

HYDER ENVIRONMENTAL

A DIVISION OF HYDER CONSULTING (AUSTRALIA) PTY LTD

Hyder

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**IMPACT
ASSESSMENT
STUDY
FOR
PROPOSED
DAWSON
DAM**

APPENDICES

OCTOBER 1997

APPENDIX 1

DAWSON RIVER PROJECT

IMPACT ASSESSMENT STUDY TERMS OF REFERENCE

BACKGROUND

In order to underpin the economic development of the region, the Department of Natural Resources is evaluating a proposal to construct a major water storage in the Dawson Valley.

The site which appears to have the greatest potential is located on the Dawson River some 72 kilometres downstream from Taroom and upstream of Nathan Gorge

A major constraint on the full supply level (FSL) of the storage is a requirement for a minimal impact on flooding in the town of Taroom. At this stage it appears that the maximum achievable FSL is EL 185.

The storage could provide up to 150,000 megalitres of water for the expansion of agricultural, industrial and extractive industries in the valley.

IMPACT ASSESSMENT STUDY REQUIREMENTS

These terms of reference or guidelines for the preparation of the Impact Assessment Study (IAS) take into account the requirements of Queensland environmental impact assessment procedures in accordance with the provisions of the *Policies and Administrative Arrangements of Queensland's State Development and Public Works Organisation Act 1971-1981*.

In general, the IAS should provide:

- a) Description of the development proposal and any alternative means of achieving the development objectives;
- b) Description of relevant aspects of the existing environment;
- c) Definition and analysis of the likely impacts of the development on the environment and measures proposed to mitigate any adverse effects. The analysis should be in sufficient detail to allow reviewers to make a proper assessment of the findings;
- d) An Environmental Management Plan (EMP) to monitor and manage actual impacts of the development and to mitigate any adverse effects.

These terms of reference are intended to be a guide only and it is possible that additional issues may be identified by the proponent or the community during the preparation of the IAS.

The final IAS should read as a stand alone document. Where applicable, existing studies can be used to support this further assessment. However, any information in these studies which is relevant to the IAS should be included in suitable summary detail. Any supporting studies should be made available for inspection during the period of public display of the IAS.

CONTENTS

The IAS and EMP should incorporate the following headings and sub headings, however, the consultant may include additional headings considered necessary to cover all aspects of the study.

1. SUMMARY

- The title of the proposal.
- The name and address of the proponent.
- The proposal.
- The objectives of the proposal.
- The background to and the need for the proposal.
- The existing environment (physical, natural and socio-economic).
- The principal impacts (both adverse and beneficial).
- The environmental protection measures and safeguards proposed.

2. INTRODUCTION

The introduction should briefly:

- Define the proposal and its objectives.
- Discuss the status of the proposal and the requirement for the Impact Assessment Study (IAS).
- Describe the regional setting of the project.
- Outline any studies/surveys/consultations conducted in the course of the development of the proposal and the preparation of the draft IAS.
- Refer to any heritage status of the area and its surroundings (eg National Trust listing or National Estate Register nomination).

3. BACKGROUND TO AND NEED FOR THE PROPOSAL

The background of the proposal should be discussed and the need for the proposal should be justified, including:

- The legislative basis or Government (State and Federal) policy upon which the proposal is based.
- The specific objectives which the proposal is intended to meet.
- An analysis of the need for the project (based on the demand for and use of water) and how it fits into the overall water management strategy for the Fitzroy Basin.
- The implications of not implementing the proposal.
- The costs and the benefits of the implementation of the proposal.
- Any major constraints on the development.

4. ALTERNATIVES TO THE PROPOSAL

- Any prudent or feasible alternatives to the proposed development should be described and discussed.
- The ‘do nothing’ alternative, ie continuation of the present arrangements, should be comprehensively evaluated in terms of private and public benefits over the long term.

5. DESCRIPTION OF THE PROPOSAL

The construction and operational phases of all components of the proposal should be described in as much detail as possible. Relevant aspects from those listed below should be addressed for each component of the proposal.

- Site location.
- Design and layout (including storage capacity and proposed allocation of water from the storage).
- Proposed infrastructure.
- Timescale or staging of project implementation.
- Size and source of construction workforce.

- Sources, quantities and method of transport of construction materials.
- Extent and methods of vegetation clearance and earthmoving required.
- Construction standards, techniques and site management arrangements, including safety measures proposed to be employed.
- Arrangements for the disposal or recycling of construction wastes.
- Restoration or revegetation procedures proposed to be undertaken.
- Land use plan of those areas expected to be affected by the proposal.
- Arrangements for the administration and control of facilities during the operational phase.

6. EXISTING ENVIRONMENT

The Dawson River Project involves two distinct but highly related activities which are separated temporally and for which the study areas are separated geographically.

- The construction and operation of a dam on the Dawson River and the release of stored water downstream.
- The utilisation of water released from the dam for irrigation, urban and industrial use.

The existing environment (biophysical and socio-economic) of those areas expected to be affected by the proposed development should be described.

This section of the IAS should incorporate the following headings, however the consultant may include additional headings necessary to cover all aspects of the study. In the interests of document readability, the headings in the following section (Section 7) should mirror those used in this section.

6.1 General Biophysical

The relevant general biophysical aspects of the areas expected to be affected by all activities associated with the proposal should be briefly described. These aspects include:

- Topography (including location of populations centres and roads).
- Geomorphology, geology and soil types.

- Climate (including seasonality and frequency of hazardous events such as cyclones).
- Aesthetics (including scenic amenity, air quality noise levels).

6.2 Terrestrial and Aquatic Environment of the Dam and its Impoundment

The terrestrial and aquatic environment of the area expected to be affected by the construction and operation of a storage on the Dawson River and the release of stored water downstream should be described.

Terrestrial Flora

- A description of the plant species and communities in the study area. Maps of vegetation communities should be included.
- A determination of whether any significant (from a conservation or commercial viewpoint) flora species/communities exist in the study area and an indication of how well these are represented elsewhere.
- A determination of the significance of the flora species/communities in the area at a local, regional and national level.
- An evaluation of the extent of past disturbance to the natural vegetation and extent of exotic species and diseases.

Terrestrial Fauna

- A description of fauna species in terms of distribution, abundance and seasonal variation within the study area. Details of the results of fauna surveys should be included.
- A determination of the existence of any significant fauna species (from a conservation, commercial and recreational viewpoint) in the study area and an indication of how well these are represented elsewhere.
- A determination of the significance of the fauna species in the area at a local, regional and national level.
- A description of habitat requirements and their availability in the study area.
- A determination of the incidence of feral and exotic fauna species.
- A determination of the use (actual and potential) of the area as a wildlife corridor. Maps of wildlife corridors and refuges should be included.

Aquatic and Riparian Flora

- A description of the aquatic and riparian flora species/communities in terms of distribution, abundance and seasonal variation within the study area.
- A determination of whether any species/communities of significance (from a conservation and commercial viewpoint) occur in the study area and an indication of how well these are represented elsewhere.
- A determination of the significance of the aquatic and riparian flora species/communities in the area at a local, regional and national level.
- A description of the habitat requirements and the sensitivity of aquatic flora species to changes in flow regime, water levels and water quality in the study area.
- An evaluation of the extent of past disturbance to the natural aquatic and riparian vegetation and extent of exotic species and diseases.

Aquatic Fauna

- A description of aquatic fauna species (including fish) in terms of distribution, abundance and seasonal variation within the study area.
- A determination of the existence of any significant aquatic fauna species (from a conservation, commercial and recreational viewpoint) in the study area and an indication of how well these are represented elsewhere.
- A determination of the significance of the aquatic fauna species in the area at a local, regional and national level.
- A description of habitat requirements and their availability in the study area.
- A determination of the incidence of feral and exotic aquatic fauna species.
- A determination of the migratory patterns and triggers of aquatic fauna species in the study area.
- A determination of the sensitivity of aquatic fauna species to changes in flow regime, water levels and water quality in the study area

6.3 Boggomosses (Mound Springs) and Other Spring Fed Areas

The existing environment of the area expected to be affected by the construction and operation of a dam on the Dawson River and the release of stored water downstream, with respect to boggomosses and other spring fed areas, should be described.

- The distribution and abundance of boggomosses and other spring fed areas (including onstream and offstream occurrences) in the study area should be described with the aid of mapping.
- A general description of the flora and fauna species comprising the boggomosses and other spring fed areas including seasonal variation in community structure.
- The determination of the presence or otherwise of any significant (from a conservation, commercial and recreational viewpoint) flora and fauna species associated with boggomosses and other spring fed areas.
- The determination of the significance of boggomosses and other spring fed areas (including associated flora and fauna) at a local, regional and national level.
- The determination of the ecological significance of the boggomosses (importance as refuges etc).
- The determination of the hydrology of the boggomosses (seasonal fluctuations).
- A description of the water quality of the boggomosses.

6.4 Hydrology

The hydrology of the area expected to be affected by the construction and operation of a dam on the Dawson River and the release of stored water downstream should be described.

- Description of the surface drainage, pattern of flooding for the area, water table, location of wetlands.
- Description of the surface water quality and siltation pattern, including seasonal variation, of the Dawson River system.
- Description of the historical and existing hydrological regime of the Dawson River including existing regulatory structures.
- Description of the current operation of the water storage and distribution system, including yield, operating strategy, supply reliability, allocation and use of water supplies, water use efficiency.
- A determination, in consultation with the Water Allocation Management Plan (WAMP) process, of the flow rates required to satisfy environmental flow requirements.

6.5 Socio-Economic

The socio-economic aspects of the area expected to be affected by the construction and operation of a dam on the Dawson River and the release of stored water downstream should be described.

Aboriginal Cultural Heritage

- Identification of Aboriginal people with legitimate traditional and/or contemporary interests in the study area. Those groups of people (a) with traditional affiliation to the land within the study area, (b) with historical association to the land within the study area and (c) living in or near the study area.
- Determination of the Aboriginal anthropological characteristics (eg traditional owners, traditional use of local resources, land claims and significant sites).
- Determination of native title through land tenure research.
- Description of the spiritual significance of the area.
- Descriptions of any archaeological artefacts/relics and sites, including type, condition and location, taking into account the sensitivity of such information.
- Determination of the archaeological and historical significance of the study area at a local regional and national level.
- Determination of heritage areas including those on the register of the National Estate and archaeological sites (explain their significance and conservation values).
- Determination of sites of archaeological significance by historical research and field survey.

European Cultural Heritage

- Description of sites of European heritage and cultural significance identified by historic research or field survey.

Social

The existing social environment of the study area, couched in terms of the relevant issues from the headings listed below, should be determined and discussed.

- Demographic: Population (rate of growth, spatial distribution, age and gender distribution). Workforce Characteristics (age and gender distribution, occupation, source, unemployment, itinerant workers, ethnicity).

- Economic: Growth, income distribution, rates and taxes, prices, economic activity, business and property, capital values, availability of goods and services, employment and training.
- Housing, Accommodation and Land: Public sector/private sector, home ownership, property prices, rentals, rates, availability of serviced lands, mobile homes, caravan parks, low income accommodation, accessibility, community housing, strategic plan designation and zoning of lands, land values, land tenure, current land use.
- Health: Physical, mental and occupational health. Services (hospitals, community health centres, medical and dental, paediatric, nursing homes. Pollution and pollution control. Alcohol consumption.
- Education: Primary, secondary, tertiary, technical, adult, workforce levels, accessibility. Special problems (children in caravan parks, Aboriginal and Torres Strait Islander communities, migrants, retraining.
- Access and Mobility: Public transport, road safety, parking and traffic congestion, pedestrian/cycle access, community transport.
- Social Welfare and Security: Support services (children, youth, women, low income families, unemployed, aged, invalids, handicapped).
- Levels of Social Expenditure: Distribution of revenue within a local authority by Federal, State and Local government.
- Psychological: Involvement, expectations, stress, frustration, commitment, challenges, work satisfaction, opportunities, self expression.
- Social and Cultural: Community structure, life styles, cohesion, alienation, stability, conflict, values, inequality, relationships, customs, beliefs, attitudes, religions, cross cultural.
- Political/Institutional: Federal, State and Local governments, division of responsibilities, responsiveness, structure, accountability, accessibility, equity, stability, efficiency, co-ordination, public involvement, interest groups, parties.
- Recreation and Open Space - Passive, active, outdoor, indoor, sports facilities, parks and open space, entertainment, cultural facilities.
- Pollution: Air and noise, insect pests (eg mosquitoes).
- Public Safety: Crime rates and incidence, law and order and emergency services, perceptions of safety, crime prevention programs.
- Aesthetic: Visual and landscape quality.

- Urban Design, Safety, Sense of Place, Character etc: Neighbourhood and residential amenity, focal points, community identity.

The following issues, which relate particularly to Aboriginal people, should be examined.

- Assessment of contemporary Aboriginal use of local terrestrial, aquatic and marine resources within the study area for economic, social or cultural purposes.
- Assessment of the role and significance of Aboriginal subsistence activities in the study area.

6.6 Water Use Effects

The existing environment of the areas expected to be affected by the utilisation of water released from the dam should be described.

- A description of land tenures and current land use in the study area, with particular reference to land with special purposes (e.g. National Parks).
- General condition of the land in the study area.
- Soil suitability for irrigated agriculture in the study area.
- Land capacity in the study area (details of the sensitivity of various land units to soil erosion, bank stability, compaction, salinity etc.).
- Current use of surface and ground water from the Fitzroy River system for agricultural, urban and industrial water supplies, with particular reference to any existing water storage and distribution systems.

7. ENVIRONMENTAL IMPACTS

The principal environmental impacts expected to result from the proposed development should be clearly identified. The potential impacts of the proposal on the natural and social environment of the study area, taking into consideration activities during the construction and operational phases of the proposal should be analysed.

Where appropriate, reference should be made to measures proposed to mitigate negative impacts and to enhance positive impacts.

Areas of high conservation value or which contain endangered or rare species should be specifically addressed. Further, any community sensitivities to the proposal which may be identified should also be specifically addressed.

This section of the IAS should incorporate the following headings, however the consultant may include additional headings necessary to cover all aspects of the study. In the interests of document readability, the headings in the previous section (Section 6) should mirror those used in this section.

7.1 General Biophysical

The principal general biophysical impacts expected as a result of the proposal should be identified and described.

- A determination of the potential impact of the proposed development on the relevant general biophysical aspects of the environment set out in Section 6. The construction and operational stages of the proposed development should be considered.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts during the construction and operational stages of the proposed development.

7.2 Terrestrial and Aquatic Environment of the Dam and its Impoundment

The principal impacts of the construction and operation of a dam on the Dawson River and the release of stored water downstream on the terrestrial and aquatic environment of the dam and its impoundment should be identified and described.

Terrestrial Flora

- A determination of the potential impact of the proposed development on the terrestrial flora of the study area during the construction and operational stages of the proposed development.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing positive impacts during the construction and operational stages of the proposed development.

Terrestrial Fauna

- Determination of the potential impact of the proposed development on the terrestrial fauna in the study area during the construction and operational stages of the proposed development.
- Determination of the impacts of the proposed development on the use (actual and potential) of the study area as a wildlife corridor.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts during the construction and operational stages of the proposed development.

Aquatic and Riparian Flora

- A determination of the potential impact of the proposed development on the aquatic and riparian flora of the study area during the construction and operational stages of the proposed development.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing positive impacts during the construction and operational stages of the proposed development.

Aquatic Fauna

- Determination of the potential impact of the proposed development on the aquatic fauna (including fish) in the study area during the construction and operational stages of the proposed development.
- Determination of the necessity or otherwise for a fishway to be incorporated into the design of the proposed development and a discussion of a suitable fishway design.
- Recommendations, based upon local species occurrence, of suitable fish species for dam stocking.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts during the construction and operational stages of the proposed development

7.3 Boggomosses (Mound Springs) and Other Spring Fed Areas

The principal impacts of the construction and operation of a dam on the Dawson River and the release of stored water downstream on boggomosses and other spring fed areas in the study area should be identified and described.

- Determination of the extent of disturbance of the boggomosses and other spring fed areas and the occurrence of associated exotic flora and fauna as a result of the proposed development.
- Determination of the potential impact of the proposed development on the boggomosses and other spring fed areas (including associated flora and fauna) in the study area during the construction and operational phases of the proposal.
- Determination of the potential impact of the proposed development on boggomosses and other spring fed areas outside the study area.
- Recommendations for any practicable means of mitigating the negative impacts and enhancing the positive impacts of the proposed development during the construction and operational phases of the development.

7.4 Hydrology

The principal impacts of the construction and operation of a dam on the Dawson River and the release of stored water downstream on the hydrology of the study area should be identified and described.

- Evaluation of the effects of the proposed development on other storages on the Dawson River.
- Determination of the potential impacts of the proposed development on upstream and downstream wetlands (inundation and drainage effects).
- Determination of the potential impacts of the proposed development on existing flood plains within the study area.
- Determination of the potential effects of the proposed development on sediment transport and deposition.
- Evaluation of the potential effects of the proposed development on groundwater recharge.
- Development of an environmental flow release strategy, in co-ordination with the Water Allocation Management Plan (WAMP), for the proposed development and existing regulatory structures on the Dawson River, based on species flow requirements.
- Development of operating guidelines for the proposed development and existing regulatory structures on the Dawson River, for the release of flows for the maintenance of the downstream environment.
- Determination of the effect of the environmental flow regime on the yield of the proposed development and other regulatory structures on the Dawson River (in co-ordination with the WAMP process).
- Development of an environmental monitoring program for assessing the impact of the proposed development on the downstream environment (including flora, fauna and water quality) and for assessing the suitability of the environmental flow strategy.

7.5 Socio-Economic

The principal socio-economic impacts of the construction and operation of a dam on the Dawson River and the release of stored water downstream should be identified and described.

Aboriginal Cultural Heritage

- Determination of the potential impact of the proposed development on the archaeological artefacts/sites/values of the study area.
- Effects on areas of heritage conservation value.
- Effect on an Aboriginal or archaeological sites of significance.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts during the construction and operational stages of the proposed development.

European Cultural Heritage

- Determination of the potential impact of the proposed development on sites of European heritage and historical significance.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts during the construction and operational stages of the proposed development.

Social

A determination of the potential impact of the proposed development on the relevant general social aspects of the environment set out in Section 6. Issues which should be given particular attention are as follows:

- The potential impacts of the proposed development on the demographic, social, cultural and economic profiles of the existing communities.
- Impacts on the health and well being of residents and communities expected to be affected by the proposed development.
- Evaluation of the impacts of the proposed development on current and potential recreation (including loss of access, increased public access to private land).
- Evaluation of the potential for increased activity in the form of agricultural ventures, industrial development and tourism generated by the proposal.
- Evaluation of the ability of the existing infrastructure to meet the additional demands generated by the proposal.
- Evaluation of the impacts of the interaction of both the construction and operational workforces with the existing communities.
- Evaluation of the accommodation and service requirements of the construction workforce.
- Social impacts of the proposal not proceeding.

- Evaluation of water supply issues (including restrictions on use of water upstream, restrictions on use of agricultural chemicals upstream, water harvesting)
- Assessment of the need for and extent of buffer zones around the proposed reservoir and an assessment of the impacts of the provision of such buffer zones (eg land resumption, fencing, stock access, water quality management).
- Evaluation of the potential effects of the fencing off of cattle from the storage area.
- Evaluation of the effects of land resumption (including an evaluation of the viability and sustainability of riparian landholders).
- Evaluation of the potential effects of major floods.
- Recommendations on any practicable means of mitigating any negative effects and enhancing any positive effects during the construction and operational stages of the proposed development.
- Development of a monitoring program to assess the long term effects of the proposed development on the social environment.

The following issues are of particular relevance to Aboriginal people.

- Implications for Aboriginal groups in the study area of any impacts caused by the presence and activities of non-Aborigines associated with the proposed development.
- Implications for the use of subsistence resources within the project area for social, cultural and economic purposes.
- Implications for the use of and access to culturally important sites and landscapes within the project areas.
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts during the construction and operational stages of the proposed development (eg opportunities for Aboriginal involvement in the project related economy; access for Aboriginals in the area to training and employment programs within the project).

7.6 Water Use Effects

The principal environmental impacts expected to result from the utilisation of water from the dam should be identified.

- Determination of the impact, on the upstream and downstream environment, of potential use of water made available as a consequence of the proposed

development (eg chemicals and fertilisers, waste and tail water, farm and industrial effluent).

- Determination of the extent and effect of vegetation clearance for irrigated agriculture.
- Evaluation of the ecological sustainability of proposed water uses (with reference to potential salinisation and waterlogging).
- Recommendations for any practicable means of mitigating any negative impacts and enhancing any positive impacts expected to result from the utilisation of water from the dam.

8. ENVIRONMENTAL SAFEGUARDS, MONITORING PROPOSALS AND THE ENVIRONMENTAL MANAGEMENT PLAN

This section has two components: environmental safeguards and monitoring proposals which are required to minimise adverse impacts; and the Environmental Management Plan.

8.1 Safeguards and Monitoring

This component should describe all measures proposed to minimise the adverse impacts associated with the proposal and contain a clear statement of specific commitments made by the proponent to minimise the adverse impacts. Any actions required by others to enable the proponent to meet these commitments should be identified.

Minimisation of the impacts of each activity associated with the proposal should be addressed. The following points are intended only as a broad scale guide to the type of safeguards which may need to be addressed for each activity.

Construction

- Provide for the protection and management of areas of high nature conservation and heritage values.
- Protect any Aboriginal sites and artefacts in accordance with relevant legislation.
- Ensure environmentally sensitive riparian land management practices are carried out.
- Ensure construction impacts associated with the dam site are minimised.
- Ensure construction camp operation is environmentally sensitive and employees and construction managers understand their environmental protection obligations (eg incorporation of appropriate clauses in construction contracts).

- Minimise noise, dust, erosion and water pollution.
- Restore/rehabilitate disturbed areas.
- Ensure controlled access of cattle to impoundment.
- Prevent and manage the introduction and/or spread of exotic species.
- Implement monitoring and management arrangements to ensure the above measures are effectively applied.

Operation

- Liaise with Local Government to provide for appropriate recognition of land use for catchment protection and agricultural purposes in strategic and zoning plan(s) where existing designations are inappropriate.
- Manage the activities in the dam's catchment area (including recreational use of the area, fire management and cattle access) and maintain appropriate water quality.
- Minimise the impact on sensitive areas of land and vegetation.
- Provide continuing protection of flora and fauna of significance.
- Prevent bank erosion.
- Ensure soil suitability for irrigation and prevent soil erosion and damage to soil structure.
- Provide measures to minimise flooding during wet season.
- Provide continuing protection to cultural heritage areas.
- Develop best management practices for differing land types, as a guide for landholder and development and property management planning.
- Develop property management planning at a catchment scale as a basis for landholder implementation and irrigated farm layout.
- Develop methods for information transfer for application of these practices by landholders.
- Ensure proper responses to the results of monitoring programs particularly in regard to water quality and emerging soil and vegetation problems.

8.2 Environmental Management Plan

The mechanism for implementing the commitments made by the proponent to minimise adverse impacts associated with the proposal will be through the Environmental Management Plan (EMP) which should be described in detail as a stand-alone section to facilitate approval and use in ongoing management. (See attached information on EMPs). The EMP should also describe all monitoring programs which should be designed to:

- Ensure safeguards are being applied effectively.
- Consider possible unpredicted impacts requiring remedial measures.
- Measure any differences between predicted and actual impacts.
- Provide for periodic review of the management plan itself.

9. CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings of the IAS, a balanced overview of the net impact of the proposal and recommendations on the proposal should be presented. This should include the identification of any alterations to the proposal which would maximise/optimise benefits and mitigate environmental, social and economic costs.

10. PUBLIC CONSULTATION

The IAS should also incorporate the Public Consultation Process undertaken throughout the study. The following public consultation activities should be regarded as a minimum requirement.

- Consultation with Government and other authorities, local conservation groups, community groups, industry based groups and Aboriginal groups (including incorporated groups with an interest in the area). These activities should cover both the Environmental Assessment Process itself and such consultations necessary for the proper conduct of component studies (eg social impact study).
- Advertising and invitation of public submissions in response to the IAS.
- Review of submissions received in response to the IAS and the incorporation of all issues raised into a Supplementary Report.

11. APPENDICES/GLOSSARY

Information relevant to the IAS but not considered suitable for inclusion in the main text should be included as appendices; eg detailed technical or statistical information, supporting documents or background reports. This supporting documentation should be made available during the period of public display of the IAS.

A glossary defining technical terms and abbreviations used in the text should be included to assist the general reader.

Environmental Management Plan (EMP)

The EMP identifies all potential environmental impacts and mitigation measures to be implemented and then details corrective action to be carried out if an undesirable impact occurs.

The aims of the EMP are to :

1. provide evidence of practical and achievable plans for the management of the project to ensure that environmental requirements are complied with, by producing a framework of comprehensive monitoring and control of construction and operational impacts;
2. provide Local, State and Commonwealth authorities with a framework to confirm compliance with their policies and requirements; and
3. provide community with evidence of the management of the project in an environmentally acceptable manner.

The EMP is periodically updated to reflect knowledge gained during the course of operations. Changes to the management plan should be implemented in consultation with the relevant authorities.

In general, the EMP should contain a detailed list of commitments by the sponsors and proponents to environmental protection. Essential components which should be included in an EMP are as follows:

- establishment of agreed performance criteria and objectives in relation to environmental and social impacts;
- detailed prevention, minimisation and mitigation measures for environmental impacts at specific sites and on the affected catchment;
- details of the proposed monitoring of the effectiveness of remedial measures against the agreed performance criteria in consultation with relevant government agencies and the community;
- details of the funding and implementation responsibilities for environmental management;
- timing of environmental management initiatives;
- reporting requirements and auditing responsibilities for meeting environmental performance objectives.

The structure of the EMP is as follows:

Element:	Aspect of construction or operation.
Policy:	The operational policy that applies to the element.
Performance Requirement:	A performance requirement for each element of the operation.
Monitoring:	The monitoring requirements which will measure actual performance
Reporting:	Format, timing and responsibility for reporting and auditing of monitoring results.
Corrective Action:	The action to be implemented in case a performance requirement is not reached and the person(s) responsible for action.

WORKED EXAMPLE OF THE STRUCTURE OF AN ELEMENT OF AN E.M.P.

ELEMENT

River Water Quality

POLICY

To minimise the impact on river water quality (from a wastewater land disposal scheme)

PERFORMANCE REQUIREMENT

- River TDS
 - For 100 % of river flow time T.D.S. < ? mg/L
 - For 98 % of river flow time T.D.S. < ? mg/L
 - For 90 % of river flow time T.D.S. < ? mg/L
- $\text{NO}_3\text{-N} < ? \text{ mg/L}$ (for all river flow circumstances)

MONITORING

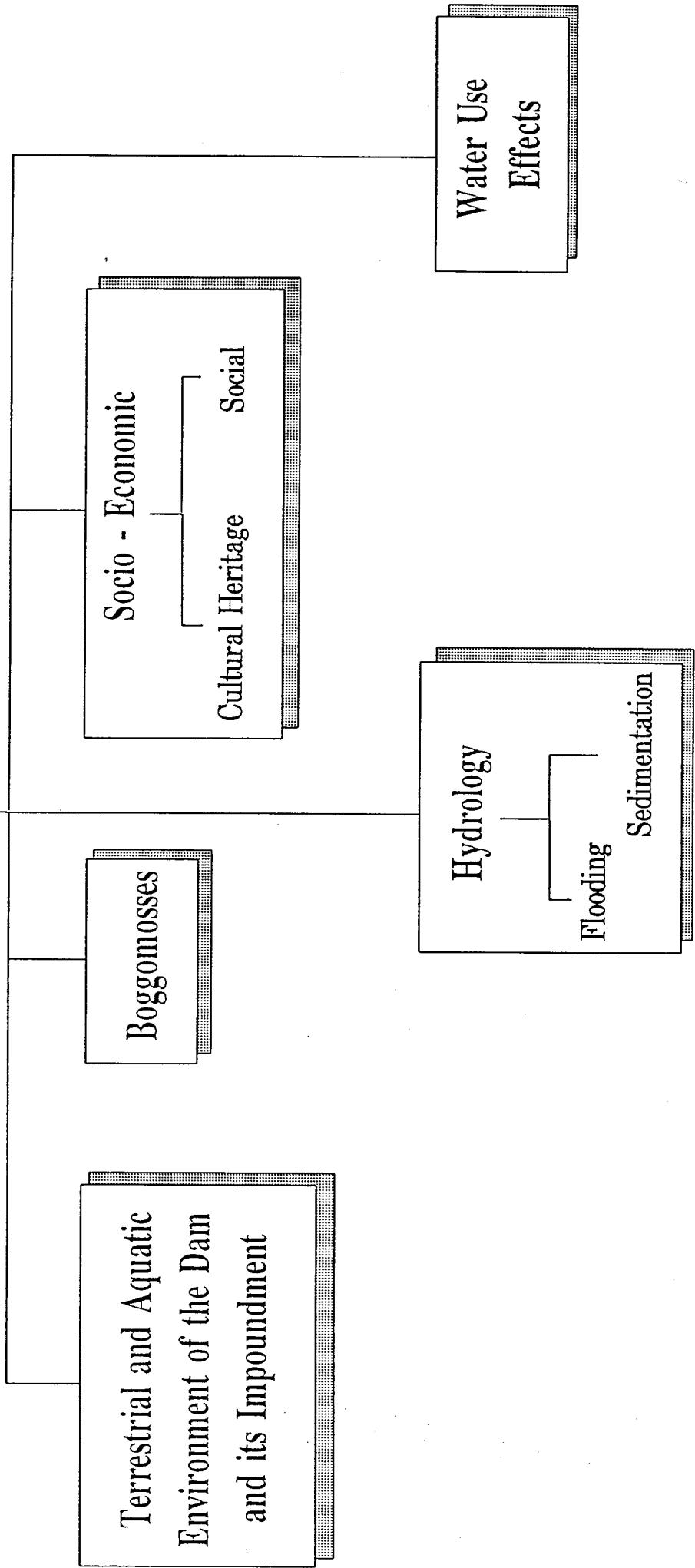
- Event based and bi-monthly sampling of river water at upstream and downstream boundaries.
- Analysis for TDS and N.
- Quarterly analysis of NO_3 , EC, pH, Cl, CaSO_4 of monitoring bores.

CORRECTIVE ACTION

- Stop wastewater irrigation until monitoring allows resumption of irrigation.
- Install bores on southern boundary to intercept aquifer and pump water to balancing storage. Dilute and reapply.
- Reduce NO_3 by increased sludge removal and denitrification.
- Purchase W.R.C. water allocation for river dilution at low flows as a last resort following a period of increasing river T.D.S. and decreasing river flow.

DAWSON RIVER

Impact Assessment Study (IAS)



APPENDIX 2

Appendix 2

Approach and Methodology

PROPOSED METHODOLOGY - Form E

1. STUDY RATIONALE

Very few large-scale water resource projects have been undertaken in Australia over the past twenty years. This partly reflects the fact that the best opportunities for large-scale impoundment had already been exploited prior to that time. But it also reflects a widespread perception in the 1960s that some of the developments to that stage had not been in the best public interest. It was felt by many ordinary people that the vast sums required to make water resource projects operational represented a misallocation of resources when agricultural commodities were oversupplied and prices low. It was also felt that mechanisms for securing an equitable distribution of the gains due to the transition from dryland to irrigation were largely absent and further, the competition for infrastructural investment was demonstrably strong throughout the community.

As a consequence of this introspection, large public works proposals must now be tested for social and economic merit before they can become tangible projects. Indeed, the Australian public requires the evaluation of commercial water resource projects to be independent and be seen to be independent. The test of a proposal's social acceptability can be judged in terms of its overall impacts, including its economics. The latter refers to the net dollar return to the State, region and local community taking into account the expected flow of benefits and costs if the project went ahead.

If a project can be shown to give a positive return on resources invested, then it will be economic in an absolute sense. Investment in this project may not, however, be in the public interest if the competing options indicate a higher return. In practice, therefore, the acceptable project must be both economic and the best option on offer at the time. Since the present study is confined to the Dawson River Nathan Dam option, it can do no more than prove whether or not it is economic in an absolute sense. An overview process will be required to select the best option from among those that would be economically acceptable in absolute terms.

The benchmark for measuring the economic impact of a given project is the 'do nothing' scenario. This makes specification of the existing (do nothing) situation an important part of feasibility study methodology.

The severe drought events of the 1990s have refocused attention on large-scale water resource infrastructure development options and in Queensland, a process has been established to identify prospective development options and to test their environmental sustainability. Nevertheless, the social and environmental sustainability of any of these options will still depend on demonstrating economic merit. It must be appreciated that a comprehensive economic analysis captures and summarises virtually all of the technical, social; and communal dimensions of a proposal. Based on this reality, the Consultant proposes to include a detailed economic analysis in the IAS in line with the methodology proposed later.

As a precursor to establishing the methodology for the IAS and EMP study of the Nathan Dam proposal, it is first necessary to consider other forces driving the project so as to correctly diagnose the potential sources of impact and to identify essential inputs to the planning process for the study.

Accordingly, this section deals with the rationale for the project, documents the Consultant's understanding of the project, establishes the methodology and identifies the tangible outputs of the study.

Need for the project

The Dawson River valley has been used for irrigated agriculture since the early 1920s, along with other traditional dryland uses such as cropping and grazing. A series of six weirs have been built along the Dawson River since the Theodore Weir in 1925. These weirs both service riparian use and government distribution systems at various points along the river. Irrigation schemes exist at both Theodore and Moura.

The present storage and distribution systems irrigate about 7,500 ha of valuable agricultural land out of a potential 300,000+ ha within the valley. Much of this land has only come available through the rapid clearing under the Queensland Brigalow Scheme in the 1960s which encouraged landholders to expand

activity to take advantage of new pasture varieties for the grazing industry. Higher revenues per hectare can be obtained from cropping and in recent years, there have been increasing moves to take up water allocations for cotton production on the rich alluvial soils along the river and nearby lands.

Supplies available from the weirs and river flows (at 75% annual reliability) currently amount to about 60,000 ML/year which is close to the total storage capacity. The historical no failure yield is about 28,400 ML and recent droughts have highlighted the limitations of the present storage systems. In addition to agriculture, there are other major water users in the valley such as power stations, the mining industry and domestic requirements.

Studies dating back to 1922 when the Nathan Dam was first mooted, have recommended various options for guaranteeing supplies to all users. Groundwater sources in the valley are mostly highly saline and of poor quality and largely considered unsuitable for use at present costs of treatment even for urban purposes. This study recognises the need to improve both the total storage and reliability of supply to meet current and foreseen needs for agriculture, urban and the coal industry which underpins much of the economic development in the valley.

Impetus for construction of the Nathan Dam was given in the 1995 Queensland Government publication *From Strength to Strength* which formally endorsed the dam as part of the Queensland water resources infrastructure strategy. This proposal has also been adopted by the present government, resulting in the need for the present study.

Water storage options

A large number of sites have been investigated as potential dam and weir sites along the Dawson River and its many tributaries. Many of these are inefficient in terms of storage ratios and costs and are unlikely to ever be seriously considered. There is a considerable body of opinion which believes that the river is already over-allocated as peak summer crop demands are at the end of the dry season and often test the storages before the summer storms have refilled them. It is, therefore, important that any storages are sufficiently cost effective and large enough to meet present and foreseen needs.

Major dams at Nathan Gorge and Baroondah, as well as augmentation of existing weirs plus construction of purpose-built weirs to service the coal industry, are options under evaluation.

This proposal is based on a dam site upstream of Nathan Gorge which, depending on design and crest height of the dam, can store more than 150,000 ML without any impact on the nearby township of

Taroom. After due evaluation of the various options, this site and design capacity have been selected as the preferred option for consideration at present, pending conduct of an IAS.

The Dawson River as part of the larger Fitzroy Basin is currently subject to a Water Allocation Management Plan (WAMP) study. This will recommend an integrated catchment management plan which includes among other aspects, a minimum environmental flow which must be maintained in the river at all times. The capacity of the river to meet all its commitments without further development of storages is doubtful.

Economic development

The main economic activity in the Dawson Valley is based on agriculture and the coal industry. Of lesser importance are tourism, hydrocarbons and other mining, and industrial as well as commercial activity associated with the towns. As in much of Australia, further economic development is constrained by the lack of reliable water supplies. The potential for secondary industry development in the Valley is limited given its location and resource limitations. Consequently, agriculture and mining are likely to remain the mainstays of the economy. The Queensland Government is keen to see the revitalisation of rural towns and is constantly seeking opportunities to ensure the economic, social and environmental sustainability of rural Queensland. Additionally, there is significant government infrastructure throughout the region which requires sustained economic growth and population stability to ensure its effective use and realise its full potential.

The existence of Regional Development Organisations (RDOs) and the activities supported by funding through the joint State and Commonwealth Rural Partnership Program (RPP), are evidence of this commitment to regional economic development. The development of adequate and reliable water supplies to service the needs of agriculture, the mining industry and the major towns of Wandoan, Taroom, Cracow, Theodore, Moura as well as smaller centres, is a critical part of this economic strategy.

Social issues

An important aspect of the region is its diverse cultural heritage which contributes to the unique community values, lifestyle and social values of the region. The indigenous people have a long association with the area, particularly in the gorge and sandstone outcrop areas, as well as in the traditional hunting areas. Current studies will build on previous work in documenting the sites of cultural significance such as story places and other sites of spiritual significance.

Although European involvement has by comparison been relatively short (some 150 years), there are nevertheless, associations which are equally important dating from the time when Ludwig Leichhardt first crossed the Dawson River near where Taroom is now situated. It is still called the Leichhardt Crossing. Much of the early settlement was by pastoralists (sheep and wool) who followed Leichhardt and Charles Archer into the Dawson Valley. These early settlers were later followed by others seeking minerals and opening up the alluvial areas for cropping to feed the growing colony.

It is important that the cultural heritage of both the indigenous and European inhabitants of the region is both fully documented and protected as much as possible, while incurring minimal impact from the dam development if it proceeds.

2. UNDERSTANDING OF THE STUDY

Terms of Reference

The Consultant understands that the Study Terms of Reference (STOR) are a draft only; they were developed by the Department of Natural Resources (DNR) and a Local Management Group (LMG) which provided community input; they are currently being reviewed by external Advisory Bodies; and that they may be subject to modification as an outcome of this review process. The Consultant has accordingly, developed the following Methodology based on the draft information provided and accepts that subsequent adjustments may be required. Any adjustments will be subject to negotiation between the Principal and the Consultant.

The STOR clearly defines two components for the present study which, though they mark (i) the construction phase and (ii) the subsequent operational phase; both constitute essential inputs in the development of the Impact Assessment Study (IAS) and the preparation of the Environmental Management Plan (EMP). The Impact Assessment Study (IAS) needs to address all aspects of the biophysical and socioeconomic environment but responsibilities for the individual components have been clearly defined for the purposes of this study by the Principal as follows.

The Consultant shall be responsible for the following studies:

- general biophysical;
- terrestrial and aquatic environment of the dam and its impoundment;
- hydrology;
- socioeconomic issues (European cultural heritage and social aspects);
- water use effects; and
- preparation of IAS and Environmental Management Plan (EMP).

Other consultants shall be responsible for studies on:

- boggomosses and other spring-fed areas; and
- aboriginal cultural heritage.

The Consultant understands that these additional studies, along with recommendations of the Water Allocation Management Plan (WAMP) review, will be made available for input to and incorporation into the IAS and EMP during the course of the study.

The Study Area

From a reading of the STOR and further discussions with the Project Officer, the Consultant understands that the study area includes:

- the area bounded by the dam wall at approximately 314 km AMTD on the Dawson River and the 185 m EL contour (i.e the impoundment area);
- any additional area which the Consultant determines to be an appropriate halo buffer area around the impoundment;
- borrow areas for construction materials and construction needs;
- the section of the river below the dam to be affected by altered flow conditions; and
- the riparian access lands below the dam to the junction of the Dawson and Fitzroy Rivers.

In developing the IAS and the EMP, the Consultant recognises the need to determine the benefited area to properly evaluate the impacts (both negative and positive) which construction and operation of the dam will have on the Dawson valley. To this end, the Consultant proposes to undertake an economic scoping study which seeks to determine the net economic impact expressed in Net Present Value terms to assist in decision making. This will provide valuable input to the Principal's later economic study which will be used to justify and prioritise the construction of the Nathan Dam within the overall State water resource program. In addition, an evaluation will be made of alternatives to the development, including a 'do nothing' alternative to assess the private and public benefits or adverse consequences in the long-term.

Hydrological issues

The Dawson River System currently supplies water for irrigation, town water supply and extractive industries. The current yield from the system is estimated at some 60,000 ML/year. The proposed Nathan Dam, when constructed, is expected to increase this yield by 150,000 ML/year to a total of 210,000 ML/year. To achieve this target yield, it is estimated that the dam will need a full supply level of EL 185 m and a full supply capacity of 1 million ML.

A number of studies on catchment yield, flooding and water quality have been undertaken to date. However, all these studies are of a preliminary nature and have been undertaken as part of feasibility studies for various water resource development proposals considered for the Dawson River system. For example, the yield studies have been undertaken based on a monthly time interval, and flood studies have been undertaken using a preliminary backwater model based on uncalibrated discharges.

For a comprehensive assessment of the Nathan Dam proposal, more detailed studies using daily simulation models are required. The Consultant notes that such detailed studies on catchment yield, system demand and water allocation management planning (WAMP) are already underway. Ideally, the results of these studies would be available prior to the commencement of this present study. However, this is not the case, but interim results from these studies are expected to be available during the course of this study (in September).

It is understood that the consultant is not required to undertake any modelling work in this study. Rather, the consultant is to review and assess results from studies undertaken in the past and from studies currently underway and, if necessary, request the Department of Natural Resources (DNR) to undertake additional modelling runs to provide the necessary input to the impact assessment study.

The Consultant notes that the time frame specified for the initial phase of the IAS/EMP study is only 14 weeks. To meet this deadline, it is essential that at least interim results from the studies that are currently underway be provided early in the study and that responses to requests for additional modelling runs be made with minimum delay. If this is not the case, it will not be possible to provide the necessary outcome from this study within the specified timeframe.

Scope of the Study

Preliminary hydrological, land resource suitability and community interest studies undertaken by the Principal have identified that the availability of water from the proposed storage is the limiting factor in the extent of irrigation expansion, rather than the availability of suitable irrigation lands. To this end, the proposal is demand-driven rather than supply-driven, though the total supply available from the storage will be ultimately be limited by the maximum storage depth set at the 185 m EL at this stage.

It is understood that a detailed demand study, involving both existing landholders and other likely interstate stakeholders, will be undertaken soon to more accurately assess the need for irrigation water and to confirm the design parameters. There is no intention by DNR to implement an irrigation scheme and all water uptake for riparian use will be at the cost of the individual landholders once allocations have been assigned. Allocations will be made under a policy to be determined as a result of the recommendations arising from the IAS/EMP.

Outputs of the study

There are to be two major outputs from the study:

- an IAS; and
- an EMP.

Both of these reports are subject to review by the Principal, the Department of Environment, and the Local Management Group, and will be made available for local community review through both submissions and public consultation meetings.

The IAS/EMP will meet the statutory requirements of the Policies and Administrative Arrangements of the *State Development and Public Works Organisation Act of 1971-1981* as well as the Administrative Procedures of the Commonwealth's *Environmental Protection (Impact of Proposals) Act 1974*.

These reports will include recommendations from the other studies and integrate the findings of all component studies undertaken by the Consultant. All conclusions drawn and recommendations made in the IAS and the EMP will be supported by documented evidence which can withstand rigorous evaluation. The IAS/EMP will be prepared in the preferred format established by the Principal in the STOR, modified where necessary to take account of the study's findings. In particular, the Consultant understands the IAS is to:

- describe the development proposal and any possible alternatives for achieving the development objectives;
- describe the biophysical, social, cultural and economic environment impacted by the project;
- define and analyse the likely impacts (both adverse and beneficial) and identify measures to mitigate any adverse impacts; and
- be subject to community review and subsequently amended.

Further, the Consultant understands the EMP is to:

- establish criteria for the sustainable irrigation of land from the dam and streamflow;
- set out clear management guidelines for land use;
- establish conditions for irrigation management to be met as a precursor to the assignment of water pumping rights;
- determine appropriate guidelines for buffer zones around the impoundment;
- determine appropriate permissible uses of land within the direct catchment of the impoundment; and
- develop recommendations for the protection of flora, fauna and cultural heritage sites.

This EMP is to reflect the Department of Environment's (DoE) requirements under existing legislation controlling the conduct and application of IAS and EMP studies, current government policy initiatives and the community's expectations. At the same time, it will need to be a practical document which takes account of the realities of the economic, social and environmental conditions applying in the impacted region, while recognising the constraints faced in implementation and regulation of complex environmental management plans. Such an outcome will require close consultation between the Consultant, the Principal, the DoE and representative community groups both at the local level and at the broader level (i.e. the Irrigators' Association of the Dawson Valley Development Association and representative Aboriginal Groups such as the Ji:man people).

3. METHODOLOGY

The methodology for the study has been developed to address the key issues raised by the STOR for each of the major study components, covering both the construction and operational phases. The

study has been assigned to a series of readily identifiable tasks which best describe the activities to be undertaken by each member of the team. For each task identified, the expected outcomes of the activities are clearly documented to assist the Principal evaluate the Consultant's proposed methodology and its likelihood of meeting the STOR and the Principal's expectations.

The Consultant recognises that the Dawson River environment is no longer a pristine environment, having been used for agriculture and pastoral pursuits since the first settlement in the mid 1800s. The IAS/EMP, therefore, will not seek to address issues of resource degradation and resource management as though the area was being developed for the first time. Rather, the Consultant believes that the study should be premised on ensuring sustainable further resource development while seeking to enhance environmental aspects through sound environmental, water and land management strategies. Amongst other things, this may include developing recommendations for water management strategies based on an adaptive flexible approach which achieves satisfactory production and environmental outcomes by combining water allocations with environmental flows as part of a capacity-sharing process of water management.

The Consultant proposes a team approach in which team members are responsible for individual activities within their discipline and where the team is effectively integrated through close consultation to ensure optimum benefits from the collective inputs of each study component. Team consultation and external liaison with the Principal and local community advisory groups will be the responsibility of the Project Manager(PM)/EIA specialist. The following section sets out the team composition, describes their individual responsibilities and documents a detailed methodology for the study.

The team

The following team roles have been identified by the Consultant as necessary to undertake the study and to achieve the objectives as set out in the STOR. In support of this methodology, a detailed description of each team member in terms of experience, capability to undertake the work and specified inputs is given in Form B.

Team member	Role title	Brief role description
Dr Robert Thistletonwaite	Project Manager/IAS/EMP specialist	<ul style="list-style-type: none">• Manage the project on behalf of the Consultant• Coordinate the preparation of the draft IAS/EMP• Manage the IAS/EMP review and finalisation
Mr Peter Shields	Land resource/IAS specialist	<ul style="list-style-type: none">• Undertake an evaluation of the land resources of the impacted area• Assess published reports on soils, land suitability• Derive recommendations on land use management conditions for sustainable irrigation• Assist in the preparation of the IAS/EMP and its subsequent review• Coordinate with other key team members in integration of data
Dr Chris Joy	Hydrology specialist	<ul style="list-style-type: none">• Assess hydrological data for storage design• Evaluate operational aspects of dam relative to down valley commitments• Evaluate and incorporate

		<p>recommendations of WAMP study</p> <ul style="list-style-type: none"> • Assist in preparation of IAS/EMP and its subsequent review
Mr Ian Whan	Economist	<ul style="list-style-type: none"> • Undertake socio-economic analysis • Determine benchmarks of social and economic performance of system • Derive net impact in NPV terms as basis for decision making • Assist in preparation of IAS/EMP and subsequent review • Work closely with other key team members in consultation and evaluation process
Ms Ann Wallin	Cultural heritage and social impact specialist	<ul style="list-style-type: none"> • Evaluate European cultural heritage • Assess social impacts of proposal • Incorporate relevant aboriginal heritage findings in IAS/EMP • Assist in any community consultations and review of IAS/EMP
Mr Ralph Dowling	Terrestrial and aquatic flora specialist	<ul style="list-style-type: none"> • Undertake an assessment of the terrestrial, riparian and aquatic flora potentially impacted by the construction and operation • Identify by field and data search any rare or endangered species present • Incorporate findings of separate boggomoss study • Develop recommendations for mitigation of adverse impacts • Assist in preparation of IAS/EMP and subsequent review
Dr John Anderson	Freshwater fauna specialist	<ul style="list-style-type: none"> • Evaluate existing study findings on fauna • Undertake additional surveys to determine any rare or endangered species present • Develop recommendations for mitigation of adverse impact of construction and operation phases • Assist in preparation of IAS/EMP and subsequent review
Dr Amy Jansen	Terrestrial fauna specialist	<ul style="list-style-type: none"> • Evaluate existing studies and incorporate findings • Undertake additional surveys across seasonal differences • Develop recommendations for mitigation of adverse impact of construction and operation phases • Assist in preparation of IAS/EMP and subsequent review

Project mobilisation

The Consultant will be able to commence work on the project within one week of being advised of selection and the contract negotiations being finalised. All members of the team are based in Brisbane with the exception of the terrestrial and aquatic fauna specialists and their availability will be according to the proposed methodology and worksheet schedule. During peak field activity in the

study area and for the duration of all local consultations and liaison, the Project Manager will establish a headquarters in Taroom. Otherwise all project management will be coordinated from the Axis office in Brisbane.

