelihood of its current known distribution and/or patch size being its actual distribution and/or population size. Where possible, please indicate areas that haven't been surveyed but may add to the information required in determining the community's overall viability and quality.*

Figure 5 and 6 show a typical stretch of the floodplain habitat which contains this community, part of the survey carried out by Queensland Water Infrastructure for the EIS on the proposed Traveston Crossing Dam. Each of the threatened species in the community are the subjects of individual survey and monitoring programmes which are summarized in the SPRAT database

Is there an ongoing monitoring programme? If so, please describe the extent and length of the programme.

Queensland NRW have commenced a pool/riffle monitoring programme as part of the provisions of the draft Resource Operations Plan for the Mary Basin (due to be released in late 2008). This involve extensive physical, chemical and biological monitoring of 8 or 9 pool/riffle sequences in the Mary Catchment. Six of these are on the flood plain and would be monitoring examples of this nominated community. This programme has just commenced.

Community -based waterwatch activities are well established in the Mary Catchment, and a number of the regular sites monitored and observed by community volunteers are home to the nominated community.

Threats

23. *Identify past, current and future threats to the ecological community indicating whether they are actual or potential. For each threat, describe:*

a. *how and where it impacts on this ecological community?*
b. *what its effect has been so far (indicate whether it is known or suspected; provide supporting information/research; does the threat only affect certain patches)?*
c. *what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does the threat only affect certain patches)?*

Threats as described in the SPRAT data base for the individual species

24. *Catastrophic threats (if not included above) i.e. threats with a low predictability that are likely to severely affect the ecological community. Identify the threat, explain its likely impact and indicate the likelihood of it occurring (e.g. a drought/cyclone in the area every 100 years)*

Reduction in stream flow due to climate change combined with increased extraction. Increase in variability of water temperature. It only takes one really long extended dry period or one extreme temperature event (cold or hot) to cause a catastrophic loss of a localized fragmented population or to miss a rare breeding opportunity

25. *Identify and explain any additional biological characteristics particular to the community or species within that are threatening to its survival (e.g. Low genetic diversity)? Identify and explain any models addressing survival or particular features.*

a. How does it respond to disturbance?
b. How long does it take to regenerate and/or recover?

Threats as described in the SPRAT data base for the individual species

26. *Relative status of remnants within the community?*

How much of the community would you describe as in good condition, (i.e. Likely to persist into the long-term with minimal management?) Please describe how you would identify areas in good condition using one or a combination of indicators such as species richness, structure, remnant size, weed invasion etc.

How much of the community would you describe as in medium condition (i.e. Likely to persist into the long-term future with management?) Please describe how you would identify areas in medium condition using one or a combination of indicator such as species diversity, structure, remnant size, weed invasion etc.

How much of the community would you describe as in poor condition, (i.e. Unlikely to be recoverable with active management?) Please describe how you would identify area in poor condition using one or a combination of indicators such as species diversity, structure, remnant size, weed invasion etc.

Described in detail in the MR&T Rehabiliation Plan – implementation edition

Threat Abatement and Recovery

27. *Identify key management documentation available for the ecological community, e.g. recovery plans, conservation plans, threat abatement plans.*
Mary River and Tributaries Rehabilitation Plan, Burnett-Mary Regional Group Country to Coast Priority Action Plan Mary River Cod Recovery Plan South East Queensland Stream Frog Recovery Plan Lungfish Recovery Plan
28. *Give an overview of how threats are being abated/could be abated and other recovery actions underway/proposed. Identify who is undertaking these activities and how successful the activities have been to date.*
Landholder action in accordance with the MR&T Rehab Plan has been working to abate the threats. Increased pressure from resource extraction (sand and gravel) and proposed water infrastructure development (which has the clear and predictable consequence of destroying the nominated ecological community) is undermining the public's past efforts to protect the main trunk of the river.
29. *What portion of the current extent of the ecological community is protected in a reserve system? Which of these are actively managed? Give details including the name of the reserves, and the extent the ecological community is protected within these reserves.*
None protected in reserves

Section 2 - Justification for this nomination

30. Provide data that demonstrates why the ecological community meets at least one of the following criteria for the nominated category of threat. **This data may already have been provided in previous sections. Please refer to the data again and demonstrate how it specifically meets at least one of the following criteria.**
Criterion 1: Decline in geographic distribution.
As explained in section 14 part C
Criterion 2: Small geographic distribution coupled with demonstrable threat.
Explained in section 14 part D
Criterion 3: Loss or decline of functionally important species.
Criterion 4: Reduction in community integrity.
Explained in section 14 parts A and D. Important communities which were once connected and support breeding populations of listed threatened species are now fragmented and isolated from each other, and imminent infrastructure plans and development trends will greatly increase the level of fragmentation
Criterion 5: Rate of continuing detrimental change.
Criterion 6: Quantitative analysis showing probability of extinction.

Section 3 – Recovery, Conservation, Protection

Additional information on legal status

31. *Does the ecological community have legal protection under other legislation or political agreements, i.e. State or Territory legislation?*
The ecological community as a whole is not legally protected, although a number of individual threatened species are. Protection of some ecological values is legislated into the Mary Basin Water Resource Plan.

Additional information on distribution

32. *Give locations of sites for proposed management, preferably that have been identified in recovery plans. Are the sites considered to demonstrate those remnants of highest quality/most needing management/most under threat?*
Mary River and Tributaries Rehabilitation Plan has systematically prioritized management and rehabilitation works.

Conservation Advice

33. *Give details of recovery actions that are or could be carried out at the local and regional level. e.g. develop and implement management plan for the control of specific weed species (regional), undertake weeding of known sites (local).*
The water infrastructure plans currently proposed by the Queensland Water Commission for the Mary River will inevitably lead to the decline of this ecological community. These plans are simply in complete defiance of the principles of ecologically sustainable development with respect to maintaining the biodiversity values of the Mary River floodplain. There are no offsets or mitigation strategies which can be applied that could avoid this decline should these plans proceed.

Community Networks

34. *Is there an existing support network for the ecological community that facilitates recovery? e.g. an active landcare group, Conservation Management Network or funding.*
There is a strong public ethos and a long history of integrated catchment management in the catchment. Refer to Mary River Catchment Coordinating Association website for details and history (www.mrccc.org.au).

Survey Methods

35. *Describe methods for identifying the ecological community including when to conduct surveys (e.g. season, time of day, weather conditions); length, intensity and pattern of search effort; and limitations and expert acceptance; recommended methods; survey-effort guide.*
Easily recognizable by the criteria summarized in section 4. Can be broadly recognized and mapped from satellite imagery and aerial photography , although condition needs to be assessed on foot and via canoe. Individuals of large iconic species easily observed and recognized from canoe. Specialist knowledge and techniques (eg electrofishing) needed for intensive quantitative monitoring of individual species.
36. *Give details of the distinctiveness and detectability of the ecological community.*
Unmistakeable and easily recognized, primarily by the physical habitat described in section 9

Other

37. *Are there other aspects relating to the survival of this ecological community that you would like to address?*
Even though some of the individual species are listed and supposedly 'protected' under the EPBC act, the ecological community and ecosystem as a whole is far more than just the collection of species. This particular collection of cohabiting species display some extraordinary adaptations and is geographically confined to just this one part of this river basin. I believe the key to their ongoing survival and rehabilitation is the protection of the riffle/pool/sandbar sequences and the flow processes that support them. The large unique long lived species from this community that are listed under the act are just a 'symptom' of the unique conditions that exist in this river and perhaps nowhere else on Earth. Much more work needs to be done on studying the lower trophic levels, the ecology of the juveniles and the macroinvertebrate fauna to understand why these ancient and unusual genetic lineages have persisted in this ecosystem, and not elsewhere.

Section 4 – References

Notes:

- The opinion of appropriate scientific experts may be cited (with their approval) in support of a nomination. If this is done the names of the experts, their qualifications and full contact details must also be provided in the reference list below.
- Please provide copies of key documentation/references used in the nomination

38. *Reference list*

Brizga & Associates Pty Ltd (2006) Environmental Assessment of Logan/Albert and Mary Catchment Development Scenarios (Technical Advisory Panel Document prepared for SEQ Water Supply Strategy) (Excerpts attached)

Brizga, S.O., Arthington, A.H, Balcombe, S., Condina , P., Connell, M., Connolly, N., Craigie, N.M., Kennard, M., Kenyon, R., Mackay, S. and Schlacher, T. (2005) Mary River Basin Draft Water Resource Plan: Environmental Flow Assessment Framework and Scenario Implications. Report for the Department of Natural Resources and Mines, Queensland.

Brizga, S.O., Arthington, A.H., Condina, P., Connolly, N., Craigie, N.M., Kennard, M.J., Kenyon, R., Loneragan, N.L., Mackay, S.J., Werren, G.L. 2004. Mary Basin Draft Water Resource Plan. Environmental Conditions Report. (Includes Mary River, Burrum River and Beelbi Creek Catchments). Department of Natural Resources and Mines, Brisbane. 2 Volumes.

Brizga, S.O., Craigie, N.M, Condina, P. and Werren, G.L. (2003) Mary catchment: River Process Study. Report for the Department of Natural Resources and Mines, Queensland. S. Brizga & Associates Pty Ltd.

Bunn, S.E. and Arthington, A.H. (2002). Basic principles and consequences of altered hydrological regimes for aquatic biodiversity. Environmental Management 30: 492–507.

Burgess S. J. (2008) Hydrological Analysis of the Flow and Storage Data Presented in the Environmental Impact Statement for the Proposed Traveston Crossing Dam**.** Mary River Catchment Coordinating Committee

BMRG (2005) Country to Coast - a healthy sustainable future. PriorityAction Plan 2.2 Rivercare Theme. Mary and Burrum Basins - Final Reports. Burnett Mary Regional Group

MRCCC (2001) Mary River & Tributaries Rehabilitation Plan. Mary Catchment Coordinating Committee, Gympie. (Excerpts attached)

MRCCC (2008) MRCCC website (background information)**,** **www.mrccc.org.au**

Queensland Water Infrastructure (2007) Traveston Crossing Dam EIS. **www.qldwi.com.au** (Excerpts attached)

39. *Has this document been reviewed and/or have relevant experts been consulted? If so, indicate by whom.*

Not reviewed yet. Consulted with local experts in preparations–
Eve Ford- (lungfish and giant barred frog)
Brad Wedlock (MR Cod, instream habitat, aquatic macrophytes)
Glenda Pickersgill (MR Cod, habitat, MR Turtle)
Marilyn Connell (MR Turtle)
Craig Latta (Turtles)
Andrew McDougal (Flows, habitat)
John Cutmore (local fishing knowledge of Obi Obi Creek)
Will send around for comment and forward responses.

Typical fish species list

Native species

Ambasiss agassizii	Olive perchlet
Anguilla Australis	Shortfinned eel
Ang. reinhardtii	Longfinned eel
Arius graeffei	Fork-tailed catfish
Craterocephalus marjoriae	Marjorie's hardyhead
Cra. s. fulvus	Flyspecked hardyhead
Glossamia aprion	Mouth almighty
Gobiomorphus australis	Striped gudgeon
Hyp. Galii	Firetailed gudgeon
Hyp. Klunzingeri	Western carp gudgeon
Lates calcarifer	Barramundi
Leiopotherapon unicolor	Spangled perch
Macquaria novemaculeata	Australian bass
Maccullochella peelii mariensis	Mary River cod
Melanotaenia duboulayi	Duboulay's rainbowfish
Mogurnda adspersa	Purple-spotted gudgeon
Mugil cephalus	Sea mullet
Myxus petardi	Freshwater mullet
Nematalosa erebi	Bony bream
Neoceratodus forsteri	Lungfish
Neosilurus hyrtlii	Hyrtl's tandan
Notesthes robusta	Bullrout
Philypnodon grandiceps	Flathead gudgeon
Philypnodon sp.	A Dwarf flathead gudgeon
Pseudomugil signifer	Southern blue-eye
Retropinna semoni	Australian smelt
Rhadinocentrus ornatus	Softspined sunfish
Tandanus tandanus	Eel-tailed catfish

Translocated native species

Bidyanus bidyanus	Silver perch
Hephaestus fuliginosus	Sooty grunter
Macquaria ambigua	Golden perch

Alien species

Gambusia holbrooki	*Eastern Gambusia*
Xipophorus helleri	*Swordtail*
Poecilia reticulata	*Guppy*

Reach	Length(km)	Current	Future
Mary 4	13	0	0
Mary 5	8	1	1
Mary 6	8	0	0
Mary 7	15	1	1
Mary 8	17	1	0
Mary 9	46	1	0
Mary 10	18	1	0
Mary 11	81	1	1
Mary 12	24	0	0
Obi 4	26	1	0
Yabba 4	10	1	0
Amam 3	11	1	1
Six 2	7	1	1
Six 3	14	1	1
Six 4	18	1	1
Six 5	15	1	1
Deep 3	11	0	0
Gutchy 2	7	0	0
Tinana 2	124	1	1
Tinana 3	14	0	0
Total km	487	410	293

Table 1. Reaches from the Mary River and Tributaries Rehabilitation Plan identified as having suitable pool/riffle/sandbar sequences

White faced snapping turtle *(Elseya albigula)*	Currently being classified Expected to be vulnerable pers. comm.C. Limpus	**Habitat** Main river channel with rocks and logs protruding from the banks or jut from the water. Adults require sparse to dense macrophyte cover, submerged log jams and rock crevices. Riffles provide food source and oxygenate water for all age classes. Suitable sand banks are needed for nesting. Juveniles prefer rocky areas with sand/gravel substrate. **Food** Juveniles feed predominately on aquatic insect larvae and freshwater sponges. As an adult is has predominately an herbivorous diet. **Movement Requirements** Adults have high site fidelity and return to specific sites to nest. Adults stay within 0.5-1.5km of preferred riffle or nesting bank. **Population Characteristics** Surveys indicate low juvenile population **Distribution** Endemic to Mary River, Burnett and Fitzroy catchments.	Cann, J.(1998) *Australian Freshwater Turtles* John Cann/Beaumont Publishing Pty Ltd Farley, S. *Conservation Genetics of the snapping turtle* Tucker, A.D. (ed) (2000) *Cumulative effects of dams and weirs on Freshwater turtles*. EPA Brisbane
Mary River turtle *Elusor macrurus*	Endangered(EPBC)	**Habitat** Main river channel with rocks and logs protruding from the banks or jut from the water. Adults require sparse to dense macrophyte cover, submerged log jams and rock crevices. Riffles provide food source and oxygenate water for all age classes. Suitable sand banks are needed for nesting. Juveniles prefer rocky areas with sand/gravel substrate. **Food** Juveniles feed predominately on aquatic insect larvae and freshwater sponges. As an adult is has predominately an herbivorous diet. **Movement Requirements** Has high site fidelity and females return to specific sites to nest each year. Adults move between 100m to 2km. During flood events they move into gullies. **Population Characteristics** Estimated lifespan of 80 years. Sexual maturity may not be reached until age 15 years Surveys indicate very few juveniles in the population. Populations are thought to have been significantly reduced by predation. **Distribution** Known distribution is main trunk of Mary River between Mary River barrage and confluence of Yabba Creek, extending into Yabba Creek (C. Limpus, pers. comm.). Population is known from Tinana Creek. Existing datasets biased by differences in survey effort. **Other Information** Monotypic species, endemic to Mary River catchment. Described in 1994.	Cann, J.(1998) *Australian Freshwater Turtles* John Cann/Beaumont Publishing Pty Ltd Personal comm. C. Limpus, S. Emerick, M. Connell Flakus, Samatha (2000) *Ontogenetic dietary shifts in an Australian chelid turtle, Elusor macrurus* Tucker, A.D. (ed) (2000) *Cumulative effects of dams and weirs on Freshwater turtles.* EPA Brisbane Van Kampen, T., Emerick, S.P., Parkes, D. (2003) *Increasing survivorship of the Mary River turtle*
Giant barred frog *Mixophyes iteratus*	Endangered(EPBC)	**Habitat** Shallow rocky streams in rainforest, wet sclerophyll forest and farmland between 100 m and 1000 m or, deep, slow moving streams with steep banks in lowland areas. Knowledge gap – long term studies which include non-breeding times required to adequately assess habitat usage **Population Characteristics** Tadpoles are present throughout the year. Individuals may move up to 100m in a night, but not more than 20m from a stream **Distribution** Belli Creek near Eumundi south to Warrimoo mid-east NSW. Has suffered major declines in southern portion of its range. In south east Qld currently known from scattered locations in Mary River catchment,	Hines, H et al (2002) *Recovery Plan for stream frogs of south-east Qld 2001-2005* Qld Environmental Protection Agency

