Indigenous social and cultural values relating to water in the Fitzroy Valley, Kimberley (WA): Information availability, knowledge gaps and research needs

Gooniyandi Seasonal Calendar produced under the TRaCK Program

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Background and aims

This short review has been prepared to inform the development of project ideas under the Northern Environmental Resources Hub of the National Environmental Science Program (NESP). It draws together previous literature relating to Indigenous social and cultural values of water in the Fitzroy River valley of the Kimberley in anticipation of discussions about research that might improve the capacity of water managers, Indigenous communities and others to plan for future water use in the catchment. This document does not articulate a research proposal or plan. To develop such will require detailed discussions with the Department of Water and with representative Indigenous organisations in the region. In light of the current state of research planning for NESP, this review aims to:

- collate and summarise information available on the water-related values, knowledge and management interests of Indigenous communities of the Fitzroy Valley;
- identify knowledge gaps and propose some preliminary ideas for how they might be filled; and
- lay out some initial thoughts for future discussions between NESP researchers, Indigenous organisations and the Department of Water.

Australia’s national water policy, the National Water Initiative (NWI) (Australian Government 2004), explicitly recognises Indigenous interests in water, although the rights acknowledged are limited (Tan and Jackson 2014). The NWI requires jurisdictions to include Indigenous customary, social and spiritual objectives in water plans. Native title interests in water are to be taken into account and Indigenous water use assessed and addressed in plans which involve Indigenous communities in their development. Western Australia’s Implementation Plan for the NWI recognises the importance of Indigenous engagement and contributions of ecological knowledge in developing water management plans and making water allocations. In the plan, Indigenous access to water is limited to non-consumptive ‘cultural’ uses. The State’s Rights in Water and Irrigation Act 1914 does not however expressly recognise Indigenous issues or engagement and, except through local water resource management committees, provides no additional measures for Indigenous engagement (NWC 2014).

The Draft Kimberley Regional Water Plan (Department of Water, 2010), acknowledges that ‘water in the Kimberley has important cultural and social values which will continue to be understood and recognised in planning and management’ (p.12) and identifies a priority for research on ‘water dependent values to establish water
regimes for existing ecological, social, cultural and economic values’ (p. 34)1. Under this Plan, ecological, social and cultural values of waterways will be recognised when assessing new development proposals.

It is evident that across Australia water managers are beginning to recognise the potential of Indigenous hydrological knowledge to contribute to contemporary water resource management challenges. Western Australia showed an early interest in this area in work conducted in the Canning Basin, the Ord, the Fitzroy and Pilbara areas of the state’s north. In all these WA regions, relatively comprehensive studies of Indigenous values were commissioned by the then Water and Rivers Commission and this body of work will be of value in future research and practice (see Barber and Rumley 2003; Yu 2000; 2001; Rumley and Barber 2004). At the same time, many Indigenous communities have shown that they are keen to undertake or contribute to research activities that will promote and conserve their water related knowledge as well as to develop water policy. In the Kimberley region there is a recent history of Indigenous participation in research for the TRaCK program (Jackson and Douglas 2015), growth of Indigenous capacity for environmental management (evident in the burgeoning Ranger movement) and leadership from Indigenous organisations in developing catchment scale plans (Griffiths and Kinnane 2010). Kimberley Aboriginal leaders were also closely involved in the pan-north Australian discussions relating to water policy development and Indigenous water rights conducted under the auspices of NAILSMA’s Indigenous Water Policy Group (see nailsma.org.au).

Water resource managers face multiple challenges in determining Indigenous water requirements and allocating water to meet Indigenous water needs, including methodological ones (Finn and Jackson 2011; Jackson et al. 2012). The recent (third) biennial assessment of national progress on water reform found that where assessments of Indigenous values have been made, they usually involved cursory desktop reviews (NWC 2011) and not engaged participatory research or comprehensive studies of the hydrological linkages between water-dependent ecosystems and Indigenous use and values. Finn and Jackson (2011) note the prevalence of a limiting assumption that environmental flows can adequately serve as a surrogate for a targeted mechanism or assessment process to meet Indigenous social, cultural or spiritual requirements, obviating the perceived need for more rigorous assessments.

Studies referred to below describe Indigenous interests in water and values associated with water as distinct, diverse, wide-ranging, elemental, holistic in

1 The WA Department of Water released its first Reconciliation Plan (2015-2017) in July. In it the Director General committed to ‘strengthening our relationship with Aboriginal people and providing genuine economic opportunities’ across the state.
perspective, interconnected (see for example, Toussaint et al. 2005; Yu 2005; Jackson and Barber 2014). What is readily apparent when one seeks to address such values in a water resource management context is how intangible, subjective, and hence, difficult some of these values are to translate given the prevalent conceptualisation of water as a resource and the utility based definition of environmental value in contemporary water resource management (Jackson 2006; Gibbs 2006; Langton 2005). Studies of the significance of water to Indigenous societies, like those cited below in relation to the Kimberley, provide a rich account, narrative and qualitative in style, but they provide little guidance to water planners seeking to understand the contribution of flow to Indigenous use of rivers, water-bodies and resources. Water planners require a specification of some flow or range of flows that optimise, permit, or do not irrevocably harm the human (and other) uses reliant on flow. For instance, South African environmental flow research demonstrates the need to make clear the link between direct human resource use and flow regime, achieved through studies of resource use patterns and their dependence on flow, quantification of harvested resources and spatially explicit information on harvesting rates (Finn and Jackson 2011).

Quantifying ecological goods and services provided by rivers and the people with responsibilities for their stewardship as well as establishing better links between environmental flows, organism health and human well-being are important Australian research priorities. Some values and relationships will not be amenable to quantification. Qualitative information can illuminate the way in which the consumption and distribution of resources is underpinned by beliefs, values and social relations, and improve our understanding of value concepts in cross-cultural contexts (Finn and Jackson 2011). Establishing potential links between flow regimes and water landscape qualities would provide a useful qualitative analysis if they identify components of the flow regime that are a critical feature of socially valuable flows for the area.

The challenge in this area is also a water governance one, it is not limited to merely identifying water needs or determining an ideal flow regime that will meet those needs. Traditional owner groups throughout Australia are currently expressing a strong desire to exercise authority, responsibility and control in the determination of water allocations to meet their requirements. The benefits Indigenous people derive from increased environmental allocations, for instance, could be enhanced with improvements to water planning processes and environmental water governance arrangements to ensure that they are more inclusive of Indigenous uses, values and priorities (Nikolakis and Grafton 2014; O’Donnell 2014; Jackson and Altman 2009).
To achieve this, environmental water programs need to be more accessible to Indigenous people and the opportunities for co-management of water bodies with Indigenous NRM groups investigated. It is through direct participation in water management that Indigenous people will be better placed to maintain and transmit local knowledge and cultural values.