Prior to formally commencing the field study and within 14 days of the date of acceptance of offer, the Consultant proposes to convene the Team to develop a detailed program for all activities to be undertaken. This will expand on the indicative logframe of work provided in this proposal and more accurately reflect the specific activities, adjusted to take account of any changes requested by the Principal following the present public review of the draft STOR. The program will establish milestones and performance criteria for conduct of the study, and a process of monitoring and review will be established to assess progress and ensure the project is completed on schedule. This detailed program will be provided to the DNR Project Officer for approval and modification if necessary. Once accepted by the Principal, this program will constitute the basis for Project Management.

The Consultant proposes to schedule a series of initial meetings with the various members of the team, the Principal and the local community advisory groups to identify key issues for consideration. Subsequent liaison with the Principal will be the responsibility of the PM, except where otherwise indicated.

Project management

Axis Environmental Consultants Pty Ltd will provide the Project Manager (PM), Dr Robert Thistlethwaite, who will be based in Taroom for the coordination of peak field activity and for all public meetings and community consultation. The PM will be supported by the extensive resources of Axis and the other team members.

The PM will be responsible for all liaison with the Project Officer, Mr Ken Watson, DNR, Brisbane, the Local Management Group and the team members. He will facilitate all community consultation processes required with all stakeholders associated with preparation, review and finalisation of the IAS and EMP. The PM will be responsible for the preparation and submission of all monthly invoices to the Principal, and for all general administrative management of the team and the study. The major tasks of the PM are as follows:

Major tasks - Project Manager

- ◊ manage liaison with the Principal, the Local Management Group, community groups and all other relevant bodies;
- ◊ assisted by team members, prepare the formal program schedule for approval;
- ◊ manage, facilitate and coordinate the functions of the team;
- ◊ manage and coordinate all reporting and billing functions;
- ◊ coordinate and organise all necessary community consultation meetings;
- ◊ provide logistical and administrative support for the team;
- ◊ undertake the role of the EIA specialist;
- ◊ coordinate inputs to and assume responsibility for preparation of the IAS and EMP; and
- ◊ coordinate and undertake all modifications to the IAS and EMP following public review and prepare the final study reports.

Major outcomes - Project Manager

- ◊ a successfully managed project;
- ◊ a complete IAS and EMP which meets all expectations and objectives of the Principal according to the STOR and is acceptable to the community interest groups;
- ◊ a well-managed study completed on time and within cost estimates.

Consultation

There is little likelihood of the IAS and EMP being acceptable to the various interest groups and achieving broad community support and commitment unless a successful community consultation process is undertaken by the team as an integral part of the study. This includes involvement of the Principal (representing State Government interests), the various Local Government authorities (Taroom, Banana and Duaringa shires), the Dawson Valley Development Association (DVDA), the Irrigators Association, local Landcare groups, commercial interests in the towns, other relevant community groups.

The Consultant is aware that the DNR has commissioned a separate study of aboriginal cultural issues by the Ji:man people. Nevertheless, it is essential that close liaison is maintained with this group during the course of the field studies and also the preparation of the IAS and EMP, to ensure that the Team is aware of culturally sensitive issues and that due recognition is given to the incorporation of their recommendations into the IAS and EMP.

Additional inputs to this process will occur during the demand survey to be undertaken by the Principal independently of this study. It is anticipated that the Team members will, during the course of field activities, encounter many of the potential beneficiaries of the project, and create in them an awareness of the tangible implications of the dam for economic growth in the valley.

At the completion of the preparation of the draft IAS and EMP, if this consultation process has been successful, there should be a greater community awareness of the findings and contents of the IAS and EMP than otherwise would be expected, resulting in a relatively trouble-free public review phase.

Biophysical environment evaluation

1. *Land resources*

The land resource part of the biophysical assessment is based on the understanding that there are two distinct study areas with each requiring specific investigation: (i) the impoundment, associated infrastructure sites, and appropriate buffer zone around the impoundment and the Dawson River downstream to the junction with the Fitzroy River; and (ii) all possible benefit areas that may be irrigated. In undertaking such an assessment there a number of clearly defined activities required. These are specified later under major tasks. In developing the methodology for the resource assessment, the Consultant has identified tasks based on the two components above.

Assuming the EL 185 contour represents the impoundment area, the impoundment, the construction and the borrow areas all have well defined geographic boundaries. Nevertheless, this first study area must be extended further to include any land above the FSL on which the Principal will need to directly control land use as well as a wider area where land use options may impact upon water quality. Accordingly, the investigation will include all subcatchments draining directly into the impoundment to more effectively assess the land use constraints, planning and management implications for maintaining water quality. This will enable effective definition of a preferred buffer zone requiring either resumption (for management by the Principal) or cooperative management with the local authority and landowners under guidelines of permissible uses and practices. The upstream catchments extend approximately 10 km from the impoundment and include Taroom township.

The second study area is associated with the release and utilisation of water. This area extends approximately 314 km downstream along the Dawson River to its junction with the Fitzroy River,

though there is no defined boundary on either side of the stream. Under this proposal, the Consultant will consider all land that can be reasonably irrigated by private schemes within this study area. The Consultant understands that additional allocations may be provided to the Dawson River Irrigation Area at Theodore, and this will be taken into consideration in the assessment. In discussing the resource appraisal process these subareas will be referred to as the impoundment area (immediately surrounding the FSL); Nathan upstream (subcatchments within 10 km of the impoundment); and the benefit area (downstream to the Fitzroy River junction).

In undertaking the resource assessment, three components have been identified:

- Existing environment - collation of baseline data;
- Water use effects - land use suitability and land use constraints; and
- Environmental impacts - based on social and biophysical impacts in relation to land and water use.

Existing environment - Collation of appropriate baseline data is essential for assessment of land tenure, land condition, remnant vegetation and potential impacts as well as providing and adequate basemap for displaying geographic information for both study areas. Baseline data which is essential for the impoundment area includes cadastral information such as real property boundaries, description of lots and land tenure, geodata describing the land resources (topography, geology, soils and hydrology), FSL of the dam and Landsat TM data for mapping land use and remnant vegetation.

Although the location and boundaries of the benefit area are not defined precisely, for the purposes of this study an envelope on either side of the Dawson to the Fitzroy River will be defined for investigation. This envelope will be large enough to cover all land that could be reasonably irrigated from the river as part of a private irrigation scheme as well as including the existing irrigation area between Theodore and Moura. The benefit area delineated by this method will be very large, and as the actual irrigation area within this envelope will not be defined, it will be inappropriate to undertake detailed geographic analysis of land tenure, lot size and remnant vegetation for this part of the study. However, broadscale geodata in the form of land resources and original vegetation will be collated to enable identification of particular landscapes that are suitable for irrigation and the potential impacts of any irrigation. *Can* *Why?*

Similarly, broadscale land resource and remnant vegetation data will be collated for the Nathan upstream catchments.

All data will be compiled within MAPINFO GIS enhancing overlay and intersection of different coverages. The GIS also enables map coverages of different sources and original scales to be reproduced at a uniform scale, but this scale must be appropriate for the original coverage and the purpose of the study. All maps generated during this study will be produced at a scale of 1:25,000 to 1:50,000 within the impoundment and at a scale of 1:500,000 for the remaining areas.

The cadastral information will be acquired in digital format from the DNR DCDB for direct input into the GIS. Land tenure information is also available as part of the DCDB. Geodata are presently available as hard copy maps that will be digitised into the GIS by the Consultant. A hard copy map of the dam FSL supplied by the Principal will be incorporated in the GIS.

The most detailed topographic maps available for the impoundment are at 1:100,000 scale. These will be used to delineate and describe all landforms and modal slope classes within the area using the classification of the Australian Soil and Land Survey Field Handbook (McDonald *et al.* 1990). The terrain units delineated on the topographic maps will be input to the GIS. Such detailed terrain analysis is not proposed for the benefit area as its actual location and boundaries are unknown. The CSIRO has produced a series of land systems maps covering Central Queensland with the Dawson-Fitzroy map (Speck *et al.* 1968) covering the benefit area. A land system represents an area of

common geology with similar topography, soils and vegetation patterns. The available land systems information will be used to produce a broadscale classification of landforms and modal slope classes within the benefit area. Similar methodology will be used for terrain analysis in the Nathan upstream catchments.

The land systems map of the Dawson-Fitzroy region and the later DPI land resource mapping of Taroom Shire (Forster 1985) will form the basis for describing the land resources of the impoundment area. The later DPI mapping is basically an amalgamation of the original land systems data and detailed field investigation will be undertaken to verify both data sets within the impoundment area. A land resource inventory describing the geology, geomorphology and soils will be produced from a review of available literature and detailed field investigation.

A detailed soils map that is available for the riparian area around Theodore (Isbell 1957) will be overlain on the land systems map of the Dawson-Fitzroy to produce a combined map of the land resources within the benefit area. Each land system is subdivided into a number of land units representing homogenous patterns of soil, topography and vegetation. The land units are described but not mapped for each land system. The more detailed land unit information will be used in conjunction with soils data provided by Isbell (1957) to produce a land resource inventory describing the geology, geomorphology, soils and proportion of the mapping unit within the benefit area. Limited field investigations will be undertaken to verify mapping unit boundaries and dominant components.

Similar methodology (i.e to that for the benefit area) will be used to compile a land resource inventory for the Nathan upstream catchments.

Water use effects - The land suitability of each land resource mapping unit for irrigated agriculture will be assessed based on the standard methodology described by the DPI Land Resources Branch Staff (1990). Crops included in this assessment will include cotton, cereals, lucerne, horticultural tree and small crops and pastures. The more detailed land unit information and soils data of Isbell (1957) will be used to compile an inventory describing the suitability for irrigation, limitations to irrigation and proportion of the mapping unit.

This approach will be identical for the impoundment area, the benefit area and the Nathan upstream catchments.

The Landsat TM data for the impoundment area will be visually scanned to produce a preliminary map of current land use. Detailed field investigations will be undertaken to verify the preliminary mapping and add site data such as buildings, water tanks, stockyards and other farm infrastructure.

Land tenure information from the DCDB will be checked with Taroom Shire records to produce an accurate database describing lot size, ownership and tenure.

Limited field investigation will be used in conjunction with Landsat TM data and available aerial photographs to assess land and water use within the Nathan upstream catchments.

The size of the potential benefit area prohibits detailed assessment of current land use but limited field inspection will be undertaken to compile a broadscale description of land use activity downstream to the junction with the Fitzroy River.

Existing land degradation will be mapped within the impoundment area using the Landsat TM imagery and detailed field investigations. Land degradation to be assessed includes sheet, rill and gully erosion, streambank stability, secondary salinisation and woody weed regrowth. Limited field

investigation will be used in conjunction with Landsat TM to undertake a less detailed investigation within the Nathan upstream catchments.

Limited field inspection will be undertaken to compile a broadscale description of land degradation within the benefit area with particular emphasis placed on verifying streambank stability along the Dawson River.

Remnant
Veg?
wetlands?

Environmental impacts - The Consultant will determine the extent of disturbance to the biophysical environment due to impoundment and irrigation and recommend practical means of mitigating any negative impacts and enhancing the potential positive impacts. At this stage of the study, it will be essential that all team members consult to ensure a fully integrated approach to defining impacts and developing effective strategies to mitigate adverse impacts as part of a wholistic approach to catchment management. This will also include an evaluation and incorporation of outputs from the boggomoss and the aboriginal cultural heritage study where appropriate.

Potential economic benefits for agriculture from an additional supply of irrigation water include an increase in production of crops presently grown within the benefit area and the possibility of establishing new crops. The Consultant will undertake a simplified market analysis to identify and quantify, wherever possible, these benefits as well as describe the constraints to each. This will involve the Economist working in conjunction with the Land Resource Specialist to match resource needs with opportunities.

Potential negative impacts include a loss of agricultural production from the impoundment area and the upstream catchments if land use constraints restrict agricultural use as a condition of maintaining water quality. Such effects will be similarly identified and quantified wherever possible.

Preferred land use management within the Nathan upstream catchments will be evaluated based on the existing land tenure, land use, remnant vegetation, land degradation and planning constraints as well as the suitability for agricultural use.

In particular, the study will determine in consultation with all team members, the size of any desirable buffer zone around the impoundment, indicated as fundamental to the control of land use and water quality. As a result, the Consultant will be better able to assess the need for land use restrictions within the subcatchments and the buffer zone and make reasoned recommendations on the size, permissible uses and management requirements acceptable within the buffer zone and in the upper catchments.

While the Consultant recognises that it is the role of the Principal to make policy decisions with respect to the definition, declaration and management of the buffer zone, this study should provide a sound scientific basis for the determination of such policy. Innovative solutions to use and management of the buffer zone which may not involve the traditional resumption and management of the catchment under the auspices of the Principal are actually envisaged for this project.

The potential impacts on vegetation clearance associated with land development for new irrigation farms will be assessed. Guidelines for land clearing will be developed and will incorporate areas of specific concern within the riparian zone.

* existing?
Best?/
Flood/valleys

The salinity and land degradation hazard resulting from irrigation on each suitable land type within the benefit area will be evaluated. Evaluation of the salinity hazard will be based on the DNR's SALF model which determines root zone salinity, deep leaching fraction and salinity of the water draining below the root zone for a wide range of soil, crop, rainfall and irrigation variables. Evaluation of the land degradation hazard will be based on soils and terrain features of the suitable land types. As a result of these assessments it will be possible to recommend best irrigation and farm

management practices for each land type. This will enable the Principal to develop a policy for the determination of water allocations and to impose management conditions under the EMP.

On farm water management guidelines for a number of potential development scenarios will be developed. These scenarios will cover expansion of existing irrigation areas as well as new areas to be developed under the proposal. The guidelines will cover such issues as the disposal and reuse options for tailwaters, the construction and location of off-stream storages, and the role and need for conjunctive use of groundwaters in areas subject to salinisation.

These findings and recommendations should, further, provide a sound basis for the development of government policy on water allocation and use rights and conditions for water management and disposal within the context of the EMP.

Major tasks - Land resource assessment

- What does this mean?*
- ◊ describe the land resources within both study areas;
 - ◊ describe the general socioeconomic, land use, hydrological, vegetation and faunal issues as they relate to an appreciation of the importance of the land resources of the areas;
 - ◊ assess the environmental impacts (both positive and negative) on the land resources;
 - ◊ assist in the determination of effective strategies for the definition and management of the buffer zone around the impoundment;
 - ◊ develop criteria for land suitability assessment and determination of irrigation suitability to assist the Principal in formulating policy for water allocation and irrigation management;
 - ◊ develop recommendations for mitigation of adverse impacts and enhancement of positive impacts; and
 - ◊ prepare documentation for inclusion in the IAS and EMP and assist in the review and revision of these documents.

Major outcomes - Land resource assessment

- ◊ GIS and resource database as a primary tool for decision making in land management for the areas;
- ◊ complete baseline data which describes the physical and environmental attributes of the area;
- ◊ assessment of buffer zone requirements and sustainable land use management practices for the potential irrigation lands in the benefited area; and
- ◊ completed IAS/EMP.

2/3. Terrestrial flora and aquatic flora

The Consultant recognises the critical importance of understanding the impact of the construction and operational phases on the vegetation communities in the dam impoundment area and along the riparian zone of the Dawson River. Given the long history of river regulation and controlled flows from the existing weirs, it is not anticipated that the new dam will greatly affect riparian vegetation. Therefore, the majority of the effort in the terrestrial and aquatic flora aspects of the study will be put into the impoundment area.

The study will commence with a literature review to assess the available botanical information for the proposed dam site and adjacent areas. This will include the production of a list of plant species known for the dam and adjacent areas using the Queensland Herbarium HERBRECS database. Any rare and endangered species known to be present in the area will also be identified from this search

and special attention paid to these during field activities. The information generated will be used as a base list for checking and modification following field investigations. Other species observed in the field would be noted and where necessary, specimens collected for identification and incorporation in the Queensland Herbarium collection.

Aerial photography and Landsat imagery would be examined and aerial photography interpretation undertaken to delineate the vegetation types or associations as well as patterns which require field verification. This API would be followed by field validation surveys. During field survey, vegetation data would be undertaken using standard methodology and recording format to record floristics of plant communities in the area. These data would then be input to the CORVEG database for use in data analysis where required. The vegetation units would be confirmed on imagery and entered into a GIS along with site locations and other related information. A vegetation map would be produced at appropriate scales for the various data interpretations needed. At this stage, it is envisioned that 1:25,000 scale be used for the dam impoundment, 1:50,00 scale for the Nathan upstream segment, and 1:500,000 scale for the downstream component.

Photointerpretation and Landsat imagery assessment supported by limited field checking would be undertaken to evaluate and document any significant vegetation communities between the dam and the junction of the Dawson and Mackenzie Rivers. *Finding?*

Information of value with respect to the riparian vegetation in particular will be made available for inclusion in the standard recording format for the *State of the Rivers* database as part of the freshwater fauna study segment.

A report would be prepared covering, but not necessarily confined to: vegetation units and plant community descriptions; the significance of any plant species, communities or associations in the area; evaluation of past and current disturbance to the site; and the extent, nature and significance of introduced and pest plant species on the impacted area. Comments of a similar nature would also be made about the aquatic and riparian vegetation but would also include comments on the sensitivity of aquatic flora to changes in flow regimes, water levels and water quality in the area.

Major tasks - terrestrial and aquatic flora

- ◊ collation of available information from literature review and HERBRECS;
- ◊ aerial photography and satellite imagery interpretation;
- ◊ field traverses and site collection of vegetation data;
- ◊ data entry to database and to CORVEG;
- ◊ production of vegetation and associated vegetation map units and descriptions; and
- ◊ report preparation.

Major outcomes - Terrestrial and aquatic flora

- ◊ vegetation maps at an appropriate scale for various needs suitable for planning and assessment purposes;
- ◊ species lists for the study area including any rare and endangered species;
- ◊ areas of botanical significance and an assessment of potential adverse impact;
- ◊ evaluation of potential beneficial impacts if any from impoundment; and
- ◊ completed reports and expanded vegetation database for Queensland.

4. Terrestrial fauna

The loss of an area of vegetation within the impoundment area and potentially some disturbance to some riparian impacts may affect both fauna which inhabit these vegetation types and those which use it for movements between areas. Given the existence of Glebe Weir and the established modified environment around the weir, the relatively small increase in impoundment area on that reach of the river is not expected to be great. Nevertheless, between Glebe Weir and the proposed dam wall there is potential for impact which requires assessment.

The methodology to be used includes a review of published material undertaken as preliminary studies and other literature relevant to the area, together with an assessment of records of rare and endangered species known to be associated with the potentially impacted area. Additionally, fauna surveys will be undertaken to determine type, distribution, population and any seasonal variation detectable in the limited time available.

Though much of the area within the impoundment area and the surrounding region has been used for agriculture and pastoral purposes for many years and the wildlife has adapted to these changes, there is a need to assess the occurrence of any significant species from a commercial, conservation and recreational aspect and evaluate the likelihood of any adverse impact from the construction/operation of the dam. These surveys will rate species in terms of how representative they are of regional populations and additionally, assess any likely population growth caused by the establishment of a major new water impoundment.

An examination of GIS output will be undertaken to determine the extent and type of habitats of concern (riparian, forest, woodland and grassland) that will be inundated or in some other way affected by the construction or operation of the dam. Habitat definition will be determined across the study area and documented in maps showing areas of significance and wildlife corridors of concern. This will be supported by field survey to describe and assess the extent of different habitats within the affected areas. Daytime searches will be carried out to determine the presence of birds, macropods and reptiles, supported by night-time searches for arboreal marsupials and frogs and other animals along the riparian zone. This information will be recorded in a format compatible with the *State of the Rivers* database used for the aquatic survey.

Studies will also be undertaken, including consultation with local landholders, to assess the occurrence of feral and exotic fauna species and to determine the effect of these species on local native species and habitats.

In preparing input for the IAS and developing recommendations for the EMP due consideration will be given to the findings of other team members, and in particular, close consultation will be maintained with the land resource specialist in the development of recommendations for the definition and management of the buffer zone.

Major tasks - Terrestrial fauna studies

- ◊ review all available faunal literature and relevant studies;
- ◊ describe species and major habitats present in the likely affected areas, including details of faunal surveys);
- ◊ describe vegetation types in terms of fauna habitats;
- ◊ indicate rare/endangered species present based on relevant Queensland and Federal legislation;
- ◊ evaluate effect of vegetation clearance for construction and agriculture on fauna species and habitat;
- ◊ assess impacts of construction, quarrying and human activity during construction phase;
- ◊ assess the destruction, disturbance or isolation of habitats, natural communities, refuges, wildlife corridors, barriers to movement and recolonisation caused by the dam;

- ◊ assess both negative and positive impacts on fauna of inundation;
- ◊ assess effects of construction and operation on feral animal populations;
- ◊ liaise closely with other team members in developing principles and management of the buffer zone concept; and
- ◊ contribute to the preparation, review and revision of the IAS/EMP.

Major outcomes - Terrestrial fauna studies

- ◊ documented lists/maps of all fauna, feral animals, habitats and wildlife corridors impacted by the proposal;
- ◊ a clear understanding of the local faunal relationships to the site and the level of disruption to habitat, movement, populations and distribution both during the construction and operational phases;
- ◊ a list of any rare and endangered species in the area; and
- ◊ a completed IAS and recommendations for inclusion in the EMP.

5. *Aquatic and riparian fauna*

The fundamental approach is to use the *State of the Rivers* methodology developed by the consultant to classify the habitats in the area of the dam and impoundment, and to rate their value and condition (ecological and physical) in the context of distribution of similar habitats in the Dawson River Catchment. This will be achieved by reviewing previous studies and by re-analysing existing data collected for a study by Telfer (1995) of the Dawson River using this methodology. The existing data and sites will be supplemented by additional surveys in the study area using the same methodology (see recording system in Appendix II). This process is facilitated by the involvement in the study team of Dr. John Anderson who developed the methodology upon which this survey was based. These data summaries will enable the value of the areas directly affected by the new dam to be assessed in terms of the type, value and condition of similar habitats throughout the Dawson catchment.

The methodology includes a technique for assessing the passage/flow relationships at each site surveyed and for making a preliminary assessment of the relationship between flow stage and habitat availability and habitat condition using the transects taken at each site (see Appendix II. -Data Sheets). The extra sites surveyed in the vicinity of the dam site and immediately downstream through the Nathan Gorge to the Gyranda weir will provide the basis for the IAS and the EMP in terms of habitats and ecosystems. The capability of the consultant to undertake these studies and to re-analyse the existing *State of the Rivers* database is crucial for this task. The involvement of the public consultation in identifying key areas and issues is also seen as being important. The sites to be surveyed will be partially determined by the public consultation. Importantly, the *State of the Rivers* methodology has been designed to be repeated - site locations are precisely defined and standard photographs are taken at each site. This provides the basis for continued monitoring through the EMP.

- **Riparian and aquatic fauna surveys** - Specific purpose surveys of aquatic fauna will be conducted to supplement existing information on species occurrence and distribution and community/habitat relationships. The short-term nature of the study will restrict the surveys- no detailed seasonal surveys can be conducted, relying instead on supplementing existing data with seasonal data covering the study period. The purpose of these surveys will be to identify species of special concern in terms of conservation status or commercial and recreational uses, and the presence of exotic species. The surveys will include fish, macro-invertebrates, reptiles, amphibians and aquatic mammals, with major emphasis on fish. The surveys will be extended into areas immediately upstream and downstream of the new impoundment, and further downstream as required to supplement existing information. These surveys will be used to identify the migratory passage requirements for the species (if any), and to assist in developing the IAS and the monitoring program for the EMP. The *State of the Rivers* methodology includes a broad-scale assessment of riparian vegetation communities which will add to the other flora surveys.

In-situ water quality measurements (depth profiles) of temperature, dissolved oxygen, salinity and pH will be taken during the fish surveys, and at selected sites during the *State of the Rivers* surveys. Water quality changes in downstream impoundments and deeper pools is seen as of major importance for the EMP and environmental flows studies. These measurements, when combined with existing water quality data, will enable the impact of regulated flows on water quality and habitat value to be predicted. The habitat data available from the *State of the Rivers* assessment at the fish survey sites will provide a means to assess habitat requirement information to supplement existing data. These fauna surveys will also be used to develop the monitoring program for the EMP.

- **Likely environmental impacts on riparian and aquatic fauna and environments and major issues for environmental management** - The environmental impact needs to be assessed in the context of the existing values of the environment and habitat, and the condition of those habitats. The special consideration required to minimise impact on the riparian communities in the Precipice (Nathan Gorge) National Park immediately downstream of the dam site is an issue, although aquatic communities are not specifically protected. The area of the impoundment and the area immediately downstream of the dam that will receive the direct impact are already regulated through existing weirs - Glebe Weir, Gyranda Weir, Orange Creek Weir, Theodore Weir, and Moura Weir, on the Dawson River and a number of weirs on the tributaries. The area of major direct impact will occur within the limits of the new impoundment, and the 30 km section of the river between the dam (AMTD 314) and the next downstream obstruction at Gyranda Weir (AMTD 284).

The study will need to address environmental impacts occurring during the dam construction, during the filling phase and during various operational guidelines developed for downstream releases according to the storage within the dam when completed. The study will need to address

impacts caused by reduced flows, changes in the flooding regimes and variability of flows. It will also need to consider possible negative and positive impacts of releases from the storage to meet water needs downstream (higher than normal flows, water quality considerations). In this context the possible environmental impacts during construction and operation associated with water use will need to be considered in the Dawson River between Taroom and the Mackenzie River junction. It is also clear that the issue of environmental flows needs to be focused on the area of direct impact but also on the general issue of environmental flows in the Dawson River, given the relatively large size of the new storage and the likely changes on water use and management in the catchment.

The fact that most of the area already has regulated flows and much of the area is in only moderate to good condition (Telfer 1995) does not imply that there are only low environmental values that need to be protected. The environmental impact assessment should be considered in an overall context - that is in terms of a net impact considering losses and benefits. For a system that is already modified, the opportunities for restoring or enhancing environmental values becomes more important.

In terms of environmental flows the preferred approach is that of 'hands on' management rather than protection of some proportion of existing values. The concept is to identify key environmental concerns, issues and species, and then to establish the flow needs to maintain or enhance these values and the practical flow management strategies that are possible within the water use management plan for the new scheme. The concept is to identify key targets, key criteria for their achievement and key practical attributes which can be monitored during the EMP. The establishment of targets and objectives that are translated into practical and measurable entities is seen to be an important part of the public consultation process.

The low rainfall of the area, the history of relatively frequent flow stoppages in the Dawson River, the existing flow regulation and weirs on the Dawson provide an important framework for the IAS, EMP environmental flow aspects of the study. It would appear that water quality within existing natural pools and weir pools in the river during low flow periods is likely to be a major issue. This concerns temperature stratification leading to hypoxia below the thermocline with subsequent loss of habitat values and available habitat for aquatic fauna and possible fish-kills following 'first-flush' events and also algal blooms etc. It is also likely that the new dam and greater storage and diversion from the Dawson River will primarily affect the minor and moderate flood events. The major flood events and their environmental impact will be unaffected. It would appear that the impact of the new scheme on flow variability and water quality issues are likely to be more important than low flows and flow stoppages.

Ideally an adaptive management approach should be incorporated into the environmental management plan. Future monitoring of key environmental targets and areas of concern may require changes in release strategies from the initial strategy. Where possible, the ability to make

these changes and the criteria upon which they can be justified, should be established as part of the EMP. If possible the concept of 'capacity sharing' with a portion of the storage capacity set aside for environmental use should be included as an option. This allows the issue of flow variability to be addressed, and it also allows the environmental release strategy to be changed without affecting other users.

There is a great deal of scope for maximising environmental benefits through the close cooperation of the water managers and those responsible for maintaining environmental values. Changing the timing of releases from the dam to meet downstream water use requirements and the general management of the releases can provide environmental benefits whilst still meeting the delivery requirements. For example, if there is a need to fill a downstream weir to meet an irrigation requirement, the way this release is made can be beneficial to the environment. Making the release slowly over many days may reduce a potential harmful impact downstream. At other times, making a relatively large release over a shorter time may be preferred environmentally to provide a flush to improve water quality or to provide for fish passage at critical times. As far as possible these operational guidelines to maximise environmental benefits whilst still meeting water delivery requirements should be built into the EMP, especially in a system that has already been modified.

Major Tasks - Review of previous fauna studies

- ◊ Prepare a general literature review for the aquatic and riparian environments in the area including all relevant published and unpublished reports.

Major outcomes - review phase

- ◊ Literature review for the IAS and EMP Reports;
- ◊ Guidelines to direct the public consultation, habitat assessments and aquatic fauna surveys and interpretation of the key features and species to be considered in terms of environmental impact during construction and operation of the water storage;
- ◊ Review of fish species distribution, habitat requirements, stocking history, recreational fishing records for the Dawson River;
- ◊ Initial listing of rare or endangered species or key habitat issues; and
- ◊ Provide background for the public consultation.

Major task - Public consultation

- ◊ Review of existing reports which are outcomes from local interest groups including the Dawson Valley Appraisal Study and the Dawson Valley Integrated Catchment Management Program Catchment Study;

- ◊ Consult with recreational angling groups and the general public through meetings/workshops;
- ◊ Participate in the general public consultation phase of the project; and
- ◊ Summarise the list of issues and concerns raised and to ensure that they are addressed during the study.

Major outcomes - Public consultation phase

- ◊ Contribution to the public consultation; and
- ◊ Preparation of summary reports of the outcomes and issues raised.

- **Survey, classify and rate current aquatic habitat and environment values and condition in river sections to be inundated by the new reservoir and areas immediately upstream and downstream of the dam and impoundment** - This task will be undertaken using the *State of the Rivers* methodology. The existing report on the Dawson River and major Tributaries (Telfer 1995), will be reviewed to provide for the general overview required for the study. The surveys are focused on instream attributes and include the following components each of which is surveyed using a separate datasheet and linked database.
- *Site location and stream section information (length of section, sub-catchment area);*
- *Channel habitat classification (pools, riffles, runs and relative size);*
- *Channel dimensions, bed and bank sediments, cross-sections for each habitat type;*
- *Bank dimensions and condition assessment;*
- *Bed and bar dimensions and condition assessment (including passage criteria);*
- *Riparian and aquatic vegetation;*
- *Aquatic habitat assessment;*
- *Scenic and recreational values (semi-subjective); and*
- *Conservation values (semi-subjective) for aquatic, riparian and wildlife corridors (See attached data sheets).*

*W.H. flow cross-sections
& gauging?*

Additional sites will be surveyed to provide detailed information on the type of aquatic habitats and their current ecological and physical condition in the area of the impoundment and the areas immediately upstream and downstream of it. The data from the new sites will be combined with the original data to provide a detailed evaluation of the type, condition and value of the aquatic and riparian habitats to be impacted by the proposed development.

This aspect of the study has three objectives:

- Broad-scale environmental evaluation of the area to be inundated by the new dam and the areas immediately upstream and downstream of the new impoundment;

- Identification and relative ranking of environmental values of areas/features potentially affected by the development in the context of the condition and value of habitats in the rest of the Dawson River catchment; and
- Broad-scale assessment of the relationships between habitat distribution and availability for various flow regimes.

A total of 20-30 additional sites will be surveyed in the areas to be inundated and in the areas immediately upstream of the impoundment limits and downstream of the dam site. This will supplement the 5 sites on the Dawson between Taroona and Theodore, and 6 sites in the lower reaches of the tributaries flowing into the impoundment (Bentley, Cockatoo and Spring Gully Creeks) sampled for the Telfer (1995) study. Most of the sites will be in the immediate area of the impoundment but supplementary sites will also be located through Nathan Gorge and the area downstream of the dam which will be impacted by the new development and changes in flow regime associated with releases and the conduit of the water downstream for various activities.

In-situ water quality measurements will be taken for depth profiles at the point of maximum depth in the pools and also in the shallows and riffle areas. When appropriate, dusk and dawn readings will be taken to establish diurnal changes in deep, slow-flowing pools. The parameters to be included are temperature, conductivity, dissolved oxygen and pH). These measurements are needed to provide general information for the distribution of fish and other fauna and also to establish whether water quality deterioration during low flow periods and in slow flowing sections may be a major consideration in evaluating the effects of the dams and diversions, and examining environmental flow options. These measurements will be used to develop a water quality sampling strategy for the environmental management plan.

Major changes in the availability of major habitat types (flow, depth and substrates) at the survey sites and passage through the area will be determined by mapping the classified habitats and determining their area by using a set of fixed transect points at each site. The estimates of changes in habitat availability will apply to gross changes such as riffle areas and pool depths, areas of overhanging vegetation and banks, and inundation of emergent macrophytes along the banks. Changes in the passage opportunity at selected sites (key natural barriers) will also be assessed. These data will add to the general passage information and transects included in the *State of the Rivers* assessment. The focus for assessing the impact of changes in discharge will be on water quality, passage through critical areas and broadscale habitat availability changes.

Data from the new sites will be combined with the existing data in the area of the impoundment and its environs to produce detailed data summaries for the area. These data and summaries will provide the basis for:

- general assessment of the existing environment, the value and attributes of the riparian and aquatic habitats and aquatic fauna in the area to be inundated;

- value, key attributes and classification of habitats immediately downstream of the new dam which are likely to be most affected during construction and operation of the new dam; and
- characterise downstream habitats for consideration in evaluating environmental flow requirements and a release strategy as part of the environmental management plan.

Major tasks - Survey and rating of habitat and environmental values

- ◊ undertake additional field characterisation surveys;
- ◊ measure *in situ* water quality;
- ◊ assess and map major changes in habitat availability and passage opportunity with discharge changes; and
- ◊ analyse data, prepare summaries and reports.
- ◊ a complete classification of the aquatic environment within the study area;
- ◊ a comprehensive database including all the attributes surveyed at the sites;
- ◊ derivation of habitat, condition and value ratings for each site and section in terms of the individual components and overall ratings;
- ◊ summaries of the ratings for all sections to be affected by each of the proposed schemes in the form of maps and pie-diagrams;
- ◊ identification of critical and high value areas and features which need to be considered in the EMP and for environmental flow assessments;
- ◊ detailed consideration of the aquatic environmental issues raised during the public consultation;
- ◊ evaluation of water quality issues which need to be addressed for the EMP; and
- ◊ consideration of passage issues relevant for assessing the need for a fish-way and for general passage through the areas downstream of the dam which will be affected by the regulated flow regime.

- **Fish and aquatic faunal surveys at sites associated with the nominated schemes** - The main objectives of this phase are to: conduct the initial sampling for the detailed investigation of the existing environmental values and the impact of diversions and dams associated with the various options; provide aquatic fauna information for the initial evaluation of the various options for input to the process of producing a short-list and for evaluation of this short-list to select a preferred option; and to establish a baseline for the EMP and for future monitoring of the areas during the dam construction and initial operational phases of the project.

Previous studies of the aquatic environment, and fish distribution and stocking records will be reviewed and incorporated into the evaluation. These previous studies will be used to direct the location of the sampling sites and the methods to be adopted.

A total of 10 sites will be surveyed over a five day period in the area to be inundated and the areas immediately upstream and downstream of the new impoundment. These surveys will be used to

supplement existing information on fish distribution and abundance in the area, to identify habitat requirements that need to be assessed for the IAS and EMP, and passage requirements. These sites will be a subset of the sites sampled using the *State of the Rivers* methodology which will provide the necessary background habitat information to establish links to habitat and habitat requirements.

Fish populations at the sites will be surveyed during the day and night using a variety of methods depending on the habitat type. More than one method will be used at each site to overcome the biases inherent in using a single method. The methods and effort used will be standardised using standard techniques (sets, time set, area fished etc.) to obtain *catch per unit effort* estimates to compare the relative abundance of the species at different sites and at different times. A single day/night sample will be obtained at each site.

The methods to be used include gill nets (range of mesh sizes); single wing fyke nets; double wing fyke nets; hand seine nets; large seine nets; hand nets; and back-pack electrofishing. Standard measurements and information will be recorded for the fish caught and the catch information will be entered into the FISHDATA database system for storage and analysis. As far as possible the sampling will be non-destructive with all but a representative sample of the species being released after measurement. Species identification will be confirmed using type specimens through consultation with Museum Staff. The species list for each site will be supplemented from the results of previous surveys and through consultation with local fishermen and landowners (subject to adequate verification).

The presence of aquatic mammals, amphibians, reptiles, turtles, and macro-crustaceans at the sites will be determined using a combination of the following methods: netting with fyke nets and mesh nets (note fyke nets will be set with cod ends out of the water to prevent drowning of any platypus); observations at dawn and dusk; anecdotal records from local landowners; and electrofishing. The species caught will be identified and sexed (where possible) and then released. Survey results will be compiled in terms of the species and relative numbers caught using the FISHDATA system. Fyke nets and gill nets are very effective for sampling platypus - indeed, so effective that the gear will be checked regularly to ensure that any platypus caught can be released unharmed.

Surveys of macroinvertebrates will be conducted by rapid survey techniques developed for the National River Health Initiative.

The aquatic faunal surveys are designed to provide the following information:

- list of species occurring at each site, population structure and identification of rare and endangered species or species with habitat requirements likely to be affected by the various schemes (including passage requirements);

- relative abundance of the species and species diversity for rating the overall value of the sites in terms of aquatic fauna present and habitat diversity;
- identification and description of the interactions between physical characteristics (habitat type and availability, water quality, passage requirements) and faunal populations using statistical techniques to examine correlations between species distribution and abundance and habitat variables. Existing information on the habitat requirements of the species will also be used to establish these relationships. The wide range of sites surveyed and their varying habitat values and hydrology will enable various correlations to be tested; and
- assess potential impacts of the dam on habitats and aquatic faunal populations.

Major tasks - Fish and aquatic faunal surveys

- ◊ review previous studies of the aquatic environment, fish distribution and fish stocking activity;
- ◊ survey 10 new sites using *State of the Rivers* methodology for fish distribution and habitat requirements;
- ◊ undertake diurnal fish population surveys using a range of methods;
- ◊ assess presence and populations of aquatic mammals, frogs, reptiles, turtles, yabbies and other crustaceans;
- ◊ undertake rapid macroinvertebrate surveys; and
- ◊ analyse and interpret data.

Major outcomes - Fish and aquatic faunal surveys

- ◊ list of species occurring at each site;
- ◊ population structure; and
- ◊ identification of rare and endangered species or species with habitat requirements likely to be affected by the various schemes (including passage requirements).

- **Identification of key aquatic ecosystem concerns, habitat requirements and sensitivities of key environmental components to flow regulation** - Analysis of the aquatic fauna survey results, the habitat condition and classification study, the review of the literature and the outcome of the public consultation will provide the basis for identifying the principle impacts (positive and negative) on the aquatic and riparian flora and fauna and their habitats that are expected to result from the proposed development. These analyses will also form the basis for identifying habitat requirements in relation to environmental flow and other practical means of mitigating negative impacts and enhancing positive impacts during the construction and operational stages of the development.

The objectives of this phase include:

- identify significant aquatic and riparian species and habitats (conservation status, commercial and recreational value) and establish their local, regional and national significance;
- identify habitat requirement for key species, habitats and ecosystems, their availability on the area, the relationship between habitat requirements, availability and condition and flow regime; and
- determine migratory patterns and triggers for movement of aquatic fauna in the area and how this is affected by seasonal flow regimes and various release strategies and water usage patterns.

Major tasks - Identify key environmental components and concerns

- ◊ analyse the habitat data and aquatic fauna data; and
- ◊ evaluate literature review information produced by previous tasks.

Major outcomes - Key environmental components and concerns

- ◊ ranked listing of species of concern and major issues for consideration for the EMP;
- ◊ development of a water management strategy which may include environmental flows and other management initiatives to reduce native impacts and enhance positive impacts of the development and the dam operation. (These will be delivered in the form of practical and achievable criteria with a ranking and evaluation of various options.)

- **Review of water resources management issues and environmental flow issues** - Major objectives of this phase are to provide input to the development of an EMP and a water resources management strategy in relation to the overall issues for the project.

Major tasks - Review of water resources management issues

- ◊ contribute to the development of the IAS/EMP through consultation with other members of the team, Queensland Government Agencies and liaison with the public; and
- ◊ review major water resource management issues.

Major outcomes - Review of water resource management issues

- ◊ assist in development of the IAS/EMP;
- ◊ an evaluation of the need for environmental flows or other water management guidelines to sustain environmental values;
- ◊ documented need for passage devices, or specific purposes releases to facilitate passage of fish and other aquatic fauna;
- ◊ identification of an agreed set of values and criteria which need to be met to reduce the overall environmental impact of the dam during its construction and operation;

- ◊ development of attributes and measurements that can be incorporated into a monitoring program; and
 - ◊ recommendations for management of recreational fisheries in the new impoundment including species for stocking and fisheries enhancement strategies.
- **Contribution to preparation of IAS/EMP covering the construction of the dam and its initial operation** - The main objectives of this phase are to contribute to the development of a monitoring strategy which ensures the environmental issues identified in the EMP are addressed during the construction of the dam and its initial operation.

Major tasks - Preparation of IAS/EMP

- ◊ establish the environmental monitoring strategy for the riparian and aquatic environments during the construction phase;
- ◊ definite what needs to be monitored, the desired criteria, the sampling locations and sampling frequency for aspects such as water quality, the status of species, communities and habitats of concern;
- ◊ prepare draft IAS/EMP reports inputs;
- ◊ assist in review process and subsequent revision of relevant inputs to reports; and
- ◊ assist in finalisation of IAS/EMP study outputs.

Major outcomes - IAS/EMP reporting

- ◊ preparation of the monitoring program for the riparian and aquatic habitats;
- ◊ documentation of findings in IAS/EMP draft for review; and
- ◊ review comments and prepare final reports for the project.

6. *Boggomosses*

DNR has commissioned a separate study of the boggomosses area to assess any adverse impacts that the construction and operation of the Nathan Dam may have directly on the boggomosses, on the groundwaters that feed the mound springs, and on the specific fauna such as the endangered snail species which inhabits the boggomoss area. This specialist report will form an addendum to the main study report but, nevertheless, its recommendations will require incorporation into the main IAS/EMP for the sake of completeness and in order to effectively integrate all requisite environmental monitoring indicated for the project.

While the Consultant recognises the clear distinction between conducting this particular aspect of the study and the overall project, it is worth noting that the Team's terrestrial and aquatic flora specialist also has particular expertise with respect to boggomosses.

7. *Hydrology*

The hydrological and water use aspects of this study fall into 4 principal components:

- Review of existing hydrology;
- Description of current water use;
- Evaluation of performance of the proposed dam; and
- Impact of proposed dam on existing hydrology.

The methodology to address each of these components is described below.

Review of existing hydrology. After discussions with Department of Natural Resources, a number of previous hydrological studies in the Dawson River Catchment have been identified. These include a number of preliminary yield studies, a flood study, a flood frequency analysis study and a study on the impact of land use on Dawson River water quality. A number of additional studies which also relate to the hydrological evaluation on yield, water demand, boggomosses and WAMP are currently underway. Interim results from the current studies are expected to be available during the course of this study. The above studies are expected to provide most of the hydrological data that are of relevance to this present study. In addition, we have identified sources of available topographical, rainfall, streamgauging, groundwater and water quality data of relevance to the Dawson River System. Data from all sources will be collected, collated and reviewed.

As specified in the STOR, this review will identify and briefly describe the following characteristics of the area expected to be affected by the construction and operation of a dam on the Dawson River and the release of stored water downstream.

- Surface drainage network;
- Flooding behaviour;
- Groundwater behaviour;
- Location of environmentally sensitive areas, such as wetlands;
- Surface water quality and siltation pattern (including seasonal variation);
- Historical and existing hydrological regime of the Dawson River, including existing regulatory structures;
- Current operation of the water storages in the Dawson River and the distribution system;
- Performance of the existing regulatory structures in the Dawson River (yield, supply reliability, etc.); and
- Hydrology and water quality of the boggomosses (this will add to the existing boggomosses study).

Current water use. Both surface and groundwater from the Fitzroy River system is currently used for irrigation, urban and industrial use. The current study will assess water use effects along the Dawson River up to its junction with the Fitzroy River.

The Dawson River Irrigation area is the main irrigation water user in the area of interest. Water from the Dawson River System is also used for town water supplies to Theodore, Moura, Baralaba and Cracow, and for industrial use at mine sites in Moura and Cracow. Present water use from the system has been documented in previous studies and is being reviewed in the demand study currently in progress. Information available from the above sources will be collected, reviewed and documented.

Evaluation of the performance of the proposed dam. Based on discussions with DNR, it is understood that any hydrological modelling required for this study will be undertaken by DNR upon

request from the consultant, i.e. the consultant does not need to undertake any modelling work. Thus, the evaluation of the performance of the proposed dam would be on the basis of information provided to the Consultant by DNR. To meet the tight time frame set for this study (14 weeks), it is essential that requests for additional modelling work be acted upon without delay. If this is not the case, it will not be possible to meet the time targets set for this study.

A number of hydrological, yield, water allocation and operational studies of the Dawson River system have been undertaken in the past by DNR (e.g. 1967, 1977, 1979, 1981, 1983 and 1993). These studies appear to be of a preliminary nature based on monthly simulation models. The results from these studies are indicative, rather than definitive. The Consultant believes more comprehensive and detailed simulation studies based on a daily time step will need to be undertaken to provide more reliable results to assess the hydrological performance and the impact of the proposed dam.

We understand that three detailed (but separate) studies that are of direct relevance to the current study are presently underway:

- The first of these studies is a Water Allocation Management Planning (WAMP) strategy for the Fitzroy River Basin;
- The second study involves a comprehensive analysis of current and future water demands in the Dawson River Catchment; and
- The third study involves the development of a comprehensive daily simulation model to assess yield, operating strategy, water supply reliability, etc. from the proposed dam.

To obtain the best possible outcome of the current study, the results from the above studies should be available prior to the commencement of this study. The Consultant understands it is unlikely that these studies will be completed prior to the completion of this present study. However, it is believed that at least interim results from the above studies will be made available for use in this study. Needless to say, the findings of this present study will be based on the best available information.

The results from the above studies will be used to evaluate the performance of the proposed dam. If necessary, requests will be made for additional model runs to assess effectiveness of different operating strategies in meeting the current and future water needs of the area for irrigation, urban, industrial demands and environmental flows.

Impact of proposed dam on existing hydrology. The impact of the construction and operation of the proposed dam and the release of stored water on the hydrology of the study area would be assessed on the basis of available data, discussion with relevant authorities and available modelling results. Results from the various modelling studies will assist in evaluating the hydrological impacts of the proposed dam. Potential impacts that will be identified, analysed and discussed include:

- Impact on the other storages on the Dawson River. This will be assessed based on results from the daily simulation models.
- Impact on upstream and downstream wetlands. Inundation effects will be assessed based on results from flood modelling. Drainage effects will be assessed based on results from the various simulation studies.
- Impact on flooding behaviour. This will be assessed using the backwater model developed by DNR for the study area.

- Impact on water quality of the Dawson River. This will be assessed in terms of the existing quality levels and any likely changes in quality following construction of the proposed dam. The baseline water quality data from six water quality monitoring stations along the Dawson River and from the various monitoring stations in the Dawson Valley Irrigation Area would be used for this purpose. The impact of the dam on sediment transport and deposition will also be assessed.
- Impact on groundwater recharge. This will be assessed on the basis of existing groundwater data and an estimation of the effects of increased water levels in the dam on the volume of water delivered to the groundwater table.
- Impact on Environmental flows. This will be assessed using the results from the current WAMP, demand and yield studies. The results from these studies would allow the development of an environmental flow strategy, provide guidelines for the operation of the proposed dam and existing regulation structures on the Dawson River.