		Maroochy River, Upper Stanley River, Caboolture River, Burpengary Creek and Coomera River. Present in Happy Jack Creek (Traveston Dam pondage area – upper levels of storage will impound part of creek) – MRCCC frog records **Other Information** Chytrid fungus, upstream clearing, changes in water flow regimes, degradation of water quality, feral animals, domestic stock, weed invasion and disturbance to riparian vegetation threaten current population.	
Mary River Cod *Maccullochella peelii mariensis*	Endangered(EPBC)	**Habitat** *General*: occurs in a variety of types of habitat in the Mary River system including the main channel and tributaries. Habitats range from high-gradient rocky upland streams to large, slow-flowing pools in lowland areas. The ideal habitat appears to be deep, shaded, slowflowing pools with sand, mud and/or clay substrates, with intact riparian vegetation and abundant in-stream cover such as woody debris and log-jams, rock ledges and boulders. *Spawning habitat*: structures such as hollow logs located in deeper pools are probably used in the wild *Juvenile habitat*: little information available **Diet** Little information available but other cod species are carnivorous. **Movement Requirements** Has been documented to undertake substantial large-scale movements as well as local movements within the home range. Observed patterns of movement of cod in the Mary River were considered to be unrelated to spawning behaviour, as stream depths were generally too low to allow movement in spring when spawning occurs. Large mature cod did not display increased activity or movement immediately before or after the spawning period. However, local activity of cod was relatively high in late summer, autumn and winter in the lead up to spawning, possibly as a consequence of territorial interactions during selection of nest sites prior to spawning. Individual cod may move long distances during periods of high water flow. Movements tend to be upstream in summer and downstream in autumn. Between periods of movement, cod occupy a restricted home range which they maintain for up to several years. Homing to a former home range following extensive movements has been recorded. The movement patterns of juvenile cod are unknown. **Population Characteristics** Little information on age and growth is available but the Mary River cod is a large-bodied species and is therefore probably long-lived. Sexual maturity probably reached after 4-5years (about 30cm length) and individuals may live as long as 30 years. Little is known on spawning and recruitment patterns in this species. **Distribution** Endemic to the Mary River system. A species of cod (probably very similar to the Mary River cod) was once present in the Brisbane, Logan/Albert and Coomera Rivers, but natural populations are now thought to be extinct. The Mary River cod has since been translocated and stocked widely within these catchments. **Other Information** Mary River cod occupy a high trophic level in the Mary River system. It is therefore likely that they exert a controlling influence over the population size of prey species (particularly decapod crustaceans and other fish species). Restoration of stream habitats to increase their suitability for cod habitation will lead to increased habitat diversity. **Key Threats** Natural populations of the Mary River cod are restricted to only a few tributaries of the Mary River, although re-stocking of cod fingerlings in key parts of the Mary River catchment has been ongoing since 1998. Declines in Mary River cod populations are probably due to a	Simpson, R. (1994). *An investigation into the habitat preferences and the population status of the endangered Mary River cod (*Maccullochella peeli mariensis*) in the Mary River system, south–eastern Queensland*. QDPI Information Series QI94011. Simpson R. & Jackson, P. (1996) *The Mary River Cod Recovery Plan* Qld Dept of Primary Industries, Fisheries Group. Prepared for Australian Nature Conservation Agency Endangered Species Program. Project Number ESP 505. Simpson, R.R. & Mapleston, A.J. (2002). Movements and habitat use by the endangered Australian freshwater Mary River cod, *Maccullochella peelii mariensis*. *Environmental Biology of Fishes* 65: 401–410. Pusey, B.J., Kennard, M.J. & Arthington, A.H. (2004). *Freshwater fishes of northeastern* *Australia*. CSIRO Publishing,

		combination of anthropogenic disturbances including habitat degradation, overfishing, the potentially deleterious effects of alien fish species, together with the effects of flow regime modification and barriers to fish movement caused by weirs and impoundments. The overall distribution and abundance of the Mary River cod has undergone significant declines. The known distribution of extends over only some 170 km of stream length, whereas the presumed historical distribution extended over at least 700 km of stream and river length. The total population of cod from the four main areas of remnant populations is estimated to be less than 1000 individuals. In one important focal area, Tinana and Coondoo Creeks, the distribution extends over approximately 70 km of stream length and contains a population of only about 250 individuals. This sub-catchment also contains Queensland lungfish (Neoceratodus forsteri) and the only known populations of the Critically Endangered Oxleyan pygmy perch (*Nannoperca oxleyana*) in the Mary River basin. There has been a significant reduction in the size of cod in this river system since the early 1900s. Cod weighing 5 – 6 kg are now rare, probably as a result of fishing pressure, altered habitat conditions and habitat loss, or a combination of the two. Reduction/loss of fish passage due to dams and weirs is also believed to have impaired the movement and homing behaviour of the cod and disrupted its access to the most suitable habitats and structural features providing cover and resting sites. The presence of tidal barriers (e.g. in the Mary River and Tinana Creek) may further impact on cod by preventing or hindering recolonisation of freshwaters if displaced by floods to brackish estuarine areas downstream of tidal barrages. Simpson and Jackson (1996) have suggested that habitats currently occupied by remnant cod populations in the Mary River system do not represent optimal cod habitats but are simply refuges where small populations have been able to survive. Historical accounts strongly suggest that large deep pools that once occurred along the main channel of the Mary River were probably important habitats producing very large individuals, before erosion and sedimentation caused infilling and loss of habitat heterogeneity. Remnant populations, habitats likely to support natural populations and restocking sites in the Mary River and its tributaries warrant special and ongoing management, protection and/or restoration, given the rarity of Mary River cod and the considerable efforts recently undertaken as part of the recovery plan for this species. Specific recovery actions should include efforts to minimize the impacts of barriers to movement; appropriately designed fishways should be installed on all newly constructed stream storages in the Mary River catchment. Stream crossings should be constructed to conform to guidelines established by the Department of Primary Industries. Large woody debris should be preserved or enhanced throughout the species range in the Mary River catchment. Riparian regeneration should be promoted in areas where riparian cover has been reduced or removed, to foster the production of woody debris and the consolidated structure of stream banks. Mary River cod may not be able to breed successfully in large impoundments and recruitment in impoundment populations is likely to be very low to judge from evidence for other cod species. Nonetheless, Mary River cod breed successfully in large artificial ponds thus successful spawning and recruitment in large dams may potentially lead to self-sustaining populations provided suitable conditions are provided, especially fallen timber and woody debris as cover and spawning sites. The effects on cod of large-bodied translocated species such as yellowbelly (*Macquaria ambigua*) are unknown; however, this ecologically similar species now occurs in several tributaries and main channel areas of Mary River basin. It is possible that negative biotic interactions (e.g. predation and competition for food and space) may be detrimental to remnant and re-stocked cod populations. **Knowledge gaps** • Precise spawning, movement and dietary requirements and environmental tolerances. • Environmental cues for movement and purpose of movements. • Factors influencing spawning and recruitment success.	

		• Larval and juvenile habitat requirements • Precise environmental flow requirements for all life stages	
Queensland Lungfish *Neoceratodus forsteri*	Vulnerable	**Habitat** *General*: main river channel and major tributaries in slow- flowing and still waters with deep pools and aquatic vegetation. Closely associated with overhanging vegetation, submerged woody debris, undercut banks and dense beds of aquatic vegetation. *Spawning habitat*: Shallow, still-moderately flowing pools and runs with stable water levels and dense beds of aquatic vegetation over sand and gravel substrates. *Juvenile habitat*: similar to that utilised by adults for spawning – a range of substrates (predominately sand and gravel), water depth 500 mm or less, suitable levels of oxygen and dense macrophyte bed which contains complex variety of algae, protozoa, worms, small molluscs and crustaceans. The dense cover allows juveniles to avoid light, evade predators and provides food resources. **Diet** Juveniles and adults have carnivorous diet. **Movement Requirements** Populations in natural riverine habitats are essentially sedentary with strong site fidelity within a restricted area such that home ranges rarely extend beyond one or two adjacent pools. However, substantial large scale movements may be undertaken by individuals as they actively seek out suitable spawning habitat. Fish in dam and weir impoundments have been documented to move out of these artificially ponded areas and upstream into shallow freeflowing reaches to spawn. **Population Characteristics** The lungfish is a slow-growing and very long-lived species. Sexual maturity may not be achieved until at least 15 years of age and individuals may live as long as 60-100 years. Spawning and recruitment may not occur every year and recruitment into the adult population is probably inherently low. **Distribution** Endemic to the Mary and Burnett River systems and possibly the Brisbane River. Translocated to other nearby rivers and dams. **Other Information** Among the largest of Australia's freshwater fish. Probably the world's oldest living vertebrate species. One of five extant representatives of the ancient and once speciose air-breathing Dipnoan (lungfish) lineage. Sole remaining Australian representative of this group and is most morphologically primitive of the extant Dipnoans. Bimodal respiratory system with only the lungfish having true lungs. Low genetic diversity implying potential susceptibility to anthropogenic impacts (e.g. population fragmentation, population declines, translocations). The taking of lungfish has been prohibited since it was declared a protected species under the *Queensland Fish and Oyster Act 1914*, and it was placed on the CITES list in 1977. It is currently protected from fishing, and collection for educational or research purposes requires a permit in *Queensland under the Fisheries Act 1994*, and from the Commonwealth Government. **Key Threats** Substantial loss or reduction in the quality of lungfish breeding and nursery habitat has occurred throughout its natural range in the Burnett and Mary Rivers due to water resource development and associated habitat degradation. Impoundments and riverine areas downstream of dams may not provide suitable habitat for spawning, egg development and juvenile recruitment as sudden fluctuations in water levels in these areas may cause exposure and desiccation of macrophyte beds, eggs and larvae. Dams and weirs cause barriers to lungfish movement and affect ability to locate suitable spawning sites, dispersal of juveniles and exchange of genetic material. Lungfish can have difficulty negotiating fishways/fish locks, high mortality of fish that are washed over spillways during overtopping flows can	Kemp, A. (1986). The biology of the Australian lungfish, *Neoceratodus forsteri* (Krefft 1870). *Journal of Morphology* 1 (Supplement): 181–198. Kemp, A. (1995). Threatened fishes of the world: *Neoceratodus forsteri* (Krefft, 1870) (Neoceratodontidae). *Environmental Biology of Fishes* 43: 310. Frentiu, F.D., Ovenden, J.R. & Street, R. (2001). Australian lungfish (*Neoceratodus forsteri*: Dipnoi) have low genetic variation at allozyme and mitochondrial DNA loci: a conservation alert? *Conservation Genetics* 2: 63–67. Brooks, S.G & Kind, P.K. (2002) *Ecology and demography of the Queensland lungfish (Neoceratodus forsteri) in the Burnett River, Queensland with reference to the impacts of Walla Weir and future water infrastructure development.* Final report May 2004. QO02004. Dept. Primary Industries, Queensland. Agency for Food and Fibre Sciences. Joss, J. (2002). Australian Lungfish, *Neoceratodus forsteri. Fishes of Sahul.* 16: 836–844. Berghuis, A.P. & Broadfoot, C.P. (2004). *Downstream Passage of Fish at Ned Churchward Weir*. DPI Fisheries Report for the Department of State Development. March 2004. 22pp. Berghuis, A.P. & Broadfoot, C.P. (2004). *Upstream Passage of Queensland Lungfish at Ned Churchward Weir Fishlock*. DPI Fisheries Report for the Department of State Development. March 2004. 21pp. Pusey, B.J., Kennard, M.J. & Arthington, A.H. (2004). *Freshwater fishes of north eastern Australia*. CSIRO Publishing, Collingwood.

		occur and rapid drawdowns can lead to stranding of lungfish downstream of weirs. Lungfish are intolerant of saline conditions if washed/move downstream of tidal barrages and are unable to return upstream. **Knowledge gaps** • Precise spawning, movement and dietary requirements and environmental tolerances. • Environmental cues for movement and purpose of movements. • Factors influencing spawning and recruitment success. • Larval and juvenile habitat requirements • Limited information on age and growth • Precise environmental flow requirements for all life stages.	
Vallisneria nana R.Br.	Rare(NCA)	**Habitat** A submerged macrophyte found in a variety of habitats. Does not appear to have any specific water quality requirements. More often associated with variable discharge regimes in the Mary River, as indicated by high coefficient of variation in mean daily discharge (Mackay et al. 2003). However, Blanch et al. (1999) noted the association of *V. americana* with permanently flooded/stable water levels. The growth of *V. americana* has been found to be strongly related to average irradiance in the water column (Blanch et al. 1998). A similar situation may exist for *V. nana* as higher abundances are generally associated with low riparian canopy cover in the Mary River. **Distribution** Found from Sydney to Northern Territory. Widespread in southeast Queensland, particularly in the Mary and Brisbane River catchments, where it often co-occurs with *Myriophyllum verrucosum* on riffles and runs.	Blanch et al. (1998); Blanch et al. (1999); Mackay et al. (2003)

N

1:500000

ISIS
HERVEY BAY
BIGGENDEN
MARYBOROUGH
TIARO
WOOCOO
KILKIVAN
COOLOOLA
NOOSA
MAROOCHY
KILCOY
CALOUNDRA
CABOOLTURE

MU1
MU2
MU3
BROOWEENA
MARYBOROUGH
M14
T4
M13
T3
M12
TIARO
BAUPLE
GU2
GUNDIAH
MIVA
GU1
GUNALDA
WB3
WB2
KILKIVAN
WB1
M11
GYMPIE
D3
W2
G3
GLASTONBURY
G2
T2
D2
T1
D1
SM5
W1
G1
A2
A3
AMAMOOR
SM4
COORAN
SM3
POMONA
SM2
K3
KANDANGA
COOROY
A1
M9
SM1
K2
K1
Y4
Y3
Y2
M8
B2
B1
KENILWORTH
M7
LY2
M6
GH2
GH1
JIMNA
LY1
Y1
M5
O4
CONONDALE
M4
SC1
BO1
SC2
O1
MALENY
O2
O3
M3
M2
M1

SIX MILE CREEK
MILE CREEK
GRAHAMS CREEK
MARY RIVER
MYRTLE CREEK
TWENTY GULLY CREEK
BENARIPE CREEK
SALTWATER CREEK
SUSAN RIVER
BLACKSTUMP CREEK
BOOMPA CREEK
EEL CREEK
LITTLE EEL CREEK
SANDY CREEK
TEEBAR CREEK
TAYLOR CREEK
DRY CREEK
SIPHON CREEK
JOSEPH CREEK
MUNNA CREEK
CALOOLA CREEK
TEMPLER CREEK
SANDY CREEK
RUNNING CREEK
CUT LOG CREEK
OOBARERA CREEK
TIMANA CREEK
LOOGIMA CREEK
SCRUB TURKEY CREEK
YARD CREEK
BIG SANDY CREEK
KANGAN CREEK
BUTCHY CREEK
OAKY CREEK
ULIRRAM CREEK
SANDY CREEK
SCRUBBER CREEK
NATHLE LOG CREEK
COONGOO CREEK
CURRA CREEK
HOCKEY CREEK
POMPUL PEAK CREEK
SERPENTINE CREEK
YAP CREEK
KAN YEMA CREEK
WIDE BAY CREEK
PEPPERMINE CREEK
LITTLE WOOSE CREEK
WOOSE CREEK
AMAMOOR CREEK
KANDANGA CREEK
IMBIL
YABBA CREEK
BELLA CREEK
MIDDLE CREEK
LITTLE YABBA CREEK
MARCH CREEK
OBI OBI CREEK

LEGEND

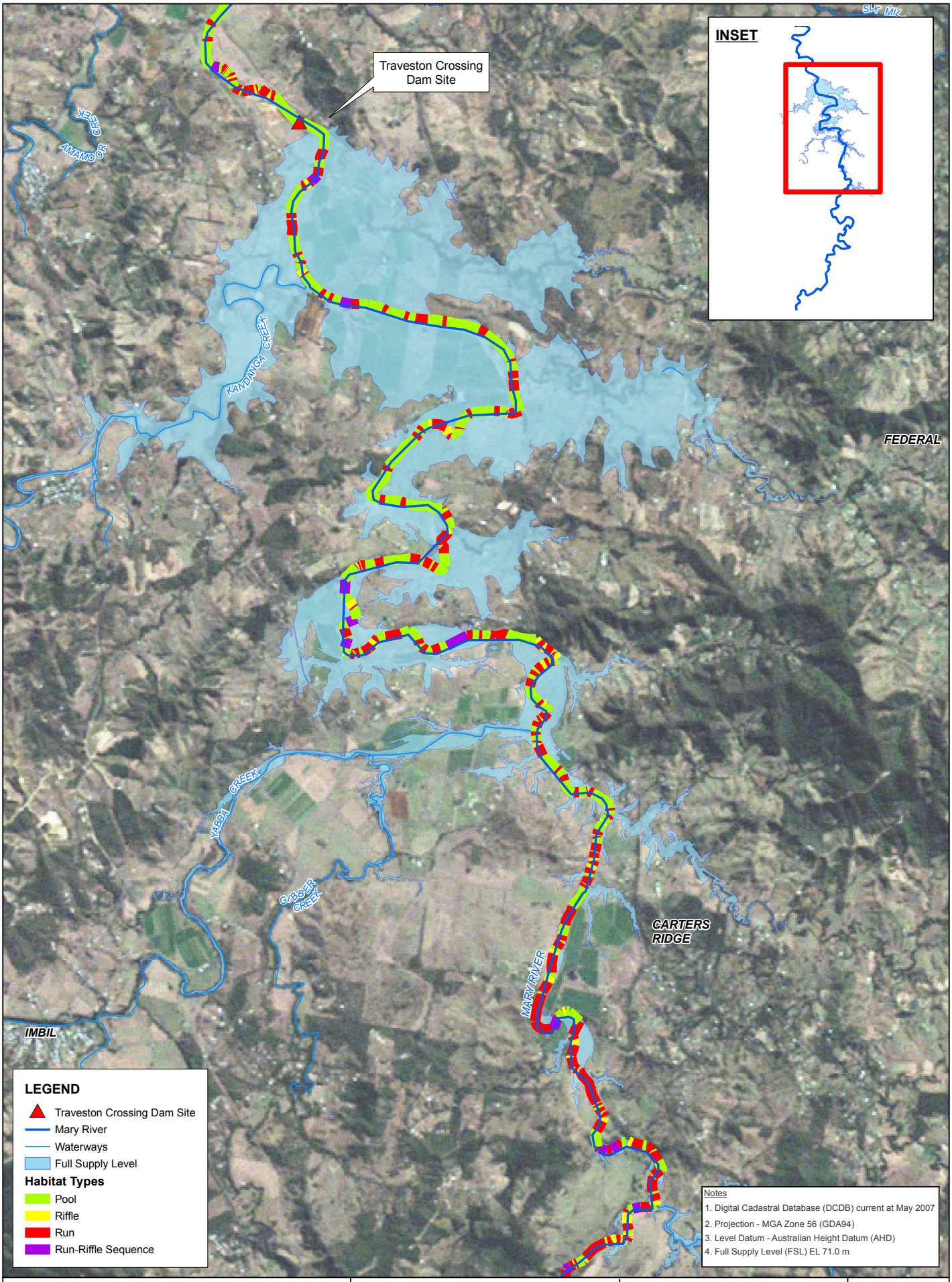
- Project Sampling Sites
- Data Collection Sites (other sources)
- Limits of Geomorphic Reach Types
- Shire Boundary
- Major Dams
- Towns
- Railway
- Highway
- Streams
- Mary River Catchment Boundary

MARY RIVER CATCHMENT COORDINATING COMMITTEE

MARY RIVER CATCHMENT LOCATION

2000

Figure 5.1



QUEENSLAND WATER INFRASTRUCTURE PTY LTD

SKM

FIGURE 8-15

TRAVESTON CROSSING DAM EIS

RUN, RIFFLE AND POOL HABITAT TRAVESTON CROSSING DAM

DRAWING NUMBER

100516

DATE: SEPTEMBER 2007

I:\QENV\Projects\QE06430\Spatial\Arc_MXD\Figures\Final\Final_Print\Figure_8-15_Riffles_FSL.mxd Produced: 11/9/2007. This figure should be read in conjunction with the data disclaimer at the front of this report.