Recently we have seen experimentation in research methods to incorporate Indigenous water values in water management and this has occurred in the tropical north (Jackson et al. 2014; Stoeckl et al. 2014), the arid centre (Rea et al. 2008) and in the Murray-Darling Basin (Mooney et al. 2012; Jackson et al. 2015). These studies explored the application of methods to derive water requirements to meet Indigenous values at each case study site. Jackson et al. 2015 for example defined additional volumes of water and potential works that would be needed to meet the water requirements of two Aboriginal communities in two NSW catchments and the impact of alternative water planning scenarios on those values (see also Stoeckl et al. 2014 for an NT case). The experience from these studies, particularly those that were undertaken in north Australia as part of the TRaCK program, will be useful in refining the scoping process for Kimberley work over coming months.

Figure 1: TRaCK monitoring project working at Jillyardie behind Bayulu. Left: Roneil Skeen (Gooniyandi). Top right: Thomas Dick. Bottom right (L-R): Morris Mackie, Marcus Finn, Roneil Skeen, Canian Skeen.
A further point should be made about building on the legacy of the TRaCK program, as well as the efforts of the State water agency. The body of research undertaken by TRaCK established some firm relationships with traditional owner groups (and others, e.g. FITZCAM), built capacity among non-Indigenous biophysical researchers to collaborate with Indigenous communities and it generated knowledge that will be of use to future water-related research in the Fitzroy catchment. The following projects reviewed publications, policies and laws and collected data that is likely to be of use in understanding the socio-ecological system, water use impacts and the mediating effects of governance arrangements. At the very least data obtained from some of this work as well as ecological studies referred to in a parallel review of ecological water requirements (Pusey and Kath 2015), could serve as baseline information with which to assess changes in ecological and socio-economic condition. Other studies referred to below (e.g. work by Close (2014), Toussaint et al. (2011; 2005), Toussaint (2008; 2009; 2014) and Morphy (2010) could also serve a similar function.
Some relevant TRaCK projects:

- TRaCK 2.2. Indigenous Socio-Economic Values and River Flows: this project worked with traditional owners and Indigenous residents of Fitzroy Crossing to collect information on people’s use of aquatic plant and animal life; it quantified that use over a 2 year period and estimated the economic value of those resources. It also worked with Warlmajarri and Gooniyandi language speakers to develop seasonal calendars representing eco-hydrological knowledge and local management actions. A third component worked with Rangers to trial a participatory water monitoring program. Following completion of the project, researchers explored new ways of representing this information in models of subsistence resource use and models that predicted changes from water use.

![Figure 3: Promoting the Gooniyandi seasonal calendar](image)
• **TRaCK 6.1 – The NAILSMA Facilitator’s Guide to Indigenous Water Planning:**
   (The following summary was obtained from the TRaCK website): The Facilitators’ Guide to Indigenous Water Planning outlines a structured, community-based program to improve the inclusion and participation of Traditional Owners and Indigenous communities in water management. The Guide forms part of a suite of initiatives directed towards the statutory recognition of traditional and custodial management systems of the Traditional Owners of Australia’s water resources.

   The model of facilitation promoted in the Handbook progresses in steps from initial engagement through to the production of a Catchment Action Plan (CAPs) that is developed and owned by Traditional Owners for cultural management and commercial developments on ‘Water Country’.

   The Guide is based on five years of research, engagement and capacity-building initiatives and aims to progress Traditional Owner and Indigenous community interests in water reform. The work has been carried out by the Tropical Rivers and Coastal Knowledge (TRaCK) research consortium and North Australian Indigenous Land and Sea Management Alliance (NAILSMA).

• **TRaCK 1.3 Collaborative water planning tools:** Although this project did not directly work in the Fitzroy (rather the Ord River was a focal study), this project provides a comprehensive understanding of the legal and policy frameworks affecting water use and management and it trailed a number of collaborative planning tools that could be applicable to future work.

• **TRaCK 6.2 Indigenous water rights in Northern Australia:** This review project covered the range of laws applicable in northern Australia that recognize and affect Indigenous rights and interests in relation to onshore or inland waters both surface and subterranean. This included both Federal law and the law of the provincial jurisdictions of Western Australia, the Northern Territory and Queensland (see [http://www.track.org.au/publications/registry/track938](http://www.track.org.au/publications/registry/track938)).

**Scope and research problem definition**

The Fitzroy Valley was chosen as the focal area given the likelihood of increased water use by the agricultural and mining sectors and the possibility of associated environmental and social impacts. It is assumed here that comprehensive water
planning will be undertaken in this area in the near future and that an NWI compliant allocation regime will accompany such planning. Indigenous representation in water planning would be a requirement of an NWI-compliant approach to water allocation, for example (Jackson et al. 2012), as would careful attention to the determination of environmental flows. It is further assumed that one objective of such a process will be to specify Indigenous water requirements, in a manner that protects the native title rights of Indigenous communities including their heritage, and establishes the required water governance arrangements to meet identified needs for water, as well as for the co-management of water resources. Indigenous people of the Kimberley have demonstrated on numerous occasions that they have distinct and diverse interests in the outcomes of water allocation decisions and therefore need to be involved in deliberating over the consequent costs and benefits of water use scenarios (see the work of Yu and Toussaint for example).

Environmental water management is likely to be a strong focus of the research but may not be the only one. It is hoped that water managers and the wider State government, as well as other non-Indigenous stakeholders, will be looking to establish innovative, fair and equitable water governance arrangements and management institutions that achieve more than a legal minimum, ones that are of benefit to Indigenous people and align with their wider aspirations for greater self-determination in environmental management and regional development (see Griffiths and Kinnane 2010). Indigenous groups in many parts of Australia have encountered considerable difficulty in having their values recognised in environmental water management (problems arising from short planning time-frames, the technical complexity of water management and the narrow ecological focus given to the definition of environmental assets or environmental water objectives) and so scoping for new research in the Kimberley should allow participants to reflect on these common barriers and to experiment in alternative approaches.