If appropriate, strategies to manage/minimise any adverse impacts will be recommended. In addition, a monitoring program will be proposed to measure actual impacts.

Socioeconomic environment evaluation

1. Social issues

In the past around the world, many major infrastructure projects have been undertaken with only the technical design, construction and final operation issues seen as important by the commissioning agent. To the detriment of some of these projects, the real impact on the communities affected by these developments were overlooked, often creating social dislocation and adverse impacts on community life. In recent years, planning and government authorities have realised the need to involve the community more in the planning and decision-making process to ensure that potential adverse social impacts are identified and addressed in advance of their occurring.

This has generally been achieved by holding public consultations and allowing the general community, industry and representative community groups opportunities to comment on the planning and review the proposed outcomes. A suitable mechanism for this has been to incorporate the consultation into the IAS/EMP preparation, review and finalisation process.

The Consultant proposes to hold three public meetings at Taroom, Theodore and Moura early in the field study to assess community interest in and seek input to the preparation of the draft IAS/EMP for the Nathan Dam. These meetings would be facilitated by the PM and attended by the European heritage specialist, the economist, the fauna and flora specialists and the hydrologist depending on an assessment of the level of community interest following a broad community awareness campaign by the Consultant. The cost of this consultation process is included in the budget.

2. European cultural heritage issues

There has been a European association with the Dawson Valley since 1844 when Ludwig Leichhardt first explored the area and this needs to be considered along with the longer associations with the area of the Ji:man people, traditional owners of this country. Accordingly, the Consultant proposes to undertake a cultural heritage survey and evaluation consistent with the STOR to document this association and to identify any sites of cultural significance worthy of preservation or investigation prior to inundation. In an historical and historical archaeological study, it is important to have

analysis by both an experienced historian skilled in archival research, and an archaeologist who is able to record sites, map them and assess them for their historical significance.

To achieve such outcomes the Consultant proposes to undertake intensive historical research in relevant libraries and archives, local history groups and other sources to provide a background overview on key sites and events. All sites identified thus, would then be assessed and rated using accepted significance criteria, photographed and documented. Key local historians and general members of the community will also be consulted to determine other sites of particular interest from a social, cultural and historical perspective. The significance of Glebe Homestead in the area is acknowledged and proper account will be taken of the impact of the dam impoundment on this particular site and surrounds.

Many of the tales of the area's early settlement and subsequent development often represent strong social attachments and memories though they may not be tangible entities that can be preserved physically. It is these memories that have often in the past been lost through infrastructure developments. It is essential that such issues be recorded for future generations' benefit and to ensure that strong associations with local sites and memories are not lost for the present generation either.

Due and effective community consultation will therefore be a central methodology in the social and historical impact assessment for the proposal.

Additionally, the Consultant proposes to use Ann Wallin on the team for this role. Ann has excellent credentials for this role and has discussed with the Ji:man people, the possibility of working in conjunction with them providing the archaeological input to their independent assessment of indigenous cultural heritage values. Such an association would be immensely beneficial to positive and effective outcomes from the study and engender a strong commitment from the Ji:man people to acceptance of the IAS and implementation of the EMP through their direct involvement in its preparation.

Major tasks - Social and historical survey

- ◊ undertake background historical and archival research to identify sites of known significance;
- ◊ interview key local historians and undertake wide community consultation to identify other sites of significance;
- ◊ record sites descriptively and photographically and document local stories of relevance;
- ◊ interact with and support the Ji:man people in the conduct of their cultural survey;
- ◊ interpret the historical and archaeological data obtained; and
- ◊ assist in the preparation of the IAS and develop recommendations for preservation, protection and recording of important sites and their subsequent management through the EMP.

Major outcomes - Social and historical survey

- ◊ literature review;
- ◊ documented records and photographs of significant European cultural heritage sites;
- ◊ integrated indigenous cultural records in overall study; and
- ◊ completed IAS/EMP which addresses all issues of protection, recording and management of significant cultural heritage sites.

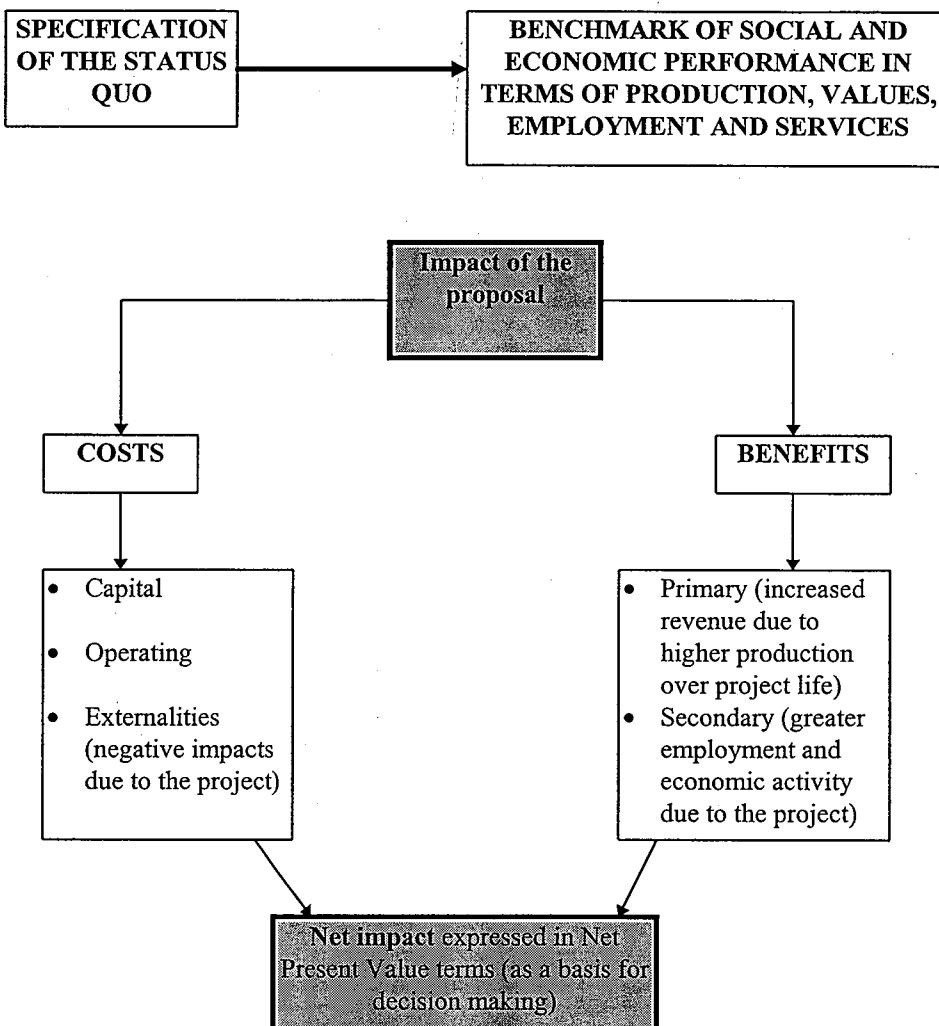
3. Economic aspects

The project brief indicates that there is no shortage of suitable irrigable land below the dam and that demand for water (mainly for irrigation of crops such as cotton) from the proposed Nathan Dam is likely to exceed the supply. This is desirable in any event as it suggests that the available water will face an eager market and should attract a strong price. More importantly, it suggests the water will be used to its full potential (with due allowance for an environmental flow maintenance); practically a prerequisite if the project is to be economic.

However, a demand study to be undertaken by the Principal (presumably scoped to discover likely quantity and price dimensions of the Dawson Valley water usage) will not indicate the overall economics of the proposal. Indeed the price at which the water is sold is not relevant from a national perspective since it is merely a transfer payment from one sector to another. From the national perspective, the economics of the proposal must be evaluated in terms of its net dollar effect relative to the existing situation (the real benefits are those which could not be generated without the additional water provided by the new dam). The approach in the following diagram is therefore, recommended in line with section 6.5 of the STOR.

Implicit in our methodology will be specification of the ‘do nothing’ option. This option is clearly one of the possibilities open to the decision making process and it may be found the most desirable course of action if the project does not indicate a positive net gain to the nation and community. In practice, the viability of the ‘do nothing’ option will depend on how fully the potential of the target area has been developed. If, for example, water can be impounded and distributed at low cost per megalitre and the region is endowed with a climate and soils suitable for high value crops, then the area will have vast potential and should have no trouble generating a net gain over and above the ‘do nothing’ scenario. The first imperative of an economic input to the IAS, therefore, is to define the status quo and objectively assess the target area’s contingent economic potential.

Essential elements of the Dawson River proposal economic analysis



As shown in the above diagram, the economic analysis will have three main elements: specification of the current situation (i.e. the benchmark); quantification of the costs due to the project; and quantification of the benefits due to the project. All these elements are brought together to arrive at the anticipated 'result'. As will be appreciated, the biggest challenge for any analysis of this nature is generation of the data associated with the flow of expected benefits. For the Dawson River project, quantification of the primary benefits will involve the following:

- quantifying the effective amount of water available for utilisation by irrigation and other purposes such as mining and domestic needs;
- specifying the pattern of development over the life of the project; and
- identifying the crops that will be produced under irrigation together with yields and prices over the life of the project.

Data with respect to the above will be secured by several means. Firstly, close liaison with the project engineers and the team hydrologist will secure data relevant to the amount of water to be made available over time and the contingent costs (capital and operating). The capital costs will relate to the dam itself and the water distribution system (the latter in this case will be minimal as the system is riparian). The effective water yield will be generated by models based on catchment size,

historical rainfall patterns, losses due to evaporation and distribution and agreed release patterns. Water availability in conjunction with riparian soil maps will indicate the total area of land likely to be under production. Realistic assumptions will be developed regarding the annual areas that will go under irrigated crop by type (e.g. cotton, sorghum, pasture seed ...).

Crop yield and cost of production data will be sourced from the literature on comparable areas (e.g. Emerald, St. George) and local experts (e.g. DPI staff, local farmers and consultants). The size and nature of negative impacts will be derived by close examination of established irrigation areas and through consultations with local parties. In summary, the study will necessitate detailed field work to generate accurate input data. Ultimately, the benefits and costs will stem from a set of assumptions about likely costs and returns. Our study will clearly state these assumptions together with the detail of how they were derived.

Since we cannot know with certainty the future pattern of development, or the returns from additional economic activity, the analysis will include a sensitivity analysis. This analysis will show the sensitivity of project returns to possible scenarios, e.g. fast/slow rates of development, different usages of the water, high/low commodity prices and other situations, consistent with the requirements of the STOR. Equipped with the output of this analysis, the ultimate decision makers will be more reliably informed of the likely economic performance characteristics of the proposal.

Major tasks - Economic specialist

- ◊ undertake collection and review of published data to specify the current situation;
- ◊ quantify costs due to the project;
- ◊ quantify benefits due to the project;
- ◊ analyse and interpret data; and
- ◊ prepare input to IAS/EMP and assist in review and revision phase of final reporting.

Major outcomes - Economic specialist

- ◊ absolute economic viability (expressed in Benefit/Cost ratios), Net Present Values (\$), and Internal Rates of Return (%);
- ◊ returns to the nation, region and local community (which will depend on how the benefits and costs are distributed among the three sectors);
- ◊ time required for the project to break even;
- ◊ nature, size and distribution of secondary benefits such as new jobs, infrastructure etc.;
- ◊ size and nature of any externalities (i.e. negative effects due to the development);
- ◊ size and nature of compensation required to negate the externalities; and
- ◊ detailed description of the fundamental changes induced in the local economy due to the development (i.e the 'before' vs the 'after').

4. Aboriginal cultural heritage issues

DNR has commissioned a separate study to be undertaken by the Ji:man people to document all sites of cultural heritage such as occupation sites, story places and traditional areas of spiritual significance. Nevertheless, the Consultant through primarily the European Cultural Heritage specialist who is also qualified in aboriginal culture and archaeology, and has frequently worked with the Ji:man people and their representatives, will seek to incorporate the major recommendations of this separate study into the IAS/EMP.

Preparation of IAS/EMP

1. Documentation

The role of the IAS is the identification and examination of environmental, social, economic and technical issues of concern raised by the team's evaluation of the proposed dam construction and operation. The IAS is required to discuss both the positive and negative impacts associated with the dam proposal, provide background information the need for the project, consider any alternative means of achieving the stated objectives and comprehensively evaluate the biophysical, social and technical dimensions. The IAS needs to contain sufficient data to allow an informed evaluation of the proposal, its impacts and to define the necessary mitigating measures to be implemented to avoid adverse impacts. The likely impacts have to be discussed in relation to the existing physical, social/cultural and economic environment to establish their scale and magnitude of impact and, therefore, their significance in terms of the overall proposal. The IAS is the principal policy document arising from the study and will constitute the basis of decision making by the Principal, Local Management Group and the community. The Consultant acknowledges that the IAS should not contain value judgements but rather be a strict documentation of the significant issues and an evaluation of impacts on the basis of supporting evidence.

The IAS will be supported by an EMP which clearly sets out the recommended monitoring requirements for both the construction and operation phases. The EMP is a mechanism to ensure satisfactory environmental, social, technical and cultural heritage management within acceptable economic parameters in relation to any potential adverse impacts identified. The EMP will contain detail on specific commitments to minimise adverse impacts by assigning responsibility for environmental management tasks and other monitoring requirements, and attaching specified corrective action recommendations to these tasks. The EMP will be developed to reflect both impacts and their requisite management in respect of both the construction and operational phases of the dam project.

Within the EMP, there will be an environmental monitoring schedule which is designed to verify sound environmental performance and ensure sufficient warning of impending adverse impacts to permit government or community reaction to prevent harm occurring.

Preparation of the IAS and EMP will be the responsibility of the PM/EIA specialist who will undertake to collate all technical reports and recommendations from the discipline-based members of the team. The team members will be directly involved in report preparation and developing recommendations, and in the review of the IAS/EMP documentation prior to its submission to the Principal.

Major tasks - Preparation of IAS

- ◊ evaluate all environmental, technical, hydrological, social, cultural and economic impacts for both the construction and operational phases;
- ◊ work closely with all team members, local advisory management groups and community groups in collating technical reports and developing recommendations for management;
- ◊ prepare draft IAS for review by the Principal and nominated advisory groups; and
- ◊ revise draft IAS following review recommendations and prepare for public display and comment.

Major outcomes - IAS preparation

- ◊ completed draft IAS for the siting, construction, operation and management of the Nathan Dam; and

- ◊ revised IAS following review by the Principal and nominated review bodies.

Major tasks - EMP preparation

- ◊ undertake preparation of a complete draft EMP incorporating inputs from the technical component studies;
- ◊ develop an effective and realistic monitoring schedule which adequately addresses all the environmental, technical, social and economic concerns raised by the IAS; and
- ◊ revise EMP following review by the Principal and nominated advisory review bodies.

Major outcomes - EMP preparation

- ◊ construction management plan;
- ◊ land management plan;
- ◊ archaeology and heritage management plan;
- ◊ groundwater management plan (in respect of boggomosses in particular);
- ◊ waterway management plan;
- ◊ water quality management plan;
- ◊ weeds, exotic flora and fauna management plan;
- ◊ rehabilitation and revegetation management plan;
- ◊ storage area recreation and land use management plan; and
- ◊ monitoring program.

A construction management plan will need to be developed to minimise potential impact during the construction activities. It will address issues including: noise, dust and air pollution; water pollution; sediment and erosion control; construction camp/compound operation; machinery maintenance and washdown areas; hazardous materials storage and handling; concrete batching; quarrying and haul routes; and other relevant issues.

The following monitoring tasks are recommended to achieve the outcomes listed below as part of the EMP phase.

Major tasks - Monitoring program

- ◊ selection of suitable lands for irrigation;
- ◊ allocation of water rights conditional on established standards;
- ◊ irrigation management practices;
- ◊ land use management and erosion control;
- ◊ groundwater monitoring for levels, quantity, quality, salinity, pesticides, heavy metals;
- ◊ waterway volumes and water balances along major channels (environmental flows);
- ◊ riparian vegetation and habitat clearing procedures;
- ◊ surface water quality including suspended solids, dissolved oxygen, pH, conductivity, temperature, pesticides, fertilisers;
- ◊ water quality both upstream and downstream of construction site;
- ◊ algae growth;
- ◊ aquatic flora and fauna;
- ◊ avifauna;
- ◊ terrestrial flora and fauna;
- ◊ assessment of fish-stocking policy options;
- ◊ fish distribution and populations and change;
- ◊ wetland water volume and hydrological changes;
- ◊ construction activity in areas of high archaeology/cultural heritage value;
- ◊ fire management; and

- ◊ infestation and spread of weeds as a result of disturbance.

Major outcomes - Monitoring phase

- ◊ protection of areas of high conservation and cultural heritage value;
- ◊ sensitive management of riparian vegetation and lands;
- ◊ sound management of construction activity impacts;
- ◊ rehabilitation and stabilisation of disturbed areas;
- ◊ vegetation impact management in terms of disturbance and prevention of introduction of exotic species through dirty machinery;
- ◊ implementation of an effective monitoring and management arrangement; and
- ◊ storage area activities management including recreation, fire, and animal/human access.

2. Review by the Principal and subsequently Approval Authorities

During this phase the draft IAS/EMP will be reviewed by firstly, the Principal and the local management group to assess the degree to which the documents meet expectations and needs. Following this review and subsequent revision by the Consultant, the draft IAS/EMP will be reviewed by the DoE acting as the responsible Approval Authority.

Any revisions or modifications arising from this review process will then be incorporated by the Consultant to prepare a final draft IAS/EMP for subsequent public perusal and comment.

3. Public review

The IAS/EMP will be subject to public comment and submission following a process of advertising to attract community awareness. The Consultant proposes (should the Principal agree) to hold a series of public meetings at, say, Taroom, Theodore and Moura. This would ensure that the public is given adequate opportunity for input to the IAS/EMP finalisation process. The Consultant believes that if inadequate opportunity is afforded for community evaluation and comment on the IAS/EMP, there is potential for rejection of the findings of the IAS and a lack of community commitment to the implementation of the EMP. The cost of this community consultation is not included in the budget.

The community meetings would be held as open meetings after due advertising, and properly facilitated to ensure satisfactory outcomes. Appropriate members of the team would be in attendance to answer questions supported by the PM and the Principal. An independent reporter will record questions and responses for subsequent evaluation and incorporation into the revision process for the IAS/EMP.

4. IAS/EMP finalisation

Following this public consultation, a supplementary report will be prepared incorporating comments from the Principal in response to the outcomes and recommendations of the public input. On submission of this supplementary report, the consultancy will be deemed complete.

4. REPORTING REQUIREMENTS AND CONSULTATIONS

In developing the Project Program documentation at the outset of the study, the Consultant proposes to conduct a series of three meetings at Taroom, Theodore and Moura to seek community input to the IAS process, and seek information from the Dawson Valley Development Association, the Irrigators Association and other community groups. Additionally, the Consultant will liaise with the Principal in developing the detailed project methodology to ensure that all expectations will be met. Given the

extent of the region and the length of the river involved in the study, and the diversity of the community groups involved or potentially impacted by the project, the Consultant believes that these meetings are essential. This will ensure that adequate opportunities are afforded the entire community to express their concerns/support for the project.

The Consultant proposes to maintain regular liaison with the Principal in addition to the requisite monthly reporting to ensure that the Principal is kept aware of progress and issues arising that may impact on other planning inputs. Such regular monitoring and review of the study's progress will ensure that the study is kept to the schedule and that adjustments are made if necessary to meet agreed milestones.

The IAS and EMP reports will be prepared in the format proposed by the Principal in the STOR. The Consultant reserves the right to include additional sections in both documents if the findings of the study indicate the need to cover material not included in the recommended report structure. Allowance has been made in the budget for preparation of multiple copies of the IAS/EMP reports for public display, as well as for an extensive advertising program to create awareness of the availability of the documentation for public scrutiny and inviting submissions. The Consultant believes that if the proposed series of community meetings are held and that adequate consultation is held as proposed, there should not be any adverse outcomes from the public review.

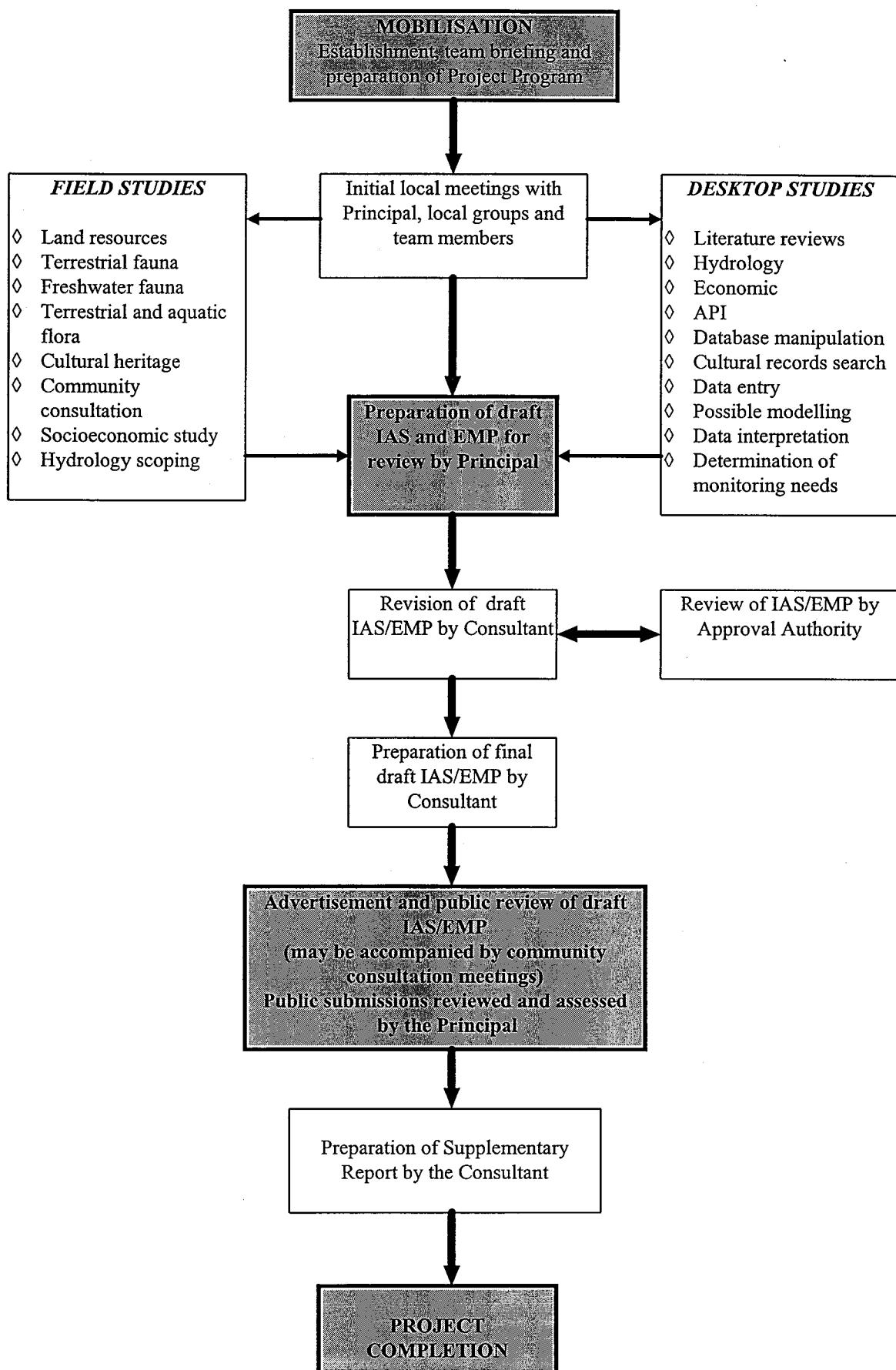
The Consultant notes Clause 15 of the Special Conditions of Contract and has provided costings for any attendance at public consultations outside the STOR requirements. Additionally, the Consultant proposes that a series of three meetings should be held at Taroom, Theodore and Moura during the public display of the IAS/EMP to answer any community concerns about the documentation and proposed management plan. Costings for this approach are not included in the proposal and are dependent on acceptance of this suggestion by the Principal. Costs would only reflect hourly rates of those attending, travel and accommodation costs and per diems.

The reporting schedule is shown in the following table.

Item	Month									
	1	2	3	4	5	6	7	8	9	10
Prepare Project Program by Week 2	█									
Present draft IAS/EMP by Week 14				█						
DNR review of IAS/EMP by Week 16					█					
Revision of IAS/EMP by Consultant by Week 18					█					
Approval Authority review by Week 23						█				
Final IAS/EMP by Week 25							█			
Public review completed by Week 33								█		
DNR collation and review by Week 35									█	
Final Supplementary report by Consultant by Week 39 and completion of Contract										█

Essentially, the methodology of the study proposed by the Consultant can be summarised as shown in the following diagram.

FLOWCHART OF PROJECT APPROACH



APPENDIX 3



10 October 1997

Stuart Macnish
Senior Environmental Consultant
Hyder Environmental Ltd
Level 1, 27 Peel Street
SOUTH BRISBANE QLD 4101

Dear Stuart

DAWSON DAM IAS - HYDROLOGICAL IMPACT ASSESSMENT - DETERMINATION OF WATER DEMAND DISTRIBUTION

I refer to the draft copy of Hydrological Assessment Report for Dawson Dam Impact Assessment Study and recent discussions between this Department and Dr Sharmil Markar of Water Studies Pty Ltd on the contents of this report.

As discussed with Sharmil, the basis on which the demand distribution for the Dawson Dam Project was derived is outlined below.

Determination of Water Demand Distribution

In order to determine allocatable yields from a proposed dam on the Dawson River at AMTD 313.9 km it was necessary for DNR staff to assess where the likely demand for additional water supplies along the Dawson River would potentially occur. As the yield of the proposed storage is very dependent upon the demand distribution pattern used in the IQQM model Regional and Central Office staff with expert and/or local knowledge in the Dawson River area were asked to participate in a two day workshop in order to establish among other parameters logical demand scenarios.

Participants at the Workshop included Rob Keogh, District Manager DNR Biloela, Don Collier, DNR Technical Officer Theodore, Craig Gordon DNR Regional Planning Officer Rockhampton, Warren Hutton DNR Principal Project Officer Brisbane, John Ruffini DNR Principal Hydrologist Brisbane, Alex Loy Hydrologist Brisbane, Paul Harding Hydrologist Brisbane.

Information used in the workshop to determine possible demand distribution scenarios included:

- Dawson Valley Soils Mapping Information including "Potential Irrigation Areas Along the Lower Dawson and the Lower Comet - Mackenzie Rivers - A preliminary assessment" Resource Management Central



DEPARTMENT OF NATURAL RESOURCES

QUEENSLAND GOVERNMENT

- “Report on the Agricultural Demands For Water In The Nogoa, Comet, Mackenzie and Dawson Systems” John Rolfe and Daniel Teghe Central Queensland University
- Annual Statistics 1995-1996 DNR Water Infrastructure

A large proportion of the demand identified in the demand survey was classified as “not known or specified”, from people who did not currently own land in the area. It would be reasonable to expect that development of new irrigation farms is most likely to occur in areas of suitable soils and where the cost of developing these farms into sustainable irrigated agricultural concerns was minimised. In light of the above, provided sufficient supplies are available this demand was distributed to areas considered to be the most sought after by potential irrigators.

Guiding principles/assumptions used as a basis for distributing the agricultural water demand included;

- a competitive process, either auction or tender would be used to distribute water allocations.
- reliability of supply should be restricted to medium security irrigation (say 85% monthly) and high security, urban and, industrial and irrigation (Historic no failure yield)
- the not known or specified demand, from people who did not currently own land in the area, would be distributed in accordance with the principal of water being supplied to areas considered to be most sought after by potential irrigators. This consideration was to be made in light of the availability of suitable soils and the cost of developing these soils into irrigated agricultural production.
- higher emphasis should be given to areas with good soils rather than those areas with poorer, broken country
- higher emphasis should be given to flood free country rather than country susceptible to flooding, in particular deep and/or erosive flooding.
- higher emphasis should be given to country closer to the river rather than areas with longer distance pumping.

It was also agreed that the sectors identified in the Water Demand Survey be adopted as the basis for distributing demand.

Soils

The soils mapping information indicated that approximately 87 000 ha of land in categories 1, 2 and 3 (defined in report -copy attached) occur within 0 to 5 km of the Dawson River, mainly downstream from Theodore (D4, D5 and D6). The information also indicated that there is a 48 km stretch of river downstream of the damsite to near Theodore (D2, D3) with only limited areas identified as having potential for irrigation.

Distribution of Demand

Below is an outline of the logic behind the distribution of demand in the six sectors (D1 to D6).

Sector D1 Upper Dawson

The Water Demand Survey indicates that, by the year 2005, based on a moderate case scenario the demand for water in this sector would be 52325 megalitres. As the impact assessment studies were focused on a dam site at AMTD 313.9 km and do not include structures upstream of Taroom, an assessment was carried out to determine:

- the area of land around the storage which would be suited to irrigation from the storage and
- the areas which would be inundated by a dam in this location and which were included in the demand survey.

As a result it was agreed that the demand in this sector be reduced to 30,000 megalitres.

Sector D2 Nathan Gorge Section

The water demand survey indicated that there was no additional demand for water in this sector and as the area contains no areas of suitable irrigable soils a figure of 0 megalitres was adopted for this sector.

Sector D3 Gyranda to Theodore

The water demand survey, based on a moderate demand scenario, indicated a demand in 2005 of 18 811 megalitres. This sector was seen to attract expansion of existing landholders irrigation concerns. Most properties in this sector have existing irrigation and there is believed limited (by topography and soil suitability) opportunity for new properties to be brought into production. It was decided to limit the increased water demand in this sector to in the order of the level indicated in the demand survey. The basis for this was the soils information as outlined above. The demand for this sector was therefore set at 15 000 megalitres.

Sector D4 Theodore to Moura

The Water Demand Survey, based on a moderate demand scenario indicated a demand of 14962 megalitres for this sector. The area was considered to have areas of suitable soils which could sustain a higher level of use than was indicated in the demands for water by existing landowners. After analysing available soils information it was determined that the area could potentially attract new irrigators from the pool of not known or specified respondents and the demand figure was increased to 25,000 megalitres.

Sector D5 Moura to Neville Hewitt

The Water demand Survey, based on a moderate demand scenario, indicated a demand in 2005 of 22 634 megalitres. This sector was seen by the group to contain large areas of suitable irrigable soils and it was considered that the area would attract a great deal of attention from prospective developers of new irrigation farms. This area and area D6 immediately downstream were considered to have the greatest potential for future irrigation development and, as the model required the entire yield of the dam to be distributed, the remaining yield was distributed between these sectors. The demand for this sector was therefore increased to 75 0000 megalitres.

Sector D6 Lower Dawson

The Water Demand Survey, based on a moderate demand scenario, indicated a demand of 32 878 megalitres in 2005. Due to presence of large areas of suitable irrigable soils this area was considered highly likely to attract developers of new irrigation farms and accordingly the demand was increased to 75 000 megalitres.

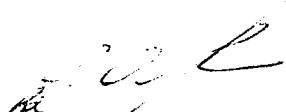
Conclusions

In a long river system such as the Dawson the distribution of water use can have a significant impact on the yield and operation of the system. As a result DNR have attempted to determine the distribution pattern using the best information available. It is recognised however that, in the event of a competitive process being used to allocate available irrigation supplies, accurate distribution patterns will only be known after the competitive process has been completed.

In reaching a decision on demand distribution a conservative approach was adopted which would ensure that a reasonable "Worst Case" scenario was considered in the impact assessment process. Subsequent changes to the distribution pattern which resulted in a movement of water from the downstream sector to upstream sectors would tend to increase the system efficiency and produce an increase in system yield.

I trust the above information addresses your requirements. Should you have any further queries, please contact me on telephone (07) 3224 7227.

Yours faithfully


Warren Hutton
PRINCIPAL PROJECT OFFICER (WATER MARKETING)

Potential Irrigation Areas Along the Lower Dawson and the Lower Comet - Mackenzie Rivers

A preliminary assessment

Resource Management
Central



DEPARTMENT OF
PRIMARY INDUSTRIES

POTENTIAL IRRIGATION AREAS ALONG THE LOWER DAWSON AND THE LOWER COMET - MACKENZIE RIVERS

A preliminary assessment

A preliminary assessment of the potential irrigation areas below the proposed Comet Dam and Nathan Dam was undertaken by officers of the Resource Management Group in Central Region. The study area for the Comet Dam was a 20 km wide, 220 km long strip extending downstream from the proposed dam site, along the Comet River and the Mackenzie River to its junction with the Dawson River, north-east of Duaringa. The study area for the Nathan Dam was a 20 km wide, 200 km long strip extending downstream from the proposed dam site along the Dawson River to its junction with the Mackenzie River, north-east of Duaringa.

The study area is shown in Figure 1.

Study Objective

The objective of this study was to review existing broad scale land resource information to identify areas of land suitable for irrigation of agricultural and horticultural crops.

Study Methodology

The study was undertaken as a desk top exercise using existing land resource information, supplemented by a ground reconnaissance over two days for each study area. During the field trip, discussions were held with a limited number of landholders to ascertain their views on the suitability and management of soils for irrigation.

Mr Malcolm Fraser, grazier and grain grower of Wandoan, assisted with information collected during a land use and broad soil type study along the Dawson River for the Dawson Valley Development Association.

Sources of existing land resource data used in the assessment included:

- land systems map and report of the Isaac-Comet area (Story, 1967).
- land systems map and report of the Dawson-Fitzroy area (Perry, 1968).
- land systems map and report of the Capricornia Coastal Lands (Forster, B.A., in preparation).
- Atlas of Australian Soils, Sheet 4, map and report (Northcote, 1967).
- soil association map along the Dawson River between Theodore and Baralaba (Isbell, 1957).

Land Suitability Assessment

Soil and land parameters considered when assessing suitability for irrigation included:

- soil type, depth and water holding capacity
- surface infiltration and subsoil permeability
- wetness

- soil variability
- topography
- rockiness
- microrelief, particularly gilgai
- erosion hazard
- flooding hazard (superficially)

*Comment
Very
? -*

The main crops considered included: cotton, peanuts and grain legumes, grain sorghum, horticultural tree crops and horticultural small crops.

Mapping

The land systems mapping was used as the basis for this study, with modifications where necessary from other sources of data. Each land system is comprised of several land units, which have specific landform, soil and vegetation characteristics. By assessing the suitability of each land unit for irrigation, an overall assessment for each land system was obtained. In this way, each of the land systems covering the study areas was assessed for suitability for irrigation and classified into one of the following categories.

- | | | |
|------------|---|---|
| Category 1 | - | > 70% of the mapped area has land suitable for irrigation. |
| Category 2 | - | 40 - 70% of the mapped area has land suitable for irrigation. |
| Category 3 | - | 20 - 40% of the mapped area has land suitable for irrigation. |
| Category 4 | - | < 20% of the mapped area has land suitable for irrigation. |

The boundaries of the land systems were used to delineate the potential irrigation areas over most of the study area. Modifications to the land system mapping were necessary in some areas because of overriding topographic limitations and more detailed information from local advice, field inspections and other sources.

Two subscripts have been used to highlight areas with special limitations. Subscript "f" indicates major alluvial areas subject to irregular, but severe flooding. The flooding hazard and its influence on suitability for irrigation needs to be more rigorously assessed by specific flood studies. Subscript "i" indicates areas of soils with high surface infiltration and permeable subsoils, which are generally not suitable for furrow irrigation but better suited to overhead spray irrigation or low volume trickle or micro-spray irrigation. Peanuts, horticultural tree crops and horticultural small crops are more suited to these areas than field crops.

The distribution of potential irrigation areas for the proposed Comet Dam and Nathan Dam are shown in Figures 2 and 3 respectively.

Potential Irrigation Areas

The areas of potential irrigation land for categories 1, 2 and 3 for the proposed Comet Dam and Nathan Dam are shown in Tables 1 and 2 respectively, within a 5 km, 5 - 10 km and the full 0-10 km wide strip either side of each river. **It should be noted that the areas in Tables 1 and 2 include all areas that have already been developed for either irrigated or dryland cropping.**

A brief description of the major areas within categories 1, 2 and 3, below the proposed Comet Dam and Nathan Dam, is provided in Tables 3 and 4 respectively. Small mapped areas are not included.

Table 1. Areas of land suitable for irrigation below the proposed Comet Dam

Category	Median % (range) of area suitable for irrigation	Estimated area suitable for irrigation (ha)		
		0-5 km strip	5-10 km strip	0-10 km strip
2	50 (40 - 70)	11 746	14 818	26 564
2f		67 684	12 598	80 282
2i		2 892	3 308	6 200
2 (Subtotal)		82 322	30 724	113 046
3	30 (20 - 40)	12 083	14 247	26 330
3f		2 912	445	3 357
3i		7 600	14 834	22 434
3 (Subtotal)		22 595	29 526	52 121
TOTAL		104 917	60 250	165 167

Table 2. Areas of land suitable for irrigation below the proposed Nathan Dam

Category	Median % (range) of area suitable for irrigation	Estimated area suitable for irrigation (ha)		
		0-5 km strip	5-10 km strip	0-10 km strip
1	75 (>70)	22 965	7 798	30 763
1f		4 515	996	5 511
1 (Subtotal)		27 480	8794	36 274
2f	50 (40 - 70)	35 914	4 111	40 025
2i		164	55	218
2 (Subtotal)		36 078	4 166	40 243
3	30 (20 - 40)	7 771	10 265	18 036
3f		3 113	14	3 127
3i		12 863	19 530	32 393
3 (Subtotal)		23 747	29 809	53 556
TOTAL		87 305	42 769	130 073

Table 3. Brief description of major potential irrigation areas below the proposed Comet Dam

Category	Location	Landform	Dominant soils	Major limitations	Remarks
2 40 - 70% of area has land suitable for irrigation					
2	Comet Dam to 50 km downstream.	Gently undulating plains.	Dark cracking clays, variable depth.	Difficult to work; wetness.	Mainly downs country.
2	50 km downstream of Comet Dam, to Isaac River junction.	Gently undulating plains.	Grey cracking clays.	Difficult to work; wetness; salinity; sodicity.	Pulled brigalow country.
2f	Comet Dam to Isaac River junction, through to Fitzroy River junction.	Floodplains.	Dark and grey cracking clays.	Flooding; wetness; difficult to work.	Brigalow; coolibah; some riparian irrigation. Requires flood assessment.
2i	Comet - Mackenzie and Isaac - Mackenzie River junctions.	Undulating rises and low, level plateaus.	Sandy and loamy red earths.	High permeability; hard setting surface; intake areas; erosion.	Best suited to spray irrigation or low volume irrigation.
3 20 - 40% of area has land suitable for irrigation					
3	Comet Dam to 10 km west of Fitzroy Development Road.	Gently undulating plains.	Grey cracking clays.	Topography; difficult to work; wetness; sodicity.	Brigalow / Dawson gum country.
3	North west of junction of Fitzroy Development Road and Mackenzie River.	Undulating plains.	Grey cracking clays and texture contrast soils.	Topography; soil variability.	Brigalow / eucalypt.
3	Downstream of Fitzroy Development Road, left bank.	Undulating plains.	Grey cracking clays.	Topography; difficult to work; sodicity.	Brigalow.
3f	Upstream and downstream of Fitzroy Development Road.	Alluvial plains.	Texture contrast soils.	Hard setting surface; sodicity; erosion; flooding.	Poplar box; higher level plain than brigalow and coolibah floodplain.
3i	Downstream of Fitzroy Development Road, right bank.	Gently undulating plains and rises.	Sandy and loamy surface texture contrast soils; red earths.	High infiltration and permeability; hard setting surface; intake areas; erosion.	Suitable for peanuts and horticultural crops.

Table 4. Brief description of major potential irrigation areas below the proposed Nathan Dam

Category	Location	Landform	Dominant soils	Major limitations	Remarks
1 > 70% of area has land suitable for irrigation					
1	Dawson River, downstream of Baralaba.	Alluvial fans and plains.	Dark cracking clays.	Difficult to work; wetness.	Some riparian irrigation.
1	Confluence of Dawson River with Kiangra Creek and with Roundstone and Mimosa Creeks, west of Moura.	Alluvial fans and plains.	Dark and grey cracking clays.	Difficult to work; wetness.	Large areas; some existing riparian irrigation.
1f	Dawson River, Theodore.	Floodplains.	Uniform loams and clays and dark cracking clays.	Flooding; wetness; soil variability.	Existing irrigation schemes (Theodore, Gibber Gundayah); protected by levees.
2 40 - 70% of area has land suitable for irrigation					
2f	Dawson River, Baralaba to Theodore.	Floodplains.	Dark and grey cracking clays; texture contrast soils; uniform loams.	Flooding; wetness; soil variability; hardsetting texture contrast soils; sodicity, salinity.	Large variable unit; existing riparian irrigation around Moura.
2f	Dawson River, upstream of Theodore.	Floodplains.	Uniform loams, texture contrast soils and dark and grey cracking clays.	Soil variability; hardsetting texture contrast soils; sodicity, salinity.	Some existing riparian irrigation.
2f	Dawson River, Duaringa.	Floodplains.	Dark cracking clays.	Flooding; difficult to work.	

Table 4. Brief description of major potential irrigation areas below the proposed Nathan Dam (continued)

3 20 - 40% of area has land suitable for irrigation	
3	Baralaba, western side of river. Undulating plains.
	Texture contrast soils, some red earths.
	Hardsetting surface; soil variability; sodicity, salinity.
3	Theodore, upstream and downstream. Undulating plains with long colluvial slopes.
	Grey cracking clays.
	Topography; difficult to work; erosion.
	Slopes may be too variable.
3f	Baralaba, upstream and downstream. Narrow, dissected floodplains.
	Dark cracking clays.
	Topography; flooding; difficult to work.
3i	Duarิงa and south of Duaringa, western side of river. Plateaus and slopes on sandstone.
	Sandy and loamy red earths and yellow earths.
	High infiltration and permeability; intake areas; hardsetting surface; erosion.
	Best suited to spray or low volume irrigation of horticultural tree crops, but very high lift required to irrigate.
3i	Duarิงa, eastern side of river. Gently undulating plains and rises.
	Sandy surface texture contrast soils.
	High infiltration and permeability; erosion.
3i	Moura to Theodore. Gently undulating plains and rises.
	Sandy surface texture contrast soils.
	High infiltration and permeability; erosion.
	Suitable for peanuts and horticultural crops.
	Suitable for peanuts and horticultural crops.

Discussion

Large or moderate sized areas of land in category 1, or large areas in category 2, where they occur in conjunction with category 1 land, have the most potential for a major irrigation development. There is an additional advantage if these areas occur close to a proposed dam, because of technical and economic efficiencies in delivery and reticulation of water.

For smaller areas of land in categories 2 and 3, it is unlikely that suitable land will occur in sufficiently large areas for major development, however smaller areas close to the rivers are suitable for riparian irrigation.

It is likely that only areas within the 0 - 5 km strip either side of each river will be considered for further irrigation development. This is due to the higher cost to deliver water further than 5 km and because many potential areas further from the river are more undulating and elevated above the immediate floodplain. The elevation above which it would not be economical to lift has not been determined as part of this study.

Proposed Comet Dam

There are no areas assessed as category 1 along the Comet - Mackenzie Rivers. Almost 105,000 ha of land in categories 2 and 3 occur within the 0 - 5 km strip either side of the river. The largest proportion, some 70,000 ha, is flood prone land (2f and 3f) with cracking clay soils along the immediate river floodplain. These areas have the advantage of being low level and close to the river, for easy delivery of water, but some areas are susceptible to moderate to severe erosive flooding. A further 23,800 ha of land in categories 2 and 3 are elevated above the floodplain, on a range of clay and duplex soils. A relatively small area (some 10,500 ha) in 2i and 3i categories has permeable soils which are better suited to low volume irrigation.

Outside the 5 km distance from the river, ie., within the 5 - 10 km strip, there are a further 60,000 ha of land in categories 2 and 3 suitable for irrigation.

Proposed Nathan Dam

Approximately 87,000 ha of land in categories 1, 2 and 3 occur within the 0 - 5 km strip either side of the Dawson River, mainly downstream from Theodore. There is a 48 km stretch of river downstream of the dam site to near Theodore, with only limited areas identified as having potential for irrigation. A significant area of land in categories 1 and flood prone 1f, totalling some 27,500 ha, has the highest potential for irrigation. A further 36,000 ha of land in category 2, the majority of which is flood prone land with cracking clay and duplex soils, also occur within the 0 - 5 km strip. The flood prone lands are susceptible to moderate to severe erosive flooding.

Another 23,700 ha of land in category 3 occur within the 0 - 5 km strip. A large proportion (some 12,800 ha) is in category 3i, with permeable soils which are better suited to low volume irrigation.

Outside the 5 km distance from the river, ie., within the 5 - 10 km strip, there are a further 42,700 ha of land in categories 1, 2 and 3 suitable for irrigation.

Conclusion

The preliminary assessment indicates that there are large areas of potentially irrigable land downstream of the proposed Nathan and Comet Dams.

However, as this assessment is based on the interpretation of very broad scale land resource mapping, more detailed investigations will be required to accurately identify potential areas and to provide guidelines for the planning of further irrigation development. More detailed studies or surveys will almost certainly show the results of this assessment to be an overestimate of potentially irrigable land (Williams et al., 1985).

Issues which require further detailed study or attention include:

- characterisation of major soils along the river, and their distribution;
- assessment of the suitability of major soils for irrigation for a range of potential crops;
- topographic information to use in the planning of irrigation development and erosion hazard assessment;
- flooding hazard, particularly for floodplain areas;
- soil salinity and sodicity hazards, including potential effects of irrigating elevated intake or recharge areas;
- soil management practices to overcome specific soil limitations; and
- off-site environmental effects.

References

- Forster, B.A. (in prep.). Land Systems of the Capricornia Coast. Queensland Department of Primary Industries.
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- Williams, J., Day, K.J., Isbell, R.F. and Reddy, S.J. (1985). Soils and Climate. In-Agro-Research for the Semi-Arid Tropics: North-West Australia. University of Queensland Press.