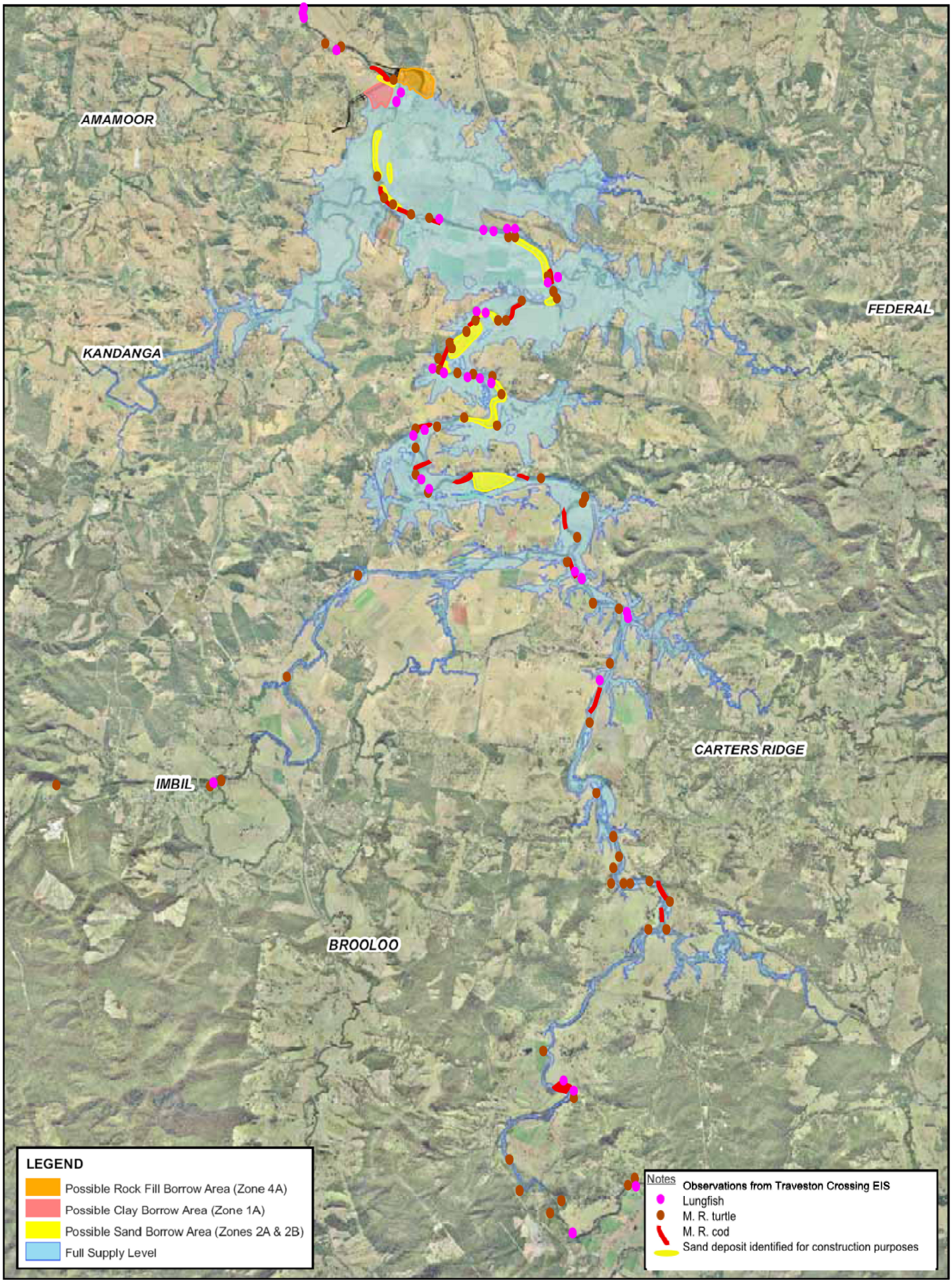


Figure 1. Typical distribution of distinctive fauna species and sand deposits - mid Mary Valley floodplain- Traveston Crossing
Prepared from the EIS for the Traveston Crossing Dam proposal - Queensland Water Infrastructure Pty Ltd 2007.
(Sand deposits illustrated represent those targetted for potential extraction during construction, not all riparian sand deposits in the area)

MARY RIVER & TRIBUTARIES REHABILIATION PLAN

APPENDIX 1

REACH SUMMARY SHEETS

Brian Stockwell
2000

EXPLANATION OF TERMS AND RATINGS

ABBREVIATION, CODE or RATING	MEANING
Parameters Highlighted Green	Indicates relatively intact condition - Good *
Parameters Highlighted Yellow	Indicates relatively minor disturbance *
Parameters Highlighted Pink	Indicates moderate to major disturbance *
Parameters Highlighted Red	Indicates major to severe disturbance *
SIGNAL	Stream biota Index Grade Number - Average Level A measure of water quality based on pollution sensitivity of stream macroinvertebrates - >6 - clean water, 5-6 possible mild pollution, 4-5 probable moderate pollution, <4 probable severe pollution. Where more than one habitat is sampled scores are averaged.
PET Richness	The number of families present from pollution sensitive invertebrate orders. If more than one sample the maximum value is stated.
AusRivAS O/E	An Australian river health score based on biological and physical attributes of streams. O/E is the ratio of observed results over that expected for a similar stream in good condition. When it is 1 or greater it is in good condition.
Macroinvertebrate Richness	The number of different families collected in 10m sample of a habitat. If more than one sample the stated figure is a maximum.
Recovery Potential	The ability of the relevant stream characteristic to naturally recover from disturbance.
P	A measure of stream sinuousity - a ration derived from the overall length of a meander over the straight line distance between the two points of inflection.
Incidence of Erosion (expressed as #/km)	The number of discrete bank erosion events recorded by Doak (1995) regardless of length or degree of disturbance.

* Note: For riparian condition the colours relate to amore specific ranking as set out below:
A **green** rating indicates native vegetation present on the bank and verge with an intact canopy.
A **yellow** rating was given to riparian areas which have an overstorey of native vegetation on the bank and verge but there is some disturbance in the middle or ground layers.
A **pink** rating was given to riparian areas which have major disturbance in the native vegetation such as verge vegetation being removed and leaving only the bank vegetation intact.
A **red** rating was where disturbance has left no native bank or verge vegetation. There can be bare soil, invasion of grasses or weeds.

Reach Name: ***Mary River Witta to Bellthorpe - Confined Steep Headwaters***

Reach Code: ***Mary*** **1**

Reach Description and Boundaries: Dropping quickly from the Blackall Range escarpment the well-vegetated high-energy confined headwaters are bedrock controlled. Small waterfalls and cascades occur along the predominantly boulder and cobble lined channel. Starting near Doyles Rd near Witta and finishing at the Geraghty's Creek confluence on the valley floor above Conondale.

Position In Catchment: Upland - Maleny & Bellthorpe Maps (1:25,000) **AMTD:** 307 - 302 km

STREAM MORPHOLOGY			
Channel planform		Straight Single Channel	
Bed material character		**Geomorphic units**	
Bedrock 15% Boulder 40% Cobble 40% Pebble 5%		**Within Channel** • Bedrock controlled cascade- pools • Series of Glides, Runs and Riffles • Would form rapids in high flow • No LWD **Floodplain -** no floodplain	
Bed Stability - Degradation		Highly stable	
Changes to Hydrologic Regime		Nil	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Minor Disturbance
Good 40% Minor Disturbance 60% Major Disturbance	Intact Condition Stable Stony Beds
Assets/Conservation Status	**Stock Access**
"Of Concern" ecosystem near Geraghty's Ck 100% canopy cover of stream	Light grazing of 60% of waterway Minor disturbance of understorey
Riparian Trajectory: Recovering	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Nil		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to location	
SIGNAL Score	6	**Fish Species Richness**	
Macro-invertebrate Richness	19	Native:	Exotic:
PET Richness	7	**Known Mary River Cod Holes**	Nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 species rare & threatened frog	
On Substrate	Nil	**Bank Overhang**	Nil
In Water Column	Nil	**Canopy Overhang**	100%
Overall In-stream Condition		Very Good	
Flora & Fauna Assets/ Conservation Status		Water Quality, Natural flows, biodiversity of local significance.	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	Very High

Reach Name: ***Mary River Bellthorpe to Kilcoy Creek***
Partly Confined Bedrock - Controlled Discontinuous Floodplain

Reach Code: ***Mary 2***

Reach Description and Boundaries: Mostly confined headwaters that appear to wander between valley margins with limited pockets of floodplain. Relatively straight medium - high stream power reach of Mary River from confluence of Geraghty's Creek to just below Kilcoy Creek confluence. Low sediment supply - throughput phase.

Position In Catchment: Upland - Bellthorpe Map (1:25,000) **AMTD:** 302 - 296 km

STREAM MORPHOLOGY			
Channel planform		Straight	
Bed material character		**Geomorphic units**	
Bedrock 5% Boulder 35% Cobble 35% Pebble 10% Gravel 5% Sand 10%		**Within Channel** • Pool and Riffle sequences • Glides and Runs - 10-30m long • Occasional LWD **Floodplain** Limited Pockets	
Bed Stability - Degradation		Highly stable - degraded at road crossings	
Changes to Hydrologic Regime		Minor abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Occasional Minor Disturbance
Good 50% Minor Disturbance 50% Major Disturbance Cleared of Vegetation	Generally good condition where stabilised by vegetation. In areas of vegetation disturbance bank erosion can occur.
Assets/Conservation Status	**Stock Access**
Good mixed native canopy and regenerating, 80% canopy cover of stream	Minor disturbance, some exclusion fencing
Riparian Trajectory: Recovering	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Nil		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to location	
SIGNAL Score (av. 2 sites)	6.1	**Fish Species Richness**	
Macro-invertebrate Richness	23	Native: 8	Exotic: Nil
PET Richness	11	**Known Mary River Cod Holes**	Nil
AusRivAS O/E	1.13	**Other Species of Significance Present**	
Filamentous Algae Abundance		1 species rare and threatened frog	
On Substrate	Nil	**Bank Overhang**	0 m
In Water Column	Nil	**Canopy Overhang**	70%
Overall In-stream Condition		Good	
Flora & Fauna Assets/ Conservation Status		Water Quality, Frog of local significance	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	Very High

Reach Name: ***Mary River Kilcoy Creek to Conondale***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Mary 3***

Reach Description and Boundaries: Mainly confined reach just downstream of Beausang Bridge to Bedrock control just upstream of Grigor Bridge, running through narrow valley. Low sinuosity section with bends where river hits bedrock at valley margin. Cascades over bedrock controls with rapids, riffles occurring between glides and pools.

Position In Catchment: Upland - Bellthorpe, Conondale Maps (1:25,000) **AMTD:** 296 - 289 km

STREAM MORPHOLOGY			
Channel planform		Moderately sinuous, but erratic (P= 2.1)	
Bed material character		**Geomorphic units**	
Bedrock 25 % Boulders 35% Cobbles 25% Pebble 10% Sand 5 %		**Within Channel** • Bedrock Controlled • Pools, Runs, Riffles, Glides (over bedrock) • Occasional LWD **Floodplain** 75% against valley margin, 25% floodplain	
Bed Stability - Degradation		Stable stony bed with vegetated bars	
Changes to Hydrologic Regime		Limited abstraction for irrigation	
Sand and Gravel Extraction (or resource)		Nil (small sediment slug from Kilcoy Creek)	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Isolated Minor Disturbance
Good 50% Minor Disturbance 40% Major Disturbance 10%	Good condition Mainly stabilised by vegetation Isolated bank erosion
Assets/Conservation Status	**Stock Access**
60-100% canopy cover, good mix of sclerophyll and rainforest communities	Mainly minor disturbance of understorey with some exclusion fencing.
Riparian Trajectory: Recovering	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Slightly elevated turbidity levels after rain.		Native: 3	Exotic:
		Macrophyte Condition	
		Slightly overabundant due to shade loss	
SIGNAL Score	6.1	**Fish Species Richness**	
Macro-invertebrate Richness	13	Native:	Exotic:
PET Richness	7	**Known Mary River Cod Holes**	nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 species rare and threatened frog	
On Substrate	A lot in sunlit areas	**Bank Overhang**	0.5
In Water Column	Moderate in sunlight	**Canopy Overhang**	60%
Overall In-stream Condition		Good	
Flora & Fauna Assets/ Conservation Status		Bedrock, frog habitat – local significance	
In-stream Trajectory	Starting to Degrade	**In-stream Recovery Potential**	V.High

Reach Name: ***Mary River Conondale to Cambroon - Alluvial Meandering Sand Bed***

Reach Code: ***Mary 4***

Reach Description and Boundaries: Sandy over-wide reach commencing at the Conondale township and finishing at beginning of narrow valley at Cambroon. Sediment slugs are obvious with meandering channel through moderately wide floodplain confined by bedrock at valley margin, where river bends occur. Braided low flow channel within high banks that are 2-3 times wider than pre-disturbance condition.

Position In Catchment: Upland - Conondale Map (1:25,000) **AMTD:** 289 - 276 km

STREAM MORPHOLOGY			
Channel planform		Sinuous (P= 1.4)	
Bed material character		**Geomorphic units**	
Bedrock Boulder 5% Cobble 20% Pebble 10% Gravel 5% Sand 60%		**Within Channel** • Mainly pools and runs • Glides but no LWD • Indistinct occasional riffles **Floodplain** Almost Continuous Floodplain (90%) One Historic (1950s) channel avulsion	
Bed Stability - Degradation		Deeply entrenched from historical incision. Almost all shifting sand, substantial evidence of active bed instability	
Changes to Hydrologic Regime		Moderate abstraction for irrigation	
Sand and Gravel Extraction		Extensive past and current activity	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Frequent moderate disturbance
Good 10% Minor Disturbance 30% Major Disturbance 40% No Native Vegatation 20%	Incidence of Bank Erosion- 3.85#/km Evidence of recent bank erosion from channel widening, under mining, scour, slumping and accelerated meander migration.
Assets/Conservation Status	**Stock Access**
Regenerating Pioneers	Evidence of Severe impacts, some exclusion
Riparian Trajectory: Recovering	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Moderate turbidity problem after rain Potential nutrient problem from dairy activity Elevated temperatures due to shade loss		Native: 7	Exotic: Nil
		Macrophyte Condition	
		Good-but over-abundant for upper catchment	
SIGNAL Score	6.1	**Fish Species Richness**	
Macro-invertebrate Richness	19	Native:	Exotic:
PET Richness	10	**Known Mary River Cod Holes**	Nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Little	**Bank Overhang**	Nil
In Water Column	Little	**Canopy Overhang**	0-5%
Overall In-stream Condition:		Moderate	
Flora & Fauna Assets/ Conservation Status		6 potential cod restocking holes (1 restocked)	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Mary River Cambroon - Walli***
Partly Confined Bedrock - Controlled Discontinuous Floodplain

Reach Code: ***Mary 5***

Reach Description and Boundaries: Narrower more confined reach through narrow generally steep sided valley commencing just above Cambroon Bridge and ending above the confluence of Walli Creek. Still over wide in places with point bars are armouring with bedrock controls and scattered large woody debris influencing pool formation. Stream is over-wide except in a remnant channel.