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2 A significant proportion of the state is subject to native title or native title claims that also influence Indigenous access to water for customary or traditional purposes. Under the Native Title Act 1993 future acts legislative regime, procedural rights exist for native title holders and claimants to provide comment before a decision is made to grant a water license or permit. The Western Australian Aboriginal Heritage Act 1972 also affects Indigenous access to water, as water users are liable for any action that interferes with or damages an Indigenous heritage site (NWC 2013; see also O’Donnell 2013).
Based on this understanding, it is suggested that the scope of research on Indigenous water values could be built around two inter-related components:

(i) a socio-ecological one that identifies and where possible quantifies flow links and works towards predicting and mitigating negative impacts from water resource development; and

(ii) a water governance one that examines the opportunities for new arrangements, mechanisms and institutions to improve access to water, enable Indigenous participation in water related decision-making and improve the strength of Indigenous people’s relationships to water e.g. through sharing in decisions affecting water, through the maintenance and restoration of Indigenous practices that transmit and affirm cultural values, through support for Indigenous caring for country activities.
Agreement should be reached on this framing of the research context and definition of the problem (or opportunity) before there is any further scoping of research activities. Indigenous participation will be essential to this step and should enable discussion of opportunities for Indigenous people to be directly involved in the selected research activities. It will also be necessary to consider the approach of the current water agency to the assessment of environmental flows and models for assessing water use scenarios as well as to align the research with procedural steps in water planning.

**Sources of Literature**

The literature reviewed below was obtained from online searches of journal papers and reports. Most materials could be downloaded from either open source sites or from the online facility of the Griffith University library. Two literature reviews pertaining to the Kimberley (Scott 2009; Sullivan and Stacy 2012) were read closely to update the material held by the author. Only a small number of reports or documents were not cited and these are referred to in the bibliography to follow.

The bibliography is divided into two sections: (i) journal papers and unpublished or published reports and (ii) databases, films, and other media. Before turning to the bibliography, a section that generalises and summarises the Australian literature on Indigenous water values is provided to give some further context to the scope of the field of research as well as to character of water values – the associations with, meanings attributed to and uses of water.

**Overview of Australian literature on Indigenous water values**

The significance of water and rivers to Indigenous societies has grown as a topic of interest to researchers, lawyers engaged in native title processes, natural resource management groups, and water resource managers since the late 1990s. Within anthropology and geography there have been a number of studies explicitly documenting and analysing the ways in which Indigenous societies attribute meaning to water and the place of water in their formalised systems of knowledge and social institutions (Strang 2001; Langton 2002, 2006; Yu 2003; Rose 2004; Toussaint et al. 2005; Jackson 2006; Weir 2009; Maclean and Bana Yaralji Bubu Inc., 2011). Much of this literature is drawn from ethnographic studies carried out in northern Australia, in regions such as the Kimberley. Water is examined as a feature of the Indigenous cultural landscape with significant attention devoted to the symbolic dimension of
individual and group attachment to water bodies and to the role of water in connecting people through social institutions that govern resource management. As well as examining the symbolic, metaphorical and conceptual significance of water, studies also reveal the material use of water according to Indigenous custom. Some authors describe water’s economic significance as a vital element underpinning the Indigenous harvest and intra-community distribution of aquatic life (e.g. Strang 2001; Altman 2004; Behrendt & Thompson 2004; Jackson et al. 2011; 2014; Toussaint 2014). A number of the studies cited here describe and interpret the stories relating to water represented in myth, painting, film, and dance, and the local customary practices, beliefs and ideas associated with water that are characterised as ‘water ways’ by Toussaint et al (2005).

From this literature it is apparent that water plays a central role in Australian Indigenous societies. All studies reviewed in Jackson and Morrison (2011) observe that groups conceptualise water sources and rivers as having derived from the actions of mythic beings during the Dreaming, when the world attained its present shape and the socio-cultural institutions governing water use were formed (Langton 2002; Barber & Rumley 2003; Yu 2003; Toussaint et al. 2005). Water’s vitality is underscored in these accounts and research from the Kimberley in particular has stressed the life-giving quality of water in Indigenous accounts. In contexts where resources or places are under pressure, there may be a tendency to focus on key places or sacred sites as people strive to retain their traditions. However, affiliations to water are much broader than those encompassed by the conventional cultural heritage paradigm: these humanitarian values relate to notions of sociality, sacredness, identity and life-giving (Jackson 2006).

Published and unpublished research in the field of native title discusses Indigenous affiliations with a range of Kimberley water sources, such as rivers, soaks, creeks, pools, lagoons and ‘living water’ (known locally as jila) (Toussaint 2008). The recent Kimberley studies (Yu 2000; Barber and Rumley 2003 and Toussaint et al 2003) were commissioned by WA’s water agency to inform the development of water allocation plans, illustrating the way in which recent scientific interest in water management is driving the documentation of Indigenous water use and knowledge and other attachments to water.

More recently, analysis has been directed to the definition, explication and incorporation of Indigenous values relating to water in environmental planning and to Indigenous aspirations for resource governance in catchment-scale institutions (Morgan et al. 2004; Rea 2008; Weir 2009; Maclean and Robinson 2011; Jackson et al. 2012), particularly within the water-stressed Murray-Darling basin (Jackson et al. 2015). The articulation between customary and statutory water rights systems has
been analysed in the legal and policy literature (Behrendt and Thompson 2004; Lingiari Foundation 2004; O’Donnell 2011; 2013; Tan and Jackson 2014).

**Annotated Bibliography of Kimberley Literature**


A scoping report that presents stakeholder views on Kimberley water issues. A chapter on the Fitzroy River Valley includes discussion of the WAI proposal; disruption to ecological systems; Aboriginal interests; and fishing, tourism and pearling. The report documented concerns about regulation of the Fitzroy River or its tributaries including: potential impacts on local fish stocks, fish passage and migration, damage to the riverine environment, loss of places of cultural significance due to inundation, the loss of areas with high eco-tourism potential (e.g. Dimond Gorge).

The need to assess and protect the Indigenous cultural values of the area was highlighted in reported consultations. Of particular concern were those values associated with seasonal water holes and soaks. This was cited as an example of the close linkages between the ecology of the area and Indigenous cultural values. The important role of groundwater as a life force in the beliefs of the Indigenous community was also raised.