LOCALITY MAP POTENTIAL IRRIGATION AREAS PROPOSED COMET AND NATHAN DAMS

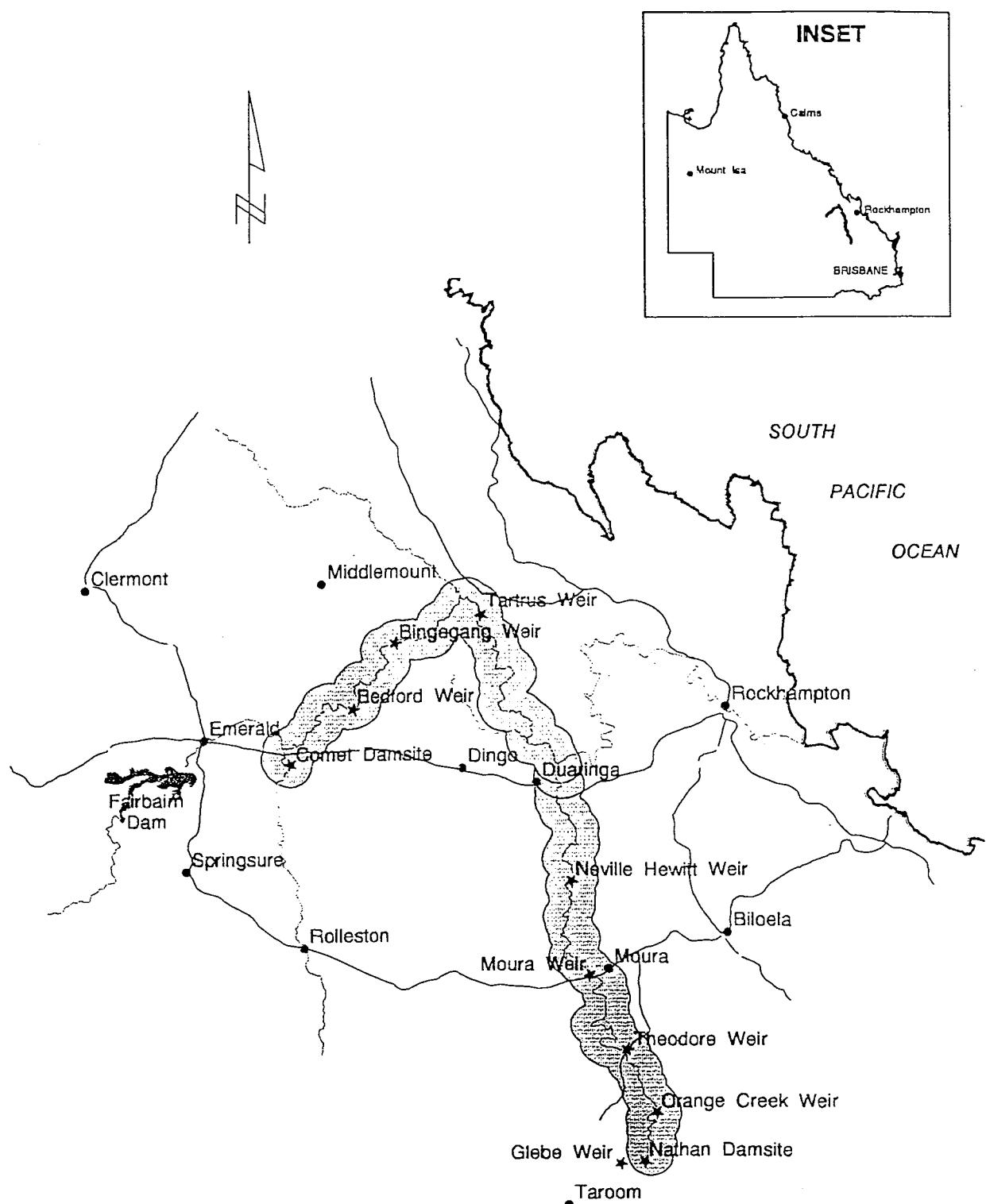
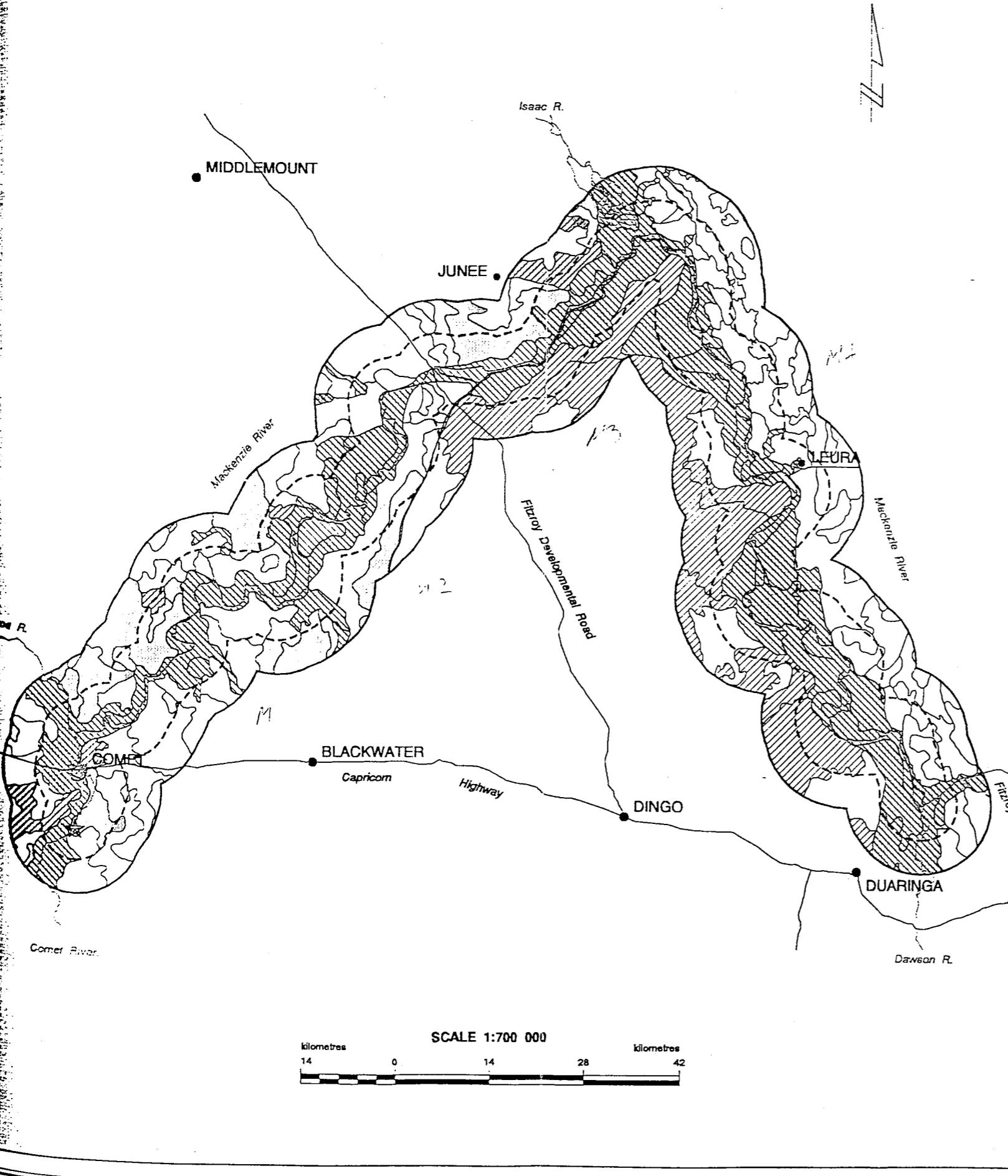


FIG. 1

POTENTIAL IRRIGATION AREAS

PROPOSED COMET DAM

COMET - MACKENZIE RIVERS



LEGEND

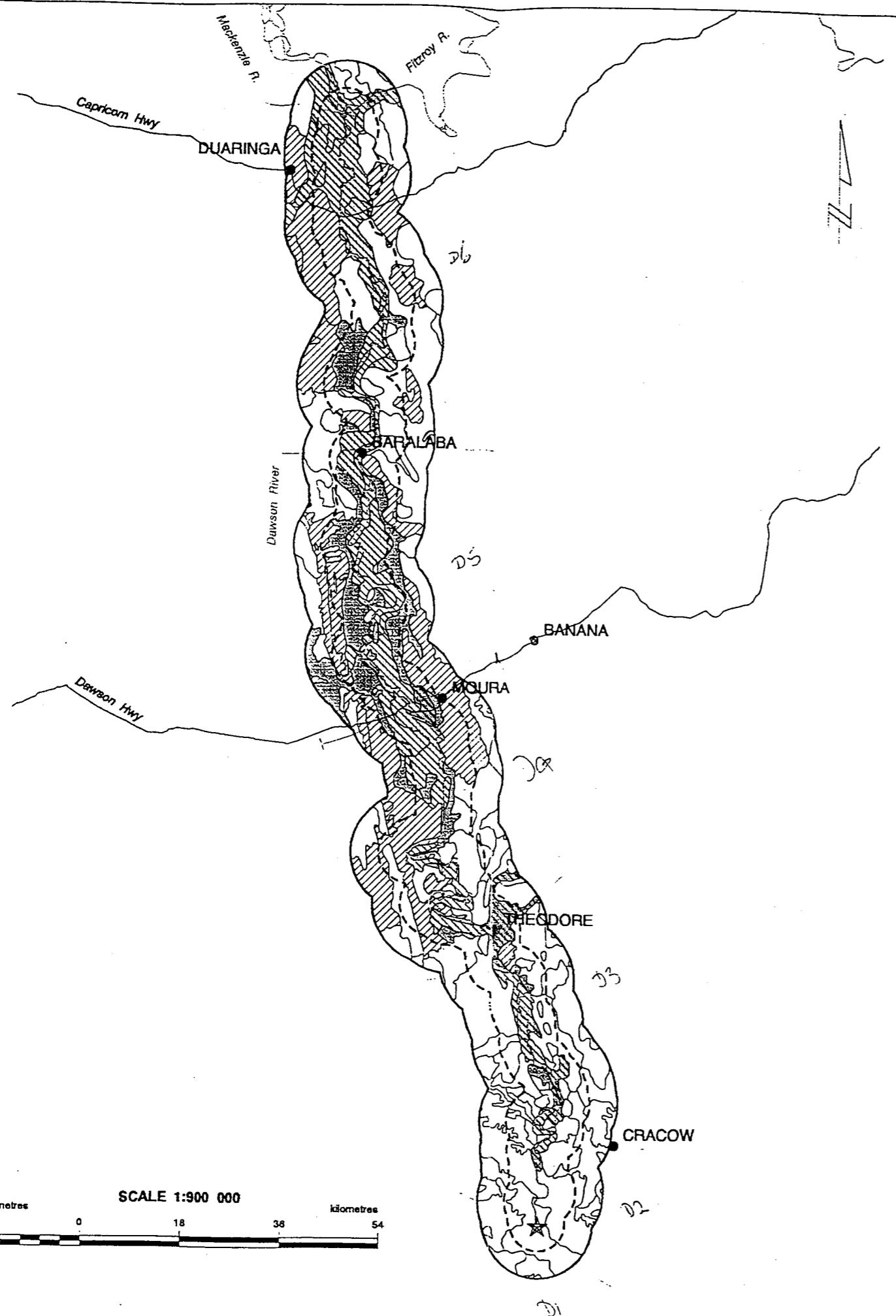
- 2 40-70% of area has soils suitable for irrigation
- 2f Flood prone
- 2i Light textured permeable soils
- 3 20-40% of area has soils suitable for irrigation
- 3f Flood prone
- 3i Light textured permeable soils
- 4 <20% of area has soils suitable for irrigation

- ★ Proposed Dam location
- Major Roads
- 10 km distance from river
- - - 5 km distance from river
- Rivers

DISCLAIMER

Information shown on this map has been derived from the following reports:
 "Lands of the Dawson-Fitzroy Area" CSIRO Land Research Series No. 21 (1968).
 "Lands of the Isaac-Comet Area" CSIRO Land Research Series No. 19 (1967).
 "Land Systems of the Capricorn Coastal Lands" DPI Land Resource Bulletin (in prep).

This map is intended for broad scale strategic planning purposes only.
 The Department of Primary Industries accepts no liability for the
 accuracy of the information at larger scales and for unauthorised use.



POTENTIAL IRRIGATION AREAS PROPOSED NATHAN DAM DAWSON RIVER

LEGEND

- 1 >70% of area has soils suitable for irrigation
 - 1f Flood prone
 - 2f 40-70% of area has soils suitable for irrigation
Flood prone
 - 3 20-40% of area has soils suitable for irrigation
 - 3f Flood prone
 - 3i Light textured permeable soils
 - 4 <20% of area has soils suitable for irrigation
- ★ Proposed Dam location
- Major Roads
- 10 km distance from river
- - - 5 km distance from river
- Rivers

APPENDIX 4

APPENDIX 4

List of species of land snails, slaters and terrestrial vertebrates from the sites in the greater Taroom and surrounding areas. which were surveyed during the supplementary and Boggomoss studies of Ingram and Stanisic (1997).

Exotic animals are indicated by *I*. Special fauna , for example, endangered, vulnerable and rare, as defined by *Nature Conservation (Wildlife) Regulation 1994, Subordinate Legislation No. 474 of 1994*, are detailed in Appendix 1. In the following, scientific names of land snails follow Smith (1992), isopods follow Vandel (1972), mammals, frogs, and reptiles follow Ingram & Raven (1991), birds follow Christidis & Boles (1994) and Pizzey & Knight (1997).

LAND SNAILS

PUPILLIDAE

Gastrocopta pediculus (Shuttleworth, 1852)

Gastrocopta hedleyi Pilsbry, 1917

Pumilicopta bifurcata Solem, 1989

Cylindrovertilla hedleyi Pilsbry, 1920

Pupoides pacificus (Pfeiffer, 1846)

SUBULINIDAE

Eremopeas tuckeri (Pfeiffer, 1846)

Lamellaxis gracilis (Hutton, 1834) *I*

RHYTIDIDAE

Rhytididae BL 2

PUNCTIDAE

Punctididae BL 1

Punctidae BL 2

CHAROPIDAE

Elsothera hewittorum Stanisic, 1996

Discocharopa aperta (Moellendorff, 1888)

Charopidae BL 6

HELICODISCIDAE

Stenopylis coarctata (Moellendorff, 1894)

SUCCINEIDAE

Succineidae BL 1

HELICARIONIDAE

Helicarionidae BL 1

Helicarionidae BL 2

Helicarionidae BL 12

ZONITIDAE

Hawaiia minuscula (Binney, 1840) *I*

LIMACIDAE

Deroceras panormitanum (Lessona & Pollonera, 1882) *I*

CAMAENIDAE

Figuladra mattea (Iredale, 1933)

Sphaerospira mossmani (Brazier, 1875).

Xanthomelon pachystylum (Pfeiffer, 1845)

Neveritis misella (Gude, 1907)

Trachiopsis mucosa (Cox, 1868)

Pallidelix greenhilli (Cox, 1866)

Adclarkia dawsonensis Stanisic, 1996

Camaenidae BL 1

Camaenidae BL 10

Camaenidae BL 17

SLATERS

PHILOSCIDAE

Laevophiloscia sp. A

ARMIDILLIDAE

Australiodilla bifrons

Cubaris sp. A

Cubaris sp. B

Cubaris sp. C

Cubaris sp. D

Spherillo grossus

Spherillo sp. A

Spherillo sp. B

Acanthodillo sp. A

ONISCIDAE

Hanoniscus sp. A

TRACHELIPIDAE

Nagurus sp. A

PORCELLIONIDAE

*Porcellionides pruinosusi*I**

MAMMALS

ORNITHORHYNCHIDAE

Ornithorhynchus anatinus

Platypus

TACHYGLOSSIDAE

Tachyglossus aculeatus

Short-beaked Echidna

DASYURIDAE

Planigale maculata

Common Planigale

Sminthopsis macroura

Stripe-faced Dunnart

Sminthopsis murina

Common Dunnart

PERAMELIDAE

Isoodon macrourus

Northern Brown Bandicoot

PHASCOLARCTIDAE

Phascolarctos cinereus

Koala

PETAURIDAE

Petaurus breviceps

Sugar Glider

Petaurus norfolkensis

Squirrel Glider

Petaurus australis

Yellow-bellied Glider

PSEUDOCHIRIDAE

Petauroides volans

Greater Glider

PHALANGERIDAE

Trichosurus vulpecula

Common Brushtail Possum

ACROBATIDAE

Acrobates pygmaeus

Feathertail Glider

POTOROIDAE

Aepyprymnus rufescens

Rufous Bettong

MACROPODIDAE

Onychogalea fraenata

Bridled Naitail Wallaby

Macropus dorsalis

Black-striped Wallaby

Macropus giganteus

Eastern Grey Kangaroo

Macropus parryi

Whiptail Wallaby

Macropus robustus

Common Wallaroo

Macropus rufogriseus

Red-necked Wallaby

Petrogale herberti

Herbert's Rock-wallaby

Wallabia bicolor

Swamp Wallaby

PTEROPODIDAE

Pteropus scapulatus

Little Red Flying-fox

EMBALLONURIDAE

Saccopteryx flaviventris

Yellow-bellied Sheathtail-bat

MOLOSSIDAE

<i>Mormopterus beccarii</i>	Beccari's Mastiff-bat
<i>Mormopterus planiceps</i>	Little Mastiff-bat
VESPERTILIONIDAE	
<i>Chalinolobus dwyeri</i>	Large Pied Bat
<i>Chalinolobus gouldii</i>	Gould's Wattle Bat
<i>Chalinolobus nigrogriseus</i>	Hoary Bat
<i>Chalinolobus picatus</i>	Little Pied Bat
<i>Eptesicus pumilis</i>	Little Cave Bat
<i>Miniopterus schreibersii</i>	Common Bent-winged Bat
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat
<i>Scotorepens greyii</i>	Little Broad-nosed Bat
LEPORIDAE	
<i>Lepus capensis</i>	Brown Hare*I*
<i>Oryctolagus cuniculus</i>	Rabbit*I*
MURIDAE	
<i>Hydromys chrysogaster</i>	Water Rat
<i>Melomys cervinipes</i>	Fawn-footed Melomys
<i>Pseudomys delicatulus</i>	Delicate Mouse
<i>Pseudomys gracilicaudatus</i>	Eastern Chestnut Mouse
<i>Mus musculus</i>	House Mouse*I*
<i>Rattus rattus</i>	Black Rat*I*
<i>Rattus fuscipes</i>	BushRat
<i>Rattus tunneyi</i>	Pale Field-rat
CANIDAE	
<i>Canis familiaris dingo</i>	Dingo
<i>Vulpes vulpes</i>	Fox*I*
FELIDAE	
<i>Felis catus</i>	Feral Cat*I*
SUIDAE	
<i>Sus scrofa</i>	Feral Pig*I*
BOVIDAE	
<i>Capra hircus</i>	Feral Goat*I*

BIRDS

CASUARIIDAE	
<i>Dromaius novaehollandiae</i>	Emu
MEGAPODIIDAE	
<i>Alectura lathami</i>	Australian Brush-turkey
PHASIANIDAE	
<i>Coturnix pectoralis</i>	Stubble Quail
ANATIDAE	
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck
<i>Dendrocygna arcuata</i>	Wandering Whistling-Duck
<i>Cygnus atratus</i>	Black Swan
<i>Chenonetta jubata</i>	Australian Wood Duck
<i>Stictonetta naevosa</i>	Freckled Duck
<i>Nettapus coromandelianus</i>	Cotton Pygmy-goose
<i>Anas platyrhynchos</i>	Mallard*I*
<i>Anas superciliosa</i>	Pacific Black Duck
<i>Anas rhynchotis</i>	Australasian Shoveler
<i>Anas gracilis</i>	Grey Teal
<i>Aythya australis</i>	Hardhead
PODICIPEDIDAE	
<i>Podiceps cristatus</i>	Great Crested Grebe
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe
<i>Poliocephalus poliocephalus</i>	Hoary-headed Grebe
ANHINGIDAE	
<i>Anhinga melanogaster</i>	Darter

PHALACROCORACIDAE	
<i>Phalacrocorax melanoleucus</i>	Little Pied Cormorant
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant
<i>Phalacrocorax carbo</i>	Great Cormorant
PELECANIDAE	
<i>Pelecanus conspicillatus</i>	Australian Pelican
ARDEIDAE	
<i>Egretta novaehollandiae</i>	White-faced Heron
<i>Ardea pacifica</i>	White-necked Heron
<i>Ardea alba</i>	Great Egret
<i>Ardea garzetta</i>	Little Egret
<i>Ardea intermedia</i>	Intermediate Egret
<i>Nycticorax caledonicus</i>	Nankeen Night Heron
THRESKIORNITHIDAE	
<i>Plegadis falcinellus</i>	Glossy Ibis
<i>Threskiornis molucca</i>	Australian White Ibis
<i>Threskiornis spinicollis</i>	Straw-necked Ibis
<i>Platalea regia</i>	Royal Spoonbill
<i>Platalea flavipes</i>	Yellow-billed Spoonbill
CICONIIDAE	
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork
ACCIPITRIDAE	
<i>Aviceda subcristata</i>	Pacific Baza
<i>Elanus axillaris</i>	Black-shouldered Kite
<i>Milvus migrans</i>	Black Kite
<i>Haliastur sphenurus</i>	Whistling Kite
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle
<i>Accipiter fasciatus</i>	Brown Goshawk
<i>Accipiter cirrhocephalus</i>	Collared Sparrowhawk
<i>Aquila audax</i>	Wedge-tailed Eagle
FALCONIDAE	
<i>Falco berigora</i>	Brown Falcon
<i>Falco longipennis</i>	Australian Hobby
<i>Falco peregrinus</i>	Perigine Falcon
<i>Falco cenchroides</i>	Nankeen Kestrel
GRUIDAE	
<i>Grus rubicunda</i>	Brolga
RALLIDAE	
<i>Porzana tabuensis</i>	Spotless Crake
<i>Porphyrio porphyrio</i>	Purple Swamphen
<i>Gallinula tenebrosa</i>	Dusky Moorhen
<i>Fulica atra</i>	Eurasian Coot
OTIDIDAE	
<i>Ardeotis australis</i>	Australian Bustard
TURNICIDAE	
<i>Turnix pyrrhothorax</i>	Red-chested Button-quail
<i>Turnix varia</i>	Painted Button-quail
SCOLOPACIDAE	
<i>Gallinago hardwickii</i>	Latham's Snipe
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper
PEDIONOMIDAE	
<i>Pedionomus torquatus</i>	Plains-wanderer
ROSTRATULIDAE	
<i>Rostratula benghalensis</i>	Painted Snipe
JACANIDAE	
<i>Irediparra gallinacea</i>	Comb-crested Jacana
BURHINIDAE	
<i>Burhinus grallarius</i>	Bush Stone-curlew

RECURVIROSTRIDAE	
<i>Himantopus himantopus</i>	Black-winged Stilt
CHARADRIIDAE	
<i>Elseyornis melanops</i>	Black-fronted Dotterel
<i>Erythrogonyx cinctus</i>	Red-kneed Dotterel
<i>Vanellus tricolor</i>	Banded Lapwing
<i>Vanellus miles</i>	Masked Lapwing
LARIDAE	
<i>Phaethon rubricauda</i>	Red-tailed Tropicbird
<i>Larus novaehollandiae</i>	Silver Gull
<i>Chlidonias hybridus</i>	Whiskered Tern
COLUMBIDAE	
<i>Columba livia</i>	Feral Pigeon*I*
<i>Chalcophaps indica</i>	Emerald Dove
<i>Phaps chalcoptera</i>	Common Bronzewing
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Geophaps scripta</i>	Squatter Pigeon
<i>Geopelia cuneata</i>	Diamond Dove
<i>Geopelia striata</i>	Peaceful Dove
<i>Geopelia humeralis</i>	Bar-shouldered Dove
<i>Leucosarcia melanoleuca</i>	Wonga Pigeon
CACATUIDAE	
<i>Calyptorhynchus banksii</i>	Red-tailed Black-Cockatoo
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo
<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo
<i>Cacatua roseicapilla</i>	Galah
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
<i>Nymphicus hollandicus</i>	Cockatiel
PSITTACIDAE	
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet
<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet
<i>Glossopsitta pusilla</i>	Little Lorikeet
<i>Alisterus scapularis</i>	Australian King-Parrot
<i>Aprosmictus erythropterus</i>	Red-winged Parrot
<i>Platycercus adscitus</i>	Pale-headed Rosella
<i>Northiella haematonota</i>	Blue Bonnet
<i>Psephotus haematonotus</i>	Red-rumped Parrot
<i>Psephotus pulcherrimus</i>	Paradise Parrot
<i>Neophema pulchella</i>	Torquoise Parrot
<i>Melopsittacus undulatus</i>	Budgerigar
CUCULIDAE	
<i>Cuculus pallidus</i>	Pallid Cuckoo
<i>Cacomantis variolosus</i>	Brush Cuckoo
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo
<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo
<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo
<i>Eudynamys scolopacea</i>	Common Koel
<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo
CENTROPODIDAE	
<i>Centropus phasianinus</i>	Pheasant Coucal
STRIGIDAE	
<i>Ninox novaeseelandiae</i>	Southern Boobook
<i>Ninox strenua</i>	Powerful Owl
TYTONIDAE	
<i>Tyto novaehollandiae</i>	Masked Owl
<i>Tyto alba</i>	Barn Owl
PODARGIDAE	
<i>Podargus strigoides</i>	Tawny Frogmouth

CAPRIMULGIDAE	
<i>Eurostopodus mystacalis</i>	White-throated Nightjar
AEGOTHELIDAE	
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar
APODIDAE	
<i>Hirundapus caudacutus</i>	White-throated Needletail
<i>Apus pacificus</i>	Fork-tailed Swift
ALCEDINIDAE	
<i>Alcedo azurea</i>	Azure Kingfisher
HALCYONIDAE	
<i>Dacelo novaeguineae</i>	Laughing Kookaburra
<i>Todiramphus macleayii</i>	Forest Kingfisher
<i>Todiramphus pyrrhopygia</i>	Red-backed Kingfisher
<i>Todiramphus sanctus</i>	Sacred Kingfisher
MEROPIDAE	
<i>Meropus ornatus</i>	Rainbow Bee-eater
CORACIIDAE	
<i>Eurystomus orientalis</i>	Dollarbird
CLIMACTERIDAE	
<i>Cormobates leucophaeus</i>	White-throated Treecreeper
<i>Climacteris picumnus</i>	Brown Treecreeper
MALURIDAE	
<i>Malurus cyaneus</i>	Superb Fairy-wren
<i>Malurus melanocephalus</i>	Red-backed Fairy-wren
<i>Malurus lamberti</i>	Variegated Fairy-wren
PARDALOTIDAE	
<i>Pardalotus punctatus</i>	Spotted Pardalote
<i>Pardalotus striatus</i>	Striated Pardalote
<i>Sericornis frontalis</i>	White-browed Scrubwren
<i>Chthonicola sagittata</i>	Speckled Warbler
<i>Smicrornis brevirostris</i>	Weebill
<i>Gerygone fusca</i>	Western Gerygone
<i>Gerygone olivacea</i>	White-throated Gerygone
<i>Acanthiza pusilla</i>	Brown Thornbill
<i>Acanthiza apicalis</i>	Inland Thornbill
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
<i>Acanthiza nana</i>	Yellow Thornbill
<i>Acanthiza lineata</i>	Striated Thornbill
MELIPHAGIDAE	
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
<i>Plectrohyncha lanceolata</i>	Striped Honeyeater
<i>Philemon corniculatus</i>	Noisy Friarbird
<i>Philemon citreogularis</i>	Little Friarbird
<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater
<i>Manorina melanocephala</i>	Noisy Miner
<i>Manorina flavigula</i>	Yellow-throated Miner
<i>Meliphaga lewinii</i>	Lewin's Honeyeater
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater
<i>Lichenostomus virescens</i>	Singing Honeyeater
<i>Lichenostomus fuscus</i>	Fuscous Honeyeater
<i>Lichenostomus leucotis</i>	White-eared Honeyeater
<i>Lichenostomus melanops</i>	Yellow-tufted Honeyeater
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater
<i>Melithreptus gularis</i>	Black-chinned Honeyeater
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater
<i>Melithreptus albogularis</i>	White-throated Honeyeater
<i>Melithreptus lunatus</i>	White-naped Honeyeater

<i>Lichmera indistincta</i>	Brown Honeyeater
<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater
<i>Acanthorhynchus tenurirostris</i>	Eastern Spinebill
PETROICIDAE	
<i>Microeca fascinans</i>	Jacky Winter
<i>Petroica goodenovii</i>	Red-capped Robin
<i>Petroica rosea</i>	Rose Robin
<i>Eopsaltria australis</i>	Eastern Yellow Robin
POMATOSTOMIDAE	
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler
CINCLOSOMATIDAE	
<i>Psophodes olivaceus</i>	Eastern Whipbird
NEOSITTIDAE	
<i>Daphoenositta chrysopetra</i>	Varied Sittella
PACHYCEPHALIDAE	
<i>Pachycephala pectoralis</i>	Golden Whistler
<i>Pachycephala rufiventris</i>	Rufous Whistler
<i>Colluricinclla megarhyncha</i>	Little Shrike-thrush
<i>Colluricinclla harmonica</i>	Grey Shrike-thrush
DICRURIDAE	
<i>Myiagria rubecula</i>	Leaden Flycatcher
<i>Myiagra cyanoleuca</i>	Satin Flycatcher
<i>Myiagra alecto</i>	Shining Flycatcher
<i>Myiagra inquieta</i>	Restless Flycatcher
<i>Grallina cyanoleuca</i>	Magpie-lark
<i>Rhipidura rufifrons</i>	Rufous Fantail
<i>Rhipidura fuliginosa</i>	Grey Fantail
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Dicerurus bracteatus</i>	Spangled Drongo
CAMPEPHAGIDAE	
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike
<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike
<i>Coracina tenuirostris</i>	Cicadabird
<i>Coracina maxima</i>	Ground Cuckoo-shrike
<i>Lalage sueurii</i>	White-winged Triller
ORIOLIDAE	
<i>Oriolus sagittatus</i>	Olive-backed Oriole
<i>Sphecotheres viridis</i>	Figbird
ARTAMIDAE	
<i>Artamus leucorynchus</i>	White-breasted Woodswallow
<i>Artamus superciliosus</i>	White-browed Woodswallow
<i>Artamus cinereus</i>	Black-faced Woodswallow
<i>Artamus cyanopterus</i>	Dusky Woodswallow
<i>Artamus minor</i>	Little Woodswallow
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Cracticus nigrogularis</i>	Pied Butcherbird
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Strepera graculina</i>	Pied Currawong
CORVIDAE	
<i>Corvus coronoides</i>	Australian Raven
<i>Corvus orru</i>	Torresian Crow
CORCORACIDAE	
<i>Corcorax melanorhamphos</i>	White-winged Chough
<i>Struthidea cinerea</i>	Apostlebird
PTILONORHYNCHIDAE	
<i>Chlamydera maculata</i>	Spotted Bowerbird
ALAUDIDAE	
<i>Mirafra javanica</i>	Singing Bushlark

MOTACILLIDAE*Anthus novaeseelandiae*

Richard's Pipit

PASSERIDAE*Passer domesticus*

House Sparrow*I*

Taeniopygia guttata

Zebra Finch

Taeniopygia bichenovii

Double-barred Finch

Neochmia modesta

Plum-headed Finch

Neochmia ruficauda

Star Finch

Neochmia phaeton

Crimson Finch

Neochmia temporalis

Red-browed Finch

Lonchura castaneothorax

Chestnut-breasted Mannikin

DICAEIDAE*Dicaeum hirundinaceum*

Mistletoebird

HIRUNDINIDAE*Cheramoeca leucosternus*

White-backed Swallow

Hirundo neoxena

Welcome Swallow

Hirundo nigricans

Tree Martin

Hirundo ariel

Fairy Martin

SYLVIIDAE*Acrocephalus stentoreus*

Clamorous Reed Warbler

Megalurus timoriensis

Tawny Grassbird

Cincloramphus mathewsi

Rufous Songlark

Cisticola exilis

Golden-headed Cisticola

ZOSTEROPIDAE*Zosterops lateralis*

Silvereye

STURNIDAE*Sturnus vulgaris*

Common Starling*I*

AMPHIBIANS**BUFONIDAE***Bufo marinus*

Cane Toad*I*

HYLIDAE*Cyclorana novaehollandiae*

Eastern Snapping-Frog

Litoria alboguttata

Greenstripe Frog

Litoria caerulea

Green Treefrog

Litoria fallax

Eastern Sedgefrog

Litoria latopalmata

Broad-palmed Rocketfrog

Litoria lesueuri

Stony-creek Frog

Litoria peronii

Emerald-spotted Treefrog

Litoria rubella

Naked Treefrog

MYOBATRACHIDAE*Crinia parinsignifera*

Beeping Froglet

Limnodynastes fletcheri

Barking Frog

Limnodynastes ornatus

Ornate Burrowing Frog

Limnodynastes peroni

Striped Marshfrog

Limnodynastes salmini

Salmon-striped Frog

Limnodynastes tasmaniensis

Spotted Marshfrog

Limnodynastes terraereginae

Scarlet-sided Pobblebonk

Pseudophryne major

Great Brown Broodfrog

Pseudophryne ravensi

Copper-backed Broodfrog

Uperoleia rugosa

Chubby Gungan

REPTILES**CHELONIIDAE***Chelodina longicollis*

Eastern Long-necked Tortoise

Elseya latisternum

Saw-shelled Tortoise

Emydura macquarii

Murray Tortoise

GEKKONIDAE

<i>Diplodactylus steindachneri</i>	
<i>Diplodactylus taenicauda</i>	Golden-tailed Gecko
<i>Diplodactylus vittatus</i>	Wood Gecko
<i>Diplodactylus williamsi</i>	
<i>Gehyra dubia</i>	
<i>Heteronotia binoei</i>	Bynoe's Gecko
<i>Oedura rhombifer</i>	
<i>Oedura robusta</i>	Robust Velvet Gecko
<i>Oedura tryoni</i>	Southern Spotted Velvet Gecko
<i>Saltuarius salebrosus</i>	
<i>Underwoodisaurus milii</i>	Thick-tailed Gecko
PYGOPODIDAE	
<i>Lialis burtonis</i>	Burton's Snake Lizard
<i>Paradelma orientalis</i>	
<i>Pygopus nigriceps</i>	Hooded Scaly-foot
SCINCIDAE	
<i>Anomalopus brevicollis</i>	
<i>Anomalopus leuckartii</i>	
<i>Anomalopus verreauxi</i>	
<i>Carlia pectoralis</i>	
<i>Carlia schmeltzii</i>	
<i>Cryptoblepharus plagioccephalus</i>	
<i>Cryptoblepharus virgatus</i>	
<i>Ctenotus robustus</i>	
<i>Cyclodomorphus gerrardii</i>	Pink-tongue Skink
<i>Egernia modesta</i>	
<i>Egernia rugosa</i>	Yakka Skink
<i>Egernia striolata</i>	Tree Skink
<i>Eulamprus brachysoma</i>	
<i>Eulamprus martini</i>	
<i>Lampropholis delicata</i>	
<i>Lerista fragilis</i>	
<i>Lerista muelleri</i>	
<i>Lerista punctatovittata</i>	
<i>Lygisaurus foliorum</i>	
<i>Lygisaurus timlowi</i>	
<i>Morethia boulengeri</i>	
<i>Morethia taeniopleura</i>	Fire-tailed Skink
<i>Sphenomorphus quoyii</i>	Water Skink
<i>Tiliqua scincoides</i>	Eastern Blue-tongue
AGAMIDAE	
<i>Diporiphora australis</i>	
<i>Gemmatophora nobbi</i>	Nobbi
<i>Physignathus lesueurii</i>	Eastern Water Dragon
<i>Pogona barbata</i>	Bearded Dragon
VARANIDAE	
<i>Varanus gouldii</i>	Sand Monitor
<i>Varanus tristis</i>	
<i>Varanus varius</i>	Lace Monitor
TYPHLOPIDAE	
<i>Ramphotyphlops ligatus</i>	
<i>Ramphotyphlops proximus</i>	
BOIDAE	
<i>Aspidites melanocephalus</i>	Black-headed Python
<i>Morelia spilota</i>	Carpet Snake
COLUBRIDAE	
<i>Boiga irregularis</i>	Brown Tree Snake
<i>Dendrelaphis punctulata</i>	Green Tree Snake

<i>Tropidonophis mairii</i>	Freshwater Snake
ELAPIDAE	
<i>Acanthophis antarcticus</i>	Common Death Adder
<i>Cacophis harriettae</i>	White-naped Snake
<i>Demansia psammophis</i>	Yellow-faced Whip Snake
<i>Demansia torquata</i>	Collared Whip Snake
<i>Furina diadema</i>	Red-naped Snake
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake
<i>Oxyuranus scutellatus</i>	Taipan
<i>Pseudechis australis</i>	Mulga Snake
<i>Pseudonaja textilis</i>	Eastern Brown Snake
<i>Rhinoplocephalus nigrescens</i>	Eastern Small-eyed Snake
<i>Simoselaps australis</i>	Coral Snake
<i>Vermicella annulata</i>	Common Bandy-Bandy

APPENDIX 5

APPENDIX 5

SPECIAL SPECIES

The following is an annotated list of the extinct, endangered, vulnerable, rare and special cultural species as designated in *Nature Conservation (Wildlife) Regulation 1994, Subordinate Legislation No. 474 of 1994.*

MAMMALS

BRIDLED NAILTAIL WALLABY.

Species name: Bridled Nailtail Wallaby *Onychogalea fraenata*.

Distribution:

Local: Extinct.

Queensland: Restricted to an area of about 11,000ha in Central Queensland (Strahan, 1983).

Reintroduced elsewhere.

Extralimital: Extinct in New South Wales and Victoria.

Population Status: Extinct in the Taroom area.

Conservation Status: Endangered.

Population Health: Not applicable.

Habitat Preferences: Not applicable.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: Not applicable.

Amelioration Measures including Habitat Restoration: Not applicable.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

2. LARGE PIED BAT.

Species name: Large Pied Bat *Chalinolobus dwyeri*.

Distribution:

Local: Recorded as scarce by Crossman & Reimer (1986).

Queensland: Interior, sub-arid Southern Queensland.

Extralimital: Interior, sub-arid Northern New South Wales.

Population Status: Recorded as scarce by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Well-wooded habitats with daytime roosts of caves, tunnels, mines and abandoned nests of martins (Strahan, 1983).

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: Unknown.

Effects from the proposed Activity: Unknown.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

3. LITTLE PIED BAT.

Species name: Little Pied Bat *Chalinolobus picatus*.

Distribution:

Local: Recorded as scarce by Crossman & Reimer (1986).

Queensland: Interior, arid and sub-arid of Western and Southern Queensland.

Extralimital: Interior, arid Western New South Wales and Eastern South Australia.

Population Status: Recorded as scarce by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Arid habitats - providing water is available - with daytime roosts of caves and mine-shafts (Strahan, 1983).

Barriers/corridors: The species is vagile.
Sensitivity to Habitat Modifications: Unknown.
Effects from the proposed Activity: Unknown.
Amelioration Measures including Habitat Restoration: None planned.
Ability of a Species to Recover: Unknown.
Recovery Plans: None planned.
On-going Monitoring/audit Programmes: None planned.

4. PLATYPUS

Species name: Platypus *Ornithorhynchus anatinus*.

Distribution:

Local: Two records from the Dawson River (Crossman & Reimer, 1986).
State: Eastern watersheds, but was once occurred in much of the Condamine River.
Extralimital: Tasmania; also coastal New South Wales, Victoria and southeastern South Australia

Population Status: Unknown.

Conservation Status: Special Cultural.

Population Health: Unknown.

Habitat Preferences: Clear pools, streams, creeks and rivers.

Barriers/corridors: Blocking of waterway by weirs and the creation of unsuitable aquatic habitats.

Sensitivity to Habitat Modifications: The Platypus has not been significantly affected by impacts from forestry, farming and grazing throughout its range. However, it is sensitive to pollution and any activity that destroys its crustacean prey.

Effects from the proposed Activity: Siltation will affect their crustacean prey. While Platypus feed in the water of dams, inundation often destroys the banks of creeks that are favoured for breeding (S. Van Dyck, pers. comm.).

Amelioration Measures including Habitat Restoration: Environmental flow of the river downstream of the dam should be maintained. Soil should not to be released into the water.

Ability of a Species to Recover: Platypuses are found in human-modified areas as long as the creeks are not destroyed or polluted.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

5. SHORT-BEAKED ECHIDNA.

Species name: Short-beaked Echidna *Tachyglossus aculeatus*.

Distribution:

Local: Recorded as uncommon by Crossman & Reimer (1986).
State: All of the State.
Extralimital: Tasmania and Australia

Population Status: Recorded as uncommon by Crossman & Reimer (1986). Ingram & Stanisic (1997) said it was recorded from boggomosses several times during their survey.

Conservation Status: Special Cultural.

Population Health: Unknown.

Habitat Preferences: Most terrestrial habitats.

Barriers/corridors: Barriers are land cleared for farming and grazing and expanded waterways made by weirs.

Sensitivity to Habitat Modifications: The echidna has not been significantly affected by impacts from forestry, farming and grazing throughout its range.

Effects from the proposed Activity: In the initial stages, flooding will create wider, water barriers to cross and may result in isolation and drowning of animals.

Amelioration Measures including Habitat Restoration: During the initial stages of flooding, regular checks should be carried out to save echidnas from the possibility of drowning. Individuals isolated by rising water should be captured and moved to safety.

Ability of a Species to Recover: Echidnas are found in human-modified areas.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

6. KOALA

Species name: Koala *Phascolarctos cinereus*.

Distribution:

Local: Recorded as uncommon by Crossman & Reimer (1986).

State: Widespread in eastern Queensland.

Extralimital: Southern, eastern Australia.

Population Status: Recorded as uncommon by Crossman & Reimer (1986).

Conservation Status: Special Cultural.

Population Health: Unknown

Habitat Preferences: Found in areas with suitable food trees, from tall open forest to open woodland.

Koalas occur in areas modified by humans such as residential developments and farm land.

Barriers/corridors: Barriers are land cleared for farming and grazing and expanded waterways made by weirs.

Sensitivity to Habitat Modifications: Koalas are able to exist in human-made habitats but they are sensitive to completely removing or drowning the trees.

Effects from the proposed Activity: Inundation will result in the loss of food trees. Also, in the initial stages, flooding will create wider, water barriers to cross and may result in isolation and drowning of animals.

Amelioration Measures including Habitat Restoration: During the initial stages of flooding, regular checks should be carried out to save Koalas from the possibility of drowning. Koalas isolated by rising water should be captured and moved to safe trees. Also, a planting program should be instigated to replace the loss of food trees in the catchment area.

Ability of a Species to Recover: Koala can live in human-modified environment.

Recovery Plans: If needed, this should be done in association with the Shire and Department of Environment.

On-going Monitoring/audit Programmes: None planned.

BIRDS

1. PARADISE PARROT.

Species name: Paradise Parrot *Psephotus pulcherrimus*.

Distribution:

Local: Records from John Gilbert's diary from the ill-fated Leichhardt Expedition (Crossman & Reimer, 1986).

Queensland: Coastal Central Queensland inland and south to northern New South Wales.

Extralimital: Northern Central New South Wales.

Population Status: The last authenticated sighting of the species was in November 1927 (Forshaw, 1978).

Conservation Status: Extinct.

Population Health: Not applicable.

Habitat Preferences: Open woodland and scrubby grasslands where termite mounds, in which they nested, abounded. Their distribution nearly coincided with the Brigalow Biogeographical Region.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: Not applicable.

Amelioration Measures including Habitat Restoration: Not applicable.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

2. STAR FINCH.

Species name: Star Finch *Neochmia ruficauda*.

Distribution:

Local: Extinct.

Queensland: Now restricted to Northwestern Queensland and Southwestern Cape York Peninsula.

Extralimital: Northern Western Australia and Northern Territory

Population Status: Extinct in Taroom area. Once widespread in eastern Queensland (Holmes, 1996).

Conservation Status: Endangered.

Population Health: Not applicable.
Habitat Preferences: Not applicable.
Barriers/corridors: Not applicable.
Sensitivity to Habitat Modifications: Not applicable.
Effects from the proposed Activity: Not applicable.
Amelioration Measures including Habitat Restoration: Not applicable.
Ability of a Species to Recover: Not applicable.
Recovery Plans: Not applicable.
On-going Monitoring/audit Programmes: Department of Environment have a program presently in place for Queensland.

3. PLAINS-WANDERER

Species name: Plains-wanderer *Pedionomus torquatus*.

Distribution:

Local: Record from Isla Gorge (*Bird Observer* 689:84, 1989).
Queensland: South Central and South western.
Extralimital: South Western Northern Territory, Eastern South Australian and Western New South Wales and Victoria.

Population Status: Unknown.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Sparse treeless grasslands to saltbush or low shrubland. Also areas with old grain crops (Pizzey & Knight, 1997).

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by loss of its habitat.

Effects from the proposed Activity: Unknown.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

4. SQUATTER PIGEON.

Species name: Squatter Pigeon *Geophaps scripta* southern subspecies.

Distribution:

Local: Recorded as uncommon by Crossman & Reimer (1986).
Queensland: From the middle of Cape York Peninsula through Eastern Queensland.
Extralimital: Northern Central New South Wales.

Population Status: Recorded as uncommon by Crossman & Reimer (1986).

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Seldom far from water in woodlands with short grass. Also rocky or sandy ground or newly burned grass or bush (Pizzey & Knight, 1997).

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by destruction of its habitat.

Effects from the proposed Activity: Unknown.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

5. GLOSSY BLACK-COCKATOO.

Species name: Glossy Black-cockatoo *Calyptorhynchus lathami*.

Distribution:

Local: Listed as "uncommon" by Crossman & Reimer (1986).
Queensland: Eastern Queensland from Eungella National Park south to the NSW border.
Extralimital: Eastern NSW and Victoria with an isolated population on Kangaroo Island, SA.

Population Status: Sedentary, declining (Pizzey & Knight, 1997).

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Found within a range of forests, woodlands, trees bordering watercourses and in partially cleared land. Their distribution is patchy because they rely on the seeds of *Allocasuarina* trees for food. Also, for nesting, they are reliant on hollow dead trees or large, hollow limbs on live trees.

Barriers/corridors: The bird is vagile.

Sensitivity to Habitat Modifications: Sensitive to loss of food and nesting habitat from clearing and hot fires.

Effects from the Proposed Activity: Food trees will be lost as well as large trees that have hollow nesting sites.

Amelioration Measures including Habitat Restoration: Special attention should be given to maintain hollow trees untouched by inundation.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

6. RED-TAILED TROPICBIRD

Species name: Red-tailed Tropicbird *Phaethon rubricauda*.

Distribution:

Local: Crossman & Reimer (1986) noted that a single specimen was known

Queensland: Seas of the eastern coast.

Extralimital: Seas off Western Australia and NSW. Southern oceans.

Population Status: Vagrant, accidental.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Open seas and their islands.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: None.

Amelioration Measures including Habitat Restoration: None.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

7. CRIMSON FINCH.

Species name: Crimson Finch *Neochmia phaeton*

Distribution:

Local: Extinct in the Taroom area (Crossman & Reimer, 1986).

Queensland: Northern and Northwestern Queensland.

Extralimital: Northern Northern Territory and Western Australia.

Population Status: Extinct in the Taroom area (Crossman & Reimer, 1986).

Conservation Status: Vulnerable.

Population Health: Not applicable.

Habitat Preferences: Not applicable.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: Not applicable.

Amelioration Measures including Habitat Restoration: Not applicable.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

8. POWERFUL OWL.

Species name: Powerful Owl *Ninox strenua*.

Distribution:

Local: Recorded as scarce in the area by Crossman & Reimer (1986).

Queensland: From Eungella NP south to the NSW border.

Extralimital: eastern NSW and southeastern Australia.

Population Status: Uncommon (Pizzey & Knight, 1997).

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Occurs in dry and wet eucalypt forest. Nests in hollows usually in large eucalypts.

Barriers/corridors: The bird is vagile.

Sensitivity to Habitat Modifications: These birds are very sensitive to habitat modification.

Effects from the Proposed Activity: The bird is scarce in the area. However, it will be affected by the loss of nesting.

Amelioration Measures including Habitat Restoration Special attention should be given to maintain hollow trees untouched by inundation.

Ability of a Species to Recover: Little is known. However, will occupy human-modified habitats (Chafer, 1992; Sansom, 1991).

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

9. GREAT CRESTED GREBE.

Species name: Great Crested Grebe *Podiceps cristatus*.

Distribution:

Local: Crossman & Reimer (1986) mentioned one record from the area.

Queensland: Over much of the State

Extralimital: Tasmania and most of Australia. Irregular inland.

Population Status: Unknown.

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Generally still, shallow fresh water areas including dams.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the pollution and elimination of its habitat.

Effects from the proposed Activity: The species should be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species should be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

10. COTTON PYGMY-GOOSE

Species name: Cotton Pygmy-goose *Nettapus coromandelianus*.

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Eastern Queensland.

Extralimital: Northeastern New South Wales; also Southeastern Asia, the Indo-Australian Archipelago and the Philippines.

Population Status: Recorded as uncommon by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Deeper freshwater swamps, lagoons and dams with waterplants (Pizzey & Knight, 1997).

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the pollution and elimination of its habitat.

Effects from the proposed Activity: The species should be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species should be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

11. BLACK-NECKED STORK.

Species name: Black-Necked Stork *Ephippiorhynchus asiaticus*.

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Coastal and sub-coastal Queensland.

Extralimital: Coastal and sub-coastal Northern Australia and New South Wales. Also Southeastern Asia and the Indo-Australian Archipelago.

Population Status: Recorded as uncommon in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Wetlands and their edges.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.

Effects from the proposed Activity: The species might be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species should be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

12. PAINTED SNIPE.

Species name: Painted Snipe *Rostratula benghalensis*.

Distribution:

Local: Recorded as scarce in the area by Crossman & Reimer (1986).

Queensland: Most of the State.

Extralimital: New South Wales, Victoria, Northern Territory and Western Australia. Also in the Indo-Australian Archipelago.

Population Status: Recorded as scarce in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Well-vegetated shallows and margins of wetlands.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.

Effects from the proposed Activity: The species might be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species might be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

13. TORQUOISE PARROT.

Species name: Torquoise Parrot *Neophema pulchella*.

Distribution:

Local: Extinct.

