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Australian Government

Department of Agriculture, Fisheries and Forestry  
National Landcare Program


# Northern Territory Cattlemen's Association

Adaptive Management of  
Ecologically Sustainable  
Development in the  
Douglas-Daly Region

## The Adaptive Management Plan

June 2006

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# 1. Executive Summary

## 1.1 Background

Over the past 20 years the Douglas-Daly Region has become a focus for pastoral and agricultural development. Gross income to the region from live cattle and other sources such as melons and peanuts is in excess of \$27,000,000 per annum.

Development occurred in a seasonally dry tropical environment against a background of limited knowledge of the region's natural resources and the needs and techniques required for ecologically sustainable development. A number of critical management issues was dealt with by individual farmers, the provision of advice and direction from officers in relevant government agencies, and by the sharing of knowledge among farmers. This resulted in significant improvement in the methods of land development and management, weeds management, the development of improved pastures, the technology of rain-fed farming, and the use of irrigation in a small part of the region.

These improvements resulted in enhanced productivity and lessened impacts on the environment.

There has been no documented example of the development having significantly impacted on the availability of ground water, water levels in the Daly River, siltation or pollution of the Daly River, or on the region's biological diversity.

In direct response to comments from environmental and amateur fisher special interest groups the Northern Territory Government established a "Community Reference Group" (CRG) in November 2003, and introduced a moratorium on permits for land clearing and approvals of subdivisions. The moratorium will continue until 2007.

The CRG was to have reviewed knowledge of the natural resources of the region, identified issues and undertaken a lengthy consultative approach to development of an "Integrated Regional Land-Use Plan" by September 2004. This was altered to a report on ongoing management and planning processes for the region.

The CRG's report was made public in 2005. It documented a qualitative risk assessment focused on four hypothetical impacts arising from development: being loss of perennial stream-flow (in the Daly River), sedimentation in the river, habitat degradation, and decline in indigenous values.

The report recommends research priorities, a draft monitoring program for the region, and a series of highly specific issues-oriented recommendations, especially in relation to future management and planning in the region. Of particular importance was the recommendation that future development and management be guided and undertaken using an adaptive management framework. Adaptive management provides a means for solving development problems while accommodating the absence of definitive information and high levels of uncertainty.

The need for development and implementation of an adaptive management plan for ecologically sustainable development in the Douglas-Daly region was recognised by the Northern Territory Cattlemen's Association (NTCA) in consultation with the region's

stakeholders. The NTCA made application for, and received a grant under the National LandCare Program for the development and implementation of a plan over a three-year period.

The plan was developed under the direction of a Steering Committee composed of:

- ▶ Mr Stuart Kenny, Executive Director, Northern Territory Cattlemen's Association;
- ▶ Dr David Ritchie, Chief Executive, Department of Natural Resources Environment and the Arts;
- ▶ Mr. Rod Gobbey, General Manager, Primary Industry Group, Department of Business, Industry and Resource Development; and
- ▶ Mr. Ian McBean, Cattleman, Douglas-Daly Region.

## **1.2 The Adaptive Management Plan**

Adaptive management is the process through which uncertainties surrounding major sustainable development issues are subject to analysis, prioritisation, testing, and monitoring leading ultimately to the dissemination and incorporation of improved management practices. The result is better informed and continually improving, ecologically sustainable development.

The plan employs adaptive management as a tool for working towards resolution of the major issues facing the Douglas-Daly. It involves a partnership between stakeholders and government. The primary concern of the plan is the resolution of issues within the Douglas-Daly Region, rather than attempting elusive, whole of system solutions for the entire Daly River catchment.

The plan for "Adaptive Management of Ecologically Sustainable Development of the Douglas-Daly Region" has two components. The first is the plan, and the second appendices that provide detailed documentation on adaptive management programs dealing with each of the major issues of sustainable development identified by stakeholders.

The plan provides a "blueprint" for the conduct of adaptive management in the Douglas-Daly. It documents the area of land and issues over which it has application. It identifies the stakeholders and the procedures they use in conducting management of the plan, in determining their priorities, in establishing adaptive management programs and in disseminating improved management procedures.

The plan relates to:

- ▶ that area of land defined by the ADMA Farms Area, the Stray Creek blocks, the Tipperary Group of Stations and Jindare Station in the Douglas-Daly Region (Fig. 1);
- ▶ the support industries, residents and school of this part of the Daly River catchment; and
- ▶ the ecological, social and economic relationships between that land and the remainder of the Daly Basin, and the people who live on and/or have a material interest in ensuring the ecologically sustainable development of that land.

The adaptive management plan is developed and implemented through consensus among stakeholders. The stakeholders are members of the Douglas Daly Community Development Association Inc.

The Adaptive Management Plan deals with development issues by following a two-phased process implemented through an organisational structure based around a central, decision-making Stakeholders' Forum. In the first phase the Stakeholders' Forum develops clear statements of goals and objectives, and undertakes an explicit, quantitative process for the assessment of priority objectives.

The second phase involves development of adaptive management programs for each major issue of concern. Knowledge teams undertake assessments of existing knowledge, understanding and practices associated with the priority objectives. If there is sufficient information, targets, monitoring protocols and assessment criteria are developed for each priority objective. The information gathered is used to identify development / management alternatives and estimates of their potential impacts on objectives. The alternatives are evaluated and choices of preferred development/management alternative/s made. Chosen alternatives are implemented and monitored by operational teams. The Stakeholders' Forum regularly reviews progress and outputs and outcomes.

Monitoring data are evaluated in relation to targets. If targets are satisfactorily met, results are used to refine and improve development and management approaches. These are incorporated into management and/or decision-making. The outcomes of transfer and incorporation of information are monitored and reviewed appropriately. Completion of an adaptive management program is followed by re-assessment of goals and objectives in order to determine future priorities.

### **1.3 Adaptive Management Programs**

During 2005-06 stakeholders identified 13 objectives they regarded as having the most profound influence on ecologically sustainable development in the region. These objectives were grouped according to six major issues:

- ▶ the provision of power to farms;
- ▶ implementation of a Douglas-Daly communications strategy;
- ▶ improved weed management in the Douglas-Daly;
- ▶ better access to and sustainable management of water;
- ▶ enhanced conservation management in the Douglas-Daly Region; and
- ▶ improved methods for land development and management.

The first two of these issues were regarded as not requiring adaptive management. Steps were taken to begin the process of provision of more sustainable sources of electric power. This included beginning the process leading to possible connection to the Northern Territory power grid, and investigation of Commonwealth Government programs supporting the application of hybrid power generating systems.

A communications strategy was regarded as essential. Media coverage of issues associated with the Douglas-Daly has been dominated by misinformation (pictorial, verbal and print) at local and national levels. Stakeholders are particularly concerned at the depiction of the Douglas-Daly as equivalent to or potentially equivalent to the environmental situation in the Murray-Darling and south-eastern Australia. The strategy develops a system for the rapid provision of accurate information that counters and pre-empts media misinformation. The communications strategy is at Appendix D.

The remaining major issues are to be dealt with under adaptive management programs. These include the Weed Management Program (Appendix E), the Water Management Program (Appendix F), the Management Program for Improved Nature Conservation (Appendix G), and the Adaptive Management Program for Land Development (Appendix H).

Each of the management programs was compiled under the direction of a different Knowledge Team and approved by the Stakeholders' Forum. Each contains an assessment of information pertinent to the objectives enunciated by stakeholders, and the development of assessment and performance criteria, targets for action and cost effective monitoring for each objective. Priority actions for objectives are developed, reporting requirements enunciated and timetables for the implementation of actions provided.