The objective of the Fitzroy River Catchment Management plan was to prepare a plan for the future development of the catchment region that meets the needs of all stakeholders for maintaining the key values of the region, through community engagement and catchment planning. This project was commissioned and funded by Rangelands NRM WA. In developing the Management Plan the facilitators held a number of workshops with FitzCAM and other stakeholder groups. During the workshops a total of 122 individual assets were identified. These assets were grouped into 5 themes:

The second theme was Water:

*Water, and more specifically water quality, was identified as a core issue for Indigenous people and pastoralists. The relatively unregulated water flow of the Fitzroy River was identified as an important asset that helps to maintain a healthy river system through annual cleansing during floods.*
The Plan identified a number of threats to waterways and aquifers including dams and over-extraction. The top two priorities for action were:

- Research and document the links between the different water storage systems of the river (surface, alluvial and groundwater).
- Give appropriate input to assist the Department of Water to produce equitable water management plans, which include maintaining natural river flows.


This report has a section on Social and Cultural Considerations that includes reference to the studies covered here (e.g. Toussaint et al 2005, Yu 2000). The report also refers to the heritage management system noting that a number of areas have been listed on the Register of the National Estate, including Geike Gorge. Although Indigenous values are known to exist in the area of Geike Gorge, at the time of writing, these had not been identified, documented or assessed for National Estate significance by the Heritage Commission. The Kimberley region had recently been declared for its heritage significance:

The West Kimberley, about 22,500,000 ha, generally extending from Roebuck Bay in the west to the Hann River (including Drysdale River National Park) in the east, and from the Fitzroy River in the south to, and including, the Bonaparte and Buccaneer Archipelagos in the north, is now listed on the National Heritage List (2009: 90).


A preliminary study that explored the perception that fishing reduces the abundance of targeted, large-bodied species (e.g. barramundi and black bream) that become restricted to disconnected waterholes during the distinct dry season. The authors used metrics of human ‘accessibility’ to map pressure on waterholes. Data indicated that the abundance of some targeted species, particularly barramundi and probably black bream, were correlated with accessibility and showed a negative relationship to
fishing pressure, whereas non-target species showed no discernible trend. In light of increases in visitation rates and regional populations, the authors recommend that more detailed information be gathered on the spatio-temporal harvesting of fish by both Indigenous and recreational fishers. Such information should be considered in future management options and in research that addresses the impact of Indigenous harvesting of various fish species for ceremonial and other purposes, including mourning rituals (Toussaint 2010). In light of the high Indigenous population, the authors suggest that freshwater protected areas represent a management option worthy of attention.


The Plan brings together the four peak Regional Aboriginal Organisations (RAOs) which ‘understand and practise proper cultural governance’. These RAO’s are responsible for caring for Country, rights, law, language, land and culture on country. The Plan provides information on the recent history of Kimberley Indigenous NRM activities including the formation of the Kimberley Aboriginal Reference Group (KARG) which in 2007 contributed an Aboriginal chapter to a broad Kimberley NRM Plan (for further information, see Appendix 1). KARG then attracted funds to complete a Kimberley Aboriginal Caring for Country Plan.

Through extensive consultation and a review of caring for country activities in the Kimberley region, the authors found that there were a range of recurring themes emerging from successful programs, namely: access to country; right people for country; transmission of law, culture and language on country; respect for Indigenous rights and Indigenous knowledge; managing country; economic opportunities on country; governance on country, cultural blocs and regional Aboriginal organisations; information management for country; partnerships for caring for country; and protocols for caring for country. Within each theme the key issues, threats and pressures are identified. The Plan provides specific and in-depth evidence to support the connection between caring for country and broad reaching cultural, spiritual, social, political, environmental and economic benefits for the region.

River (freshwater) Country is one of four landscape types that are defined as organising concepts for the Plan. These ‘Country types’ were put forward in response to the Natural Resource Management (NRM) boundaries that had been decided on by the Federal Government. One of the high management priorities was to ‘Ensure the health of water sources (e.g. monitor water quality in river, jila and other waterholes, and control cattle’ (p. 89).
The Plan contains maps showing the location of Aboriginal communities in both the West and East Kimberley regions and the location of major cultural blocs. A central bloc identified in this report is the Fitzroy (Marawarra) Valley flowing west from the central Kimberley to the mouth of the Fitzroy, encompassing the following groups: Wangkatjungka, Walmajarri, Gooniyandi, Bunuba, Walmajarri, Nyikina Mangala. The authors argue that language has been a neglected aspect of NRM and that there is now a push to incorporate language into NRM practices:

*Cultural knowledge is bound in language and there is far more to it than the use of words from Aboriginal languages to identify plants and animals, or tell the stories associated with particular sites, cultural practices or the uses of natural resources. Knowledge transmitted through language is tied to places and people and how they relate, behave and live. It is part of a deeper understanding of how to manage Country appropriately through guardianship, resource use, upholding values and ensuring the health of Country. This is why Traditional Owners have identified language on Country as a priority for the Caring for Country Plan (p. 37).*


This project responded to the fact that although environmental flow assessments and allocations have been practiced in Australia for nearly 20 years, they had not effectively incorporated Indigenous values. The project team was particularly interested in examining how to adapt environmental flow assessments to better account for linkages and dependencies between people and rivers in the northern catchments, where earlier preliminary work in the Daly River (NT) had revealed significant relationships between Indigenous communities and their water bodies (Jackson 2004, Jackson 2006). Consistent with other TRaCK studies, this project covered parts of three large river systems in north Australia: the Daly (Northern Territory), Fitzroy (Western Australia) and Mitchell (Queensland). In the Fitzroy, the researchers worked with traditional owners and residents of Noonkanbah and Fitzroy Crossing (including Bayulu, Bungardi, Darlgunya, Junjuwa, Ngurtuwarta, Muladja). This research engaged with Bunuba, Gooniyandi, Walmajarri and Nyikina-Mangala speakers from the Fitzroy region.
This four-year study (commencing in 2007) had a number of components. Working with two communities in each catchment, the project team

(i) combined qualitative and quantitative methods to understand the spatial and temporal pattern of resource use, its social, cultural and economic significance to local communities and their economies, and the eco-hydrological dependencies of the wild aquatic resources consumed by Indigenous households;

(ii) devoted a significant effort to recording local ecological knowledge; reproduced in the multiple forms including seasonal calendars with a strong focus on resource availability during different seasons (see www.TRaCK.gov.au); and

(iii) trialled a monitoring program for one year with four Indigenous land management groups enhanced local capacity for wetland and river monitoring (with Gooniyandi in the Fitzroy).