Queensland: Southeastern Queensland.

Extralimital: Eastern New South Wales and Northeastern Victoria.

Population Status: Not applicable.

Conservation Status: Rare.

Population Health: Not applicable.

Habitat Preferences: Not applicable.

Barriers/corridors: Not applicable.

Sensitivity to Habitat Modifications: Not applicable.

Effects from the proposed Activity: Not applicable.

Amelioration Measures including Habitat Restoration: Not applicable.

Ability of a Species to Recover: Not applicable.

Recovery Plans: Not applicable.

On-going Monitoring/audit Programmes: Not applicable.

14. BLACK-CHINNED HONEYEATER.

Species name: Black-chinned Honeyeater *Melithreptus gularis*.

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Recorded over most of Queensland accept the extreme Southwest.

Extralimital: Also recorded from New South Wales, Victoria, Northern Territory and Western Australia.

Population Status: Recorded as uncommon in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Woodland to open forest with thick undergrowth.

Barriers/corridors: The species is vagile and seasonally nomadic.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.

Effects from the proposed Activity: Unknown.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

15. YELLOW-TUFTED HONEYEATER.

Species name: Yellow-tufted Honeyeater *Lichenostomus melanops*.

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Central and Southeastern Queensland.

Extralimital: Southeastern Australia.

Population Status: Recorded as uncommon in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Open forest to woodland with undergrowth and shrub layers.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.

Effects from the proposed Activity: Unknown.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

16. GROUND CUCKOO-SHRIKE.

Species name: Ground Cuckoo-shrike *Coracina maxima*.

Distribution:

Local: Recorded as scarce in the area by Crossman & Reimer (1986).

Queensland: Most of Queensland accept Cape York Peninsula.

Extralimital: Over most of Australia but usually absent from the coast.

Population Status: Recorded as scarce in the area by Crossman & Reimer (1986).

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Open grasslands with live or dead trees.

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the elimination of its habitat.

Effects from the proposed Activity: Unknown

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

17. FRECKLED DUCK

Species name: Freckled Duck *Stictonetta naevosa*.

Distribution:

Local: Recorded from Taroom (Redhead, 1988).

Queensland: Southern Queensland.

Extralimital: Tasmania, Victoria, Western Australia, South Australia, and New South Wales.

Population Status: Unknown.

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Large well-vegetated swamps; in dry periods moves to open lakes (Pizzey & Knight, 1997).

Barriers/corridors: The species is vagile.

Sensitivity to Habitat Modifications: It is negatively affected by the pollution and elimination of its habitat.

Effects from the proposed Activity: The species could be positively affected by the increase in wetlands.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: The species could be positively affected by the increase in wetlands.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

REPTILES

1. FITZROY RIVER TURTLE.

Species name: Fitzroy River Turtle *Rheodytes leukops*.

Distribution:

Local: Recorded as uncommon in the area by Crossman & Reimer (1986).

Queensland: Fitzroy River System (Legler & Cann, 1980).

Extralimital: Queensland only.

Population Status: Unknown. I.E.P (1996) did not locate the species in Nathan Gorge areas.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: In habited rivers have high water-clarity and are characterised by large, deep pools with rocky, gravelly or sandy substrates connected by shallow riffles. As well, extensive beds of Ribbon Weed (*Vallisneria* sp.) are usually associated (Cogger *et al.* 1993).

Barriers/corridors: Weir walls and turbid water.

Sensitivity to Habitat Modifications: The species negatively affected by turbidity and deep sedimentation (Cogger *et al.* 1993).

Effects from the proposed Activity: Unknown. This aquatic species, although not part of the brief, is included here for completeness.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

2. PARADELMA ORIENTALIS.

Species name: Paradelma orientalis.

Distribution:

Local: Expedition range, west of Taroom during the Queensland Museum survey. Cogger *et al.* (1993) mentions a concentration of museum specimens from the Cracow area.

Queensland: Brigalow Biogeographical area east of the Great Dividing Range in Central to Southern Queensland.

Extralimital: Found only in Queensland.

Population Status: Unknown.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: Brigalow or eucalypt woodland with an understorey of Brigalow and sparse, tussock grass ground cover, on grey, cracking clay soils (Cogger *et al.*, 1993).

Barriers/corridors: Barriers are the Dawson River and the cleared farm land of the Taroom area.

Sensitivity to Habitat Modifications: Cogger *et al.* (1993) suggested a combination of activities that have contributed to the decline of the species. These were: overgrazing by cattle, clearance of habitat for agriculture and cattle grazing, pasture improvement, crop production and native forest logging.

Effects from the proposed Activity: Unknown. Possible drownings. The species has not been recorded in the proposed area of inundation.

Amelioration Measures including Habitat Restoration: None proposed.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

3. YAKKA SKINK.

Species name: Yakka Skink *Egernia rugosa*.

Distribution:

Local: Crossman & Reimer (1986) said the species was uncommon.

Queensland: Subhumid to semi-arid eastern interior (Wilson & Knowles, 1988).

Extralimital: Queensland only.

Population Status: Unknown. It is very secretive.

Conservation Status: Vulnerable. Cogger *et al.* (1993) designated the species "rare or insufficiently known".

Population Health: Unknown.

Habitat Preferences: *Woodlands:* It excavates a burrow system below low vegetation. Also found hiding in hollow logs, root systems of fallen trees and under rocks (Wilson & Knowles, 1988).

Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.

Sensitivity to Habitat Modifications: Unknown.

Effects from the proposed Activity: Flooding of habitat and drownings.

Amelioration Measures including Habitat Restoration: None planned

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned

On-going Monitoring/audit Programmes: None planned

4. DUNMALL'S SNAKE.

Species name: Dunmall's Snake *Glyphodon dunmelli*.

Distribution:

Local: Expedition range.

Queensland: Southeastern interior of Queensland.

Extralimital: Queensland only.

Population Status: Unknown.

Conservation Status: Vulnerable.

Population Health: Unknown.

Habitat Preferences: preferred habitat is Brigalow forest or woodland growing on cracking black clay and clay loam soils (Cogger *et al.*, 1993).

Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.

Sensitivity to Habitat Modifications: Unknown.

Effects from the proposed Activity: Flooding of habitat and drownings.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

5. GOLDEN-TAILED GECKO.

Species name: Golden-tailed Gecko *Diplodactylus taenicaudus*.

Distribution:

Local: Crossman & Reimer (1986) recorded it is common.

Queensland: Central coast to the southeastern interior.

Extralimital: Queensland only.

Population Status: Common (Crossman & Reimer, 1986).

Conservation Status: Rare. Cogger *et al.* (1993) designated the species "rare or insufficiently known".

Population Health: Unknown.

Habitat Preferences: Open forest and woodlands especially with the native pines of *Callitris*.

Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.

Sensitivity to Habitat Modifications: It is eliminated by the removal of trees. However, is found in human modified areas and their structures.

Effects from the proposed Activity: Loss of trees and drowning.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

6. ANOMALOPUS BREVICOLLIS.

Species name: *Anomalopus brevicollis*.

Distribution:

Local: Recorded from near Theodore and Cracow (Ingram & Stanisic, 1997).

Queensland: Mid-eastern Queensland south to Cracow, Southeastern Queensland.

Extralimital: Queensland Only.

Population Status: Unknown.

Conservation Status: Rare. Not mentioned by Cogger *et al.* (1993).

Population Health: Unknown.

Habitat Preferences: Found in a broad range of habitats fro open forest to rainforest.

Barriers/corridors: Unknown.

Sensitivity to Habitat Modifications: Unknown.

Effects from the proposed Activity: Unknown. The species probably doesn't occur in the proposed area of inundation.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

7. COMMON DEATH ADDER.

Species name: Common Death Adder *Acanthopis antarcticus*.

Distribution:

Local: One record from Taroom (Ingram & Stanisic, 1997).

Queensland: From the humid Northeast south to South Central and Souheastern Queensland.

Extralimital: Widespread disjunct populations throughout southern and eastern Australia (Wilson & Knowles, 1988).

Population Status: Unknown.

Conservation Status: Rare. Cogger *et al.* (1993) lists the species as rare or insufficiently known.

Population Health: Unknown.

Habitat Preferences: Wide variety of habitats from rainforest and woodland to coastal heathlands.

Barriers/corridors: Barriers are clearing from farming and grazing and the Dawson River.

Sensitivity to Habitat Modifications: Death Adders have been declining probably because of disturbance of habitat. As well, they have been poisoned by Cane Toads, *Bufo marinus* (Wilson & Knowles, 1988).

Effects from the proposed Activity:

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

AMPHIBIA

20. CYCLOPANA VERRUCOSUS.

Species name: *Cyclorana verrucosus*.

Distribution:

Local: Crossman & Reimer (1986) collected two specimens from a dry creek bed.

Queensland: Unknown.

Extralimital: Unknown.

Population Status: The identity of the specimens is in doubt. They could not be located in the Queensland Museum where most of the specimens of Crossman & Reimer (1986) are housed. Also Ingram & Raven (1991) doubted the reality of this species.

Conservation Status: Rare.

Population Health: Unknown.

Habitat Preferences: Unknown.

Barriers/corridors: Unknown.

Sensitivity to Habitat Modifications: Unknown.

Effects from the proposed Activity: Unknown.

Amelioration Measures including Habitat Restoration: None planned.

Ability of a Species to Recover: Unknown.

Recovery Plans: None planned.

On-going Monitoring/audit Programmes: None planned.

APPENDIX 6

Appendix 6.1 Habitat Assessment for Dawson River, main channel sites - Upstream of Taroom

Source	Site	Location	Depth (m)	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environments Rating	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Bank Habitat Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating	
DAWSON RIVER SITES (In order upstream to downstream)																
T 166	Dawson River west of Taroom	Pool	100	0.6	0.046	3.8	8.7	1.2	50	78	95	2	3	48	71	66
T 168	Dawson River 50km u/s Taroom	Run Pool	10 90	0.1 0.5	0.061 0.016	4.0	5.0	2.0	50	64	48	60	5	53	67	68
T 170	Dawson River 10km u/s Pine Creek junction	Riffle Run Pool	2 65 33	0.2 0.4 1.5	0.200	3.6	11.6	1.8	83	88	75	30	39	68	62	93

Appendix 6.2 Habitat Assessment for Dawson River, tributary sites - Upstream of Taroom

Source	Site	Location	Depth (m)	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Bank Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Bank Habitat Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating			
TRIBUTARY SITES (In order upstream to downstream)																
T 351	Kinnoul Creek 10km u/s Dawson	Pool	100	1.0	0.010	4.1	16.7	1.7	33	47	52	5	49	27	34	73
T 352	Kungay Mungay Cr. 10km u/s Dawson	Pool	100	0.1	0.013	3.0	5.1	1.1	33	72	42	19	a	41	61	58
T 304	Juandah Creek 5km u/s Dawson	Pool	100	1.3	0.010	7.2	23.5	1.5	50	44	95	2	a	1	1	70
T 303	Back Creek 5km u/s Juandah junct.	Riffle Run Pool	55 10 35	0.1 0.4 0.6	0.010	3.7	6.0	0.8	50	20	39	1	a	17	26	51
T 167	Eurombah Creek 3 km u/s Dawson	Run Pool	10 70	0.1 0.6	0.016 0.010	5.6	7.0	0.6	50	86	56	2	a	30	41	42
T 169	Scott Creek 20km u/s Dawson	Riffle Run Pool	30 35 45	0.1 0.4 1.2	0.056 0.074	5.7	13.5	1.6	33	60	26	5	a	2	1	44

Appendix 6.3 Habitat Assessment for Dawson River, main channel sites - Inundation Area - Dam Site to Taroom

Source	Site	Location	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environments Rating	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Bank Habitat Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating	
DAWSON RIVER SITES (In order upstream to downstream)															
T	165	Dawson River 5km d/s of Taroom	Pool	100	0.8	0.010	7.4	11.7	1.7	67	50	95	51	9	35
A	919	Dawson River 10 km d/s Taroom	Pool	100	1.8	0.010	8.8	21.0	2.2	50	100	95	70	10	75
A	915	Dawson River 5km d/s Glebe Weir	Run Pool	50	1.0	0.010	10.2	29.0	2.2	60	100	100	67	a	82
															87
															69

(A= this survey, T = Telfer (1995))

Appendix 6.4 Habitat Assessment for Dawson River, tributary sites - Innundation Area - Dam Site to Taroom

Data Sources
(A = this survey, T = Telfer (1995))

Source	Site	Location	TRIBUTARY SITES (In order upstream to downstream)															
			Depth (m)	% of Reach Length	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environment Rating	Bank Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Stream Bank Habitat Rating	Scenic & Recreation Rating				
T	264	Bentley Cr. 5km u/s Dawson	Run	35	0.3	0.020												
T	265	Cockatoo Creek	Pool	65	0.5	0.016	4.6	10.3	1.3	33	46	66	5	1	4	1	59	
T	265	Cockatoo Creek	Run	85	0.3	0.028												
A	918	25 km u/s Dawson	Pool	15	0.3	0.06	5.0	6.8	0.4	67	34	53	2	a	6	1	63	
A	917	Cockatoo Creek	Riffle	10	0.1	0.562												
A	917	10 km u/s Dawson	Run	10	0.4	0.01	6.0	5.0	0.8	67	100	87	21	a	66	76	85	
T	131	Spring Gully North arm	Pool	80	1.5	0.01												
T	131	Spring Gully North arm	Run	10	1.5	0.010	0.010	9.6	13.0	2.0	67	100	95	82	a	72	78	67
T	172	Palm Tree Creek	Cas/Rapid	15	0.1													
T	172	Palm Tree Creek	Riffle	10	0.1													
T	172	Palm Tree Creek	Run	55	0.2	0.596												
T	172	Palm Tree Creek	Pool	20	0.5	0.019	.24	3.8	0.5	33	20	94	5	a	1	1	50	
T	172	15km u/s Dawson	Riffle	5	0.2													
T	129	Box Creek 10km u/s Palm Tree Cr.	Run	35	0.5	0.071												
T	129	Box Creek 10km u/s Palm Tree Cr.	Pool	60	0.6	0.079	3.2	12.3	0.7	83	34	24	34	a	54	64	71	
T	129	Box Creek 10km u/s Palm Tree Cr.	Run	60	0.2	0.03												
T	129	Box Creek 10km u/s Palm Tree Cr.	Pool	40	0.8	0.02	4.8	6.1	0.6	50	32	94	1	a	1	1	64	

Appendix 6.5 Habitat Assessment for Dawson River, main channel sites - Dam Site to Gyrandia Weir

Source	Site	Location	Width to Depth Ratio	Mean sediment diameter (mm)	Depth (m)	% of Reach Length	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream & Bank Habitat Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating			
							DAWSON RIVER SITES									
A	907	Dawson River just d/s Price Creek junct.	Run Pool	30 0.6 70 1.0	0.032 0.032	5.3	22.4	4.2	83	80	96	100	a	79	98	86
A	914	Dawson River just d/s of dam site	Rapid Pool	10 0.2 90 1.5	31.3 0.119	19.4	18.9	2.4	100	99	43	100	a	84	97	71
A	989	Dawson River old Dam site	Run Pool	25 0.5 75 1.1	3.49 0.06	15.0	7.9	1.9	75	49	74	57	25	74	93	68
A	988	Dawson River 'Round Water Hole'	Pool	100 5.0	0.010	6.8	40.0	9.3	83	100	95	98	a	100	100	87
A	905	Dawson River at Crocker Creek junction	Riffle Pool	30 0.1 70 0.8	158.0 281.1	3.3	5.0	1.3	100	96	33	88	a	66	90	93
A	902	Dawson River just u/s Cabbage Tree Creek junction	Pool	100 2.0	0.010	13.4	61.4	2.8	100	100	96	84	a	100	83	95
T	260	Dawson River 5km upstream of Gyrandia weir (in weir pool)	Pool	100 6.0	0.001	25.0	75.0	1.5	50	94	95	12	a	56	63	75

Appendix 6.6 Habitat Assessment for Dawson River, tributary sites - Dam Site to Gyrandia Weir

Data Sources

(A = this survey, T = Telfer (1995))

Source	Site	Location	Depth (m)	% of Reach Length	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environs Rating	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Bank Habitat Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating	
TRIBUTARY SITES (Listed upstream to downstream)																	
A	908	Price Creek 1km u/s Dawson	Rapid	40	0.2	316.0											
A	911	Upper Price Creek 2km u/s Dawson	Pool	60	0.4	316	15.7	40	0.8	83	100	95	100	52	63	93	89
A	906	Crocker Cr. just u/s Dawson junction	Run	50	0.4	0.32											
A	903	Cabbage Tree Creek at Dawson junction	Pool	50	0.7	0.060	6.0	6.4	1.0	60	80	85	45	74	55	45	76
T	266	Cabbage Tree Creek at Dawson Junction	Pool	100	1.5	0.028	4.0	17.0	2.7	83	99	96	89	a	38	47	82
T	267	Cabbage Tree Creek 10km u/s Dawson	Pool	100	2.0	0.010	5.6	21.5	2.3	100	100	95	84	a	100	88	95
A	967	Cabbage Tree Creek 10km u/s Dawson	Cascade	10	0.3	316.0											
T	263	Cabbage Tree Creek 5km u/s Cabbage Tr	Pool	90	1.5	0.010	7.3	14.5	1.7	100	94	96	100	8	75	99	95
T	262	Downfall Creek	Run	65	0.2	0.06											
T	261	Cracow Creek	Pool	35	0.4	0.10	4.5	11.1	0.8	33	64	95	5	a	8	1	62
T	258	40 km u/s Dawson Cracow Creek	Cascade	5	0.6	33.0											
T	70	70 km u/s Dawson	Run	95	0.1	1.88	2.9	1.0	0.3	100	64	94	1	a	2	1	87
			Pool	70	0.3	0.6											
			Pool	30	0.2	0.013	3.7	7.9	1.8	33	52	51	1	a	5	1	42
			Riffle	4	0.1	0.01											
			Run	15	0.3	0.01											
			Pool	81	0.6	0.01	23.0	7.0	0.4	33	70	91	1	a	20	32	60

Appendix 6.7 Habitat Assessment for Dawson River, main channel sites - Gyrenda Weir to Theodore Weir pool

Source	Site	Location	% of Reach Length	Depth (m)	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environments Rating	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Stream Bank Habitat Rating	Stream Aquatic Habitat Rating	Scenic & Recreation Rating			
DAWSON RIVER SITES																			
A	950	Dawson River about 5km d/s Orange Cr.	Pool	100	8.0	0.316	65.0	31.0	5.3	67	100	94	74	a	88	98	68		
T	249	Dawson River just d/s Delusion junction	Run Pool	65	0.7	5.13	11.0	16.0	1.0	67	86	93	45	a	10	8	70		
A	921	Dawson River 5km u/s Oxtrack Cr. junct	Run Pool	20	1.5	112.2	0.010	8.8	27.0	2.6	67	74	64	63	a	83	95	57	
T	246	Dawson River 10km u/s Theodore	Riffle Run Pool	5	0.1	1.631	0.5	0.025	5.2	12.3	1.1	33	50	28	2	a	42	50	60

Data Sources
(A = this survey, T = Telfer (1995))

Appendix 6.8 Habitat Assessment for Dawson River, tributary sites - Gyranda Weir to Theodore Weir pool

Data Sources
(A = this survey, T = Telfer (1995))

Source	Site	Location	TRIBUTARY SITES	% of Reach Length	Depth (m)	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environments Rating	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating	
T	255	Upper Delusion Ck	Riffle Run Pool	35 50 15	0.3 0.5 0.5	0.01 0.23	5.9	4.6	0.4	33	78	62	2	a	26	22	50
T	248	Delusion Creek 3km u/s Dawson	Run	100	0.4	1.23	5.7	8.8	0.4	50	44	45	15	1	43	60	64
T	250	Unnamed Creek near Oxtrack Creek	Run Pool	80 20	0.1 0.5	0.010 0.010	10.6	3.7	0.3	33	8	26	1	a	1	1	44
T	247	Oxtrack Creek 10km u/s Dawson	Run Pool	25 75	0.4 0.8	0.166 0.348	4.9	0.5	6.5	33	24	26	1	a	45	68	42
T	245	Boam Creek 3 km u/s Dawson	Riffle Pool	70 30	0.1 0.1	0.69	3.8 4.2	6.0	0.9	50	70	71	14	a	38	63	62
T	244	Boam Creek 10km u/s Dawson	Riffle Pool	30 70	0.1 0.5	0.097	2.09 11.2	4.7	0.5	50	72	23	3	a	14	14	59

Appendix 6.9 Habitat Assessment for Dawson River, main channel sites - Theodore Weir pool and downstream

Source	Site	Location	% of Reach Length	Depth (m)	Mean sediment diameter (mm)	Width to Depth Ratio	Channel Width at Water Mark (m)	Channel Depth at Water Mark (m)	Environments Rating	Bank Stability Rating	Bed and Bar Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Bank Habitat Rating	Instream Aquatic Habitat Rating	Scenic & Recreation Rating	
DAWSON RIVER SITES (In order upstream to downstream)																	
T	243	Theodore Weir Pool	100	8.0	0.010	11.6	120.0	9.8	50	91	45	20	a	22	1	71	
T	242	Just d/s Theodore Weir	Run	10	0.2	6.78	4.9	17.5	0.9	50	80	94	47	a	42	40	76
T	122	near Highworth Bend	Pool	90	0.9	0.187	0.019										
T	117	west of Moura	Riffle	20	0.3												
T	108	5km u/s Kiangia Cr.	Run	10	0.4	0.253	0.010	7.1	54	6.5	33	100	95	69	a	68	77
A	935	10 km u/s Banana Cr.	Pool	90	0.4												
T	110	5km u/s Banana Cr.	Pool	100	3.0	0.011	2.2	3.9	65.0	4.2	50	94	95	10	a	44	32
T	59	at Baralba	Run	100	0.8	6.68	0.345	9.6	37.0	0.9	50	75	75	6	a	10	1
T	61	15km d/s Baralaba	Pool	100	1.6												
T	62	25km d/s Baralaba	Pool	100	1.5	0.010	14.9	107.0									
T	42	15km d/s Don River	Pool	100	1.5	0.013	8.5	46.0	2.0	83	64	94	23	a	55	64	87
T	41	10km u/s Duaringa	Pool	100	1.7	0.178	6.6	33.0	2.3	67	88	74	36	a	26	28	76
T	40	5 km u/s Duaringa	Pool	100	1.0	0.335	5.6	13.0	1.9	67	65	95	26	a	41	45	76

Appendix 6.10 Habitat Assessment for Dawson River, tributary sites - Theodore Weir pool and downstream

Source	Site	Location	DAWSON RIVER SITES (In order upstream to downstream)	Mean sediment diameter (mm)	Width to Depth Ratio	Depth (m)	% of Reach Length	Environment Rating	Bank Stability Rating	Riparian Vegetation Rating	Aquatic Vegetation Rating	Instream Bank Habitat Rating	Instream Aquatic Habitat Rating	Semic & Recreation Rating		
T 240	Castle Creek	Run	100	0.2	0.21	4.3	26.0	4.5	50	52	52	6	a	26	32	68
T 241	Taramba Creek	Pool	100	2.0	0.010	1.5	7.4	0.8	50	88	95	8	a	48	56	76
T 234	Four Mile Creek	Run	100	0.2	0.266	2.3	2.7	0.3	50	56	41	10	a	18	18	58
T 109	Kianga Creek	Run	100	0.3	0.013	12.5	16.5	0.4	33	74	40	41	a	25	1	52
T 115	Mimosa Creek	Run	100	0.6	0.207	6.1	12.3	0.8	67	72	37	38	a	20	18	89
T 57	Banana Creek	Run	50	0.4	0.016	8.1	7.5	0.7	67	85	78	11	2	26	14	63
T 58	Benleith Creek	Riffle Pool	20	0.1	0.017	8.8	4.3	0.4	50	78	78	5	a	1	1	39

APPENDIX 7

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

(page 1)

Source	Gear Used	Units (Shots for A&H surveys)	DAWSON RIVER SITES (above inundation area)										TRIBUTARY SITES (above inundation area)									
Dawson River, Yabna Crossing																						
DEAP	G,S,BT		1																			
DEAP	G,S,BT		2																			
DEAP	G,S,BT		1																			
DS	G,BT,LS		37																			
DS	G,BT,LS		17																			
Dawson River, Broiga Downs																						
DS	G,BT,LS																					
Dawson River, Wilde Water																						
DS	G,BT,LS																					
DPI	G,S,BT																					
Baffle Creek																						
SHM	G,S,DN		A												R							

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

(page 2)

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

(page 3)

Source	Gear Used	Units (Shots for A&H surveys)	TRIBUTARY SITES (Inundation area)																			
			Site 965 - Blackboy Creek		Site 918 - Cockatoo Creek		Site 917 - Lower Cockatoo Creek		Site 911 - Top of Price Creek		Site 908 - Upper Price Creek											
A&H	SH	60	A&H	SH	4	A&H	G	ER	500	A&H	G21	G31	A&H	G41	H1	ER	150	A&H	ER	380		
Bony Bream																						
Eel-tailed Catfish (<i>T. tandanus</i>)																						
Hydrilla's Tandan (<i>N. hydrilla</i>)																						
Pacific Blue-eye																						
Flyspecked Hardhead																						
Siliver Perch																						
Golden Perch																						
Spangleled Perch																						
Leatherly Gruntler																						
Saratoga																						
Flat-headed Gudgeon																						
Purple-spotted Gudgeon																						
Midgley's Carp Gudgeon																						
Empire Gudgeon																						
Firetail Gudgeon																						
Western Carp Gudgeon																						
Unspecified Gudgeon																						
Olive Perchlet																						
Lone-finn Eel																						
Mouth Almigthy																						
Slippy Cod																						
Black Bream																						
Gambusia																						
Goldfishe																						
Candean Shrimp																						
Macrobenthium Shrimps																						
Redclaw Yabby																						

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

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Appendix 7 Catch summary data for all sites (in order upstream to downstream)

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TRIBUTARY SITES (913.9 dam sites to Gurranda Weir)

Site 905 - Crocker Creek, upstream		Site 906 - Crocker Creek, downstream		Site 967 - Upper Cabbage Tree Creek	
A&H	ER 40				
A&H	ER 150				
G	1	283.0	1.0		
G21	1	283.0	1.0		
A&H			0.7	1.3	
A&H					0.7
A&H					5.3
A&H					13.3
					42.7
					0.7
					1.2
					1.0
					8.5
					4.0
					8.0
					2.2
					7.3
					83.3
					51.3
					2.0

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

(page 6)

Source	Gear Used	Units (Shots for A&H surveys)									
		Site 950 - Dawson River, Gyrenda Station/Below Orange Ck. Weir					Site 321 Dawson River, Reedy Creek Passora				
A&H	BT	10	2.2	0.5	7.7	0.1	2.5	1.0	0.2	0.2	0.2
A&H	G	6	10.0	9.0	10.0	1.0	4.0	4.0	0.2	0.2	0.2
A&H	G21	1									
A&H	G31	1									
A&H	G41	3	1.0	1.0	8.3						
A&H	G51	1									
A&H	H1	7									
SHM	G,S,DN		C	C	C	C	0.4	R	A	C*	C C C
Krefft's River Turtle											
Saw-sheiled Turtle											
Gambusia											
Goldfish											
Black Bream											
Sleepy Cod											
Mouth Almigthy											
Long-fin Eel											
Olive Perchlet											
Unspecificed Gudgeon											
Western Carp Gudgeon											
Firetail Gudgeon											
Empire Gudgeon											
Midgley's Carp Gudgeon											
Purple-spotted Gudgeon											
Flat-headed Gudgeon											
Saratoga											
Leather Gurnet											
Banded Gurnet											
Spanaled Perch											
Golden Perch											
Silver Perch											
Flyspecked Hardyhead											
Pacific Blue-eye											
Eastern Rainbowfish											
Fork-tailed Catfish (A. graeffei)											
Eel-tailed Catfish (unspecified)											
Hyatt's Tandan (N. hyrtii)											
Eel-tailed Catfish (T. tandanus)											
Bony Bream											
Redclaw Yabby											
Macrobrachium Shrimp											

Notes

* *Arius leptaspis* reported by Midgley, 1979 is likely to be *Arius gracilis*.

* *Mogurnda mogurnda* reported by Midgley, 1979 is likely to be *Mogurnda adspersa*.

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

(page 7)

Source	Gear Used	Units (Shots for A&H surveys)	DAWSON RIVER SITES (downstream of Theodore)														
			Above Moura Weir			Below Moura Weir			Neville Hewitt Weir			Becker's					
DS	G,S,DN	DPI	SHM	G,SDN	DPI	SHM	G,SDN	DPI	G,SDN	G,C,ER	DPI	G,S,BT	DEAP	DEAP	DEAP	DS	G,BT,LS
Bony Bream																	
Bell-tailed Catfish (<i>T. tandanus</i>)																	
Hyril's Tandana (<i>N. hyrilli</i>)																	
Eel-tailed Catfish (<i>A. guentheri</i>)																	
Fork-tailed Catfish (<i>A. graeffei</i>)																	
Eastern Rainbowfish																	
Pacific Blue-eye																	
Flyspecked Hardhead																	
Siliver Perch																	
Golden Perch																	
Spangled Perch																	
Leatherly Grunter																	
Saratoga																	
Flat-headed Gudgeon																	
Purple-spotted Gudgeon																	
Midgeley's Carp Gudgeon																	
Emperie Gudgeon																	
Firetail Gudgeon																	
Western Carp Gudgeon																	
Unspecified Gudgeon																	
Long-fin Eel																	
Olive Perchlet																	
Mouth Almightry																	
Black Bream																	
Slippy Cod																	
Goldfish																	
Gambusia																	
Saw-sheiled Turle																	
Krefft's River Turle																	
Caridean Shrimp																	
Macrobrachium Shrimp																	
Redclaw Yabby																	

Appendix 7 Catch summary data for all sites (in order upstream to downstream)

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APPENDIX

APPENDIX 8

SPECIES OBSERVED DURING THE COURSE OF FIELD WORK

During the course of field work the following species were observed growing within the proposed impoundment area or within the surveyed envelope. These species are listed alphabetically together with their common name and special status, if any, in Table 1 below.

Due to the time frame of the survey and, more importantly, due to seasonal factors, this list will not contain all species that grow within these areas. Seasonal factors can result in other species being present at certain times of the year. For example, all billabongs were dry or nearly dry so many water plants that would normally be expected to occur (eg *Nymphaea*) were not present.

Table 2 lists the species by botanical Family.

Table 1 - Alphabetical List of Species

Note: ♦ in Status represents introduced species or weed;
R = Rare as defined in Queensland Conservation Act 1992

Species	Common name	Status
<i>Abutilon fraseri</i> (Hook.) Hook. ex Walp.	dwarf lantern flower	
<i>Abutilon oxycarpum</i> (F.Muell.) F. Muell. ex Benth. forma oxycarpum	flannel weed	
<i>Abutilon oxycarpum</i> forma acutatum Benth.	prickly wattle	
<i>Acacia amblygona</i> Benth.		
<i>Acacia caroleae</i> Pedley	crowded-leaf wattle	
<i>Acacia conferta</i> Benth.	green wattle	
<i>Acacia deanei</i> (R.T. Baker) M.B. Welch, Coombs & McGlynn subsp. deanei	pretty wattle	
<i>Acacia decora</i> Rchb.	ironwood	
<i>Acacia excelsa</i> Benth.	mimosa bush	
<i>Acacia farnesiana</i> (L.) Willd.	scrub ironbark	♦
<i>Acacia fasciculifera</i> F. Muell. ex Benth.	brigalow	
<i>Acacia harpophylla</i> F. Muell. ex Benth.		
<i>Acacia juncifolia</i> Benth. subsp. juncifolia	Brisbane black wattle	
<i>Acacia leiocalyx</i> (Domin) Pedley subsp. leiocalyx		
<i>Acacia longispicata</i> Benth.	zigzag wattle	
<i>Acacia macradenia</i> Benth.	rosewood	
<i>Acacia rhodoxylon</i> Maiden	sally wattle	
<i>Acacia salicina</i> Lindl.	lancewood	
<i>Acacia shirleyi</i> Maiden	currawong	
<i>Acacia sparsiflora</i> Maiden	river cooba	
<i>Acacia stenophylla</i> A. Cunn. ex Benth.	soft acalypha	
<i>Acalypha eremorum</i> Muell. Arg.	chaff flower	
<i>Achyranthes aspera</i> L.		♦
<i>Adriana glabrata</i> var. <i>subglabra</i> (Baill.) Airy Shaw	blowinggrass	
<i>Agrostis avenacea</i> J.F. Gmel. var. <i>avenacea</i>	Australian bugle	
<i>Ajuga australis</i> R. Br.	grey birds-eye	
<i>Alectryon connatus</i> (F. Muell.) Radlk.	scrub boonaree	
<i>Alectryon diversifolius</i> (F. Muell.) S. Reynolds		

Species	Common name	Status
<i>Alectryon oleifolius</i> subsp. <i>elongatus</i> S.T. Reynolds	boonaree	
<i>Allocasuarina luehmannii</i> (R.T. Barker) L.A.S. Johnson	bull oak	
<i>Alphitonia excelsa</i> (A. Cunn. ex Fenzl) Reissek ex Benth.	soap tree	
<i>Alstonia constricta</i> F. Muell.	bitterbark	
<i>Alternanthera denticulata</i> R. Br.	lesser joyweed	
<i>Alternanthera nodiflora</i> R.Br.	joyweed	
<i>Amaranthus graecizans</i> subsp. <i>sylvestris</i> (Vill.) Asch.	green amaranth	♦
<i>Amaranthus viridis</i> L.	erect mistletoe	♦
<i>Ampelopteris prolifera</i> (Retz.) Copel.		
<i>Amyema congener</i> (Sieber ex Schult. & Schult.f.) Tiegh. subsp. <i>congener</i>		
<i>Amyema quandang</i> var. <i>bancroftii</i> (F.M.Bailey) Barlow	hooky grass	
<i>Ancistrachne uncinulata</i> (R. Br.) S.T. Blake	roughbark apple	
<i>Angophora floribunda</i> (Sm.) Sweet	smooth-bark apple	
<i>Angophora leiocarpa</i> (L.A.S. Johnson ex G.J. Leach) K.R. Thiele & Ladiges	broom bush	♦
<i>Apophyllum anomalum</i> F. Muell.		
<i>Argemone ochroleuca</i> Sweet subsp. <i>ochroleuca</i>	many headed wiregrass	
<i>Aristida benthamii</i> var. <i>spinulifera</i> B.K.Simon		
<i>Aristida calycina</i> R. Br. var. <i>calycina</i>		
<i>Aristida calycina</i> var. <i>praealta</i> Domin		
<i>Aristida caput-medusae</i> Domin		
<i>Aristida gracilipes</i> (Domin) Henrard		
<i>Aristida latifolia</i> Domin		
<i>Aristida leichhardtiana</i> Domin		
<i>Aristida lignosa</i> B.K.Simon		
<i>Aristida personata</i> Henrard		
<i>Aristida queenslandica</i> Henrard var. <i>queenslandica</i>	purple wiregrass	
<i>Aristida queenslandica</i> var. <i>dissimilis</i> (S.T.Blake) B.K.Simon	reed grass	
<i>Aristida ramosa</i> R.Br.	common woodruff	
<i>Arundinella neplanensis</i> Trin.		
<i>Asperula conferta</i> Hook.f.	wild aster	♦
<i>Asperula geminifolia</i> F. Muell.	whitewood	
<i>Aster subulatus</i> Michx.	whitewood	
<i>Atalaya hemiglaucha</i> (F.Muell) F.Muell. ex Benth.	annual saltbush	
<i>Atalaya salicifolia</i> (A. DC.) Blume	smooth-barked ironwood	
<i>Atriplex muelleri</i> Benth.	slender bamboo grass	
<i>Austumyrtus bidwillii</i> (Benth.) Burret	fernly azolla	
<i>Austrostipa verticillata</i> (Nees ex Spreng.) S.W.L. Jacobs & J. Everett	groundsel bush	♦
<i>Azolla pinnata</i> R.Br.		
<i>Baccharis halimifolia</i> L.		
<i>Bacopa monnieri</i> (L.) Pennell		
<i>Basilicum polystachyon</i> (L.) Moench		
<i>Bertia oleifolia</i> Planch.		
<i>Bertia pedicellata</i> F. Muell.		R
<i>Bidens bipinnata</i> L.	bipinnate beggar's ticks	♦
<i>Boerhavia dominii</i> Meidle & Hewson		
<i>Boerhavia pubescens</i> R. Br.		
<i>Bothriochloa bladhii</i> (Retz.) S.T. Blake subsp. <i>bladhii</i>	forest bluegrass	
<i>Bothriochloa decipiens</i> (Hack.) C.E. Hubb. var. <i>decipiens</i>	pitted bluegrass	
<i>Brachiaria eruciformis</i> (Sm.) Griseb.		
<i>Brachiaria foliosa</i> (R. Br.) Hughes	leafy panic	♦
<i>Brachiaria subquadripara</i> (Trin.) Hitch.		
<i>Brachychiton australis</i> (Schott & Endl.) A. Terracc.	broad-leaved bottle tree	
<i>Brachychiton populneus</i> (Schott & Endl.) R. Br. subsp. <i>populneus</i>	kurrajong	
<i>Brachychiton rupestris</i> (Mitch. ex Lindl.) K. Schum.	narrow-leaved bottle tree	
<i>Brachyscome trachycarpa</i> F. Muell.		
<i>Bracteantha bracteata</i> (Vent.) Anderb. & Haegi	golden everlasting	

Species	Common name	Status
<i>Breynia oblongifolia</i> (Muell. Arg.) Muell. Arg.	coffee bush	
<i>Brunoniella australis</i> (Cav.) Bremek.	blue trumpet	
<i>Bursaria incana</i> Lindl. var. <i>incana</i>		
<i>Callitricha sonderi</i> Hegelm.	starwort	
<i>Callitris glauophylla</i> Thompson & L.A.S.Johnson	white cypress pine	
<i>Calotis cuneata</i> (F. Muell. ex Benth.) G.L. Davis	blue burr daisy	
<i>Calotis cuneifolia</i> R.Br.		
<i>Calotis dentex</i> R. Br.	white burr daisy	
<i>Calotis hispidula</i> (F. Muell.) F. Muell.	bogan flea	
<i>Calotis lappulacea</i> Benth.	yellow burr daisy	
<i>Calyptochloa gracillima</i> C.E. Hubb.		
<i>Canthium coprosmoides</i> F. Muell.	coastal coffee bush	
<i>Canthium odoratum</i> (G. Forst.) Seem.	myrtle tree	
<i>Canthium oleifolium</i> Hook.		
<i>Canthium</i> sp. (Berrigurra Station E.R.Anderson 2829)		
<i>Canthium vaccinifolium</i> F. Muell.	small-leaved canthium	
<i>Capillipedium spicigerum</i> S.T. Blake	scented top	
<i>Capparis canescens</i> Banks ex DC.	wild orange	
<i>Capparis lasiantha</i> R. Br. ex DC.	nipan	
<i>Capparis loranthifolia</i> var. <i>bancroftii</i> C.T. White ex M. Jacobs	narrow leaf bumble-tree	
<i>Capparis mitchellii</i> Lindl.		
<i>Carex appressa</i> R. Br.	tall sedge	
<i>Carex polyantha</i> F. Muell.		
<i>Carissa ovata</i> R.Br.	current bush	
<i>Cassia tomentella</i> Domin	velvet cassia	
<i>Cassine australis</i> var. <i>angustifolia</i> (Benth.) Jessup	red oliveplum	
<i>Cassinia laevis</i> R. Br.	coughbush	
<i>Casuarina cristata</i> Miq.	belah	
<i>Cenchrus ciliaris</i> L.	buffel grass	♦
<i>Centaurea melitensis</i> L.	Maltese cockspur	♦
<i>Centaurium erythraea</i> Rafn.	common centaury	♦
<i>Centella asiatica</i> (L.) Urb.	pennywort	
<i>Centipeda minima</i> (L.) A. Braun & Aschers	spreading sneezeweed	
<i>Chamaesyce dallachiana</i> (Baill.) D.C. Hassall	caustic-weed	
<i>Chara</i> sp.	stonewort	
<i>Cheilanthes distans</i> (R. Br.) Mett.	bristly cloak fern	
<i>Cheilanthes sieberi</i> Kunze subsp. <i>sieberi</i>	mulga fern	
<i>Chenopodium ambrosioides</i> L.	Mexican tea	
<i>Chenopodium carinatum</i> R. Br.	green crumbweed	♦
<i>Chenopodium desertorum</i> subsp. <i>anidiophyllum</i> (Aellen) Paul G. Wilson		
<i>Chenopodium pumilio</i> R. Br.	small crumbweed	
<i>Chionachne cyathopoda</i> (F. Muell.) F. Muell. ex Benth.	river grass	
<i>Chloris divaricata</i> R. Br.	slender chloris	
<i>Chloris gayana</i> Kunth	rhodes grass	♦
<i>Chloris ventricosa</i> R. Br.	tall chloris	
<i>Chrysocephalum apiculatum</i> (Labill.) Steetz	yellow buttons	
<i>Ciclospermum leptophyllum</i> (Pers.) Sprague	slender celery	♦
<i>Cirsium vulgare</i> (Sav.) Ten.	spear thistle	♦
<i>Cissus opaca</i> F. Muell.	slender grape	
<i>Citriobatus spinescens</i> (F. Muell.) Druce	large-fruited orange thorn	
<i>Claoxylon tenerifolium</i> (Baill.) F. Muell.	Queensland brittlewood	
<i>Cleistochloa subjuncea</i> C.E. Hubb.		
<i>Clerodendrum floribundum</i> R. Br.	lollybush	
<i>Commelinia diffusa</i> Burm.f.	wandering jew	
<i>Conyza bonariensis</i> (L.) Cronq.	flaxleaf fleabane	♦
<i>Coronopus didymus</i> (L.) Smith	lesser swine-cress	♦

Species	Common name	Status
<i>Corymbia clarksoniana</i> (D.J. Carr & S.G. Carr) K.D. Hill & L.A.S. Johnson	long-fruited bloodwood	
<i>Crassula sieberiana</i> (Schult. & Schult.f.) Druce	native crassula	
<i>Crotalaria incana</i> L. subsp. <i>incana</i>	woolly rattlepod	♦
<i>Crotalaria montana</i> Roth		
<i>Croton insularis</i> Baill.	native cascara bark	
<i>Croton phebaloides</i> F. Muell. ex Muell. Arg.	narrow-leaved croton	
<i>Cryptandra</i> sp. (Isla Gorge P.Sharpe 627)	dodder	♦
<i>Cuscuta campestris</i> Yunck.		
<i>Cyclosorus interruptus</i> (Willd.) H.Ito		
<i>Cymbidium canaliculatum</i> R.Br.		
<i>Cymbopogon bombycinus</i> (R. Br.) Domin	silky oilgrass	
<i>Cymbopogon refractus</i> (R.Br.) A. Camus	barb wire grass	
<i>Cynodon dactylon</i> (L.) Pers. var. <i>dactylon</i>	green couch	
<i>Cynoglossum australe</i> R. Br. var. <i>australe</i>	Australian forget me not	
<i>Cyperus difformis</i> L.	rice sedge	
<i>Cyperus flaccidus</i> R. Br.		
<i>Cyperus gracilis</i> R. Br.	slender sedge	
<i>Cyperus iria</i> L.		
<i>Cyperus lucidus</i> R. Br.		
<i>Cyperus polystachyos</i> Rottb. var. <i>polystachyos</i>	bunchy sedge	
<i>Cyperus pygmaeus</i> Rottb.	dwarf sedge	
<i>Cyperus rigidellus</i> (Benth.) J.M. Black		
<i>Cyperus rotundus</i> L.	nutgrass	♦
<i>Cyperus sanguinolentus</i> Vahl		
<i>Cyperus sphaeroideus</i> L.A.S. Johnson & O.D. Evans	kyllinga weed	
<i>Datura ferox</i> L.	fierce thornapple	♦
<i>Daucus glochidiatus</i> (Labill.) Fischer, C.A.Meyer & Ave-Lall.	Australian carrot	
<i>Denhamia oleaster</i> (Lindl.) F. Muell.		
<i>Denhamia pittosporoides</i> F. Muell.	orange boxwood	
<i>Desmodium brachypodium</i> A. Gray		
<i>Desmodium rhytidophyllum</i> F. Muell. ex Benth.		
<i>Desmodium varians</i> (Labill.) G. Don	slender tick trefoil	
<i>Dianella brevipedunculata</i> R.F.J. Hend.		
<i>Dianella caerulea</i> var. <i>vannata</i> R.J.F. Hend.		
<i>Dianella longifolia</i> R. Br. var. <i>longifolia</i>		
<i>Dichanthium sericeum</i> subsp. <i>humilius</i> (J.M. Black) B.K. Simon		
<i>Dichondra repens</i> J.R. Forst. & G. Forst.	kidney weed	
<i>Digitaria breviglumis</i> (Domin) Henrard		
<i>Digitaria brownii</i> (Roem. & Schult.) Hughes	cotton panic	
<i>Digitaria divaricatissima</i> (R. Br.) Hughes	umbrella grass	
<i>Digitaria longiflora</i> (Retz.) Pers.		
<i>Diospyros humilis</i> (R. Br.) F. Muell.	small-leaved ebony	
<i>Dodonaea heteromorpha</i> J.G. West		
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i> (Sm.) J.G. West	sticky hop bush	
<i>Dysphania glomulifera</i> (Nees) Paul G. Wilson subsp. <i>glomulifera</i>		
<i>Echinochloa crusgalli</i> (L.) P. Beauv.	barnyard grass	
<i>Eclipta prostrata</i> (L.) L.	white eclipta	♦
<i>Ehretia membranifolia</i> R. Br.	weeping koda	
<i>Einadia hastata</i> (R. Br.) A.J. Scott	ruby saltbush	
<i>Einadia nutans</i> (R. Br.) A.J. Scott subsp. <i>nutans</i>	nodding saltbush	
<i>Einadia nutans</i> subsp. <i>linifolia</i> (R. Br.) Paul G. Wilson	climbing saltbush	
<i>Einadia trigonos</i> subsp. <i>stellulata</i> (Benth.) Paul G. Wilson		
<i>Elatine gratioloides</i> A. Cunn.	waterwort	
<i>Eleocharis cylindrostachys</i> Boeck.		
<i>Eleocharis equisetina</i> C. Presl	spikerush	
<i>Eleocharis plana</i> S.T. Blake	ribbed spikerush	
<i>Eleocharis pusilla</i> R. Br.	small spikerush	