While the development of each management program was a separate entity, with its own actions, funding, and reporting, the ecological issues and the actions to implement the programs overlap. Below is an integrated summary of all the programs. Greater detail on the background to each program and its specific actions can be obtained by consulting the appropriate Appendix.

## 2. On-ground Actions

### 2.1 Priority Programs

Each management program contains one or usually more priority programs. These are as follows:

- ▶ consultation with government;
- ▶ weed distribution and abundance in the Douglas-Daly region;
- ▶ cost effective weed control;
- ▶ better understanding of movement of herbicides and nutrients into the river system and ground water;
- ▶ adaptive management of off-park nature conservation; and
- ▶ adaptive management of land development.

#### 2.1.1 Consultation with Government

Consultation with government will be undertaken in a spirit of cooperation in joint implementation of all the stakeholders' priority programs. It is fundamental that all parties have trust and confidence in the decision making of other involved parties. It is assumed that achievement of objectives is part and parcel of all discussions and operations involving government and stakeholders.

It is also recognised that in many instances actions by stakeholders in isolation can not hope to succeed. In some cases stakeholder are simply not capable of productive action until government makes certain decisions. Hopefully those decisions will be made in consultation with stakeholders. In other cases actions by government and/or stakeholders are more profitably pursued through joint action, and close consultation concerning action. Finally it is critically important that government be aware of stakeholder concerns and proposed actions such that government is in a position to understand the stakeholders position, and to be able, if appropriate, to communicate that understanding to others, or to potentially mediate fruitful cooperation with others.

The major issues for stakeholder and government consultation are:

- ▶ development of a strategic approach to weed management in the region;
- ▶ support for government's proposed water reforms under the National Water Initiative;
- ▶ collaboration in assessment of herbicide and nutrient pollution;
- ▶ improvement in nature conservation reservation on and off-park;
- ▶ promotion of the Property Development Plan as a sound basis for land clearing applications for a 15 year period (subject to staged approvals of individual developments);
- ▶ implementation of the beginnings of an adaptive approach to land development.

In all cases consultation will be primarily conducted through the responsible Knowledge Team, with all stakeholder positions and decisions to subject to approval by the Stakeholders' Forum.

### **2.1.2 Strategic Weed Management**

There is a fundamental lack of formal information on the distribution and abundance of weeds in the region. This is to be rectified through stratified sampling of lands according to use (roads, farming and grazing lands, parks, recreational areas, wildlife corridors). All data are to be shared with government. Results are to be promulgated to stakeholders and used in development of a more strategic approach to regional weed management involving stakeholders, Parks and Wildlife and the Roads Division of the Department of Planning and Infrastructure. This project is funding dependent.

### **2.1.3 Cost Effective Weed Management**

There is a fundamental absence of formal information on weed control practices and their effectiveness in the region. Five landholders have volunteered to participate in a program to evaluate weed management practices, cost-effectiveness and grazing productivity on two paddocks on each of five properties. The project is designed to identify major variables that may be subject to subsequent adaptive management trials.

### **2.1.4 Movement of Herbicides and Nutrient in Water Systems**

The two paddocks on each of five properties identified above will be evaluated with models to determine their potential for shedding herbicides and nutrients into surface and ground waters. Should there be a significant potential, testing will be conducted to determine whether it occurs and if so what extent. This project is funding dependent.

### **2.1.5 Off-park Nature Conservation**

In collaboration with government, stakeholders seek to identify joint priorities for off-park nature conservation in the Douglas-Daly, and its implementation in the Douglas-Daly.

### **2.1.6 Adaptive Management of Land Development**

As with the other issues of concern to stakeholders there is a very limited amount of information available of the processes and consequences of land development in the region. While techniques of land development used in the region are the result of individual adaptation and sharing of knowledge over many years and are viewed as sustainable, little of the information has been formally compiled. This program involves all stakeholders undertaking land development in an organised compilation of information on techniques used in land development in the region, and the monitoring of environmental parameters associated with the process. Results will be analysed to determine the range, effectiveness and potential sustainability of techniques used in

order to develop a more comprehensive, adaptive approach to improvement in land development.

## **2.2 Integrated Action Plan**

Actions under the individual management programs will be undertaken by combinations of individual stakeholders, and small action teams of 5 or fewer stakeholders. In all cases consultants are available for advice and assistance. Some tasks will be undertaken by consultants. Similarly, the collaborative nature of the project is likely to involve on-ground collaboration between stakeholders, government officers, and consultants. Government officers will continue to undertake their usual responsibilities, some of which may involve actions associated with the management programs.

<b>Time</b>	<b>Strategic Weed Control</b>	<b>Cost Effective Weed Control</b>	<b>Herbicides &amp; Nutrients in Water</b>	<b>Off-park Nature Conservation</b>	<b>Adaptive Land Development</b>
August 2006		<p>Identification of paddocks for the project (<i>Operations Team (Malcolm Bishop, Phil Howie, Sam McBean, Chris Muldon, Dan Thomson, Consultant)</i>)</p> <p>Confirm work schedule (<i>Operations Team, Stakeholders Forum</i>)</p>			
September-October 2006	Reporting on weed distribution and abundance on stakeholder properties ( <i>All stakeholders, Stakeholders Forum</i> )			Undertake biodiversity surveys of areas likely to be subject to development in the coming year ( <i>NRETA</i> )	Collate information on land development from Clearing Applications and Stakeholders ( <i>Consultant, Land Development Knowledge Team</i> )
October-November 2007		<p>Early growing season weed survey (<i>Operations Team</i>)</p> <p>Pre-herbicide weed survey (<i>Operations Team</i>)</p>		<p>Determine draft priorities for off-park conservation in the Douglas-Daly (<i>Nature Conservation Knowledge Team</i>)</p> <p>Gain approval of draft priorities (<i>NRETA &amp; Stakeholders' Forum</i>)</p>	Report findings to the Stakeholders' Forum ( <i>Knowledge Team</i> )
October-December 2006		<p>Post-herbicide survey (<i>Operations Team</i>)</p> <p>Pre-stock survey (<i>Operations Team</i>)</p>			

<b>Time</b>	<b>Strategic Weed Control</b>	<b>Cost Effective Weed Control</b>	<b>Herbicides &amp; Nutrients in Water</b>	<b>Off-park Nature Conservation</b>	<b>Adaptive Land Development</b>
November 2006	<p>Analysis and confirmation of weed information (<i>All stakeholders &amp; consultant</i>)</p> <p>Identification of strategic weed control priorities (<i>Weeds Knowledge Team, Stakeholders' Forum</i>)</p> <p>Co-ordination with Roads Division and Parks &amp; Wildlife (<i>Weeds Knowledge Team</i>)</p>			Design draft off-park system of conservation for the Douglas-Daly ( <i>Knowledge Team</i> )	
November-December 2006		Pre-herbicide weed survey ( <i>Operations Team</i> )		Gain approval of the draft design ( <i>NRETA, Stakeholders' Forum</i> )	
November 2006-March 2007	Strategic weed control ( <i>5-person stakeholder teams for specified areas, Roads Division, Parks and Wildlife</i> )			Implement design in areas subject to land development ( <i>Affected Stakeholders</i> )	
January 2007					<p>Initiate land development under permit (<i>Stakeholders</i>)</p> <p>Initiate monthly and event-based completion of monitoring sheets (<i>Stakeholders</i>)</p> <p>Collate all monitoring data sheets</p>