An initial resource mapping exercise gathered data on the spatial and temporal distribution of Indigenous resource use, allowing potential relationships between important sites and flow to be determined. This provided an understanding of the distribution of harvesting sites, the species obtained and seasonal information on species availability, and in some cases site hydrology. To quantify Indigenous resource use a total of 82 households were surveyed twice every three months over a two year period (2009-10). A variety of methods was used to obtain the information required for the quantification of wild resource harvest and included direct observation, household surveys, resource use diaries, and doorstep accounting. The average number of households surveyed in the Fitzroy River was 36, representing 20% of indigenous households in the survey communities. The economic value of resources consumed by households was calculated using the replacement goods method (Altman 1987) where the market price of a proxy or substitute is used for products that do not have their own market value.

This report presents the quantitative results from the economic component of the project in order to estimate the value of aquatic resource use to participating communities and to attempt to assess the impacts of potential flow alteration on those values (see also Jackson et al. 2012; 2014). Results from the traditional knowledge component were published in Woodward et al. (2012), Liedloff et al. (2013), Woodward and McTaggart (2015). The authors argue that by more clearly understanding aquatic resource use and framing that knowledge within a hybrid economic model, a vital sphere of economic activity and its sociocultural significance is more fully revealed to decision-makers.
In all, 42 species are harvested across both catchments, with 20 species being common to both. The report presents data on
- Seasonal Pattern of Trips
- Preferred habitats
- Species Caught and Consumed in Highest Numbers
- Intra- and Inter-Community Distribution of Wild Resources
- Economic value of places and species

Species making the largest contribution to replacement value in the Fitzroy River were: Black Bream; Fork-tailed Catfish; Freshwater Sawfish; Barramundi; and Cherabin. Comparison of this data with the semi-quantitative assessment of the relative risks of freshwater fish to dry season water extraction in the Daly River (Pusey and Kennard 2009, Kennard et al. 2009), suggests that 3 of the 10 most valuable species in the Daly, and 4 of the 10 most valuable species in the Fitzroy, could be considered at high risk of impact under dry season water extraction scenario.

Investigations demonstrate that access to the aquatic habitats supporting species of economic importance to indigenous people and the maintenance of the seasonal wetting and drying that determine their availability are critical to maintaining a vibrant customary economy. It is therefore crucial for water allocation plans to be underpinned by a sound understanding of the composition of the indigenous customary harvest and its spatial and temporal patterns.

Given gaps in empirical knowledge, the authors were not in a position to quantify the potential effect of water use decisions and any consequent flow alterations on the economic value of indigenous wild resource harvest. However, they argue that conceptual models of the indigenous economy can assist in considering and balancing the likely impacts on indigenous livelihoods and further work published in Stoeckl et al. (2014) attempted to do this.

The results could be used to examine more closely the possible impacts of water use scenarios and to establish a baseline for assessing and monitoring the socio-economic impact of hydrological and ecological changes from water resource development (see Jackson et al. 2014).


This paper arises from the TRaCK study above (Jackson et al. 2011). Using data collected from household surveys across two catchments in northern Australia, the
Daly River, Northern Territory (NT) and the Fitzroy River, Western Australia (WA), this paper describes and compares indigenous aquatic resource use patterns. The authors describe the subsistence strategies that depend on seasonal availability of a wide array of aquatic species and are attuned to the life histories and movement patterns of key species, such as Long-necked Turtle (*Chelodina rugosa*) and Magpie Goose (*Anseranas semipalmata*). Indigenous households harvested resources from different habitats. Results pertaining to the Fitzroy show a constant reliance on the main river channel and tributaries in the Fitzroy River. Difference in the main species utilised appears strongly related to habitat use, with four of the five most commonly harvested in the Daly catchment being non-fish species associated with billabong habitats. Commonly harvested species from the Fitzroy catchment included small bodied species used as bait and two popular food species, Black Bream (*Hephaestus jenkinsi*) and Catfish (*Neoarius spp.*). Results suggest that indigenous subsistence strategies are vulnerable to changes in the natural systems that provide the “ecosystem goods,” particularly annual inundation of floodplains that drives productivity and provides habitat for some key species.


Paper arising from the TRaCK study above (Jackson et al. 2011). This paper explores the economic data obtained from household surveys and the implications for environmental assessment processes. It finds that more than 90% of the gross replacement value in each catchment, including the Fitzroy, was accounted for by a small subset of high value species which could be used as integrated indicators of ecological and socio-economic change. The total value of species harvested was distributed across a large number of sites, justifying the need for a regional management approach to ensure the maintenance of diverse habitats for hunting and fishing.


Not accessed for this review.

This paper outlines a novel approach in which indigenous ecological knowledge informs cause and effect relationships between species and aquatic habitats to promote broader ecosystem understanding. The paper drew on the knowledge of a group of Gooniyandi language speakers obtained previously by researchers to build a seasonal calendar (Jackson et al. 2011). In this paper, a Bayesian Network was developed to synthesise the seasonal Indigenous aquatic knowledge, including fish species' availability, condition and required habitat, and integrate it with hydrogeological understanding obtained from TRaCK research in a stretch of the Fitzroy River. This research, which was undertaken across most of the lower Fitzroy River catchment downstream of Fitzroy Crossing, also provided insights to the potential source aquifers for the groundwater discharge. One of the focus areas of the research was the main channel of the river between Fitzroy Crossing and Noonkanbah where tracer data provide unequivocal evidence for both shallow, local groundwater discharge and deep, old groundwater discharge into sections of the river (Gardner et al., 2011). Indigenous ecological and hydrological knowledge was recorded over a period of 18 months (2009-10) with 9 senior Gooniyandi language speakers during small meetings in Fitzroy Crossing and at surrounding wetlands, while on hunting, gathering or fishing trips. The information recorded during these interviews was distilled into a calendar that represents a single Gooniyandi perspective on the timing of key events in the landscape and social, cultural and economic life of Gooniyandi people. While seasonal calendars of indigenous knowledge have been used for relationship building, communication and education, the authors used the cause and effect relationships between species and aquatic habitats of the seasonal calendar to promote broader ecosystem understanding.

The authors found that potential changes in river flow rates caused by future water resource development, such as groundwater extraction and surface water diversion, may have detrimental effects on the ability to catch the high value aquatic food species such as Barramundi and Sawfish, but also that species such as Black Bream may benefit. These findings result from changes in availability of habitats at times when Gooniyandi understanding shows they are important for providing aquatic resources in good condition. The model developed in this study showed that both water extraction and surface water diversion will influence most of the aquatic species considered, based on indigenous ecological understanding and the worst case changes to flow as predicted by experts. As the predicted influence was seasonal and
affected different species at different times, all valued species must be considered in any water allocation management plan. Further, a range of additional species such as bait species must also be considered in future as these will influence those species higher up food chains. The authors argue that the study could be used as a basis for including Indigenous people in efforts to predict eco-hydrological changes. It was treated as a proof of concept study that aimed to evaluate the methodology, and the authors highlighted future model improvements and application to communicate the potential impacts of water development in the Fitzroy Catchment.