Position In Catchment: Upland - Conondale, Kenilworth Maps (1:25000) **AMTD:** 276 - 268 km

STREAM MORPHOLOGY			
Channel planform		Moderately sinuous (P =1.6)	
Bed material character		**Geomorphic units**	
Boulder Cobble Pebble Gravel 10% Sand 80% Silt 10%		**Within Channel** • Runs and pools with limited riffles • Point bars being armoured with cobble • Bedrock controls approx. 500 m apart **Floodplain** 50-75% confined by valley margins	
Bed Stability - Degradation		Hung tributaries and littoral vegetation high above waterline in the entrenched channel suggest historical and current bed instability Bedrock controls may slow degradation. Point bars are armouring after 1999 flood.	
Changes to Hydrologic Regime		Moderate abstraction for irrigation	
Sand and Gravel Extraction (resources)		Floodplain operation - pressure for more.	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS			
VEGETATION		**BANK STABILITY**	
Condition		**Condition** - Frequent moderate disturbance	
Good 25% Minor Disturbance 35% Major Disturbance 25% No Native Vegetation 15%		Incidence of Bank Erosion: 6.25#/km Frequent bank slumping associated with significantly disturbed and cleared areas Good against valley margin & in remnants	
Assets/Conservation Status		**Stock Access**	
Remnants beside channel above Walli Creek		Frequent stock damage with some exclusion	
Riparian Trajectory	Recovering	**Recovery Potential**	Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Moderate Turbidity problems after rain. Signal score and nitrogen and phosphorous levels have lead to only a moderate water quality ranking by DEH/DNR (1999).		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score	5.1	**Fish Species Richness**	
Macro-invertebrate Richness	24	Native: 15	Exotic: 2
PET Richness	6	**Known Mary River Cod Holes**	1
AusRivAS O/E	1.18	**Other Species of Significance Present**	
Filamentous Algae Abundance		Possibly Mary River Turtle, 1 Rare and Threatened Frog species	
On Substrate	Little	**Bank Overhang**	
In Water Column	Nil	**Canopy Overhang**	15%
Overall In-stream Condition		Moderate Remnant Section before Walli Ck.	
Flora & Fauna Assets/ Conservation Status		Frog and turtle habitat - local significance	
In-stream Trajectory	Stable?	**In-stream Recovery Potential**	High

Reach Name: ***Mary River Walli Creek to Kenilworth - Meandering Sand Bed***

Reach Code: ***Mary 6***

Reach Description and Boundaries: Largely cleared over wide midland river with accelerated meander migration, large eroding outside bends and point bars which are developing and armouring between large runs and glides with occasional riffles and some large scale river restoration. Hung tributaries and bank erosion contribute sediment to system. Starts at Walli Creek confluence and ends at large bedrock control below Beatties Creek. Deposition on bars assists channel to narrow width.

Position In Catchment: Midland - Kenilworth Map (1:25,000) **AMTD:** 268 - 260 km

STREAM MORPHOLOGY			
Channel planform		Meandering of moderate sinuosity (P=1.6)	
Bed material character		**Geomorphic units**	
Bedrock Boulder Cobble 55% Pebble 15% Gravel Sand 30%		**Within Channel** • Mainly runs and glides with pools • Small occasional riffles • LWD common **Floodplain** Almost continuous flood plains, terraced on outside bends, old channels obvious	
Bed Stability - Degradation		Deeply entrenched from historical incision and evidence of significant recent bed instability (2-4m), hung tributaries.	
Changes to Hydrologic Regime		Moderate abstraction for irrigation	
Sand and Gravel Extraction		Significant past and some present activity	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Limited

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Frequent Major Erosion
Good Minor Disturbance 10% Major Disturbance 20% No Native Vegetation 70%	Incidence of Bank Erosion - 5.37#/km Approximately 50% stabilised by vegetation only with the balance actively eroding with 25-50% bare earth. Vertical banks on outside bends, with some regrading elsewhere.
Assets/Conservation Status	**Stock Access**
Nil	60% grazed with limited exclusion fencing.
Riparian Trajectory: Degrading	**Recovery Potential:** Limited

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Moderate turbidity problem after rain. Nutrient from dairy farms may be an issue, particularly down stream of Obi Obi.		Native: Nil	Exotic: Nil
		Macrophyte Condition	
SIGNAL Score	6.2	**Fish Species Richness**	
Macro-invertebrate Richness	15	Native:	Exotic:
PET Richness	5	**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	A lot	**Bank Overhang**	0.2m
In Water Column	Moderate	**Canopy Overhang**	0-5%
Overall In-stream Condition		Degraded	
Flora & Fauna Assets/ Conservation Status		Restoration work	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Mary River Gheerulla - Moy Pocket***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Mary 7***

Reach Description and Boundaries: A highly sinuous section where moderately broad valleys are intercepted by bedrock intrusions causing river to bend. Long deep straight pools are also interrupted by point bars and pebbled riffles, which are a mechanism to reduce channel width. Channel is incised and appears in sediment deficit as a result of current and historic extraction. This style of river commences just below Paulgers Crossing and ends downstream of Walkers Rd Bridge at Moy Pocket.

Position In Catchment: Midland - Gheerulla Creek Map (1:25,000) **AMTD:** 260 - 245 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous with straight reaches (P=1.8)	
Bed material character		**Geomorphic units**	
Bedrock Boulder Cobble 15% Pebble 25% Gravel 10% Sand 45% Silt 5%		**Within Channel** • Incised pools over 500m in length • Short and reconstructed riffles and runs • Sandy point bars and Flood runners • Common to abundant LWD **Floodplain** Large but discontinuous flood plains	
Bed Stability - Degradation		Partly Shifting sand and silt, apparent bed instability with evidence up to 0.9m lowering after removal of controls.	
Changes to Hydrologic Regime		Extensive Abstraction, major dam on upstream tributary.	
Sand and Gravel Extraction		Extensive historic and lesser current activities	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Limited

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Frequent Moderate Disturbance
Good 15% Minor Disturbance 35% Major Disturbance 30% No Native Vegetation 20%	Incidence of Bank Erosion: 4#/km Major outside bend erosion, and slumping of banks common. Up to 25-50% of banks are bare with recent signs of active movement. Massive bank scour from flood runners outfall during extreme events
Assets/Conservation Status	**Stock Access**
15% has good remnant vegetation remnant sections at Pickerings & Walkers Rd Bridges.	Up to 75% shows mod.-severe cattle impact
Riparian Trajectory: Degrading	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Turbidity after rains and silty sediment deposition on substrate out of flow. Nitrogen has been recorded in excess of guidelines.		Native: 3	Exotic: Nil
		Macrophyte Condition	
		Good - mainly at edge in shallow runs	
SIGNAL Score	**5.7**	**Fish Species Richness**	
Macro-invertebrate Richness	**15**	Native: 13	Exotic: 2
PET Richness	**5**	**Known Mary River Cod Holes**	1
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		Mary River Turtle, Qld Lungfish	
On Substrate	Common	**Bank Overhang**	Nil
In Water Column	Common	**Canopy Overhang**	15%
Overall In-stream Condition		Moderate Remnants at two Bridges	
Flora & Fauna Assets/ Conservation Status		25 Potential Cod Holes	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Mary River Moy Pocket to Tuchekoi***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Mary 8***

Reach Description and Boundaries: Low sinuosity, partly clay bank confined reaches with narrow radius of curvature threading through narrow valley. Recent and historic bed instability, with some remnant toe vegetation perched at top of bank. Silty substrate more common with abundant LWD playing a more significant geomorphic role than experienced upstream. Starts one meander downstream of Walkers Bridge and ends upstream of Tuchekoi Bridge.

Position In Catchment: Midland - Kenilworth, Tuchekoi Maps (1:25,000) **AMTD:** 245 - 228 km

STREAM MORPHOLOGY			
Channel planform		Low sinuosity, no meanders	
Bed material character		**Geomorphic units**	
Boulder Cobble 5% Pebble 10% Gravel 25% Sand 50% Silt/Clay 10%		**Within Channel** • Mainly runs • Some gravel and pebble point bars • Abundant LWD forming islands & bars **Floodplain** Discontinuous with elevated terraces	
Bed Stability - Degradation		Historical and recent bed instability but less than upstream	
Changes to Hydrologic Regime		One upstream dam & extensive abstraction	
Sand and Gravel Extraction		Limited historic extraction, no active works	
Channel Trajectory	Recovering	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Frequent Moderate Disturbance
Good 10% **Minor Disturbance 50%** **Major Disturbance 25%** **No Native Vegetation 15%**	Incidence of Bank Erosion: 3.06#/km Massive slumping and undercutting of banks by bed instability and flood disturbance. In second half banks have higher clay content that may confine stream pattern. Bank condition reflects vegetation condition.
Assets/Conservation Status	**Stock Access**
Significant length of only minor disturbance.	Some exclusion with stock damage to 40%.
Riparian Trajectory: Degrading	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Silty material from banks disperses quickly into water causing high turbidity potential if disturbed.		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score	5	**Fish Species Richness**	
Macro-invertebrate Richness	23	Native:	Exotic:
PET Richness	5	**Known Mary River Cod Holes**	1
AusRivAS O/E	1.16	**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Little	**Bank Overhang**	0.6m
In Water Column	None	**Canopy Overhang**	20%
Overall In-stream Condition		Moderate to Good - 10 potential cod holes	
Flora & Fauna Assets/ Conservation Status		LWD & diverse habitats - local significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Mary River Tuchekoi to Gympie - Alluvial Meandering Sand Bed***

Reach Code: ***Mary 9***

Reach Description and Boundaries: Highly sinuous meandering midland river with broad terraced flood plains. Minimally confined by occasional influence of valley margin. Over wide channel severely impacted by major flooding and extensive riparian clearing. High banks are prone to slip circle failures and general slumping are common, outside bend scour. Commences above Tuchekoi Bridge and ends at bedrock control at just above Deep Creek.

Position In Catchment: Midland - Imbil Map (1:50,000) **AMTD:** 228 - 182 km

STREAM MORPHOLOGY			
Channel planform		Highly Sinuous - meandering (P=2.5)	
Bed material character		**Geomorphic units**	
Boulder Cobble 5% Pebble 10% Gravel 10% Sand 60% Silt/Clay 15%		**Within Channel** • Long glides and runs with pools • Occasional riffle space 1-1.5 km apart • Small point bars **Floodplain** Continuous large and terraced	
Bed Stability - Degradation		Deeply entrenched through historical and possibly current bed instability, largely shifting sand	
Changes to Hydrologic Regime		Extensive abstraction, 2 major dams upstream	
Sand and Gravel Extraction		Extensive historic, less currently, some floodplain	
Channel Trajectory	Recovering?	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Frequent Major Disturbance
Good 5% Minor Disturbance 35% Major Disturbance 25% No Native Vegetation 35%	Incidence of Bank Erosion: 3.34#/km Extensively degraded and extremely poor condition for the most part. Good remnant vegetation is insufficient to control processes in some instances.
Assets/Conservation Status	**Stock Access**
Remnant rainforest at the Dawn is of Catchment conservation significance	Extensive sever stock damage but increasing exclusion fencing
Riparian Trajectory: Recovering?	**Recovery Potential:** Minimal

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Major problem with turbidity exceeding ANZECC guidelines. With quality in terms of phosphorous and nitrogen considered poor		Native: 1	Exotic:
		Macrophyte Condition	
		Degraded species diversity	
SIGNAL Score	4.3	**Fish Species Richness**	
Macro-invertebrate Richness	14	Native: 10	Exotic: 2
PET Richness	3	**Known Mary River Cod Holes**	11
AusRivAS O/E	0.6	**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Common	**Bank Overhang**	
In Water Column	Common	**Canopy Overhang**	0-15%
Overall In-stream Condition		Degraded Remnant Section at The Dawn	
Flora & Fauna Assets/ Conservation Status		Cod Holes but in need of restoration	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Minimal

Reach Name: ***Mary River Gympie to Glastonbury Creek***
Partly Confined Bedrock - Controlled Discontinuous Floodplain

Reach Code: ***Mary 10***

Reach Description and Boundaries: The river straightens and narrows as it flows through the narrower undulating valley from Gympie south to Fisherman's Pocket, just above Bell's Bridge. Massive slumping and slip circle failures occur on stream banks formed on alluvium. The valley constricts flood flows at Fisherman' Pocket accentuating flood peaks at Gympie.

Position In Catchment: Midland - Gympie Map (1:50,000) **AMTD:** 182 - 164 km

STREAM MORPHOLOGY			
Channel planform		Straight and confined for 60% of length	
Bed material character		**Geomorphic units**	
Boulder 5% Cobble 10% Pebble 15% Gravel 20% Sand 45% Silt/Clay 5%		**Within Channel** • Mainly runs and deep glides • Occasional sandy point bars • No LWD for most of length **Floodplain** Large but discontinuous flood plains generally only on one side of river	
Bed Stability - Degradation		Deeply entrenched from historical incision. Bed lowering (1m) evident over last 25yrs, sand slug moving through lower sections	
Changes to Hydrologic Regime		3 Major tributary dams upstream, plus weir at Gympie, extensive abstraction & regulation	
Sand and Gravel Extraction		Historic extraction, none at present	
Channel Trajectory	Recovering?	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS			
VEGETATION		**BANK STABILITY**	
Condition		**Condition** - Frequent Major Disturbance	
Good 5% Minor Disturbance 50% Major Disturbance 25% No Native Vegetation 20% (Significant woody/viny weed problems)		Incidence of Bank Erosion: 3.28#/km Frequent extreme bank erosion with high banks. Rapid draw down after flood, in association with poor cover, leads to toe collapse and rotational bank movement,	
Assets/Conservation Status		**Stock Access**	
Fishermans Pocket State Forest area		20-40% grazed with mod. To severe impact	
Riparian Trajectory: Degrading		**Recovery Potential:** Limited - good downstream	

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Large nutrient inflow from Gympie urban area. Massive turbid flows after storms. Phosphorous & nitrogen levels exceed limits.		Native:	Exotic:
		Macrophyte Condition	
		Excessive macrophytes down stream of STP.	
SIGNAL Score (Reference)	5.5	**Fish Species Richness**	
Macro-invertebrate Richness	21	Native: 16	Exotic: 3
PET Richness (Reference)	7	**Known Mary River Cod Holes**	4
AusRivAS O/E (Reference) ◀	1.19	**Other Species of Significance Present**	
Filamentous Algae Abundance		Mary River Turtle, Lungfish, 2 R&T Frogs	
On Substrate	Lots	**Bank Overhang**	
In Water Column	Moderate	**Canopy Overhang**	5-20%
Overall In-stream Condition		Poor Remnant Section at Fisherman's Pocket	
Flora & Fauna Assets/ Conservation Status		Fisherman's Pocket, Widgee Crossing habitats - Regional Significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Mary River Glastonbury Creek to Tiaro - Alluvial Meandering Sand Bed***

Reach Code: ***Mary 11***

Reach Description and Boundaries: Only minimally confined by the valley margins the highly sinuous river generally meanders with large floodplains on both sides. While mainly degraded, the condition is better than the similar style reach above Gympie. Commencing from where the river leaves the confined valley at Fisherman's pocket and ending at the beginning of the ponded area backed up from the Maryborough tidal barrage.

Position in Catchment: Lowland - Woolooga, Marambuh Maps (1:50 000) **AMTD:** 164 - 83 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous - meandering	
Bed material character		**Geomorphic units**	
Cobble 20% Pebble 20% Gravel 5% Sand 15% Silt/Clay 40%		**Within Channel** • Large sandy/silty pools, glides and runs • Sandy point bars with occasional riffles • Occasional LWD **Floodplain** Extensive nearly continuous on both sides	
Bed Stability - Degradation		Sand Slugs moving through system	
Changes to Hydrologic Regime		3 upstream dams, extensive abstraction	
Sand and Gravel Extraction		Minor Extraction (within sustainable limit)	
Channel Trajectory	Recovering	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Frequent Major Disturbance
Good 5% Minor Disturbance 75% Major Disturbance 10% No Native Vegetation 10%	Incidence of Bank Erosion: 2.77#/km Bank slumping less frequent than upstream but erosion is more frequently severe. Accelerated meander migration. Slumping, rotational movement and regressive erosion.
Assets/Conservation Status	**Stock Access**
'Of Concern' Regional ecosystems below confluence of Wide Bay Creek, and between Coramera and Gutchy Creeks. .	Extensive but mainly minor disturbance with few exclusion fences compared to upstream.
Riparian Trajectory: Recovering?	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Brackish major tributaries can lead to salinity problems in dry times. Turbidity after storm events. E-coli and nutrients v. high in parts.		Native:	Exotic:
		Macrophyte Condition	
		Large good quality macrophyte beds occur	
SIGNAL Score	4.3	**Fish Species Richness**	
Macro-invertebrate Richness	21	Native: 13	Exotic: 1
PET Richness	1- 5	**Known Mary River Cod Holes**	1
AusRivAS O/E	0.63	**Other Species of Significance Present**	
Filamentous Algae Abundance		Mary River Turtle Breeding, Qld Lungfish	
On Substrate		**Bank Overhang**	
In Water Column		**Canopy Overhang**	5%
Overall In-stream Condition		Moderate Remnant section in lower part	
Flora & Fauna Assets/ Conservation Status		Turtle habitat - regional significance, 46 Potential Cod Holes	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Mary River Ponded Area Tiaro to Barage - Impounded***

Reach Code: ***Mary 12***

Reach Description and Boundaries: From 3km upstream of Tiaro to the Tidal barrage flow is reduced and water level increased reducing variability of a range of riverine characteristics. Stored water levels lead to wetting of dispersive soils horizons in places and reducing toe stability, sometimes in association with tunnel erosion, this is leading to current bank retreat.