<b>Time</b>	<b>Strategic Weed Control</b>	<b>Cost Effective Weed Control</b>	<b>Herbicides &amp; Nutrients in Water</b>	<b>Off-park Nature Conservation</b>	<b>Adaptive Land Development</b>
March-April 2007	Assessment of weed control effectiveness and re-assessment of weeds on stakeholder properties ( <i>All stakeholders</i> )	Late wet/early dry season survey ( <i>Operations Team</i> )			
May-June 2007	Evaluation of effectiveness of strategic weed control and make adaptive improvements to strategic plan ( <i>Knowledge Team &amp; Stakeholders' Forum</i> )			Undertake first follow-up survey ( <i>NRETA</i> )	
July 2007					Report on interim findings ( <i>Knowledge Team, Stakeholders' Forum</i> )
September-October 2007	Implement adaptive improvements to strategic plan ( <i>Stakeholders</i> )			Undertake second follow-up survey ( <i>NRETA</i> )	
November 2007		Analysis of data ( <i>consultant</i> ) Report to Stakeholders Forum ( <i>Weeds Knowledge Team</i> )			

<b>Time</b>	<b>Strategic Weed Control</b>	<b>Cost Effective Weed Control</b>	<b>Herbicides &amp; Nutrients in Water</b>	<b>Off-park Nature Conservation</b>	<b>Adaptive Land Development</b>
December 2007		Evaluation of results & decision on future action with adaptive trials <i>(Stakeholders' Forum)</i>		Evaluate results and determine possible improvements to the design <i>(Knowledge Team, NRETA)</i>  Gain approval of proposed amendments to the design <i>(NRETA, Stakeholders' forum)</i>  Implement amended design <i>(Affected Stakeholders)</i>	Report on interim findings <i>(Knowledge Team, Stakeholders' Forum)</i>
December 2008					Report findings, and recommendations on adaptive improvements for testing in future land development <i>(Knowledge Team, Stakeholders' Forum)</i>  Implement adaptive management trial of modified approach <i>(Stakeholders)</i>
Funding dependent	Formal assessment of weed distribution & abundance <i>(Consultant)</i>		Evaluate models for applicability to Douglas-Daly and report <i>(Consultant, Water Knowledge Team &amp; Stakeholders' Forum)</i>		
Funding dependent	Analysis of role of roads, parks, & wildlife corridors and Gamba Grass <i>(Consultany)</i>		Undertake modelling of five/ten paddocks <i>(Consultant)</i>  Assess potential for pollution <i>(Water Knowledge Team)</i>		

<b>Time</b>	<b>Strategic Weed Control</b>	<b>Cost Effective Weed Control</b>	<b>Herbicides &amp; Nutrients in Water</b>	<b>Off-park Nature Conservation</b>	<b>Adaptive Land Development</b>
Funding dependent	Strategic Weed Control Plan (Consultant & Knowledge Team)		Undertake field evaluation of soil and water pollution <i>(Operations Team, Consultant)</i>		
Funding dependent			Re-evaluate model and recommend alternate adaptive management if appropriate <i>(Water Knowledge Team)</i>		
Funding dependent			Implement Adaptive Program if appropriate <i>(Stakeholders' Forum)</i>		

## 3. Introduction

### 3.1 Development of the Plan

Stakeholders in the Douglas-Daly Region developed this plan. The content of the plan and the procedures used in its development and implementation are the product of their direction and involvement. Every element in the plan has been formally agreed and endorsed at meetings of the stakeholders.

### 3.2 Scope of the Plan

The plan for “Adaptive Management of Ecologically Sustainable Development of the Douglas-Daly Region” relates to:

- ▶ the area of land enclosing the ADMA farms, the Stray Creek development blocks, the Tipperary group of pastoral leases, and Jindare Station (Fig. 1);
- ▶ the support industries, residents and local school of this part of the Daly River catchment; and
- ▶ the ecological, social and economic relationships between that land and the remainder of the Daly Basin, and the people who live on and/or have a material interest in ensuring the ecologically sustainable development of the land.

Stakeholders are members of the Douglas-Daly Community Development Association Inc. The Association’s rules of membership are that:

- ▶ full members reside, rent, lease or own land in the area, and are nominated and accepted for membership; and
- ▶ associate members are those with an interest in the development of the Douglas-Daly.

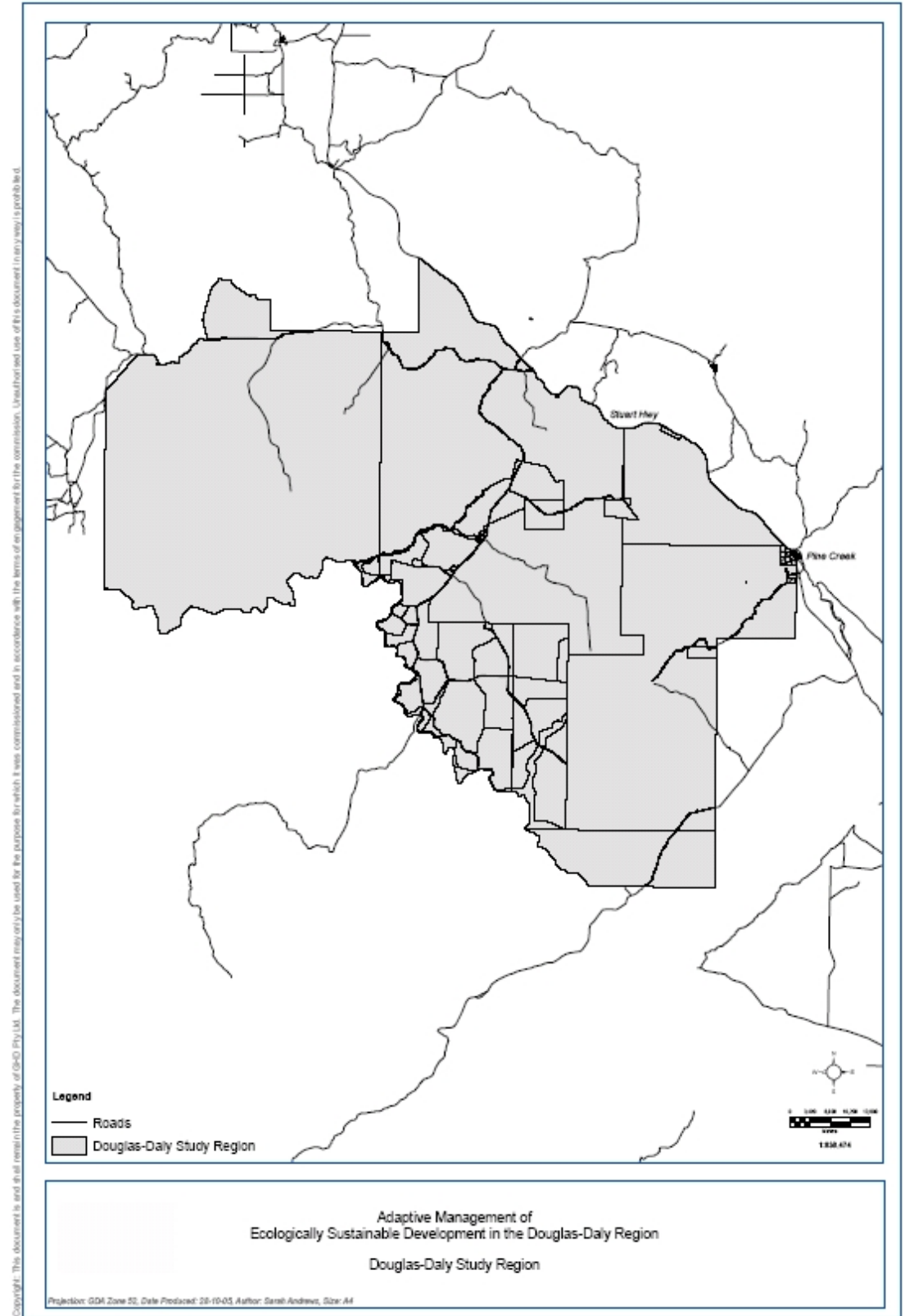
The plan has no defined end point. It will extend well beyond the end of any short term funding solution. This is because there are scientific and social uncertainties with respect to achieving ecologically sustainable development, and because stakeholder objectives are likely to change through time.