They acknowledge that the model does not currently contain all of the information needed to give a complete explanation of the impact of future water development on aquatic species as season (time of year) can be as important in determining animal behaviour, desirability and catchability as is the availability of habitat. Shifts in river flow outside of the broad seasonal changes may be of greater importance than habitat availability. In order to capture this level of detail in the model, researchers would be required to build a more detailed model for each species, such as was done by Chan et al. (2012) for the Daly River. In this study, the indigenous knowledge obtained for the seasonal calendar was not collected with the modelling task in mind, and was therefore somewhat restricted in what it could provide towards the BN. The authors also suggested that future work should involve evaluating the model with the indigenous experts involved in creating the seasonal calendars.


Morgan et al (2004, 2011), outline the plethora of Indigenous people’s language names and locations for fish assemblages and local flora in the Fitzroy River indicating not only people’s knowledge but also their familiarity with local environmental flows and interdependent fish and plant species.


CAEPR developed a sub-regional baseline profile for the Aboriginal population resident within the Fitzroy Valley. The profile was constructed in two phases. The first entailed a desktop exercise, collating information available in the public domain from
administrative datasets to cover the labour force status, education and training status, income, welfare, housing and health status of the population, as well as indicators of interaction with the welfare justice system. For each of these categories, the aim would be to quantify the main current characteristics of the Fitzroy Valley Aboriginal population and establish a time series where possible in order to gauge trends. This phase was not reported on in the Working Paper. The second phase, funded by a research grant from the Fitzroy Futures Forum involved the development of a population database of the resident Aboriginal population of the Valley, with some attention also to the wider Aboriginal ‘service’ population. Data were obtained from a household survey conducted in 2009 throughout the (more than 40) communities of the Valley, from Jimbalakudunj and Yungngora in the west to Yiyili and its satellite communities in the east.

The survey was designed to collect two different kinds of data. One aim was to carry out a comprehensive head count of the population and gather basic demographic information on age and sex. The second was to collect data that would begin to flesh out the picture of how that population lives as people. In proposing a categorisation of relationship to place that is more complex than the ‘resident’ versus ‘visitor’ distinction employed in the national census, the survey addresses the cultural factors that influence patterns of settlement and mobility, and the patterns of connection within and between the communities of the Valley. The authors state that

‘the regional identity of the Valley is founded in a complex interaction of topography, culture, history and current administrative arrangements... the Valley’s boundaries do not coincide neatly either with local government boundaries or with the various boundaries of the census geography. As with so many of the lines drawn on the map by the settler society, these boundaries bear no relation either to topography or to patterns of social interaction and economic activity on the ground (p.2).’

Building on recent thinking on ‘ethnographically informed demography’ (after Taylor), the analysis attends to the social organisation and attachment to customary estates as well as property relations among Indigenous groups. It is recommended as a planning tool.

The authors provide a very useful map depicting the language groups and settlements found within the Fitzroy Valley (see map 3.2, page 11), noting that the Valley ‘defines itself in terms of its constituent communities rather than on the basis of a bounded region’. This map shows clearly how the Fitzroy River and its tributaries dominate the topography of the Valley.

Report that discusses the cultural significance of sites in the Upper Fitzroy Valley to local Indigenous people, including the proposed dam site at Dimond Gorge. Not accessed for this review.


This report presents results from a scoping study - the primary objective of which was to conduct a ‘preliminary’ assessment of social and economic values associated with Australia’s tropical rivers. The scoping study included a community forum held in Derby in February 2006 to discuss the importance of northern rivers. This report formed the basis for a journal publication by Jackson et al. (2008).


A book chapter that describes the social and cultural significance of water to the Walmajari community living on the flood plain of the Fitzroy River and its tributaries at the edge of the Great Sandy Desert. In it Sullivan describes the current beliefs and activities of the Walmajari. Field work was conducted in 2000 and centred on a short period of research conducted in the vicinity of Yakanarra community, which is about 65 kilometres south-west of Fitzroy Crossing. Bush food is an important part of the community’s diet and a significant element of cultural identity. Fresh water sources are regarded as important for their food resources and recreation and are a pre-condition for establishment of small homeland communities. Historical fishing practices are described. The description of cultural attachment to water in this chapter shows how the *kalpurru* are the centre and source of all water and the animal species associated with it. Kalpurru are creatures of myth and ritual and through their actions formed the landscape of the Yakanarra area as well as features of the hydrological cycle. Some pools in the Fitzroy remain throughout the wet season and these can have mythological significance. Sullivan refers to a number of such pools as well as specific billabongs, claypans, soaks and other waterbodies that are culturally significant even though they dry out during the year. This chapter explores an
important foundational concept for the water cultures of the Indigenous communities of the Fitzroy Valley; that of jila or living water (see also papers by Sarah Yu).

Sullivan stresses the importance of cultural practice to the maintenance of Indigenous values and recommends cross cultural exchange around water management: ‘The environmental degradation witnessed during this survey is linked in Walmajarri thinking to the lack of proper cultural maintenance of water sources... One way of dealing with both Walmajarri and mainstream priorities would be to develop a programme of two-way environmental knowledge-sharing. It would be an opportunity to more clearly understand Aboriginal thinking on the nature of water and the regeneration of the land, and therefore the values that they would wish to see preserved in any proposals for water use. Secondly, it could lead to a programme of conservation of water sources and monitoring of the use of the land that could produce the regeneration that the people so much desire’. The author recommends an audit of pastoral station water sources to be undertaken by community members with local knowledge, enabling the identification of conservation measures for rivers and other water sources. At the same time appropriate cultural activities and practices could be renewed with the involvement of young adults.


A report to NAILSMA (funded by NAWFA) that focused on how well local governments, state governments and the Commonwealth government cooperate together to assist, encourage and support local self-management. The project took the approach of analysing the appropriate literature on Community-based NRM, particularly the Working on Country program, and current progressive scholarship in the theory of public administration. Recommendations were made to improve cooperation and support sustainable employment opportunities. It endorsed the establishment of a CMA for the Fitzroy noting that ‘One of the great strengths of FizCam was that it brought together individuals and factions that would otherwise not communicate’ (p. 15).