Species	Common name	Status
<i>Enchytraea tomentosa</i> R. Br.	ruby saltbush	
<i>Enneapogon gracilis</i> (R. Br.) P. Beauv.	slender nineawn	
<i>Enneapogon lindleyanus</i> (Domin) C.E. Hubb.	prickly couch	
<i>Enteropogon acicularis</i> (Lindl.) Lazarides	curly windmill grass	
<i>Enteropogon ramosus</i> B.K. Simon	windmill grass	
<i>Enteropogon unispiceus</i> (F. Muell.) Clayton		
<i>Epaltes australis</i> Less.	epalates	
<i>Epilobium hirtigerum</i> A. Cunn.		
<i>Eragrostis elongata</i> (Willd.) J. Jacq.	clustered love grass	
<i>Eragrostis lacunaria</i> F. Muell. ex Benth.	purple lovegrass	
<i>Eragrostis leptostachya</i> (R. Br.) Steud.	paddock love grass	
<i>Eragrostis longipedicellata</i> B.K. Simon		
<i>Eremocitrus glauca</i> (Lindl.) Swingle	limebush	
<i>Eremophila debilis</i> (Andrews) Chinnock	winter apple	
<i>Eremophila longifolia</i> (R. Br.) F. Muell.	berrigan	
<i>Eremophila mitchellii</i> Benth.	bastard sandalwood	
<i>Eriocaulon scariosum</i> Sm.	pipewort	
<i>Eriochloa decumbens</i> F.M. Bailey		
<i>Eriochloa pseudoacrotricha</i> (Stapf ex Thell.) J.M. Black	early spring grass	
<i>Erodium crinitum</i> Carolin	blue crowfoot	
<i>Erythrina vespertilio</i> Benth.	bats-wing coral tree	
<i>Erythroxylum</i> sp. (Splityard Creek L.Pedley 5360)		
<i>Eucalyptus camaldulensis</i> Dehnh.	river red gum	
<i>Eucalyptus cambageana</i> Maiden	Dawson gum	
<i>Eucalyptus coolabah</i> Blakely & Jacobs	coolabah	
<i>Eucalyptus crebra</i> F. Muell.	narrow-leaved ironbark	
<i>Eucalyptus exserta</i> F. Muell.	Queensland peppermint	
<i>Eucalyptus melanophloia</i> F. Muell.	silver leaved ironbark	
<i>Eucalyptus populnea</i> F. Muell.	poplar box	
<i>Eucalyptus tenuipes</i> (Maiden & Blakely) Blakley & C.T. White	narrow-leaved mahogany	
<i>Eucalyptus tereticornis</i> Sm.	forest red gum	
<i>Eucalyptus tessellaris</i> F. Muell.	Moreton Bay ash	
<i>Euchiton sphaericus</i> (Willd.) Anderb.	cudweed	
<i>Eulalia aurea</i> (Bory) Kunth	silky browntop	
<i>Euphorbia tannensis</i> var. <i>eremophila</i> (A.Cunn.) D.C. Hassall	desert spurge	
<i>Evolvulus alsinoides</i> (L.) L.	tropical speedwell	
<i>Excoecaria dallachiana</i> (Baill.) Benth.	scrub poison	
<i>Exocarpos latifolius</i> R. Br.	native cherry	
<i>Fallopia convolvulus</i> (L.) A. Love		♦
<i>Ficus opposita</i> Miq.	sandpaper fig	
<i>Fimbristylis dichotoma</i> (L.) Vahl	common fringe-rush	
<i>Flindersia australis</i> R. Br.	crow's ash	
<i>Flindersia collina</i> F.M. Bailey	broad-leaved leopard tree	
<i>Gahnia aspera</i> (R.Br.) Spreng.		♦
<i>Gaura parviflora</i> Douglas	clockweed	
<i>Geijera parviflora</i> Lindl.	wilga	
<i>Glinus lotoides</i> L.	hairy carpet weed	
<i>Glossocardia bidens</i> (Retz.) Veldkamp	native cobbler's pegs	
<i>Glycine tabacina</i> (Labill.) Benth.	glycine pea	
<i>Glycine tomentella</i> Hayata	woolly glycine	
<i>Gnaphalium polycaulon</i> Pers.		
<i>Gomphocarpus physocarpus</i> E. Mey.	balloon cotton bush	♦
<i>Gomphrena celosioides</i> Mart.	soft khakiweed	♦
<i>Goodenia fascicularis</i> F. Muell. & Tate	fan flower	
<i>Goodenia glabra</i> R. Br.		
<i>Goodenia grandiflora</i> Sims		
<i>Gratiola pedunculata</i> R. Br.		
<i>Grevillea robusta</i> A. Cunn. ex R. Br.	silky oak	

Species	Common name	Status
<i>Grevillea striata</i> R. Br.	beefwood	
<i>Grewia latifolia</i> F. Muell. ex Benth.	dog's nuts	
<i>Hakea fraseri</i> R.Br.	corkwood oak	
<i>Halgania brachyrhyncha</i> Peter G. Wilson		
<i>Haloragis aspera</i> Lindl.	raspweed	
<i>Helichrysum collinum</i> DC.		♦
<i>Heliotropium amplexicaule</i> Vahl	blue heliotrope	
<i>Heliotropium indicum</i> L.		♦
<i>Heteropogon contortus</i> (L.) Beauv. ex. Roem. & Schult.	black speargrass	
<i>Hibbertia</i> sp.		
<i>Hibiscus sturtii</i> Hook.		
<i>Hibiscus trionum</i> L.	bladder ketmia	
<i>Hovea lanceolata</i> Sims		
<i>Hovea longipes</i> Benth.	brush hovea	
<i>Hybanthus monopetalus</i> (Schult.) Domin	lady's slipper	
<i>Hypochoeris glabra</i> L.	smooth catsear	
<i>Imperata cylindrica</i> (L.) Raeusch.	blady grass	
<i>Indigofera linnaei</i> Ali	nine-leaved indigo	
<i>Indigofera</i> sp.		
<i>Isachne globosa</i> (Thunb.) Kuntze	swamp millet	
<i>Isotoma axillaris</i> Lindl.	Australian harebell	
<i>Ixiolaena leptolepis</i> (DC.) Benth.	stalked ixiolaena	
<i>Jacksonia scoparia</i> R.Br.	dogwood	
<i>Jacquemontia paniculata</i> (Burm.f.) Hallier f.		
<i>Jasminum didymum</i> subsp. <i>lineare</i> (R. Br.) P.S.Green	native jasmine	
<i>Jasminum simplicifolium</i> subsp. <i>australiense</i> P.S. Green	stiff jasmine	
<i>Juncus prismatocarpus</i> R. Br.	branching rush	
<i>Juncus</i> sp.		
<i>Juncus usitatus</i> L.A.S. Johnson	rush	
<i>Keraudrenia corollata</i> (Steetz) Druce		
<i>Laxmannia compacta</i> Conran & P.I. Forst.		
<i>Leersia hexandra</i> Sw.	swamp rice grass	
<i>Lemna trisulca</i> L.		
<i>Lepidium africanum</i> (N. Burm.) DC.	common peppercress	
<i>Lepidium bonariense</i> L.	Argentine peppercress	♦
<i>Leptochloa ciliolata</i> (Jedwabn.) S.T. Blake		
<i>Leptochloa digitata</i> (R. Br.) Domin	umbrella canegrass	
<i>Leptochloa peacockii</i> (Maiden & Betche) Domin		
<i>Leptospermum neglectum</i> Joy Thoms.		
<i>Livistona</i> sp. (Taroom R.W.Johnson 2764)		
<i>Lomandra confertifolia</i> subsp. <i>pallida</i> A.T. Lee		
<i>Lomandra filiformis</i> (Thunb.) Britten subsp. <i>filiformis</i>		
<i>Lomandra leucocephala</i> (R.Br.) Ewart	woolly matrush	
<i>Lomandra longifolia</i> Labill.	spinyhead matrush	
<i>Lomandra multiflora</i> (R. Br.) Britten subsp. <i>multiflora</i>		
<i>Lophostemon suaveolens</i> (Sol. ex Gaertn.) Peter G. Wilson & J.T. Waterh.	swamp box	
<i>Lotus australis</i> Andrews		
<i>Ludwigia octovalvis</i> (Jacq.) Raven	Australian trefoil	
<i>Ludwigia peploides</i> subsp. <i>montevidensis</i> (Spreng.) P.H. Raven	willow primrose	
<i>Lysicarpus angustifolius</i> (Hook.) Druce		♦
<i>Lysiphylgium carronii</i> (F. Muell.) Pedley	budgeroo	
<i>Macfadyena unguis-cati</i> (L.) A.H. Gentry	ebony tree	
<i>Macroptilium lathyroides</i> (L.) Urb.	cat's claw	
<i>Maireana microphylla</i> (Moq.) Paul G. Wilson	phasey bean	
<i>Malva parviflora</i> L.	saltbush	
<i>Malvastrum americanum</i> (L.) Torr.	marshmallow	
<i>Malvastrum coromandelianum</i> (L.) Garcke	spiked malvastrum	
	prickly malvastrum	♦

Species	Common name	Status
<i>Marsdenia microlepis</i> Benth.		
<i>Marsilea hirsuta</i> R. Br.	hairy nardoo	
<i>Maytenus cunninghamii</i> (Hook.) Loes.		♦
<i>Medicago polymorpha</i> L.		
<i>Melaleuca linariifolia</i> var. <i>trichostachya</i> (Lindl.) Benth.	flaxleaf paperbark	♦
<i>Melania oblongifolia</i> F. Muell.		
<i>Melichrus urceolatus</i> R. Br.		
<i>Melicope erythrococca</i> (F. Muell.) Benth.	honey gorse	
<i>Melilotus indicus</i> (L.) All.	tingletongue	
<i>Melinis repens</i> (Willd.) Zizka	hexham scent	♦
<i>Mimulus gracilis</i> R. Br.	red Natal grass	♦
<i>Minuria integrifolia</i> (DC.) Benth.		
<i>Muehlenbeckia florulenta</i> Meisner	smooth minuria	
<i>Murdannia graminea</i> (R. Br.) Bruchn.	lignum	
<i>Neptunia gracilis</i> Benth.	grass lily	
<i>Nicotiana megalosiphon</i> Huerck & Muell. Arg. subsp. <i>megalosiphon</i>	sensitive plant	
<i>Notelaea microcarpa</i> R. Br.		
<i>Nyssanthes diffusa</i> R. Br.	small fruited mock olive	
<i>Oenothera indecora</i> subsp. <i>bonariensis</i> W. Dietr.	barbed-wire weed	
<i>Oldenlandia mitrasacmoides</i> subsp. <i>trachymenoides</i> (F. Muell.) Halford	small flower evening	
<i>Olearia canescens</i> (Benth.) Hutch.	primrose	♦
<i>Oplismenus aemulus</i> (R. Br.) Roem. & Schult.		
<i>Opuntia aurantiaca</i> Lindl.	creeping shade grass	
<i>Opuntia stricta</i> (Haw.) Haw. var. <i>stricta</i>	tiger pear	♦
<i>Opuntia tomentosa</i> Salm-Dyck	prickly pear	♦
<i>Ottelia ovalifolia</i> (R. Br.) Rich.	velvety tree pear	♦
<i>Owenia venosa</i> F. Muell.	swamp lily	
<i>Oxalis perennans</i> Haw.	emu apple	
<i>Ozothamnus diosmifolius</i> (Vent.) DC.		
<i>Pandorea pandorana</i> (Andrews) Steenis	sago flower	
<i>Panicum effusum</i> R. Br. var. <i>effusum</i>	wonga vine	
<i>Panicum laevinode</i> Lindl.	hairy panic	
<i>Panicum maximum</i> var. <i>trichoglume</i> Eyles ex Robyns	pepper grass	
<i>Parsonia eucalyptophylla</i> F. Muell.	green panic	♦
<i>Parsonia lanceolata</i> R. Br.	gargaloo	
<i>Paspalidium caespitosum</i> C.E.Hubb.	northern silkpod	
<i>Paspalidium constrictum</i> (Domin) C.E. Hubb.	brigalow grass	
<i>Paspalidium criniforme</i> S.T.Blake	knottybutt grass	
<i>Paspalidium disjunctum</i> S.T.Blake		
<i>Paspalidium distans</i> (Trin.) Hughes	shotgrass	
<i>Paspalidium gracile</i> (R. Br.) Hughes	slender panic	
<i>Paspalidium jubiflorum</i> (Trin.) Hughes	warrego grass	
<i>Paspalum dilatatum</i> Poir.	paspalum	♦
<i>Periploca hispida</i> var. <i>setosa</i> (N.T. Burb.) G.L. Nesom		
<i>Perotis rara</i> R. Br.	comet grass	
<i>Persicaria attenuata</i> (R. Br.) Sojak subsp. <i>attenuata</i>		
<i>Persicaria decipiens</i> (R. Br.) K.L. Wilson		
<i>Persicaria hydropiper</i> (L.) Spach	water pepper	
<i>Persicaria lapathifolia</i> (L.) S.F. Gray		
<i>Persicaria orientalis</i> (L.) Spach		
<i>Petalostigma pubescens</i> Domin	quinine tree	
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	common reed	
<i>Phyla canescens</i> (Kunth) Greene	condamine couch	
<i>Phyllanthus gasstroemii</i> Muell. Arg.		
<i>Phyllanthus maderaspatensis</i> L. var. <i>maderaspatensis</i>		
<i>Phyllanthus</i> sp.		
<i>Phyllanthus virgatus</i> G. Forst.		

Species	Common name	Status
<i>Physalis lanceifolia</i> Nees		
<i>Pimelea latifolia</i> R. Br.		
<i>Pimelea trichostachya</i> Lindl.		
<i>Pittosporum rhombifolium</i> A. Cunn. ex Hook.		
<i>Planchonella cotinifolia</i> var. <i>pubescens</i> P. Royen		
<i>Plantago cunninghamii</i> Decne.		
<i>Plantago turrifera</i> B.G. Briggs, Carolin & Pulley		
<i>Plectranthus parviflorus</i> Willd.		
<i>Poa fordeana</i> F. Muell.	sweet swampgrass	
<i>Podolepis longipedata</i> Cunn. ex DC.		
<i>Polycarpaea corymbosa</i> (L.) Lam. var. <i>corymbosa</i>		
<i>Polygonum plebeium</i> R. Br.	small knotweed	
<i>Polymeria calycina</i> R. Br.	pink bindweed	
<i>Polymeria pusilla</i> R. Br.		
<i>Portulaca bicolor</i> F. Muell.		
<i>Portulaca oleracea</i> L.	pigweed	
<i>Portulaca pilosa</i> L. subsp. <i>pilosa</i>		
<i>Potamogeton crispus</i> L.	curly pondweed	
<i>Potamogeton tricarinatus</i> F. Muell. & A. Benn. ex A. Benn.	floating pondweed	
<i>Prostanthera euphrasioides</i> Benth.		
<i>Pseuderanthemum variabile</i> (R. Br.) Radlk.	loveflower	
<i>Psoralea tenax</i> Lindl.	emu-foot	
<i>Pterocaulon redolens</i> (Willd.) Fern.-Vill.		
<i>Ptilotus exaltatus</i> var. <i>semilanatus</i> (Lindl.) Maiden & Betche	Prince-of-Wales feather	
<i>Ptilotus macrocephalus</i> (R. Br.) Poir.	green pussytails	
<i>Ranunculus lappaceus</i> Sm.	common buttercup	
<i>Rhodanthe polypylla</i> (F. Muell.) Paul G. Wilson		
<i>Rhynchosia minima</i> var. <i>australis</i> (Benth.) C. Moore	rhynchosia	
<i>Richardia brasiliensis</i> Gomes	Mexican clover	
<i>Rorippa eustylis</i> (F. Muell.) L.A.S. Johnson		
<i>Rostellularia adscendens</i> (R.Br.) R.M. Barker var. <i>adscendens</i>		
<i>Rubus parvifolius</i> L.	native raspberry	
<i>Rumex brownii</i> Campd.	swamp dock	
<i>Rumex tenax</i> Rech.f.		
<i>Rutidosis crispata</i> A.E. Holland		R
<i>Sacciolepis indica</i> (L.) Chase	Indian cupscale grass	
<i>Salix babylonica</i> L.	weeping willow	
<i>Salsola kali</i> L.	soft roly-poly	
<i>Salvia plebeia</i> R. Br.	common sage	
<i>Salvia reflexa</i> Hornem.	mintweed	
<i>Santalum lanceolatum</i> R. Br.	sandelwood	
<i>Sarcostemma viminale</i> subsp. <i>brunonianum</i> (Wight & Arn.) P.I Forst.	caustic-vine	
<i>Schoenoplectus mucronatus</i> (L.) Pall. ex J. Kern.		
<i>Schoenoplectus validus</i> (Vahl) A. Love & D. Love	umbrella sedge	
<i>Schoenus kennyi</i> (F.M. Bailey) S.T. Blake		
<i>Scleria mackaviensis</i> Boeck.		
<i>Scleria sphacelata</i> F.Muell.		
<i>Sclerolaena birchii</i> (F. Muell.) Domin	galvanised burr	
<i>Sclerolaena muricata</i> (Moq.) Domin var. <i>muricata</i>	prickly roly-poly	
<i>Sclerolaena muricata</i> var. <i>villosa</i> (Benth.) Ulbr.	prickly roly-poly	
<i>Sclerolaena tetracuspis</i> (C.T. White) A.J. Scott	brigalow burr	
<i>Secamone elliptica</i> R. Br.	milkvine	
<i>Senecio lautus</i> subsp. <i>dissectifolius</i> Ali	fireweed	
<i>Senecio quadridentatus</i> Labill.	cotton fireweed	
<i>Senna artemisioides</i> subsp. <i>zygophylla</i> (Benth.) Randell	silver cassia	
<i>Senna barclayana</i> (Sweet) Randell		
<i>Senna sophera</i> (L.) Roxb. var. <i>sophera</i>	pepper leaf senna	
<i>Senna sophera</i> var. (40Mile Scrub J.R.Clarkson+ 6908)		

Species	Common name	Status
<i>Sesbania cannabina</i> (Retz.) Poir. var <i>cannabina</i>		
<i>Setaria dielsii</i> Herrm.		
<i>Setaria surgens</i> Stapf		
<i>Sida corrugata</i> Lindl.	corrugated sida	
<i>Sida filiformis</i> A. Cunn.		
<i>Sida pleiantha</i> F. Muell. ex Benth.		
<i>Sida rhombifolia</i> L.	sida retusa	
<i>Sida rohlenae</i> Domin		
<i>Sida spinosa</i> L.		
<i>Sida subspicata</i> F. Muell. ex Benth.	spiny sida	
<i>Sida trichopoda</i> F. Muell.	spiked sida	
<i>Silybum marianum</i> (L.) Gaertn.	high sida	
<i>Sisymbrium thellungi</i> O.E. Schulz	variegated thistle	♦
<i>Solanum americanum</i> Mill.	African turnip-weed	♦
<i>Solanum ellipticum</i> R.Br.	glossy nightshade	
<i>Solanum esuriale</i> Lindl.	potato bush	
<i>Solanum parvifolium</i> R. Br.	potato weed	
<i>Solanum semiarmatum</i> F. Muell.		
<i>Soliva anthemifolia</i> (Juss.) R. Br. ex Less.	prickly nightshade	
<i>Sonchus oleraceus</i> L.	dwarf jo jo weed	♦
<i>Sorghum leiocladum</i> (Hack.) C.E. Hubb.	common sowthistle	♦
<i>Spartothamnella juncea</i> (A. Cunn. ex Walp.) Briq.	wild sorghum	
<i>Spartothamnella puberula</i> (F. Muell.) Maiden & Betche	native broom	
<i>Spermacoce multicaulis</i> Benth.		
<i>Sporobolus caroli</i> Mez.	yakka grass	
<i>Sporobolus coromandelianus</i> (Retz.) Kunth		♦
<i>Sporobolus elongatus</i> R. Br.	slender rat's-tail grass	
<i>Sporobolus mitchellii</i> (Trin.) C.E. Hubb. ex S.T. Blake	rat's tail couch	
<i>Stackhousia muricata</i> Lindl.		
<i>Stellaria angustifolia</i> Hook.	swamp starwort	
<i>Swainsona galegifolia</i> (Andrews) R.Br.	smooth Darling pea	
<i>Swainsona oroboides</i> F. Muell. ex Benth.	variable swainsona	
<i>Tetragonia tetragonoides</i> (Pallas) Kuntze	New Zealand spinach	
<i>Thellungia advena</i> Stapf ex Probst	coolibah grass	
<i>Themeda avenacea</i> (F. Muell.) Maiden & Betche	native oatgrass	
<i>Themeda triandra</i> Forssk.	kangaroo grass	
<i>Thyridolepis xerophila</i> (Domin) S.T. Blake		
<i>Tragus australianus</i> S.T. Blake	small burr grass	
<i>Trianthema triquetra</i> Rottb. ex Willd.	red spinach	
<i>Tribulus micrococcus</i> Domin		
<i>Tricoryne elatior</i> R. Br.	rush lily	
<i>Triodia mitchellii</i> Benth. var. <i>mitchellii</i>	buck spinifex	
<i>Triodia pungens</i> R. Br. var. <i>pungens</i>		
<i>Turraea pubescens</i> Hellen.	native honeysuckle	
<i>Urochloa mosambicensis</i> (Hack.) Dandy	sabi grass	♦
<i>Utricularia dichotoma</i> Labill.		
<i>Utricularia gibba</i> L.		
<i>Verbena aristigera</i> S.Moore	Mayne's pest	♦
<i>Verbena litoralis</i> Kunth	verbena	♦
<i>Verbena officinalis</i> L.	common verbena	
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.f. ex A. Gray	wild sunflower	♦
<i>Vernonia cinerea</i> (L.) Less. var. <i>cinerea</i>	vernonia	
<i>Vetiveria filipes</i> (Benth.) C.E. Hubb.	Australian vetiveria	
<i>Vittadinia cuneata</i> var. <i>hirsuta</i> N.T. Burb.		
<i>Vittadinia dissecta</i> var. <i>hirta</i> N.T. Burb.		
<i>Vittadinia pterochaeta</i> (F. Muell. ex Benth.) J.M. Black		
<i>Vittadinia pustulata</i> N.T. Burb.		
<i>Wahlenbergia communis</i> Carolin	an Australian bluebell	

Species	Common name	Status
<i>Wahlenbergia gracilis</i> (G. Forst.) A. DC.	an Australian bluebell	
<i>Wahlenbergia turnidiflora</i> P.J. Sm.	an Australian bluebell	
<i>Xanthium spinosum</i> L.	Bathurst burr	♦
<i>Zaleya galericulata</i> (Melville) H.Eichler subsp. <i>galericulata</i>	hogweed	
<i>Zinnia peruviana</i> (L.) L.	wild zinnia	♦
<i>Zornia muriculata</i> subsp. <i>angustata</i> S.T. Reynolds & A.E. Holland	zornia	
<i>Zygophyllum apiculatum</i> F. Muell.	gall weed	

Table 2 - Species listing sorted by Family

Note: ♦ in Status represents introduced species or weed
R = Rare as defined in Queensland Conservation Act 1992

Family	Species	Common name	Status
Algae			
Characeae	Chara sp.	stonewort	
Pteridophytes			
Adiantaceae	Cheilanthes distans (R. Br.) Mett.	bristly cloak fern	
Adiantaceae	Cheilanthes sieberi Kunze subsp. sieberi	mulga fern	
Azollaceae	Azolla pinnata R.Br.	fernly azolla	
Marsileaceae	Marsilea hirsuta R. Br.	hairy nardoo	
Thelypteridaceae	Ampelopteris prolifera (Retz.) Copel.		
Thelypteridaceae	Cyclosorus interruptus (Willd.) H.Ito		
Gymnosperms			
Cupressaceae	Callitris glauophylla Thompson & L.A.S.Johnson	white cypress pine	
Angiosperms			
Acanthaceae	Brunoniella australis (Cav.) Bremek.	blue trumpet	
Acanthaceae	Pseuderanthemum variabile (R. Br.) Radlk.	loveflower	
Acanthaceae	Rostellularia adscendens (R.Br.) R.M. Barker var. adscendens		
Aizoaceae	Tetragonia tetragonoides (Pallas) Kuntze	New Zealand spinach	
Aizoaceae	Trianthema triquetra Rottb. ex Willd.	red spinach	
Aizoaceae	Zaleya galericulata (Melville) H.Eichler subsp. galericulata	hogweed	
Amaranthaceae	Achyranthes aspera L.	chaff flower	♦
Amaranthaceae	Alternanthera denticulata R. Br.	lesser joyweed	
Amaranthaceae	Alternanthera nodiflora R.Br.	joyweed	
Amaranthaceae	Amaranthus graecizans subsp. sylvestris (Vill.) Asch.		♦
Amaranthaceae	Amaranthus viridis L.	green amaranth	♦
Amaranthaceae	Gomphrena celosioides Mart.	soft khakiweed	♦
Amaranthaceae	Ptilotus exaltatus var. semilanatus (Lindl.) Maiden & Betche	Prince-of-Wales feather	
Amaranthaceae	Ptilotus macrocephalus (R. Br.) Poir.	green pussytails	
Amaranthaceae	Nyssanthes diffusa R. Br.	barbed-wire weed	
Apiaceae	Centella asiatica (L.) Urb.	pennywort	
Apiaceae	Ciclospermum leptophyllum (Pers.) Sprague	slender celery	♦
Apiaceae	Daucus glochidiatus (Labill.) Fischer, C.A.Meyer & Ave-Lall.	Australian carrot	
Apocynaceae	Alstonia constricta F.Muell.	bitterbark	
Apocynaceae	Carissa ovata R.Br.	current bush	
Apocynaceae	Parsonsia eucalyptophylla F.Muell.	gargaloo	
Apocynaceae	Parsonsia lanceolata R. Br.	northern silkpod	
Arecaceae	Livistona sp. (Taroom R.W.Johnson 2764)		
Asclepidaceae	Gomphocarpus physocarpus E. Mey.	balloon cotton bush	♦
Asclepidaceae	Marsdenia microlepis Benth.		
Asclepidaceae	Sarcostemma viminale subsp. brunonianum (Wight & Arn.) P.I Forst.	caustic-vine	
Asclepidaceae	Secamone elliptica R. Br.	milkvine	
Asteraceae	Aster subulatus Michx.	wild aster	♦
Asteraceae	Baccharis halimifolia L.	groundsel bush	♦
Asteraceae	Bidens bipinnata L.	bipinnate beggar's ticks	♦
Asteraceae	Brachyscome trachycarpa F. Muell.		

Family	Species	Common name	Status
Asteraceae	<i>Bracteantha bracteata</i> (Vent.) Anderb. & Haegi	golden everlasting	
Asteraceae	<i>Calotis cuneata</i> (F. Muell. ex Benth.) G.L. Davis	blue burr daisy	
Asteraceae	<i>Calotis cuneifolia</i> R.Br.		
Asteraceae	<i>Calotis dentex</i> R. Br.	white burr daisy	
Asteraceae	<i>Calotis hispidula</i> (F. Muell.) F. Muell.	bogan flea	
Asteraceae	<i>Calotis lappulacea</i> Benth.	yellow burr daisy	
Asteraceae	<i>Cassinia laevis</i> R. Br.	coughbush	
Asteraceae	<i>Centaurea melitensis</i> L.	Maltese cockspur	♦
Asteraceae	<i>Centipeda minima</i> (L.) A. Braun & Aschers	spreading sneezeweed	
Asteraceae	<i>Chrysoccephalum apiculatum</i> (Labill.) Steetz	yellow buttons	
Asteraceae	<i>Cirsium vulgare</i> (Sav.) Ten.	spear thistle	♦
Asteraceae	<i>Conyza bonariensis</i> (L.) Cronq.	flaxleaf fleabane	♦
Asteraceae	<i>Eclipta prostrata</i> (L.) L.	white eclipta	
Asteraceae	<i>Epaltes australis</i> Less.	epalates	
Asteraceae	<i>Euchiton sphaericus</i> (Willd.) Anderb.	cudweed	
Asteraceae	<i>Glossocardia bidens</i> (Retz.) Veldkamp	native cobbler's pegs	
Asteraceae	<i>Gnaphalium polycaulon</i> Pers.		
Asteraceae	<i>Helichrysum collinum</i> DC.		
Asteraceae	<i>Hypochaeris glabra</i> L.	smooth catsear	♦
Asteraceae	<i>Ixiolaena leptolepis</i> (DC.) Benth.	stalked ixiolaena	
Asteraceae	<i>Minuria integriflora</i> (DC.) Benth.	smooth minuria	
Asteraceae	<i>Olearia canescens</i> (Benth.) Hutch.		
Asteraceae	<i>Ozothamnus diosmifolius</i> (Vent.) DC.	sago flower	
Asteraceae	<i>Peripleura hispidula</i> var. <i>setosa</i> (N.T. Burb.) G.L. Nesom		
Asteraceae	<i>Podolepis longipedata</i> Cunn. ex DC.		
Asteraceae	<i>Pterocaulon redolens</i> (Willd.) Fern.-Vill.		
Asteraceae	<i>Rhodanthe polyphylla</i> (F. Muell.) Paul G. Wilson		
Asteraceae	<i>Rutidosis crispata</i> A.E. Holland		
Asteraceae	<i>Senecio lautus</i> subsp. <i>dissectifolius</i> Ali	fireweed	
Asteraceae	<i>Senecio quadridentatus</i> Labill.	cotton fireweed	
Asteraceae	<i>Silybum marianum</i> (L.) Gaertn.	variegated thistle	♦
Asteraceae	<i>Soliva anthemifolia</i> (Juss.) R. Br. ex Less.	dwarf jo jo weed	♦
Asteraceae	<i>Sonchus oleraceus</i> L.	common sowthistle	♦
Asteraceae	<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.f. ex A. Gray	wild sunflower	♦
Asteraceae	<i>Vernonia cinerea</i> (L.) Less. var. <i>cinerea</i>	vernonia	
Asteraceae	<i>Vittadinia cuneata</i> var. <i>hirsuta</i> N.T. Burb.		
Asteraceae	<i>Vittadinia dissecta</i> var. <i>hirta</i> N.T. Burb.		
Asteraceae	<i>Vittadinia pterocheata</i> (F. Muell. ex Benth.) J.M. Black		
Asteraceae	<i>Vittadinia pustulata</i> N.T. Burb.	Bathurst burr	♦
Asteraceae	<i>Xanthium spinosum</i> L.	wild zinnia	♦
Asteraceae	<i>Zinnia peruviana</i> (L.) L.	cat's claw	♦
Bignoniaceae	<i>Macfadyena unguis-cati</i> (L.) A.H. Gentry	wonga vine	
Bignoniaceae	<i>Pandorea pandorana</i> (Andrews) Steenis	Australian forget me not	
Boraginaceae	<i>Cynoglossum australe</i> R. Br. var. <i>australe</i>	weeping koda	
Boraginaceae	<i>Ehretia membranifolia</i> R. Br.		
Boraginaceae	<i>Halgnia brachyrhyncha</i> Peter G. Wilson	blue heliotrope	♦
Boraginaceae	<i>Heliotropium amplexicaule</i> Vahl		
Boraginaceae	<i>Heliotropium indicum</i> L.		♦
Brassicaceae	<i>Coronopus didymus</i> (L.) Smith	lesser swine-cress	♦
Brassicaceae	<i>Lepidium africanum</i> (N. Burm.) DC.	common peppercress	♦
Brassicaceae	<i>Lepidium bonariense</i> L.	Argentine peppercress	♦
Brassicaceae	<i>Rorippa eustylis</i> (F. Muell.) L.A.S. Johnson		
Brassicaceae	<i>Sisymbrium thellungii</i> O.E. Schulz	African turnip-weed	♦
Cactaceae	<i>Opuntia aurantiaca</i> Lindl.	tiger pear	♦
Cactaceae	<i>Opuntia stricta</i> (Haw.) Haw. var. <i>stricta</i>	prickly pear	♦

Family	Species	Common name	Status
Cactaceae	<i>Opuntia tomentosa</i> Salm-Dyck	velvety tree pear	♦
Caesalpiniaceae	<i>Cassia tomentella</i> Domin	velvet cassia	
Caesalpiniaceae	<i>Lysiphyllum carronii</i> (F. Muell.) Pedley	ebony tree	
Caesalpiniaceae	<i>Senna barclayana</i> (Sweet) Randell	pepper leaf senna	
Caesalpiniaceae	<i>Senna sophera</i> (L.) Roxb. var. <i>sophera</i>		
Caesalpiniaceae	<i>Senna sophera</i> var. (40Mile Scrub J.R.Clarkson+ 6908)		
Caesalpiniaceae	<i>Senna artemisioides</i> subsp. <i>zygophylla</i> (Benth.) Randell	silver cassia	
Callitrichaceae	<i>Callitriche sonderi</i> Hegelm.	starwort	
Campanulaceae	<i>Isotoma axillaris</i> Lindl.	Australian harebell	
Campanulaceae	<i>Wahlenbergia communis</i> Carolin	an Australian bluebell	
Campanulaceae	<i>Wahlenbergia gracilis</i> (G. Forst.) A. DC.	an Australian bluebell	
Capmanulaceae	<i>Wahlenbergia tumidiflucta</i> P.J. Sm.	an Australian bluebell	
Capparaceae	<i>Apophyllum anomalum</i> F. Muell.	broom bush	
Capparaceae	<i>Capparis canescens</i> Banks ex DC.	wild orange	
Capparaceae	<i>Capparis lasiantha</i> R. Br. ex DC.	nipan	
Capparaceae	<i>Capparis loranthifolia</i> var. <i>bancroftii</i> C.T. White ex M. Jacobs	narrow leaf bumble-tree	
Capparaceae	<i>Capparis mitchellii</i> Lindl.		
Caryophyllaceae	<i>Polycarpaea corymbosa</i> (L.) Lam. var. <i>corymbosa</i>	swamp starwort	
Caryophyllaceae	<i>Stellaria angustifolia</i> Hook.	bull oak	
Casuarinaceae	<i>Allocasuarina luehmannii</i> (R.T. Barker) L.A.S. Johnson		
Casuarinaceae	<i>Casuarina cristata</i> Miq.	belah	
Celastraceae	<i>Cassine australis</i> var. <i>angustifolia</i> (Benth.) Jessup	red oliveplum	
Celastraceae	<i>Denhamia oleaster</i> (Lindl.) F. Muell.		
Celastraceae	<i>Denhamia pittosporoides</i> F. Muell.	orange boxwood	
Celastraceae	<i>Maytenus cunninghamii</i> (Hook.) Loes.		
Chenopodiaceae	<i>Atriplex muelleri</i> Benth.	annual saltbush	
Chenopodiaceae	<i>Chenopodium ambrosioides</i> L.	Mexican tea	
Chenopodiaceae	<i>Chenopodium carinatum</i> R. Br.	green crumbweed	
Chenopodiaceae	<i>Chenopodium desertorum</i> subsp. <i>anidiophyllum</i> (Aellen) Paul G. Wilson		
Chenopodiaceae	<i>Chenopodium pumilio</i> R. Br.	small crumbweed	
Chenopodiaceae	<i>Dysphania glomulifera</i> (Nees) Paul G. Wilson subsp. <i>glomulifera</i>		
Chenopodiaceae	<i>Einadia hastata</i> (R. Br.) A.J. Scott	ruby saltbush	
Chenopodiaceae	<i>Einadia nutans</i> (R. Br.) A.J. Scott subsp. <i>nutans</i>	nodding saltbush	
Chenopodiaceae	<i>Einadia nutans</i> subsp. <i>linifolia</i> (R. Br.) Paul G. Wilson	climbing saltbush	
Chenopodiaceae	<i>Einadia trigonos</i> subsp. <i>stellulata</i> (Benth.) Paul G. Wilson		
Chenopodiaceae	<i>Enchytraea tomentosa</i> R. Br.	ruby saltbush	
Chenopodiaceae	<i>Maireana microphylla</i> (Moq.) Paul G. Wilson	saltbush	
Chenopodiaceae	<i>Salsola kali</i> L.	soft roly-poly	
Chenopodiaceae	<i>Sclerolaena birchii</i> (F. Muell.) Domin	galvanised burr	
Chenopodiaceae	<i>Sclerolaena muricata</i> (Moq.) Domin var. <i>muricata</i>	prickly roly-poly	
Chenopodiaceae	<i>Sclerolaena muricata</i> var. <i>villosa</i> (Benth.) Ulbr.	prickly roly-poly	
Chenopodiaceae	<i>Sclerolaena tetracuspis</i> (C.T. White) A.J. Scott	brigalow burr	
Commelinaceae	<i>Commelina diffusa</i> Burm.f.	wandering jew	
Commelinaceae	<i>Murdannia graminea</i> (R. Br.) Bruchn.	grass lily	
Convolvulaceae	<i>Cuscuta campestris</i> Yunck.	dodder	
Convolvulaceae	<i>Dichondra repens</i> J.R. Forst. & G. Forst.	kidney weed	
Convolvulaceae	<i>Evolvulus alsinoides</i> (L.) L.	tropical speedwell	
Convolvulaceae	<i>Jacquemontia paniculata</i> (Burm.f.) Hallier f.		
Convolvulaceae	<i>Polymeria calycina</i> R. Br.	pink bindweed	
Convolvulaceae	<i>Polymeria pusilla</i> R. Br.		

Family	Species	Common name	Status
Crassulaceae	<i>Crassula sieberiana</i> (Schult. & Schult.f.) Druce	native crassula	
Cyperaceae	<i>Carex appressa</i> R. Br.	tall sedge	
Cyperaceae	<i>Carex polyantha</i> F. Muell.		
Cyperaceae	<i>Cyperus difformis</i> L.	rice sedge	
Cyperaceae	<i>Cyperus flaccidus</i> R. Br.		
Cyperaceae	<i>Cyperus gracilis</i> R. Br.	slender sedge	
Cyperaceae	<i>Cyperus iria</i> L.		
Cyperaceae	<i>Cyperus lucidus</i> R. Br.		
Cyperaceae	<i>Cyperus polystachyos</i> Rottb. var. <i>polystachyos</i>	bunchy sedge	
Cyperaceae	<i>Cyperus pygmaeus</i> Rottb.	dwarf sedge	
Cyperaceae	<i>Cyperus rigidellus</i> (Benth.) J.M. Black		
Cyperaceae	<i>Cyperus rotundus</i> L.	nutgrass	
Cyperaceae	<i>Cyperus sanguinolentus</i> Vahl		♦
Cyperaceae	<i>Cyperus sphaeroideus</i> L.A.S. Johnson & O.D. Evans	kyllinga weed	
Cyperaceae	<i>Eleocharis cylindrostachys</i> Boeck.		
Cyperaceae	<i>Eleocharis equisetina</i> C. Presl	spikerush	
Cyperaceae	<i>Eleocharis plana</i> S.T. Blake	ribbed spikerush	
Cyperaceae	<i>Eleocharis pusilla</i> R. Br.	small spikerush	
Cyperaceae	<i>Fimbristylis dichotoma</i> (L.) Vahl	common fringe-rush	
Cyperaceae	<i>Gahnia aspera</i> (R.Br.) Spreng.		
Cyperaceae	<i>Schoenoplectus mucronatus</i> (L.) Pall. ex J. Kern.		
Cyperaceae	<i>Schoenoplectus validus</i> (Vahl) A. Love & D. Love	umbrella sedge	
Cyperaceae	<i>Schoenus kennyi</i> (F.M. Bailey) S.T. Blake		
Cyperaceae	<i>Scleria mackaviensis</i> Boeck.		
Cyperaceae	<i>Scleria sphacelata</i> F.Muell.		
Dilleniaceae	<i>Hibbertia</i> sp.		
Ebenaceae	<i>Diospyros humilis</i> (R. Br.) F. Muell.	small-leaved ebony	
Elatinaceae	<i>Elatine gratioloides</i> A. Cunn.	waterwort	
Epacridaceae	<i>Melichrus urceolatus</i> R. Br.	honey gorse	
Eriocaulaceae	<i>Eriocaulon scariosum</i> Sm.	pipewort	
Erythroxylaceae	<i>Erythroxylum</i> sp. (Splityard Creek L.Pedley 5360)		
Euphorbiaceae	<i>Acalypha eremorum</i> Muell. Arg.	coffee bush	
Euphorbiaceae	<i>Adriana glabrata</i> var. <i>subglabra</i> (Baill.) Airy Shaw	caustic-weed	
Euphorbiaceae	<i>Bertia oleifolia</i> Planch.	Queensland brittlewood	
Euphorbiaceae	<i>Bertia pedicellata</i> F. Muell.	native cascarilla bark	
Euphorbiaceae	<i>Breynia oblongifolia</i> (Muell. Arg.) Muell. Arg.	narrow-leaved croton	
Euphorbiaceae	<i>Chamaesyce dallachiana</i> (Baill.) D.C. Hassall	desert spurge	
Euphorbiaceae	<i>Claoxylon tenerifolium</i> (Baill.) F. Muell.		
Euphorbiaceae	<i>Croton insularis</i> Baill.	scrub poison	
Euphorbiaceae	<i>Croton phebaloides</i> F. Muell. ex Muell. Arg.	quinine tree	
Euphorbiaceae	<i>Euphorbia tannensis</i> var. <i>eremophila</i> (A.Cunn.) D.C. Hassall		
Euphorbiaceae	<i>Excoecaria dallachiana</i> (Baill.) Benth.		
Euphorbiaceae	<i>Petalostigma pubescens</i> Domin		
Euphorbiaceae	<i>Phyllanthus gasstroemii</i> Muell. Arg.		
Euphorbiaceae	<i>Phyllanthus maderaspatensis</i> L. var. <i>maderaspatensis</i>		
Euphorbiaceae	<i>Phyllanthus</i> sp.	woolly rattlepod	
Euphorbiaceae	<i>Phyllanthus virgatus</i> G. Forst.		
Fabaceae	<i>Crotalaria incana</i> L. subsp. <i>incana</i>		
Fabaceae	<i>Crotalaria montana</i> Roth		
Fabaceae	<i>Desmodium brachypodium</i> A. Gray		
Fabaceae	<i>Desmodium rhytidophyllum</i> F. Muell. ex Benth.		
Fabaceae	<i>Desmodium varians</i> (Labill.) G. Don	slender tick trefoil	
Fabaceae	<i>Erythrina vespertilio</i> Benth.	bats-wing coral tree	
Fabaceae	<i>Glycine tabacina</i> (Labill.) Benth.	glycine pea	
Fabaceae	<i>Glycine tomentella</i> Hayata	woolly glycine	

Family	Species	Common name	Status
Fabaceae	<i>Hovea lanceolata</i> Sims		
Fabaceae	<i>Hovea longipes</i> Benth.	brush hovea	
Fabaceae	<i>Indigofera linnaei</i> Ali	nine-leaved indigo	
Fabaceae	<i>Indigofera</i> sp.		
Fabaceae	<i>Jacksonia scoparia</i> R.Br.	dogwood	
Fabaceae	<i>Lotus australis</i> Andrews	Australian trefoil	
Fabaceae	<i>Macroptilium lathyroides</i> (L.) Urb.	phasey bean	♦
Fabaceae	<i>Medicago polymorpha</i> L.		♦
Fabaceae	<i>Melilotus indicus</i> (L.) All.	hexham scent	♦
Fabaceae	<i>Psoralea tenax</i> Lindl.	emu-foot	♦
Fabaceae	<i>Rhynchosia minima</i> var. <i>australis</i> (Benth.) C. Moore	rhynchosia	
Fabaceae	<i>Sesbania cannabina</i> (Retz.) Poir. var <i>cannabina</i>		
Fabaceae	<i>Swainsona galegifolia</i> (Andrews) R.Br.	smooth Darling pea	
Fabaceae	<i>Swainsona oroboides</i> F. Muell. ex Benth.	variable swainsona	
Fabaceae	<i>Zornia muriculata</i> subsp. <i>angustata</i> S.T. Reynolds & A.E. Holland	zornia	
Gentianaceae	<i>Centaurium erythraea</i> Rafn.	common centaury	
Geraniaceae	<i>Erodium crinitum</i> Carolin	blue crowfoot	♦
Goodeniaceae	<i>Goodenia fascicularis</i> F. Muell. & Tate	fan flower	
Goodeniaceae	<i>Goodenia glabra</i> R. Br.		
Goodeniaceae	<i>Goodenia grandiflora</i> Sims		
Haloragaceae	<i>Haloragis aspera</i> Lindl.	raspweed	
Hydrocharitaceae	<i>Ottelia ovalifolia</i> (R. Br.) Rich.	swamp lily	
Juncaceae	<i>Juncus prismatocarpus</i> R. Br.	branching rush	
Juncaceae	<i>Juncus</i> sp.		
Juncaceae	<i>Juncus usitatus</i> L.A.S. Johnson	rush	
Lamiaceae	<i>Ajuga australis</i> R. Br.	Australian bugle	
Lamiaceae	<i>Basilicum polystachyon</i> (L.) Moench		
Lamiaceae	<i>Plectranthus parviflorus</i> Willd.		
Lamiaceae	<i>Prostanthera euphrasiooides</i> Benth.		
Lamiaceae	<i>Salvia plebeia</i> R. Br.	common sage	
Lamiaceae	<i>Salvia reflexa</i> Hornem.	mintweed	♦
Lemnaceae	<i>Lemna trisulca</i> L.		
Lentibulariaceae	<i>Utricularia dichotoma</i> Labill.		
Lentibulariaceae	<i>Utricularia gibba</i> L.		
Liliaceae	<i>Dianella brevipedunculata</i> R.F.J. Hend.	rush lily	
Liliaceae	<i>Dianella caerulea</i> var. <i>vannata</i> R.J.F. Hend.	erect mistletoe	
Liliaceae	<i>Dianella longifolia</i> R. Br. var. <i>longifolia</i>		
Liliaceae	<i>Laxmannia compacta</i> Conran & P.I. Forst.		
Liliaceae	<i>Tricoryne elatior</i> R. Br.		
Loranthaceae	<i>Amyema</i> congener (Sieber ex Schult. & Schult.f.) Tiegh. subsp. congener		
Loranthaceae	<i>Amyema quandang</i> var. <i>bancroftii</i> (F.M.Bailey)		
Malvaceae	<i>Barlow</i>		
Malvaceae	<i>Abutilon fraseri</i> (Hook.) Hook. ex Walp.	dwarf lantern flower	
Malvaceae	<i>Abutilon oxycarpum</i> (F.Muell.) F. Muell. ex Benth. forma <i>oxycarpum</i>		
Malvaceae	<i>Abutilon oxycarpum</i> forma <i>acutatum</i> Benth.	flannel weed	
Malvaceae	<i>Hibiscus sturtii</i> Hook.		
Malvaceae	<i>Hibiscus trionum</i> L.	bladder ketmia	
Malvaceae	<i>Malva parviflora</i> L.	marshmallow	
Malvaceae	<i>Malvastrum americanum</i> (L.) Torr.	spiked malvastrum	♦
Malvaceae	<i>Malvastrum coromandelianum</i> (L.) Garcke	prickly malvastrum	♦
Malvaceae	<i>Sida corrugata</i> Lindl.	corrugated sida	♦
Malvaceae	<i>Sida filiformis</i> A. Cunn.		
Malvaceae	<i>Sida pleiantha</i> F. Muell. ex Benth.		
Malvaceae	<i>Sida rhombifolia</i> L.	sida retusa	
Malvaceae	<i>Sida rohlenae</i> Domin		

Family	Species	Common name	Status
Malvaceae	<i>Sida spinosa</i> L.	spiny sida	
Malvaceae	<i>Sida subspicata</i> F. Muell. ex Benth.	spiked sida	
Malvaceae	<i>Sida trichopoda</i> F. Muell.	high sida	
Meliaceae	<i>Owenia venosa</i> F. Muell.	emu apple	
Meliaceae	<i>Turraea pubescens</i> Hellen.	native honeysuckle	
Mimosaceae	<i>Acacia amblygona</i> Benth.	prickly wattle	
Mimosaceae	<i>Acacia caroleae</i> Pedley		
Mimosaceae	<i>Acacia conferta</i> Benth.		
Mimosaceae	<i>Acacia deanei</i> (R.T. Baker) M.B. Welch, Coombs & McGlynn subsp. <i>deanei</i>	crowded-leaf wattle	
	<i>Acacia decora</i> Rchb.	green wattle	
Mimosaceae	<i>Acacia excelsa</i> Benth.	pretty wattle	
Mimosaceae	<i>Acacia farnesiana</i> (L.) Willd.	ironwood	
Mimosaceae	<i>Acacia fasciculifera</i> F. Muell. ex Benth.	mimosa bush	
Mimosaceae	<i>Acacia harpophylla</i> F. Muell. ex Benth.	scrub ironbark	
Mimosaceae	<i>Acacia juncifolia</i> Benth. subsp. <i>juncifolia</i>	brigalow	
Mimosaceae	<i>Acacia leiocalyx</i> (Domin) Pedley subsp. <i>leiocalyx</i>	Brisbane black wattle	
Mimosaceae	<i>Acacia longispicata</i> Benth.		
Mimosaceae	<i>Acacia macradenia</i> Benth.	zig-zag wattle	
Mimosaceae	<i>Acacia rhodoxylon</i> Maiden	rosewood	
Mimosaceae	<i>Acacia salicina</i> Lindl.	sally wattle	
Mimosaceae	<i>Acacia shirleyi</i> Maiden	lancewood	
Mimosaceae	<i>Acacia sparsiflora</i> Maiden	currawong	
Mimosaceae	<i>Acacia stenophylla</i> A. Cunn. ex Benth.	river cooba	
Mimosaceae	<i>Neptunia gracilis</i> Benth.	sensitive plant	
Molluginaceae	<i>Glinus lotoides</i> L.	hairy carpet weed	
Moraceae	<i>Ficus opposita</i> Miq.	sandpaper fig	
Myoporaceae	<i>Eremophila debilis</i> (Andrews) Chinnock	winter apple	
Myoporaceae	<i>Eremophila longifolia</i> (R., Br.) F. Muell.	berrigan	
Myoporaceae	<i>Eremophila mitchellii</i> Benth.	bastard sandalwood	
Myrtaceae	<i>Angophora floribunda</i> (Sm.) Sweet	roughbark apple	
Myrtaceae	<i>Angophora leiocarpa</i> (L.A.S. Johnson ex G.J. Leach) K.R. Thiele & Ladiges	smooth-bark apple	
Myrtaceae	<i>Austromyrtus bidwillii</i> (Benth.) Burret		
Myrtaceae	<i>Corymbia clarksoniana</i> (D.J. Carr & S.G. Carr) K.D. Hill & L.A.S. Johnson	smooth-barked	
Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh.	ironwood	
Myrtaceae	<i>Eucalyptus camaganeana</i> Maiden	long-fruited bloodwood	
Myrtaceae	<i>Eucalyptus coolabah</i> Blakely & Jacobs		
Myrtaceae	<i>Eucalyptus crebra</i> F. Muell.	river red gum	
Myrtaceae	<i>Eucalyptus exserta</i> F. Muell.	Dawson gum	
Myrtaceae	<i>Eucalyptus melanophloia</i> F. Muell.	coolabah	
Myrtaceae	<i>Eucalyptus populnea</i> F. Muell.	narrow-leaved ironbark	
Myrtaceae	<i>Eucalyptus tenuipes</i> (Maiden & Blakely) Blakley & C.T. White	Queensland peppermint	
Myrtaceae	<i>Eucalyptus tereticornis</i> Sm.	silver leaved ironbark	
Myrtaceae	<i>Eucalyptus tessellaris</i> F. Muell.	poplar box	
Myrtaceae	<i>Leptospermum neglectum</i> Joy Thoms.	narrow-leaved	
Myrtaceae	<i>Lophostemon suaveolens</i> (Sol. ex Gaertn.) Peter G. Wilson & J.T. Waterh.	mahogany	
Myrtaceae	<i>Lysicarpus angustifolius</i> (Hook.) Druce	forest red gum	
Myrtaceae	<i>Melaleuca linariifolia</i> var. <i>trichostachya</i> (Lindl.) Benth.	Moreton Bay ash	
Nyctaginaceae	<i>Boerhavia dominii</i> Meidle & Hewson	swamp box	
Nyctaginaceae	<i>Boerhavia pubescens</i> R. Br.		
Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i> (R. Br.) P.S.Green	budgeroo	
		flaxleaf paperbark	
		native jasmine	