These uncertainties mean that stakeholders design processes that allow them to learn from their management experiences, and so adjust, modify and improve future management.

### 3.3 Adaptive Management

The Adaptive Management Plan describes the process through which information on key uncertainties impacting on stakeholders is generated, analysed, disseminated and incorporated into decision-making. The result is better-informed and continually improving ecologically sustainable development.

**Figure 1.** The Douglas-Daly Region.



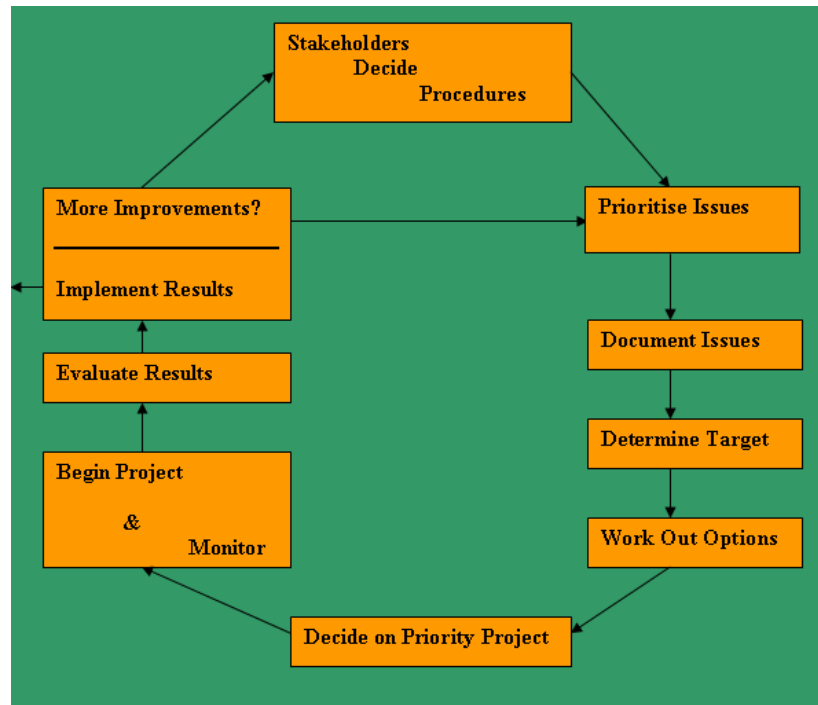
The Adaptive Management Plan is developed and implemented through consensus among stakeholders. It continues to identify issues of critical importance to the development of the region when and as appropriate. While it may receive guidance from, it is in no way bounded or limited by the “Daly Region Community Reference Group: Draft Report, November 2004”.

The process and sequence of stakeholder decision-making is recorded in a “Record of Decision” (ROD).

The elements of the Adaptive Management Plan include:

- ▶ stakeholder management and control of the entire process;
- ▶ clear statement of goals and objectives and an explicit process for the assessment of priorities for adaptive management;
- ▶ sound assessment of existing knowledge, understanding and practices relevant to the goals and objectives;
- ▶ development of targets and assessment criteria for priority objectives;
- ▶ identification of development/management alternatives and estimation of their impacts on objectives;
- ▶ evaluation and choice of preferred development/management alternative/s for particular objectives;
- ▶ implementation and monitoring of preferred alternatives;
- ▶ evaluation of results, including refinement and improvement of future development and management action;
- ▶ re-assessment of goals and objectives; and
- ▶ incorporation of new information into management and/or decision-making.

**Figure 2.** The process of adaptive management.



## 4. The Need for Adaptive Management

Over the past 20 years the Douglas-Daly Region has become a focus for pastoral and agricultural development. Gross income to the region from live cattle and other sources such as melons and peanuts is in excess of \$27,000,000 per annum.

Development occurred in a seasonally dry tropical environment against a background of limited knowledge of the region's natural resources and the needs and techniques required for ecologically sustainable development. Over the period a number of critical issues have impacted directly on pastoralism and farming in the region. These have been dealt with by a combination of individual farmers' learning experiences, the provision of advice and direction from officers in relevant government agencies, and by the sharing of knowledge among farmers. These processes have resulted in significant improvement in:

- ▶ the methods and nature of land development and management;
- ▶ the technology and application of weeds management;
- ▶ the development of improved pastures;
- ▶ the technology of rain-fed farming; and
- ▶ the use of irrigation in a small part of the region.

These improvements resulted in enhanced productivity and lessened impacts on the environment.

There has been no documented example of the development having significantly impacted on:

- ▶ the availability of ground water;
- ▶ water levels in the Daly River;
- ▶ siltation or pollution of the Daly River, or significant impact on
- ▶ the region's biological diversity.

The mere existence of land clearing and the attendant use of herbicides, water, introduced forage species and fertilizers however has resulted in increasingly vocal comment, particularly from environmental and amateur fisher special interest groups.

In direct response to these comments the Northern Territory Government established a "Community Reference Group" (CRG) in November 2003, and introduced a moratorium on permits for land clearing and approval of subdivisions. The moratorium will continue until 2007. The CRG was requested to review knowledge of the natural resources of the region, identify issues and undertake a lengthy consultative approach to development of an "Integrated Regional Land-Use Plan" by September 2004. In May 2004 the CRG informed government that it was not in a position to produce the required plan. The government acknowledged this by altering the terms of reference to require a report on ongoing management and planning processes for the region.

The CRG's report was made public in 2005. The report reviewed the state of knowledge and issues associated with natural resources in the region. The group undertook a qualitative risk analysis of four hypothetical impacts arising from development: loss of perennial stream-flow (in the Daly River), sedimentation in the river, habitat degradation, and decline in indigenous values.

The analysis was informed by existing information on the natural resources of the region. These data however were viewed as being insufficient to the task and all four major issues were treated in a similar manner. This took the form of flow diagrams of interactions among likely causal factors leading towards the hypothetical impact of development. The causal factors were discussed in a largely qualitative sense. The inadequacy of existing information prevented any attempt to assess or evaluate the relative importance/significance of each individual factor.

The report recommends research priorities, a draft monitoring program for the region, and a series of highly specific issues-oriented recommendations, especially in relation to future management and planning in the region. Of particular importance was the recommendation that future development and management be guided and undertaken using an adaptive management framework. This framework accommodates the absence of definitive information and the high level of uncertainty as reflected in the comments and deliberations described in the report.

This plan employs adaptive management as a tool for working towards resolution of the major issues facing the Douglas-Daly, and involves a partnership between stakeholders and government. It acknowledges and accommodates the existing lack of information. Adaptive management is the stakeholders' tool for dealing with issues of concern to them. Some of the concerns were identified as possibly contributing towards the risks reported by the CRG. The plan provides for the resolution of these individual issues within the Douglas-Daly region rather than attempting elusive, whole of system solutions for the entire Daly River catchment. Stakeholders also use the adaptive management framework to learn about management of issues that were not identified by the CRG.

The need for the development and implementation of this plan was recognised by the Northern Territory Cattlemen's Association (NTCA) in consultation with the region's stakeholders. In consequence the NTCA made application for, and received a grant under the National LandCare Program for the development and implementation of this plan over a three-year period.