CAEPR Working Paper that contains a detailed profile of socioeconomic conditions in the West Kimberley region with a focus on the dynamics Indigenous labour demand and supply. It provides a statistical baseline against which any subsequent monitoring of development impacts can take place. Source: URL - [http://www.anu.edu.au/caepr/working.php](http://www.anu.edu.au/caepr/working.php)

The freshwater sawfish, Pristis microdon, is noted as an important ‘cultural and spiritual icon’ for a number of indigenous peoples throughout northern Australia, including those of the Fitzroy River valley: the Bunuba, Gooniyandi, Ngarinyin, Nyikina and Walmajarri peoples (Morgan et al. 2002, 2004). P. microdon, referred to as ‘galwanyi’ in Bunuba and Gooniyandi, ‘wirridanyniny’ in Nyikina, and ‘wirrdani’ in Walmajarri, is actively fished for from the Fitzroy Crossing area downstream to the confluence of the estuary with the sea near Derby. The authors argue that the cultural significance of P. microdon and its importance as a food source provide ‘additional incentive to focus on this species in the Fitzroy River, and ensure the sustainability of this iconic species as a food resource’ (2004: 8). The study did not attempt to establish water requirements of this species, however, the effect of barriers on the upstream migration of P. microdon was discussed.


The report provides a preliminary assessment of Fitzroy Valley Indigenous cultural values as these relate to water sources, especially major rivers such as the Fitzroy, Margaret and Hann. It refers to the expectation of a second stage inquiry.

It provides

- interpretations of the ecosystems within the Fitzroy Valley with particular reference to Aboriginal use of certain species of bush food and medicine) and seasonal activity (e.g. influence of the wet season, consequences when the river becomes high, problems when the water level drops);
- cultural significance of water with respect to familial, social, ceremonial, totemic, work, educative and recreational activities;
- the relationship between local groupings distinguished as 'the river people' and 'the desert people' (e.g. cultural and economic resource exchange, including knowledge and information about the river and its history);
- the relationship between water, plants, birds, animals, insects and humans;
• measures required to 'look after' or protect water resources; and
• consequences of negative impact of water loss or abundance (and Aboriginal explanations for these).

Recommendations are made to direct future work by the water agency, then the Water and Rivers Commission, in the region and to ensure the maintenance of water-related Indigenous cultural values. Eighteen recommendations focus on ‘the need for regular consultation with Indigenous groups, including by way of regional and local organisations and communities, the importance of emphasising cultural analysis and work practices when focusing on waters and rivers, and rehabilitation of the area surrounding the failed Camballin Irrigation Project’ (p 4). A negotiated Memorandum of Understanding (MOU) between Indigenous groups and the WRC with respect to waters and rivers in the Fitzroy Valley, and conservation measures which accord with Indigenous etiquette are also among the recommendations.

This very detailed report formed the basis of the paper by Toussaint et al (2005).


This paper is about Aboriginal relationships to water in northern Australia. The authors explore a range of local practices, beliefs and ideas that they characterise as ‘water ways’ to encompass the meanings embedded in both human activity and the water’s flow. Their ethnographic focus is primarily on Aboriginal relationships to the Fitzroy River.


This article examines Kimberley Indigenous and non-Indigenous people's attachments to place and culture from an anthropological perspective, with particular reference to recent conflicts over developing the water resources of the Fitzroy River. Toussaint finds that, in parallel with other Australian indigenous groups, ‘distinctions exist between salt and freshwater sources, and rivers and other forms of water (such as rain, and permanent or ephemeral waterways), continue to be conceptualised as having been inspired by the Dreaming’ (p 52).

Paper that investigates the complex attachments to the Fitzroy River manifested by local residents, conservationists, scientists and others as well as the conflict in values that emerged from the proposal to pipe water south. Contains some Indigenous landscape valuations that demonstrate a clear appreciation of seasonal changes in the flow and form of the Fitzroy. A number of cultural and social activities are described e.g. art production.

Toussaint, S 2014. *Fishing for Fish and for Jaminyjarti in Northern Aboriginal Australia, Oceania*, 84: 38–51

Paper that describes the central part that fishing plays in mourning rituals, particularly jaminyjarti, which relies on close kin regularly catching, cooking and sharing fish for bereaved family members during the ‘sorry business’ time that emerges after the death of a loved one. Toussaint uses this focus to illustrate how central are fish related activities to the past and present reproduction of cultural life and kinship.


This report to an LWA funded scoping study undertaken by Jackson and O’Leary (2005) provides a detailed account of rich cultural beliefs about the creation of the Fitzroy river and its tributaries, the riverine environment and the seasonal changes in the river country. It describes the cultural significance of the Fitzroy River as it travels through the traditional countries of many language groups. Yu states that...

...the complexity of cultural relationships to the river country has been further compounded by the historical relocation of desert groups on the station properties along the river. Whilst each group has distinct cultural responsibilities and articulates their relationship in varying ways, the groups are united through a system of Law that weaves together complex narratives and rituals required for the sustenance of the river country and its complex ecosystems. There is no single name for the river except marduwarra, which is a generic word for river. Rather, the Fitzroy River is conceptualised as series of linked narratives which arise from the many permanent pools along
Yu reminds us that Indigenous people in the Fitzroy valley of the Kimberley have experienced water resource developments and their environmental impacts. The Camballin Irrigation Project in the West Kimberley, developed in the 1960s, was conducted without regard for Indigenous interests and in this case environmental impacts have been felt by the Jarlmadangah Indigenous community (Yu 2000). As with many north Australian agricultural schemes, the project failed leaving an unrehabilitated landscape and abandoned infrastructure. Yu explains that the Traditional Owners of the Fitzroy valley have opposed more recent development proposals for dams and irrigated agriculture. Their actions should not be portrayed as anti-development, rather Yu argues that Traditional Owners wish to maintain the integrity of cultural management systems by linking customary and scientific approaches to land management strategies, and developing appropriate economic projects to engage and train their young people. They have participated in a number of projects with biophysical scientists to record their knowledge, learn and teach.

This report breaks the material into sections that provide insight into the cosmology of those groups on the 'Nygina side' from the lower Fitzroy, the ‘Ngarinyin side’ of the upper Fitzroy and the numerous desert groups. She elaborates on common cultural concepts such as named places, living water, conception sites, seasonal cycles, protecting water sources, working with scientists, documenting environmental change and planning for the future.