Position In Catchment: Lowland - Maryborough Map (1:50,000) **AMTD:** 83 - 59 km

STREAM MORPHOLOGY			
Channel planform		Ponded areas	
Bed material character		**Geomorphic units**	
Pebble Gravel 20% Sand 40% Silt/Clay 40%		**Within Channel** • Pool **Floodplain** Discontinuous floodplain	
Bed Stability - Degradation		Possibly degrading through sedimentation behind barrage	
Changes to Hydrologic Regime		Impounded and water diverted for irrigation including into Tinana Creek Catchment	
Sand and Gravel Extraction		Minor Extraction (within sustainable limit)	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Constrained

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Common Minor to moderate Erosion
Good 10% Minor Disturbance 65% Major Disturbance 20% No Native Vegetation 5%	Incidence of Bank Erosion: 2.25#/km Generally banks are in good - moderate condition, but small reduction in vegetation cover appears to increase erosion potential
Assets/Conservation Status	**Stock Access**
"Of Concern" Ecosystems opposite (& along) Myrtle Creek and Benarige Creeks.	Limited exclusion fencing, moderate impact.
Riparian Trajectory: Recovering?	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Anecdotal evidence that increased seasonal summer turbidity leading to reduce fish abundance. Quality in terms of phosphorous and nitrogen is only moderate.		Native:	Exotic:
		Macrophyte Condition	
		Hyacynth, *Salvinia* and possibly *Cabomba* are problem aquatic weeds in this locality	
SIGNAL Score	<5	**Fish Species Richness**	
Macro-invertebrate Richness		Native:	Exotic: 3
PET Richness		**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate		**Bank Overhang**	
In Water Column		**Canopy Overhang**	5%
Overall In-stream Condition		Poor	
Flora & Fauna Assets/ Conservation Status		Mary River Turtle habitat of regional significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Constrained

Reach Name: ***Mary River Barrage to Estuarine Inlet - Tidal***

Reach Code: ***Mary 13***

Reach Description and Boundaries: Immediately downstream of the barrage the river is tidal and impoundment construction is thought to have increased tidal amplification leading to increased wetting and drying of banks. Long stretches of river in broad meanders are flanked by continuous floodplains. Mangroves are the dominant toe species and mud predominate.

Position In Catchment: Lowland - Maryborough, Pialba Maps (1:50000) **AMTD:** 59 - 22 km

STREAM MORPHOLOGY			
Channel planform		Large meanders with long straight reaches	
Bed material character		**Geomorphic units**	
Some sand Predominantly silt, clay and estuarine mud.		**Within Channel** Tidal runs and glides Mudflats **Floodplain** Extensive continuous on both sides of river	
Bed Stability - Degradation		Stable (possible sediment deficit from barrage?)	
Changes to Hydrologic Regime		Maximum limit of tidal influence has been reduced due to barrage construction. Extensive abstraction upstream and diversion– no environmental flow strategy.	
Sand and Gravel Extraction		Historic and Current major extraction	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Major Disturbance
Good **& Minor Impact 70%** **Major Impact 30%** **& No Native Vegetation** (Johnson 1997) Luceana, legumes and other escaped production plants can infest riparian zone.	Initially massive bank slumping, possibly linked to increased tidal amplitude. Scour with large *Eucalyptus* during flood events occurs in areas where understorey is poor. Loss of mangroves and *Hibiscus tilaceous* at toe also can lead to slumping. Normal meander migration occurs.
Assets/Conservation Status	**Stock Access**
Mangroves important to fishery/wader birds.	Mainly Cane land, urban and rural residential
Riparian Trajectory: Stable	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Minor dissolved oxygen problems have been identified near Tinana Creek confluence. Turbidity is an issue throughout the reach. Elevated phosphorous and excessive nitrogen near Saltwater Creek confluence.		Native:	Exotic:
		Macrophyte Condition	
		Sea grasses known to be impacted by sedimentation	
SIGNAL Score	N/a	**Fish Species Richness**	
Macro-invertebrate Richness	N/a	Native:	Exotic:
AusRivAS O/E	N/a	**Other Species of Significance Present**	
Canopy Overhang: 5%			
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Mangroves and sea grass - local significance	
In-stream Trajectory		**In-stream Recovery Potential**	Moderate

Reach Name: ***Mary River Saltwater Creek to River Heads - Estuary***

Reach Code: ***Mary 14***

Reach Description and Boundaries: The estuarine inlet that empties the Mary and Susan Rivers into Hervey Bay at River Heads. Contains wetlands and wader bird habitat of national and international significance. Large mangrove wetlands and sea grass beds and islands formed in channel. Generally good riparian vegetation and reach conditions.

Position In Catchment: Lowland - Pialba Map (1:50,000) **AMTD:** 22 - 0 km

STREAM MORPHOLOGY			
Channel planform		Estuary	
Bed material character		**Geomorphic units**	
Some sand Predominantly silts, clays and estuarine mud		**Within Channel** • Estuarine inlet • In channel islands • Flats and wetlands **Floodplain** Continuous extensive flood plains	
Bed Stability - Degradation		Stable	
Changes to Hydrologic Regime		Upstream regulation may impact, well flushed	
Sand and Gravel Extraction		Moderate extraction	
Channel Trajectory	Stable	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Occasional Minor Disturbance
Good **Minor Impacts**	No significant degradation, disturbance largely related to vegetation disturbance.
Assets/Conservation Status	**Stock Access**
Mangrove communities of national significance. "Of Concern" ecosystem near Saltwater Creek.	Minor damage where grazing occurs, no known exclusion fencing
Riparian Trajectory: Stable	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Sedimentation following flood events known to impact sea grass and dugong populations.		Native:	Exotic:
		Macrophyte Condition	
		Sea grass beds moderately impacted	
SIGNAL Score		**Fish Species Richness**	
Macro-invertebrate Richness		Native:	Exotic:
PET Richness		**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		RAMSAR Migratory Bird site	
On Substrate		**Bank Overhang**	
In Water Column		**Canopy Overhang**	5 %
Overall In-stream Condition		Good	
Flora & Fauna Assets/ Conservation Status		Mangrove Wetlands, Seagrasses, Bird habitat - National Conservation Significance.	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	Moderate

Reach Name: ***Kilcoy Creek/Flagstone Creek - Confined Steep Headwater***

Reach Code: ***Kilcoy 1***

Reach Description and Boundaries: Commencing as an high energy intact rainforest stream in the Conondale Ranges the creek drops through gorges and waterfalls to a lower gradient stream prior to entering the Mary River at the end of *Mary 2*. Cattle disturb the understorey of luxuriant riparian vegetation with cascades and boulders dominating the channel.

Position In Catchment: Upland - Bellthorpe Map (1:25,000) **AMTD:** entire length

STREAM MORPHOLOGY			
Channel planform		Mainly straight following valley margin	
Bed material character		**Geomorphic units**	
Bedrock 20% Boulder 30% Cobble 25% Pebble 15% Gravel 10%		**Within Channel** • Waterfalls in upper reaches • Occasional cascades over bedrock (10%), with small backwater pools • Abundant rapids and riffles (60%) • LWD over 10% of reach **Floodplain -** nil	
Bed Stability - Degradation		Stabilised by bedrock and boulders	
Changes to Hydrologic Regime		Minor abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Minor Disturbance
Good 50% Minor Impact 50% Major Impact No Native Vegetation	Steeper section stabilised by bedrock with lower gradients stabilised mostly by rock and vegetation (90%). Good condition for the vast majority of stream.
Assets/Conservation Status	**Stock Access**
Suite of vegetation and frog species of conservation significance, "Of Concern" ecosystem in headwaters	Lower gradient section cause minor disturbance
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Nil		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to location	
SIGNAL Score		**Fish Species Richness**	
Macro-invertebrate Richness		Native: 9	Exotic: 2
PET Richness		**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		3 species rare and threatened frog and lobster	
On Substrate	Minimal	**Bank Overhang**	20% undercut
In Water Column	Nil	**Canopy Overhang**	80%
Overall In-stream Condition		Very good	
Flora & Fauna Assets/ Conservation Status		Water quality, biodiversity - regional significance	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	Very High

Reach Name: ***Boloumba Creek Catchment - Confined Steep Headwater***

Reach Code: ***Bool 1***

Reach Description and Boundaries: Dropping from Peters and Bundaroo Creeks in the Conondale National Park, flowing through scientific area in the State Forest and a small amount of private land before entering Little Yabba Creek. Bedrock constraints lead to waterfalls and gorges in the upper reaches, giving way to cobble lined channels lower down.

Position In Catchment: Upland - Conondale Map (1:25,000) **AMTD:** entire length

STREAM MORPHOLOGY			
Channel planform		Low sinuosity manly straight	
Bed material character		**Geomorphic units**	
Bedrock 5% Boulder 10% Cobble 35% Pebble 20% Gravel 15% Sand 10% Silt/Clay 5%		**Within Channel** • Waterfalls and cascades (15%) • Rapids and Riffles (60%) • Runs and Glides (15% • Pools (10%) **Floodplain** Nil	
Bed Stability - Degradation		Stable stony beds with well vegetated bars	
Changes to Hydrologic Regime		Nil	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Minor Disturbance
Good 100% **Minor Impact**	Banks stabilised by rock and vegetation in places where bedrock does not form bank. Only disturbance occurs at road and track crossings where bank is regraded.
Assets/Conservation Status	**Stock Access**
All of Regional Conservation Significance "Endangered and Of Concern" Ecosystems.	Minor, if any
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Some turbidity increases with rainfall were recorded ie ambient 1 NTU, max. 10 NTU, road crossings may be responsible. Cyanide tailings dam remained uncapped for several years which may have impacted stream.		Native: 3	Exotic: Nil
		Macrophyte Condition	
		Uncommon assemblage of significance	
SIGNAL Score	6	**Fish Species Richness**	
Macro-invertebrate Richness	31	Native: 13	Exotic: 1
PET Richness	11	**Known Mary River Cod Holes**	0
AusRivAS O/E	0.79	**Other Species of Significance Present**	
Filamentous Algae Abundance		5 Rare & Threatened Frog species, Rare Conondale Lobster and Yabby.	
On Substrate	Nil	**Bank Overhang**	
In Water Column	Nil	**Canopy Overhang**	45%
Overall In-stream Condition		Very Good	
Flora & Fauna Assets/ Conservation Status		Suite of Aspects of Regional Significance	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	Very High

UPPER CATCHMENT HEADWATER REACHES

REACHES NOT SAMPLED DUE TO DIFFICULT ACCESS

Booloumba Creek 1 **provides a suitable reference reach description for these reaches**

REACH NAME	REACH CODE
Little Yabba Creek - Confined Steep Headwaters (includes a less confined tableland section, which has different slope and characteristics)	*Lit Yab 1*
Scrubby Creek Confined Steep Headwaters (entire length)	*Scrub 1*
Geraghty's Creek Confined Steep Headwaters (entire length)	*Gera 1*
Elaman Creek Confined Steep Headwaters	*Elam 1*
Yabba Creek – Confined Steep Headwaters (includes a less confined tableland section, which has different slope and characteristics)	*Yabba 1*
Gheerulla Creek Confined Steep Headwaters	*Gheer 1*
Belli and Cedar Creeks Confined Steep Headwaters	*Belli 1*
Kandanga Creek Confined Steep Headwaters	*Kand 1*
Amamoor Creek Confined Steep Headwaters	*Amam 1*

Reach Name: ***Little Yabba Creek***
Partly Confined Bedrock - Controlled Discontinuous Floodplain

Reach Code: ***Lit Yab 2***

Reach Description and Boundaries: Subsequent to its steep decent the creek winds down to its confluence with the Mary at *Mary 5* reach. In places the substrate is more sandy, and at times silty, than would be expected, possibly resulting from historic and ongoing logging. The moderately sinuous creek is confined by a narrow valley with pockets of floodplain.

Position In Catchment: Upland - Conondale Map (1:25,000) **AMTD:** 18 - 0 km

STREAM MORPHOLOGY			
Channel planform		Moderately sinuous following valley margins	
Bed material character		**Geomorphic units**	
Boulder 5% Cobble 25% Pebble 30% Gravel 20% Sand 15% Silt/Clay 5%		**Within Channel** • Large pools and glides • Occasional riffles on bends • Abundant LWD playing a geomorphic role **Floodplain** Small pockets of floodplain	
Bed Stability - Degradation		Mainly Stable stony bed with shifting sand. Head cut moving up from Mary.	
Changes to Hydrologic Regime		Minor abstraction for campers, irrigation	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Isolated Minor Disturbance
Good 70% **Minor Disturbance 30%**	Banks generally stabilised by good vegetation. No disturbance of significance noted. Forestry tracks and roads impact at road crossings.
Assets/Conservation Status	**Stock Access**
Pockets of "Endangered" Ecosystems Regional Recreational and Educational node	Feral deer in catchment, no exclusion fences.
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
No problems recorded. Sediment plume during kick sampling suggests entrainment of sediments from forestry needs monitoring.		Native: 8	Exotic: Nil
		Macrophyte Condition	
		Excellent beds in low velocity areas	
SIGNAL Score	**6.3**	**Fish Species Richness**	
Macro-invertebrate Richness	**12**	Native: 15	Exotic: 2
PET Richness	**3**	**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		3 Rare and Threatened Frog species	
On Substrate	Little	**Bank Overhang**	0
In Water Column	Nil	**Canopy Overhang**	15%
Overall In-stream Condition		Moderate - Good	
Flora & Fauna Assets/ Conservation Status		Local significance including frogs & LWD	
In-stream Trajectory		**In-stream Recovery Potential**	

Reach Name: ***Obi Obi Creek Headwaters to Maleny Weir***
Alluvial Low sinuosity and channelised fill

Reach Code: ***Obi 1***

Reach Description and Boundaries: Includes two river styles. The lower order streams in the Obi Obi headwaters around Witta are steep, but quickly reduce in gradient as the creek flows through the basalt derived soils of the Maleny Plateau. The low sinuosity, which is a feature of this reach that ends in Maleny, is possibly due clay content of the confining banks elements, lower order tributaries in this reach show features of Channelised Fill and Chain of Bonds geomorphology.

Position In Catchment: Upland - Maleny map (1:25,000) **AMTD:** 58 - 51 km

STREAM MORPHOLOGY			
Channel planform		Low sinuosity	
Bed material character		**Geomorphic units**	
Bedrock 25% Boulder 5% Cobble 25% Pebble 15% Gravel Sand Silt/Clay 30%		**Within Channel** • Cobbled Riffles • Runs and Glides • Occasional Pools **Floodplain** Pockets of floodplain occur after headwaters	
Bed Stability - Degradation		Incised due to increased stream power, resulting from catchment & LWD clearance	
Changes to Hydrologic Regime		Moderate abstraction for irrigation and town	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Minor Disturbance
Good 5% Minor Impact Major Impact 30% No Native Vegetation 65% (Above Excludes headwaters)	In upper headwaters bedrock and boulder and cobble stabilise stream. Banks in the lower gradient sections of the reach are largely (60-80%) stable due to clay content.
Assets/Conservation Status	**Stock Access**
Good remnants left are critical remnants, swampy Chain of Ponds type features	Increasing amount of exclusion fencing
Riparian Trajectory: Degrading	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
No recorded problems		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score	5	**Fish Species Richness**	
Macro-invertebrate Richness	25	Native:	Exotic:
PET Richness	7	**Known Mary River Cod Holes**	Nil
AusRivAS O/E	1.05	**Other Species of Significance Present**	
Filamentous Algae Abundance		1 Rare and Threatened Frog Species and Yabby	
On Substrate	Moderate	**Bank Overhang**	
In Water Column	Nil	**Canopy Overhang**	75%
Overall In-stream Condition		Good to Moderate	
Flora & Fauna Assets/ Conservation Status		Local Significance - Frogs and Yabby.	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Obi Obi Maleny Weir to Gardners Falls***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Obi 2***

Reach Description and Boundaries: Highly sinuous reach as stream deflects off valley margins. Urbanised reach is degraded but actively being rehabilitated ending in better quality remnant habitat at Gardner's Falls National Park where the reach ends.

Position in Catchment: Upland - Maleny Map (1:25,000) **AMTD:** 51 - 46 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous with narrow radius of curvature	
Bed material character		**Geomorphic units**	
Bedrock 25% Boulder 15% Cobble 15% Pebble 10% Gravel 10% Sand 10% Silt/Clay 15%		**Within Channel** • Glides and Runs • Occasional pools • Riffles increasing with slope • Ends in bedrock chute **Floodplain** Discontinuous pockets of floodplain.	
Bed Stability - Degradation		Stable, no known degradation	
Changes to Hydrologic Regime		Irrigation and town water abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Common Minor Disturbance
Good 5% Minor Disturbance Major Disturbance 60% No Native Vegetation 35%	Due to clay content banks generally in good condition, with disturbance due to riparian clearing generally minor in comparison to elsewhere in catchment.
Assets/Conservation Status	**Stock Access**
Gardner's Falls NP (straddles Obi 2 & Obi 3)	Mostly rural residential, some stock excluded
Riparian Trajectory: Recovering	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
In early 90s Consistently High N and P readings, likely to be from dairies. This problem, however, is being addressed.		Native:	Exotic:
		Macrophyte Condition	
		Dense macrophyte in open canopy areas	
SIGNAL Score	5.05	**Fish Species Richness**	
Macro-invertebrate Richness	21	Native:	Exotic:
PET Richness	7	**Known Mary River Cod Holes**	0
AusRivAS O/E	1.06	**Other Species of Significance Present**	
Filamentous Algae Abundance		Yabby, 1 rare and threatened Frog Species	
On Substrate		**Bank Overhang**	
In Water Column		**Canopy Overhang**	40%
Overall In-stream Condition		Good - Moderate	
Flora & Fauna Assets/ Conservation Status		Water quality, current restoration activities	
In-stream Trajectory	Recovering	**In-stream Recovery Potential**	High

Reach Name: ***Obi Obi Gardners Falls - Baroon Pocket Gorge - Confined Gorge***

Reach Code: ***Obi 3***

Reach Description and Boundaries: Steep confined section of creek dropping circuitously down 180m to the Baroon Pocket dam through a narrow valley in 13 km. "The Narrows" the continuation of the bedrock gorge below the dam wall has a significant remnant cod population. Boulders and bedrock are a dominant feature of this reach. The major dam alters hydrological conditions significantly.