## 5. Organisation

### 5.1 Organisational Structure

The process of Adaptive Management is structured to ensure that:

- ▶ decision making is the sole prerogative of stakeholders;
- ▶ decisions are based on accurate knowledge of current understanding of particular issues and processes;
- ▶ decisions are made with regard to the interests and objectives of other residents and users of the region's resources;
- ▶ activities are coordinated among stakeholders;
- ▶ activities and decisions are undertaken with the knowledge and where appropriate assistance of government agencies;
- ▶ there is effective reporting to funding sources; and
- ▶ the decisions, activities and outcomes of the process are communicated to the broader community.

The process of adaptive management is supported by:

- ▶ Stakeholders Fora that make all decisions on all matters;
- ▶ individual stakeholders who provide support and ideas;
- ▶ operational groups that implement adaptive management programs;
- ▶ knowledge teams that provide technical and other advice;
- ▶ a Steering Committee and the NTCA that oversee the entire project through the NTCA's responsibility to the existing funding source (the NLP);
- ▶ consultants who provide suggestions on the conduct of adaptive management and on-ground coordination, and
- ▶ government agencies that provide advice and support.

The detailed roles and responsibilities of these groups/individuals are provided below.

#### **Stakeholders' Forum (SF)**

**Role:** Decision Maker

**Responsibilities:** Makes decisions on:

- ▶ how decisions are made;
- ▶ who makes decision;
- ▶ who are stakeholders;
- ▶ admission to meetings;
- ▶ goals and objectives;

- ▶ priorities;
- ▶ composition of Knowledge Teams;
- ▶ approvals of programs;
- ▶ implementation and monitoring of programs;
- ▶ approvals of reports;
- ▶ approval of applications for funding;
- ▶ communications; and on
- ▶ the sharing of the dividends of continuous improvement.

### **Individual Stakeholders**

**Role:** Project shareholder.

**Responsibilities:** Undertake to:

- ▶ participate in Stakeholders Fora;
- ▶ play an active role in program implementation and monitoring; and
- ▶ provide ideas.

### **Operational Groups**

**Role:** Implementation of Programs.

**Responsibilities:** Undertake to:

- ▶ implement, monitor, and report on Adaptive Management Programs;
- ▶ participate in Stakeholders Fora;
- ▶ play an active role in transfer of information on new approaches;
- ▶ provide ideas; and
- ▶ undertake the roles of Best Practice Groups.

### **Project Steering Committee & NTCA**

**Role:** Coordinator/manager

**Responsibilities:** Undertakes:

- ▶ budget management (NTCA resources only);
- ▶ consultant management;
- ▶ arrangements for Fora;
- ▶ record keeping i.e. "Record of Decisions" (ROD); and
- ▶ communications.

## **Knowledge Teams**

**Role:** Advisors

**Responsibilities:** Provide:

- ▶ summaries of the state of knowledge concerning priority objectives;
- ▶ recommendations on the priorities of various information gathering activities;
- ▶ alternative practices or approaches on priority issues;
- ▶ appropriate targets, assessment criteria and monitoring;
- ▶ alternative hypotheses, models and designs; and to
- ▶ advise Stakeholders of meeting times and places so that they may attend if they choose.

## **Consultant**

**Role:** Adviser, coordinator and facilitator.

**Responsibilities:** Manages/undertakes the following at the direction of the Stakeholder Forum or Advisory Committee:

- ▶ the process of risk assessment;
- ▶ the process of prioritisation;
- ▶ the development of alternative approaches in development/management;
- ▶ preparation of agendas;
- ▶ data storage and analysis;
- ▶ research as required and funded;
- ▶ preparation of reports;
- ▶ preparation of the Adaptive Management Plan;
- ▶ management of Knowledge Teams;
- ▶ development of adaptive management programs for priority objectives;
- ▶ implementation of adaptive management programs;
- ▶ monitoring;
- ▶ liaison and coordination with government agencies; and
- ▶ production of reports and applications to funding bodies.

## **Government Agencies**

**Role:** Advisors.

**Responsibilities:** Provide:

- ▶ technical advice on priority objectives;
- ▶ advice on alternative approaches in development/management;

- ▶ coordination of governmental monitoring with adaptive management programs;
- ▶ collaborative or other original research where appropriate; and
- ▶ a conduit for communications with other groups in the region.

## **5.2 The Process of Decision Making**

Decisions made by the Stakeholders' Forum are made on the basis of consensus or on the basis of a simple majority when the former proves impossible.

The Stakeholders' Forum may delegate decision-making on particular operational matters to any of the participants listed above. Delegation requires provision of reports on decisions taken under delegations. Reports are made to the Stakeholders' Forum following a decision having been made.

## 6. Plan Goals and Objectives

### 6.1 Objectives

Plan goals and objectives are developed through the Stakeholders' Forum, reviewed by the Steering Committee (Appendix A) and subsequently approved at a Stakeholders Forum.

The goals and objectives listed below are those viewed by the Stakeholders' Forum (2 June 2005) as being based on issues likely to have the gravest impacts of their capacity to implement ecologically sustainable development into the foreseeable future. The stakeholders may alter the objectives should physical, economic or social circumstances change, or new knowledge or understanding provide additional insights.

#### 6.1.1 Goal 1 – Development Approvals

Enhance and facilitate efficient and effective development approvals by government.

- ▶ Objective 1.1: Ensure that the most appropriate soils for the intended production system can be used in the most productive ways.
- ▶ Objective 1.2: Ensure forward approval of land clearing and water allocations on the basis of farm development plans.
- ▶ Objective 1.3: Develop greater flexibility in clearing approvals so as to avoid problems arising from inaccurate and misleading mapping.
- ▶ Objective 1.4: Ensure the on-ground presence of government soil conservation people providing advice on, and learning about land clearing and contour banks.
- ▶ Objective 1.5: Ensure review of government guidelines and requirements for clearing and control of re-growth i.e. reduce the cost and increase the practicality.
- ▶ Objective 1.6: Assist government in development of a definition of re-growth.
- ▶ Objective 1.7: Facilitate and assist government officers in remembering and responding to information provided by landholders.
- ▶ Objective 1.8: Ensure an appropriate right to control re-growth in areas cleared prior to there being a need to gain a permit.
- ▶ Objective 1.9: Engage government in a discussion on the ecologically sustainable clearing of all types of soil.
- ▶ Objective 1.10: Encourage government officers conducting site inspections to be prepared and carry sound data and background information.
- ▶ Objective 1.11: All development approvals are to be assessed by professional experts, not clerks.
- ▶ Objective 1.12: Ensure clear distinctions between minor and major clearing applications to reduce turn-around times.
- ▶ Objective 1.13: Ensure the right to sub-divide freehold lands for horticulture and special purposes e.g. conservation.

- ▶ Objective 1.14: Improve the capacity to sub-divide pastoral lands for more intensive development.
- ▶ Objective 1.15: Improve understanding of the meaning of the term “freehold”.

### **6.1.2 Goal 2 - Ground Water and the Daly River**

Ensure ecologically sustainable allocations of water to property owners.

- ▶ Objective 2.1: Ensure that ecologically sustainable allocations of water to property owners have guaranteed long-term security and certainty.
- ▶ Objective 2.2: Provide for enhanced long-term security and certainty of water allocations.
- ▶ Objective 2.3: Ensure the ability to transfer/sell water rights.
- ▶ Objective 2.4: Develop a better knowledge of herbicide and pesticide infiltration of ground water.
- ▶ Objective 2.5: Develop a better understanding of the movement of sediment, herbicide and pesticides into the river system.
- ▶ Objective 2.6: Improve understanding of merits and demerits of irrigation versus dry land systems.
- ▶ Objective 2.7: Support development and implementation of a regional/district water management plan.
- ▶ Objective 2.8: Support development of alternate and better methods of secure water storage including on-farm dams.

### **6.1.3 Goal 3 - Biodiversity**

Ensure the establishment and management of effective conservation areas in the Douglas-Daly Region.