The draft report details an ethno-ecology and cultural mapping project in a study area referred to as Walangkarr Jirrkaliy, the catchment area of the Edgar Ranges and Geegully Creek. The project had the following aims: assessment of the 'health' of Walangkarr Jirrkaliy country with reference to previous and current Aboriginal management practices; baseline survey of flora and fauna; documentation of ecological processes (in Traditional Owner terms); expression of community aspirations for sustainable management of Walangkarr Jirrkaliy country.


Not yet obtained and reviewed.
Other sources: Websites, databases, films, posters, conference proceedings

Department of the Environment. Australian Heritage Database

A searchable database for heritage listed sites and sites under assessment for inclusion on the heritage list in Australia. A search on Fitzroy River finds information on: Geike Gorge (registered on the Register of the National Estate), Camballin Floodplain (indicative place), King Leopold Ranges (indicative place) and The West Kimberley (national heritage listing assessed in 2011).


A huge ten by eight metre canvas is painted by over 70 Aboriginal artists in the Great Sandy Desert. The painting then becomes the conduit to explain country and attachment in the Ngurarra title claim, including to water bodies.

Source: Mangkaja Arts, Fitzroy Crossing; KLC Library, Derby; Broome and Derby Public Libraries.

Centre for Fish and Fisheries Research – Murdoch University, Kimberley Land Council, Kimberley Language Resource Centre, Yiriman Project, Department of Agriculture and Food (WA), Natural Heritage Trust. Fishes of the Fitzroy River, Western Australia, and their Walmajarri names.

This poster contains pictures of fish species found in the Fitzroy River along with common English names and Walmajarri language names.


The Kimberley Water Forum was held in Broome on 13-14 March 2008. The forum brought together about 100 people from sectors such as government (state and federal), industry and community representatives, mostly from the region, to share information about State and Commonwealth water policy reforms, water planning

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3 These sources are not cited in the References.
and management processes, and water-related activities in the Kimberley. A number of presentations were made by Indigenous people of the Kimberley.


Proceedings contain presentations from a number of Indigenous leaders who were then participating in debates about water use, especially the damming of the Fitzroy e.g. Joe Ross, Wayne Bergman.

Hughes, J. (Director) (1999). River of Dreams - land, water, cotton and culture in the Kimberley

The film looks at the controversy over the large-scale cotton growing proposal in the West Kimberley and the plan to dam the Fitzroy River. Traditional Owners speak about their cultural connections to water and country. The film screened on SBS in October 1999.


The book introduces a significant collection of works about water by artists from Mangkaja Arts in Fitzroy Crossing.

National Native Title Tribunal. National Native Title Tribunal - resolution of native title issues over land and waters

Webpage that includes a searchable database of native title claims and determinations, Indigenous land use agreements etc.

References


Rumley, H., Barber, K., 2004. We Used to Get Our Water Free’: Identification and Protection of Aboriginal Cultural Values of the Pilbara Region. Water and Rivers Commission of Western Australia, Perth.


Appendix 1 Fitzroy Crossing and the lower catchment region of the Fitzroy River: Extract from Sullivan and Stacy (2012)⁴

Introduction

The Fitzroy River catchment is located in the central Kimberley region of Western Australia, comprising about 23% of the Kimberley region, and is estimated to be an area of over 95,000 km² (CENRM, 2010: 12). Fitzroy Crossing and Derby are the two centres within the catchment region, with a number of smaller communities spread throughout the region. While Derby is the bigger centre of the two, the prime interests in river management emerge from Fitzroy Crossing – additionally a number of Indigenous organizations are based in Fitzroy.

The catchment falls within three shires: Shire of Wyndham / East Kimberley; Shire of Halls Creek; and Shire of Derby / West Kimberley. Rangelands Natural Resource Management is the federally prescribed NRM body for the region and in 2007 Rangelands funded the Fitzroy Catchment Management Project (FitzCam). FitzCam was commissioned by Rangelands under NHT funding to produce the Fitzroy River Catchment Management Plan (CENRM, 2010: 6-8). The plan engaged with a number of Indigenous stakeholders and a working agreement was established between the Kimberley Land Council, Kimberley Aboriginal Law and Culture Centre, Kimberley Language Resource Centre, and Kimberley Aboriginal Pastoralists Incorporated.

There is an estimated population of approximately 7,000 people living within the region, with approximately 80% of the population identifying as Aboriginal or Torres Strait Islander (ABS, 2007). It should also be noted that Aboriginal and Torres Strait Islander populations are often underrepresented in census data due to the complexities of recording populations in remote regions.

Within the catchment region there are a number of language groups, including: Bunuba, Kija, Walmajarri, Wankatjunka, Gooniyandi, Nyikina, Western Jaru, Mangala, Worrowa, Andajin and Ngaranyin (Fitzroy River Catchment Management Plan, 2010).

There are a range of tenures present within the catchment region, including pastoral leases, native title and conservation reserves. A number of native title determinations connected to the catchment region including Noonkanbah, which is entirely within the region, and other determinations such as Ngurrara, which overlap the border of the catchment region (see Map 4). There are also five registered applications for native title within the catchment region.

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⁴ The original catchment profile contains a number of maps and tables that are not reproduced here.
The catchment falls within three shires: Shire of Wyndham / East Kimberley; Shire of Halls Creek; and Shire of Derby / West Kimberley. The Shire of Derby / West Kimberley is the governing authority in the western part of the catchment region, while the Shire of Halls Creek is the governing authority for the eastern part of the catchment region.

**Government structures for environmental management**

Rangelands NRM has played a key role in environmental management of the Fitzroy River through the Fitzroy River Catchment Management Plan. This incorporated relationships with a range of Commonwealth and State stakeholders, including: Department of Sustainability, Environment, Water, Population and Communities (SEWPAC); the Department of Agriculture and Food Western Australia (DAFWA), who run programs facilitating pastoral diversification and Indigenous pastoral support program; Department of Environment and Conservation (DEC), who are engaged in the joint management of Geikie Gorge national park; Department of Planning (Planning WA), who coordinate land-use in communities; and the Department of Water; Department of Fisheries.

**Community Involvement in Environmental Management**

The Fitzroy River Catchment Management Plan engaged with a number of Indigenous stakeholders, and in May 2008, a working agreement was reached between Kimberley Land Council, Kimberley Aboriginal Law and Culture Centre, Kimberley Language Resource Centre, and Kimberley Aboriginal Pastoralists Incorporated. The outcomes of this working agreement informed the Kimberley Aboriginal Caring for Country Plan (Griffiths and Kinnane, 2010). The Fitzroy River Catchment Management Plan endorsed the values expressed in the Caring for Country Plan.