Family	Species	Common name	Status
Oleaceae	<i>Jasminum simplicifolium</i> subsp. <i>australiense</i> P.S. Green	stiff jasmine	
Oleaceae	<i>Notelaea microcarpa</i> R. Br.	small fruited mock olive	
Onagraceae	<i>Epilobium hirtigerum</i> A. Cunn.		
Onagraceae	<i>Gaura parviflora</i> Douglas	clockweed	♦
Onagraceae	<i>Ludwigia octovalvis</i> (Jacq.) Raven	willow primrose	♦
Onagraceae	<i>Ludwigia peploides</i> subsp. <i>montevidensis</i> (Spreng.) P.H. Raven		♦
Onagraceae	<i>Oenothera indecora</i> subsp. <i>bonariensis</i> W. Dietr.	small flower evening primrose	♦
Orchidaceae	<i>Cymbidium canaliculatum</i> R.Br.		
Oxalidaceae	<i>Oxalis perennans</i> Haw.		
Papaveraceae	<i>Argemone ochroleuca</i> Sweet subsp. <i>ochroleuca</i>		
Pittosporaceae	<i>Bursaria incana</i> Lindl. var. <i>incana</i>		
Pittosporaceae	<i>Citriobatus spinescens</i> (F. Muell.) Druce	large-fruited orange thorn	
Pittosporaceae	<i>Pittosporum rhombifolium</i> A. Cunn. ex Hook.		
Plantaginaceae	<i>Plantago cunninghamii</i> Decne.		
Plantaginaceae	<i>Plantago turrifera</i> B.G. Briggs, Carolin & Pulley		
Poaceae	<i>Agrostis avenacea</i> J.F. Gmel. var. <i>avenacea</i>	blowngrass	
Poaceae	<i>Ancistrachne uncinulata</i> (R. Br.) S.T. Blake	hooky grass	
Poaceae	<i>Aristida benthamii</i> var. <i>spinulifera</i> B.K.Simon		
Poaceae	<i>Aristida calycina</i> R. Br. var. <i>calycina</i>		
Poaceae	<i>Aristida calycina</i> var. <i>praealta</i> Domin	many headed wiregrass	
Poaceae	<i>Aristida caput-medusae</i> Domin		
Poaceae	<i>Aristida gracilipes</i> (Domin) Henrard		
Poaceae	<i>Aristida latifolia</i> Domin		
Poaceae	<i>Aristida leichhardtiana</i> Domin		
Poaceae	<i>Aristida lignosa</i> B.K.Simon		
Poaceae	<i>Aristida personata</i> Henrard		
Poaceae	<i>Aristida queenslandica</i> Henrard var. <i>queenslandica</i>		
Poaceae	<i>Aristida queenslandica</i> var. <i>dissimilis</i> (S.T.Blake) B.K.Simon		
Poaceae	<i>Aristida ramosa</i> R.Br.	purple wiregrass	
Poaceae	<i>Arundinella neplanensis</i> Trin.	reed grass	
Poaceae	<i>Austrostipa verticillata</i> (Nees ex Spreng.) S.W.L. Jacobs & J. Everett	slender bamboo grass	
Poaceae	<i>Bothriochloa bladhii</i> (Retz.) S.T. Blake subsp. <i>bladhii</i>	forest bluegrass	
Poaceae	<i>Bothriochloa decipiens</i> (Hack.) C.E. Hubb. var. <i>decipiens</i>	pitted bluegrass	
Poaceae	<i>Brachiaria eruciformis</i> (Sm.) Griseb.		
Poaceae	<i>Brachiaria foliosa</i> (R. Br.) Hughes	leafy panic	♦
Poaceae	<i>Brachiaria subquadripila</i> (Trin.) Hitch.		
Poaceae	<i>Calyptochloa gracillima</i> C.E. Hubb.		
Poaceae	<i>Capillipedium spicigerum</i> S.T. Blake	scented top	
Poaceae	<i>Cenchrus ciliaris</i> L.	buffel grass	♦
Poaceae	<i>Chionachne cyathopoda</i> (F. Muell.) F. Muell. ex Benth.	river grass	
Poaceae	<i>Chloris divaricata</i> R. Br.	slender chloris	
Poaceae	<i>Chloris gayana</i> Kunth	rhodes grass	♦
Poaceae	<i>Chloris ventricosa</i> R. Br.	tall chloris	
Poaceae	<i>Cleistochloa subjuncea</i> C.E. Hubb.		
Poaceae	<i>Cymbopogon bombycinus</i> (R. Br.) Domin	silky oilgrass	
Poaceae	<i>Cymbopogon refractus</i> (R.Br.) A. Camus	barb wire grass	
Poaceae	<i>Cynodon dactylon</i> (L.) Pers. var. <i>dactylon</i>	green couch	
Poaceae	<i>Dichanthium sericeum</i> subsp. <i>humilius</i> (J.M. Black) B.K. Simon		

Family	Species	Common name	Status
Poaceae	<i>Digitaria breviglumis</i> (Domin) Henrard	cotton panic	
Poaceae	<i>Digitaria brownii</i> (Roem. & Schult.) Hughes	umbrella grass	
Poaceae	<i>Digitaria divaricatissima</i> (R. Br.) Hughes		
Poaceae	<i>Digitaria longiflora</i> (Retz.) Pers.		
Poaceae	<i>Echinochloa crusgalli</i> (L.) P. Beauv.	barnyard grass	♦
Poaceae	<i>Enneapogon gracilis</i> (R. Br.) P. Beauv.	slender nineawn	
Poaceae	<i>Enneapogon lindleyanus</i> (Domin) C.E. Hubb.	prickly couch	
Poaceae	<i>Enteropogon acicularis</i> (Lindl.) Lazarides	curly windmill grass	
Poaceae	<i>Enteropogon ramosus</i> B.K. Simon	windmill grass	
Poaceae	<i>Enteropogon unispiceus</i> (F. Muell.) Clayton		
Poaceae	<i>Eragrostis elongata</i> (Willd.) J. Jacq.	clustered love grass	
Poaceae	<i>Eragrostis lacunaria</i> F. Muell. ex Benth.	purple lovegrass	
Poaceae	<i>Eragrostis leptostachya</i> (R. Br.) Steud.	paddock love grass	
Poaceae	<i>Eragrostis longipedicellata</i> B.K. Simon		
Poaceae	<i>Eriochloa decumbens</i> F.M. Bailey		
Poaceae	<i>Eriochloa pseudoacrotricha</i> (Stapf ex Thell.) J.M. Black	early spring grass	
Poaceae	<i>Eulalia aurea</i> (Bory) Kunth	silky browntop	
Poaceae	<i>Heteropogon contortus</i> (L.) Beauv. ex Roem. & Schult.	black speargrass	
Poaceae	<i>Imperata cylindrica</i> (L.) Raeusch.	blady grass	
Poaceae	<i>Isachne globosa</i> (Thunb.) Kuntze	swamp millet	
Poaceae	<i>Leersia hexandra</i> Sw.	swamp rice grass	
Poaceae	<i>Leptochloa ciliolata</i> (Jedwabn.) S.T. Blake	umbrella canegrass	
Poaceae	<i>Leptochloa digitata</i> (R. Br.) Domin		
Poaceae	<i>Leptochloa peacockii</i> (Maiden & Betche) Domin	red Natal grass	♦
Poaceae	<i>Melinis repens</i> (Willd.) Zizka	creeping shade grass	
Poaceae	<i>Oplismenus aemulus</i> (R. Br.) Roem. & Schult.	hairy panic	
Poaceae	<i>Panicum effusum</i> R. Br. var. <i>effusum</i>	pepper grass	
Poaceae	<i>Panicum laevinode</i> Lindl.	green panic	♦
Poaceae	<i>Panicum maximum</i> var. <i>trichoglume</i> Eyles ex Robyns		
Poaceae	<i>Paspalidium caespitosum</i> C.E. Hubb.	brigalow grass	
Poaceae	<i>Paspalidium constrictum</i> (Domin) C.E. Hubb.	knottybutt grass	
Poaceae	<i>Paspalidium criniforme</i> S.T. Blake		
Poaceae	<i>Paspalidium disjunctum</i> S.T. Blake	shotgrass	
Poaceae	<i>Paspalidium distans</i> (Trin.) Hughes	slender panic	
Poaceae	<i>Paspalidium gracile</i> (R. Br.) Hughes	warrego grass	
Poaceae	<i>Paspalidium jubiflorum</i> (Trin.) Hughes	paspalum	
Poaceae	<i>Paspalum dilatatum</i> Poir.	comet grass	♦
Poaceae	<i>Perotis rara</i> R. Br.	common reed	
Poaceae	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	sweet swampgrass	
Poaceae	<i>Poa fordeana</i> F. Muell.	Indian cupscale grass	
Poaceae	<i>Sacciolepis indica</i> (L.) Chase		
Poaceae	<i>Setaria dielsii</i> Herrm.		
Poaceae	<i>Setaria surgens</i> Stapf	wild sorghum	
Poaceae	<i>Sorghum leiocladium</i> (Hack.) C.E. Hubb.	yakka grass	
Poaceae	<i>Sporobolus caroli</i> Mez.		
Poaceae	<i>Sporobolus coromandelianus</i> (Retz.) Kunth	slender rat's-tail grass	♦
Poaceae	<i>Sporobolus elongatus</i> R. Br.	rat's tail couch	
Poaceae	<i>Sporobolus mitchellii</i> (Trin.) C.E. Hubb. ex S.T. Blake		
Poaceae	<i>Thellungia advena</i> Stapf ex Probst	coolibah grass	
Poaceae	<i>Themeda avenacea</i> (F. Muell.) Maiden & Betche	native oatgrass	
Poaceae	<i>Themeda triandra</i> Forssk.	kangaroo grass	
Poaceae	<i>Thyridolepis xerophila</i> (Domin) S.T. Blake		
Poaceae	<i>Tragus australianus</i> S.T. Blake	small burr grass	
Poaceae	<i>Triodia mitchellii</i> Benth. var. <i>mitchellii</i>	buck spinifex	

Family	Species	Common name	Status
Poaceae	<i>Triodia pungens</i> R. Br. var. <i>pungens</i>	sabi grass	♦
Poaceae	<i>Urochloa mosambicensis</i> (Hack.) Dandy	Australian vetiveria	♦
Poaceae	<i>Vetiveria filipes</i> (Benth.) C.E. Hubb.		
Polygonaceae	<i>Fallopia convolvulus</i> (L.) A. Love	lignum	♦
Polygonaceae	<i>Muehlenbeckia florulenta</i> Meisner		
Polygonaceae	<i>Persicaria attenuata</i> (R. Br.) Sojak subsp. <i>attenuata</i>		
Polygonaceae	<i>Persicaria decipiens</i> (R. Br.) K.L. Wilson		
Polygonaceae	<i>Persicaria hydropiper</i> (L.) Spach	water pepper	
Polygonaceae	<i>Persicaria lapathifolia</i> (L.) S.F. Gray		
Polygonaceae	<i>Persicaria orientalis</i> (L.) Spach		
Polygonaceae	<i>Polygonum plebeium</i> R. Br.	small knotweed	
Polygonaceae	<i>Rumex brownii</i> Campd.	swamp dock	
Polygonaceae	<i>Rumex tenax</i> Rech.f.		
Portulacaceae	<i>Portulaca bicolor</i> F. Muell.		
Portulacaceae	<i>Portulaca oleracea</i> L.	pigweed	
Portulacaceae	<i>Portulaca pilosa</i> L. subsp. <i>pilosa</i>		
Potamogetonaceae	<i>Potamogeton crispus</i> L.	curly pondweed	
Potamogetonaceae	<i>Potamogeton tricarinatus</i> F. Muell. & A. Benn. ex A. Benn.	floating pondweed	
Proteaceae	<i>Grevillea robusta</i> A. Cunn. ex R. Br.	silky oak	
Proteaceae	<i>Grevillea striata</i> R. Br.	beefwood	
Proteaceae	<i>Hakea fraseri</i> R.Br.	corkwood oak	
Ranunculaceae	<i>Ranunculus lappaceus</i> Sm.	common buttercup	
Rhamnaceae	<i>Alphitonia excelsa</i> (A. Cunn. ex Fenzl) Reissek ex Benth.	soap tree	
Rhamnaceae	<i>Cryptandra</i> sp. (Isla Gorge P.Sharpe 627)		
Rosaceae	<i>Rubus parvifolius</i> L.	native raspberry	
Rubiaceae	<i>Asperula conferta</i> Hook.f.	common woodruff	
Rubiaceae	<i>Asperula geminifolia</i> F. Muell.		
Rubiaceae	<i>Canthium coprosmoides</i> F. Muell.	coastal coffee bush	
Rubiaceae	<i>Canthium odoratum</i> (G. Forst.) Seem.		
Rubiaceae	<i>Canthium oleifolium</i> Hook.	myrtle tree	
Rubiaceae	<i>Canthium</i> sp. (Berrigurra Station E.R.Anderson 2829)		
Rubiaceae	<i>Canthium vacciniifolium</i> F. Muell.	small-leaved canthium	
Rubiaceae	<i>Oldenlandia mitrasacmoides</i> subsp. <i>trachymenoides</i> (F. Muell.) Halford		
Rubiaceae	<i>Richardia brasiliensis</i> Gomes	Mexican clover	♦
Rubiaceae	<i>Spermacoce multicaulis</i> Benth.		
Rutaceae	<i>Eremocitrus glauca</i> (Lindl.) Swingle	limebush	
Rutaceae	<i>Flindersia australis</i> R. Br.	crow's ash	
Rutaceae	<i>Flindersia collina</i> F.M. Bailey	broad-leaved leopard tree	
Rutaceae	<i>Geijera parviflora</i> Lindl.	wilga	
Rutaceae	<i>Melicope erythrococca</i> (F. Muell.) Benth.	tingletongue	
Salicaceae	<i>Salix babylonica</i> L.	weeping willow	
Santalaceae	<i>Exocarpos latifolius</i> R. Br.	native cherry	
Santalaceae	<i>Santalum lanceolatum</i> R. Br.	sandalwood	
Sapindaceae	<i>Alectryon connatus</i> (F. Muell.) Radk.	grey birds-eye	
Sapindaceae	<i>Alectryon diversifolius</i> (F. Muell.) S. Reynolds	scrub boonaree	
Sapindaceae	<i>Alectryon oleifolius</i> subsp. <i>elongatus</i> S.T. Reynolds	boonaree	
Sapindaceae	<i>Atalaya hemiglaucha</i> (F.Muell.) F.Muell. ex Benth.	whitewood	
Sapindaceae	<i>Atalaya salicifolia</i> (A. DC.) Blume	whitewood	
Sapindaceae	<i>Dodonaea heteromorpha</i> J.G. West	sticky hop bush	
Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i> (Sm.) J.G. West		
Sapotaceae	<i>Planchonella cotinifolia</i> var. <i>pubescens</i> P. Royen		
Scrophulariaceae	<i>Bacopa monnieri</i> (L.) Pennell		
Scrophulariaceae	<i>Gratiola pedunculata</i> R. Br.		

Family	Species	Common name	Status
Scrophulariaceae	<i>Mimulus gracilis</i> R. Br.		
Solanaceae	<i>Datura ferox</i> L.		♦
Solanaceae	<i>Nicotiana megalosiphon</i> Huerck & Muell. Arg. subsp. <i>megalosiphon</i>	fierce thornapple	♦
Solanaceae	<i>Physalis lanceifolia</i> Nees		♦
Solanaceae	<i>Solanum americanum</i> Mill.	glossy nightshade	
Solanaceae	<i>Solanum ellipticum</i> R.Br.	potato bush	
Solanaceae	<i>Solanum esuriale</i> Lindl.	potato weed	
Solanaceae	<i>Solanum parvifolium</i> R. Br.		
Solanaceae	<i>Solanum semiarmatum</i> F. Muell.	prickly nightshade	
Stackhousiaceae	<i>Stackhousia muricata</i> Lindl.	broad-leaved bottle tree	
Sterculiaceae	<i>Brachychiton australis</i> (Schott & Endl.) A. Terracc.		
Sterculiaceae	<i>Brachychiton populneus</i> (Schott & Endl.) R. Br. subsp. <i>populneus</i>	kurrajong	
Sterculiaceae	<i>Brachychiton rupestris</i> (Mitch. ex Lindl.) K. Schum.	narrow-leaved bottle tree	
Sterculiaceae	<i>Keraudrenia corollata</i> (Steetz) Druce		
Sterculiaceae	<i>Melhania oblongifolia</i> F. Muell.		
Thymelaeaceae	<i>Pimelea latifolia</i> R. Br.		
Thymelaeaceae	<i>Pimelea trichostachya</i> Lindl.	spiked riceflower	
Tiliaceae	<i>Grewia latifolia</i> F. Muell. ex Benth.	dog's nuts	
Verbanaceae	<i>Phyla canescens</i> (Kunth) Greene	condamine couch	
Verbenaceae	<i>Clerodendrum floribundum</i> R. Br.	lollybush	
Verbenaceae	<i>Spartothamnella juncea</i> (A. Cunn. ex Walp.) Briq.	native broom	
Verbenaceae	<i>Spartothamnella puberula</i> (F. Muell.) Maiden & Betche		
Verbenaceae	<i>Verbena aristigera</i> S.Moore	Mayne's pest	♦
Verbenaceae	<i>Verbena litoralis</i> Kunth	verbena	♦
Verbenaceae	<i>Verbena officinalis</i> L.	common verbena	
Violaceae	<i>Hybanthus monopetalus</i> (Schult.) Domin	lady's slipper	
Vitaceae	<i>Cissus opaca</i> F. Muell.	slender grape	
Xanthorrhoeaceae	<i>Lomandra confertifolia</i> subsp. <i>pallida</i> A.T. Lee		
Xanthorrhoeaceae	<i>Lomandra filiformis</i> (Thunb.) Britten subsp. <i>filiformis</i>		
Xanthorrhoeaceae	<i>Lomandra leucocephala</i> (R.Br.) Ewart	woolly matrush	
Xanthorrhoeaceae	<i>Lomandra longifolia</i> Labill.	spinyhead matrush	
Xanthorrhoeaceae	<i>Lomandra multiflora</i> (R. Br.) Britten subsp. <i>multiflora</i>		
Zygophyllaceae	<i>Tribulus micrococcus</i> Domin		
Zygophyllaceae	<i>Zygophyllum apiculatum</i> F. Muell.	gall weed	

APPENDIX 9

APPENDIX 9

SPECIES AND OCCURRENCE IN VEGETATION COMMUNITIES AND MAPPING UNITS

Listed below are the species recorded and the map units in which they were observed. Species not recorded in a site but observed in the field are recorded under others. Species listed as others are recorded under the habitat in which they were observed.

The codes for the vegetation types are those used elsewhere within this report, viz:

1. Mixed *Eucalyptus camaldulensis* (river red gum), *Eucalyptus tereticornis* (forest red gum), *Eucalyptus coolabah* (coolibah) communities of the Dawson River and its tributaries
2. Mixed *Eucalyptus camaldulensis* (river red gum), *Eucalyptus tereticornis* (forest red gum) of the tributaries of the Dawson River
3. *Eucalyptus coolabah* (coolibah) communities of the Dawson River floodplain and associated creek systems
4. *Callitris glauophylla* (cypress pine) communities on sands
5. Mixed *Eucalyptus crebra* (ironbark) and *Callitris glauophylla* (cypress pine) communities on sandstone
6. Mixed *Acacia harpophylla* (brigalow), vine thicket and *Eucalyptus* spp communities
7. *Eucalyptus populnea* (poplar box) communities on alluvium
8. Mixed *Eucalyptus* spp communities
- 9a. Vine thicket communities
- 9b. *Brachychiton rupestris* (bottle tree) communities
10. *Casuarina cristata* (belah) communities
11. *Acacia rhodoxylon* (rosewood) communities
12. Mixed *Acacia rhodoxylon* (rosewood), *Acacia shirleyi* (lancewood) and *Acacia harpophylla* (brigalow) communities

Species	Map Unit												others	
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	
<i>Abutilon fraseri</i>						6		8						
<i>Abutilon oxycarpum</i> forma acutatum						6		8	9a	9b				
<i>Abutilon oxycarpum</i> forma oxycarpum	1	2	3		5		7	8	9a			11	12	
<i>Acacia amblygona</i>						5								
<i>Acacia caroleae</i>						5			8					
<i>Acacia conferta</i>									8					
<i>Acacia deanei</i> subsp. <i>deanei</i>		2			5									
<i>Acacia decora</i>		2		4					8					
<i>Acacia excelsa</i>	1			4		6		8			10			
<i>Acacia farnesiana</i>	1	2	3											
<i>Acacia fasciculifera</i>						6			9a	9b				
<i>Acacia harpophylla</i>			3		5	6		8		9b			12	
<i>Acacia juncifolia</i> subsp. <i>juncifolia</i>					5									
<i>Acacia leiocalyx</i> subsp. <i>leiocalyx</i>				4	5									
<i>Acacia longispicata</i>						6								

Species	Map Unit												others	
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	
Acacia macradenia								8						
Acacia rhodoxylon								8				11	12	
Acacia salicina		2												
Acacia shirleyi													12	
Acacia sparsiflora					5									
Acacia stenophylla	1		3											
Acalypha eremorum						6			9a	9b				
Achyranthes aspera						6		8	9a					
Adriana glabrata var. subglabra		2												
Agrostis avenacea var. avenacea		2												
Ajuga australis		2												
Alectryon connatus						6			9a					
Alectryon diversifolius	1				5	6	7		9a	9b	10			
Alectryon oleifolius subsp. elongatus	1													
Allocasuarina luehmannii					5									
Alphitonia excelsa		2			5			8					11	
Alstonia constricta				4		6		8		9b		11	12	
Alternanthera denticulata	1	2	3											
Alternanthera nodiflora	1													
Amaranthus graecizans subsp. sylvestris									9a					
Amaranthus viridis			3											
Ampelopteris prolifera		2												
Amyema congener subsp. congener							7							
Amyema quandang var. bancroftii												11		
Ancistrachne uncinulata					5	6		8	9a	9b	10		12	
Angophora floribunda					5									
Angophora leiocarpa		2			5									
Apophyllum anomalum					5	6		8	9a	9b				
Argemone ochroleuca subsp. ochroleuca		2												
Aristida benthamii var. spinulifera				4										
Aristida calycina var. calycina							7							
Aristida calycina var. praealta		2			5	6	7	8				11		
Aristida caput-medusae				4	5	6		8				11	12	
Aristida gracilipes						6		8						
Aristida latifolia			3											
Aristida leichhardtiana					5									
Aristida lignosa					5	6								
Aristida personata	1	2			5		7				10			
Aristida queenslandica var. dissimilis								8						
Aristida queenslandica var. queenslandica					5									
Aristida ramosa					5									
Arundinella neplanensis		2			5			8						
Asperula conferta	1		3											
Asperula geminifolia		2												
Aster subulatus		2												
Atalaya hemiglaucia					5	6		8						

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
<i>Atalaya salicifolia</i>						6		8	9a		10	11	
<i>Atriplex muelleri</i>			3										
<i>Austromyrtus bidwillii</i>										9b			
<i>Austrostipa verticillata</i>				4				8	9a	9b			
<i>Azolla pinnata</i>													aquatic
<i>Baccharis halimifolia</i>		2											
<i>Bacopa monnieri</i>		2											
<i>Basilicum polystachyon</i>	1												
<i>Bertya oleifolia</i>		2			5								
<i>Bertya pedicellata</i>												11	
<i>Bidens bipinnata</i>		2											
<i>Boerhavia dominii</i>	1		3	4				8					
<i>Boerhavia pubescens</i>				4									
<i>Bothriochloa bladhii</i> subsp. <i>bladhii</i>	1	2											
<i>Bothriochloa decipiens</i> var. <i>decipiens</i>	1	2	3			6	7	8					
<i>Brachiaria eruciformis</i>							7						
<i>Brachiaria foliosa</i>								8	9a				
<i>Brachiaria subquadripala</i>		2					7						
<i>Brachychiton australis</i>						6							
<i>Brachychiton populneus</i> subsp. <i>populneus</i>		2											
<i>Brachychiton rupestris</i>						6		8	9a	9b			
<i>Brachyscome trachycarpa</i>		3											
<i>Bracteantha bracteata</i>					5	6							
<i>Breynia oblongifolia</i>				4		6				9b		12	
<i>Brunoniella australis</i>			3		5	6		8				12	
<i>Bursaria incana</i> var. <i>incana</i>						6				9b			
<i>Callitricha sonderi</i>		2											
<i>Callitris glaucophylla</i>				4	5	6		8					
<i>Calotis cuneata</i>	1	2	3				7						
<i>Calotis cuneifolia</i>						5							
<i>Calotis dentex</i>		2				5							
<i>Calotis hispidula</i>				3									
<i>Calotis lappulacea</i>	1			4									
<i>Calyptochloa gracillima</i>						5	6	7	8	9a	9b	10	12
<i>Canthium coprosmoides</i>						5	6						
<i>Canthium odoratum</i>				4	5	6							12
<i>Canthium oleifolium</i>								8					
<i>Canthium</i> sp. (Berrigurra Station E.R.Anderson 2829)						6		8		9b	10		
<i>Canthium vacciniifolium</i>						5	6		9a	9b	10		12
<i>Capillipedium spicigerum</i>		2											
<i>Capparis canescens</i>						6							
<i>Capparis lasiantha</i>						5		8	9a	9b	10	11	
<i>Capparis loranthifolia</i> var. <i>bancroftii</i>						6						12	
<i>Capparis mitchellii</i>						5		8	9a			11	
<i>Carex appressa</i>	1	2											

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
Carex polyantha		2											
Carissa ovata					5	6		8	9a	9b	10	11	12
Cassia tomentella								8	9a				
Cassine australis var. angustifolia						6		8	9a		10		
Cassinia laevis						5							
Casuarina cristata									9a		10		
Cenchrus ciliaris	1	2	3	4			7	8	9a	9b	10	11	12
Centaurea melitensis		2											
Centaurium erythraea		2											
Centella asiatica		2											
Centipeda minima	1	2											
Chamaesyce dallachiana	1		3				7	8					
Chara sp.													aquatic
Cheilanthes distans				4	5	6		8	9a				
Cheilanthes sieberi subsp. sieberi				4	5			8					12
Chenopodium ambrosioides		2											
Chenopodium carinatum		2		4		6	7		9a				11
Chenopodium desertorum subsp. anidiophyllum							7						
Chenopodium pumilio			3										
Chionachne cyathopoda		2											
Chloris divaricata			3										
Chloris gayana													roadside
Chloris ventricosa			3		5	6	7	8	9a	9b			
Chrysocephalum apiculatum				4	5								
Ciclospermum leptophyllum	1	2	3										
Cirsium vulgare		2											
Cissus opaca						6		8	9a	9b	10	11	12
Citriobatus spinescens						6			9a	9b			
Claoxylon tenerifolium													11
Cleistochloa subjuncea					5			8					11 12
Clerodendrum floribundum					5								11
Commelina diffusa	1			4									11
Conyza bonariensis	1	2	3			6							
Coronopus didymus	1	2											
Corymbia clarksoniana					5			8					
Crassula sieberiana								8					
Crotalaria incana subsp. incana		2											
Crotalaria montana		2											
Croton insularis						6			9a	9b			
Croton phebaliooides						6			9a				11
Cryptandra sp. (Isla Gorge P.Sharpe 627)					5								
Cuscuta campestris	1												
Cyclosorus interruptus		2											
Cymbidium canaliculatum											10		
Cymbopogon bombycinus				4	5								

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
<i>Cymbopogon refractus</i>					5	6	7	8					
<i>Cynodon dactylon</i> var. <i>dactylon</i>	1	2	3										
<i>Cynoglossum australe</i> var. <i>australe</i> ,							7						
<i>Cyperus difformis</i>		2											
<i>Cyperus flaccidus</i>	1												
<i>Cyperus gracilis</i>	1	2	3	4			7	8	9a	9b			
<i>Cyperus iria</i>	1		3										
<i>Cyperus lucidus</i>		2											
<i>Cyperus polystachyos</i> var. <i>polystachyos</i>		2											
<i>Cyperus pygmaeus</i>	1												
<i>Cyperus rigidellus</i>											11		
<i>Cyperus rotundus</i>		2	3										
<i>Cyperus sanguinolentus</i>		2											
<i>Cyperus sphaeroideus</i>		2											
<i>Datura ferox</i>													paddock
<i>Daucus glochidiatus</i>													paddock
<i>Denhamia oleaster</i>							7	8	9a		10		
<i>Denhamia pittosporoides</i>								8					
<i>Desmodium brachypodium</i>												11	
<i>Desmodium rhytidophyllum</i>					5								
<i>Desmodium varians</i>							7						
<i>Dianella brevipedunculata</i>					5								
<i>Dianella caerulea</i> var. <i>vannata</i>											12		
<i>Dianella longifolia</i> var. <i>longifolia</i>		2											
<i>Dichanthium sericeum</i> subsp. <i>humilius</i>	1		3				7						
<i>Dichondra repens</i>	1		3										
<i>Digitaria breviglumis</i>					5			8				11	
<i>Digitaria brownii</i>					5		7	8		9b			
<i>Digitaria divaricatissima</i>				4									
<i>Digitaria longiflora</i>				4									
<i>Diospyros humilis</i>						6			9a	9b		12	
<i>Dodonaea heteromorpha</i>					5								
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>					5		7					12	
<i>Dysphania glomulifera</i> subsp. <i>glomulifera</i>												11	
<i>Echinochloa crusgalli</i>		2											
<i>Eclipta prostrata</i>													bore
<i>Ehretia membranifolia</i>					5	6				9b			
<i>Einadia hastata</i>					5								
<i>Einadia nutans</i> subsp. <i>linifolia</i>		2					7			9b			
<i>Einadia nutans</i> subsp. <i>nutans</i>			3	4				8	9a	9b			
<i>Einadia trigonos</i> subsp. <i>stellulata</i>												12	
<i>Elatine gratioloides</i>		2											
<i>Eleocharis cylindrostachys</i>		2											
<i>Eleocharis equisetina</i>		2											
<i>Eleocharis plana</i>		1											
<i>Eleocharis pusilla</i>		1		3									

Species	Map Unit												others	
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	
Enchytraea tomentosa											10			
Enneapogon gracilis	1		3		5	6	7			9b				
Enneapogon lindleyanus				4	5	6		8			10		12	
Enteropogon acicularis			3		5		7	8			10			
Enteropogon ramosus					5		7							
Enteropogon unispiceus						6		8					12	
Epaltes australis				4										
Epilobium hirtigerum				4			7							bore
Eragrostis elongata				4	5		7							
Eragrostis lacunaria	1		3	4	5	6	7	8				12		
Eragrostis leptostachya				4			7							
Eragrostis longipedicellata								8					12	
Eremocitrus glauca			3								10			
Eremophila debilis	1	2			5									
Eremophila longifolia			3											
Eremophila mitchellii					5	6	7	8		9b	10		12	
Eriocaulon scariosum		2												
Eriochloa decumbens	1	2	3				7				10			
Eriochloa pseudoacrotricha					5	6								
Erodium crinitum							7							
Erythrina vespertilio								8						
Erythroxylum sp. (Splityard Creek L.Pedley 5360)					5	6				9b		11	12	
Eucalyptus camaldulensis	1	2	3											
Eucalyptus camaganeana					5	6		8					12	
Eucalyptus coolabah	1		3											
Eucalyptus crebra					5	6		8				11		
Eucalyptus exserta												11		
Eucalyptus melanophloia				4	5									
Eucalyptus populnea	1						7	8			10			
Eucalyptus tenuipes								8						
Eucalyptus tereticornis		2												
Eucalyptus tessellaris					4	5								
Euchiton sphaericus	1	2	3	4			7		9a					
Eulalia aurea							7							
Euphorbia tannensis var. eremophila					5							11		
Evolvulus alsinoides	1			4	5	6		8					12	
Excoecaria dallachiana										9b				
Exocarpos latifolius									9a					
Fallopia convolvulus														paddock
Ficus opposita		2												
Fimbristylis dichotoma		2		4										
Flindersia australis						6						11	12	
Flindersia collina													12	
Gahnia aspera					5							11		
Gaura parviflora			3											

Species	Map Unit													
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	others
<i>Geijera parviflora</i>	1		3	4	5	6	7	8	9a	9b	10		12	
<i>Glinus lotoides</i>	1													
<i>Glossocardia bidens</i>							7							
<i>Glycine tabacina</i>	1		3											
<i>Glycine tomentella</i>			2		4									
<i>Gnaphalium polycaulon</i>	1	2	3	4										
<i>Gomphocarpus physocarpus</i>			2											
<i>Gomphrena celosioides</i>	1						7							
<i>Goodenia fascicularis</i>	1	2	3											
<i>Goodenia glabra</i>						5			8					
<i>Goodenia grandiflora</i>						5								
<i>Gratiola pedunculata</i>	1	2												
<i>Grevillea robusta</i>							6							
<i>Grevillea striata</i>						5	6							
<i>Grewia latifolia</i>			3						8					
<i>Hakea fraseri</i>						5	6		8				12	
<i>Halgania brachyrhyncha</i>						5								
<i>Haloragis aspera</i>	1	2												
<i>Helichrysum collinum</i>						5	6							
<i>Heliotropium amplexicaule</i>			2											
<i>Heliotropium indicum</i>	1	2												
<i>Heteropogon contortus</i>		2		4			7							
<i>Hibbertia</i> sp.						5								
<i>Hibiscus sturtii</i>						5	6		8	9a			11	12
<i>Hibiscus trionum</i>								7						
<i>Hovea lanceolata</i>						5								
<i>Hovea longipes</i>						5	6		8				12	
<i>Hybanthus monopetalus</i>						5	6							
<i>Hypochaeris glabra</i>								7						
<i>Imperata cylindrica</i>		2												
<i>Indigofera linnaei</i>								7						
<i>Indigofera</i> sp.									8				12	
<i>Isachne globosa</i>		2												
<i>Isotoma axillaris</i>													11	
<i>Ixiolaena leptolepis</i>			3											
<i>Jacksonia scoparia</i>						5								
<i>Jacquemontia paniculata</i>							6							
<i>Jasminum didymum</i> subsp. <i>lineare</i>	1		3		5			8		9b	10		12	
<i>Jasminum simplicifolium</i> subsp. <i>australiense</i>								8						
<i>Juncus prismatocarpus</i>		2												
<i>Juncus</i> sp.		2												
<i>Juncus usitatus</i>		2												
<i>Keraudrenia corollata</i>					5			8						
<i>Laxmannia compacta</i>				4		6								
<i>Leersia hexandra</i>		2												
<i>Lemna trisulca</i>													aquatic	

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
<i>Lepidium africanum</i>							7						
<i>Lepidium bonariense</i>	1	2					7			9b		11	
<i>Leptochloa ciliolata</i>										9b			
<i>Leptochloa digitata</i>	1	2	3										
<i>Leptochloa peacockii</i>		2			5	6						12	
<i>Leptospermum neglectum</i>								8					
<i>Livistona</i> sp. (Taram R.W.Johnson 2764)	1	2											
<i>Lomandra confertifolia</i> subsp. <i>pallida</i>						6						11	
<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		2						8					
<i>Lomandra leucocephala</i>					4								
<i>Lomandra longifolia</i>	1	2											
<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	1		3		5							11	12
<i>Lophostemon suaveolens</i>		2			5								
<i>Lotus australis</i>		2	3										
<i>Ludwigia octovalvis</i>													aquatic
<i>Ludwigia peploides</i> subsp. <i>montevideensis</i>													bore
<i>Lysicarpus angustifolius</i>					5			8					
<i>Lysiphyllo caronii</i>	2	3				6		8	9a	9b	10		
<i>Macfadyena unguis-cati</i>							7						
<i>Macroptilium lathyroides</i>	1												
<i>Maireana microphylla</i>		2						8	9a	9b	10	11	
<i>Malva parviflora</i>													paddock
<i>Malvastrum americanum</i>		2			5	6	7	8		9b			
<i>Malvastrum coromandelianum</i>							7						
<i>Marsdenia microlepis</i>												11	12
<i>Marsilea hirsuta</i>	1	2											
<i>Maytenus cunninghamii</i>					5	6						12	
<i>Medicago polymorpha</i>	1												
<i>Melaleuca linariifolia</i> var. <i>trichostachya</i>	1	2											
<i>Melania oblongifolia</i>						6		8					
<i>Melichrus urceolatus</i>								8					
<i>Melicope erythrococca</i>						6							
<i>Melilotus indicus</i>	1												
<i>Melinis repens</i>	1	2		4			7	8					
<i>Mimulus gracilis</i>	1												
<i>Minuria integrifolia</i>			3										
<i>Muehlenbeckia florulenta</i>	1	2	3										
<i>Murdannia graminea</i>				4									
<i>Neptunia gracilis</i>	1		3										
<i>Nicotiana megalosiphon</i> subsp. <i>megalosiphon</i>													paddock
<i>Notelaea microcarpa</i>					5				9a			12	
<i>Nyssanthes diffusa</i>			3	4	5	6	7	8		9b	10		
<i>Oenothera indecora</i> subsp. <i>bonariensis</i>				4									
<i>Oldenlandia mitrasacmoides</i> subsp. <i>trachymenoides</i>				4									

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
Olearia canescens									9a				12
Oplismenus aemulus		2											
Opuntia aurantiaca			4		6					9b			12
Opuntia stricta var. stricta		2				6	7		9a				12
Opuntia tormentosa					5	6	7	8		9b			
Ottelia ovalifolia		2											
Owenia venosa						6		8	9a			11	12
Oxalis perennans	1	2	3	4		6			9a			11	12
Ozothamnus diosmifolius					5								
Pandorea pandorana								8				11	
Panicum effusum var. effusum					5		7	8					
Panicum laevinode	1	2											
Panicum maximum var. trichoglume		2						8				11	
Parsonia eucalyptophylla								8			10		
Parsonia lanceolata								8	9a	9b			
Paspalidium caespitosum			3										
Paspalidium constrictum		2											
Paspalidium criniforme	1	2					7			9b		11	
Paspalidium disjunctum			3										
Paspalidium distans	1	2	3			6	7	8			10		
Paspalidium gracile	1		3		5	6	7	8	9a		10	11	12
Paspalidium jubiflorum	1												
Paspalum dilatatum			2										
Peripleura hispidula var. setosa						5							
Perotis rara					4								
Persicaria attenuata subsp. attenuata	1												
Persicaria decipiens			2										
Persicaria hydropiper	1	2											
Persicaria lapathifolia			2										
Persicaria orientalis	1												
Petalostigma pubescens				4	5				8				
Phragmites australis		2											
Phyla canescens	1		3						6				
Phyllanthus gasstroemii													
Phyllanthus maderaspatensis var. maderaspatensis	1		3										
Phyllanthus sp.					5								
Phyllanthus virgatus				3									
Physalis lanceifolia	1												
Pimelea latifolia												11	
Pimelea trichostachya							7						
Pittosporum rhombifolium									9a				
Planchonella cotinifolia var. pubescens						6			9a	9b	10		
Plantago cunninghamii	1		3										
Plantago turrifera			3										
Plectranthus parviflorus				4						9b			

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
Poa fordeana	1												
Podolepis longipedata				4					8				
Polycarphaea corymbosa var. corymbosa					4								
Polygonum plebeium	1	2											
Polymeria calycina									8				
Polymeria pusilla	1		3										
Portulaca bicolor								8					
Portulaca oleracea										9a	9b		
Portulaca pilosa subsp. pilosa					4						9b		
Potamogeton crispus													
Potamogeton tricarinatus		2											
Prostanthera euphrasioides						5							
Pseuderanthemum variabile	1		3	4	5			8					12
Psoralea tenax	1												
Pterocaulon redolens						6							
Ptilotus exaltatus var. semilanatus							7						
Ptilotus macrocephalus								7					
Ranunculus lappaceus		2											
Rhodanthe polyphylla			3										
Rhynchosia minima var. australis			3				7						
Richardia brasiliensis		2		4									
Rorippa eustylis		2											
Rostellularia adscendens var. adscendens			3	4	5		7			9b			
Rubus parvifolius		2											
Rumex brownii		2											
Rumex tenax	1		3										
Rutidosis crispata													12
Sacciolepis indica		2											
Salix babylonica	1												
Salsola kali			3							9b			
Salvia plebeia		2											
Salvia reflexa													paddock
Santalum lanceolatum					5			8					12
Sarcostemma viminale subsp. brunonianum						6							11
Schoenoplectus mucronatus		2											
Schoenoplectus validus		2											
Schoenus kennyi								8					
Scleria mackaviensis					5								
Scleria sphacelata					5			8					11
Sclerolaena birchii								8					
Sclerolaena muricata var. muricata			3										
Sclerolaena muricata var. villosa			3										
Sclerolaena tetracuspis			3										
Secamone elliptica						6							
Senecio laetus subsp. dissectifolius							7						
Senecio quadridentatus					5								

Species	Map Unit												others	
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	
<i>Senna artemisioides</i> subsp. <i>zygophylla</i>					5	6							12	
<i>Senna barclayana</i>							7							
<i>Senna sophera</i> var. (40Mile Scrub J.R.Clarkson+ 6908)												11		
<i>Senna sophera</i> var. <i>sophera</i>	1													
<i>Sesbania cannabina</i> var <i>cannabina</i>		2							9a			11	12	
<i>Setaria dielsii</i>									9a			11	12	
<i>Setaria surgens</i>								8						
<i>Sida corrugata</i>		3			5		7							
<i>Sida filiformis</i>					5	6		8				11	12	
<i>Sida pleiantha</i>		3					7							
<i>Sida rhombifolia</i>		2												
<i>Sida rohlenae</i>			3	4								11		
<i>Sida spinosa</i>	1		3											
<i>Sida subspicata</i>							7	8				11		
<i>Sida trichopoda</i>	1		3											
<i>Silybum marianum</i>		2												
<i>Sisymbrium thellungii</i>			3				7							
<i>Solanum americanum</i>									9a	9b				
<i>Solanum ellipticum</i>					5	6		8				11		
<i>Solanum esuriale</i>														paddock
<i>Solanum parvifolium</i>								8		9b	10			
<i>Solanum semiarmatum</i>						6								
<i>Soliva anthemifolia</i>		2					7							
<i>Sonchus oleraceus</i>	1	2												
<i>Sorghum leiocladum</i>		2												
<i>Spartothamnella juncea</i>								8	9a			12		
<i>Spartothamnella puberula</i>					5									
<i>Spermacoce multicaulis</i>								8						
<i>Sporobolus caroli</i>	1		3				7	8		9b	10			
<i>Sporobolus coromandelianus</i>											10			
<i>Sporobolus elongatus</i>	1													
<i>Sporobolus mitchellii</i>	1		3					8						
<i>Stackhousia muricata</i>			3		5		7							
<i>Stellaria angustifolia</i>		2	3											
<i>Swainsona galegifolia</i>		2												
<i>Swainsona oroboides</i>							7							
<i>Tetragonia tetragonoides</i>	1	2	3	4						9b				
<i>Thellungia advena</i>		2	3	4	5	6	7	8		9b				
<i>Themeda avenacea</i>		2					7							
<i>Themeda triandra</i>		2			5							12		
<i>Thyridolepis xerophila</i>					5			8				12		
<i>Tragus australianus</i>						6		8	9a					
<i>Trianthema triquetra</i>							7							
<i>Tribulus micrococcus</i>									9a					
<i>Tricoryne elatior</i>		2												

Species	Map Unit												
	1	2	3	4	5	6	7	8	9a	9b	10	11	12
<i>Triodia mitchellii</i> var. <i>mitchellii</i>					5			8					
<i>Triodia pungens</i> var. <i>pungens</i>												11	
<i>Turraea pubescens</i>												11	
<i>Urochloa mosambicensis</i>	1												
<i>Utricularia dichotoma</i>		2											
<i>Utricularia gibba</i>		2											
<i>Verbena aristigera</i>	1	2					7						
<i>Verbena litoralis</i>		2											
<i>Verbena officinalis</i>	1	2					7						
<i>Verbesina encelioides</i>							7						
<i>Vernonia cinerea</i> var. <i>cinerea</i>	1			4					8				
<i>Vetiveria filipes</i>	1	2	3						8				
<i>Vittadinia cuneata</i> var. <i>hirsuta</i>					4	5							
<i>Vittadinia dissecta</i> var. <i>hirta</i>					4								
<i>Vittadinia pterochaeta</i>					4								
<i>Vittadinia pustulata</i>		2					6						
<i>Wahlenbergia communis</i>		2											
<i>Wahlenbergia gracilis</i>	1	2	3										
<i>Wahlenbergia tumidiflora</i>		2			5			8					
<i>Xanthium spinosum</i>		2											
<i>Zaleya galericulata</i> subsp. <i>galericulata</i>									8				
<i>Zinnia peruviana</i>							7						
<i>Zornia muriculata</i> subsp. <i>angustata</i>							7						
<i>Zygophyllum apiculatum</i>										9b			

APPENDIX A

APPENDIX 10

SPECIES LIST BY MAP UNIT

The species found in each map unit are listed below.