- ▶ Objective 3.1: Ensure that planning of wildlife corridors and conservation occurs at the district and regional levels rather than at the level of individual farms.
- ▶ Objective 3.2: Develop wildlife corridors that are well planned, functional, are not havens for weeds and fire, and are not a drain on property management resources.
- ▶ Objective 3.3: Plan wildlife corridors that do not take up the best lands and soils.
- ▶ Objective 3.4: Implement effective and efficient management of wallabies.
- ▶ Objective 3.5: Ensure government adequately provides for the management of its conservation areas and other biodiversity responsibilities.
- ▶ Objective 3.6 Support development and implementation of a regional/district biodiversity conservation plan.

### **6.1.4 Goal 4 - Infrastructure**

Promote the development and functionality of services provided by public and private infrastructure (e.g. roads, power lines, schools).

- ▶ Objective 4.1: Ensure improved road maintenance in the district.
- ▶ Objective 4.2: Improve road design to avoid diversion drains causing erosion in paddocks.
- ▶ Objective 4.3: Provide power to all farms.
- ▶ Objective 4.4: Develop the Town of Fleming as a district centre providing service industries, workers, and cultural facilities.
- ▶ Objective 4.5: Attain recognition of the district by government and business e.g. Telstra, and obtain a postcode for the Douglas-Daly.

#### **6.1.5 Goal 5 - Invasive Species**

Implement management to maintain or reduce current levels and spread of invasive species.

- ▶ Objective 5.1: Improve control of unwanted species e.g. water buffalo and pigs.
- ▶ Objective 5.2: Gain access to an effective pig bait.
- ▶ Objective 5.3: Develop more cost effective measures for the control of weeds.
- ▶ Objective 5.4: Improve understanding and management of weed-feral animal and weed-fisher interactions.
- ▶ Objective 5.5: Ensure improved management of the public's perception of Gamba Grass.
- ▶ Objective 5.6: Ensure government attends to weed management of its road verges and other lands.

#### **6.1.6 Goal 6 - Improved Production**

Improve pastoral and farming techniques to ensure profitability and sustainability:

- ▶ Objective 6.1: Ensure that decisions are made only after sufficient research.
- ▶ Objective 6.2: Develop and promote best practice techniques.

#### **6.1.7 Goal 7 - Communications**

Develop sound mechanisms for ensuring accurate understanding of the region among the broader community.

- ▶ Objective 7.1: Counter and pre-empt media misinformation with up-to-date data.
- ▶ Objective 7.2: Demonstrate that what is happening in the Murray-Darling and in southeastern Australia is not what is happening in the Douglas-Daly Region.
- ▶ Objective 7.3: Develop a system for the rapid provision of accurate information.

## 6.2 Priorities

Objectives are prioritised having regard to:

- ▶ criticality (the probability of the issue's occurrence in a twelve month period);
- ▶ impact (of an occurrence of the issue as an average proportion of property gross annual income); and
- ▶ achievability (how long, in years, it will take to get a desired result).

The products of criticality and impact are used to provide indices of importance of the objectives, with achievability used to eliminate any objective viewed as unattainable or next to unattainable, and to distinguish between closely ranked goals and objectives. The priorities of the goals, and the objectives within the goals, are listed in Appendix D with the priority, with the top 13 presented in Table 1.

**Table 1 The 13 high priority objectives.**

Objective	Frequency	Importance	Risk	Risk Ranks
Objective 4.3: Provide power to farms	1	0.3	0.3	1
Objective 7.1: Counter and pre-empt media misinformation with up-to-date data.	1	0.22	0.22	2
Objective 6.1: Ensure that decisions are made only after sufficient research.	1	0.2	0.2	3
Objective 5.3: Develop more cost effective measures for the control of weeds.	1	0.2	0.2	3
Objective 3.2: Develop wildlife corridors that are well planned, functional, are not havens for weeds and fire, and are not a drain on property management resources.	1	0.17	0.17	4
Objective 2.2: Provide for enhanced long-term security and certainty of water allocations.	1	0.17	0.17	4
Objective 7.2: Demonstrate that what is happening in the Murray-Darling and in southeastern Australia is not what is happening in the Douglas-Daly Region.	1	0.15	0.15	5
Objective 5.6: Ensure government attends to weed management of its road verges and other lands.	1	0.15	0.15	5
Objective 3.5: Ensure government adequately provides for the management of its conservation areas and other biodiversity responsibilities.	1	0.15	0.15	5

<b>Objective</b>	<b>Frequency</b>	<b>Importance</b>	<b>Risk</b>	<b>Risk Ranks</b>
Objective 1.6: Assist government in development of a definition of re-growth.	1	0.15	0.15	5
Objective 1.2: Ensure forward approval of land clearing and water allocations on the basis of farm development plans.	1	0.2	0.15	5
Objective 1.1: Ensure that the most appropriate soils for the intended production system can be used in the most productive ways.	1	0.15	0.15	5
Objective 7.3: Develop a system for the rapid provision of accurate information.	1	0.13	0.13	6

The 13 high priority objectives are viewed by stakeholders as reflecting their major areas of concern in the ecologically sustainable development of the region. These areas are designated as follows.

- ▶ the provision of power to farms;
- ▶ implementation of a Douglas-Daly Communications Strategy;
- ▶ improved weeds management in the Douglas-Daly;
- ▶ better access to and sustainable management of water;
- ▶ enhanced conservation management in the Douglas-Daly Region; and
- ▶ improved methods for land development and management.

Stakeholders view the provision of power to farms and the implementation of a communications strategy as not requiring an adaptive management approach. Each of the remaining areas of concern will be the object of an Adaptive Management Program designed to find solutions to achieving its component objectives. The programs were ranked in order of importance in Table 2 below, along with the objectives they address, and the estimated time it will take to bring about some level of effective change.

Programs for provision of electric power, the development and implementation of a communications strategy, improved weeds management and better access to and sustainable use of water have either been initiated or are in the process of development.

**Table 2 Prioritised program, objectives and estimates of time to achieve an effective outcome.**

<b>Proposed Program</b>	<b>Objectives</b>	<b>Time to having an Effect (years)</b>
Provision of power to farms	4.3; 6.1	5, 5
Implementation of a communications strategy	7.1; 7.2	3, 5, 2
Improved weeds management	5.3; 5.6; 3.2; 6.1	5, 7, 5, 5
Improved access to and management of water	1.2; 2.2; 6.1	3, 5, 5
Enhanced conservation management	3.2; 3.5, 6.1	5, 5, 5

Proposed Program	Objectives	Time to having an Effect (years)
Improved development and management of land	1.1; 1.2; 1.6; 6.1	3, 3, 2, 5

## 7. Adaptive Management Programs

### 7.1 Knowledge and Understanding

Stakeholders are aware that implementation of these objectives may:

- ▶ involve resolution of conflicting interests and divergent priorities within and outside the Daly Basin;
- ▶ uncover incompatibilities among objectives;
- ▶ demonstrate that some objectives are more easily achieved than others;
- ▶ requires tolerance and understanding of others; and must be
- ▶ based on the availability of sound and generally accepted information.

Knowledge needs of the areas of major concern are reviewed in relation to this plan's objectives and priorities, and subjected to stakeholder discussion and consensus. The Knowledge Teams (Appendix B) conduct syntheses, based on literature reviews, of the knowledge issues surrounding priority objectives.

The Knowledge Teams use the syntheses to develop knowledge-based evaluations of the priority objectives. These are documented in the Knowledge Sections of the adaptive management programs and include assessments of:

- ▶ the current extent and nature of information on the issue available for the region;
- ▶ pertinent information that may be available from beyond the region; and
- ▶ details of stakeholder concern about the issues.