Position In Catchment: Upland - Maleny Map (1:25,000) **AMTD:** 46 - 26 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous down slope then straight	
Bed material character		**Geomorphic units**	
Bedrock 70% Boulder 30%		**Within Channel** • Waterfalls, cascades and chutes • Pools formed behind confinements • With rapids forming in high flows • Occasional LWD **Floodplain:** Completely absent	
Bed Stability - Degradation		Mostly Stable - in dam highly modified	
Changes to Hydrologic Regime		50,000 ML/an currently licensed out of dam, No specific environmental flow strategy 1ML /day release for downstream irrigators.	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable (except dam)	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Isolated Minor Disturbance
Good 55% Minor Disturbance 10% Major Disturbance 25% No Native Vegatation 15%	The banks are completely stabilised by bedrock as the watercourse scours its way through the mountainside. (Rating disregards dam area, where revegetation is occurring)
Assets/Conservation Status	**Stock Access**
Excellent riparian vegetation along gorge below dam.	Too steep to access
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Potentially cold water release, high in sulfides and low in DO from lower part of dam. Blue Green Algae blooms in dam.		Native: 3	Exotic: Nil
		Macrophyte Condition	
		Sparse in protected areas behind rock	
SIGNAL Score	**5.1**	**Fish Species Richness**	
Macro-invertebrate Richness	**10**	Native:	Exotic:
PET Richness	**2**	**Known Mary River Cod Holes**	1
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		4 Rare & Threatened Frog Species	
On Substrate	Abundant	**Bank Overhang**	Nil
In Water Column	Nil	**Canopy Overhang**	20%
Overall In-stream Condition		V. Good above dam, Degraded below	
Flora & Fauna Assets/ Conservation Status		Cod Holes - National Significance, Geomorphology and frogs of local significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Constrained

Reach Name: ***Obi Obi Creek Kenilworth***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Obi 4***

Reach Description and Boundaries: Starting at the base of the escarpment where the valley widens, and floodplains begin, the reach features relatively sinuous sections followed by straighter alignments where the channel follows the valley margin. The reach joins the Mary at *Mary 6* where significant bed instability threatens to destabilise the Obi Obi.

Position In Sub-Catchment: Lowland - Kenilworth Map (1:25,000) **AMTD:** 26 - 0 km

STREAM MORPHOLOGY			
Channel planform		Irregular in unconfined sections. Avulsions and meander migration/scrolls	
Bed material character		**Geomorphic units**	
Bedrock 5% Boulder Cobble 20% Pebble 25% Gravel 30% Sand 20% Silt/Clay		**Within Channel** • Mainly pools and glides (80%) • Riffles and runs at points of inflection • Bedrock controls • LWD is common **Floodplain** Discontinuous but substantial broad plains	
Bed Stability - Degradation		Altered flow regime appears to have caused instability. Mary R. bed instability threatens	
Changes to Hydrologic Regime		Major abstraction and regulation	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Moderate Disturbance
Good 40% Minor Disturbance 35% Major Disturbance 5% No Native Vegetation 20%	Recent bank slumping and outside bend erosion in unconfined areas, partly resulting from altered flow regime (25-50%). Confined areas are protected by stable bedrock.
Assets/Conservation Status	**Stock Access**
Large "Of Concern" Ecosystem surrounding early stages of reach. Remnants in confined s.	40% either is not grazed or cattle are excluded, 25 % is mod. to severely impacted
Riparian Trajectory: Degrading	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Phosphorous and Nitrogen levels commonly exceed guidelines, probably due to intensive dairying. Remedial action is under way.		Native: 6	Exotic: Nil
		Macrophyte Condition	
		Good diversity and condition in open canopy	
SIGNAL Score	5.9	**Fish Species Richness**	
Macro-invertebrate Richness	15	Native: 10	Exotic: 1
PET Richness	6	**Known Mary River Cod Holes**	Potential
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 rare and threatened frog species	
On Substrate	Common	**Bank Overhang**	0.5
In Water Column	Isolated	**Canopy Overhang**	20- 100%
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		LWD, fish diversity, frog and remnants associated with bedrock of local significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Gheerulla Creek***
Alluvial Low Sinuosity Fine Grained

Reach Code: ***Gheer 2***

Reach Description and Boundaries: Lower order headwater streams drop quickly to a series of pools and palm-fringed wetlands, which are rare within the catchment. Passing out of the State Forest the low sinuosity short stream is extensively cleared through degraded grazing land before entering the shaded pools and runs through Pioneer Park shortly before it joins the Mary at Gheerulla *(Mary 7)*.

Position In Catchment: Midland - Gheerulla Map (1:25,000) **AMTD:** entire length

STREAM MORPHOLOGY			
Channel planform		Low sinuosity	
Bed material character		**Geomorphic units**	
(Lowland) Boulder Cobble 30% Pebble 40% Gravel 20% Sand 10% Silt/Clay		**Within Channel** • Confined low gradient shallow pools - forming wetlands in middle reaches • Pools and runs with small riffles • Abundant LWD on public land **Floodplain** Limited floodplains in mid - to lower reaches	
Bed Stability - Degradation		Stabilised by LWD	
Changes to Hydrologic Regime		Minor abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Moderate Disturbance
Good 60% Minor Disturbance Major Disturbance 10% No Native Vegetation 30%	Banks are stabilised by vegetation and LWD except for privately owned land prior to Pioneer Park where it appears that cattle tracking in dispersive soils has resulted in slumping and erosion.
Assets/Conservation Status	**Stock Access**
'Of concern and endangered' ecosystems	In middle section with severe impact
Riparian Trajectory: Mostly stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Dissolved oxygen was at very low during January and February. Opaque coloration possibly from dispersive soils eroding.		Native: **N**il	Exotic: Nil
		Macrophyte Condition	
		Appropriate to location	
SIGNAL Score	5.2	**Fish Species Richness**	
Macro-invertebrate Richness	12	Native:	Exotic:
PET Richness	4	**Known Mary River Cod Holes**	Nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 Rare and Threatened Frog Species	
On Substrate	Nil	**Bank Overhang**	0.3
In Water Column	Nil	**Canopy Overhang**	Mainly 100%
Overall In-stream Condition		Good for most part. Clearing impacts lower	
Flora & Fauna Assets/ Conservation Status		LWD, Wetlands Formations, Frog - Local significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Belli Creek and Cedar Creek***
Alluvial Low to Moderate Sinuosity Fine Grained

Reach Code: ***Belli 2***

Reach Description and Boundaries: Commencing below the steep gradient of the headwater and running to the Mary River at Tuchekoi this tributary is confined by generally high clay banks and abundant large woody debris. Changing from low to high sinuosity as it matures the creek enjoys good riparian vegetation and is home to the threatened Giant Barred Frog.

Position In Catchment: Midland - Nambour, Cooroy Maps (1:50,000) **AMTD:** 21 - 0 km

STREAM MORPHOLOGY			
Channel planform		Low to High Sinuosity	
Bed material character		**Geomorphic units**	
Pebble Gravel Sand 50% Silt/Clay 50%		**Within Channel** • Mainly slow moving glides • Abundant LWD with pools backing up behind larger jams • Some pools in side channels **Floodplain** Mainly continuous	
Bed Stability - Degradation		Stabilised by clay and LWD	
Changes to Hydrologic Regime		Minor to moderate abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Occasional Minor Disturbance
Good 50% Minor Disturbance 40% Major Disturbance 10% No Native Vegetation	Mainly stable cohesive banks, with minor disturbance down stream of road crossings. LWD may cause local scour and channel avulsion as normal part of riverine system.
Assets/Conservation Status	**Stock Access**
Large areas of "endangered" ecosystems	Some exclusion fencing, 50% understorey disturbance
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Extremely low dissolved oxygen in late summer, similar to other creeks of this type, but at levels which could kill fish.		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to the location	
SIGNAL Score	**6**	**Fish Species Richness**	
Macro-invertebrate Richness	**8**	Native:	Exotic:
PET Richness	**2**	**Known Mary River Cod Holes**	Nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 Rare and Threatened Frog Species	
On Substrate	Nil	**Bank Overhang**	0.6m
In Water Column	Nil	**Canopy Overhang**	100%
Overall In-stream Condition		Good	
Flora & Fauna Assets/ Conservation Status		LWD and Frog habitat- Regionally important	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Yabba Creek Borumba to Imbil Weir***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Yabba 3***

Reach Description and Boundaries: Immediately below the Borumba Dam to the town weir in Imbil this largely cobble lined reach features some good riparian vegetation but significant alteration to natural flow regimes. Discontinuous floodplains of moderate width occur throughout the highly sinuous reach as the waterway winds back and forth across the moderately wide valley floor.

Position In Catchment: Midland **AMTD:** 31 - 10 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous, impounded behind weir	
Bed material character		**Geomorphic units**	
Boulder 5% Cobble 30% Gravel 40% Fine Gravel 15% Sand 5% Mud 5% (Kennard 2000)		**Within Channel** • Boulder and cobble riffles • Runs and glides • Common LWD **Floodplain** Moderately sized but discontinuous	
Bed Stability - Degradation		Close to dam wall major bed alteration, Sediment deficit and drowned riffles may be issues below dam. Possible sedimentation in town weir pool.	
Changes to Hydrologic Regime		Significant regulation of flow, moderate abstraction for irrigation.	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading?	**Channel Recovery Potential**	Constrained

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Minor Disturbance
Good 40% Minor Disturbance 45% Major Disturbance 5% No Native Vegetation 10%	Banks are generally stabilised by rock and vegetation. Disturbance of understorey vegetation and LWD can result in erosion in the high stream power flood flows.
Assets/Conservation Status	**Stock Access**
Of scenic and recreational value	Mainly unfenced causing minor disturbance.
Riparian Trajectory: Degrading (cats claw)	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Poor quality in terms of nitrogen below dam possibly dairying and in town reach from diffuse urban pollutants.		Native: 3	Exotic: Nil
		Macrophyte Condition	
		Over? Abundant macrophytes in weir pool	
SIGNAL Score		**Fish Species Richness**	
Macro-invertebrate Richness		Native: 13	Exotic: 1
PET Richness		**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		Qld Lungfish and Mary River Turtle	
On Substrate		**Bank Overhang**	
In Water Column		**Canopy Overhang**	30% (Kennard 2000)
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Turtle and Lungfish - Regional Significance	
In-stream Trajectory		**In-stream Recovery Potential**	

Reach Name: ***Yabba Creek Imbil Weir to Mary River***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Yabba 4***

Reach Description and Boundaries: Immediately below the weir the channel moves irregularly broadly across the floodplain with an old meander cut-off resulting in the annabranch at this location. The valley margins constrain the meandering tendency to some extent, but large almost continuous flood plains exist. The variability of flow is reduced as a result of regulation and this may influence system.

Position in Catchment: Midland - Imbil Map (1:25,000) **AMTD:** 10 - 0 km

STREAM MORPHOLOGY			
Channel planform		Irregular - partly confined	
Bed material character		**Geomorphic units**	
Boulder Cobble Pebble 10% Gravel 20% Sand 60% Silt/Clay 10%		**Within Channel** • Mainly runs and glides (60%) • Pebbled riffles occur on bends • Pools are generally small • Common LWD – small in size **Floodplain** Large almost continuous	
Bed Stability - Degradation		Mostly shifting sand and silt, some riffles could be drowned due to regulated flows.	
Changes to Hydrologic Regime		Significant regulation, less variability and increased low flows.	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Constrained

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Moderate Disturbance
Good 40% Minor Disturbance 45% Major Disturbance 5% No Native Vegetation 10%	Mostly stable (60-80%) banks where protected by vegetation. Where vegetation is absent moderate level bank erosion occurs.
Assets/Conservation Status	**Stock Access**
	Results in moderate to severe disturbance
Riparian Trajectory: Degrading	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Diffuse source pollution from unsewered township is thought to elevate nutrient levels, which may be buffered by weir pool plants.		Native: 2	Exotic: Nil
		Macrophyte Condition	
		Reasonable beds for location	
SIGNAL Score	6.4	**Fish Species Richness**	
Macro-invertebrate Richness	13	Native:	Exotic:
PET Richness	6	**Known Mary River Cod Holes**	0
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Moderate	**Bank Overhang**	0.3
In Water Column	Moderate	**Canopy Overhang**	60%
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status			
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Kandanga Creek Forestry to Hygait***
Partly Confined Bedrock - Controlled Discontinuous Floodplain

Reach Code: ***Kand 2***

Reach Description and Boundaries: Commencing from the obvious change of grade at the bottom of the headwaters this reach is mainly confined to a narrow valley. The clay banks and valley margins exert the dominant influence on the morphology of the reach that has good riparian cover in the earlier state forest sections.

Position In Catchment: Upland - Imbil, Manumbar Maps (1:50,000) **AMTD:** 46 - 25 km

STREAM MORPHOLOGY			
Channel planform		Low to moderate sinuosity - deflecting off valley margins	
Bed material character		**Geomorphic units**	
Cobble 20% Gravel 45% Fine Gravel 25% Sand 5% Silt Clay 5% (Kennard 2000)		**Within Channel** • Runs and glides with some deep pools • Occasional to Common LWD • Riffles and rapids in earlier parts **Floodplain** Small pockets within narrow valleys	
Bed Stability- Degradation		Possible sedimentation from hillslopes	
Changes to Hydrologic Regime		Minor abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** Occasional Moderate Disturbance
(Johnson 1997) Good 50% Minor Disturbance Major Disturbance 50% No Native Vegetation	Generally stable although clearing of steep banks and hillslopes above can lead to mass movement.
Assets/Conservation Status	**Stock Access**
Section through State Forest	Lower 50% grazed with severe disturbance
Riparian Trajectory: Degrading	**Recovery Potential:** Very High - Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Nitrogen levels have exceeded guideline values and salinity levels have approached values considered to be brackish. Both may be related to the underlying geology.		Native: 4	Exotic: Nil
		Macrophyte Condition	
		Good	
SIGNAL Score	4.8	**Fish Species Richness**	
Macro-invertebrate Richness	34	Native: 13	Exotic: 0
PET Richness	3	**Known Mary River Cod Holes**	
AusRivAS O/E	1.04	**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate		**Bank Overhang**	
In Water Column		**Canopy Overhang**	70% (Kennard 2000)
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Riparian camping local recreational asset	
In-stream Trajectory	Degrading ?	**In-stream Recovery Potential**	High

Reach Name: ***Kandanga Lowland***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Kand 3***

Reach Description and Boundaries: Commencing at Happy Valley as the stream emerges from the narrow mountain valley the creek beings to meander with only occasional confinement by the valley margin. Almost continuous floodplains with the confining clay content in the banks increasing toward the confluence of the Mary River at *Mary 9* reach. The reach is biologically diverse in the lower parts.

Position in Catchment: Midland - Imbil Map (1: 50,000) **AMTD:** 25 - 0 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous - meandering	
Bed material character		**Geomorphic units**	
Pebble Gravel Sand 50% Clay 50%		**Within Channel** • Runs and glides • Long deep pools • Occasional Riffles • Abundant LWD **Floodplain** Mostly continuous	
Bed Stability- Degradation		Lower mostly stable where LWD is abundant	
Changes to Hydrologic Regime		Moderate abstraction for irrigation and town	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading (upper)	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Common Moderate Disturbance
Good …10% Minor Disturbance 50% Major Disturbance 40% Madeira vine and cat's claw are a problem.	Banks are generally stable with increasing clay content as you head towards the Mary River. Poor riparian cover and grazing practices in the upper parts leads to erosion.
Assets/Conservation Status	**Stock Access**
The good remnants in the lower part and abundant LWD are of local significance.	Upper is poorly fenced with moderate damage, lower has substantial exclusion
Riparian Trajectory: Degrading (weeds)	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Nitrogen, chromium and nickel levels have exceeded ANZECC environmental, Phosphorous levels are also elevated.		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to sampling location	
SIGNAL Score	5.4	**Fish Species Richness**	
Macro-invertebrate Richness	14	Native:	Exotic:
PET Richness	1	**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		2 species rare & threatened frogs	
On Substrate	Nil	**Bank Overhang**	0.6m
In Water Column	Nil	**Canopy Overhang**	100%
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		LWD & frog/fish habitat - local significance	
In-stream Trajectory		**In-stream Recovery Potential**	

Reach Name: ***Amamoor Creek Midland***
Partly Confined Bedrock - Controlled Discontinuous Floodplain

Reach Code: ***Amam 2***

Reach Description and Boundaries: From the base of the steep headwater tributaries this reach winds through a narrow forested valley largely pinned against the valley margin. Hillslope process including landslips may impact the waterway.