Map unit 1. Tall Open forest of
Eucalyptus camaldulensis (river red
gum), *Eucalyptus tereticornis* (forest red
gum) and *Eucalyptus coolabah*
(coolibah)

Abutilon oxycarpum forma *oxycarpum*
Acacia excelsa
Acacia farnesiana
Acacia stenophylla
Alectryon diversifolius
Alectryon oleifolius subsp. *elongatus*
Alternanthera denticulata
Alternanthera nodiflora
Aristida personata
Asperula conferta
Basilicum polystachyon
Boerhavia dominii
Bothriochloa bladhii subsp. *bladhii*
Bothriochloa decipiens var. *decipiens*
Calotis cuneata
Calotis lappulacea
Carex appressa
Cenchrus ciliaris
Centipeda minima
Chamaesyce dallachiana
Ciclospermum leptophyllum
Commelina diffusa
Conyzia bonariensis
Coronopus didymus
Cuscuta campestris
Cynodon dactylon var. *dactylon*
Cyperus flaccidus
Cyperus gracilis
Cyperus iria
Cyperus pygmaeus
Dichanthium sericeum subsp. *humilius*
Dichondra repens
Eleocharis plana
Eleocharis pusilla
Enneapogon gracilis
Eragrostis lacunaria

Eremophila debilis
Eriochloa decumbens
Eucalyptus camaldulensis
Eucalyptus coolabah
Eucalyptus populnea
Euchiton sphaericus
Evolvulus alsinoides
Geijera parviflora
Glinus lotoides
Glycine tabacina
Gnaphalium polycaulon
Gomphrena celosioides
Goodenia fascicularis
Gratiola pedunculata
Haloragis aspera
Heliotropium indicum
Jasminum didymum subsp. *lineare*
Lepidium bonariense
Leptochloa digitata
Livistona sp. (Taroom R.W.Johnson 2764)
Lomandra longifolia
Lomandra multiflora subsp. *multiflora*
Macroptilium lathyroides
Medicago polymorpha
Melaleuca linariifolia var. *trichostachya*
Melilotus indicus
Melinis repens
Mimulus gracilis
Muehlenbeckia florulenta
Neptunia gracilis
Oxalis perennans
Panicum laevinode
Paspalidium criniforme
Paspalidium distans
Paspalidium gracile
Paspalidium jubiflorum
Persicaria attenuata subsp. *attenuata*
Persicaria hydropiper
Persicaria orientalis
Phyla canescens
Phyllanthus maderaspatensis var.
maderaspatensis
Physalis lanceifolia

Plantago cunninghamii	Callitriche sonderi
Poa fordeana	Calotis cuneata
Polygonum plebeium	Calotis dentex
Polymeria pusilla	Capillipedium spicigerum
Pseuderanthemum variabile	Carex appressa
Psoralea tenax	Carex polyantha
Rumex tenax	Cenchrus ciliaris
Salix babylonica	Centaurea melitensis
Senna sophera var. sophera	Centaurium erythraea
Sida spinosa	Centella asiatica
Sida trichopoda	Centipeda minima
Sonchus oleraceus	Chenopodium ambrosioides
Sporobolus caroli	Chenopodium carinatum
Sporobolus elongatus	Chionachne cyathopoda
Sporobolus mitchellii	Ciclospermum leptophyllum
Tetragonia tetragonoides	Cirsium vulgare
Urochloa mosambicensis	Conyza bonariensis
Verbena aristigera	Coronopus didymus
Verbena officinalis	Crotalaria incana subsp. incana
Vernonia cinerea var. cinerea	Crotalaria montana
Vetiveria filipes	Cyclosorus interruptus
Wahlenbergia gracilis	Cynodon dactylon var. dactylon

Map Unit 2 Very tall Open forest-tall woodland of *Eucalyptus camaldulensis* (river red gum) and *Eucalyptus tereticornis* (forest red gum)

Abutilon oxycarpum forma oxycarpum	Cyperus difformis
Acacia deanei subsp. deanei	Cyperus gracilis
Acacia decora	Cyperus lucidus
Acacia farnesiana	Cyperus polystachyos var. polystachyos
Acacia salicina	Cyperus rotundus
Adriana glabrata var. subglabra	Cyperus sanguinolentus
Agrostis avenacea var. avenacea	Cyperus sphaeroideus
Ajuga australis	Dianella longifolia var. longifolia
Alphitonia excelsa	Echinochloa crusgalli
Alternanthera denticulata	Einadia nutans subsp. linifolia
Ampelopteris prolifera	Elatine gratioloides
Angophora leiocarpa	Eleocharis cylindrostachys
Argemone ochroleuca subsp. ochroleuca	Eleocharis equisetina
Aristida calycina var. praealta	Eremophila debilis
Aristida personata	Eriocaulon scariosum
Arundinella neplanensis	Eriochloa decumbens
Asperula geminifolia	Eucalyptus camaldulensis
Aster subulatus	Eucalyptus tereticornis
Baccharis halimifolia	Euchiton sphaericus
Bacopa monnieri	Ficus opposita
Bertya oleifolia	Fimbristylis dichotoma
Bidens bipinnata	Glycine tomentella
Bothriochloa bladhii subsp. bladhii	Gnaphalium polycaulon
Bothriochloa decipiens var. decipiens	Gomphocarpus physocarpus
Brachiaria subquadripala	Goodenia fascicularis
Brachychiton populneus subsp. populneus	Gratiola pedunculata
	Haloragis aspera
	Heliotropium amplexicaule
	Heliotropium indicum
	Heteropogon contortus
	Imperata cylindrica
	Isachne globosa
	Juncus prismatocarpus

Juncus sp.	Tricoryne elatior
Juncus usitatus	Utricularia dichotoma
Leersia hexandra	Utricularia gibba
Lepidium bonariense	Verbena aristigera
Leptochloa digitata	Verbena litoralis
Leptochloa peacockii	Verbena officinalis
Livistona sp. (Taroom R.W.Johnson 2764)	Vetiveria filipes
Lomandra filiformis subsp. filiformis	Vittadinia pustulata
Lomandra longifolia	Wahlenbergia communis
Lophostemon suaveolens	Wahlenbergia gracilis
Lotus australis	Wahlenbergia tumidifructa
Lysiphylloum carronii	Xanthium spinosum
Maireana microphylla	
Malvastrum americanum	
Marsilea hirsuta	
Melaleuca linariifolia var. trichostachya	
Melinis repens	
Muehlenbeckia florulenta	
Oplismenus aemulus	
Opuntia stricta var. stricta	
Ottelia ovalifolia	
Oxalis perennans	
Panicum laevinode	
Panicum maximum var. trichoglume	
Paspalidium constrictum	
Paspalidium criniforme	
Paspalidium distans	
Paspalum dilatatum	
Persicaria decipiens	
Persicaria hydropiper	
Persicaria lapathifolia	
Phragmites australis	
Polygonum plebeium	
Potamogeton tricarinatus	
Ranunculus lappaceus	
Richardia brasiliensis	
Rorippa eustylos	
Rubus parvifolius	
Rumex brownii	
Sacciolepis indica	
Salvia plebeia	
Schoenoplectus mucronatus	
Schoenoplectus validus	
Sesbania cannabina var cannabina	
Sida rhombifolia	
Silybum marianum	
Soliva anthemifolia	
Sonchus oleraceus	
Sorghum leiocladum	
Stellaria angustifolia	
Swainsona galegifolia	
Tetragonia tetragonoides	
Thellungiella advena	
Themeda avenacea	
Themeda triandra	
	Abutilon oxycarpum forma oxycarpum
	Acacia farnesiana
	Acacia harpophylla
	Acacia stenophylla
	Alternanthera denticulata
	Amaranthus viridis
	Aristida latifolia
	Asperula conferta
	Atriplex muelleri
	Boerhavia dominii
	Bothriochloa decipiens var. decipiens
	Brachyscome trachycarpa
	Brunoniella australis
	Calotis cuneata
	Calotis hispidula
	Cenchrus ciliaris
	Chamaesyce dallachyana
	Chenopodium pumilio
	Chloris divaricata
	Chloris ventricosa
	Ciclospermum leptophyllum
	Conyza bonariensis
	Cynodon dactylon var. dactylon
	Cyperus gracilis
	Cyperus iria
	Cyperus rotundus
	Dichanthium sericeum subsp. humilius
	Dichondra repens
	Einadia nutans subsp. nutans
	Eleocharis pusilla
	Enneapogon gracilis
	Enteropogon acicularis
	Eragrostis lacunaria
	Eremocitrus glauca
	Eremophila longifolia
	Eriochloa decumbens
	Eucalyptus camaldulensis

Eucalyptus coolabah
Euchiton sphaericus
Gaura parviflora
Geijera parviflora
Glycine tabacina
Gnaphalium polycaulon
Goodenia fascicularis
Grewia latifolia
Ixiolaena leptolepis
Jasminum didymum subsp. lineare
Leptochloa digitata
Lomandra multiflora subsp. multiflora
Lotus australis
Lysiphylloum carronii
Minuria integriflora
Muehlenbeckia florulenta
Neptunia gracilis
Nyssanthes diffusa
Oxalis perennans
Paspalidium caespitosum
Paspalidium disjunctum
Paspalidium distans
Paspalidium gracile
Phyla canescens
Phyllanthus maderaspatensis var. maderaspatensis
Phyllanthus virgatus
Plantago cunninghamii
Plantago turrifera
Polymeria pusilla
Pseuderanthemum variabile
Rhodanthe polyphylla
Rhynchosia minima var. australis
Rostellularia adscendens var. adscendens
Rumex tenax
Salsola kali
Sclerolaena muricata var. muricata
Sclerolaena muricata var. villosa
Sclerolaena tetracuspis
Sida corrugata
Sida pleiantha
Sida rohlenae
Sida spinosa
Sida trichopoda
Sisymbrium thellungi
Sporobolus caroli
Sporobolus mitchellii
Stackhousia muricata
Stellaria angustifolia
Tetragonia tetragonoides
Thellungia advena
Vetiveria filipes
Wahlenbergia gracilis

Map Unit 4 Tall Open forest of *Callitris glauophylla* (white cypress pine)

Acacia decora
Acacia excelsa
Acacia leiocalyx subsp. leiocalyx
Alstonia constricta
Aristida benthamii var. spinulifera
Aristida caput-medusae
Austrostipa verticillata
Boerhavia dominii
Boerhavia pubescens
Breynia oblongifolia
Callitris glauophylla
Calotis lappulacea
Canthium odoratum
Cenchrus ciliaris
Cheilanthes distans
Cheilanthes sieberi subsp. sieberi
Chenopodium carinatum
Chrysocephalum apiculatum
Commelina diffusa
Cymbopogon bombycinus
Cyperus gracilis
Digitaria divaricatissima
Digitaria longiflora
Einadia nutans subsp. nutans
Enneapogon lindleyanus
Epaltes australis
Epilobium hirtigerum
Eragrostis elongata
Eragrostis lacunaria
Eragrostis leptostachya
Eucalyptus melanophloia
Eucalyptus tessellaris
Euchiton sphaericus
Evolvulus alsinoides
Fimbristylis dichotoma
Geijera parviflora
Glycine tomentella
Gnaphalium polycaulon
Heteropogon contortus
Laxmannia compacta
Lomandra leucocephala
Melinis repens
Murdannia graminea
Nyssanthes diffusa
Oenothera indecora subsp. bonariensis
Oldenlandia mitrasacmoides subsp. trachymenoides
Opuntia aurantiaca
Oxalis perennans
Perotis rara
Petalostigma pubescens

Plectranthus parviflorus	Canthium vacciniifolium
Podolepis longipedata	Capparis lasiantha
Polycarpaea corymbosa var. corymbosa	Capparis mitchellii
Portulaca pilosa subsp. pilosa	Carissa ovata
Pseuderanthemum variabile	Cassinia laevis
Richardia brasiliensis	Cheilanthes distans
Rostellularia adscendens var. adscendens	Cheilanthes sieberi subsp. sieberi
Sida rohlenae	Chloris ventricosa
Tetragonia tetragonoides	Chrysocephalum apiculatum
Thellungia advena	Cleistochloa subjuncea
Vernonia cinerea var. cinerea	Clerodendrum floribundum
Vittadinia cuneata var. hirsuta	Corymbia clarksoniana
Vittadinia dissecta var. hirta	Cryptandra sp. (Isla Gorge P.Sharpe 627)
Vittadinia pterochaeta	Cymbopogon bombycinus
Map Unit 5 Tall Open forest-Mid high Open forest-Mid high woodland of <i>Eucalyptus crebra</i> (narrow-leaved ironbark) and <i>Callitris glaucophylla</i> (white cypress pine)	
Abutilon oxycarpum forma oxycarpum	Cymbopogon refractus
Acacia amblygona	Desmodium rhytidophyllum
Acacia caroleae	Dianella brevipedunculata
Acacia deanei subsp. deanei	Digitaria breviglumis
Acacia harpophylla	Digitaria brownii
Acacia juncifolia subsp. juncifolia	Dodonaea heteromorpha
Acacia leiocalyx subsp. leiocalyx	Dodonaea viscosa subsp. spatulata
Acacia sparsiflora	Ehretia membranifolia
Alectryon diversifolius	Einadia hastata
Allocasuarina luehmannii	Enneapogon gracilis
Alphitonia excelsa	Enneapogon lindleyanus
Ancistrachne uncinulata	Enteropogon acicularis
Angophora floribunda	Enteropogon ramosus
Angophora leiocarpa	Eragrostis elongata
Apophyllum anomalum	Eragrostis lacunaria
Aristida calycina var. praealta	Eremophila debilis
Aristida caput-medusae	Eremophila mitchellii
Aristida leichhardtiana	Eriochloa pseudoacrotricha
Aristida lignosa	Erythroxylum sp. (Splityard Creek L.Pedley 5360)
Aristida personata	Eucalyptus cambageana
Aristida queenslandica var. queenslandica	Eucalyptus crebra
Aristida ramosa	Eucalyptus melanophloia
Arundinella neplanensis	Eucalyptus tessellaris
Atalaya hemiglaucha	Euphorbia tannensis var. eremophila
Bertya oleifolia	Evolvulus alsinoides
Bracteantha bracteata	Gahnia aspera
Brunoniella australis	Geijera parviflora
Callitris glaucophylla	Goodenia glabra
Calotis cuneifolia	Goodenia grandiflora
Calotis dentex	Grevillea striata
Calyptochloa gracillima	Hakea fraseri
Canthium coprosmoides	Halgania brachyrhyncha
Canthium odoratum	Helichrysum collinum
	Hibbertia sp.
	Hibiscus sturtii
	Hovea lanceolata
	Hovea longipes
	Hybanthus monopetalus
	Jacksonia scoparia
	Jasminum didymum subsp. lineare

Keraudrenia corollata
Leptochloa peacockii
Lomandra multiflora subsp. multiflora
Lophostemon suaveolens
Lysicarpus angustifolius
Malvastrum americanum
Maytenus cunninghamii
Notelaea microcarpa
Nyssanthes diffusa
Opuntia tomentosa
Ozothamnus diosmifolius
Panicum effusum var. effusum
Paspalidium gracile
Peripleura hispidula var. setosa
Petalostigma pubescens
Phyllanthus sp.
Prostanthera euphrasioides
Pseuderanthemum variabile
Rostellularia adscendens var. adscendens
Santalum lanceolatum
Scleria mackaviensis
Scleria sphacelata
Senecio quadridentatus
Senna artemisioides subsp. zygophylla
Sida corrugata
Sida filiformis
Solanum ellipticum
Spartothamnella puberula
Stackhousia muricata
Thellungia advena
Themeda triandra
Thyridolepis xerophila
Triodia mitchellii var. mitchellii
Vittadinia cuneata var. hirsuta
Wahlenbergia tumidifructa

Map Unit 6 Tall woodland- Mid high
Open forest of *Acacia harpophylla*
(brigalow), vine thicket and *Eucalyptus*
spp.

Abutilon fraseri
Abutilon oxycarpum forma acutatum
Acacia excelsa
Acacia fasciculifera
Acacia harpophylla
Acacia longispicata
Acalypha eremorum
Achyranthes aspera
Alectryon connatus
Alectryon diversifolius
Alstonia constricta
Ancistrachne uncinulata
Apophyllum anomalum
Aristida calycina var. praealta
Aristida caput-medusae
Aristida gracilipes
Aristida lignosa
Atalaya hemiglaucha
Atalaya salicifolia
Bothriochloa decipiens var. decipiens
Brachychiton australis
Brachychiton rupestris
Bracteantha bracteata
Brennia oblongifolia
Brunoniella australis
Bursaria incana var. incana
Callitris glauophylla
Calyptochloa gracillima
Canthium coprosmoides
Canthium odoratum
Canthium sp. (Berrigurra Station E.R.Anderson
2829)
Canthium vacciniifolium
Capparis canescens
Capparis loranthifolia var. bancroftii
Carissa ovata
Cassine australis var. angustifolia
Cheilanthes distans
Chenopodium carinatum
Chloris ventricosa
Cissus opaca
Citriobatus spinescens
Conyza bonariensis
Croton insularis
Croton phebaloides
Cymbopogon refractus
Diospyros humilis
Ehretia membranifolia
Enneapogon gracilis

Enneapogon lindleyanus
Enteropogon unispiceus
Eragrostis lacunaria
Eremophila mitchellii
Eriochloa pseudoacrotricha
Erythroxylum sp. (Splityard Creek L.Pedley
5360)
Eucalyptus cambageana
Eucalyptus crebra
Evolvulus alsinoides
Flindersia australis
Geijera parviflora
Grevillea robusta
Grevillea striata
Hakea fraseri
Helichrysum collinum
Hibiscus sturtii
Hovea longipes
Hybanthus monopetalus
Jacquemontia paniculata
Laxmannia compacta
Leptochloa peacockii
Lomandra confertifolia subsp. pallida
Lysiphyllosum carronii
Malvastrum americanum
Maytenus cunninghamii
Melhania oblongifolia
Melicope erythroccoca
Nyssanthes diffusa
Opuntia aurantiaca
Opuntia stricta var. stricta
Opuntia tomentosa
Owenia venosa
Oxalis perennans
Paspalidium distans
Paspalidium gracile
Phyllanthus gasstroemii
Planchonella cotinifolia var. pubescens
Pterocaulon redolens
Sarcostemma viminale subsp. brunonianum
Secamone elliptica
Senna artemisioides subsp. zygophylla
Sida filiformis
Solanum ellipticum
Solanum semiarmatum
Thellungia advena
Tragus australianus
Vittadinia pustulata

**Map Unit 7 Tall Open forest-Mid high
woodland of *Eucalyptus populnea*
(poplar box)**

Abutilon oxycarpum forma oxycarpum
Alectryon diversifolius
Amyema congener subsp. congener
Aristida calycina var. calycina
Aristida calycina var. praealta
Aristida personata
Bothriochloa decipiens var. decipiens
Brachiaria eruciformis
Brachiaria subquadripara
Calotis cuneata
Calyptochloa gracillima
Cenchrus ciliaris
Chamaesyce dallachiana
Chenopodium carinatum
Chenopodium desertorum subsp. anidiophyllum
Chloris ventricosa
Cymbopogon refractus
Cynoglossum australe var. australe
Cyperus gracilis
Denhamia oleaster
Desmodium varians
Dichanthium sericeum subsp. humilius
Digitaria brownii
Dodonea viscosa subsp. spatulata
Einadia nutans subsp. linifolia
Enneapogon gracilis
Enteropogon acicularis
Enteropogon ramosus
Epilobium hirtigerum
Eragrostis elongata
Eragrostis lacunaria
Eragrostis leptostachya
Eremophila mitchellii
Eriochloa decumbens
Erodium crinitum
Eucalyptus populnea
Euchiton sphaericus
Eulalia aurea
Geijera parviflora
Glossocardia bidens
Gomphrena celosioides
Heteropogon contortus
Hibiscus trionum
Hypochaeris glabra
Indigofera linnaei
Lepidium africanum
Lepidium bonariense
Macfadyena unguis-cati
Malvastrum americanum
Malvastrum coromandelianum
Melinis repens

<i>Nyssanthes diffusa</i>	<i>Arundinella neplanensis</i>
<i>Opuntia stricta</i> var. <i>stricta</i>	<i>Atalaya hemiglaucha</i>
<i>Opuntia tomentosa</i>	<i>Atalaya salicifolia</i>
<i>Panicum effusum</i> var. <i>effusum</i>	<i>Austrostipa verticillata</i>
<i>Paspalidium criniforme</i>	<i>Boerhavia dominii</i>
<i>Paspalidium distans</i>	<i>Bothriochloa decipiens</i> var. <i>decipiens</i>
<i>Paspalidium gracile</i>	<i>Brachiaria foliosa</i>
<i>Pimelea trichostachya</i>	<i>Brachychiton rupestris</i>
<i>Ptilotus exaltatus</i> var. <i>semilanatus</i>	<i>Brunoniella australis</i>
<i>Ptilotus macrocephalus</i>	<i>Callitris glauophylla</i>
<i>Rhynchosia minima</i> var. <i>australis</i>	<i>Calyptochloa gracillima</i>
<i>Rostellularia adscendens</i> var. <i>adscendens</i>	<i>Canthium oleifolium</i>
<i>Senecio laetus</i> subsp. <i>dissectifolius</i>	<i>Canthium</i> sp. (Berrigurra Station E.R.Anderson 2829)
<i>Senna barclayana</i>	<i>Capparis lasiantha</i>
<i>Sida corrugata</i>	<i>Capparis mitchellii</i>
<i>Sida pleiantha</i>	<i>Carissa ovata</i>
<i>Sida subspicata</i>	<i>Cassia tomentella</i>
<i>Sisymbrium thellungii</i>	<i>Cassine australis</i> var. <i>angustifolia</i>
<i>Soliva anthemifolia</i>	<i>Cenchrus ciliaris</i>
<i>Sporobolus caroli</i>	<i>Chamaesyce dallachiana</i>
<i>Stackhousia muricata</i>	<i>Cheilanthes distans</i>
<i>Swainsona oroboides</i>	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>
<i>Thellungia advena</i>	<i>Chloris ventricosa</i>
<i>Themedia avenacea</i>	<i>Cissus opaca</i>
<i>Trianthema triquetra</i>	<i>Cleistochloa subjuncea</i>
<i>Verbena aristigera</i>	<i>Corymbia clarkeana</i>
<i>Verbena officinalis</i>	<i>Crassula sieberiana</i>
<i>Verbesina encelioides</i>	<i>Cymbopogon refractus</i>
<i>Zinnia peruviana</i>	<i>Cyperus gracilis</i>
<i>Zornia muriculata</i> subsp. <i>angustata</i>	<i>Denhamia oleaster</i>

Map Unit 8 Tall woodland-Mid high
Open forest-Mid high woodland of
mixed *Eucalyptus* spp

<i>Abutilon fraseri</i>
<i>Abutilon oxycarpum</i> forma <i>acutatum</i>
<i>Abutilon oxycarpum</i> forma <i>oxyacarpum</i>
<i>Acacia caroleae</i>
<i>Acacia conferta</i>
<i>Acacia decora</i>
<i>Acacia excelsa</i>
<i>Acacia harpophylla</i>
<i>Acacia macradenia</i>
<i>Acacia rhodoxylon</i>
<i>Achyranthes aspera</i>
<i>Alphitonia excelsa</i>
<i>Alstonia constricta</i>
<i>Ancistrachne uncinulata</i>
<i>Apophyllum anomalum</i>
<i>Aristida calycina</i> var. <i>praealta</i>
<i>Aristida caput-medusae</i>
<i>Aristida gracilipes</i>
<i>Aristida queenslandica</i> var. <i>dissimilis</i>

<i>Arundinella neplanensis</i>
<i>Atalaya hemiglaucha</i>
<i>Atalaya salicifolia</i>
<i>Austrostipa verticillata</i>
<i>Boerhavia dominii</i>
<i>Bothriochloa decipiens</i> var. <i>decipiens</i>
<i>Brachiaria foliosa</i>
<i>Brachychiton rupestris</i>
<i>Brunoniella australis</i>
<i>Callitris glauophylla</i>
<i>Calyptochloa gracillima</i>
<i>Canthium oleifolium</i>
<i>Canthium</i> sp. (Berrigurra Station E.R.Anderson 2829)
<i>Capparis lasiantha</i>
<i>Capparis mitchellii</i>
<i>Carissa ovata</i>
<i>Cassia tomentella</i>
<i>Cassine australis</i> var. <i>angustifolia</i>
<i>Cenchrus ciliaris</i>
<i>Chamaesyce dallachiana</i>
<i>Cheilanthes distans</i>
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>
<i>Chloris ventricosa</i>
<i>Cissus opaca</i>
<i>Cleistochloa subjuncea</i>
<i>Corymbia clarkeana</i>
<i>Crassula sieberiana</i>
<i>Cymbopogon refractus</i>
<i>Cyperus gracilis</i>
<i>Denhamia oleaster</i>
<i>Denhamia pittosporoides</i>
<i>Digitaria breviglumis</i>
<i>Digitaria brownii</i>
<i>Einadia nutans</i> subsp. <i>nutans</i>
<i>Enneapogon lindleyanus</i>
<i>Enteropogon acicularis</i>
<i>Enteropogon unispiceus</i>
<i>Eragrostis lacunaria</i>
<i>Eragrostis longipedicellata</i>
<i>Eremophila mitchellii</i>
<i>Erythrina vespertilio</i>
<i>Eucalyptus cambageana</i>
<i>Eucalyptus crebra</i>
<i>Eucalyptus populnea</i>
<i>Eucalyptus tenuipes</i>
<i>Evolvulus alsinoides</i>
<i>Geijera parviflora</i>
<i>Goodenia glabra</i>
<i>Grewia latifolia</i>
<i>Hakea fraseri</i>
<i>Hibiscus sturtii</i>
<i>Hovea longipes</i>
<i>Indigofera</i> sp.
<i>Jasminum didymum</i> subsp. <i>lineare</i>

Jasminum simplicifolium subsp. *australiense*
Keraudrenia corollata
Leptospermum neglectum
Lomandra filiformis subsp. *filiformis*
Lysicarpus angustifolius
Lysiphyllo carronii
Maireana microphylla
Malvastrum americanum
Melhania oblongifolia
Melichrus urceolatus
Melinis repens
Nyssanthes diffusa
Opuntia tomentosa
Owenia venosa
Pandorea pandorana
Panicum effusum var. *effusum*
Panicum maximum var. *trichoglume*
Parsonsia eucaalyptophylla
Parsonsia lanceolata
Paspalidium distans
Paspalidium gracile
Petalostigma pubescens
Podolepis longipedata
Polymeria calycina
Portulaca bicolor
Pseuderanthemum variabile
Santalum lanceolatum
Schoenus kennyi
Scleria sphacelata
Sclerolaena birchii
Setaria surgens
Sida filiformis
Sida subspicata
Solanum ellipticum
Solanum parvifolium
Spartothamnella juncea
Spermacoce multicaulis
Sporobolus caroli
Sporobolus mitchellii
Thellungia advena
Thyridolepis xerophila
Tragus australianus
Triodia mitchellii var. *mitchellii*
Vernonia cinerea var. *cinerea*
Vetiveria filipes
Wahlenbergia tumidifructa
Zaleya galericulata subsp. *galericulata*

Map Unit 9a Tall Open forest of Vine thicket

Abutilon oxycarpum forma *acutatum*
Abutilon oxycarpum forma *oxycarpum*
Acacia fasciculifera
Acalypha eremorum
Achyranthes aspera
Alectryon connatus
Alectryon diversifolius
Amaranthus graecizans subsp. *sylvestris*
Ancistrachne uncinulata
Apophyllum anomalum
Atalaya salicifolia
Austrostipa verticillata
Brachiaria foliosa
Brachychiton rupestris
Calyptochloa gracillima
Canthium vacciniifolium
Capparis lasiantha
Capparis mitchellii
Carissa ovata
Cassia tomentella
Cassine australis var. *angustifolia*
Casuarina cristata
Cenchrus ciliaris
Cheilanthes distans
Chenopodium carinatum
Chloris ventricosa
Cissus opaca
Citriobatus spinescens
Croton insularis
Croton phebaliooides
Cyperus gracilis
Denhamia oleaster
Diospyros humilis
Einadia nutans subsp. *nutans*
Euchiton sphaericus
Exocarpos latifolius
Geijera parviflora
Hibiscus sturtii
Lysiphyllo carronii
Maireana microphylla
Notelaea microcarpa
Olearia canescens
Opuntia stricta var. *stricta*
Owenia venosa
Oxalis perennans
Parsonsia lanceolata
Paspalidium gracile
Pittosporum rhombifolium
Planchonella cotinifolia var. *pubescens*
Portulaca oleracea
Setaria dielsii
Solanum americanum

Spartothamnella juncea
Tragus australianus
Tribulus micrococcus

Map Unit 9b Tall woodland of
Brachychiton rupestris (narrow-leaved
bottle tree)

Abutilon oxyacarpum forma acutatum
Acacia fasciculifera
Acacia harpophylla
Acalypha eremorum
Alectryon diversifolius
Alstonia constricta
Ancistrachne uncinulata
Apophyllum anomalum
Austromyrtus bidwillii
Austrostipa verticillata
Brachychiton rupestris
Breynia oblongifolia
Bursaria incana var. *incana*
Calyptochloa gracillima
Canthium sp. (Berrigurra Station E.R.Anderson
2829)
Canthium vacciniifolium
Capparis lasiantha
Carissa ovata
Cenchrus ciliaris
Chloris ventricosa
Cissus opaca
Citriobatus spinescens
Croton insularis
Cyperus gracilis
Digitaria brownii
Diospyros humilis
Ehretia membranifolia
Einadia nutans subsp. *linifolia*
Einadia nutans subsp. *nutans*
Enneapogon gracilis
Eremophila mitchellii
Erythroxylum sp. (Splityard Creek L.Pedley
5360)
Excoecaria dallachiana
Geijera parviflora
Jasminum didymum subsp. *lineare*
Lepidium bonariense
Leptochloa ciliolata
Lysiphylloum caronii
Maireana microphylla
Malvastrum americanum
Nyssanthes diffusa
Opuntia aurantiaca
Opuntia tomentosa
Parsonsia lanceolata

Paspalidium criniforme
Planchonella cotinifolia var. *pubescens*
Plectranthus parviflorus
Portulaca oleracea
Portulaca pilosa subsp. *pilosa*
Rostellularia adscendens var. *adscendens*
Salsola kali
Solanum americanum
Solanum parvifolium
Sporobolus caroli
Tetragonia tetragonoides
Thellungia advena
Zygophyllum apiculatum

Map Unit 10 Tall woodland of
Casuarina cristata (belah)

Acacia excelsa
Alectryon diversifolius
Ancistrachne uncinulata
Aristida personata
Atalaya salicifolia
Calyptochloa gracillima
Canthium sp. (Berrigurra Station E.R.Anderson
2829)
Canthium vacciniifolium
Capparis lasiantha
Carissa ovata
Cassine australis var. *angustifolia*
Casuarina cristata
Cenchrus ciliaris
Cissus opaca
Cymbidium canaliculatum
Denhamia oleaster
Enchytraea tomentosa
Enneapogon lindleyanus
Enteropogon acicularis
Eremocitrus glauca
Eremophila mitchellii
Eriochloa decumbens
Eucalyptus populnea
Eremophila mitchellii
Jasminum didymum subsp. *lineare*
Lysiphylloum caronii
Maireana microphylla
Nyssanthes diffusa
Parsonia eucalyptophylla
Paspalidium distans
Paspalidium gracile
Planchonella cotinifolia var. *pubescens*
Solanum parvifolium
Sporobolus caroli
Sporobolus coromandelianus

Map Unit 11 Mid high Open forest-
Mid high woodland of *Acacia
rhodoxylon* (rosewood)

Abutilon oxycarpum forma oxycarpum
Acacia rhodoxylon
Alphitonia excelsa
Alstonia constricta
Amyema quandang var. bancroftii
Aristida calycina var. praealta
Aristida caput-medusae
Atalaya salicifolia
Bertya pedicellata
Capparis lasiantha
Capparis mitchellii
Carissa ovata
Cenchrus ciliaris
Chenopodium carinatum
Cissus opaca
Claoxylon tenerifolium
Cleistochloa subjuncea
Clerodendrum floribundum
Commelina diffusa
Croton phebaloides
Cyperus rigidellus
Desmodium brachypodium
Digitaria breviglumis
Dysphania glomulifera subsp. glomulifera
Erythroxylum sp. (Splityard Creek L.Pedley
5360)
Eucalyptus crebra
Eucalyptus exserta
Euphorbia tannensis var. eremophila
Flindersia australis
Gahnia aspera
Hibiscus sturtii
Isotoma axillaris
Lepidium bonariense
Lomandra confertifolia subsp. pallida
Lomandra multiflora subsp. multiflora
Maireana microphylla
Marsdenia microlepis
Owenia venosa
Oxalis perennans
Pandorea pandorana
Panicum maximum var. trichoglume
Paspalidium criniforme
Paspalidium gracile
Pimelea latifolia
Sarcostemma viminale subsp. brunonianum
Scleria sphacelata
Senna sophera var. (40Mile Scrub J.R.Clarkson+
6908)
Setaria dielsii
Sida filiformis

Sida rohlenae
Sida subspicata
Solanum ellipticum
Triodia pungens var. pungens
Turraea pubescens

Map Unit 12 Mid high Open forest-
Mid high woodland of *Acacia
rhodoxylon* (rosewood), *Acacia shirleyi*
(lancewood) and *Acacia harpophylla*
(brigalow)

Abutilon oxycarpum forma oxycarpum
Acacia harpophylla
Acacia rhodoxylon
Acacia shirleyi
Alstonia constricta
Ancistrachne uncinulata
Aristida caput-medusae
Brenya oblongifolia
Brunoniella australis
Calyptochloa gracillima
Canthium odoratum
Canthium vacciniifolium
Capparis loranthifolia var. bancroftii
Carissa ovata
Cenchrus ciliaris
Cheilanthes sieberi subsp. sieberi
Cissus opaca
Cleistochloa subjuncea
Dianella caerulea var. vannata
Diospyros humilis
Dodonaea viscosa subsp. spatulata
Einadia trigonos subsp. stellulata
Enneapogon lindleyanus
Enteropogon unispiceus
Eragrostis lacunaria
Eragrostis longipedicellata
Eremophila mitchellii
Erythroxylum sp. (Splityard Creek L.Pedley
5360)
Eucalyptus cambageana
Evolvulus alsinoides
Flindersia australis
Flindersia collina
Geijera parviflora
Hakea fraseri
Hibiscus sturtii
Hovea longipes
Indigofera sp.
Jasminum didymum subsp. lineare
Leptochloa peacockii
Lomandra multiflora subsp. multiflora
Marsdenia microlepis

Maytenus cunninghamii
Notelaea microcarpa
Olearia canescens
Opuntia aurantiaca
Opuntia stricta var. stricta
Owenia venosa
Oxalis perennans
Paspalidium gracile
Pseuderanthemum variabile
Rutidosis crispata
Santalum lanceolatum
Senma artemisioides subsp. zygophylla
Setaria dielsii
Sida filiformis
Spartothamnella juncea
Themeda triandra
Thyridolepis xerophila

APPENDIX A

Appendix 11

Site data for *Rutidosis crispata* observed during field work August 1997

Site: 1

Location: "Riverview" locality observed in flora survey 1996, approximately 3.5 km E of Riverview homestead, 15.8 km NE (47°) of Taroom.

Latitude/Longitude: 25°32'31" 149°54'44" **Easting/Northing:** 792639, 7171853

Habitat Description

Landform Pattern: low hills **Landform Element:** hillslope **Altitude:** 220-240 m

Slope: 3° simple **Aspect:** SSW, 200°

Soil: fine sandy loam, greyish brown 7.5 YR 4/2 **Surface: Rock(%) < 1 Bare(%): 30-40**

Vegetation Description: Open forest: co-dominant canopy species *Acacia rhodoxylon*, *Acacia shirleyi* and *Eucalyptus cambageana*.

Small tree and shrub layer: sparse. Species present include *Alstonia constricta*, *Breynia oblongifolia*, *Eremophila mitchellii*, *Erythroxylum* sp. (Splityard Creek L.Pedley 5360), *Hovea longipes* and *Maytenus cunninghamii*.

Ground layer: sparse. Species present include *Abutilon oxycarpum*, *Aristida caput-medusae*, *Brunoniella australis*, *Calyptochloa gracillima*, *Carissa ovata*, *Cissus opaca*, *Cleistochloa subjuncea*, *Einadia trigonos* subsp. *stellulata*, *Enneapogon lindleyanus*, *Eragrostis longipedicellata*, *Evolvulus alsinoides*, *Hibiscus sturtii*, *Leptochloa peacockii*, *Marsdenia microlepis*, *Paspalidium gracile*, *Pseuderanthemum variabile*, *Rutidosis crispata*, *Setaria dielsii* and *Sida glomerata*.

Extent of Population: 18 individuals scattered over an area of approximately 0.75 ha (150 m down and 50 m across the slope) from the top of the ridge down the slope to gully channel.

General comments: There is some disturbance from animal trails across slope near the top of the slope.

Site: 2

Location: "Riverview" approximately 300 m S of site 1, 15.6 km NE (48°) of Taroom.

Approximate centre of population

Latitude/Longitude: 25°32'39" 149°54'45" **Easting/Northing:** 792677, 7171557

Lowest contour on slope where plants occurred

Latitude/Longitude: 25°32'45" 149°54'47" **Easting/Northing:** 792742, 7171377

Habitat Description:

Landform Pattern: low hills **Landform Element:** hillslope **Altitude:** 180-220 m

Slope: 15°, simple **Aspect:** SW, 230°

Soil: fine sandy loam, dark brown 10 YR 3/4 **Surface: Rock(%) < 1 Bare(%): 10-20**

Vegetation Description: Open forest: dominant canopy species *Eucalyptus crebra* with *Flindersia australis* occasionally present.

Small tree and shrub layer: sparse. Species present include *Acacia bancroftii*, *Acacia longispicata* subsp. *longispicata*, *Alphitonia excelsa*, *Canthium* sp. (Berrigurra Station E.R.Anderson 2829), *Eremophila mitchellii*, *Geijera parviflora*, *Hakea fraseri*, *Hovea longipes* and *Opuntia tomentosa* *.

Ground layer: sparse to mid dense. Species present included *Alectryon diversifolius*, *Ancistrachne uncinulata*, *Aristida caput-medusae*, *Aristida lignosa*, *Brunoniella australis*, *Calotis cuneifolia*, *Calyptochloa gracillima*, *Carissa ovata*, *Chenopodium carinatum*, *Cleistochloa subjuncea*, *Enneapogon lindleyanus*, *Eragrostis lacunaria*, *Evolvulus alsinoides*, *Jasminum didymum* subsp. *racemosum*, *Leptochloa peacockii*, *Lomandra* sp., *Maireana microphylla*, *Malvastrum americanum*, *Maytenus cunninghamii*, *Pandorea pandorana*, *Panicum effusum* var. *effusum*, *Paspalidium gracile*, *Rutidosis crispata*, *Setaria dielsii*, *Sida glomerata*, *Solanum parvifolium*, *Spartothamnella juncea*, *Thellungiella advena*, *Themeda triandra*, *Thyridolepis xerophila* and *Verbena aristigera* *.

Extent of Population: 250 individuals over the slope covering an area approximately 1 ha (100 x 100 m) from the gully channel up the slope. Plants more frequent and less drought stressed towards base of slope.

General comments: There is very little disturbance.

Site: 3

Location: "Riverview" approximately 1 km S of site 1 on edge of Dawson River flood plain, 15.3 km NE (53°) of Taroom.

Latitude/Longitude: 25°32'59" 149°54'47" **Easting/Northing:** 792730, 7170932

Habitat Description:

Landform Pattern: low hills **Landform Element:** slope at foot of cliff **Altitude:** 180-200 m

Slope: 20 **Aspect:** 175°, S

Soil: silt loam, brownish black 7.5 YR 3/2

Surface: Rock(%) 20 Bare(%): 10-20

Vegetation Description: Open forest: dominant canopy species *Eucalyptus crebra* with *Callitris glaucophylla* occasionally present.

Small tree and shrub layer: sparse. Species present include *Acacia decora*, *Acacia excelsa*, *Acacia stenophylla*, *Alectryon hemiglaucum*, *Alectryon oleifolius*, *Canthium* sp. (Berrigurra Station E.R.Anderson 2829), *Citriobatus spinescens*, *Diospyros humilis*, *Geijera parviflora* and *Opuntia tomentosa* *

Ground layer: sparse. Species present include *Abutilon oxycarpum*, *Alectryon diversifolius*, *Ancistrachne uncinulata*, *Arundinella nepalensis*, *Austrostipa verticillata*, *Brachiaria foliosa*, *Calyptochloa gracillima*, *Carissa ovata*, *Chloris ventricosa*, *Dianella caerulea* var. *vannata*, *Enneapogon lindleyanus*, *Enteropogon unispiceus*, *Jasminum didymum* subsp. *racemosum*, *Leptochloa peacockii*, *Opuntia aurantiaca* *, *Pandorea pandorana*, *Panicum maximum* var. *trichoglume* *, *Paspalidium gracile*, *Plectranthus parviflorus*, *Rutidosis crispata*, *Scleria sphacelata*, *Tetragonia tetragonoides* and *Thellungiella advena*.

Extent of Population: 57 plants observed in an area approximately 0.25 ha (250 m long and 10 m wide) along the cliff base. *Rutidosis crispata* was not observed to extend down onto the flats below the foot-slope.

General comments: There is some disturbance from animal trails across slope.

Site: 4

Location: "Riverview" approximately 500 m SSW of site 1, 15.2 km NE (48°) of Taroom.

Latitude/Longitude: 25°32'47", 149°54'35" **Easting/Northing:** 792394, 7171334

Habitat Description:

Landform Pattern: low hills **Landform Element:** crest **Altitude:** 240-260 m

Slope: 0°, flat hill top **Aspect:** not applicable

Soil: not recorded

Surface: Rock(%) 0 **Bare(%):** 10-20

Vegetation Description: Open forest: dominant canopy species *Eucalyptus crebra* with *Acacia harpophylla*

Extent of Population: 2 plants observed on top of hill within an area of approximately 1 ha (100 x 100 m)

General comments: disturbance none.

Site: 5

Location: "Riverview" on slope adjacent to Brodie's Road to "The Bend". approximately 3.5 km ESE of Riverview homestead, 16.6 km NE (44°) of Taroom.

Latitude/Longitude: 25°31'52" 149°54'37" **Easting/Northing:** 792500, 7173023

Habitat Description:

Landform Pattern: low hills **Landform Element:** hillslope **Altitude:** 220-240 m

Slope: 10° **Aspect:** SE, 75°

Soil: not recorded

Surface: Rock(%): <5 **Bare(%):** 20

Vegetation Description: Highly disturbed habitat remnant small trees and shrub on crest of hill. *Cenchrus ciliaris* dominant ground layer species.

Extent of Population: 6 plants recorded from near the top of slope on the edge of a remnant stand of trees.

General comments: Numerous animal trails through area.

Site: 6

Location: "Riverview" approximately 1 km SSW of site 1 on edge of the Dawson River floodplain, 14.8 km NE (49°) of Taroom.

Approximate centre of population

Latitude/Longitude: 25°33'02", 149°54'28" **Easting/Northing:** 792201, 7170849

Lowest contour on slope where plants occurred

Latitude/Longitude: 25°33'08", 149°54'30" **Easting/Northing:** 792259, 7170682

Habitat Description:

Landform Pattern: low hills **Landform Element:** hillslope **Altitude:** 180-200 m

Slope: 10°/30°, upper slope and cliff-foot slope **Aspect:** 180°, S

Soil: fine sandy loam, dark brown 7.5 YR 3/4

Surface: Rock(%) 20 Bare(%): 10-20

Vegetation Description: Open forest: dominant canopy species *Eucalyptus crebra* with *Eucalyptus populnea* occasionally present.

Small tree and shrub layer: sparse. Species present include *Acacia decora*, *Acacia excelsa*, *Acacia longispicata* subsp. *longispicata*, *Alstonia constricta*, *Brachychiton populneus* subsp. *populneus*, *Canthium vacciniifolium*, *Geijera parviflora*, *Alectryon diversifolius*, *Alphitonia excelsa*, *Callitris glaucophylla*, *Canthium* sp. (Berrigurra Station E.R.Anderson 2829), *Denhamia oleaster* and *Diospyros humilis*.

Ground layer: sparse. Species present include *Ancistrachne uncinulata*, *Aristida caput-medusae*, *Calotis cuneifolia*, *Calyptochloa gracillima*, *Carissa ovata*, *Cenchrus ciliaris* *, *Cleistochloa subjuncea*, *Dianella caerulea* var. *vannata*, *Enneapogon lindleyanus*, *Eremophila debilis*, *Goodenia glabra*, *Jasminum didymum* subsp. *racemosum*, *Leptochloa peacockii*, *Opuntia tomentosa* *, *Rutidosis crispata* and *Spartothamnella juncea*.

Extent of Population: 12 plants recorded in an area approximately 0.9 ha (150 x 60) from the base of small cliff up the slope.

General comments: disturbance none

Site: 7

Location: "Riverview" approximately 1 km SW of site 1, 14.7 km NE (47°) of Taroom.

Latitude/Longitude: 25°32'54", 149°54'17" **Easting/Northing:** 791899, 7171126

Habitat Description:

Landform Pattern: low hills **Landform Element:** hillslope **Altitude:** 180-200 m

Slope: 20°, simple **Aspect:** 195°, S

Soil: not recorded

Surface: Rock(%) 10 Bare(%): 30

Vegetation Description: Open forest: dominant canopy species *Eucalyptus crebra* with *Casuarina cristata*, *Acacia harpophylla* and *Eucalyptus populnea* occasionally present.

Small tree and shrub layer: sparse to mid dense. Species present include *Acacia decora*, *Alphitonia excelsa*, *Casuarina cristata*, *Eremophila mitchellii*, *Grevillea striata*, *Hovea longipes*, *Notelaea microcarpa*, *Abutilon oxycarpum* and *Alectryon hemiglaucum*.

Ground layer: sparse to mid dense. Species present include *Ancistrachne uncinulata*, *Aristida caput-medusae*, *Brachiaria foliosa*, *Callitris glaucophylla*, *Calyptochloa gracillima*, *Carissa ovata*, *Cissus opaca*, *Jasminum didymum* subsp. *racemosum*, *Maireana microphylla*, *Pandorea pandorana*, *Paspalidium gracile* and *Rutidosis crispata*.

Extent of Population: 14 individuals recorded on the slope covering an area approximately 3 ha (100 x 300 m)

General comments: There is some disturbance from animal trails across slope.

Site: 10

Location: "Bookabie", 14.9 km ENE (57°) of Taroom.

Latitude/Longitude: 25°33'56", 149°55'21" **Easting/Northing:** 793627, 7169156

Habitat Description:

Landform Pattern: low hills **Landform Element:** hillslope **Altitude:** 240-260 m

Slope: 10°/20°, waxing upper-slope and maximal lower-slope **Aspect:** SE, 130°

Soil:, fine sandy loam, greyish brown 7.5 YR 4/2

Surface: Rock(%) 40 Bare(%): 10

Vegetation Description: Open forest: dominant canopy species *Eucalyptus crebra* and *Callitris glaucophylla* with a lower tree stratum of *Hakea fraseri*, *Canthium* sp. (Berrigurra Station E.R.Anderson 2829), *Flindersia australis* and *Geijera parviflora*.

Shrub layer: sparse. Species present include *Alectryon diversifolius*, *Bursaria incana*, *Canthium coprosmoides*, *Canthium vacciniifolium*, *Capparis canescens*, *Citriobatus spinescens*, *Denhamia oleaster*, *Eremophila mitchellii*, *Hakea fraseri*, *Hovea longipes*, *Notelaea microcarpa* and *Santalum lanceolatum*.

Ground layer: sparse to mid dense. Species present include *Aristida caput-medusae*, *Aristida lignosa*, *Calyptochloa gracillima*, *Carissa ovata*, *Cissus opaca*, *Cleistochloa subjuncea*, *Dianella caerulea* var. *vannata*, *Enneapogon lindleyanus*, *Eragrostis lacunaria*, *Laxmannia* sp., *Opuntia tomentosa* *, *Pandorea pandorana* and *Paspalidium gracile*.

Extent of Population: 10 plants recorded in an area approximately 0.4 ha (20 x 200 m) along the slope in a narrow band.

General comments: disturbance none

Site: 11

Location: Isla Gorge National Park, hill W of Leichhardt Highway, 55.4 km NNE (21°) of Taroom.

Latitude/Longitude: 25°10'40", 150°00'25" **Easting/Northing:** 798330, 7211999

Habitat Description:

Landform Pattern: low hills **Landform Element:** hillslope to crest **Altitude:** 260-280 m

Slope: 10°/20°, southern side of crest and upper slope **Aspect:** S, 190°

Soil: sandy loam, very dark brown 7.5 YR 2/3

Surface: Rock(%): 20 Bare(%): 40

Vegetation Description: Open forest: dominant canopy species *Acacia rhodoxylon*, *Corymbia citriodora*, *Eucalyptus cloziana* and *Eucalyptus suffulgens*.

Small tree and shrub layer: sparse. Species present include *Alstonia constricta* and *Callitris endlicheri*.

Ground layer: sparse. Species present include *Acacia complanata*, *Aristida queenslandica* var. *dissimilis*, *Aristida ramosa*, *Cleistochloa subjuncea*, *Einadia hastata*, *Eragrostis longipedicellata*, *Gahnia aspera*, *Hibiscus sturtii*, *Leptochloa peacockii*, *Lomandra* sp., *Paspalidium gracile*, *Peripleura bicolor*, *Phyllanthus gasstroemii*, *Scleria sphacelata*, *Sida trichopoda* and *Solanum parvifolium*.

Extent of Population: 29 plants recorded in an area approximately 1.5 ha (100 x 150 m) from the crest down the slope to gully channel.

General comments: disturbance none; plants drought stressed.