The knowledge-based evaluations inform stakeholders of conflicts and uncertainties and assist in the development of alternative ways of understanding and doing things. Resolution of conflicting objectives and priorities however may ultimately reflect societal values.

### 7.2 Targets and Assessment Criteria

Development of Adaptive Management Programs for priority objectives requires identification of:

- ▶ performance standards and measurements for evaluating objectives based on the best existing baseline/reference conditions;
- ▶ the knowledge basis for the performance standards and measures;
- ▶ monitoring activities to track progress, including methods, timelines, and responsible parties;
- ▶ how monitoring information is checked for quality/peer review if appropriate;
- ▶ how information is fed into the Knowledge Teams for interpretation and reporting to decision makers i.e. stakeholders; and
- ▶ activities associated with research targeted on monitoring requirements.

Development of the programs has resulted in the identification of performance standards and monitoring procedures for:

- ▶ Improved Weeds Management - Objectives 5.3, 3.2, 5.6, 3.5; and
- ▶ Access to and Sustainable Use of Water – Objectives 3.2 and 2.2

Additional information gathering and research requirements were identified as being required in order to begin development of alternative practices for adaptive management in relation to:

- ▶ Improved Weeds Management - Objectives 5.3 and 3.2 (although monitoring methods have been agreed).

### **7.3 Management and/or Development Alternatives**

Appropriate conceptual models, graphical models, written descriptions of cause and effect and even mechanistic/stochastic quantitative models are developed to ensure full understanding of processes leading to outcomes in relation to priority objectives. The basic principles of model building are as follows.

- ▶ Multi-parameter models require more assumptions than simple models.
- ▶ Simple models are usually capable of modelling the majority of variation in a parameter.
- ▶ Simple models are preferred in all cases.
- ▶ Acquiring perfection through development and rigorous testing of complex models over inevitably long periods of time is viewed as “fiddling while Rome burns”.

Models are developed by the stakeholders through the Knowledge Teams, and by outside expertise under the direction of the Stakeholders Forum. The models allow for the identification of key uncertainties that can be tested by adaptive management, or as appropriate by additional research.

Alternative development/management actions/processes are developed to test key uncertainties associated with each priority objective. The design of tests of alternative development/management options is based on the following rules:

- ▶ simple designs are usually more practical and more likely to yield informative results than complex designs; and
- ▶ contrasts of extremes (light and dark) are more likely to be informative than less contrasting comparisons (grey A versus grey B).

Priority objectives may be influenced by more than one alternative hypothetical model. In some of these cases stakeholders may consider that the only alternative is to request that government consider funding additional research into the issues. In the remaining cases an Adaptive Management Program to test the alternatives will be possible, and would produce a relatively fast and reliable outcome.

Full details of required research, performance measures, monitoring protocols and details of the designs for testing approved alternatives are provided in the Adaptive Management Program for each priority area.

## **7.4 Selecting Management / Development Alternatives**

The additional costs, the likely impacts on the objective and the performance target, and the time required to adequately test alternative practices are developed for each priority objective where it is possible to implement adaptive management. These are compared within and across objectives in order to determine those objectives and alternative practices to be subject to adaptive management. The selection is based on total costs, level of impact on the objective, this level in relation to the estimated required performance target and time based efficiency of the expenditure.

The decision to focus on particular objectives is strongly related to the critical nature of the issues to the future development of the region, and the likely positive significance of environmental and economic outcomes.

## **7.5 Implementation and Monitoring**

Implementation of an Adaptive Management Program is carefully planned to ensure:

- ▶ identification and acquisition of any required monetary support;
- ▶ identification and approval to use lands, places etc required for the program;
- ▶ identification, acquisition and/or approval to use required equipment or operational supplies;
- ▶ identification of participants in the program, and delineation of individual roles and responsibilities;
- ▶ identification of contingencies in case of unforeseen disruption to planned activities;
- ▶ identification of back-up personnel to ensure continuity when someone encounters an unforeseen inability to fulfil a role;
- ▶ development and promulgation of a timetable of activities for the program as a whole, and for each individual participant;
- ▶ development and promulgation of lines of communication for transfer of monitoring and other information;
- ▶ identification of repositories for data/information, and the person/s designated to analyse such data;
- ▶ identification of appropriate quality control and peer review mechanisms;
- ▶ development of requirements for reporting the status of a program, and updating and communicating monitoring information; and
- ▶ identification of appropriate times for review of progress with individual participants and the Stakeholder's Forum.

Each of these issues is detailed in the Adaptive Management Programs for each priority objective.

## **7.6 Review and Evaluation**

Reviews of progress of the Adaptive Management Programs for each priority objective are established at appropriate milestones during implementation. These milestones involve review of progress and monitoring, reporting to the Stakeholders Forum, and approval of any modification, change of direction, additional activities or even cessation of the program. The reviews include the following activities, or answer the following questions.

- ▶ Does the monitoring information document progress toward performance standards from monitoring information.
- ▶ Was the performance measure a feasible metric that gave an accurate measurement of the standard?
- ▶ Do results show change along a predicted ecological trajectory toward achieving the objectives?
  - If not, are there factors constraining or impacting the system?
  - Or, is the system functioning well and should performance standards be changed?
- ▶ How should future monitoring be designed?
- ▶ What actions for current and future phases should participants consider implementing based on this information?
- ▶ Did/is the experiment answering the question posed?
- ▶ Was the Conceptual Model confirmed, or does it need to be revised?
- ▶ Was the correct link in the Conceptual Model identified and the wrong question asked (wrong hypothesis)?
- ▶ Was the Adaptive Management experiment capable of answering the question?
- ▶ Describe the process for evaluating and including exogenous and social factors into Adaptive Management, applied studies and/or interpretation.
- ▶ Did the experiment reveal a need for additional information or research?
- ▶ Should the program continue and if so for how long?
- ▶ If the program has been completed, would it be desirable to incorporate the results into ongoing management decision-making?
  - If so, is incorporation of results into ongoing management cost effective?
  - Or does achievement of the objective require development of another Adaptive Management Program, dealing with an alternate model, hypothesis, variable or design, and what is its priority compared to other possible activities?

## 8. Incorporating New Information into Management Decisions

A plan is developed to facilitate and ensure adoption of and/or incorporation of results into future decision making/management following final review of the results of an Adaptive Management Program, and a decision to make use of those results.

This includes:

- identification of stakeholders for whom the results are of use;
- identification of the form of information transfer/training;
- identification and production of aids to information transfer;
- facilitation of acquisition of resources required for implementation;
- development of a timetable for incorporation;
- identification of mechanisms for measuring the effectiveness of incorporation, and the benefits of outcomes in terms of the original objective; and
- establishment of a timetable for future review of outcomes.

The process of transfer of information to stakeholders and its incorporation in management is in essence an Adaptive Management Program in itself, and should be treated as one.

## Appendix A

# Steering Committee

### **Chairperson**

Mr Stuart Kenny,

Executive Director, Northern Territory  
Cattlemen's Association

### **Committee Members**

Ian McBean

Douglas-Daly NTCA Representative

Dr David Ritchie

Chief Executive, Department of Natural  
Resources, Environment and the Arts

Mr Rod Gobbey

General Manager, Primary Industry Group,  
Department of Primary Industry, Fisheries and  
Mines

### **Consultants**

Dr Bill Freeland

GHD Pty Ltd

Mr Roger Smith

Kholassey Pty Ltd

## Appendix B

# Knowledge Teams

### **Provision of Power to Farms:**

Stakeholders are to complete expressions of interest to the Power and Water Corporation for connection to the electricity grid. This is with a view to joint funding with the NT government and a proposed Regional Partnership Program grant funding on behalf of the Douglas Daly Community Development Association. In addition the Stakeholders Forum will be provided with information on the Commonwealth Government's Renewable Energy Program to support the adoption of hybrid power systems.