Position in Catchment: Midland - Imbil Map (1:50,000) **AMTD:** 37 - 11 km

STREAM MORPHOLOGY			
Channel planform		Sinuous wandering between valley margins	
Bed material character		**Geomorphic units**	
Boulder Cobble 10% Pebble 20% Gravel 30% Sand 20% Silt/Clay 20%		**Within Channel** • Pebble/cobble lined riffles • Small pool linked by series of runs • Point bars armouring after flood • Common LWD **Floodplain** Minimal pockets of floodplain.	
Bed Stability- Degradation		Stable	
Changes to Hydrologic Regime		Not significant - Dam proposal upstream	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Isolated Moderate Disturbance
Good 80% Minor Diturbance 10% Major Disturbance 10% No Native Vegetation	Banks generally good condition. Some rotational movement near road works some deposition from hillslope slips. Some floodplain scour downstream of a culvert.
Assets/Conservation Status	**Stock Access**
Intact Riparian Vegetation- local significance	Limited grazing activities along reach
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Significant turbidity issue after storms measured increase from 5 to 100 NTU in 1km, possibly due to forestry plantation activities, landslip and road works.		Native: 1	Exotic: 0
		Macrophyte Condition	
		Naturally sparse	
SIGNAL Score (Average)	5.1	**Fish Species Richness**	
Macro-invertebrate Richness	21	Native:	Exotic:
PET Richness (max.)	9	**Known Mary River Cod Holes**	
AusRivAS O/E (average)	1.1	**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Nil	**Bank Overhang**	
In Water Column	Nil	**Canopy Overhang**	100%
Overall In-stream Condition		Good	
Flora & Fauna Assets/ Conservation Status		Many potential cod holes - regional recreational asset & conservation significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Very High

Reach Name: ***Amamoor Creek Red Gully to Mary River***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Amam 3***

Reach Description and Boundaries: Lower gradient moderately sinuous section of the creek which is significantly more disturbed than the previous, while retaining some good remnants which are known cod holes. Flowing through a broad valley with almost continuous floodplains

Position In Catchment: Midland - Imbil Map (1,50,000) **AMTD:** 11 - 0 km

STREAM MORPHOLOGY			
Channel planform		Moderately sinuous - meandering	
Bed material character		**Geomorphic units**	
Boulder 5% Cobble 20% Pebble 30% Gravel 10% Sand 15% Silt/Clay 20%		**Within Channel** • Riffles on points of inception • Pebble lined runs • Mainly pools with interconnecting glides • Occasional to common LWD **Floodplain** Almost continuous moderate width	
Bed Stability- Degradation		Unstable stony beds, some evidence of bed incision at Red Gully and deposition of sand and gravel from upstream forestry reach	
Changes to Hydrologic Regime		Moderate abstraction town and irrigation	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading ?	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Common Minor Erosion
Good 10% Minor Disturbance 30% Major Disturbance 55% No Native Vegetation 5%	Approximately 70% is stabilised by rock and vegetation, the other 30% is eroded with patchy bare earth.
Assets/Conservation Status	**Stock Access**
Good remnants when associated with deep pools with snags for Cod.	Moderate to severe damage allowing opening understorey to madeira vine etc.
Riparian Trajectory: Degrading	**Recovery Potential:** Limited

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Turbidity and magnesium problems are known to effect town water supplies. Elevated nitrogen levels have been recorded.		Native: 7	Exotic: 1
		Macrophyte Condition	
		Perhaps over abundant for location with Para grass invading areas where canopy is open.	
SIGNAL Score	6.3	**Fish Species Richness**	
Macro-invertebrate Richness	22	Native:	Exotic:
PET Richness	7	**Known Mary River Cod Holes**	3
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		Numerous potential cod holes	
On Substrate	Abundant (in open)	**Bank Overhang**	0.7 m
In Water Column	Common (in open)	**Canopy Overhang**	100% (in good areas)
Overall In-stream Condition		Moderate - good	
Flora & Fauna Assets/ Conservation Status		Potential/known cod habitat & linking reach	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Six Mile Creek Confined Steep Headwaters to Lake Macdonald Dam Alluvial Low Sinuosity Fine Grained***

Reach Code: ***Six 1***

Reach Description and Boundaries: Six miles creek rocky confined headwaters drop steeply from Mount Cooroy and quickly become a slow moving moderately sinuous clay controlled stream which lacks native vegetation for some distance. Wetland areas beside the creek may suggest the creek at this location has incised since clearing. Its condition improves where good vegetation and LWD has been retained prior to entering the ponded area of Lake MacDonald, Noosa's major water storage.

Position in Catchment: Upland - Cooroy Map (1:25,000) **AMTD:** 68 - 54 km

STREAM MORPHOLOGY			
Channel planform		Straight headwaters then small sinuous bends	
Bed material character		**Geomorphic units**	
Gravel Sand 50% Clay/Silt 50%		**Within Channel** • Mainly glides with some runs • Majority of length is pooled • LWD common in lower half **Floodplain** Pockets of discontinuous floodplain	
Bed Stability - Degradation		Above Cooroy Mtn Rd maybe historically incised chain of ponds, some siltation.	
Changes to Hydrologic Regime		Major regulation and abstraction at Dam. Small environment release but not strategic	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition**
Good 15% Minor Disturbance 35% No Native Vegetation 50%	Cohesive strength of clay banks reduce erosion hazard. Some scouring along cattle tracks and from fluvial action.
Assets/Conservation Status	**Stock Access**
Headwater stream Protected Area, small patches of endangered ecosystem	Stock access minor (where canopy retained) to moderate damage (where cleared).
Riparian Trajectory	**Recovery Potential**

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Low dissolved oxygen during late summer, sediments anaerobic under camphor laurel. Elevated nutrient levels increasing weed growth in Lake Macdonald. High manganese.		Native: 3	Exotic: 1
		Macrophyte Condition	
		Weed problem of state significance in dam.	
SIGNAL Score	6.6	**Fish Species Richness**	
Macro-invertebrate Richness	3-12	Native:	Exotic:
PET Richness	0-3	**Known Mary River Cod Holes**	Historic
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		2 Rare or threatened frog species	
On Substrate	A little	**Bank Overhang**	0.5
In Water Column	Nil	**Canopy Overhang**	0 - 100%
Overall In-stream Condition		Poor immediately below headwaters and ponded area, moderate - good elsewhere	
Flora & Fauna Assets/ Conservation Status		Remnant Vegetation of locality significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Six Mile Creek Lake Macdonald to Pomona - Alluvial Low Sinuosity Fine Grained***

Reach Code: ***Six 2***

Reach Description and Boundaries: Commencing just downstream of Lake Macdonald dam wall after a large weedy pond, this reach runs almost completely through state forest with excellent riparian and floodplain conditions, to just past Louis Bazzo Drive. It has very low sinuosity, being straight for long sections with abundant LWD stabilising the very low gradient channel flowing in a broad valley.

Position In Catchment: Midland - Cooroy Map (1:50,000) **AMTD:** 54 - 47 km

STREAM MORPHOLOGY			
Channel planform		Straight - low sinuosity	
Bed material character		**Geomorphic units**	
Pebble Gravel 5% Sand 85% Clay/Silt 10%		**Within Channel** • Mainly glides and pools • Few riffles • Abundant LWD **Floodplain** Forested relatively broad floodplain	
Bed Stability - Degradation		Stabilised by vegetation and LWD	
Changes to Hydrologic Regime		Major abstraction and regulation upstream	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Minor Disturbance
Good 90% Minor Disturbance 10% Major Disturbance No Native Vegetation	No significant disturbance only patchy bare earth due heavy shade cover.
Assets/Conservation Status	**Stock Access**
Small patches of "Of Concern" Ecosystem, very good public intact remnant	Not generally grazed.
Riparian Trajectory: Stable	**Recovery Potential:** Very High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico –Chemical Problems		**Macrophyte Species Richness**	
Low dissolved oxygen levels as elsewhere throughout Six Mile Creek. Dam release may impact on temperature.		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to location	
SIGNAL Score		**Fish Species Richness**	
Macro-invertebrate Richness		Native:	Exotic:
PET Richness		**Known Mary River Cod Holes**	2
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate		**Bank Overhang**	0.5m
In Water Column		**Canopy Overhang**	95%
Overall In-stream Condition		Very good	
Flora & Fauna Assets/ Conservation Status		Cod habitat of national significance	
In-stream Trajectory		**In-stream Recovery Potential**	

Reach name: ***Six Mile Creek Midland Pomona - Falls Creek - Alluvial Meandering Fine Grained***

Reach Code: ***Six 3***

Reach Description and Boundaries: Commencing just below Louis Bazzo Drive the sinuosity of the creek increases dramatically. As the creek begins to meander, in a broad but still partially confining valley, floodplain width and utilisation increases as does riparian disturbance. Clay content of banks increases.

Position in Catchment: Midland - Cooroy Map (1:50,000) **AMTD:** 47 - 33 km

STREAM MORPHOLOGY			
Channel planform		Meandering - minimally confined	
Bed material character		**Geomorphic units**	
Pebble Gravel 10% Sand 50% Silt/Clay 40%		**Within Channel** • Mainly glides and pools • Occassional billabongs & wetlands • Abundant LWD **Floodplain** Extensive almost continuous flats	
Bed Stability - Degradation		Stable	
Changes to Hydrologic Regime		Moderate within reach irrigation, major upstream abstraction and regulation.	
Sand and Gravel Extraction		Nil	
Channel Trajectory	**Stable**	**Channel Recovery Potential**	Very High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Occasional Minor Disturbance
Good 40% Minor Disturbance 50% Major Disturbance 10% No Native Vegetation	Removal of understorey and trampling by stock can lead to minor bank failure and scour during flow events.
Assets/Conservation Status	**Stock Access**
Intact remnants are of regional significance	Occasional minor disturbance,
Riparian Trajectory: Degrading	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Chronic and some times extremely low dissolved oxygen levels. Quality in terms of nitrogen level is ranked as only moderate.		Native: Nil	Exotic: Nil
		Macrophyte Condition	
		Appropriate to location	
SIGNAL Score	5.7	**Fish Species Richness**	
Macro-invertebrate Richness	19	Native: 7	Exotic: 1
PET Richness	4	**Known Mary River Cod Holes**	2
AusRivAS O/E	0.99	**Other Species of Significance Present**	
Filamentous Algae Abundance		3 Rare and Threatened Frog Species	
On Substrate		**Bank Overhang**	Isolated
In Water Column		**Canopy Overhang**	90%
Overall In-stream Condition		Good to moderate	
Flora & Fauna Assets/ Conservation Status		Cod Habitat of National significance Frog habitat of local significance	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	High

Reach Name: ***Six Mile Creek Lowland, Falls Creek - Woondum Creek***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Six 4***

Reach Description and Boundaries: Falls Creek joins the Six Mile just downstream of Cooran at the beginning of a narrow constriction between Mt Cooran and the Mothar Mountain. From here the creek tends to wander from one side of the valley to the other with the Woondum and Mothar Mountain ranges form the controls. While the valley widens again around Traveston, floodplains tend to be restricted to one side of the creek as it takes a sinuous path to its confluence with the Mary River.

Position In Catchment: Midland - Cooroy, Imbil, Gympie Maps (1:50,000) **AMTD:** 33 - 15 km

STREAM MORPHOLOGY	
Channel planform	Wandering - irregular
Bed material character	**Geomorphic units**
Pebble Gravel 10% Sand 65% Silt/Clay 25%	**Within Channel** • Mainly glides and pools, some riffles • Abundant LWD • Bedrock controls when against valley margin **Floodplain** Broad in places but discontinuous
Bed Stability - Degradation	Stablilised by LWD, but depth of shifting sand suggests sedimentation is occurring
Changes to Hydrologic Regime	Upstream abstraction is moderate in terms of overall subcatchment runoff
Sand and Gravel Extraction	Nil
Channel Trajectory Stable	**Channel Recovery Potential** High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Isolated Minor Disturbance
Good 40% **Minor Disturbance 50%** **Major Disturbance 10%** **No Native Vegetation**	Banks generally stabilised by good riparian vegetation and LWD. Cattle trampling is major cause of minor erosion.
Assets/Conservation Status	**Stock Access**
Small patch of "Of Concern Ecosystem", Good canopy cover for Cod habitat	Extensive cattle access causing minor impact, steep banks tend reduce access and damage.
Riparian Trajectory: Degrading	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Some local heavy metal contamination has been recorded in farm dam, may be linked to dumping or historic dip sites.		Native: 3	Exotic: 1?
		Macrophyte Condition	
		Moderate - in wider pools before confluence	
SIGNAL Score	5.6	**Fish Species Richness**	
Macro-invertebrate Richness	10	Native:	Exotic:
PET Richness	4	**Known Mary River Cod Holes**	2+
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 rare and threatened frog species	
On Substrate Common		**Bank Overhang**	0.6m
In Water Column Isolated		**Canopy Overhang**	25-90%
Overall In-stream Condition		Good to moderate	
Flora & Fauna Assets/ Conservation Status		Cod Habitat of National Significance, Frog habitat of regional significance.	
In-stream Trajectory Degrading		**In-stream Recovery Potential**	High

Reach Name: ***Six Mile Creek Lowland, Woondum Creek - Gympie***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Six 5***

Reach Description and Boundaries: Commencing at the confluence of Woondum Creek this reach while of similar style to the previous becomes progressively more degraded as it winds its way to Gympie. Riparian weed infestations become progressively worse as the creek takes a sinuous path to its confluence with the Mary River. Water quality impacts from urban development are also an issue.

Position In Catchment: Midland - Cooroy, Imbil, Gympie Maps (1:50,000) **AMTD:** 15 - 0 km

STREAM MORPHOLOGY			
Channel planform		Wandering - highly sinuous	
Bed material character		**Geomorphic units**	
Pebble Gravel 10% Sand 65% Silt/Clay 25%		**Within Channel** • Mainly glides and pools, some riffles • Abundant LWD • Bedrock controls when against valley margin **Floodplain** Broad in places but discontinuous	
Bed Stability- Degradation		Stablilised by LWD, but depth of shifting sand suggests sedimentation is occurring	
Changes to Hydrologic Regime		Upstream abstraction is moderate in terms of overall subcatchment runoff	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Minor Disturbance
Good 30% **Minor Disturbance 45%** **Major Disturbance 20%** **No Native Vegetation 5%**	Banks generally stabilised by good riparian vegetation and LWD. Cattle trampling is major cause of minor erosion.
Assets/Conservation Status	**Stock Access**
Good canopy cover for Cod habitat but being invaded by woody and viny weeds	Extensive cattle access causing minor impact, steep banks tend reduce access and damage.
Riparian Trajectory: Degrading	**Recovery Potential:** Moderate - High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Localised nitrogen and phosphorous (& possibly heavy metal) impacts from small STP at Gympie industrial estate.		Native: 3	Exotic: 1?
		Macrophyte Condition	
		Moderate - in wider pools before confluence	
SIGNAL Score	5.6	**Fish Species Richness**	
Macro-invertebrate Richness	10	Native:	Exotic:
PET Richness	4	**Known Mary River Cod Holes**	1+
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Common	**Bank Overhang**	0.6m
In Water Column	Isolated	**Canopy Overhang**	25-90%
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Cod Habitat of National Significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Deep Creek Headwaters Beenham Range to Cedar Pocket Dam***
Confined Steep Headwaters

Reach Code: ***Deep 1***

Reach Description and Boundaries: Steep bedrock confined headwaters drop from the Beenham Range and Mothar Mountain to the narrow valley above Cedar Pocket. The cobble lined stream threads its way through the valley floor from one bedrock constraint to another. Massive landslips in the adjacent hillslopes can impact on the waterway, inputting large volumes of sediment.

Position in catchment: Upland - Wolvi Map (1:50,000) **AMTD:** 34 - 25 km

STREAM MORPHOLOGY			
Channel planform		Straight - wandering	
Bed material character		**Geomorphic units**	
Bedrock 10% Boulder 30% Cobble 50% Pebble 5% Gravel 5% Sand		**Within Channel** • Waterfalls in headwaters and cascades over bedrock constraints • Mainly riffles which would become rapids in high flows, linked by runs and glides. **Floodplain** - Nil	
Bed Stability - Degradation		Stable	
Changes to Hydrologic Regime		Minor abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Moderate Disturbance
Good 10% (escarpments) Minor Disturbance 40% Major Disturbance 20% No Native Vegetation 40%	Banks are generally stabilised by rock and vegetation, where vegetation has been cleared, bank and stream character changes significantly, possibly narrowing.
Assets/Conservation Status	**Stock Access**
Good riparian rainforest and "Of Concern" Ecosystem in steep headwater section.	Common severe disturbance associated with completely cleared sections.
Riparian Trajectory: Degrading	**Recovery Potential:** Moderate

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Cleared sections would raise water temperature and together with agricultural activities has potential to impact dam.		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score	10	**Fish Species Richness**	
Macro-invertebrate Richness	7	Native:	Exotic:
PET Richness	6.8	**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Abundant in clearing	**Bank Overhang**	Nil
In Water Column	Abundant in clearing	**Canopy Overhang**	0-100%
Overall In-stream Condition		Moderate (some parts good, some poor)	
Flora & Fauna Assets/ Conservation Status		Steep headwater streams of local significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	High

Reach Name: ***Deep Creek Dam to North Deep Creek Confluence***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Deep 2***

Reach Description and Boundaries: Downstream of the bedrock control at the dam the creek beings to meander/wander through a progressively broader discontinuous floodplain. It is pinned against the valley margin for about 30% of the time. Riparian vegetation is highly disturbed particularly by camphor laurel. By the end of the reach at the north deep creek junction the channel is entrenched.