### **Implementation of a Communications Strategy:**

Roger Smith and Stuart Kenny consulted with Jane Munday to develop a communications strategy for consideration by the Douglas Daly Adaptive Management Stakeholders Forum.  
The strategy has been approved and is included in Appendix D.

### **Improved Weeds Management:**

Sam McBean (Stakeholder)  
Stefan Hart (Stakeholder)  
Alice Bielby (Department of Natural Resources, Environment and the Arts)  
Rowena Eastick (Primary Industries Group)  
Bill Freeland (Consultant)  
Roger Smith (Consultant)

### **Access to and Management of Water:**

Phil Howie (Stakeholder)  
Dan Thomson (Stakeholder)  
Ian Smith (Department of Natural Resources, Environment and the Arts)  
Fergal O'Gara (Primary Industries Group)  
Bill Freeland (Consultant)  
Roger Smith (Consultant)

### **Enhanced Conservation Management:**

Dan Thomson (Stakeholder)  
Chris Muldoon (Stakeholder)  
To be determined (Department of Natural Resources, Environment and the Arts)  
Phil Hausler (Primary Industries Group)  
Bill Freeland (Consultant)

Roger Smith (Consultant)

**Improved Land Development and Management:**

Phil Howie (Stakeholder)

Sam McBean (Stakeholder)

Ian Lancaster (Department of Natural Resources, Environment and the Arts)

Phil Hausler ((Primary Industries Group)

Bill Freeland (Consultant)

Roger Smith (Consultant)



## Appendix C

# Risk Assessment of Objectives.

<b>Objective</b>	<b>Frequency</b>	<b>Importance</b>	<b>Risk</b>	<b>Risk Ranks</b>
Objective 4.3: Provide power to farms	1	0.3	0.3	1
Objective 7.1: Counter and pre-empt media misinformation with up-to-date data.	1	0.22	0.22	2
Objective 6.1: Ensure that decisions are made only after sufficient research.	1	0.2	0.2	3
Objective 5.3: Develop more cost effective measures for the control of weeds.	1	0.2	0.2	3
Objective 3.2: Develop wildlife corridors that are well planned, functional, are not havens for weeds and fire, and are not a drain on property management resources.	1	0.17	0.17	4
Objective 2.2: Provide for enhanced long-term security and certainty of water allocations.	1	0.17	0.17	4
Objective 7.2: Demonstrate that what is happening in the Murray-Darling and in south-eastern Australia is not what is happening in the Douglas-Daly Region.	1	0.15	0.15	5
Objective 5.6: Ensure government attends to weed management of its road verges and other lands.	1	0.15	0.15	5
Objective 3.5: Ensure government adequately provides for the management of its conservation areas and other biodiversity responsibilities.	1	0.15	0.15	5
Objective 1.6: Assist government in development of a definition of re-growth.	1	0.15	0.15	5

<b>Objective</b>	<b>Frequency</b>	<b>Importance</b>	<b>Risk</b>	<b>Risk Ranks</b>
Objective 1.2: Ensure forward approval of land clearing and water allocations of the basis of farm development plans.	1	0.2	0.15	5
Objective 1.1: Ensure that the most appropriate soils for the intended production system can be used in the most productive ways.	1	0.15	0.15	5
Objective 7.3: Develop a system for the rapid provision of accurate information.	1	0.13	0.13	6
Objective 3.4: Implement effective and efficient management of wallabies.	1	0.13	0.13	6
Objective 1.5: Ensure review of government guidelines and requirements for clearing and control of re-growth i.e. reduce the cost and increase the practicality.	1	0.12	0.12	7
Objective 1.8: Ensure an appropriate right to control re-growth in areas cleared prior to there being a need to gain a permit.	1	0.1	0.1	7
Objective 4.4: Develop the Town of Fleming as a district centre providing service industries, workers, and cultural facilities.	1	0.1	0.1	7
Objective 1.3: Develop greater flexibility in clearing approvals so as to avoid problems arising from inaccurate and misleading mapping.	1	0.1	0.1	7
Objective 4.1: Ensure improved road maintenance in the district.	1	0.09	0.09	8
Objective 2.1: Ensure ecologically sustainable allocations of water to property owners have guaranteed long-term security and certainty.	1	0.08	0.08	9
Objective 5.2: Gain access to an effective pig bait.	1	0.07	0.07	10
Objective 5.1: Improve control of unwanted species e.g. water buffalo and pigs.	1	0.07	0.07	10

<b>Objective</b>	<b>Frequency</b>	<b>Importance</b>	<b>Risk</b>	<b>Risk Ranks</b>
Objective 4.2: Improve road design to avoid diversion drains causing erosion in paddocks.	1	0.07	0.07	10
Objective 3.1: Ensure that planning of wildlife corridors and conservation occurs at the district and regional levels rather than at the level of individual farms.	1	0.07	0.07	10
Objective 2.7: Support development and implementation of a regional/district water management plan.	1	0.07	0.07	10
Objective 1.4: Ensure the on-ground presence of government soil conservation people providing advice on, and learning about land clearing and contour banks.	1	0.07	0.07	10
Objective 1.7: Facilitate and assist government officers in remembering and responding to information provided by landholders.	1	0.05	0.05	11
Objective 5.4: Improve understanding and management of weed-feral animal and weed-fisher interactions.	1	0.05	0.05	11
Objective 1.9: Engage government in a discussion on the ecologically sustainable clearing of all types of soil.	0.9	0.05	0.045	12
Objective 5.5: Ensure improved management of public's perception of Gamba Grass.	1	0.03	0.03	13
Objective 4.5: Attain recognition of the district by government and business e.g. Telstra, and obtain a postcode for the Douglas-Daly.	1	0.03	0.03	13
Objective 3.3: Plan wildlife corridors that do not take up the best lands and soils.	1	0.03	0.03	13
Objective 2.5: Develop a better understanding of the movement of sediment, herbicide and pesticides into the river system.	1	0.03	0.03	13
Objective 2.4: Develop a better knowledge of herbicide and pesticide infiltration of ground water.	1	0.03	0.03	13

<b>Objective</b>	<b>Frequency</b>	<b>Importance</b>	<b>Risk</b>	<b>Risk Ranks</b>
Objective 2.6: Improve understanding of merits and demerits of irrigation versus dry land systems.	1	0.025	0.025	14
Objective 1.13: Ensure the right to sub-divide freehold lands for horticulture and special purposes e.g. conservation.	0.5	0.05	0.025	14
Objective 1.14: Improve the capacity to sub-divide pastoral lands for more intensive development.	0.42	0.03	0.012 6	15
Objective 1.15: Improve understanding of the meaning of the term "freehold".	1	0.01	0.01	16
Objective 1.11: All development approvals are to be assessed by professional experts, not clerks.	1	0.01	0.01	16
Objective 1.10: Encourage government officers conducting site inspections to be prepared and carry sound data and background information.	1	0.01	0.01	16
Objective 2.3: Ensure the ability to transfer/sell water rights.	0.5	0.01	0.005	17
Objective 1.12: Ensure clear distinctions between minor and major clearing applications to reduce turn-around times.	0.33	0.01	0.003 3	18

Appendix D

# A Communications Strategy for the Ecologically Sustainable Development of the Douglas Daly Region



Appendix E

**An Adaptive Management  
Program for Improved Weeds  
Management in the Douglas Daly  
Region.**

Appendix F  
Water Management Program.

Appendix G

# Management Program for Improved Nature Conservation.

Appendix H

# Adaptive Management Program for Land Development.

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**Document Status**

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