Position in Catchment: Midland - Wolvi, Gympie Maps (1:50,000) **AMTD:** 25 - 11 km

STREAM MORPHOLOGY			
Channel planform		Moderately - sinuous, wandering between valley margins	
Bed material character		**Geomorphic units**	
Boulder Cobble 20% Pebble 50% Gravel 10% Sand 10% Silt/Clay 10%		**Within Channel** • Mainly runs and glides • Deeper pools on outside bends against bedrock valley margin controls. • Occasional riffles • A number of small artificial weir pools **Floodplain** Moderately wide but discontinuous	
Bed Stability - Degradation		Historically incised but could be silting up due to low flushing rates.	
Changes to Hydrologic Regime		Extensive abstraction and regulation from dam supply can lead to stagnation of pools. No environmental flow mechanisms.	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Degrading	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** Occasional Moderate Disturbance
Minor Disturbance 20% Major Disturbance 60% No Native Vegetation 20%	Accelerated migration of outside bends where vegetation has been cleared. Surface erosion and gullying in cattle tracks etc.
Assets/Conservation Status	**Stock Access**
Any remnants are significant to locality	Common moderate impact some fencing
Riparian Trajectory: Degrading	**Recovery Potential:** Limited

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Principal issue is related to potential over abstraction and flow regulation leading to stagnation of pools in fry periods.		Native: 1	Exotic:
		Macrophyte Condition	
		Moderate - Para grass invading cleared areas	
SIGNAL Score	6	**Fish Species Richness**	
Macro-invertebrate Richness	11	Native:	Exotic:
PET Richness	4	**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	A little	**Bank Overhang**	Nil
In Water Column	Common	**Canopy Overhang**	75%
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Least disturbed areas of locality significance	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Constrained

Reach Name: ***Deep Creek Lowland Junction to Mary River***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Deep 3***

Reach Description and Boundaries: From the confluence of the east and north tributaries the valley reduces in width and the stream diverts through low hills, the stream bed appears to be historically incised so that it is largely entrenched within high clay banks. Historic mining activity, a piggery, an abattoir and a range of industrial development in the catchment has lead to degradation of the stream.

Position In Catchment: Midland - Gympie Map (1:50,000) **AMTD:** 11 - 0 km

STREAM MORPHOLOGY			
Channel planform		Highly sinuous following topography	
Bed material character		**Geomorphic units**	
Boulder Cobble 5% Pebble Gravel Sand 45% Silt/Clay 50%		**Within Channel** • Mainly glides (90%) and pools • An artificial riffle (sampled) • Little if any LWD **Floodplain** Limited pockets, tend to be terraced and narrow	
Bed Stability - Degradation		No apparent active degradation	
Changes to Hydrologic Regime		Moderate upstream abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable?	**Channel Recovery Potential**	Low

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Common Minor Disturbance
Good Minor Disturbance Major Disturbance 20% No Native Vegetation 80%	Clay content of bank makes them less prone to instability. Cattle trampling leads to surface erosion. Bank formation is modified in urban and old mining areas.
Assets/Conservation Status	**Stock Access**
Revegetation near highway	Moderate to severe disturbance of vegetation
Riparian Trajectory: Degrading	**Recovery Potential:** Constrained

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Significantly degraded, Heavy metal levels well in excess of environmental guidelines have been recorded, Phosphorous and nitrogen are very high and the water is brackish and turbidity can be excessive.		Native: 6	Exotic: 1
		Macrophyte Condition	
		Healthy beds of macrophytes in the approaching the Bruce Hwy, plentiful emergents in this location.	
SIGNAL Score	4.9	**Fish Species Richness**	
Macro-invertebrate Richness	12	Native: 6	Exotic: 1
PET Richness	4	**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate		**Bank Overhang**	Nil
In Water Column		**Canopy Overhang**	1%
Overall In-stream Condition		Degraded - poor	
Flora & Fauna Assets/ Conservation Status		Macrophyte beds and emergents	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Constrained

Reach Name: ***Gutchy Creek - Gunalda Range to Gundiah includes Deacons Creek Tributary Aluvial Low - Moderate Sinuosity Sand Bed***

Reach Code: ***Gutchy 1***

Reach Description and Boundaries: Commencing from the Gunalda Range from Atkinson's Mountain & Theebine Mountain as the creek enters the Tiaro Coal Measures geological unit below Glenwood, the reach enjoys relatively good riparian cover. Brackish water quality, that is likely to be associated with underlying marine deposition, poses hazards for irrigated agriculture. Wandering through flat terrain the reach includes off-stream wetlands and old channel cut-offs. Abundant macrophytes and deep pools are also features.

Position In Catchment: Lowland - Gundiah Map (1:50,000) **AMTD:** 14 - 7 km

STREAM MORPHOLOGY			
Channel planform		Wandering - low sinuosity - partly confined	
Bed material character		**Geomorphic units**	
Gravel Sand 25% Silt/Clay 75%		**Within Channel** • Relatively large pools linked by glides • Occasional riffles • Common LWD **Floodplain** Broad but discontinuous	
Bed Stability - Degradation		Stable, no obvious signs of degradation	
Changes to Hydrologic Regime		Minor abstraction - but increasing	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Moderate Disturbance
Good 25% Minor Disturbance 65% Major Disturbance 10% No Native Vegetation	High clay content in banks can add to stability. However, some soils are sodic and dispersive in subsoil is exposed or disturbed**.** This can lead to toe collapse and slumping.
Assets/Conservation Status	**Stock Access**
Recovering areas of significance to locality	Stock causing minor to moderate disturbance
Riparian Trajectory: Recovering	**Recovery Potential:** Moderate to High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
High conductivity readings in the catchment, suggesting salinity will be an issue. Dissolved oxygen was also very low at levels where fish death may occur.		Native: 4	Exotic: 1
		Macrophyte Condition	
		Very good – abundant and diverse in pools	
SIGNAL Score	6	**Fish Species Richness**	
Macro-invertebrate Richness	17	Native: 6	Exotic:
PET Richness	3	**Known Mary River Cod Holes**	Nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		Water rats (*Hydromys sp.*) sighted	
On Substrate	Nil	**Bank Overhang**	0.2
In Water Column	Nil	**Canopy Overhang**	20%
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Wetlands and macrophyte beds	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Limited

Reach Name: ***Gutchy Creek Lowlands Gundiah to Mary River***
Partly Confined Meandering Planform - Controlled Discontinuous Floodplain

Reach Code: ***Gutchy 2***

Reach Description and Boundaries: Longer wavelength meanders commence just downstream of Gundiah with an almost continuous floodplain to the north of the creek. The creek however passes through an area of moderate relief where it follows valley margins, about 2 km from the Mary River. Generally moderate to good riparian vegetation is complemented by abundant LWD and good pools.

Position in Catchment: Lowland **AMTD:** 7 - 0 km

STREAM MORPHOLOGY			
Channel planform		Mainly moderately sinuous - meandering	
Bed material character		**Geomorphic units**	
Cobble 30% Pebble 35% Gravel 15% Sand 15% Silt/Clay 5%		**Within Channel** • Mainly pools joined by glides • LWD appears to be dominant control • Occasional runs and riffles **Floodplain** Broad floodplain for the most part	
Bed Stability - Degradation		Stabilised by cobble/pebble and LWD	
Changes to Hydrologic Regime		Relatively minor abstraction for irrigation	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Occasional Minor Disturbance
Good 15% Minor Disturbance 50% Major Disturbance 20% No Native Vegetation 15%	Banks are generally stabilised by vegetation and LWD. Dispersive soil problem may exist in early part of reach.
Assets/Conservation Status	**Stock Access**
Good remnants of local significance	Minor disturbance in grazed areas
Riparian Trajectory: Recovering	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Brackish water even though experiencing flush at time of testing, possibly linked to underlying geology which will represent ongoing hazard if irrigated agriculture were to expand. Dissolved oxygen levels are also marginal.		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score	6.2	**Fish Species Richness**	
Macro-invertebrate Richness	12	Native: 12	Exotic: 1
PET Richness	2	**Known Mary River Cod Holes**	Nil
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Moderate	**Bank Overhang**	0.4m
In Water Column	Nil	**Canopy Overhang**	75%
Overall In-stream Condition		Good- Moderate	
Flora & Fauna Assets/ Conservation Status		LWD abundance.	
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Moderate

Reach Name: ***Tinana Creek Headwaters to Mount Tagigan - Partly Confined mixed type***

Reach Code: ***Tinan 1***

Reach Description and Boundaries: The largely inaccessible headwaters tributaries drop sharply from the Wolvi, Tagigan and Beenham Ranges to a moderately narrow low gradient valley that runs through to Goomboorian, just south of the Tin Can Bay Road. Generally well vegetated the slow moving stream stops flowing during dry periods and stagnant pool conditions can result. Evidence exists of degraded upland wetlands on the floodplain, which have largely been cleared and drained.

Position in Catchment: Upland - Wolvi Map (1:50,000) **AMTD:** 158 - 140 km

STREAM MORPHOLOGY			
Channel planform		Partly confined - low sinuosity	
Bed material character		**Geomorphic units**	
Cobble Pebble Gravel Sand 25% Silt/Clay 75%		**Within Channel** • Mainly long glides with pools • Occasional Riffles for most part • Abundant LWD **Floodplain** Discontinuous moderate sized - disturbed wetlands	
Bed Stability - Degradation		Stable no evidence of degradation	
Changes to Hydrologic Regime		Minor to moderate abstraction	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Occasional Minor Disturbance
Good 25% Minor Disturbance 75% Major Disturbance No Native Vegetation	Generally stable low banks. Cattle access can cause pugging.
Assets/Conservation Status	**Stock Access**
Endangered and Of Concern Ecosystems	Widespread minor impacts
Riparian Trajectory: Recovering	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Dissolved oxygen levels have been recorded at very low levels in late summer and during dry times as pools tend towards stagnancy. The level of abstraction during these periods may exacerbate a natural cyclical event.		Native:	Exotic:
		Macrophyte Condition	
		Good - Abundant and diverse in pools, including submerged, floating and emergents.	
SIGNAL Score		**Fish Species Richness**	
Macro-invertebrate Richness		Native: 5	Exotic: 0
PET Richness		**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance		1 rare and Threatened frog species	
On Substrate	Nil	**Bank Overhang**	0.4m
In Water Column	Nil	**Canopy Overhang**	75%
Overall In-stream Condition		Good-tending toward moderate	
Flora & Fauna Assets/ Conservation Status		Frog, Abundant LWD and macrophytes – of local conservation significance	
In-stream Trajectory	Degrading ?	**In-stream Recovery Potential**	High

Reach Name: ***Tinana Creek Mt Tagigan to Teddington Weir***
Partly Confined Low Sinuosity Planform - Controlled Discontinuous Floodplain

Reach Code: ***Tinana 2***

(Note: This reach is similar to the Coondoo Creek tributary, which is not separately described)

Reach Description and Boundaries: Commencing near the Wilson's Pocket Rd Crossing, the flood- plain broadens as the creek runs along the boundary of the strongly undulating Goomboorian red podzolic and the yellow podzolics of the coastal plain. LWD and clay content of banks appear to be dominant controls on the style of the creek. Includes "The Lagoons" of Scrubber Creek tributary of regional significance, important habitat for the Cod and the threatened pygmy perch in Coondoo Creek.

Position in Catchment: Midland - Maryborough Map (1:100,000) **AMTD:** 140 - 16 km

STREAM MORPHOLOGY			
Channel planform		Irregular moderately sinuous	
Bed material character		**Geomorphic units**	
Cobble Pebble 5% Gravel 5% Sand 25% Silt/Clay 65%		**Within Channel** • Mainly silty clay pools and glides • Occasional riffles • Abundant LWD **Floodplain** Mainly continuous mod. broad floodplain.	
Bed Stability - Degradation		Stabilised by LWD	
Changes to Hydrologic Regime		Tellegalla Weir for back up Town supply- irregular use, Teddington Weir major abstraction and cross catchment inflows	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	High

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition -** Isolated Minor Disturbance
Good 80% Minor Disturbance 15% Major Disturbance 5% No Native Vegetation	Banks generally stable due to high clay content and abundant LWD. Isolated moderate problems in more disturbed area around Kia Ora, weed problems in this area.
Assets/Conservation Status	**Stock Access**
Very Good remnants including Rare & Threatened Species and high diversity	Minor impact from largely unfenced stock
Riparian Trajectory: Recovering	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Turbidity and nitrogen levels have been rated as being of only moderate quality. Coondoo Creek is naturally slightly acid. High conductivity readings from sub catchments flowing into this reach suggesting salinity will be an issue in the future.		Native:	Exotic:
		Macrophyte Condition: good in open pools	
SIGNAL Score (Average)	5.3	**Fish Species Richness**	
Macro-invertebrate Richness	17	Native: 17	Exotic: 1
PET Richness	7	**Known Mary River Cod Holes**	4+
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance	Threatened Pygmy Perch in Coondoo, 6 threatened Frogs in tributaries, vulnerable Black-breasted button quail in riparian zone.		
On Substrate	Moderate	**Bank Overhang**	5% of bank
In Water Column		**Canopy Overhang**	35-100%
Overall In-stream Condition		Good to Very Good	
Flora & Fauna Assets/ Conservation Status		Habitat of National Significance	
In-stream Trajectory	Stable	**In-stream Recovery Potential**	Very High

Reach Name: ***Tinana Creek Teddington Weir - Tinana Barrage Impounded***

Reach Code: ***Tinan 3***

Reach Description and Boundaries: Below Teddington Weir the creek begins to meander through broad floodplains substantially developed for sugar production. The Silty clay channel is subject to moderate banks slumping in parts and riparian buffer width is minimal and weed infested.

Position in Catchment: Lowland - Maryborough (1:100 000) **AMTD:** 16 - 2 km

STREAM MORPHOLOGY			
Channel planform		Mainly moderately sinuous - meandering	
Bed material character		**Geomorphic units**	
Cobble Pebble Gravel Sand Silt/Clay		**Within Channel** • Mainly glides and pools • Silty clay channel **Floodplain** Broad continuous floodplain	
Bed Stability - Degradation		No known bed degradation	
Changes to Hydrologic Regime		Major abstraction upstream, no environmental flow releases or strategy	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable	**Channel Recovery Potential**	Moderate

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** Occasional Moderate Disturbance
Good Minor Disturbance 20% Major Disturbance 70% No Native Vegetation 10%	Loss of riparian vegetation and LWD has lead to at times moderate bank instability including outside bend erosion and slumping.
Assets/Conservation Status	**Stock Access**
	Not substantially grazed
Riparian Trajectory: Recovering	**Recovery Potential:** High

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Potential acid sulfate soils in the locality may impact pH of stream if disturbed, but no recorded occurrence of this to date.		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score	N/A	**Fish Species Richness**	
Macro-invertebrate Richness	N/A	Native:	Exotic:
PET Richness	N/A	**Known Mary River Cod Holes**	
AusRivAS O/E	N/A	**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Moderate	**Bank Overhang**	0.4m
In Water Column		**Canopy Overhang**	15%
Overall In-stream Condition		Moderate to Poor	
Flora & Fauna Assets/ Conservation Status			
In-stream Trajectory	Degrading	**In-stream Recovery Potential**	Constrained

Reach Name: ***Tinana Barrage to Mary River Confluence - Tidal***

Reach Code: ***Tinan 4***

Reach Description and Boundaries: The Tinana Barrage is constructed 1.6 kilometres from the confluence of the creek with the Mary River, to allow the reach above to be used as a conduit for fresh irrigation water. The increase in tidal amplitude is likely to be a major factor in the significant bank slumping that occurs in the reach. Mangrove communities at the toe of the bank play an important geomorphic and ecological role.

Position in Catchment: Lowland - Maryborough Map (1:100,000) **AMTD:** 2 - 0 km

STREAM MORPHOLOGY			
Channel planform		Mainly moderately sinuous - meandering	
Bed material character		**Geomorphic units**	
Sand 25% Silt/Clay 75%		**Within Channel** • Tidal glide and weir pool **Floodplain** **Extensive continuous floodplains**	
Bed Stability - Degradation		Unknown - effect of sedimentation above barrage compared to input from tidal action?	
Changes to Hydrologic Regime		Substantial modification with no environmental flow releases.	
Sand and Gravel Extraction		Nil	
Channel Trajectory	Stable?	**Channel Recovery Potential**	Unknown

RIPARIAN ZONE CHARACTERISTICS	
VEGETATION	**BANK STABILITY**
Condition	**Condition** - Common Moderate Disturbance
Good Minor Disturbance 20% Major Disturbance 70% No Native Vegetation 10%	High bank slumping into water as toe is destabilised by increased wetting from tidal amplification and lack of binding from riparian and littoral root systems.
Assets/Conservation Status	**Stock Access**
Mangrove communities where present	Largely ungrazed
Riparian Trajectory: Degrading	**Recovery Potential:** Limited

IN-STREAM CHARACTERISTICS			
WATER QUALITY ASPECTS		**HABITAT PARAMETERS**	
Physico - Chemical Problems		**Macrophyte Species Richness**	
Tidal flushing is likely to reduce impacts of loss of flow.		Native:	Exotic:
		Macrophyte Condition	
SIGNAL Score		**Fish Species Richness**	
Macro-invertebrate Richness		Native:	Exotic:
PET Richness		**Known Mary River Cod Holes**	
AusRivAS O/E		**Other Species of Significance Present**	
Filamentous Algae Abundance			
On Substrate	Moderate	**Bank Overhang**	0.4m
In Water Column		**Canopy Overhang**	
Overall In-stream Condition		Moderate	
Flora & Fauna Assets/ Conservation Status		Wading bird habitat and fish nursery,	
In-stream Trajectory	Stable?	**In-stream Recovery Potential**	Moderate?

MAJOR NORTH WESTERN TRIBUTARIES
CURRENTLY UNDER INVESTIGATION

Tributaries Assessed from Broad Mapping, Previous Research and Limited Field Assessment Only
(Insufficient Data to Complete Reach Summary Sheets)

Glastonbury Creek
Widgee Creek
Wide Bay Creek
Munna Creek
Myrtle Creek
Susan River